

## LC User's Guide

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<b>1 CFS Limit Checker (LC) Documentation</b>	<b>2</b>
1.1 CFS Limit Checker Introduction . . . . .	2
1.2 CFS Limit Checker Overview . . . . .	3
1.2.1 Design Overview . . . . .	3
1.3 CFS Limit Checker Operation . . . . .	4
1.4 CFS Limit Checker Commands . . . . .	6
1.5 CFS Limit Checker Telemetry . . . . .	6
1.6 CFS Limit Checker Events . . . . .	6
1.7 CFS Limit Checker Deployment Guide . . . . .	6
1.8 CFS Limit Checker Configuration . . . . .	7
1.9 CFS Limit Checker Table Definitions . . . . .	7
1.10 CFS Limit Checker Operational Constraints . . . . .	8
1.11 CFS Limit Checker Frequently Asked Questions . . . . .	9
<b>2 Core Flight Executive Documentation</b>	<b>15</b>
2.1 Background . . . . .	16
2.1.1 Core Flight Executive (cFE) Goals . . . . .	17
2.2 Applicable Documents . . . . .	17
2.3 Version Numbers . . . . .	17
2.3.1 Version Number Semantics . . . . .	17
2.3.2 How and Where Defined . . . . .	18
2.3.3 Identifying Development Builds . . . . .	18
2.3.4 Templates for the short and long version string . . . . .	18
2.4 Dependencies . . . . .	19
2.5 Acronyms . . . . .	19
2.6 cFE Executive Services Overview . . . . .	20
2.6.1 Terminology . . . . .	21
2.6.2 Software Reset . . . . .	23
2.6.3 Reset Types and Subtypes . . . . .	24
2.6.4 Exception and Reset (ER) Log . . . . .	24
2.6.5 Application and Child Task Management . . . . .	24
2.6.6 Starting an Application . . . . .	25
2.6.7 Stopping an Application . . . . .	25
2.6.8 Restarting an Application . . . . .	25
2.6.9 Reloading an Application . . . . .	26
2.6.10 Listing Current Applications . . . . .	26
2.6.11 Listing Current Tasks . . . . .	27
2.6.12 Loading Common Libraries . . . . .	27
2.6.13 Basic File System . . . . .	27

2.6.14 Performance Data Collection . . . . .	27
2.6.15 Critical Data Store . . . . .	28
2.6.16 Memory Pool . . . . .	29
2.6.17 System Log . . . . .	31
2.6.18 Version Identification . . . . .	31
2.6.19 Frequently Asked Questions about Executive Services . . . . .	31
2.7 cFE Executive Services Commands . . . . .	32
2.8 cFE Executive Services Telemetry . . . . .	33
2.9 cFE Executive Services Configuration Parameters . . . . .	34
2.10 cFE Event Services Overview . . . . .	38
2.10.1 Event Message Format . . . . .	39
2.10.2 Local Event Log . . . . .	40
2.10.3 Event Message Control . . . . .	40
2.10.4 Event Message Filtering . . . . .	42
2.10.5 EVS Registry . . . . .	43
2.10.6 EVS Counters . . . . .	43
2.10.7 Resetting EVS Counters . . . . .	44
2.10.8 Effects of a Processor Reset on EVS . . . . .	44
2.10.9 EVS squelching of misbehaving apps . . . . .	45
2.10.10 Frequently Asked Questions about Event Services . . . . .	45
2.11 cFE Event Services Commands . . . . .	46
2.12 cFE Event Services Telemetry . . . . .	48
2.13 cFE Event Services Configuration Parameters . . . . .	48
2.14 cFE Software Bus Overview . . . . .	49
2.14.1 Software Bus Terminology . . . . .	50
2.14.2 Autonomous Actions . . . . .	51
2.14.3 Operation of the SB Software . . . . .	52
2.14.4 Frequently Asked Questions about Software Bus . . . . .	55
2.15 cFE Software Bus Commands . . . . .	56
2.16 cFE Software Bus Telemetry . . . . .	57
2.17 cFE Software Bus Configuration Parameters . . . . .	58
2.18 cFE Table Services Overview . . . . .	59
2.18.1 Managing Tables . . . . .	59
2.18.2 cFE Table Types and Table Options . . . . .	60
2.18.3 Table Registry . . . . .	62
2.18.4 Table Services Telemetry . . . . .	63
2.18.5 Effects of Processor Reset on Tables . . . . .	63
2.18.6 Frequently Asked Questions about Table Services . . . . .	63
2.19 cFE Table Services Commands . . . . .	65

---

2.20 cFE Table Services Telemetry . . . . .	65
2.21 cFE Table Services Configuration Parameters . . . . .	66
2.22 cFE Time Services Overview . . . . .	67
2.22.1 Time Components . . . . .	69
2.22.2 Time Structure . . . . .	69
2.22.3 Time Formats . . . . .	70
2.22.4 Time Configuration . . . . .	70
2.22.5 Time Format Selection . . . . .	75
2.22.6 Enabling Fake Tone Signal . . . . .	75
2.22.7 Selecting Tone and Data Ordering . . . . .	75
2.22.8 Specifying Tone and Data Window . . . . .	76
2.22.9 Specifying Time Server/Client . . . . .	76
2.22.10 Specifying Time Tone Byte Order . . . . .	76
2.22.11 Virtual MET . . . . .	77
2.22.12 Specifying Time Source . . . . .	77
2.22.13 Specifying Time Signal . . . . .	78
2.22.14 Time Services Paradigm(s) . . . . .	78
2.22.15 Flywheeling . . . . .	79
2.22.16 Time State . . . . .	79
2.22.17 Initialization . . . . .	79
2.22.18 Power-On Reset . . . . .	80
2.22.19 Processor Reset . . . . .	80
2.22.20 Initialization . . . . .	81
2.22.21 Power-On Reset . . . . .	81
2.22.22 Processor Reset . . . . .	82
2.22.23 Normal Operation . . . . .	82
2.22.24 Client . . . . .	84
2.22.25 Server . . . . .	84
2.22.26 Setting Time . . . . .	85
2.22.27 Adjusting Time . . . . .	86
2.22.28 Setting MET . . . . .	86
2.22.29 Frequently Asked Questions about Time Services . . . . .	86
2.23 cFE Time Services Commands . . . . .	86
2.24 cFE Time Services Telemetry . . . . .	87
2.25 cFE Time Services Configuration Parameters . . . . .	88
2.26 cFE Event Message Cross Reference . . . . .	89
2.27 cFE Command Mnemonic Cross Reference . . . . .	89
2.28 cFE Telemetry Mnemonic Cross Reference . . . . .	93

<b>3 Glossary of Terms</b>	<b>104</b>
<b>4 cFE Application Programmer's Interface (API) Reference</b>	<b>105</b>
4.1 Executive Services API . . . . .	105
4.2 Events Services API . . . . .	107
4.3 File Services API . . . . .	108
4.4 Message API . . . . .	108
4.5 Resource ID API . . . . .	109
4.6 Software Bus Services API . . . . .	109
4.7 Table Services API . . . . .	110
4.8 Time Services API . . . . .	111
<b>5 Osal API Documentation</b>	<b>112</b>
5.1 OSAL Introduction . . . . .	113
5.2 File System Overview . . . . .	114
5.3 File Descriptors In Osal . . . . .	114
5.4 Timer Overview . . . . .	115
<b>6 cFE Mission Configuration Parameters</b>	<b>115</b>
<b>7 Module Index</b>	<b>116</b>
7.1 Modules . . . . .	116
<b>8 Data Structure Index</b>	<b>119</b>
8.1 Data Structures . . . . .	119
<b>9 File Index</b>	<b>129</b>
9.1 File List . . . . .	129
<b>10 Module Documentation</b>	<b>135</b>
10.1 CFS Limit Checker Event IDs . . . . .	135
10.1.1 Detailed Description . . . . .	138
10.1.2 Macro Definition Documentation . . . . .	138
10.2 CFS Limit Checker Version . . . . .	158
10.2.1 Detailed Description . . . . .	158
10.2.2 Macro Definition Documentation . . . . .	158
10.3 CFS Limit Checker Command Codes . . . . .	159
10.3.1 Detailed Description . . . . .	159
10.3.2 Macro Definition Documentation . . . . .	159
10.4 CFS Limit Checker Mission Configuration . . . . .	165
10.4.1 Detailed Description . . . . .	165
10.4.2 Macro Definition Documentation . . . . .	165

---

10.5 CFS Limit Checker Platform Configuration . . . . .	168
10.5.1 Detailed Description . . . . .	168
10.5.2 Macro Definition Documentation . . . . .	168
10.6 CFS Limit Checker Command Message IDs . . . . .	172
10.6.1 Detailed Description . . . . .	172
10.6.2 Macro Definition Documentation . . . . .	172
10.7 CFS Limit Checker Telemetry Message IDs . . . . .	173
10.7.1 Detailed Description . . . . .	173
10.7.2 Macro Definition Documentation . . . . .	173
10.8 CFS Limit Checker Command Structures . . . . .	174
10.8.1 Detailed Description . . . . .	174
10.9 CFS Limit Checker Telemetry . . . . .	175
10.9.1 Detailed Description . . . . .	175
10.10 cFE Return Code Defines . . . . .	176
10.10.1 Detailed Description . . . . .	181
10.10.2 Macro Definition Documentation . . . . .	181
10.11 cFE Resource ID APIs . . . . .	199
10.11.1 Detailed Description . . . . .	199
10.11.2 Function Documentation . . . . .	199
10.12 cFE Entry/Exit APIs . . . . .	202
10.12.1 Detailed Description . . . . .	202
10.12.2 Function Documentation . . . . .	202
10.13 cFE Application Control APIs . . . . .	204
10.13.1 Detailed Description . . . . .	204
10.13.2 Function Documentation . . . . .	204
10.14 cFE Application Behavior APIs . . . . .	207
10.14.1 Detailed Description . . . . .	207
10.14.2 Function Documentation . . . . .	207
10.15 cFE Information APIs . . . . .	211
10.15.1 Detailed Description . . . . .	211
10.15.2 Function Documentation . . . . .	211
10.16 cFE Child Task APIs . . . . .	220
10.16.1 Detailed Description . . . . .	220
10.16.2 Function Documentation . . . . .	220
10.17 cFE Miscellaneous APIs . . . . .	224
10.17.1 Detailed Description . . . . .	224
10.17.2 Function Documentation . . . . .	224
10.18 cFE Critical Data Store APIs . . . . .	227
10.18.1 Detailed Description . . . . .	227

10.18.2 Function Documentation . . . . .	227
10.19 cFE Memory Manager APIs . . . . .	232
10.19.1 Detailed Description . . . . .	232
10.19.2 Function Documentation . . . . .	232
10.20 cFE Performance Monitor APIs . . . . .	239
10.20.1 Detailed Description . . . . .	239
10.20.2 Macro Definition Documentation . . . . .	239
10.20.3 Function Documentation . . . . .	240
10.21 cFE Generic Counter APIs . . . . .	241
10.21.1 Detailed Description . . . . .	241
10.21.2 Function Documentation . . . . .	241
10.22 cFE Registration APIs . . . . .	247
10.22.1 Detailed Description . . . . .	247
10.22.2 Function Documentation . . . . .	247
10.23 cFE Send Event APIs . . . . .	249
10.23.1 Detailed Description . . . . .	249
10.23.2 Function Documentation . . . . .	249
10.24 cFE Reset Event Filter APIs . . . . .	254
10.24.1 Detailed Description . . . . .	254
10.24.2 Function Documentation . . . . .	254
10.25 cFE File Header Management APIs . . . . .	256
10.25.1 Detailed Description . . . . .	256
10.25.2 Function Documentation . . . . .	256
10.26 cFE File Utility APIs . . . . .	260
10.26.1 Detailed Description . . . . .	260
10.26.2 Function Documentation . . . . .	260
10.27 cFE Generic Message APIs . . . . .	265
10.27.1 Detailed Description . . . . .	265
10.27.2 Function Documentation . . . . .	265
10.28 cFE Message Primary Header APIs . . . . .	266
10.28.1 Detailed Description . . . . .	266
10.28.2 Function Documentation . . . . .	266
10.29 cFE Message Extended Header APIs . . . . .	275
10.29.1 Detailed Description . . . . .	275
10.29.2 Function Documentation . . . . .	275
10.30 cFE Message Secondary Header APIs . . . . .	281
10.30.1 Detailed Description . . . . .	281
10.30.2 Function Documentation . . . . .	281
10.31 cFE Message Id APIs . . . . .	286

---

10.31.1 Detailed Description . . . . .	286
10.31.2 Function Documentation . . . . .	286
10.32 cFE Message Integrity APIs . . . . .	288
10.32.1 Detailed Description . . . . .	288
10.32.2 Function Documentation . . . . .	288
10.33 cFE Pipe Management APIs . . . . .	290
10.33.1 Detailed Description . . . . .	290
10.33.2 Function Documentation . . . . .	290
10.34 cFE Message Subscription Control APIs . . . . .	295
10.34.1 Detailed Description . . . . .	295
10.34.2 Function Documentation . . . . .	295
10.35 cFE Send/Receive Message APIs . . . . .	300
10.35.1 Detailed Description . . . . .	300
10.35.2 Function Documentation . . . . .	300
10.36 cFE Zero Copy APIs . . . . .	303
10.36.1 Detailed Description . . . . .	303
10.36.2 Function Documentation . . . . .	303
10.37 cFE Message Characteristics APIs . . . . .	306
10.37.1 Detailed Description . . . . .	306
10.37.2 Function Documentation . . . . .	306
10.38 cFE Message ID APIs . . . . .	311
10.38.1 Detailed Description . . . . .	311
10.38.2 Function Documentation . . . . .	311
10.39 cFE SB Pipe options . . . . .	316
10.39.1 Detailed Description . . . . .	316
10.39.2 Macro Definition Documentation . . . . .	316
10.40 cFE Registration APIs . . . . .	317
10.40.1 Detailed Description . . . . .	317
10.40.2 Function Documentation . . . . .	317
10.41 cFE Manage Table Content APIs . . . . .	322
10.41.1 Detailed Description . . . . .	322
10.41.2 Function Documentation . . . . .	322
10.42 cFE Access Table Content APIs . . . . .	328
10.42.1 Detailed Description . . . . .	328
10.42.2 Function Documentation . . . . .	328
10.43 cFE Get Table Information APIs . . . . .	333
10.43.1 Detailed Description . . . . .	333
10.43.2 Function Documentation . . . . .	333
10.44 cFE Table Type Defines . . . . .	336

10.44.1 Detailed Description . . . . .	336
10.44.2 Macro Definition Documentation . . . . .	336
10.45 cFE Get Current Time APIs . . . . .	338
10.45.1 Detailed Description . . . . .	338
10.45.2 Function Documentation . . . . .	338
10.46 cFE Get Time Information APIs . . . . .	341
10.46.1 Detailed Description . . . . .	341
10.46.2 Function Documentation . . . . .	341
10.47 cFE Time Arithmetic APIs . . . . .	344
10.47.1 Detailed Description . . . . .	344
10.47.2 Function Documentation . . . . .	344
10.48 cFE Time Conversion APIs . . . . .	347
10.48.1 Detailed Description . . . . .	347
10.48.2 Function Documentation . . . . .	347
10.49 cFE External Time Source APIs . . . . .	349
10.49.1 Detailed Description . . . . .	349
10.49.2 Function Documentation . . . . .	349
10.50 cFE Miscellaneous Time APIs . . . . .	354
10.50.1 Detailed Description . . . . .	354
10.50.2 Function Documentation . . . . .	354
10.51 cFE Resource ID base values . . . . .	357
10.51.1 Detailed Description . . . . .	357
10.51.2 Enumeration Type Documentation . . . . .	357
10.52 cFE Clock State Flag Defines . . . . .	359
10.52.1 Detailed Description . . . . .	359
10.52.2 Macro Definition Documentation . . . . .	359
10.53 OSAL Semaphore State Defines . . . . .	361
10.53.1 Detailed Description . . . . .	361
10.53.2 Macro Definition Documentation . . . . .	361
10.54 OSAL Binary Semaphore APIs . . . . .	362
10.54.1 Detailed Description . . . . .	362
10.54.2 Function Documentation . . . . .	362
10.55 OSAL BSP low level access APIs . . . . .	367
10.55.1 Detailed Description . . . . .	367
10.55.2 Function Documentation . . . . .	367
10.56 OSAL Real Time Clock APIs . . . . .	368
10.56.1 Detailed Description . . . . .	369
10.56.2 Function Documentation . . . . .	369
10.57 OSAL Core Operation APIs . . . . .	379

---

10.57.1 Detailed Description . . . . .	379
10.57.2 Function Documentation . . . . .	379
10.58 OSAL Condition Variable APIs . . . . .	382
10.58.1 Detailed Description . . . . .	382
10.58.2 Function Documentation . . . . .	382
10.59 OSAL Counting Semaphore APIs . . . . .	388
10.59.1 Detailed Description . . . . .	388
10.59.2 Function Documentation . . . . .	388
10.60 OSAL Directory APIs . . . . .	393
10.60.1 Detailed Description . . . . .	393
10.60.2 Function Documentation . . . . .	393
10.61 OSAL Return Code Defines . . . . .	397
10.61.1 Detailed Description . . . . .	399
10.61.2 Macro Definition Documentation . . . . .	399
10.62 OSAL Error Info APIs . . . . .	404
10.62.1 Detailed Description . . . . .	404
10.62.2 Function Documentation . . . . .	404
10.63 OSAL File Access Option Defines . . . . .	406
10.63.1 Detailed Description . . . . .	406
10.63.2 Macro Definition Documentation . . . . .	406
10.64 OSAL Reference Point For Seek Offset Defines . . . . .	407
10.64.1 Detailed Description . . . . .	407
10.64.2 Macro Definition Documentation . . . . .	407
10.65 OSAL Standard File APIs . . . . .	408
10.65.1 Detailed Description . . . . .	408
10.65.2 Function Documentation . . . . .	408
10.66 OSAL File System Level APIs . . . . .	419
10.66.1 Detailed Description . . . . .	419
10.66.2 Function Documentation . . . . .	419
10.67 OSAL Heap APIs . . . . .	427
10.67.1 Detailed Description . . . . .	427
10.67.2 Function Documentation . . . . .	427
10.68 OSAL Object Type Defines . . . . .	428
10.68.1 Detailed Description . . . . .	428
10.68.2 Macro Definition Documentation . . . . .	428
10.69 OSAL Object ID Utility APIs . . . . .	431
10.69.1 Detailed Description . . . . .	431
10.69.2 Function Documentation . . . . .	431
10.70 OSAL Dynamic Loader and Symbol APIs . . . . .	436

---

10.70.1 Detailed Description . . . . .	436
10.70.2 Function Documentation . . . . .	436
10.71 OSAL Mutex APIs . . . . .	440
10.71.1 Detailed Description . . . . .	440
10.71.2 Function Documentation . . . . .	440
10.72 OSAL Network ID APIs . . . . .	444
10.72.1 Detailed Description . . . . .	444
10.72.2 Function Documentation . . . . .	444
10.73 OSAL Printf APIs . . . . .	446
10.73.1 Detailed Description . . . . .	446
10.73.2 Function Documentation . . . . .	446
10.74 OSAL Message Queue APIs . . . . .	447
10.74.1 Detailed Description . . . . .	447
10.74.2 Function Documentation . . . . .	447
10.75 OSAL Select APIs . . . . .	451
10.75.1 Detailed Description . . . . .	451
10.75.2 Function Documentation . . . . .	451
10.76 OSAL Shell APIs . . . . .	455
10.76.1 Detailed Description . . . . .	455
10.76.2 Function Documentation . . . . .	455
10.77 OSAL Socket Address APIs . . . . .	456
10.77.1 Detailed Description . . . . .	456
10.77.2 Function Documentation . . . . .	456
10.78 OSAL Socket Management APIs . . . . .	460
10.78.1 Detailed Description . . . . .	460
10.78.2 Function Documentation . . . . .	460
10.79 OSAL Task APIs . . . . .	468
10.79.1 Detailed Description . . . . .	468
10.79.2 Function Documentation . . . . .	468
10.80 OSAL Time Base APIs . . . . .	474
10.80.1 Detailed Description . . . . .	474
10.80.2 Function Documentation . . . . .	474
10.81 OSAL Timer APIs . . . . .	479
10.81.1 Detailed Description . . . . .	479
10.81.2 Function Documentation . . . . .	479
<b>11 Data Structure Documentation</b>	<b>485</b>
11.1 CCSDS_ExtendedHeader Struct Reference . . . . .	485
11.1.1 Detailed Description . . . . .	485

---

11.1.2 Field Documentation . . . . .	485
11.2 CCSDS_PrimaryHeader Struct Reference . . . . .	485
11.2.1 Detailed Description . . . . .	485
11.2.2 Field Documentation . . . . .	486
11.3 CFE_ES_AppInfo Struct Reference . . . . .	486
11.3.1 Detailed Description . . . . .	487
11.3.2 Field Documentation . . . . .	487
11.4 CFE_ES_AppNameCmd_Payload Struct Reference . . . . .	490
11.4.1 Detailed Description . . . . .	490
11.4.2 Field Documentation . . . . .	490
11.5 CFE_ES_AppReloadCmd_Payload Struct Reference . . . . .	490
11.5.1 Detailed Description . . . . .	491
11.5.2 Field Documentation . . . . .	491
11.6 CFE_ES_BlockStats Struct Reference . . . . .	491
11.6.1 Detailed Description . . . . .	491
11.6.2 Field Documentation . . . . .	491
11.7 CFE_ES_CDSRegDumpRec Struct Reference . . . . .	492
11.7.1 Detailed Description . . . . .	492
11.7.2 Field Documentation . . . . .	492
11.8 CFE_ES_ClearERLogCmd Struct Reference . . . . .	493
11.8.1 Detailed Description . . . . .	493
11.8.2 Field Documentation . . . . .	493
11.9 CFE_ES_ClearSysLogCmd Struct Reference . . . . .	493
11.9.1 Detailed Description . . . . .	494
11.9.2 Field Documentation . . . . .	494
11.10 CFE_ES_DeleteCDSCmd Struct Reference . . . . .	494
11.10.1 Detailed Description . . . . .	494
11.10.2 Field Documentation . . . . .	494
11.11 CFE_ES_DeleteCDSCmd_Payload Struct Reference . . . . .	495
11.11.1 Detailed Description . . . . .	495
11.11.2 Field Documentation . . . . .	495
11.12 CFE_ES_DumpCDSRegistryCmd Struct Reference . . . . .	495
11.12.1 Detailed Description . . . . .	495
11.12.2 Field Documentation . . . . .	495
11.13 CFE_ES_DumpCDSRegistryCmd_Payload Struct Reference . . . . .	496
11.13.1 Detailed Description . . . . .	496
11.13.2 Field Documentation . . . . .	496
11.14 CFE_ES_FileNameCmd Struct Reference . . . . .	496
11.14.1 Detailed Description . . . . .	496

11.14.2 Field Documentation . . . . .	496
11.15 CFE_ES_FileNameCmd_Payload Struct Reference . . . . .	497
11.15.1 Detailed Description . . . . .	497
11.15.2 Field Documentation . . . . .	497
11.16 CFE_ES_HousekeepingTlm Struct Reference . . . . .	497
11.16.1 Detailed Description . . . . .	497
11.16.2 Field Documentation . . . . .	498
11.17 CFE_ES_HousekeepingTlm_Payload Struct Reference . . . . .	498
11.17.1 Detailed Description . . . . .	500
11.17.2 Field Documentation . . . . .	500
11.18 CFE_ES_MemPoolStats Struct Reference . . . . .	506
11.18.1 Detailed Description . . . . .	506
11.18.2 Field Documentation . . . . .	507
11.19 CFE_ES_MemStatsTlm Struct Reference . . . . .	507
11.19.1 Detailed Description . . . . .	508
11.19.2 Field Documentation . . . . .	508
11.20 CFE_ES_NoopCmd Struct Reference . . . . .	508
11.20.1 Detailed Description . . . . .	508
11.20.2 Field Documentation . . . . .	508
11.21 CFE_ES_OneAppTlm Struct Reference . . . . .	508
11.21.1 Detailed Description . . . . .	509
11.21.2 Field Documentation . . . . .	509
11.22 CFE_ES_OneAppTlm_Payload Struct Reference . . . . .	509
11.22.1 Detailed Description . . . . .	509
11.22.2 Field Documentation . . . . .	509
11.23 CFE_ES_OverWriteSysLogCmd Struct Reference . . . . .	509
11.23.1 Detailed Description . . . . .	510
11.23.2 Field Documentation . . . . .	510
11.24 CFE_ES_OverWriteSysLogCmd_Payload Struct Reference . . . . .	510
11.24.1 Detailed Description . . . . .	510
11.24.2 Field Documentation . . . . .	510
11.25 CFE_ES_PoolAlign Union Reference . . . . .	511
11.25.1 Detailed Description . . . . .	511
11.25.2 Field Documentation . . . . .	511
11.26 CFE_ES_PoolStatsTlm_Payload Struct Reference . . . . .	511
11.26.1 Detailed Description . . . . .	512
11.26.2 Field Documentation . . . . .	512
11.27 CFE_ES_QueryAllCmd Struct Reference . . . . .	512
11.27.1 Detailed Description . . . . .	512

---

11.27.2 Field Documentation . . . . .	512
11.28 CFE_ES_QueryAllTasksCmd Struct Reference . . . . .	513
11.28.1 Detailed Description . . . . .	513
11.28.2 Field Documentation . . . . .	513
11.29 CFE_ES_QueryOneCmd Struct Reference . . . . .	513
11.29.1 Detailed Description . . . . .	513
11.29.2 Field Documentation . . . . .	513
11.30 CFE_ES_ReloadAppCmd Struct Reference . . . . .	514
11.30.1 Detailed Description . . . . .	514
11.30.2 Field Documentation . . . . .	514
11.31 CFE_ES_ResetCountersCmd Struct Reference . . . . .	514
11.31.1 Detailed Description . . . . .	514
11.31.2 Field Documentation . . . . .	515
11.32 CFE_ES_ResetPRCountCmd Struct Reference . . . . .	515
11.32.1 Detailed Description . . . . .	515
11.32.2 Field Documentation . . . . .	515
11.33 CFE_ES_RestartAppCmd Struct Reference . . . . .	515
11.33.1 Detailed Description . . . . .	515
11.33.2 Field Documentation . . . . .	515
11.34 CFE_ES_RestartCmd Struct Reference . . . . .	516
11.34.1 Detailed Description . . . . .	516
11.34.2 Field Documentation . . . . .	516
11.35 CFE_ES_RestartCmd_Payload Struct Reference . . . . .	516
11.35.1 Detailed Description . . . . .	517
11.35.2 Field Documentation . . . . .	517
11.36 CFE_ES_SendHkCmd Struct Reference . . . . .	517
11.36.1 Detailed Description . . . . .	517
11.36.2 Field Documentation . . . . .	517
11.37 CFE_ES_SendMemPoolStatsCmd Struct Reference . . . . .	517
11.37.1 Detailed Description . . . . .	518
11.37.2 Field Documentation . . . . .	518
11.38 CFE_ES_SendMemPoolStatsCmd_Payload Struct Reference . . . . .	518
11.38.1 Detailed Description . . . . .	518
11.38.2 Field Documentation . . . . .	518
11.39 CFE_ES_SetMaxPRCountCmd Struct Reference . . . . .	519
11.39.1 Detailed Description . . . . .	519
11.39.2 Field Documentation . . . . .	519
11.40 CFE_ES_SetMaxPRCountCmd_Payload Struct Reference . . . . .	519
11.40.1 Detailed Description . . . . .	519

11.40.2 Field Documentation . . . . .	519
11.41 CFE_ES_SetPerfFilterMaskCmd Struct Reference . . . . .	520
11.41.1 Detailed Description . . . . .	520
11.41.2 Field Documentation . . . . .	520
11.42 CFE_ES_SetPerfFilterMaskCmd_Payload Struct Reference . . . . .	520
11.42.1 Detailed Description . . . . .	521
11.42.2 Field Documentation . . . . .	521
11.43 CFE_ES_SetPerfTriggerMaskCmd Struct Reference . . . . .	521
11.43.1 Detailed Description . . . . .	521
11.43.2 Field Documentation . . . . .	521
11.44 CFE_ES_SetPerfTrigMaskCmd_Payload Struct Reference . . . . .	522
11.44.1 Detailed Description . . . . .	522
11.44.2 Field Documentation . . . . .	522
11.45 CFE_ES_StartApp Struct Reference . . . . .	522
11.45.1 Detailed Description . . . . .	522
11.45.2 Field Documentation . . . . .	522
11.46 CFE_ES_StartAppCmd_Payload Struct Reference . . . . .	523
11.46.1 Detailed Description . . . . .	523
11.46.2 Field Documentation . . . . .	523
11.47 CFE_ES_StartPerfCmd_Payload Struct Reference . . . . .	524
11.47.1 Detailed Description . . . . .	524
11.47.2 Field Documentation . . . . .	524
11.48 CFE_ES_StartPerfDataCmd Struct Reference . . . . .	524
11.48.1 Detailed Description . . . . .	525
11.48.2 Field Documentation . . . . .	525
11.49 CFE_ES_StopAppCmd Struct Reference . . . . .	525
11.49.1 Detailed Description . . . . .	525
11.49.2 Field Documentation . . . . .	525
11.50 CFE_ES_StopPerfCmd_Payload Struct Reference . . . . .	526
11.50.1 Detailed Description . . . . .	526
11.50.2 Field Documentation . . . . .	526
11.51 CFE_ES_StopPerfDataCmd Struct Reference . . . . .	526
11.51.1 Detailed Description . . . . .	526
11.51.2 Field Documentation . . . . .	526
11.52 CFE_ES_TaskInfo Struct Reference . . . . .	527
11.52.1 Detailed Description . . . . .	527
11.52.2 Field Documentation . . . . .	527
11.53 CFE_ES_WriteERLogCmd Struct Reference . . . . .	528
11.53.1 Detailed Description . . . . .	528

---

11.53.2 Field Documentation . . . . .	529
11.54 CFE_ES_WriteSysLogCmd Struct Reference . . . . .	529
11.54.1 Detailed Description . . . . .	529
11.54.2 Field Documentation . . . . .	529
11.55 CFE_EVS_AddEventFilterCmd Struct Reference . . . . .	529
11.55.1 Detailed Description . . . . .	530
11.55.2 Field Documentation . . . . .	530
11.56 CFE_EVS_AppDataCmd_Payload Struct Reference . . . . .	530
11.56.1 Detailed Description . . . . .	530
11.56.2 Field Documentation . . . . .	530
11.57 CFE_EVS_AppNameBitMaskCmd_Payload Struct Reference . . . . .	531
11.57.1 Detailed Description . . . . .	531
11.57.2 Field Documentation . . . . .	531
11.58 CFE_EVS_AppNameCmd_Payload Struct Reference . . . . .	531
11.58.1 Detailed Description . . . . .	532
11.58.2 Field Documentation . . . . .	532
11.59 CFE_EVS_AppNameEventIDCmd_Payload Struct Reference . . . . .	532
11.59.1 Detailed Description . . . . .	532
11.59.2 Field Documentation . . . . .	532
11.60 CFE_EVS_AppNameEventIDMaskCmd_Payload Struct Reference . . . . .	532
11.60.1 Detailed Description . . . . .	533
11.60.2 Field Documentation . . . . .	533
11.61 CFE_EVS_AppTimData Struct Reference . . . . .	533
11.61.1 Detailed Description . . . . .	534
11.61.2 Field Documentation . . . . .	534
11.62 CFE_EVS_BinFilter Struct Reference . . . . .	534
11.62.1 Detailed Description . . . . .	535
11.62.2 Field Documentation . . . . .	535
11.63 CFE_EVS_BitMaskCmd_Payload Struct Reference . . . . .	535
11.63.1 Detailed Description . . . . .	535
11.63.2 Field Documentation . . . . .	535
11.64 CFE_EVS_ClearLogCmd Struct Reference . . . . .	536
11.64.1 Detailed Description . . . . .	536
11.64.2 Field Documentation . . . . .	536
11.65 CFE_EVS_DeleteEventFilterCmd Struct Reference . . . . .	536
11.65.1 Detailed Description . . . . .	536
11.65.2 Field Documentation . . . . .	536
11.66 CFE_EVS_DisableAppEventsCmd Struct Reference . . . . .	537
11.66.1 Detailed Description . . . . .	537

11.66.2 Field Documentation . . . . .	537
11.67 CFE_EVS_DisableAppEventTypeCmd Struct Reference . . . . .	537
11.67.1 Detailed Description . . . . .	537
11.67.2 Field Documentation . . . . .	537
11.68 CFE_EVS_DisableEventTypeCmd Struct Reference . . . . .	538
11.68.1 Detailed Description . . . . .	538
11.68.2 Field Documentation . . . . .	538
11.69 CFE_EVS_DisablePortsCmd Struct Reference . . . . .	538
11.69.1 Detailed Description . . . . .	538
11.69.2 Field Documentation . . . . .	539
11.70 CFE_EVS_EnableAppEventsCmd Struct Reference . . . . .	539
11.70.1 Detailed Description . . . . .	539
11.70.2 Field Documentation . . . . .	539
11.71 CFE_EVS_EnableAppEventTypeCmd Struct Reference . . . . .	539
11.71.1 Detailed Description . . . . .	540
11.71.2 Field Documentation . . . . .	540
11.72 CFE_EVS_EnableEventTypeCmd Struct Reference . . . . .	540
11.72.1 Detailed Description . . . . .	540
11.72.2 Field Documentation . . . . .	540
11.73 CFE_EVS_EnablePortsCmd Struct Reference . . . . .	541
11.73.1 Detailed Description . . . . .	541
11.73.2 Field Documentation . . . . .	541
11.74 CFE_EVS_HousekeepingTlm Struct Reference . . . . .	541
11.74.1 Detailed Description . . . . .	541
11.74.2 Field Documentation . . . . .	542
11.75 CFE_EVS_HousekeepingTlm_Payload Struct Reference . . . . .	542
11.75.1 Detailed Description . . . . .	543
11.75.2 Field Documentation . . . . .	543
11.76 CFE_EVS_LogFileCmd_Payload Struct Reference . . . . .	545
11.76.1 Detailed Description . . . . .	545
11.76.2 Field Documentation . . . . .	545
11.77 CFE_EVS_LongEventTlm Struct Reference . . . . .	545
11.77.1 Detailed Description . . . . .	546
11.77.2 Field Documentation . . . . .	546
11.78 CFE_EVS_LongEventTlm_Payload Struct Reference . . . . .	546
11.78.1 Detailed Description . . . . .	546
11.78.2 Field Documentation . . . . .	546
11.79 CFE_EVS_NoopCmd Struct Reference . . . . .	547
11.79.1 Detailed Description . . . . .	547

---

11.79.2 Field Documentation . . . . .	547
11.80 CFE_EVS_PacketID Struct Reference . . . . .	547
11.80.1 Detailed Description . . . . .	548
11.80.2 Field Documentation . . . . .	548
11.81 CFE_EVS_ResetAllFiltersCmd Struct Reference . . . . .	549
11.81.1 Detailed Description . . . . .	549
11.81.2 Field Documentation . . . . .	549
11.82 CFE_EVS_ResetAppCounterCmd Struct Reference . . . . .	549
11.82.1 Detailed Description . . . . .	549
11.82.2 Field Documentation . . . . .	550
11.83 CFE_EVS_ResetCountersCmd Struct Reference . . . . .	550
11.83.1 Detailed Description . . . . .	550
11.83.2 Field Documentation . . . . .	550
11.84 CFE_EVS_ResetFilterCmd Struct Reference . . . . .	550
11.84.1 Detailed Description . . . . .	550
11.84.2 Field Documentation . . . . .	551
11.85 CFE_EVS_SendHkCmd Struct Reference . . . . .	551
11.85.1 Detailed Description . . . . .	551
11.85.2 Field Documentation . . . . .	551
11.86 CFE_EVS_SetEventFormatCode_Payload Struct Reference . . . . .	551
11.86.1 Detailed Description . . . . .	552
11.86.2 Field Documentation . . . . .	552
11.87 CFE_EVS_SetEventFormatModeCmd Struct Reference . . . . .	552
11.87.1 Detailed Description . . . . .	552
11.87.2 Field Documentation . . . . .	552
11.88 CFE_EVS_SetFilterCmd Struct Reference . . . . .	553
11.88.1 Detailed Description . . . . .	553
11.88.2 Field Documentation . . . . .	553
11.89 CFE_EVS_SetLogMode_Payload Struct Reference . . . . .	553
11.89.1 Detailed Description . . . . .	553
11.89.2 Field Documentation . . . . .	553
11.90 CFE_EVS_SetLogModeCmd Struct Reference . . . . .	554
11.90.1 Detailed Description . . . . .	554
11.90.2 Field Documentation . . . . .	554
11.91 CFE_EVS_ShortEventTlm Struct Reference . . . . .	554
11.91.1 Detailed Description . . . . .	555
11.91.2 Field Documentation . . . . .	555
11.92 CFE_EVS_ShortEventTlm_Payload Struct Reference . . . . .	555
11.92.1 Detailed Description . . . . .	555

11.92.2 Field Documentation . . . . .	555
11.93 CFE_EVS_WriteAppDataFileCmd Struct Reference . . . . .	555
11.93.1 Detailed Description . . . . .	556
11.93.2 Field Documentation . . . . .	556
11.94 CFE_EVS_WriteLogDataFileCmd Struct Reference . . . . .	556
11.94.1 Detailed Description . . . . .	556
11.94.2 Field Documentation . . . . .	556
11.95 CFE_FS_FileWriteMetaData Struct Reference . . . . .	557
11.95.1 Detailed Description . . . . .	557
11.95.2 Field Documentation . . . . .	557
11.96 CFE_FS_Header Struct Reference . . . . .	558
11.96.1 Detailed Description . . . . .	558
11.96.2 Field Documentation . . . . .	558
11.97 CFE_SB_AllSubscriptionsTlm Struct Reference . . . . .	559
11.97.1 Detailed Description . . . . .	560
11.97.2 Field Documentation . . . . .	560
11.98 CFE_SB_AllSubscriptionsTlm_Payload Struct Reference . . . . .	560
11.98.1 Detailed Description . . . . .	560
11.98.2 Field Documentation . . . . .	560
11.99 CFE_SB_DisableRouteCmd Struct Reference . . . . .	561
11.99.1 Detailed Description . . . . .	561
11.99.2 Field Documentation . . . . .	561
11.100 CFE_SB_DisableSubReportingCmd Struct Reference . . . . .	561
11.100.1 Detailed Description . . . . .	562
11.100.2 Field Documentation . . . . .	562
11.101 CFE_SB_EnableRouteCmd Struct Reference . . . . .	562
11.101.1 Detailed Description . . . . .	562
11.101.2 Field Documentation . . . . .	562
11.102 CFE_SB_EnableSubReportingCmd Struct Reference . . . . .	562
11.102.1 Detailed Description . . . . .	563
11.102.2 Field Documentation . . . . .	563
11.103 CFE_SB_HousekeepingTlm Struct Reference . . . . .	563
11.103.1 Detailed Description . . . . .	563
11.103.2 Field Documentation . . . . .	563
11.104 CFE_SB_HousekeepingTlm_Payload Struct Reference . . . . .	563
11.104.1 Detailed Description . . . . .	564
11.104.2 Field Documentation . . . . .	564
11.105 CFE_SB_Msg Union Reference . . . . .	567
11.105.1 Detailed Description . . . . .	567

---

11.105.2 Field Documentation . . . . .	567
11.106 CFE_SB_MsgId_t Struct Reference . . . . .	568
11.106.1 Detailed Description . . . . .	568
11.106.2 Field Documentation . . . . .	568
11.107 CFE_SB_MsgMapFileEntry Struct Reference . . . . .	568
11.107.1 Detailed Description . . . . .	569
11.107.2 Field Documentation . . . . .	569
11.108 CFE_SB_NoopCmd Struct Reference . . . . .	569
11.108.1 Detailed Description . . . . .	569
11.108.2 Field Documentation . . . . .	569
11.109 CFE_SB_PipeDepthStats Struct Reference . . . . .	569
11.109.1 Detailed Description . . . . .	570
11.109.2 Field Documentation . . . . .	570
11.110 CFE_SB_PipeInfoEntry Struct Reference . . . . .	571
11.110.1 Detailed Description . . . . .	571
11.110.2 Field Documentation . . . . .	571
11.111 CFE_SB_Qos_t Struct Reference . . . . .	572
11.111.1 Detailed Description . . . . .	572
11.111.2 Field Documentation . . . . .	572
11.112 CFE_SB_ResetCountersCmd Struct Reference . . . . .	573
11.112.1 Detailed Description . . . . .	573
11.112.2 Field Documentation . . . . .	573
11.113 CFE_SB_RouteCmd_Payload Struct Reference . . . . .	573
11.113.1 Detailed Description . . . . .	573
11.113.2 Field Documentation . . . . .	574
11.114 CFE_SB_RoutingFileEntry Struct Reference . . . . .	574
11.114.1 Detailed Description . . . . .	574
11.114.2 Field Documentation . . . . .	574
11.115 CFE_SB_SendHkCmd Struct Reference . . . . .	575
11.115.1 Detailed Description . . . . .	575
11.115.2 Field Documentation . . . . .	575
11.116 CFE_SB_SendPrevSubsCmd Struct Reference . . . . .	576
11.116.1 Detailed Description . . . . .	576
11.116.2 Field Documentation . . . . .	576
11.117 CFE_SB_SendSbStatsCmd Struct Reference . . . . .	576
11.117.1 Detailed Description . . . . .	576
11.117.2 Field Documentation . . . . .	576
11.118 CFE_SB_SingleSubscriptionTlm Struct Reference . . . . .	576
11.118.1 Detailed Description . . . . .	577

11.118.2 Field Documentation . . . . .	577
11.119 CFE_SB_SingleSubscriptionTlm_Payload Struct Reference . . . . .	577
11.119.1 Detailed Description . . . . .	577
11.119.2 Field Documentation . . . . .	577
11.120 CFE_SB_StatsTlm Struct Reference . . . . .	578
11.120.1 Detailed Description . . . . .	578
11.120.2 Field Documentation . . . . .	578
11.121 CFE_SB_StatsTlm_Payload Struct Reference . . . . .	579
11.121.1 Detailed Description . . . . .	579
11.121.2 Field Documentation . . . . .	579
11.122 CFE_SB_SubEntries Struct Reference . . . . .	582
11.122.1 Detailed Description . . . . .	582
11.122.2 Field Documentation . . . . .	582
11.123 CFE_SB_WriteFileInfoCmd_Payload Struct Reference . . . . .	583
11.123.1 Detailed Description . . . . .	583
11.123.2 Field Documentation . . . . .	583
11.124 CFE_SB_WriteMapInfoCmd Struct Reference . . . . .	583
11.124.1 Detailed Description . . . . .	583
11.124.2 Field Documentation . . . . .	583
11.125 CFE_SB_WritePipeInfoCmd Struct Reference . . . . .	584
11.125.1 Detailed Description . . . . .	584
11.125.2 Field Documentation . . . . .	584
11.126 CFE_SB_WriteRoutingInfoCmd Struct Reference . . . . .	584
11.126.1 Detailed Description . . . . .	585
11.126.2 Field Documentation . . . . .	585
11.127 CFE_TBL_AbortLoadCmd Struct Reference . . . . .	585
11.127.1 Detailed Description . . . . .	585
11.127.2 Field Documentation . . . . .	585
11.128 CFE_TBL_AbortLoadCmd_Payload Struct Reference . . . . .	586
11.128.1 Detailed Description . . . . .	586
11.128.2 Field Documentation . . . . .	586
11.129 CFE_TBL_ActivateCmd Struct Reference . . . . .	586
11.129.1 Detailed Description . . . . .	586
11.129.2 Field Documentation . . . . .	586
11.130 CFE_TBL_ActivateCmd_Payload Struct Reference . . . . .	587
11.130.1 Detailed Description . . . . .	587
11.130.2 Field Documentation . . . . .	587
11.131 CFE_TBL_DelCDSCmd_Payload Struct Reference . . . . .	587
11.131.1 Detailed Description . . . . .	587

---

11.131.2 Field Documentation . . . . .	587
11.132 CFE_TBL_DeleteCDSCmd Struct Reference . . . . .	588
11.132.1 Detailed Description . . . . .	588
11.132.2 Field Documentation . . . . .	588
11.133 CFE_TBL_DumpCmd Struct Reference . . . . .	588
11.133.1 Detailed Description . . . . .	589
11.133.2 Field Documentation . . . . .	589
11.134 CFE_TBL_DumpCmd_Payload Struct Reference . . . . .	589
11.134.1 Detailed Description . . . . .	589
11.134.2 Field Documentation . . . . .	589
11.135 CFE_TBL_DumpRegistryCmd Struct Reference . . . . .	590
11.135.1 Detailed Description . . . . .	590
11.135.2 Field Documentation . . . . .	590
11.136 CFE_TBL_DumpRegistryCmd_Payload Struct Reference . . . . .	590
11.136.1 Detailed Description . . . . .	591
11.136.2 Field Documentation . . . . .	591
11.137 CFE_TBL_File_Hdr Struct Reference . . . . .	591
11.137.1 Detailed Description . . . . .	591
11.137.2 Field Documentation . . . . .	591
11.138 CFE_TBL_FileDef Struct Reference . . . . .	592
11.138.1 Detailed Description . . . . .	592
11.138.2 Field Documentation . . . . .	592
11.139 CFE_TBL_HousekeepingTlm Struct Reference . . . . .	593
11.139.1 Detailed Description . . . . .	593
11.139.2 Field Documentation . . . . .	594
11.140 CFE_TBL_HousekeepingTlm_Payload Struct Reference . . . . .	594
11.140.1 Detailed Description . . . . .	595
11.140.2 Field Documentation . . . . .	595
11.141 CFE_TBL_Info Struct Reference . . . . .	598
11.141.1 Detailed Description . . . . .	599
11.141.2 Field Documentation . . . . .	599
11.142 CFE_TBL_LoadCmd Struct Reference . . . . .	600
11.142.1 Detailed Description . . . . .	600
11.142.2 Field Documentation . . . . .	600
11.143 CFE_TBL_LoadCmd_Payload Struct Reference . . . . .	600
11.143.1 Detailed Description . . . . .	601
11.143.2 Field Documentation . . . . .	601
11.144 CFE_TBL_NoopCmd Struct Reference . . . . .	601
11.144.1 Detailed Description . . . . .	601

11.144.2 Field Documentation . . . . .	601
11.145 CFE_TBL_NotifyCmd Struct Reference . . . . .	601
11.145.1 Detailed Description . . . . .	602
11.145.2 Field Documentation . . . . .	602
11.146 CFE_TBL_NotifyCmd_Payload Struct Reference . . . . .	602
11.146.1 Detailed Description . . . . .	602
11.146.2 Field Documentation . . . . .	602
11.147 CFE_TBL_ResetCountersCmd Struct Reference . . . . .	602
11.147.1 Detailed Description . . . . .	603
11.147.2 Field Documentation . . . . .	603
11.148 CFE_TBL_SendHkCmd Struct Reference . . . . .	603
11.148.1 Detailed Description . . . . .	603
11.148.2 Field Documentation . . . . .	603
11.149 CFE_TBL_SendRegistryCmd Struct Reference . . . . .	603
11.149.1 Detailed Description . . . . .	604
11.149.2 Field Documentation . . . . .	604
11.150 CFE_TBL_SendRegistryCmd_Payload Struct Reference . . . . .	604
11.150.1 Detailed Description . . . . .	604
11.150.2 Field Documentation . . . . .	604
11.151 CFE_TBL_TableRegistryTlm Struct Reference . . . . .	604
11.151.1 Detailed Description . . . . .	605
11.151.2 Field Documentation . . . . .	605
11.152 CFE_TBL_TblRegPacket_Payload Struct Reference . . . . .	605
11.152.1 Detailed Description . . . . .	606
11.152.2 Field Documentation . . . . .	606
11.153 CFE_TBL_ValidateCmd Struct Reference . . . . .	609
11.153.1 Detailed Description . . . . .	609
11.153.2 Field Documentation . . . . .	609
11.154 CFE_TBL_ValidateCmd_Payload Struct Reference . . . . .	609
11.154.1 Detailed Description . . . . .	609
11.154.2 Field Documentation . . . . .	609
11.155 CFE_TIME_AddAdjustCmd Struct Reference . . . . .	610
11.155.1 Detailed Description . . . . .	610
11.155.2 Field Documentation . . . . .	610
11.156 CFE_TIME_AddDelayCmd Struct Reference . . . . .	610
11.156.1 Detailed Description . . . . .	611
11.156.2 Field Documentation . . . . .	611
11.157 CFE_TIME_AddOneHzAdjustmentCmd Struct Reference . . . . .	611
11.157.1 Detailed Description . . . . .	611

---

11.157.2 Field Documentation . . . . .	611
11.158 CFE_TIME_DiagnosticTlm Struct Reference . . . . .	612
11.158.1 Detailed Description . . . . .	612
11.158.2 Field Documentation . . . . .	612
11.159 CFE_TIME_DiagnosticTlm_Payload Struct Reference . . . . .	612
11.159.1 Detailed Description . . . . .	614
11.159.2 Field Documentation . . . . .	614
11.160 CFE_TIME_FakeToneCmd Struct Reference . . . . .	620
11.160.1 Detailed Description . . . . .	621
11.160.2 Field Documentation . . . . .	621
11.161 CFE_TIME_HousekeepingTlm Struct Reference . . . . .	621
11.161.1 Detailed Description . . . . .	621
11.161.2 Field Documentation . . . . .	621
11.162 CFE_TIME_HousekeepingTlm_Payload Struct Reference . . . . .	621
11.162.1 Detailed Description . . . . .	622
11.162.2 Field Documentation . . . . .	622
11.163 CFE_TIME_LeapsCmd_Payload Struct Reference . . . . .	624
11.163.1 Detailed Description . . . . .	624
11.163.2 Field Documentation . . . . .	625
11.164 CFE_TIME_NoopCmd Struct Reference . . . . .	625
11.164.1 Detailed Description . . . . .	625
11.164.2 Field Documentation . . . . .	625
11.165 CFE_TIME_OneHzAdjustmentCmd_Payload Struct Reference . . . . .	625
11.165.1 Detailed Description . . . . .	625
11.165.2 Field Documentation . . . . .	625
11.166 CFE_TIME_OneHzCmd Struct Reference . . . . .	626
11.166.1 Detailed Description . . . . .	626
11.166.2 Field Documentation . . . . .	626
11.167 CFE_TIME_ResetCountersCmd Struct Reference . . . . .	626
11.167.1 Detailed Description . . . . .	626
11.167.2 Field Documentation . . . . .	626
11.168 CFE_TIME_SendDiagnosticCmd Struct Reference . . . . .	627
11.168.1 Detailed Description . . . . .	627
11.168.2 Field Documentation . . . . .	627
11.169 CFE_TIME_SendHkCmd Struct Reference . . . . .	627
11.169.1 Detailed Description . . . . .	627
11.169.2 Field Documentation . . . . .	627
11.170 CFE_TIME_SetLeapSecondsCmd Struct Reference . . . . .	627
11.170.1 Detailed Description . . . . .	628

11.170.2 Field Documentation . . . . .	628
11.171 CFE_TIME_SetMETCmd Struct Reference . . . . .	628
11.171.1 Detailed Description . . . . .	628
11.171.2 Field Documentation . . . . .	628
11.172 CFE_TIME_SetSignalCmd Struct Reference . . . . .	629
11.172.1 Detailed Description . . . . .	629
11.172.2 Field Documentation . . . . .	629
11.173 CFE_TIME_SetSourceCmd Struct Reference . . . . .	629
11.173.1 Detailed Description . . . . .	630
11.173.2 Field Documentation . . . . .	630
11.174 CFE_TIME_SetStateCmd Struct Reference . . . . .	630
11.174.1 Detailed Description . . . . .	630
11.174.2 Field Documentation . . . . .	630
11.175 CFE_TIME_SetSTCFCmd Struct Reference . . . . .	631
11.175.1 Detailed Description . . . . .	631
11.175.2 Field Documentation . . . . .	631
11.176 CFE_TIME_SetTimeCmd Struct Reference . . . . .	631
11.176.1 Detailed Description . . . . .	631
11.176.2 Field Documentation . . . . .	631
11.177 CFE_TIME_SignalCmd_Payload Struct Reference . . . . .	632
11.177.1 Detailed Description . . . . .	632
11.177.2 Field Documentation . . . . .	632
11.178 CFE_TIME_SourceCmd_Payload Struct Reference . . . . .	632
11.178.1 Detailed Description . . . . .	632
11.178.2 Field Documentation . . . . .	633
11.179 CFE_TIME_StateCmd_Payload Struct Reference . . . . .	633
11.179.1 Detailed Description . . . . .	633
11.179.2 Field Documentation . . . . .	633
11.180 CFE_TIME_SubAdjustCmd Struct Reference . . . . .	633
11.180.1 Detailed Description . . . . .	634
11.180.2 Field Documentation . . . . .	634
11.181 CFE_TIME_SubDelayCmd Struct Reference . . . . .	634
11.181.1 Detailed Description . . . . .	634
11.181.2 Field Documentation . . . . .	634
11.182 CFE_TIME_SubOneHzAdjustmentCmd Struct Reference . . . . .	634
11.182.1 Detailed Description . . . . .	635
11.182.2 Field Documentation . . . . .	635
11.183 CFE_TIME_SysTime Struct Reference . . . . .	635
11.183.1 Detailed Description . . . . .	635

---

11.183.2 Field Documentation . . . . .	635
11.184 CFE_TIME_TimeCmd_Payload Struct Reference . . . . .	636
11.184.1 Detailed Description . . . . .	636
11.184.2 Field Documentation . . . . .	636
11.185 CFE_TIME_ToneDataCmd Struct Reference . . . . .	636
11.185.1 Detailed Description . . . . .	637
11.185.2 Field Documentation . . . . .	637
11.186 CFE_TIME_ToneDataCmd_Payload Struct Reference . . . . .	637
11.186.1 Detailed Description . . . . .	637
11.186.2 Field Documentation . . . . .	637
11.187 CFE_TIME_ToneSignalCmd Struct Reference . . . . .	638
11.187.1 Detailed Description . . . . .	638
11.187.2 Field Documentation . . . . .	638
11.188 LC_AdTEntry_t Struct Reference . . . . .	638
11.188.1 Detailed Description . . . . .	639
11.188.2 Field Documentation . . . . .	639
11.189 LC_AppData_t Struct Reference . . . . .	641
11.189.1 Detailed Description . . . . .	641
11.189.2 Field Documentation . . . . .	641
11.190 LC_ArTEEntry_t Struct Reference . . . . .	643
11.190.1 Detailed Description . . . . .	643
11.190.2 Field Documentation . . . . .	643
11.191 LC_HkPacket_t Struct Reference . . . . .	645
11.191.1 Detailed Description . . . . .	645
11.191.2 Field Documentation . . . . .	645
11.192 LC_HkTlm_Payload_t Struct Reference . . . . .	646
11.192.1 Detailed Description . . . . .	646
11.192.2 Field Documentation . . . . .	646
11.193 LC_MListTag Struct Reference . . . . .	648
11.193.1 Detailed Description . . . . .	648
11.193.2 Field Documentation . . . . .	648
11.194 LC_MultiType_t Union Reference . . . . .	649
11.194.1 Detailed Description . . . . .	649
11.194.2 Field Documentation . . . . .	649
11.195 LC_NoopCmd_t Struct Reference . . . . .	650
11.195.1 Detailed Description . . . . .	650
11.195.2 Field Documentation . . . . .	651
11.196 LC_OperData_t Struct Reference . . . . .	651
11.196.1 Detailed Description . . . . .	652

11.196.2 Field Documentation . . . . .	652
11.197 LC_ResetAPStats_Payload_t Struct Reference . . . . .	655
11.197.1 Detailed Description . . . . .	655
11.197.2 Field Documentation . . . . .	655
11.198 LC_ResetAPStatsCmd_t Struct Reference . . . . .	656
11.198.1 Detailed Description . . . . .	656
11.198.2 Field Documentation . . . . .	656
11.199 LC_ResetCountersCmd_t Struct Reference . . . . .	656
11.199.1 Detailed Description . . . . .	656
11.199.2 Field Documentation . . . . .	656
11.200 LC_ResetWPStats_Payload_t Struct Reference . . . . .	657
11.200.1 Detailed Description . . . . .	657
11.200.2 Field Documentation . . . . .	657
11.201 LC_ResetWPStatsCmd_t Struct Reference . . . . .	657
11.201.1 Detailed Description . . . . .	658
11.201.2 Field Documentation . . . . .	658
11.202 LC_RTSRequest_Payload_t Struct Reference . . . . .	658
11.202.1 Detailed Description . . . . .	658
11.202.2 Field Documentation . . . . .	658
11.203 LC_RTSRequestCmd_t Struct Reference . . . . .	659
11.203.1 Detailed Description . . . . .	659
11.203.2 Field Documentation . . . . .	659
11.204 LC_SampleAP_Payload_t Struct Reference . . . . .	659
11.204.1 Detailed Description . . . . .	660
11.204.2 Field Documentation . . . . .	660
11.205 LC_SampleAPCmd_t Struct Reference . . . . .	660
11.205.1 Detailed Description . . . . .	660
11.205.2 Field Documentation . . . . .	661
11.206 LC_SendHkCmd_t Struct Reference . . . . .	661
11.206.1 Detailed Description . . . . .	661
11.206.2 Field Documentation . . . . .	661
11.207 LC_SetAPPermOff_Payload_t Struct Reference . . . . .	661
11.207.1 Detailed Description . . . . .	662
11.207.2 Field Documentation . . . . .	662
11.208 LC_SetAPPermOffCmd_t Struct Reference . . . . .	662
11.208.1 Detailed Description . . . . .	662
11.208.2 Field Documentation . . . . .	662
11.209 LC_SetAPState_Payload_t Struct Reference . . . . .	663
11.209.1 Detailed Description . . . . .	663

---

11.209.2 Field Documentation . . . . .	663
11.210 LC_SetAPStateCmd_t Struct Reference . . . . .	663
11.210.1 Detailed Description . . . . .	663
11.210.2 Field Documentation . . . . .	664
11.211 LC_SetLCState_Payload_t Struct Reference . . . . .	664
11.211.1 Detailed Description . . . . .	664
11.211.2 Field Documentation . . . . .	664
11.212 LC_SetLCStateCmd_t Struct Reference . . . . .	665
11.212.1 Detailed Description . . . . .	665
11.212.2 Field Documentation . . . . .	665
11.213 LC_WDTEEntry_t Struct Reference . . . . .	665
11.213.1 Detailed Description . . . . .	666
11.213.2 Field Documentation . . . . .	666
11.214 LC_WListTag Struct Reference . . . . .	667
11.214.1 Detailed Description . . . . .	667
11.214.2 Field Documentation . . . . .	667
11.215 LC_WRTEntry_t Struct Reference . . . . .	668
11.215.1 Detailed Description . . . . .	669
11.215.2 Field Documentation . . . . .	669
11.216 LC_WRTTransition_t Struct Reference . . . . .	670
11.216.1 Detailed Description . . . . .	670
11.216.2 Field Documentation . . . . .	670
11.217 OS_bin_sem_prop_t Struct Reference . . . . .	671
11.217.1 Detailed Description . . . . .	671
11.217.2 Field Documentation . . . . .	671
11.218 OS_condvar_prop_t Struct Reference . . . . .	672
11.218.1 Detailed Description . . . . .	672
11.218.2 Field Documentation . . . . .	672
11.219 OS_count_sem_prop_t Struct Reference . . . . .	672
11.219.1 Detailed Description . . . . .	672
11.219.2 Field Documentation . . . . .	673
11.220 os_dirent_t Struct Reference . . . . .	673
11.220.1 Detailed Description . . . . .	673
11.220.2 Field Documentation . . . . .	673
11.221 OS_FdSet Struct Reference . . . . .	673
11.221.1 Detailed Description . . . . .	674
11.221.2 Field Documentation . . . . .	674
11.222 OS_file_prop_t Struct Reference . . . . .	674
11.222.1 Detailed Description . . . . .	674

---

11.222.2 Field Documentation . . . . .	674
11.223 os_fsinfo_t Struct Reference . . . . .	675
11.223.1 Detailed Description . . . . .	675
11.223.2 Field Documentation . . . . .	675
11.224 os_fstat_t Struct Reference . . . . .	675
11.224.1 Detailed Description . . . . .	676
11.224.2 Field Documentation . . . . .	676
11.225 OS_heap_prop_t Struct Reference . . . . .	676
11.225.1 Detailed Description . . . . .	676
11.225.2 Field Documentation . . . . .	677
11.226 OS_module_address_t Struct Reference . . . . .	677
11.226.1 Detailed Description . . . . .	677
11.226.2 Field Documentation . . . . .	677
11.227 OS_module_prop_t Struct Reference . . . . .	678
11.227.1 Detailed Description . . . . .	678
11.227.2 Field Documentation . . . . .	678
11.228 OS_mut_sem_prop_t Struct Reference . . . . .	679
11.228.1 Detailed Description . . . . .	679
11.228.2 Field Documentation . . . . .	679
11.229 OS_queue_prop_t Struct Reference . . . . .	679
11.229.1 Detailed Description . . . . .	680
11.229.2 Field Documentation . . . . .	680
11.230 OS_SockAddr_t Struct Reference . . . . .	680
11.230.1 Detailed Description . . . . .	680
11.230.2 Field Documentation . . . . .	680
11.231 OS_SockAddrData_t Union Reference . . . . .	681
11.231.1 Detailed Description . . . . .	681
11.231.2 Field Documentation . . . . .	681
11.232 OS_socket_prop_t Struct Reference . . . . .	681
11.232.1 Detailed Description . . . . .	682
11.232.2 Field Documentation . . . . .	682
11.233 OS_static_symbol_record_t Struct Reference . . . . .	682
11.233.1 Detailed Description . . . . .	682
11.233.2 Field Documentation . . . . .	682
11.234 OS_statvfs_t Struct Reference . . . . .	683
11.234.1 Detailed Description . . . . .	683
11.234.2 Field Documentation . . . . .	683
11.235 OS_task_prop_t Struct Reference . . . . .	683
11.235.1 Detailed Description . . . . .	684

---

---

11.235.2 Field Documentation . . . . .	684
11.236 OS_time_t Struct Reference . . . . .	684
11.236.1 Detailed Description . . . . .	684
11.236.2 Field Documentation . . . . .	684
11.237 OS_timebase_prop_t Struct Reference . . . . .	685
11.237.1 Detailed Description . . . . .	685
11.237.2 Field Documentation . . . . .	685
11.238 OS_timer_prop_t Struct Reference . . . . .	686
11.238.1 Detailed Description . . . . .	686
11.238.2 Field Documentation . . . . .	686
<b>12 File Documentation</b> . . . . .	<b>686</b>
12.1 apps/lc/config/default_lc_fncodes.h File Reference . . . . .	686
12.1.1 Detailed Description . . . . .	687
12.1.2 Macro Definition Documentation . . . . .	687
12.2 apps/lc/config/default_lc_interface_cfg.h File Reference . . . . .	687
12.2.1 Detailed Description . . . . .	687
12.3 apps/lc/config/default_lc_internal_cfg.h File Reference . . . . .	688
12.3.1 Detailed Description . . . . .	688
12.4 apps/lc/config/default_lc_mission_cfg.h File Reference . . . . .	688
12.4.1 Detailed Description . . . . .	688
12.5 apps/lc/config/default_lc_msg.h File Reference . . . . .	689
12.5.1 Detailed Description . . . . .	689
12.6 apps/lc/config/default_lc_msgdefs.h File Reference . . . . .	689
12.6.1 Detailed Description . . . . .	690
12.6.2 Macro Definition Documentation . . . . .	691
12.7 apps/lc/config/default_lc_msgids.h File Reference . . . . .	693
12.7.1 Detailed Description . . . . .	694
12.8 apps/lc/config/default_lc_msgstruct.h File Reference . . . . .	694
12.8.1 Detailed Description . . . . .	695
12.9 apps/lc/config/default_lc_platform_cfg.h File Reference . . . . .	695
12.9.1 Detailed Description . . . . .	695
12.10 apps/lc/config/default_lc_tbl.h File Reference . . . . .	695
12.10.1 Detailed Description . . . . .	695
12.11 apps/lc/config/default_lc_tbldefs.h File Reference . . . . .	695
12.11.1 Detailed Description . . . . .	698
12.11.2 Macro Definition Documentation . . . . .	699
12.12 apps/lc/config/default_lc_tblstruct.h File Reference . . . . .	705
12.12.1 Detailed Description . . . . .	706

12.13 apps/lc/docs/dox_src/cfs_lc.dox File Reference . . . . .	706
12.14 apps/lc/fsw/inc/lc_eventids.h File Reference . . . . .	706
12.14.1 Detailed Description . . . . .	709
12.15 apps/lc/fsw/inc/lc_perfids.h File Reference . . . . .	709
12.15.1 Detailed Description . . . . .	709
12.16 apps/lc/fsw/src/lc_action.c File Reference . . . . .	709
12.16.1 Detailed Description . . . . .	710
12.16.2 Macro Definition Documentation . . . . .	710
12.16.3 Function Documentation . . . . .	710
12.17 apps/lc/fsw/src/lc_action.h File Reference . . . . .	715
12.17.1 Detailed Description . . . . .	716
12.17.2 Macro Definition Documentation . . . . .	716
12.17.3 Function Documentation . . . . .	716
12.18 apps/lc/fsw/src/lc_app.c File Reference . . . . .	721
12.18.1 Detailed Description . . . . .	722
12.18.2 Function Documentation . . . . .	722
12.18.3 Variable Documentation . . . . .	732
12.19 apps/lc/fsw/src/lc_app.h File Reference . . . . .	733
12.19.1 Detailed Description . . . . .	735
12.19.2 Macro Definition Documentation . . . . .	735
12.19.3 Typedef Documentation . . . . .	737
12.19.4 Function Documentation . . . . .	737
12.19.5 Variable Documentation . . . . .	748
12.20 apps/lc/fsw/src/lc_cmds.c File Reference . . . . .	749
12.20.1 Detailed Description . . . . .	750
12.20.2 Macro Definition Documentation . . . . .	750
12.20.3 Function Documentation . . . . .	750
12.21 apps/lc/fsw/src/lc_cmds.h File Reference . . . . .	759
12.21.1 Detailed Description . . . . .	759
12.21.2 Function Documentation . . . . .	759
12.22 apps/lc/fsw/src/lc_custom.c File Reference . . . . .	769
12.22.1 Detailed Description . . . . .	769
12.22.2 Function Documentation . . . . .	769
12.23 apps/lc/fsw/src/lc_custom.h File Reference . . . . .	771
12.23.1 Detailed Description . . . . .	771
12.23.2 Function Documentation . . . . .	771
12.24 apps/lc/fsw/src/lc_dispatch.c File Reference . . . . .	773
12.24.1 Detailed Description . . . . .	774
12.24.2 Function Documentation . . . . .	774

---

12.25 apps/lc/fsw/src/lc_dispatch.h File Reference . . . . .	781
12.25.1 Detailed Description . . . . .	781
12.25.2 Function Documentation . . . . .	781
12.26 apps/lc/fsw/src/lc_utils.c File Reference . . . . .	782
12.26.1 Detailed Description . . . . .	783
12.26.2 Function Documentation . . . . .	783
12.27 apps/lc/fsw/src/lc_utils.h File Reference . . . . .	785
12.27.1 Detailed Description . . . . .	786
12.27.2 Function Documentation . . . . .	786
12.28 apps/lc/fsw/src/lc_verify.h File Reference . . . . .	788
12.28.1 Detailed Description . . . . .	788
12.29 apps/lc/fsw/src/lc_version.h File Reference . . . . .	788
12.29.1 Detailed Description . . . . .	789
12.30 apps/lc/fsw/src/lc_watch.c File Reference . . . . .	789
12.30.1 Detailed Description . . . . .	790
12.30.2 Macro Definition Documentation . . . . .	790
12.30.3 Function Documentation . . . . .	790
12.31 apps/lc/fsw/src/lc_watch.h File Reference . . . . .	803
12.31.1 Detailed Description . . . . .	804
12.31.2 Macro Definition Documentation . . . . .	804
12.31.3 Function Documentation . . . . .	805
12.32 apps/lc/fsw/tables/lc_def_adt.c File Reference . . . . .	818
12.32.1 Detailed Description . . . . .	818
12.32.2 Variable Documentation . . . . .	818
12.33 apps/lc/fsw/tables/lc_def_wdt.c File Reference . . . . .	819
12.33.1 Detailed Description . . . . .	819
12.33.2 Variable Documentation . . . . .	819
12.34 build/osal_public_api/inc/osconfig.h File Reference . . . . .	819
12.34.1 Macro Definition Documentation . . . . .	821
12.35 cfe/cmake/sample_defs/example_mission_cfg.h File Reference . . . . .	825
12.35.1 Detailed Description . . . . .	826
12.35.2 Macro Definition Documentation . . . . .	827
12.36 cfe/cmake/sample_defs/example_platform_cfg.h File Reference . . . . .	836
12.36.1 Detailed Description . . . . .	840
12.36.2 Macro Definition Documentation . . . . .	840
12.37 cfe/cmake/sample_defs/sample_perfids.h File Reference . . . . .	880
12.37.1 Detailed Description . . . . .	881
12.37.2 Macro Definition Documentation . . . . .	881
12.38 cfe/docs/src/cfe_api.dox File Reference . . . . .	882

12.39 cfe/docs/src/cfe_es.dox File Reference . . . . .	882
12.40 cfe/docs/src/cfe_evs.dox File Reference . . . . .	882
12.41 cfe/docs/src/cfe_frontpage.dox File Reference . . . . .	882
12.42 cfe/docs/src/cfe_glossary.dox File Reference . . . . .	882
12.43 cfe/docs/src/cfe_sb.dox File Reference . . . . .	882
12.44 cfe/docs/src/cfe_tbl.dox File Reference . . . . .	882
12.45 cfe/docs/src/cfe_time.dox File Reference . . . . .	882
12.46 cfe/docs/src/cfe_xref.dox File Reference . . . . .	882
12.47 cfe/docs/src/cfs_versions.dox File Reference . . . . .	882
12.48 cfe/modules/core_api/config/default_cfe_core_api_base_msgids.h File Reference . . . . .	882
12.48.1 Detailed Description . . . . .	883
12.48.2 Macro Definition Documentation . . . . .	883
12.49 cfe/modules/core_api/config/default_cfe_core_api_interface_cfg.h File Reference . . . . .	885
12.49.1 Detailed Description . . . . .	885
12.49.2 Macro Definition Documentation . . . . .	885
12.50 cfe/modules/core_api/config/default_cfe_mission_cfg.h File Reference . . . . .	887
12.50.1 Detailed Description . . . . .	887
12.51 cfe/modules/core_api/config/default_cfe_msgids.h File Reference . . . . .	887
12.51.1 Detailed Description . . . . .	887
12.52 cfe/modules/core_api/fsw/inc/cfe.h File Reference . . . . .	887
12.52.1 Detailed Description . . . . .	887
12.53 cfe/modules/core_api/fsw/inc/cfe_config.h File Reference . . . . .	887
12.53.1 Detailed Description . . . . .	888
12.53.2 Function Documentation . . . . .	888
12.54 cfe/modules/core_api/fsw/inc/cfe_config_api_typedefs.h File Reference . . . . .	891
12.54.1 Detailed Description . . . . .	891
12.54.2 Macro Definition Documentation . . . . .	891
12.54.3 Typedef Documentation . . . . .	891
12.55 cfe/modules/core_api/fsw/inc/cfe_endian.h File Reference . . . . .	892
12.55.1 Detailed Description . . . . .	892
12.55.2 Macro Definition Documentation . . . . .	892
12.56 cfe/modules/core_api/fsw/inc/cfe_error.h File Reference . . . . .	892
12.56.1 Detailed Description . . . . .	899
12.56.2 Macro Definition Documentation . . . . .	899
12.56.3 Typedef Documentation . . . . .	900
12.56.4 Function Documentation . . . . .	900
12.57 cfe/modules/core_api/fsw/inc/cfe_es.h File Reference . . . . .	901
12.57.1 Detailed Description . . . . .	904
12.57.2 Macro Definition Documentation . . . . .	904

---

12.58 cfe/modules/core_api/fsw/inc/cfe_es_api_typedefs.h File Reference . . . . .	904
12.58.1 Detailed Description . . . . .	906
12.58.2 Macro Definition Documentation . . . . .	906
12.58.3 Typedef Documentation . . . . .	908
12.58.4 Enumeration Type Documentation . . . . .	909
12.59 cfe/modules/core_api/fsw/inc/cfe_evs.h File Reference . . . . .	909
12.59.1 Detailed Description . . . . .	910
12.59.2 Macro Definition Documentation . . . . .	910
12.60 cfe/modules/core_api/fsw/inc/cfe_evs_api_typedefs.h File Reference . . . . .	911
12.60.1 Detailed Description . . . . .	912
12.60.2 Macro Definition Documentation . . . . .	912
12.60.3 Typedef Documentation . . . . .	913
12.61 cfe/modules/core_api/fsw/inc/cfe_fs.h File Reference . . . . .	913
12.61.1 Detailed Description . . . . .	914
12.62 cfe/modules/core_api/fsw/inc/cfe_fs_api_typedefs.h File Reference . . . . .	914
12.62.1 Detailed Description . . . . .	915
12.62.2 Typedef Documentation . . . . .	915
12.62.3 Enumeration Type Documentation . . . . .	916
12.63 cfe/modules/core_api/fsw/inc/cfe_msg.h File Reference . . . . .	916
12.63.1 Detailed Description . . . . .	919
12.64 cfe/modules/core_api/fsw/inc/cfe_msg_api_typedefs.h File Reference . . . . .	919
12.64.1 Detailed Description . . . . .	920
12.64.2 Macro Definition Documentation . . . . .	920
12.64.3 Typedef Documentation . . . . .	920
12.64.4 Enumeration Type Documentation . . . . .	922
12.65 cfe/modules/core_api/fsw/inc/cfe_resourceid.h File Reference . . . . .	923
12.65.1 Detailed Description . . . . .	924
12.65.2 Macro Definition Documentation . . . . .	924
12.65.3 Function Documentation . . . . .	925
12.66 cfe/modules/core_api/fsw/inc/cfe_resourceid_api_typedefs.h File Reference . . . . .	928
12.66.1 Detailed Description . . . . .	929
12.66.2 Macro Definition Documentation . . . . .	929
12.67 cfe/modules/core_api/fsw/inc/cfe_sb.h File Reference . . . . .	929
12.67.1 Detailed Description . . . . .	931
12.67.2 Macro Definition Documentation . . . . .	931
12.68 cfe/modules/core_api/fsw/inc/cfe_sb_api_typedefs.h File Reference . . . . .	932
12.68.1 Detailed Description . . . . .	933
12.68.2 Macro Definition Documentation . . . . .	933
12.68.3 Typedef Documentation . . . . .	935

12.69 cfe/modules/core_api/fsw/inc/cfe_tbl.h File Reference . . . . .	935
12.69.1 Detailed Description . . . . .	936
12.70 cfe/modules/core_api/fsw/inc/cfe_tbl_api_typedefs.h File Reference . . . . .	936
12.70.1 Detailed Description . . . . .	937
12.70.2 Macro Definition Documentation . . . . .	937
12.70.3 Typedef Documentation . . . . .	938
12.70.4 Enumeration Type Documentation . . . . .	938
12.71 cfe/modules/core_api/fsw/inc/cfe_tbl_filedef.h File Reference . . . . .	938
12.71.1 Detailed Description . . . . .	939
12.71.2 Macro Definition Documentation . . . . .	939
12.71.3 Typedef Documentation . . . . .	940
12.72 cfe/modules/core_api/fsw/inc/cfe_time.h File Reference . . . . .	940
12.72.1 Detailed Description . . . . .	941
12.72.2 Macro Definition Documentation . . . . .	941
12.73 cfe/modules/core_api/fsw/inc/cfe_time_api_typedefs.h File Reference . . . . .	942
12.73.1 Detailed Description . . . . .	942
12.73.2 Macro Definition Documentation . . . . .	942
12.73.3 Typedef Documentation . . . . .	942
12.73.4 Enumeration Type Documentation . . . . .	943
12.74 cfe/modules/core_api/fsw/inc/cfe_version.h File Reference . . . . .	943
12.74.1 Detailed Description . . . . .	944
12.74.2 Macro Definition Documentation . . . . .	944
12.75 cfe/modules/es/config/default_cfe_es_extern_typedefs.h File Reference . . . . .	945
12.75.1 Detailed Description . . . . .	947
12.75.2 Macro Definition Documentation . . . . .	948
12.75.3 Typedef Documentation . . . . .	948
12.75.4 Enumeration Type Documentation . . . . .	952
12.76 cfe/modules/es/config/default_cfe_es_fcncodes.h File Reference . . . . .	954
12.76.1 Detailed Description . . . . .	954
12.76.2 Macro Definition Documentation . . . . .	954
12.77 cfe/modules/es/config/default_cfe_es_interface_cfg.h File Reference . . . . .	974
12.77.1 Detailed Description . . . . .	975
12.77.2 Macro Definition Documentation . . . . .	975
12.78 cfe/modules/es/config/default_cfe_es_internal_cfg.h File Reference . . . . .	977
12.78.1 Detailed Description . . . . .	979
12.78.2 Macro Definition Documentation . . . . .	979
12.79 cfe/modules/es/config/default_cfe_es_mission_cfg.h File Reference . . . . .	997
12.79.1 Detailed Description . . . . .	997
12.80 cfe/modules/es/config/default_cfe_es_msg.h File Reference . . . . .	997

---

12.80.1 Detailed Description . . . . .	998
12.81 cfe/modules/es/config/default_cfe_es_msgdefs.h File Reference . . . . .	998
12.81.1 Detailed Description . . . . .	999
12.81.2 Typedef Documentation . . . . .	999
12.81.3 Enumeration Type Documentation . . . . .	1001
12.82 cfe/modules/es/config/default_cfe_es_msgids.h File Reference . . . . .	1002
12.82.1 Detailed Description . . . . .	1002
12.82.2 Macro Definition Documentation . . . . .	1002
12.83 cfe/modules/es/config/default_cfe_es_msgstruct.h File Reference . . . . .	1003
12.83.1 Detailed Description . . . . .	1004
12.83.2 Typedef Documentation . . . . .	1005
12.84 cfe/modules/es/config/default_cfe_es_platform_cfg.h File Reference . . . . .	1007
12.84.1 Detailed Description . . . . .	1007
12.85 cfe/modules/es/config/default_cfe_es_topicids.h File Reference . . . . .	1007
12.85.1 Detailed Description . . . . .	1007
12.85.2 Macro Definition Documentation . . . . .	1007
12.86 cfe/modules/es/fsw/inc/cfe_es_eventids.h File Reference . . . . .	1008
12.86.1 Detailed Description . . . . .	1011
12.86.2 Macro Definition Documentation . . . . .	1011
12.87 cfe/modules/evs/config/default_cfe_evs_extern_typedefs.h File Reference . . . . .	1033
12.87.1 Detailed Description . . . . .	1034
12.87.2 Typedef Documentation . . . . .	1034
12.87.3 Enumeration Type Documentation . . . . .	1035
12.88 cfe/modules/evs/config/default_cfe_evs_fcncodes.h File Reference . . . . .	1036
12.88.1 Detailed Description . . . . .	1037
12.88.2 Macro Definition Documentation . . . . .	1037
12.89 cfe/modules/evs/config/default_cfe_evs_interface_cfg.h File Reference . . . . .	1054
12.89.1 Detailed Description . . . . .	1054
12.89.2 Macro Definition Documentation . . . . .	1055
12.90 cfe/modules/evs/config/default_cfe_evs_internal_cfg.h File Reference . . . . .	1055
12.90.1 Detailed Description . . . . .	1055
12.90.2 Macro Definition Documentation . . . . .	1055
12.91 cfe/modules/evs/config/default_cfe_evs_mission_cfg.h File Reference . . . . .	1059
12.91.1 Detailed Description . . . . .	1059
12.92 cfe/modules/evs/config/default_cfe_evs_msg.h File Reference . . . . .	1059
12.92.1 Detailed Description . . . . .	1060
12.93 cfe/modules/evs/config/default_cfe_evs_msgdefs.h File Reference . . . . .	1060
12.93.1 Detailed Description . . . . .	1061
12.93.2 Macro Definition Documentation . . . . .	1061

12.93.3 Typedef Documentation . . . . .	1062
12.94 cfe/modules/evs/config/default_cfe_evs_msgids.h File Reference . . . . .	1063
12.94.1 Detailed Description . . . . .	1064
12.94.2 Macro Definition Documentation . . . . .	1064
12.95 cfe/modules/evs/config/default_cfe_evs_msgstruct.h File Reference . . . . .	1064
12.95.1 Detailed Description . . . . .	1066
12.95.2 Typedef Documentation . . . . .	1066
12.96 cfe/modules/evs/config/default_cfe_evs_platform_cfg.h File Reference . . . . .	1067
12.96.1 Detailed Description . . . . .	1067
12.97 cfe/modules/evs/config/default_cfe_evs_topicids.h File Reference . . . . .	1068
12.97.1 Detailed Description . . . . .	1068
12.97.2 Macro Definition Documentation . . . . .	1068
12.98 cfe/modules/evs/fsw/inc/cfe_evs_eventids.h File Reference . . . . .	1069
12.98.1 Detailed Description . . . . .	1070
12.98.2 Macro Definition Documentation . . . . .	1070
12.99 cfe/modules/fs/config/default_cfe_fs_extern_typedefs.h File Reference . . . . .	1081
12.99.1 Detailed Description . . . . .	1081
12.100 cfe/modules/fs/config/default_cfe_fs_filedef.h File Reference . . . . .	1081
12.100.1 Detailed Description . . . . .	1081
12.100.2 Typedef Documentation . . . . .	1081
12.100.3 Enumeration Type Documentation . . . . .	1082
12.101 cfe/modules/fs/config/default_cfe_fs_interface_cfg.h File Reference . . . . .	1083
12.101.1 Detailed Description . . . . .	1083
12.101.2 Macro Definition Documentation . . . . .	1083
12.102 cfe/modules/fs/config/default_cfe_fs_mission_cfg.h File Reference . . . . .	1083
12.102.1 Detailed Description . . . . .	1083
12.103 cfe/modules/msg/fsw/inc/ccsds_hdr.h File Reference . . . . .	1084
12.103.1 Detailed Description . . . . .	1084
12.103.2 Typedef Documentation . . . . .	1084
12.104 cfe/modules/resourceid/fsw/inc/cfe_core_resourceid_basevalues.h File Reference . . . . .	1084
12.104.1 Detailed Description . . . . .	1085
12.105 cfe/modules/resourceid/fsw/inc/cfe_resourceid_basevalue.h File Reference . . . . .	1085
12.105.1 Detailed Description . . . . .	1085
12.105.2 Macro Definition Documentation . . . . .	1085
12.106 cfe/modules/sb/config/default_cfe_sb_extern_typedefs.h File Reference . . . . .	1086
12.106.1 Detailed Description . . . . .	1086
12.106.2 Macro Definition Documentation . . . . .	1086
12.106.3 Typedef Documentation . . . . .	1087
12.106.4 Enumeration Type Documentation . . . . .	1087

---

12.107 cfe/modules/sb/config/default_cfe_sb_fcncodes.h File Reference . . . . .	1088
12.107.1 Detailed Description . . . . .	1088
12.107.2 Macro Definition Documentation . . . . .	1088
12.108 cfe/modules/sb/config/default_cfe_sb_interface_cfg.h File Reference . . . . .	1097
12.108.1 Detailed Description . . . . .	1097
12.108.2 Macro Definition Documentation . . . . .	1097
12.109 cfe/modules/sb/config/default_cfe_sb_internal_cfg.h File Reference . . . . .	1098
12.109.1 Detailed Description . . . . .	1099
12.109.2 Macro Definition Documentation . . . . .	1099
12.110 cfe/modules/sb/config/default_cfe_sb_mission_cfg.h File Reference . . . . .	1106
12.110.1 Detailed Description . . . . .	1106
12.111 cfe/modules/sb/config/default_cfe_sb_msg.h File Reference . . . . .	1107
12.111.1 Detailed Description . . . . .	1107
12.112 cfe/modules/sb/config/default_cfe_sb_msghdefs.h File Reference . . . . .	1107
12.112.1 Detailed Description . . . . .	1108
12.112.2 Typedef Documentation . . . . .	1108
12.113 cfe/modules/sb/config/default_cfe_sb_msghids.h File Reference . . . . .	1109
12.113.1 Detailed Description . . . . .	1110
12.113.2 Macro Definition Documentation . . . . .	1110
12.114 cfe/modules/sb/config/default_cfe_sb_msghstruct.h File Reference . . . . .	1111
12.114.1 Detailed Description . . . . .	1111
12.114.2 Typedef Documentation . . . . .	1112
12.115 cfe/modules/sb/config/default_cfe_sb_platform_cfg.h File Reference . . . . .	1113
12.115.1 Detailed Description . . . . .	1113
12.116 cfe/modules/sb/config/default_cfe_sb_topicids.h File Reference . . . . .	1113
12.116.1 Detailed Description . . . . .	1113
12.116.2 Macro Definition Documentation . . . . .	1113
12.117 cfe/modules/sb/fsw/inc/cfe_sb_eventids.h File Reference . . . . .	1114
12.117.1 Detailed Description . . . . .	1117
12.117.2 Macro Definition Documentation . . . . .	1117
12.118 cfe/modules/tbl/config/default_cfe_tbl_extern_typedefs.h File Reference . . . . .	1134
12.118.1 Detailed Description . . . . .	1134
12.118.2 Typedef Documentation . . . . .	1134
12.118.3 Enumeration Type Documentation . . . . .	1134
12.119 cfe/modules/tbl/config/default_cfe_tbl_fcncodes.h File Reference . . . . .	1135
12.119.1 Detailed Description . . . . .	1135
12.119.2 Macro Definition Documentation . . . . .	1135
12.120 cfe/modules/tbl/config/default_cfe_tbl_interface_cfg.h File Reference . . . . .	1144
12.120.1 Detailed Description . . . . .	1144

12.120.2 Macro Definition Documentation . . . . .	1144
12.121 cfe/modules/tbl/config/default_cfe_tbl_internal_cfg.h File Reference . . . . .	1145
12.121.1 Detailed Description . . . . .	1146
12.121.2 Macro Definition Documentation . . . . .	1146
12.122 cfe/modules/tbl/config/default_cfe_tbl_mission_cfg.h File Reference . . . . .	1151
12.122.1 Detailed Description . . . . .	1151
12.123 cfe/modules/tbl/config/default_cfe_tbl_msg.h File Reference . . . . .	1151
12.123.1 Detailed Description . . . . .	1151
12.124 cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h File Reference . . . . .	1152
12.124.1 Detailed Description . . . . .	1153
12.124.2 Typedef Documentation . . . . .	1153
12.125 cfe/modules/tbl/config/default_cfe_tbl_msgids.h File Reference . . . . .	1154
12.125.1 Detailed Description . . . . .	1154
12.125.2 Macro Definition Documentation . . . . .	1154
12.126 cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h File Reference . . . . .	1155
12.126.1 Detailed Description . . . . .	1156
12.126.2 Typedef Documentation . . . . .	1156
12.127 cfe/modules/tbl/config/default_cfe_tbl_platform_cfg.h File Reference . . . . .	1157
12.127.1 Detailed Description . . . . .	1157
12.128 cfe/modules/tbl/config/default_cfe_tbl_topicids.h File Reference . . . . .	1157
12.128.1 Detailed Description . . . . .	1157
12.128.2 Macro Definition Documentation . . . . .	1157
12.129 cfe/modules/tbl/fsw/inc/cfe_tbl_eventids.h File Reference . . . . .	1158
12.129.1 Detailed Description . . . . .	1161
12.129.2 Macro Definition Documentation . . . . .	1161
12.130 cfe/modules/time/config/default_cfe_time_extern_typedefs.h File Reference . . . . .	1178
12.130.1 Detailed Description . . . . .	1179
12.130.2 Typedef Documentation . . . . .	1180
12.130.3 Enumeration Type Documentation . . . . .	1181
12.131 cfe/modules/time/config/default_cfe_time_fcncodes.h File Reference . . . . .	1183
12.131.1 Detailed Description . . . . .	1184
12.131.2 Macro Definition Documentation . . . . .	1184
12.132 cfe/modules/time/config/default_cfe_time_interface_cfg.h File Reference . . . . .	1199
12.132.1 Detailed Description . . . . .	1199
12.132.2 Macro Definition Documentation . . . . .	1199
12.133 cfe/modules/time/config/default_cfe_time_internal_cfg.h File Reference . . . . .	1203
12.133.1 Detailed Description . . . . .	1203
12.133.2 Macro Definition Documentation . . . . .	1204
12.134 cfe/modules/time/config/default_cfe_time_mission_cfg.h File Reference . . . . .	1208

---

12.134.1 Detailed Description . . . . .	1209
12.135 cfe/modules/time/config/default_cfe_time_msg.h File Reference . . . . .	1209
12.135.1 Detailed Description . . . . .	1209
12.136 cfe/modules/time/config/default_cfe_time_msqdefs.h File Reference . . . . .	1209
12.136.1 Detailed Description . . . . .	1211
12.136.2 Typedef Documentation . . . . .	1211
12.137 cfe/modules/time/config/default_cfe_time_msqids.h File Reference . . . . .	1211
12.137.1 Detailed Description . . . . .	1212
12.137.2 Macro Definition Documentation . . . . .	1212
12.138 cfe/modules/time/config/default_cfe_time_msqstruct.h File Reference . . . . .	1213
12.138.1 Detailed Description . . . . .	1214
12.138.2 Typedef Documentation . . . . .	1214
12.139 cfe/modules/time/config/default_cfe_time_platform_cfg.h File Reference . . . . .	1216
12.139.1 Detailed Description . . . . .	1216
12.140 cfe/modules/time/config/default_cfe_time_topicids.h File Reference . . . . .	1216
12.140.1 Detailed Description . . . . .	1216
12.140.2 Macro Definition Documentation . . . . .	1217
12.141 cfe/modules/time/fsw/inc/cfe_time_eventids.h File Reference . . . . .	1218
12.141.1 Detailed Description . . . . .	1219
12.141.2 Macro Definition Documentation . . . . .	1219
12.142 osal/docs/src/osal_frontpage.dox File Reference . . . . .	1228
12.143 osal/docs/src/osal_fs.dox File Reference . . . . .	1228
12.144 osal/docs/src/osal_timer.dox File Reference . . . . .	1228
12.145 osal/src/os/inc/common_types.h File Reference . . . . .	1228
12.145.1 Detailed Description . . . . .	1229
12.145.2 Macro Definition Documentation . . . . .	1230
12.145.3 Typedef Documentation . . . . .	1230
12.145.4 Function Documentation . . . . .	1232
12.146 osal/src/os/inc/osapi-binsem.h File Reference . . . . .	1233
12.146.1 Detailed Description . . . . .	1234
12.147 osal/src/os/inc/osapi-bsp.h File Reference . . . . .	1234
12.147.1 Detailed Description . . . . .	1234
12.148 osal/src/os/inc/osapi-clock.h File Reference . . . . .	1234
12.148.1 Detailed Description . . . . .	1235
12.148.2 Enumeration Type Documentation . . . . .	1236
12.149 osal/src/os/inc/osapi-common.h File Reference . . . . .	1236
12.149.1 Detailed Description . . . . .	1237
12.149.2 Typedef Documentation . . . . .	1237
12.149.3 Enumeration Type Documentation . . . . .	1237

---

12.150 osal/src/os/inc/osapi-condvar.h File Reference . . . . .	1238
12.150.1 Detailed Description . . . . .	1239
12.151 osal/src/os/inc/osapi-constants.h File Reference . . . . .	1239
12.151.1 Detailed Description . . . . .	1239
12.151.2 Macro Definition Documentation . . . . .	1239
12.152 osal/src/os/inc/osapi-countsem.h File Reference . . . . .	1240
12.152.1 Detailed Description . . . . .	1240
12.153 osal/src/os/inc/osapi-dir.h File Reference . . . . .	1240
12.153.1 Detailed Description . . . . .	1241
12.153.2 Macro Definition Documentation . . . . .	1241
12.154 osal/src/os/inc/osapi-error.h File Reference . . . . .	1241
12.154.1 Detailed Description . . . . .	1243
12.154.2 Macro Definition Documentation . . . . .	1244
12.154.3 Typedef Documentation . . . . .	1244
12.155 osal/src/os/inc/osapi-file.h File Reference . . . . .	1244
12.155.1 Detailed Description . . . . .	1246
12.155.2 Macro Definition Documentation . . . . .	1246
12.155.3 Enumeration Type Documentation . . . . .	1247
12.156 osal/src/os/inc/osapi-fs.h File Reference . . . . .	1247
12.156.1 Detailed Description . . . . .	1248
12.156.2 Macro Definition Documentation . . . . .	1248
12.157 osal/src/os/inc/osapi-heap.h File Reference . . . . .	1249
12.157.1 Detailed Description . . . . .	1249
12.158 osal/src/os/inc/osapi-idmap.h File Reference . . . . .	1249
12.158.1 Detailed Description . . . . .	1250
12.158.2 Macro Definition Documentation . . . . .	1250
12.159 osal/src/os/inc/osapi-macros.h File Reference . . . . .	1251
12.159.1 Detailed Description . . . . .	1251
12.159.2 Macro Definition Documentation . . . . .	1251
12.160 osal/src/os/inc/osapi-module.h File Reference . . . . .	1252
12.160.1 Detailed Description . . . . .	1253
12.160.2 Macro Definition Documentation . . . . .	1253
12.161 osal/src/os/inc/osapi-mutex.h File Reference . . . . .	1254
12.161.1 Detailed Description . . . . .	1254
12.162 osal/src/os/inc/osapi-network.h File Reference . . . . .	1254
12.162.1 Detailed Description . . . . .	1255
12.163 osal/src/os/inc/osapi-printf.h File Reference . . . . .	1255
12.163.1 Detailed Description . . . . .	1255
12.164 osal/src/os/inc/osapi-queue.h File Reference . . . . .	1255

---

12.164.1 Detailed Description . . . . .	1256
12.165 osal/src/os/inc/osapi-select.h File Reference . . . . .	1256
12.165.1 Detailed Description . . . . .	1256
12.165.2 Enumeration Type Documentation . . . . .	1256
12.166 osal/src/os/inc/osapi-shell.h File Reference . . . . .	1257
12.166.1 Detailed Description . . . . .	1257
12.167 osal/src/os/inc/osapi-sockets.h File Reference . . . . .	1257
12.167.1 Detailed Description . . . . .	1259
12.167.2 Macro Definition Documentation . . . . .	1259
12.167.3 Enumeration Type Documentation . . . . .	1259
12.168 osal/src/os/inc/osapi-task.h File Reference . . . . .	1260
12.168.1 Detailed Description . . . . .	1261
12.168.2 Macro Definition Documentation . . . . .	1261
12.168.3 Typedef Documentation . . . . .	1261
12.168.4 Function Documentation . . . . .	1262
12.169 osal/src/os/inc/osapi-timebase.h File Reference . . . . .	1262
12.169.1 Detailed Description . . . . .	1262
12.169.2 Typedef Documentation . . . . .	1263
12.170 osal/src/os/inc/osapi-timer.h File Reference . . . . .	1263
12.170.1 Detailed Description . . . . .	1263
12.170.2 Typedef Documentation . . . . .	1263
12.171 osal/src/os/inc/osapi-version.h File Reference . . . . .	1264
12.171.1 Detailed Description . . . . .	1264
12.171.2 Macro Definition Documentation . . . . .	1265
12.171.3 Function Documentation . . . . .	1266
12.172 osal/src/os/inc/osapi.h File Reference . . . . .	1267
12.172.1 Detailed Description . . . . .	1268
12.173 psp/fsw/inc/cfe_psp.h File Reference . . . . .	1268
12.173.1 Macro Definition Documentation . . . . .	1272
12.173.2 Function Documentation . . . . .	1275
12.174 psp/fsw/inc/cfe_psp_error.h File Reference . . . . .	1295
12.174.1 Detailed Description . . . . .	1296
12.174.2 Macro Definition Documentation . . . . .	1296
12.174.3 Typedef Documentation . . . . .	1298
12.174.4 Function Documentation . . . . .	1298

# 1 CFS Limit Checker (LC) Documentation

- [CFS Limit Checker Introduction](#)
- [CFS Limit Checker Overview](#)
- [CFS Limit Checker Operation](#)
- [CFS Limit Checker Commands](#)
- [CFS Limit Checker Telemetry](#)
- [CFS Limit Checker Events](#)
- [CFS Limit Checker Deployment Guide](#)
- [CFS Limit Checker Configuration](#)
- [CFS Limit Checker Table Definitions](#)
- [CFS Limit Checker Operational Constraints](#)
- [CFS Limit Checker Frequently Asked Questions](#)

## 1.1 CFS Limit Checker Introduction

### Scope

This document provides a complete specification for the commands and telemetry associated with the CFS Limit Checker (LC) application software. The document is intended primarily for users of the software (operations personnel, test engineers, and maintenance personnel). The last section of the document, the deployment guide section, is intended for mission developers when deploying and configuring the LC application software for a mission flight software build environment.

### [CFS Limit Checker Version](#)

### Acronyms

Acronym	Description
API	Application Programming Interface
ATP	Absolute Time Processor
ATS	Absolute Time tagged command Sequence
CCSDS	Consultative Committee for Space Data Systems
C&DH	Command and Data Handling
CFE	Core Flight Executive
CFS	Core Flight System
CI	Command Ingest
Cmd	Command
CPU	Central Processing Unit
EDAC	Error Detection and Correction
FDS	Flight Data System

FM	File Manager
FSW	Flight Software
GN&C	Guidance Navigation & Control
GSFC	Goddard Space Flight Center
HK	Housekeeping
HW, H/W	Hardware
ICD	Interface Control Document
ISR	Interrupt Service Routine
LC	CFS Limit Checker
OS	Operating System
OSAL	Operating System Abstraction Layer
Pkts	Packets
RAM	Random-Access Memory
RTOS	Real Time Operating System
RTP	Relative Time Processor
RTS	Relative Time tagged command Sequence
SB	Software Bus Service
SBC	Single Board Computer
SC	Stored Commands task
SW, S/W	Software
TBD	To Be Determined
TBL	Table
TDM	Time Data Multiplex
TLM	Telemetry
UTC	Universal time code

## 1.2 CFS Limit Checker Overview

The CFS Limit Checker (LC) application monitors telemetry data points in the flight system and compares the values against predefined threshold limits. When a threshold condition is encountered, an event message is issued and a Relative Time Sequence (RTS) command script may be initiated to respond to the threshold violation.

LC is a table-driven application. Monitoring and response configuration data is stored in definition tables that can be updated by the ground operators, while statistics on threshold violations are stored in dump-only results tables and summarized in housekeeping data.

When processing beyond the standard comparison operators is needed, LC supports the use of custom evaluation functions that can be modified by a software patch or application update.

### 1.2.1 Design Overview

The LC design is built around two fundamental constructs. The Watchpoint and the Actionpoint.

A Watchpoint defines a comparison between a piece of telemetry data and a pre-defined constant. Watchpoints are defined in the Watchpoint Definition Table (WDT). Statistics on watchpoint evaluations are stored in the Watchpoint Results Table (WRT) (see [CFS Limit Checker Table Definitions](#)). Watchpoints are evaluated whenever a message containing the telemetry point is received over the software bus by LC.

An Actionpoint defines the response LC will take based upon the current state of one or more watchpoints. Actionpoints are defined in the Actionpoint Definition Table (ADT). Statistics on actionpoint evaluations are stored in the Actionpoint Results Table (ART) (see [CFS Limit Checker Table Definitions](#)). Actionpoints are evaluated whenever LC receives a message with the [LC\\_SAMPLE\\_AP\\_MID](#) message ID. This is not a ground command but an internal message that will normally come from the CFS scheduler (SCH) application.

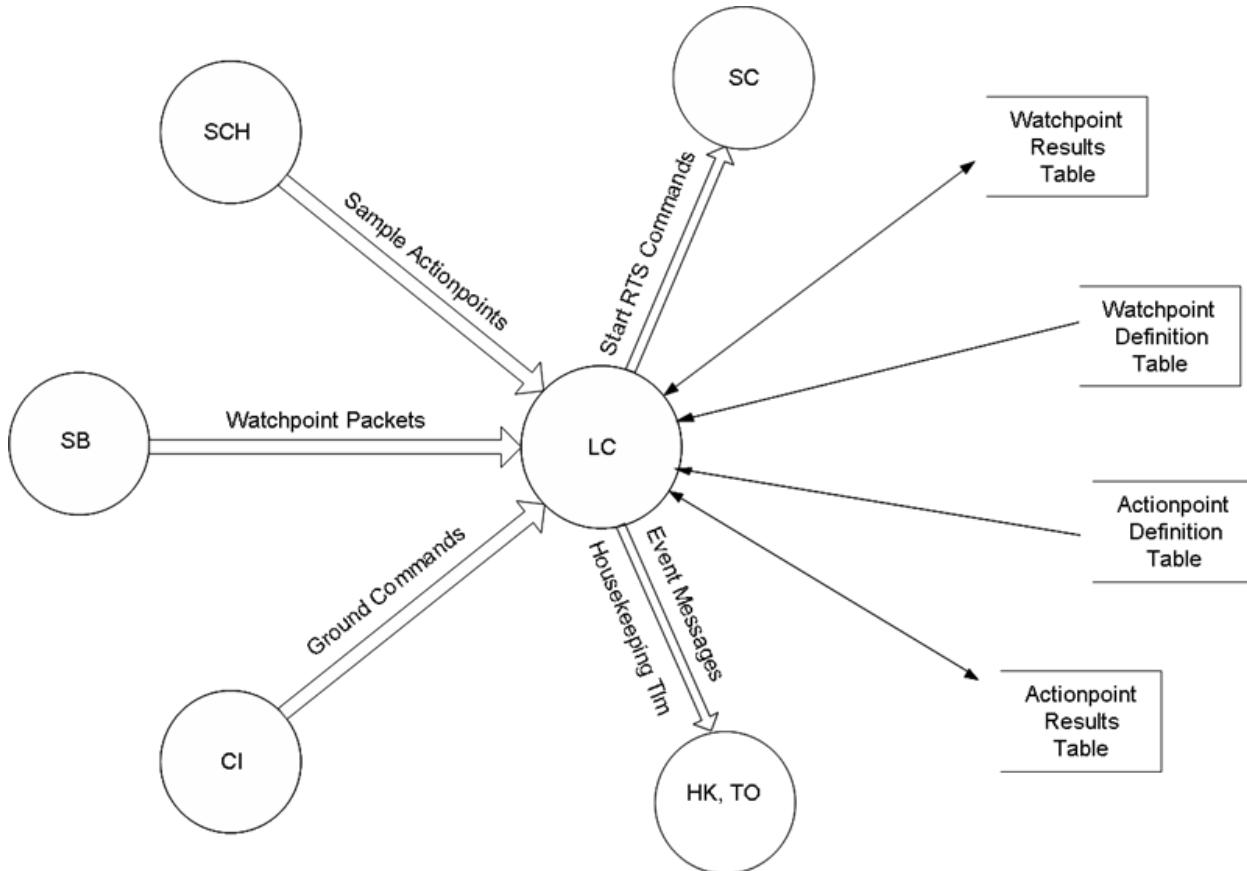


Figure 1 LC Context Diagram

### 1.3 CFS Limit Checker Operation

The CFS Limit Checker has three modes of operation, set by the [LC\\_SET\\_LC\\_STATE\\_CC](#) ground command and echoed in the CurrentLCState housekeeping variable.

**Active** - Active mode is the normal operation mode. In Active mode, the LC task performs all limit tests defined in the watchpoint definition table and will invoke stored command sequences if the results of watchpoint evaluations trigger an actionpoint condition as defined in the actionpoint definition table.

**Passive** - In Passive mode, the LC task behaves just like in Active mode except no stored command sequences will be invoked as a result of actionpoint triggers.

**Disabled** - When disabled, the LC task will perform no watchpoint or actionpoint limit tests.

Watchpoints are evaluated whenever a message containing the telemetry point is received by LC. Watchpoints may evaluate to [LC\\_WATCH\\_TRUE](#), [LC\\_WATCH\\_FALSE](#), [LC\\_WATCH\\_STALE](#) or [LC\\_WATCH\\_ERROR](#). Watchpoints can

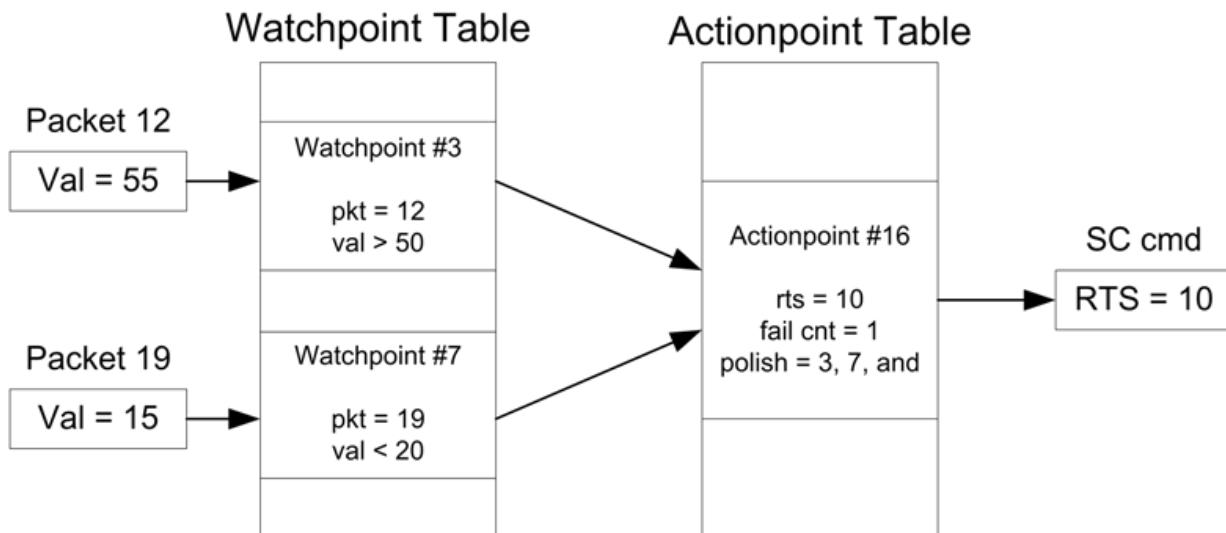
not be individually disabled. The only ways to keep Watchpoints from being evaluated are to squelch the telemetry packet on which they trigger, load a WDT that undefines a Watchpoint or disable the entire LC task.

Actionpoints are evaluated whenever LC receives a message with the [LC\\_SAMPLE\\_AP\\_MID](#) message ID. This message contains a parameter indicating which actionpoint to evaluate. A single actionpoint can be specified by using the actionpoint ID (0 to [LC\\_MAX\\_ACTIONPOINTS](#)). All actionpoints can be evaluated by specifying `xFFFF` as the parameter. There is no way to evaluate multiple actionpoints other than ALL within a single message. An Actionpoint defines a logical relationship between one or more Watchpoint results.

This logical relationship is defined in the form of a Reverse Polish Notation (RPN) expression in the actionpoint definition specified in the ADT. The result of this RPN evaluation is either [LC\\_ACTION\\_PASS](#), [LC\\_ACTION\\_FAIL](#), [LC\\_ACTION\\_STALE](#) or [LC\\_ACTION\\_ERROR](#). In the Actionpoint definition, a maximum number of consecutive fails is specified. If an Actionpoint fails the specified number of times consecutively, LC sends a request to the Stored Command (SC) application to execute a RTS (Relative Time Sequence) of commands as a response to this condition.

Actionpoints can be individually enabled/disabled with the [LC\\_SET\\_AP\\_STATE\\_CC](#) ground command. The state of an actionpoint may be set to [LC\\_APSTATE\\_ACTIVE](#), [LC\\_APSTATE\\_PASSIVE](#), or [LC\\_APSTATE\\_DISABLED](#). These states operate in the same way as the application operating modes described above. [LC\\_APSTATE\\_PASSIVE](#) will just disable RTS requests, while [LC\\_APSTATE\\_DISABLED](#) will stop evaluation of the actionpoint all together. An additional state [LC\\_APSTATE\\_PERMOFF](#) which functions the same as [LC\\_APSTATE\\_DISABLED](#) but can only be changed via table load, can be set using the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) ground command (see [CFS Limit Checker Frequently Asked Questions](#)).

An example of this watchpoint/actionpoint relationship is shown in the following diagram:



- 1) Telemetry packet #12 arrives – watchpoint #3 results set to TRUE
- 2) Telemetry packet #19 arrives – watchpoint #7 results set to TRUE
- 3) Action command arrives – actionpoint #16 evaluates to FAIL
- 4) Actionpoint #16 triggers – LC sends command to start RTS #10

Figure 2 LC Monitoring Process Example Diagram

Since LC is a table-driven application, its behavior is dictated by the contents of the WDT and ADT configuration tables. To change this behavior is simply a matter of loading a new table with modified parameters. LC will check for any pending table updates whenever it processes a housekeeping request. If the table passes validation it will go into effect right away before the next message is read from the software bus. It is not necessary to disable LC before updating a table, however since the watchpoint and actionpoint definitions use two separate tables, careful attention needs to be paid to ensure that the tables are consistent with each other whenever LC is active. For this reason, a mission may choose to always disable LC prior to any table updates and then re-enable monitoring.

When either the WDT or ADT are updated, the corresponding results table (WRT or ART) is reset to initialization values.

Ideally, LC should require no intervention from the ground on a routine basis. Once monitoring is enabled, it will keep processing data and checking for threshold violations (assuming regular scheduler input).

## 1.4 CFS Limit Checker Commands

[CFS Limit Checker Command Message IDs](#)

[CFS Limit Checker Command Structures](#)

[CFS Limit Checker Command Codes](#)

## 1.5 CFS Limit Checker Telemetry

[CFS Limit Checker Telemetry Message IDs](#)

[CFS Limit Checker Telemetry](#)

## 1.6 CFS Limit Checker Events

[CFS Limit Checker Event IDs](#)

## 1.7 CFS Limit Checker Deployment Guide

The first step in deploying the LC application is to size and construct default WDT and ADT tables. LC requires these default table images to be on the filesystem when the application is started or it will fail to load. These files are required even if using the Critical Data Store (CDS) since LC will fall back to these table images if a table restore from CDS fails (which will happen during a power-on reset). Where LC will look to find these files is dictated by the configuration parameters [LC\\_WDT\\_FILENAME](#) and [LC\\_ADT\\_FILENAME](#).

The size of the WDT and ADT tables is dictated by the configuration parameters [LC\\_MAX\\_WATCHPOINTS](#) and [LC\\_MAX\\_ACTIONPOINTS](#). The total size of either table should not exceed the cFE size limit for a single buffered table set by the [CFE\\_PLATFORM\\_TBL\\_MAX\\_SNGL\\_TABLE\\_SIZE](#) parameter. When considering how many watchpoints and actionpoints are needed, keep in mind the the entire WDT is sequentially searched whenever a message that may contain watchpoints is received. Likewise the entire ADT will be processed whenever a [LC\\_SAMPLE\\_AP\\_MID](#) message is received. While it is desirable to leave unused entries in both tables for later updates, large tables will increase search time which may be undesirable depending on the telemetry and actionpoint sample rates required. LC defines the performance ID [LC\\_WDT\\_SEARCH\\_PERF\\_ID](#) that can be used to monitor WDT search time. There is not

currently a performance ID for ADT processing since the actionpoint sample cycle is not dependent on telemetry rates but set by the configuration of the scheduler (SCH) application.

Example source code for these tables sized to the default number of watchpoints and actionpoints are provided in the files [lc\\_def\\_wdt.c](#) and [lc\\_def\\_adt.c](#).

LC requires a message with the message ID [LC\\_SAMPLE\\_AP\\_MID](#) to sample actionpoints. The CFS scheduler application (SCH) needs to be configured to provide this trigger message at the desired frequency for actionpoint processing to occur.

The function [LC\\_ExecuteRTS](#) in the file [lc\\_custom.c](#) needs to be reviewed for any modifications that may be needed to properly initiate RTS responses to actionpoint failures. This function uses a local declaration of an example stored commanding (SC) message structure which was done to allow LC to be compiled independent of any other external application's data structures. A mission may choose to remove this and use a message structure declared outside LC instead. This also applies to the [LC\\_RTS\\_REQ\\_MID](#) and [LC\\_RTS\\_REQ\\_CC](#) constants in [lc\\_mission\\_cfg.h](#).

If custom functions are to be used, the function [LC\\_CustomFunction](#) in the file [lc\\_custom.c](#) needs to modified appropriately (see [CFS Limit Checker Frequently Asked Questions](#)).

In the [lc\\_platform\\_cfg.h](#) file, there are configuration parameters that control use of the Critical Data Store (CDS) and the LC operation mode on application initialization. The default case is not to use the CDS and to set the application state to [LC\\_STATE\\_DISABLED](#).

## 1.8 CFS Limit Checker Configuration

[CFS Limit Checker Mission Configuration](#)

[CFS Limit Checker Platform Configuration](#)

## 1.9 CFS Limit Checker Table Definitions

### Watchpoint Definition Table (WDT)

The structure of a single watchpoint definition is defined by [LC\\_WDTEEntry\\_t](#). The WDT is an array of these entries sized by the configuration parameter [LC\\_MAX\\_WATCHPOINTS](#). The zero based index into this table is used by LC as the Watchpoint ID.

### Actionpoint Definition Table (ADT)

The structure of a single actionpoint definition is defined by [LC\\_ADTEEntry\\_t](#). The ADT is an array of these entries sized by the configuration parameter [LC\\_MAX\\_ACTIONPOINTS](#). The zero based index into this table is used by LC as the Actionpoint ID.

## Watchpoint Results Table (WRT)

The structure of a single watchpoint results table entry is defined by [LC\\_WRTEntry\\_t](#). The WRT is an array of these entries sized by the configuration parameter [LC\\_MAX\\_WATCHPOINTS](#). The index into this table is the same Watchpoint ID used for the corresponding definition table entry.

The timestamp used for the LastFalseToTrue and LastTrueToFalse fields is taken from the header of the message that contained the watchpoint. If the message timestamp is zero, LC will use the time returned by the [CFE\\_TIME\\_GetTime](#) function instead.

## Actionpoint Results Table (ART)

The structure of a single actionpoint results table entry is defined by [LC\\_ARTEEntry\\_t](#). The ART is an array of these entries sized by the configuration parameter [LC\\_MAX\\_ACTIONPOINTS](#). The index into this table is the same Actionpoint ID used for the corresponding definition table entry.

The entire WDT is searched any time a message is received that may contain watchpoints. For this reason, it is important that unused entries are properly marked by setting the WDT parameter DataType to [LC\\_DATA\\_WATCH\\_NOT\\_USED](#).

The entire ADT is processed any time a sample request is received that specifies an actionpoint equal to [LC\\_ALL\\_ACTIONPOINTS](#). For this reason, it is important that unused entries are properly marked by setting the ADT parameter DefaultState to [LC\\_APSTATE\\_NOT\\_USED](#).

When either the WDT or ADT are updated, the corresponding results table (WRT or ART) is reset to initialization values. For each entry in the WRT, WatchResult is set to [LC\\_WATCH\\_STALE](#) and all other values are zeroed. For each entry in the ART, ActionResult is set to [LC\\_ACTION\\_STALE](#), the CurrentState is set to the value of the actionpoint's Default State specified in the ADT, and all other values are zeroed. When preparing to update the WDT or ADT, the LC state should be set to inactive prior to the update and then set to active after the update is completed.

These are also the values used (for the entries specified in the command) when the [LC\\_RESET\\_AP\\_STATS\\_CC](#) or [LC\\_RESET\\_WP\\_STATS\\_CC](#) ground command is received.

## 1.10 CFS Limit Checker Operational Constraints

The LC application requires default WDT and ADT table images to be on the filesystem when the application is started or it will fail to load. These files are required even if using the Critical Data Store (CDS) since LC will fall back to these table images if a table restore from CDS fails (which will happen during a power-on reset). Where LC will look to find these files is dictated by the configuration parameters [LC\\_WDT\\_FILENAME](#) and [LC\\_ADT\\_FILENAME](#).

Potential causes for LC to terminate prematurely are an error return from the software bus in the application main loop or error return from one of the cFE table services functions when LC tries to do table management (check for updates, dump requests etc.) during each housekeeping cycle.

When using the Critical Data Store (CDS), the results tables and housekeeping data will only be restored if the application was shut down through cFE Executive Services and exited clean. If this is not the case, default values will be used (see [CFS Limit Checker Frequently Asked Questions](#)).

Ideally, LC should require no intervention from the ground on a routine basis. Once monitoring is enabled, it will keep processing data and checking for threshold violations (assuming regular scheduler input).

## 1.11 CFS Limit Checker Frequently Asked Questions

### Watchpoint Questions

**(Q) Watchpoints evaluate to [LC\\_WATCH\\_TRUE](#) or [LC\\_WATCH\\_FALSE](#). When the the watchpoint is defined which should be the error condition?**

*Watchpoints evaluate to a boolean True or False. So if you setup a comparison < 100 any watchpoint value 0 to 99 will evaluate [LC\\_WATCH\\_TRUE](#) and 100+ will be [LC\\_WATCH\\_FALSE](#).*

*You want to construct the watchpoint cases so they evaluate True when you are outside of the acceptable range for a telemetry point. That's why there are cumulative and consecutive true counts in the watchpoint results table, but no corresponding values for False.*

*For some examples, see the file [lc\\_def\\_wdt.c](#)*

**(Q) There is only a single comparison value for each watchpoint. How can I have multiple thresholds for a single telemetry point?**

*Create additional watchpoint definitions that reference the same telemetry point but have different comparison values. The watchpoints will be evaluated in the order they are listed in the WDT when the monitor point arrives.*

*Having multiple watchpoints allows different Actionpoints to trigger on each watchpoint state (or combination of states).*

**(Q) How do I calculate the watchpoint offset?**

*The offset is a zero based byte offset from the beginning of the message (including any headers) to the first byte of the watchpoint data. So for a cFE raw command using CCSDS, the offset has to account for the size of the cFE command header.*

**(Q) When do I need to use the bitmask in a watchpoint definition?**

*All watchpoints are sized to a 32 bit value when extracted from a message. The specified bitmask value is then applied (as a bitwise AND operation) before the comparison is made or the custom function is called.*

*When the watchpoint data is sized, data types smaller than 32 bits are properly sign or zero extended. For this reason, it is not necessary to define a mask for UWORLD, WORD or UBYTE, BYTE data types to compare properly. Although it's not needed, a properly constructed bit mask will not cause a problem for these evaluations either.*

*When you really need to use a bitmask is when monitoring odd sized data (such as a 24 bit sensor reading) or testing data to see if certain bits have been set (or cleared).*

*When no bitmask is needed, be sure to use the constant [LC\\_BITMASK\\_NONE](#) (or its equivalent value 0xFFFFFFFF) in your WDT tables. Since masking is a bitwise AND, setting the bitmask to zero will have the effect of always clearing the watchpoint data prior to comparison.*

**(Q) Why do I need to specify the byte order (big or little endian) of the watchpoint data type?**

*One enhancement made to the CFS version of LC is that it will properly byte swap watchpoint data prior to masking and comparison if the byte order of the data is different than the order used by the processor running LC. This allows LC to monitor telemetry data that might be constructed by instrument or other subsystem processors that use a different byte order.*

LC determines its byte order using the `STRUCT_HIGH_BIT_FIRST` and `STRUCT_LOW_BIT_FIRST` compiler switches that are set in the cFE header `common_types.h` according to the platform designated in the cFE platform makefile.

**(Q) When would a watchpoint evaluate to `LC_WATCH_STALE`?**

`LC_WATCH_STALE` is an initialization value for the Watchpoint Results Table. If a watchpoint has this WatchResult then the watchpoint is unused (the `DataType` in the WDT is set to `LC_DATA_WATCH_NOT_USED`) or a message that contains the watchpoint has not yet been received by LC and evaluated.

**(Q) When would a watchpoint evaluate to `LC_WATCH_ERROR`?**

`LC_WATCH_ERROR` is a runtime error indicator for watchpoint processing. Such a result should be rare since most of the causes are invalid watchpoint parameters that should be caught during validation of the Watchpoint Definition Table.

One notable exception is for floating point watchpoints when the message data is detected to be a floating point NAN (Not-A-Number) that can't be relationally compared to any value.

In all cases, an error event detailing the cause of the problem will be issued when a WatchResult is set to `LC_WATCH_ERROR`.

**(Q) What is a custom function and how do I create one?**

A custom function is a way to do more complicated processing on a watchpoint when the standard comparison operators are not adequate.

When the OperatorID in a watchpoint definition is set to `LC_OPER_CUSTOM`. The function `LC_CustomFunction` is called instead of LC doing a comparison. `LC_CustomFunction` will then return `LC_WATCH_TRUE` or `LC_WATCH_FALSE` that will be used as the WatchResult.

Although `LC_CustomFunction` is the same entry point for all watchpoints with a designated custom function operator, a mission can modify the function body to switch on the watchpoint ID (or `CustomFuncArgument` specified in the watchpoint definition) and branch to as many different sub-functions as it needs for watchpoint specific processing.

The `LC_CustomFunction` stub is in the source file `lc_custom.c`

**(Q) How is the WPResults array in the housekeeping packet (`LC_HkPacket_t`) interpreted?**

The WPResults array is a byte array (aligned to the nearest longword boundary) that contains a packed subset of the current contents of the Watchpoint Results Table (see `LC_WRTEntry_t`).

It allocates 2 bits per watchpoint for the most recent watchpoint comparison result. The numerical 2 bit values are defined using the following constants:

`LC_HKWR_FALSE`, `LC_HKWR_TRUE`, `LC_HKWR_ERROR`, `LC_HKWR_STALE`

Ordering (up to `LC_MAX_WATCHPOINTS`) is as follows :

Byte 0:(`Rwp3, Rwp2, Rwp1, Rwp0`), Byte 1:(`Rwp7, Rwp6, Rwp5, Rwp4`), etc...

The WPResults array is constructed every housekeeping cycle and is not effected by the reset counters (`LC_RESET_CC`) ground command. It will only get cleared if the Watchpoint Results Table is reset (via a new WDT table load or with a `LC_RESET_WP_STATS_CC` ground command)

## Actionpoint Questions

**(Q) Actionpoints evaluate to [LC\\_ACTION\\_PASS](#) or [LC\\_ACTION\\_FAIL](#). How should the RPN expression get constructed so it will evaluate to the proper result?**

*Actionpoint RPN expressions are combinations of watchpoint states and logical operators that evaluate to a boolean True or False.*

*Just like a watchpoint evaluation of True indicates a parameter outside acceptable limits, an AP expression that evaluates True is considered to have Failed and will have its ActionResult set to [LC\\_ACTION\\_FAIL](#).*

*While the terminology may seem confusing, the key point is to construct both watchpoint and actionpoint expressions to define the error condition LC is looking for and NOT the normal condition of the spacecraft data stream.*

*For some examples, see the file [lc\\_def\\_adt.c](#)*

**(Q) When would an actionpoint evaluate to [LC\\_ACTION\\_STALE](#)?**

*[LC\\_ACTION\\_STALE](#) is an initialization value for the Actionpoint Results Table. If an actionpoint has this ActionResult then one of three possible conditions are true:*

- 1) *The actionpoint is unused (the DefaultState in the ADT is set to [LC\\_APSTATE\\_NOT\\_USED](#)).*
- 2) *An actionpoint sample request ([LC\\_SAMPLE\\_AP\\_MID](#)) targeting the AP has not yet been received by LC so the AP has not yet been evaluated.*
- 3) *One or more of the watchpoints that this AP depends on (as defined by the RPN expression) has a current WatchResult of [LC\\_WATCH\\_STALE](#) so the AP can't be evaluated.*

**(Q) When would an actionpoint evaluate to [LC\\_ACTION\\_ERROR](#)?**

*[LC\\_ACTION\\_ERROR](#) is a runtime error indicator for actionpoint processing. Such a result should be rare since most of the causes are invalid actionpoint parameters or improperly constructed RPN expressions that should be caught during validation of the Actionpoint Definition Table.*

*However, an exception is the case where one or more watchpoints that this AP depends on (as defined by the RPN expression) has a current WatchResult of [LC\\_WATCH\\_ERROR](#). Since the AP can't be evaluated, this will cause the ActionResult to be set to [LC\\_ACTION\\_ERROR](#).*

*In all cases, an error event detailing the cause of the problem will be issued when an ActionResult is set to [LC\\_ACTION\\_ERROR](#).*

**(Q) How does the Actionpoint state [LC\\_APSTATE\\_PERMOFF](#) differ from [LC\\_APSTATE\\_DISABLED](#)?**

*The AP state [LC\\_APSTATE\\_PERMOFF](#) is intended to provide a way to disable an AP so it can not easily be turned back on by mistake. Such actionpoints may not be needed after a separation sequence or only apply to certain mission phases.*

*While the two states are treated the same way during actionpoint processing (the AP isn't evaluated), there are a few differences.*

*An AP can't be set to [LC\\_APSTATE\\_PERMOFF](#) with the [LC\\_SET\\_AP\\_STATE\\_CC](#) command, it must be done with the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command.*

To set an AP to [LC\\_APSTATE\\_PERMOFF](#) with the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command, the current AP state must be [LC\\_APSTATE\\_DISABLED](#).

The [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command can only be issued for a single actionpoint, [LC\\_ALL\\_ACTIONPOINTS](#) is not valid as an argument for this command.

Once an AP is set to [LC\\_APSTATE\\_PERMOFF](#), it can only be changed with a new ADT table load.

**(Q) How is the APResults array in the housekeeping packet ([LC\\_HkPacket\\_t](#)) interpreted?**

The APResults array is a byte array (aligned to the nearest longword boundary) that contains a packed subset of the current contents of the Actionpoint Results Table (see [LC\\_ARTEntry\\_t](#)).

It allocates 4 bits per actionpoint, with 2 bits representing the current state, and 2 bits for the most recent evaluation result.

The numerical 2 bit values for current state are defined using the following constants:

[LC\\_HKAR\\_STATE\\_NOT\\_USED](#), [LC\\_HKAR\\_STATE\\_ACTIVE](#), [LC\\_HKAR\\_STATE\\_PASSIVE](#), [LC\\_HKAR\\_STATE\\_DISABLED](#)

An actionpoint whose current state is [LC\\_APSTATE\\_PERMOFF](#) will have its state reported in the APResults as [LC\\_HKAR\\_STATE\\_NOT\\_USED](#).

The numerical 2 bit values for evaluation results are defined using the following constants:

[LC\\_HKAR\\_PASS](#), [LC\\_HKAR\\_FAIL](#), [LC\\_HKAR\\_ERROR](#), [LC\\_HKAR\\_STALE](#)

Ordering (up to [LC\\_MAX\\_ACTIONPOINTS](#)) is as follows :

Byte 0:(Sap1, Rap1, Sap0, Rap0), Byte 1:(Sap3, Rap3, Sap2, Rap2), etc...

The APResults array is constructed every housekeeping cycle and is not effected by the reset counters ([LC\\_RESET\\_CC](#)) ground command. It will only get cleared if the Actionpoint Results Table is reset (via a new ADT table load or with a [LC\\_RESET\\_AP\\_STATS\\_CC](#) ground command)

**(Q) Will an RTS get requested more than once if an AP stays in the [LC\\_ACTION\\_FAIL](#) state?**

No. Assuming the current state of an actionpoint is [LC\\_APSTATE\\_ACTIVE](#), then when the actionpoint fails enough times to trigger an RTS, the state is set to [LC\\_APSTATE\\_PASSIVE](#).

In the passive state, the AP will continue to be sampled and statistics updated, but no RTS requests will be initiated.

**(Q) Can we filter event messages per actionpoint?**

Not in the current implementation. Transition event messages for actionpoints are of type [CFE\\_EVS\\_EventType\\_DEBUG](#) and enabling them will turn on events for all actionpoint transitions.

However, it is planned to add event message limits and event message counts to the ADT and ART tables that would allow this type of filtering in a future version of LC.

**(Q) Can I send a single actionpoint evaluation message for multiple actionpoints (eg. 1,2,5,6,7)?**

No. You can send individual messages for each action point or a single message to evaluate ALL (xFFFF) action-points.

**(Q) What if most of my actionpoints need to be evaluated at 1HZ but one needs to be evaluated at 10HZ. How would I setup the Scheduler table to do this?**

In order to evaluate an actionpoint, an evaluation message must be placed in the scheduler table. Since the scheduler table is evaluated at 1HZ, the suggested way to accomplish this is to place 9 entries for the 10HZ actionpoint and a single entry to evaluate ALL actionpoints. Note that the ALL actionpoints message needs to be placed 100ms away from the other 9.

## General Questions

### (Q) When do results tables get cleared?

When either the WDT or ADT are updated, the corresponding results table (WRT or ART) is reset to initialization values. For each entry in the WRT, WatchResult is set to `LC_WATCH_STALE` and all other values are zeroed. For each entry in the ART, ActionResult is set to `LC_ACTION_STALE`, the CurrentState is set to the value of the actionpoint's DefaultState specified in the ADT, and all other values are zeroed.

These are also the values used (for the entries specified in the command) when the `LC_RESET_AP_STATS_CC` or `LC_RESET_WP_STATS_CC` ground command is received.

### (Q) Where can I find some examples of watchpoint and actionpoint table definitions?

The files `lc_def_wdt.c` and `lc_def_adt.c` provide example source code files that can be used to build LC tables and contain some sample table entries in the comment blocks.

Since the CFS LC was based upon the LC implementation for LRO, LRO limit checker tables may also provide guidance though there are some minor differences in syntax between the two implementations.

### (Q) When using the CDS, what is restored and when will defaults be used?

When the platform configuration parameter `LC_SAVE_TO_CDS` is defined, LC will attempt to use the critical data store (CDS) to save and restore data across application restarts. The data that LC will save are:

- Watchpoint and Actionpoint Definition Tables
- Watchpoint and Actionpoint Results Tables
- LC Housekeeping Data

While the definition tables only need to be updated in the CDS when new ones are loaded, it is not practical from a performance standpoint to update the CDS every time the housekeeping data or results data changes. For this reason, results tables and housekeeping are only updated in the CDS if the application is shut down by cFE Executive Services and exits cleanly. When the application starts, it will check a "saved on exit" flag in the data restored from CDS to see if the data is good. If not, it will be reset to initialization values.

The detailed sequence for a CDS restore on application startup (with failure cases) is as follows:

#### 1) Try to restore Watchpoint Definition Table from CDS

- If FAILS Load default Watchpoint Definition Table from filesystem
- Load default Actionpoint Definition Table from filesystem
- Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

#### 2) If 1 succeeded, try to restore Actionpoint Definition Table from CDS

- If FAILS Load default Watchpoint Definition Table from filesystem
- Load default Actionpoint Definition Table from filesystem
- Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

3) If 1 and 2 succeeded, try to restore Watchpoint Results Table from CDS

- If FAILS Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

4) If 1 through 3 succeeded, try to restore Actionpoint Results Table from CDS

- If FAILS Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

5) If 1 through 4 succeeded, try to restore Application data (housekeeping variables) from CDS

- If FAILS Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

6) If 1 through 5 succeeded, check "save on exit" flag in application data restored in 5

- IF not set to "SAVED" (meaning we updated on exit)
- Clear Watchpoint Results Table to init values
- Clear Actionpoint Results Table to init values
- Clear Housekeeping variables to init values

## 2 Core Flight Executive Documentation

- General Information and Concepts
  - Background
  - Applicable Documents
  - Version Numbers
  - Dependencies
  - Acronyms
  - Glossary of Terms
- Executive Services (ES)
  - cFE Executive Services Overview
  - cFE Executive Services Commands
  - cFE Executive Services Telemetry
  - ES Event Message Reference
  - cFE Executive Services Configuration Parameters
- Events Services (EVS)
  - cFE Event Services Overview
  - cFE Event Services Commands
  - cFE Event Services Telemetry
  - EVS Event Message Reference
  - cFE Event Services Configuration Parameters
- Software Bus Services (SB)
  - cFE Software Bus Overview
  - cFE Software Bus Commands
  - cFE Software Bus Telemetry
  - SB Event Message Reference
  - cFE Software Bus Configuration Parameters
- Table Services (TBL)
  - cFE Table Services Overview
  - cFE Table Services Commands
  - cFE Table Services Telemetry
  - TBL Event Message Reference
  - cFE Table Services Configuration Parameters
- Time Services (TIME)
  - cFE Time Services Overview
  - cFE Time Services Commands
  - cFE Time Services Telemetry
  - TIME Event Message Reference
  - cFE Time Services Configuration Parameters

- [cFE Event Message Cross Reference](#)
- [cFE Command Mnemonic Cross Reference](#)
- [cFE Telemetry Mnemonic Cross Reference](#)
- [cFE Application Programmer's Interface \(API\) Reference](#)

## 2.1 Background

The Core Flight Executive (cFE) is an application development and run-time environment. The cFE provides a set of core services including Software Bus (messaging), Time, Event (Alerts), Executive (startup and runtime), and Table services. The cFE defines an application programming interface (API) for each service which serves as the basis for application development.

The cFE Software Bus service provides a publish and subscribe messaging system that allows applications to easily plug and play into the system. Applications subscribe to cFE services at runtime, making system modifications easy. Facilitating rapid prototyping, new applications can be compiled, linked, loaded, and started without requiring the entire system to be rebuilt.

Each service comes complete with a built in application that allows users to interface with each service. To support reuse and project independence, the cFE contains a configurable set of requirements and code. The configurable parameters allow the cFE to be tailored for each environment including desk-top and closed loop simulation environments. This provides the ability to run and test software applications on a developer's desktop and then deploy that same software without changes to the embedded system. In addition the cFE includes the following software development tools:

- Unit Test Framework (UTF) for unit testing applications developed via the cFE
- Software Timing Analyzer that provides visibility into the real-time performance of embedded systems software
- Table Builder
- Command and Telemetry utilities

The cFE is one of the components of the Core Flight System (cFS), a platform and project independent reusable software framework and set of reusable software applications. There are three key aspects to the cFS architecture: a dynamic run-time environment, layered software, and a component based design. The combination of these key aspects along with an implementation targeted to the embedded software domain makes it suitable for reuse on any number of NASA flight projects and/or embedded software systems.

The pivotal design feature, abstracting the software architecture from the hardware and forming the basis of reuse, is component layering. Each layer of the architecture "hides" its implementation and technology details from the other layers by defining and using standard Application Programming Interfaces (APIs). The internals of a layer can be changed without affecting other layers' internals and components.

The layers include an OS Abstraction Layer (OSAL), Platform Support Package (PSP) layer, core Flight Executive (cFE) layer, and an Application layer. The cFE layer runs on top of the PSP and OSAL layers. The cFE comes complete with a build environment, deployment guide, API reference guide, and provides a sample PSP. The OSAL is available open source and once integrated into the cFE build environment, developers will be ready to build and run the system and start developing their mission/project specific applications that easily plug and play into the system.

### 2.1.1 Core Flight Executive (cFE) Goals

The main long term goal of the cFE is to form the basis for a platform and project independent reusable software framework. The cFE with the OSAL allow the development of portable embedded system software that is independent of a particular Real Time Operating System and hardware platform. A secondary long term goal is to create a standardized, product-line approach for development of embedded aerospace flight software.

**2.1.1.1 Functional and Community Goals** The cFE allows embedded system software to be developed and tested on desktop workstations and ported to the target platform without changing a single line of code, providing a shorter development and debug time. The cFE is an enabler of software collaboration amongst all users promoting the growth of the application and library layers where new applications, libraries, tools, and lessons learned can be contributed and shared.

It is important for application developers to realize the long term and functional goals of the cFE. With a standard set of services providing a standard API, all applications developed with the cFE have an opportunity to become useful on future missions through code reuse. In order to achieve this goal, applications must be written with care to ensure that their code does not have dependencies on specific hardware, software or compilers. The cFE and the underlying generic operating system API (OS API) have been designed to insulate the cFE Application developer from hardware and software dependencies. The developer, however, must make the effort to identify the proper methods through the cFE and OS API to satisfy their software requirements and not be tempted to take a "short-cut" and accomplish their goal with a direct hardware or operating system software interface.

## 2.2 Applicable Documents

Document Title	Link
cFE System (L4) Requirements Document	<a href="cfe/docs/cfe_requirements.docx">cfe/docs/cfe_requirements.docx'</a>
cFE Functional (L5) Requirements Document	<a href="cfe/docs/cFE_FunctionalRequirements.csv">cfe/docs/cFE_FunctionalRequirements.csv</a>
cFE Application Developers Guide	<a href="cfe/docs/cFE_Application_Developers_Guide.md">cfe/docs/cFE_Application_Developers_Guide.md'</a>
cFE User's Guide (includes API)	Autogenerated from code, provided with releases in cFE repository
OS Abstraction Layer (OSAL) API	Autogenerated from code, provided with releases in OSAL repository

## 2.3 Version Numbers

### 2.3.1 Version Number Semantics

The version number is a sequence of four numbers, generally separated by dots when written. These are, in order, the Major number, the Minor number, the Revision number, and the Mission Revision number.

It is important to note that version numbers are only updated upon official releases of tagged versions, **NOT** on development builds. We aim to follow the Semantic Versioning v2.0 specification with our versioning.

The MAJOR number is incremented on release to indicate when there is a change to an API that may cause existing, correctly-written cFS components to stop working. It may also be incremented for a release that contains changes deemed to be of similar impact, even if there are no actual changes to the API.

The MINOR number is incremented on release to indicate the addition of features to the API which do not break the existing code. It may also be incremented for a release that contains changes deemed to be of similar impact, even if there are no actual updates to the API.

The REVISION number shall be incremented on changes that benefit from unique identification such as bug fixes or major documentation updates. The Revision number may also be updated if there are other changes contained within a release that make it desirable for applications to distinguish one release from another. WARNING: The revision number is set to the number 99 in development builds. To distinguish between development builds refer to the BUILD\_NUMBER and BUILD\_BASELINE detailed in the section "Identifying Development Builds".

The Mission Rev Version number is set to zero in all official releases, and is reserved for the mission use.

### 2.3.2 How and Where Defined

The version numbers are provided as simple macros defined in the [cfe\\_version.h](#) header file as part of the API definition; these macros must expand to simple integer values, so that they can be used in simple if directives by the macro preprocessor.

Note the Mission Rev number is provided for missions to be able to identify unique changes they have made to the released software (via clone and own). Specifically, the values 1-254 are reserved for mission use to denote patches/customizations while 0 and 0xFF are reserved for cFS open-source development use (pending resolution of nasa/cFS#440).

### 2.3.3 Identifying Development Builds

In order to distinguish between development versions, we also provide a BUILD\_NUMBER.

The BUILD\_NUMBER reflects the number of commits since the BUILD\_BASELINE, a baseline git tag, for each particular component. The BUILD\_NUMBER integer monotonically increases for a given baseline. The BUILD\_BASELINE identifies the current development cycle and is a git tag with format vMAJOR.MINOR.REVISION. The Codename used in the version string also refers to the current development cycle. When a new baseline tag and codename are created, the BUILD\_NUMBER resets to zero and begins increasing from a new baseline.

### 2.3.4 Templates for the short and long version string

See [cfe\\_version.h](#) for the standard layout and definition of version information. The apps and repositories follow the same pattern by replacing the CFE\_ prefix with the appropriate name; for example, osal uses OS\_, psp uses CFE\_P←SP\_IMPL, and so on.

Suggested pattern for development:

- CFSCOMPONENT\_SRC\_VERSION: REFERENCE\_GIT\_TAG"+dev"BUILD\_NUMBER
  - Example: "v6.8.0-rc1+dev123"
- CFSCOMPONENT\_VERSION\_STRING: "CFSCOMPONENT DEVELOPMENT BUILD "CFSCOMPONENT\_S←RC\_VERSION" (Codename: CFSCONSTELLATION), Last Official Release: MAJOR.MINOR.REVISION"
  - Example: "cFE DEVELOPMENT BUILD v6.8.0-rc1+dev123 (Codename: Bootes), Last Official Release: cfe v6.7.0"

Suggested pattern for official releases:

- CFSCOMPONENT\_SRC\_VERSION: OFFICIAL\_GIT\_TAG
  - Example: "v7.0.0"
- COMPONENT\_VERSION\_STRING: "CFSCOMPONENT OFFICIAL RELEASE "CFSCOMPONENT\_SRC\_VERSION" (Codename: CFSCONSTELLATION)"
  - Example: "cFE OFFICIAL RELEASE v7.0.0 (Codename: Caelum)"

## 2.4 Dependencies

The Core Flight Executive (cFE) is required to be built with the Operating System Abstraction Layer (OSAL) and Platform Support Package (PSP) components of the Core Flight System (cFS). It is always recommended to build with the latest versions of each of the components as backward compatibility may not be supported.

Several internal data structures within the cFE use the "char" data type. This data type is typically 1 byte in storage size with a value range -128 to 127 or 0 to 255. The size of the "char" data type and whether or not the type is signed or unsigned can change across platforms. The cFE assumes use of the "char" data type as an **8-bit type**.

## 2.5 Acronyms

Acronym	Description
AC	Attitude Control
ACE	Attitude Control Electronics
ACS	Attitude Control System
API	Application Programming Interface
APID	CCSDS Application ID
App	Application
CCSDS	Consultative Committee for Space Data Systems
CDH, C&DH	Command and Data Handling
cFE	core Flight Executive
cFS	core Flight System
CM	Configuration Management
CMD	Command
CPU	Central Processing Unit
EDAC	Error Detection and Correction
EEPROM	Electrically Erasable Programmable Read-Only Memory
ES	Executive Services
EVS	Event Services
FC	Function Code
FDC	Failure Detection and Correction
FSW	Flight Software
HW, H/W	Hardware
ICD	Interface Control Document

Acronym	Description
MET	Mission Elapsed Time
MID	Message ID
OS	Operating System
OSAL	Operating System Abstraction Layer
PID	Pipeline ID
PKT	Packet
PSP	Platform Support Package
RAM	Random-Access Memory
SB	Software Bus
SDO	Solar Dynamics Observatory
ST5	Space Technology Five
STCF	Spacecraft Time Correlation Factor
SW, S/W	Software
TAI	International Atomic Time
TBD	To Be Determined
TBL	Table Services
TID	Task ID
TIME	Time Services
TLM	Telemetry
UTC	Coordinated Universal Time

## 2.6 cFE Executive Services Overview

Executive Services (ES) is one of the five core Flight Executive components. ES is the primary interface to the underlying Operating System, providing a high level interface to system control facilities. The ES component is responsible for starting up and restarting the cFE, starting up, shutting down, and restarting cFE Applications, logging errors and performance data, and providing a persistent memory store for cFE Applications.

The interfaces to the ES task include the Ground Interface (commands and telemetry) and the Application Programmer Interfaces (APIs). The ES task interfaces to the OS through the OS Abstraction Layer (OSAL) and platform through the Platform Support Package (PSP).

The functionality provided by the ES task include Software Reset, Application and Child Task Management, Basic File System, Performance Data Collection, Critical Data Store, Memory Pool, System Log, Shell Command.

For additional detail on Executive Services, see the following sections:

- [Terminology](#)
- [Software Reset](#)
  - [Reset Types and Subtypes](#)
  - [Exception and Reset \(ER\) Log](#)

- Application and Child Task Management
  - Starting an Application
  - Stopping an Application
  - Restarting an Application
  - Reloading an Application
  - Listing Current Applications
  - Listing Current Tasks
  - Loading Common Libraries
- Basic File System
- Performance Data Collection
- Critical Data Store
- Memory Pool
- System Log
- Version Identification
- Frequently Asked Questions about Executive Services

### 2.6.1 Terminology

The following sections describe terminology that is very relevant to understanding the Executive Services:

- "Application" and "cFE Application"
- "Task"
- "Startup Script"

### 2.6.1.1 "Application" and "cFE Application"

#### Application

The term 'Application' as defined in the [Glossary of Terms](#) is a *set of data and functions that is treated as a single entity by the cFE*. *cFE resources are allocated on a per-Application basis. Applications are made up of a Main Task and zero or more Child Tasks.*

#### cFE Application

A 'cFE Application' is an application that is external to the cFE and designed to interface to the cFE through the APIs. It is created through an entry in the ["Startup Script"](#) (with the 'Object Type' field set to CFE\_APP) or by way of the [CFE\\_ES\\_START\\_APP\\_CC](#) ground command.

When referring to one of the five applications internal to the cFE (ES, EVS, SB, TIME or TBL), the term 'Service' or 'Core Application' is typically used.

A listing of cFE applications can be acquired by using the [CFE\\_ES\\_QUERY\\_ALL\\_CC](#) ground command. This listing will include the cFE internal applications as well as cFE applications that are loaded and running.

**2.6.1.2 "Task"** A Task is a thread of execution in the operating system, often associated with a cFE Application. Each cFE Application has a Main task providing its CPU context, stack and other OS resources. In addition, each cFE Application can create multiple Child Tasks which are closely associated with the Parent Task and cFE Application.

In a traditional Real Time Operating System such as vxWorks, the cFE Application Main task and child tasks end up being mapped to these OS tasks in the same shared memory space. For example, a Stored Command cFE Application that consists of a cFE Main Task and 10 Relative Time Sequence Child Tasks would have 11 tasks on a vxWorks system. The only association between these tasks exists in the cFE.

In a memory protected process oriented Operating System, the intention is to have a cFE Application implemented as a memory protected process with its own virtual address space. In this Process Model, each cFE Child Task would be a thread in the parent Process, much like a Unix process with multiple threads. In this model, the Stored Command example with a cFE Main Task and 10 Relative Time Sequence Child Tasks would consist of a Unix Process and 10 pthreads, all under the same virtual address space.

**2.6.1.3 "Startup Script"** The startup script is a text file, written by the user that contains a list of entries (one entry for each application) and is used by the ES application for automating the startup of applications. For a processor reset, ES checks for the CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE first, and if it doesn't exist or for a power on reset ES uses the file passed in to [CFE\\_ES\\_Main](#) (typically CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE but dependent on the PSP).

The fields in a single entry include:

---

Object Type	CFE_APP for an Application, or CFE_LIB for a library.
Path/Filename	This is a cFE Virtual filename, not a vxWorks device pathname
Entry Point	This is the name of the "main" function for App.
CFE Name	The cFE name for the APP or Library
Priority	This is the Priority of the App, not used for a Library
Stack Size	This is the Stack size for the App, not used for a Library
Load Address	This is the Optional Load Address for the App or Library. It is currently not implemented so it should always be 0x0.
Exception Action	<p>This is the Action the cFE should take if the Application has an exception.</p> <ul style="list-style-type: none"> <li>• 0 = Do a cFE Processor Reset</li> <li>• Non-Zero = Just restart the Application</li> </ul>

Immediately after the cFE completes its initialization, the ES Application first looks for the volatile startup script. The location in the file system is defined by the cFE platform configuration parameter named [CFE\\_PLATFORM\\_ES\\_VOLATILE\\_STARTUP\\_FILE](#). This configuration parameter contains a path as well as a filename. If the file is found, ES begins to startup the applications that are listed in the file. If ES does not find the file, it attempts to open the [CFE\\_PLATFORM\\_ES\\_NONVOL\\_STARTUP\\_FILE](#).

If ES finds the volatile startup script, the attempt to open the nonvolatile startup script is bypassed.

Any errors encountered in the startup script processing are written to the [System Log](#). The [System Log](#) may also contain positive acknowledge messages regarding the startup script processing.

The startup script delivered with the cFE (`cfe_es_startup.scr`) also has some detailed information about the fields and the settings.

## 2.6.2 Software Reset

The ES Software Reset provides a command to [reset the cFE](#) as well as [resetting individual applications](#). Because applications are dependent on the cFE services, it is not possible to reset the cFE without affecting the applications. Therefore, a command to reset the cFE will also reset every application that is running at the time the command is received.

Also include is the Exception and Reset (ER) Log, which has a command for [dumping](#) or [clearing](#) the log and telemetry to show the number of entries in the log. In addition to the ER log, the user may find information about the most recent reset in the ES task housekeeping telemetry.

The ES Software Reset also provides a command to [set the maximum number of processor resets](#) before ES issues a power-on reset. There is a corresponding 'processor resets' counter in ES housekeeping telemetry that may be [reset through another ES command](#).

### 2.6.3 Reset Types and Subtypes

The Reset Type is sent to the ground in the ES housekeeping packet and tells how the current running version of the cFE was invoked. The possible Reset Types expected in the telemetry field are [CFE\\_PSP\\_RST\\_TYPE\\_POWERON](#) and [CFE\\_PSP\\_RST\\_TYPE\\_PROCESSOR](#). There is a third Reset Type defined in the ES code as [CFE\\_ES\\_APP\\_RESTART](#) which applies only to restarting an individual application and is covered in more detail in the section titled Application and Child Task.

The Reset Subtype is also sent in the ES housekeeping packet and gives more detail about the type of reset that started the execution of the current running version of the cFE. The possible Reset Subtypes are [CFE\\_PSP\\_RST\\_SUBTYPE\\_POWER\\_CYCLE](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_PUSH\\_BUTTON](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_HW\\_SPECIA](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_HW\\_WATCHDOG](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_RESET\\_COMMAND](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_EXCEP](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_UNDEFINED\\_RESET](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_HWDEBUG\\_RESET](#), [CFE\\_PSP\\_RST\\_SUBTYPE\\_BAN](#).

### 2.6.4 Exception and Reset (ER) Log

The Exception and Reset Log contains detailed information about past resets and exceptions. To view the information the [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#) command must be sent. This command will write the log to a binary file. The path and filename may be specified in the command. If the filename command field contains an empty string, the configuration parameter [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_ER\\_LOG\\_FILE](#) is used to specify the path and filename. Use the ground system to get the file and display the contents. There is also a command to clear the ER log, [CFE\\_ES\\_CLEAR\\_ER\\_LOG\\_CC](#).

The size of the ER log is defined by the platform configuration parameter [CFE\\_PLATFORM\\_ES\\_ER\\_LOG\\_ENTRIES](#). This log is preserved after a processor reset and held in the ES reset area.

A count of the number of entries in the log is present in the ES housekeeping telemetry. This count can be used with the configuration parameter [CFE\\_PLATFORM\\_ES\\_ER\\_LOG\\_ENTRIES](#) to calculate the fullness of the log.

The information contained in a single log entry is defined by the structure [CFE\\_ES\\_ERLog\\_t](#).

### 2.6.5 Application and Child Task Management

The ES Application and Child Task Management provides the user with full control over starting and stopping applications as well as querying information regarding applications, tasks and library routines.

There is no command to start or stop a child task. Child tasks can be controlled (started, stopped or deleted) only by the parent application through an API call.

This provides a way for the user to load a set of library routines, (via the startup script) without starting a corresponding task. See the section related to library routines for more detail.

The ES task maintains a counter for the number of registered applications, number of registered child tasks and the number of registered libraries in the ES housekeeping data.

### 2.6.6 Starting an Application

There are two ways to start an application, through the ground command [CFE\\_ES\\_START\\_APP\\_CC](#) or through the startup script. In either case, the object file must be loaded on board before the command is sent or before the startup script is executed. The startup script contains a list of applications and library routines to load and start immediately after the cFE finishes its startup sequence. The parameters in the command, match the elements of an entry in the startup script.

The format of the Start Application command, is defined in the structure [CFE\\_ES\\_StartAppCmd\\_t](#). The members of the structure include, application name, entry point, filename, stack size, load address, exception action and priority.

If the command fails for any reason, an error event will be sent stating the reason for the failure. There may be additional information in the system log that can be viewed by sending the ES command to dump the system log.

After starting an application, the ES task sends an informational event message displaying the application name, file-name of the object and the application ID. The new application will then show up in the query list downloaded in response to the [CFE\\_ES\\_QUERY\\_ALL\\_CC](#) command.

### 2.6.7 Stopping an Application

Stopping an application can be done through the ground command [CFE\\_ES\\_STOP\\_APP\\_CC](#). This command will terminate the application execution and all child tasks created by the application, free the system resources that it allocated and delete the corresponding object file.

The process of stopping an application is done in a controlled manner when the application is properly using the return code from the call to the [CFE\\_ES\\_RunLoop](#). When the application properly uses this function, the ES task starts a timer and (via the return code) tells the application to exit at its own convenience. This gives the application time to free its own resources and do any cleanup that may be required before terminating itself by calling [CFE\\_ES\\_ExitApp](#). If the timer expires and the application still exists, then ES must 'kill' the application. When the application is killed, ES attempts to cleanup the applications resources as best it could. In this case there is no guarantee that all the system resources are properly released.

The format of the Stop Application command, is defined in the structure [CFE\\_ES\\_StopAppCmd\\_t](#). The only parameter in the command is an application name.

If the command fails for any reason, an error event will be sent stating the reason for the failure. There may be additional information in the system log that can be viewed by sending the ES command to dump the system log.

After stopping an application, the ES task sends a debug message stating the name of the application. After executing the command, the application (or any resources it allocated) should no longer be listed in any cFE tables or files.

### 2.6.8 Restarting an Application

The [CFE\\_ES\\_RESTART\\_APP\\_CC](#) command is used to restart an application using the same file name as the last start.

This command checks for file existence, the application is running, and the application is not a core app. If valid, the application restart is requested.

When requested, ES stops the application, unloads the object file, loads the object file using the previous file name, and restarts an application using the parameters defined when the application was previously started, either through the startup script or by way of the [CFE\\_ES\\_START\\_APP\\_CC](#) command.

### 2.6.9 Reloading an Application

The [CFE\\_ES\\_RELOAD\\_APP\\_CC](#) command is used to reload an application using a new file name.

This command performs the same actions as [CFE\\_ES\\_RESTART\\_APP\\_CC](#) only using the new file.

### 2.6.10 Listing Current Applications

There are two options for receiving information about applications, the [CFE\\_ES\\_QUERY\\_ONE\\_CC](#) command can be used to get details about a single application. This command takes an application name as its only parameter and the application information is sent as a software bus packet that can be telemetered to the ground.

Or the [CFE\\_ES\\_QUERY\\_ALL\\_CC](#) command can be used to get information about all the applications that are currently registered with ES. This command writes the application data to a file and has a one parameter which specifies the path and filename of the output file.

For either command, the following Application information is made available:

- **Application ID** - The Application ID assigned by the cFE to the Application
- **Type Identifier** - Identifies whether the Application is a CORE App or an EXTERNAL App
- **Name** - The Application Name
- **Entry Point** - The symbolic name for the entry point into the Application
- **Filename** - The name of the file the Application was loaded from
- **Stack Size** - The number of bytes allocated for the Application's stack
- **Load Address** - The starting address of memory where the Application was loaded
- **Load Size** - The size, in bytes, of the Application when loaded into memory
- **Start Address** - The physical address that maps to the Entry Point
- **Exception Action** - A flag that identifies whether the Processor should undergo a Restart or whether just the Application should restart upon an exception condition within the Application
- **Priority** - The assigned priority for the Application
- **Main Task ID** - The Task ID assigned to the main task associated with the Application
- **Main Task Name** - The name of the main task associated with the Application
- **Number of Child Tasks** - The number of child tasks spawned by the main task

For a description of the format in which this data is dumped, see [CFE\\_ES\\_AppInfo\\_t](#).

### 2.6.11 Listing Current Tasks

The [CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#) command is used to get a list of child tasks that are currently registered with ES. The following information is provided for each registered task:

- **Task ID** - The Task ID associated with the specified task
- **Task Name** - The name of the Task
- **Application ID** - The ID for the Application the Task is associated with
- **Application Name** - The name of the Application the Task is associated with

### 2.6.12 Loading Common Libraries

Library routines may be loaded only through the startup script. There is an option that allows a library routine initialization function to be executed after the library is loaded. Refer to the cFE Application Developers Guide for more information regarding Library Routines and startup scripts. The startup script delivered with the cFE (`cfe_es_startup.scr`) also has some detailed information about library routines.

### 2.6.13 Basic File System

ES provides minimal functionality to initialize, read, and write cfe File headers.

### 2.6.14 Performance Data Collection

The Performance Data Collection provides precise timing information for each software application similar to how a logic analyzer can trigger and filter data.

API calls are inserted by the development team at key points in the code. The basic operation is to start the data collection, wait some amount of time, then send the command to stop the data collection. When the stop command is received, the ES task writes all the data from the buffer to a file. The file can then be imported to analysis tools for viewing. The size of the buffer is configurable through the [CFE\\_PLATFORM\\_ES\\_PERF\\_DATA\\_BUFFER\\_SIZE](#) platform configuration parameter.

Additional information follows:

- [Performance Data Collection Trigger Masks](#)
- [Starting to Collect Performance Data](#)
- [Stopping the Collection of Performance Data](#)
- [Viewing the Collection of Performance Data](#)

**2.6.14.1 Performance Data Collection Trigger Masks** The trigger mask is used to control precisely when to start collecting the data. There is a bit in the trigger mask for every marker used in the code. After a start command is received, the trigger mask is read and dictates when to begin storing data in the buffer.

If the trigger mask is set to all zeros, then the collection will begin immediately after the start command and continue until a stop command is received. In this case the buffer behaves in a 'circular' manner.

**2.6.14.2 Starting to Collect Performance Data** The [CFE\\_ES\\_START\\_PERF\\_DATA\\_CC](#) command is used to start the data collection process. The ES task sends a debug event when the command is received. It is not possible to start a collection if the buffer-to-file write is in process from an earlier collection. There is an ES telemetry point that can be used to ensure there is not a buffer-to-file write in progress. This ES telemetry point is called 'Perf Data to Write' and begins counting down from 'Data Count' to zero. If this counter is zero, it is ok to send the start command. If any errors are encountered when the start command is received, the details will be displayed in an error event message.

**2.6.14.3 Stopping the Collection of Performance Data** The [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#) command is used to stop the data collection process and write the buffer data to a file. The path and filename may be specified in the command. If the filename command field contains an empty string, the configuration parameter [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_PERF\\_DUMP\\_FILENAME](#) is used to specify the path and filename. The number of entries written to the file is determined by the 'data count' variable, which is sent in the ES housekeeping telemetry packet. To ensure cpu hogging does not occur during the write process, ES creates a low priority child task to perform the file write operation. This child task will write a number of entries, then sleep for a short time to give tasks of lower priority a chance to run. The number of entries between delays, and the delay time is displayed in the debug event at the time the stop command is received.

**2.6.14.4 Viewing the Collection of Performance Data** To view the performance data, the file created as a result of the stop command must be transferred to the ground and imported into a viewing tool. See <https://github.com/nasa/perfutils-java> as an example.

## 2.6.15 Critical Data Store

Some missions are required, for health, safety and mission success criteria, to survive Processor Resets. These mission requirements frequently flow down to Attitude Control and/or Command and Data Handling requirements that force an Application developer to design a mechanism for retaining software state information through a Processor Reset. The cFE provides the Critical Data Store to assist the developer in meeting these requirements.

The Critical Data Store is an area of memory that is not cleared during a Processor Reset. In addition, the contents of memory are validated when accessed with a Data Integrity Value that helps to ensure the contents have not been corrupted. Each processor platform, through the design of its Board Support Package, can implement this area of memory in a number of ways to ensure the contents survive a Processor Reset. Applications can allocate a section of this memory for their use in a way similar to the [cFE Table Services Overview](#).

When an Application registers a Critical Data Store (CDS), the Executive Services allocates a section of the Critical Data Store memory for the application's use and assigns the Application specified name to the memory area. The operator can find and learn the characteristics of these Critical Data Stores by using the [Dump CDS Registry Command](#). This command will dump the contents of the CDS Registry maintained by the Executive Services into a file that can be downlinked and examined by the operator.

The CDS Registry dump will identify the following information for each registered CDS:

- **Handle** - the numeric identifier used by an Application to access the contents of the CDS
- **Size** - the number of bytes allocated to the specified CDS
- **Table Flag** - a flag that indicates whether the CDS is associated with a [Critical Tables](#) (when non-zero) or not (when equal to zero).
- **Name** - a processor specific name that uniquely identifies the CDS. The name comes in two parts, "AppName . ← CDSName". AppName identifies which Application registered the CDS. CDSName is the name the Application assigned to the CDS.

The format of the CDS Registry Dump File is a cFE Standard File header (see [CFE\\_FS\\_Header\\_t](#)) followed by one or more CDS Registry Dump File Records (see [CFE\\_ES\\_CDSRegDumpRec\\_t](#)).

### 2.6.16 Memory Pool

Refer to the cFE Application Developers Guide for additional information.

Applications that are designed for generic missions, frequently have to wait until run-time before allocating memory for buffers, data records, etc.

The cFE provides a memory allocation algorithm that may be used by an application to manage its block of memory. The user provides a pointer to its memory block and a list of block sizes and the cFE provides 'get' and 'put' API's to the user for managing its memory pool.

Run-time memory allocation in an embedded system can be risky because of the potential problem of memory fragmentation. Memory fragmentation is also referred to as External Fragmentation and is defined in the wikipedia as:

External fragmentation is the phenomenon in which free storage becomes divided into many small pieces over time. It is a weakness of certain storage allocation algorithms, occurring when an application allocates and deallocates ("frees") regions of storage of varying sizes, and the allocation algorithm responds by leaving the allocated and deallocated regions interspersed. The result is that, although free storage is available, it is effectively unusable because it is divided into pieces that are too small to satisfy the demands of the application. The term "external" refers to the fact that the unusable storage is outside the allocated regions.

To help prevent this from happening, the cFE has integrated a memory allocation algorithm that is designed to create blocks at run-time, based on the size of the blocks requested. After a reset, there are no blocks created, the memory pool is said to be unconfigured. As requests for memory blocks are made, the memory pool first tries to use blocks that have been created but are no longer in use. If it cannot find an available block, it will create a new one. The created blocks remain until a reset occurs.

This algorithm is recommended when the size of the requests and the peak rate of requests can be pre-determined. It is highly recommended that adequate margin is designed into the pool size. The memory pool should never get close to being fully configured (i.e. not enough memory to create a new block). If the memory does become fully configured, requests for new size blocks will fail, regardless of whether the created blocks are in-use or not. The margin on the memory pool can be monitored by viewing the 'free bytes' member of the memory pool statistics. The memory pool statistics are dumped only when commanded by way of the ES command [CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#).

A user of the ES memory pool begins by tailoring the memory pool for the particular use, by defining a list of block sizes and allocating a block of memory. These block size definitions simply give the memory pool a set of sizes to choose from. They do not configure the memory pool in any way and they do not affect the size of the pool. The cFE defines a default set of block sizes in the `cfe_platform_cfg.h` file.

If the default block sizes are used, the application will create the pool using the simpler [CFE\\_ES\\_PoolCreate](#) API. This API takes a pointer to the first byte of the memory pool (allocated by the application) and a size parameter. The API returns a handle to be used for the get and put requests.

If the defaults are not sufficient, the user must define the block sizes and use the [CFE\\_ES\\_PoolCreateEx](#) API.

After receiving a positive response from the PoolCreate API, the memory pool is ready to accept requests, but at this point it is completely unconfigured (meaning there are no blocks created). The first valid request (via [CFE\\_ES\\_GetPoolBuf](#) API) after creating the pool will always cause the memory pool to create a block and return a pointer to the new block. The size of the block depends on the size definitions mentioned earlier. If there is not an exact match between the requested and defined sizes, then the memory pool will create and return the smallest block that meets the following criteria: is a defined size and large enough to hold the request.

If another request for that size comes in before the first block was released through the [CFE\\_ES\\_PutPoolBuf](#) API, then the memory pool will create a second block of that size and return a pointer to the second block. If both blocks were then released through the [CFE\\_ES\\_PutPoolBuf](#) API and the memory pool statistics were dumped via the [CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#) command, the number of blocks created would be two. The number of 'free bytes' in the pool would be the size of the pool minus the sum of the following items:

- the size of the two blocks created (even though they are not 'in-use').
- a buffer descriptor for each of the two blocks created ( $2 * 12$  bytes)
- a 168 byte pool descriptor Refer to the cFE Applications Developers Guide for more details.

This allocation algorithm does have its limits. There are certain conditions that can place the memory pool in an undesired state. For instance, if a burst of get requests were received for the same block size, the memory pool may create a large number of blocks of that size. If this is a one-time burst, the memory pool would be configured with this large number of blocks that may no longer be needed. This scenario would use up the 'free bytes' margin in an undesired way. It should be noted that once the blocks are created, they cannot be deleted by any means other than a processor or power-on reset. It is highly recommended that the memory pool statistics be carefully monitored to ensure that the 'free-bytes' margin is sufficient (which is typically dictated by mission requirements).

An operator can obtain information about an Application's Memory Pool by using the [Telemeter Memory Pool Statistics Command](#).

This command will cause Executive Services to extract pertinent statistics from the data used to manage the Memory Pool and telemeter them to the ground in the [Memory Pool Statistics Telemetry Packet](#).

In order to obtain the statistics associated with a memory pool, the operator **MUST** have the correct Memory Handle as reported by the Application who owns the Memory Pool. **It should be noted that an inappropriate Memory Pool Handle can (and likely will) cause the system software to crash!** Within the cFE itself, there are three cFE Core Applications that make use of the Executive Services Memory Pool API. These are Software Bus (SB), Event Services (EVS) and Table Services (TBL). Each of these cFE Core Applications report their memory pool handles in telemetry.

The [Memory Pool Statistics Telemetry Packet](#) contains the following information:

- **Memory Pool Handle** - the handle, as provided by the operator in the [Telemeter Memory Pool Statistics Command](#). This repeating of the handle in telemetry ensures the operator knows which Memory Pool Statistics are being viewed

- **Pool Size** - The total size of the memory pool (in bytes)
- **Number Blocks Requested** - The total number of memory blocks requested for allocation
- **Number of Errors** - The total number of errors encountered when a block was released
- **Number of Free Bytes** - The total number of bytes in the Memory Pool that have never been allocated to a Memory Block
- **Block Statistics** - For each specified size of memory block (of which there are [CFE\\_MISSION\\_ES\\_POOL\\_MAX\\_BUCKETS](#)), the following statistics are kept
  - **Block Size** - The size, in bytes, of all blocks of this type
  - **Number of Blocks Allocated** - The number of this sized block which are currently allocated and in use
  - **Number of Blocks Free** - The number of this size block which have been in use previously but are no longer being used

### 2.6.17 System Log

The System Log is an array of bytes that contains back-to-back printf type messages from applications. The cFE internal applications use this log when errors are encountered during initialization before the Event Manager is fully initialized. To view the information the [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#) command must be sent. This command will write the log to a binary file. The path and filename may be specified in the command. If the filename command field contains an empty string, the configuration parameter [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_SYSLOG\\_FILE](#) is used to specify the path and filename. Use the ground system to get the file and display the contents. The [CFE\\_ES\\_CLEAR\\_SYS\\_LOG\\_CC](#) is used to clear the System log.

The size of the System log is defined by the platform configuration parameter [CFE\\_PLATFORM\\_ES\\_SYSTEM\\_LOG\\_SIZE](#). This log is preserved after a processor reset and held in the ES reset area.

A count of the number of entries in the log is present in the ES housekeeping telemetry.

### 2.6.18 Version Identification

Version information is reported at startup, and upon receipt of a No-op command

### 2.6.19 Frequently Asked Questions about Executive Services

None submitted

## 2.7 cFE Executive Services Commands

Upon receipt of any command, the Executive Services application will confirm that the message length embedded within the header (from `CFE_MSG_GetSize()`) matches the expected length of that message, based on the size of the C structure defining that command. If there is any discrepancy between the expected and actual message size, ES will generate the `CFE_ES_LEN_ERR_EID` event, increment the command error counter (`$sc_$cpu_ES_CMDEC`), and the command will *not* be accepted for processing.

The following is a list of commands that are processed by the cFE Executive Services Task.

### Global `CFE_ES_CLEAR_ER_LOG_CC`

Clears the contents of the Exception and Reset Log

### Global `CFE_ES_CLEAR_SYS_LOG_CC`

Clear Executive Services System Log

### Global `CFE_ES_DELETE_CDS_CC`

Delete Critical Data Store

### Global `CFE_ES_DUMP_CDS_REGISTRY_CC`

Dump Critical Data Store Registry to a File

### Global `CFE_ES_NOOP_CC`

Executive Services No-Op

### Global `CFE_ES_OVER_WRITE_SYS_LOG_CC`

Set Executive Services System Log Mode to Discard/Overwrite

### Global `CFE_ES_QUERY_ALL_CC`

Writes all Executive Services Information on all loaded modules to a File

### Global `CFE_ES_QUERY_ALL_TASKS_CC`

Writes a list of All Executive Services Tasks to a File

### Global `CFE_ES_QUERY_ONE_CC`

Request Executive Services Information on a specified module

### Global `CFE_ES_RELOAD_APP_CC`

Stops, Unloads, Loads from the command specified File and Restarts an Application

### Global `CFE_ES_RESET_COUNTERS_CC`

Executive Services Reset Counters

### Global `CFE_ES_RESET_PR_COUNT_CC`

Resets the Processor Reset Counter to Zero

### Global `CFE_ES_RESTART_APP_CC`

Stops, Unloads, Loads using the previous File name, and Restarts an Application

### Global `CFE_ES_RESTART_CC`

Executive Services Processor / Power-On Reset

### Global `CFE_ES_SEND_MEM_POOL_STATS_CC`

Telemeter Memory Pool Statistics

### Global `CFE_ES_SET_MAX_PR_COUNT_CC`

Configure the Maximum Number of Processor Resets before a Power-On Reset

**Global CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC**

Set Performance Analyzer's Filter Masks

**Global CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC**

Set Performance Analyzer's Trigger Masks

**Global CFE\_ES\_START\_APP\_CC**

Load and Start an Application

**Global CFE\_ES\_START\_PERF\_DATA\_CC**

Start Performance Analyzer

**Global CFE\_ES\_STOP\_APP\_CC**

Stop and Unload Application

**Global CFE\_ES\_STOP\_PERF\_DATA\_CC**

Stop Performance Analyzer and write data file

**Global CFE\_ES\_WRITE\_ER\_LOG\_CC**

Writes Exception and Reset Log to a File

**Global CFE\_ES\_WRITE\_SYS\_LOG\_CC**

Writes contents of Executive Services System Log to a File

## 2.8 cFE Executive Services Telemetry

The following are telemetry packets generated by the cFE Executive Services Task.

**Global CFE\_ES\_HousekeepingTlm\_Payload\_t**

Executive Services Housekeeping Packet

**Global CFE\_ES\_HousekeepingTlm\_Payload\_t**

Executive Services Housekeeping Packet

**Global CFE\_ES\_HousekeepingTlm\_t**

Executive Services Housekeeping Packet

**Global CFE\_ES\_HousekeepingTlm\_t**

Executive Services Housekeeping Packet

**Global CFE\_ES\_MemStatsTlm\_t**

Memory Pool Statistics Packet

**Global CFE\_ES\_MemStatsTlm\_t**

Memory Pool Statistics Packet

**Global CFE\_ES\_OneAppTlm\_Payload\_t**

Single Application Information Packet

**Global CFE\_ES\_OneAppTlm\_Payload\_t**

Single Application Information Packet

**Global CFE\_ES\_OneAppTlm\_t**

Single Application Information Packet

**Global CFE\_ES\_OneAppTlm\_t**

Single Application Information Packet

**Global CFE\_ES\_PoolStatsTlm\_Payload\_t**

Memory Pool Statistics Packet

**Global CFE\_ES\_PoolStatsTlm\_Payload\_t**

Memory Pool Statistics Packet

## 2.9 cFE Executive Services Configuration Parameters

The following are configuration parameters used to configure the cFE Executive Services either for each platform or for a mission as a whole.

### Global CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN

Maximum Length of Full CDS Name in messages

Maximum Length of Full CDS Name in messages

### Global CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH

Maximum Length of CDS Name

Maximum Length of CDS Name

### Global CFE\_MISSION\_ES\_DEFAULT\_CRC

Mission Default CRC algorithm

Mission Default CRC algorithm

### Global CFE\_MISSION\_ES\_MAX\_APPLICATIONS

Mission Max Apps in a message

Mission Max Apps in a message

### Global CFE\_MISSION\_ES\_PERF\_MAX\_IDS

Define Max Number of Performance IDs for messages

Define Max Number of Performance IDs for messages

### Global CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS

Maximum number of block sizes in pool structures

Maximum number of block sizes in pool structures

### Global CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MSEC

CFE core application startup timeout

### Global CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT

Define ES Application Kill Timeout

Define ES Application Kill Timeout

### Global CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE

Define ES Application Control Scan Rate

Define ES Application Control Scan Rate

### Global CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES

Define Maximum Number of Registered CDS Blocks

Define Maximum Number of Registered CDS Blocks

### Global CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01

Define ES Critical Data Store Memory Pool Block Sizes

Define ES Critical Data Store Memory Pool Block Sizes

### Global CFE\_PLATFORM\_ES\_CDS\_SIZE

Define Critical Data Store Size

Define Critical Data Store Size

**Global CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE**

Default Application Information Filename

Default Application Information Filename

**Global CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE**

Default Critical Data Store Registry Filename

Default Critical Data Store Registry Filename

**Global CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE**

Default Exception and Reset (ER) Log Filename

Default Exception and Reset (ER) Log Filename

**Global CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME**

Default Performance Data Filename

Default Performance Data Filename

**Global CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE**

Define Default System Log Mode following Power On Reset

Define Default System Log Mode following Power On Reset

**Global CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE**

Define Default System Log Mode following Processor Reset

Define Default System Log Mode following Processor Reset

**Global CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE**

Define Default Stack Size for an Application

Define Default Stack Size for an Application

**Global CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE**

Default System Log Filename

Default System Log Filename

**Global CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE**

Default Application Information Filename

Default Application Information Filename

**Global CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES**

Define Max Number of ER (Exception and Reset) log entries

Define Max Number of ER (Exception and Reset) log entries

**Global CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE**

Maximum size of CPU Context in ES Error Log

Maximum size of CPU Context in ES Error Log

**Global CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS**

Define Max Number of Applications

Define Max Number of Applications

**Global CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS**

Define Max Number of Generic Counters

Define Max Number of Generic Counters

**Global CFE\_PLATFORM\_ES\_MAX\_LIBRARIES**

Define Max Number of Shared libraries

Define Max Number of Shared libraries

**Global CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS**

Maximum number of memory pools

Maximum number of memory pools

**Global CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS**

Define Number of Processor Resets Before a Power On Reset

Define Number of Processor Resets Before a Power On Reset

**Global CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01**

Define Default ES Memory Pool Block Sizes

Define Default ES Memory Pool Block Sizes

**Global CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN**

Define Memory Pool Alignment Size

Define Memory Pool Alignment Size

**Global CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING**

Default virtual path for persistent storage

Default virtual path for persistent storage

**Global CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE**

ES Nonvolatile Startup Filename

ES Nonvolatile Startup Filename

**Global CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE**

Define Number of entries in the ES Object table

Define Number of entries in the ES Object table

**Global CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY**

Define Performance Analyzer Child Task Delay

Define Performance Analyzer Child Task Delay

**Global CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY**

Define Performance Analyzer Child Task Priority

Define Performance Analyzer Child Task Priority

**Global CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE**

Define Performance Analyzer Child Task Stack Size

Define Performance Analyzer Child Task Stack Size

**Global CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE**

Define Max Size of Performance Data Buffer

Define Max Size of Performance Data Buffer

**Global CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS**

Define Performance Analyzer Child Task Number of Entries Between Delay

Define Performance Analyzer Child Task Number of Entries Between Delay

**Global CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL**

Define Filter Mask Setting for Enabling All Performance Entries

Define Filter Mask Setting for Enabling All Performance Entries

**Global CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT**

Define Default Filter Mask Setting for Performance Data Buffer

Define Default Filter Mask Setting for Performance Data Buffer

**Global CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE**

Define Filter Mask Setting for Disabling All Performance Entries  
Define Filter Mask Setting for Disabling All Performance Entries

**Global CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL**

Define Filter Trigger Setting for Enabling All Performance Entries  
Define Filter Trigger Setting for Enabling All Performance Entries

**Global CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT**

Define Default Filter Trigger Setting for Performance Data Buffer  
Define Default Filter Trigger Setting for Performance Data Buffer

**Global CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE**

Define Default Filter Trigger Setting for Disabling All Performance Entries  
Define Default Filter Trigger Setting for Disabling All Performance Entries

**Global CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS**

Maximum number of block sizes in pool structures  
Maximum number of block sizes in pool structures

**Global CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING**

Default virtual path for volatile storage  
Default virtual path for volatile storage

**Global CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS**

ES Ram Disk Number of Sectors  
ES Ram Disk Number of Sectors

**Global CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED**

Percentage of Ram Disk Reserved for Decompressing Apps  
Percentage of Ram Disk Reserved for Decompressing Apps

**Global CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE**

ES Ram Disk Sector Size  
ES Ram Disk Sector Size

**Global CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY**

Define ES Task Priority  
Define ES Task Priority

**Global CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE**

Define ES Task Stack Size  
Define ES Task Stack Size

**Global CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC**

Startup script timeout  
Startup script timeout

**Global CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC**

Poll timer for startup sync delay  
Poll timer for startup sync delay

**Global CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE**

Define Size of the cFE System Log.  
Define Size of the cFE System Log.

**Global CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE**

Define User Reserved Memory Size

Define User Reserved Memory Size

**Global CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE**

ES Volatile Startup Filename

ES Volatile Startup Filename

**Global CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY**

Define EVS Task Priority

Define EVS Task Priority

**Global CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE**

Define EVS Task Stack Size

Define EVS Task Stack Size

**Global CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01**

Define SB Memory Pool Block Sizes

Define SB Memory Pool Block Sizes

**Global CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY**

Define SB Task Priority

Define SB Task Priority

**Global CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE**

Define SB Task Stack Size

Define SB Task Stack Size

**Global CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY**

Define TBL Task Priority

Define TBL Task Priority

**Global CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE**

Define TBL Task Stack Size

Define TBL Task Stack Size

## 2.10 cFE Event Services Overview

Event Services (EVS) provides centralized control for the processing of event messages originating from the EVS task itself, other cFE core applications (ES, SB, TIME, and TBL), and from cFE applications. Event messages are asynchronous messages that are used to inform the operator of a significant event from within the context of a registered application or core service. EVS provides various ways to filter event messages in order to manage event message generation.

Note for messages outside the context of a registered application (for example early in app initialization or if registration fails) [CFE\\_ES\\_WriteToSysLog](#) can be used for reporting.

For more information on cFE Event Services, see the following sections:

- [Event Message Format](#)

- Local Event Log
- Event Message Control
- Event Message Filtering
- EVS Registry
- EVS Counters
- Resetting EVS Counters
- Effects of a Processor Reset on EVS
- EVS squelching of misbehaving apps
- Frequently Asked Questions about Event Services

### 2.10.1 Event Message Format

Event messages are software bus messages that contain the following fields:

- Timestamp
- Event Type
- Spacecraft ID
- Processor ID
- Application Name
- Event ID
- Message

The *Timestamp* corresponds to when the event was generated, in spacecraft time. The *Event Type* is one of the following: DEBUG, INFO, ERROR or CRITICAL. The *Spacecraft ID* and *Processor ID* identify the spacecraft and processor from which the event was generated. Note that the *Spacecraft ID* is defined in the cfe\_mission\_cfg.h file; The *Processor ID* is defined in the appropriate cfe\_platform\_cfg.h file. The *Application Name* refers to the Application that issued the event message as specified on application startup (either startup script or app start command). The *Event ID* is an Application unique number that identifies the event. The *Message* is an ASCII text string describing the event. Event messages may have parameters associated with the event message. EVS formats the parameters such that they are part of the ASCII text string that make up the event message.

In order to accommodate missions that have limited telemetry bandwidth, EVS can be configured such that the ASCII text string part of the event message is omitted, thus reducing the size of each event message. This is referred to as *Short Format*; Event messages including the ASCII text string are referred to as *Long Format*. The default setting is specified in the cfe\_platform\_cfg.h file. EVS also provides commands in order to set the mode (short or long).

Since the design of the cFE's Software Bus is based on run-time registration, no predetermined message routing is defined, hence it is not truly correct to say that events are generated as telemetry. Technically, EVS generates events in the form of software bus messages. Applications such as Telemetry Output and Data Storage can then subscribe to these messages making them telemetry. For the purposes of this document, any references to telemetry assumes that a telemetry application subscribes to the EVS event software bus message and routes it to the ground as telemetry. Note that short format event messages on the Software Bus have different message lengths than long form messages and do not include any part of the long format message string.

The EVS can be configured via ground command to send event messages out one or more message ports. These message ports may include ports such as debug, console, and UART. Messages sent out of the message ports will be in ASCII text format. This is generally used for lab purposes. Note that the event mode (short or long) does affect the event message content sent out these message ports.

### 2.10.2 Local Event Log

In addition to generating a software bus message, EVS logs the event message to a Local Event Log. Note that this is an optional feature that must be enabled via the cfe\_platform\_cfg.h file. The Local Event Log resides on the same processor as the EVS which is used to store events without relying on an external bus. In multi-processor cFE configurations the Local Event Buffer preserves event messages during non-deterministic processor initialization sequences and during failure scenarios. In order to obtain the contents of the Local Event Log, a command must be sent to write the contents of the buffer to a file which can then be sent to the ground via a file transfer mechanism. Note that event messages stored in the EVS Local Event Log are always long format messages and are not affected by the event mode (short or long).

EVS provides a command in order to [clear the Local Event Log](#).

**2.10.2.1 Local Event Log Mode** EVS can be configured to control the Local Event Log to either discard or overwrite the contents of the log when it becomes full. If the mode is set to overwrite, the log is treated like a circular buffer, overwriting the oldest event message contained in the log first. This control is configured by default in the cfe\_platform\_cfg.h file but can be modified by [a command](#).

### 2.10.3 Event Message Control

In order for an application to be serviced by EVS, it must be registered with EVS. EVS provides various commands in order to control the event messages that are generated as software bus messages.

**2.10.3.1 Event Message Control - By Type** The highest level of event message control that EVS provides is the ability to enable and disable event message types. As mentioned above, there are four event types. They are:

1. DEBUG

2. INFORMATION

3. ERROR

4. CRITICAL

When commands are sent to [enable](#) or [disable](#) a particular type of event message, ALL event messages of the specified type are affected. Typically, event messages of type DEBUG are disabled on-orbit. Note that EVS provides the capability to affect multiple types within one command using a bit mask. Note also that the configuration parameter [CFE\\_PLATFORM\\_EVS\\_DEFAULT\\_TYPE\\_FLAG](#) in the `cfe_platform_cfg.h` file specifies which event message types are enabled/disabled by default.

**2.10.3.2 Event Message Control - By Application** Commands are available to [enable](#) and [disable](#) the generation of event messages for a particular application. The result is that ALL event messages for the specified Application are affected (i.e. enabled or disabled).

**2.10.3.3 Event Message Control - By Event Type for an Application** EVS also provides the capability to [enable](#) / [disable](#) an event type for a particular application. Note that EVS provides the capability to affect multiple event types within one command using a bit mask.

**2.10.3.4 Event Message Control - Individual Events** There are two ways to control the generation of individual events depending on whether the application's event message has been registered with EVS or not.

**2.10.3.4.1 Modifying a registered event message filter** When an application registers with EVS, the application has the option of specifying the events that it wants to register for filtering along with the [Event Message Filtering](#) (only the Binary Filtering Scheme exists currently). Note that applications are limited in the number of events that they can register for filtering (see [CFE\\_PLATFORM\\_EVS\\_MAX\\_EVENT\\_FILTERS](#) in `cfe_platform_cfg.h` for the mission defined limit). The filtering method uses a mask to determine if the message is forwarded to the software bus, making it available in telemetry (see [Event Message Filtering](#) for a description on filtering). Commands are available to [modify the filter mask](#) for any registered event.

An on-orbit mission, for example, might be experiencing a problem resulting in an application's event message being repeatedly issued, flooding the downlink. If the event message for the application is registered with EVS, then a command can be issued to set the event message filter to the specified value in order to prevent flooding of the downlink.

**2.10.3.4.2 Adding/Removing an event message for filtering** Commands are also available to add filtering for those events that are not registered for filtering. Once an event is [registered for filtering](#), the filter can be modified (see above) or [removed](#).

An on-orbit mission, for example, might be experiencing a problem resulting in an event message being repeatedly issued, flooding the downlink. If the event message was not registered with EVS for filtering then the ground can add (i.e. register) the offending application's event for filtering (much like an application registers the event during initialization).

EVS also supports the ability to [remove](#) (i.e. unregister) an application's event message. Once it is removed, the event will no longer be filtered. Note that commands issued to disable events by event type, by application or by event type for an application are still valid and could affect this particular event.

## 2.10.4 Event Message Filtering

EVS uses a hexadecimal bit mask that controls how often a message is filtered. An event's filter mask is bit-wise ANDed with the event's event counter. There is one event counter for each event ID. If the result of the ANDing is zero then the message is sent.

Filter masks can be set so that one out of 1, 2, 4, 8 events are sent. Some examples of masks that use this pattern are: (0x0000, Every one), (0x0001, One of every 2), (0x0003, One of every 4), and (0x0007, One of every 8).

Filter masks can also be set so that only the first n events are sent. For example, the mask 0xFFFF generates one event message and then stops. Note that when the filter counter is reset to zero by command, this will restart the counting and enable n more events to be sent.

Event messages will be filtered until CFE\_EVS\_MAX\_FILTER\_COUNT events of the filtered event ID from the application have been received. After this, the filtering will become locked (no more of that event will be received by the ground) until the filter is either reset or deleted by ground command. This is to prevent the counter from rolling over, which would cause some filters to behave improperly. An event message will be sent when this maximum count is reached.

The following shows an example of how filtering works using a filter mask of x'0001', resulting in sending every other event:

	<b>packet x</b>	<b>packet X+1</b>	<b>packet X+2</b>	<b>packet X+3</b>	<b>packet X+4</b>	...
<b>Event ID counter</b>	x'0000'	x'0001'	x'0002'	x'0003'	x'0004'	
<b>Event Filter mask</b>	x'0001'	x'0001'	x'0001'	x'0001'	x'0001'	
<b>Bitwise AND results</b>	x'0000'	x'0001'	x'0000'	x'0001'	x'0000'	
<b>Send event?</b>	Yes	No	Yes	No	Yes	

In this example, the ground uses a filter mask of x'FFFE' resulting in the first two events being sent and then no more.

	<b>packet x</b>	<b>packet X+1</b>	<b>packet X+2</b>	<b>packet X+3</b>	<b>packet X+4</b>	...
<b>Event ID counter</b>	x'0000'	x'0001'	x'0002'	x'0003'	x'0004'	
<b>Event Filter mask</b>	x'FFFE'	x'FFFE'	x'FFFE'	x'FFFE'	x'FFFE'	
<b>Bitwise AND results</b>	x'0000'	x'0000'	x'0002'	x'0002'	x'0004'	
<b>Send event?</b>	Yes	Yes	No	No	No	

See [cfe\\_evs.h](#) for predefined macro values which can be used for masks.

### 2.10.5 EVS Registry

EVS maintains information on each registered application and all events registered for an application.

The registry contains the following information for each Registered Application:

- Active Flag - If equal to FALSE (0), all events from this Application are Filtered
- Event Count - Total number of events issued by this Application. Note that this value stop incrementing at 65535.

The following information for each Filtered Event (up to [CFE\\_PLATFORM\\_EVS\\_MAX\\_EVENT\\_FILTERS](#))  
:

- Event ID - Event ID for event whose filter has been defined
- Mask - Binary Filter mask value (see [Event Message Filtering](#) for an explanation)
- Count - Current number of times this Event ID has been issued by this Application

### 2.10.6 EVS Counters

There are 2 types of counters in EVS housekeeping telemetry:

- Total events sent counter
- Number of events sent for each Application

The difference is that the first one is the sum of all of the event messages sent. Both of these represent events that are actually sent (by EVS to the software bus). If an event message is filtered or disabled, neither counter is incremented.

There are other counters available that show how many event messages were generated by an App, however, these are only available for those events that are registered for filtering hence if you have a message that is not registered for filtering and the message type (e.g. DEBUG) is disabled then you won't know if the event was ever issued by an application. These counters are available by sending a command to [write the EVS Application Data](#) and transferring the file to the ground.

### 2.10.7 Resetting EVS Counters

As far as reset commands, there are 4 commands available:

1. [Reset the total events sent counter](#)
2. [Reset the events sent counter for a particular Application](#) - e.g. reset the LC application events counter
3. [Reset all of the event counters for a particular registered event for a particular Application](#) - e.g. Reset event counter for Event ID 5 for the LC Application.
4. [Reset all of the event counters for ALL registered events for a particular App](#) - e.g. Reset all registered event counters for LC.

Note that there is currently no way to reset ALL of the events sent counters for all of the Apps with one command.

### 2.10.8 Effects of a Processor Reset on EVS

On a processor reset, the EVS Registry is cleared such that applications must re-register with EVS in order to use EVS services. All counters are also cleared with the exceptions of those listed below.

On a processor reset, the following EVS data is preserved (if the cFE is configured to include an [Local Event Log](#)):

- Local Event Log if the Local Event Log Mode is configured to Discard (1). If the Local Event Log Mode is configured to Overwrite (0), the contents of the log may be overwritten depending on the size and contents of the log prior to the reset.
- Local Event Log Full Flag
- Local Event Log overflow counter

The Local Event Log Mode (overwrite/discard) is set to the configured value specified in the `cfe_platform_cfg.h` file. The default value is Discard (1). Discard mode will guarantee the contents of the event log are preserved over a processor restart.

This provides the ground with the capability to write the Local Event Log to a file and transfer it to the ground in order to help debug a reset.

### 2.10.9 EVS squelching of misbehaving apps

Event squelching is an optional feature for suppressing excessive events from misbehaving apps. It is enabled by setting `CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST` to a nonzero positive value, and `CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC` equal to or less than that value.

`CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST` controls the maximum events that can be sent at a given moment, and `CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC` is the sustained event throughput per second.

The suppression mechanism initializes with `CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST * 1000` credits. Each event costs 1000 credits. Credits are restored at a rate of `CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC * 1000` up to a maximum balance of `CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST * 1000`, and the maximum "debt" is `-CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST * 1000`. When the credit count crosses from positive to negative, a squelched event message is emitted and events are suppressed, until the credit count becomes positive again.

Figure EVS-1 is a notional state diagram of the event squelching mechanism.

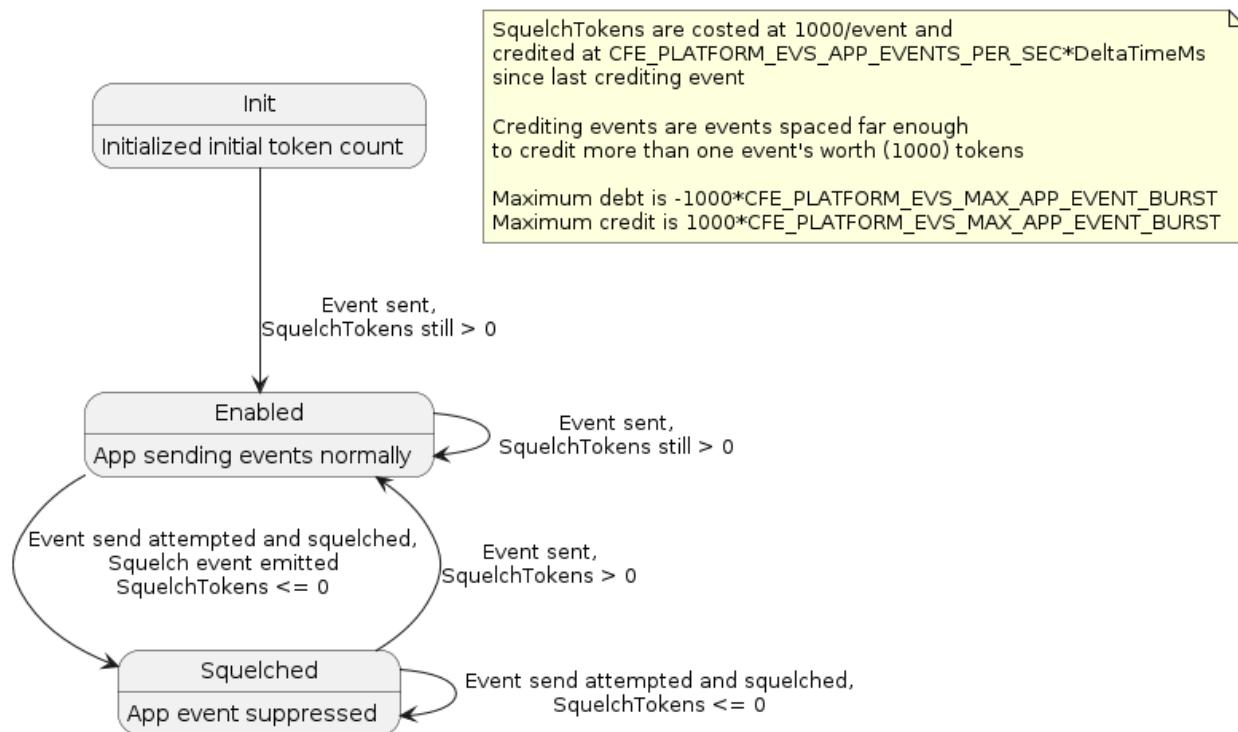


Figure 3 Figure EVS-1: EVS Squelching State Diagram

### 2.10.10 Frequently Asked Questions about Event Services

#### (Q) My telemetry stream is being flooded with the same event message. How do I make it stop?

The most direct way to stop an event message from flooding your downlink stream is to send a command to EVS to filter the offending event (see [Event Message Control](#) or `$sc_$cpu_EVS_SetBinFltrMask`). In order to stop the event

*message from being sent, a bit mask of '0xFFFF' should be used. If the event is not currently registered for filtering, the event message must be added using the command [\\$sc\\_\\$cpu\\_EVS\\_AddEvtFltr](#).*

**(Q) I filtered an event message and would now like to see it again. What do I do in order to see those events again?**

*If the event message that you are interested in is registered with EVS for filtering, then you have 2 options:*

1. *You can use the [\\$sc\\_\\$cpu\\_EVS\\_SetBinFltrMask](#) command using a bit mask of '0x0000' which will result in getting all of the events for that Event Id*
2. *You can remove the registration of that event with EVS (see [\\$sc\\_\\$cpu\\_EVS\\_DelEvtFltr](#)).*

*Note that option (1) is the preferred method.*

**(Q) What is the purpose of DEBUG event messages?**

*Event message of type "DEBUG" are primarily used during flight software development in order to provide information that is most likely not needed on orbit. Some commands send debug event messages as verification that a command request was received. When writing the EVS local event log to a file, for example, an event message of type DEBUG is issued. On orbit, this event message is probably not needed. Instead, the command counter is used for command verification.*

**(Q) How do I find out which events are registered for filtering?**

*EVS provides a command ([\\$sc\\_\\$cpu\\_EVS\\_WriteAppData2File](#)) which generates a file containing all of the applications that have registered with EVS and all of the filters that are registered for each application. Note that EVS merely generates the file. The file must be transferred to the ground in order to view it.*

**(Q) Why do I see event messages in my console window?**

*By default, the events are configured to transmit out a "port" that shows event messages in the console*

**(Q) What is the difference between event services and the ES System Log**

*Events are within the context of an App or cFE Service (requires registration with ES). The system log can be written to outside of the Application or cFE Service context, for example during application startup to report errors before registration.*

## 2.11 cFE Event Services Commands

Upon receipt of any command, the Event Services application will confirm that the message length embedded within the header (from [CFE\\_MSG\\_GetSize\(\)](#)) matches the expected length of that message, based on the size of the C structure defining that command. If there is any discrepancy between the expected and actual message size, EVS will generate the [CFE\\_EVS\\_LEN\\_ERR\\_EID](#) event, increment the command error counter ([\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#)), and the command will *not* be accepted for processing.

The following is a list of commands that are processed by the cFE Event Services Task.

### Global [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#)

Add Application Event Filter

**Global CFE\_EVS\_CLEAR\_LOG\_CC**

Clear Event Log

**Global CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC**

Delete Application Event Filter

**Global CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC**

Disable Application Event Type

**Global CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC**

Disable Event Services for an Application

**Global CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC**

Disable Event Type

**Global CFE\_EVS\_DISABLE\_PORTS\_CC**

Disable Event Services Output Ports

**Global CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC**

Enable Application Event Type

**Global CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC**

Enable Event Services for an Application

**Global CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC**

Enable Event Type

**Global CFE\_EVS\_ENABLE\_PORTS\_CC**

Enable Event Services Output Ports

**Global CFE\_EVS\_NOOP\_CC**

Event Services No-Op

**Global CFE\_EVS\_RESET\_ALL\_FILTERS\_CC**

Reset All Event Filters for an Application

**Global CFE\_EVS\_RESET\_APP\_COUNTER\_CC**

Reset Application Event Counters

**Global CFE\_EVS\_RESET\_COUNTERS\_CC**

Event Services Reset Counters

**Global CFE\_EVS\_RESET\_FILTER\_CC**

Reset an Event Filter for an Application

**Global CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC**

Set Event Format Mode

**Global CFE\_EVS\_SET\_FILTER\_CC**

Set Application Event Filter

**Global CFE\_EVS\_SET\_LOG\_MODE\_CC**

Set Logging Mode

**Global CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC**

Write Event Services Application Information to File

**Global CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC**

Write Event Log to File

## 2.12 cFE Event Services Telemetry

The following are telemetry packets generated by the cFE Event Services Task.

### Global `CFE_EVS_HousekeepingTlm_Payload_t`

Event Services Housekeeping Telemetry Packet

### Global `CFE_EVS_HousekeepingTlm_Payload_t`

Event Services Housekeeping Telemetry Packet

### Global `CFE_EVS_LongEventTlm_Payload_t`

Event Message Telemetry Packet (Long format)

### Global `CFE_EVS_LongEventTlm_Payload_t`

Event Message Telemetry Packet (Long format)

### Global `CFE_EVS_ShortEventTlm_Payload_t`

Event Message Telemetry Packet (Short format)

### Global `CFE_EVS_ShortEventTlm_Payload_t`

Event Message Telemetry Packet (Short format)

## 2.13 cFE Event Services Configuration Parameters

The following are configuration parameters used to configure the cFE Event Services either for each platform or for a mission as a whole.

### Global `CFE_MISSION_EVS_MAX_MESSAGE_LENGTH`

Maximum Event Message Length

Maximum Event Message Length

### Global `CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC`

Sustained number of event messages per second per app before squelching

Sustained number of event messages per second per app before squelching

### Global `CFE_PLATFORM_EVS_DEFAULT_APP_DATA_FILE`

Default EVS Application Data Filename

Default EVS Application Data Filename

### Global `CFE_PLATFORM_EVS_DEFAULT_LOG_FILE`

Default Event Log Filename

Default Event Log Filename

### Global `CFE_PLATFORM_EVS_DEFAULT_LOG_MODE`

Default EVS Local Event Log Mode

Default EVS Local Event Log Mode

### Global `CFE_PLATFORM_EVS_DEFAULT_MSG_FORMAT_MODE`

Default EVS Message Format Mode

Default EVS Message Format Mode

**Global CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG**

Default EVS Event Type Filter Mask

Default EVS Event Type Filter Mask

**Global CFE\_PLATFORM\_EVS\_LOG\_MAX**

Maximum Number of Events in EVS Local Event Log

Maximum Number of Events in EVS Local Event Log

**Global CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST**

Maximum number of event before squelching

Maximum number of event before squelching

**Global CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS**

Define Maximum Number of Event Filters per Application

Define Maximum Number of Event Filters per Application

**Global CFE\_PLATFORM\_EVS\_PORT\_DEFAULT**

Default EVS Output Port State

Default EVS Output Port State

## 2.14 cFE Software Bus Overview

The Software Bus (SB) handles communication between software tasks on a processor. All tasks communicate with each other, with hardware devices, and with the ground by sending command and telemetry messages. The software bus provides an application programming interface (API) to other tasks for sending and receiving messages. This API is independent of the underlying operating system so that tasks can use the same interface regardless of which processor they reside on. Refer to the [cFE Application Programmer's Interface \(API\) Reference](#) for detailed information about the API functions.

The software bus is used internally by the flight software, and normally does not require attention from the ground. However, because of the scalability and the dynamic nature of the software bus, it is strongly recommended that each project carefully review the SB statistics and SB memory pool to be sure adequate margin is met on the configurable items.

The cFE software bus uses a dynamic protocol and builds its routing table at run-time through the SB subscribe API's. Also the cFE software bus pipes are created at run-time through the [CFE\\_SB\\_CreatePipe](#) API. Because the routing is established, and pipes are created at run-time, it is necessary to have a clear view of the routing details on command. The cFE software bus allows the user to dump the routing table, the pipe table, the message map and the statistics packet. Each of these items are described in detail in the corresponding section of this document.

- [Software Bus Terminology](#)
- [Autonomous Actions](#)
- [Operation of the SB Software](#)
- [Frequently Asked Questions about Software Bus](#)

### 2.14.1 Software Bus Terminology

In order to fully understand the Software Bus, it is imperative that the basic terms used to describe its features are also understood. Below are the critical terms that help identify what the Software Bus accomplishes for each Application:

- [Messages](#)
- [Pipes](#)
- [Subscriptions](#)
- [Memory](#)

**2.14.1.1 Messages** The sole purpose of the software bus is to provide applications a way to send messages to each other. The term message and the term packet are used interchangeably throughout this document. A message is a combined set of bytes with a predefined format that is used as the basis of communication on a spacecraft. All commands, telemetry, and other data that are passed between the ground and the spacecraft, and between subsystems of the spacecraft, are considered to be messages. The most common message format is CCSDS (Consultative Committee for Space Data Systems) in [CCSDS Space Packet Protocol](#), but can be customized by replacing the message module.

There are two general types of messages - commands (or command packets) and telemetry (or telemetry packets). Command packets are sent to a particular software task from the ground (or another task). Telemetry packets are sent from a particular software task to the ground (or other tasks).

The concept of a message identifier is utilized to provide abstraction from header implementation, often abbreviated as message ID, MsgId, or MID. Header and message identifier values should not be accessed directly to avoid implementation specific dependencies.

Telemetry packets typically contain a timestamp that indicates when the packet was produced. Command packets typically contain a command code that identifies the particular type of command.

The message module provides APIs for 'setting' and 'getting' the fields in the header of the message. The message module was separated from software bus to enable users to customize message headers without requiring clone and own of the entire cfe repository. To customize, remove the built in msg module from the build and replace with custom implementation. See sample target definitions folder for examples.

Following the header is the user defined message data.

**2.14.1.2 Pipes** The destinations to which messages are sent are called pipes. These are queues that can hold messages until they are read out and processed by a task. Each pipe is created at run-time through the [CFE\\_SB\\_CreatePipe](#) API. The pipe name and the pipe depth are given as arguments in the API. The pipe identifier (or PipeId) is given back to the caller after the API is executed. Each pipe can be read by only one task, but a task may read more than one pipe. Only the pipe owner is allowed to subscribe to messages on the pipe.

The Pipe IDs are specific to a particular processor (that is, the same ID number may refer to a different pipe on each processor). The pipe information for all pipes that have been created, may be requested at anytime by sending the ['Write Pipe Info' SB command](#). The software bus also provides a set of figures regarding capacity, current utilization and high water marks relevant to pipes. This information may be requested by sending the command to [dump the SB statistics packet](#).

**2.14.1.3 Subscriptions** A subscription is a run-time request for a particular message to be sent to a particular pipe. If the caller of the subscribe API is not the owner of the pipe, the request is rejected and an error event is sent. The application that creates the pipe is considered the owner of the pipe. The pipe specified in the subscription is sometimes referred to as the destination of the message. There are a maximum number of destinations for a particular message. This value is specified by the platform configuration parameter [CFE\\_PLATFORM\\_SB\\_MAX\\_DEST\\_PER\\_PKT](#).

As subscriptions are received, the destinations are added to the head of a linked list. During the sending of a message, the list is traversed beginning at the head of the list. Therefore the message will first be sent to the last subscriber. If an application has timing constraints and needs to receive a message in the shortest possible time, the developer may consider holding off its subscription until other applications have subscribed to the message.

The message limit specifies the maximum number of messages (with the specified Message ID) that are allowed on the specified pipe at any time. This limit is specified by the application at the time of the subscription. If the application uses the [CFE\\_SB\\_Subscribe](#) API, a message limit default value of four is used. If this default value is not sufficient, the caller would use the [CFE\\_SB\\_SubscribeEx](#) API that allows the message limit to be specified.

The software bus also provides the user with an option to unsubscribe to a message. The [unsubscribe API](#) takes two parameters, Message ID and Pipe ID. Only the owner of a pipe may unsubscribe to messages on that pipe.

**2.14.1.4 Memory** The software bus statically allocates a block of memory for message buffers and subscription blocks. The size of this memory block is defined by the platform configuration parameter [CFE\\_PLATFORM\\_SB\\_BUF\\_MEMORY\\_BYTES](#). The memory is managed by the cFE ES memory pool and is used only by the software bus. The ES memory pool allows an application to define the block sizes for the pool at compile time. These sizes are defined by the platform configuration parameters prefixed with CFE\_SB\_MEM\_BLOCK\_SIZE (for example, [CFE\\_PLATFORM\\_SB\\_MEM\\_BLOCK\\_SIZE\\_01](#)). It is recommended that a project tailor these values for the mission, based on the software bus packet sizes.

At the time a message is sent, two buffers are allocated from the pool. One for a buffer descriptor (CFE\_SB\_BufferD\_t) and one for the size of the packet. Both buffers are returned to the pool when the message has been received by all recipients. More precisely, if there is one recipient for a message, the message buffers will be released on the following call to CFE\_SB\_ReceiveBuffer for the pipe that received the buffer.

Also when subscriptions are received through the subscribe API's, the software bus allocates a subscription block (CFE\_SB\_DestinationD\_t) from the pool. The subscription blocks are returned to the pool if and when the subscription is nullified through a [CFE\\_SB\\_Unsubscribe](#) call.

The software bus provides a set of figures regarding memory capacity, current memory utilization and high water marks relevant to the SB memory pool. This information may be requested by sending the command to dump the SB statistics packet. In addition, the current memory utilization value and the 'unmarked memory' value ([CFE\\_PLATFORM\\_SB\\_BUF\\_MEMORY\\_BYTES](#) minus peak memory in use) are sent in software bus housekeeping telemetry. The unmarked memory value should be monitored regularly to ensure that the value (in bytes) does not continue to decline or approach zero. If this value were to approach zero, there is a possibility that memory requests would fail which may inhibit the sending of a message. The current memory utilization value should also be monitored to ensure the system contains no memory leaks. The value (in bytes) should remain stable under nominal conditions. Refer to the ES users guide for more information regarding the ES Memory Pool.

## 2.14.2 Autonomous Actions

The software bus is primarily a set of library routines that are called by other software tasks to send and receive packets. The software bus does not perform any operations autonomously, except for sending event messages if errors are detected during the transfer of packets.

As do other tasks, the SB task sends out housekeeping telemetry when requested through the 'Send Housekeeping Data' command.

### 2.14.3 Operation of the SB Software

- Initialization
- All Resets
- Message Routing
- Packet Sequence Values
- Message Limit Error
- Pipe Overflow Error
- SB Event Filtering
- Diagnostic Data
- Control of Packet Routing
- Quality of Service
- Known Problem

**2.14.3.1 Initialization** No action is required by the ground to initialize the software bus. The software bus initializes internal data structures and tables the same way regardless of the type of reset.

**2.14.3.2 All Resets** The software bus does not preserve any information across a reset of any kind. The software bus initializes internal data structures and tables the same way regardless of the type of reset. The routing is reestablished as the system initializes. It is normal procedure for each task of the system to create the pipe or pipes it needs and do all of its subscriptions during task initialization.

After any reset the following statements are true:

- The routing table is cleared and does not contain any routes.
- All subscriptions are lost and must be regenerated.
- The pipe table contains no data, all pipes must be recreated.
- Any packets in transit at the time of the reset are lost.
- The sequence counters for telemetry packets will begin again with a value of one.

**2.14.3.3 Message Routing** In the software bus, all messages are processed in a similar way. The software bus uses the Message ID and the packet length fields (contained in the header) for routing the message to the destination pipe. If either of these two fields do not pass validation, the software bus generates an error event and aborts the delivery process. The software bus performs some validation checks by simply checking message header values against mission or platform configuration parameters. Messages originating from various tasks or instruments are routed to one or more pipes, where they wait until read by a task. The routing configuration for each message is established when applications call one of the SB subscribe APIs. The subscribe APIs take a Message ID and a Pipe ID as parameters. The routing for each packet is stored in SB memory and may be requested at any time by sending the 'Send Routing Info' command. The software bus also provides a set of figures regarding capacity, current utilization and high water marks relevant to the routing. This information may be requested by sending the command to dump the SB statistics packet.

**2.14.3.4 Packet Sequence Values** The sequence count behavior depends on if the message is a command type or telemetry type.

The sequence counter for command messages is not altered by the software bus.

For a telemetry message, the behavior is controlled via API input parameters when sending. When enabled, the software bus will populate the packet sequence counter using an internal counter that gets initialized upon the first subscription to the message (first message will have a packet sequence counter value of 1). From that point on each send request will increment the counter by one, regardless of the number of destinations or if there is an active subscription.

After a rollover condition the sequence counter will be a value of zero for one instance. The sequence counter is incremented after all the checks have passed prior to the actual sending of the message. This includes the parameter checks and the memory allocation check.

When disabled, the original message will not be altered. This method of message delivery is recommended for situations where the sender did not generate the packet, such as a network interface application passing a packet from a remote system to the local software bus.

**2.14.3.5 Message Limit Error** Before placing a message on a pipe, the software bus checks the message limit to ensure the maximum number of packets in transit to the destination is not exceeded. If placing the message on the pipe would exceed the message limit, then the action of sending to that pipe is aborted and the 'Message Limit Error' event is sent. This condition will typically occur when an application that receives the packets does not respond quickly enough, or if the sender of the packets produces them too quickly.

This condition occurs often during development and during integration, for example when a remote processor gets reset or a 1553 cable becomes disconnected. Because of the common occurrences, the event may have filtering associated with it. Any filtering for this event would be performed by the cFE Event Services (EVS). Filtering for SB events may be specified in the cFE platform configuration file or may be commanded after the system initializes.

If this error occurs during nominal conditions, it could be an indication that the 'message limit' is not set correctly. The message limit is given at the time of the subscription and given as a parameter in the subscribe API. With the [CFE\\_SB\\_Subscribe](#) API, the SB uses a default message limit value specified by [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_MSG\\_LIMIT](#). This constant is currently set to a value of four. If the default value is insufficient, the message limit value can be specified in the [CFE\\_SB\\_SubscribeEx](#) API.

A related failure is the pipe overflow condition, which can occur if the total number of packets (of all kinds) sent to a particular pipe is too large.

**2.14.3.6 Pipe Overflow Error** Another common error that occurs during the send process is the pipe overflow error. This condition occurs if the total number of packets (of all kinds) sent to a particular pipe is too large. If this error occurs too frequently, it may be an indication that the pipe depth is not set correctly. The pipe depth is given at the time the pipe is created as a parameter in the [CFE\\_SB\\_CreatePipe](#) API.

**2.14.3.7 SB Event Filtering** Most filtering for SB events is performed by the cFE Event Services (EVS). Filtering for SB events may be specified in the cFE platform configuration file or may be commanded after the system initializes. There is no SB event log that limits the number of events based on the capacity of the log, as in the heritage software bus.

There is one case in which events are filtered by the software bus instead of event services. This occurs when the software bus needs to suppress events so that a fatal recursive event condition does not transpire. Because error cases encountered when sending a message generate an event, and events cause a message to be sent a calling sequence could cause a stack overflow if the recursion is not properly terminated. The cFE software bus detects this condition and properly terminates the recursion. This is done by using a set of flags (one flag per event in the Send API) which determine whether an API has relinquished its stack. If the software bus needs to send an event that may cause recursion, the flag is set and the event is sent. If sending the event would cause the same event again, the event call will be bypassed, terminating the recursion. The result is that the user will see only one event instead of the many events that would normally occur without the protection. The heritage software bus did not have this condition because it stored events in the software bus event log and another thread would read them out at a later time.

**2.14.3.8 Diagnostic Data** The cFE software bus provides a set of commands to dump SB diagnostic data to help troubleshoot problems or check configuration settings. These commands allow the user to view the routing table, the pipe table or the message map. The message map is a lookup table used during a send operation to give fast access to the routing table index that corresponds to the message being sent.

The software bus also provides a statistics packet that can be used to tune the configuration parameters. This information is sent to the ground in the form of an SB packet when the corresponding command is received. The cFE limits the number of system pipes, unique Message IDs, buffer memory, messages on a pipe and subscriptions per Message ID. These limits are configurable through cFE platform and mission configuration parameters. The statistics packet was designed to let the project verify that these user settings provide the necessary margin to meet requirements.

The SB statistics information shows 'Currently In Use' figures, 'High Water Mark' figures and 'Max Allowed' figures for the following: buffer memory, messages on each pipe (pipe depth stats), System Pipes, Unique Message IDs and total subscriptions.

Depending on the task-scheduling implementation details of the operating system, it is possible to see the peak messages on a pipe occasionally exceed the depth of the pipe. The "Peak Messages In Use" parameter is included in the SB statistics packet under the pipe depth stats.

**2.14.3.9 Control of Packet Routing** The software bus allows the ground to disable and enable the sending of packets of a specified Message ID to a specified pipe. All destinations that are needed for normal operation are enabled by default. Modifying the routing of packets may be required for the following reasons:

- In flight, one can enable diagnostic packets to see them on the ground.
- During testing, one can disable a destination to simulate an anomaly.

**2.14.3.10 Quality of Service** The software bus has a parameter in the [CFE\\_SB\\_SubscribeEx](#) API named Quality, which means Quality of Service (QOS) for off-board routing and is of the type [CFE\\_SB\\_Qos\\_t](#). This structure has two members named priority and reliability. The Quality parameter is currently unused by the software bus. It is a placeholder to be used with the future software bus capability of inter-processor communication. Although currently the software bus does not implement quality of service.

A default quality of services is provided via the [CFE\\_SB\\_DEFAULT\\_QOS](#) macro.

**2.14.3.11 Known Problem** The software bus may perform unexpectedly under an unlikely corner-case scenario. This scenario was revealed in a stress test. The stress test was designed to deplete the Software Bus memory pool by having a high priority application continuously send 1000 byte packets to a lower priority application until the memory pool code returned an error code and sent the following event. "CFE\_ES:getPoolBuf err:Request won't fit in remaining memory" At this point the higher priority sending application would stop executing. This would allow the lower priority receiving application to begin receiving the 1000 byte packets. After the receiving app processed all of the packets, the memory was restored to the memory pool as expected. The SB memory-in-use telemetry was zero because there were no software bus packets in transit. At this point any attempt to send a new-sized packet on the software bus was be rejected. The ES memory pool stated that the "...Request won't fit in remaining memory" even though there was currently no memory in use.

The simplest way to prevent this behavior is to ensure that there is margin when sizing the SB memory pool. To check the margin, monitor the "Peak Memory in Use" vs. the configuration parameter [CFE\\_PLATFORM\\_SB\\_BUF\\_MEMORY\\_BYTES](#) which indicates the amount allocated.

#### 2.14.4 Frequently Asked Questions about Software Bus

**(Q) How is the memory pool handle (sent in SB housekeeping telemetry) intended to be used?**

*The memory pool handle is used to analyze the SB memory pool statistics. The cFE ES command ([CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#)) to dump the memory pool statistics takes the pool handle as a parameter. These statistics tell how the SB memory pool is configured and gives details on margin. An improperly configured SB memory pool may inhibit communication. This may occur if there is not enough margin to create a block of the size needed for a transfer. Refer to the ES memory pool users guide for more details. [Memory Pool](#)*

**(Q) When sending a message, what message header fields are critical for routing the message?**

*To route the message properly, the software bus uses only the Message ID and packet length fields from the header of the message. If the packet length field is incorrect, then the buffer allocation for the message will also be incorrect. This may appear to the receiver as a truncated message or a message with unknown data added to the end of the message.*

**(Q) How many copies of the message are performed in a typical message delivery?**

*There is a single copy of the message performed when sending a message (from the callers memory space) using [CFE\\_SB\\_TransmitMsg](#). When transmitting the message, the software bus copies the message from the callers memory space into a buffer in the software bus memory space. There is also the option to request a buffer from SB, write directly to the buffer and send via [CFE\\_SB\\_TransmitBuffer](#). This is equivalent to the previous zero copy implementation. The [CFE\\_SB\\_ReceiveBuffer](#) API gives the user back a pointer to the buffer. When working with the buffers, the additional complexity to be aware of is the buffer is only available to the app from the request to send (on the sending side), or from the receive until the next receive on the same pipe on the receiving side. If the data is required outside that scope, the app needs a local copy.*

**(Q) When does the software bus free the buffer during a typical message delivery process? Or how long is the message, and the pointer to the buffer in the [CFE\\_SB\\_ReceiveBuffer](#) valid?**

*After receiving a buffer by calling [CFE\\_SB\\_ReceiveBuffer](#), the buffer received is valid until the next call to [CFE\\_SB\\_ReceiveBuffer](#) with the same Pipe Id. If the caller needs the message longer than the next call to [CFE\\_SB\\_ReceiveBuffer](#), the caller must copy the message to its memory space.*

**(Q) The first parameter in the [CFE\\_SB\\_ReceiveBuffer](#) API is a pointer to a pointer which can get confusing. How can I be sure that the correct address is given for this parameter.**

Typically a caller declares a ptr of type `CFE_SB_Buffer_t` (i.e. `CFE_SB_Buffer_t *Ptr`) then gives the address of that pointer (`&Ptr`) as this parameter. After a successful call to `CFE_SB_ReceiveBuffer`, `Ptr` will point to the first byte of the software bus buffer. This should be used as a read-only pointer. In systems with an MMU, writes to this pointer may cause a memory protection fault.

**(Q) Why am I not seeing expected Message Limit error events or Pipe Overflow events?**

*It is possible the events are being filtered by cFE Event Services. The filtering for this event may be specified in the platform configuration file or it may have been commanded after the system initializes.*

*There is a corresponding counter for each of these conditions. First verify that the condition is happening by viewing the counter in SB HK telemetry. If the condition is happening, you can view the SB filter information through the EVS App Data Main page by clicking the 'go to' button for SB. The event Id for these events can be learned through a previous event or from the `cfe_sb_eventids.h` file.*

**(Q) Why does the SB provide event filtering through the platform configuration file?**

*To give the user the ability to filter events before an EVS command can be sent. During system initialization, there are many conditions occurring that can cause a flood of SB events such as No Subscribers, Pipe Overflow and MsgId to Pipe errors. This gives the user a way to limit these events.*

**(Q) Why does SB have so many debug event messages?**

*The SB debug messages are positive acknowledgments that an action (like receiving a cmd, creating a pipe or subscribing to a message) has occurred. They are intended to help isolate system problems. For instance, if an expected response to a command is not happening, it may be possible to repeat the scenario with the debug event turned on to verify that the command was successfully received.*

**(Q) How is the QOS parameter in the `CFE_SB_SubscribeEx` used by the software bus?**

*The QOS parameter is currently unused by the software bus. It is a placeholder to be used with the future software bus capability of inter-processor communication. Setting the QOS as `CFE_SB_DEFAULT_QOS` will ensure seamless integration when the software bus is expanded to support inter-processor communication.*

**(Q) Can I confirm my software bus buffer was delivered?**

*There is no built in mechanism for confirming delivery (it could span systems). This could be accomplished by generating a response message from the receiver.*

## 2.15 cFE Software Bus Commands

Upon receipt of any command, the Software Bus application will confirm that the message length embedded within the header (from `CFE_MSG_GetSize()`) matches the expected length of that message, based on the size of the C structure defining that command. If there is any discrepancy between the expected and actual message size, SB will generate the `CFE_SB_LEN_ERR_EID` event, increment the command error counter (\$sc\_\$cpu\_SB\_CMDEC), and the command will *not* be accepted for processing.

The following is a list of commands that are processed by the cFE Software Bus Task.

### Global `CFE_SB_DISABLE_ROUTE_CC`

Disable Software Bus Route

**Global CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC**

Disable Subscription Reporting Command

**Global CFE\_SB\_ENABLE\_ROUTE\_CC**

Enable Software Bus Route

**Global CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC**

Enable Subscription Reporting Command

**Global CFE\_SB\_NOOP\_CC**

Software Bus No-Op

**Global CFE\_SB\_RESET\_COUNTERS\_CC**

Software Bus Reset Counters

**Global CFE\_SB\_SEND\_PREV\_SUBS\_CC**

Send Previous Subscriptions Command

**Global CFE\_SB\_SEND\_SB\_STATS\_CC**

Send Software Bus Statistics

**Global CFE\_SB\_WRITE\_MAP\_INFO\_CC**

Write Map Info to a File

**Global CFE\_SB\_WRITE\_PIPE\_INFO\_CC**

Write Pipe Info to a File

**Global CFE\_SB\_WRITE\_ROUTING\_INFO\_CC**

Write Software Bus Routing Info to a File

## 2.16 cFE Software Bus Telemetry

The following are telemetry packets generated by the cFE Software Bus Task.

**Global CFE\_SB\_AllSubscriptionsTlm\_Payload\_t**

SB Previous Subscriptions Packet

**Global CFE\_SB\_AllSubscriptionsTlm\_Payload\_t**

SB Previous Subscriptions Packet

**Global CFE\_SB\_HousekeepingTlm\_Payload\_t**

Software Bus task housekeeping Packet

**Global CFE\_SB\_HousekeepingTlm\_Payload\_t**

Software Bus task housekeeping Packet

**Global CFE\_SB\_SingleSubscriptionTlm\_Payload\_t**

SB Subscription Report Packet

**Global CFE\_SB\_SingleSubscriptionTlm\_Payload\_t**

SB Subscription Report Packet

**Global CFE\_SB\_StatsTlm\_Payload\_t**

SB Statistics Telemetry Packet

**Global CFE\_SB\_StatsTlm\_Payload\_t**

SB Statistics Telemetry Packet

## 2.17 cFE Software Bus Configuration Parameters

The following are configuration parameters used to configure the cFE Software Bus either for each platform or for a mission as a whole.

### Global CFE\_MISSION\_SB\_MAX\_PIPES

Maximum Number of pipes that SB command/telemetry messages may hold

Maximum Number of pipes that SB command/telemetry messages may hold

### Global CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE

Maximum SB Message Size

Maximum SB Message Size

### Global CFE\_PLATFORM\_ENDIAN

Platform Endian Indicator

### Global CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES

Size of the SB buffer memory pool

Size of the SB buffer memory pool

### Global CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME

Default Message Map Filename

Default Message Map Filename

### Global CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT

Default Subscription Message Limit

Default Subscription Message Limit

### Global CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME

Default Pipe Information Filename

Default Pipe Information Filename

### Global CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME

Default Routing Information Filename

Default Routing Information Filename

### Global CFE\_PLATFORM\_SB\_FILTERED\_EVENT1

SB Event Filtering

SB Event Filtering

### Global CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID

Highest Valid Message Id

Highest Valid Message Id

### Global CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT

Maximum Number of unique local destinations a single MsgId can have

Maximum Number of unique local destinations a single MsgId can have

### Global CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS

Maximum Number of Unique Message IDs SB Routing Table can hold

Maximum Number of Unique Message IDs SB Routing Table can hold

### Global CFE\_PLATFORM\_SB\_MAX\_PIPES

Maximum Number of Unique Pipes SB Routing Table can hold

Maximum Number of Unique Pipes SB Routing Table can hold

## 2.18 cFE Table Services Overview

Applications often organize sets of their parameters into logical units called tables. These are typically constant parameters that can change the behavior of a flight software algorithm and are only intended to be modified by operations personnel. Examples of this would be attitude control gains, sensor scalefactors, telemetry filter settings, etc.

Table Services (TBL) provides a centralized control of flight software tables. Operations personnel would interact with TBL in order to dump the contents of current tables, load new table images, verify the contents of a table image and manage Critical tables.

None of the cFE core applications (EVS, SB, ES, TIME, or TBL) use tables, and it is possible to build cFE without Table Services if not needed or an alternative parameter management mechanism is to be utilized.

For additional detail on Tables and how to manage them, see the following sections:

- [Managing Tables](#)
- [cFE Table Types and Table Options](#)
- [Table Registry](#)
- [Table Services Telemetry](#)
- [Effects of Processor Reset on Tables](#)
- [Frequently Asked Questions about Table Services](#)

### 2.18.1 Managing Tables

In order to effectively manage tables, an operator needs to understand how cFE Applications manage tables from their end. There are a number of methods that cFE Applications typically use to manage their tables. Each method is appropriate based upon the nature of the contents of the table.

cFE Applications are required to periodically check to see if their table is to be validated, updated (or in the case of dump-only tables, dumped). Most Applications perform this periodic management at the same time as housekeeping requests are processed. This table management is performed by the cFE Application that "owns" a table (ie - the cFE Application that registered the table with cFE Table Services). It is possible for cFE Applications to "share" a table with other cFE Applications. An Application that shares a table does not typically perform any of the management duties associated with that table.

A table can have one of two different types and a number of different options. These are discussed further in later sections. An operator should understand the chosen type and selected options for a particular table before attempting to modify a table's contents.

To understand the methods of maintaining a table, it is important that the terminology be clear. A table has two images: "Active" and "Inactive". The Active table is the one that a cFE Application is currently accessing when it executes. The

Inactive table is a copy of the Active table that an operator (or on-board process such as a stored command processor) can manipulate and change to have a newly desired set of data.

To create an Inactive table image on board, the operator would be required to perform a "Load" to the table. Loads are table images stored in on-board files. The Load can contain either a complete table image or just a part of a table image. If the Load contains just a portion, the Inactive image is first initialized with the contents of the Active image and then the portion identified in the Load file is written on top of the Active image. After the initial Load, an operator can continue to manipulate the Inactive table image with additional partial table load images. This allows the operator to reconfigure the contents of multiple portions of the table before deciding to "Validate" and/or "Activate" it.

Some cFE Applications provide special functions that will examine a table image to determine if the contents are logically sound. This function is referred to as the "Validation Function." When a cFE Application assigns a Validation Function to a table during the table registration process, it is then requiring that a Validation be performed before the table can be Activated. When an operator requests a Validation of a table image, they are sending a request to the owning Application to execute the associated Validation Function on that image. The results of this function are then reported in telemetry. If the Validation is successful, the operator is free to perform a table Activation. If the Validation fails, the operator would be required to make additional changes to the Inactive table image and attempt another Validation before commanding an Activation.

To change an Inactive table image into the Active table image, an operator must Activate a table. When an operator sends the table Activation command, they are notifying the table's owning Application that a new table image is available. It is then up to the Application to determine when is the best time to perform the "Update" of the table. When an Application performs an Update, the contents of the Inactive table image become the Active table image.

### 2.18.2 cFE Table Types and Table Options

A cFE Application Developer has several choices when creating a cFE Application. There are two basic types of tables: single buffered and double buffered. In addition to these two basic types there are a small variety of options possible with each table. These options control special characteristics of the table such as whether it is dump-only, critical or whether it has an application defined location in memory.

Each choice has its advantages and disadvantages. The developer chooses the appropriate type based upon the requirements of the application. Anyone operating a particular cFE Application must understand the nature of the type and options selected for a particular table before they can successfully understand how to perform updates, validations, etc.

For more information on the different types of tables available, see the following sections:

- Table Types
  - [Single Buffered Tables](#)
  - [Double Buffered Tables](#)
- Table Options
  - [Tables with Validation Functions](#)
  - [Critical Tables](#)
  - [User Defined Address Tables](#)
  - [Dump Only Tables](#)

**2.18.2.1 Single Buffered Tables** The default table type for a cFE Application to use is a single buffered table. The principle advantage of a single buffered table is that it can share one of several shared table buffers for uploaded and pending table images. Since many cFE Applications have relatively small tables that are not changed at time critical moments or are not changed very often during a mission, single buffered tables represent the most memory resource efficient method of being managed.

The number of single buffered tables that can have inactive table images being manipulated at one time is specified by a TBL Services configuration parameter ([CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#)) found in the `cfe_platform_cfg.h` file associated with the processor in question. This parameter identifies the number of shared table buffers that are available.

Since inactive single buffered table images share a common resource, it may not be prudent for an operator to load an image and then delay on the image's activation for an extended period of time.

Single buffered tables are allowed to be critical (see [Critical Tables](#)), dump-only (see [Dump Only Tables](#)) and/or have a user-defined address (see [User Defined Address Tables](#)).

**2.18.2.2 Double Buffered Tables** Under certain conditions, a cFE Application Developer may choose to use a double buffered table type within their application. Double buffered tables retain a dedicated inactive image of the table data. With a dedicated inactive table image available, double buffered tables are then capable of efficiently swapping table contents and/or delaying the activation of a table's contents for an indeterminate amount of time.

Some cFE Applications prefer to delay the Activation of a table until a specified time (e.g. - a Spacecraft Ephemeris). These tables are typically defined as double buffered tables so that the Inactive image can be left sitting untouched for an extended period of time without interfering with shared resources for other tables. Then the Application can perform the Update when the time is right.

Applications which have unusually large tables may decide to conserve memory resources by making them double buffered. This is because the shared buffers used by single buffered tables must be sized to match the largest table. If there is one table that is unusually large, there is little reason to allocate up to [CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#) number of buffers that size. A double buffered table will only allocate ONE extra buffer of that size.

Performance minded Applications that are required to perform processing with tight timing deadlines may choose to use double buffered tables because the Update for a double buffered table is deterministic and quick.

**2.18.2.3 Tables with Validation Functions** Applications that associate Validation Functions with their tables when the tables are registered are effectively requiring that the contents of a table be logically Validated before it is Activated. The cFE will refuse to let a table with an associated Validation Function be Activated until a successful Validation on the Inactive table image has occurred.

Tables that are NOT assigned a Validation Function are assumed to be valid regardless of the contents of the table image. These tables do not require a Validation Command prior to Activation.

**2.18.2.4 Critical Tables** Applications that must be able to recover quickly from a Processor Reset may select the "Critical" table option when registering their table. Table Services automatically creates a Critical Data Store for the table and ensures that the contents of the Critical Data Store are updated whenever a Table Activation occurs.

If a Processor Reset happens, when the Application attempts to Register the table again, Table Services automatically locates the associated Critical Data Store and initializes the Table with the saved contents.

**2.18.2.5 User Defined Address Tables** In order to provide a mechanism for Flight Software Maintenance teams to quickly create a table image for dumping contents of memory that isn't normally loaded by the ground, there is an option to create User-Defined Address tables. These tables, when they are first registered, provide a memory address where the Active image of the table is to be maintained. Normally, the address is specified by Table Services from its memory pool.

By specifying the address, the Flight Software Maintenance team can create a Dump-Only table that contains the contents of a data structure that is not normally accessible via telemetry or table dumps. Then, on command, the Flight Software Maintenance team can periodically dump the data structure's contents to an on-board file(s) that can then be transferred to the ground for later analysis.

**2.18.2.6 Dump Only Tables** On occasion, cFE Applications require a segment of memory in which the Application writes data. The typical cFE Table is not normally modified directly by an Application but only via Load and Activate commands from either the Ground or Stored Command Processor. However, for those situations where an Application wishes to modify the contents of a data structure and the Application is limited in its telemetry bandwidth so that the modified data cannot be telemetered, the Application can create a Dump-Only table.

Dump-Only tables are not allowed to be modified via the Load/Validate/Activate process most other tables are. They are only supposed to be modified by onboard Applications. The Operator can still command a Dump which will be processed by the table's owning Application when it manages its tables. By letting the Application perform the dump, the Operator can feel confident that the table contents are a complete snapshot in time and not corrupted by taking a snapshot while the Application was in the process of modifying its contents.

### 2.18.3 Table Registry

When Applications register tables, Table Services retains pertinent information on the table in the Table Registry. The following information (along with other information that is less important for an operator) is kept for each table:

- The Application ID of the Application that Registered the table
- The full name of the table
- The size, in bytes, of the table
- Pointers to the start addresses of the Table's image buffers, Active and Inactive (if appropriate)
- A pointer to the start address of a Validation Function
- A flag indicating whether a table image has been loaded into an Inactive buffer
- A flag indicating whether the table is Critical and its associated CDS Handle if it is
- A flag indicating whether the table has ever been loaded (initialized)
- A flag indicating whether the table is Dump Only
- A flag indicating whether the table has an Update Pending
- A flag indicating whether the table is double buffered or not
- The System Time when the Table was last Updated
- The filename of the last file loaded into the table
- The File Creation Time for the last file used to load the contents of the table

This information can be obtained by either sending the Dump Registry command which will put all of the information from the Table Registry into an onboard file for later downlink or the operator can send a command to Telemeter the Registry Entry for a single table. This will cause the pertinent registry entry for a single table to be sent via a telemetry packet.

The API function [CFE\\_TBL\\_Register\(\)](#) returns either CFE\_SUCCESS or CFE\_TBL\_INFO\_RECOVERED\_TBL to indicate that the table was successfully registered. The difference is whether the table data was recovered from CDS as part of the registration. There are several error return values that describe why the function failed to register the table but nothing related to why the restoration from CDS might have failed. There is, however, a message written to the System Error Log by Table Services that can be dumped by the ground to get this information. Note that failure to restore a table from CDS is not an expected error and requires some sort of data corruption to occur.

#### 2.18.4 Table Services Telemetry

Table Services produces two different telemetry packets. The first packet, referred to as the Table Services Housekeeping Packet, is routinely produced by Table Services upon receipt of the Housekeeping Request message that is typically sent to all Applications by an on board scheduler. The contents and format of this packet are described in detail at [CFE\\_TBL\\_HousekeepingTlm\\_t](#).

#### 2.18.5 Effects of Processor Reset on Tables

When a processor resets, the Table Registry is re-initialized. All Applications must, therefore, re-register and re-initialize their tables. The one exception, however, is if the Application has previously tagged a table as "Critical" during Table Registration, then Table Services will attempt to locate a table image for that table stored in the Critical Data Store. Table Services also attempts to locate the Critical Table Registry which is also maintained in the Critical Data Store.

If Table Services is able to find a valid table image for a Critical table in the Critical Data Store, the contents of the table are automatically loaded into the table and the Application is notified that the table does not require additional initialization.

#### 2.18.6 Frequently Asked Questions about Table Services

##### (Q) Is it an error to load a table image that is smaller than the registered size?

*Table images that are smaller than the declared size of a table fall into one of two categories.*

*If the starting offset of the table image (as specified in the Table Image secondary file header) is not equal to zero, then the table image is considered to be a "partial" table load. Partial loads are valid as long as a table has been previously loaded with a non-"partial" table image.*

*If the starting offset of the table image is zero and the size is less than the declared size of the table, the image is considered "short" but valid. This feature allows application developers to use variable length tables.*

##### (Q) I tried to validate a table and received the following event message that said the event failed:

**MyApp validation failed for Inactive 'MyApp.MyTable', Status=0x####**

##### What happened?

*The event message indicates the application who owns the table has discovered a problem with the contents of the image. The code number following the 'Status' keyword is defined by the Application. The documentation for the specified Application should be referred to in order to identify the exact nature of the problem.*

##### (Q) What commands do I use to load a table with a new image?

*There are a number of steps required to load a table.*

1. The operator needs to create a cFE Table Services compatible table image file with the desired data contained in it. This can be accomplished by creating a 'C' source file, compiling it with the appropriate cross compiler for the onboard platform and then running the `elf2cfetbl` utility on the resultant object file.
2. The file needs to be loaded into the onboard processor's filesystem using whichever file transfer protocol is used for that mission.
3. The [Load Command](#) is sent next to tell Table Services to load the table image file into the Inactive Table Image Buffer for the table identified in the file.
4. The [Validate Command](#) is then sent to validate the contents of the inactive table image. This will ensure the file was not corrupted or improperly defined. The results of the validation are reported in Table Services Housekeeping Telemetry. If a table does not have a validation function associated with it, the operator may wish to compare the computed CRC to verify the table contents match what was intended.
5. Upon successful validation, the operator then sends the [Activate Command](#). The application owning the table should, within a reasonable amount of time, perform a table update and send an event message.

**(Q) What causes cFE Table Services to generate the following sys log message:**

```
CFE_TBL:GetAddressInternal-App(%d) attempt to access unowned Tbl Handle=%d
```

When an application sharing its table(s) with one or more applications is reloaded, the reloaded application's table handle(s) are released. cFE Table Services sees that the table(s) are shared and keeps a 'shadow' version of the table in the Table Services registry. The registry will show the released, shared tables with no name. When the applications sharing the table attempt to access the table via the 'old', released handle, Table Services will return an error code to the applications and generate the sys log message. The applications may then unregister the 'old' handle(s) in order to remove the released, shared table(s) from the Table Services registry and share the newly loaded application table(s).

**(Q) When does the Table Services Abort Table Load command need to be issued?**

The Abort command should be used whenever a table image has been loaded but the application has not yet activated it and the operator no longer wants the table to be loaded.

The purpose of the Abort command is to free a previously allocated table buffer. It should be noted, however, that multiple table loads to the SAME table without an intervening activation or abort, will simply OVERWRITE the previous table load using the SAME buffer.

Therefore, the most likely scenarios that would lead to a needed abort are as follows:

1. Operator loads a table and realizes immediately that the load is not wanted.
2. Operator loads a table and performs a validation on it. Regardless of whether the table passes or fails the validation, if the operator no longer wants to activate the table, the abort command should be issued.  
*It should be noted that a table image that fails activation is retained in the inactive buffer for diagnosis, if necessary. It is NOT released until it is aborted or overwritten and successfully validated and activated.*
3. A table image was loaded; the image was successfully validated; the command for activation was sent; but the application fails to perform the activation.

The Abort command will free the table buffer and clear the activation request.

This situation can occur when either the application is improperly designed and fails to adequately manage its tables (sometimes seen in the lab during development) or the application is "hung" and not performing as it should.

## 2.19 cFE Table Services Commands

Upon receipt of any command, the Table Services application will confirm that the message length embedded within the header (from `CFE_MSG_GetSize()`) matches the expected length of that message, based on the size of the C structure defining that command. If there is any discrepancy between the expected and actual message size, TBL will generate the `CFE_TBL_LEN_ERR_EID` event, increment the command error counter (`$sc_$cpu_TBL_CMDEC`), and the command will *not* be accepted for processing.

The following is a list of commands that are processed by the cFE Table Services Task.

### Global `CFE_TBL_ABORT_LOAD_CC`

Abort Table Load

### Global `CFE_TBL_ACTIVATE_CC`

Activate Table

### Global `CFE_TBL_DELETE_CDS_CC`

Delete Critical Table from Critical Data Store

### Global `CFE_TBL_DUMP_CC`

Dump Table

### Global `CFE_TBL_DUMP_REGISTRY_CC`

Dump Table Registry

### Global `CFE_TBL_LOAD_CC`

Load Table

### Global `CFE_TBL_NOOP_CC`

Table No-Op

### Global `CFE_TBL_RESET_COUNTERS_CC`

Table Reset Counters

### Global `CFE_TBL_SEND_REGISTRY_CC`

Telemeter One Table Registry Entry

### Global `CFE_TBL_VALIDATE_CC`

Validate Table

## 2.20 cFE Table Services Telemetry

The following are telemetry packets generated by the cFE Table Services Task.

### Global `CFE_TBL_HousekeepingTlm_Payload_t`

Table Services Housekeeping Packet

### Global `CFE_TBL_HousekeepingTlm_Payload_t`

Table Services Housekeeping Packet

### Global `CFE_TBL_TblRegPacket_Payload_t`

Table Registry Info Packet

### Global `CFE_TBL_TblRegPacket_Payload_t`

Table Registry Info Packet

## 2.21 cFE Table Services Configuration Parameters

The following are configuration parameters used to configure the cFE Table Services either for each platform or for a mission as a whole.

### Global CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN

Maximum Length of Full Table Name in messages  
Maximum Length of Full Table Name in messages

### Global CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH

Maximum Table Name Length  
Maximum Table Name Length

### Global CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES

Size of Table Services Table Memory Pool  
Size of Table Services Table Memory Pool

### Global CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE

Default Filename for a Table Registry Dump  
Default Filename for a Table Registry Dump

### Global CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES

Maximum Number of Critical Tables that can be Registered  
Maximum Number of Critical Tables that can be Registered

### Global CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE

Maximum Size Allowed for a Double Buffered Table  
Maximum Size Allowed for a Double Buffered Table

### Global CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES

Maximum Number of Table Handles  
Maximum Number of Table Handles

### Global CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES

Maximum Number of Tables Allowed to be Registered  
Maximum Number of Tables Allowed to be Registered

### Global CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS

Maximum Number of Simultaneous Table Validations  
Maximum Number of Simultaneous Table Validations

### Global CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS

Maximum Number of Simultaneous Loads to Support  
Maximum Number of Simultaneous Loads to Support

### Global CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE

Maximum Size Allowed for a Single Buffered Table  
Maximum Size Allowed for a Single Buffered Table

### Global CFE\_PLATFORM\_TBL\_VALID\_PRID\_1

Processor ID values used for table load validation  
Processor ID values used for table load validation

**Global CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT**

Number of Processor ID's specified for validation

Number of Processor ID's specified for validation

**Global CFE\_PLATFORM\_TBL\_VALID\_SCID\_1**

Spacecraft ID values used for table load validation

Spacecraft ID values used for table load validation

**Global CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT**

Number of Spacecraft ID's specified for validation

Number of Spacecraft ID's specified for validation

## 2.22 cFE Time Services Overview

The cFE Time Service (TIME) is one of the cFE core services. TIME provides time correlation, distribution and synchronization services. TIME exists in two varieties: a Time Server responsible for maintaining the master time reference for all remote systems, and a Time Client responsible for synchronizing to that master time reference.

Since TIME is a generic implementation aimed to meet the needs of a variety of mission configurations, there are numerous configuration parameters, which dictate the behavior of TIME (see `cfe_mission_cfg.h` and `cfe_platform_cfg.h` for the specific mission configuration).

With the exception of those sections specific to Time Clients and Servers, this document assumes the most common physical environment - one instantiation of cFE installed on a single processor. Therefore, TIME represents cFE Time Services configured as a Time Server.

For additional detail on Time Services and how to manage it, see the following sections:

- [Time Components](#)
- [Time Structure](#)
- [Time Formats](#)
- [Time Configuration](#)
  - [Time Format Selection](#)
  - [Enabling Fake Tone Signal](#)
  - [Selecting Tone and Data Ordering](#)
  - [Specifying Tone and Data Window](#)
  - [Specifying Time Server/Client](#)

- Specifying Time Tone Byte Order
- Virtual MET
- Specifying Time Source
- Specifying Time Signal
- Time Services Paradigm(s)
- Flywheeling
- Time State
- Initialization
  - Power-On Reset
  - Processor Reset
- Initialization
  - Power-On Reset
  - Processor Reset
- Normal Operation
  - Client
  - Server
    - \* Setting Time
    - \* Adjusting Time
    - \* Setting MET
- Frequently Asked Questions about Time Services

### 2.22.1 Time Components

Time knowledge is stored in several pieces, so that the time information can more easily be manipulated and utilized. These components include:

The **Ground Epoch** is an arbitrary date and time that establishes the zero point for spacecraft time calculations. The selection of the epoch is mission specific, although in the past, it was common to select the same epoch as defined for the Operating System used by the computers hosting the ground system software. Recent mission epoch selections have also included using zero seconds after midnight, Jan 1, 2001.

**Spacecraft Time** is the number of seconds (and fraction of a second) since the ground epoch. Spacecraft time is the sum of **Mission Elapsed Time** (MET) and the **Spacecraft Time Correlation Factor** (STCF). By definition, MET is a measure of time since launch or separation. However, for most missions the MET actually represents the amount of time since powering on the hardware containing the MET timer. The STCF correlates the MET to the ground epoch.

The **Tone** is the signal that MET seconds have incremented. In most hardware configurations, the tone is synonymous with the **1 PPS** signal. The tone signal may be generated by a local hardware timer, or by an external event (G↔PS receiver, spacewire time tick, 1553 bus signal, etc). TIME may also be configured to simulate the tone for lab environments that do not have the necessary hardware to provide a tone signal. Note that MET sub-seconds will be zero at the instant of the tone.

**Time at the Tone** is the spacecraft time at the most recent "valid" tone.

**Time since the Tone** is the amount of time since the tone (usually less than one second). This value is often measured using the local processor clock. Upon detecting the tone signal, TIME stores the contents of the local processor clock to facilitate this measurement.

Thus, **Current Spacecraft Time** is the sum of "time at the tone" and "time since the tone".

**Leap Seconds** occur to keep clocks correlated to astronomical observations. The modern definition of a second (9,192,631,770 oscillations of a cesium-133 atom) is constant while the earth's rotation has been slow by a small fraction of a second per day. The **International Earth Rotation and Reference System Service** (IERS) maintains the count of leap seconds as a signed whole number that is subject to update twice a year. Although it is possible to have a negative leap second count if the earth rotates too fast, it is highly unlikely. The initial count of leap seconds (10) was established in January of 1972 and the first leap second was added to the initial count in June of 1972. The most recent leap seconds are announced by the International Earth Rotation Service (IERS): <https://www.iers.org> in IERS Bulletin C (leap second announcements). Search the IERS site for "Bulletin C" to obtain the latest issue/announcement.

### 2.22.2 Time Structure

The cFE implementation of the **System Time Structure** is a modified version of the CCSDS Unsegmented Time Code (CUC) which includes 4 bytes of seconds, and 4 bytes of subseconds, where a subsecond is equivalent to  $1/(2^{32})$  seconds. The system time structure is used by TIME to store current time, time at the tone, time since the tone, the MET, the STCF and command arguments for time adjustments. Note that typically the 32 bits of seconds and the upper 16 bits of subseconds are used for time stamping Software bus messages, but this is dependent on the underlying definition.

The system time structure is defined as follows:

```
typedef struct {
    uint32    Seconds;      /* Number of seconds */
    uint32    Subseconds;   /* Number of 2^(-32) subseconds */
} CFE_TIME_SysTime_t;
```

### 2.22.3 Time Formats

**International Atomic Time** (TAI) is one of two time formats supported by cFE TIME. TAI is the number of seconds and sub-seconds elapsed since the ground epoch as measured with the atomic clock previously described. TAI has no reference to leap seconds and is calculated using the following equation:

$$\text{TAI} = \text{MET} + \text{STCF}$$

It should be noted that TAI is only "true" TAI when the selected ground epoch is the same as the TAI epoch (zero seconds after midnight, January 1, 1958). However, nothing precludes configuring cFE TIME to calculate time in the TAI format and setting the STCF to correlate to any other epoch definition.

**Coordinated Universal Time** (UTC) is the other time format supported by cFE TIME. UTC differs from TAI in the fact that UTC includes a leap seconds adjustment. TIME computes UTC using the following equation:

$$\text{UTC} = \text{TAI} - \text{Leap Seconds}.$$

The preceding UTC equation might seem to imply that TAI includes leap seconds and UTC does not - which is not the case. In fact, the UTC calculation includes a leap seconds adjustment that subtracts leap seconds from the same time components used to create TAI. Alternatively, it might be less confusing to express the UTC equation as follows:

$$\text{UTC} = \text{MET} + \text{STCF} - \text{Leap Seconds}$$

### 2.22.4 Time Configuration

All configurations of TIME require a local processor source for a 1Hz interrupt and access to a local clock with a resolution fine enough that it can be used to measure short periods of elapsed time. The local interrupt is used to wake-up TIME at a regular interval for the purpose of verifying that the tone is being received. The local clock is used to measure time since the tone and to provide coarse verification that the tone is occurring at approximately one second intervals. The presumption is that the tone is the most accurate timer in the system and, within reason, is to be trusted. Note that nothing precludes the use of the MET as the local clock, assuming the MET is both local and provides sub-second data. However, the tone must not be used as the source for the local 1Hz interrupt.

Consider the following brief description of three hypothetical hardware configurations. These sample systems may be used as reference examples to help clarify the descriptions of the various TIME configuration selections.

In the first system, there is no MET timer and therefore no tone signal. The MET is a count of the number of "fake" tones generated by TIME software. There is no validation performed regarding the quality of time data. This hardware configuration is a common lab environment using COTS equipment.

In the second system, the MET timer is a hardware register that is directly accessible by TIME. When MET seconds increment, a processor interrupt signals the tone. Upon detecting the tone, TIME can read the MET to establish the time at the tone. To verify that the tone is valid, TIME need only validate that this tone signal occurred approximately one second after the previous tone signal (as measured with the local clock).

In the third system, the MET is located on hardware connected via spacewire. When MET seconds increment, a spacewire time tick triggers a local processor interrupt to signal the tone. Shortly after announcing the tone, the hardware containing the MET also generates a spacewire data packet containing the MET value corresponding to the tone. TIME must wait until both the tone and data packet have been received before validating the tone. The tone must have occurred approximately one second after the previous tone signal and the data packet must have been received within a specified window in time following the tone.

The hardware design choice for how the tone signal is distributed is not material to TIME configuration. The software detecting the tone need only call the cFE API function announcing the arrival of the tone. This function is designed to be called from interrupt handlers.

For detail on each of the individual configuration settings for cFE Time Services, see the following sections:

- [Time Format Selection](#)
- [Enabling Fake Tone Signal](#)
- [Selecting Tone and Data Ordering](#)
- [Specifying Tone and Data Window](#)
- [Specifying Time Server/Client](#)
- [Specifying Time Tone Byte Order](#)
- [Virtual MET](#)
- [Specifying Time Source](#)
- [Specifying Time Signal](#)

#### 2.22.4.1 Time Format Selection

Time format is defined in the mission configuration header file.

This selection defines the default time format as TAI or UTC. The API functions to get time in either specific format are still enabled, but the API function to get time in the default format will follow this selection. Enable one, and **only one**, of the following time format definitions:

```
#define CFE_MISSION_TIME_CFG_DEFAULT_TAI  TRUE  
#define CFE_MISSION_TIME_CFG_DEFAULT_UTC  FALSE
```

or

```
#define CFE_MISSION_TIME_CFG_DEFAULT_TAI  FALSE  
#define CFE_MISSION_TIME_CFG_DEFAULT_UTC  TRUE
```

The choice of time format is a mission specific decision and is not directly affected by the hardware configuration.

See also

[CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_TAI](#), [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_UTC](#)

#### 2.22.4.2 Enabling Fake Tone Signal

The fake tone is defined in the mission configuration header file.

If this selection is set to TRUE, TIME will generate a "fake" tone signal by calling the same API function as would be called upon detection of the "real" tone signal. Enable the fake tone only for hardware configurations that do not provide a tone signal.

```
#define CFE_MISSION_TIME_CFG_FAKE_TONE    TRUE
```

Hypothetical hardware configuration number one (described above) would enable the fake tone signal.

See also

[CFE\\_MISSION\\_TIME\\_CFG\\_FAKE\\_TONE](#)

#### 2.22.4.3 Selecting Tone and Data Ordering

Tone and data order is defined in the mission configuration header file.

This selection defines which comes first - the tone or the time at the tone data. Does the time data describe the tone that already occurred, or the tone that has not yet occurred? This decision may be driven by the hardware design but can also be arbitrary. Enable one, and only one, of the following:

```
#define CFE_MISSION_TIME_AT_TONE_WAS  
#define CFE_MISSION_TIME_AT_TONE_WILL_BE
```

Hypothetical hardware configuration number three (described [Time Configuration](#) above) would enable "time at the tone was".

See also

[CFE\\_MISSION\\_TIME\\_AT\\_TONE\\_WAS](#), [CFE\\_MISSION\\_TIME\\_AT\\_TONE\\_WILL\\_BE](#)

#### 2.22.4.4 Specifying Tone and Data Window

The tone and data window is defined in the mission configuration header file.

In concert with the definition of tone and data order, this selection defines the valid window in time for the second of the pair to follow the first. Both must be defined, units are micro-seconds.

```
#define CFE_MISSION_TIME_MIN_ELAPSED  0  
#define CFE_MISSION_TIME_MAX_ELAPSED 100000
```

Hypothetical hardware configuration number three (described above) might use these values which describe a window that begins immediately after the tone and lasts for one tenth of a second.

See also

[CFE\\_MISSION\\_TIME\\_MIN\\_ELAPSED](#), [CFE\\_MISSION\\_TIME\\_MAX\\_ELAPSED](#)

**2.22.4.5 Specifying Time Server/Client** Configure TIME as a client only when the target system has multiple processors running separate instantiations of the cFE. One instantiation must be configured as the server and the remainder configured as clients. If the target system has only one processor running the cFE, then TIME must be configured as a server.

Enable one, and only one, of the following definitions in the platform configuration header file:

```
#define CFE_PLATFORM_TIME_CFG_SERVER    TRUE  
#define CFE_PLATFORM_TIME_CFG_CLIENT   FALSE
```

or

```
#define CFE_PLATFORM_TIME_CFG_SERVER    FALSE  
#define CFE_PLATFORM_TIME_CFG_CLIENT   TRUE
```

#### See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_CLIENT](#)

**2.22.4.6 Specifying Time Tone Byte Order** By default, the CFE time tone message is a payload of integers in platform-endian order (containing the tone's timestamp, the leap seconds, and state information.) In some configurations, it may be better to have the payload produced in big-endian order—particularly in mixed-endian environments.

In order to force the tone message to be in big-endian order, you must define the following:

```
#define CFE_PLATFORM_TIME_CFG_BIGENDIAN
```

**2.22.4.7 Virtual MET** This configuration option refers to whether the MET is local to this instantiation of TIME. If the MET is not local then TIME must be configured as using a virtual MET.

Therefore, all TIME clients must be configured as using a virtual MET. If the MET was local to any TIME client, then that instantiation of TIME would have to be the server.

TIME servers must be configured as using a virtual MET

**2.22.4.8 Specifying Time Source** TIME configuration provides the ability to specify where the source for time data is originating - either internal or external. In hypothetical system one, the MET is internal. In system two, TIME cannot directly read the MET, therefore time data must be received from an external source.

This selection also enables a command interface to switch between internal and external input. When commanded to use internal time data, TIME will ignore the external data. However, TIME will continue to use the API function as the trigger to generate a "time at the tone" command packet regardless of the internal/external command selection.

Set the following definition to TRUE only for TIME servers using an external time data source.

```
#define CFE_PLATFORM_TIME_CFG_SOURCE   TRUE
```

The remainder of this section pertains only to TIME servers configured to accept external time data.

When configured to accept external time data, TIME requires an additional definition for the type of external data (GPS, MET, spacecraft time, etc.). This selection will enable an API function specific to the selected data type. Regardless of how the time data is received, the receiver need only pass the data to the appropriate API function.

TIME servers using an external time data source must set one, and only one, of the following to TRUE, for example:

```
#define CFE_PLATFORM_TIME_CFG_SRC_MET    TRUE
#define CFE_PLATFORM_TIME_CFG_SRC_GPS    FALSE
#define CFE_PLATFORM_TIME_CFG_SRC_TIME   FALSE
```

configuration definitions for the particular source.

If the cfe\_platform\_cfg.h file contains "#define CFE\_PLATFORM\_TIME\_CFG\_SOURCE TRUE" then time is configured to allow switching between internal and external time sources (see [CFE\\_TIME\\_SET\\_SOURCE\\_CC](#)). If this configuration parameter is set to FALSE then the command to set the source will be rejected.

If this configuration parameter is set to TRUE then ONE and ONLY ONE of the following configuration parameters must also be set TRUE in order to specify the external time source, for example:

```
#define CFE_PLATFORM_TIME_CFG_SRC_MET    TRUE
#define CFE_PLATFORM_TIME_CFG_SRC_GPS    FALSE
#define CFE_PLATFORM_TIME_CFG_SRC_TIME   FALSE
```

Note that Internal MET source depends on available hardware. It may be the local count of tone signals, the contents of a hardware register or an OS specific time function.

Note also that when configured to use an external time source, commands to set the time will be overwritten.

#### See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_MET](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_GPS](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_TIME](#)

**2.22.4.9 Specifying Time Signal** Some hardware configurations support a primary and redundant tone signal selection. Setting the following configuration definition to TRUE will result in enabling a TIME command to select the active tone signal.

```
#define CFE_PLATFORM_TIME_CFG_SIGNAL  TRUE
```

Note: this feature requires additional custom software to make the physical signal switch.

#### See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SIGNAL](#)

### 2.22.5 Time Format Selection

Time format is defined in the mission configuration header file.

This selection defines the default time format as TAI or UTC. The API functions to get time in either specific format are still enabled, but the API function to get time in the default format will follow this selection. Enable one, and **only one**, of the following time format definitions:

```
#define CFE_MISSION_TIME_CFG_DEFAULT_TAI TRUE  
#define CFE_MISSION_TIME_CFG_DEFAULT_UTC FALSE
```

or

```
#define CFE_MISSION_TIME_CFG_DEFAULT_TAI FALSE  
#define CFE_MISSION_TIME_CFG_DEFAULT_UTC TRUE
```

The choice of time format is a mission specific decision and is not directly affected by the hardware configuration.

See also

[CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_TAI](#), [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_UTC](#)

### 2.22.6 Enabling Fake Tone Signal

The fake tone is defined in the mission configuration header file.

If this selection is set to TRUE, TIME will generate a "fake" tone signal by calling the same API function as would be called upon detection of the "real" tone signal. Enable the fake tone only for hardware configurations that do not provide a tone signal.

```
#define CFE_MISSION_TIME_CFG_FAKE_TONE TRUE
```

Hypothetical hardware configuration number one (described above) would enable the fake tone signal.

See also

[CFE\\_MISSION\\_TIME\\_CFG\\_FAKE\\_TONE](#)

### 2.22.7 Selecting Tone and Data Ordering

Tone and data order is defined in the mission configuration header file.

This selection defines which comes first - the tone or the time at the tone data. Does the time data describe the tone that already occurred, or the tone that has not yet occurred? This decision may be driven by the hardware design but can also be arbitrary. Enable one, and only one, of the following:

```
#define CFE_MISSION_TIME_AT_TONE_WAS  
#define CFE_MISSION_TIME_AT_TONE_WILL_BE
```

Hypothetical hardware configuration number three (described [Time Configuration](#) above) would enable "time at the tone was".

See also

[CFE\\_MISSION\\_TIME\\_AT\\_TONE\\_WAS](#), [CFE\\_MISSION\\_TIME\\_AT\\_TONE\\_WILL\\_BE](#)

### 2.22.8 Specifying Tone and Data Window

The tone and data window is defined in the mission configuration header file.

In concert with the definition of tone and data order, this selection defines the valid window in time for the second of the pair to follow the first. Both must be defined, units are micro-seconds.

```
#define CFE_MISSION_TIME_MIN_ELAPSED 0  
#define CFE_MISSION_TIME_MAX_ELAPSED 100000
```

Hypothetical hardware configuration number three (described above) might use these values which describe a window that begins immediately after the tone and lasts for one tenth of a second.

See also

[CFE\\_MISSION\\_TIME\\_MIN\\_ELAPSED](#), [CFE\\_MISSION\\_TIME\\_MAX\\_ELAPSED](#)

### 2.22.9 Specifying Time Server/Client

Configure TIME as a client only when the target system has multiple processors running separate instantiations of the cFE. One instantiation must be configured as the server and the remainder configured as clients. If the target system has only one processor running the cFE, then TIME must be configured as a server.

Enable one, and only one, of the following definitions in the platform configuration header file:

```
#define CFE_PLATFORM_TIME_CFG_SERVER TRUE  
#define CFE_PLATFORM_TIME_CFG_CLIENT FALSE
```

or

```
#define CFE_PLATFORM_TIME_CFG_SERVER FALSE  
#define CFE_PLATFORM_TIME_CFG_CLIENT TRUE
```

See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_CLIENT](#)

### 2.22.10 Specifying Time Tone Byte Order

By default, the CFE time tone message is a payload of integers in platform-endian order (containing the tone's timestamp, the leap seconds, and state information.) In some configurations, it may be better to have the payload produced in big-endian order—particularly in mixed-endian environments.

In order to force the tone message to be in big-endian order, you must define the following:

```
#define CFE_PLATFORM_TIME_CFG_BIGENDIAN
```

### 2.22.11 Virtual MET

This configuration option refers to whether the MET is local to this instantiation of TIME. If the MET is not local then TIME must be configured as using a virtual MET.

Therefore, all TIME clients must be configured as using a virtual MET. If the MET was local to any TIME client, then that instantiation of TIME would have to be the server.

TIME servers must be configured as using a virtual MET

### 2.22.12 Specifying Time Source

TIME configuration provides the ability to specify where the source for time data is originating - either internal or external. In hypothetical system one, the MET is internal. In system two, TIME cannot directly read the MET, therefore time data must be received from an external source.

This selection also enables a command interface to switch between internal and external input. When commanded to use internal time data, TIME will ignore the external data. However, TIME will continue to use the API function as the trigger to generate a "time at the tone" command packet regardless of the internal/external command selection.

Set the following definition to TRUE only for TIME servers using an external time data source.

```
#define CFE_PLATFORM_TIME_CFG_SOURCE TRUE
```

The remainder of this section pertains only to TIME servers configured to accept external time data.

When configured to accept external time data, TIME requires an additional definition for the type of external data (GPS, MET, spacecraft time, etc.). This selection will enable an API function specific to the selected data type. Regardless of how the time data is received, the receiver need only pass the data to the appropriate API function.

TIME servers using an external time data source must set one, and only one, of the following to TRUE, for example:

```
#define CFE_PLATFORM_TIME_CFG_SRC_MET TRUE
#define CFE_PLATFORM_TIME_CFG_SRC_GPS FALSE
#define CFE_PLATFORM_TIME_CFG_SRC_TIME FALSE
```

configuration definitions for the particular source.

If the cfe\_platform\_cfg.h file contains "#define CFE\_PLATFORM\_TIME\_CFG\_SOURCE TRUE" then time is configured to allow switching between internal and external time sources (see [CFE\\_TIME\\_SET\\_SOURCE\\_CC](#)). If this configuration parameter is set to FALSE then the command to set the source will be rejected.

If this configuration parameter is set to TRUE then ONE and ONLY ONE of the following configuration parameters must also be set TRUE in order to specify the external time source, for example:

```
#define CFE_PLATFORM_TIME_CFG_SRC_MET TRUE
#define CFE_PLATFORM_TIME_CFG_SRC_GPS FALSE
#define CFE_PLATFORM_TIME_CFG_SRC_TIME FALSE
```

Note that Internal MET source depends on available hardware. It may be the local count of tone signals, the contents of a hardware register or an OS specific time function.

Note also that when configured to use an external time source, commands to set the time will be overwritten.

#### See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_MET](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_GPS](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_TIME](#)

### 2.22.13 Specifying Time Signal

Some hardware configurations support a primary and redundant tone signal selection. Setting the following configuration definition to TRUE will result in enabling a TIME command to select the active tone signal.

```
#define CFE_PLATFORM_TIME_CFG_SIGNAL TRUE
```

Note: this feature requires additional custom software to make the physical signal switch.

See also

[CFE\\_PLATFORM\\_TIME\\_CFG\\_SIGNAL](#)

### 2.22.14 Time Services Paradigm(s)

In order for the cFE Time Services to work for a particular mission, the methods of obtaining time, distributing time and translating time must follow some standard paradigms used in previous missions. The following describes this expected context:

Mission dependent hardware provides the Tone. When this Tone message is received, TIME latches the local time based on the local clock. Note that in lab environments, a simulated Tone capability exists which uses an SB message. Mission dependent hardware also provides the "time at the tone" message based on the hardware latched time and the reference times stored by TIME Server. The TIME Client then updates its local reference time based on the local hardware latched time at the Tone and the provided Time-at-Tone message packet when certain checks (such as the Validity bit being set) pass.

When used in an environment that includes multiple processors, each running a separate instantiation of cFE software, the presumption is that TIME will be distributed in a client/server relationship. In this model, one processor will have TIME configured as the server and the other processors as clients. The TIME server will maintain the various time components and publish a "time at the tone" message to provide synchronized time to the TIME clients. Environments that have only a single instance of TIME must be configured as a TIME server.

In all configurations, the final step in calculating the time "right now" for any instantiation of TIME is to use a local processor clock to measure the "time since the tone".

The specific MET hardware properties will determine whether the MET value can be modified. However, the cFE design is such that there should never be a need to purposefully change or reset the MET.

Regardless of the physical hardware implementation for the MET (elapsed seconds, elapsed ticks, etc.), cFE TIME will convert the hardware MET value into a System Time Format structure for time calculations and will report the converted value in telemetry. cFE TIME will also maintain and report the STCF in a System Time Format structure.

cFE TIME has no knowledge of the current epoch; it is up to the user to keep time on the spacecraft correlated to an epoch. An exception might appear to be the epoch definition required in the cFE mission configuration definition file. However, this definition is for use only by the API functions that convert spacecraft time and file system time, and the API function that prints spacecraft time as a date and time text string. The cFE "get time" functions are independent of the ground epoch.

The mission configuration parameters, [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_TAI](#) and [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_UTC](#) specify the default time format. Applications are encouraged to use the [CFE\\_TIME\\_GetTime](#) API, which returns time in the format specified by this configuration parameter.

### 2.22.15 Flywheeling

Flywheeling occurs when TIME is not getting a valid tone signal or external "time at the tone" message. While this has minimal impact on internal operations, it can result in the drifting apart of times being stored by different spacecraft systems.

Flywheeling occurs when at least one of the following conditions is true:

- loss of tone signal
- loss of "time at the tone" data packet
- signal and packet not within valid window
- commanded into fly-wheel mode

If the TIME server is in Flywheel mode then the TIME client is also in flywheel mode.

### 2.22.16 Time State

Clock state is a combination of factors, most significantly whether the spacecraft time has been accurately set and whether Time Service is operating in FLYWHEEL mode. A ground command is provided to set the state to reflect when the ground has determined the spacecraft time is now correct, or that time is no longer correct. This information will be distributed to Time Clients, and in turn, to any interested sub-systems. If time has not been set then TIME services reports the state of time as invalid, regardless of whether time is flywheeling or not. Also, this command may be used to force a Time Server or Time Client into FLYWHEEL mode. Use of FLYWHEEL mode is mainly for debug purposes although, in extreme circumstances, it may be of value to force Time Service not to rely on normal time updates. Note that when commanded into FLYWHEEL mode, the Time Service will remain so until receipt of another "set state" command setting the state into a mode other than FLYWHEEL. Note also that setting the clock state to VALID or INV← ALID on a Time Client that is currently getting time updates from the Time Server will have very limited effect. As soon as the Time Client receives the next time update, the VALID/INVALID selection will be set to that of the Time Server. However, setting a Time Client to FLYWHEEL cannot be overridden by the Time Server since the Time Client will ignore time updates from the Time Server while in FLYWHEEL mode.

### 2.22.17 Initialization

No action is required by the ground to initialize the TIME software; however, time variables in the TIME Server must be set by command to allow correct time to propagate.

For a description of what happens during each type of reset, see below:

- [Power-On Reset](#)
- [Processor Reset](#)

**2.22.17.1 Power-On Reset** TIME initializes all counters in housekeeping telemetry, sets the Validity state to Invalid, and initializes the STCF, Leap Seconds, and 1 Hz Adjustment to zero.

**2.22.17.2 Processor Reset** In the event of a processor reset, the following time values are preserved:

- MET
- STCF
- Leap Seconds
- Clock Signal Selection
- Current Time Client Delay (if applicable)

Note that since it is virtually impossible for TIME services to validate the actual data that is saved across a processor reset, a signature pattern is written to the preserved area. On a processor reset, TIME queries that signature to make sure that it matches what is expected. If the signature does not match, then TIME is initialized as if a cFE power-on reset occurred.

#### **2.22.18 Power-On Reset**

TIME initializes all counters in housekeeping telemetry, sets the Validity state to Invalid, and initializes the STCF, Leap Seconds, and 1 Hz Adjustment to zero.

#### **2.22.19 Processor Reset**

In the event of a processor reset, the following time values are preserved:

- MET
- STCF
- Leap Seconds
- Clock Signal Selection
- Current Time Client Delay (if applicable)

Note that since it is virtually impossible for TIME services to validate the actual data that is saved across a processor reset, a signature pattern is written to the preserved area. On a processor reset, TIME queries that signature to make sure that it matches what is expected. If the signature does not match, then TIME is initialized as if a cFE power-on reset occurred.

### 2.22.20 Initialization

No action is required by the ground to initialize the TIME software; however, time variables in the TIME Server must be set by command to allow correct time to propagate.

For a description of what happens during each type of reset, see below:

- [Power-On Reset](#)
- [Processor Reset](#)

**2.22.20.1 Power-On Reset** TIME initializes all counters in housekeeping telemetry, sets the Validity state to Invalid, and initializes the STCF, Leap Seconds, and 1 Hz Adjustment to zero.

**2.22.20.2 Processor Reset** In the event of a processor reset, the following time values are preserved:

- MET
- STCF
- Leap Seconds
- Clock Signal Selection
- Current Time Client Delay (if applicable)

Note that since it is virtually impossible for TIME services to validate the actual data that is saved across a processor reset, a signature pattern is written to the preserved area. On a processor reset, TIME queries that signature to make sure that it matches what is expected. If the signature does not match, then TIME is initialized as if a cFE power-on reset occurred.

### 2.22.21 Power-On Reset

TIME initializes all counters in housekeeping telemetry, sets the Validity state to Invalid, and initializes the STCF, Leap Seconds, and 1 Hz Adjustment to zero.

### 2.22.22 Processor Reset

In the event of a processor reset, the following time values are preserved:

- MET
- STCF
- Leap Seconds
- Clock Signal Selection
- Current Time Client Delay (if applicable)

Note that since it is virtually impossible for TIME services to validate the actual data that is saved across a processor reset, a signature pattern is written to the preserved area. On a processor reset, TIME queries that signature to make sure that it matches what is expected. If the signature does not match, then TIME is initialized as if a cFE power-on reset occurred.

### 2.22.23 Normal Operation

The following sections describe the operator's responsibilities for maintaining time under nominal conditions:

- [Client](#)
- [Server](#)

**2.22.23.1 Client** Under normal operation, TIME Client systems do not require any attention from the ground, however TIME clients do provide commands to set the persistent latency between the server and client. Latency can be either added or subtracted to the current TIME client time calculation to account for the latency.

**2.22.23.2 Server** TIME Servers require maintenance by the operations team to ensure the spacecraft is maintaining a time that can be successfully correlated to other entities. The following sections describe the commands that the operations team can use to help maintain a proper time reference:

- [Setting Time](#)
- [Adjusting Time](#)
- [Setting MET](#)

**2.22.23.2.1 Setting Time** The Time Server provides commands to set time. The new time value represents the desired offset from mission-defined time epoch and takes effect immediately upon execution of this command. Time Service will calculate a new STCF value based on the current MET and the desired new time using one of the following:

If Time Service is configured to compute current time as TAI:

```
STCF = new time - current MET  
current time = current MET + STCF
```

If Time Service is configured to compute current time as UTC:

```
STCF = ((new time) - (current MET)) + Leap Seconds  
current time = ((current MET) + STCF) - Leap Seconds
```

#### See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#)

**2.22.23.2.2 Adjusting Time** The TIME Server includes commands to set the STCF, Leap Seconds, and Validity state. The STCF should be set implicitly using the [CFE\\_TIME\\_SET\\_TIME\\_CC](#) or explicitly using [CFE\\_TIME\\_SET\\_STCF\\_CC](#). TIME provides the ability to command a one time adjustment ([CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#) and [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#)) to the current STCF. In addition there is a 1Hz adjustment ([CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#) and [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)) that can be made to the STCF to compensate for oscillator drift. Mission specific ground correlation should be used to assist in determining the proper values to use. The Leap Seconds should be set to the current TAI-UTC. Note that the International Earth Rotation and Reference Systems Service Bulletin C, which defines the current difference, reports it as UTC-TAI, and thus that value must be negated. **The Leap Seconds value will always be a positive number.** The Validity state does not have to be set to invalid to change the STCF or Leap Seconds, and should be set to valid at any time that the TIME Server time reference should be synchronized to by the other systems.

#### See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

**2.22.23.2.3 Setting MET** The TIME Server provides the capability to set the MET. Note that the MET (as implemented for cFE Time Service) is a logical representation and not a physical timer. Thus, setting the MET is not dependent on whether the hardware supports a MET register that can be written to. Note also that Time Service "assumes" that during normal operation, the MET is synchronized to the tone signal. Therefore, unless operating in FLYWHEEL mode, the sub-seconds portion of the MET will be set to zero at the next tone signal interrupt. The new MET takes effect immediately upon execution of this command.

#### See also

[CFE\\_TIME\\_SET\\_MET\\_CC](#)

### 2.22.24 Client

Under normal operation, TIME Client systems do not require any attention from the ground, however TIME clients do provide commands to set the persistent latency between the server and client. Latency can be either added or subtracted to the current TIME client time calculation to account for the latency.

### 2.22.25 Server

TIME Servers require maintenance by the operations team to ensure the spacecraft is maintaining a time that can be successfully correlated to other entities. The following sections describe the commands that the operations team can use to help maintain a proper time reference:

- [Setting Time](#)
- [Adjusting Time](#)
- [Setting MET](#)

**2.22.25.0.1 Setting Time** The Time Server provides commands to set time. The new time value represents the desired offset from mission-defined time epoch and takes effect immediately upon execution of this command. Time Service will calculate a new STCF value based on the current MET and the desired new time using one of the following:

If Time Service is configured to compute current time as TAI:

```
STCF = new time - current MET
current time = current MET + STCF
```

If Time Service is configured to compute current time as UTC:

```
STCF = ((new time) - (current MET)) + Leap Seconds
current time = ((current MET) + STCF) - Leap Seconds
```

See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#)

**2.22.25.0.2 Adjusting Time** The TIME Server includes commands to set the STCF, Leap Seconds, and Validity state. The STCF should be set implicitly using the [CFE\\_TIME\\_SET\\_TIME\\_CC](#) or explicitly using [CFE\\_TIME\\_SET\\_STCF\\_CC](#). TIME provides the ability to command a one time adjustment ([CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#) and [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#)) to the current STCF. In addition there is a 1Hz adjustment ([CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#) and [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)) that can be made to the STCF to compensate for oscillator drift. Mission specific ground correlation should be used to assist in determining the proper values to use. The Leap Seconds should be set to the current TAI-UTC. Note that the International Earth Rotation and Reference Systems Service Bulletin C, which defines the current difference, reports it as UTC-TAI, and thus that value must be negated. **The Leap Seconds value will always be a positive number.** The Validity state does not have to be set to invalid to change the STCF or Leap Seconds, and should be set to valid at any time that the TIME Server time reference should be synchronized to by the other systems.

See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

**2.22.25.0.3 Setting MET** The TIME Server provides the capability to set the MET. Note that the MET (as implemented for cFE Time Service) is a logical representation and not a physical timer. Thus, setting the MET is not dependent on whether the hardware supports a MET register that can be written to. Note also that Time Service "assumes" that during normal operation, the MET is synchronized to the tone signal. Therefore, unless operating in FLYWHEEL mode, the sub-seconds portion of the MET will be set to zero at the next tone signal interrupt. The new MET takes effect immediately upon execution of this command.

See also

[CFE\\_TIME\\_SET\\_MET\\_CC](#)

## 2.22.26 Setting Time

The Time Server provides commands to set time. The new time value represents the desired offset from mission-defined time epoch and takes effect immediately upon execution of this command. Time Service will calculate a new STCF value based on the current MET and the desired new time using one of the following:

If Time Service is configured to compute current time as TAI:

```
STCF = new time - current MET
current time = current MET + STCF
```

If Time Service is configured to compute current time as UTC:

```
STCF = ((new time) - (current MET)) + Leap Seconds
current time = ((current MET) + STCF) - Leap Seconds
```

See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#)

### 2.22.27 Adjusting Time

The TIME Server includes commands to set the STCF, Leap Seconds, and Validity state. The STCF should be set implicitly using the [CFE\\_TIME\\_SET\\_TIME\\_CC](#) or explicitly using [CFE\\_TIME\\_SET\\_STCF\\_CC](#). TIME provides the ability to command a one time adjustment ([CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#) and [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#)) to the current STCF. In addition there is a 1Hz adjustment ([CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#) and [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)) that can be made to the STCF to compensate for oscillator drift. Mission specific ground correlation should be used to assist in determining the proper values to use. The Leap Seconds should be set to the current TAI-UTC. Note that the International Earth Rotation and Reference Systems Service Bulletin C, which defines the current difference, reports it as UTC-TAI, and thus that value must be negated. **The Leap Seconds value will always be a positive number.** The Validity state does not have to be set to invalid to change the STCF or Leap Seconds, and should be set to valid at any time that the TIME Server time reference should be synchronized to by the other systems.

See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

### 2.22.28 Setting MET

The TIME Server provides the capability to set the MET. Note that the MET (as implemented for cFE Time Service) is a logical representation and not a physical timer. Thus, setting the MET is not dependent on whether the hardware supports a MET register that can be written to. Note also that Time Service "assumes" that during normal operation, the MET is synchronized to the tone signal. Therefore, unless operating in FLYWHEEL mode, the sub-seconds portion of the MET will be set to zero at the next tone signal interrupt. The new MET takes effect immediately upon execution of this command.

See also

[CFE\\_TIME\\_SET\\_MET\\_CC](#)

### 2.22.29 Frequently Asked Questions about Time Services

None submitted

## 2.23 cFE Time Services Commands

Upon receipt of any command, the Time Services application will confirm that the message length embedded within the header (from [CFE\\_MSG\\_GetSize\(\)](#)) matches the expected length of that message, based on the size of the C structure defining that command. If there is any discrepancy between the expected and actual message size, TIME will generate the [CFE\\_TIME\\_LEN\\_ERR\\_EID](#) event, increment the command error counter (\$sc\_\$cpu\_TIME\_CMDEC), and the command will *not* be accepted for processing.

The following is a list of commands that are processed by the cFE Time Services Task.

#### Global [CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#)

Add Delta to Spacecraft Time Correlation Factor

**Global CFE\_TIME\_ADD\_DELAY\_CC**

Add Time to Tone Time Delay

**Global CFE\_TIME\_ADD\_ONE\_HZ\_ADJUSTMENT\_CC**

Add Delta to Spacecraft Time Correlation Factor each 1Hz

**Global CFE\_TIME\_NOOP\_CC**

Time No-Op

**Global CFE\_TIME\_RESET\_COUNTERS\_CC**

Time Reset Counters

**Global CFE\_TIME\_SEND\_DIAGNOSTIC\_CC**

Request TIME Diagnostic Telemetry

**Global CFE\_TIME\_SET\_LEAP\_SECONDS\_CC**

Set Leap Seconds

**Global CFE\_TIME\_SET\_MET\_CC**

Set Mission Elapsed Time

**Global CFE\_TIME\_SET\_SIGNAL\_CC**

Set Tone Signal Source

**Global CFE\_TIME\_SET\_SOURCE\_CC**

Set Time Source

**Global CFE\_TIME\_SET\_STATE\_CC**

Set Time State

**Global CFE\_TIME\_SET\_STCF\_CC**

Set Spacecraft Time Correlation Factor

**Global CFE\_TIME\_SET\_TIME\_CC**

Set Spacecraft Time

**Global CFE\_TIME\_SUB\_ADJUST\_CC**

Subtract Delta from Spacecraft Time Correlation Factor

**Global CFE\_TIME\_SUB\_DELAY\_CC**

Subtract Time from Tone Time Delay

**Global CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC**

Subtract Delta from Spacecraft Time Correlation Factor each 1Hz

## 2.24 cFE Time Services Telemetry

The following are telemetry packets generated by the cFE Time Services Task.

**Global CFE\_TIME\_DiagnosticTlm\_Payload\_t**

Time Services Diagnostics Packet

**Global CFE\_TIME\_DiagnosticTlm\_Payload\_t**

Time Services Diagnostics Packet

**Global CFE\_TIME\_HousekeepingTlm\_Payload\_t**

Time Services Housekeeping Packet

**Global CFE\_TIME\_HousekeepingTlm\_Payload\_t**

Time Services Housekeeping Packet

## 2.25 cFE Time Services Configuration Parameters

The following are configuration parameters used to configure the cFE Time Services either for each platform or for a mission as a whole.

### Global CFE\_MISSION\_TIME\_AT\_TONE\_WAS

Default Time and Tone Order

Default Time and Tone Order

### Global CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI

Default Time Format

Default Time Format

### Global CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE

Default Time Format

Default Time Format

### Global CFE\_MISSION\_TIME\_DEF\_MET\_SECS

Default Time Values

Default Time Values

### Global CFE\_MISSION\_TIME\_EPOCH\_YEAR

Default EPOCH Values

Default EPOCH Values

### Global CFE\_MISSION\_TIME\_FS\_FACTOR

Time File System Factor

Time File System Factor

### Global CFE\_MISSION\_TIME\_MIN\_ELAPSED

Min and Max Time Elapsed

Min and Max Time Elapsed

### Global CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY

Define Periodic Time to Update Local Clock Tone Latch

Define Periodic Time to Update Local Clock Tone Latch

### Global CFE\_PLATFORM\_TIME\_CFG\_SERVER

Time Server or Time Client Selection

Time Server or Time Client Selection

### Global CFE\_PLATFORM\_TIME\_CFG\_SIGNAL

Include or Exclude the Primary/Redundant Tone Selection Cmd

Include or Exclude the Primary/Redundant Tone Selection Cmd

### Global CFE\_PLATFORM\_TIME\_CFG\_SOURCE

Include or Exclude the Internal/External Time Source Selection Cmd

Include or Exclude the Internal/External Time Source Selection Cmd

### Global CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET

Choose the External Time Source for Server only

Choose the External Time Source for Server only

**Global CFE\_PLATFORM\_TIME\_CFG\_START\_FLY**

Define Time to Start Flywheel Since Last Tone

Define Time to Start Flywheel Since Last Tone

**Global CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT**

Define Timing Limits From One Tone To The Next

Define Timing Limits From One Tone To The Next

**Global CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL**

Time Tone In Big-Endian Order

Local MET or Virtual MET Selection for Time Servers

Time Tone In Big-Endian Order

Local MET or Virtual MET Selection for Time Servers

**Global CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS**

Define the Max Delta Limits for Time Servers using an Ext Time Source

Define the Max Delta Limits for Time Servers using an Ext Time Source

**Global CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS**

Define the Local Clock Rollover Value in seconds and subseconds

Define the Local Clock Rollover Value in seconds and subseconds

**Global CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY**

Define TIME Task Priorities

Define TIME Task Priorities

**Global CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE**

Define TIME Task Stack Sizes

Define TIME Task Stack Sizes

## 2.26 cFE Event Message Cross Reference

The following cross reference maps the text associated with each cFE Event Message to its Event Message Identifier. A user can search this page for the text of the message they wish to learn more about and then click on the associated Event Message Identifier to obtain more information.

---

## 2.27 cFE Command Mnemonic Cross Reference

The following cross reference maps the cFE command codes to Command Mnemonics. To learn about the details of a particular command, click on its associated command code.

---

**Global CFE\_ES\_CLEAR\_ER\_LOG\_CC**

\$sc\_\$cpu\_ES\_ClearERLog

**Global CFE\_ES\_CLEAR\_SYS\_LOG\_CC**

\$sc\_\$cpu\_ES\_ClearSysLog

**Global CFE\_ES\_DELETE\_CDS\_CC**

\$sc\_\$cpu\_ES\_DeleteCDS

**Global CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC**

\$sc\_\$cpu\_ES\_WriteCDS2File

```
Global CFE_ES_NOOP_CC
$sc_$cpu_ES_NOOP

Global CFE_ES_OVER_WRITE_SYS_LOG_CC
$sc_$cpu_ES_OverwriteSysLogMode

Global CFE_ES_QUERY_ALL_CC
$sc_$cpu_ES_WriteApplInfo2File

Global CFE_ES_QUERY_ALL_TASKS_CC
$sc_$cpu_ES_WriteTaskInfo2File

Global CFE_ES_QUERY_ONE_CC
$sc_$cpu_ES_QueryApp

Global CFE_ES_RELOAD_APP_CC
$sc_$cpu_ES_ReloadApp

Global CFE_ES_RESET_COUNTERS_CC
$sc_$cpu_ES_ResetCtrs

Global CFE_ES_RESET_PR_COUNT_CC
$sc_$cpu_ES_ResetPRCnt

Global CFE_ES_RESTART_APP_CC
$sc_$cpu_ES_ResetApp

Global CFE_ES_RESTART_CC
$sc_$cpu_ES_ProcessorReset, $sc_$cpu_ES_PowerOnReset

Global CFE_ES_SEND_MEM_POOL_STATS_CC
$sc_$cpu_ES_PoolStats

Global CFE_ES_SET_MAX_PR_COUNT_CC
$sc_$cpu_ES_SetMaxPRCnt

Global CFE_ES_SET_PERF_FILTER_MASK_CC
$sc_$cpu_ES_LAFilterMask

Global CFE_ES_SET_PERF_TRIGGER_MASK_CC
$sc_$cpu_ES_LATriggerMask

Global CFE_ES_START_APP_CC
$sc_$cpu_ES_StartApp

Global CFE_ES_START_PERF_DATA_CC
$sc_$cpu_ES_StartLAData

Global CFE_ES_STOP_APP_CC
$sc_$cpu_ES_StopApp

Global CFE_ES_STOP_PERF_DATA_CC
$sc_$cpu_ES_StopLAData

Global CFE_ES_WRITE_ER_LOG_CC
$sc_$cpu_ES_WriteERLog2File

Global CFE_ES_WRITE_SYS_LOG_CC
$sc_$cpu_ES_WriteSysLog2File

Global CFE_EVS_ADD_EVENT_FILTER_CC
$sc_$cpu_EVS_AddEvtFltr
```

**Global CFE\_EVS\_CLEAR\_LOG\_CC**

\$sc\_\$cpu\_EVS\_ClrLog

**Global CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC**

\$sc\_\$cpu\_EVS\_DelEvtFltr

**Global CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC**

\$sc\_\$cpu\_EVS\_DisAppEvtType, \$sc\_\$cpu\_EVS\_DisAppEvtTypeMask

**Global CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC**

\$sc\_\$cpu\_EVS\_DisAppEvGen

**Global CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC**

\$sc\_\$cpu\_EVS\_DisEventType, \$sc\_\$cpu\_EVS\_DisEventTypeMask

**Global CFE\_EVS\_DISABLE\_PORTS\_CC**

\$sc\_\$cpu\_EVS\_DisPort, \$sc\_\$cpu\_EVS\_DisPortMask

**Global CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC**

\$sc\_\$cpu\_EVS\_EnaAppEvtType, \$sc\_\$cpu\_EVS\_EnaAppEvtTypeMask

**Global CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC**

\$sc\_\$cpu\_EVS\_EnaAppEvGen

**Global CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC**

\$sc\_\$cpu\_EVS\_EnaEventType, \$sc\_\$cpu\_EVS\_EnaEventTypeMask

**Global CFE\_EVS\_ENABLE\_PORTS\_CC**

\$sc\_\$cpu\_EVS\_EnaPort, \$sc\_\$cpu\_EVS\_EnaPortMask

**Global CFE\_EVS\_NOOP\_CC**

\$sc\_\$cpu\_EVS\_NOOP

**Global CFE\_EVS\_RESET\_ALL\_FILTERS\_CC**

\$sc\_\$cpu\_EVS\_RstAllFltrs

**Global CFE\_EVS\_RESET\_APP\_COUNTER\_CC**

\$sc\_\$cpu\_EVS\_RstAppCtrs

**Global CFE\_EVS\_RESET\_COUNTERS\_CC**

\$sc\_\$cpu\_EVS\_ResetCtrs

**Global CFE\_EVS\_RESET\_FILTER\_CC**

\$sc\_\$cpu\_EVS\_RstBinFltrCtr

**Global CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC**

\$sc\_\$cpu\_EVS\_SetEvtFmt

**Global CFE\_EVS\_SET\_FILTER\_CC**

\$sc\_\$cpu\_EVS\_SetBinFltrMask

**Global CFE\_EVS\_SET\_LOG\_MODE\_CC**

\$sc\_\$cpu\_EVS\_SetLogMode

**Global CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC**

\$sc\_\$cpu\_EVS\_WriteAppData2File

**Global CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC**

\$sc\_\$cpu\_EVS\_WriteLog2File

**Global CFE\_SB\_DISABLE\_ROUTE\_CC**

\$sc\_\$cpu\_SB\_DisRoute

**Global CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC**  
\$sc\_\$cpu\_SB\_DisSubRptg

**Global CFE\_SB\_ENABLE\_ROUTE\_CC**  
\$sc\_\$cpu\_SB\_EnaRoute

**Global CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC**  
\$sc\_\$cpu\_SB\_EnaSubRptg

**Global CFE\_SB\_NOOP\_CC**  
\$sc\_\$cpu\_SB\_NOOP

**Global CFE\_SB\_RESET\_COUNTERS\_CC**  
\$sc\_\$cpu\_SB\_ResetCtrs

**Global CFE\_SB\_SEND\_PREV\_SUBS\_CC**  
\$sc\_\$cpu\_SB\_SendPrevSubs

**Global CFE\_SB\_SEND\_SB\_STATS\_CC**  
\$sc\_\$cpu\_SB\_DumpStats

**Global CFE\_SB\_WRITE\_MAP\_INFO\_CC**  
\$sc\_\$cpu\_SB\_WriteMap2File

**Global CFE\_SB\_WRITE\_PIPE\_INFO\_CC**  
\$sc\_\$cpu\_SB\_WritePipe2File

**Global CFE\_SB\_WRITE\_ROUTING\_INFO\_CC**  
\$sc\_\$cpu\_SB\_WriteRouting2File

**Global CFE\_TBL\_ABORT\_LOAD\_CC**  
\$sc\_\$cpu\_TBL\_LoadAbort

**Global CFE\_TBL\_ACTIVATE\_CC**  
\$sc\_\$cpu\_TBL\_Activate

**Global CFE\_TBL\_DELETE\_CDS\_CC**  
\$sc\_\$cpu\_TBL\_DeleteCDS

**Global CFE\_TBL\_DUMP\_CC**  
\$sc\_\$cpu\_TBL\_Dump

**Global CFE\_TBL\_DUMP\_REGISTRY\_CC**  
\$sc\_\$cpu\_TBL\_WriteReg2File

**Global CFE\_TBL\_LOAD\_CC**  
\$sc\_\$cpu\_TBL\_Load

**Global CFE\_TBL\_NOOP\_CC**  
\$sc\_\$cpu\_TBL\_Noop

**Global CFE\_TBL\_RESET\_COUNTERS\_CC**  
\$sc\_\$cpu\_TBL\_ResetCtrs

**Global CFE\_TBL\_SEND\_REGISTRY\_CC**  
\$sc\_\$cpu\_TBL\_TLMReg

**Global CFE\_TBL\_VALIDATE\_CC**  
\$sc\_\$cpu\_TBL\_Validate

**Global CFE\_TIME\_ADD\_ADJUST\_CC**  
\$sc\_\$cpu\_TIME\_AddSTCFAdj

**Global CFE\_TIME\_ADD\_DELAY\_CC**  
\$sc\_\$cpu\_TIME\_AddClockLat

**Global CFE\_TIME\_ADD\_ONE\_HZ\_ADJUSTMENT\_CC**  
\$sc\_\$cpu\_TIME\_Add1HzSTCF

**Global CFE\_TIME\_NOOP\_CC**  
\$sc\_\$cpu\_TIME\_NOOP

**Global CFE\_TIME\_RESET\_COUNTERS\_CC**  
\$sc\_\$cpu\_TIME\_ResetCtrs

**Global CFE\_TIME\_SEND\_DIAGNOSTIC\_CC**  
\$sc\_\$cpu\_TIME\_RequestDiag

**Global CFE\_TIME\_SET\_LEAP\_SECONDS\_CC**  
\$sc\_\$cpu\_TIME\_SetClockLeap

**Global CFE\_TIME\_SET\_MET\_CC**  
\$sc\_\$cpu\_TIME\_SetClockMET

**Global CFE\_TIME\_SET\_SIGNAL\_CC**  
\$sc\_\$cpu\_TIME\_SetSignal

**Global CFE\_TIME\_SET\_SOURCE\_CC**  
\$sc\_\$cpu\_TIME\_SetSource

**Global CFE\_TIME\_SET\_STATE\_CC**  
\$sc\_\$cpu\_TIME\_SetState

**Global CFE\_TIME\_SET\_STCF\_CC**  
\$sc\_\$cpu\_TIME\_SetClockSTCF

**Global CFE\_TIME\_SET\_TIME\_CC**  
\$sc\_\$cpu\_TIME\_SetClock

**Global CFE\_TIME\_SUB\_ADJUST\_CC**  
\$sc\_\$cpu\_TIME\_SubSTCFAdj

**Global CFE\_TIME\_SUB\_DELAY\_CC**  
\$sc\_\$cpu\_TIME\_SubClockLat

**Global CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC**  
\$sc\_\$cpu\_TIME\_Sub1HzSTCF

## 2.28 cFE Telemetry Mnemonic Cross Reference

The following cross reference maps the cFE telemetry packet members to their associated ground system telemetry mnemonics.

---

**Global CFE\_ES\_AppInfo::AddressesAreValid**  
\$sc\_\$cpu\_ES\_AddrsValid

**Global CFE\_ES\_AppInfo::BSSAddress**  
\$sc\_\$cpu\_ES\_BSSAddress

**Global CFE\_ES\_AppInfo::BSSSize**  
\$sc\_\$cpu\_ES\_BSSSize

**Global CFE\_ES\_AppInfo::CodeAddress**  
\$sc\_\$cpu\_ES\_CodeAddress

```
Global CFE_ES_AppInfo::CodeSize
$sc_$cpu_ES_CodeSize

Global CFE_ES_AppInfo::DataAddress
$sc_$cpu_ES_DataAddress

Global CFE_ES_AppInfo::DataSize
$sc_$cpu_ES_DataSize

Global CFE_ES_AppInfo::EntryPoint [CFE_MISSION_MAX_API_LEN]
$sc_$cpu_ES_AppEntryPt[OS_MAX_API_NAME]

Global CFE_ES_AppInfo::ExceptionAction
$sc_$cpu_ES_ExceptnActn

Global CFE_ES_AppInfo::ExecutionCounter
$sc_$cpu_ES_ExecutionCtr

Global CFE_ES_AppInfo::FileName [CFE_MISSION_MAX_PATH_LEN]
$sc_$cpu_ES_AppFilename[OS_MAX_PATH_LEN]

Global CFE_ES_AppInfo::MainTaskId
$sc_$cpu_ES_MainTaskId

Global CFE_ES_AppInfo::MainTaskName [CFE_MISSION_MAX_API_LEN]
$sc_$cpu_ES_MainTaskName[OS_MAX_API_NAME]

Global CFE_ES_AppInfo::Name [CFE_MISSION_MAX_API_LEN]
$sc_$cpu_ES_AppName[OS_MAX_API_NAME]

Global CFE_ES_AppInfo::NumOfChildTasks
$sc_$cpu_ES_ChildTasks

Global CFE_ES_AppInfo::Priority
$sc_$cpu_ES_Priority

Global CFE_ES_AppInfo::ResourceID
$sc_$cpu_ES_AppID

Global CFE_ES_AppInfo::StackSize
$sc_$cpu_ES_StackSize

Global CFE_ES_AppInfo::StartAddress
$sc_$cpu_ES_StartAddr

Global CFE_ES_AppInfo::Type
$sc_$cpu_ES_AppType

Global CFE_ES_HousekeepingTlm_Payload::BootSource
$sc_$cpu_ES_BootSource

Global CFE_ES_HousekeepingTlm_Payload::CFECoreChecksum
$sc_$cpu_ES_CKSUM

Global CFE_ES_HousekeepingTlm_Payload::CFEMajorVersion
$sc_$cpu_ES_CFEMAJORVER

Global CFE_ES_HousekeepingTlm_Payload::CFEMinorVersion
$sc_$cpu_ES_CFE_MINORVER

Global CFE_ES_HousekeepingTlm_Payload::CFEMissionRevision
$sc_$cpu_ES_CFEMISSIONREV
```

**Global CFE\_ES\_HousekeepingTlm\_Payload::CFERevision**  
\$sc\_\$cpu\_ES\_CFEREVISION

**Global CFE\_ES\_HousekeepingTlm\_Payload::CommandCounter**  
\$sc\_\$cpu\_ES\_CMDPC

**Global CFE\_ES\_HousekeepingTlm\_Payload::CommandErrorCounter**  
\$sc\_\$cpu\_ES\_CMDEC

**Global CFE\_ES\_HousekeepingTlm\_Payload::ERLogEntries**  
\$sc\_\$cpu\_ES\_ERLOGENTRIES

**Global CFE\_ES\_HousekeepingTlm\_Payload::ERLogIndex**  
\$sc\_\$cpu\_ES\_ERLOGINDEX

**Global CFE\_ES\_HousekeepingTlm\_Payload::HeapBlocksFree**  
\$sc\_\$cpu\_ES\_HeapBlocksFree

**Global CFE\_ES\_HousekeepingTlm\_Payload::HeapBytesFree**  
\$sc\_\$cpu\_ES\_HeapBytesFree

**Global CFE\_ES\_HousekeepingTlm\_Payload::HeapMaxBlockSize**  
\$sc\_\$cpu\_ES\_HeapMaxBlkSize

**Global CFE\_ES\_HousekeepingTlm\_Payload::MaxProcessorResets**  
\$sc\_\$cpu\_ES\_MaxProcResets

**Global CFE\_ES\_HousekeepingTlm\_Payload::OSALMajorVersion**  
\$sc\_\$cpu\_ES\_OSMAJORVER

**Global CFE\_ES\_HousekeepingTlm\_Payload::OSALMinorVersion**  
\$sc\_\$cpu\_ES\_OSMINORVER

**Global CFE\_ES\_HousekeepingTlm\_Payload::OSALMissionRevision**  
\$sc\_\$cpu\_ES\_OSMISSIONREV

**Global CFE\_ES\_HousekeepingTlm\_Payload::OSALRevision**  
\$sc\_\$cpu\_ES\_OSREVISION

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfDataCount**  
\$sc\_\$cpu\_ES\_PerfDataCnt

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfDataEnd**  
\$sc\_\$cpu\_ES\_PerfDataEnd

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfDataStart**  
\$sc\_\$cpu\_ES\_PerfDataStart

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfDataToWrite**  
\$sc\_\$cpu\_ES\_PerfData2Write

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfFilterMask [CFE\_MISSION\_ES\_PERF\_MAX\_IDS/32]**  
\$sc\_\$cpu\_ES\_PerfFltrMask[MaskCnt]

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfMode**  
\$sc\_\$cpu\_ES\_PerfMode

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfState**  
\$sc\_\$cpu\_ES\_PerfState

**Global CFE\_ES\_HousekeepingTlm\_Payload::PerfTriggerCount**  
\$sc\_\$cpu\_ES\_PerfTrigCnt

```
Global CFE_ES_HousekeepingTlm_Payload::PerfTriggerMask [CFE_MISSION_ES_PERF_MAX_IDS/32]
$sc_$cpu_ES_PerfTrigMask[MaskCnt]

Global CFE_ES_HousekeepingTlm_Payload::ProcessorResets
$sc_$cpu_ES_ProcResetCnt

Global CFE_ES_HousekeepingTlm_Payload::PSPMajorVersion
$sc_$cpu_ES_PSPMAJORVER

Global CFE_ES_HousekeepingTlm_Payload::PSPMinorVersion
$sc_$cpu_ES_PSPMINORVER

Global CFE_ES_HousekeepingTlm_Payload::PSPMissionRevision
$sc_$cpu_ES_PSPMISSIONREV

Global CFE_ES_HousekeepingTlm_Payload::PSPRevision
$sc_$cpu_ES_PSPREVISION

Global CFE_ES_HousekeepingTlm_Payload::RegisteredCoreApps
$sc_$cpu_ES_RegCoreApps

Global CFE_ES_HousekeepingTlm_Payload::RegisteredExternalApps
$sc_$cpu_ES_RegExtApps

Global CFE_ES_HousekeepingTlm_Payload::RegisteredLibs
$sc_$cpu_ES_RegLibs

Global CFE_ES_HousekeepingTlm_Payload::RegisteredTasks
$sc_$cpu_ES_RegTasks

Global CFE_ES_HousekeepingTlm_Payload::ResetSubtype
$sc_$cpu_ES_ResetSubtype

Global CFE_ES_HousekeepingTlm_Payload::ResetType
$sc_$cpu_ES_ResetType

Global CFE_ES_HousekeepingTlm_Payload::SysLogBytesUsed
$sc_$cpu_ES_SYSLOGBYTEUSED

Global CFE_ES_HousekeepingTlm_Payload::SysLogEntries
$sc_$cpu_ES_SYSLOGENTRIES

Global CFE_ES_HousekeepingTlm_Payload::SysLogMode
$sc_$cpu_ES_SYSLOGMODE

Global CFE_ES_HousekeepingTlm_Payload::SysLogSize
$sc_$cpu_ES_SYSLOGSIZE

Global CFE_ES_MemPoolStats::BlockStats [CFE_MISSION_ES_POOL_MAX_BUCKETS]
$sc_$cpu_ES_BlkStats[BLK_SIZES]

Global CFE_ES_MemPoolStats::CheckErrCtr
$sc_$cpu_ES_BlkErrCTR

Global CFE_ES_MemPoolStats::NumBlocksRequested
$sc_$cpu_ES_BlkREQ

Global CFE_ES_MemPoolStats::NumFreeBytes
$sc_$cpu_ES_FreeBytes

Global CFE_ES_MemPoolStats::PoolSize
$sc_$cpu_ES_PoolSize
```

**Global CFE\_ES\_PoolStatsTlm\_Payload::PoolHandle**  
\$sc\_\$cpu\_ES\_PoolHandle

**Global CFE\_EVS\_AppTlmData::AppEnableStatus**  
\$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS].APPENABLESTAT

**Global CFE\_EVS\_AppTlmData::AppID**  
\$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS].APPID

**Global CFE\_EVS\_AppTlmData::AppMessageSentCounter**  
\$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS].APPMGSENTC

**Global CFE\_EVS\_AppTlmData::AppMessageSquelchedCounter**  
\$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS].SQUELCHEDC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::AppData [CFE\_MISSION\_ES\_MAX\_APPLICATIONS]**  
\$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS]

**Global CFE\_EVS\_HousekeepingTlm\_Payload::CommandCounter**  
\$sc\_\$cpu\_EVS\_CMDPC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::CommandErrorCounter**  
\$sc\_\$cpu\_EVS\_CMDEC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::LogEnabled**  
\$sc\_\$cpu\_EVS\_LOGENABLED

**Global CFE\_EVS\_HousekeepingTlm\_Payload::LogFullFlag**  
\$sc\_\$cpu\_EVS\_LOGFULL

**Global CFE\_EVS\_HousekeepingTlm\_Payload::LogMode**  
\$sc\_\$cpu\_EVS\_LOGMODE

**Global CFE\_EVS\_HousekeepingTlm\_Payload::LogOverflowCounter**  
\$sc\_\$cpu\_EVS\_LOGOVERFLOWC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::MessageFormatMode**  
\$sc\_\$cpu\_EVS\_MSGFMTMODE

**Global CFE\_EVS\_HousekeepingTlm\_Payload::MessageSendCounter**  
\$sc\_\$cpu\_EVS\_MSGSENTC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::MessageTruncCounter**  
\$sc\_\$cpu\_EVS\_MSGTRUNC

**Global CFE\_EVS\_HousekeepingTlm\_Payload::OutputPort**  
\$sc\_\$cpu\_EVS\_OUTPUTPORT

**Global CFE\_EVS\_HousekeepingTlm\_Payload::Spare1**  
\$sc\_\$cpu\_EVS\_HK\_SPARE1

**Global CFE\_EVS\_HousekeepingTlm\_Payload::Spare2**  
\$sc\_\$cpu\_EVS\_HK\_SPARE2

**Global CFE\_EVS\_HousekeepingTlm\_Payload::Spare3**  
\$sc\_\$cpu\_EVS\_HK\_SPARE3

**Global CFE\_EVS\_HousekeepingTlm\_Payload::UnregisteredAppCounter**  
\$sc\_\$cpu\_EVS\_UNREGAPPC

**Global CFE\_EVS\_LongEventTlm\_Payload::Message [CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH]**  
\$sc\_\$cpu\_EVENT[CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH]

```
Global CFE_EVS_LongEventTlm_Payload::Spare1
$sc_$cpu_EVS_SPARE1

Global CFE_EVS_LongEventTlm_Payload::Spare2
$sc_$cpu_EVS_SPARE2

Global CFE_EVS_PacketID::AppName [CFE_MISSION_MAX_API_LEN]
$sc_$cpu_EVS_APPNAME[OS_MAX_API_NAME]

Global CFE_EVS_PacketID::EventID
$sc_$cpu_EVS_EVENTID

Global CFE_EVS_PacketID::EventType
$sc_$cpu_EVS_EVENTTYPE

Global CFE_EVS_PacketID::ProcessorID
$sc_$cpu_EVS_PROCESSORID

Global CFE_EVS_PacketID::SpacecraftID
$sc_$cpu_EVS_SCID

Global CFE_SB_HousekeepingTlm_Payload::CommandCounter
$sc_$cpu_SB_CMDPC

Global CFE_SB_HousekeepingTlm_Payload::CommandErrorCounter
$sc_$cpu_SB_CMDEC

Global CFE_SB_HousekeepingTlm_Payload::CreatePipeErrorCounter
$sc_$cpu_SB_NewPipeEC

Global CFE_SB_HousekeepingTlm_Payload::DuplicateSubscriptionsCounter
$sc_$cpu_SB_DupSubCnt

Global CFE_SB_HousekeepingTlm_Payload::GetPipeldByNameErrorCounter
$sc_$cpu_SB_GetPipeIDByNameEC

Global CFE_SB_HousekeepingTlm_Payload::InternalErrorCounter
$sc_$cpu_SB_InternalEC

Global CFE_SB_HousekeepingTlm_Payload::MemInUse
$sc_$cpu_SB_MemInUse

Global CFE_SB_HousekeepingTlm_Payload::MemPoolHandle
$sc_$cpu_SB_MemPoolHdl

Global CFE_SB_HousekeepingTlm_Payload::MsgLimitErrorCounter
$sc_$cpu_SB_MsgLimEC

Global CFE_SB_HousekeepingTlm_Payload::MsgReceiveErrorCounter
$sc_$cpu_SB_MsgRecEC

Global CFE_SB_HousekeepingTlm_Payload::MsgSendErrorCounter
$sc_$cpu_SB_MsgSndEC

Global CFE_SB_HousekeepingTlm_Payload::NoSubscribersCounter
$sc_$cpu_SB_NoSubEC

Global CFE_SB_HousekeepingTlm_Payload::PipeOptsErrorCounter
$sc_$cpu_SB_PipeOptsEC

Global CFE_SB_HousekeepingTlm_Payload::PipeOverflowErrorCounter
$sc_$cpu_SB_PipeOvrEC
```

**Global CFE\_SB\_HousekeepingTlm\_Payload::Spare2Align [1]**  
\$sc\_\$cpu\_SB\_Spare2Align[2]

**Global CFE\_SB\_HousekeepingTlm\_Payload::SubscribeErrorCounter**  
\$sc\_\$cpu\_SB\_SubscrEC

**Global CFE\_SB\_HousekeepingTlm\_Payload::UnmarkedMem**  
\$sc\_\$cpu\_SB\_UnMarkedMem

**Global CFE\_SB\_PipeDepthStats::CurrentQueueDepth**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES].SB\_PDINUSE

**Global CFE\_SB\_PipeDepthStats::MaxQueueDepth**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES].SB\_PDDEPTH

**Global CFE\_SB\_PipeDepthStats::PeakQueueDepth**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES].SB\_PDPKINUSE

**Global CFE\_SB\_PipeDepthStats::PipeId**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES].SB\_PDPipeID

**Global CFE\_SB\_PipeDepthStats::Spare**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES].SB\_PDSpare

**Global CFE\_SB\_StatsTlm\_Payload::MaxMemAllowed**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMBMALW

**Global CFE\_SB\_StatsTlm\_Payload::MaxMsgIdsAllowed**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMMDALW

**Global CFE\_SB\_StatsTlm\_Payload::MaxPipeDepthAllowed**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMPDALW

**Global CFE\_SB\_StatsTlm\_Payload::MaxPipesAllowed**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMPALW

**Global CFE\_SB\_StatsTlm\_Payload::MaxSubscriptionsAllowed**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMSALW

**Global CFE\_SB\_StatsTlm\_Payload::MemInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMBMIU

**Global CFE\_SB\_StatsTlm\_Payload::MsgIdsInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMMIDIU

**Global CFE\_SB\_StatsTlm\_Payload::PeakMemInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPBMIU

**Global CFE\_SB\_StatsTlm\_Payload::PeakMsgIdsInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPMIDIU

**Global CFE\_SB\_StatsTlm\_Payload::PeakPipesInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPPIU

**Global CFE\_SB\_StatsTlm\_Payload::PeakSBBuffersInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPSSBIU

**Global CFE\_SB\_StatsTlm\_Payload::PeakSubscriptionsInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPSIU

**Global CFE\_SB\_StatsTlm\_Payload::PipeDepthStats [CFE\_MISSION\_SB\_MAX\_PIPES]**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPDS[CFE\_PLATFORM\_SB\_MAX\_PIPES]

Global **CFE\_SB\_StatsTlm\_Payload::PipesInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMPIU

Global **CFE\_SB\_StatsTlm\_Payload::SBBuffersInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMSBBIU

Global **CFE\_SB\_StatsTlm\_Payload::SubscriptionsInUse**  
\$sc\_\$cpu\_SB\_Stat.SB\_SMSIU

Global **CFE\_TBL\_HousekeepingTlm\_Payload::ActiveBuffer**  
\$sc\_\$cpu\_TBL\_LastValBuf

Global **CFE\_TBL\_HousekeepingTlm\_Payload::ByteAlignPad1**  
\$sc\_\$cpu\_TBL\_BytAlignPad1

Global **CFE\_TBL\_HousekeepingTlm\_Payload::CommandCounter**  
\$sc\_\$cpu\_TBL\_CMDPC

Global **CFE\_TBL\_HousekeepingTlm\_Payload::CommandErrorCounter**  
\$sc\_\$cpu\_TBL\_CMDEC

Global **CFE\_TBL\_HousekeepingTlm\_Payload::FailedValCounter**  
\$sc\_\$cpu\_TBL\_ValFailedCtr

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastFileDumped [CFE\_MISSION\_MAX\_PATH\_LEN]**  
\$sc\_\$cpu\_TBL\_LastFileDumped[OS\_MAX\_PATH\_LEN]

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastFileLoaded [CFE\_MISSION\_MAX\_PATH\_LEN]**  
\$sc\_\$cpu\_TBL\_LastFileLoaded[OS\_MAX\_PATH\_LEN]

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastTableLoaded [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]**  
\$sc\_\$cpu\_TBL\_LastTableLoaded[CFE\_TBL\_MAX\_FULL\_NAME\_LEN]

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastUpdatedTable [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_L←EN]**  
\$sc\_\$cpu\_TBL\_LastUpdTblName[CFE\_TB\_MAX\_FULL\_NAME\_LEN]

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastUpdateTime**  
\$sc\_\$cpu\_TBL\_LastUpdTm, \$sc\_\$cpu\_TBL\_SECONDS, \$sc\_\$cpu\_TBL\_SUBSECONDS

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastValCrc**  
\$sc\_\$cpu\_TBL\_LastValCRC

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastValStatus**  
\$sc\_\$cpu\_TBL\_LastVals

Global **CFE\_TBL\_HousekeepingTlm\_Payload::LastValTableName [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_L←EN]**  
\$sc\_\$cpu\_TBL\_LastValTblName[CFE\_TB\_MAX\_FULL\_NAME\_LEN]

Global **CFE\_TBL\_HousekeepingTlm\_Payload::MemPoolHandle**  
\$sc\_\$cpu\_TBL\_MemPoolHandle

Global **CFE\_TBL\_HousekeepingTlm\_Payload::NumFreeSharedBufs**  
\$sc\_\$cpu\_TBL\_NumFreeShrBuf

Global **CFE\_TBL\_HousekeepingTlm\_Payload::NumLoadPending**  
\$sc\_\$cpu\_TBL\_NumUpdatesPend

Global **CFE\_TBL\_HousekeepingTlm\_Payload::NumTables**  
\$sc\_\$cpu\_TBL\_NumTables

**Global CFE\_TBL\_HousekeepingTlm\_Payload::NumValRequests**  
\$sc\_\$cpu\_TBL\_ValReqCtr

**Global CFE\_TBL\_HousekeepingTlm\_Payload::SuccessValCounter**  
\$sc\_\$cpu\_TBL\_ValSuccessCtr

**Global CFE\_TBL\_HousekeepingTlm\_Payload::ValidationCounter**  
\$sc\_\$cpu\_TBL\_ValCompltdCtr

**Global CFE\_TBL\_TblRegPacket\_Payload::ActiveBufferAddr**  
\$sc\_\$cpu\_TBL\_ActBufAdd

**Global CFE\_TBL\_TblRegPacket\_Payload::ByteAlign4**  
\$sc\_\$cpu\_TBL\_Spare4

**Global CFE\_TBL\_TblRegPacket\_Payload::Crc**  
\$sc\_\$cpu\_TBL\_CRC

**Global CFE\_TBL\_TblRegPacket\_Payload::Critical**  
\$sc\_\$cpu\_TBL\_Spare3

**Global CFE\_TBL\_TblRegPacket\_Payload::DoubleBuffered**  
\$sc\_\$cpu\_TBL\_DblBuffered

**Global CFE\_TBL\_TblRegPacket\_Payload::DumpOnly**  
\$sc\_\$cpu\_TBL\_DumpOnly

**Global CFE\_TBL\_TblRegPacket\_Payload::FileCreateTimeSecs**  
\$sc\_\$cpu\_TBL\_FILECSECONDS

**Global CFE\_TBL\_TblRegPacket\_Payload::FileCreateTimeSubSecs**  
\$sc\_\$cpu\_TBL\_FILECSUBSECONDS

**Global CFE\_TBL\_TblRegPacket\_Payload::InactiveBufferAddr**  
\$sc\_\$cpu\_TBL\_IActBufAdd

**Global CFE\_TBL\_TblRegPacket\_Payload::LastFileLoaded [CFE\_MISSION\_MAX\_PATH\_LEN]**  
\$sc\_\$cpu\_TBL\_LastFileUpd[OS\_MAX\_PATH\_LEN]

**Global CFE\_TBL\_TblRegPacket\_Payload::LoadPending**  
\$sc\_\$cpu\_TBL\_UpdatePndng

**Global CFE\_TBL\_TblRegPacket\_Payload::Name [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]**  
\$sc\_\$cpu\_TBL\_Name[CFE\_TB\_MAX\_FULL\_NAME\_LEN]

**Global CFE\_TBL\_TblRegPacket\_Payload::OwnerAppName [CFE\_MISSION\_MAX\_API\_LEN]**  
\$sc\_\$cpu\_TBL\_OwnerApp[OS\_MAX\_API\_NAME]

**Global CFE\_TBL\_TblRegPacket\_Payload::Size**  
\$sc\_\$cpu\_TBL\_SIZE

**Global CFE\_TBL\_TblRegPacket\_Payload::TableLoadedOnce**  
\$sc\_\$cpu\_TBL\_LoadedOnce

**Global CFE\_TBL\_TblRegPacket\_Payload::TimeOfLastUpdate**  
\$sc\_\$cpu\_TBL\_TimeLastUpd, \$sc\_\$cpu\_TBL\_TLUSECONDS, \$sc\_\$cpu\_TBL\_TLUUSUBSECONDS

**Global CFE\_TBL\_TblRegPacket\_Payload::ValidationFuncPtr**  
\$sc\_\$cpu\_TBL\_ValFuncPtr

**Global CFE\_TIME\_DiagnosticTlm\_Payload::AtToneDelay**  
\$sc\_\$cpu\_TIME\_DLlatentS, \$sc\_\$cpu\_TIME\_DLlatentSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::AtToneLatch**  
\$sc\_\$cpu\_TIME\_DTVValidS, \$sc\_\$cpu\_TIME\_DTVValidSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::AtToneLeapSeconds**  
\$sc\_\$cpu\_TIME\_DLearpS

**Global CFE\_TIME\_DiagnosticTlm\_Payload::AtToneMET**  
\$sc\_\$cpu\_TIME\_DTMETS, \$sc\_\$cpu\_TIME\_DTMETSSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::AtToneSTCF**  
\$sc\_\$cpu\_TIME\_DSTCFS, \$sc\_\$cpu\_TIME\_DSTCFSS

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockFlyState**  
\$sc\_\$cpu\_TIME\_DFlywheel

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockSetState**  
\$sc\_\$cpu\_TIME\_DValid

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockSignal**  
\$sc\_\$cpu\_TIME\_DSignal

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockSource**  
\$sc\_\$cpu\_TIME\_DSource

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockStateAPI**  
\$sc\_\$cpu\_TIME\_DAPISate

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ClockStateFlags**  
\$sc\_\$cpu\_TIME\_DStateFlags, \$sc\_\$cpu\_TIME\_DFlagSet, \$sc\_\$cpu\_TIME\_DFlagFly, \$sc\_\$cpu\_TIME\_DFlagSrc,  
\$sc\_\$cpu\_TIME\_DFlagPri, \$sc\_\$cpu\_TIME\_DFlagSfly, \$sc\_\$cpu\_TIME\_DFlagCfly, \$sc\_\$cpu\_TIME\_DFlagAdj,  
\$sc\_\$cpu\_TIME\_DFlag1Hzd, \$sc\_\$cpu\_TIME\_DFlagClat, \$sc\_\$cpu\_TIME\_DFlagSorC, \$sc\_\$cpu\_TIME\_DFlag←  
NIU

**Global CFE\_TIME\_DiagnosticTlm\_Payload::CurrentLatch**  
\$sc\_\$cpu\_TIME\_DLcalS, \$sc\_\$cpu\_TIME\_DLcalSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::CurrentMET**  
\$sc\_\$cpu\_TIME\_DMETS, \$sc\_\$cpu\_TIME\_DMETSSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::CurrentTAI**  
\$sc\_\$cpu\_TIME\_DTAIS, \$sc\_\$cpu\_TIME\_DTAISS

**Global CFE\_TIME\_DiagnosticTlm\_Payload::CurrentUTC**  
\$sc\_\$cpu\_TIME\_DUTCS, \$sc\_\$cpu\_TIME\_DUTCSS

**Global CFE\_TIME\_DiagnosticTlm\_Payload::DataStoreStatus**  
\$sc\_\$cpu\_TIME\_DataStStat

**Global CFE\_TIME\_DiagnosticTlm\_Payload::DelayDirection**  
\$sc\_\$cpu\_TIME\_DLlatentDir

**Global CFE\_TIME\_DiagnosticTlm\_Payload::Forced2Fly**  
\$sc\_\$cpu\_TIME\_DCMD2Fly

**Global CFE\_TIME\_DiagnosticTlm\_Payload::LocalIntCounter**  
\$sc\_\$cpu\_TIME\_D1HzSRCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::LocalTaskCounter**  
\$sc\_\$cpu\_TIME\_D1HzTaskCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::MaxElapsed**  
\$sc\_\$cpu\_TIME\_DMaxWindow

**Global CFE\_TIME\_DiagnosticTlm\_Payload::MaxLocalClock**  
\$sc\_\$cpu\_TIME\_DWrapS, \$sc\_\$cpu\_TIME\_DWrapSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::MinElapsed**  
\$sc\_\$cpu\_TIME\_DMinWindow

**Global CFE\_TIME\_DiagnosticTlm\_Payload::OneHzAdjust**  
\$sc\_\$cpu\_TIME\_D1HzAdjS, \$sc\_\$cpu\_TIME\_D1HzAdjSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::OneHzDirection**  
\$sc\_\$cpu\_TIME\_D1HzAdjDir

**Global CFE\_TIME\_DiagnosticTlm\_Payload::OneTimeAdjust**  
\$sc\_\$cpu\_TIME\_DAdjustS, \$sc\_\$cpu\_TIME\_DAdjustSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::OneTimeDirection**  
\$sc\_\$cpu\_TIME\_DAdjustDir

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ServerFlyState**  
\$sc\_\$cpu\_TIME\_DSrvFly

**Global CFE\_TIME\_DiagnosticTlm\_Payload::TimeSinceTone**  
\$sc\_\$cpu\_TIME\_DElapsedS, \$sc\_\$cpu\_TIME\_DElapsedSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneDataCounter**  
\$sc\_\$cpu\_TIME\_DTatTCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneDataLatch**  
\$sc\_\$cpu\_TIME\_DTDS, \$sc\_\$cpu\_TIME\_DTDSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneIntCounter**  
\$sc\_\$cpu\_TIME\_DTsISRCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneIntErrorCounter**  
\$sc\_\$cpu\_TIME\_DTsISRERR

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneMatchCounter**  
\$sc\_\$cpu\_TIME\_DVerifyCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneMatchErrorCounter**  
\$sc\_\$cpu\_TIME\_DVerifyER

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneOverLimit**  
\$sc\_\$cpu\_TIME\_DMaxSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneSignalCounter**  
\$sc\_\$cpu\_TIME\_DTSDetCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneSignalLatch**  
\$sc\_\$cpu\_TIME\_DTTS, \$sc\_\$cpu\_TIME\_DTTSSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneTaskCounter**  
\$sc\_\$cpu\_TIME\_DTsTaskCNT

**Global CFE\_TIME\_DiagnosticTlm\_Payload::ToneUnderLimit**  
\$sc\_\$cpu\_TIME\_DMinSs

**Global CFE\_TIME\_DiagnosticTlm\_Payload::VersionCounter**  
\$sc\_\$cpu\_TIME\_DVersionCNT

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**Global CFE\_TIME\_DiagnosticTlm\_Payload::VirtualMET**  
\$sc\_\$cpu\_TIME\_DLLogicalMET

**Global CFE\_TIME\_HousekeepingTlm\_Payload::ClockStateAPI**  
\$sc\_\$cpu\_TIME\_DAPISate

**Global CFE\_TIME\_HousekeepingTlm\_Payload::ClockStateFlags**  
\$sc\_\$cpu\_TIME\_StateFlg, \$sc\_\$cpu\_TIME\_FlagSet, \$sc\_\$cpu\_TIME\_FlagFly, \$sc\_\$cpu\_TIME\_FlagSrc, \$sc\_\$cpu\_TIME\_FlagPri, \$sc\_\$cpu\_TIME\_FlagSfly, \$sc\_\$cpu\_TIME\_FlagCfly, \$sc\_\$cpu\_TIME\_FlagAdj, \$sc\_\$cpu\_TIME\_Flag1Hzd, \$sc\_\$cpu\_TIME\_FlagClat, \$sc\_\$cpu\_TIME\_FlagSorC, \$sc\_\$cpu\_TIME\_FlagNIU

**Global CFE\_TIME\_HousekeepingTlm\_Payload::CommandCounter**  
\$sc\_\$cpu\_TIME\_CMDPC

**Global CFE\_TIME\_HousekeepingTlm\_Payload::CommandErrorCounter**  
\$sc\_\$cpu\_TIME\_CMDEC

**Global CFE\_TIME\_HousekeepingTlm\_Payload::LeapSeconds**  
\$sc\_\$cpu\_TIME\_LeapSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::Seconds1HzAdj**  
\$sc\_\$cpu\_TIME\_1HzAdjSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SecondsDelay**  
\$sc\_\$cpu\_TIME\_1HzAdjSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SecondsMET**  
\$sc\_\$cpu\_TIME\_METSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SecondsSTCF**  
\$sc\_\$cpu\_TIME\_STCFSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::Subsecs1HzAdj**  
\$sc\_\$cpu\_TIME\_1HzAdjSSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SubsecsDelay**  
\$sc\_\$cpu\_TIME\_1HzAdjSSecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SubsecsMET**  
\$sc\_\$cpu\_TIME\_METSubsecs

**Global CFE\_TIME\_HousekeepingTlm\_Payload::SubsecsSTCF**  
\$sc\_\$cpu\_TIME\_STCFSubsecs

### 3 Glossary of Terms

Term	Definition
Application (or App)	A set of data and functions that is treated as a single entity by the cFE. cFE resources are allocated on a per-Application basis. Applications are made up of a Main Task and zero or more Child Tasks.
Application ID	A processor unique reference to an Application. <b>NOTE: This is different from a CCSDS Application ID which is referred to as an "APID."</b>
Application Programmer's Interface (API)	A set of routines, protocols, and tools for building software applications
Platform Support Package (PSP)	A collection of user-provided facilities that interface an OS and the cFE with a specific hardware platform. The PSP is responsible for hardware initialization.

Term	Definition
Child Task	A separate thread of execution that is spawned by an Application's Main Task.
Command	A Software Bus Message defined by the receiving Application. Commands can originate from other onboard Applications or from the ground.
Core Flight Executive (cFE)	A runtime environment and a set of services for hosting FSW Applications
Critical Data Store (CDS)	A collection of data that is not modified by the OS or cFE following a Processor Reset.
Cyclic Redundancy Check	A polynomial based method for checking that a data set has remained unchanged from one time period to another.
Developer	Anyone who is coding a cFE Application.
Event Data	Data describing an Event that is supplied to the cFE Event Service. The cFE includes this data in an <a href="#">Event Message</a> .
Event Filter	A numeric value (bit mask) used to determine how frequently to output an application Event Message defined by its <a href="#">Event ID</a> .
Event Format Mode	Defines the Event Message Format downlink option: short or long. The short format is used when there is limited telemetry bandwidth and is binary. The long format is in ASCII and is used for logging to a Local Event Log and to an Event Message Port.
Event ID	A numeric literal used to uniquely name an Application event.
Event Type	A numeric literal used to identify the type of an Application event. An event type may be <a href="#">CFE_EVS_EventType_DEBUG</a> , <a href="#">CFE_EVS_EventType_INFORMATION</a> , <a href="#">CFE_EVS_EventType_ERROR</a> , or <a href="#">CFE_EVS_EventType_CRITICAL</a> .
Event Message	A data item used to notify the user and/or an external <a href="#">Application</a> of a significant event. Event Messages include a time-stamp of when the message was generated, a processor unique identifier, an <a href="#">Application ID</a> , the <a href="#">Event Type</a> (DEBUG,INFO,ERROR or CRITICAL), and <a href="#">Event Data</a> . An Event Message can either be real-time or playback from a Local Event Log.

## 4 cFE Application Programmer's Interface (API) Reference

### 4.1 Executive Services API

- [cFE Entry/Exit APIs](#)
  - [CFE\\_ES\\_Main](#) - cFE Main Entry Point used by Board Support Package to start cFE
  - [CFE\\_ES\\_ResetCFE](#) - Reset the cFE Core and all cFE Applications.
- [cFE Application Control APIs](#)
  - [CFE\\_ES\\_RestartApp](#) - Restart a single cFE Application.
  - [CFE\\_ES\\_ReloadApp](#) - Reload a single cFE Application.
  - [CFE\\_ES\\_DeleteApp](#) - Delete a cFE Application.
- [cFE Application Behavior APIs](#)
  - [CFE\\_ES\\_RunLoop](#) - Check for Exit, Restart, or Reload commands.
  - [CFE\\_ES\\_WaitForStartupSync](#) - Allow an Application to Wait for the "OPERATIONAL" global system state.

- [CFE\\_ES\\_WaitForSystemState](#) - Allow an Application to Wait for a minimum global system state.
  - [CFE\\_ES\\_IncrementTaskCounter](#) - Increments the execution counter for the calling task.
  - [CFE\\_ES\\_ExitApp](#) - Exit a cFE Application.
- [cFE Information APIs](#)
    - [CFE\\_ES\\_GetResetType](#) - Return the most recent Reset Type.
    - [CFE\\_ES\\_GetAppID](#) - Get an Application ID for the calling Application.
    - [CFE\\_ES\\_GetTaskID](#) - Get the task ID of the calling context.
    - [CFE\\_ES\\_GetAppIDByName](#) - Get an Application ID associated with a specified Application name.
    - [CFE\\_ES\\_GetLibIDByName](#) - Get a Library ID associated with a specified Library name.
    - [CFE\\_ES\\_GetAppName](#) - Get an Application name for a specified Application ID.
    - [CFE\\_ES\\_GetLibName](#) - Get a Library name for a specified Library ID.
    - [CFE\\_ES\\_GetAppInfo](#) - Get Application Information given a specified App ID.
    - [CFE\\_ES\\_GetTaskInfo](#) - Get Task Information given a specified Task ID.
    - [CFE\\_ES\\_GetLibInfo](#) - Get Library Information given a specified Resource ID.
    - [CFE\\_ES\\_GetModuleInfo](#) - Get Information given a specified Resource ID.
  - [cFE Child Task APIs](#)
    - [CFE\\_ES\\_CreateChildTask](#) - Creates a new task under an existing Application.
    - [CFE\\_ES\\_GetTaskIDByName](#) - Get a Task ID associated with a specified Task name.
    - [CFE\\_ES\\_GetTaskName](#) - Get a Task name for a specified Task ID.
    - [CFE\\_ES\\_DeleteChildTask](#) - Deletes a task under an existing Application.
    - [CFE\\_ES\\_ExitChildTask](#) - Exits a child task.
  - [cFE Critical Data Store APIs](#)
    - [CFE\\_ES\\_RegisterCDS](#) - Reserve space (or re-obtain previously reserved space) in the Critical Data Store (CDS)
    - [CFE\\_ES\\_GetCDSBlockIDByName](#) - Get a CDS Block ID associated with a specified CDS Block name.
    - [CFE\\_ES\\_GetCDSBlockName](#) - Get a Block name for a specified Block ID.
    - [CFE\\_ES\\_CopyToCDS](#) - Save a block of data in the Critical Data Store (CDS)
    - [CFE\\_ES\\_RestoreFromCDS](#) - Recover a block of data from the Critical Data Store (CDS)
  - [cFE Memory Manager APIs](#)
    - [CFE\\_ES\\_PoolCreate](#) - Initializes a memory pool created by an application while using a semaphore during processing.
    - [CFE\\_ES\\_PoolCreateEx](#) - Initializes a memory pool created by an application with application specified block sizes.
    - [CFE\\_ES\\_PoolCreateNoSem](#) - Initializes a memory pool created by an application without using a semaphore during processing.
    - [CFE\\_ES\\_PoolDelete](#) - Deletes a memory pool that was previously created.
    - [CFE\\_ES\\_GetPoolBuf](#) - Gets a buffer from the memory pool created by [CFE\\_ES\\_PoolCreate](#) or [CFE\\_ES\\_PoolCreateNoSem](#).
    - [CFE\\_ES\\_PutPoolBuf](#) - Releases a buffer from the memory pool that was previously allocated via [CFE\\_ES\\_GetPoolBuf](#).
    - [CFE\\_ES\\_GetMemPoolStats](#) - Extracts the statistics maintained by the memory pool software.

- [CFE\\_ES\\_GetPoolBufInfo](#) - Gets info on a buffer previously allocated via [CFE\\_ES\\_GetPoolBuf](#).
- cFE Performance Monitor APIs
  - [CFE\\_ES\\_PerfLogEntry](#) - Entry marker for use with Software Performance Analysis Tool.
  - [CFE\\_ES\\_PerfLogExit](#) - Exit marker for use with Software Performance Analysis Tool.
  - [CFE\\_ES\\_PerfLogAdd](#) - Adds a new entry to the data buffer.
- cFE Generic Counter APIs
  - [CFE\\_ES\\_RegisterGenCounter](#) - Register a generic counter.
  - [CFE\\_ES\\_DeleteGenCounter](#) - Delete a generic counter.
  - [CFE\\_ES\\_IncrementGenCounter](#) - Increments the specified generic counter.
  - [CFE\\_ES\\_SetGenCount](#) - Set the specified generic counter.
  - [CFE\\_ES\\_GetGenCount](#) - Get the specified generic counter count.
  - [CFE\\_ES\\_GetGenCounterIDByName](#) - Get the Id associated with a generic counter name.
  - [CFE\\_ES\\_GetGenCounterName](#) - Get a Counter name for a specified Counter ID.
- cFE Miscellaneous APIs
  - [CFE\\_ES\\_BackgroundWakeUp](#) - Wakes up the CFE background task.
  - [CFE\\_ES\\_CalculateCRC](#) - Calculate a CRC on a block of memory.
  - [CFE\\_ES\\_WriteToSysLog](#) - Write a string to the cFE System Log.
  - [CFE\\_ES\\_ProcessAsyncEvent](#) - Notification that an asynchronous event was detected by the underlying OS/PSP.
  - [CFE\\_ES\\_StatusToString](#) - Convert status to a string.
- cFE Resource ID APIs
  - [CFE\\_ES\\_AppID\\_ToIndex](#) - Obtain an index value correlating to an ES Application ID.
  - [CFE\\_ES\\_LibID\\_ToIndex](#) - Obtain an index value correlating to an ES Library ID.
  - [CFE\\_ES\\_TaskID\\_ToIndex](#) - Obtain an index value correlating to an ES Task ID.
  - [CFE\\_ES\\_CounterID\\_ToIndex](#) - Obtain an index value correlating to an ES Counter ID.

## 4.2 Events Services API

- cFE Registration APIs
  - [CFE\\_EVS\\_Register](#) - Register an application for receiving event services.
- cFE Send Event APIs
  - [CFE\\_EVS\\_SendEvent](#) - Generate a software event.
  - [CFE\\_EVS\\_SendEventWithAppID](#) - Generate a software event given the specified Application ID.
  - [CFE\\_EVS\\_SendTimedEvent](#) - Generate a software event with a specific time tag.
- cFE Reset Event Filter APIs
  - [CFE\\_EVS\\_ResetFilter](#) - Resets the calling application's event filter for a single event ID.
  - [CFE\\_EVS\\_ResetAllFilters](#) - Resets all of the calling application's event filters.

### 4.3 File Services API

- cFE File Header Management APIs
  - [CFE\\_FS\\_ReadHeader](#) - Read the contents of the Standard cFE File Header.
  - [CFE\\_FS\\_InitHeader](#) - Initializes the contents of the Standard cFE File Header.
  - [CFE\\_FS\\_WriteHeader](#) - Write the specified Standard cFE File Header to the specified file.
  - [CFE\\_FS\\_SetTimestamp](#) - Modifies the Time Stamp field in the Standard cFE File Header for the specified file.
- cFE File Utility APIs
  - [CFE\\_FS\\_GetDefaultMountPoint](#) - Get the default virtual mount point for a file category.
  - [CFE\\_FS\\_GetDefaultExtension](#) - Get the default filename extension for a file category.
  - [CFE\\_FS\\_ParseInputFileNameEx](#) - Parse a filename input from an input buffer into a local buffer.
  - [CFE\\_FS\\_ParseInputFileName](#) - Parse a filename string from the user into a local buffer.
  - [CFE\\_FS\\_ExtractFilenameFromPath](#) - Extracts the filename from a unix style path and filename string.
  - [CFE\\_FS\\_BackgroundFileDumpRequest](#) - Register a background file dump request.
  - [CFE\\_FS\\_BackgroundFileDumpsPending](#) - Query if a background file write request is currently pending.

### 4.4 Message API

- cFE Generic Message APIs
  - [CFE\\_MSG\\_Init](#) - Initialize a message.
- cFE Message Primary Header APIs
  - [CFE\\_MSG.GetSize](#) - Gets the total size of a message.
  - [CFE\\_MSG\\_SetSize](#) - Sets the total size of a message.
  - [CFE\\_MSG.GetType](#) - Gets the message type.
  - [CFE\\_MSG\\_SetType](#) - Sets the message type.
  - [CFE\\_MSG\\_GetHeaderVersion](#) - Gets the message header version.
  - [CFE\\_MSG\\_SetHeaderVersion](#) - Sets the message header version.
  - [CFE\\_MSG\\_GetHasSecondaryHeader](#) - Gets the message secondary header boolean.
  - [CFE\\_MSG\\_SetHasSecondaryHeader](#) - Sets the message secondary header boolean.
  - [CFE\\_MSG\\_GetApId](#) - Gets the message application ID.
  - [CFE\\_MSG\\_SetApId](#) - Sets the message application ID.
  - [CFE\\_MSG\\_GetSegmentationFlag](#) - Gets the message segmentation flag.
  - [CFE\\_MSG\\_SetSegmentationFlag](#) - Sets the message segmentation flag.
  - [CFE\\_MSG\\_GetSequenceCount](#) - Gets the message sequence count.
  - [CFE\\_MSG\\_SetSequenceCount](#) - Sets the message sequence count.
  - [CFE\\_MSG\\_GetNextSequenceCount](#) - Gets the next sequence count value (rolls over if appropriate)
- cFE Message Extended Header APIs
  - [CFE\\_MSG\\_GetEDSVersion](#) - Gets the message EDS version.
  - [CFE\\_MSG\\_SetEDSVersion](#) - Sets the message EDS version.
  - [CFE\\_MSG\\_GetEndian](#) - Gets the message endian.

- [CFE\\_MSG\\_SetEndian](#) - Sets the message endian.
- [CFE\\_MSG\\_GetPlaybackFlag](#) - Gets the message playback flag.
- [CFE\\_MSG\\_SetPlaybackFlag](#) - Sets the message playback flag.
- [CFE\\_MSG\\_GetSubsystem](#) - Gets the message subsystem.
- [CFE\\_MSG\\_SetSubsystem](#) - Sets the message subsystem.
- [CFE\\_MSG\\_GetSystem](#) - Gets the message system.
- [CFE\\_MSG\\_SetSystem](#) - Sets the message system.
- cFE Message Secondary Header APIs
  - [CFE\\_MSG\\_GenerateChecksum](#) - Calculates and sets the checksum of a message.
  - [CFE\\_MSG\\_ValidateChecksum](#) - Validates the checksum of a message.
  - [CFE\\_MSG\\_SetFcnCode](#) - Sets the function code field in a message.
  - [CFE\\_MSG\\_GetFcnCode](#) - Gets the function code field from a message.
  - [CFE\\_MSG\\_GetMsgTime](#) - Gets the time field from a message.
  - [CFE\\_MSG\\_SetMsgTime](#) - Sets the time field in a message.
- cFE Message Id APIs
  - [CFE\\_MSG\\_GetMsgId](#) - Gets the message id from a message.
  - [CFE\\_MSG\\_SetMsgId](#) - Sets the message id bits in a message.
  - [CFE\\_MSG.GetTypeFromMsgId](#) - Gets message type using message ID.

## 4.5 Resource ID API

- cFE Resource Misc APIs
  - [CFE\\_Resourceld\\_ToInteger](#) - Convert a resource ID to an integer.
  - [CFE\\_Resourceld\\_FromInteger](#) - Convert an integer to a resource ID.
  - [CFE\\_Resourceld\\_Equal](#) - Compare two Resource ID values for equality.
  - [CFE\\_Resourceld\\_IsDefined](#) - Check if a resource ID value is defined.
  - [CFE\\_Resourceld\\_GetBase](#) - Get the Base value (type/category) from a resource ID value.
  - [CFE\\_Resourceld\\_GetSerial](#) - Get the Serial Number (sequential ID) from a resource ID value.
  - [CFE\\_Resourceld\\_FindNext](#) - Locate the next resource ID which does not map to an in-use table entry.
  - [CFE\\_Resourceld\\_ToIndex](#) - Internal routine to aid in converting an ES resource ID to an array index.

## 4.6 Software Bus Services API

- cFE Pipe Management APIs
  - [CFE\\_SB\\_CreatePipe](#) - Creates a new software bus pipe.
  - [CFE\\_SB\\_DeletePipe](#) - Delete a software bus pipe.
  - [CFE\\_SB\\_Pipeld\\_ToIndex](#) - Obtain an index value correlating to an SB Pipe ID.
  - [CFE\\_SB\\_SetPipeOpts](#) - Set options on a pipe.
  - [CFE\\_SB\\_GetPipeOpts](#) - Get options on a pipe.
  - [CFE\\_SB\\_GetPipeName](#) - Get the pipe name for a given id.
  - [CFE\\_SB\\_GetPipeldByName](#) - Get pipe id by pipe name.
- cFE Message Subscription Control APIs

- [CFE\\_SB\\_Subscribe](#) - Subscribe to a message on the software bus with default parameters.
- [CFE\\_SB\\_SubscribeEx](#) - Subscribe to a message on the software bus.
- [CFE\\_SB\\_SubscribeLocal](#) - Subscribe to a message while keeping the request local to a cpu.
- [CFE\\_SB\\_Unsubscribe](#) - Remove a subscription to a message on the software bus.
- [CFE\\_SB\\_UnsubscribeLocal](#) - Remove a subscription to a message on the software bus on the current CPU.
- [cFE Send/Receive Message APIs](#)
  - [CFE\\_SB\\_TransmitMsg](#) - Transmit a message.
  - [CFE\\_SB\\_ReceiveBuffer](#) - Receive a message from a software bus pipe.
- [cFE Zero Copy APIs](#)
  - [CFE\\_SB\\_AllocateMessageBuffer](#) - Get a buffer pointer to use for "zero copy" SB sends.
  - [CFE\\_SB\\_ReleaseMessageBuffer](#) - Release an unused "zero copy" buffer pointer.
  - [CFE\\_SB\\_TransmitBuffer](#) - Transmit a buffer.
- [cFE Message Characteristics APIs](#)
  - [CFE\\_SB\\_SetUserDataLength](#) - Sets the length of user data in a software bus message.
  - [CFE\\_SB\\_TimeStampMsg](#) - Sets the time field in a software bus message with the current spacecraft time.
  - [CFE\\_SB\\_MessageStringSet](#) - Copies a string into a software bus message.
  - [CFE\\_SB\\_GetUserData](#) - Get a pointer to the user data portion of a software bus message.
  - [CFE\\_SB\\_GetUserDataLength](#) - Gets the length of user data in a software bus message.
  - [CFE\\_SB\\_MessageStringGet](#) - Copies a string out of a software bus message.
- [cFE Message ID APIs](#)
  - [CFE\\_SB\\_IsValidMsgId](#) - Identifies whether a given [CFE\\_SB\\_MsgId\\_t](#) is valid.
  - [CFE\\_SB\\_MsgId\\_Equal](#) - Identifies whether two [CFE\\_SB\\_MsgId\\_t](#) values are equal.
  - [CFE\\_SB\\_MsgIdToValue](#) - Converts a [CFE\\_SB\\_MsgId\\_t](#) to a normal integer.
  - [CFE\\_SB\\_ValueToMsgId](#) - Converts a normal integer into a [CFE\\_SB\\_MsgId\\_t](#).

## 4.7 Table Services API

- [cFE Registration APIs](#)
  - [CFE\\_TBL\\_Register](#) - Register a table with cFE to obtain Table Management Services.
  - [CFE\\_TBL\\_Share](#) - Obtain handle of table registered by another application.
  - [CFE\\_TBL\\_Unregister](#) - Unregister a table.
- [cFE Manage Table Content APIs](#)
  - [CFE\\_TBL\\_Load](#) - Load a specified table with data from specified source.
  - [CFE\\_TBL\\_Update](#) - Update contents of a specified table, if an update is pending.
  - [CFE\\_TBL\\_Validate](#) - Perform steps to validate the contents of a table image.
  - [CFE\\_TBL\\_Manage](#) - Perform standard operations to maintain a table.
  - [CFE\\_TBL\\_DumpToBuffer](#) - Copies the contents of a Dump Only Table to a shared buffer.
  - [CFE\\_TBL\\_Modified](#) - Notify cFE Table Services that table contents have been modified by the Application.
- [cFE Access Table Content APIs](#)

- [CFE\\_TBL\\_GetAddress](#) - Obtain the current address of the contents of the specified table.
- [CFE\\_TBL\\_GetAddresses](#) - Obtain the current addresses of an array of specified tables.
- [CFE\\_TBL\\_ReleaseAddress](#) - Release previously obtained pointer to the contents of the specified table.
- [CFE\\_TBL\\_ReleaseAddresses](#) - Release the addresses of an array of specified tables.
- cFE Get Table Information APIs
  - [CFE\\_TBL\\_GetStatus](#) - Obtain current status of pending actions for a table.
  - [CFE\\_TBL\\_GetInfo](#) - Obtain characteristics/information of/about a specified table.
  - [CFE\\_TBL\\_NotifyByMessage](#) - Instruct cFE Table Services to notify Application via message when table requires management.

## 4.8 Time Services API

- cFE Get Current Time APIs
  - [CFE\\_TIME\\_GetTime](#) - Get the current spacecraft time.
  - [CFE\\_TIME\\_GetTAI](#) - Get the current TAI (MET + SCTF) time.
  - [CFE\\_TIME\\_GetUTC](#) - Get the current UTC (MET + SCTF - Leap Seconds) time.
  - [CFE\\_TIME\\_GetMET](#) - Get the current value of the Mission Elapsed Time (MET).
  - [CFE\\_TIME\\_GetMETseconds](#) - Get the current seconds count of the mission-elapsed time.
  - [CFE\\_TIME\\_GetMETsubsecs](#) - Get the current sub-seconds count of the mission-elapsed time.
- cFE Get Time Information APIs
  - [CFE\\_TIME\\_GetSTCF](#) - Get the current value of the spacecraft time correction factor (STCF).
  - [CFE\\_TIME\\_GetLeapSeconds](#) - Get the current value of the leap seconds counter.
  - [CFE\\_TIME\\_GetClockState](#) - Get the current state of the spacecraft clock.
  - [CFE\\_TIME\\_GetClockInfo](#) - Provides information about the spacecraft clock.
- cFE Time Arithmetic APIs
  - [CFE\\_TIME\\_Add](#) - Adds two time values.
  - [CFE\\_TIME\\_Subtract](#) - Subtracts two time values.
  - [CFE\\_TIME\\_Compare](#) - Compares two time values.
- cFE Time Conversion APIs
  - [CFE\\_TIME\\_MET2SCTime](#) - Convert specified MET into Spacecraft Time.
  - [CFE\\_TIME\\_Sub2MicroSecs](#) - Converts a sub-seconds count to an equivalent number of microseconds.
  - [CFE\\_TIME\\_Micro2SubSecs](#) - Converts a number of microseconds to an equivalent sub-seconds count.
- cFE External Time Source APIs
  - [CFE\\_TIME\\_ExternalTone](#) - Provides the 1 Hz signal from an external source.
  - [CFE\\_TIME\\_ExternalMET](#) - Provides the Mission Elapsed Time from an external source.
  - [CFE\\_TIME\\_ExternalGPS](#) - Provide the time from an external source that has data common to GPS receivers.
  - [CFE\\_TIME\\_ExternalTime](#) - Provide the time from an external source that measures time relative to a known epoch.
  - [CFE\\_TIME\\_RegisterSyncCallback](#) - Registers a callback function that is called whenever time synchronization occurs.

- [CFE\\_TIME\\_UnregisterSynchCallback](#) - Unregisters a callback function that is called whenever time synchronization occurs.
- [cFE Miscellaneous Time APIs](#)
  - [CFE\\_TIME\\_Print](#) - Print a time value as a string.
  - [CFE\\_TIME\\_Local1HzISR](#) - This function is called via a timer callback set up at initialization of the TIME service.

## 5 Osal API Documentation

- General Information and Concepts
  - [OSAL Introduction](#)
- Core
  - [OSAL Return Code Defines](#)
  - [OSAL Object Type Defines](#)
  - APIs
    - \* [OSAL Core Operation APIs](#)
    - \* [OSAL Object ID Utility APIs](#)
    - \* [OSAL Task APIs](#)
    - \* [OSAL Message Queue APIs](#)
    - \* [OSAL Heap APIs](#)
    - \* [OSAL Error Info APIs](#)
    - \* [OSAL Select APIs](#)
    - \* [OSAL Printf APIs](#)
    - \* [OSAL BSP low level access APIs](#)
    - \* [OSAL Real Time Clock APIs](#)
    - \* [OSAL Shell APIs](#)
  - [Common Reference](#)
  - [Return Code Reference](#)
  - [Id Map Reference](#)
  - [Clock Reference](#)
  - [Task Reference](#)
  - [Message Queue Reference](#)
  - [Heap Reference](#)
  - [Select Reference](#)
  - [Printf Reference](#)
  - [BSP Reference](#)
  - [Shell Reference](#)
- File System
  - [File System Overview](#)
  - [File Descriptors In Osal](#)
  - [OSAL File Access Option Defines](#)
  - [OSAL Reference Point For Seek Offset Defines](#)

- APIs
  - \* OSAL Standard File APIs
  - \* OSAL Directory APIs
  - \* OSAL File System Level APIs
- File System Reference
- File Reference
- Directory Reference
- Object File Loader
  - APIs
    - \* OSAL Dynamic Loader and Symbol APIs
  - File Loader Reference
- Network
  - APIs
    - \* OSAL Network ID APIs
    - \* OSAL Socket Address APIs
    - \* OSAL Socket Management APIs
  - Network Reference
  - Socket Reference
- Timer
  - Timer Overview
  - APIs
    - \* OSAL Time Base APIs
    - \* OSAL Timer APIs
  - Timer Reference
  - Time Base Reference
- Semaphore and Mutex
  - OSAL Semaphore State Defines
  - APIs
    - \* OSAL Binary Semaphore APIs
    - \* OSAL Counting Semaphore APIs
    - \* OSAL Mutex APIs
  - Binary Semaphore Reference
  - Counting Semaphore Reference
  - Mutex Reference

## 5.1 OSAL Introduction

The goal of this library is to promote the creation of portable and reusable real time embedded system software. Given the necessary OS abstraction layer implementations, the same embedded software should compile and run on a number of platforms ranging from spacecraft computer systems to desktop PCs.

The OS Application Program Interfaces (APIs) are broken up into core, file system, loader, network, and timer APIs. See the related document sections for full descriptions.

### Note

The majority of these APIs should be called from a task running in the context of an OSAL application and in general should not be called from an ISR. There are a few exceptions, such as the ability to give a binary semaphore from an ISR.

## 5.2 File System Overview

The File System API is a thin wrapper around a selection of POSIX file APIs. In addition the File System API presents a common directory structure and volume view regardless of the underlying system type. For example, vxWorks uses MS-DOS style volume names and directories where a vxWorks RAM disk might have the volume "RAM:0". With this File System API, volumes are represented as Unix-style paths where each volume is mounted on the root file system:

- RAM:0/file1.dat becomes /mnt/ram/file1.dat
- FL:0/file2.dat becomes /mnt/fl/file2.dat

This abstraction allows the applications to use the same paths regardless of the implementation and it also allows file systems to be simulated on a desktop system for testing. On a desktop Linux system, the file system abstraction can be set up to map virtual devices to a regular directory. This is accomplished through the OS\_mkfs call, OS\_mount call, and a BSP specific volume table that maps the virtual devices to real devices or underlying file systems.

In order to make this file system volume abstraction work, a "Volume Table" needs to be provided in the Board Support Package of the application. The table has the following fields:

- Device Name: This is the name of the virtual device that the Application uses. Common names are "ramdisk1", "flash1", or "volatile1" etc. But the name can be any unique string.
- Physical Device Name: This is an implementation specific field. For vxWorks it is not needed and can be left blank. For a File system based implementation, it is the "mount point" on the root file system where all of the volume will be mounted. A common place for this on Linux could be a user's home directory, "/tmp", or even the current working directory "..". In the example of "/tmp" all of the directories created for the volumes would be under "/tmp" on the Linux file system. For a real disk device in Linux, such as a RAM disk, this field is the device name "/dev/ram0".
- Volume Type: This field defines the type of volume. The types are: FS\_BASED which uses the existing file system, RAM\_DISK which uses a RAM\_DISK device in vxWorks, RTEMS, or Linux, FLASH\_DISK\_FORMAT which uses a flash disk that is to be formatted before use, FLASH\_DISK\_INIT which uses a flash disk with an existing format that is just to be initialized before its use, EEPROM which is for an EEPROM or PROM based system.
- Volatile Flag: This flag indicates that the volume or disk is a volatile disk (RAM disk) or a non-volatile disk, that retains its contents when the system is rebooted. This should be set to TRUE or FALSE.
- Free Flag: This is an internal flag that should be set to FALSE or zero.
- Is Mounted Flag: This is an internal flag that should be set to FALSE or zero. Note that a "pre-mounted" FS\_BASED path can be set up by setting this flag to one.
- Volume Name: This is an internal field and should be set to a space character " ".
- Mount Point Field: This is an internal field and should be set to a space character " ".
- Block Size Field: This is used to record the block size of the device and does not need to be set by the user.

## 5.3 File Descriptors In Osal

The OSAL uses abstracted file descriptors. This means that the file descriptors passed back from the OS\_open and OS\_creat calls will only work with other OSAL OS\_\* calls. The reasoning for this is as follows:

Because the OSAL now keeps track of all file descriptors, OSAL specific information can be associated with a specific file descriptor in an OS independent way. For instance, the path of the file that the file descriptor points to can be easily retrieved. Also, the OSAL task ID of the task that opened the file can also be retrieved easily. Both of these pieces of information are very useful when trying to determine statistics for a task, or the entire system. This information can all be retrieved with a single API, OS\_FDGetInfo.

All of the possible file system calls are not implemented. "Special" files requiring OS specific control/operations are by nature not portable. Abstraction in this case is not possible, so the raw OS calls should be used (including

open/close/etc). Mixing with OSAL calls is not supported for such cases. [OS\\_TranslatePath](#) is available to support using open directly by an app and maintain abstraction on the file system.

There are some small drawbacks with the OSAL file descriptors. Because the related information is kept in a table, there is a define called OS\_MAX\_NUM\_OPEN\_FILES that defines the maximum number of file descriptors available. This is a configuration parameter, and can be changed to fit your needs.

Also, if you open or create a file not using the OSAL calls (OS\_open or OS\_creat) then none of the other OS\_\* calls that accept a file descriptor as a parameter will work (the results of doing so are undefined). Therefore, if you open a file with the underlying OS's open call, you must continue to use the OS's calls until you close the file descriptor. Be aware that by doing this your software may no longer be OS agnostic.

## 5.4 Timer Overview

The timer API is a generic interface to the OS timer facilities. It is implemented using the POSIX timers on Linux and vxWorks and the native timer API on RTEMS. The number of timers supported is controlled by the configuration parameter OS\_MAX\_TIMERS.

# 6 cFE Mission Configuration Parameters

## Global [CFE\\_MISSION\\_ES\\_CMD\\_TOPICID](#)

cFE Portable Message Numbers for Commands

## Global [CFE\\_MISSION\\_ES\\_HK\\_TLM\\_TOPICID](#)

cFE Portable Message Numbers for Telemetry

## Global [CFE\\_MISSION\\_EVS\\_CMD\\_TOPICID](#)

cFE Portable Message Numbers for Commands

## Global [CFE\\_MISSION\\_EVS\\_HK\\_TLM\\_TOPICID](#)

cFE Portable Message Numbers for Telemetry

## Global [CFE\\_MISSION\\_MAX\\_API\\_LEN](#)

cFE Maximum length for API names within data exchange structures

cFE Maximum length for API names within data exchange structures

## Global [CFE\\_MISSION\\_MAX\\_FILE\\_LEN](#)

cFE Maximum length for filenames within data exchange structures

cFE Maximum length for filenames within data exchange structures

## Global [CFE\\_MISSION\\_MAX\\_NUM\\_FILES](#)

cFE Maximum number of files in a message/data exchange

cFE Maximum number of files in a message/data exchange

## Global [CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)

cFE Maximum length for pathnames within data exchange structures

cFE Maximum length for pathnames within data exchange structures

## Global [CFE\\_MISSION\\_SB\\_CMD\\_TOPICID](#)

cFE Portable Message Numbers for Commands

## Global [CFE\\_MISSION\\_SB\\_HK\\_TLM\\_TOPICID](#)

cFE Portable Message Numbers for Telemetry

## Global [CFE\\_MISSION\\_TBL\\_CMD\\_TOPICID](#)

cFE Portable Message Numbers for Commands

**Global CFE\_MISSION\_TBL\_HK\_TLM\_TOPICID**

cFE Portable Message Numbers for Telemetry

**Global CFE\_MISSION\_TIME\_CMD\_TOPICID**

cFE Portable Message Numbers for Commands

**Global CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID**

cFE Portable Message Numbers for Global Messages

**Global CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID**

cFE Portable Message Numbers for Telemetry

## 7 Module Index

### 7.1 Modules

Here is a list of all modules:

<b>CFS Limit Checker Event IDs</b>	135
<b>CFS Limit Checker Version</b>	158
<b>CFS Limit Checker Command Codes</b>	159
<b>CFS Limit Checker Mission Configuration</b>	165
<b>CFS Limit Checker Platform Configuration</b>	168
<b>CFS Limit Checker Command Message IDs</b>	172
<b>CFS Limit Checker Telemetry Message IDs</b>	173
<b>CFS Limit Checker Command Structures</b>	174
<b>CFS Limit Checker Telemetry</b>	175
<b>cFE Return Code Defines</b>	176
<b>cFE Resource ID APIs</b>	199
<b>cFE Entry/Exit APIs</b>	202
<b>cFE Application Control APIs</b>	204
<b>cFE Application Behavior APIs</b>	207
<b>cFE Information APIs</b>	211
<b>cFE Child Task APIs</b>	220
<b>cFE Miscellaneous APIs</b>	224
<b>cFE Critical Data Store APIs</b>	227
<b>cFE Memory Manager APIs</b>	232
<b>cFE Performance Monitor APIs</b>	239

cFE Generic Counter APIs	241
cFE Registration APIs	247
cFE Send Event APIs	249
cFE Reset Event Filter APIs	254
cFE File Header Management APIs	256
cFE File Utility APIs	260
cFE Generic Message APIs	265
cFE Message Primary Header APIs	266
cFE Message Extended Header APIs	275
cFE Message Secondary Header APIs	281
cFE Message Id APIs	286
cFE Message Integrity APIs	288
cFE Pipe Management APIs	290
cFE Message Subscription Control APIs	295
cFE Send/Receive Message APIs	300
cFE Zero Copy APIs	303
cFE Message Characteristics APIs	306
cFE Message ID APIs	311
cFE SB Pipe options	316
cFE Registration APIs	317
cFE Manage Table Content APIs	322
cFE Access Table Content APIs	328
cFE Get Table Information APIs	333
cFE Table Type Defines	336
cFE Get Current Time APIs	338
cFE Get Time Information APIs	341
cFE Time Arithmetic APIs	344
cFE Time Conversion APIs	347
cFE External Time Source APIs	349
cFE Miscellaneous Time APIs	354

cFE Resource ID base values	357
cFE Clock State Flag Defines	359
OSAL Semaphore State Defines	361
OSAL Binary Semaphore APIs	362
OSAL BSP low level access APIs	367
OSAL Real Time Clock APIs	368
OSAL Core Operation APIs	379
OSAL Condition Variable APIs	382
OSAL Counting Semaphore APIs	388
OSAL Directory APIs	393
OSAL Return Code Defines	397
OSAL Error Info APIs	404
OSAL File Access Option Defines	406
OSAL Reference Point For Seek Offset Defines	407
OSAL Standard File APIs	408
OSAL File System Level APIs	419
OSAL Heap APIs	427
OSAL Object Type Defines	428
OSAL Object ID Utility APIs	431
OSAL Dynamic Loader and Symbol APIs	436
OSAL Mutex APIs	440
OSAL Network ID APIs	444
OSAL Printf APIs	446
OSAL Message Queue APIs	447
OSAL Select APIs	451
OSAL Shell APIs	455
OSAL Socket Address APIs	456
OSAL Socket Management APIs	460
OSAL Task APIs	468
OSAL Time Base APIs	474

OSAL Timer APIs	479
-----------------	-----

## 8 Data Structure Index

### 8.1 Data Structures

Here are the data structures with brief descriptions:

<a href="#">CCSDS_ExtendedHeader</a> CCSDS packet extended header	485
<a href="#">CCSDS_PrimaryHeader</a> CCSDS packet primary header	485
<a href="#">CFE_ES_AppInfo</a> Application Information	486
<a href="#">CFE_ES_AppNameCmd_Payload</a> Generic application name command payload	490
<a href="#">CFE_ES_AppReloadCmd_Payload</a> Reload Application Command Payload	490
<a href="#">CFE_ES_BlockStats</a> Block statistics	491
<a href="#">CFE_ES_CDSRegDumpRec</a> CDS Register Dump Record	492
<a href="#">CFE_ES_ClearERLogCmd</a>	493
<a href="#">CFE_ES_ClearSysLogCmd</a>	493
<a href="#">CFE_ES_DeleteCDSCmd</a> Delete Critical Data Store Command	494
<a href="#">CFE_ES_DeleteCDSCmd_Payload</a> Delete Critical Data Store Command Payload	495
<a href="#">CFE_ES_DumpCDSRegistryCmd</a> Dump CDS Registry Command	495
<a href="#">CFE_ES_DumpCDSRegistryCmd_Payload</a> Dump CDS Registry Command Payload	496
<a href="#">CFE_ES_FileNameCmd</a> Generic file name command	496
<a href="#">CFE_ES_FileNameCmd_Payload</a> Generic file name command payload	497
<a href="#">CFE_ES_HousekeepingTIm</a>	497
<a href="#">CFE_ES_HousekeepingTIm_Payload</a>	498
<a href="#">CFE_ES_MemPoolStats</a> Memory Pool Statistics	506

<a href="#">CFE_ES_MemStatsTlm</a>	507
<a href="#">CFE_ES_NoopCmd</a>	508
<a href="#">CFE_ES_OneAppTlm</a>	508
<a href="#">CFE_ES_OneAppTlm_Payload</a>	509
<a href="#">CFE_ES_OverWriteSysLogCmd</a> Overwrite/Discard System Log Configuration Command Payload	509
<a href="#">CFE_ES_OverWriteSysLogCmd_Payload</a> Overwrite/Discard System Log Configuration Command Payload	510
<a href="#">CFE_ES_PoolAlign</a> Pool Alignment	511
<a href="#">CFE_ES_PoolStatsTlm_Payload</a>	511
<a href="#">CFE_ES_QueryAllCmd</a>	512
<a href="#">CFE_ES_QueryAllTasksCmd</a>	513
<a href="#">CFE_ES_QueryOneCmd</a>	513
<a href="#">CFE_ES_ReloadAppCmd</a> Reload Application Command	514
<a href="#">CFE_ES_ResetCountersCmd</a>	514
<a href="#">CFE_ES_ResetPRCountCmd</a>	515
<a href="#">CFE_ES_RestartAppCmd</a>	515
<a href="#">CFE_ES_RestartCmd</a> Restart cFE Command	516
<a href="#">CFE_ES_RestartCmd_Payload</a> Restart cFE Command Payload	516
<a href="#">CFE_ES_SendHkCmd</a>	517
<a href="#">CFE_ES_SendMemPoolStatsCmd</a> Send Memory Pool Statistics Command	517
<a href="#">CFE_ES_SendMemPoolStatsCmd_Payload</a> Send Memory Pool Statistics Command Payload	518
<a href="#">CFE_ES_SetMaxPRCountCmd</a> Set Maximum Processor Reset Count Command	519
<a href="#">CFE_ES_SetMaxPRCountCmd_Payload</a> Set Maximum Processor Reset Count Command Payload	519
<a href="#">CFE_ES_SetPerfFilterMaskCmd</a> Set Performance Analyzer Filter Mask Command	520

<b>CFE_ES_SetPerfFilterMaskCmd_Payload</b>	Set Performance Analyzer Filter Mask Command Payload	520
<b>CFE_ES_SetPerfTriggerMaskCmd</b>	Set Performance Analyzer Trigger Mask Command	521
<b>CFE_ES_SetPerfTrigMaskCmd_Payload</b>	Set Performance Analyzer Trigger Mask Command Payload	522
<b>CFE_ES_StartApp</b>	Start Application Command	522
<b>CFE_ES_StartAppCmd_Payload</b>	Start Application Command Payload	523
<b>CFE_ES_StartPerfCmd_Payload</b>	Start Performance Analyzer Command Payload	524
<b>CFE_ES_StartPerfDataCmd</b>	Start Performance Analyzer Command	524
<b>CFE_ES_StopAppCmd</b>		525
<b>CFE_ES_StopPerfCmd_Payload</b>	Stop Performance Analyzer Command Payload	526
<b>CFE_ES_StopPerfDataCmd</b>	Stop Performance Analyzer Command	526
<b>CFE_ES_TaskInfo</b>	Task Information	527
<b>CFE_ES_WriteERLogCmd</b>		528
<b>CFE_ES_WriteSysLogCmd</b>		529
<b>CFE_EVS_AddEventFilterCmd</b>		529
<b>CFE_EVS_AppDataCmd_Payload</b>	Write Event Services Application Information to File Command Payload	530
<b>CFE_EVS_AppNameBitMaskCmd_Payload</b>	Generic App Name and Bitmask Command Payload	531
<b>CFE_EVS_AppNameCmd_Payload</b>	Generic App Name Command Payload	531
<b>CFE_EVS_AppNameEventIDCmd_Payload</b>	Generic App Name and Event ID Command Payload	532
<b>CFE_EVS_AppNameEventIDMaskCmd_Payload</b>	Generic App Name, Event ID, Mask Command Payload	532
<b>CFE_EVS_AppTlmData</b>		533
<b>CFE_EVS_BinFilter</b>	Event message filter definition structure	534

<b>CFE_EVS_BitMaskCmd_Payload</b>	
Generic Bitmask Command Payload	535
<b>CFE_EVS_ClearLogCmd</b>	536
<b>CFE_EVS_DeleteEventFilterCmd</b>	536
<b>CFE_EVS_DisableAppEventsCmd</b>	537
<b>CFE_EVS_DisableAppEventTypeCmd</b>	537
<b>CFE_EVS_DisableEventTypeCmd</b>	538
<b>CFE_EVS_DisablePortsCmd</b>	538
<b>CFE_EVS_EnableAppEventsCmd</b>	539
<b>CFE_EVS_EnableAppEventTypeCmd</b>	539
<b>CFE_EVS_EnableEventTypeCmd</b>	540
<b>CFE_EVS_EnablePortsCmd</b>	541
<b>CFE_EVS_HousekeepingTlm</b>	541
<b>CFE_EVS_HousekeepingTlm_Payload</b>	542
<b>CFE_EVS_LogFileCmd_Payload</b>	
Write Event Log to File Command Payload	545
<b>CFE_EVS_LongEventTlm</b>	545
<b>CFE_EVS_LongEventTlm_Payload</b>	546
<b>CFE_EVS_NoopCmd</b>	547
<b>CFE_EVS_PacketID</b>	547
<b>CFE_EVS_ResetAllFiltersCmd</b>	549
<b>CFE_EVS_ResetAppCounterCmd</b>	549
<b>CFE_EVS_ResetCountersCmd</b>	550
<b>CFE_EVS_ResetFilterCmd</b>	550
<b>CFE_EVS_SendHkCmd</b>	551
<b>CFE_EVS_SetEventFormatCode_Payload</b>	
Set Event Format Mode Command Payload	551
<b>CFE_EVS_SetEventFormatModeCmd</b>	
Set Event Format Mode Command	552
<b>CFE_EVS_SetFilterCmd</b>	553
<b>CFE_EVS_SetLogMode_Payload</b>	
Set Log Mode Command Payload	553

<b>CFE_EVS_SetLogModeCmd</b> Set Log Mode Command	554
<b>CFE_EVS_ShortEventTlm</b>	554
<b>CFE_EVS_ShortEventTlm_Payload</b>	555
<b>CFE_EVS_WriteAppDataFileCmd</b> Write Event Services Application Information to File Command	555
<b>CFE_EVS_WriteLogFileCmd</b> Write Event Log to File Command	556
<b>CFE_FS_FileWriteMetaData</b> External Metadata/State object associated with background file writes	557
<b>CFE_FS_Header</b> Standard cFE File header structure definition	558
<b>CFE_SB_AllSubscriptionsTlm</b>	559
<b>CFE_SB_AllSubscriptionsTlm_Payload</b>	560
<b>CFE_SB_DisableRouteCmd</b>	561
<b>CFE_SB_DisableSubReportingCmd</b>	561
<b>CFE_SB_EnableRouteCmd</b>	562
<b>CFE_SB_EnableSubReportingCmd</b>	562
<b>CFE_SB_HousekeepingTlm</b>	563
<b>CFE_SB_HousekeepingTlm_Payload</b>	563
<b>CFE_SB_Msg</b> Software Bus generic message	567
<b>CFE_SB_MsgId_t</b> CFE_SB_MsgId_t type definition	568
<b>CFE_SB_MsgMapFileEntry</b> SB Map File Entry	568
<b>CFE_SB_NoopCmd</b>	569
<b>CFE_SB_PipeDepthStats</b> SB Pipe Depth Statistics	569
<b>CFE_SB_PipeInfoEntry</b> SB Pipe Information File Entry	571
<b>CFE_SB_Qos_t</b> Quality Of Service Type Definition	572
<b>CFE_SB_ResetCountersCmd</b>	573

<b>CFE_SB_RouteCmd_Payload</b>		
Enable/Disable Route Command Payload		573
<b>CFE_SB_RoutingFileEntry</b>		
SB Routing File Entry		574
<b>CFE_SB_SendHkCmd</b>		575
<b>CFE_SB_SendPrevSubsCmd</b>		576
<b>CFE_SB_SendSbStatsCmd</b>		576
<b>CFE_SB_SingleSubscriptionTlm</b>		576
<b>CFE_SB_SingleSubscriptionTlm_Payload</b>		577
<b>CFE_SB_StatsTlm</b>		578
<b>CFE_SB_StatsTlm_Payload</b>		579
<b>CFE_SB_SubEntries</b>		
SB Previous Subscriptions Entry		582
<b>CFE_SB_WriteFileInfoCmd_Payload</b>		
Write File Info Command Payload		583
<b>CFE_SB_WriteMapInfoCmd</b>		583
<b>CFE_SB_WritePipeInfoCmd</b>		584
<b>CFE_SB_WriteRoutingInfoCmd</b>		584
<b>CFE_TBL_AbortLoadCmd</b>		
Abort Load Command		585
<b>CFE_TBL_AbortLoadCmd_Payload</b>		
Abort Load Command Payload		586
<b>CFE_TBL_ActivateCmd</b>		
Activate Table Command		586
<b>CFE_TBL_ActivateCmd_Payload</b>		
Activate Table Command Payload		587
<b>CFE_TBL_DelCDSCmd_Payload</b>		
Delete Critical Table CDS Command Payload		587
<b>CFE_TBL_DeleteCDSCmd</b>		
Delete Critical Table CDS Command		588
<b>CFE_TBL_DumpCmd</b>		588
<b>CFE_TBL_DumpCmd_Payload</b>		
Dump Table Command Payload		589
<b>CFE_TBL_DumpRegistryCmd</b>		
Dump Registry Command		590

<a href="#"><b>CFE_TBL_DumpRegistryCmd_Payload</b></a>		
Dump Registry Command Payload		<a href="#">590</a>
<a href="#"><b>CFE_TBL_File_Hdr</b></a>		
The definition of the header fields that are included in CFE Table Data files		<a href="#">591</a>
<a href="#"><b>CFE_TBL_FileDef</b></a>		
Table File summary object		<a href="#">592</a>
<a href="#"><b>CFE_TBL_HousekeepingTlm</b></a>		<a href="#">593</a>
<a href="#"><b>CFE_TBL_HousekeepingTlm_Payload</b></a>		<a href="#">594</a>
<a href="#"><b>CFE_TBL_Info</b></a>		
Table Info		<a href="#">598</a>
<a href="#"><b>CFE_TBL_LoadCmd</b></a>		
Load Table Command		<a href="#">600</a>
<a href="#"><b>CFE_TBL_LoadCmd_Payload</b></a>		
Load Table Command Payload		<a href="#">600</a>
<a href="#"><b>CFE_TBL_NoopCmd</b></a>		<a href="#">601</a>
<a href="#"><b>CFE_TBL_NotifyCmd</b></a>		<a href="#">601</a>
<a href="#"><b>CFE_TBL_NotifyCmd_Payload</b></a>		
Table Management Notification Command Payload		<a href="#">602</a>
<a href="#"><b>CFE_TBL_ResetCountersCmd</b></a>		<a href="#">602</a>
<a href="#"><b>CFE_TBL_SendHkCmd</b></a>		<a href="#">603</a>
<a href="#"><b>CFE_TBL_SendRegistryCmd</b></a>		
Send Table Registry Command		<a href="#">603</a>
<a href="#"><b>CFE_TBL_SendRegistryCmd_Payload</b></a>		
Send Table Registry Command Payload		<a href="#">604</a>
<a href="#"><b>CFE_TBL_TableRegistryTlm</b></a>		<a href="#">604</a>
<a href="#"><b>CFE_TBL_TblRegPacket_Payload</b></a>		<a href="#">605</a>
<a href="#"><b>CFE_TBL_ValidateCmd</b></a>		
Validate Table Command		<a href="#">609</a>
<a href="#"><b>CFE_TBL_ValidateCmd_Payload</b></a>		
Validate Table Command Payload		<a href="#">609</a>
<a href="#"><b>CFE_TIME_AddAdjustCmd</b></a>		<a href="#">610</a>
<a href="#"><b>CFE_TIME_AddDelayCmd</b></a>		<a href="#">610</a>
<a href="#"><b>CFE_TIME_AddOneHzAdjustmentCmd</b></a>		<a href="#">611</a>
<a href="#"><b>CFE_TIME_DiagnosticTlm</b></a>		<a href="#">612</a>
<a href="#"><b>CFE_TIME_DiagnosticTlm_Payload</b></a>		<a href="#">612</a>

<a href="#">CFE_TIME_FakeToneCmd</a>	620
<a href="#">CFE_TIME_HousekeepingTlm</a>	621
<a href="#">CFE_TIME_HousekeepingTlm_Payload</a>	621
<a href="#">CFE_TIME_LeapsCmd_Payload</a>	
Set leap seconds command payload	624
<a href="#">CFE_TIME_NoopCmd</a>	625
<a href="#">CFE_TIME_OneHzAdjustmentCmd_Payload</a>	
Generic seconds, subseconds command payload	625
<a href="#">CFE_TIME_OneHzCmd</a>	626
<a href="#">CFE_TIME_ResetCountersCmd</a>	626
<a href="#">CFE_TIME_SendDiagnosticCmd</a>	627
<a href="#">CFE_TIME_SendHkCmd</a>	627
<a href="#">CFE_TIME_SetLeapSecondsCmd</a>	
Set leap seconds command	627
<a href="#">CFE_TIME_SetMETCmd</a>	628
<a href="#">CFE_TIME_SetSignalCmd</a>	
Set tone signal source command	629
<a href="#">CFE_TIME_SetSourceCmd</a>	
Set time data source command	629
<a href="#">CFE_TIME_SetStateCmd</a>	
Set clock state command	630
<a href="#">CFE_TIME_SetSTCFCmd</a>	631
<a href="#">CFE_TIME_SetTimeCmd</a>	631
<a href="#">CFE_TIME_SignalCmd_Payload</a>	
Set tone signal source command payload	632
<a href="#">CFE_TIME_SourceCmd_Payload</a>	
Set time data source command payload	632
<a href="#">CFE_TIME_StateCmd_Payload</a>	
Set clock state command payload	633
<a href="#">CFE_TIME_SubAdjustCmd</a>	633
<a href="#">CFE_TIME_SubDelayCmd</a>	634
<a href="#">CFE_TIME_SubOneHzAdjustmentCmd</a>	634
<a href="#">CFE_TIME_SysTime</a>	
Data structure used to hold system time values	635

<b>CFE_TIME_TimeCmd_Payload</b> Generic seconds, microseconds command payload	636
<b>CFE_TIME_ToneDataCmd</b> Time at tone data command	636
<b>CFE_TIME_ToneDataCmd_Payload</b> Time at tone data command payload	637
<b>CFE_TIME_ToneSignalCmd</b>	638
<b>LC_ADTEEntry_t</b> Actionpoint Definition Table (ADT) Entry	638
<b>LC_AppData_t</b> LC Application Data Structure	641
<b>LC_ARTEntry_t</b> Actionpoint Results Table (ART) Entry	643
<b>LC_HkPacket_t</b> Housekeeping Telemetry Structure Structure	645
<b>LC_HkTlm_Payload_t</b> Housekeeping Payload Structure	646
<b>LC_MListTag</b> Linked list of MessageID's with same hash function result	648
<b>LC_MultiType_t</b> Alignment union	649
<b>LC_NoopCmd_t</b> No-op Command	650
<b>LC_OperData_t</b> LC Operational Data Structure	651
<b>LC_ResetAPStats_Payload_t</b> Reset AP (Actionpoint) Statistics Payload	655
<b>LC_ResetAPStatsCmd_t</b> Reset AP (Actionpoint) Statistics Command	656
<b>LC_ResetCountersCmd_t</b> Reset Counters Command	656
<b>LC_ResetWPStats_Payload_t</b> Reset WP (Watchpoint) Statistics Payload	657
<b>LC_ResetWPStatsCmd_t</b> Reset WP (Watchpoint) Statistics Command	657
<b>LC_RTSRequest_Payload_t</b> Payload to Start a Stored Command RTS	658

<a href="#"><b>LC_RTSRequestCmd_t</b></a>	Send Command to Start a Stored Command RTS	659
<a href="#"><b>LC_SampleAP_Payload_t</b></a>	Sample AP (Actionpoint) Payload	659
<a href="#"><b>LC_SampleAPCmd_t</b></a>	Sample AP (Actionpoint) Request	660
<a href="#"><b>LC_SendHkCmd_t</b></a>	Send HK Command	661
<a href="#"><b>LC_SetAPPermOff_Payload_t</b></a>	Set AP (Actionpoint) Permanently Off Payload	661
<a href="#"><b>LC_SetAPPermOffCmd_t</b></a>	Set AP (Actionpoint) Permanently Off Command	662
<a href="#"><b>LC_SetAPState_Payload_t</b></a>	Set AP (Actionpoint) State Payload	663
<a href="#"><b>LC_SetAPStateCmd_t</b></a>	Set AP (Actionpoint) State Command	663
<a href="#"><b>LC_SetLCState_Payload_t</b></a>	Set LC Application State Payload	664
<a href="#"><b>LC_SetLCStateCmd_t</b></a>	Set LC Application State Command	665
<a href="#"><b>LC_WDTEEntry_t</b></a>	Watchpoint Definition Table (WDT) Entry	665
<a href="#"><b>LC_WListTag</b></a>	Linked list of Watchpoints that reference the same MessageID	667
<a href="#"><b>LC_WRTEEntry_t</b></a>	Watchpoint Results Table (WRT) Entry	668
<a href="#"><b>LC_WRTTransition_t</b></a>	Watchpoint Transition Structure	670
<a href="#"><b>OS_bin_sem_prop_t</b></a>	OSAL binary semaphore properties	671
<a href="#"><b>OS_condvar_prop_t</b></a>	OSAL condition variable properties	672
<a href="#"><b>OS_count_sem_prop_t</b></a>	OSAL counting semaphore properties	672
<a href="#"><b>os_dirent_t</b></a>	Directory entry	673
<a href="#"><b>OS_FdSet</b></a>	An abstract structure capable of holding several OSAL IDs	673

<b>OS_file_prop_t</b>	OSAL file properties	674
<b>os_fsinfo_t</b>	OSAL file system info	675
<b>os_fstat_t</b>	File system status	675
<b>OS_heap_prop_t</b>	OSAL heap properties	676
<b>OS_module_address_t</b>	OSAL module address properties	677
<b>OS_module_prop_t</b>	OSAL module properties	678
<b>OS_mut_sem_prop_t</b>	OSAL mutex properties	679
<b>OS_queue_prop_t</b>	OSAL queue properties	679
<b>OS_SockAddr_t</b>	Encapsulates a generic network address	680
<b>OS_SockAddrData_t</b>	Storage buffer for generic network address	681
<b>OS_socket_prop_t</b>	Encapsulates socket properties	681
<b>OS_static_symbol_record_t</b>	Associates a single symbol name with a memory address	682
<b>OS_statvfs_t</b>		683
<b>OS_task_prop_t</b>	OSAL task properties	683
<b>OS_time_t</b>	OSAL time interval structure	684
<b>OS_timebase_prop_t</b>	Time base properties	685
<b>OS_timer_prop_t</b>	Timer properties	686

## 9 File Index

### 9.1 File List

Here is a list of all files with brief descriptions:

<a href="#">apps/lc/config/default_lc_fcncodes.h</a>	686
<a href="#">apps/lc/config/default_lc_interface_cfg.h</a>	687
<a href="#">apps/lc/config/default_lc_internal_cfg.h</a>	688
<a href="#">apps/lc/config/default_lc_mission_cfg.h</a>	688
<a href="#">apps/lc/config/default_lc_msg.h</a>	689
<a href="#">apps/lc/config/default_lc_msgdefs.h</a>	689
<a href="#">apps/lc/config/default_lc_msgids.h</a>	693
<a href="#">apps/lc/config/default_lc_msgstruct.h</a>	694
<a href="#">apps/lc/config/default_lc_platform_cfg.h</a>	695
<a href="#">apps/lc/config/default_lc_tbl.h</a>	695
<a href="#">apps/lc/config/default_lc_tbldefs.h</a>	695
<a href="#">apps/lc/config/default_lc_tblstruct.h</a>	705
<a href="#">apps/lc/fsw/inc/lc_eventids.h</a>	706
<a href="#">apps/lc/fsw/inc/lc_perfids.h</a>	709
<a href="#">apps/lc/fsw/src/lc_action.c</a>	709
<a href="#">apps/lc/fsw/src/lc_action.h</a>	715
<a href="#">apps/lc/fsw/src/lc_app.c</a>	721
<a href="#">apps/lc/fsw/src/lc_app.h</a>	733
<a href="#">apps/lc/fsw/src/lc_cmds.c</a>	749
<a href="#">apps/lc/fsw/src/lc_cmds.h</a>	759
<a href="#">apps/lc/fsw/src/lc_custom.c</a>	769
<a href="#">apps/lc/fsw/src/lc_custom.h</a>	771
<a href="#">apps/lc/fsw/src/lc_dispatch.c</a>	773
<a href="#">apps/lc/fsw/src/lc_dispatch.h</a>	781
<a href="#">apps/lc/fsw/src/lc_utils.c</a>	782
<a href="#">apps/lc/fsw/src/lc_utils.h</a>	785
<a href="#">apps/lc/fsw/src/lc_verify.h</a>	788
<a href="#">apps/lc/fsw/src/lc_version.h</a>	788
<a href="#">apps/lc/fsw/src/lc_watch.c</a>	789
<a href="#">apps/lc/fsw/src/lc_watch.h</a>	803

<a href="#">apps/lc/fsw/tables/<b>lc_def_adt.c</b></a>	818
<a href="#">apps/lc/fsw/tables/<b>lc_def_wdt.c</b></a>	819
<a href="#">buildosal_public_api/inc/<b>osconfig.h</b></a>	819
<a href="#">cfe/cmake/sample_defs/<b>example_mission_cfg.h</b></a>	825
<a href="#">cfe/cmake/sample_defs/<b>example_platform_cfg.h</b></a>	836
<a href="#">cfe/cmake/sample_defs/<b>sample_perfids.h</b></a>	880
<a href="#">cfe/modules/core_api/config/<b>default_cfe_core_api_base_msgids.h</b></a>	882
<a href="#">cfe/modules/core_api/config/<b>default_cfe_core_api_interface_cfg.h</b></a>	885
<a href="#">cfe/modules/core_api/config/<b>default_cfe_mission_cfg.h</b></a>	887
<a href="#">cfe/modules/core_api/config/<b>default_cfe_msgids.h</b></a>	887
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe.h</b></a>	887
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_config.h</b></a>	887
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_config_api_typedefs.h</b></a>	891
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_endian.h</b></a>	892
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_error.h</b></a>	892
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_es.h</b></a>	901
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_es_api_typedefs.h</b></a>	904
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_evs.h</b></a>	909
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_evs_api_typedefs.h</b></a>	911
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_fs.h</b></a>	913
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_fs_api_typedefs.h</b></a>	914
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_msg.h</b></a>	916
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_msg_api_typedefs.h</b></a>	919
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_resourceid.h</b></a>	923
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_resourceid_api_typedefs.h</b></a>	928
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_sb.h</b></a>	929
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_sb_api_typedefs.h</b></a>	932
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_tbl.h</b></a>	935
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_tbl_api_typedefs.h</b></a>	936
<a href="#">cfe/modules/core_api/fsw/inc/<b>cfe_tbl_filedef.h</b></a>	938

<a href="#">cfe/modules/core_api/fsw/inc/cfe_time.h</a>	940
<a href="#">cfe/modules/core_api/fsw/inc/cfe_time_api_typedefs.h</a>	942
<a href="#">cfe/modules/core_api/fsw/inc/cfe_version.h</a>	943
<a href="#">cfe/modules/es/config/default_cfe_es_extern_typedefs.h</a>	945
<a href="#">cfe/modules/es/config/default_cfe_es_fcncodes.h</a>	954
<a href="#">cfe/modules/es/config/default_cfe_es_interface_cfg.h</a>	974
<a href="#">cfe/modules/es/config/default_cfe_es_internal_cfg.h</a>	977
<a href="#">cfe/modules/es/config/default_cfe_es_mission_cfg.h</a>	997
<a href="#">cfe/modules/es/config/default_cfe_es_msg.h</a>	997
<a href="#">cfe/modules/es/config/default_cfe_es_msgdefs.h</a>	998
<a href="#">cfe/modules/es/config/default_cfe_es_msgids.h</a>	1002
<a href="#">cfe/modules/es/config/default_cfe_es_msgstruct.h</a>	1003
<a href="#">cfe/modules/es/config/default_cfe_es_platform_cfg.h</a>	1007
<a href="#">cfe/modules/es/config/default_cfe_es_topicids.h</a>	1007
<a href="#">cfe/modules/es/fsw/inc/cfe_es_eventids.h</a>	1008
<a href="#">cfe/modules/evs/config/default_cfe_evs_extern_typedefs.h</a>	1033
<a href="#">cfe/modules/evs/config/default_cfe_evs_fcncodes.h</a>	1036
<a href="#">cfe/modules/evs/config/default_cfe_evs_interface_cfg.h</a>	1054
<a href="#">cfe/modules/evs/config/default_cfe_evs_internal_cfg.h</a>	1055
<a href="#">cfe/modules/evs/config/default_cfe_evs_mission_cfg.h</a>	1059
<a href="#">cfe/modules/evs/config/default_cfe_evs_msg.h</a>	1059
<a href="#">cfe/modules/evs/config/default_cfe_evs_msgdefs.h</a>	1060
<a href="#">cfe/modules/evs/config/default_cfe_evs_msgids.h</a>	1063
<a href="#">cfe/modules/evs/config/default_cfe_evs_msgstruct.h</a>	1064
<a href="#">cfe/modules/evs/config/default_cfe_evs_platform_cfg.h</a>	1067
<a href="#">cfe/modules/evs/config/default_cfe_evs_topicids.h</a>	1068
<a href="#">cfe/modules/evs/fsw/inc/cfe_evs_eventids.h</a>	1069
<a href="#">cfe/modules/fs/config/default_cfe_fs_extern_typedefs.h</a>	1081
<a href="#">cfe/modules/fs/config/default_cfe_fs_filedef.h</a>	1081
<a href="#">cfe/modules/fs/config/default_cfe_fs_interface_cfg.h</a>	1083

<a href="#">cfe/modules/fs/config/default_cfe_fs_mission_cfg.h</a>	1083
<a href="#">cfe/modules/msg/fsw/inc/ccsds_hdr.h</a>	1084
<a href="#">cfe/modules/resourceid/fsw/inc/cfe_core_resourceid_basevalues.h</a>	1084
<a href="#">cfe/modules/resourceid/fsw/inc/cfe_resourceid_basevalue.h</a>	1085
<a href="#">cfe/modules/sb/config/default_cfe_sb_extern_typedefs.h</a>	1086
<a href="#">cfe/modules/sb/config/default_cfe_sb_fcncodes.h</a>	1088
<a href="#">cfe/modules/sb/config/default_cfe_sb_interface_cfg.h</a>	1097
<a href="#">cfe/modules/sb/config/default_cfe_sb_internal_cfg.h</a>	1098
<a href="#">cfe/modules/sb/config/default_cfe_sb_mission_cfg.h</a>	1106
<a href="#">cfe/modules/sb/config/default_cfe_sb_msg.h</a>	1107
<a href="#">cfe/modules/sb/config/default_cfe_sb_msgdefs.h</a>	1107
<a href="#">cfe/modules/sb/config/default_cfe_sb_msgids.h</a>	1109
<a href="#">cfe/modules/sb/config/default_cfe_sb_msgstruct.h</a>	1111
<a href="#">cfe/modules/sb/config/default_cfe_sb_platform_cfg.h</a>	1113
<a href="#">cfe/modules/sb/config/default_cfe_sb_topicids.h</a>	1113
<a href="#">cfe/modules/sb/fsw/inc/cfe_sb_eventids.h</a>	1114
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_extern_typedefs.h</a>	1134
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_fcncodes.h</a>	1135
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_interface_cfg.h</a>	1144
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_internal_cfg.h</a>	1145
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_mission_cfg.h</a>	1151
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_msg.h</a>	1151
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h</a>	1152
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_msgids.h</a>	1154
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h</a>	1155
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_platform_cfg.h</a>	1157
<a href="#">cfe/modules/tbl/config/default_cfe_tbl_topicids.h</a>	1157
<a href="#">cfe/modules/tbl/fsw/inc/cfe_tbl_eventids.h</a>	1158
<a href="#">cfe/modules/time/config/default_cfe_time_extern_typedefs.h</a>	1178
<a href="#">cfe/modules/time/config/default_cfe_time_fcncodes.h</a>	1183

<a href="#">cfe/modules/time/config/default_cfe_time_interface_cfg.h</a>	1199
<a href="#">cfe/modules/time/config/default_cfe_time_internal_cfg.h</a>	1203
<a href="#">cfe/modules/time/config/default_cfe_time_mission_cfg.h</a>	1208
<a href="#">cfe/modules/time/config/default_cfe_time_msg.h</a>	1209
<a href="#">cfe/modules/time/config/default_cfe_time_msgdefs.h</a>	1209
<a href="#">cfe/modules/time/config/default_cfe_time_msgids.h</a>	1211
<a href="#">cfe/modules/time/config/default_cfe_time_msgstruct.h</a>	1213
<a href="#">cfe/modules/time/config/default_cfe_time_platform_cfg.h</a>	1216
<a href="#">cfe/modules/time/config/default_cfe_time_topicids.h</a>	1216
<a href="#">cfe/modules/time/fsw/inc/cfe_time_eventids.h</a>	1218
<a href="#">osal/src/os/inc/common_types.h</a>	1228
<a href="#">osal/src/os/inc/osapi-binsem.h</a>	1233
<a href="#">osal/src/os/inc/osapi-bsp.h</a>	1234
<a href="#">osal/src/os/inc/osapi-clock.h</a>	1234
<a href="#">osal/src/os/inc/osapi-common.h</a>	1236
<a href="#">osal/src/os/inc/osapi-condvar.h</a>	1238
<a href="#">osal/src/os/inc/osapi-constants.h</a>	1239
<a href="#">osal/src/os/inc/osapi-countsem.h</a>	1240
<a href="#">osal/src/os/inc/osapi-dir.h</a>	1240
<a href="#">osal/src/os/inc/osapi-error.h</a>	1241
<a href="#">osal/src/os/inc/osapi-file.h</a>	1244
<a href="#">osal/src/os/inc/osapi-filenames.h</a>	1247
<a href="#">osal/src/os/inc/osapi-heap.h</a>	1249
<a href="#">osal/src/os/inc/osapi-idmap.h</a>	1249
<a href="#">osal/src/os/inc/osapi-macros.h</a>	1251
<a href="#">osal/src/os/inc/osapi-module.h</a>	1252
<a href="#">osal/src/os/inc/osapi-mutex.h</a>	1254
<a href="#">osal/src/os/inc/osapi-network.h</a>	1254
<a href="#">osal/src/os/inc/osapi-printf.h</a>	1255
<a href="#">osal/src/os/inc/osapi-queue.h</a>	1255

<a href="#">osal/src/os/inc/osapi-select.h</a>	1256
<a href="#">osal/src/os/inc/osapi-shell.h</a>	1257
<a href="#">osal/src/os/inc/osapi-sockets.h</a>	1257
<a href="#">osal/src/os/inc/osapi-task.h</a>	1260
<a href="#">osal/src/os/inc/osapi-timebase.h</a>	1262
<a href="#">osal/src/os/inc/osapi-timer.h</a>	1263
<a href="#">osal/src/os/inc/osapi-version.h</a>	1264
<a href="#">osal/src/os/inc/osapi.h</a>	1267
<a href="#">psp/fsw/inc/cfe_psp.h</a>	1268
<a href="#">psp/fsw/inc/cfe_psp_error.h</a>	
CFE PSP Error header	1295

## 10 Module Documentation

### 10.1 CFS Limit Checker Event IDs

#### Macros

- `#define LC_RESERVED_EID 0`  
*Reserved EID.*
- `#define LC_TASK_EXIT_EID 1`  
*LC Application Fatal Termination Event ID.*
- `#define LC_INIT_INF_EID 2`  
*LC Initialization Event ID.*
- `#define LC_CR_PIPE_ERR_EID 3`  
*LC Create Command Pipe Failed Event ID.*
- `#define LC_SUB_HK_REQ_ERR_EID 4`  
*LC Subscribe To Housekeeping Request Failed Event ID.*
- `#define LC_SUB_GND_CMD_ERR_EID 5`  
*LC Subscribe To Ground Command Failed Event ID.*
- `#define LC_SUB_SAMPLE_CMD_ERR_EID 6`  
*LC Subscribe To Actionpoint Sample Command Failed Event ID.*
- `#define LC_WDT_REGISTER_ERR_EID 7`  
*LC Watchpoint Definition Table Registration Failed Event ID.*
- `#define LC_WDT_REREGISTER_ERR_EID 8`  
*LC Watchpoint Definition Table Reregistration Failed Event ID.*
- `#define LC_ADT_REGISTER_ERR_EID 9`  
*LC Actionpoint Definition Table Registration Failed Event ID.*
- `#define LC_WRT_REGISTER_ERR_EID 10`  
*LC Watchpoint Results Table Registration Failed Event ID.*
- `#define LC_ART_REGISTER_ERR_EID 11`  
*LC Actionpoint Results Table Registration Failed Event ID.*
- `#define LC_WRT_CDS_REGISTER_ERR_EID 12`

- #define LC\_ART\_CDS\_REGISTER\_ERR\_EID 13
  - LC Watchpoint Result Table CDS Registration Failed Event ID.
- #define LC\_APP\_CDS\_REGISTER\_ERR\_EID 14
  - LC Application Data CDS Registration Failed Event ID.
- #define LC\_WDT\_LOAD\_ERR\_EID 15
  - LC Watchpoint Definition Table Load From File Failed Event ID.
- #define LC\_ADT\_LOAD\_ERR\_EID 16
  - LC Actionpoint Definition Table Load From File Failed Event ID.
- #define LC\_WRT\_GETADDR\_ERR\_EID 17
  - LC Watchpoint Result Table Get Address Failed Event ID.
- #define LC\_ART\_GETADDR\_ERR\_EID 18
  - LC Actionpoint Result Table Get Address Failed Event ID.
- #define LC\_WDT\_GETADDR\_ERR\_EID 19
  - LC Watchpoint Definition Table Get Address Failed Event ID.
- #define LC\_ADT\_GETADDR\_ERR\_EID 20
  - LC Actionpoint Definition Table Get Address Failed Event ID.
- #define LC\_CDS\_RESTORED\_INF\_EID 21
  - LC State Restored From CDS Event ID.
- #define LC\_CDS\_UPDATED\_INF\_EID 22
  - LC Default State Initialized and Stored to CDS Event ID.
- #define LC\_CDS\_DISABLED\_INF\_EID 23
  - LC Use Of CDS Disabled Event ID.
- #define LC\_CC\_ERR\_EID 24
  - LC Command Code Invalid Event ID.
- #define LC\_APSAMPLE\_APNUM\_ERR\_EID 25
  - LC Sample Actionpoint Message Start Or End Number Invalid Event ID.
- #define LC\_NOOP\_INF\_EID 26
  - LC No-op Command Event ID.
- #define LC\_RESET\_DBG\_EID 27
  - LC Reset Counters Command Event ID.
- #define LC\_LCSTATE\_INF\_EID 28
  - LC Set Limit Checker State Command Event ID.
- #define LC\_LCSTATE\_ERR\_EID 29
  - LC Set Limit Checker State, State Invalid Event ID.
- #define LC\_APSTATE\_NEW\_ERR\_EID 30
  - LC Set Actionpoint State New State Invalid Event ID.
- #define LC\_APSTATE\_CURR\_ERR\_EID 31
  - LC Set Actionpoint State Current State Invalid Event ID.
- #define LC\_APSTATE\_APNUM\_ERR\_EID 32
  - LC Set Actionpoint State Actionpoint Number Invalid Event ID.
- #define LC\_APSTATE\_INF\_EID 33
  - LC Set Actionpoint State Command Event ID.
- #define LC\_APOFF\_APNUM\_ERR\_EID 34
  - LC Set Actionpoint Permanently Off Actionpoint Number Invalid Event ID.
- #define LC\_APOFF\_CURR\_ERR\_EID 35
  - LC Set Actionpoint Permanently Off Actionpoint Not Disabled Event ID.

- #define **LC\_APOFF\_INF\_EID** 36  
*LC Set Actionpoint Permanently Off Command Event ID.*
- #define **LC\_APSTATS\_APNUM\_ERR\_EID** 37  
*LC Reset Actionpoint Stats Actionpoint Number Invalid Event ID.*
- #define **LC\_APSTATS\_INF\_EID** 38  
*LC Reset Actionpoint Stats Command Event ID.*
- #define **LC\_WPSTATS\_WPNUM\_ERR\_EID** 39  
*LC Reset Watchpoint Stats Watchpoint Number Invalid Event ID.*
- #define **LC\_WPSTATS\_INF\_EID** 40  
*LC Reset Watchpoint Stats Command Event ID.*
- #define **LC\_HKREQ\_LEN\_ERR\_EID** 41  
*LC Housekeeping Request Message Length Invalid Event ID.*
- #define **LC\_APSAMPLE\_LEN\_ERR\_EID** 42  
*LC Actionpoint Sample Message Length Invalid Event ID.*
- #define **LC\_LEN\_ERR\_EID** 43  
*LC Command Message Length Invalid Event ID.*
- #define **LC\_UNSUB\_WP\_ERR\_EID** 44  
*LC Watchpoint Message Unsubscribe Failed Event ID.*
- #define **LC\_SUB\_WP\_ERR\_EID** 45  
*LC Watchpoint Message Subscribe Failed Event ID.*
- #define **LC\_WRT\_NO\_SAVE\_ERR\_EID** 46  
*LC Watchpoint Results Table Not Saved To CDS On Exit Event ID.*
- #define **LC\_ART\_NO\_SAVE\_ERR\_EID** 47  
*LC Actionpoint Results Table Not Saved To CDS On Exit Event ID.*
- #define **LC\_APP\_NO\_SAVE\_START\_ERR\_EID** 48  
*LC Application Data Not Saved To CDS On Startup Event ID.*
- #define **LC\_MID\_INF\_EID** 49  
*LC Unreferenced Message ID Received Event ID.*
- #define **LC\_WP\_DATATYPE\_ERR\_EID** 50  
*LC Watchpoint Data Type Undefined Event ID.*
- #define **LC\_WP\_OPERID\_ERR\_EID** 51  
*LC Watchpoint Operator ID Invalid Event ID.*
- #define **LC\_WP\_NAN\_ERR\_EID** 52  
*LC Watchpoint Data Value Is Float NAN Event ID.*
- #define **LC\_WP\_OFFSET\_ERR\_EID** 53  
*LC Watchpoint Offset Value Invalid Event ID.*
- #define **LC\_WDTVAL\_FPERR\_EID** 54  
*LC Watchpoint Definition Table Validation Floating Point Check Failed Event ID.*
- #define **LC\_WDTVAL\_ERR\_EID** 55  
*LC Watchpoint Definition Table Validation Failed (Not Floating Point Check) Event ID.*
- #define **LC\_WDTVAL\_INF\_EID** 56  
*LC Watchpoint Definition Table Validation Results Event ID.*
- #define **LC\_APSAMPLE\_CURR\_ERR\_EID** 57  
*LC Sample Actionpoint Current Actionpoint State Invalid Event ID.*
- #define **LC\_AP\_PASSTOFAIL\_INF\_EID** 58  
*LC Actionpoint State Change From PASS To FAIL Event ID.*
- #define **LC\_PASSIVE\_FAIL\_DBG\_EID** 59

*LC Actionpoint Failed While Limit Checker State Passive Event ID.*

- #define **LC\_AP\_PASSIVE\_FAIL\_INF\_EID** 60

*LC Actionpoint Failed While Actionpoint State Passive Event ID.*

- #define **LC\_AP\_FAILTOPASS\_INF\_EID** 61

*LC Actionpoint State Change From FAIL To PASS Event ID.*

- #define **LC\_ACTION\_ERROR\_ERR\_EID** 62

*LC Actionpoint Evaluated To Error Event ID.*

- #define **LC\_INVALID\_RPN\_ERR\_EID** 63

*LC Actionpoint RPN Expression Illegal Event ID.*

- #define **LC\_ADTVAL\_RPNERR\_EID** 64

*LC Actionpoint Definition Table Validation RPN Equation Check Failed Event ID.*

- #define **LC\_ADTVAL\_ERR\_EID** 65

*LC Actionpoint Definition Table Validation Failed (Not RPN Equation Check) Event ID.*

- #define **LC\_ADTVAL\_INF\_EID** 66

*LC Actionpoint Definition Table Validation Result Event ID.*

- #define **LC\_CFCALL\_ERR\_EID** 67

*LC LC\_CustomFunction Called With Unexpected Watchpoint ID Event ID.*

- #define **LC\_WDT\_REGISTER\_CRIT\_ERR\_EID** 68

*LC Watchdog Definition Table Critical Table Registration Failed Event ID.*

- #define **LC\_ADT\_REGISTER\_CRIT\_ERR\_EID** 69

*LC Actionpoint Definition Table Critical Table Registration Failed Event ID.*

- #define **LC\_BASE\_AP\_EID** 1000

*LC Actionpoint Definition Table Base ID.*

### 10.1.1 Detailed Description

### 10.1.2 Macro Definition Documentation

**10.1.2.1 LC\_ACTION\_ERROR\_ERR\_EID** #define **LC\_ACTION\_ERROR\_ERR\_EID** 62  
LC Actionpoint Evaluated To Error Event ID.

Type: INFORMATION

Cause:

This event message is issued when an actionpoint evaluation results in **LC\_ACTION\_ERROR** Definition at line 837 of file lc\_eventids.h.

**10.1.2.2 LC\_ADT\_GETADDR\_ERR\_EID** #define **LC\_ADT\_GETADDR\_ERR\_EID** 20  
LC Actionpoint Definition Table Get Address Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the address can't be obtained from table services for the actionpoint definition table (ADT).

Definition at line 282 of file lc\_eventids.h.

**10.1.2.3 LC\_ADT\_LOAD\_ERR\_EID** #define LC\_ADT\_LOAD\_ERR\_EID 16  
LC Actionpoint Definition Table Load From File Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when an error is encountered loading the actionpoint definition table (ADT) from the default file image

Definition at line 234 of file lc\_eventids.h.

**10.1.2.4 LC\_ADT\_REGISTER\_CRIT\_ERR\_EID** #define LC\_ADT\_REGISTER\_CRIT\_ERR\_EID 69  
LC Actionpoint Definition Table Critical Table Registration Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the actionpoint definition table (ADT) could not be registered as a critical table.

Definition at line 924 of file lc\_eventids.h.

**10.1.2.5 LC\_ADT\_REGISTER\_ERR\_EID** #define LC\_ADT\_REGISTER\_ERR\_EID 9  
LC Actionpoint Definition Table Registration Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the actionpoint definition table (ADT) could not be registered.

Definition at line 148 of file lc\_eventids.h.

**10.1.2.6 LC\_ADTVAL\_ERR\_EID** #define LC\_ADTVAL\_ERR\_EID 65  
LC Actionpoint Definition Table Validation Failed (Not RPN Equation Check) Event ID.

Type: ERROR

Cause:

This event message is issued on the first error when a table validation fails for an actionpoint definition table (ADT) load and the error is NOT a failed RPN equation check.

Definition at line 875 of file lc\_eventids.h.

**10.1.2.7 LC\_ADTVAL\_INF\_EID** #define LC\_ADTVAL\_INF\_EID 66  
LC Actionpoint Definition Table Validation Result Event ID.

Type: INFORMATION

Cause:

This event message is issued when a table validation has been completed for an actionpoint definition table (ADT) load  
Definition at line 887 of file lc\_eventids.h.

**10.1.2.8 LC\_ADTVAL\_RPNERR\_EID** #define LC\_ADTVAL\_RPNERR\_EID 64  
LC Actionpoint Definition Table Validation RPN Equation Check Failed Event ID.

Type: ERROR

Cause:

This event message is issued on the first error when a table validation fails for an actionpoint definition table (ADT) load and the error is a failed RPN equation check.

Definition at line 862 of file lc\_eventids.h.

**10.1.2.9 LC\_AP\_FAILTOPASS\_INF\_EID** #define LC\_AP\_FAILTOPASS\_INF\_EID 61  
LC Actionpoint State Change From FAIL To PASS Event ID.

Type: INFORMATION

Cause:

This event message is issued when an actionpoint evaluation transitions from [LC\\_ACTION\\_FAIL](#) to [LC\\_ACTION\\_PASS](#)  
Definition at line 825 of file lc\_eventids.h.

**10.1.2.10 LC\_AP\_PASSIVE\_FAIL\_INF\_EID** #define LC\_AP\_PASSIVE\_FAIL\_INF\_EID 60  
LC Actionpoint Failed While Actionpoint State Passive Event ID.

Type: DEBUG

Cause:

This event message is issued when an actionpoint fails evaluation while the actionpoint state is [LC\\_APSTATE\\_PASSIVE](#)  
Definition at line 813 of file lc\_eventids.h.

**10.1.2.11 LC\_AP\_PASSTOFAIL\_INF\_EID** #define LC\_AP\_PASSTOFAIL\_INF\_EID 58  
LC Actionpoint State Change From PASS To FAIL Event ID.

Type: INFORMATION

Cause:

This event message is issued when an actionpoint evaluation transitions from [LC\\_ACTION\\_PASS](#) to [LC\\_ACTION\\_FAIL](#)  
Definition at line 789 of file lc\_eventids.h.

**10.1.2.12 LC\_APOFF\_APNUM\_ERR\_EID** #define LC\_APOFF\_APNUM\_ERR\_EID 34  
LC Set Actionpoint Permanently Off Actionpoint Number Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command has been received with an invalid  
actionpoint number specified  
Definition at line 490 of file lc\_eventids.h.

**10.1.2.13 LC\_APOFF\_CURR\_ERR\_EID** #define LC\_APOFF\_CURR\_ERR\_EID 35  
LC Set Actionpoint Permanently Off Actionpoint Not Disabled Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command has been received and the current  
actionpoint state is not [LC\\_APSTATE\\_DISABLED](#)  
Definition at line 503 of file lc\_eventids.h.

**10.1.2.14 LC\_APOFF\_INF\_EID** #define LC\_APOFF\_INF\_EID 36  
LC Set Actionpoint Permanently Off Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#) command has been successfully executed  
Definition at line 515 of file lc\_eventids.h.

**10.1.2.15 LC\_APP\_CDS\_REGISTER\_ERR\_EID** #define LC\_APP\_CDS\_REGISTER\_ERR\_EID 14  
LC Application Data CDS Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the CDS area for the LC application data could not be registered.  
Definition at line 208 of file lc\_eventids.h.

**10.1.2.16 LC\_APP\_NO\_SAVE\_START\_ERR\_EID** #define LC\_APP\_NO\_SAVE\_START\_ERR\_EID 48  
LC Application Data Not Saved To CDS On Startup Event ID.

Type: ERROR

Cause:

This event message is issued when the LC application data could not be saved to the CDS on application startup.  
Definition at line 661 of file lc\_eventids.h.

**10.1.2.17 LC\_APSAMPLE\_APNUM\_ERR\_EID** #define LC\_APSAMPLE\_APNUM\_ERR\_EID 25  
LC Sample Actionpoint Message Start Or End Number Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SAMPLE\\_AP\\_MID](#) message has been received with an invalid actionpoint  
start or end number specified  
Definition at line 381 of file lc\_eventids.h.

**10.1.2.18 LC\_APSAMPLE\_CURR\_ERR\_EID** #define LC\_APSAMPLE\_CURR\_ERR\_EID 57  
LC Sample Actionpoint Current Actionpoint State Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SAMPLE\\_AP\\_MID](#) message has been received and the current state for the specified actionpoint state is either [LC\\_APSTATE\\_NOT\\_USED](#) or [LC\\_APSTATE\\_PERMOFF](#).  
Definition at line 777 of file lc\_eventids.h.

**10.1.2.19 LC\_APSAMPLE\_LEN\_ERR\_EID** #define LC\_APSAMPLE\_LEN\_ERR\_EID 42  
LC Actionpoint Sample Message Length Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when an actionpoint sample request is received with a message length that doesn't match the expected value.  
Definition at line 587 of file lc\_eventids.h.

**10.1.2.20 LC\_APSTATE\_APNUM\_ERR\_EID** #define LC\_APSTATE\_APNUM\_ERR\_EID 32  
LC Set Actionpoint State Actionpoint Number Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_STATE\\_CC](#) command has been received with an invalid action-point number specified  
Definition at line 466 of file lc\_eventids.h.

**10.1.2.21 LC\_APSTATE\_CURR\_ERR\_EID** #define LC\_APSTATE\_CURR\_ERR\_EID 31  
LC Set Actionpoint State Current State Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_STATE\\_CC](#) command has been received and the current action-point state is either [LC\\_APSTATE\\_NOT\\_USED](#) or [LC\\_APSTATE\\_PERMOFF](#) which can only be changed with a table load.

Definition at line 454 of file lc\_eventids.h.

**10.1.2.22 LC\_APSTATE\_INF\_EID** #define LC\_APSTATE\_INF\_EID 33  
LC Set Actionpoint State Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_STATE\\_CC](#) command has been successfully executed  
Definition at line 478 of file lc\_eventids.h.

**10.1.2.23 LC\_APSTATE\_NEW\_ERR\_EID** #define LC\_APSTATE\_NEW\_ERR\_EID 30  
LC Set Actionpoint State New State Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_AP\\_STATE\\_CC](#) command has been received with an invalid state  
argument specified  
Definition at line 440 of file lc\_eventids.h.

**10.1.2.24 LC\_APSTATS\_APNUM\_ERR\_EID** #define LC\_APSTATS\_APNUM\_ERR\_EID 37  
LC Reset Actionpoint Stats Actionpoint Number Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_RESET\\_AP\\_STATS\\_CC](#) command has been received with an invalid ac-  
tionpoint number specified  
Definition at line 527 of file lc\_eventids.h.

**10.1.2.25 LC\_APSTATS\_INF\_EID** #define LC\_APSTATS\_INF\_EID 38  
LC Reset Actionpoint Stats Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when the [LC\\_RESET\\_AP\\_STATS\\_CC](#) command has been successfully executed  
Definition at line 539 of file lc\_eventids.h.

**10.1.2.26 LC\_ART\_CDS\_REGISTER\_ERR\_EID** #define LC\_ART\_CDS\_REGISTER\_ERR\_EID 13  
LC Actionpoint Result Table CDS Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the CDS area for the actionpoint results table (ART) data could not be registered.  
Definition at line 196 of file lc\_eventids.h.

**10.1.2.27 LC\_ART\_GETADDR\_ERR\_EID** #define LC\_ART\_GETADDR\_ERR\_EID 18  
LC Actionpoint Result Table Get Address Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the address can't be obtained from table services for the actionpoint results table (ART).

Definition at line 258 of file lc\_eventids.h.

**10.1.2.28 LC\_ART\_NO\_SAVE\_ERR\_EID** #define LC\_ART\_NO\_SAVE\_ERR\_EID 47  
LC Actionpoint Results Table Not Saved To CDS On Exit Event ID.

Type: ERROR

Cause:

This event message is issued when the actionpoint results table (ART) data could not be saved to the CDS on application exit.

Definition at line 649 of file lc\_eventids.h.

**10.1.2.29 LC\_ART\_REGISTER\_ERR\_EID** #define LC\_ART\_REGISTER\_ERR\_EID 11  
LC Actionpoint Results Table Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the actionpoint results table (ART) could not be registered.  
Definition at line 172 of file lc\_eventids.h.

**10.1.2.30 LC\_BASE\_AP\_EID** #define LC\_BASE\_AP\_EID 1000  
LC Actionpoint Definition Table Base ID.

Type: User defined in Actionpoint Definition Table

Cause:

The actionpoint base event ID is designed to avoid conflicts between the event ID's defined above for use by the LC application and the user defined event ID's in the actionpoint table.

These events are generated when the evaluation of an actionpoint results in sending a command to the stored command (SC) processor to start a real time command sequence (RTS). The event text is user defined and specific to the particular actionpoint.

Note that user defined event ID's can be easily recognized if the base number is easily recognizable. For example, using the value 1000 for the base event ID and using the actionpoint table index as the offset portion creates an obvious correlation. Thus, if an LC event ID is 1025 then it is immediately apparent that the event is the user defined event for actionpoint table index 25.

Definition at line 949 of file lc\_eventids.h.

**10.1.2.31 LC\_CC\_ERR\_EID** #define LC\_CC\_ERR\_EID 24

LC Command Code Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when a software bus message is received with an invalid command code.

Definition at line 369 of file lc\_eventids.h.

**10.1.2.32 LC\_CDS\_DISABLED\_INF\_EID** #define LC\_CDS\_DISABLED\_INF\_EID 23

LC Use Of CDS Disabled Event ID.

Type: INFORMATION

Cause:

This event message is issued following LC startup initialization when the entire LC execution state has been set to default values successfully stored to the Critical Data Store (CDS). Application global data, actionpoint results data and watchpoint results data were stored to CDS areas managed directly by LC. Actionpoint and watchpoint definition table data are stored to the CDS area managed by cFE Table Services.

This event implies that the CDS areas were not created successfully or that LC was unable to write the default values to CDS.

Note that an attempt to use CDS is only made when the appropriate parameter is enabled in the LC platform configuration header file.

See also

[LC\\_SAVE\\_TO\\_CDS](#), [LC\\_CDS\\_RESTORED\\_INF\\_EID](#), [LC\\_CDS\\_UPDATED\\_INF\\_EID](#)

Definition at line 357 of file lc\_eventids.h.

**10.1.2.33 LC\_CDS\_RESTORED\_INF\_EID** #define LC\_CDS\_RESTORED\_INF\_EID 21  
LC State Restored From CDS Event ID.

Type: INFORMATION

Cause:

This event message is issued following a processor reset when the entire LC execution state has been successfully restored from the Critical Data Store (CDS). Application global data, actionpoint results data and watchpoint results data were restored from CDS areas managed directly by LC. Actionpoint definition table data and watchpoint definition table data were restored from the CDS area managed by cFE Table Services.

Note that an attempt to use CDS is only made when the appropriate parameter is enabled in the LC platform configuration header file.

See also

[LC\\_SAVE\\_TO\\_CDS](#), [LC\\_CDS\\_UPDATED\\_INF\\_EID](#), [LC\\_CDS\\_DISABLED\\_INF\\_EID](#)

Definition at line 304 of file lc\_eventids.h.

**10.1.2.34 LC\_CDS\_UPDATED\_INF\_EID** #define LC\_CDS\_UPDATED\_INF\_EID 22  
LC Default State Initialized and Stored to CDS Event ID.

Type: INFORMATION

Cause:

This event message is issued following LC startup initialization when the entire LC execution state has been set to default values successfully stored to the Critical Data Store (CDS). Application global data, actionpoint results data and watchpoint results data were stored to CDS areas managed directly by LC. Actionpoint and watchpoint definition table data are stored to the CDS area managed by cFE Table Services.

This event implies that the CDS areas were created successfully. The reason that previous data was not restored may be due to the reset type (warm vs cold) or to a failure to restore the entire set of data described above. If data from any CDS area cannot be restored, then all data is set to defaults and written to CDS.

Note that an attempt to use CDS is only made when the appropriate parameter is enabled in the LC platform configuration header file.

See also

[LC\\_SAVE\\_TO\\_CDS](#), [LC\\_CDS\\_RESTORED\\_INF\\_EID](#), [LC\\_CDS\\_DISABLED\\_INF\\_EID](#)

Definition at line 332 of file lc\_eventids.h.

**10.1.2.35 LC\_CFCALL\_ERR\_EID** #define LC\_CFCALL\_ERR\_EID 67  
LC LC\_CustomFunction Called With Unexpected Watchpoint ID Event ID.

Type: ERROR

**Cause:**

This event message is issued when the mission specific custom function [LC\\_CustomFunction](#) is called with an unexpected watchpoint ID

Definition at line 900 of file lc\_eventids.h.

**10.1.2.36 LC\_CR\_PIPE\_ERR\_EID** #define LC\_CR\_PIPE\_ERR\_EID 3  
LC Create Command Pipe Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the CFS Limit Checker is unable to create its command pipe via the [CFE\\_SB\\_CreatePipe](#) API

Definition at line 69 of file lc\_eventids.h.

**10.1.2.37 LC\_HKREQ\_LEN\_ERR\_EID** #define LC\_HKREQ\_LEN\_ERR\_EID 41  
LC Housekeeping Request Message Length Invalid Event ID.

Type: ERROR

**Cause:**

This event message is issued when a housekeeping request is received with a message length that doesn't match the expected value.

Definition at line 575 of file lc\_eventids.h.

**10.1.2.38 LC\_INIT\_INF\_EID** #define LC\_INIT\_INF\_EID 2  
LC Initialization Event ID.

Type: INFORMATION

**Cause:**

This event message is issued when the CFS Limit Checker has completed initialization.

Definition at line 56 of file lc\_eventids.h.

**10.1.2.39 LC\_INVALID\_RPN\_ERR\_EID** #define LC\_INVALID\_RPN\_ERR\_EID 63  
LC Actionpoint RPN Expression Illegal Event ID.

Type: ERROR

Cause:

This event message is issued when an illegal Reverse Polish Notation (RPN) expression is detected during an action-point evaluation

Definition at line 849 of file lc\_eventids.h.

**10.1.2.40 LC\_LCSTATE\_ERR\_EID** #define LC\_LCSTATE\_ERR\_EID 29  
LC Set Limit Checker State, State Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_SET\\_LC\\_STATE\\_CC](#) command has been received with an invalid state argument specified

Definition at line 428 of file lc\_eventids.h.

**10.1.2.41 LC\_LCSTATE\_INF\_EID** #define LC\_LCSTATE\_INF\_EID 28  
LC Set Limit Checker State Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when the [LC\\_SET\\_LC\\_STATE\\_CC](#) command has been successfully executed

Definition at line 416 of file lc\_eventids.h.

**10.1.2.42 LC\_LEN\_ERR\_EID** #define LC\_LEN\_ERR\_EID 43  
LC Command Message Length Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when a ground command message is received with a message length that doesn't match the expected value.

Definition at line 599 of file lc\_eventids.h.

**10.1.2.43 LC\_MID\_INF\_EID** #define LC\_MID\_INF\_EID 49  
LC Unreferenced Message ID Received Event ID.

Type: INFORMATION

Cause:

This event message is issued when a software bus message has been received that isn't a recognized LC message and has no defined watchpoints referencing its message ID  
Definition at line 674 of file lc\_eventids.h.

**10.1.2.44 LC\_NOOP\_INF\_EID** #define LC\_NOOP\_INF\_EID 26  
LC No-op Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when a NOOP command has been received.  
Definition at line 392 of file lc\_eventids.h.

**10.1.2.45 LC\_PASSIVE\_FAIL\_DBG\_EID** #define LC\_PASSIVE\_FAIL\_DBG\_EID 59  
LC Actionpoint Failed While Limit Checker State Passive Event ID.

Type: DEBUG

Cause:

This event message is issued when an actionpoint fails evaluation while the LC task operating state is [LC\\_STATE\\_PASSIVE](#)  
Definition at line 801 of file lc\_eventids.h.

**10.1.2.46 LC\_RESERVED\_EID** #define LC\_RESERVED\_EID 0  
Reserved EID.  
Definition at line 32 of file lc\_eventids.h.

**10.1.2.47 LC\_RESET\_DBG\_EID** #define LC\_RESET\_DBG\_EID 27  
LC Reset Counters Command Event ID.

Type: DEBUG

**Cause:**

This event message is issued when a reset counters command has been received.

Definition at line 404 of file lc\_eventids.h.

**10.1.2.48 LC\_SUB\_GND\_CMD\_ERR\_EID** #define LC\_SUB\_GND\_CMD\_ERR\_EID 5  
LC Subscribe To Ground Command Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the CFS Limit Checker is unable to subscribe to its ground commands via the [CFE\\_SB\\_Subscribe](#) API

Definition at line 95 of file lc\_eventids.h.

**10.1.2.49 LC\_SUB\_HK\_REQ\_ERR\_EID** #define LC\_SUB\_HK\_REQ\_ERR\_EID 4  
LC Subscribe To Housekeeping Request Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the CFS Limit Checker is unable to subscribe to its Housekeeping Request message via the [CFE\\_SB\\_Subscribe](#) API

Definition at line 82 of file lc\_eventids.h.

**10.1.2.50 LC\_SUB\_SAMPLE\_CMD\_ERR\_EID** #define LC\_SUB\_SAMPLE\_CMD\_ERR\_EID 6  
LC Subscribe To Actionpoint Sample Command Failed Event ID.

Type: ERROR

**Cause:**

This event message is issued when the CFS Limit Checker is unable to subscribe to its actionpoint sample command via the [CFE\\_SB\\_Subscribe](#) API

Definition at line 108 of file lc\_eventids.h.

**10.1.2.51 LC\_SUB\_WP\_ERR\_EID** #define LC\_SUB\_WP\_ERR\_EID 45  
LC Watchpoint Message Subscribe Failed Event ID.

Type: ERROR

Cause:

This event message is issued when an error is encountered when subscribing to a watchpoint message iD  
Definition at line 623 of file lc\_eventids.h.

**10.1.2.52 LC\_TASK\_EXIT\_EID** #define LC\_TASK\_EXIT\_EID 1  
LC Application Fatal Termination Event ID.

Type: CRITICAL

Cause:

This event message is issued when the CFS Limit Checker exits due to a fatal error condition.  
Definition at line 44 of file lc\_eventids.h.

**10.1.2.53 LC\_UNSUB\_WP\_ERR\_EID** #define LC\_UNSUB\_WP\_ERR\_EID 44  
LC Watchpoint Message Unsubscribe Failed Event ID.

Type: ERROR

Cause:

This event message is issued when an error is encountered unsubscribing to a watchpoint message ID  
Definition at line 611 of file lc\_eventids.h.

**10.1.2.54 LC\_WDT\_GETADDR\_ERR\_EID** #define LC\_WDT\_GETADDR\_ERR\_EID 19  
LC Watchpoint Definition Table Get Address Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the address can't be obtained from table services for the watchpoint definition table  
(WDT).  
Definition at line 270 of file lc\_eventids.h.

**10.1.2.55 LC\_WDT\_LOAD\_ERR\_EID** #define LC\_WDT\_LOAD\_ERR\_EID 15  
LC Watchpoint Definition Table Load From File Failed Event ID.

Type: ERROR

Cause:

This event message is issued when an error is encountered loading the watchpoint definition table (WDT) from the default file image  
Definition at line 221 of file lc\_eventids.h.

**10.1.2.56 LC\_WDT\_REGISTER\_CRIT\_ERR\_EID** #define LC\_WDT\_REGISTER\_CRIT\_ERR\_EID 68  
LC Watchdog Definition Table Critical Table Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the watchpoint definition table (WDT) could not be registered as a critical table.  
Definition at line 912 of file lc\_eventids.h.

**10.1.2.57 LC\_WDT\_REGISTER\_ERR\_EID** #define LC\_WDT\_REGISTER\_ERR\_EID 7  
LC Watchpoint Definition Table Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the watchpoint definition table (WDT) could not be registered.  
Definition at line 120 of file lc\_eventids.h.

**10.1.2.58 LC\_WDT\_REREGISTER\_ERR\_EID** #define LC\_WDT\_REREGISTER\_ERR\_EID 8  
LC Watchpoint Definition Table Reregistration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the watchpoint definition table (WDT) could not be registered non-critical after first registering and then unregistering the table as critical. This sequence can only occur when the WDT succeeds and the ADT fails the attempt to register as a critical table. This error is extremely unlikely to occur.  
Definition at line 136 of file lc\_eventids.h.

**10.1.2.59 LC\_WDTVAL\_ERR\_EID** #define LC\_WDTVAL\_ERR\_EID 55  
LC Watchpoint Definition Table Validation Failed (Not Floating Point Check) Event ID.

Type: ERROR

Cause:

This event message is issued on the first error when a table validation fails for a watchpoint definition table (WDT) load and the error is NOT a failed floating point check.

Definition at line 752 of file lc\_eventids.h.

**10.1.2.60 LC\_WDTVAL\_FPERR\_EID** #define LC\_WDTVAL\_FPERR\_EID 54  
LC Watchpoint Definition Table Validation Floating Point Check Failed Event ID.

Type: ERROR

Cause:

This event message is issued on the first error when a table validation fails for a watchpoint definition table (WDT) load and the error is a failed floating point check. This error is caused when the data type for a wachpoint definition is floating point and the comparison value equates to a floating point NAN (not-a-number) or infinite value.

Definition at line 739 of file lc\_eventids.h.

**10.1.2.61 LC\_WDTVAL\_INF\_EID** #define LC\_WDTVAL\_INF\_EID 56  
LC Watchpoint Definition Table Validation Results Event ID.

Type: INFORMATION

Cause:

This event message is issued when a table validation has been completed for a watchpoint definition table (WDT) load  
Definition at line 764 of file lc\_eventids.h.

**10.1.2.62 LC\_WP\_DATATYPE\_ERR\_EID** #define LC\_WP\_DATATYPE\_ERR\_EID 50  
LC Watchpoint Data Type Undefined Event ID.

Type: ERROR

Cause:

This event message is issued whenever an undefined watchpoint data type identifier is detected  
Definition at line 686 of file lc\_eventids.h.

**10.1.2.63 LC\_WP\_NAN\_ERR\_EID** #define LC\_WP\_NAN\_ERR\_EID 52  
LC Watchpoint Data Value Is Float NAN Event ID.

Type: ERROR

Cause:

This event message is issued when a watchpoint is defined as a float type, but the extracted value would equate to a floating point NAN (not-a-number) value  
Definition at line 711 of file lc\_eventids.h.

**10.1.2.64 LC\_WP\_OFFSET\_ERR\_EID** #define LC\_WP\_OFFSET\_ERR\_EID 53  
LC Watchpoint Offset Value Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when a watchpoint offset value extends past the end of the message as reported by the [CFE\\_MSG\\_GetSize](#) function  
Definition at line 724 of file lc\_eventids.h.

**10.1.2.65 LC\_WP\_OPERID\_ERR\_EID** #define LC\_WP\_OPERID\_ERR\_EID 51  
LC Watchpoint Operator ID Invalid Event ID.

Type: ERROR

Cause:

This event message is issued whenever an undefined watchpoint operator identifier is detected  
Definition at line 698 of file lc\_eventids.h.

**10.1.2.66 LC\_WPSTATS\_INF\_EID** #define LC\_WPSTATS\_INF\_EID 40  
LC Reset Watchpoint Stats Command Event ID.

Type: INFORMATION

Cause:

This event message is issued when the [LC\\_RESET\\_WP\\_STATS\\_CC](#) command has been successfully executed  
Definition at line 563 of file lc\_eventids.h.

**10.1.2.67 LC\_WPSTATS\_WPNUM\_ERR\_EID** #define LC\_WPSTATS\_WPNUM\_ERR\_EID 39  
LC Reset Watchpoint Stats Watchpoint Number Invalid Event ID.

Type: ERROR

Cause:

This event message is issued when the [LC\\_RESET\\_WP\\_STATS\\_CC](#) command has been received with an invalid watchpoint number specified

Definition at line 551 of file lc\_eventids.h.

**10.1.2.68 LC\_WRT\_CDS\_REGISTER\_ERR\_EID** #define LC\_WRT\_CDS\_REGISTER\_ERR\_EID 12  
LC Watchpoint Result Table CDS Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the CDS area for the watchpoint results table (WRT) data could not be registered.  
Definition at line 184 of file lc\_eventids.h.

**10.1.2.69 LC\_WRT\_GETADDR\_ERR\_EID** #define LC\_WRT\_GETADDR\_ERR\_EID 17  
LC Watchpoint Result Table Get Address Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the address can't be obtained from table services for the watchpoint results table (WRT).

Definition at line 246 of file lc\_eventids.h.

**10.1.2.70 LC\_WRT\_NO\_SAVE\_ERR\_EID** #define LC\_WRT\_NO\_SAVE\_ERR\_EID 46  
LC Watchpoint Results Table Not Saved To CDS On Exit Event ID.

Type: ERROR

Cause:

This event message is issued when the watchpoint results table (WRT) data could not be saved to the CDS on application exit.

Definition at line 636 of file lc\_eventids.h.

**10.1.2.71 LC\_WRT\_REGISTER\_ERR\_EID** #define LC\_WRT\_REGISTER\_ERR\_EID 10  
LC Watchpoint Results Table Registration Failed Event ID.

Type: ERROR

Cause:

This event message is issued when the watchpoint results table (WRT) could not be registered.  
Definition at line 160 of file lc\_eventids.h.

## 10.2 CFS Limit Checker Version

### Version Numbers

#### Macros

- `#define LC_MAJOR_VERSION 2`  
*Major version number.*
- `#define LC_MINOR_VERSION 2`  
*Minor version number.*
- `#define LC_REVISION 99`  
*Revision number.*

#### 10.2.1 Detailed Description

##### Version Numbers

#### 10.2.2 Macro Definition Documentation

##### 10.2.2.1 **LC\_MAJOR\_VERSION** `#define LC_MAJOR_VERSION 2`

Major version number.

Definition at line 34 of file lc\_version.h.

##### 10.2.2.2 **LC\_MINOR\_VERSION** `#define LC_MINOR_VERSION 2`

Minor version number.

Definition at line 35 of file lc\_version.h.

##### 10.2.2.3 **LC\_REVISION** `#define LC_REVISION 99`

Revision number.

Definition at line 36 of file lc\_version.h.

## 10.3 CFS Limit Checker Command Codes

### Macros

- #define `LC_NOOP_CC` 0  
*Noop.*
- #define `LC_RESET_CC` 1  
*Reset Counters.*
- #define `LC_SET_LC_STATE_CC` 2  
*Set LC Application State.*
- #define `LC_SET_AP_STATE_CC` 3  
*Set AP State.*
- #define `LC_SET_AP_PERM_OFF_CC` 4  
*Set AP Permanently Off.*
- #define `LC_RESET_AP_STATS_CC` 5  
*Reset AP Statistics.*
- #define `LC_RESET_WP_STATS_CC` 6  
*Reset WP Statistics.*

### 10.3.1 Detailed Description

### 10.3.2 Macro Definition Documentation

#### 10.3.2.1 `LC_NOOP_CC` #define `LC_NOOP_CC` 0

Noop.

##### Description

Implements the Noop command that insures the LC task is alive

##### Command Structure

`LC_NoopCmd_t`

##### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `LC_HkTlm_Payload_t.CmdCount` will increment
- The `LC_NOOP_INF_EID` informational event message will be generated when the command is received

##### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected

##### Evidence of failure may be found in the following telemetry:

- `LC_HkTlm_Payload_t.CmdErrCount` will increment
- Error specific event message `LC_LEN_ERR_EID`

**Criticality**

None

**See also**

[LC\\_RESET\\_CC](#)

Definition at line 67 of file default\_lc\_fcncodes.h.

**10.3.2.2 LC\_RESET\_AP\_STATS\_CC** #define LC\_RESET\_AP\_STATS\_CC 5  
Reset AP Statistics.**Description**

Resets actionpoint statistics

**Command Structure**

[LC\\_ResetAPStatsCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will increment
- The [LC\\_APSTATS\\_INF\\_EID](#) informational event message will be generated when the command is executed

**Error Conditions**

This command may fail for the following reason(s):

- Command packet length not as expected
- Actionpoint number specified in command message is out of range

**Evidence of failure may be found in the following telemetry:**

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)
- Error specific event message [LC\\_APSTATS\\_APNUM\\_ERR\\_EID](#)

**Criticality**

None

**See also**

[LC\\_RESET\\_WP\\_STATS\\_CC](#)

Definition at line 238 of file default\_lc\_fcncodes.h.

**10.3.2.3 LC\_RESET\_CC** #define LC\_RESET\_CC 1  
Reset Counters.

#### Description

Resets the LC housekeeping counters

#### Command Structure

[LC\\_ResetCountersCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will be cleared
- The [LC\\_RESET\\_DBG\\_EID](#) debug event message will be generated when the command is executed

#### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected

#### Evidence of failure may be found in the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)

#### Criticality

None

#### See also

[LC\\_NOOP\\_CC](#)

Definition at line 98 of file default\_lc\_fcncodes.h.

**10.3.2.4 LC\_RESET\_WP\_STATS\_CC** #define LC\_RESET\_WP\_STATS\_CC 6  
Reset WP Statistics.

#### Description

Resets watchpoint statistics

#### Command Structure

[LC\\_ResetWPStatsCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will increment
- The [LC\\_WPSTATS\\_INF\\_EID](#) informational event message will be generated when the command is executed

### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected
- Watchpoint number specified in command message is out of range

Evidence of failure may be found in the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)
- Error specific event message [LC\\_WPSTATS\\_WPNUM\\_ERR\\_EID](#)

### Criticality

None

### See also

[LC\\_RESET\\_AP\\_STATS\\_CC](#)

Definition at line 272 of file default\_lc\_fcncodes.h.

### 10.3.2.5 LC\_SET\_AP\_PERM\_OFF\_CC #define LC\_SET\_AP\_PERM\_OFF\_CC 4

Set AP Permanently Off.

#### Description

Set the specified actionpoint's state to [LC\\_APSTATE\\_PERMOFF](#)

#### Command Structure

[LC\\_SetAPPermOffCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will increment
- The [LC\\_APOFF\\_INF\\_EID](#) informational event message will be generated when the command is executed

### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected
- Actionpoint number specified in command message is out of range
- Actionpoint current state is not [LC\\_APSTATE\\_DISABLED](#)

Evidence of failure may be found in the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)
- Error specific event message [LC\\_APOFF\\_APNUM\\_ERR\\_EID](#)
- Error specific event message [LC\\_APOFF\\_CURR\\_ERR\\_EID](#)

### Criticality

None

Definition at line 204 of file default\_lc\_fcncodes.h.

**10.3.2.6 LC\_SET\_AP\_STATE\_CC** #define LC\_SET\_AP\_STATE\_CC 3  
Set AP State.

#### Description

Set actionpoint state

#### Command Structure

[LC\\_SetAPStateCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will increment
- The [LC\\_APSTATE\\_INF\\_EID](#) informational event message will be generated when the command is executed

#### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected
- Invalid actionpoint state specified in command message
- Actionpoint number specified in command message is out of range
- Actionpoint current state is either [LC\\_APSTATE\\_NOT\\_USED](#) or [LC\\_APSTATE\\_PERMOFF](#)

Evidence of failure may be found in the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)
- Error specific event message [LC\\_APSTATE\\_NEW\\_ERR\\_EID](#)
- Error specific event message [LC\\_APSTATE\\_APNUM\\_ERR\\_EID](#)
- Error specific event message [LC\\_APSTATE\\_CURR\\_ERR\\_EID](#)

#### Criticality

None

Definition at line 169 of file default\_lc\_fcncodes.h.

**10.3.2.7 LC\_SET\_LC\_STATE\_CC** #define LC\_SET\_LC\_STATE\_CC 2  
Set LC Application State.

#### Description

Sets the operational state of the LC application

#### Command Structure

[LC\\_SetLCStateCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdCount](#) will increment
- [LC\\_HkTlm\\_Payload\\_t.CurrentLCState](#) will be set to the new state
- The [LC\\_LCSTATE\\_INF\\_EID](#) informational event message will be generated when the command is executed

### Error Conditions

This command may fail for the following reason(s):

- Command packet length not as expected
- Invalid new state specified in command message

Evidence of failure may be found in the following telemetry:

- [LC\\_HkTlm\\_Payload\\_t.CmdErrCount](#) will increment
- Error specific event message [LC\\_LEN\\_ERR\\_EID](#)
- Error specific event message [LC\\_LCSTATE\\_ERR\\_EID](#)

### Criticality

None

Definition at line 131 of file default\_lc\_fcncodes.h.

## 10.4 CFS Limit Checker Mission Configuration

### Macros

- `#define LC_RTS_REQ_MID 0x18A9`  
*RTS Request Message ID.*
- `#define LC_RTS_REQ_CC 4`  
*RTS Request Command Code.*
- `#define LC_MAX_WATCHPOINTS 176`  
*Maximum number of watchpoints.*
- `#define LC_MAX_ACTIONPOINTS 176`  
*Maximum number of actionpoints.*
- `#define LC_MAX_ACTION_TEXT 32`  
*Maximum actionpoint event text string size.*
- `#define LC_MAX_RPN_EQU_SIZE 20`  
*Maximum reverse polish (RPN) equation size.*
- `#define LC_APPMAIN_PERF_ID 28`  
*Main task performance ID.*
- `#define LC_WDT_SEARCH_PERF_ID 43`  
*Watchpoing definition table search performance ID.*

### 10.4.1 Detailed Description

### 10.4.2 Macro Definition Documentation

#### 10.4.2.1 LC\_APPMAIN\_PERF\_ID `#define LC_APPMAIN_PERF_ID 28`

Main task performance ID.

Definition at line 31 of file lc\_perfids.h.

#### 10.4.2.2 LC\_MAX\_ACTION\_TEXT `#define LC_MAX_ACTION_TEXT 32`

Maximum actionpoint event text string size.

##### Description:

Maximum length of the event message string that can specified in an actionpoint definition (including NUL terminator)

##### Limits:

LC appends the trailer text `LC_AP_EVENT_TAIL_STR` to this string when reporting actionpoint failures. The size of this string is `LC_AP_EVENT_TAIL_LEN`

The total value of `LC_MAX_ACTION_TEXT + LC_AP_EVENT_TAIL_LEN` should be less than `CFE_MISSION_EVS_MAX_MESSAGE_LEN` to avoid event message truncation

Raising this value will also increase the size of the Actionpoint Definition Table (ADT)

Definition at line 148 of file default\_lc\_interface\_cfg.h.

**10.4.2.3 LC\_MAX\_ACTIONPOINTS** #define LC\_MAX\_ACTIONPOINTS 176  
Maximum number of actionpoints.

Description:

Maximum number of actionpoints that can be defined in the Actionpoint Definition Table (ADT)

Limits:

This parameter can't be larger than an unsigned 16 bit integer (65535). It must be a multiple of 2 to avoid indexing past the end of the array as LC indexes ahead to build the packed status bytes.

This parameter will dictate the size of the Actionpoint Definition Table:

ADT Size = LC\_MAX\_ACTIONPOINTS \* sizeof([LC\\_ADTEEntry\\_t](#))

The total size of this table should not exceed the cFE size limit for a single buffered table set by the [CFE\\_PLATFORM\\_TBL\\_MAX\\_SNGL\\_TABLE\\_SIZE](#) parameter

Definition at line 127 of file default\_lc\_interface\_cfg.h.

**10.4.2.4 LC\_MAX\_RPN\_EQU\_SIZE** #define LC\_MAX\_RPN\_EQU\_SIZE 20  
Maximum reverse polish (RPN) equation size.

Description:

Maximum combined number of operators and operands that may exist in an actionpoint definition's reverse polish equation

Limits:

The LC app limits this parameter to 32. Increasing this value will increase the size of the Actionpoint Definition Table (ADT)

Definition at line 162 of file default\_lc\_interface\_cfg.h.

**10.4.2.5 LC\_MAX\_WATCHPOINTS** #define LC\_MAX\_WATCHPOINTS 176  
Maximum number of watchpoints.

Description:

Maximum number of watchpoints that can be defined in the Watchpoint Definition Table (WDT)

Limits:

This parameter can't be larger than 65520 (0xFFFF0) because higher values are reserved for use as Reverse Polish operators. It must be a multiple of 4 to avoid indexing past the end of the array as LC indexes ahead to build the packed status bytes.

This parameter will dictate the size of the Watchpoint Definition Table:

WDT Size = LC\_MAX\_WATCHPOINTS \* sizeof([LC\\_WDTEEntry\\_t](#))

The total size of this table should not exceed the cFE size limit for a single buffered table set by the [CFE\\_PLATFORM\\_TBL\\_MAX\\_SNGL\\_TABLE\\_SIZE](#) parameter

Definition at line 103 of file default\_lc\_interface\_cfg.h.

**10.4.2.6 LC\_RTS\_REQ\_CC** #define LC\_RTS\_REQ\_CC 4  
RTS Request Command Code.

Description:

Command code that will be used by the [LC\\_ExecuteRTS](#) function to construct the RTS request message.

We define this here to allow the LC application to be built without including headers from the application (e.g. SC) that will receive the command. Obviously, this definition must match the command code expected by the receiving application.

Limits:

This parameter can't be larger than 127 (the maximum value of 7-bit number).

Definition at line 78 of file default\_lc\_interface\_cfg.h.

**10.4.2.7 LC\_RTS\_REQ\_MID** #define LC\_RTS\_REQ\_MID 0x18A9  
RTS Request Message ID.

Description:

Message ID that will be used by the [LC\\_ExecuteRTS](#) function to construct the RTS request message.

We define this here to allow the LC application to be built without including headers from the application (e.g. SC) that will receive the command. Obviously, this definition must match the message ID expected by the receiving application. A mission may choose to modify the [LC\\_ExecuteRTS](#) function not to use this or define it using a message ID constant that is defined numerically elsewhere.

Limits:

This parameter shouldn't be larger than the value set for [CFE\\_PLATFORM\\_SB\\_HIGHEST\\_VALID\\_MSGID](#).

Definition at line 60 of file default\_lc\_interface\_cfg.h.

**10.4.2.8 LC\_WDT\_SEARCH\_PERF\_ID** #define LC\_WDT\_SEARCH\_PERF\_ID 43  
Watchpoing definition table search performance ID.  
Definition at line 32 of file lc\_perfid.h.

## 10.5 CFS Limit Checker Platform Configuration

### Macros

- `#define LC_APP_NAME "LC"`  
*Application Name.*
- `#define LC_PIPE_DEPTH 12`  
*Command Pipe Depth.*
- `#define LC_STATE_POWER_ON_RESET LC_STATE_DISABLED`  
*LC state after power-on reset.*
- `#define LC_STATE_WHEN_CDS_RESTORED LC_STATE_FROM_CDS`  
*Save data to CDS compiler switch.*
- `#define LC_WDT_FILENAME "/cf/lc_def_wdt.tbl"`  
*Watchpoint Definition Table (WDT) filename.*
- `#define LC_ADT_FILENAME "/cf/lc_def_adt.tbl"`  
*Actionpoint Definition Table (ADT) filename.*
- `#define LC_MAX_VALID_ADT_RTSID 0xFFFF`  
*Maximum valid ADT RTS ID.*
- `#define LC_FLOAT_TOLERANCE (1.0e-25)`  
*Floating Point Compare Tolerance.*
- `#define LC_MISSION_REV 0`  
*Mission specific version number for LC application.*

### LC Table Name Strings

- `#define LC_WDT_TABLENAME "LC_WDT"`
- `#define LC_ADT_TABLENAME "LC_ADT"`
- `#define LC_WRT_TABLENAME "LC_WRT"`
- `#define LC_ART_TABLENAME "LC_ART"`

#### 10.5.1 Detailed Description

#### 10.5.2 Macro Definition Documentation

##### 10.5.2.1 LC\_ADT\_FILENAME `#define LC_ADT_FILENAME "/cf/lc_def_adt.tbl"`

Actionpoint Definition Table (ADT) filename.

Description:

Default file to load the actionpoint definition table from during a power-on reset sequence

Limits:

This string shouldn't be longer than `OS_MAX_PATH_LEN` for the target platform in question

Definition at line 151 of file `default_lc_internal_cfg.h`.

##### 10.5.2.2 LC\_ADT\_TABLENAME `#define LC_ADT_TABLENAME "LC_ADT"`

Definition at line 184 of file `default_lc_internal_cfg.h`.

**10.5.2.3 LC\_APP\_NAME** `#define LC_APP_NAME "LC"`  
Application Name.

**Description:**

This definition must match the name used at startup by the cFE Executive Services when creating the LC application. Note that application names are also an argument to certain cFE commands. For example, the application name is needed to access tables via cFE Table Services commands.

**Limits:**

LC requires that this name be defined, but otherwise places no limits on the definition. Refer to CFE Executive Services for specific information on limits related to application names.

Definition at line 56 of file default\_lc\_internal\_cfg.h.

**10.5.2.4 LC\_ART\_TABLENAME** `#define LC_ART_TABLENAME "LC_ART"`  
Definition at line 186 of file default\_lc\_internal\_cfg.h.

**10.5.2.5 LC\_FLOAT\_TOLERANCE** `#define LC_FLOAT_TOLERANCE (1.0e-25)`  
Floating Point Compare Tolerance.

**Description:**

Difference between 2 floats that will still compare as equal. The default value of (1.0e-25) was taken from the GNC file mathconstants.h

**Limits:**

The LC app does not place a limit on this parameter.

Definition at line 177 of file default\_lc\_internal\_cfg.h.

**10.5.2.6 LC\_MAX\_VALID\_ADT\_RTSID** `#define LC_MAX_VALID_ADT_RTSID 0xFFFF`  
Maximum valid ADT RTS ID.

**Description:**

The maximum RTS ID that LC will allow during table validation in an Actionpoint Definition Table (ADT) entry

**Limits:**

This parameter can't be larger than an unsigned 16 bit integer (65535).

Definition at line 164 of file default\_lc\_internal\_cfg.h.

**10.5.2.7 LC\_MISSION\_REV** `#define LC_MISSION_REV 0`  
Mission specific version number for LC application.

**Description:**

An application version number consists of four parts: major version number, minor version number, revision number and mission specific revision number. The mission specific revision number is defined here and the other parts are defined in "lc\_version.h".

**Limits:**

Must be defined as a numeric value that is greater than or equal to zero.

Definition at line 203 of file default\_lc\_internal\_cfg.h.

**10.5.2.8 LC\_PIPE\_DEPTH** `#define LC_PIPE_DEPTH 12`

Command Pipe Depth.

**Description:**

Maximum number of messages that will be allowed in the LC command pipe at one time. Used during initialization in the call to [CFE\\_SB\\_CreatePipe](#)

**Limits:**

This parameter can't be larger than an unsigned 16 bit integer (65535).

Definition at line 70 of file default\_lc\_internal\_cfg.h.

**10.5.2.9 LC\_STATE\_POWER\_ON\_RESET** `#define LC_STATE_POWER_ON_RESET LC_STATE_DISABLED`

LC state after power-on reset.

**Description:**

What operating state LC should initialize to after a power-on reset.

**Limits:**

This parameter must be one of the following: [LC\\_STATE\\_ACTIVE](#) [LC\\_STATE\\_PASSIVE](#) [LC\\_STATE\\_DISABLED](#)

Definition at line 85 of file default\_lc\_internal\_cfg.h.

**10.5.2.10 LC\_STATE\_WHEN\_CDS\_RESTORED** `#define LC_STATE_WHEN_CDS_RESTORED LC_STATE_FROM_CDS`

Save data to CDS compiler switch.

**Description:**

Compile switch that tells LC that we should save data over a processor or application reset by using the Critical Data Store (CDS). Comment out or #undef to force LC to do a default (power-on) initialization sequence on all restarts (this is the default case).

**Limits:**

n/a

LC state when CDS is restored

**Description:**

What operating state LC should initialize to after successfully restoring information from the CDS after a processor or application reset. This is only used when LC\_SAVE\_TO\_CDS is set to true, and provides a way to override any state LC may have been operating in prior to the reset occurring.

If this is set to LC\_STATE\_FROM\_CDS and LC\_SAVE\_TO\_CDS is set to true, then the LC state will be preserved across resets and restored. If this is not set to LC\_STATE\_FROM\_CDS, the state saved in the CDS is overwritten by the state assigned here.

**Limits:**

This parameter must be one of the following: [LC\\_STATE\\_ACTIVE](#) [LC\\_STATE\\_PASSIVE](#) [LC\\_STATE\\_DISABLED](#) [LC\\_STATE\\_FROM\\_CDS](#)

Definition at line 125 of file default\_lc\_internal\_cfg.h.

**10.5.2.11 LC\_WDT\_FILENAME #define LC\_WDT\_FILENAME "/cf/lc\_def\_wdt.tbl"**

Watchpoint Definition Table (WDT) filename.

**Description:**

Default file to load the watchpoint definition table from during a power-on reset sequence

**Limits:**

This string shouldn't be longer than [OS\\_MAX\\_PATH\\_LEN](#) for the target platform in question

Definition at line 138 of file default\_lc\_internal\_cfg.h.

**10.5.2.12 LC\_WDT\_TABLENAME #define LC\_WDT\_TABLENAME "LC\_WDT"**

Definition at line 183 of file default\_lc\_internal\_cfg.h.

**10.5.2.13 LC\_WRT\_TABLENAME #define LC\_WRT\_TABLENAME "LC\_WRT"**

Definition at line 185 of file default\_lc\_internal\_cfg.h.

## 10.6 CFS Limit Checker Command Message IDs

### Macros

- `#define LC_CMD_MID 0x18A4`  
*Msg ID for cmd to LC*
- `#define LC_SEND_HK_MID 0x18A5`  
*Msg ID to request LC housekeeping*
- `#define LC_SAMPLE_AP_MID 0x18A6`  
*Msg ID to request actionpoint sample.*

#### 10.6.1 Detailed Description

#### 10.6.2 Macro Definition Documentation

##### 10.6.2.1 LC\_CMD\_MID `#define LC_CMD_MID 0x18A4`

Msg ID for cmd to LC

Definition at line 32 of file default\_lc\_msgids.h.

##### 10.6.2.2 LC\_SAMPLE\_AP\_MID `#define LC_SAMPLE_AP_MID 0x18A6`

Msg ID to request actionpoint sample.

Definition at line 34 of file default\_lc\_msgids.h.

##### 10.6.2.3 LC\_SEND\_HK\_MID `#define LC_SEND_HK_MID 0x18A5`

Msg ID to request LC housekeeping

Definition at line 33 of file default\_lc\_msgids.h.

## 10.7 CFS Limit Checker Telemetry Message IDs

### Macros

- #define [LC\\_HK\\_TLM\\_MID](#) 0x08A7

*LC Housekeeping Telemetry.*

#### 10.7.1 Detailed Description

#### 10.7.2 Macro Definition Documentation

##### 10.7.2.1 [LC\\_HK\\_TLM\\_MID](#) #define LC\_HK\_TLM\_MID 0x08A7

LC Housekeeping Telemetry.

Definition at line 43 of file default\_lc\_msgids.h.

## 10.8 CFS Limit Checker Command Structures

### Data Structures

- struct [LC\\_SendHkCmd\\_t](#)  
*Send HK Command.*
- struct [LC\\_NoopCmd\\_t](#)  
*No-op Command.*
- struct [LC\\_ResetCountersCmd\\_t](#)  
*Reset Counters Command.*
- struct [LC\\_SetLCState\\_Payload\\_t](#)  
*Set LC Application State Payload.*
- struct [LC\\_SetLCStateCmd\\_t](#)  
*Set LC Application State Command.*
- struct [LC\\_SetAPState\\_Payload\\_t](#)  
*Set AP (Actionpoint) State Payload.*
- struct [LC\\_SetAPStateCmd\\_t](#)  
*Set AP (Actionpoint) State Command.*
- struct [LC\\_SetAPPermOff\\_Payload\\_t](#)  
*Set AP (Actionpoint) Permanently Off Payload.*
- struct [LC\\_SetAPPermOffCmd\\_t](#)  
*Set AP (Actionpoint) Permanently Off Command.*
- struct [LC\\_ResetAPStats\\_Payload\\_t](#)  
*Reset AP (Actionpoint) Statistics Payload.*
- struct [LC\\_ResetAPStatsCmd\\_t](#)  
*Reset AP (Actionpoint) Statistics Command.*
- struct [LC\\_ResetWPStats\\_Payload\\_t](#)  
*Reset WP (Watchpoint) Statistics Payload.*
- struct [LC\\_ResetWPStatsCmd\\_t](#)  
*Reset WP (Watchpoint) Statistics Command.*
- struct [LC\\_SampleAP\\_Payload\\_t](#)  
*Sample AP (Actionpoint) Payload.*
- struct [LC\\_SampleAPCmd\\_t](#)  
*Sample AP (Actionpoint) Request.*
- struct [LC\\_RTSRequest\\_Payload\\_t](#)  
*Payload to Start a Stored Command RTS.*
- struct [LC\\_RTSRequestCmd\\_t](#)  
*Send Command to Start a Stored Command RTS.*

### 10.8.1 Detailed Description

## 10.9 CFS Limit Checker Telemetry

### Data Structures

- struct [LC\\_HkTlm\\_Payload\\_t](#)  
*Housekeeping Payload Structure.*
- struct [LC\\_HkPacket\\_t](#)  
*Housekeeping Telemetry Structure Structure.*

#### 10.9.1 Detailed Description

## 10.10 cFE Return Code Defines

### Macros

- #define CFE\_SUCCESS ((CFE\_Status\_t)0)  
*Successful execution.*
- #define CFE\_STATUS\_NO\_COUNTER\_INCREMENT ((CFE\_Status\_t)0x48000001)  
*No Counter Increment.*
- #define CFE\_STATUS\_WRONG\_MSG\_LENGTH ((CFE\_Status\_t)0xc8000002)  
*Wrong Message Length.*
- #define CFE\_STATUS\_UNKNOWN\_MSG\_ID ((CFE\_Status\_t)0xc8000003)  
*Unknown Message ID.*
- #define CFE\_STATUS\_BAD\_COMMAND\_CODE ((CFE\_Status\_t)0xc8000004)  
*Bad Command Code.*
- #define CFE\_STATUS\_EXTERNAL\_RESOURCE\_FAIL ((CFE\_Status\_t)0xc8000005)  
*External failure.*
- #define CFE\_STATUS\_REQUEST\_ALREADY\_PENDING ((int32)0xc8000006)  
*Request already pending.*
- #define CFE\_STATUS\_VALIDATION\_FAILURE ((int32)0xc8000007)  
*Request or input value failed basic structural validation.*
- #define CFE\_STATUS\_RANGE\_ERROR ((int32)0xc8000008)  
*Request or input value is out of range.*
- #define CFE\_STATUS\_INCORRECT\_STATE ((int32)0xc8000009)  
*Cannot process request at this time.*
- #define CFE\_STATUS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc800ffff)  
*Not Implemented.*
- #define CFE\_EVS\_UNKNOWN\_FILTER ((CFE\_Status\_t)0xc2000001)  
*Unknown Filter.*
- #define CFE\_EVS\_APP\_NOT\_REGISTERED ((CFE\_Status\_t)0xc2000002)  
*Application Not Registered.*
- #define CFE\_EVS\_APP\_ILLEGAL\_APP\_ID ((CFE\_Status\_t)0xc2000003)  
*Illegal Application ID.*
- #define CFE\_EVS\_APP\_FILTER\_OVERLOAD ((CFE\_Status\_t)0xc2000004)  
*Application Filter Overload.*
- #define CFE\_EVS\_RESET\_AREA\_POINTER ((CFE\_Status\_t)0xc2000005)  
*Reset Area Pointer Failure.*
- #define CFE\_EVS\_EVT\_NOT\_REGISTERED ((CFE\_Status\_t)0xc2000006)  
*Event Not Registered.*
- #define CFE\_EVS\_FILE\_WRITE\_ERROR ((CFE\_Status\_t)0xc2000007)  
*File Write Error.*
- #define CFE\_EVS\_INVALID\_PARAMETER ((CFE\_Status\_t)0xc2000008)  
*Invalid Pointer.*
- #define CFE\_EVS\_APP\_SQUELCHED ((CFE\_Status\_t)0xc2000009)  
*Event squelched.*
- #define CFE\_EVS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc200ffff)  
*Not Implemented.*
- #define CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID ((CFE\_Status\_t)0xc4000001)  
*Resource ID is not valid.*

- #define CFE\_ES\_ERR\_NAME\_NOT\_FOUND ((CFE\_Status\_t)0xc4000002)  
*Resource Name Error.*
- #define CFE\_ES\_ERR\_APP\_CREATE ((CFE\_Status\_t)0xc4000004)  
*Application Create Error.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_CREATE ((CFE\_Status\_t)0xc4000005)  
*Child Task Create Error.*
- #define CFE\_ES\_ERR\_SYS\_LOG\_FULL ((CFE\_Status\_t)0xc4000006)  
*System Log Full.*
- #define CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE ((CFE\_Status\_t)0xc4000008)  
*Memory Block Size Error.*
- #define CFE\_ES\_ERR\_LOAD\_LIB ((CFE\_Status\_t)0xc4000009)  
*Load Library Error.*
- #define CFE\_ES\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc400000a)  
*Bad Argument.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER ((CFE\_Status\_t)0xc400000b)  
*Child Task Register Error.*
- #define CFE\_ES\_CDS\_ALREADY\_EXISTS ((CFE\_Status\_t)0x4400000d)  
*CDS Already Exists.*
- #define CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY ((CFE\_Status\_t)0xc400000e)  
*CDS Insufficient Memory.*
- #define CFE\_ES\_CDS\_INVALID\_NAME ((CFE\_Status\_t)0xc400000f)  
*CDS Invalid Name.*
- #define CFE\_ES\_CDS\_INVALID\_SIZE ((CFE\_Status\_t)0xc4000010)  
*CDS Invalid Size.*
- #define CFE\_ES\_CDS\_INVALID ((CFE\_Status\_t)0xc4000012)  
*CDS Invalid.*
- #define CFE\_ES\_CDS\_ACCESS\_ERROR ((CFE\_Status\_t)0xc4000013)  
*CDS Access Error.*
- #define CFE\_ES\_FILE\_IO\_ERR ((CFE\_Status\_t)0xc4000014)  
*File IO Error.*
- #define CFE\_ES\_RST\_ACCESS\_ERR ((CFE\_Status\_t)0xc4000015)  
*Reset Area Access Error.*
- #define CFE\_ES\_ERR\_APP\_REGISTER ((CFE\_Status\_t)0xc4000017)  
*Application Register Error.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE ((CFE\_Status\_t)0xc4000018)  
*Child Task Delete Error.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_MAIN\_TASK ((CFE\_Status\_t)0xc4000019)  
*Child Task Delete Passed Main Task.*
- #define CFE\_ES\_CDS\_BLOCK\_CRC\_ERR ((CFE\_Status\_t)0xc400001A)  
*CDS Block CRC Error.*
- #define CFE\_ES\_MUT\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001B)  
*Mutex Semaphore Delete Error.*
- #define CFE\_ES\_BIN\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001C)  
*Binary Semaphore Delete Error.*
- #define CFE\_ES\_COUNT\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001D)  
*Counting Semaphore Delete Error.*
- #define CFE\_ES\_QUEUE\_DELETE\_ERR ((CFE\_Status\_t)0xc400001E)

- #define CFE\_ES\_FILE\_CLOSE\_ERR ((CFE\_Status\_t)0xc400001F)  
*File Close Error.*
- #define CFE\_ES\_CDS\_WRONG\_TYPE\_ERR ((CFE\_Status\_t)0xc4000020)  
*CDS Wrong Type Error.*
- #define CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR ((CFE\_Status\_t)0xc4000022)  
*CDS Owner Active Error.*
- #define CFE\_ES\_APP\_CLEANUP\_ERR ((CFE\_Status\_t)0xc4000023)  
*Application Cleanup Error.*
- #define CFE\_ES\_TIMER\_DELETE\_ERR ((CFE\_Status\_t)0xc4000024)  
*Timer Delete Error.*
- #define CFE\_ES\_BUFFER\_NOT\_IN\_POOL ((CFE\_Status\_t)0xc4000025)  
*Buffer Not In Pool.*
- #define CFE\_ES\_TASK\_DELETE\_ERR ((CFE\_Status\_t)0xc4000026)  
*Task Delete Error.*
- #define CFE\_ES\_OPERATION\_TIMED\_OUT ((CFE\_Status\_t)0xc4000027)  
*Operation Timed Out.*
- #define CFE\_ES\_LIB\_ALREADY\_LOADED ((CFE\_Status\_t)0x44000028)  
*Library Already Loaded.*
- #define CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED ((CFE\_Status\_t)0x44000029)  
*System Log Message Truncated.*
- #define CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE ((CFE\_Status\_t)0xc400002B)  
*Resource ID is not available.*
- #define CFE\_ES\_POOL\_BLOCK\_INVALID ((CFE\_Status\_t)0xc400002C)  
*Invalid pool block.*
- #define CFE\_ES\_ERR\_DUPLICATE\_NAME ((CFE\_Status\_t)0xc400002E)  
*Duplicate Name Error.*
- #define CFE\_ES\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc400ffff)  
*Not Implemented.*
- #define CFE\_FS\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc6000001)  
*Bad Argument.*
- #define CFE\_FS\_INVALID\_PATH ((CFE\_Status\_t)0xc6000002)  
*Invalid Path.*
- #define CFE\_FS\_FNAME\_TOO\_LONG ((CFE\_Status\_t)0xc6000003)  
*Filename Too Long.*
- #define CFE\_FS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc600ffff)  
*Not Implemented.*
- #define CFE\_SB\_TIME\_OUT ((CFE\_Status\_t)0xca000001)  
*Time Out.*
- #define CFE\_SB\_NO\_MESSAGE ((CFE\_Status\_t)0xca000002)  
*No Message.*
- #define CFE\_SB\_BAD\_ARGUMENT ((CFE\_Status\_t)0xca000003)  
*Bad Argument.*
- #define CFE\_SB\_MAX\_PIPES\_MET ((CFE\_Status\_t)0xca000004)  
*Max Pipes Met.*
- #define CFE\_SB\_PIPE\_CR\_ERR ((CFE\_Status\_t)0xca000005)  
*Pipe Create Error.*

- #define CFE\_SB\_PIPE\_RD\_ERR ((CFE\_Status\_t)0xca000006)  
*Pipe Read Error.*
- #define CFE\_SB\_MSG\_TOO\_BIG ((CFE\_Status\_t)0xca000007)  
*Message Too Big.*
- #define CFE\_SB\_BUF\_ALOC\_ERR ((CFE\_Status\_t)0xca000008)  
*Buffer Allocation Error.*
- #define CFE\_SB\_MAX\_MSGS\_MET ((CFE\_Status\_t)0xca000009)  
*Max Messages Met.*
- #define CFE\_SB\_MAX\_DESTS\_MET ((CFE\_Status\_t)0xca00000a)  
*Max Destinations Met.*
- #define CFE\_SB\_INTERNAL\_ERR ((CFE\_Status\_t)0xca00000c)  
*Internal Error.*
- #define CFE\_SB\_WRONG\_MSG\_TYPE ((CFE\_Status\_t)0xca00000d)  
*Wrong Message Type.*
- #define CFE\_SB\_BUFFER\_INVALID ((CFE\_Status\_t)0xca00000e)  
*Buffer Invalid.*
- #define CFE\_SB\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xca00ffff)  
*Not Implemented.*
- #define CFE\_TBL\_ERR\_INVALID\_HANDLE ((CFE\_Status\_t)0xcc000001)  
*Invalid Handle.*
- #define CFE\_TBL\_ERR\_INVALID\_NAME ((CFE\_Status\_t)0xcc000002)  
*Invalid Name.*
- #define CFE\_TBL\_ERR\_INVALID\_SIZE ((CFE\_Status\_t)0xcc000003)  
*Invalid Size.*
- #define CFE\_TBL\_INFO\_UPDATE\_PENDING ((CFE\_Status\_t)0x4c000004)  
*Update Pending.*
- #define CFE\_TBL\_ERR\_NEVER\_LOADED ((CFE\_Status\_t)0xcc000005)  
*Never Loaded.*
- #define CFE\_TBL\_ERR\_REGISTRY\_FULL ((CFE\_Status\_t)0xcc000006)  
*Registry Full.*
- #define CFE\_TBL\_WARN\_DUPLICATE ((CFE\_Status\_t)0x4c000007)  
*Duplicate Warning.*
- #define CFE\_TBL\_ERR\_NO\_ACCESS ((CFE\_Status\_t)0xcc000008)  
*No Access.*
- #define CFE\_TBL\_ERR\_UNREGISTERED ((CFE\_Status\_t)0xcc000009)  
*Unregistered.*
- #define CFE\_TBL\_ERR\_HANDLES\_FULL ((CFE\_Status\_t)0xcc00000B)  
*Handles Full.*
- #define CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE ((CFE\_Status\_t)0xcc00000C)  
*Duplicate Table With Different Size.*
- #define CFE\_TBL\_ERR\_DUPLICATE\_NOT OWNED ((CFE\_Status\_t)0xcc00000D)  
*Duplicate Table And Not Owned.*
- #define CFE\_TBL\_INFO\_UPDATED ((CFE\_Status\_t)0x4c00000E)  
*Updated.*
- #define CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL ((CFE\_Status\_t)0xcc00000F)  
*No Buffer Available.*
- #define CFE\_TBL\_ERR\_DUMP\_ONLY ((CFE\_Status\_t)0xcc000010)

- Dump Only Error.*
- #define CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE ((CFE\_Status\_t)0xcc000011)  
*Illegal Source Type.*
  - #define CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS ((CFE\_Status\_t)0xcc000012)  
*Load In Progress.*
  - #define CFE\_TBL\_ERR\_FILE\_TOO\_LARGE ((CFE\_Status\_t)0xcc000014)  
*File Too Large.*
  - #define CFE\_TBL\_WARN\_SHORT\_FILE ((CFE\_Status\_t)0x4c000015)  
*Short File Warning.*
  - #define CFE\_TBL\_ERR\_BAD\_CONTENT\_ID ((CFE\_Status\_t)0xcc000016)  
*Bad Content ID.*
  - #define CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING ((CFE\_Status\_t)0x4c000017)  
*No Update Pending.*
  - #define CFE\_TBL\_INFO\_TABLE\_LOCKED ((CFE\_Status\_t)0x4c000018)  
*Table Locked.*
  - #define CFE\_TBL\_INFO\_VALIDATION\_PENDING ((CFE\_Status\_t)0x4c000019)
  - #define CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDING ((CFE\_Status\_t)0x4c00001A)
  - #define CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID ((CFE\_Status\_t)0xcc00001B)  
*Bad Subtype ID.*
  - #define CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT ((CFE\_Status\_t)0xcc00001C)  
*File Size Inconsistent.*
  - #define CFE\_TBL\_ERR\_NO\_STD\_HEADER ((CFE\_Status\_t)0xcc00001D)  
*No Standard Header.*
  - #define CFE\_TBL\_ERR\_NO\_TBL\_HEADER ((CFE\_Status\_t)0xcc00001E)  
*No Table Header.*
  - #define CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG ((CFE\_Status\_t)0xcc00001F)  
*Filename Too Long.*
  - #define CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE ((CFE\_Status\_t)0xcc000020)  
*File For Wrong Table.*
  - #define CFE\_TBL\_ERR\_LOAD\_INCOMPLETE ((CFE\_Status\_t)0xcc000021)  
*Load Incomplete.*
  - #define CFE\_TBL\_WARN\_PARTIAL\_LOAD ((CFE\_Status\_t)0x4c000022)  
*Partial Load Warning.*
  - #define CFE\_TBL\_ERR\_PARTIAL\_LOAD ((CFE\_Status\_t)0xcc000023)  
*Partial Load Error.*
  - #define CFE\_TBL\_INFO\_DUMP\_PENDING ((CFE\_Status\_t)0x4c000024)  
*Dump Pending.*
  - #define CFE\_TBL\_ERR\_INVALID\_OPTIONS ((CFE\_Status\_t)0xcc000025)  
*Invalid Options.*
  - #define CFE\_TBL\_WARN\_NOT\_CRITICAL ((CFE\_Status\_t)0x4c000026)  
*Not Critical Warning.*
  - #define CFE\_TBL\_INFO\_RECOVERED\_TBL ((CFE\_Status\_t)0x4c000027)  
*Recovered Table.*
  - #define CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID ((CFE\_Status\_t)0xcc000028)  
*Bad Spacecraft ID.*
  - #define CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID ((CFE\_Status\_t)0xcc000029)  
*Bad Processor ID.*

- #define CFE\_TBL\_MESSAGE\_ERROR ((CFE\_Status\_t)0xcc00002a)  
*Message Error.*
- #define CFE\_TBL\_ERR\_SHORT\_FILE ((CFE\_Status\_t)0xcc00002b)
- #define CFE\_TBL\_ERR\_ACCESS ((CFE\_Status\_t)0xcc00002c)
- #define CFE\_TBL\_BAD\_ARGUMENT ((CFE\_Status\_t)0xcc00002d)  
*Bad Argument.*
- #define CFE\_TBL\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xcc00ffff)  
*Not Implemented.*
- #define CFE\_TIME\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xce00ffff)  
*Not Implemented.*
- #define CFE\_TIME\_INTERNAL\_ONLY ((CFE\_Status\_t)0xce000001)  
*Internal Only.*
- #define CFE\_TIME\_OUT\_OF\_RANGE ((CFE\_Status\_t)0xce000002)  
*Out Of Range.*
- #define CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS ((CFE\_Status\_t)0xce000003)  
*Too Many Sync Callbacks.*
- #define CFE\_TIME\_CALLBACK\_NOT\_REGISTERED ((CFE\_Status\_t)0xce000004)  
*Callback Not Registered.*
- #define CFE\_TIME\_BAD\_ARGUMENT ((CFE\_Status\_t)0xce000005)  
*Bad Argument.*

#### 10.10.1 Detailed Description

#### 10.10.2 Macro Definition Documentation

##### 10.10.2.1 CFE\_ES\_APP\_CLEANUP\_ERR #define CFE\_ES\_APP\_CLEANUP\_ERR ((CFE\_Status\_t)0xc4000023)

Application Cleanup Error.

Occurs when an attempt was made to Clean Up an application which involves calling Table, EVS, and SB cleanup functions, then deleting all ES resources, child tasks, and unloading the object module. The approach here is to keep going even though one of these steps had an error. There will be syslog messages detailing each problem.

Definition at line 588 of file cfe\_error.h.

##### 10.10.2.2 CFE\_ES\_BAD\_ARGUMENT #define CFE\_ES\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc40000a)

Bad Argument.

Bad parameter passed into an ES API.

Definition at line 399 of file cfe\_error.h.

##### 10.10.2.3 CFE\_ES\_BIN\_SEM\_DELETE\_ERR #define CFE\_ES\_BIN\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001C)

Binary Semaphore Delete Error.

Occurs when trying to delete a Binary Semaphore that belongs to a task that ES is cleaning up.

Definition at line 527 of file cfe\_error.h.

##### 10.10.2.4 CFE\_ES\_BUFFER\_NOT\_IN\_POOL #define CFE\_ES\_BUFFER\_NOT\_IN\_POOL ((CFE\_Status\_t)0xc4000025)

Buffer Not In Pool.

The specified address is not in the memory pool.

Definition at line 605 of file cfe\_error.h.

**10.10.2.5 CFE\_ES\_CDS\_ACCESS\_ERROR** #define CFE\_ES\_CDS\_ACCESS\_ERROR (([CFE\\_Status\\_t](#))0xc4000013)  
CDS Access Error.

The CDS was inaccessible

Definition at line 458 of file cfe\_error.h.

**10.10.2.6 CFE\_ES\_CDS\_ALREADY\_EXISTS** #define CFE\_ES\_CDS\_ALREADY\_EXISTS (([CFE\\_Status\\_t](#))0x4400000d)  
CDS Already Exists.

The Application is receiving the pointer to a CDS that was already present.

Definition at line 415 of file cfe\_error.h.

**10.10.2.7 CFE\_ES\_CDS\_BLOCK\_CRC\_ERR** #define CFE\_ES\_CDS\_BLOCK\_CRC\_ERR (([CFE\\_Status\\_t](#))0xc400001A)  
CDS Block CRC Error.

Occurs when trying to read a CDS Data block and the CRC of the current data does not match the stored CRC for the data. Either the contents of the CDS Data Block are corrupted or the CDS Control Block is corrupted.

Definition at line 509 of file cfe\_error.h.

**10.10.2.8 CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY** #define CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY (([CFE\\_Status\\_t](#))0xc400000e)  
CDS Insufficient Memory.

The Application is requesting a CDS Block that is larger than the remaining CDS memory.

Definition at line 424 of file cfe\_error.h.

**10.10.2.9 CFE\_ES\_CDS\_INVALID** #define CFE\_ES\_CDS\_INVALID (([CFE\\_Status\\_t](#))0xc4000012)  
CDS Invalid.

The CDS contents are invalid.

Definition at line 450 of file cfe\_error.h.

**10.10.2.10 CFE\_ES\_CDS\_INVALID\_NAME** #define CFE\_ES\_CDS\_INVALID\_NAME (([CFE\\_Status\\_t](#))0xc400000f)  
CDS Invalid Name.

The Application is requesting a CDS Block with an invalid ASCII string name. Either the name is too long (> [CFE\\_MISSION\\_ES\\_CDS\\_MAX\\_NAME\\_LENGTH](#)) or was an empty string.

Definition at line 433 of file cfe\_error.h.

**10.10.2.11 CFE\_ES\_CDS\_INVALID\_SIZE** #define CFE\_ES\_CDS\_INVALID\_SIZE (([CFE\\_Status\\_t](#))0xc4000010)  
CDS Invalid Size.

The Application is requesting a CDS Block or Pool with a size beyond the applicable limits, either too large or too small/zero.

Definition at line 442 of file cfe\_error.h.

**10.10.2.12 CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR** #define CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR (([CFE\\_Status\\_t](#))0xc4000022)  
CDS Owner Active Error.

Occurs when an attempt was made to delete a CDS when an application with the same name associated with the CDS is still present. CDSs can ONLY be deleted when Applications that created them are not present in the system.

Definition at line 575 of file cfe\_error.h.

**10.10.2.13 CFE\_ES\_CDS\_WRONG\_TYPE\_ERR** #define CFE\_ES\_CDS\_WRONG\_TYPE\_ERR (([CFE\\_Status\\_t](#))0xc4000020)  
CDS Wrong Type Error.

Occurs when Table Services is trying to delete a Critical Data Store that is not a Critical Table Image or when Executive Services is trying to delete a Critical Table Image.

Definition at line 564 of file [cfe\\_error.h](#).

**10.10.2.14 CFE\_ES\_COUNT\_SEM\_DELETE\_ERR** #define CFE\_ES\_COUNT\_SEM\_DELETE\_ERR (([CFE\\_Status\\_t](#))0xc400001D)  
Counting Semaphore Delete Error.

Occurs when trying to delete a Counting Semaphore that belongs to a task that ES is cleaning up.

Definition at line 536 of file [cfe\\_error.h](#).

**10.10.2.15 CFE\_ES\_ERR\_APP\_CREATE** #define CFE\_ES\_ERR\_APP\_CREATE (([CFE\\_Status\\_t](#))0xc4000004)  
Application Create Error.

There was an error loading or creating the App.

Definition at line 358 of file [cfe\\_error.h](#).

**10.10.2.16 CFE\_ES\_ERR\_APP\_REGISTER** #define CFE\_ES\_ERR\_APP\_REGISTER (([CFE\\_Status\\_t](#))0xc4000017)  
Application Register Error.

Occurs when a task cannot be registered in ES global tables

Definition at line 482 of file [cfe\\_error.h](#).

**10.10.2.17 CFE\_ES\_ERR\_CHILD\_TASK\_CREATE** #define CFE\_ES\_ERR\_CHILD\_TASK\_CREATE (([CFE\\_Status\\_t](#))0xc4000005)  
Child Task Create Error.

There was an error creating a child task.

Definition at line 366 of file [cfe\\_error.h](#).

**10.10.2.18 CFE\_ES\_ERR\_CHILD\_TASK\_DELETE** #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE (([CFE\\_Status\\_t](#))0xc4000018)  
Child Task Delete Error.

There was an error deleting a child task.

Definition at line 490 of file [cfe\\_error.h](#).

**10.10.2.19 CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_MAIN\_TASK** #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_M←  
AIN\_TASK (([CFE\\_Status\\_t](#))0xc4000019)

Child Task Delete Passed Main Task.

There was an attempt to delete a cFE App Main Task with the [CFE\\_ES\\_DeleteChildTask](#) API.

Definition at line 499 of file [cfe\\_error.h](#).

**10.10.2.20 CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER** #define CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER (([CFE\\_Status\\_t](#))0xc400000b)  
Child Task Register Error.

Errors occurred when trying to register a child task.

Definition at line 407 of file [cfe\\_error.h](#).

**10.10.2.21 CFE\_ES\_ERR\_DUPLICATE\_NAME** #define CFE\_ES\_ERR\_DUPLICATE\_NAME (([CFE\\_Status\\_t](#))0xc400002E)  
Duplicate Name Error.

Resource creation failed due to the name already existing in the system.

Definition at line 668 of file cfe\_error.h.

**10.10.2.22 CFE\_ES\_ERR\_LOAD\_LIB** #define CFE\_ES\_ERR\_LOAD\_LIB (([CFE\\_Status\\_t](#))0xc4000009)

Load Library Error.

Could not load the shared library.

Definition at line 391 of file cfe\_error.h.

**10.10.2.23 CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE** #define CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE (([CFE\\_Status\\_t](#))0xc4000008)  
Memory Block Size Error.

The block size requested is invalid.

Definition at line 383 of file cfe\_error.h.

**10.10.2.24 CFE\_ES\_ERR\_NAME\_NOT\_FOUND** #define CFE\_ES\_ERR\_NAME\_NOT\_FOUND (([CFE\\_Status\\_t](#))0xc4000002)

Resource Name Error.

There is no match in the system for the given name.

Definition at line 350 of file cfe\_error.h.

**10.10.2.25 CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID** #define CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID (([CFE\\_Status\\_t](#))0xc4000000)

Resource ID is not valid.

This error indicates that the passed in resource identifier (App ID, Lib ID, Counter ID, etc) did not validate.

Definition at line 342 of file cfe\_error.h.

**10.10.2.26 CFE\_ES\_ERR\_SYS\_LOG\_FULL** #define CFE\_ES\_ERR\_SYS\_LOG\_FULL (([CFE\\_Status\\_t](#))0xc4000006)

System Log Full.

The cFE system Log is full. This error means the message was not logged at all

Definition at line 375 of file cfe\_error.h.

**10.10.2.27 CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED** #define CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED (([CFE\\_Status\\_t](#))0x44000029)

System Log Message Truncated.

This information code means the last syslog message was truncated due to insufficient space in the log buffer.

Definition at line 640 of file cfe\_error.h.

**10.10.2.28 CFE\_ES\_FILE\_CLOSE\_ERR** #define CFE\_ES\_FILE\_CLOSE\_ERR (([CFE\\_Status\\_t](#))0xc400001F)

File Close Error.

Occurs when trying to close a file that belongs to a task that ES is cleaning up.

Definition at line 554 of file cfe\_error.h.

**10.10.2.29 CFE\_ES\_FILE\_IO\_ERR** #define CFE\_ES\_FILE\_IO\_ERR (([CFE\\_Status\\_t](#))0xc4000014)

File IO Error.

Occurs when a file operation fails

Definition at line 466 of file cfe\_error.h.

**10.10.2.30 CFE\_ES\_LIB\_ALREADY\_LOADED** #define CFE\_ES\_LIB\_ALREADY\_LOADED ((CFE\_Status\_t)0x44000028)  
Library Already Loaded.

Occurs if CFE\_ES\_LoadLibrary detects that the requested library name is already loaded.

Definition at line 631 of file cfe\_error.h.

**10.10.2.31 CFE\_ES\_MUT\_SEM\_DELETE\_ERR** #define CFE\_ES\_MUT\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001B)  
Mutex Semaphore Delete Error.

Occurs when trying to delete a Mutex that belongs to a task that ES is cleaning up.

Definition at line 518 of file cfe\_error.h.

**10.10.2.32 CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE** #define CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE ((CFE\_Status\_t)0xc400001C)  
Resource ID is not available.

This error indicates that the maximum resource identifiers (App ID, Lib ID, Counter ID, etc) has already been reached and a new ID cannot be allocated.

Definition at line 650 of file cfe\_error.h.

**10.10.2.33 CFE\_ES\_NOT\_IMPLEMENTED** #define CFE\_ES\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc400ffff)  
Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 679 of file cfe\_error.h.

**10.10.2.34 CFE\_ES\_OPERATION\_TIMED\_OUT** #define CFE\_ES\_OPERATION\_TIMED\_OUT ((CFE\_Status\_t)0xc4000027)  
Operation Timed Out.

Occurs if the timeout for a given operation was exceeded

Definition at line 622 of file cfe\_error.h.

**10.10.2.35 CFE\_ES\_POOL\_BLOCK\_INVALID** #define CFE\_ES\_POOL\_BLOCK\_INVALID ((CFE\_Status\_t)0xc400002C)  
Invalid pool block.

Software attempted to "put" a block back into a pool which does not appear to belong to that pool. This may mean the pool has become unusable due to memory corruption.

Definition at line 660 of file cfe\_error.h.

**10.10.2.36 CFE\_ES\_QUEUE\_DELETE\_ERR** #define CFE\_ES\_QUEUE\_DELETE\_ERR ((CFE\_Status\_t)0xc400001E)  
Queue Delete Error.

Occurs when trying to delete a Queue that belongs to a task that ES is cleaning up.

Definition at line 545 of file cfe\_error.h.

**10.10.2.37 CFE\_ES\_RST\_ACCESS\_ERR** #define CFE\_ES\_RST\_ACCESS\_ERR ((CFE\_Status\_t)0xc4000015)  
Reset Area Access Error.

Occurs when the BSP is not successful in returning the reset area address.

Definition at line 474 of file cfe\_error.h.

**10.10.2.38 CFE\_ES\_TASK\_DELETE\_ERR** #define CFE\_ES\_TASK\_DELETE\_ERR (([CFE\\_Status\\_t](#))0xc4000026)  
Task Delete Error.

Occurs when trying to delete a task that ES is cleaning up.

Definition at line 614 of file [cfe\\_error.h](#).

**10.10.2.39 CFE\_ES\_TIMER\_DELETE\_ERR** #define CFE\_ES\_TIMER\_DELETE\_ERR (([CFE\\_Status\\_t](#))0xc4000024)  
Timer Delete Error.

Occurs when trying to delete a Timer that belongs to a task that ES is cleaning up.

Definition at line 597 of file [cfe\\_error.h](#).

**10.10.2.40 CFE\_EVS\_APP\_FILTER\_OVERLOAD** #define CFE\_EVS\_APP\_FILTER\_OVERLOAD (([CFE\\_Status\\_t](#))0xc2000004)  
Application Filter Overload.

Number of Application event filters input upon registration is greater than [CFE\\_PLATFORM\\_EVS\\_MAX\\_EVENT\\_FILTERS](#)

Definition at line 276 of file [cfe\\_error.h](#).

**10.10.2.41 CFE\_EVS\_APP\_ILLEGAL\_APP\_ID** #define CFE\_EVS\_APP\_ILLEGAL\_APP\_ID (([CFE\\_Status\\_t](#))0xc2000003)  
Illegal Application ID.

Application ID returned by [CFE\\_ES\\_GetAppIDByName](#) is greater than [CFE\\_PLATFORM\\_ES\\_MAX\\_APPLICATIONS](#)

Definition at line 267 of file [cfe\\_error.h](#).

**10.10.2.42 CFE\_EVS\_APP\_NOT\_REGISTERED** #define CFE\_EVS\_APP\_NOT\_REGISTERED (([CFE\\_Status\\_t](#))0xc2000002)

Application Not Registered.

Calling application never previously called [CFE\\_EVS\\_Register](#)

Definition at line 258 of file [cfe\\_error.h](#).

**10.10.2.43 CFE\_EVS\_APP\_SQUELCHED** #define CFE\_EVS\_APP\_SQUELCHED (([CFE\\_Status\\_t](#))0xc2000009)

Event squelched.

Event squelched due to being sent at too high a rate

Definition at line 318 of file [cfe\\_error.h](#).

**10.10.2.44 CFE\_EVS\_EVT\_NOT\_REGISTERED** #define CFE\_EVS\_EVT\_NOT\_REGISTERED (([CFE\\_Status\\_t](#))0xc2000006)

Event Not Registered.

[CFE\\_EVS\\_ResetFilter](#) EventID argument was not found in any event filter registered by the calling application.

Definition at line 294 of file [cfe\\_error.h](#).

**10.10.2.45 CFE\_EVS\_FILE\_WRITE\_ERROR** #define CFE\_EVS\_FILE\_WRITE\_ERROR (([CFE\\_Status\\_t](#))0xc2000007)

File Write Error.

A file write error occurred while processing an EVS command

Definition at line 302 of file [cfe\\_error.h](#).

**10.10.2.46 CFE\_EVS\_INVALID\_PARAMETER** #define CFE\_EVS\_INVALID\_PARAMETER (([CFE\\_Status\\_t](#))0xc2000008)

Invalid Pointer.

Invalid parameter supplied to EVS command

Definition at line 310 of file [cfe\\_error.h](#).

**10.10.2.47 CFE\_EVS\_NOT\_IMPLEMENTED** #define CFE\_EVS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc200ffff)  
Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 329 of file cfe\_error.h.

**10.10.2.48 CFE\_EVS\_RESET\_AREA\_POINTER** #define CFE\_EVS\_RESET\_AREA\_POINTER ((CFE\_Status\_t)0xc2000005)  
Reset Area Pointer Failure.

Could not get pointer to the ES Reset area, so we could not get the pointer to the EVS Log.

Definition at line 285 of file cfe\_error.h.

**10.10.2.49 CFE\_EVS\_UNKNOWN\_FILTER** #define CFE\_EVS\_UNKNOWN\_FILTER ((CFE\_Status\_t)0xc2000001)  
Unknown Filter.

[CFE\\_EVS\\_Register](#) FilterScheme parameter was illegal

Definition at line 250 of file cfe\_error.h.

**10.10.2.50 CFE\_FS\_BAD\_ARGUMENT** #define CFE\_FS\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc6000001)  
Bad Argument.

A parameter given by a caller to a File Services API did not pass validation checks.

Definition at line 692 of file cfe\_error.h.

**10.10.2.51 CFE\_FS\_FNAME\_TOO\_LONG** #define CFE\_FS\_FNAME\_TOO\_LONG ((CFE\_Status\_t)0xc6000003)  
Filename Too Long.

FS filename string is too long

Definition at line 708 of file cfe\_error.h.

**10.10.2.52 CFE\_FS\_INVALID\_PATH** #define CFE\_FS\_INVALID\_PATH ((CFE\_Status\_t)0xc6000002)  
Invalid Path.

FS was unable to extract a filename from a path string

Definition at line 700 of file cfe\_error.h.

**10.10.2.53 CFE\_FS\_NOT\_IMPLEMENTED** #define CFE\_FS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc600ffff)  
Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 719 of file cfe\_error.h.

**10.10.2.54 CFE\_SB\_BAD\_ARGUMENT** #define CFE\_SB\_BAD\_ARGUMENT ((CFE\_Status\_t)0xca000003)  
Bad Argument.

A parameter given by a caller to a Software Bus API did not pass validation checks.

Definition at line 750 of file cfe\_error.h.

**10.10.2.55 CFE\_SB\_BUF\_ALOC\_ERR** #define CFE\_SB\_BUF\_ALOC\_ERR (([CFE\\_Status\\_t](#))0xca000008)  
Buffer Allocation Error.

Returned when the memory in the SB message buffer pool has been depleted. The amount of memory in the pool is dictated by the configuration parameter [CFE\\_PLATFORM\\_SB\\_BUF\\_MEMORY\\_BYTES](#) specified in the [cfe\\_platform\\_cfg.h](#) file. Also the memory statistics, including current utilization figures and high water marks for the SB Buffer memory pool can be monitored by sending a Software Bus command to send the SB statistics packet.

Definition at line 808 of file [cfe\\_error.h](#).

**10.10.2.56 CFE\_SB\_BUFFER\_INVALID** #define CFE\_SB\_BUFFER\_INVALID (([CFE\\_Status\\_t](#))0xca00000e)  
Buffer Invalid.

This error code will be returned when a request to release or send a zero copy buffer is invalid, such as if the handle or buffer is not correct or the buffer was previously released.

Definition at line 859 of file [cfe\\_error.h](#).

**10.10.2.57 CFE\_SB\_INTERNAL\_ERR** #define CFE\_SB\_INTERNAL\_ERR (([CFE\\_Status\\_t](#))0xca00000c)  
Internal Error.

This error code will be returned by the [CFE\\_SB\\_Subscribe](#) API if the code detects an internal index is out of range. The most likely cause would be a Single Event Upset.

Definition at line 840 of file [cfe\\_error.h](#).

**10.10.2.58 CFE\_SB\_MAX\_DESTS\_MET** #define CFE\_SB\_MAX\_DESTS\_MET (([CFE\\_Status\\_t](#))0xca00000a)  
Max Destinations Met.

Will be returned when calling one of the SB subscription API's if the SB routing table cannot accommodate another destination for a particular the given message ID. This occurs when the number of destinations in use meets the platform configuration parameter [CFE\\_PLATFORM\\_SB\\_MAX\\_DEST\\_PER\\_PKT](#).

Definition at line 830 of file [cfe\\_error.h](#).

**10.10.2.59 CFE\_SB\_MAX\_MSGS\_MET** #define CFE\_SB\_MAX\_MSGS\_MET (([CFE\\_Status\\_t](#))0xca000009)  
Max Messages Met.

Will be returned when calling one of the SB subscription API's if the SB routing table cannot accommodate another unique message ID because the platform configuration parameter [CFE\\_PLATFORM\\_SB\\_MAX\\_MSG\\_IDS](#) has been met.

Definition at line 818 of file [cfe\\_error.h](#).

**10.10.2.60 CFE\_SB\_MAX\_PIPES\_MET** #define CFE\_SB\_MAX\_PIPES\_MET (([CFE\\_Status\\_t](#))0xca000004)  
Max Pipes Met.

This error code will be returned from [CFE\\_SB\\_CreatePipe](#) when the SB cannot accommodate the request to create a pipe because the maximum number of pipes ([CFE\\_PLATFORM\\_SB\\_MAX\\_PIPES](#)) are in use. This configuration parameter is defined in the [cfe\\_platform\\_cfg.h](#) file.

Definition at line 761 of file [cfe\\_error.h](#).

**10.10.2.61 CFE\_SB\_MSG\_TOO\_BIG** #define CFE\_SB\_MSG\_TOO\_BIG (([CFE\\_Status\\_t](#))0xca000007)  
Message Too Big.

The size field in the message header indicates the message exceeds the max Software Bus message size. The max size is defined by configuration parameter [CFE\\_MISSION\\_SB\\_MAX\\_SB\\_MSG\\_SIZE](#) in [cfe\\_mission\\_cfg.h](#)

Definition at line 795 of file [cfe\\_error.h](#).

**10.10.2.62 CFE\_SB\_NO\_MESSAGE** #define CFE\_SB\_NO\_MESSAGE ((CFE\_Status\_t)0xca000002)

No Message.

When "Polling" a pipe for a message in [CFE\\_SB\\_ReceiveBuffer](#), this return value indicates that there was not a message on the pipe.

Definition at line 741 of file cfe\_error.h.

**10.10.2.63 CFE\_SB\_NOT\_IMPLEMENTED** #define CFE\_SB\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xca00ffff)

Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 870 of file cfe\_error.h.

**10.10.2.64 CFE\_SB\_PIPE\_CR\_ERR** #define CFE\_SB\_PIPE\_CR\_ERR ((CFE\_Status\_t)0xca000005)

Pipe Create Error.

The maximum number of queues([OS\\_MAX\\_QUEUES](#)) are in use. Or possibly a lower level problem with creating the underlying queue has occurred such as a lack of memory. If the latter is the problem, the status code displayed in the event must be tracked.

Definition at line 772 of file cfe\_error.h.

**10.10.2.65 CFE\_SB\_PIPE\_RD\_ERR** #define CFE\_SB\_PIPE\_RD\_ERR ((CFE\_Status\_t)0xca000006)

Pipe Read Error.

This return value indicates an error at the Queue read level. This error typically cannot be corrected by the caller. Some possible causes are: queue was not properly initialized or created, the number of bytes read from the queue was not the number of bytes requested in the read. The queue id is invalid. Similar errors regarding the pipe will be caught by higher level code in the Software Bus.

Definition at line 785 of file cfe\_error.h.

**10.10.2.66 CFE\_SB\_TIME\_OUT** #define CFE\_SB\_TIME\_OUT ((CFE\_Status\_t)0xca000001)

Time Out.

In [CFE\\_SB\\_ReceiveBuffer](#), this return value indicates that a packet has not been received in the time given in the "timeout" parameter.

Definition at line 732 of file cfe\_error.h.

**10.10.2.67 CFE\_SB\_WRONG\_MSG\_TYPE** #define CFE\_SB\_WRONG\_MSG\_TYPE ((CFE\_Status\_t)0xca00000d)

Wrong Message Type.

This error code will be returned when a request such as [CFE\\_MSG\\_SetMsgTime](#) is made on a packet that does not include a field for msg time.

Definition at line 849 of file cfe\_error.h.

**10.10.2.68 CFE\_STATUS\_BAD\_COMMAND\_CODE** #define CFE\_STATUS\_BAD\_COMMAND\_CODE ((CFE\_Status\_t)0xc8000004)

Bad Command Code.

This error code will be returned when a message identification process determined that the command code is does not correspond to any known value

Definition at line 182 of file cfe\_error.h.

**10.10.2.69 CFE\_STATUS\_EXTERNAL\_RESOURCE\_FAIL** #define CFE\_STATUS\_EXTERNAL\_RESOURCE\_FA←  
IL ((CFE\_Status\_t) 0xc8000005)

External failure.

This error indicates that the operation failed for some reason outside the scope of CFE. The real failure may have been in OSAL, PSP, or another dependent library.

Details of the original failure should be written to syslog and/or a system event before returning this error.

Definition at line 194 of file cfe\_error.h.

**10.10.2.70 CFE\_STATUS\_INCORRECT\_STATE** #define CFE\_STATUS\_INCORRECT\_STATE ((int32) 0xc8000009)

Cannot process request at this time.

The system is not currently in the correct state to accept the request at this time.

Definition at line 227 of file cfe\_error.h.

**10.10.2.71 CFE\_STATUS\_NO\_COUNTER\_INCREMENT** #define CFE\_STATUS\_NO\_COUNTER\_INCREMENT ((CFE\_Status\_t) 0x48000000)

No Counter Increment.

Informational code indicating that a command was processed successfully but that the command counter should *not* be incremented.

Definition at line 155 of file cfe\_error.h.

**10.10.2.72 CFE\_STATUS\_NOT\_IMPLEMENTED** #define CFE\_STATUS\_NOT\_IMPLEMENTED ((CFE\_Status\_t) 0xc800ffff)

Not Implemented.

Current version does not have the function or the feature of the function implemented. This could be due to either an early build for this platform or the platform does not support the specified feature.

Definition at line 238 of file cfe\_error.h.

**10.10.2.73 CFE\_STATUS\_RANGE\_ERROR** #define CFE\_STATUS\_RANGE\_ERROR ((int32) 0xc8000008)

Request or input value is out of range.

A message, table, or function call input contained a value that was outside the acceptable range, and the request was rejected.

Definition at line 219 of file cfe\_error.h.

**10.10.2.74 CFE\_STATUS\_REQUEST\_ALREADY\_PENDING** #define CFE\_STATUS\_REQUEST\_ALREADY\_PENDI←

NG ((int32) 0xc8000006)

Request already pending.

Commands or requests are already pending or the pending request limit has been reached. No more requests can be made until the current request(s) complete.

Definition at line 203 of file cfe\_error.h.

**10.10.2.75 CFE\_STATUS\_UNKNOWN\_MSG\_ID** #define CFE\_STATUS\_UNKNOWN\_MSG\_ID ((CFE\_Status\_t) 0xc8000003)

Unknown Message ID.

This error code will be returned when a message identification process determined that the message ID does not correspond to a known value

Definition at line 173 of file cfe\_error.h.

**10.10.2.76 CFE\_STATUS\_VALIDATION\_FAILURE** #define CFE\_STATUS\_VALIDATION\_FAILURE ((int32)0xc8000007)  
Request or input value failed basic structural validation.

A message or table input was not in the proper format to be understood and processed by an application, and was rejected.

Definition at line 211 of file cfe\_error.h.

**10.10.2.77 CFE\_STATUS\_WRONG\_MSG\_LENGTH** #define CFE\_STATUS\_WRONG\_MSG\_LENGTH ((CFE\_Status\_t)0xc8000002)  
Wrong Message Length.

This error code will be returned when a message validation process determined that the message length is incorrect

Definition at line 164 of file cfe\_error.h.

**10.10.2.78 CFE\_SUCCESS** #define CFE\_SUCCESS ((CFE\_Status\_t)0)  
Successful execution.

Operation was performed successfully

Definition at line 147 of file cfe\_error.h.

**10.10.2.79 CFE\_TBL\_BAD\_ARGUMENT** #define CFE\_TBL\_BAD\_ARGUMENT ((CFE\_Status\_t)0xcc00002d)  
Bad Argument.

A parameter given by a caller to a Table API did not pass validation checks.

Definition at line 1281 of file cfe\_error.h.

**10.10.2.80 CFE\_TBL\_ERR\_ACCESS** #define CFE\_TBL\_ERR\_ACCESS ((CFE\_Status\_t)0xcc00002c)  
Error code indicating that the TBL file could not be opened by the OS.

Definition at line 1272 of file cfe\_error.h.

**10.10.2.81 CFE\_TBL\_ERR\_BAD\_CONTENT\_ID** #define CFE\_TBL\_ERR\_BAD\_CONTENT\_ID ((CFE\_Status\_t)0xcc000016)  
Bad Content ID.

The calling Application called [CFE\\_TBL\\_Load](#) with a filename that specified a file whose content ID was not that of a table image.

Definition at line 1064 of file cfe\_error.h.

**10.10.2.82 CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID** #define CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID ((CFE\_Status\_t)0xcc000029)  
Bad Processor ID.

The selected table file failed validation for Processor ID. The platform configuration file has verification of table files enabled for Processor ID and an attempt was made to load a table with an invalid Processor ID in the table file header.

Definition at line 1252 of file cfe\_error.h.

**10.10.2.83 CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID** #define CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID ((CFE\_Status\_t)0xcc000028)  
Bad Spacecraft ID.

The selected table file failed validation for Spacecraft ID. The platform configuration file has verification of table files enabled for Spacecraft ID and an attempt was made to load a table with an invalid Spacecraft ID in the table file header.

Definition at line 1241 of file cfe\_error.h.

**10.10.2.84 CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID** #define CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID ((CFE\_Status\_t)0xcc00001B)  
Bad Subtype ID.

The calling Application tried to access a table file whose Subtype identifier indicated it was not a table image file.  
Definition at line 1105 of file cfe\_error.h.

**10.10.2.85 CFE\_TBL\_ERR\_DUMP\_ONLY** #define CFE\_TBL\_ERR\_DUMP\_ONLY ((CFE\_Status\_t)0xcc000010)  
Dump Only Error.

The calling Application has attempted to perform a load on a table that was created with "Dump Only" attributes.  
Definition at line 1016 of file cfe\_error.h.

**10.10.2.86 CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE** #define CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE ((CFE\_Status\_t)0xcc00000C)  
Duplicate Table With Different Size.

An application attempted to register a table with the same name as a table that is already in the registry. The size of the new table is different from the size already in the registry.

Definition at line 977 of file cfe\_error.h.

**10.10.2.87 CFE\_TBL\_ERR\_DUPLICATE\_NOT\_OWNED** #define CFE\_TBL\_ERR\_DUPLICATE\_NOT\_OWNED ((CFE\_Status\_t)0xcc00000D)  
Duplicate Table And Not Owned.

An application attempted to register a table with the same name as a table that is already in the registry. The previously registered table is owned by a different application.

Definition at line 987 of file cfe\_error.h.

**10.10.2.88 CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE** #define CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE ((CFE\_Status\_t)0xcc00000E)  
File For Wrong Table.

The calling Application tried to load a table using a file whose header indicated that it was for a different table.  
Definition at line 1149 of file cfe\_error.h.

**10.10.2.89 CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT** #define CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT ((CFE\_Status\_t)0xcc00001C)  
File Size Inconsistent.

The calling Application tried to access a table file whose Subtype identifier indicated it was not a table image file.  
Definition at line 1114 of file cfe\_error.h.

**10.10.2.90 CFE\_TBL\_ERR\_FILE\_TOO\_LARGE** #define CFE\_TBL\_ERR\_FILE\_TOO\_LARGE ((CFE\_Status\_t)0xcc000014)  
File Too Large.

The calling Application called [CFE\\_TBL\\_Load](#) with a filename that specified a file that contained more data than the size of the table OR which contained more data than specified in the table header.

Definition at line 1044 of file cfe\_error.h.

**10.10.2.91 CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG** #define CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG ((CFE\_Status\_t)0xcc00001F)  
Filename Too Long.

The calling Application tried to load a table using a filename that was too long.  
Definition at line 1140 of file cfe\_error.h.

**10.10.2.92 CFE\_TBL\_ERR\_HANDLES\_FULL** #define CFE\_TBL\_ERR\_HANDLES\_FULL (([CFE\\_Status\\_t](#))0xcc00000B)  
Handles Full.

An application attempted to create a table and the Table Handle Array already used all CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES in it.

Definition at line 967 of file [cfe\\_error.h](#).

**10.10.2.93 CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE** #define CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE (([CFE\\_Status\\_t](#))0xcc000011)  
Illegal Source Type.

The calling Application called [CFE\\_TBL\\_Load](#) with an illegal value for the second parameter.

Definition at line 1025 of file [cfe\\_error.h](#).

**10.10.2.94 CFE\_TBL\_ERR\_INVALID\_HANDLE** #define CFE\_TBL\_ERR\_INVALID\_HANDLE (([CFE\\_Status\\_t](#))0xcc000001)  
Invalid Handle.

The calling Application attempted to pass a Table handle that represented too large an index or identified a Table Access Descriptor that was not used.

Definition at line 884 of file [cfe\\_error.h](#).

**10.10.2.95 CFE\_TBL\_ERR\_INVALID\_NAME** #define CFE\_TBL\_ERR\_INVALID\_NAME (([CFE\\_Status\\_t](#))0xcc000002)  
Invalid Name.

The calling Application attempted to register a table whose name length exceeded the platform configuration value of [CFE\\_MISSION\\_TBL\\_MAX\\_NAME\\_LENGTH](#) or was zero characters long.

Definition at line 894 of file [cfe\\_error.h](#).

**10.10.2.96 CFE\_TBL\_ERR\_INVALID\_OPTIONS** #define CFE\_TBL\_ERR\_INVALID\_OPTIONS (([CFE\\_Status\\_t](#))0xcc000025)  
Invalid Options.

The calling Application has used an illegal combination of table options. A summary of the illegal combinations are as follows:

#[CFE\\_TBL\\_OPT\\_USR\\_DEF\\_ADDR](#) cannot be combined with any of the following:

1. [CFE\\_TBL\\_OPT\\_DBL\\_BUFFER](#)
2. [CFE\\_TBL\\_OPT\\_LOAD\\_DUMP](#)
3. [CFE\\_TBL\\_OPT\\_CRITICAL](#)

#[CFE\\_TBL\\_OPT\\_DBL\\_BUFFER](#) cannot be combined with the following:

1. [CFE\\_TBL\\_OPT\\_USR\\_DEF\\_ADDR](#)
2. [CFE\\_TBL\\_OPT\\_DUMP\\_ONLY](#)

Definition at line 1206 of file [cfe\\_error.h](#).

**10.10.2.97 CFE\_TBL\_ERR\_INVALID\_SIZE** #define CFE\_TBL\_ERR\_INVALID\_SIZE (([CFE\\_Status\\_t](#))0xcc000003)  
Invalid Size.

The calling Application attempted to register a table: a) that was a double buffered table with size greater than [CFE\\_PLATFORM\\_TBL\\_MAX\\_DBL\\_TABLE\\_SIZE](#) b) that was a single buffered table with size greater than [CFE\\_PLATFORM\\_TBL\\_MAX\\_SNGL\\_TABLE\\_SIZE](#) c) that had a size of zero

Definition at line 905 of file [cfe\\_error.h](#).

**10.10.2.98 CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS** #define CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS ((CFE\_Status\_t)0xcc000012)  
Load In Progress.

The calling Application called [CFE\\_TBL\\_Load](#) when another Application was trying to load the table.  
Definition at line 1034 of file cfe\_error.h.

**10.10.2.99 CFE\_TBL\_ERR\_LOAD\_INCOMPLETE** #define CFE\_TBL\_ERR\_LOAD\_INCOMPLETE ((CFE\_Status\_t)0xcc000021)  
Load Incomplete.

The calling Application tried to load a table file whose header claimed the load was larger than what was actually read from the file.

Definition at line 1158 of file cfe\_error.h.

**10.10.2.100 CFE\_TBL\_ERR\_NEVER\_LOADED** #define CFE\_TBL\_ERR\_NEVER\_LOADED ((CFE\_Status\_t)0xcc000005)  
Never Loaded.

Table has not been loaded with data.

Definition at line 921 of file cfe\_error.h.

**10.10.2.101 CFE\_TBL\_ERR\_NO\_ACCESS** #define CFE\_TBL\_ERR\_NO\_ACCESS ((CFE\_Status\_t)0xcc000008)  
No Access.

The calling application either failed when calling [CFE\\_TBL\\_Register](#), failed when calling [CFE\\_TBL\\_Share](#) or forgot to call either one.

Definition at line 949 of file cfe\_error.h.

**10.10.2.102 CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL** #define CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL ((CFE\_Status\_t)0xcc00000F)  
No Buffer Available.

The calling Application has tried to allocate a working buffer but none were available.

Definition at line 1007 of file cfe\_error.h.

**10.10.2.103 CFE\_TBL\_ERR\_NO\_STD\_HEADER** #define CFE\_TBL\_ERR\_NO\_STD\_HEADER ((CFE\_Status\_t)0xcc00001D)  
No Standard Header.

The calling Application tried to access a table file whose standard cFE File Header was the wrong size, etc.

Definition at line 1122 of file cfe\_error.h.

**10.10.2.104 CFE\_TBL\_ERR\_NO\_TBL\_HEADER** #define CFE\_TBL\_ERR\_NO\_TBL\_HEADER ((CFE\_Status\_t)0xcc00001E)  
No Table Header.

The calling Application tried to access a table file whose standard cFE Table File Header was the wrong size, etc.

Definition at line 1131 of file cfe\_error.h.

**10.10.2.105 CFE\_TBL\_ERR\_PARTIAL\_LOAD** #define CFE\_TBL\_ERR\_PARTIAL\_LOAD ((CFE\_Status\_t)0xcc000023)  
Partial Load Error.

The calling Application tried to load a table file whose header claimed the load did not start with the first byte and the table image had NEVER been loaded before. Partial loads are not allowed on uninitialized tables. It should be noted that [CFE\\_TBL\\_WARN\\_SHORT\\_FILE](#) also indicates a partial load.

Definition at line 1180 of file cfe\_error.h.

**10.10.2.106 CFE\_TBL\_ERR\_REGISTRY\_FULL** #define CFE\_TBL\_ERR\_REGISTRY\_FULL (([CFE\\_Status\\_t](#))0xcc000006)  
Registry Full.

An application attempted to create a table and the Table registry already contained [CFE\\_PLATFORM\\_TBL\\_MAX\\_NUM\\_TABLES](#) in it.

Definition at line 930 of file [cfe\\_error.h](#).

**10.10.2.107 CFE\_TBL\_ERR\_SHORT\_FILE** #define CFE\_TBL\_ERR\_SHORT\_FILE (([CFE\\_Status\\_t](#))0xcc00002b)

Error code indicating that the TBL file is shorter than indicated in the file header.

Definition at line 1266 of file [cfe\\_error.h](#).

**10.10.2.108 CFE\_TBL\_ERR\_UNREGISTERED** #define CFE\_TBL\_ERR\_UNREGISTERED (([CFE\\_Status\\_t](#))0xcc000009)  
Unregistered.

The calling application is trying to access a table that has been unregistered.

Definition at line 958 of file [cfe\\_error.h](#).

**10.10.2.109 CFE\_TBL\_INFO\_DUMP\_PENDING** #define CFE\_TBL\_INFO\_DUMP\_PENDING (([CFE\\_Status\\_t](#))0x4c000024)  
Dump Pending.

The calling Application should call [CFE\\_TBL\\_Manage](#) for the specified table. The ground has requested a dump of the Dump-Only table and needs to synchronize with the owning application.

Definition at line 1190 of file [cfe\\_error.h](#).

**10.10.2.110 CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING** #define CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING (([CFE\\_Status\\_t](#))0x4c000017)  
No Update Pending.

The calling Application has attempted to update a table without a pending load.

Definition at line 1072 of file [cfe\\_error.h](#).

**10.10.2.111 CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDING** #define CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDI←  
NG (([CFE\\_Status\\_t](#))0x4c00001A)

No Validation Pending

The calling Application tried to validate a table that did not have a validation request pending.

Definition at line 1096 of file [cfe\\_error.h](#).

**10.10.2.112 CFE\_TBL\_INFO\_RECOVERED\_TBL** #define CFE\_TBL\_INFO\_RECOVERED\_TBL (([CFE\\_Status\\_t](#))0x4c000027)  
Recovered Table.

The calling Application registered a critical table whose previous contents were discovered in the Critical Data Store.

The discovered contents were copied back into the newly registered table as the table's initial contents.

**NOTE:** In this situation, the contents of the table are **NOT** validated using the table's validation function.

Definition at line 1230 of file [cfe\\_error.h](#).

**10.10.2.113 CFE\_TBL\_INFO\_TABLE\_LOCKED** #define CFE\_TBL\_INFO\_TABLE\_LOCKED (([CFE\\_Status\\_t](#))0x4c000018)  
Table Locked.

The calling Application tried to update a table that is locked by another user.

Definition at line 1080 of file [cfe\\_error.h](#).

**10.10.2.114 CFE\_TBL\_INFO\_UPDATE\_PENDING** #define CFE\_TBL\_INFO\_UPDATE\_PENDING (([CFE\\_Status\\_t](#))0x4c000004)  
Update Pending.

The calling Application has identified a table that has a load pending.

Definition at line 913 of file cfe\_error.h.

**10.10.2.115 CFE\_TBL\_INFO\_UPDATED** #define CFE\_TBL\_INFO\_UPDATED (([CFE\\_Status\\_t](#))0x4c00000E)  
Updated.

The calling Application has identified a table that has been updated.

**NOTE:** This is a nominal return code informing the calling application that the table identified in the call has had its contents updated since the last time the application obtained its address or status.

Definition at line 998 of file cfe\_error.h.

**10.10.2.116 CFE\_TBL\_INFO\_VALIDATION\_PENDING** #define CFE\_TBL\_INFO\_VALIDATION\_PENDING (([CFE\\_Status\\_t](#))0x4c000010)  
Validation Pending

The calling Application should call [CFE\\_TBL\\_Validate](#) for the specified table.

Definition at line 1088 of file cfe\_error.h.

**10.10.2.117 CFE\_TBL\_MESSAGE\_ERROR** #define CFE\_TBL\_MESSAGE\_ERROR (([CFE\\_Status\\_t](#))0xcc00002a)  
Message Error.

Error code indicating that the TBL command was not processed successfully and that the error counter should be incremented.

Definition at line 1260 of file cfe\_error.h.

**10.10.2.118 CFE\_TBL\_NOT\_IMPLEMENTED** #define CFE\_TBL\_NOT\_IMPLEMENTED (([CFE\\_Status\\_t](#))0xcc00ffff)  
Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 1292 of file cfe\_error.h.

**10.10.2.119 CFE\_TBL\_WARN\_DUPLICATE** #define CFE\_TBL\_WARN\_DUPLICATE (([CFE\\_Status\\_t](#))0x4c000007)  
Duplicate Warning.

This is an error that the registration is trying to replace an existing table with the same name. The previous table stays in place and the new table is rejected.

Definition at line 940 of file cfe\_error.h.

**10.10.2.120 CFE\_TBL\_WARN\_NOT\_CRITICAL** #define CFE\_TBL\_WARN\_NOT\_CRITICAL (([CFE\\_Status\\_t](#))0x4c000026)  
Not Critical Warning.

The calling Application attempted to register a table as "Critical". Table Services failed to create an appropriate Critical Data Store (See System Log for reason) to save the table contents. The table will be treated as a normal table from now on.

Definition at line 1217 of file cfe\_error.h.

**10.10.2.121 CFE\_TBL\_WARN\_PARTIAL\_LOAD** #define CFE\_TBL\_WARN\_PARTIAL\_LOAD (([CFE\\_Status\\_t](#))0x4c000022)  
Partial Load Warning.

The calling Application tried to load a table file whose header claimed the load did not start with the first byte. It should be noted that [CFE\\_TBL\\_WARN\\_SHORT\\_FILE](#) also indicates a partial load.

Definition at line 1168 of file `cfe_error.h`.

**10.10.2.122 CFE\_TBL\_WARN\_SHORT\_FILE** `#define CFE_TBL_WARN_SHORT_FILE ((CFE_Status_t)0x4c000015)`  
Short File Warning.

The calling Application called [CFE\\_TBL\\_Load](#) with a filename that specified a file that started with the first byte of the table but contained less data than the size of the table. It should be noted that [CFE\\_TBL\\_WARN\\_PARTIAL\\_LOAD](#) also indicates a partial load (one that starts at a non-zero offset).

Definition at line 1055 of file `cfe_error.h`.

**10.10.2.123 CFE\_TIME\_BAD\_ARGUMENT** `#define CFE_TIME_BAD_ARGUMENT ((CFE_Status_t)0xce000005)`  
Bad Argument.

A parameter given by a caller to a TIME Services API did not pass validation checks.

Definition at line 1364 of file `cfe_error.h`.

**10.10.2.124 CFE\_TIME\_CALLBACK\_NOT\_REGISTERED** `#define CFE_TIME_CALLBACK_NOT_REGISTERED ((CFE_Status_t)0xce000004)`  
Callback Not Registered.

An attempt to unregister a cFE Time Services Synchronization callback has failed because the specified callback function was not located in the Synchronization Callback Registry.

Definition at line 1355 of file `cfe_error.h`.

**10.10.2.125 CFE\_TIME\_INTERNAL\_ONLY** `#define CFE_TIME_INTERNAL_ONLY ((CFE_Status_t)0xce000001)`  
Internal Only.

One of the TIME Services API functions to set the time with data from an external time source has been called, but TIME Services has been commanded to not accept external time data. However, the command is still a signal for the Time Server to generate a "time at the tone" command packet using internal data.

Definition at line 1319 of file `cfe_error.h`.

**10.10.2.126 CFE\_TIME\_NOT\_IMPLEMENTED** `#define CFE_TIME_NOT_IMPLEMENTED ((CFE_Status_t)0xce00ffff)`  
Not Implemented.

Current version of cFE does not have the function or the feature of the function implemented. This could be due to either an early build of the cFE for this platform or the platform does not support the specified feature.

Definition at line 1307 of file `cfe_error.h`.

**10.10.2.127 CFE\_TIME\_OUT\_OF\_RANGE** `#define CFE_TIME_OUT_OF_RANGE ((CFE_Status_t)0xce000002)`  
Out Of Range.

One of the TIME Services API functions to set the time with data from an external time source has been called, but TIME Services has determined that the new time data is invalid. However, the command is still a signal for the Time Server to generate a "time at the tone" command packet using internal data.

Note that the test for invalid time update data only occurs if TIME Services has previously been commanded to set the clock state to "valid".

Definition at line 1334 of file `cfe_error.h`.

**10.10.2.128 CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS** #define CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS  
KS ((CFE\_Status\_t)0xce000003)

Too Many Sync Callbacks.

An attempt to register too many cFE Time Services Synchronization callbacks has been made. Only one callback function is allowed per application. It is expected that the application itself will distribute the single callback to child threads as needed.

Definition at line 1345 of file cfe\_error.h.

## 10.11 cFE Resource ID APIs

### Functions

- `CFE_Status_t CFE_ES_AppID_ToIndex (CFE_ES_AppId_t AppID, uint32 *Idx)`  
*Obtain an index value correlating to an ES Application ID.*
- `int32 CFE_ES_LibID_ToIndex (CFE_ES_LibId_t LibId, uint32 *Idx)`  
*Obtain an index value correlating to an ES Library ID.*
- `CFE_Status_t CFE_ES_TaskID_ToIndex (CFE_ES_TaskId_t TaskID, uint32 *Idx)`  
*Obtain an index value correlating to an ES Task ID.*
- `CFE_Status_t CFE_ES_CounterID_ToIndex (CFE_ES_CounterId_t CounterId, uint32 *Idx)`  
*Obtain an index value correlating to an ES Counter ID.*

#### 10.11.1 Detailed Description

#### 10.11.2 Function Documentation

**10.11.2.1 CFE\_ES\_AppID\_ToIndex()** `CFE_Status_t CFE_ES_AppID_ToIndex (`  
`CFE_ES_AppId_t AppID,`  
`uint32 * Idx )`

Obtain an index value correlating to an ES Application ID.

This calculates a zero based integer value that may be used for indexing into a local resource table/array.

Index values are only guaranteed to be unique for resources of the same type. For instance, the indices corresponding to two [valid] application IDs will never overlap, but the index of an application and a library ID may be the same. Furthermore, indices may be reused if a resource is deleted and re-created.

#### Note

There is no inverse of this function - indices cannot be converted back to the original AppID value. The caller should retain the original ID for future use.

#### Parameters

in	<i>AppID</i>	Application ID to convert
out	<i>Idx</i>	Buffer where the calculated index will be stored (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_ERR_RESOURCEID_NOT_VALID</code>	Resource ID is not valid.

**10.11.2.2 CFE\_ES\_CounterID\_ToIndex()** `CFE_Status_t CFE_ES_CounterID_ToIndex (`  
`CFE_ES_CounterId_t CounterId,`  
`uint32 * Idx )`

Obtain an index value correlating to an ES Counter ID.

This calculates a zero based integer value that may be used for indexing into a local resource table/array.

Index values are only guaranteed to be unique for resources of the same type. For instance, the indices corresponding to two [valid] Counter IDs will never overlap, but the index of a Counter and a library ID may be the same. Furthermore, indices may be reused if a resource is deleted and re-created.

#### Note

There is no inverse of this function - indices cannot be converted back to the original CounterID value. The caller should retain the original ID for future use.

#### Parameters

in	<i>Counter</i> <i>Id</i>	Counter ID to convert
out	<i>Idx</i>	Buffer where the calculated index will be stored (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.

**10.11.2.3 CFE\_ES\_LibID\_ToIndex()** `int32 CFE_ES_LibID_ToIndex (`  
    `CFE_ES_LibId_t LibId,`  
    `uint32 * Idx )`

Obtain an index value correlating to an ES Library ID.

This calculates a zero based integer value that may be used for indexing into a local resource table/array.

Index values are only guaranteed to be unique for resources of the same type. For instance, the indices corresponding to two [valid] Library IDs will never overlap, but the index of an Library and a library ID may be the same. Furthermore, indices may be reused if a resource is deleted and re-created.

#### Note

There is no inverse of this function - indices cannot be converted back to the original LibID value. The caller should retain the original ID for future use.

#### Parameters

in	<i>Lib</i> <i>Id</i>	Library ID to convert
out	<i>Idx</i>	Buffer where the calculated index will be stored (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

## Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.

```
10.11.2.4 CFE_ES_TaskID_ToIndex() CFE_Status_t CFE_ES_TaskID_ToIndex (
    CFE_ES_TaskId_t TaskID,
    uint32 * Idx )
```

Obtain an index value correlating to an ES Task ID.

This calculates a zero based integer value that may be used for indexing into a local resource table/array.

Index values are only guaranteed to be unique for resources of the same type. For instance, the indices corresponding to two [valid] Task IDs will never overlap, but the index of a Task and a library ID may be the same. Furthermore, indices may be reused if a resource is deleted and re-created.

## Note

There is no inverse of this function - indices cannot be converted back to the original TaskID value. The caller should retain the original ID for future use.

## Parameters

in	<i>TaskID</i>	Task ID to convert
out	<i>Idx</i>	Buffer where the calculated index will be stored (must not be null)

## Returns

Execution status, see [cFE Return Code Defines](#)

## Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

## 10.12 cFE Entry/Exit APIs

### Functions

- void [CFE\\_ES\\_Main](#) (uint32 StartType, uint32 StartSubtype, uint32 ModelId, const char \*StartFilePath)  
*cFE Main Entry Point used by Board Support Package to start cFE*
- [CFE\\_Status\\_t CFE\\_ES\\_ResetCFE](#) (uint32 ResetType)  
*Reset the cFE Core and all cFE Applications.*

#### 10.12.1 Detailed Description

#### 10.12.2 Function Documentation

**10.12.2.1 CFE\_ES\_Main()** void CFE\_ES\_Main (

```
    uint32 StartType,
    uint32 StartSubtype,
    uint32 ModelId,
    const char * StartFilePath )
```

cFE Main Entry Point used by Board Support Package to start cFE

#### Description

cFE main entry point. This is the entry point into the cFE software. It is called only by the Board Support Package software.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>StartType</i>	Identifies whether this was a <a href="#">CFE_PSP_RST_TYPE_POWERON</a> or <a href="#">CFE_PSP_RST_TYPE_PROCESSOR</a> .
in	<i>StartSubtype</i>	Specifies, in more detail, what caused the <i>StartType</i> identified above. See <a href="#">CFE_PSP_RST_SUBTYPE_POWER_CYCLE</a> for possible examples.
in	<i>ModelId</i>	Identifies the source of the Boot as determined by the BSP.
in	<i>StartFilePath</i>	Identifies the startup file to use to initialize the cFE apps.

#### See also

[CFE\\_ES\\_ResetCFE](#)

**10.12.2.2 CFE\_ES\_ResetCFE()** [CFE\\_Status\\_t CFE\\_ES\\_ResetCFE](#) (

```
    uint32 ResetType )
```

Reset the cFE Core and all cFE Applications.

#### Description

This API causes an immediate reset of the cFE Kernel and all cFE Applications. The caller can specify whether the reset should clear all memory ([CFE\\_PSP\\_RST\\_TYPE\\_POWERON](#)) or try to retain volatile memory areas ([CFE\\_PSP\\_RST\\_TYPE\\_PROCESSOR](#)).

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>ResetType</i>	Identifies the type of reset desired. Allowable settings are: <ul style="list-style-type: none"><li>• <a href="#">CFE_PSP_RST_TYPE_POWERON</a> - Causes all memory to be cleared</li><li>• <a href="#">CFE_PSP_RST_TYPE_PROCESSOR</a> - Attempts to retain volatile disk, critical data store and user reserved memory.</li></ul>
----	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_NOT_IMPLEMENTED</a>	Not Implemented.

**See also**

[CFE\\_ES\\_Main](#)

## 10.13 cFE Application Control APIs

### Functions

- `CFE_Status_t CFE_ES_RestartApp (CFE_ES_AppId_t AppID)`  
*Restart a single cFE Application.*
- `CFE_Status_t CFE_ES_ReloadApp (CFE_ES_AppId_t AppID, const char *AppFileName)`  
*Reload a single cFE Application.*
- `CFE_Status_t CFE_ES_DeleteApp (CFE_ES_AppId_t AppID)`  
*Delete a cFE Application.*

#### 10.13.1 Detailed Description

#### 10.13.2 Function Documentation

##### 10.13.2.1 `CFE_ES_DeleteApp()` `CFE_Status_t CFE_ES_DeleteApp (` `CFE_ES_AppId_t AppID )`

Delete a cFE Application.

#### Description

This API causes a cFE Application to be stopped deleted.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<code>AppID</code>	Identifies the application to be reset.
----	--------------------	---

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_ES_ERR_RESOURCEID_NOT_VALID</code>	Resource ID is not valid.
<code>CFE_SUCCESS</code>	Successful execution.

#### See also

[CFE\\_ES\\_RestartApp](#), [CFE\\_ES\\_ReloadApp](#)

##### 10.13.2.2 `CFE_ES_ReloadApp()` `CFE_Status_t CFE_ES_ReloadApp (` `CFE_ES_AppId_t AppID,` `const char * AppFileName )`

Reload a single cFE Application.

**Description**

This API causes a cFE Application to be stopped and restarted from the specified file.

**Assumptions, External Events, and Notes:**

The filename is checked for existence prior to load. A missing file will be reported and the reload operation will be aborted prior to unloading the app.

Goes through the standard CFE\_ES\_CleanUpApp which unloads, then attempts a load using the specified file name. In the event that an application cannot be reloaded due to a corrupt file, the application may no longer be reloaded when given a valid load file (it has been deleted and no longer exists). To recover, the application may be started by loading the application via the ES\_STARTAPP command ([CFE\\_ES\\_START\\_APP\\_CC](#)).

**Parameters**

in	<i>AppID</i>	Identifies the application to be reset.
in	<i>AppFileName</i>	Identifies the new file to start (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_FILE_IO_ERR</a>	File IO Error.

**See also**

[CFE\\_ES\\_RestartApp](#), [CFE\\_ES\\_DeleteApp](#), [CFE\\_ES\\_START\\_APP\\_CC](#)

### 10.13.2.3 [CFE\\_ES\\_RestartApp\(\)](#) `CFE_Status_t CFE_ES_RestartApp (` `CFE_ES_AppId_t AppID )`

Restart a single cFE Application.

**Description**

This API causes a cFE Application to be unloaded and restarted from the same file name as the last start.

**Assumptions, External Events, and Notes:**

The filename is checked for existence prior to load. A missing file will be reported and the reload operation will be aborted prior to unloading the app.

Goes through the standard CFE\_ES\_CleanUpApp which unloads, then attempts a load using the original file name. In the event that an application cannot be reloaded due to a missing file or any other load issue, the application may no longer be restarted or reloaded when given a valid load file (the app has been deleted and no longer exists). To recover, the application may be started by loading the application via the ES\_STARTAPP command ([CFE\\_ES\\_START\\_APP\\_CC](#)).

**Parameters**

in	<i>AppID</i>	Identifies the application to be reset.
----	--------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i></a>	Resource ID is not valid.
<a href="#"><i>CFE_ES_FILE_IO_ERR</i></a>	File IO Error.
<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.

**See also**

[CFE\\_ES\\_ReloadApp](#), [CFE\\_ES\\_DeleteApp](#)

## 10.14 cFE Application Behavior APIs

### Functions

- void [CFE\\_ES\\_ExitApp](#) ([uint32](#) ExitStatus)  
*Exit a cFE Application.*
- bool [CFE\\_ES\\_RunLoop](#) ([uint32](#) \*RunStatus)  
*Check for Exit, Restart, or Reload commands.*
- [CFE\\_Status\\_t CFE\\_ES\\_WaitForSystemState](#) ([uint32](#) MinSystemState, [uint32](#) TimeOutMilliseconds)  
*Allow an Application to Wait for a minimum global system state.*
- void [CFE\\_ES\\_WaitForStartupSync](#) ([uint32](#) TimeOutMilliseconds)  
*Allow an Application to Wait for the "OPERATIONAL" global system state.*
- void [CFE\\_ES\\_IncrementTaskCounter](#) (void)  
*Increments the execution counter for the calling task.*

### 10.14.1 Detailed Description

### 10.14.2 Function Documentation

#### 10.14.2.1 [CFE\\_ES\\_ExitApp\(\)](#) void CFE\_ES\_ExitApp (

[uint32](#) ExitStatus )

Exit a cFE Application.

##### Description

This API is the "Exit Point" for the cFE application

##### Assumptions, External Events, and Notes:

None

##### Parameters

in	<a href="#">ExitStatus</a>	Acceptable values are: <ul style="list-style-type: none"><li>• <a href="#">CFE_ES_RunStatus_APP_EXIT</a> - Indicates that the Application wants to exit normally.</li><li>• <a href="#">CFE_ES_RunStatus_APP_ERROR</a> - Indicates that the Application is quitting with an error.</li><li>• <a href="#">CFE_ES_RunStatus_CORE_APP_INIT_ERROR</a> - Indicates that the Core Application could not Init.</li><li>• <a href="#">CFE_ES_RunStatus_CORE_APP_RUNTIME_ERROR</a> - Indicates that the Core Application had a runtime failure.</li></ul>
----	----------------------------	--

##### See also

[CFE\\_ES\\_RunLoop](#)

Referenced by [LC\\_AppMain\(\)](#).

```
10.14.2.2 CFE_ES_IncrementTaskCounter() void CFE_ES_IncrementTaskCounter (
    void )
```

Increments the execution counter for the calling task.

#### Description

This routine increments the execution counter that is stored for the calling task. It can be called from cFE Application main tasks, child tasks, or cFE Core application main tasks. Normally, the call is not necessary from a cFE Application, since the CFE\_ES\_RunLoop call increments the counter for the Application.

#### Assumptions, External Events, and Notes:

NOTE: This API is not needed for Applications that call the CFE\_ES\_RunLoop call.

#### See also

[CFE\\_ES\\_RunLoop](#)

```
10.14.2.3 CFE_ES_RunLoop() bool CFE_ES_RunLoop (
    uint32 * RunStatus )
```

Check for Exit, Restart, or Reload commands.

#### Description

This is the API that allows an app to check for exit requests from the system, or request shutdown from the system.

#### Assumptions, External Events, and Notes:

This API updates the internal task counter tracked by ES for the calling task. For ES to report application counters correctly this API should be called from the main app task as part of it's main processing loop.

In the event of a externally initiated app shutdown request (such as the APP\_STOP, APP\_RELOAD, and APP\_RESET commands) or if a system error occurs requiring the app to be shut down administratively, this function returns "false" and optionally sets the "RunStatus" output to further indicate the specific application state.

If "RunStatus" is passed as non-NULL, it should point to a local status variable containing the requested status to ES. Normally, this should be initialized to [CFE\\_ES\\_RunStatus\\_APP\\_RUN](#) during application start up, and should remain as this value during normal operation.

If "RunStatus" is set to [CFE\\_ES\\_RunStatus\\_APP\\_EXIT](#) or [CFE\\_ES\\_RunStatus\\_APP\\_ERROR](#) on input, this acts as a shutdown request - [CFE\\_ES\\_RunLoop\(\)](#) function will return "false", and a shutdown will be initiated similar to if ES had been externally commanded to shut down the app.

If "RunStatus" is not used, it should be passed as NULL. In this mode, only the boolean return value is relevant, which will indicate if an externally-initiated shutdown request is pending.

#### Parameters

in, out	<i>RunStatus</i>	Optional pointer to a variable containing the desired run status
---------	------------------	--

#### Returns

Boolean indicating application should continue running

**Return values**

<i>true</i>	Application should continue running
<i>false</i>	Application should not continue running

**See also**

[CFE\\_ES\\_ExitApp](#)

Referenced by LC\_AppMain().

**10.14.2.4 CFE\_ES\_WaitForStartupSync()** `void CFE_ES_WaitForStartupSync (`  
`uint32 TimeOutMilliseconds )`

Allow an Application to Wait for the "OPERATIONAL" global system state.

**Description**

This is the API that allows an app to wait for the rest of the apps to complete their entire initialization before continuing. It is most useful for applications such as Health and Safety or the Scheduler that need to wait until applications exist and are running before sending out packets to them.

This is a specialized wrapper for CFE\_ES\_WaitForSystemState for compatibility with applications using this API.

**Assumptions, External Events, and Notes:**

This API should only be called as the last item of an Apps initialization. In addition, this API should only be called by an App that is started from the ES Startup file. It should not be used by an App that is started after the system is running. ( Although it will cause no harm )

**Parameters**

<i>in</i>	<i>TimeOutMilliseconds</i>	The timeout value in Milliseconds. This parameter must be at least 1000. Lower values will be rounded up. There is not an option to wait indefinitely to avoid hanging a critical application because a non-critical app did not start.
-----------	----------------------------	---

**See also**

[CFE\\_ES\\_RunLoop](#)

**10.14.2.5 CFE\_ES\_WaitForSystemState()** `CFE_Status_t CFE_ES_WaitForSystemState (`  
`uint32 MinSystemState,`  
`uint32 TimeOutMilliseconds )`

Allow an Application to Wait for a minimum global system state.

**Description**

This is the API that allows an app to wait for the rest of the apps to complete a given stage of initialization before continuing.

This gives finer grained control than [CFE\\_ES\\_WaitForStartupSync](#)

**Assumptions, External Events, and Notes:**

This API assumes that the caller has also been initialized sufficiently to satisfy the global system state it is waiting for, and the apps own state will be updated accordingly.

**Parameters**

in	<i>MinSystemState</i>	Determine the state of the App
in	<i>TimeOutMilliseconds</i>	The timeout value in Milliseconds. There is not an option to wait indefinitely to avoid hanging a critical application because a non-critical app did not start.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	State successfully achieved
<i>CFE_ES_OPERATION_TIMED_OUT</i>	(return value only verified in coverage test) Timeout was reached

**See also**

[CFE\\_ES\\_RunLoop](#)

## 10.15 cFE Information APIs

### Functions

- `int32 CFE_ES_GetResetType (uint32 *ResetSubtypePtr)`  
*Return the most recent Reset Type.*
- `CFE_Status_t CFE_ES_GetAppID (CFE_ES_AppId_t *AppIdPtr)`  
*Get an Application ID for the calling Application.*
- `CFE_Status_t CFE_ES_GetTaskID (CFE_ES_TaskId_t *TaskIdPtr)`  
*Get the task ID of the calling context.*
- `CFE_Status_t CFE_ES_GetAppIDByName (CFE_ES_AppId_t *AppIdPtr, const char *AppName)`  
*Get an Application ID associated with a specified Application name.*
- `CFE_Status_t CFE_ES_GetLibIDByName (CFE_ES_LibId_t *LibIdPtr, const char *LibName)`  
*Get a Library ID associated with a specified Library name.*
- `CFE_Status_t CFE_ES_GetAppName (char *AppName, CFE_ES_AppId_t AppId, size_t BufferLength)`  
*Get an Application name for a specified Application ID.*
- `CFE_Status_t CFE_ES_GetLibName (char *LibName, CFE_ES_LibId_t LibId, size_t BufferLength)`  
*Get a Library name for a specified Library ID.*
- `CFE_Status_t CFE_ES_GetAppInfo (CFE_ES_AppInfo_t *AppInfo, CFE_ES_AppId_t AppId)`  
*Get Application Information given a specified App ID.*
- `CFE_Status_t CFE_ES_GetTaskInfo (CFE_ES_TaskInfo_t *TaskInfo, CFE_ES_TaskId_t TaskId)`  
*Get Task Information given a specified Task ID.*
- `int32 CFE_ES_GetLibInfo (CFE_ES_AppInfo_t *LibInfo, CFE_ES_LibId_t LibId)`  
*Get Library Information given a specified Resource ID.*
- `int32 CFE_ES_GetModuleInfo (CFE_ES_AppInfo_t *ModuleInfo, CFE_Resourceld_t Resourceld)`  
*Get Information given a specified Resource ID.*

### 10.15.1 Detailed Description

### 10.15.2 Function Documentation

**10.15.2.1 CFE\_ES\_GetAppID()** `CFE_Status_t CFE_ES_GetAppID (`  
`CFE_ES_AppId_t * AppIdPtr )`

Get an Application ID for the calling Application.

#### Description

This routine retrieves the cFE Application ID for the calling Application.

#### Assumptions, External Events, and Notes:

NOTE: All tasks associated with the Application would return the same Application ID.

#### Parameters

<code>out</code>	<code>AppIdPtr</code>	Pointer to variable that is to receive the Application's ID (must not be null). <code>*AppIdPtr</code> will be set to the application ID of the calling Application.
------------------	-----------------------	--

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_GetResetType](#), [CFE\\_ES\\_GetAppIDByName](#), [CFE\\_ES\\_GetAppName](#), [CFE\\_ES\\_GetTaskInfo](#)

**10.15.2.2 CFE\_ES\_GetAppIDByName()** *CFE\_Status\_t* CFE\_ES\_GetAppIDByName (

```
    CFE_ES_AppId_t * AppIdPtr,  
    const char * AppName )
```

Get an Application ID associated with a specified Application name.

**Description**

This routine retrieves the cFE Application ID associated with a specified Application name.

**Assumptions, External Events, and Notes:**

None

**Parameters**

<i>out</i>	<i>AppIdPtr</i>	Pointer to variable that is to receive the Application's ID (must not be null).
<i>in</i>	<i>AppName</i>	Pointer to null terminated character string containing an Application name (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_NAME_NOT_FOUND</i>	Resource Name Error.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_GetAppID](#), [CFE\\_ES\\_GetAppName](#), [CFE\\_ES\\_GetAppInfo](#)

**10.15.2.3 CFE\_ES\_GetAppInfo()** *CFE\_Status\_t* CFE\_ES\_GetAppInfo (

```
    CFE_ES_AppInfo_t * AppInfo,
```

`CFE_ES_AppId_t AppId )`

Get Application Information given a specified App ID.

#### Description

This routine retrieves the information about an App associated with a specified App ID. The information includes all of the information ES maintains for an application ( documented in the `CFE_ES_AppInfo_t` type )

#### Assumptions, External Events, and Notes:

None

#### Parameters

out	<i>AppInfo</i>	Pointer to a structure (must not be null) that will be filled with resource name and memory addresses information.
in	<i>AppId</i>	ID of application to obtain information about

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_ERR_RESOURCEID_NOT_VALID</code>	Resource ID is not valid.
<code>CFE_ES_BAD_ARGUMENT</code>	Bad Argument.

#### See also

[CFE\\_ES\\_GetAppID](#), [CFE\\_ES\\_GetAppIDByName](#), [CFE\\_ES\\_GetAppName](#)

#### 10.15.2.4 CFE\_ES\_GetAppName()

```
CFE_Status_t CFE_ES_GetAppName (
    char * AppName,
    CFE_ES_AppId_t AppId,
    size_t BufferLength )
```

Get an Application name for a specified Application ID.

#### Description

This routine retrieves the cFE Application name associated with a specified Application ID.

#### Assumptions, External Events, and Notes:

In the case of a failure (`CFE_ES_ERR_RESOURCEID_NOT_VALID`), an empty string is returned.

#### Parameters

out	<i>AppName</i>	Pointer to a character array (must not be null) of at least <code>BufferLength</code> in size that will be filled with the appropriate Application name.
in	<i>AppId</i>	Application ID of Application whose name is being requested.
in	<i>BufferLength</i>	The maximum number of characters, including the null terminator, that can be put into the <code>AppName</code> buffer. This routine will truncate the name to this length, if necessary.
<small>Generated by Doxygen</small>		

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i></a>	Resource ID is not valid.
<a href="#"><i>CFE_ES_BAD_ARGUMENT</i></a>	Bad Argument.

**See also**

[CFE\\_ES\\_GetAppID](#), [CFE\\_ES\\_GetAppIDByName](#), [CFE\\_ES\\_GetAppInfo](#)

**10.15.2.5 CFE\_ES\_GetLibIDByName()** [\*CFE\\_Status\\_t\*](#) CFE\_ES\_GetLibIDByName (   
   [\*CFE\\_ES\\_LibId\\_t\*](#) \* *LibIdPtr*,  
   const char \* *LibName* )

Get a Library ID associated with a specified Library name.

**Description**

This routine retrieves the cFE Library ID associated with a specified Library name.

**Assumptions, External Events, and Notes:**

None

**Parameters**

<a href="#"><i>out</i></a>	<i>LibIdPtr</i>	Pointer to variable that is to receive the Library's ID (must not be null).
<a href="#"><i>in</i></a>	<i>LibName</i>	Pointer to null terminated character string containing a Library name (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_ES_ERR_NAME_NOT_FOUND</i></a>	Resource Name Error.
<a href="#"><i>CFE_ES_BAD_ARGUMENT</i></a>	Bad Argument.

**See also**

[CFE\\_ES\\_GetLibName](#)

**10.15.2.6 CFE\_ES\_GetLibInfo()** [\*int32\*](#) CFE\_ES\_GetLibInfo (   
   [\*CFE\\_ES\\_AppInfo\\_t\*](#) \* *LibInfo*,

```
CFE_ES_LibId_t LibId )
```

Get Library Information given a specified Resource ID.

#### Description

This routine retrieves the information about a Library associated with a specified ID. The information includes all of the information ES maintains for this resource type ( documented in the CFE\_ES\_AppInfo\_t type ).

This shares the same output structure as CFE\_ES\_GetAppInfo, such that informational commands can be executed against either applications or libraries. When applied to a library, the task information in the structure will be omitted, as libraries do not have tasks associated.

#### Assumptions, External Events, and Notes:

None

#### Parameters

out	<i>LibInfo</i>	Pointer to a structure (must not be null) that will be filled with resource name and memory addresses information.
in	<i>LibId</i>	ID of application to obtain information about

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

#### See also

[CFE\\_ES\\_GetLibIDByName](#), [CFE\\_ES\\_GetLibName](#)

```
10.15.2.7 CFE_ES_GetLibName() CFE_Status_t CFE_ES_GetLibName (
    char * LibName,
    CFE_ES_LibId_t LibId,
    size_t BufferLength )
```

Get a Library name for a specified Library ID.

#### Description

This routine retrieves the cFE Library name associated with a specified Library ID.

#### Assumptions, External Events, and Notes:

In the case of a failure ([CFE\\_ES\\_ERR\\_RESOURCEID\\_NOT\\_VALID](#)), an empty string is returned.

**Parameters**

<i>out</i>	<i>LibName</i>	Pointer to a character array (must not be null) of at least <i>BufferLength</i> in size that will be filled with the Library name.
<i>in</i>	<i>LibId</i>	Library ID of Library whose name is being requested.
<i>in</i>	<i>BufferLength</i>	The maximum number of characters (must not be zero), including the null terminator, that can be put into the <i>LibName</i> buffer. This routine will truncate the name to this length, if necessary.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_GetLibIDByName](#)

**10.15.2.8 CFE\_ES\_GetModuleInfo()** `int32 CFE_ES_GetModuleInfo ( CFE_ES_AppInfo_t * ModuleInfo, CFE_ResourceId_t ResourceId )`

Get Information given a specified Resource ID.

**Description**

This routine retrieves the information about an Application or Library associated with a specified ID.

This is a wrapper API that in turn calls either CFE\_ES\_GetAppInfo or CFE\_ES\_GetLibInfo if passed an AppId or LibId, respectively.

This allows commands originally targeted to operate on AppIDs to be easily ported to operate on either Libraries or Applications, where relevant.

**Assumptions, External Events, and Notes:**

None

**Parameters**

<i>out</i>	<i>ModuleInfo</i>	Pointer to a structure (must not be null) that will be filled with resource name and memory addresses information.
<i>in</i>	<i>ResourceId</i>	ID of application or library to obtain information about

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_GetLibInfo](#), [CFE\\_ES\\_GetApplInfo](#)

### 10.15.2.9 CFE\_ES\_GetResetType()

```
int32 CFE_ES_GetResetType (
    uint32 * ResetSubtypePtr )
```

Return the most recent Reset Type.

**Description**

Provides the caller with codes that identifies the type of Reset the processor most recently underwent. The caller can also obtain information on what caused the reset by supplying a pointer to a variable that will be filled with the Reset Sub-Type.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in, out	<i>ResetSubtypePtr</i>	Pointer to <code>uint32</code> type variable in which the Reset Sub-Type will be stored. The caller can set this pointer to NULL if the Sub-Type is of no interest. <i>ResetSubtypePtr</i> If the provided pointer was not NULL, the Reset Sub-Type is stored at the given address. For a list of possible Sub-Type values, see " <a href="#">Reset Sub-Types</a> ".
---------	------------------------	---

**Returns**

Processor reset type

**Return values**

<a href="#">CFE_PSP_RST_TYPE_POWERON</a>	
<a href="#">CFE_PSP_RST_TYPE_PROCESSOR</a>	

**See also**

[CFE\\_ES\\_GetAppID](#), [CFE\\_ES\\_GetAppIDByName](#), [CFE\\_ES\\_GetAppName](#), [CFE\\_ES\\_GetTaskInfo](#)

---

**10.15.2.10 CFE\_ES\_GetTaskID()** `CFE_Status_t CFE_ES_GetTaskID (`  
 `CFE_ES_TaskId_t * TaskIdPtr )`

Get the task ID of the calling context.

#### Description

This retrieves the current task context from OSAL

#### Assumptions, External Events, and Notes:

Applications which desire to call other CFE ES services such as CFE\_ES\_TaskGetInfo() should use this API rather than getting the ID from OSAL directly via [OS\\_TaskGetId\(\)](#).

#### Parameters

out	<i>TaskIdPtr</i>	Pointer to variable that is to receive the ID (must not be null). Will be set to the ID of the calling task.
-----	------------------	--

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**10.15.2.11 CFE\_ES\_GetTaskInfo()** `CFE_Status_t CFE_ES_GetTaskInfo (`  
 `CFE_ES_TaskInfo_t * TaskInfo,`  
 `CFE_ES_TaskId_t TaskId )`

Get Task Information given a specified Task ID.

#### Description

This routine retrieves the information about a Task associated with a specified Task ID. The information includes Task Name, and Parent/Creator Application ID.

#### Assumptions, External Events, and Notes:

None

#### Parameters

out	<i>TaskInfo</i>	Pointer to a <code>CFE_ES_TaskInfo_t</code> structure (must not be null) that holds the specific task information. <code>*TaskInfo</code> is the filled out <code>CFE_ES_TaskInfo_t</code> structure containing the Task Name, Parent App Name, Parent App ID among other fields.
in	<i>TaskId</i>	Application ID of Application whose name is being requested.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i></a>	Resource ID is not valid.
<a href="#"><i>CFE_ES_BAD_ARGUMENT</i></a>	Bad Argument.

**See also**

[CFE\\_ES\\_GetTaskID](#), [CFE\\_ES\\_GetTaskIDByName](#), [CFE\\_ES\\_GetTaskName](#)

## 10.16 cFE Child Task APIs

### Functions

- `CFE_Status_t CFE_ES_CreateChildTask (CFE_ES_TaskId_t *TaskIdPtr, const char *TaskName, CFE_ES_ChildTaskMainFuncPtr FunctionPtr, CFE_ES_StackPointer_t StackPtr, size_t StackSize, CFE_ES_TaskPriority_Atom_t Priority, uint32 Flags)`

*Creates a new task under an existing Application.*
- `CFE_Status_t CFE_ES_GetTaskIDByName (CFE_ES_TaskId_t *TaskIdPtr, const char *TaskName)`

*Get a Task ID associated with a specified Task name.*
- `CFE_Status_t CFE_ES_GetTaskName (char *TaskName, CFE_ES_TaskId_t TaskId, size_t BufferLength)`

*Get a Task name for a specified Task ID.*
- `CFE_Status_t CFE_ES_DeleteChildTask (CFE_ES_TaskId_t TaskId)`

*Deletes a task under an existing Application.*
- `void CFE_ES_ExitChildTask (void)`

*Exits a child task.*

### 10.16.1 Detailed Description

### 10.16.2 Function Documentation

**10.16.2.1 CFE\_ES\_CreateChildTask()** `CFE_Status_t CFE_ES_CreateChildTask (`

```
    CFE_ES_TaskId_t * TaskIdPtr,
    const char * TaskName,
    CFE_ES_ChildTaskMainFuncPtr_t FunctionPtr,
    CFE_ES_StackPointer_t StackPtr,
    size_t StackSize,
    CFE_ES_TaskPriority_Atom_t Priority,
    uint32 Flags )
```

Creates a new task under an existing Application.

#### Description

This routine creates a new task (a separate execution thread) owned by the calling Application.

#### Assumptions, External Events, and Notes:

None

#### Parameters

<code>out</code>	<code>TaskIdPtr</code>	A pointer to a variable that will be filled in with the new task's ID (must not be null). TaskIdPtr is the Task ID of the newly created child task.
<code>in</code>	<code>TaskName</code>	A pointer to a string containing the desired name of the new task (must not be null). This can be up to <code>OS_MAX_API_NAME</code> characters, including the trailing null.
<code>in</code>	<code>FunctionPtr</code>	A pointer to the function that will be spawned as a new task (must not be null).
<code>in</code>	<code>StackPtr</code>	A pointer to the location where the child task's stack pointer should start. NOTE: Not all underlying operating systems support this parameter. The <code>CFE_ES_TASK_STACK_ALLOCATE</code> constant may be passed to indicate that the stack should be dynamically allocated.
<code>in</code>	<code>StackSize</code>	The number of bytes to allocate for the new task's stack (must not be zero).

**Parameters**

in	<i>Priority</i>	The priority for the new task. Lower numbers are higher priority, with 0 being the highest priority.
in	<i>Flags</i>	Reserved for future expansion.

**Returns**Execution status, see [cFE Return Code Defines](#)**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_CHILD_TASK_CREATE</a>	Child Task Create Error.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.

**See also**[CFE\\_ES\\_DeleteChildTask](#), [CFE\\_ES\\_ExitChildTask](#)**10.16.2.2 CFE\_ES\_DeleteChildTask()** [CFE\\_Status\\_t](#) CFE\_ES\_DeleteChildTask ([CFE\\_ES\\_TaskId\\_t](#) *TaskId* )

Deletes a task under an existing Application.

**Description**

This routine deletes a task under an Application specified by the *TaskId* obtained when the child task was created using the [CFE\\_ES\\_CreateChildTask](#) API.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TaskId</i>	The task ID previously obtained when the Child Task was created with the <a href="#">CFE_ES_CreateChildTask</a> API.
----	---------------	--

**Returns**Execution status, see [cFE Return Code Defines](#)**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_CHILD_TASK_DELETE</a>	(return value only verified in coverage test) Child Task Delete Error.
<a href="#">CFE_ES_ERR_CHILD_TASK_DELETE_MAIN_TASK</a>	Child Task Delete Passed Main Task.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.

**See also**

[CFE\\_ES\\_CreateChildTask](#), [CFE\\_ES\\_ExitChildTask](#)

**10.16.2.3 CFE\_ES\_ExitChildTask()** `void CFE_ES_ExitChildTask (`  
  `void )`

Exits a child task.

**Description**

This routine allows the current executing child task to exit and be deleted by ES.

**Assumptions, External Events, and Notes:**

This function cannot be called from an Application's Main Task.

**Note**

This function does not return a value, but if it does return at all, it is assumed that the Task was either unregistered or this function was called from a cFE Application's main task.

**See also**

[CFE\\_ES\\_CreateChildTask](#), [CFE\\_ES\\_DeleteChildTask](#)

**10.16.2.4 CFE\_ES\_GetTaskIDByName()** `CFE_Status_t CFE_ES_GetTaskIDByName (`  
  `CFE_ES_TaskId_t * TaskIdPtr,`  
  `const char * TaskName )`

Get a Task ID associated with a specified Task name.

**Description**

This routine retrieves the cFE Task ID associated with a specified Task name.

**Assumptions, External Events, and Notes:**

None

**Parameters**

<code>out</code>	<code>TaskIdPtr</code>	Pointer to variable that is to receive the Task's ID (must not be null).
<code>in</code>	<code>TaskName</code>	Pointer to null terminated character string containing a Task name (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_ERR_NAME_NOT_FOUND</code>	Resource Name Error.

**Return values**

<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
-------------------------------------	---------------

**See also**

[CFE\\_ES\\_GetTaskName](#)

```
10.16.2.5 CFE_ES_GetTaskName() CFE\_Status\_t CFE_ES_GetTaskName (
    char * TaskName,
    CFE\_ES\_TaskId\_t TaskId,
    size_t BufferLength )
```

Get a Task name for a specified Task ID.

**Description**

This routine retrieves the cFE Task name associated with a specified Task ID.

**Assumptions, External Events, and Notes:**

In the case of a failure ([CFE\\_ES\\_ERR\\_RESOURCEID\\_NOT\\_VALID](#)), an empty string is returned.

**Parameters**

out	<i>TaskName</i>	Pointer to a character array (must not be null) of at least <i>BufferLength</i> in size that will be filled with the Task name.
in	<i>TaskId</i>	Task ID of Task whose name is being requested.
in	<i>BufferLength</i>	The maximum number of characters, including the null terminator, that can be put into the <i>TaskName</i> buffer. This routine will truncate the name to this length, if necessary.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_GetTaskIDByName](#)

## 10.17 cFE Miscellaneous APIs

### Functions

- void [CFE\\_ES\\_BackgroundWakeup](#) (void)  
*Wakes up the CFE background task.*
- [CFE\\_Status\\_t CFE\\_ES\\_WriteToSysLog](#) (const char \*SpecStringPtr,...) [OS\\_PRINTF](#)(1  
*Write a string to the cFE System Log.*
- [CFE\\_Status\\_t uint32 CFE\\_ES\\_CalculateCRC](#) (const void \*DataPtr, size\_t DataLength, uint32 InputCRC,  
[CFE\\_ES\\_CrcType\\_Enum\\_t](#) TypeCRC)  
*Calculate a CRC on a block of memory.*
- void [CFE\\_ES\\_ProcessAsyncEvent](#) (void)  
*Notification that an asynchronous event was detected by the underlying OS/PSP.*

#### 10.17.1 Detailed Description

#### 10.17.2 Function Documentation

##### 10.17.2.1 [CFE\\_ES\\_BackgroundWakeup\(\)](#) void CFE\_ES\_BackgroundWakeup (

    void )

Wakes up the CFE background task.

#### Description

Normally the ES background task wakes up at a periodic interval. Whenever new background work is added, this can be used to wake the task early, which may reduce the delay between adding the job and the job getting processed.

#### Assumptions, External Events, and Notes:

Note the amount of work that the background task will perform is pro-rated based on the amount of time elapsed since the last wakeup. Waking the task early will not cause the background task to do more work than it otherwise would - it just reduces the delay before work starts initially.

##### 10.17.2.2 [CFE\\_ES\\_CalculateCRC\(\)](#) [CFE\\_Status\\_t uint32 CFE\\_ES\\_CalculateCRC](#) (

    const void \* DataPtr,  
    size\_t DataLength,  
    uint32 InputCRC,  
    [CFE\\_ES\\_CrcType\\_Enum\\_t](#) TypeCRC )

Calculate a CRC on a block of memory.

#### Description

This routine calculates a cyclic redundancy check (CRC) on a block of memory. The CRC algorithm used is determined by the last parameter.

#### Assumptions, External Events, and Notes:

None

**Parameters**

in	<i>DataPtr</i>	Pointer to the base of the memory block.
in	<i>DataLength</i>	The number of bytes in the memory block.
in	<i>InputCRC</i>	A starting value for use in the CRC calculation. This parameter allows the user to calculate the CRC of non-contiguous blocks as a single value. Nominally, the user should set this value to zero.
in	<i>TypeCRC</i>	One of the following CRC algorithm selections defined in CFE_ES_CrcType_Enum_t

**Returns**

The result of the CRC calculation on the specified memory block. If the TypeCRC is unimplemented will return 0. If DataPtr is null or DataLength is 0, will return InputCRC

**10.17.2.3 CFE\_ES\_ProcessAsyncEvent()** `void CFE_ES_ProcessAsyncEvent ( void )`

Notification that an asynchronous event was detected by the underlying OS/PSP.

**Description**

This hook routine is called from the PSP when an exception or other asynchronous system event occurs

**Assumptions, External Events, and Notes:**

The PSP must guarantee that this function is only invoked from a context which may use OSAL primitives. In general this means that it shouldn't be *directly* invoked from an ISR/signal context.

**10.17.2.4 CFE\_ES\_WriteToSysLog()** `CFE_Status_t CFE_ES_WriteToSysLog ( const char * SpecStringPtr, ... )`

Write a string to the cFE System Log.

**Description**

This routine writes a formatted string to the cFE system log. This can be used to record very low-level errors that can't be reported using the Event Services. This function is used in place of printf for flight software. It should be used for significant startup events, critical errors, and conditionally compiled debug software.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>SpecStringPtr</i>	The format string for the log message (must not be null). This is similar to the format string for a printf() call.
----	----------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_SYS_LOG_FULL</i>	System Log Full.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

Referenced by LC\_AppMain(), and LC\_EvsInit().

## 10.18 cFE Critical Data Store APIs

### Functions

- [CFE\\_Status\\_t CFE\\_ES\\_RegisterCDS \(CFE\\_ES\\_CDSHandle\\_t \\*CDSHandlePtr, size\\_t BlockSize, const char \\*Name\)](#)  
*Reserve space (or re-obtain previously reserved space) in the Critical Data Store (CDS)*
- [CFE\\_Status\\_t CFE\\_ES\\_GetCDSBlockIDByName \(CFE\\_ES\\_CDSHandle\\_t \\*BlockIdPtr, const char \\*BlockName\)](#)  
*Get a CDS Block ID associated with a specified CDS Block name.*
- [CFE\\_Status\\_t CFE\\_ES\\_GetCDSBlockName \(char \\*BlockName, CFE\\_ES\\_CDSHandle\\_t BlockId, size\\_t BufferLength\)](#)  
*Get a Block name for a specified Block ID.*
- [CFE\\_Status\\_t CFE\\_ES\\_CopyToCDS \(CFE\\_ES\\_CDSHandle\\_t Handle, const void \\*DataToCopy\)](#)  
*Save a block of data in the Critical Data Store (CDS)*
- [CFE\\_Status\\_t CFE\\_ES\\_RestoreFromCDS \(void \\*RestoreToMemory, CFE\\_ES\\_CDSHandle\\_t Handle\)](#)  
*Recover a block of data from the Critical Data Store (CDS)*

#### 10.18.1 Detailed Description

#### 10.18.2 Function Documentation

**10.18.2.1 CFE\_ES\_CopyToCDS()** [CFE\\_Status\\_t CFE\\_ES\\_CopyToCDS \(](#)  
[CFE\\_ES\\_CDSHandle\\_t Handle,](#)  
[const void \\* DataToCopy \)](#)

Save a block of data in the Critical Data Store (CDS)

##### Description

This routine copies a specified block of memory into the Critical Data Store that had been previously registered via [CFE\\_ES\\_RegisterCDS](#). The block of memory to be copied must be at least as big as the size specified when registering the CDS.

##### Assumptions, External Events, and Notes:

None

##### Parameters

in	<i>Handle</i>	The handle of the CDS block that was previously obtained from <a href="#">CFE_ES_RegisterCDS</a> .
in	<i>DataToCopy</i>	A Pointer to the block of memory to be copied into the CDS (must not be null).

##### Returns

Execution status, see [cFE Return Code Defines](#)

##### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_RegisterCDS](#), [CFE\\_ES\\_RestoreFromCDS](#)

Referenced by `LC_UpdateTaskCDS()`.

**10.18.2.2 CFE\_ES\_GetCDSBlockIDByName()** `CFE_Status_t CFE_ES_GetCDSBlockIDByName (`  
 `CFE_ES_CDSHandle_t * BlockIdPtr,`  
 `const char * BlockName )`

Get a CDS Block ID associated with a specified CDS Block name.

**Description**

This routine retrieves the CDS Block ID associated with a specified CDS Block name.

**Assumptions, External Events, and Notes:**

None

**Parameters**

out	<i>BlockIdPtr</i>	Pointer to variable that is to receive the CDS Block ID (must not be null).
in	<i>BlockName</i>	Pointer to null terminated character string containing a CDS Block name (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_NAME_NOT_FOUND</i>	Resource Name Error.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.
<i>CFE_ES_NOT_IMPLEMENTED</i>	The processor does not support a Critical Data Store.

**See also**

[CFE\\_ES\\_GetCDSBlockName](#)

**10.18.2.3 CFE\_ES\_GetCDSBlockName()** `CFE_Status_t CFE_ES_GetCDSBlockName (`  
 `char * BlockName,`  
 `CFE_ES_CDSHandle_t BlockId,`  
 `size_t BufferLength )`

Get a Block name for a specified Block ID.

**Description**

This routine retrieves the cFE Block name associated with a specified Block ID.

**Assumptions, External Events, and Notes:**

In the case of a failure ([CFE\\_ES\\_ERR\\_RESOURCEID\\_NOT\\_VALID](#)), an empty string is returned.

**Parameters**

out	<i>BlockName</i>	Pointer to a character array (must not be null) of at least <i>BufferLength</i> in size that will be filled with the CDS Block name.
in	<i>BlockId</i>	Block ID/Handle of CDS registry entry whose name is being requested.
in	<i>BufferLength</i>	The maximum number of characters, including the null terminator, that can be put into the <i>BlockName</i> buffer. This routine will truncate the name to this length, if necessary.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_NOT_IMPLEMENTED</a>	The processor does not support a Critical Data Store.

**See also**

[CFE\\_ES\\_GetCDSBlockIDByName](#)

**10.18.2.4 CFE\_ES\_RegisterCDS()** [CFE\\_Status\\_t](#) CFE\_ES\_RegisterCDS (

```
    CFE\_ES\_CDSHandle\_t * CDSHandlePtr,
    size_t BlockSize,
    const char * Name )
```

Reserve space (or re-obtain previously reserved space) in the Critical Data Store (CDS)

**Description**

This routine allocates a block of memory in the Critical Data Store and associates it with the calling Application. The memory can survive an Application restart as well as a Processor Reset.

**Assumptions, External Events, and Notes:**

This function does *not* clear or otherwise initialize/modify the data within the CDS block. If this function returns [CFE\\_ES\\_CDS\\_ALREADY\\_EXISTS](#) the block may already have valid data in it.

If a new CDS block is reserved (either because the name did not exist, or existed as a different size) it is the responsibility of the calling application to fill the CDS block with valid data. This is indicated by a [CFE\\_SUCCESS](#) return code, and in this case the calling application should ensure that it also calls [CFE\\_ES\\_CopyToCDS\(\)](#) to fill the block with valid data.

**Parameters**

<i>out</i>	<i>CDSHandlePtr</i>	Pointer Application's variable that will contain the CDS Memory Block Handle (must not be null). HandlePtr is the handle of the CDS block that can be used in <a href="#">CFE_ES_CopyToCDS</a> and <a href="#">CFE_ES_RestoreFromCDS</a> .
<i>in</i>	<i>BlockSize</i>	The number of bytes needed in the CDS (must not be zero).
<i>in</i>	<i>Name</i>	A pointer to a character string (must not be null) containing an application unique name of <a href="#">CFE_MISSION_ES_CDS_MAX_NAME_LENGTH</a> characters or less.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	The memory block was successfully created in the CDS.
<a href="#">CFE_ES_NOT_IMPLEMENTED</a>	The processor does not support a Critical Data Store.
<a href="#">CFE_ES_CDS_ALREADY_EXISTS</a>	CDS Already Exists.
<a href="#">CFE_ES_CDS_INVALID_SIZE</a>	CDS Invalid Size.
<a href="#">CFE_ES_CDS_INVALID_NAME</a>	CDS Invalid Name.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_CDS_INVALID</a>	(return value only verified in coverage test) CDS Invalid.

**See also**

[CFE\\_ES\\_CopyToCDS](#), [CFE\\_ES\\_RestoreFromCDS](#)

Referenced by [LC\\_CreateTaskCDS\(\)](#).

**10.18.2.5 CFE\_ES\_RestoreFromCDS()** [CFE\\_Status\\_t](#) [CFE\\_ES\\_RestoreFromCDS](#) (

```
void * RestoreToMemory,
CFE\_ES\_CDSHandle\_t Handle )
```

Recover a block of data from the Critical Data Store (CDS)

**Description**

This routine copies data from the Critical Data Store identified with the Handle into the area of memory pointed to by the *RestoreToMemory* pointer. The area of memory to be copied into must be at least as big as the size specified when registering the CDS. The recovery will indicate an error if the data integrity check maintained by the CDS indicates the contents of the CDS have changed. However, the contents will still be copied into the specified area of memory.

**Assumptions, External Events, and Notes:**

None

**Parameters**

<i>in</i>	<i>Handle</i>	The handle of the CDS block that was previously obtained from <a href="#">CFE_ES_RegisterCDS</a> .
<i>out</i>	<i>RestoreToMemory</i>	A Pointer to the block of memory (must not be null) that is to be restored with the contents of the CDS. * <i>RestoreToMemory</i> is the contents of the specified CDS.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_CDS_BLOCK_CRC_ERR</i>	(return value only verified in coverage test) CDS Block CRC Error.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_RegisterCDS](#), [CFE\\_ES\\_CopyToCDS](#)

Referenced by `LC_CreateTaskCDS()`.

## 10.19 cFE Memory Manager APIs

### Functions

- `CFE_Status_t CFE_ES_PoolCreateNoSem (CFE_ES_MemHandle_t *PoolID, void *MemPtr, size_t Size)`  
*Initializes a memory pool created by an application without using a semaphore during processing.*
- `CFE_Status_t CFE_ES_PoolCreate (CFE_ES_MemHandle_t *PoolID, void *MemPtr, size_t Size)`  
*Initializes a memory pool created by an application while using a semaphore during processing.*
- `CFE_Status_t CFE_ES_PoolCreateEx (CFE_ES_MemHandle_t *PoolID, void *MemPtr, size_t Size, uint16 NumBlockSizes, const size_t *BlockSizes, bool UseMutex)`  
*Initializes a memory pool created by an application with application specified block sizes.*
- `int32 CFE_ES_PoolDelete (CFE_ES_MemHandle_t PoolID)`  
*Deletes a memory pool that was previously created.*
- `int32 CFE_ES_GetPoolBuf (CFE_ES_MemPoolBuf_t *BufPtr, CFE_ES_MemHandle_t Handle, size_t Size)`  
*Gets a buffer from the memory pool created by `CFE_ES_PoolCreate` or `CFE_ES_PoolCreateNoSem`.*
- `CFE_Status_t CFE_ES_GetPoolBufInfo (CFE_ES_MemHandle_t Handle, CFE_ES_MemPoolBuf_t BufPtr)`  
*Gets info on a buffer previously allocated via `CFE_ES_GetPoolBuf`.*
- `int32 CFE_ES_PutPoolBuf (CFE_ES_MemHandle_t Handle, CFE_ES_MemPoolBuf_t BufPtr)`  
*Releases a buffer from the memory pool that was previously allocated via `CFE_ES_GetPoolBuf`.*
- `CFE_Status_t CFE_ES_GetMemPoolStats (CFE_ES_MemPoolStats_t *BufPtr, CFE_ES_MemHandle_t Handle)`  
*Extracts the statistics maintained by the memory pool software.*

### 10.19.1 Detailed Description

### 10.19.2 Function Documentation

**10.19.2.1 CFE\_ES\_GetMemPoolStats()** `CFE_Status_t CFE_ES_GetMemPoolStats (`  
    `CFE_ES_MemPoolStats_t * BufPtr,`  
    `CFE_ES_MemHandle_t Handle )`

Extracts the statistics maintained by the memory pool software.

#### Description

This routine fills the `CFE_ES_MemPoolStats_t` data structure with the statistics maintained by the memory pool software. These statistics can then be telemetered by the calling Application.

#### Assumptions, External Events, and Notes:

None

#### Parameters

<code>out</code>	<code>BufPtr</code>	Pointer to <code>CFE_ES_MemPoolStats_t</code> data structure (must not be null) to be filled with memory statistics. <code>*BufPtr</code> is the Memory Pool Statistics stored in given data structure.
<code>in</code>	<code>Handle</code>	The handle to the memory pool whose statistics are desired.

#### Returns

Execution status, see [cFE Return Code Defines](#)

## Return values

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

## See also

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_PutPoolBuf](#)

```
10.19.2.2 CFE_ES_GetPoolBuf() int32 CFE_ES_GetPoolBuf (
    CFE_ES_MemPoolBuf_t * BufPtr,
    CFE_ES_MemHandle_t Handle,
    size_t Size )
```

Gets a buffer from the memory pool created by [CFE\\_ES\\_PoolCreate](#) or [CFE\\_ES\\_PoolCreateNoSem](#).

## Description

This routine obtains a block of memory from the memory pool supplied by the calling application.

## Assumptions, External Events, and Notes:

1. The size allocated from the memory pool is, at a minimum, 12 bytes more than requested.

## Parameters

out	<i>BufPtr</i>	A pointer to the Application's pointer (must not be null) in which will be stored the address of the allocated memory buffer. *BufPtr is the address of the requested buffer.
in	<i>Handle</i>	The handle to the memory pool as returned by <a href="#">CFE_ES_PoolCreate</a> or <a href="#">CFE_ES_PoolCreateNoSem</a> .
in	<i>Size</i>	The size of the buffer requested. NOTE: The size allocated may be larger.

## Returns

Bytes Allocated, or error code cFE Return Code Defines

## Return values

<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_ES_ERR_MEM_BLOCK_SIZE</i>	Memory Block Size Error.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

## See also

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_PutPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#), [CFE\\_ES\\_GetPoolBufInfo](#)

```
10.19.2.3 CFE_ES_GetPoolBufInfo() CFE_Status_t CFE_ES_GetPoolBufInfo (
```

```
CFE_ES_MemHandle_t Handle,  
CFE_ES_MemPoolBuf_t BufPtr )
```

Gets info on a buffer previously allocated via [CFE\\_ES\\_GetPoolBuf](#).

#### Description

This routine gets info on a buffer in the memory pool.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>Handle</i>	The handle to the memory pool as returned by <a href="#">CFE_ES_PoolCreate</a> or <a href="#">CFE_ES_PoolCreateNoSem</a> .
in	<i>BufPtr</i>	A pointer to the memory buffer to provide status for (must not be null).

#### Returns

Size of the buffer if successful, or status code if not successful, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BUFFER_NOT_IN_POOL</a>	Buffer Not In Pool.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

#### See also

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#), [CFE\\_ES\\_PutPoolBuf](#)

```
10.19.2.4 CFE_ES_PoolCreate() CFE_Status_t CFE_ES_PoolCreate (  
    CFE_ES_MemHandle_t * PoolID,  
    void * MemPtr,  
    size_t Size )
```

Initializes a memory pool created by an application while using a semaphore during processing.

#### Description

This routine initializes a pool of memory supplied by the calling application. When a memory pool created by this routine is processed, mutex handling will be performed.

#### Assumptions, External Events, and Notes:

1. The size of the pool must be an integral number of 32-bit words
2. The start address of the pool must be 32-bit aligned
3. 168 bytes are used for internal bookkeeping, therefore, they will not be available for allocation.

**Parameters**

<i>out</i>	<i>PoolID</i>	A pointer to the variable the caller wishes to have the memory pool handle kept in (must not be null). PoolID is the memory pool handle.
<i>in</i>	<i>MemPtr</i>	A Pointer to the pool of memory created by the calling application (must not be null). This address must be aligned suitably for the processor architecture. The <a href="#">CFE_ES_STATIC_POOL_TYPE</a> macro may be used to assist in creating properly aligned memory pools.
<i>in</i>	<i>Size</i>	The size of the pool of memory (must not be zero). Note that this must be an integral multiple of the memory alignment of the processor architecture.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_PutPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#)

```
10.19.2.5 CFE_ES_PoolCreateEx() CFE\_Status\_t CFE_ES_PoolCreateEx (
    CFE\_ES\_MemHandle\_t * PoolID,
    void * MemPtr,
    size_t Size,
    uint16 NumBlockSizes,
    const size_t * BlockSizes,
    bool UseMutex )
```

Initializes a memory pool created by an application with application specified block sizes.

**Description**

This routine initializes a pool of memory supplied by the calling application.

**Assumptions, External Events, and Notes:**

1. The size of the pool must be an integral number of 32-bit words
2. The start address of the pool must be 32-bit aligned
3. 168 bytes are used for internal bookkeeping, therefore, they will not be available for allocation.

**Parameters**

<i>out</i>	<i>PoolID</i>	A pointer to the variable the caller wishes to have the memory pool handle kept in (must not be null). PoolID is the memory pool handle.
<i>in</i>	<i>MemPtr</i>	A Pointer to the pool of memory created by the calling application (must not be null). This address must be aligned suitably for the processor architecture. The <a href="#">CFE_ES_STATIC_POOL_TYPE</a> macro may be used to assist in creating properly aligned memory pools.

**Parameters**

in	<i>Size</i>	The size of the pool of memory (must not be zero). Note that this must be an integral multiple of the memory alignment of the processor architecture.
in	<i>NumBlockSizes</i>	The number of different block sizes specified in the <i>BlockSizes</i> array. If set larger than <code>CFE_PLATFORM_ES_POOL_MAX_BUCKETS</code> , <code>CFE_ES_BAD_ARGUMENT</code> will be returned. If <i>BlockSizes</i> is null and <i>NumBlockSizes</i> is 0, <i>NubBlockSizes</i> will be set to <code>CFE_PLATFORM_ES_POOL_MAX_BUCKETS</code> .
in	<i>BlockSizes</i>	Pointer to an array of sizes to be used instead of the default block sizes specified by <code>CFE_PLATFORM_ES_MEM_BLOCK_SIZE_01</code> through <code>CFE_PLATFORM_ES_MAX_BLOCK_SIZE</code> . If the pointer is equal to NULL, the default block sizes are used.
in	<i>UseMutex</i>	Flag indicating whether the new memory pool will be processing with mutex handling or not. Valid parameter values are <code>CFE_ES_USE_MUTEX</code> and <code>CFE_ES_NO_MUTEX</code>

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_BAD_ARGUMENT</code>	Bad Argument.
<code>CFE_ES_NO_RESOURCE_IDS_AVAILABLE</code>	Resource ID is not available.
<code>CFE_STATUS_EXTERNAL_RESOURCE_FAIL</code>	(return value only verified in coverage test) External failure.

**See also**

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_PutPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#)

**10.19.2.6 CFE\_ES\_PoolCreateNoSem()** `CFE_Status_t CFE_ES_PoolCreateNoSem (`

```
    CFE_ES_MemHandle_t * PoolID,
    void * MemPtr,
    size_t Size )
```

Initializes a memory pool created by an application without using a semaphore during processing.

**Description**

This routine initializes a pool of memory supplied by the calling application. When a memory pool created by this routine is processed, no mutex handling is performed.

**Assumptions, External Events, and Notes:**

1. The size of the pool must be an integral number of 32-bit words
2. The start address of the pool must be 32-bit aligned
3. 168 bytes are used for internal bookkeeping, therefore, they will not be available for allocation.

**Parameters**

out	<i>PoolID</i>	A pointer to the variable the caller wishes to have the memory pool handle kept in (must not be null). PoolID is the memory pool handle.
in	<i>MemPtr</i>	A Pointer to the pool of memory created by the calling application (must not be null). This address must be aligned suitably for the processor architecture. The <a href="#">CFE_ES_STATIC_POOL_TYPE</a> macro may be used to assist in creating properly aligned memory pools.
in	<i>Size</i>	The size of the pool of memory (must not be zero). Note that this must be an integral multiple of the memory alignment of the processor architecture.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_PutPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#)

### 10.19.2.7 CFE\_ES\_PoolDelete()

```
int32 CFE_ES_PoolDelete (
    CFE_ES_MemHandle_t PoolID )
```

Deletes a memory pool that was previously created.

**Description**

This routine removes the pool ID and frees the global table entry for future re-use.

**Assumptions, External Events, and Notes:**

All buffers associated with the pool become invalid after this call. The application should ensure that buffers/references to the pool are returned before deleting the pool.

**Parameters**

in	<i>PoolID</i>	The ID of the pool to delete
----	---------------	------------------------------

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.

**See also**

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_PutPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#)

**10.19.2.8 CFE\_ES\_PutPoolBuf()** `int32 CFE_ES_PutPoolBuf (`  
    `CFE_ES_MemHandle_t Handle,`  
    `CFE_ES_MemPoolBuf_t BufPtr )`

Releases a buffer from the memory pool that was previously allocated via [CFE\\_ES\\_GetPoolBuf](#).

**Description**

This routine releases a buffer back into the memory pool.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>Handle</i>	The handle to the memory pool as returned by <a href="#">CFE_ES_PoolCreate</a> or <a href="#">CFE_ES_PoolCreateNoSem</a> .
in	<i>BufPtr</i>	A pointer to the memory buffer to be released (must not be null).

**Returns**

Bytes released, or error code cFE Return Code Defines

**Return values**

<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_BUFFER_NOT_IN_POOL</a>	Buffer Not In Pool.
<a href="#">CFE_ES_POOL_BLOCK_INVALID</a>	Invalid pool block.

**See also**

[CFE\\_ES\\_PoolCreate](#), [CFE\\_ES\\_PoolCreateNoSem](#), [CFE\\_ES\\_PoolCreateEx](#), [CFE\\_ES\\_GetPoolBuf](#), [CFE\\_ES\\_GetMemPoolStats](#),  
[CFE\\_ES\\_GetPoolBufInfo](#)

## 10.20 cFE Performance Monitor APIs

### Macros

- `#define CFE_ES_PerfLogEntry(id) (CFE_ES_PerfLogAdd(id, 0))`  
*Entry marker for use with Software Performance Analysis Tool.*
- `#define CFE_ES_PerfLogExit(id) (CFE_ES_PerfLogAdd(id, 1))`  
*Exit marker for use with Software Performance Analysis Tool.*

### Functions

- void `CFE_ES_PerfLogAdd (uint32 Marker, uint32 EntryExit)`  
*Adds a new entry to the data buffer.*

#### 10.20.1 Detailed Description

#### 10.20.2 Macro Definition Documentation

##### 10.20.2.1 CFE\_ES\_PerfLogEntry `#define CFE_ES_PerfLogEntry(` `id ) (CFE_ES_PerfLogAdd(id, 0))`

Entry marker for use with Software Performance Analysis Tool.

#### Description

This macro logs the entry or start event/marker for the specified entry `id`. This macro, in conjunction with the `CFE_ES_PerfLogExit`, is used by the Software Performance Analysis tool.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<code>id</code>	Identifier of the specific event or marker.
----	-----------------	---

#### See also

`CFE_ES_PerfLogExit`, `CFE_ES_PerfLogAdd`

Definition at line 1464 of file `cfe_es.h`.

##### 10.20.2.2 CFE\_ES\_PerfLogExit `#define CFE_ES_PerfLogExit(` `id ) (CFE_ES_PerfLogAdd(id, 1))`

Exit marker for use with Software Performance Analysis Tool.

#### Description

This macro logs the exit or end event/marker for the specified entry `id`. This macro, in conjunction with the `CFE_ES_PerfLogEntry`, is used by the Software Performance Analysis tool.

#### Assumptions, External Events, and Notes:

None

**Parameters**

in	<i>id</i>	Identifier of the specific event or marker.
----	-----------	---

**See also**

[CFE\\_ES\\_PerfLogEntry](#), [CFE\\_ES\\_PerfLogAdd](#)

Definition at line 1483 of file cfe\_es.h.

### 10.20.3 Function Documentation

**10.20.3.1 CFE\_ES\_PerfLogAdd()** void CFE\_ES\_PerfLogAdd (

```
    uint32 Marker,
    uint32 EntryExit )
```

Adds a new entry to the data buffer.

Function called by [CFE\\_ES\\_PerfLogEntry](#) and [CFE\\_ES\\_PerfLogExit](#) macros

**Description**

This function logs the entry and exit marker for the specified *id*. This function is used by the Software Performance Analysis tool.

**Assumptions, External Events, and Notes:**

Marker limited to the range of 0 to [CFE\\_MISSION\\_ES\\_PERF\\_MAX\\_IDS](#) - 1. Any performance ids outside of this range will be ignored and will be flagged as an error.

This function implements a circular buffer using an array. DataStart points to first stored entry DataEnd points to next available entry if DataStart == DataEnd then the buffer is either empty or full depending on the value of the DataCount. Time is stored as 2 32 bit integers, (TimerLower32, TimerUpper32): TimerLower32 is the current value of the hardware timer register. TimerUpper32 is the number of times the timer has rolled over.

**Parameters**

in	<i>Marker</i>	Identifier of the specific event or marker.
in	<i>EntryExit</i>	Used to specify Entry(0) or Exit(1)

**See also**

[CFE\\_ES\\_PerfLogEntry](#), [CFE\\_ES\\_PerfLogExit](#)

## 10.21 cFE Generic Counter APIs

### Functions

- `CFE_Status_t CFE_ES_RegisterGenCounter (CFE_ES_CounterId_t *CounterIdPtr, const char *CounterName)`  
*Register a generic counter.*
- `CFE_Status_t CFE_ES_DeleteGenCounter (CFE_ES_CounterId_t CounterId)`  
*Delete a generic counter.*
- `CFE_Status_t CFE_ES_IncrementGenCounter (CFE_ES_CounterId_t CounterId)`  
*Increments the specified generic counter.*
- `CFE_Status_t CFE_ES_SetGenCount (CFE_ES_CounterId_t CounterId, uint32 Count)`  
*Set the specified generic counter.*
- `CFE_Status_t CFE_ES_GetGenCount (CFE_ES_CounterId_t CounterId, uint32 *Count)`  
*Get the specified generic counter count.*
- `CFE_Status_t CFE_ES_GetGenCounterIDByName (CFE_ES_CounterId_t *CounterIdPtr, const char *CounterName)`  
*Get the Id associated with a generic counter name.*
- `CFE_Status_t CFE_ES_GetGenCounterName (char *CounterName, CFE_ES_CounterId_t CounterId, size_t BufferLength)`  
*Get a Counter name for a specified Counter ID.*

#### 10.21.1 Detailed Description

#### 10.21.2 Function Documentation

##### 10.21.2.1 CFE\_ES\_DeleteGenCounter() `CFE_Status_t CFE_ES_DeleteGenCounter (CFE_ES_CounterId_t CounterId )`

Delete a generic counter.

#### Description

This routine deletes a previously registered generic counter.

#### Assumptions, External Events, and Notes:

None.

#### Parameters

in	<code>CounterId</code>	The Counter Id of the newly created counter.
----	------------------------	--

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_BAD_ARGUMENT</code>	Bad Argument.

**See also**

[CFE\\_ES\\_IncrementGenCounter](#), [CFE\\_ES\\_RegisterGenCounter](#), [CFE\\_ES\\_SetGenCount](#), [CFE\\_ES\\_GetGenCount](#),  
[CFE\\_ES\\_GetGenCounterIDByName](#)

**10.21.2.2 CFE\_ES\_GetGenCount()** `CFE_Status_t CFE_ES_GetGenCount (`  
    `CFE_ES_CounterId_t CounterId,`  
    `uint32 * Count )`

Get the specified generic counter count.

**Description**

This routine gets the value of a generic counter.

**Assumptions, External Events, and Notes:**

None.

**Parameters**

in	<i>CounterId</i>	The Counter to get the value from.
out	<i>Count</i>	Buffer to store value of the Counter (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_ES\\_RegisterGenCounter](#), [CFE\\_ES\\_DeleteGenCounter](#), [CFE\\_ES\\_SetGenCount](#), [CFE\\_ES\\_IncrementGenCounter](#),  
[CFE\\_ES\\_GetGenCounterIDByName](#)

**10.21.2.3 CFE\_ES\_GetGenCounterIDByName()** `CFE_Status_t CFE_ES_GetGenCounterIDByName (`  
    `CFE_ES_CounterId_t * CounterIdPtr,`  
    `const char * CounterName )`

Get the Id associated with a generic counter name.

**Description**

This routine gets the Counter Id for a generic counter specified by name.

**Assumptions, External Events, and Notes:**

None.

**Parameters**

<i>out</i>	<i>CounterIdPtr</i>	Pointer to variable that is to receive the Counter's ID (must not be null).
<i>in</i>	<i>CounterName</i>	Pointer to null terminated character string containing a Counter name (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_NAME_NOT_FOUND</i>	Resource Name Error.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_GetGenCounterName](#)

**10.21.2.4 CFE\_ES\_GetGenCounterName()** *CFE\_Status\_t* CFE\_ES\_GetGenCounterName (

```
    char * CounterName,
    CFE_ES_CounterId_t CounterId,
    size_t BufferLength )
```

Get a Counter name for a specified Counter ID.

**Description**

This routine retrieves the cFE Counter name associated with a specified Counter ID.

**Assumptions, External Events, and Notes:**

In the case of a failure ([CFE\\_ES\\_ERR\\_RESOURCEID\\_NOT\\_VALID](#)), an empty string is returned.

**Parameters**

<i>out</i>	<i>CounterName</i>	Pointer to a character array (must not be null) of at least <i>BufferLength</i> in size that will be filled with the Counter name.
<i>in</i>	<i>CounterId</i>	ID of Counter whose name is being requested.
<i>in</i>	<i>BufferLength</i>	The maximum number of characters, including the null terminator (must not be zero), that can be put into the <i>CounterName</i> buffer. This routine will truncate the name to this length, if necessary.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
--------------------	-----------------------

**Return values**

<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**[CFE\\_ES\\_GetGenCounterIDByName](#)**10.21.2.5 CFE\_ES\_IncrementGenCounter()** [CFE\\_Status\\_t](#) CFE\_ES\_IncrementGenCounter ( [CFE\\_ES\\_CounterId\\_t](#) CounterId )

Increments the specified generic counter.

**Description**

This routine increments the specified generic counter.

**Assumptions, External Events, and Notes:**

None.

**Parameters**

<a href="#">in</a>	<i>CounterId</i>	The Counter to be incremented.
--------------------	------------------	--------------------------------

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.

**See also**[CFE\\_ES\\_RegisterGenCounter](#), [CFE\\_ES\\_DeleteGenCounter](#), [CFE\\_ES\\_SetGenCount](#), [CFE\\_ES\\_GetGenCount](#), [CFE\\_ES\\_GetGenCounterIDByName](#)**10.21.2.6 CFE\_ES\_RegisterGenCounter()** [CFE\\_Status\\_t](#) CFE\_ES\_RegisterGenCounter ( [CFE\\_ES\\_CounterId\\_t](#) \* CounterIdPtr, [const char](#) \* CounterName )

Register a generic counter.

**Description**

This routine registers a generic thread-safe counter which can be used for inter-task management.

**Assumptions, External Events, and Notes:**

The initial value of all newly registered counters is 0.

**Parameters**

out	<i>CounterIdPtr</i>	Buffer to store the Counter Id of the newly created counter (must not be null).
in	<i>CounterName</i>	The Name of the generic counter (must not be null).

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.
<i>CFE_ES_ERR_DUPLICATE_NAME</i>	Duplicate Name Error.
<i>CFE_ES_NO_RESOURCE_IDS_AVAILABLE</i>	Resource ID is not available.

**See also**

[CFE\\_ES\\_IncrementGenCounter](#), [CFE\\_ES\\_DeleteGenCounter](#), [CFE\\_ES\\_SetGenCount](#), [CFE\\_ES\\_GetGenCount](#), [CFE\\_ES\\_GetGenCounterIDByName](#)

**10.21.2.7 CFE\_ES\_SetGenCount()** *CFE\_Status\_t* CFE\_ES\_SetGenCount (   
*CFE\_ES\_CounterId\_t* *CounterId*,  
*uint32* *Count* )

Set the specified generic counter.

**Description**

This routine sets the specified generic counter to the specified value.

**Assumptions, External Events, and Notes:**

None.

**Parameters**

in	<i>CounterId</i>	The Counter to be set.
in	<i>Count</i>	The new value of the Counter.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_ES\\_RegisterGenCounter](#), [CFE\\_ES\\_DeleteGenCounter](#), [CFE\\_ES\\_IncrementGenCounter](#), [CFE\\_ES\\_GetGenCount](#),  
[CFE\\_ES\\_GetGenCounterIDByName](#)

## 10.22 cFE Registration APIs

### Functions

- **CFE\_Status\_t CFE\_EVS\_Register** (const void \*Filters, uint16 NumEventFilters, uint16 FilterScheme)  
*Register an application for receiving event services.*

#### 10.22.1 Detailed Description

#### 10.22.2 Function Documentation

##### 10.22.2.1 CFE\_EVS\_Register() `CFE_Status_t CFE_EVS_Register (`

```
    const void * Filters,
    uint16 NumEventFilters,
    uint16 FilterScheme )
```

Register an application for receiving event services.

#### Description

This routine registers an application with event services and allocates/initializes the internal data structures used to support this application's events. An application may not send events unless it has called this routine. The routine also accepts a filter array structure for applications requiring event filtering. In the current implementation of the EVS, only the binary filtering scheme is supported. See section TBD of the cFE Application Programmer's Guide for a description of the behavior of binary filters. Applications may call **CFE\_EVS\_Register** more than once, but each call will wipe out all filters registered by previous calls (filter registration is NOT cumulative).

#### Assumptions, External Events, and Notes:

Note: Event filters can be added, deleted or modified by ground commands. All filtering schemes include a default setting that results in no filtering (such as **CFE\_EVS\_NO\_FILTER** for binary filters).

**Filter Scheme:** Binary

**Code:** CFE\_EVS\_EventFilter\_BINARY

**Filter Structure:**

```
typedef struct CFE_EVS_BinFilter {
    uint16 EventID,
    uint16 Mask ;
} CFE_EVS_BinFilter_t;
```

#### Parameters

in	<i>Filters</i>	Pointer to an array of event message filters, or NULL if no filtering is desired. The structure of an event message filter depends on the FilterScheme selected. (see Filter Schemes mentioned above)
in	<i>NumEventFilters</i>	The number of event message filters included in this call. This must be less than or equal to the maximum number of events allowed per application ( <b>CFE_PLATFORM_EVS_MAX_EVENT_FILTERS</b> ).
in	<i>FilterScheme</i>	The event filtering scheme that this application will use. For the first implementation of the event services, only filter type <b>CFE_EVS_EventFilter_BINARY</b> will be supported.

#### Returns

Execution status below or from **CFE\_ES\_GetAppID**, see **cFE Return Code Defines**

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_EVS_APP_FILTER_OVERLOAD</i>	Application Filter Overload.
<i>CFE_EVS_UNKNOWN_FILTER</i>	Unknown Filter.
<i>CFE_EVS_APP_ILLEGAL_APP_ID</i>	Illegal Application ID.
<i>CFE_ES_BAD_ARGUMENT</i>	Bad Argument.

Referenced by LC\_EvsInit().

## 10.23 cFE Send Event APIs

### Functions

- `CFE_Status_t CFE_EVS_SendEvent (uint16 EventID, uint16 EventType, const char *Spec,...) OS_PRINTF(3  
Generate a software event.`
- `CFE_Status_t CFE_Status_t CFE_EVS_SendEventWithAppID (uint16 EventID, uint16 EventType, CFE_ES_AppId_t  
AppID, const char *Spec,...) OS_PRINTF(4  
Generate a software event given the specified Application ID.`
- `CFE_Status_t CFE_Status_t CFE_Status_t CFE_EVS_SendTimedEvent (CFE_TIME_SysTime_t Time, uint16  
EventID, uint16 EventType, const char *Spec,...) OS_PRINTF(4  
Generate a software event with a specific time tag.`

### 10.23.1 Detailed Description

### 10.23.2 Function Documentation

**10.23.2.1 CFE\_EVS\_SendEvent()** `CFE_Status_t CFE_EVS_SendEvent (`  
`uint16 EventID,`  
`uint16 EventType,`  
`const char * Spec,`  
`...`  
`)`

Generate a software event.

#### Description

This routine generates a software event message. If the EventID is not filtered, the event will be sent as a software bus message, optionally logged in the local event log, and optionally sent as an ASCII text string out the enabled output port(s).

#### Assumptions, External Events, and Notes:

This API only works within the context of a registered application or core service. For messages outside the context of a registered application (for example early in app initialization or if registration fails) `CFE_ES_WriteToSysLog` can be used for reporting.

#### Parameters

in	<code>EventID</code>	A numeric literal used to uniquely identify an application event. The <code>EventID</code> is defined and supplied by the application sending the event.
in	<code>EventType</code>	A numeric literal used to classify an event, one of: <ul style="list-style-type: none"> <li>• <code>CFE_EVS_EventType_DEBUG</code></li> <li>• <code>CFE_EVS_EventType_INFORMATION</code></li> <li>• <code>CFE_EVS_EventType_ERROR</code></li> <li>• <code>CFE_EVS_EventType_CRITICAL</code></li> </ul>

**Parameters**

in	<i>Spec</i>	A pointer to a null terminated text string (must not be null) describing the output format for the event. This is the same type of format string used for the ANSI <code>printf</code> function. Nominally the post-conversion string is limited to 80 characters, but this limit is configurable through the parameter <code>CFE_MISSION_EVS_MAX_MESSAGE_LENGTH</code> . Characters beyond the limit will be truncated. Do not use floating point conversions (f, e, E, g, and G) in the format string unless your application will be running in a system that supports floating point arithmetic. Do not use non-printable characters (\t, \n, etc.) in the format string; they will mess up the formatting when the events are displayed on the ground system.
----	-------------	--

**Returns**

Execution status, see [CFE Return Code Defines](#)

**Return values**

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_EVS_APP_NOT_REGISTERED</code>	Application Not Registered.
<code>CFE_EVS_APP_ILLEGAL_APP_ID</code>	Illegal Application ID.
<code>CFE_EVS_INVALID_PARAMETER</code>	Invalid Pointer.

**See also**

[CFE\\_EVS\\_SendEventWithAppID](#), [CFE\\_EVS\\_SendTimedEvent](#)

Referenced by `LC_AddWatchpoint()`, `LC_AppInit()`, `LC_AppMain()`, `LC_AppPipe()`, `LC_CheckMsgForWPs()`, `LC_CreateDefinitionTables()`, `LC_CreateHashTable()`, `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_CustomFunction()`, `LC_EvaluateRPN()`, `LC_FloatCompare()`, `LC_GetSizedWPData()`, `LC_LoadDefaultTables()`, `LC_ManageTables()`, `LC_NoopCmd()`, `LC_OperatorCompare()`, `LC_ResetAPStatsCmd()`, `LC_ResetCountersCmd()`, `LC_ResetWPSStatsCmd()`, `LC_SampleAPReq()`, `LC_SampleAPs()`, `LC_SampleSingleAP()`, `LC_SbInit()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, `LC_SetLCStateCmd()`, `LC_SignedCompare()`, `LC_TableInit()`, `LC_UnsignedCompare()`, `LC_UpdateTaskCDS()`, `LC_ValidateADT()`, `LC_ValidateWDT()`, `LC_VerifyMsgLength()`, and `LC_WPOffsetValid()`.

```
10.23.2.2 CFE_EVS_SendEventWithAppID() CFE_Status_t CFE_Status_t CFE_EVS_SendEventWithAppID (
    uint16 EventID,
    uint16 EventType,
    CFE_ES_AppId_t AppID,
    const char * Spec,
    ...
)
```

Generate a software event given the specified Application ID.

**Description**

This routine generates a software event message. If the EventID is not filtered, the event will be sent as a software bus message, optionally logged in the local event log, and optionally sent as an ASCII text string out the enabled output port(s). Note that this function should really only be used from within an API in order to preserve the context of an Application's event. In general, [CFE\\_EVS\\_SendEvent](#) should be used.

**Assumptions, External Events, and Notes:**

The Application ID must correspond to a registered application or core service. For messages outside the context of a registered application (for example early in app initialization or if registration fails) [CFE\\_ES\\_WriteToSysLog](#) can be used for reporting.

**Parameters**

in	<i>EventID</i>	A numeric literal used to uniquely identify an application event. The <i>EventID</i> is defined and supplied by the application sending the event.
in	<i>EventType</i>	A numeric literal used to classify an event, one of: <ul style="list-style-type: none"><li>• <a href="#">CFE_EVS_EventType_DEBUG</a></li><li>• <a href="#">CFE_EVS_EventType_INFORMATION</a></li><li>• <a href="#">CFE_EVS_EventType_ERROR</a></li><li>• <a href="#">CFE_EVS_EventType_CRITICAL</a></li></ul>
in	<i>AppID</i>	The Application ID from which the event message should appear.
in	<i>Spec</i>	A pointer to a null terminated text string (must not be null) describing the output format for the event. This is the same type of format string used for the ANSI <code>printf</code> function. Nominally the post-conversion string is limited to 80 characters, but this limit is configurable through the parameter <a href="#">CFE_MISSION_EVS_MAX_MESSAGE_LENGTH</a> . Characters beyond the limit will be truncated. Do not use floating point conversions (f, e, E, g, and G) in the format string unless your application will be running in a system that supports floating point arithmetic. Do not use non-printable characters (\t, \n, etc.) in the format string; they will mess up the formatting when the events are displayed on the ground system.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_EVS_APP_NOT_REGISTERED</a>	Application Not Registered.
<a href="#">CFE_EVS_APP_ILLEGAL_APP_ID</a>	Illegal Application ID.
<a href="#">CFE_EVS_INVALID_PARAMETER</a>	Invalid Pointer.

**See also**

[CFE\\_EVS\\_SendEvent](#), [CFE\\_EVS\\_SendTimedEvent](#)

**10.23.2.3 CFE\_EVS\_SendTimedEvent()** `CFE_Status_t CFE_Status_t CFE_Status_t CFE_Status_t CFE_EVS_SendTimedEvent(`  
`Event (`  
`CFE_TIME_SysTime_t Time,`  
`uint16 EventID,`  
`uint16 EventType,`  
`const char * Spec,`  
`... )`

Generate a software event with a specific time tag.

#### Description

This routine is the same as [CFE\\_EVS\\_SendEvent](#) except that the caller specifies the event time instead of having the EVS use the current spacecraft time. This routine should be used in situations where an error condition is detected at one time, but the event message is reported at a later time.

#### Assumptions, External Events, and Notes:

This API only works within the context of a registered application or core service. For messages outside the context of a registered application (for example early in app initialization or if registration fails) [CFE\\_ES\\_WriteToSysLog](#) can be used for reporting.

#### Parameters

in	<i>Time</i>	The time to include in the event. This will usually be a time returned by the function <a href="#">CFE_TIME_GetTime</a> .
in	<i>EventID</i>	A numeric literal used to uniquely identify an application event. The <i>EventID</i> is defined and supplied by the application sending the event.
in	<i>EventType</i>	A numeric literal used to classify an event, one of: <ul style="list-style-type: none"><li>• <a href="#">CFE_EVS_EventType_DEBUG</a></li><li>• <a href="#">CFE_EVS_EventType_INFORMATION</a></li><li>• <a href="#">CFE_EVS_EventType_ERROR</a></li><li>• <a href="#">CFE_EVS_EventType_CRITICAL</a></li></ul>
in	<i>Spec</i>	A pointer to a null terminated text string (must not be null) describing the output format for the event. This is the same type of format string used for the ANSI <code>printf</code> function. Nominally the post-conversion string is limited to 80 characters, but this limit is configurable through the parameter <a href="#">CFE_MISSION_EVS_MAX_MESSAGE_LENGTH</a> . Characters beyond the limit will be truncated. Do not use floating point conversions (f, e, E, g, and G) in the format string unless your application will be running in a system that supports floating point arithmetic. Do not use non-printable characters (\t, \n, etc.) in the format string; they will mess up the formatting when the events are displayed on the ground system.

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_EVS_APP_NOT_REGISTERED</a>	Application Not Registered.
<a href="#">CFE_EVS_APP_ILLEGAL_APP_ID</a>	Illegal Application ID.
<a href="#">CFE_EVS_INVALID_PARAMETER</a>	Invalid Pointer.

See also

[CFE\\_EVS\\_SendEvent](#), [CFE\\_EVS\\_SendEventWithAppID](#)

## 10.24 cFE Reset Event Filter APIs

### Functions

- [CFE\\_Status\\_t CFE\\_EVS\\_ResetFilter \(uint16 EventID\)](#)  
*Resets the calling application's event filter for a single event ID.*
- [CFE\\_Status\\_t CFE\\_EVS\\_ResetAllFilters \(void\)](#)  
*Resets all of the calling application's event filters.*

#### 10.24.1 Detailed Description

#### 10.24.2 Function Documentation

##### 10.24.2.1 CFE\_EVS\_ResetAllFilters() [CFE\\_Status\\_t CFE\\_EVS\\_ResetAllFilters \( void \)](#)

Resets all of the calling application's event filters.

#### Description

This routine resets all the calling application's event filter counters to zero, providing a quick and convenient method for resetting event filters.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status below or from [CFE\\_ES\\_GetAppID](#), see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_EVS_APP_NOT_REGISTERED</a>	Application Not Registered.
<a href="#">CFE_EVS_APP_ILLEGAL_APP_ID</a>	Illegal Application ID.

#### See also

[CFE\\_EVS\\_ResetFilter](#)

##### 10.24.2.2 CFE\_EVS\_ResetFilter() [CFE\\_Status\\_t CFE\\_EVS\\_ResetFilter \( uint16 EventID \)](#)

Resets the calling application's event filter for a single event ID.

#### Description

Resets the filter such that the next event is treated like the first. For example, if the filter was set to only send the first event, the next event following the reset would be sent.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>EventID</i>	A numeric literal used to uniquely identify an application event. The Event ID is defined and supplied by the application sending the event.
----	----------------	--

**Returns**

Execution status below or from [CFE\\_ES\\_GetAppID](#), see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_EVS_APP_NOT_REGISTERED</a>	Application Not Registered.
<a href="#">CFE_EVS_APP_ILLEGAL_APP_ID</a>	Illegal Application ID.
<a href="#">CFE_EVS_EVT_NOT_REGISTERED</a>	Event Not Registered.

**See also**

[CFE\\_EVS\\_ResetAllFilters](#)

## 10.25 cFE File Header Management APIs

### Functions

- `CFE_Status_t CFE_FS_ReadHeader (CFE_FS_Header_t *Hdr, osal_id_t FileDes)`  
*Read the contents of the Standard cFE File Header.*
- `void CFE_FS_InitHeader (CFE_FS_Header_t *Hdr, const char *Description, uint32 SubType)`  
*Initializes the contents of the Standard cFE File Header.*
- `CFE_Status_t CFE_FS_WriteHeader (osal_id_t FileDes, CFE_FS_Header_t *Hdr)`  
*Write the specified Standard cFE File Header to the specified file.*
- `CFE_Status_t CFE_FS_SetTimestamp (osal_id_t FileDes, CFE_TIME_SysTime_t NewTimestamp)`  
*Modifies the Time Stamp field in the Standard cFE File Header for the specified file.*

#### 10.25.1 Detailed Description

#### 10.25.2 Function Documentation

**10.25.2.1 CFE\_FS\_InitHeader()** `void CFE_FS_InitHeader (`  
    `CFE_FS_Header_t * Hdr,`  
    `const char * Description,`  
    `uint32 SubType )`

Initializes the contents of the Standard cFE File Header.

#### Description

This API will clear the specified `CFE_FS_Header_t` variable and initialize the description field with the specified value

#### Parameters

in	<code>Hdr</code>	Pointer to a variable of type <code>CFE_FS_Header_t</code> that will be cleared and initialized
in	<code>Description</code>	Initializes Header's Description (must not be null)
in	<code>SubType</code>	Initializes Header's SubType

#### See also

[CFE\\_FS\\_WriteHeader](#)

**10.25.2.2 CFE\_FS\_ReadHeader()** `CFE_Status_t CFE_FS_ReadHeader (`  
    `CFE_FS_Header_t * Hdr,`  
    `osal_id_t FileDes )`

Read the contents of the Standard cFE File Header.

#### Description

This API will fill the specified `CFE_FS_Header_t` variable with the contents of the Standard cFE File Header of the file identified by the given File Descriptor.

**Assumptions, External Events, and Notes:**

1. The File has already been successfully opened using [OS\\_OpenCreate](#) and the caller has a legitimate File Descriptor.
2. File offset behavior: Agnostic on entry since it will move the offset to the start of the file, on success the offset will be at the end of the header, undefined offset behavior for error cases.

**Parameters**

<i>out</i>	<i>Hdr</i>	Pointer to a variable of type <a href="#">CFE_FS_Header_t</a> (must not be null) that will be filled with the contents of the Standard cFE File Header. *Hdr is the contents of the Standard cFE File Header for the specified file.
<i>in</i>	<i>FileDes</i>	File Descriptor obtained from a previous call to <a href="#">OS_OpenCreate</a> that is associated with the file whose header is to be read.

**Returns**

Bytes read or error status from OSAL

**Return values**

<a href="#">CFE_FS_BAD_ARGUMENT</a>	Bad Argument.
-------------------------------------	---------------

**Note**

This function invokes OSAL API routines and the current implementation may return OSAL error codes to the caller if failure occurs. In a future version of CFE, the status codes will be converted to a value in [cFE Return Code Defines](#).

**See also**

[CFE\\_FS\\_WriteHeader](#)

### 10.25.2.3 [CFE\\_FS\\_SetTimestamp\(\)](#)

```
CFE_Status_t CFE_FS_SetTimestamp (
    osal_id_t FileDes,
    CFE_TIME_SysTime_t NewTimestamp )
```

Modifies the Time Stamp field in the Standard cFE File Header for the specified file.

**Description**

This API will modify the [timestamp](#) found in the Standard cFE File Header of the specified file. The timestamp will be replaced with the time specified by the caller.

**Assumptions, External Events, and Notes:**

1. The File has already been successfully opened using [OS\\_OpenCreate](#) and the caller has a legitimate File Descriptor.
2. The NewTimestamp field has been filled appropriately by the Application.
3. File offset behavior: Agnostic on entry since it will move the offset, on success the offset will be at the end of the time stamp, undefined offset behavior for error cases.

**Parameters**

in	<i>FileDes</i>	File Descriptor obtained from a previous call to <a href="#">OS_OpenCreate</a> that is associated with the file whose header is to be read.
in	<i>NewTimestamp</i>	A <a href="#">CFE_TIME_SysTime_t</a> data structure containing the desired time to be put into the file's Standard cFE File Header.

**Returns**

Execution status, see [cFE Return Code Defines](#), or OSAL status

**Return values**

<a href="#">CFE_STATUS_EXTERNAL_RESOURCE_FAIL</a>	(return value only verified in coverage test) External failure.
<a href="#">CFE_SUCCESS</a>	Successful execution.

**Note**

This function invokes OSAL API routines and the current implementation may return OSAL error codes to the caller if failure occurs. In a future version of CFE, the status codes will be converted to a value in [cFE Return Code Defines](#).

**10.25.2.4 CFE\_FS\_WriteHeader()** [CFE\\_Status\\_t](#) CFE\_FS\_WriteHeader (   
     [osal\\_id\\_t](#) *FileDes*,  
     [CFE\\_FS\\_Header\\_t](#) \* *Hdr* )

Write the specified Standard cFE File Header to the specified file.

**Description**

This API will output the specified [CFE\\_FS\\_Header\\_t](#) variable, with some fields automatically updated, to the specified file as the Standard cFE File Header. This API will automatically populate the following fields in the specified [CFE\\_FS\\_Header\\_t](#):

1. [ContentType](#) - Filled with 0x63464531 ('cFE1')
2. [Length](#) - Filled with the sizeof(CFE\_FS\_Header\_t)
3. [SpacecraftID](#) - Filled with the Spacecraft ID
4. [ProcessorID](#) - Filled with the Processor ID
5. [ApplicationID](#) - Filled with the Application ID
6. [TimeSeconds](#) - Filled with the Time, in seconds, as obtained by [CFE\\_TIME\\_GetTime](#)
7. [TimeSubSeconds](#) - Filled with the Time, subseconds, as obtained by [CFE\\_TIME\\_GetTime](#)

**Assumptions, External Events, and Notes:**

1. The File has already been successfully opened using [OS\\_OpenCreate](#) and the caller has a legitimate File Descriptor.
2. The SubType field has been filled appropriately by the Application.
3. The Description field has been filled appropriately by the Application.
4. File offset behavior: Agnostic on entry since it will move the offset to the start of the file, on success the offset will be at the end of the header, undefined offset behavior for error cases.

**Parameters**

in	<i>FileDes</i>	File Descriptor obtained from a previous call to <a href="#">OS_OpenCreate</a> that is associated with the file whose header is to be read.
out	<i>Hdr</i>	Pointer to a variable of type <a href="#">CFE_FS_Header_t</a> (must not be null) that will be filled with the contents of the Standard cFE File Header. *Hdr is the contents of the Standard cFE File Header for the specified file.

**Returns**

Bytes read or error status from OSAL

**Return values**

<a href="#">CFE_FS_BAD_ARGUMENT</a>	Bad Argument.
-------------------------------------	---------------

**Note**

This function invokes OSAL API routines and the current implementation may return OSAL error codes to the caller if failure occurs. In a future version of CFE, the status codes will be converted to a value in [cFE Return Code Defines](#).

**See also**

[CFE\\_FS\\_ReadHeader](#)

## 10.26 cFE File Utility APIs

### Functions

- const char \* [CFE\\_FS\\_GetDefaultMountPoint](#) (CFE\_FS\_FileCategory\_t FileCategory)  
*Get the default virtual mount point for a file category.*
- const char \* [CFE\\_FS\\_GetDefaultExtension](#) (CFE\_FS\_FileCategory\_t FileCategory)  
*Get the default filename extension for a file category.*
- int32 [CFE\\_FS\\_ParseInputFileNameEx](#) (char \*OutputBuffer, const char \*InputBuffer, size\_t OutputBufSize, size\_t InputBufSize, const char \*DefaultInput, const char \*DefaultPath, const char \*DefaultExtension)  
*Parse a filename input from an input buffer into a local buffer.*
- int32 [CFE\\_FS\\_ParseInputFileName](#) (char \*OutputBuffer, const char \*InputName, size\_t OutputBufSize, CFE\_FS\_FileCategory\_t FileCategory)  
*Parse a filename string from the user into a local buffer.*
- CFE\_Status\_t [CFE\\_FS\\_ExtractFilenameFromPath](#) (const char \*OriginalPath, char \*FileNameOnly)  
*Extracts the filename from a unix style path and filename string.*
- int32 [CFE\\_FS\\_BackgroundFileDumpRequest](#) (CFE\_FS\_FileWriteMetaData\_t \*Meta)  
*Register a background file dump request.*
- bool [CFE\\_FS\\_BackgroundFileDumplsPending](#) (const CFE\_FS\_FileWriteMetaData\_t \*Meta)  
*Query if a background file write request is currently pending.*

#### 10.26.1 Detailed Description

#### 10.26.2 Function Documentation

##### 10.26.2.1 [CFE\\_FS\\_BackgroundFileDumplsPending\(\)](#) bool CFE\_FS\_BackgroundFileDumpIsPending (const CFE\_FS\_FileWriteMetaData\_t \* Meta )

Query if a background file write request is currently pending.

#### Description

This returns "true" while the request is on the background work queue. This returns "false" once the request is complete and removed from the queue.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in, out	Meta	The background file write persistent state object (must not be null)
---------	------	--

#### Returns

boolean value indicating if request is already pending

#### Return values

true	if request is pending
false	if request is not pending

**10.26.2.2 CFE\_FS\_BackgroundFileDumpRequest()** `int32 CFE_FS_BackgroundFileDumpRequest ( CFE_FS_FileWriteMetaData_t * Meta )`

Register a background file dump request.

#### Description

Puts the previously-initialized metadata into the pending request queue

#### Assumptions, External Events, and Notes:

Metadata structure should be stored in a persistent memory area (not on stack) as it must remain accessible by the file writer task throughout the asynchronous job operation.

#### Parameters

<code>in, out</code>	<code>Meta</code>	The background file write persistent state object (must not be null)
----------------------	-------------------	--

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_FS_BAD_ARGUMENT</code>	Bad Argument.
<code>CFE_FS_INVALID_PATH</code>	Invalid Path.
<code>CFE_STATUS_REQUEST_ALREADY_PENDING</code>	Request already pending.
<code>CFE_SUCCESS</code>	Successful execution.

**10.26.2.3 CFE\_FS\_ExtractFilenameFromPath()** `CFE_Status_t CFE_FS_ExtractFilenameFromPath (`

```
const char * OriginalPath,
char * FileNameOnly )
```

Extracts the filename from a unix style path and filename string.

#### Description

This API will take the original unix path/filename combination and extract the base filename. Example: Given the path/filename : "/cf/apps/myapp.o.gz" this function will return the filename: "myapp.o.gz".

#### Assumptions, External Events, and Notes:

1. The paths and filenames used here are the standard unix style filenames separated by "/" characters.
2. The extracted filename (including terminator) is no longer than `OS_MAX_PATH_LEN`

#### Parameters

<code>in</code>	<code>OriginalPath</code>	The original path (must not be null)
<code>out</code>	<code>FileNameOnly</code>	The filename that is extracted from the path (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_FS_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_FS_FNAME_TOO_LONG</a>	Filename Too Long.
<a href="#">CFE_FS_INVALID_PATH</a>	Invalid Path.
<a href="#">CFE_SUCCESS</a>	Successful execution.

**10.26.2.4 CFE\_FS\_GetDefaultExtension()** `const char* CFE_FS_GetDefaultExtension (`  
`CFE_FS_FileCategory_t FileCategory )`

Get the default filename extension for a file category.

Certain file types may have an extension that varies from system to system. This is primarily an issue for application modules which are ".so" on Linux systems, ".dll" on Windows, ".o" on VxWorks, ".obj" on RTEMS, and so on.

This uses a combination of compile-time configuration and hints from the build environment to get the default/expected extension for a given file category.

**Returns**

String containing the extension

**Return values**

<code>NULL</code>	if no default extension is known for the given file category
-------------------	--

**10.26.2.5 CFE\_FS\_GetDefaultMountPoint()** `const char* CFE_FS_GetDefaultMountPoint (`  
`CFE_FS_FileCategory_t FileCategory )`

Get the default virtual mount point for a file category.

Certain classes of files generally reside in a common directory, mainly either the persistent storage (/cf typically) or ram disk (/ram typically).

Ephemeral status files are generally in the ram disk while application modules and scripts are generally in the persistent storage.

This returns the expected directory for a given class of files in the form of a virtual OSAL mount point string.

**Returns**

String containing the mount point

**Return values**

<code>NULL</code>	if no mount point is known for the given file category
-------------------	--

**10.26.2.6 CFE\_FS\_ParseInputFileName()** `int32 CFE_FS_ParseInputFileName (`  
`char * OutputBuffer,`

```
const char * InputName,
size_t OutputBufSize,
CFE_FS_FileCategory_t FileCategory)
```

Parse a filename string from the user into a local buffer.

#### Description

Simplified API for [CFE\\_FS\\_ParseInputFileNameEx\(\)](#) where input is always known to be a non-empty, null terminated string and the fixed-length input buffer not needed. For instance this may be used where the input is a fixed string from cfe\_platform\_cfg.h or similar.

#### Assumptions, External Events, and Notes:

The parameters are organized such that this is basically like strncpy() with an extra argument, and existing file name accesses which use a direct copy can easily change to use this instead.

#### See also

[CFE\\_FS\\_ParseInputFileNameEx\(\)](#)

#### Parameters

out	<i>OutputBuffer</i>	Buffer to store result (must not be null).
in	<i>InputName</i>	A null terminated input string (must not be null).
in	<i>OutputBufSize</i>	Maximum Size of output buffer (must not be zero).
in	<i>FileCategory</i>	The generalized category of file (implies default path/extension)

#### Returns

Execution status, see [cFE Return Code Defines](#)

**10.26.2.7 CFE\_FS\_ParseInputFileNameEx()** `int32 CFE_FS_ParseInputFileNameEx (`

```
char * OutputBuffer,
const char * InputBuffer,
size_t OutputBufSize,
size_t InputBufSize,
const char * DefaultInput,
const char * DefaultPath,
const char * DefaultExtension )
```

Parse a filename input from an input buffer into a local buffer.

#### Description

This provides a more user friendly way to specify file names, using default values for the path and extension, which can vary from system to system.

If InputBuffer is null or its length is zero, then DefaultInput is used as if it was the content of the input buffer.  
If either the pathname or extension is missing from the input, it will be added from defaults, with the complete fully-qualified filename stored in the output buffer.

**Assumptions, External Events, and Notes:**

1. The paths and filenames used here are the standard unix style filenames separated by "/" (path) and "." (extension) characters.
2. Input Buffer has a fixed max length. Parsing will not exceed InputBufSize, and does not need to be null terminated. However parsing will stop at the first null char, when the input is shorter than the maximum.

**Parameters**

out	<i>OutputBuffer</i>	Buffer to store result (must not be null).
in	<i>InputBuffer</i>	A input buffer that may contain a file name (e.g. from command) (must not be null).
in	<i>OutputBufSize</i>	Maximum Size of output buffer (must not be zero).
in	<i>InputBufSize</i>	Maximum Size of input buffer.
in	<i>DefaultInput</i>	Default value to use for input if InputBffer is empty
in	<i>DefaultPath</i>	Default value to use for pathname if omitted from input
in	<i>DefaultExtension</i>	Default value to use for extension if omitted from input

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_FS_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_FS_FNAME_TOO_LONG</a>	Filename Too Long.
<a href="#">CFE_FS_INVALID_PATH</a>	Invalid Path.
<a href="#">CFE_SUCCESS</a>	Successful execution.

## 10.27 cFE Generic Message APIs

### Functions

- `CFE_Status_t CFE_MSG_Init (CFE_MSG_Message_t *MsgPtr, CFE_SB_MsgId_t MsgId, CFE_MSG_Size_t Size)`

*Initialize a message.*

#### 10.27.1 Detailed Description

#### 10.27.2 Function Documentation

##### 10.27.2.1 `CFE_MSG_Init()`

```
CFE_Status_t CFE_MSG_Init (
    CFE_MSG_Message_t * MsgPtr,
    CFE_SB_MsgId_t MsgId,
    CFE_MSG_Size_t Size )
```

Initialize a message.

#### Description

This routine initialize a message. The entire message is set to zero (based on size), defaults are set, then the size and bits from MsgId are set.

#### Parameters

out	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
in	<code>MsgId</code>	MsgId that corresponds to message
in	<code>Size</code>	Total size of the message (used to set length field)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.

Referenced by `LC_ExecuteRTS()`, and `LC_SbInit()`.

## 10.28 cFE Message Primary Header APIs

### Functions

- `CFE_Status_t CFE_MSG_GetSize (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Size_t *Size)`  
*Gets the total size of a message.*
- `CFE_Status_t CFE_MSG_SetSize (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Size_t Size)`  
*Sets the total size of a message.*
- `CFE_Status_t CFE_MSG.GetType (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Type_t *Type)`  
*Gets the message type.*
- `CFE_Status_t CFE_MSG_SetType (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Type_t Type)`  
*Sets the message type.*
- `CFE_Status_t CFE_MSG_GetHeaderVersion (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_HeaderVersion_t *Version)`  
*Gets the message header version.*
- `CFE_Status_t CFE_MSG_SetHeaderVersion (CFE_MSG_Message_t *MsgPtr, CFE_MSG_HeaderVersion_t Version)`  
*Sets the message header version.*
- `CFE_Status_t CFE_MSG_GetHasSecondaryHeader (const CFE_MSG_Message_t *MsgPtr, bool *HasSecondary)`  
*Gets the message secondary header boolean.*
- `CFE_Status_t CFE_MSG_SetHasSecondaryHeader (CFE_MSG_Message_t *MsgPtr, bool HasSecondary)`  
*Sets the message secondary header boolean.*
- `CFE_Status_t CFE_MSG_GetApld (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Apld_t *Apld)`  
*Gets the message application ID.*
- `CFE_Status_t CFE_MSG_SetApld (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Apld_t Apld)`  
*Sets the message application ID.*
- `CFE_Status_t CFE_MSG_GetSegmentationFlag (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_SegmentationFlag_t *SegFlag)`  
*Gets the message segmentation flag.*
- `CFE_Status_t CFE_MSG_SetSegmentationFlag (CFE_MSG_Message_t *MsgPtr, CFE_MSG_SegmentationFlag_t SegFlag)`  
*Sets the message segmentation flag.*
- `CFE_Status_t CFE_MSG_GetSequenceCount (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_SequenceCount_t *SeqCnt)`  
*Gets the message sequence count.*
- `CFE_Status_t CFE_MSG_SetSequenceCount (CFE_MSG_Message_t *MsgPtr, CFE_MSG_SequenceCount_t SeqCnt)`  
*Sets the message sequence count.*
- `CFE_MSG_SequenceCount_t CFE_MSG_GetNextSequenceCount (CFE_MSG_SequenceCount_t SeqCnt)`  
*Gets the next sequence count value (rolls over if appropriate)*

#### 10.28.1 Detailed Description

#### 10.28.2 Function Documentation

```
10.28.2.1 CFE_MSG_GetApId() CFE_Status_t CFE_MSG_GetApId (
    const CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_ApId_t * ApId )
```

Gets the message application ID.

#### Description

This routine gets the message application ID.

#### Parameters

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>ApId</i>	Application ID (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

```
10.28.2.2 CFE_MSG_GetHasSecondaryHeader() CFE_Status_t CFE_MSG_GetHasSecondaryHeader (
    const CFE_MSG_Message_t * MsgPtr,
    bool * HasSecondary )
```

Gets the message secondary header boolean.

#### Description

This routine gets the message secondary header boolean.

#### Parameters

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>HasSecondary</i>	Has secondary header flag (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.28.2.3 CFE\_MSG\_GetHeaderVersion()** `CFE_Status_t CFE_MSG_GetHeaderVersion (`  
    `const CFE_MSG_Message_t * MsgPtr,`  
    `CFE_MSG_HeaderVersion_t * Version )`

Gets the message header version.

#### Description

This routine gets the message header version.

#### Parameters

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>Version</i>	Header version (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.

**10.28.2.4 CFE\_MSG\_GetNextSequenceCount()** `CFE_MSG_SequenceCount_t CFE_MSG_GetNextSequenceCount (`  
    `CFE_MSG_SequenceCount_t SeqCnt )`

Gets the next sequence count value (rolls over if appropriate)

#### Description

Abstract method to get the next valid sequence count value. Will roll over to zero for any input value greater than or equal to the maximum possible sequence count value given the field in the header.

#### Parameters

in	<i>SeqCnt</i>	Sequence count
----	---------------	----------------

#### Returns

The next valid sequence count value

**10.28.2.5 CFE\_MSG\_GetSegmentationFlag()** `CFE_Status_t CFE_MSG_GetSegmentationFlag (`  
    `const CFE_MSG_Message_t * MsgPtr,`  
    `CFE_MSG_SegmentationFlag_t * SegFlag )`

Gets the message segmentation flag.

#### Description

This routine gets the message segmentation flag

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>SegFlag</i>	Segmentation flag (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_MSG_BAD_ARGUMENT</i></a>	Error - bad argument.

**10.28.2.6 CFE\_MSG\_GetSequenceCount()** [\*CFE\\_Status\\_t\*](#) *CFE\_MSG\_GetSequenceCount* (

```
const CFE\_MSG\_Message\_t * MsgPtr,
CFE\_MSG\_SequenceCount\_t * SeqCnt )
```

Gets the message sequence count.

**Description**

This routine gets the message sequence count.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>SeqCnt</i>	Sequence count (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_MSG_BAD_ARGUMENT</i></a>	Error - bad argument.

**10.28.2.7 CFE\_MSG.GetSize()** [\*CFE\\_Status\\_t\*](#) *CFE\_MSG\_GetSize* (

```
const CFE\_MSG\_Message\_t * MsgPtr,
CFE\_MSG\_Size\_t * Size )
```

Gets the total size of a message.

**Description**

This routine gets the total size of the message.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>Size</i>	Total message size (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

Referenced by LC\_VerifyMsgLength(), and LC\_WPOffsetValid().

**10.28.2.8 CFE\_MSG\_GetType()** *CFE\_Status\_t* CFE\_MSG\_GetType (

```
    const CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_Type_t * Type )
```

Gets the message type.

**Description**

This routine gets the message type.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>Type</i>	Message type (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.9 CFE\_MSG\_SetApId()** *CFE\_Status\_t* CFE\_MSG\_SetApId (

```
    CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_ApId_t ApId )
```

Sets the message application ID.

**Description**

This routine sets the message application ID. Typically set at initialization using the MsgId, but API available to set bits that may not be included in MsgId.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>ApId</i>	Application ID

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.10 CFE\_MSG\_SetHasSecondaryHeader()** *CFE\_Status\_t* CFE\_MSG\_SetHasSecondaryHeader (

```
    CFE_MSG_Message_t * MsgPtr,
    bool HasSecondary )
```

Sets the message secondary header boolean.

**Description**

This routine sets the message secondary header boolean. Typically only set within message initialization and not used by APPs.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>HasSecondary</i>	Has secondary header flag

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.11 CFE\_MSG\_SetHeaderVersion()** *CFE\_Status\_t* CFE\_MSG\_SetHeaderVersion (

```
    CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_HeaderVersion_t Version )
```

Sets the message header version.

**Description**

This routine sets the message header version. Typically only set within message initialization and not used by APPs.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message.
in	<i>Version</i>	Header version

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.12 CFE\_MSG\_SetSegmentationFlag()** *CFE\_Status\_t* CFE\_MSG\_SetSegmentationFlag (   
     *CFE\_MSG\_Message\_t* \* *MsgPtr*,  
     *CFE\_MSG\_SegmentationFlag\_t* *SegFlag* )

Sets the message segmentation flag.

**Description**

This routine sets the message segmentation flag.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>SegFlag</i>	Segmentation flag

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.13 CFE\_MSG\_SetSequenceCount()** *CFE\_Status\_t* CFE\_MSG\_SetSequenceCount (   
     *CFE\_MSG\_Message\_t* \* *MsgPtr*,  
     *CFE\_MSG\_SequenceCount\_t* *SeqCnt* )

Sets the message sequence count.

**Description**

This routine sets the message sequence count.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>SeqCnt</i>	Sequence count

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.14 CFE\_MSG\_SetSize()** *CFE\_Status\_t* CFE\_MSG\_SetSize (

```
CFE_MSG_Message_t * MsgPtr,
```

```
CFE_MSG_Size_t Size )
```

Sets the total size of a message.

**Description**

This routine sets the total size of the message.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>Size</i>	Total message size

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.28.2.15 CFE\_MSG\_SetType()** *CFE\_Status\_t* CFE\_MSG\_SetType (

```
CFE_MSG_Message_t * MsgPtr,
```

```
CFE_MSG_Type_t Type )
```

Sets the message type.

**Description**

This routine sets the message type.

**Parameters**

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>Type</i>	Message type

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

## 10.29 cFE Message Extended Header APIs

### Functions

- `CFE_Status_t CFE_MSG_GetEDSVersion (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_EDSVersion_t *Version)`  
*Gets the message EDS version.*
- `CFE_Status_t CFE_MSG_SetEDSVersion (CFE_MSG_Message_t *MsgPtr, CFE_MSG_EDSVersion_t Version)`  
*Sets the message EDS version.*
- `CFE_Status_t CFE_MSG_GetEndian (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Endian_t *Endian)`  
*Gets the message endian.*
- `CFE_Status_t CFE_MSG_SetEndian (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Endian_t Endian)`  
*Sets the message endian.*
- `CFE_Status_t CFE_MSG_GetPlaybackFlag (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_PlaybackFlag_t *PlayFlag)`  
*Gets the message playback flag.*
- `CFE_Status_t CFE_MSG_SetPlaybackFlag (CFE_MSG_Message_t *MsgPtr, CFE_MSG_PlaybackFlag_t PlayFlag)`  
*Sets the message playback flag.*
- `CFE_Status_t CFE_MSG_GetSubsystem (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Subsystem_t *Subsystem)`  
*Gets the message subsystem.*
- `CFE_Status_t CFE_MSG_SetSubsystem (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Subsystem_t Subsystem)`  
*Sets the message subsystem.*
- `CFE_Status_t CFE_MSG_GetSystem (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_System_t *System)`  
*Gets the message system.*
- `CFE_Status_t CFE_MSG_SetSystem (CFE_MSG_Message_t *MsgPtr, CFE_MSG_System_t System)`  
*Sets the message system.*

### 10.29.1 Detailed Description

### 10.29.2 Function Documentation

**10.29.2.1 CFE\_MSG\_GetEDSVersion()** `CFE_Status_t CFE_MSG_GetEDSVersion (`  
 `const CFE_MSG_Message_t * MsgPtr,`  
 `CFE_MSG_EDSVersion_t * Version )`

Gets the message EDS version.

#### Description

This routine gets the message EDS version.

#### Parameters

in	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
out	<code>Version</code>	EDS Version (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.29.2.2 CFE\_MSG\_GetEndian()** `CFE_Status_t CFE_MSG_GetEndian (`  
    `const CFE_MSG_Message_t * MsgPtr,`  
    `CFE_MSG_Endian_t * Endian )`

Gets the message endian.

**Description**

This routine gets the message endian.

**Parameters**

<code>in</code>	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
<code>out</code>	<code>Endian</code>	Endian (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.29.2.3 CFE\_MSG\_GetPlaybackFlag()** `CFE_Status_t CFE_MSG_GetPlaybackFlag (`  
    `const CFE_MSG_Message_t * MsgPtr,`  
    `CFE_MSG_PlaybackFlag_t * PlayFlag )`

Gets the message playback flag.

**Description**

This routine gets the message playback flag.

**Parameters**

<code>in</code>	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
<code>out</code>	<code>PlayFlag</code>	Playback Flag (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.29.2.4 CFE\_MSG\_GetSubsystem()** *CFE\_Status\_t* CFE\_MSG\_GetSubsystem (

```
const CFE_MSG_Message_t * MsgPtr,
CFE_MSG_Subsystem_t * Subsystem )
```

Gets the message subsystem.

**Description**

This routine gets the message subsystem

**Parameters**

<i>in</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>out</i>	<i>Subsystem</i>	Subsystem (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.29.2.5 CFE\_MSG\_GetSystem()** *CFE\_Status\_t* CFE\_MSG\_GetSystem (

```
const CFE_MSG_Message_t * MsgPtr,
CFE_MSG_System_t * System )
```

Gets the message system.

**Description**

This routine gets the message system id

**Parameters**

<i>in</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>out</i>	<i>System</i>	System (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.29.2.6 CFE\_MSG\_SetEDSVersion()** [CFE\\_Status\\_t](#) CFE\_MSG\_SetEDSVersion (   
     [CFE\\_MSG\\_Message\\_t](#) \* *MsgPtr*,  
     [CFE\\_MSG\\_EDSVersion\\_t](#) *Version* )

Sets the message EDS version.

**Description**

This routine sets the message EDS version.

**Parameters**

<i>in, out</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>in</i>	<i>Version</i>	EDS Version

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.29.2.7 CFE\_MSG\_SetEndian()** [CFE\\_Status\\_t](#) CFE\_MSG\_SetEndian (   
     [CFE\\_MSG\\_Message\\_t](#) \* *MsgPtr*,  
     [CFE\\_MSG\\_Endian\\_t](#) *Endian* )

Sets the message endian.

**Description**

This routine sets the message endian. Invalid endian selection will set big endian.

**Parameters**

<i>in, out</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>in</i>	<i>Endian</i>	Endian

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.29.2.8 CFE\_MSG\_SetPlaybackFlag()** *CFE\_Status\_t* CFE\_MSG\_SetPlaybackFlag (

```
    CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_PlaybackFlag_t PlayFlag )
```

Sets the message playback flag.

**Description**

This routine sets the message playback flag.

**Parameters**

<i>in, out</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>in</i>	<i>PlayFlag</i>	Playback Flag

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.29.2.9 CFE\_MSG\_SetSubsystem()** *CFE\_Status\_t* CFE\_MSG\_SetSubsystem (

```
    CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_Subsystem_t Subsystem )
```

Sets the message subsystem.

**Description**

This routine sets the message subsystem. Some bits may be set at initialization using the MsgId, but API available to set bits that may not be included in MsgId.

**Parameters**

<i>in, out</i>	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
<i>in</i>	<i>Subsystem</i>	Subsystem

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

**10.29.2.10 CFE\_MSG\_SetSystem()** [`CFE\_Status\_t CFE\_MSG\_SetSystem \(`](#)  
[`CFE\_MSG\_Message\_t \* MsgPtr,`](#)  
[`CFE\_MSG\_System\_t System \)`](#)

Sets the message system.

**Description**

This routine sets the message system id. Some bits may be set at initialization using the MsgId, but API available to set bits that may not be included in MsgId.

**Parameters**

<code>in, out</code>	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
<code>in</code>	<code>System</code>	System

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

## 10.30 cFE Message Secondary Header APIs

### Functions

- `CFE_Status_t CFE_MSG_GenerateChecksum (CFE_MSG_Message_t *MsgPtr)`  
*Calculates and sets the checksum of a message.*
- `CFE_Status_t CFE_MSG_ValidateChecksum (const CFE_MSG_Message_t *MsgPtr, bool *isValid)`  
*Validates the checksum of a message.*
- `CFE_Status_t CFE_MSG_SetFcnCode (CFE_MSG_Message_t *MsgPtr, CFE_MSG_FcnCode_t FcnCode)`  
*Sets the function code field in a message.*
- `CFE_Status_t CFE_MSG_GetFcnCode (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_FcnCode_t *FcnCode)`  
*Gets the function code field from a message.*
- `CFE_Status_t CFE_MSG_GetMsgTime (const CFE_MSG_Message_t *MsgPtr, CFE_TIME_SysTime_t *Time)`  
*Gets the time field from a message.*
- `CFE_Status_t CFE_MSG_SetMsgTime (CFE_MSG_Message_t *MsgPtr, CFE_TIME_SysTime_t NewTime)`  
*Sets the time field in a message.*

#### 10.30.1 Detailed Description

#### 10.30.2 Function Documentation

**10.30.2.1 CFE\_MSG\_GenerateChecksum()** `CFE_Status_t CFE_MSG_GenerateChecksum (`  
`CFE_MSG_Message_t * MsgPtr )`

Calculates and sets the checksum of a message.

##### Description

This routine calculates the checksum of a message according to an implementation-defined algorithm. Then, it sets the checksum field in the message with the calculated value. The contents and location of this field will depend on the underlying implementation of messages. It may be a checksum, a CRC, or some other algorithm.

##### Assumptions, External Events, and Notes:

- If the underlying implementation of messages does not include a checksum field, then this routine will return `CFE_MSG_WRONG_MSG_TYPE`

##### Parameters

<code>in, out</code>	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null).
----------------------	---------------------	---

##### Returns

Execution status, see [cFE Return Code Defines](#)

##### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.
<code>CFE_MSG_WRONG_MSG_TYPE</code>	Error - wrong type.

```
10.30.2.2 CFE_MSG_GetFcnCode() CFE_Status_t CFE_MSG_GetFcnCode (
    const CFE_MSG_Message_t * MsgPtr,
    CFE_MSG_FcnCode_t * FcnCode )
```

Gets the function code field from a message.

#### Description

This routine gets the function code from a message.

#### Assumptions, External Events, and Notes:

- If the underlying implementation of messages does not include a function code field, then this routine will set FcnCode to zero and return [CFE\\_MSG\\_WRONG\\_MSG\\_TYPE](#)

#### Parameters

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>FcnCode</i>	The function code from the message (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.
<a href="#">CFE_MSG_WRONG_MSG_TYPE</a>	Error - wrong type.

Referenced by LC\_AppPipe(), and LC\_VerifyMsgLength().

```
10.30.2.3 CFE_MSG_GetMsgTime() CFE_Status_t CFE_MSG_GetMsgTime (
    const CFE_MSG_Message_t * MsgPtr,
    CFE_TIME_SysTime_t * Time )
```

Gets the time field from a message.

#### Description

This routine gets the time from a message.

#### Assumptions, External Events, and Notes:

- If the underlying implementation of messages does not include a time field, then this routine will set Time to zero and return [CFE\\_MSG\\_WRONG\\_MSG\\_TYPE](#)
- Note default implementation of command messages do not have a time field.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>Time</i>	Time from the message (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.
<i>CFE_MSG_WRONG_MSG_TYPE</i>	Error - wrong type.

Referenced by LC\_CheckMsgForWPs().

**10.30.2.4 CFE\_MSG\_SetFcnCode()** *CFE\_Status\_t* CFE\_MSG\_SetFcnCode (   
*CFE\_MSG\_Message\_t* \* *MsgPtr*,  
*CFE\_MSG\_FcnCode\_t* *FcnCode* )

Sets the function code field in a message.

**Description**

This routine sets the function code of a message.

**Assumptions, External Events, and Notes:**

- If the underlying implementation of messages does not include a function code field, then this routine will do nothing to the message contents and will return *CFE\_MSG\_WRONG\_MSG\_TYPE*.

**Parameters**

in,out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>FcnCode</i>	The function code to include in the message.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.
<i>CFE_MSG_WRONG_MSG_TYPE</i>	Error - wrong type.

Referenced by LC\_ExecuteRTS().

**10.30.2.5 CFE\_MSG\_SetMsgTime()** `CFE_Status_t CFE_MSG_SetMsgTime (`  
    `CFE_MSG_Message_t * MsgPtr,`  
    `CFE_TIME_SysTime_t NewTime )`

Sets the time field in a message.

#### Description

This routine sets the time of a message. Most applications will want to use [CFE\\_SB\\_TimeStampMsg](#) instead of this function. But, when needed, this API can be used to set multiple messages with identical time stamps.

#### Assumptions, External Events, and Notes:

- If the underlying implementation of messages does not include a time field, then this routine will do nothing to the message contents and will return [CFE\\_MSG\\_WRONG\\_MSG\\_TYPE](#).
- Note default implementation of command messages do not have a time field.

#### Parameters

in, out	<code>MsgPtr</code>	A pointer to the message (must not be null).
in	<code>NewTime</code>	The time to include in the message. This will usually be a time from <a href="#">CFE_TIME_GetTime</a> .

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.
<code>CFE_MSG_WRONG_MSG_TYPE</code>	Error - wrong type.

**10.30.2.6 CFE\_MSG\_ValidateChecksum()** `CFE_Status_t CFE_MSG_ValidateChecksum (`  
    `const CFE_MSG_Message_t * MsgPtr,`  
    `bool * IsValid )`

Validates the checksum of a message.

#### Description

This routine validates the checksum of a message according to an implementation-defined algorithm.

#### Assumptions, External Events, and Notes:

- If the underlying implementation of messages does not include a checksum field, then this routine will return [CFE\\_MSG\\_WRONG\\_MSG\\_TYPE](#) and set the IsValid parameter false.

#### Parameters

in	<code>MsgPtr</code>	A pointer to the buffer that contains the message (must not be null). This must point to the first byte of the message header.
----	---------------------	--

**Parameters**

<code>out</code>	<code>isValid</code>	Checksum validation result (must not be null) <ul style="list-style-type: none"><li>• true - valid</li><li>• false - invalid or not supported/implemented</li></ul>
------------------	----------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.
<code>CFE_MSG_WRONG_MSG_TYPE</code>	Error - wrong type.

## 10.31 cFE Message Id APIs

### Functions

- `CFE_Status_t CFE_MSG_GetMsgId (const CFE_MSG_Message_t *MsgPtr, CFE_SB_MsgId_t *MsgId)`  
*Gets the message id from a message.*
- `CFE_Status_t CFE_MSG_SetMsgId (CFE_MSG_Message_t *MsgPtr, CFE_SB_MsgId_t MsgId)`  
*Sets the message id bits in a message.*
- `CFE_Status_t CFE_MSG.GetTypeFromMsgId (CFE_SB_MsgId_t MsgId, CFE_MSG_Type_t *Type)`  
*Gets message type using message ID.*

#### 10.31.1 Detailed Description

#### 10.31.2 Function Documentation

##### 10.31.2.1 CFE\_MSG\_GetMsgId() `CFE_Status_t CFE_MSG_GetMsgId (`

```
    const CFE_MSG_Message_t * MsgPtr,  
    CFE_SB_MsgId_t * MsgId )
```

Gets the message id from a message.

#### Description

This routine gets the message id from a message. The message id is a hash of bits in the message header, used by the software bus for routing. Message id needs to be unique for each endpoint in the system.

#### Parameters

in	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
out	<i>MsgId</i>	Message id (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_MSG_BAD_ARGUMENT</code>	Error - bad argument.

Referenced by LC\_AppPipe(), LC\_VerifyMsgLength(), and LC\_WPOffsetValid().

##### 10.31.2.2 CFE\_MSG.GetTypeFromMsgId() `CFE_Status_t CFE_MSG.GetTypeFromMsgId (`

```
    CFE_SB_MsgId_t MsgId,  
    CFE_MSG_Type_t * Type )
```

Gets message type using message ID.

#### Description

This routine gets the message type using the message ID

**Parameters**

in	<i>MsgId</i>	Message id
out	<i>Type</i>	Message type (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

**10.31.2.3 CFE\_MSG\_SetMsgId()** *CFE\_Status\_t* CFE\_MSG\_SetMsgId (   
*CFE\_MSG\_Message\_t* \* *MsgPtr*,   
*CFE\_SB\_MsgId\_t* *MsgId* )

Sets the message id bits in a message.

**Description**

This routine sets the message id bits in a message. The message id is a hash of bits in the message header, used by the software bus for routing. Message id needs to be unique for each endpoint in the system.

**Note**

This API only sets the bits in the header that make up the message ID. No other values in the header are modified.

The user should ensure that this function is only called with a valid MsgId parameter value. If called with an invalid value, the results are implementation-defined. The implementation may or may not return the error code [CFE\\_MSG\\_BAD\\_ARGUMENT](#) in this case.

**Parameters**

in,out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>MsgId</i>	Message id

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_MSG_BAD_ARGUMENT</i>	Error - bad argument.

## 10.32 cFE Message Integrity APIs

### Functions

- `CFE_Status_t CFE_MSG_OriginationAction (CFE_MSG_Message_t *MsgPtr, size_t BufferSize, bool *IsAcceptable)`  
*Perform any necessary actions on a newly-created message, prior to sending.*
- `CFE_Status_t CFE_MSG_VerificationAction (const CFE_MSG_Message_t *MsgPtr, size_t BufferSize, bool *IsAcceptable)`  
*Checks message integrity/acceptability.*

#### 10.32.1 Detailed Description

#### 10.32.2 Function Documentation

##### 10.32.2.1 `CFE_MSG_OriginationAction()`

```
CFE_Status_t CFE_MSG_OriginationAction (
    CFE_MSG_Message_t * MsgPtr,
    size_t BufferSize,
    bool * IsAcceptable )
```

Perform any necessary actions on a newly-created message, prior to sending.

#### Description

This routine updates and/or appends any necessary fields on a message, is invoked via SB just prior to broadcasting the message. The actions include updating any values that should be computed/updated per message, including:

- setting the sequence number
- updating the timestamp, if present
- computing any error control or checksum fields, if present

The MSG module implementation determines which header fields meet this criteria and how they should be computed. The BufferSize parameter indicates the allocation size message of the buffer that holds the message (i.e. the message envelope size). In some implementations, the allocated buffer may include extra space in order to append a CRC or digital signature.

#### See also

[CFE\\_MSG\\_VerificationAction](#)

#### Parameters

in, out	<i>MsgPtr</i>	A pointer to the buffer that contains the message (must not be null).
in	<i>BufferSize</i>	The size of the buffer encapsulating the message
out	<i>IsAcceptable</i>	Output variable to be set, indicates message acceptability (must not be null)

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

**Return values**

<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.
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**10.32.2.2 CFE\_MSG\_VerificationAction()** [CFE\\_Status\\_t](#) CFE\_MSG\_VerificationAction ( const [CFE\\_MSG\\_Message\\_t](#) \* *MsgPtr*, size\_t *BufferSize*, bool \* *IsAcceptable* )

Checks message integrity/acceptability.

**Description**

This routine validates that any error-control field(s) in the message header matches the expected value.

The specific function of this API is entirely dependent on the header fields and may be a no-op if no error checking is implemented. In that case, it will always output "true".

**Note**

Due to the fact that software bus uses a multicast architecture, this function must not modify the message, as the buffer may be shared among multiple receivers. This should generally be the inverse of [CFE\\_MSG\\_OriginationAction\(\)](#), but on the origination side it may update header fields and/or modify the message, on the verification/receive side it must only check those fields, not modify them.

**See also**

[CFE\\_MSG\\_OriginationAction](#)

**Parameters**

in	<i>MsgPtr</i>	Message Pointer (must not be null)
in	<i>BufferSize</i>	The size of the buffer encapsulating the message
out	<i>IsAcceptable</i>	Output variable to be set, indicates message acceptability (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_MSG_BAD_ARGUMENT</a>	Error - bad argument.

## 10.33 cFE Pipe Management APIs

### Functions

- `CFE_Status_t CFE_SB_CreatePipe (CFE_SB_Pipeld_t *PipeldPtr, uint16 Depth, const char *PipeName)`  
*Creates a new software bus pipe.*
- `CFE_Status_t CFE_SB_DeletePipe (CFE_SB_Pipeld_t Pipeld)`  
*Delete a software bus pipe.*
- `CFE_Status_t CFE_SB_Pipeld_ToIndex (CFE_SB_Pipeld_t Pipeld, uint32 *Idx)`  
*Obtain an index value correlating to an SB Pipe ID.*
- `CFE_Status_t CFE_SB_SetPipeOpts (CFE_SB_Pipeld_t Pipeld, uint8 Opts)`  
*Set options on a pipe.*
- `CFE_Status_t CFE_SB_GetPipeOpts (CFE_SB_Pipeld_t Pipeld, uint8 *OptsPtr)`  
*Get options on a pipe.*
- `CFE_Status_t CFE_SB_GetPipeName (char *PipeNameBuf, size_t PipeNameSize, CFE_SB_Pipeld_t Pipeld)`  
*Get the pipe name for a given id.*
- `CFE_Status_t CFE_SB_GetPipeldByName (CFE_SB_Pipeld_t *PipeldPtr, const char *PipeName)`  
*Get pipe id by pipe name.*

#### 10.33.1 Detailed Description

#### 10.33.2 Function Documentation

**10.33.2.1 CFE\_SB\_CreatePipe()** `CFE_Status_t CFE_SB_CreatePipe (`  
    `CFE_SB_Pipeld_t * PipeIdPtr,`  
    `uint16 Depth,`  
    `const char * PipeName )`

Creates a new software bus pipe.

#### Description

This routine creates and initializes an input pipe that the calling application can use to receive software bus messages. By default, no messages are routed to the new pipe. So, the application must use `CFE_SB_Subscribe` to specify which messages it wants to receive on this pipe.

#### Assumptions, External Events, and Notes:

None

#### Parameters

out	<code>PipeldPtr</code>	A pointer to a variable of type <code>CFE_SB_Pipeld_t</code> (must not be null), which will be filled in with the pipe ID information by the <code>CFE_SB_CreatePipe</code> routine. <code>*PipeldPtr</code> is the identifier for the created pipe.
in	<code>Depth</code>	The maximum number of messages that will be allowed on this pipe at one time.
in	<code>PipeName</code>	A string (must not be null) to be used to identify this pipe in error messages and routing information telemetry. The string must be no longer than <code>OS_MAX_API_NAME</code> (including terminator). Longer strings will be truncated.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_SB_MAX_PIPES_MET</a>	Max Pipes Met.
<a href="#">CFE_SB_PIPE_CR_ERR</a>	Pipe Create Error.

**See also**

[CFE\\_SB\\_DeletePipe](#) [CFE\\_SB\\_GetPipeOpts](#) [CFE\\_SB\\_SetPipeOpts](#) [CFE\\_SB\\_GetPipeIdByName](#)

Referenced by [LC\\_SbInit\(\)](#).

**10.33.2.2 CFE\_SB\_DeletePipe()** [CFE\\_Status\\_t](#) CFE\_SB\_DeletePipe (

[CFE\\_SB\\_PipeId\\_t](#) PipeId )

Delete a software bus pipe.

**Description**

This routine deletes an input pipe and cleans up all data structures associated with the pipe. All subscriptions made for this pipe by calls to [CFE\\_SB\\_Subscribe](#) will be automatically removed from the SB routing tables. Any messages in the pipe will be discarded.

Applications should not call this routine for all of their SB pipes as part of their orderly shutdown process, as the pipe will be deleted by the support framework at the appropriate time.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>PipeId</i>	The pipe ID (obtained previously from <a href="#">CFE_SB_CreatePipe</a> ) of the pipe to be deleted.
----	---------------	--

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_SB\\_CreatePipe](#) [CFE\\_SB\\_GetPipeOpts](#) [CFE\\_SB\\_SetPipeOpts](#) [CFE\\_SB\\_GetPipeIdByName](#)

**10.33.2.3 CFE\_SB\_GetPipeIdByName()** `CFE_Status_t` `CFE_SB_GetPipeIdByName` (   
     `CFE_SB_PipeId_t` \* `PipeIdPtr`,  
     const char \* `PipeName` )

Get pipe id by pipe name.

#### Description

This routine finds the pipe id for a pipe name.

#### Parameters

in	<i>PipeName</i>	The name of the pipe (must not be null).
out	<i>PipeIdPtr</i>	The PipeId for that name (must not be null).

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_SB_BAD_ARGUMENT</code>	Bad Argument.

#### See also

[CFE\\_SB\\_CreatePipe](#) [CFE\\_SB\\_DeletePipe](#) [CFE\\_SB\\_SetPipeOpts](#) [CFE\\_SB\\_PIPEOPTS\\_IGNOREMINE](#)

**10.33.2.4 CFE\_SB\_GetPipeName()** `CFE_Status_t` `CFE_SB_GetPipeName` (   
     char \* `PipeNameBuf`,  
     size\_t `PipeNameSize`,  
     `CFE_SB_PipeId_t` `PipeId` )

Get the pipe name for a given id.

#### Description

This routine finds the pipe name for a pipe id.

#### Parameters

out	<i>PipeNameBuf</i>	The buffer to receive the pipe name (must not be null).
in	<i>PipeNameSize</i>	The size (in chars) of the PipeName buffer (must not be zero).
in	<i>PipeId</i>	The PipeId for that name.

#### Returns

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_SB\\_CreatePipe](#) [CFE\\_SB\\_DeletePipe](#) [CFE\\_SB\\_SetPipeOpts](#) [CFE\\_SB\\_GetPipeIdByName](#)

**10.33.2.5 CFE\_SB\_GetPipeOpts()** [CFE\\_Status\\_t](#) CFE\_SB\_GetPipeOpts (   
     [CFE\\_SB\\_PipeId\\_t](#) PipeId,  
     [uint8](#) \* OptsPtr )

Get options on a pipe.

**Description**

This routine gets the current options on a pipe.

**Parameters**

in	<i>PipeId</i>	The pipe ID of the pipe to get options from.
out	<i>OptsPtr</i>	A bit field of options: <a href="#">cFE SB Pipe options</a> (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_SB\\_CreatePipe](#) [CFE\\_SB\\_DeletePipe](#) [CFE\\_SB\\_SetPipeOpts](#) [CFE\\_SB\\_GetPipeIdByName](#) [CFE\\_SB\\_PIPEOPTS\\_IGNOREMIN](#)

**10.33.2.6 CFE\_SB\_PipeId\_ToIndex()** [CFE\\_Status\\_t](#) CFE\_SB\_PipeId\_ToIndex (   
     [CFE\\_SB\\_PipeId\\_t](#) PipeID,  
     [uint32](#) \* Idx )

Obtain an index value correlating to an SB Pipe ID.

This calculates a zero based integer value that may be used for indexing into a local resource table/array.

Index values are only guaranteed to be unique for resources of the same type. For instance, the indices corresponding to two [valid] application IDs will never overlap, but the index of a pipe ID and an app ID may be the same. Furthermore, indices may be reused if a resource is deleted and re-created.

**Note**

There is no inverse of this function - indices cannot be converted back to the original PipeID value. The caller should retain the original ID for future use.

**Parameters**

in	<i>PipeID</i>	Pipe ID to convert
out	<i>Idx</i>	Buffer where the calculated index will be stored (must not be null)

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i></a>	Resource ID is not valid.

**10.33.2.7 CFE\_SB\_SetPipeOpts()** [\*CFE\\_Status\\_t\*](#) CFE\_SB\_SetPipeOpts (

```
    CFE\_SB\_PipeId\_t PipeId,  
    uint8 Opts )
```

Set options on a pipe.

**Description**

This routine sets (or clears) options to alter the pipe's behavior. Options are (re)set every call to this routine.

**Parameters**

in	<i>PipeId</i>	The pipe ID of the pipe to set options on.
in	<i>Opts</i>	A bit field of options: <a href="#">cFE SB Pipe options</a>

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_SB_BAD_ARGUMENT</i></a>	Bad Argument.

**See also**

[CFE\\_SB\\_CreatePipe](#) [CFE\\_SB\\_DeletePipe](#) [CFE\\_SB\\_GetPipeOpts](#) [CFE\\_SB\\_GetPipeIdByName](#) [CFE\\_SB\\_PIPEOPTS\\_IGNOREMIN](#)

## 10.34 cFE Message Subscription Control APIs

### Functions

- [CFE\\_Status\\_t CFE\\_SB\\_SubscribeEx \(CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_SB\\_PipeId\\_t PipeId, CFE\\_SB\\_Qos\\_t Quality, uint16 MsgLim\)](#)  
*Subscribe to a message on the software bus.*
- [CFE\\_Status\\_t CFE\\_SB\\_Subscribe \(CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_SB\\_PipeId\\_t PipeId\)](#)  
*Subscribe to a message on the software bus with default parameters.*
- [CFE\\_Status\\_t CFE\\_SB\\_SubscribeLocal \(CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_SB\\_PipeId\\_t PipeId, uint16 MsgLim\)](#)  
*Subscribe to a message while keeping the request local to a cpu.*
- [CFE\\_Status\\_t CFE\\_SB\\_Unsubscribe \(CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_SB\\_PipeId\\_t PipeId\)](#)  
*Remove a subscription to a message on the software bus.*
- [CFE\\_Status\\_t CFE\\_SB\\_UnsubscribeLocal \(CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_SB\\_PipeId\\_t PipeId\)](#)  
*Remove a subscription to a message on the software bus on the current CPU.*

#### 10.34.1 Detailed Description

#### 10.34.2 Function Documentation

**10.34.2.1 CFE\_SB\_Subscribe()** [CFE\\_Status\\_t CFE\\_SB\\_Subscribe \(](#)  
`CFE_SB_MsgId_t MsgId,`  
`CFE_SB_PipeId_t PipeId )`

Subscribe to a message on the software bus with default parameters.

#### Description

This routine adds the specified pipe to the destination list for the specified message ID. This is the same as [CFE\\_SB\\_SubscribeEx](#) with the Quality field set to [CFE\\_SB\\_DEFAULT\\_QOS](#) and MsgLim set to [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_MSG\\_LIMIT](#) (4).

#### Assumptions, External Events, and Notes:

Note: As subscriptions are received, the destinations are added to the head of a linked list. During the sending of a message, the list is traversed beginning at the head of the list. Therefore the message will first be sent to the last subscriber. If an application has timing constraints and needs to receive a message in the shortest possible time, the developer may consider holding off its subscription until other applications have subscribed to the message.

#### Parameters

in	<i>MsgId</i>	The message ID of the message to be subscribed to.
in	<i>PipeId</i>	The pipe ID of the pipe the subscribed message should be sent to.

#### Returns

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_SB_MAX_MSGS_MET</i>	(return value only verified in coverage test) Max Messages Met.
<i>CFE_SB_MAX_DESTS_MET</i>	Max Destinations Met.
<i>CFE_SB_BAD_ARGUMENT</i>	Bad Argument.
<i>CFE_SB_BUF_ALOC_ERR</i>	(return value only verified in coverage test) Buffer Allocation Error.

**See also**

[CFE\\_SB\\_SubscribeEx](#), [CFE\\_SB\\_SubscribeLocal](#), [CFE\\_SB\\_Unsubscribe](#), [CFE\\_SB\\_UnsubscribeLocal](#)

Referenced by `LC_AddWatchpoint()`, and `LC_SbInit()`.

**10.34.2.2 CFE\_SB\_SubscribeEx() *CFE\_Status\_t* CFE\_SB\_SubscribeEx (**

```
    CFE_SB_MsgId_t MsgId,
    CFE_SB_PipeId_t PipeId,
    CFE_SB_Qos_t Quality,
    uint16 MsgLim )
```

Subscribe to a message on the software bus.

**Description**

This routine adds the specified pipe to the destination list associated with the specified message ID.

**Assumptions, External Events, and Notes:**

Note: As subscriptions are received, the destinations are added to the head of a linked list. During the sending of a message, the list is traversed beginning at the head of the list. Therefore the message will first be sent to the last subscriber. If an application has timing constraints and needs to receive a message in the shortest possible time, the developer may consider holding off its subscription until other applications have subscribed to the message.

**Parameters**

in	<i>MsgId</i>	The message ID of the message to be subscribed to.
in	<i>PipeId</i>	The pipe ID of the pipe the subscribed message should be sent to.
in	<i>Quality</i>	The requested Quality of Service (QoS) required of the messages. Most callers will use <a href="#">CFE_SB_DEFAULT_QOS</a> for this parameter.
in	<i>MsgLim</i>	The maximum number of messages with this Message ID to allow in this pipe at the same time.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_SB_MAX_MSGS_MET</i>	(return value only verified in coverage test) Max Messages Met.
<i>CFE_SB_MAX_DESTS_MET</i>	Max Destinations Met.
<i>CFE_SB_BAD_ARGUMENT</i>	Bad Argument.
<i>CFE_SB_BUF_ALOC_ERR</i>	(return value only verified in coverage test) Buffer Allocation Error.

**See also**

[CFE\\_SB\\_Subscribe](#), [CFE\\_SB\\_SubscribeLocal](#), [CFE\\_SB\\_Unsubscribe](#), [CFE\\_SB\\_UnsubscribeLocal](#)

**10.34.2.3 CFE\_SB\_SubscribeLocal()** `CFE_Status_t CFE_SB_SubscribeLocal (`

```
    CFE_SB_MsgId_t MsgId,
    CFE_SB_PipeId_t PipeId,
    uint16 MsgLim )
```

Subscribe to a message while keeping the request local to a cpu.

**Description**

This routine adds the specified pipe to the destination list for the specified message ID. This is similar to [CFE\\_SB\\_SubscribeEx](#) with the Quality field set to [CFE\\_SB\\_DEFAULT\\_QOS](#) and MsgLim set to [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_MSG\\_LIMIT](#), but will not report the subscription.

Software Bus Network (SBN) application is an example use case, where local subscriptions should not be reported to peers.

**Assumptions, External Events, and Notes:**

- This API is typically only used by Software Bus Network (SBN) Application

**Parameters**

in	<i>MsgId</i>	The message ID of the message to be subscribed to.
in	<i>PipeId</i>	The pipe ID of the pipe the subscribed message should be sent to.
in	<i>MsgLim</i>	The maximum number of messages with this Message ID to allow in this pipe at the same time.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_MAX_MSGS_MET</a>	(return value only verified in coverage test) Max Messages Met.
<a href="#">CFE_SB_MAX_DESTS_MET</a>	Max Destinations Met.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_SB_BUF_ALLOC_ERR</a>	(return value only verified in coverage test) Buffer Allocation Error.

**See also**

[CFE\\_SB\\_Subscribe](#), [CFE\\_SB\\_SubscribeEx](#), [CFE\\_SB\\_Unsubscribe](#), [CFE\\_SB\\_UnsubscribeLocal](#)

**10.34.2.4 CFE\_SB\_Unsubscribe()** `CFE_Status_t CFE_SB_Unsubscribe (`

```
    CFE_SB_MsgId_t MsgId,
    CFE_SB_PipeId_t PipeId )
```

Remove a subscription to a message on the software bus.

**Description**

This routine removes the specified pipe from the destination list for the specified message ID.

**Assumptions, External Events, and Notes:**

If the Pipe is not subscribed to MsgId, the CFE\_SB\_UNSUB\_NO\_SUBS\_EID event will be generated and [CFE\\_SUCCESS](#) will be returned

**Parameters**

in	<i>MsgId</i>	The message ID of the message to be unsubscribed.
in	<i>PipeId</i>	The pipe ID of the pipe the subscribed message should no longer be sent to.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_SB\\_Subscribe](#), [CFE\\_SB\\_SubscribeEx](#), [CFE\\_SB\\_SubscribeLocal](#), [CFE\\_SB\\_UnsubscribeLocal](#)

Referenced by [LC\\_CreateHashTable\(\)](#).

**10.34.2.5 CFE\_SB\_UnsubscribeLocal()** [CFE\\_Status\\_t](#) CFE\_SB\_UnsubscribeLocal (   
     [CFE\\_SB\\_MsgId\\_t](#) *MsgId*,  
     [CFE\\_SB\\_PipeId\\_t](#) *PipeId* )

Remove a subscription to a message on the software bus on the current CPU.

**Description**

This routine removes the specified pipe from the destination list for the specified message ID on the current CPU.

**Assumptions, External Events, and Notes:**

This API is typically only used by Software Bus Network (SBN) Application. If the Pipe is not subscribed to MsgId, the CFE\_SB\_UNSUB\_NO\_SUBS\_EID event will be generated and [CFE\\_SUCCESS](#) will be returned

**Parameters**

in	<i>MsgId</i>	The message ID of the message to be unsubscribed.
in	<i>PipeId</i>	The pipe ID of the pipe the subscribed message should no longer be sent to.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution.
<a href="#"><i>CFE_SB_BAD_ARGUMENT</i></a>	Bad Argument.

**See also**

[CFE\\_SB\\_Subscribe](#), [CFE\\_SB\\_SubscribeEx](#), [CFE\\_SB\\_SubscribeLocal](#), [CFE\\_SB\\_Unsubscribe](#)

## 10.35 cFE Send/Receive Message APIs

### Functions

- `CFE_Status_t CFE_SB_TransmitMsg (const CFE_MSG_Message_t *MsgPtr, bool IsOrigination)`  
*Transmit a message.*
- `CFE_Status_t CFE_SB_ReceiveBuffer (CFE_SB_Buffer_t **BufPtr, CFE_SB_PipeId_t PipeId, int32 TimeOut)`  
*Receive a message from a software bus pipe.*

#### 10.35.1 Detailed Description

#### 10.35.2 Function Documentation

**10.35.2.1 CFE\_SB\_ReceiveBuffer()** `CFE_Status_t CFE_SB_ReceiveBuffer (`  
`CFE_SB_Buffer_t ** BufPtr,`  
`CFE_SB_PipeId_t PipeId,`  
`int32 TimeOut )`

Receive a message from a software bus pipe.

#### Description

This routine retrieves the next message from the specified pipe. If the pipe is empty, this routine will block until either a new message comes in or the timeout value is reached.

#### Assumptions, External Events, and Notes:

Note - If an error occurs in this API, the `*BufPtr` value may be NULL or random. Therefore, it is recommended that the return code be tested for `CFE_SUCCESS` before processing the message.

#### Parameters

in, out	<code>BufPtr</code>	A pointer to the software bus buffer to receive to (must not be null). Typically a caller declares a ptr of type <code>CFE_SB_Buffer_t</code> (i.e. <code>CFE_SB_Buffer_t *Ptr</code> ) then gives the address of that pointer ( <code>&amp;Ptr</code> ) as this parameter. After a successful receipt of a message, <code>*BufPtr</code> will point to the first byte of the software bus buffer. This should be used as a read-only pointer (in systems with an MMU, writes to this pointer may cause a memory protection fault). The <code>*BufPtr</code> is valid only until the next call to <code>CFE_SB_ReceiveBuffer</code> for the same pipe.
in	<code>PipeId</code>	The pipe ID of the pipe containing the message to be obtained.
in	<code>TimeOut</code>	The number of milliseconds to wait for a new message if the pipe is empty at the time of the call. This can also be set to <code>CFE_SB_POLL</code> for a non-blocking receive or <code>CFE_SB_PEND_FOREVER</code> to wait forever for a message to arrive.

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_SB_BAD_ARGUMENT</code>	Bad Argument.

**Return values**

<i>CFE_SB_TIME_OUT</i>	Time Out.
<i>CFE_SB_PIPE_RD_ERR</i>	(return value only verified in coverage test) Pipe Read Error.
<i>CFE_SB_NO_MESSAGE</i>	No Message.

Referenced by LC\_AppMain().

```
10.35.2.2 CFE_SB_TransmitMsg() CFE_Status_t CFE_SB_TransmitMsg (
    const CFE_MSG_Message_t * MsgPtr,
    bool IsOrigination )
```

Transmit a message.

**Description**

This routine copies the specified message into a software bus buffer which is then transmitted to all subscribers. The software bus will read the message ID from the message header to determine which pipes should receive the message.

The *IsOrigination* parameter should be passed as "true" if the message was newly constructed by the sender and is being sent for the first time. This enables the message origination actions as determined by the CFE MSG module, which may include (but not limited to):

- Updating sequence number
- Updating timestamp
- Calculating a CRC, checksum, or other message error control field

Conversely, when forwarding a message that originated from an external entity (e.g. messages passing through CI or SBN), the parameter should be passed as "false" to not overwrite existing data.

**Assumptions, External Events, and Notes:**

- This routine will not normally wait for the receiver tasks to process the message before returning control to the caller's task.
- However, if a higher priority task is pending and subscribed to this message, that task may get to run before returning control to the caller.
- In previous versions of CFE, the boolean parameter referred to the sequence number header of telemetry messages only. This has been extended to apply more generically to any headers, as determined by the CFE MSG implementation.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the message to be sent (must not be null). This must point to the first byte of the message header.
in	<i>IsOrigination</i>	Update the headers of the message

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_SB_BAD_ARGUMENT</i>	Bad Argument.
<i>CFE_SB_MSG_TOO_BIG</i>	Message Too Big.
<i>CFE_SB_BUF_ALOC_ERR</i>	(return value only verified in coverage test) Buffer Allocation Error.

Referenced by LC\_ExecuteRTS(), and LC\_SendHkCmd().

## 10.36 cFE Zero Copy APIs

### Functions

- [CFE\\_SB\\_Buffer\\_t \\* CFE\\_SB\\_AllocateMessageBuffer \(size\\_t MsgSize\)](#)  
*Get a buffer pointer to use for "zero copy" SB sends.*
- [CFE\\_Status\\_t CFE\\_SB\\_ReleaseMessageBuffer \(CFE\\_SB\\_Buffer\\_t \\*BufPtr\)](#)  
*Release an unused "zero copy" buffer pointer.*
- [CFE\\_Status\\_t CFE\\_SB\\_TransmitBuffer \(CFE\\_SB\\_Buffer\\_t \\*BufPtr, bool IsOrigination\)](#)  
*Transmit a buffer.*

#### 10.36.1 Detailed Description

#### 10.36.2 Function Documentation

##### 10.36.2.1 CFE\_SB\_AllocateMessageBuffer() [CFE\\_SB\\_Buffer\\_t\\* CFE\\_SB\\_AllocateMessageBuffer \( size\\_t MsgSize \)](#)

Get a buffer pointer to use for "zero copy" SB sends.

#### Description

This routine can be used to get a pointer to one of the software bus' internal memory buffers that are used for sending messages. The caller can use this memory buffer to build an SB message, then send it using the [CFE\\_SB\\_TransmitBuffer\(\)](#) function. This interface avoids an extra copy of the message from the user's memory buffer to the software bus internal buffer.

#### Assumptions, External Events, and Notes:

1. The pointer returned by [CFE\\_SB\\_AllocateMessageBuffer\(\)](#) is only good for one call to [CFE\\_SB\\_TransmitBuffer\(\)](#).
2. Once a buffer has been successfully transmitted (as indicated by a successful return from [CFE\\_SB\\_TransmitBuffer\(\)](#)) the buffer becomes owned by the SB application. It will automatically be freed by SB once all recipients have finished reading it.
3. Applications must not de-reference the message pointer (for reading or writing) after the call to [CFE\\_SB\\_TransmitBuffer\(\)](#).
4. If [CFE\\_SB\\_ReleaseMessageBuffer](#) should be used only if a message is not transmitted

#### Parameters

in	MsgSize	The size of the SB message buffer the caller wants (including the SB message header).
----	---------	---

#### Returns

A pointer to a memory buffer that message data can be written to for use with [CFE\\_SB\\_TransmitBuffer\(\)](#).

##### 10.36.2.2 CFE\_SB\_ReleaseMessageBuffer() [CFE\\_Status\\_t CFE\\_SB\\_ReleaseMessageBuffer \( CFE\\_SB\\_Buffer\\_t \\* BufPtr \)](#)

Release an unused "zero copy" buffer pointer.

### Description

This routine can be used to release a pointer to one of the software bus' internal memory buffers.

### Assumptions, External Events, and Notes:

1. This function is not needed for normal "zero copy" transfers. It is needed only for cleanup when an application gets a pointer using [CFE\\_SB\\_AllocateMessageBuffer\(\)](#), but (due to some error condition) never uses that pointer in a call to [CFE\\_SB\\_TransmitBuffer\(\)](#).

### Parameters

in	<i>BufPtr</i>	A pointer to the SB internal buffer (must not be null). This must be a pointer returned by a call to <a href="#">CFE_SB_AllocateMessageBuffer()</a> , but never used in a call to <a href="#">CFE_SB_TransmitBuffer()</a> .
----	---------------	---

### Returns

Execution status, see [cFE Return Code Defines](#)

### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BUFFER_INVALID</a>	Buffer Invalid.

### 10.36.2.3 CFE\_SB\_TransmitBuffer() [CFE\\_Status\\_t](#) CFE\_SB\_TransmitBuffer (

```
    CFE_SB_Buffer_t * BufPtr,  
    bool IsOrigination )
```

Transmit a buffer.

### Description

This routine sends a message that has been created directly in an internal SB message buffer by an application (after a call to [CFE\\_SB\\_AllocateMessageBuffer](#)). This interface is more complicated than the normal [CFE\\_SB\\_TransmitMsg](#) interface, but it avoids an extra copy of the message from the user's memory buffer to the software bus internal buffer. The "zero copy" interface can be used to improve performance in high-rate, high-volume software bus traffic.

The *IsOrigination* parameter should be passed as "true" if the message was newly constructed by the sender and is being sent for the first time. This enables the message origination actions as determined by the CFE MSG module, which may include (but not limited to):

- Updating sequence number
- Updating timestamp
- Calculating a CRC, checksum, or other message error control field

Conversely, when forwarding a message that originated from an external entity (e.g. messages passing through CI or SBN), the parameter should be passed as "false" to not overwrite existing data.

**Assumptions, External Events, and Notes:**

1. A handle returned by [CFE\\_SB\\_AllocateMessageBuffer](#) is "consumed" by a *successful* call to [CFE\\_SB\\_TransmitBuffer](#).
2. If this function returns CFE\_SUCCESS, this indicates the zero copy handle is now owned by software bus, and is no longer owned by the calling application, and should not be re-used.
3. However if this function fails (returns any error status) it does not change the state of the buffer at all, meaning the calling application still owns it. (a failure means the buffer is left in the same state it was before the call).
4. Applications should be written as if [CFE\\_SB\\_AllocateMessageBuffer](#) is equivalent to a `malloc()` and a successful call to [CFE\\_SB\\_TransmitBuffer](#) is equivalent to a `free()`.
5. Applications must not de-reference the message pointer (for reading or writing) after a successful call to [CFE\\_SB\\_TransmitBuffer](#).
6. This function will increment and apply the internally tracked sequence counter if set to do so.

**Parameters**

in	<i>BufPtr</i>	A pointer to the buffer to be sent (must not be null).
in	<i>IsOrigination</i>	Update applicable header field(s) of a newly constructed message

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_SB_MSG_TOO_BIG</a>	Message Too Big.

## 10.37 cFE Message Characteristics APIs

### Functions

- void `CFE_SB_SetUserDataLength (CFE_MSG_Message_t *MsgPtr, size_t DataLength)`  
*Sets the length of user data in a software bus message.*
- void `CFE_SB_TimeStampMsg (CFE_MSG_Message_t *MsgPtr)`  
*Sets the time field in a software bus message with the current spacecraft time.*
- int32 `CFE_SB_MessageStringSet (char *DestStringPtr, const char *SourceStringPtr, size_t DestMaxSize, size_t SourceMaxSize)`  
*Copies a string into a software bus message.*
- void \* `CFE_SB_GetUserData (CFE_MSG_Message_t *MsgPtr)`  
*Get a pointer to the user data portion of a software bus message.*
- size\_t `CFE_SB_GetUserDataLength (const CFE_MSG_Message_t *MsgPtr)`  
*Gets the length of user data in a software bus message.*
- int32 `CFE_SB_MessageStringGet (char *DestStringPtr, const char *SourceStringPtr, const char *DefaultString, size_t DestMaxSize, size_t SourceMaxSize)`  
*Copies a string out of a software bus message.*

#### 10.37.1 Detailed Description

#### 10.37.2 Function Documentation

**10.37.2.1 CFE\_SB\_GetUserData()** void\* `CFE_SB_GetUserData (`  
                          `CFE_MSG_Message_t * MsgPtr )`

Get a pointer to the user data portion of a software bus message.

##### Description

This routine returns a pointer to the user data portion of a software bus message. SB message header formats can be different for each deployment of the cFE. So, applications should use this function and avoid hard coding offsets into their SB message buffers.

##### Assumptions, External Events, and Notes:

None

##### Parameters

in	<code>MsgPtr</code>	A pointer to the buffer that contains the software bus message (must not be null).
----	---------------------	--

##### Returns

A pointer to the first byte of user data within the software bus message.

**10.37.2.2 CFE\_SB\_GetUserDataLength()** size\_t `CFE_SB_GetUserDataLength (`  
                          `const CFE_MSG_Message_t * MsgPtr )`

Gets the length of user data in a software bus message.

**Description**

This routine returns the size of the user data in a software bus message.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the software bus message (must not be null). This must point to the first byte of the message header.
----	---------------	---

**Returns**

The size (in bytes) of the user data in the software bus message.

**Return values**

0	if an error occurs, such as if the <i>MsgPtr</i> argument is not valid.
---	---

```
10.37.2.3 CFE_SB_MessageStringGet() int32 CFE_SB_MessageStringGet (
    char * DestStringPtr,
    const char * SourceStringPtr,
    const char * DefaultString,
    size_t DestMaxSize,
    size_t SourceMaxSize )
```

Copies a string out of a software bus message.

**Description**

Strings within software bus messages have a defined/fixed maximum length, and may not necessarily be null terminated within the message. This presents a possible issue when using the C library functions to copy strings out of a message.

This function should replace use of C library functions such as strcpy/strncpy when copying strings out of software bus messages to local storage buffers.

Up to [SourceMaxSize] or [DestMaxSize-1] (whichever is smaller) characters will be copied from the source buffer to the destination buffer, and a NUL termination character will be written to the destination buffer as the last character.

If the *DefaultString* pointer is non-NULL, it will be used in place of the source string if the source is an empty string. This is typically a string constant that comes from the platform configuration, allowing default values to be assumed for fields that are unspecified.

**IMPORTANT** - the default string, if specified, must be null terminated. This will be the case if a string literal is passed in (the typical/expected use case).

If the default is NULL, then only the source string will be copied, and the result will be an empty string if the source was empty.

If the destination buffer is too small to store the entire string, it will be truncated, but it will still be null terminated.

**Parameters**

out	<i>DestStringPtr</i>	Pointer to destination buffer (must not be null)
-----	----------------------	--

**Parameters**

in	<i>SourceStringPtr</i>	Pointer to source buffer (component of SB message definition)
in	<i>DefaultString</i>	Default string to use if source is empty
in	<i>DestMaxSize</i>	Size of destination storage buffer (must not be zero)
in	<i>SourceMaxSize</i>	Size of source buffer as defined by the message definition

**Returns**

Number of characters copied or error code, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.
-------------------------------------	---------------

```
10.37.2.4 CFE_SB_MessageStringSet() int32 CFE_SB_MessageStringSet (
    char * DestStringPtr,
    const char * SourceStringPtr,
    size_t DestMaxSize,
    size_t SourceMaxSize )
```

Copies a string into a software bus message.

**Description**

Strings within software bus messages have a defined/fixed maximum length, and may not necessarily be null terminated within the message. This presents a possible issue when using the C library functions to copy strings out of a message.

This performs a very similar function to "strncpy()" except that the sizes of *both* buffers are passed in. Neither buffer is required to be null-terminated, but copying will stop after the first termination character is encountered. If the destination buffer is not completely filled by the source data (such as if the supplied string was shorter than the allotted length) the destination buffer will be padded with NUL characters up to the size of the buffer, similar to what strncpy() does. This ensures that the entire destination buffer is set.

**Note**

If the source string buffer is already guaranteed to be null terminated, then there is no difference between the C library "strncpy()" function and this implementation. It is only necessary to use this when termination of the source buffer is not guaranteed.

**Parameters**

out	<i>DestStringPtr</i>	Pointer to destination buffer (component of SB message definition) (must not be null)
in	<i>SourceStringPtr</i>	Pointer to source buffer (must not be null)
in	<i>DestMaxSize</i>	Size of destination buffer as defined by the message definition
in	<i>SourceMaxSize</i>	Size of source buffer

**Returns**

Number of characters copied or error code, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SB_BAD_ARGUMENT</a>	Bad Argument.
-------------------------------------	---------------

**10.37.2.5 CFE\_SB\_SetUserDataLength()** `void CFE_SB_SetUserDataLength (`

```
    CFE_MSG_Message_t * MsgPtr,
    size_t DataLength )
```

Sets the length of user data in a software bus message.

**Description**

This routine sets the field in the SB message header that determines the size of the user data in a software bus message. SB message header formats can be different for each deployment of the cFE. So, applications should use this function rather than trying to poke a length value directly into their SB message buffers.

**Assumptions, External Events, and Notes:**

- You must set a valid message ID in the SB message header before calling this function.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the software bus message (must not be null). This must point to the first byte of the message header.
in	<i>DataLength</i>	The length to set (size of the user data, in bytes).

**10.37.2.6 CFE\_SB\_TimeStampMsg()** `void CFE_SB_TimeStampMsg (`

```
    CFE_MSG_Message_t * MsgPtr )
```

Sets the time field in a software bus message with the current spacecraft time.

**Description**

This routine sets the time of a software bus message with the current spacecraft time. This will be the same time that is returned by the function [CFE\\_TIME\\_GetTime](#).

**Assumptions, External Events, and Notes:**

- If the underlying implementation of software bus messages does not include a time field, then this routine will do nothing.

**Parameters**

in	<i>MsgPtr</i>	A pointer to the buffer that contains the software bus message (must not be null). This must point to the first byte of the message header.
----	---------------	---

Referenced by LC\_SendHkCmd().

## 10.38 cFE Message ID APIs

### Functions

- bool [CFE\\_SB\\_IsValidMsgId](#) ([CFE\\_SB\\_MsgId\\_t](#) MsgId)  
*Identifies whether a given [CFE\\_SB\\_MsgId\\_t](#) is valid.*
- static bool [CFE\\_SB\\_MsgId\\_Equal](#) ([CFE\\_SB\\_MsgId\\_t](#) MsgId1, [CFE\\_SB\\_MsgId\\_t](#) MsgId2)  
*Identifies whether two [CFE\\_SB\\_MsgId\\_t](#) values are equal.*
- static [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_MsgIdToValue](#) ([CFE\\_SB\\_MsgId\\_t](#) MsgId)  
*Converts a [CFE\\_SB\\_MsgId\\_t](#) to a normal integer.*
- static [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_ValueToMsgId](#) ([CFE\\_SB\\_MsgId\\_Atom\\_t](#) MsgIdValue)  
*Converts a normal integer into a [CFE\\_SB\\_MsgId\\_t](#).*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_CmdTopicIdToMsgId](#) ([uint16](#) TopicId, [uint16](#) InstanceNum)  
*Converts a topic ID and instance number combination into a MsgID value integer.*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_TlmTopicIdToMsgId](#) ([uint16](#) TopicId, [uint16](#) InstanceNum)  
*Converts a topic ID and instance number combination into a MsgID value integer.*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_GlobalCmdTopicIdToMsgId](#) ([uint16](#) TopicId)  
*Converts a topic ID to a MsgID value integer for Global commands.*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_GlobalTlmTopicIdToMsgId](#) ([uint16](#) TopicId)  
*Converts a topic ID to a MsgID value integer for Global telemetry.*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_LocalCmdTopicIdToMsgId](#) ([uint16](#) TopicId)  
*Converts a topic ID to a MsgID value integer for local commands.*
- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) [CFE\\_SB\\_LocalTlmTopicIdToMsgId](#) ([uint16](#) TopicId)  
*Converts a topic ID to a MsgID value integer for local telemetry.*

#### 10.38.1 Detailed Description

#### 10.38.2 Function Documentation

##### 10.38.2.1 [CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#)

```
CFE_SB_MsgId_Atom_t CFE_SB_CmdTopicIdToMsgId (
    uint16 TopicId,
    uint16 InstanceNum )
```

Converts a topic ID and instance number combination into a MsgID value integer.

#### Description

This function accepts a data pair of topic ID + instance number and returns the corresponding MsgID Value (integer) for commands.

#### Assumptions and Notes:

A topic ID identifies a certain data stream from an application, for example the CFE Software bus ground commands ([CFE\\_MISSION\\_SB\\_CMD\\_TOPICID](#)). In contrast to MsgID, the topic ID is consistent across all CPUs in a system, whereas each CPU instance will have a unique MsgID.

CPU instance numbers are 1-based. The instance number of 0 is reserved for "global" MsgID values that are the same on all CPUs. The PSP function may be used to obtain the current CPU number for the host processor.

#### See also

[CFE\\_SB\\_TlmTopicIdToMsgId\(\)](#), [CFE\\_PSP\\_GetProcessorId\(\)](#)

#### Returns

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

**10.38.2.2 CFE\_SB\_GlobalCmdTopicIdToMsgId()** `CFE_SB_MsgId_Atom_t` `CFE_SB_GlobalCmdTopicIdToMsgId (`  
    `uint16 TopicId )`

Converts a topic ID to a MsgID value integer for Global commands.

#### Description

This is a wrapper around [CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#) for topic IDs which are the same on all CPUs within a system (i.e. not specific to a certain processor)

#### Assumptions and Notes:

Global MsgIDs may be used when only a single instance of a service exists within the system. The CFE framework does not use this feature for commands, but is defined for future use.

#### See also

[CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#), [CFE\\_SB\\_LocalCmdTopicIdToMsgId\(\)](#)

#### Returns

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

**10.38.2.3 CFE\_SB\_GlobalTlmTopicIdToMsgId()** `CFE_SB_MsgId_Atom_t` `CFE_SB_GlobalTlmTopicIdToMsgId (`  
    `uint16 TopicId )`

Converts a topic ID to a MsgID value integer for Global telemetry.

#### Description

This is a wrapper around [CFE\\_SB\\_TlmTopicIdToMsgId\(\)](#) for topic IDs which are the same on all CPUs within a system (i.e. not specific to a certain processor)

#### Assumptions and Notes:

Global MsgIDs may be used when only a single instance of a service exists within the system. An example for such telemetry is the time synchronization service published by CFE\_TIME.

#### See also

[CFE\\_SB\\_TlmTopicIdToMsgId\(\)](#), [CFE\\_SB\\_LocalTlmTopicIdToMsgId\(\)](#)

#### Returns

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

**10.38.2.4 CFE\_SB\_IsValidMsgId()** `bool` `CFE_SB_IsValidMsgId (`  
    `CFE_SB_MsgId_t MsgId )`

Identifies whether a given [CFE\\_SB\\_MsgId\\_t](#) is valid.

#### Description

Implements a basic sanity check on the value provided

#### Returns

Boolean message ID validity indicator

**Return values**

<i>true</i>	Message ID is within the valid range
<i>false</i>	Message ID is not within the valid range

Referenced by LC\_ValidateWDT().

**10.38.2.5 CFE\_SB\_LocalCmdTopicIdToMsgId()** [CFE\\_SB\\_MsgId\\_Atom\\_t](#) CFE\_SB\_LocalCmdTopicIdToMsgId (  
*uint16 TopicId*)

Converts a topic ID to a MsgID value integer for local commands.

**Description**

This is a wrapper around [CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#) for topic IDs which are unique on all CPUs within a system (i.e. specific to a certain processor)

**Assumptions and Notes:**

This assumes the caller is referring to a service running on the same processor instance as itself.

**See also**

[CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#), [CFE\\_SB\\_LocalTlmTopicIdToMsgId\(\)](#)

**Returns**

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

**10.38.2.6 CFE\_SB\_LocalTlmTopicIdToMsgId()** [CFE\\_SB\\_MsgId\\_Atom\\_t](#) CFE\_SB\_LocalTlmTopicIdToMsgId (  
*uint16 TopicId*)

Converts a topic ID to a MsgID value integer for local telemetry.

**Description**

This is a wrapper around [CFE\\_SB\\_TlmTopicIdToMsgId\(\)](#) for topic IDs which are unique on all CPUs within a system (i.e. specific to a certain processor)

**Assumptions and Notes:**

This assumes the caller is referring to a service running on the same processor instance as itself.

**See also**

[CFE\\_SB\\_TlmTopicIdToMsgId\(\)](#), [CFE\\_SB\\_LocalCmdTopicIdToMsgId\(\)](#)

**Returns**

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

**10.38.2.7 CFE\_SB\_MsgId\_Equal()** static bool CFE\_SB\_MsgId\_Equal (   
     CFE\_SB\_MsgId\_t MsgId1,   
     CFE\_SB\_MsgId\_t MsgId2 ) [inline], [static]

Identifies whether two [CFE\\_SB\\_MsgId\\_t](#) values are equal.

#### Description

In cases where the [CFE\\_SB\\_MsgId\\_t](#) type is not a simple integer type, it may not be possible to do a direct equality check. This inline function provides an abstraction for the equality check between two [CFE\\_SB\\_MsgId\\_t](#) values.

Applications should transition to using this function to compare MsgId values for equality to remain compatible with future versions of cFE.

#### Returns

Boolean message ID equality indicator

#### Return values

<i>true</i>	Message IDs are Equal
<i>false</i>	Message IDs are not Equal

Definition at line 791 of file `cfe_sb.h`.

References [CFE\\_SB\\_MSGID\\_UNWRAP\\_VALUE](#).

Referenced by [LC\\_AddWatchpoint\(\)](#), [LC\\_CheckMsgForWPs\(\)](#), and [LC\\_CreateHashTable\(\)](#).

**10.38.2.8 CFE\_SB\_MsgIdToValue()** static [CFE\\_SB\\_MsgId\\_Atom\\_t](#) CFE\_SB\_MsgIdToValue (   
     CFE\_SB\_MsgId\_t MsgId ) [inline], [static]

Converts a [CFE\\_SB\\_MsgId\\_t](#) to a normal integer.

#### Description

In cases where the [CFE\\_SB\\_MsgId\\_t](#) type is not a simple integer type, it is not possible to directly display the value in a printf-style statement, use it in a switch() statement, or other similar use cases.

This inline function provides the ability to map a [CFE\\_SB\\_MsgId\\_t](#) type back into a simple integer value.

Applications should transition to using this function wherever a [CFE\\_SB\\_MsgId\\_t](#) type needs to be used as an integer.

#### Assumptions and Notes:

This negates the type safety that was gained by using a non-integer type for the [CFE\\_SB\\_MsgId\\_t](#) value. This should only be used in specific cases such as UI display (printf, events, etc) where the value is being sent externally. Any internal API calls should be updated to use the [CFE\\_SB\\_MsgId\\_t](#) type directly, rather than an integer type.

#### Returns

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

Definition at line 822 of file `cfe_sb.h`.

References [CFE\\_SB\\_MSGID\\_UNWRAP\\_VALUE](#).

Referenced by [LC\\_AddWatchpoint\(\)](#), [LC\\_AppPipe\(\)](#), [LC\\_CheckMsgForWPs\(\)](#), [LC\\_CreateHashTable\(\)](#), [LC\\_GetHashTableIndex\(\)](#), [LC\\_ValidateWDT\(\)](#), [LC\\_VerifyMsgLength\(\)](#), and [LC\\_WPOffsetValid\(\)](#).

```
10.38.2.9 CFE_SB_TlmTopicIdToMsgId() CFE_SB_MsgId_Atom_t CFE_SB_TlmTopicIdToMsgId (
    uint16 TopicId,
    uint16 InstanceNum )
```

Converts a topic ID and instance number combination into a MsgID value integer.

#### Description

This function accepts a data pair of topic ID + instance number and returns the corresponding MsgID Value (integer) for telemetry.

#### Assumptions and Notes:

A topic ID identifies a certain data stream from an application, for example the CFE Software bus housekeeping telemetry (CFE\_MISSION\_SB\_HK\_TLM\_TOPICID). In contrast to MsgID, the topic ID is consistent across all CPUs in a system, whereas each CPU instance will have a unique MsgID.

CPU instance numbers are 1-based. The instance number of 0 is reserved for "global" MsgID values that are the same on all CPUs. The PSP function may be used to obtain the current CPU number for the host processor.

#### See also

[CFE\\_SB\\_CmdTopicIdToMsgId\(\)](#), [CFE\\_PSP\\_GetProcessorId\(\)](#)

#### Returns

Integer representation of the [CFE\\_SB\\_MsgId\\_t](#)

```
10.38.2.10 CFE_SB_ValueToMsgId() static CFE_SB_MsgId_t CFE_SB_ValueToMsgId (
    CFE_SB_MsgId_Atom_t MsgIdValue ) [inline], [static]
```

Converts a normal integer into a [CFE\\_SB\\_MsgId\\_t](#).

#### Description

In cases where the [CFE\\_SB\\_MsgId\\_t](#) type is not a simple integer type, it is not possible to directly use an integer value supplied via a define or similar method.

This inline function provides the ability to map an integer value into a corresponding [CFE\\_SB\\_MsgId\\_t](#) value. Applications should transition to using this function wherever an integer needs to be used for a [CFE\\_SB\\_MsgId\\_t](#).

#### Assumptions and Notes:

This negates the type safety that was gained by using a non-integer type for the [CFE\\_SB\\_MsgId\\_t](#) value. This should only be used in specific cases where the value is coming from an external source. Any internal API calls should be updated to return the [CFE\\_SB\\_MsgId\\_t](#) type directly, rather than an integer type.

#### Returns

[CFE\\_SB\\_MsgId\\_t](#) representation of the integer

Definition at line 851 of file cfe\_sb.h.

References [CFE\\_SB\\_MSGID\\_C](#).

Referenced by [LC\\_ExecuteRTS\(\)](#), and [LC\\_SbInit\(\)](#).

## 10.39 cFE SB Pipe options

### Macros

- `#define CFE_SB_PIPEOPTS_IGNOREMINE 0x00000001`

*Messages sent by the app that owns this pipe will not be sent to this pipe.*

### 10.39.1 Detailed Description

### 10.39.2 Macro Definition Documentation

#### 10.39.2.1 CFE\_SB\_PIPEOPTS\_IGNOREMINE `#define CFE_SB_PIPEOPTS_IGNOREMINE 0x00000001`

Messages sent by the app that owns this pipe will not be sent to this pipe.

Definition at line 131 of file `cfe_sb_api_typedefs.h`.

## 10.40 cFE Registration APIs

### Functions

- `CFE_Status_t CFE_TBL_Register (CFE_TBL_Handle_t *TblHandlePtr, const char *Name, size_t Size, uint16 TblOptionFlags, CFE_TBL_CallbackFuncPtr_t TblValidationFuncPtr)`  
*Register a table with cFE to obtain Table Management Services.*
- `CFE_Status_t CFE_TBL_Share (CFE_TBL_Handle_t *TblHandlePtr, const char *TblName)`  
*Obtain handle of table registered by another application.*
- `CFE_Status_t CFE_TBL_Unregister (CFE_TBL_Handle_t TblHandle)`  
*Unregister a table.*

#### 10.40.1 Detailed Description

#### 10.40.2 Function Documentation

**10.40.2.1 CFE\_TBL\_Register()** `CFE_Status_t CFE_TBL_Register (`  
`CFE_TBL_Handle_t * TblHandlePtr,`  
`const char * Name,`  
`size_t Size,`  
`uint16 TblOptionFlags,`  
`CFE_TBL_CallbackFuncPtr_t TblValidationFuncPtr )`

Register a table with cFE to obtain Table Management Services.

#### Description

When an application is created and initialized, it is responsible for creating its table images via the TBL API. The application must inform the Table Service of the table name, table size and selection of optional table features.

#### Assumptions, External Events, and Notes:

Note: This function call can block. Therefore, interrupt service routines should NOT create their own tables. An application should create any table(s) and provide the handle(s) to the interrupt service routine.

#### Parameters

out	<code>TblHandlePtr</code>	a pointer to a <code>CFE_TBL_Handle_t</code> type variable (must not be null) that will be assigned the table's handle. The table handle is required for other API calls when accessing the data contained in the table. <code>*TblHandlePtr</code> is the handle used to identify table to cFE when performing Table operations. This value is returned at address specified by <code>TblHandlePtr</code> .
in	<code>Name</code>	The raw table name. This name will be combined with the name of the application to produce a name of the form "AppName.RawTableName". This application specific name will be used in commands for modifying or viewing the contents of the table.
in	<code>Size</code>	The size, in bytes, of the table to be created (must not be zero). This is the size that will be allocated as a shared memory resource between the Table Management Service and the calling application.

## Parameters

in	<i>TblOptionFlags</i>	<p>Flag bits indicating selected options for table. A bitwise OR of the following option flags:</p> <ul style="list-style-type: none"> <li>• <a href="#">CFE_TBL_OPT_DEFAULT</a> - The default setting for table options is a combination of <a href="#">CFE_TBL_OPT_SNGL_BUFFER</a> and <a href="#">CFE_TBL_OPT_LOAD_DUMP</a>. See below for a description of these two options. This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_DBL_BUFFER</a>, <a href="#">CFE_TBL_OPT_DUMP_ONLY</a> and <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> options.</li> <li>• <a href="#">CFE_TBL_OPT_SNGL_BUFFER</a> - When this option is selected, the table will use a shared session table for performing table modifications and a memory copy from the session table to the "active" table buffer will occur when the table is updated. This is the preferred option since it will minimize memory usage. This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_DBL_BUFFER</a> option</li> <li>• <a href="#">CFE_TBL_OPT_DBL_BUFFER</a> - When this option is selected, two instances of the table are created. One is considered the "active" table and the other the "inactive" table. Whenever table modifications occur, they do not require the use of a common session table. Modifications occur in the "inactive" buffer. Then, when it is time to update the table, the pointer to the "active" table is changed to point to the "inactive" buffer thus making it the new "active" buffer. This feature is most useful for time critical applications (ie - interrupt service routines, etc). This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_SNGL_BUFFER</a> and <a href="#">CFE_TBL_OPT_DEFAULT</a> option.</li> <li>• <a href="#">CFE_TBL_OPT_LOAD_DUMP</a> - When this option is selected, the Table Service is allowed to perform all operations on the specified table. This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_DUMP_ONLY</a> option.</li> <li>• <a href="#">CFE_TBL_OPT_DUMP_ONLY</a> - When this option is selected, the Table Service will not perform table loads to this table. This does not prevent, however, a task from writing to the table via an address obtained with the <a href="#">CFE_TBL_GetAddress</a> API function. This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_LOAD_DUMP</a> and <a href="#">CFE_TBL_OPT_DEFAULT</a> options. If the Application wishes to specify their own block of memory as the Dump Only table, they need to also include the <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> option explained below.</li> <li>• <a href="#">CFE_TBL_OPT_NOT_USR_DEF</a> - When this option is selected, Table Services allocates memory for the table and, in the case of a double buffered table, it allocates the same amount of memory again for the second buffer. This option is mutually exclusive with the <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> option.</li> <li>• <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> - When this option is selected, the Table Service will not allocate memory for the table. Table Services will require the Application to identify the location of the active table buffer via the <a href="#">CFE_TBL_Load</a> function. This option implies the <a href="#">CFE_TBL_OPT_DUMP_ONLY</a> and the <a href="#">CFE_TBL_OPT_SNGL_BUFFER</a> options and is mutually exclusive of the <a href="#">CFE_TBL_OPT_DBL_BUFFER</a> option.</li> <li>• <a href="#">CFE_TBL_OPT_CRITICAL</a> - When this option is selected, the Table Service will automatically allocate space in the Critical Data Store (CDS) for the table and ensure that the contents in the CDS are the same as the contents of the currently active buffer for the table. This option is mutually exclusive of the <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> and <a href="#">CFE_TBL_OPT_DUMP_ONLY</a> options. It should also be noted that the use of this option with double buffered tables will prevent the update of the double buffered table from being quick and it could be blocked. Therefore, critical tables should not be</li> </ul>

### Parameters

in	<i>TblValidationFuncPtr</i>	<p>is a pointer to a function that will be executed in the context of the Table Management Service when the contents of a table need to be validated. If set to NULL, then the Table Management Service will assume any data is valid. If the value is not NULL, it must be a pointer to a function with the following prototype:</p> <pre><b>int32 CallbackFunc(void *TblPtr);</b></pre> <p>where</p> <p><b>TblPtr</b> will be a pointer to the table data that is to be verified. When the function returns <a href="#">CFE_SUCCESS</a>, the data is considered valid and ready for a commit. When the function returns a negative value, the data is considered invalid and an Event Message will be issued containing the returned value. If the function should return a positive number, the table is considered invalid and the return code is considered invalid. Validation functions <b>must</b> return either <a href="#">CFE_SUCCESS</a> or a negative number (whose value is at the developer's discretion). The validation function will be executed in the Application's context so that Event Messages describing the validation failure are possible from within the function.</p>
----	-----------------------------	---

### Returns

Execution status, see [cFE Return Code Defines](#)

### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_RECOVERED_TBL</a>	Recovered Table.
<a href="#">CFE_TBL_ERR_DUPLICATE_DIFF_SIZE</a>	Duplicate Table With Different Size.
<a href="#">CFE_TBL_ERR_DUPLICATE_NOT OWNED</a>	Duplicate Table And Not Owned.
<a href="#">CFE_TBL_ERR_REGISTRY_FULL</a>	Registry Full.
<a href="#">CFE_TBL_ERR_HANDLES_FULL</a>	Handles Full.
<a href="#">CFE_TBL_ERR_INVALID_SIZE</a>	Invalid Size.
<a href="#">CFE_TBL_ERR_INVALID_NAME</a>	Invalid Name.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_TBL_ERR_INVALID_OPTIONS</a>	Invalid Options.
<a href="#">CFE_TBL_WARN_DUPLICATE</a>	Duplicate Warning.
<a href="#">CFE_TBL_WARN_NOT_CRITICAL</a>	Not Critical Warning.

### See also

[CFE\\_TBL\\_Unregister](#), [CFE\\_TBL\\_Share](#)

Referenced by `LC_CreateDefinitionTables()`, and `LC_CreateResultTables()`.

```
10.40.2.2 CFE_TBL_Share() CFE\_Status\_t CFE_TBL_Share (
    CFE\_TBL\_Handle\_t * TblHandlePtr,
    const char * TblName )
```

Obtain handle of table registered by another application.

## Description

After a table has been created, other applications can gain access to that table via the table handle. In order for two or more applications to share a table, the applications that do not create the table must obtain the handle using this function.

## Assumptions, External Events, and Notes:

None

## Parameters

<i>out</i>	<i>TblHandlePtr</i>	A pointer to a <a href="#">CFE_TBL_Handle_t</a> type variable (must not be null) that will be assigned the table's handle. The table handle is required for other API calls when accessing the data contained in the table. *TblHandlePtr is the handle used to identify table to cFE when performing Table operations. This value is returned at the address specified by TblHandlePtr.
<i>in</i>	<i>TblName</i>	The application specific name of the table of the form "AppName.RawTableName", where RawTableName is the name specified in the <a href="#">CFE_TBL_Register</a> API call. Example: "ACS.TamParams" for a table called "TamParams" that was registered by the application called "ACS".

## Returns

Execution status, see [cFE Return Code Defines](#)

## Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_ERR_HANDLES_FULL</a>	Handles Full.
<a href="#">CFE_TBL_ERR_INVALID_NAME</a>	Invalid Name.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_BAD_ARGUMENT</a>	Bad Argument.

## See also

[CFE\\_TBL\\_Unregister](#), [CFE\\_TBL\\_Register](#)

### 10.40.2.3 CFE\_TBL\_Unregister()

```
CFE_Status_t CFE_TBL_Unregister (
    CFE_TBL_Handle_t TblHandle )
```

Unregister a table.

## Description

When an application is being removed from the system, ES will clean up/free all the application related resources including tables so apps are not required to call this function.

A valid use-case for this API is to unregister a shared table if access is no longer needed or the owning application was removed from the system (CS app is an example).

Typically apps should only register tables during initialization and registration/unregistration by the owning application during operation should be avoided. If unavoidable, special care needs to be taken (especially for shared tables) to avoid race conditions due to competing requests from multiple tasks.

Note the table will not be removed from memory until all table access links have been removed (registration and all shared access).

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be unregistered.
----	------------------	--

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.

**See also**

[CFE\\_TBL\\_Share](#), [CFE\\_TBL\\_Register](#)

Referenced by `LC_CreateDefinitionTables()`.

## 10.41 cFE Manage Table Content APIs

### Functions

- `CFE_Status_t CFE_TBL_Load (CFE_TBL_Handle_t TblHandle, CFE_TBL_SrcEnum_t SrcType, const void *SrcDataPtr)`  
*Load a specified table with data from specified source.*
- `CFE_Status_t CFE_TBL_Update (CFE_TBL_Handle_t TblHandle)`  
*Update contents of a specified table, if an update is pending.*
- `CFE_Status_t CFE_TBL_Validate (CFE_TBL_Handle_t TblHandle)`  
*Perform steps to validate the contents of a table image.*
- `CFE_Status_t CFE_TBL_Manage (CFE_TBL_Handle_t TblHandle)`  
*Perform standard operations to maintain a table.*
- `CFE_Status_t CFE_TBL_DumpToBuffer (CFE_TBL_Handle_t TblHandle)`  
*Copies the contents of a Dump Only Table to a shared buffer.*
- `CFE_Status_t CFE_TBL_Modified (CFE_TBL_Handle_t TblHandle)`  
*Notify cFE Table Services that table contents have been modified by the Application.*

### 10.41.1 Detailed Description

### 10.41.2 Function Documentation

#### 10.41.2.1 `CFE_TBL_DumpToBuffer()` `CFE_Status_t CFE_TBL_DumpToBuffer (CFE_TBL_Handle_t TblHandle )`

Copies the contents of a Dump Only Table to a shared buffer.

##### Description

Typically, apps should just call `CFE_TBL_Manage` as part of routine processing which will perform validation, update, or dump if pending. This API is provided for the case where just a dump should be performed.

##### Assumptions, External Events, and Notes:

If the table does not have a dump pending status, nothing will occur (no error, no dump)

##### Parameters

in	<code>TblHandle</code>	Handle of Table to be dumped.
----	------------------------	-------------------------------

##### Returns

Execution status, see [cFE Return Code Defines](#)

##### Return values

<code>CFE_SUCCESS</code>	Successful execution.
<code>CFE_ES_ERR_RESOURCEID_NOT_VALID</code>	Resource ID is not valid.
<code>CFE_TBL_ERR_NO_ACCESS</code>	No Access.
<code>CFE_TBL_ERR_INVALID_HANDLE</code>	Invalid Handle.
<code>CFE_TBL_INFO_DUMP_PENDING</code>	Dump Pending.

**See also**

[CFE\\_TBL\\_Manage](#)

**10.41.2.2 CFE\_TBL\_Load()** `CFE_Status_t CFE_TBL_Load (`  
 `CFE_TBL_Handle_t TblHandle,`  
 `CFE_TBL_SrcEnum_t SrcType,`  
 `const void * SrcDataPtr )`

Load a specified table with data from specified source.

**Description**

Once an application has created a table ([CFE\\_TBL\\_Register](#)), it must provide the values that initialize the contents of that table. The application accomplishes this with one of two different TBL API calls. This function call initializes the table with values that are held in a data structure.

**Assumptions, External Events, and Notes:**

This function call can block. Therefore, interrupt service routines should NOT initialize their own tables. An application should initialize any table(s) prior to providing the handle(s) to the interrupt service routine.

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be loaded.
in	<i>SrcType</i>	Flag indicating the nature of the given <i>SrcDataPtr</i> below. This value can be any one of the following: <ul style="list-style-type: none"> <li>• <a href="#">CFE_TBL_SRC_FILE</a> - File source When this option is selected, the <i>SrcDataPtr</i> will be interpreted as a pointer to a null terminated character string. The string should specify the full path and filename of the file containing the initial data contents of the table.</li> <li>• <a href="#">CFE_TBL_SRC_ADDRESS</a> - Address source When this option is selected, the <i>SrcDataPtr</i> will be interpreted as a pointer to a memory location that is the beginning of the initialization data for loading the table OR, in the case of a "user defined" dump only table, the address of the active table itself. The block of memory is assumed to be of the same size specified in the <a href="#">CFE_TBL_Register</a> function Size parameter.</li> </ul>
in	<i>SrcDataPtr</i>	Pointer (must not be null) to either a character string specifying a filename or a memory address of a block of binary data to be loaded into a table or, if the table was registered with the <a href="#">CFE_TBL_OPT_USR_DEF_ADDR</a> option, the address of the active table buffer.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.

**Return values**

<i>CFE_TBL_ERR_INVALID_HANDLE</i>	Invalid Handle.
<i>CFE_TBL_ERR_DUMP_ONLY</i>	Dump Only Error.
<i>CFE_TBL_ERR_ILLEGAL_SRC_TYPE</i>	Illegal Source Type.
<i>CFE_TBL_ERR_LOAD_IN_PROGRESS</i>	Load In Progress.
<i>CFE_TBL_ERR_LOAD_INCOMPLETE</i>	Load Incomplete.
<i>CFE_TBL_ERR_NO_BUFFER_AVAIL</i>	No Buffer Available.
<i>CFE_TBL_ERR_ACCESS</i>	
<i>CFE_TBL_ERR_FILE_TOO_LARGE</i>	File Too Large.
<i>CFE_TBL_ERR_BAD_CONTENT_ID</i>	Bad Content ID.
<i>CFE_TBL_ERR_BAD_SUBTYPE_ID</i>	Bad Subtype ID.
<i>CFE_TBL_ERR_NO_STD_HEADER</i>	No Standard Header.
<i>CFE_TBL_ERR_NO_TBL_HEADER</i>	No Table Header.
<i>CFE_TBL_ERR_PARTIAL_LOAD</i>	Partial Load Error.
<i>CFE_TBL_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_TBL\\_Update](#), [CFE\\_TBL\\_Validate](#), [CFE\\_TBL\\_Manage](#)

Referenced by `LC_LoadDefaultTables()`.

**10.41.2.3 CFE\_TBL\_Manage()** `CFE_Status_t CFE_TBL_Manage (`  
`CFE_TBL_Handle_t TblHandle )`

Perform standard operations to maintain a table.

**Description**

Applications should call this API periodically to process pending requests for update, validation, or dump to buffer. Typically, the application that created the table would call this function at the start or conclusion of any routine processing cycle.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be managed.
----	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_TBL_INFO_UPDATED</i>	Updated.

**Return values**

<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_TBL_ERR_NO_ACCESS</i>	No Access.
<i>CFE_TBL_ERR_INVALID_HANDLE</i>	Invalid Handle.
<i>CFE_TBL_INFO_DUMP_PENDING</i>	Dump Pending.
<i>CFE_TBL_INFO_UPDATE_PENDING</i>	Update Pending.
<i>CFE_TBL_INFO_VALIDATION_PENDING</i>	

**See also**

[CFE\\_TBL\\_Update](#), [CFE\\_TBL\\_Validate](#), [CFE\\_TBL\\_Load](#), [CFE\\_TBL\\_DumpToBuffer](#)

Referenced by LC\_ManageTables().

**10.41.2.4 CFE\_TBL\_Modified()** *CFE\_Status\_t* CFE\_TBL\_Modified ( *CFE\_TBL\_Handle\_t* TblHandle )

Notify cFE Table Services that table contents have been modified by the Application.

**Description**

This API notifies Table Services that the contents of the specified table has been modified by the Application. This notification is important when a table has been registered as "Critical" because Table Services can then update the contents of the table kept in the Critical Data Store.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle of Table that was modified.
----	------------------	------------------------------------

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_TBL_ERR_NO_ACCESS</i>	No Access.
<i>CFE_TBL_ERR_INVALID_HANDLE</i>	Invalid Handle.

**See also**[CFE\\_TBL\\_Manage](#)**10.41.2.5 CFE\_TBL\_Update()** `CFE_Status_t CFE_TBL_Update (`  
`CFE_TBL_Handle_t TblHandle )`

Update contents of a specified table, if an update is pending.

**Description**

Typically, apps should just call [CFE\\_TBL\\_Manage](#) as part of routine processing which will perform validation, update, or dump if pending. This API is provided for the case where just an update should be performed.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be updated.
----	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_NO_UPDATE_PENDING</a>	No Update Pending.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.

**See also**[CFE\\_TBL\\_Load](#), [CFE\\_TBL\\_Validate](#), [CFE\\_TBL\\_Manage](#)**10.41.2.6 CFE\_TBL\_Validate()** `CFE_Status_t CFE_TBL_Validate (`  
`CFE_TBL_Handle_t TblHandle )`

Perform steps to validate the contents of a table image.

**Description**

Typically, apps should just call [CFE\\_TBL\\_Manage](#) as part of routine processing which will perform validation, update, or dump if pending. This API is provided for the case where just a validation should be performed.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be managed.
----	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_NO_VALIDATION_PENDING</a>	
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.

**See also**

[CFE\\_TBL\\_Update](#), [CFE\\_TBL\\_Manage](#), [CFE\\_TBL\\_Load](#)

## 10.42 cFE Access Table Content APIs

### Functions

- **`CFE_Status_t CFE_TBL_GetAddress`** (`void **TblPtr, CFE_TBL_Handle_t TblHandle`)
 

*Obtain the current address of the contents of the specified table.*
- **`CFE_Status_t CFE_TBL_ReleaseAddress`** (`CFE_TBL_Handle_t TblHandle`)
 

*Release previously obtained pointer to the contents of the specified table.*
- **`CFE_Status_t CFE_TBL_GetAddresses`** (`void **TblPtrs[], uint16 NumTables, const CFE_TBL_Handle_t TblHandles[]`)
 

*Obtain the current addresses of an array of specified tables.*
- **`CFE_Status_t CFE_TBL_ReleaseAddresses`** (`uint16 NumTables, const CFE_TBL_Handle_t TblHandles[]`)
 

*Release the addresses of an array of specified tables.*

### 10.42.1 Detailed Description

### 10.42.2 Function Documentation

**10.42.2.1 `CFE_TBL_GetAddress()`** `CFE_Status_t CFE_TBL_GetAddress (`  
`void ** TblPtr,`  
`CFE_TBL_Handle_t TblHandle )`

Obtain the current address of the contents of the specified table.

#### Description

When a table has been created and initialized, it is available to any application that can identify it with its unique handle. In order to view the data contained in the table, an application must call this function or `CFE_TBL_GetAddresses`.

#### Assumptions, External Events, and Notes:

1. This call can be a blocking call when the table is not double buffered and is shared with another application of lower priority that just happens to be in the middle of a table update of the specific table. If this occurs, the application performing the table update will automatically have its priority elevated in order to release the resource as soon as possible.
2. An application must always release the returned table address using the `CFE_TBL_ReleaseAddress` or `CFE_TBL_ReleaseAddresses` function prior to either a `CFE_TBL_Update` call or any blocking call (e.g. - pending on software bus message, etc). Table updates cannot occur while table addresses have not been released.
3. `CFE_TBL_ERR_NEVER_LOADED` will be returned if the table has never been loaded (either from file or from a block of memory), but the function will still return a valid table pointer to a table with all zero content. This pointer must be released with the `CFE_TBL_ReleaseAddress` API before the table can be loaded with data.

#### Parameters

<code>out</code>	<code>TblPtr</code>	The address of a pointer (must not be null) that will be loaded with the address of the first byte of the table. This pointer can then be typecast by the calling application to the appropriate table data structure. <code>*TblPtr</code> is the address of the first byte of data associated with the specified table.
<code>in</code>	<code>TblHandle</code>	Handle, previously obtained from <code>CFE_TBL_Register</code> or <code>CFE_TBL_Share</code> , that identifies the Table whose address is to be returned.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_UPDATED</a>	Updated.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.
<a href="#">CFE_TBL_ERR_UNREGISTERED</a>	Unregistered.
<a href="#">CFE_TBL_ERR_NEVER_LOADED</a>	Never Loaded.
<a href="#">CFE_TBL_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_TBL\\_ReleaseAddress](#), [CFE\\_TBL\\_GetAddresses](#), [CFE\\_TBL\\_ReleaseAddresses](#)

Referenced by `LC_CreateResultTables()`, `LC_LoadDefaultTables()`, `LC_ManageTables()`, and `LC_TableInit()`.

**10.42.2.2 CFE\_TBL\_GetAddresses()** [CFE\\_Status\\_t](#) `CFE_TBL_GetAddresses` (

```
    void ** TblPtrs[],
    uint16 NumTables,
    const CFE\_TBL\_Handle\_t TblHandles[] )
```

Obtain the current addresses of an array of specified tables.

**Description**

When a table has been created and initialized, it is available to any application that can identify it with its unique handle. In order to view the data contained in the table, an application must call this function or [CFE\\_TBL\\_GetAddress](#).

**Assumptions, External Events, and Notes:**

1. This call can be a blocking call when the table is not double buffered and is shared with another application of lower priority that just happens to be in the middle of a table update of the specific table. If this occurs, the application performing the table update will automatically have its priority elevated in order to release the resource as soon as possible.
2. An application must always release the returned table address using the [CFE\\_TBL\\_ReleaseAddress](#) or [CFE\\_TBL\\_ReleaseAddresses](#) function prior to either a [CFE\\_TBL\\_Update](#) call or any blocking call (e.g. - pending on software bus message, etc). Table updates cannot occur while table addresses have not been released.
3. [CFE\\_TBL\\_ERR\\_NEVER\\_LOADED](#) will be returned if the table has never been loaded (either from file or from a block of memory), but the function will still return a valid table pointer to a table with all zero content. This pointer must be released with the [CFE\\_TBL\\_ReleaseAddress](#) API before the table can be loaded with data.

**Parameters**

<b>out</b>	<i>TblPtrs</i>	Array of Pointers (must not be null) to variables that calling Application wishes to hold the start addresses of the Tables. *TblPtrs is an array of addresses of the first byte of data associated with the specified tables.
<b>in</b>	<i>NumTables</i>	Size of TblPtrs and TblHandles arrays.
<b>in</b>	<i>TblHandles</i>	Array of Table Handles, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , of those tables whose start addresses are to be obtained.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_UPDATED</a>	Updated.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.
<a href="#">CFE_TBL_ERR_UNREGISTERED</a>	Unregistered.
<a href="#">CFE_TBL_ERR_NEVER_LOADED</a>	Never Loaded.
<a href="#">CFE_TBL_BAD_ARGUMENT</a>	Bad Argument.

**See also**

[CFE\\_TBL\\_GetAddress](#), [CFE\\_TBL\\_ReleaseAddress](#), [CFE\\_TBL\\_ReleaseAddresses](#)

#### 10.42.2.3 CFE\_TBL\_ReleaseAddress()

```
CFE_Status_t CFE_TBL_ReleaseAddress (
    CFE_TBL_Handle_t TblHandle )
```

Release previously obtained pointer to the contents of the specified table.

**Description**

Each application is **required** to release a table address obtained through the [CFE\\_TBL\\_GetAddress](#) function.

**Assumptions, External Events, and Notes:**

An application must always release the returned table address using the [CFE\\_TBL\\_ReleaseAddress](#) function prior to either a [CFE\\_TBL\\_Update](#) call or any blocking call (e.g. - pending on software bus message, etc). Table updates cannot occur while table addresses have not been released.

**Parameters**

<b>in</b>	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table whose address is to be released.
-----------	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_TBL_INFO_UPDATED</i>	Updated.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_TBL_ERR_NO_ACCESS</i>	No Access.
<i>CFE_TBL_ERR_INVALID_HANDLE</i>	Invalid Handle.
<i>CFE_TBL_ERR_NEVER_LOADED</i>	Never Loaded.

**See also**

[CFE\\_TBL\\_GetAddress](#), [CFE\\_TBL\\_GetAddresses](#), [CFE\\_TBL\\_ReleaseAddresses](#)

Referenced by `LC_ManageTables()`.

```
10.42.2.4 CFE_TBL_ReleaseAddresses() CFE_Status_t CFE_TBL_ReleaseAddresses (
    uint16 NumTables,
    const CFE_TBL_Handle_t TblHandles[] )
```

Release the addresses of an array of specified tables.

**Description**

Each application is **required** to release a table address obtained through the [CFE\\_TBL\\_GetAddress](#) function.

**Assumptions, External Events, and Notes:**

An application must always release the returned table address using the [CFE\\_TBL\\_ReleaseAddress](#) function prior to either a [CFE\\_TBL\\_Update](#) call or any blocking call (e.g. - pending on software bus message, etc). Table updates cannot occur while table addresses have not been released.

**Parameters**

<i>in</i>	<i>NumTables</i>	Size of TblHandles array.
<i>in</i>	<i>TblHandles</i>	Array of Table Handles (must not be null), previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , of those tables whose start addresses are to be released.

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_TBL_INFO_UPDATED</i>	Updated.
<i>CFE_ES_ERR_RESOURCEID_NOT_VALID</i>	Resource ID is not valid.
<i>CFE_TBL_ERR_NO_ACCESS</i>	No Access.
<i>CFE_TBL_ERR_INVALID_HANDLE</i>	Invalid Handle.

**Return values**

<i>CFE_TBL_ERR_NEVER_LOADED</i>	Never Loaded.
<i>CFE_TBL_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_TBL\\_GetAddress](#), [CFE\\_TBL\\_ReleaseAddress](#), [CFE\\_TBL\\_GetAddresses](#)

## 10.43 cFE Get Table Information APIs

### Functions

- [CFE\\_Status\\_t CFE\\_TBL\\_GetStatus \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Obtain current status of pending actions for a table.*
- [CFE\\_Status\\_t CFE\\_TBL\\_GetInfo \(CFE\\_TBL\\_Info\\_t \\*TblInfoPtr, const char \\*TblName\)](#)  
*Obtain characteristics/information of/about a specified table.*
- [CFE\\_Status\\_t CFE\\_TBL\\_NotifyByMessage \(CFE\\_TBL\\_Handle\\_t TblHandle, CFE\\_SB\\_MsgId\\_t MsgId, CFE\\_MSG\\_FcnCode\\_t CommandCode, uint32 Parameter\)](#)  
*Instruct cFE Table Services to notify Application via message when table requires management.*

### 10.43.1 Detailed Description

### 10.43.2 Function Documentation

**10.43.2.1 CFE\_TBL\_GetInfo()** [CFE\\_Status\\_t CFE\\_TBL\\_GetInfo \(](#)  
[CFE\\_TBL\\_Info\\_t \\* TblInfoPtr,](#)  
[const char \\* TblName \)](#)

Obtain characteristics/information of/about a specified table.

#### Description

This API provides the registry information associated with the specified table. The function fills the given data structure with the data found in the Table Registry.

#### Assumptions, External Events, and Notes:

None

#### Parameters

out	<i>TblInfoPtr</i>	A pointer to a CFE_TBL_Info_t data structure (must not be null) that is to be populated with table characteristics and information. *TblInfoPtr is the description of the tables characteristics and registry information stored in the <a href="#">CFE_TBL_Info_t</a> data structure format.
in	<i>TblName</i>	The application specific name (must not be null) of the table of the form "AppName.RawTableName", where RawTableName is the name specified in the <a href="#">CFE_TBL_Register</a> API call. Example: "ACS.TamParams" for a table called "TamParams" that was registered by the application called "ACS".

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_ERR_INVALID_NAME</a>	Invalid Name.
<a href="#">CFE_TBL_BAD_ARGUMENT</a>	Bad Argument.

**See also**[CFE\\_TBL\\_GetStatus](#)**10.43.2.2 CFE\_TBL\_GetStatus()** `CFE_Status_t CFE_TBL_GetStatus (``CFE_TBL_Handle_t TblHandle )`

Obtain current status of pending actions for a table.

**Description**

An application is **required** to perform a periodic check for an update or a validation request for all the tables that it creates. Typically, the application that created the table would call this function at the start or conclusion of any routine processing cycle. If a table update or validation request is pending, the Application should follow up with a call to [CFE\\_TBL\\_Update](#) or [CFE\\_TBL\\_Validate](#) respectively.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>TblHandle</i>	Handle, previously obtained from <a href="#">CFE_TBL_Register</a> or <a href="#">CFE_TBL_Share</a> , that identifies the Table to be managed.
----	------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_TBL_INFO_UPDATE_PENDING</a>	Update Pending.
<a href="#">CFE_TBL_INFO_VALIDATION_PENDING</a>	
<a href="#">CFE_TBL_INFO_DUMP_PENDING</a>	Dump Pending.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.

**Note**

Some status return codes are "success" while being non-zero. This behavior will change in the future.

**See also**[CFE\\_TBL\\_Manage](#), [CFE\\_TBL\\_Update](#), [CFE\\_TBL\\_Validate](#), [CFE\\_TBL\\_GetInfo](#)**10.43.2.3 CFE\_TBL\_NotifyByMessage()** `CFE_Status_t CFE_TBL_NotifyByMessage (``CFE_TBL_Handle_t TblHandle,``CFE_SB_MsgId_t MsgId,`

```
CFE_MSG_FcnCode_t CommandCode,  
    uint32 Parameter )
```

Instruct cFE Table Services to notify Application via message when table requires management.

#### Description

This API instructs Table Services to send a message to the calling Application whenever the specified table requires management by the application. This feature allows applications to avoid polling table services via the [CFE\\_TBL\\_Manage](#) call to determine whether a table requires updates, validation, etc. This API should be called following the [CFE\\_TBL\\_Register](#) API whenever the owning application requires this feature.

#### Assumptions, External Events, and Notes:

- Only the application that owns the table is allowed to register a notification message
- Recommend **NOT** using the ground command MID which typically impacts command counters. The typical approach is to use a unique MID for inter-task communications similar to how schedulers typically trigger application housekeeping messages.

#### Parameters

in	<i>TblHandle</i>	Handle of Table with which the message should be associated.
in	<i>MsgId</i>	Message ID to be used in notification message sent by Table Services.
in	<i>CommandCode</i>	Command Code value to be placed in secondary header of message sent by Table Services.
in	<i>Parameter</i>	Application defined value to be passed as a parameter in the message sent by Table Services. Suggested use includes an application's table index that allows the same MsgId and Command Code to be used for all table management notifications.

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.
<a href="#">CFE_TBL_ERR_NO_ACCESS</a>	No Access.
<a href="#">CFE_TBL_ERR_INVALID_HANDLE</a>	Invalid Handle.

#### See also

[CFE\\_TBL\\_Register](#)

## 10.44 cFE Table Type Defines

### Macros

- `#define CFE_TBL_OPT_BUFFER_MSK (0x0001)`  
*Table buffer mask.*
- `#define CFE_TBL_OPT_SNGL_BUFFER (0x0000)`  
*Single buffer table.*
- `#define CFE_TBL_OPT_DBL_BUFFER (0x0001)`  
*Double buffer table.*
- `#define CFE_TBL_OPT_LD_DMP_MSK (0x0002)`  
*Table load/dump mask.*
- `#define CFE_TBL_OPT_LOAD_DUMP (0x0000)`  
*Load/Dump table.*
- `#define CFE_TBL_OPT_DUMP_ONLY (0x0002)`  
*Dump only table.*
- `#define CFE_TBL_OPT_USR_DEF_MSK (0x0004)`  
*Table user defined mask.*
- `#define CFE_TBL_OPT_NOT_USR_DEF (0x0000)`  
*Not user defined table.*
- `#define CFE_TBL_OPT_USR_DEF_ADDR (0x0006)`  
*User Defined table,..*
- `#define CFE_TBL_OPT_CRITICAL_MSK (0x0008)`  
*Table critical mask.*
- `#define CFE_TBL_OPT_NOT_CRITICAL (0x0000)`  
*Not critical table.*
- `#define CFE_TBL_OPT_CRITICAL (0x0008)`  
*Critical table.*
- `#define CFE_TBL_OPT_DEFAULT (CFE_TBL_OPT_SNGL_BUFFER | CFE_TBL_OPT_LOAD_DUMP)`  
*Default table options.*

### 10.44.1 Detailed Description

### 10.44.2 Macro Definition Documentation

#### 10.44.2.1 CFE\_TBL\_OPT\_BUFFER\_MSK `#define CFE_TBL_OPT_BUFFER_MSK (0x0001)`

Table buffer mask.

Definition at line 48 of file cfe\_tbl\_api\_typedefs.h.

#### 10.44.2.2 CFE\_TBL\_OPT\_CRITICAL `#define CFE_TBL_OPT_CRITICAL (0x0008)`

Critical table.

Definition at line 63 of file cfe\_tbl\_api\_typedefs.h.

#### 10.44.2.3 CFE\_TBL\_OPT\_CRITICAL\_MSK `#define CFE_TBL_OPT_CRITICAL_MSK (0x0008)`

Table critical mask.

Definition at line 61 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.4 CFE\_TBL\_OPT\_DBL\_BUFFER** #define CFE\_TBL\_OPT\_DBL\_BUFFER (0x0001)

Double buffer table.

Definition at line 50 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.5 CFE\_TBL\_OPT\_DEFAULT** #define CFE\_TBL\_OPT\_DEFAULT (CFE\_TBL\_OPT\_SNGL\_BUFFER | CFE\_TBL\_OPT\_LOAD\_DUMP)

Default table options.

Definition at line 66 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.6 CFE\_TBL\_OPT\_DUMP\_ONLY** #define CFE\_TBL\_OPT\_DUMP\_ONLY (0x0002)

Dump only table.

Definition at line 54 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.7 CFE\_TBL\_OPT\_LD\_DMP\_MSK** #define CFE\_TBL\_OPT\_LD\_DMP\_MSK (0x0002)

Table load/dump mask.

Definition at line 52 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.8 CFE\_TBL\_OPT\_LOAD\_DUMP** #define CFE\_TBL\_OPT\_LOAD\_DUMP (0x0000)

Load/Dump table.

Definition at line 53 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.9 CFE\_TBL\_OPT\_NOT\_CRITICAL** #define CFE\_TBL\_OPT\_NOT\_CRITICAL (0x0000)

Not critical table.

Definition at line 62 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.10 CFE\_TBL\_OPT\_NOT\_USR\_DEF** #define CFE\_TBL\_OPT\_NOT\_USR\_DEF (0x0000)

Not user defined table.

Definition at line 57 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.11 CFE\_TBL\_OPT\_SNGL\_BUFFER** #define CFE\_TBL\_OPT\_SNGL\_BUFFER (0x0000)

Single buffer table.

Definition at line 49 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.12 CFE\_TBL\_OPT\_USR\_DEF\_ADDR** #define CFE\_TBL\_OPT\_USR\_DEF\_ADDR (0x0006)

User Defined table.,.

Note

Automatically includes [CFE\\_TBL\\_OPT\\_DUMP\\_ONLY](#) option

Definition at line 58 of file cfe\_tbl\_api\_typedefs.h.

**10.44.2.13 CFE\_TBL\_OPT\_USR\_DEF\_MSK** #define CFE\_TBL\_OPT\_USR\_DEF\_MSK (0x0004)

Table user defined mask.

Definition at line 56 of file cfe\_tbl\_api\_typedefs.h.

## 10.45 cFE Get Current Time APIs

### Functions

- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetTime \(void\)](#)  
*Get the current spacecraft time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetTAI \(void\)](#)  
*Get the current TAI (MET + SCTF) time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetUTC \(void\)](#)  
*Get the current UTC (MET + SCTF - Leap Seconds) time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetMET \(void\)](#)  
*Get the current value of the Mission Elapsed Time (MET).*
- [uint32 CFE\\_TIME\\_GetMETseconds \(void\)](#)  
*Get the current seconds count of the mission-elapsed time.*
- [uint32 CFE\\_TIME\\_GetMETsubsecs \(void\)](#)  
*Get the current sub-seconds count of the mission-elapsed time.*

### 10.45.1 Detailed Description

### 10.45.2 Function Documentation

#### 10.45.2.1 CFE\_TIME\_GetMET() [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetMET \(void\)](#)

Get the current value of the Mission Elapsed Time (MET).

##### Description

This routine returns the current mission-elapsed time (MET). MET is usually derived from a hardware-based clock that is not adjusted during normal operations. Callers of this routine should not assume that the MET return value has any specific relationship to any ground-based time standard.

##### Assumptions, External Events, and Notes:

None

##### Returns

The current MET

##### See also

[CFE\\_TIME\\_GetTime](#), [CFE\\_TIME\\_GetTAI](#), [CFE\\_TIME\\_GetUTC](#), [CFE\\_TIME\\_GetMETseconds](#), [CFE\\_TIME\\_GetMETsubsecs](#), [CFE\\_TIME\\_MET2SCTime](#)

#### 10.45.2.2 CFE\_TIME\_GetMETseconds() [uint32 CFE\\_TIME\\_GetMETseconds \(void\)](#)

Get the current seconds count of the mission-elapsed time.

##### Description

This routine is the same as [CFE\\_TIME\\_GetMET](#), except that it returns only the integer seconds portion of the MET time.

**Assumptions, External Events, and Notes:**

None

**Returns**

The current MET seconds

**See also**

[CFE\\_TIME\\_GetTime](#), [CFE\\_TIME\\_GetTAI](#), [CFE\\_TIME\\_GetUTC](#), [CFE\\_TIME\\_GetMET](#), [CFE\\_TIME\\_GetMETsubsecs](#),  
[CFE\\_TIME\\_MET2SCTime](#)

**10.45.2.3 CFE\_TIME\_GetMETsubsecs()** `uint32 CFE_TIME_GetMETsubsecs (`  
  `void )`

Get the current sub-seconds count of the mission-elapsed time.

**Description**

This routine is the same as [CFE\\_TIME\\_GetMET](#), except that it returns only the integer sub-seconds portion of the MET time. Each count is equal to  $2^{-32}$  seconds.

**Assumptions, External Events, and Notes:**

None

**Returns**

The current MET sub-seconds

**See also**

[CFE\\_TIME\\_GetTime](#), [CFE\\_TIME\\_GetTAI](#), [CFE\\_TIME\\_GetUTC](#), [CFE\\_TIME\\_GetMET](#), [CFE\\_TIME\\_GetMETseconds](#),  
[CFE\\_TIME\\_MET2SCTime](#)

**10.45.2.4 CFE\_TIME\_GetTAI()** `CFE_TIME_SysTime_t CFE_TIME_GetTAI (`  
  `void )`

Get the current TAI (MET + SCTF) time.

**Description**

This routine returns the current TAI time to the caller. TAI is an international time standard that does not include leap seconds. This routine should only be used in situations where TAI is absolutely required. Applications that call [CFE\\_TIME\\_GetTAI](#) may not be portable to all missions. Maintenance of correct TAI in flight is not guaranteed under all mission operations scenarios. To maintain re-usability across missions, most applications should be using [CFE\\_TIME\\_GetTime](#), rather than the specific routines for getting UTC/TAI directly.

**Assumptions, External Events, and Notes:**

1. The "TAI" time returned is referenced to the mission-defined time epoch, which may or may not be the same as the standard TAI epoch.
2. Even though TAI does not include leap seconds, the time returned by this function can still jump forward or backward without warning when the spacecraft clock is set or adjusted by operators. Applications using this function must be able to handle these time discontinuities gracefully.

**Returns**

The current spacecraft time in TAI

**See also**

[CFE\\_TIME\\_GetTime](#), [CFE\\_TIME\\_GetUTC](#), [CFE\\_TIME\\_GetMET](#), [CFE\\_TIME\\_GetMETseconds](#), [CFE\\_TIME\\_GetMETsubsecs](#)

**10.45.2.5 CFE\_TIME\_GetTime()** `CFE_TIME_SysTime_t CFE_TIME_GetTime ( void )`

Get the current spacecraft time.

**Description**

This routine returns the current spacecraft time, which is the amount of time elapsed since the epoch as set in mission configuration. The time returned is either TAI (no leap seconds) or UTC (including leap seconds). This choice is made in the mission configuration file by defining either [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_TAI](#) or [CFE\\_MISSION\\_TIME\\_CFG\\_DEFAULT\\_UTC](#) as true at compile time. To maintain re-usability across missions, most applications should be using this function rather than the specific routines for getting UTC/TAI directly.

**Assumptions, External Events, and Notes:**

None

**Returns**

The current spacecraft time in default format

**See also**

[CFE\\_TIME\\_GetTAI](#), [CFE\\_TIME\\_GetUTC](#), [CFE\\_TIME\\_GetMET](#), [CFE\\_TIME\\_GetMETseconds](#), [CFE\\_TIME\\_GetMETsubsecs](#)

Referenced by `LC_CheckMsgForWPs()`.

**10.45.2.6 CFE\_TIME\_GetUTC()** `CFE_TIME_SysTime_t CFE_TIME_GetUTC ( void )`

Get the current UTC (MET + SCTF - Leap Seconds) time.

**Description**

This routine returns the current UTC time to the caller. This routine should only be used in situations where UTC is absolutely required. Applications that call [CFE\\_TIME\\_GetUTC](#) may not be portable to all missions. Maintenance of correct UTC in flight is not guaranteed under all mission operations scenarios. If UTC is maintained in flight, it will jump backwards occasionally due to leap second adjustments. To maintain re-usability across missions, most applications should be using [CFE\\_TIME\\_GetTime](#), rather than the specific routines for getting UTC/TAI directly.

**Assumptions, External Events, and Notes:**

Note: The "UTC" time returned is referenced to the mission-defined time epoch, which may or may not be the same as the standard UTC epoch.

**Returns**

The current spacecraft time in UTC

**See also**

[CFE\\_TIME\\_GetTime](#), [CFE\\_TIME\\_GetTAI](#), [CFE\\_TIME\\_GetMET](#), [CFE\\_TIME\\_GetMETseconds](#), [CFE\\_TIME\\_GetMETsubsecs](#)

## 10.46 cFE Get Time Information APIs

### Functions

- `CFE_TIME_SysTime_t CFE_TIME_GetSTCF (void)`  
*Get the current value of the spacecraft time correction factor (STCF).*
- `int16 CFE_TIME_GetLeapSeconds (void)`  
*Get the current value of the leap seconds counter.*
- `CFE_TIME_ClockState_Enum_t CFE_TIME_GetClockState (void)`  
*Get the current state of the spacecraft clock.*
- `uint16 CFE_TIME_GetClockInfo (void)`  
*Provides information about the spacecraft clock.*

### 10.46.1 Detailed Description

### 10.46.2 Function Documentation

#### 10.46.2.1 CFE\_TIME\_GetClockInfo() `uint16 CFE_TIME_GetClockInfo (` `void )`

Provides information about the spacecraft clock.

##### Description

This routine returns information on the spacecraft clock in a bit mask.

##### Assumptions, External Events, and Notes:

None

##### Returns

Spacecraft clock information, [cFE Clock State Flag Defines](#). To extract the information from the returned value, the flags can be used as in the following:

```
if ((ReturnValue & CFE_TIME_FLAG_xxxxxxx) == CFE_TIME_FLAG_xxxxxxx) then the following definition of the CFE_TIME_FLAG_xxxxxxx is true.
```

##### See also

[CFE\\_TIME\\_GetSTCF](#), [CFE\\_TIME\\_GetLeapSeconds](#), [CFE\\_TIME\\_GetClockState](#)

#### 10.46.2.2 CFE\_TIME\_GetClockState() `CFE_TIME_ClockState_Enum_t CFE_TIME_GetClockState (` `void )`

Get the current state of the spacecraft clock.

##### Description

This routine returns the spacecraft clock state. Applications that are highly dependent on valid time may want to call this routine before taking actions based on the times returned by the various clock routines

**Assumptions, External Events, and Notes:**

None

**Returns**

The current spacecraft clock state

**See also**

[CFE\\_TIME\\_GetSTCF](#), [CFE\\_TIME\\_GetLeapSeconds](#), [CFE\\_TIME\\_GetClockInfo](#)

**10.46.2.3 CFE\_TIME\_GetLeapSeconds()** `int16 CFE_TIME_GetLeapSeconds ( void )`

Get the current value of the leap seconds counter.

**Description**

This routine returns the current value of the leap seconds counter. This is the delta seconds between international atomic time (TAI) and universal coordinated time (UTC). There is no API provided to set or adjust leap seconds or STCF, those actions should be done by command only. This API is provided for applications to be able to include leap seconds in their data products to aid in time correlation during downstream science data processing. Note that some mission operations teams do not maintain the leap seconds count, preferring to adjust the STCF instead. Users of this function should check with their mission ops team to see how they are planning to handle leap seconds.

**Assumptions, External Events, and Notes:**

None

**Returns**

The current spacecraft leap seconds.

**See also**

[CFE\\_TIME\\_GetSTCF](#), [CFE\\_TIME\\_GetClockState](#), [CFE\\_TIME\\_GetClockInfo](#)

**10.46.2.4 CFE\_TIME\_GetSTCF()** `CFE_TIME_SysTime_t CFE_TIME_GetSTCF ( void )`

Get the current value of the spacecraft time correction factor (STCF).

**Description**

This routine returns the current value of the spacecraft time correction factor. This is the delta time between the MET and the TAI time. There is no API provided to set or adjust leap seconds or STCF, those actions should be done by command only. This API is provided for applications to be able to include STCF in their data products to aid in time correlation during downstream science data processing.

**Assumptions, External Events, and Notes:**

Does not include leap seconds

**Returns**

The current SCTF

**See also**

[CFE\\_TIME\\_GetLeapSeconds](#), [CFE\\_TIME\\_GetClockState](#), [CFE\\_TIME\\_GetClockInfo](#)

## 10.47 cFE Time Arithmetic APIs

### Functions

- `CFE_TIME_SysTime_t CFE_TIME_Add (CFE_TIME_SysTime_t Time1, CFE_TIME_SysTime_t Time2)`  
*Adds two time values.*
- `CFE_TIME_SysTime_t CFE_TIME_Subtract (CFE_TIME_SysTime_t Time1, CFE_TIME_SysTime_t Time2)`  
*Subtracts two time values.*
- `CFE_TIME_Compare_t CFE_TIME_Compare (CFE_TIME_SysTime_t TimeA, CFE_TIME_SysTime_t TimeB)`  
*Compares two time values.*

#### 10.47.1 Detailed Description

#### 10.47.2 Function Documentation

**10.47.2.1 CFE\_TIME\_Add()** `CFE_TIME_SysTime_t CFE_TIME_Add (`  
    `CFE_TIME_SysTime_t Time1,`  
    `CFE_TIME_SysTime_t Time2 )`

Adds two time values.

#### Description

This routine adds the two specified times and returns the result. Normally, at least one of the input times should be a value representing a delta time. Adding two absolute times together will not cause an error, but the result will probably be meaningless.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>Time1</i>	The first time to be added.
in	<i>Time2</i>	The second time to be added.

#### Returns

The sum of the two times. If the sum is greater than the maximum value that can be stored in a `CFE_TIME_SysTime_t`, the result will roll over (this is not considered an error).

#### See also

[CFE\\_TIME\\_Subtract](#), [CFE\\_TIME\\_Compare](#)

**10.47.2.2 CFE\_TIME\_Compare()** `CFE_TIME_Compare_t CFE_TIME_Compare (`  
    `CFE_TIME_SysTime_t TimeA,`  
    `CFE_TIME_SysTime_t TimeB )`

Compares two time values.

### Description

This routine compares two time values to see which is "greater". It is important that applications use this function rather than trying to directly compare the component pieces of times. This function will handle roll-over cases seamlessly, which may not be intuitively obvious. The cFE's internal representation of time "rolls over" when the 32 bit seconds count reaches 0xFFFFFFFF. Also, subtracting a delta time from an absolute time close to the epoch could result in "roll under". The strange cases that result from these situations can be handled by defining the comparison function for times as follows: Plot the two times on the circumference of a circle where 0 is at the top and 0x80000000 is at the bottom. If the shortest arc from time A to time B runs clockwise around the circle, then time A is less than time B. If the shortest arc from A to B runs counter-clockwise, then time A is greater than time B.

### Assumptions, External Events, and Notes:

None

### Parameters

in	<i>TimeA</i>	The first time to compare.
in	<i>TimeB</i>	The second time to compare.

### Returns

The result of comparing the two times.

### Return values

<a href="#"><i>CFE_TIME_EQUAL</i></a>	The two specified times are considered to be equal.
<a href="#"><i>CFE_TIME_A_GT_B</i></a>	The first specified time is considered to be after the second specified time.
<a href="#"><i>CFE_TIME_A_LT_B</i></a>	The first specified time is considered to be before the second specified time.

### See also

[CFE\\_TIME\\_Add](#), [CFE\\_TIME\\_Subtract](#)

### 10.47.2.3 CFE\_TIME\_Subtract()

```
CFE_TIME_SysTime_t CFE_TIME_Subtract (
    CFE_TIME_SysTime_t Time1,
    CFE_TIME_SysTime_t Time2 )
```

Subtracts two time values.

### Description

This routine subtracts time2 from time1 and returns the result. The time values can represent either absolute or delta times, but not all combinations make sense.

- AbsTime - AbsTime = DeltaTime
- AbsTime - DeltaTime = AbsTime
- DeltaTime - DeltaTime = DeltaTime
- DeltaTime - AbsTime = garbage

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>Time1</i>	The base time.
in	<i>Time2</i>	The time to be subtracted from the base time.

**Returns**

The result of subtracting the two times. If the subtraction results in an underflow, the result will roll over (this is not considered an error).

**See also**

[CFE\\_TIME\\_Add](#), [CFE\\_TIME\\_Compare](#)

## 10.48 cFE Time Conversion APIs

### Functions

- `CFE_TIME_SysTime_t CFE_TIME_MET2SCTime (CFE_TIME_SysTime_t METTime)`  
*Convert specified MET into Spacecraft Time.*
- `uint32 CFE_TIME_Sub2MicroSecs (uint32 SubSeconds)`  
*Converts a sub-seconds count to an equivalent number of microseconds.*
- `uint32 CFE_TIME_Micro2SubSecs (uint32 MicroSeconds)`  
*Converts a number of microseconds to an equivalent sub-seconds count.*

#### 10.48.1 Detailed Description

#### 10.48.2 Function Documentation

##### 10.48.2.1 CFE\_TIME\_MET2SCTime() `CFE_TIME_SysTime_t CFE_TIME_MET2SCTime (` `CFE_TIME_SysTime_t METTime )`

Convert specified MET into Spacecraft Time.

#### Description

This function returns Spacecraft Time given MET. Note that Spacecraft Time is returned as either UTC or TAI depending on whether the mission configuration parameter `CFE_MISSION_TIME_CFG_DEFAULT_UTC` or `CFE_MISSION_TIME_CFG_DEFAULT_TAI` was set to true at compile time.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<code>METTime</code>	The MET to be converted.
----	----------------------	--------------------------

#### Returns

Spacecraft Time (UTC or TAI) corresponding to the specified MET

#### See also

`CFE_TIME_GetMET`, `CFE_TIME_GetMETseconds`, `CFE_TIME_GetMETsubsecs`, `CFE_TIME_Sub2MicroSecs`, `CFE_TIME_Micro2SubSecs`

##### 10.48.2.2 CFE\_TIME\_Micro2SubSecs() `uint32 CFE_TIME_Micro2SubSecs (` `uint32 MicroSeconds )`

Converts a number of microseconds to an equivalent sub-seconds count.

#### Description

This routine converts from microseconds (each tick is 1e-06 seconds) to a subseconds count (each tick is  $1 / 2^{32}$  seconds).

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>MicroSeconds</i>	The sub-seconds count to convert.
----	---------------------	-----------------------------------

**Returns**

The equivalent number of subseconds. If the number of microseconds passed in is greater than one second, (i.e. > 999,999), the return value is equal to 0xffffffff.

**See also**

[CFE\\_TIME\\_MET2SCTime](#), [CFE\\_TIME\\_Sub2MicroSecs](#),

**10.48.2.3 CFE\_TIME\_Sub2MicroSecs()** `uint32 CFE_TIME_Sub2MicroSecs (`  
`uint32 SubSeconds )`

Converts a sub-seconds count to an equivalent number of microseconds.

**Description**

This routine converts from a sub-seconds count (each tick is  $1 / 2^{32}$  seconds) to microseconds (each tick is  $1e-06$  seconds).

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>SubSeconds</i>	The sub-seconds count to convert.
----	-------------------	-----------------------------------

**Returns**

The equivalent number of microseconds.

**See also**

[CFE\\_TIME\\_MET2SCTime](#), [CFE\\_TIME\\_Micro2SubSecs](#),

## 10.49 cFE External Time Source APIs

### Functions

- void [CFE\\_TIME\\_ExternalTone](#) (void)
 

*Provides the 1 Hz signal from an external source.*
- void [CFE\\_TIME\\_ExternalMET](#) ([CFE\\_TIME\\_SysTime\\_t](#) NewMET)
 

*Provides the Mission Elapsed Time from an external source.*
- void [CFE\\_TIME\\_ExternalGPS](#) ([CFE\\_TIME\\_SysTime\\_t](#) NewTime, [int16](#) NewLeaps)
 

*Provide the time from an external source that has data common to GPS receivers.*
- void [CFE\\_TIME\\_ExternalTime](#) ([CFE\\_TIME\\_SysTime\\_t](#) NewTime)
 

*Provide the time from an external source that measures time relative to a known epoch.*
- [CFE\\_Status\\_t CFE\\_TIME\\_RegisterSynchCallback](#) ([CFE\\_TIME\\_SynchCallbackPtr\\_t](#) CallbackFuncPtr)
 

*Registers a callback function that is called whenever time synchronization occurs.*
- [CFE\\_Status\\_t CFE\\_TIME\\_UnregisterSynchCallback](#) ([CFE\\_TIME\\_SynchCallbackPtr\\_t](#) CallbackFuncPtr)
 

*Unregisters a callback function that is called whenever time synchronization occurs.*

#### 10.49.1 Detailed Description

#### 10.49.2 Function Documentation

##### 10.49.2.1 [CFE\\_TIME\\_ExternalGPS\(\)](#) void CFE\_TIME\_ExternalGPS (

```
    CFE\_TIME\_SysTime\_t NewTime,
    int16 NewLeaps )
```

Provide the time from an external source that has data common to GPS receivers.

#### Description

This routine provides a method to provide cFE TIME with current time data acquired from an external source. There is a presumption that this function will be called at the appropriate time (relative to the tone) such that this call may be used by cFE TIME as the signal to generate the "time at the tone" data command. The "time at the tone" data command must arrive within the configuration parameter specified window for tone signal and data packet verification.

Internally, cFE TIME will calculate a new STCF as the difference between this new time value and the spacecraft MET value at the tone. This allows cFE TIME to always calculate time as the sum of MET and STCF. The value of STCF will change only as much as the drift factor between spacecraft MET and the external time source.

#### Assumptions, External Events, and Notes:

- This routine is included in the API only when 3 specific configuration parameters are set to true. The first is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) which defines this instantiation of cFE TIME as a time server (not a client). The second required configuration parameter is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) which enables time source selection commands to the cFE TIME task, and further enables configuration definitions for the selected type of external time data. The third configuration parameter required for this routine is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_GPS](#), which indicates that the external time data consists of a time value relative to a known epoch, plus a leap seconds value.

#### Parameters

in	<i>NewTime</i>	The MET value at the next (or previous) 1 Hz tone signal.
in	<i>NewLeaps</i>	The Leap Seconds value used to calculate time as UTC.

**See also**

[CFE\\_TIME\\_ExternalTone](#), [CFE\\_TIME\\_ExternalMET](#), [CFE\\_TIME\\_ExternalTime](#)

**10.49.2.2 CFE\_TIME\_ExternalMET()** `void CFE_TIME_ExternalMET (`  
`CFE_TIME_SysTime_t NewMET )`

Provides the Mission Elapsed Time from an external source.

**Description**

This routine provides a method to provide cFE TIME with MET acquired from an external source. There is a presumption that this function will be called at the appropriate time (relative to the tone) such that this call may be used by cFE TIME as the signal to generate the "time at the tone" data command. The "time at the tone" data command must arrive within the configuration parameter specified window for tone signal and data packet verification.

The MET value at the tone "should" have zero subseconds. Although the interface accepts non-zero values for sub-seconds, it may be harmful to other applications that expect zero subseconds at the moment of the tone. Any decision to use non-zero subseconds should be carefully considered.

**Assumptions, External Events, and Notes:**

- This routine is included in the API only when 3 specific configuration parameters are set to true. The first is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) which defines this instantiation of cFE TIME as a time server (not a client). The second required configuration parameter is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) which enables time source selection commands to the cFE TIME task, and further enables configuration definitions for the selected type of external time data. The third configuration parameter required for this routine is [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_MET](#), which indicates that the external time data consists of MET.

**Parameters**

in	<i>NewMET</i>	The MET value at the next (or previous) 1 Hz tone signal.
----	---------------	---

**See also**

[CFE\\_TIME\\_ExternalTone](#), [CFE\\_TIME\\_ExternalGPS](#), [CFE\\_TIME\\_ExternalTime](#)

**10.49.2.3 CFE\_TIME\_ExternalTime()** `void CFE_TIME_ExternalTime (`  
`CFE_TIME_SysTime_t NewTime )`

Provide the time from an external source that measures time relative to a known epoch.

**Description**

This routine provides a method to provide cFE TIME with current time data acquired from an external source. There is a presumption that this function will be called at the appropriate time (relative to the tone) such that this call may be used by cFE TIME as the signal to generate the "time at the tone" data command. The "time at the tone" data command must arrive within the configuration specified window for tone signal and data packet verification.

Internally, cFE TIME will calculate a new STCF as the difference between this new time value and the spacecraft MET value at the tone. This allows cFE TIME to always calculate time as the sum of MET and STCF. The value of STCF will change only as much as the drift factor between spacecraft MET and the external time source.

**Assumptions, External Events, and Notes:**

- This routine is included in the API only when 3 specific configuration parameters are set to true. The first is `CFE_PLATFORM_TIME_CFG_SERVER` which defines this instantiation of cFE TIME as a time server (not a client). The second required configuration parameter is `CFE_PLATFORM_TIME_CFG_SOURCE` which enables time source selection commands to the cFE TIME task, and further enables configuration definitions for the selected type of external time data. The third configuration parameter required for this routine is `CFE_PLATFORM_TIME_CFG_SRC_TIME`, which indicates that the external time data consists of a time value relative to a known epoch.

**Parameters**

in	<code>NewTime</code>	The MET value at the next (or previous) 1 Hz tone signal.
----	----------------------	---

**See also**

[CFE\\_TIME\\_ExternalTone](#), [CFE\\_TIME\\_ExternalMET](#), [CFE\\_TIME\\_ExternalGPS](#)

**10.49.2.4 CFE\_TIME\_ExternalTone()** `void CFE_TIME_ExternalTone (`  
`void )`

Provides the 1 Hz signal from an external source.

**Description**

This routine provides a method for cFE TIME software to be notified of the occurrence of the 1Hz tone signal without knowledge of the specific hardware design. Regardless of the source of the tone, this routine should be called as soon as possible after detection to allow cFE TIME software the opportunity to latch the local clock as close as possible to the instant of the tone.

**Assumptions, External Events, and Notes:**

- This routine may be called directly from within the context of an interrupt handler.

**See also**

[CFE\\_TIME\\_ExternalMET](#), [CFE\\_TIME\\_ExternalGPS](#), [CFE\\_TIME\\_ExternalTime](#)

**10.49.2.5 CFE\_TIME\_RegisterSynchCallback()** `CFE_Status_t CFE_TIME_RegisterSynchCallback (`  
`CFE_TIME_SynchCallbackPtr_t CallbackFuncPtr )`

Registers a callback function that is called whenever time synchronization occurs.

**Description**

This routine passes a callback function pointer for an Application that wishes to be notified whenever a legitimate time synchronization signal (typically a 1 Hz) is received.

**Assumptions, External Events, and Notes:**

Only a single callback per application is supported, and this function should only be called from a single thread within each application (typically the apps main thread). If an application requires triggering multiple child tasks at 1Hz, it should distribute the timing signal internally, rather than registering for multiple callbacks.

**Parameters**

in	<i>CallbackFuncPtr</i>	Function to call at synchronization interval (must not be null)
----	------------------------	---

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_TIME_TOO_MANY_SYNCH_CALLBACKS</i>	Too Many Sync Callbacks.
<i>CFE_TIME_BAD_ARGUMENT</i>	Bad Argument.

**See also**

[CFE\\_TIME\\_UnregisterSynchCallback](#)

**10.49.2.6 CFE\_TIME\_UnregisterSynchCallback()** *CFE\_Status\_t CFE\_TIME\_UnregisterSynchCallback ( CFE\_TIME\_SynchCallbackPtr\_t CallbackFuncPtr )*

Unregisters a callback function that is called whenever time synchronization occurs.

**Description**

This routine removes the specified callback function pointer from the list of Callback functions that are called whenever a time synchronization (typically the 1Hz signal) is received.

**Assumptions, External Events, and Notes:**

Only a single callback per application is supported, and this function should only be called from a single thread within each application (typically the apps main thread).

**Parameters**

in	<i>CallbackFuncPtr</i>	Function to remove from synchronization call list (must not be null)
----	------------------------	--

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<i>CFE_SUCCESS</i>	Successful execution.
<i>CFE_TIME_CALLBACK_NOT_REGISTERED</i>	Callback Not Registered.
<i>CFE_TIME_BAD_ARGUMENT</i>	Bad Argument.

See also

[CFE\\_TIME\\_RegisterSyncCallback](#)

## 10.50 cFE Miscellaneous Time APIs

### Functions

- void `CFE_TIME_Print` (char \*PrintBuffer, `CFE_TIME_SysTime_t` TimeToPrint)  
*Print a time value as a string.*
- void `CFE_TIME_Local1HzISR` (void)  
*This function is called via a timer callback set up at initialization of the TIME service.*

#### 10.50.1 Detailed Description

#### 10.50.2 Function Documentation

##### 10.50.2.1 `CFE_TIME_Local1HzISR()` void CFE\_TIME\_Local1HzISR ( void )

This function is called via a timer callback set up at initialization of the TIME service.

#### Description

Drives the time processing logic from the system PSP layer. This must be called once per second based on a hardware interrupt or OS kernel signal.

#### Assumptions, External Events, and Notes:

This will update the global data structures accordingly, incrementing each by the 1Hz amount.

##### 10.50.2.2 `CFE_TIME_Print()` void CFE\_TIME\_Print ( char \* PrintBuffer,                                   `CFE_TIME_SysTime_t` TimeToPrint )

Print a time value as a string.

#### Description

This routine prints the specified time to the specified string buffer in the following format:

yyyy-ddd-hh:mm:ss.xxxxx\0

where:

- yyyy = year
- ddd = Julian day of the year
- hh = hour of the day (0 to 23)
- mm = minute (0 to 59)
- ss = second (0 to 59)
- xxxx = subsecond formatted as a decimal fraction (1/4 second = 0.25000)
- \0 = trailing null

**Assumptions, External Events, and Notes:**

- The value of the time argument is simply added to the configuration definitions for the ground epoch and converted into a fixed length string in the buffer provided by the caller.
- A loss of data during the string conversion will occur if the computed year exceeds 9999. However, a year that large would require an unrealistic definition for the ground epoch since the maximum amount of time represented by a [CFE\\_TIME\\_SysTime](#) structure is approximately 136 years.

**Parameters**

out	<i>PrintBuffer</i>	Pointer to a character array (must not be null) of at least <a href="#">CFE_TIME_PRINTED_STRING_SIZE</a> characters in length. *PrintBuffer is the time as a character string as described above.
in	<i>TimeToPrint</i>	The time to print into the character array.

## 10.51 cFE Resource ID base values

### Enumerations

- enum {
   
`CFE_RESOURCEID_ES_TASKID_BASE_OFFSET = OS_OBJECT_TYPE_OS_TASK, CFE_RESOURCEID_ES_APPID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 1, CFE_RESOURCEID_ES_LIBID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 2, CFE_RESOURCEID_ES_COUNTID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 3, CFE_RESOURCEID_ES_POOLID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 4, CFE_RESOURCEID_ES_CDSBLOCKID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 5, CFE_RESOURCEID_SB_PIPEID_RESOURCE_BASE_OFFSET = OS_OBJECT_TYPE_USER + 6, CFE_RESOURCEID_CONFIGID_BASE_OFFSET = OS_OBJECT_TYPE_USER + 7`
  
 }
- enum {
   
`CFE_ES_TASKID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_TASKID_BASE_OFFSET), CFE_ES_APPID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_APPID_BASE_OFFSET), CFE_ES_LIBID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_LIBID_BASE_OFFSET), CFE_ES_COUNTID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_COUNTID_BASE_OFFSET), CFE_ES_POOLID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_POOLID_BASE_OFFSET), CFE_ES_CDSBLOCKID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_ES_CDSBLOCKID_BASE_OFFSET), CFE_SB_PIPEID_RESOURCE_BASE_OFFSET = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_SB_PIPEID_RESOURCE_BASE_OFFSET), CFE_CONFIGID_BASE = CFE_RESOURCEID_MAKE_BASE(CFE_RESOURCEID_CONFIGID_BASE_OFFSET)`
}

#### 10.51.1 Detailed Description

#### 10.51.2 Enumeration Type Documentation

##### 10.51.2.1 anonymous enum anonymous enum

###### Enumerator

CFE_RESOURCEID_ES_TASKID_BASE_OFFSET
CFE_RESOURCEID_ES_APPID_BASE_OFFSET
CFE_RESOURCEID_ES_LIBID_BASE_OFFSET
CFE_RESOURCEID_ES_COUNTID_BASE_OFFSET
CFE_RESOURCEID_ES_POOLID_BASE_OFFSET
CFE_RESOURCEID_ES_CDSBLOCKID_BASE_OFFSET
CFE_RESOURCEID_SB_PIPEID_RESOURCE_BASE_OFFSET
CFE_RESOURCEID_CONFIGID_BASE_OFFSET

Definition at line 48 of file cfe\_core\_resourceid\_basevalues.h.

##### 10.51.2.2 anonymous enum anonymous enum

###### Enumerator

CFE_ES_TASKID_BASE
CFE_ES_APPID_BASE
CFE_ES_LIBID_BASE
CFE_ES_COUNTID_BASE

**Enumerator**

CFE_ES_POOLID_BASE	
CFE_ES_CDSBLOCKID_BASE	
CFE_SB_PIPEID_BASE	
CFE_CONFIGID_BASE	

Definition at line 80 of file `cfe_core_resourceid_basevalues.h`.

## 10.52 cFE Clock State Flag Defines

### Macros

- #define CFE\_TIME\_FLAG\_CLKSET 0x8000  
*The spacecraft time has been set.*
- #define CFE\_TIME\_FLAG\_FLYING 0x4000  
*This instance of Time Services is flywheeling.*
- #define CFE\_TIME\_FLAG\_SRCINT 0x2000  
*The clock source is set to "internal".*
- #define CFE\_TIME\_FLAG\_SIGPRI 0x1000  
*The clock signal is set to "primary".*
- #define CFE\_TIME\_FLAG\_SRVFLY 0x0800  
*The Time Server is in flywheel mode.*
- #define CFE\_TIME\_FLAG\_CMDFLY 0x0400  
*This instance of Time Services was commanded into flywheel mode.*
- #define CFE\_TIME\_FLAG\_ADDADJ 0x0200  
*One time STCF Adjustment is to be done in positive direction.*
- #define CFE\_TIME\_FLAG\_ADD1HZ 0x0100  
*1 Hz STCF Adjustment is to be done in a positive direction*
- #define CFE\_TIME\_FLAG\_ADDTCL 0x0080  
*Time Client Latency is applied in a positive direction.*
- #define CFE\_TIME\_FLAG\_SERVER 0x0040  
*This instance of Time Services is a Time Server.*
- #define CFE\_TIME\_FLAG\_GDTONE 0x0020  
*The tone received is good compared to the last tone received.*
- #define CFE\_TIME\_FLAG\_REFERR 0x0010  
*GetReference read error, will be set if unable to get a consistent ref value.*
- #define CFE\_TIME\_FLAG\_UNUSED 0x000F  
*Reserved flags - should be zero.*

### 10.52.1 Detailed Description

### 10.52.2 Macro Definition Documentation

#### 10.52.2.1 CFE\_TIME\_FLAG\_ADD1HZ #define CFE\_TIME\_FLAG\_ADD1HZ 0x0100

1 Hz STCF Adjustment is to be done in a positive direction

Definition at line 44 of file default\_cfe\_time\_msgdefs.h.

#### 10.52.2.2 CFE\_TIME\_FLAG\_ADDADJ #define CFE\_TIME\_FLAG\_ADDADJ 0x0200

One time STCF Adjustment is to be done in positive direction.

Definition at line 43 of file default\_cfe\_time\_msgdefs.h.

#### 10.52.2.3 CFE\_TIME\_FLAG\_ADDTCL #define CFE\_TIME\_FLAG\_ADDTCL 0x0080

Time Client Latency is applied in a positive direction.

Definition at line 45 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.4 CFE\_TIME\_FLAG\_CLKSET** #define CFE\_TIME\_FLAG\_CLKSET 0x8000

The spacecraft time has been set.

Definition at line 37 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.5 CFE\_TIME\_FLAG\_CMDFLY** #define CFE\_TIME\_FLAG\_CMDFLY 0x0400

This instance of Time Services was commanded into flywheel mode.

Definition at line 42 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.6 CFE\_TIME\_FLAG\_FLYING** #define CFE\_TIME\_FLAG\_FLYING 0x4000

This instance of Time Services is flywheeling.

Definition at line 38 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.7 CFE\_TIME\_FLAG\_GDTONE** #define CFE\_TIME\_FLAG\_GDTONE 0x0020

The tone received is good compared to the last tone received.

Definition at line 47 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.8 CFE\_TIME\_FLAG\_REFERR** #define CFE\_TIME\_FLAG\_REFERR 0x0010

GetReference read error, will be set if unable to get a consistent ref value.

Definition at line 48 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.9 CFE\_TIME\_FLAG\_SERVER** #define CFE\_TIME\_FLAG\_SERVER 0x0040

This instance of Time Services is a Time Server.

Definition at line 46 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.10 CFE\_TIME\_FLAG\_SIGPRI** #define CFE\_TIME\_FLAG\_SIGPRI 0x1000

The clock signal is set to "primary".

Definition at line 40 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.11 CFE\_TIME\_FLAG\_SRCINT** #define CFE\_TIME\_FLAG\_SRCINT 0x2000

The clock source is set to "internal".

Definition at line 39 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.12 CFE\_TIME\_FLAG\_SRVFLY** #define CFE\_TIME\_FLAG\_SRVFLY 0x0800

The Time Server is in flywheel mode.

Definition at line 41 of file default\_cfe\_time\_msgdefs.h.

**10.52.2.13 CFE\_TIME\_FLAG\_UNUSED** #define CFE\_TIME\_FLAG\_UNUSED 0x000F

Reserved flags - should be zero.

Definition at line 50 of file default\_cfe\_time\_msgdefs.h.

## 10.53 OSAL Semaphore State Defines

### Macros

- `#define OS_SEM_FULL 1`  
*Semaphore full state.*
- `#define OS_SEM_EMPTY 0`  
*Semaphore empty state.*

#### 10.53.1 Detailed Description

#### 10.53.2 Macro Definition Documentation

##### 10.53.2.1 OS\_SEM\_EMPTY `#define OS_SEM_EMPTY 0`

Semaphore empty state.

Definition at line 35 of file osapi-binsem.h.

##### 10.53.2.2 OS\_SEM\_FULL `#define OS_SEM_FULL 1`

Semaphore full state.

Definition at line 34 of file osapi-binsem.h.

## 10.54 OSAL Binary Semaphore APIs

### Functions

- `int32 OS_BinSemCreate (osal_id_t *sem_id, const char *sem_name, uint32 sem_initial_value, uint32 options)`  
*Creates a binary semaphore.*
- `int32 OS_BinSemFlush (osal_id_t sem_id)`  
*Unblock all tasks pending on the specified semaphore.*
- `int32 OS_BinSemGive (osal_id_t sem_id)`  
*Increment the semaphore value.*
- `int32 OS_BinSemTake (osal_id_t sem_id)`  
*Decrement the semaphore value.*
- `int32 OS_BinSemTimedWait (osal_id_t sem_id, uint32 msecs)`  
*Decrement the semaphore value with a timeout.*
- `int32 OS_BinSemDelete (osal_id_t sem_id)`  
*Deletes the specified Binary Semaphore.*
- `int32 OS_BinSemGetIdByName (osal_id_t *sem_id, const char *sem_name)`  
*Find an existing semaphore ID by name.*
- `int32 OS_BinSemGetInfo (osal_id_t sem_id, OS_bin_sem_prop_t *bin_prop)`  
*Fill a property object buffer with details regarding the resource.*

#### 10.54.1 Detailed Description

#### 10.54.2 Function Documentation

**10.54.2.1 OS\_BinSemCreate()** `int32 OS_BinSemCreate (`  
    `osal_id_t * sem_id,`  
    `const char * sem_name,`  
    `uint32 sem_initial_value,`  
    `uint32 options )`

Creates a binary semaphore.

Creates a binary semaphore with initial value specified by `sem_initial_value` and name specified by `sem_name`. `sem_id` will be returned to the caller

#### Parameters

<code>out</code>	<code>sem_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
<code>in</code>	<code>sem_name</code>	the name of the new resource to create (must not be null)
<code>in</code>	<code>sem_initial_value</code>	the initial value of the binary semaphore
<code>in</code>	<code>options</code>	Reserved for future use, should be passed as 0.

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if sem name or sem_id are NULL

## Return values

<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>
<code>OS_ERR_NO_FREE_IDS</code>	if all of the semaphore ids are taken
<code>OS_ERR_NAME_TAKEN</code>	if this is already the name of a binary semaphore
<code>OS_SEM_FAILURE</code>	if the OS call failed (return value only verified in coverage test)

```
10.54.2.2 OS_BinSemDelete() int32 OS_BinSemDelete (
    osal_id_t sem_id )
```

Deletes the specified Binary Semaphore.

This is the function used to delete a binary semaphore in the operating system. This also frees the respective `sem_id` to be used again when another semaphore is created.

## Parameters

in	<code>sem_id</code>	The object ID to delete
----	---------------------	-------------------------

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the id passed in is not a valid binary semaphore
<code>OS_SEM_FAILURE</code>	if an unspecified failure occurs (return value only verified in coverage test)

```
10.54.2.3 OS_BinSemFlush() int32 OS_BinSemFlush (
    osal_id_t sem_id )
```

Unblock all tasks pending on the specified semaphore.

The function unblocks all tasks pending on the specified semaphore. However, this function does not change the state of the semaphore.

## Parameters

in	<code>sem_id</code>	The object ID to operate on
----	---------------------	-----------------------------

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<code>OS_SUCCESS</code>	Successful execution.
-------------------------	-----------------------

**Return values**

<code>OS_ERR_INVALID_ID</code>	if the id passed in is not a binary semaphore
<code>OS_SEM_FAILURE</code>	if an unspecified failure occurs (return value only verified in coverage test)

```
10.54.2.4 OS_BinSemGetIdByName() int32 OS_BinSemGetIdByName (
    osal_id_t * sem_id,
    const char * sem_name )
```

Find an existing semaphore ID by name.

This function tries to find a binary sem Id given the name of a bin\_sem The id is returned through sem\_id

**Parameters**

out	<code>sem_id</code>	will be set to the ID of the existing resource
in	<code>sem_name</code>	the name of the existing resource to find (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	is semid or sem_name are NULL pointers
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>
<code>OS_ERR_NAME_NOT_FOUND</code>	if the name was not found in the table

```
10.54.2.5 OS_BinSemGetInfo() int32 OS_BinSemGetInfo (
    osal_id_t sem_id,
    OS_bin_sem_prop_t * bin_prop )
```

Fill a property object buffer with details regarding the resource.

This function will pass back a pointer to structure that contains all of the relevant info( name and creator) about the specified binary semaphore.

**Parameters**

in	<code>sem_id</code>	The object ID to operate on
out	<code>bin_prop</code>	The property object buffer to fill (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
-------------------------	-----------------------

**Return values**

<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid semaphore
<i>OS_INVALID_POINTER</i>	if the bin_prop pointer is null
<i>OS_ERR_NOT_IMPLEMENTED</i>	Not implemented.

**10.54.2.6 OS\_BinSemGive()** `int32 OS_BinSemGive ( osal_id_t sem_id )`

Increment the semaphore value.

The function unlocks the semaphore referenced by `sem_id` by performing a semaphore unlock operation on that semaphore. If the semaphore value resulting from this operation is positive, then no threads were blocked waiting for the semaphore to become unlocked; the semaphore value is simply incremented for this semaphore.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
----	---------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a binary semaphore
<i>OS_SEM_FAILURE</i>	if an unspecified failure occurs (return value only verified in coverage test)

**10.54.2.7 OS\_BinSemTake()** `int32 OS_BinSemTake ( osal_id_t sem_id )`

Decrement the semaphore value.

The locks the semaphore referenced by `sem_id` by performing a semaphore lock operation on that semaphore. If the semaphore value is currently zero, then the calling thread shall not return from the call until it either locks the semaphore or the call is interrupted.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
----	---------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
-------------------	-----------------------

**Return values**

<a href="#">OS_ERR_INVALID_ID</a>	the Id passed in is not a valid binary semaphore
<a href="#">OS_SEM_FAILURE</a>	if an unspecified failure occurs (return value only verified in coverage test)

```
10.54.2.8 OS_BinSemTimedWait() int32 OS_BinSemTimedWait (
    osal_id_t sem_id,
    uint32 msecs )
```

Decrement the semaphore value with a timeout.

The function locks the semaphore referenced by `sem_id`. However, if the semaphore cannot be locked without waiting for another process or thread to unlock the semaphore, this wait shall be terminated when the specified timeout, `msecs`, expires.

**Parameters**

in	<code>sem_id</code>	The object ID to operate on
in	<code>msecs</code>	The maximum amount of time to block, in milliseconds

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_SEM_TIMEOUT</a>	if semaphore was not relinquished in time
<a href="#">OS_ERR_INVALID_ID</a>	if the ID passed in is not a valid semaphore ID
<a href="#">OS_SEM_FAILURE</a>	if an unspecified failure occurs (return value only verified in coverage test)

## 10.55 OSAL BSP low level access APIs

These are for OSAL internal BSP information access to pass any BSP-specific boot/command line/startup arguments through to the application, and return a status code back to the OS after exit.

### Functions

- void `OS_BSP_SetResourceTypeConfig (uint32 ResourceType, uint32 ConfigOptionValue)`
- `uint32 OS_BSP_GetResourceTypeConfig (uint32 ResourceType)`
- `uint32 OS_BSP_GetArgC (void)`
- `char *const * OS_BSP_GetArgV (void)`
- void `OS_BSP_SetExitCode (int32 code)`

#### 10.55.1 Detailed Description

These are for OSAL internal BSP information access to pass any BSP-specific boot/command line/startup arguments through to the application, and return a status code back to the OS after exit.

Not intended for user application use

#### 10.55.2 Function Documentation

**10.55.2.1 OS\_BSP\_GetArgC()** `uint32 OS_BSP_GetArgC (`  
`void )`

**10.55.2.2 OS\_BSP\_GetArgV()** `char* const * OS_BSP_GetArgV (`  
`void )`

**10.55.2.3 OS\_BSP\_GetResourceTypeConfig()** `uint32 OS_BSP_GetResourceTypeConfig (`  
`uint32 ResourceType )`

**10.55.2.4 OS\_BSP\_SetExitCode()** `void OS_BSP_SetExitCode (`  
`int32 code )`

**10.55.2.5 OS\_BSP\_SetResourceTypeConfig()** `void OS_BSP_SetResourceTypeConfig (`  
`uint32 ResourceType,`  
`uint32 ConfigOptionValue )`

## 10.56 OSAL Real Time Clock APIs

### Functions

- `int32 OS_GetLocalTime (OS_time_t *time_struct)`  
*Get the local time.*
- `int32 OS_SetLocalTime (const OS_time_t *time_struct)`  
*Set the local time.*
- `static int64 OS_TimeGetTotalSeconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to whole number of seconds.*
- `static OS_time_t OS_TimeFromTotalSeconds (int64 tm)`  
*Get an `OS_time_t` interval object from an integer number of seconds.*
- `static int64 OS_TimeGetTotalMilliseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to millisecond units.*
- `static OS_time_t OS_TimeFromTotalMilliseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of milliseconds.*
- `static int64 OS_TimeGetTotalMicroseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to microsecond units.*
- `static OS_time_t OS_TimeFromTotalMicroseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of microseconds.*
- `static int64 OS_TimeGetTotalNanoseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to nanosecond units.*
- `static OS_time_t OS_TimeFromTotalNanoseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of nanoseconds.*
- `static int64 OS_TimeGetFractionalPart (OS_time_t tm)`  
*Get subseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetSubsecondsPart (OS_time_t tm)`  
*Get 32-bit normalized subseconds (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetMillisecondsPart (OS_time_t tm)`  
*Get milliseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetMicrosecondsPart (OS_time_t tm)`  
*Get microseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetNanosecondsPart (OS_time_t tm)`  
*Get nanoseconds portion (fractional part only) from an `OS_time_t` object.*
- `static OS_time_t OS_TimeAssembleFromNanoseconds (int64 seconds, uint32 nanoseconds)`  
*Assemble/Convert a number of seconds + nanoseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromMicroseconds (int64 seconds, uint32 microseconds)`  
*Assemble/Convert a number of seconds + microseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromMilliseconds (int64 seconds, uint32 milliseconds)`  
*Assemble/Convert a number of seconds + milliseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromSubseconds (int64 seconds, uint32 subseconds)`  
*Assemble/Convert a number of seconds + subseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAdd (OS_time_t time1, OS_time_t time2)`  
*Computes the sum of two time intervals.*
- `static OS_time_t OS_TimeSubtract (OS_time_t time1, OS_time_t time2)`  
*Computes the difference between two time intervals.*

### 10.56.1 Detailed Description

### 10.56.2 Function Documentation

#### 10.56.2.1 OS\_GetLocalTime() `int32 OS_GetLocalTime(`

```
    OS_time_t * time_struct )
```

Get the local time.

This function gets the local time from the underlying OS.

##### Note

Mission time management typically uses the cFE Time Service

##### Parameters

out	<code>time_struct</code>	An <a href="#">OS_time_t</a> that will be set to the current time (must not be null)
-----	--------------------------	--

##### Returns

Get local time status, see [OSAL Return Code Defines](#)

##### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if time_struct is null

#### 10.56.2.2 OS\_SetLocalTime() `int32 OS_SetLocalTime(`

```
    const OS_time_t * time_struct )
```

Set the local time.

This function sets the local time on the underlying OS.

##### Note

Mission time management typically uses the cFE Time Services

##### Parameters

in	<code>time_struct</code>	An <a href="#">OS_time_t</a> containing the current time (must not be null)
----	--------------------------	---

##### Returns

Set local time status, see [OSAL Return Code Defines](#)

##### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if time_struct is null

```
10.56.2.3 OS_TimeAdd() static OS_time_t OS_TimeAdd (
    OS_time_t time1,
    OS_time_t time2 ) [inline], [static]
```

Computes the sum of two time intervals.

#### Parameters

in	<i>time1</i>	The first interval
in	<i>time2</i>	The second interval

#### Returns

The sum of the two intervals (*time1* + *time2*)

Definition at line 467 of file osapi-clock.h.

References OS\_time\_t::ticks.

```
10.56.2.4 OS_TimeAssembleFromMicroseconds() static OS_time_t OS_TimeAssembleFromMicroseconds (
    int64 seconds,
    uint32 microseconds ) [inline], [static]
```

Assemble/Convert a number of seconds + microseconds into an [OS\\_time\\_t](#) interval.

This creates an [OS\\_time\\_t](#) value using a whole number of seconds and a fractional part in units of microseconds. This is the inverse of [OS\\_TimeGetTotalSeconds\(\)](#) and [OS\\_TimeGetMicrosecondsPart\(\)](#), and should recreate the original [OS\\_time\\_t](#) value from these separate values (aside from any potential conversion losses due to limited resolution of the data types/units).

#### See also

[OS\\_TimeGetTotalSeconds\(\)](#), [OS\\_TimeGetMicrosecondsPart\(\)](#)

#### Parameters

in	<i>seconds</i>	Whole number of seconds
in	<i>microseconds</i>	Number of microseconds (fractional part only)

#### Returns

The input arguments represented as an [OS\\_time\\_t](#) interval

Definition at line 402 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_SECOND, OS\_TIME\_TICKS\_PER\_USEC, and OS\_time\_t::ticks.

```
10.56.2.5 OS_TimeAssembleFromMilliseconds() static OS_time_t OS_TimeAssembleFromMilliseconds (
    int64 seconds,
    uint32 milliseconds ) [inline], [static]
```

Assemble/Convert a number of seconds + milliseconds into an [OS\\_time\\_t](#) interval.

This creates an [OS\\_time\\_t](#) value using a whole number of seconds and a fractional part in units of milliseconds. This is the inverse of [OS\\_TimeGetTotalSeconds\(\)](#) and [OS\\_TimeGetMillisecondsPart\(\)](#), and should recreate the original [OS\\_time\\_t](#) value from these separate values (aside from any potential conversion losses due to limited resolution of the data types/units).

**See also**

[OS\\_TimeGetTotalSeconds\(\)](#), [OS\\_TimeGetMillisecondsPart\(\)](#)

**Parameters**

in	<i>seconds</i>	Whole number of seconds
in	<i>milliseconds</i>	Number of milliseconds (fractional part only)

**Returns**

The input arguments represented as an [OS\\_time\\_t](#) interval

Definition at line 426 of file osapi-clock.h.

References [OS\\_TIME\\_TICKS\\_PER\\_MSEC](#), [OS\\_TIME\\_TICKS\\_PER\\_SECOND](#), and [OS\\_time\\_t::ticks](#).

**10.56.2.6 OS\_TimeAssembleFromNanoseconds()** static [OS\\_time\\_t](#) OS\_TimeAssembleFromNanoseconds (

```
    int64 seconds,
    uint32 nanoseconds ) [inline], [static]
```

Assemble/Convert a number of seconds + nanoseconds into an [OS\\_time\\_t](#) interval.

This creates an [OS\\_time\\_t](#) value using a whole number of seconds and a fractional part in units of nanoseconds. This is the inverse of [OS\\_TimeGetTotalSeconds\(\)](#) and [OS\\_TimeGetNanosecondsPart\(\)](#), and should recreate the original [OS\\_time\\_t](#) value from these separate values (aside from any potential conversion losses due to limited resolution of the data types/units).

**See also**

[OS\\_TimeGetTotalSeconds\(\)](#), [OS\\_TimeGetNanosecondsPart\(\)](#)

**Parameters**

in	<i>seconds</i>	Whole number of seconds
in	<i>nanoseconds</i>	Number of nanoseconds (fractional part only)

**Returns**

The input arguments represented as an [OS\\_time\\_t](#) interval

Definition at line 378 of file osapi-clock.h.

References [OS\\_TIME\\_TICK\\_RESOLUTION\\_NS](#), [OS\\_TIME\\_TICKS\\_PER\\_SECOND](#), and [OS\\_time\\_t::ticks](#).

**10.56.2.7 OS\_TimeAssembleFromSubseconds()** static [OS\\_time\\_t](#) OS\_TimeAssembleFromSubseconds (

```
    int64 seconds,
    uint32 subseconds ) [inline], [static]
```

Assemble/Convert a number of seconds + subseconds into an [OS\\_time\\_t](#) interval.

This creates an [OS\\_time\\_t](#) value using a whole number of seconds and a fractional part in units of sub-seconds ( $1/2^{32}$ ). This is the inverse of [OS\\_TimeGetTotalSeconds\(\)](#) and [OS\\_TimeGetSubsecondsPart\(\)](#), and should recreate the original [OS\\_time\\_t](#) value from these separate values (aside from any potential conversion losses due to limited resolution of the data types/units).

**See also**

[OS\\_TimeGetTotalSeconds\(\)](#), [OS\\_TimeGetNanosecondsPart\(\)](#)

**Parameters**

in	<i>seconds</i>	Whole number of seconds
in	<i>subseconds</i>	Number of subseconds (32 bit fixed point fractional part)

**Returns**

The input arguments represented as an [OS\\_time\\_t](#) interval

Definition at line 449 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_SECOND, and OS\_time\_t::ticks.

**10.56.2.8 OS\_TimeFromTotalMicroseconds()** static [OS\\_time\\_t](#) OS\_TimeFromTotalMicroseconds ( int64 tm ) [inline], [static]

Get an [OS\\_time\\_t](#) interval object from a integer number of microseconds.

This is the inverse operation of [OS\\_TimeGetTotalMicroseconds\(\)](#), converting the total number of microseconds into an [OS\\_time\\_t](#) value.

**See also**

[OS\\_TimeGetTotalMicroseconds\(\)](#)

**Parameters**

in	<i>tm</i>	Time interval value, in microseconds
----	-----------	--------------------------------------

**Returns**

[OS\\_time\\_t](#) value representing the interval

Definition at line 216 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_USEC.

**10.56.2.9 OS\_TimeFromTotalMilliseconds()** static [OS\\_time\\_t](#) OS\_TimeFromTotalMilliseconds ( int64 tm ) [inline], [static]

Get an [OS\\_time\\_t](#) interval object from a integer number of milliseconds.

This is the inverse operation of [OS\\_TimeGetTotalMilliseconds\(\)](#), converting the total number of milliseconds into an [OS\\_time\\_t](#) value.

**See also**

[OS\\_TimeGetTotalMilliseconds\(\)](#)

**Parameters**

in	<i>tm</i>	Time interval value, in milliseconds
----	-----------	--------------------------------------

**Returns**

[OS\\_time\\_t](#) value representing the interval

Definition at line 182 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_MSEC.

**10.56.2.10 OS\_TimeFromTotalNanoseconds()** static [OS\\_time\\_t](#) OS\_TimeFromTotalNanoseconds ( int64 tm ) [inline], [static]

Get an [OS\\_time\\_t](#) interval object from a integer number of nanoseconds.

This is the inverse operation of [OS\\_TimeGetTotalNanoseconds\(\)](#), converting the total number of nanoseconds into an [OS\\_time\\_t](#) value.

**See also**

[OS\\_TimeGetTotalNanoseconds\(\)](#)

**Parameters**

in	tm	Time interval value, in nanoseconds
----	----	-------------------------------------

**Returns**

[OS\\_time\\_t](#) value representing the interval

Definition at line 254 of file osapi-clock.h.

References OS\_TIME\_TICK\_RESOLUTION\_NS.

**10.56.2.11 OS\_TimeFromTotalSeconds()** static [OS\\_time\\_t](#) OS\_TimeFromTotalSeconds ( int64 tm ) [inline], [static]

Get an [OS\\_time\\_t](#) interval object from an integer number of seconds.

This is the inverse operation of [OS\\_TimeGetTotalSeconds\(\)](#), converting the total number of seconds into an [OS\\_time\\_t](#) value.

**See also**

[OS\\_TimeGetTotalSeconds\(\)](#)

**Parameters**

in	tm	Time interval value, in seconds
----	----	---------------------------------

**Returns**

[OS\\_time\\_t](#) value representing the interval

Definition at line 148 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_SECOND.

**10.56.2.12 OS\_TimeGetFractionalPart()** static int64 OS\_TimeGetFractionalPart ( [OS\\_time\\_t](#) tm ) [inline], [static]

Get subseconds portion (fractional part only) from an [OS\\_time\\_t](#) object.

Extracts the fractional part from a given `OS_time_t` object. Units returned are in ticks, not normalized to any standard time unit.

#### Parameters

in	<code>tm</code>	Time interval value
----	-----------------	---------------------

#### Returns

Fractional/subsecond portion of time interval in ticks

Definition at line 270 of file osapi-clock.h.

References `OS_TIME_TICKS_PER_SECOND`, and `OS_time_t::ticks`.

Referenced by `OS_TimeGetMicrosecondsPart()`, `OS_TimeGetMillisecondsPart()`, `OS_TimeGetNanosecondsPart()`, and `OS_TimeGetSubsecondsPart()`.

**10.56.2.13 OS\_TimeGetMicrosecondsPart()** static `uint32` `OS_TimeGetMicrosecondsPart` (  
    `OS_time_t tm`) [inline], [static]

Get microseconds portion (fractional part only) from an `OS_time_t` object.

Extracts the fractional part from a given `OS_time_t` object normalized to units of microseconds.

This function may be used to adapt applications initially implemented using an older OSAL version where `OS_time_t` was a structure containing a "seconds" and "microsecs" field.

This function will obtain a value that is compatible with the "microsecs" field of `OS_time_t` as it was defined in previous versions of OSAL, as well as the "tv\_usecs" field of POSIX-style "struct timeval" values.

#### See also

[OS\\_TimeGetTotalSeconds\(\)](#)

#### Parameters

in	<code>tm</code>	Time interval value
----	-----------------	---------------------

#### Returns

Number of microseconds in time interval

Definition at line 338 of file osapi-clock.h.

References `OS_TIME_TICKS_PER_USEC`, and `OS_TimeGetFractionalPart()`.

Here is the call graph for this function:



**10.56.2.14 OS\_TimeGetMillisecondsPart()** static `uint32` `OS_TimeGetMillisecondsPart` (  
    `OS_time_t tm`) [inline], [static]

Get milliseconds portion (fractional part only) from an `OS_time_t` object.

Extracts the fractional part from a given `OS_time_t` object normalized to units of milliseconds.

See also

[OS\\_TimeGetTotalSeconds\(\)](#)

Parameters

in	<i>tm</i>	Time interval value
----	-----------	---------------------

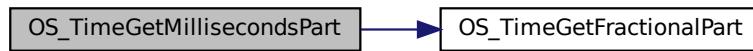
Returns

Number of milliseconds in time interval

Definition at line 313 of file osapi-clock.h.

References `OS_TIME_TICKS_PER_MSEC`, and `OS_TimeGetFractionalPart()`.

Here is the call graph for this function:



#### 10.56.2.15 `OS_TimeGetNanosecondsPart()` static uint32 OS\_TimeGetNanosecondsPart (     *OS\_time\_t tm*) [inline], [static]

Get nanoseconds portion (fractional part only) from an `OS_time_t` object.

Extracts the only number of nanoseconds from a given `OS_time_t` object.

This function will obtain a value that is compatible with the "tv\_nsec" field of POSIX-style "struct timespec" values.

See also

[OS\\_TimeGetTotalSeconds\(\)](#)

Parameters

in	<i>tm</i>	Time interval value
----	-----------	---------------------

**Returns**

Number of nanoseconds in time interval

Definition at line 357 of file osapi-clock.h.

References OS\_TIME\_TICK\_RESOLUTION\_NS, and OS\_TimeGetFractionalPart().

Here is the call graph for this function:



**10.56.2.16 OS\_TimeGetSubsecondsPart()** static `uint32` OS\_TimeGetSubsecondsPart (  
    `OS_time_t tm` ) [inline], [static]

Get 32-bit normalized subseconds (fractional part only) from an `OS_time_t` object.

Extracts the fractional part from a given `OS_time_t` object in maximum precision, with units of  $2^{-32}$  sec. This is a base-2 fixed-point fractional value with the point left-justified in the 32-bit value (i.e. left of MSB).

This is (mostly) compatible with the CFE "subseconds" value, where 0x80000000 represents exactly one half second, and 0 represents a full second.

**Parameters**

in	<code>tm</code>	Time interval value
----	-----------------	---------------------

**Returns**

Fractional/subsecond portion of time interval as 32-bit fixed point value

Definition at line 289 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_SECOND, and OS\_TimeGetFractionalPart().

Here is the call graph for this function:



**10.56.2.17 OS\_TimeGetTotalMicroseconds()** static `int64` OS\_TimeGetTotalMicroseconds (  
    `OS_time_t tm` ) [inline], [static]

Get interval from an `OS_time_t` object normalized to microsecond units.

Note this refers to the complete interval, not just the fractional part.

**See also**

[OS\\_TimeFromTotalMicroseconds\(\)](#)

**Parameters**

in	tm	Time interval value
----	----	---------------------

**Returns**

Whole number of microseconds in time interval

Definition at line 199 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_USEC, and OS\_time\_t::ticks.

**10.56.2.18 OS\_TimeGetTotalMilliseconds()** static int64 OS\_TimeGetTotalMilliseconds (   
     OS\_time\_t tm ) [inline], [static]

Get interval from an [OS\\_time\\_t](#) object normalized to millisecond units.

Note this refers to the complete interval, not just the fractional part.

**See also**

[OS\\_TimeFromTotalMilliseconds\(\)](#)

**Parameters**

in	tm	Time interval value
----	----	---------------------

**Returns**

Whole number of milliseconds in time interval

Definition at line 165 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_MSEC, and OS\_time\_t::ticks.

**10.56.2.19 OS\_TimeGetTotalNanoseconds()** static int64 OS\_TimeGetTotalNanoseconds (   
     OS\_time\_t tm ) [inline], [static]

Get interval from an [OS\\_time\\_t](#) object normalized to nanosecond units.

Note this refers to the complete interval, not just the fractional part.

**Note**

There is no protection against overflow of the 64-bit return value. Applications must use caution to ensure that the interval does not exceed the representable range of a signed 64 bit integer - approximately 140 years.

**See also**

[OS\\_TimeFromTotalNanoseconds](#)

**Parameters**

in	tm	Time interval value
----	----	---------------------

**Returns**

Whole number of microseconds in time interval

Definition at line 237 of file osapi-clock.h.

References OS\_TIME\_TICK\_RESOLUTION\_NS, and OS\_time\_t::ticks.

**10.56.2.20 OS\_TimeGetTotalSeconds()** static `int64` OS\_TimeGetTotalSeconds (   
     `OS_time_t tm` ) [inline], [static]

Get interval from an `OS_time_t` object normalized to whole number of seconds.

Extracts the number of whole seconds from a given `OS_time_t` object, discarding any fractional component.

This may also replace a direct read of the "seconds" field from the `OS_time_t` object from previous versions of OSAL, where the structure was defined with separate seconds/microseconds fields.

**See also**

[OS\\_TimeGetMicrosecondsPart\(\)](#)

[OS\\_TimeFromTotalSeconds\(\)](#)

**Parameters**

in	<i>tm</i>	Time interval value
----	-----------	---------------------

**Returns**

Whole number of seconds in time interval

Definition at line 131 of file osapi-clock.h.

References OS\_TIME\_TICKS\_PER\_SECOND, and OS\_time\_t::ticks.

**10.56.2.21 OS\_TimeSubtract()** static `OS_time_t` OS\_TimeSubtract (   
     `OS_time_t time1,`  
     `OS_time_t time2` ) [inline], [static]

Computes the difference between two time intervals.

**Parameters**

in	<i>time1</i>	The first interval
in	<i>time2</i>	The second interval

**Returns**

The difference of the two intervals ( $time1 - time2$ )

Definition at line 482 of file osapi-clock.h.

References OS\_time\_t::ticks.

## 10.57 OSAL Core Operation APIs

These are for OSAL core operations for startup/initialization, running, and shutdown. Typically only used in bsp's, unit tests, psp's, etc.

### Functions

- void [OS\\_Application\\_Startup](#) (void)  
*Application startup.*
- void [OS\\_Application\\_Run](#) (void)  
*Application run.*
- int32 [OS\\_API\\_Init](#) (void)  
*Initialization of API.*
- void [OS\\_API\\_Teardown](#) (void)  
*Teardown/de-initialization of OSAL API.*
- void [OS\\_IdleLoop](#) (void)  
*Background thread implementation - waits forever for events to occur.*
- void [OS\\_DeleteAllObjects](#) (void)  
*delete all resources created in OSAL.*
- void [OS\\_ApplicationShutdown](#) (uint8 flag)  
*Initiate orderly shutdown.*
- void [OS\\_ApplicationExit](#) (int32 Status)  
*Exit/Abort the application.*
- int32 [OS\\_RegisterEventHandler](#) (OS\_EventHandler\_t handler)  
*Callback routine registration.*

### 10.57.1 Detailed Description

These are for OSAL core operations for startup/initialization, running, and shutdown. Typically only used in bsp's, unit tests, psp's, etc.

Not intended for user application use

### 10.57.2 Function Documentation

#### 10.57.2.1 [OS\\_API\\_Init\(\)](#) int32 [OS\\_API\\_Init](#) (

`void` )

Initialization of API.

This function returns initializes the internal data structures of the OS Abstraction Layer. It must be called in the application startup code before calling any other OS routines.

#### Returns

Execution status, see [OSAL Return Code Defines](#). Any error code (negative) means the OSAL can not be initialized. Typical platform specific response is to abort since additional OSAL calls will have undefined behavior.

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERROR</a>	Failed execution. (return value only verified in coverage test)

```
10.57.2.2 OS_API_Teardown() void OS_API_Teardown (
    void )
```

Teardown/de-initialization of OSAL API.

This is the inverse of [OS\\_API\\_Init\(\)](#). It will release all OS resources and return the system to a state similar to what it was prior to invoking [OS\\_API\\_Init\(\)](#) initially.

Normally for embedded applications, the OSAL is initialized after boot and will remain initialized in memory until the processor is rebooted. However for testing and development purposes, it is potentially useful to reset back to initial conditions.

For testing purposes, this API is designed/intended to be compatible with the [UtTest\\_AddTeardown\(\)](#) routine provided by the UT-Assert subsystem.

#### Note

This is a "best-effort" routine and it may not always be possible/guaranteed to recover all resources, particularly in the case of off-nominal conditions, or if a resource is used outside of OSAL.

For example, while this will attempt to unload all dynamically-loaded modules, doing so may not be possible and/or may induce undefined behavior if resources are in use by tasks/functions outside of OSAL.

```
10.57.2.3 OS_Application_Run() void OS_Application_Run (
    void )
```

Application run.

Run abstraction such that the same BSP can be used for operations and testing.

```
10.57.2.4 OS_Application_Startup() void OS_Application_Startup (
    void )
```

Application startup.

Startup abstraction such that the same BSP can be used for operations and testing.

```
10.57.2.5 OS_ApplicationExit() void OS_ApplicationExit (
    int32 Status )
```

Exit/Abort the application.

Indicates that the OSAL application should exit and return control to the OS. This is intended for e.g. scripted unit testing where the test needs to end without user intervention.

This function does not return. Production code typically should not ever call this.

#### Note

This exits the entire process including tasks that have been created.

```
10.57.2.6 OS_ApplicationShutdown() void OS_ApplicationShutdown (
    uint8 flag )
```

Initiate orderly shutdown.

Indicates that the OSAL application should perform an orderly shutdown of ALL tasks, clean up all resources, and exit the application.

This allows the task currently blocked in [OS\\_IdleLoop\(\)](#) to wake up, and for that function to return to its caller.

This is preferred over e.g. [OS\\_ApplicationExit\(\)](#) which exits immediately and does not provide for any means to clean up first.

#### Parameters

in	flag	set to true to initiate shutdown, false to cancel
----	------	---

```
10.57.2.7 OS_DeleteAllObjects() void OS_DeleteAllObjects (
    void )
```

delete all resources created in OSAL.

provides a means to clean up all resources allocated by this instance of OSAL. It would typically be used during an orderly shutdown but may also be helpful for testing purposes.

```
10.57.2.8 OS_IdleLoop() void OS_IdleLoop (
    void )
```

Background thread implementation - waits forever for events to occur.

This should be called from the BSP main routine or initial thread after all other board and application initialization has taken place and all other tasks are running.

Typically just waits forever until "OS\_shutdown" flag becomes true.

```
10.57.2.9 OS_RegisterEventHandler() int32 OS_RegisterEventHandler (
    OS_EventHandler_t handler )
```

Callback routine registration.

This hook enables the application code to perform extra platform-specific operations on various system events such as resource creation/deletion.

#### Note

Some events are invoked while the resource is "locked" and therefore application-defined handlers for these events should not block or attempt to access other OSAL resources.

#### Parameters

in	handler	The application-provided event handler (must not be null)
----	---------	---

#### Returns

Execution status, see [OSAL Return Code Defines](#).

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if handler is NULL

## 10.58 OSAL Condition Variable APIs

### Functions

- `int32 OS_CondVarCreate (osal_id_t *var_id, const char *var_name, uint32 options)`  
*Creates a condition variable resource.*
- `int32 OS_CondVarLock (osal_id_t var_id)`  
*Locks/Acquires the underlying mutex associated with a condition variable.*
- `int32 OS_CondVarUnlock (osal_id_t var_id)`  
*Unlocks/Releases the underlying mutex associated with a condition variable.*
- `int32 OS_CondVarSignal (osal_id_t var_id)`  
*Signals the condition variable resource referenced by var\_id.*
- `int32 OS_CondVarBroadcast (osal_id_t var_id)`  
*Broadcasts the condition variable resource referenced by var\_id.*
- `int32 OS_CondVarWait (osal_id_t var_id)`  
*Waits on the condition variable object referenced by var\_id.*
- `int32 OS_CondVarTimedWait (osal_id_t var_id, const OS_time_t *abs_wakeup_time)`  
*Time-limited wait on the condition variable object referenced by var\_id.*
- `int32 OS_CondVarDelete (osal_id_t var_id)`  
*Deletes the specified condition variable.*
- `int32 OS_CondVarGetIdByName (osal_id_t *var_id, const char *var_name)`  
*Find an existing condition variable ID by name.*
- `int32 OS_CondVarGetInfo (osal_id_t var_id, OS_condvar_prop_t *condvar_prop)`  
*Fill a property object buffer with details regarding the resource.*

#### 10.58.1 Detailed Description

#### 10.58.2 Function Documentation

##### 10.58.2.1 OS\_CondVarBroadcast() `int32 OS_CondVarBroadcast (` `osal_id_t var_id )`

Broadcasts the condition variable resource referenced by var\_id.

This function may be used to indicate when the state of a data object has been changed.

If there are threads blocked on the condition variable object referenced by var\_id when this function is called, all threads will be unblocked.

Note that although all threads are unblocked, because the mutex is re-acquired before the wait function returns, only a single task will be testing the condition at a given time. The order with which each blocked task runs is determined by the scheduling policy.

#### Parameters

in	<code>var←_id</code>	The object ID to operate on
----	----------------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the id passed in is not a valid condition variable

#### 10.58.2.2 `OS_CondVarCreate()`

```
int32 OS_CondVarCreate (
    osal_id_t * var_id,
    const char * var_name,
    uint32 options )
```

Creates a condition variable resource.

A condition variable adds a more sophisticated synchronization option for mutexes, such that it can operate on arbitrary user-defined conditions rather than simply a counter or boolean (as in the case of simple semaphores).

Creating a condition variable resource in OSAL will in turn create both a basic mutex as well as a synchronization overlay. The underlying mutex is similar to the mutex functionality provided by the OSAL mutex subsystem, and can be locked and unlocked normally.

This mutex is intended to protect access to any arbitrary user-defined data object that serves as the condition being tested.

A task that needs a particular state of the object should follow this general flow:

- Lock the underlying mutex
- Test for the condition being waited for (a user-defined check on user-defined data)
- If condition IS NOT met, then call `OS_CondVarWait()` to wait, then repeat test
- If condition IS met, then unlock the underlying mutex and continue

A task that changes the state of the object should follow this general flow:

- Lock the underlying mutex
- Change the state as necessary
- Call either `OS_CondVarSignal()` or `OS_CondVarBroadcast()`
- Unlock the underlying mutex

#### Parameters

<code>out</code>	<code>var_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
<code>in</code>	<code>var_name</code>	the name of the new resource to create (must not be null)
<code>in</code>	<code>options</code>	reserved for future use. Should be passed as 0.

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if var_id or var_name are NULL
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>

**Return values**

<a href="#">OS_ERR_NO_FREE_IDS</a>	if there are no more free condition variable IDs
<a href="#">OS_ERR_NAME_TAKEN</a>	if there is already a condition variable with the same name

**10.58.2.3 OS\_CondVarDelete()** `int32 OS_CondVarDelete ( osal_id_t var_id )`

Deletes the specified condition variable.

Delete the condition variable and releases any related system resources.

**Parameters**

in	<i>var_id</i>	The object ID to delete
----	---------------	-------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the id passed in is not a valid condvar

**10.58.2.4 OS\_CondVarGetIdByName()** `int32 OS_CondVarGetIdByName (`

`osal_id_t * var_id,`  
`const char * var_name )`

Find an existing condition variable ID by name.

This function tries to find an existing condition variable ID given the name. The id is returned through var\_id.

**Parameters**

out	<i>var_id</i>	will be set to the ID of the existing resource
in	<i>var_name</i>	the name of the existing resource to find (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	is var_id or var_name are NULL pointers
<a href="#">OS_ERR_NAME_TOO_LONG</a>	name length including null terminator greater than <a href="#">OS_MAX_API_NAME</a>
<a href="#">OS_ERR_NAME_NOT_FOUND</a>	if the name was not found in the table

```
10.58.2.5 OS_CondVarGetInfo() int32 OS_CondVarGetInfo (
    osal_id_t var_id,
    OS_condvar_prop_t * condvar_prop )
```

Fill a property object buffer with details regarding the resource.

This function will fill a structure to contain the information (name and creator) about the specified condition variable.

#### Parameters

in	<i>var_id</i>	The object ID to operate on
out	<i>condvar_prop</i>	The property object buffer to fill (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid semaphore
<i>OS_INVALID_POINTER</i>	if the mut_prop pointer is null

```
10.58.2.6 OS_CondVarLock() int32 OS_CondVarLock (
    osal_id_t var_id )
```

Locks/Acquires the underlying mutex associated with a condition variable.

The mutex should always be locked by a task before reading or modifying the data object associated with a condition variable.

#### Note

This lock must be acquired by a task before invoking [OS\\_CondVarWait\(\)](#) or [OS\\_CondVarTimedWait\(\)](#) on the same condition variable.

#### Parameters

in	<i>var_id</i>	The object ID to operate on
----	---------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid condition variable

**10.58.2.7 OS\_CondVarSignal()** `int32 OS_CondVarSignal (` `osal_id_t var_id )`

Signals the condition variable resource referenced by var\_id.

This function may be used to indicate when the state of a data object has been changed.

If there are threads blocked on the condition variable object referenced by var\_id when this function is called, one of those threads will be unblocked, as determined by the scheduling policy.

**Parameters**

in	<i>var_id</i>	The object ID to operate on
----	---------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the id passed in is not a valid condition variable

**10.58.2.8 OS\_CondVarTimedWait()** `int32 OS_CondVarTimedWait (` `osal_id_t var_id,  
 const OS_time_t * abs_wakeup_time )`

Time-limited wait on the condition variable object referenced by var\_id.

Identical in operation to [OS\\_CondVarWait\(\)](#), except that the maximum amount of time that the task will be blocked is limited.

The abs\_wakeup\_time refers to the absolute time of the system clock at which the task should be unblocked to run, regardless of the state of the condition variable. This refers to the same system clock that is the subject of the [OS\\_GetLocalTime\(\)](#) API.

**Parameters**

in	<i>var_id</i>	The object ID to operate on
in	<i>abs_wakeup_time</i>	The system time at which the task should be unblocked (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	the id passed in is not a valid condvar

**10.58.2.9 OS\_CondVarUnlock()** `int32 OS_CondVarUnlock (`  
 `osal_id_t var_id )`

Unlocks/Releases the underlying mutex associated with a condition variable.  
The mutex should be unlocked by a task once reading or modifying the data object associated with a condition variable is complete.

#### Parameters

in	<i>var←_id</i>	The object ID to operate on
----	----------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid condition variable

### 10.58.2.10 OS\_CondVarWait() `int32 OS_CondVarWait ( osal_id_t var_id )`

Waits on the condition variable object referenced by var\_id.

The calling task will be blocked until another task calls the function [OS\\_CondVarSignal\(\)](#) or [OS\\_CondVarBroadcast\(\)](#) on the same condition variable.

The underlying mutex associated with the condition variable must be locked and owned by the calling task at the time this function is invoked. As part of this call, the mutex will be unlocked as the task blocks. This is done in such a way that there is no possibility that another task could acquire the mutex before the calling task has actually blocked.

This atomicity with respect to blocking the task and unlocking the mutex is a critical difference between condition variables and other synchronization primitives. It avoids a window of opportunity where inherent in the simpler synchronization resource types where the state of the data could change between the time that the calling task tested the state and the time that the task actually blocks on the sync resource.

#### Parameters

in	<i>var←_id</i>	The object ID to operate on
----	----------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	the id passed in is not a valid condvar

## 10.59 OSAL Counting Semaphore APIs

### Functions

- `int32 OS_CountSemCreate (osal_id_t *sem_id, const char *sem_name, uint32 sem_initial_value, uint32 options)`  
*Creates a counting semaphore.*
- `int32 OS_CountSemGive (osal_id_t sem_id)`  
*Increment the semaphore value.*
- `int32 OS_CountSemTake (osal_id_t sem_id)`  
*Decrement the semaphore value.*
- `int32 OS_CountSemTimedWait (osal_id_t sem_id, uint32 msecs)`  
*Decrement the semaphore value with timeout.*
- `int32 OS_CountSemDelete (osal_id_t sem_id)`  
*Deletes the specified counting Semaphore.*
- `int32 OS_CountSemGetIdByName (osal_id_t *sem_id, const char *sem_name)`  
*Find an existing semaphore ID by name.*
- `int32 OS_CountSemGetInfo (osal_id_t sem_id, OS_count_sem_prop_t *count_prop)`  
*Fill a property object buffer with details regarding the resource.*

#### 10.59.1 Detailed Description

#### 10.59.2 Function Documentation

**10.59.2.1 OS\_CountSemCreate()** `int32 OS_CountSemCreate (`  
    `osal_id_t * sem_id,`  
    `const char * sem_name,`  
    `uint32 sem_initial_value,`  
    `uint32 options )`

Creates a counting semaphore.

Creates a counting semaphore with initial value specified by `sem_initial_value` and name specified by `sem_name`. `sem_id` will be returned to the caller.

#### Note

Underlying RTOS implementations may or may not impose a specific upper limit to the value of a counting semaphore. If the OS has a specific limit and the `sem_initial_value` exceeds this limit, then `OS_INVALID_SEM_VALUE` is returned. On other implementations, any 32-bit integer value may be acceptable. For maximum portability, it is recommended to keep counting semaphore values within the range of a "short int" (i.e. between 0 and 32767). Many platforms do accept larger values, but may not be guaranteed.

#### Parameters

out	<code>sem_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
in	<code>sem_name</code>	the name of the new resource to create (must not be null)
in	<code>sem_initial_value</code>	the initial value of the counting semaphore
in	<code>options</code>	Reserved for future use, should be passed as 0.

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if sem name or sem_id are NULL
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <i>OS_MAX_API_NAME</i>
<i>OS_ERR_NO_FREE_IDS</i>	if all of the semaphore ids are taken
<i>OS_ERR_NAME_TAKEN</i>	if this is already the name of a counting semaphore
<i>OS_INVALID_SEM_VALUE</i>	if the semaphore value is too high (return value only verified in coverage test)
<i>OS_SEM_FAILURE</i>	if an unspecified implementation error occurs (return value only verified in coverage test)

**10.59.2.2 OS\_CountSemDelete()** `int32 OS_CountSemDelete (`

`osal_id_t sem_id )`

Deletes the specified counting Semaphore.

**Parameters**

<i>in</i>	<i>sem_id</i>	The object ID to delete
-----------	---------------	-------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid counting semaphore
<i>OS_SEM_FAILURE</i>	if an unspecified implementation error occurs (return value only verified in coverage test)

**10.59.2.3 OS\_CountSemGetIdByName()** `int32 OS_CountSemGetIdByName (`

`osal_id_t * sem_id,`  
`const char * sem_name )`

Find an existing semaphore ID by name.

This function tries to find a counting sem id given the name of a count\_sem. The id is returned through sem\_id

**Parameters**

<i>out</i>	<i>sem_id</i>	will be set to the ID of the existing resource
<i>in</i>	<i>sem_name</i>	the name of the existing resource to find (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if semid or sem_name are NULL pointers
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <i>OS_MAX_API_NAME</i>
<i>OS_ERR_NAME_NOT_FOUND</i>	if the name was not found in the table

**10.59.2.4 OS\_CountSemGetInfo()** `int32 OS_CountSemGetInfo (`

```
    osal_id_t sem_id,  
    OS_count_sem_prop_t * count_prop )
```

Fill a property object buffer with details regarding the resource.

This function will pass back a pointer to structure that contains all of the relevant info( name and creator) about the specified counting semaphore.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
out	<i>count_prop</i>	The property object buffer to fill (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid semaphore
<i>OS_INVALID_POINTER</i>	if the count_prop pointer is null
<i>OS_ERR_NOT_IMPLEMENTED</i>	Not implemented.

**10.59.2.5 OS\_CountSemGive()** `int32 OS_CountSemGive (`

```
    osal_id_t sem_id )
```

Increment the semaphore value.

The function unlocks the semaphore referenced by *sem\_id* by performing a semaphore unlock operation on that semaphore. If the semaphore value resulting from this operation is positive, then no threads were blocked waiting for the semaphore to become unlocked; the semaphore value is simply incremented for this semaphore.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
----	---------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a counting semaphore
<i>OS_SEM_FAILURE</i>	if an unspecified implementation error occurs (return value only verified in coverage test)

**10.59.2.6 OS\_CountSemTake()** `int32 OS_CountSemTake ( osal_id_t sem_id )`

Decrement the semaphore value.

The locks the semaphore referenced by `sem_id` by performing a semaphore lock operation on that semaphore. If the semaphore value is currently zero, then the calling thread shall not return from the call until it either locks the semaphore or the call is interrupted.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
----	---------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	the Id passed in is not a valid counting semaphore
<i>OS_SEM_FAILURE</i>	if an unspecified implementation error occurs (return value only verified in coverage test)

**10.59.2.7 OS\_CountSemTimedWait()** `int32 OS_CountSemTimedWait ( osal_id_t sem_id, uint32 msecs )`

Decrement the semaphore value with timeout.

The function locks the semaphore referenced by `sem_id`. However, if the semaphore cannot be locked without waiting for another process or thread to unlock the semaphore, this wait shall be terminated when the specified timeout, `msecs`, expires.

**Parameters**

in	<i>sem_id</i>	The object ID to operate on
in	<i>msecs</i>	The maximum amount of time to block, in milliseconds

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_SEM_TIMEOUT</i>	if semaphore was not relinquished in time
<i>OS_ERR_INVALID_ID</i>	if the ID passed in is not a valid semaphore ID
<i>OS_SEM_FAILURE</i>	if an unspecified implementation error occurs (return value only verified in coverage test)

## 10.60 OSAL Directory APIs

### Functions

- `int32 OS_DirectoryOpen (osal_id_t *dir_id, const char *path)`  
*Opens a directory.*
- `int32 OS_DirectoryClose (osal_id_t dir_id)`  
*Closes an open directory.*
- `int32 OS_DirectoryRewind (osal_id_t dir_id)`  
*Rewinds an open directory.*
- `int32 OS_DirectoryRead (osal_id_t dir_id, os_dirent_t *dirent)`  
*Reads the next name in the directory.*
- `int32 OS_mkdir (const char *path, uint32 access)`  
*Makes a new directory.*
- `int32 OS_rmdir (const char *path)`  
*Removes a directory from the file system.*

#### 10.60.1 Detailed Description

#### 10.60.2 Function Documentation

##### 10.60.2.1 OS\_DirectoryClose() `int32 OS_DirectoryClose (` `osal_id_t dir_id )`

Closes an open directory.

The directory referred to by `dir_id` will be closed

#### Parameters

in	<code>dir_id</code>	The handle ID of the directory
----	---------------------	--------------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the directory handle is invalid

##### 10.60.2.2 OS\_DirectoryOpen() `int32 OS_DirectoryOpen (` `osal_id_t * dir_id,` `const char * path )`

Opens a directory.

Prepares for reading the files within a directory

**Parameters**

out	<i>dir_id</i>	Location to store handle ID of the directory (must not be null)
in	<i>path</i>	The directory to open (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if dir_id or path is NULL
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the path argument exceeds the maximum length
<i>OS_FS_ERR_PATH_INVALID</i>	if the path argument is not valid
<i>OS_ERROR</i>	if the directory could not be opened

**10.60.2.3 OS\_DirectoryRead()** `int32 OS_DirectoryRead (`

```
    osal_id_t dir_id,  
    os_dirent_t * dirent )
```

Reads the next name in the directory.

Obtains directory entry data for the next file from an open directory

**Parameters**

in	<i>dir_id</i>	The handle ID of the directory
out	<i>dirent</i>	Buffer to store directory entry information (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if dirent argument is NULL
<i>OS_ERR_INVALID_ID</i>	if the directory handle is invalid
<i>OS_ERROR</i>	at the end of the directory or if the OS call otherwise fails

**10.60.2.4 OS\_DirectoryRewind()** `int32 OS_DirectoryRewind (`

```
    osal_id_t dir_id )
```

Rewinds an open directory.

Resets a directory read handle back to the first file.

**Parameters**

in	<i>dir_id</i>	The handle ID of the directory
----	---------------	--------------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the directory handle is invalid

```
10.60.2.5 OS_mkdir() int32 OS_mkdir (
    const char * path,
    uint32 access )
```

Makes a new directory.

Makes a directory specified by path.

**Parameters**

in	<i>path</i>	The new directory name (must not be null)
in	<i>access</i>	The permissions for the directory (reserved for future use)

**Note**

Current implementations do not utilize the "access" parameter. Applications should still pass the intended value ([OS\\_READ\\_WRITE](#) or [OS\\_READ\\_ONLY](#)) to be compatible with future implementations.

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if path is NULL
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the path is too long to be stored locally
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if path cannot be parsed
<a href="#">OS_ERROR</a>	if the OS call fails (return value only verified in coverage test)

```
10.60.2.6 OS_rmdir() int32 OS_rmdir (
    const char * path )
```

Removes a directory from the file system.

Removes a directory from the structure. The directory must be empty prior to this operation.

**Parameters**

in	<i>path</i>	The directory to remove
----	-------------	-------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_INVALID_POINTER</i></a>	if path is NULL
<a href="#"><i>OS_FS_ERR_PATH_INVALID</i></a>	if path cannot be parsed
<a href="#"><i>OS_FS_ERR_PATH_TOO_LONG</i></a>	
<a href="#"><i>OS_ERROR</i></a>	if the directory remove operation failed (return value only verified in coverage test)

## 10.61 OSAL Return Code Defines

The specific status/return code definitions listed in this section may be extended or refined in future versions of OSAL.

### Macros

- `#define OS_SUCCESS (0)`  
*Successful execution.*
- `#define OS_ERROR (-1)`  
*Failed execution.*
- `#define OS_INVALID_POINTER (-2)`  
*Invalid pointer.*
- `#define OS_ERROR_ADDRESS_MISALIGNED (-3)`  
*Address misalignment.*
- `#define OS_ERROR_TIMEOUT (-4)`  
*Error timeout.*
- `#define OS_INVALID_INT_NUM (-5)`  
*Invalid interrupt number.*
- `#define OS_SEM_FAILURE (-6)`  
*Semaphore failure.*
- `#define OS_SEM_TIMEOUT (-7)`  
*Semaphore timeout.*
- `#define OS_QUEUE_EMPTY (-8)`  
*Queue empty.*
- `#define OS_QUEUE_FULL (-9)`  
*Queue full.*
- `#define OS_QUEUE_TIMEOUT (-10)`  
*Queue timeout.*
- `#define OS_QUEUE_INVALID_SIZE (-11)`  
*Queue invalid size.*
- `#define OS_QUEUE_ID_ERROR (-12)`  
*Queue ID error.*
- `#define OS_ERR_NAME_TOO_LONG (-13)`  
*Name length including null terminator greater than `OS_MAX_API_NAME`.*
- `#define OS_ERR_NO_FREE_IDS (-14)`  
*No free IDs.*
- `#define OS_ERR_NAME_TAKEN (-15)`  
*Name taken.*
- `#define OS_ERR_INVALID_ID (-16)`  
*Invalid ID.*
- `#define OS_ERR_NAME_NOT_FOUND (-17)`  
*Name not found.*
- `#define OS_ERR_SEM_NOT_FULL (-18)`  
*Semaphore not full.*
- `#define OS_ERR_INVALID_PRIORITY (-19)`  
*Invalid priority.*
- `#define OS_INVALID_SEM_VALUE (-20)`  
*Invalid semaphore value.*

- #define OS\_ERR\_FILE (-27)  
*File error.*
- #define OS\_ERR\_NOT\_IMPLEMENTED (-28)  
*Not implemented.*
- #define OS\_TIMER\_ERR\_INVALID\_ARGS (-29)  
*Timer invalid arguments.*
- #define OS\_TIMER\_ERR\_TIMER\_ID (-30)  
*Timer ID error.*
- #define OS\_TIMER\_ERR\_UNAVAILABLE (-31)  
*Timer unavailable.*
- #define OS\_TIMER\_ERR\_INTERNAL (-32)  
*Timer internal error.*
- #define OS\_ERR\_OBJECT\_IN\_USE (-33)  
*Object in use.*
- #define OS\_ERR\_BAD\_ADDRESS (-34)  
*Bad address.*
- #define OS\_ERR\_INCORRECT\_OBJ\_STATE (-35)  
*Incorrect object state.*
- #define OS\_ERR\_INCORRECT\_OBJ\_TYPE (-36)  
*Incorrect object type.*
- #define OS\_ERR\_STREAM\_DISCONNECTED (-37)  
*Stream disconnected.*
- #define OS\_ERR\_OPERATION\_NOT\_SUPPORTED (-38)  
*Requested operation not support on supplied object(s)*
- #define OS\_ERR\_INVALID\_SIZE (-40)  
*Invalid Size.*
- #define OS\_ERR\_OUTPUT\_TOO\_LARGE (-41)  
*Size of output exceeds limit*
- #define OS\_ERR\_INVALID\_ARGUMENT (-42)  
*Invalid argument value (other than ID or size)*
- #define OS\_FS\_ERR\_PATH\_TOO\_LONG (-103)  
*FS path too long.*
- #define OS\_FS\_ERR\_NAME\_TOO\_LONG (-104)  
*FS name too long.*
- #define OS\_FS\_ERR\_DRIVE\_NOT\_CREATED (-106)  
*FS drive not created.*
- #define OS\_FS\_ERR\_DEVICE\_NOT\_FREE (-107)  
*FS device not free.*
- #define OS\_FS\_ERR\_PATH\_INVALID (-108)  
*FS path invalid.*

### 10.61.1 Detailed Description

The specific status/return code definitions listed in this section may be extended or refined in future versions of OSAL.

#### Note

Application developers should assume that any OSAL API may return any status value listed here. While the documentation of each OSAL API function indicates the return/status values that function may directly generate, functions may also pass through other status codes from related functions, so that list should not be considered absolute/exhaustive.

The `int32` data type should be used to store an OSAL status code. Negative values will always represent errors, while non-negative values indicate success. Most APIs specifically return `OS_SUCCESS` (0) upon successful execution, but some return a nonzero value, such as data size.

Ideally, in order to more easily adapt to future OSAL versions and status code extensions/refinements, applications should typically check for errors as follows:

```
int32 status;
status = OS_TaskCreate(...);  (or any other API)
if (status < OS_SUCCESS)
{
    handle or report error....
    may also check for specific codes here.
}
else
{
    handle normal/successful status...
}
```

### 10.61.2 Macro Definition Documentation

#### 10.61.2.1 OS\_ERR\_BAD\_ADDRESS #define OS\_ERR\_BAD\_ADDRESS (-34)

Bad address.

Definition at line 124 of file osapi-error.h.

#### 10.61.2.2 OS\_ERR\_FILE #define OS\_ERR\_FILE (-27)

File error.

Definition at line 117 of file osapi-error.h.

#### 10.61.2.3 OS\_ERR\_INCORRECT\_OBJ\_STATE #define OS\_ERR\_INCORRECT\_OBJ\_STATE (-35)

Incorrect object state.

Definition at line 125 of file osapi-error.h.

#### 10.61.2.4 OS\_ERR\_INCORRECT\_OBJ\_TYPE #define OS\_ERR\_INCORRECT\_OBJ\_TYPE (-36)

Incorrect object type.

Definition at line 126 of file osapi-error.h.

#### 10.61.2.5 OS\_ERR\_INVALID\_ARGUMENT #define OS\_ERR\_INVALID\_ARGUMENT (-42)

Invalid argument value (other than ID or size)

Definition at line 131 of file osapi-error.h.

**10.61.2.6 OS\_ERR\_INVALID\_ID** #define OS\_ERR\_INVALID\_ID (-16)

Invalid ID.

Definition at line 112 of file osapi-error.h.

**10.61.2.7 OS\_ERR\_INVALID\_PRIORITY** #define OS\_ERR\_INVALID\_PRIORITY (-19)

Invalid priority.

Definition at line 115 of file osapi-error.h.

**10.61.2.8 OS\_ERR\_INVALID\_SIZE** #define OS\_ERR\_INVALID\_SIZE (-40)

Invalid Size.

Definition at line 129 of file osapi-error.h.

**10.61.2.9 OS\_ERR\_NAME\_NOT\_FOUND** #define OS\_ERR\_NAME\_NOT\_FOUND (-17)

Name not found.

Definition at line 113 of file osapi-error.h.

**10.61.2.10 OS\_ERR\_NAME\_TAKEN** #define OS\_ERR\_NAME\_TAKEN (-15)

Name taken.

Definition at line 111 of file osapi-error.h.

**10.61.2.11 OS\_ERR\_NAME\_TOO\_LONG** #define OS\_ERR\_NAME\_TOO\_LONG (-13)

name length including null terminator greater than [OS\\_MAX\\_API\\_NAME](#)

Definition at line 109 of file osapi-error.h.

**10.61.2.12 OS\_ERR\_NO\_FREE\_IDS** #define OS\_ERR\_NO\_FREE\_IDS (-14)

No free IDs.

Definition at line 110 of file osapi-error.h.

**10.61.2.13 OS\_ERR\_NOT\_IMPLEMENTED** #define OS\_ERR\_NOT\_IMPLEMENTED (-28)

Not implemented.

Definition at line 118 of file osapi-error.h.

**10.61.2.14 OS\_ERR\_OBJECT\_IN\_USE** #define OS\_ERR\_OBJECT\_IN\_USE (-33)

Object in use.

Definition at line 123 of file osapi-error.h.

**10.61.2.15 OS\_ERR\_OPERATION\_NOT\_SUPPORTED** #define OS\_ERR\_OPERATION\_NOT\_SUPPORTED (-38)

Requested operation not support on supplied object(s)

Definition at line 128 of file osapi-error.h.

**10.61.2.16 OS\_ERR\_OUTPUT\_TOO\_LARGE** #define OS\_ERR\_OUTPUT\_TOO\_LARGE (-41)  
Size of output exceeds limit

Definition at line 130 of file osapi-error.h.

**10.61.2.17 OS\_ERR\_SEM\_NOT\_FULL** #define OS\_ERR\_SEM\_NOT\_FULL (-18)  
Semaphore not full.  
Definition at line 114 of file osapi-error.h.

**10.61.2.18 OS\_ERR\_STREAM\_DISCONNECTED** #define OS\_ERR\_STREAM\_DISCONNECTED (-37)  
Stream disconnected.  
Definition at line 127 of file osapi-error.h.

**10.61.2.19 OS\_ERROR** #define OS\_ERROR (-1)  
Failed execution.  
Definition at line 97 of file osapi-error.h.

**10.61.2.20 OS\_ERROR\_ADDRESS\_MISALIGNED** #define OS\_ERROR\_ADDRESS\_MISALIGNED (-3)  
Address misalignment.  
Definition at line 99 of file osapi-error.h.

**10.61.2.21 OS\_ERROR\_TIMEOUT** #define OS\_ERROR\_TIMEOUT (-4)  
Error timeout.  
Definition at line 100 of file osapi-error.h.

**10.61.2.22 OS\_FS\_ERR\_DEVICE\_NOT\_FREE** #define OS\_FS\_ERR\_DEVICE\_NOT\_FREE (-107)  
FS device not free.  
Definition at line 144 of file osapi-error.h.

**10.61.2.23 OS\_FS\_ERR\_DRIVE\_NOT\_CREATED** #define OS\_FS\_ERR\_DRIVE\_NOT\_CREATED (-106)  
FS drive not created.  
Definition at line 143 of file osapi-error.h.

**10.61.2.24 OS\_FS\_ERR\_NAME\_TOO\_LONG** #define OS\_FS\_ERR\_NAME\_TOO\_LONG (-104)  
FS name too long.  
Definition at line 142 of file osapi-error.h.

**10.61.2.25 OS\_FS\_ERR\_PATH\_INVALID** #define OS\_FS\_ERR\_PATH\_INVALID (-108)  
FS path invalid.  
Definition at line 145 of file osapi-error.h.

**10.61.2.26 OS\_FS\_ERR\_PATH\_TOO\_LONG** #define OS\_FS\_ERR\_PATH\_TOO\_LONG (-103)  
FS path too long.  
Definition at line 141 of file osapi-error.h.

**10.61.2.27 OS\_INVALID\_INT\_NUM** #define OS\_INVALID\_INT\_NUM (-5)  
Invalid Interrupt number.  
Definition at line 101 of file osapi-error.h.

**10.61.2.28 OS\_INVALID\_POINTER** #define OS\_INVALID\_POINTER (-2)  
Invalid pointer.  
Definition at line 98 of file osapi-error.h.

**10.61.2.29 OS\_INVALID\_SEM\_VALUE** #define OS\_INVALID\_SEM\_VALUE (-20)  
Invalid semaphore value.  
Definition at line 116 of file osapi-error.h.

**10.61.2.30 OS\_QUEUE\_EMPTY** #define OS\_QUEUE\_EMPTY (-8)  
Queue empty.  
Definition at line 104 of file osapi-error.h.

**10.61.2.31 OS\_QUEUE\_FULL** #define OS\_QUEUE\_FULL (-9)  
Queue full.  
Definition at line 105 of file osapi-error.h.

**10.61.2.32 OS\_QUEUE\_ID\_ERROR** #define OS\_QUEUE\_ID\_ERROR (-12)  
Queue ID error.  
Definition at line 108 of file osapi-error.h.

**10.61.2.33 OS\_QUEUE\_INVALID\_SIZE** #define OS\_QUEUE\_INVALID\_SIZE (-11)  
Queue invalid size.  
Definition at line 107 of file osapi-error.h.

**10.61.2.34 OS\_QUEUE\_TIMEOUT** #define OS\_QUEUE\_TIMEOUT (-10)  
Queue timeout.  
Definition at line 106 of file osapi-error.h.

**10.61.2.35 OS\_SEM\_FAILURE** #define OS\_SEM\_FAILURE (-6)  
Semaphore failure.  
Definition at line 102 of file osapi-error.h.

**10.61.2.36 OS\_SEM\_TIMEOUT** #define OS\_SEM\_TIMEOUT (-7)  
Semaphore timeout.  
Definition at line 103 of file osapi-error.h.

**10.61.2.37 OS\_SUCCESS** #define OS\_SUCCESS (0)  
Successful execution.  
Definition at line 96 of file osapi-error.h.

**10.61.2.38 OS\_TIMER\_ERR\_INTERNAL** #define OS\_TIMER\_ERR\_INTERNAL (-32)  
Timer internal error.  
Definition at line 122 of file osapi-error.h.

**10.61.2.39 OS\_TIMER\_ERR\_INVALID\_ARGS** #define OS\_TIMER\_ERR\_INVALID\_ARGS (-29)  
Timer invalid arguments.  
Definition at line 119 of file osapi-error.h.

**10.61.2.40 OS\_TIMER\_ERR\_TIMER\_ID** #define OS\_TIMER\_ERR\_TIMER\_ID (-30)  
Timer ID error.  
Definition at line 120 of file osapi-error.h.

**10.61.2.41 OS\_TIMER\_ERR\_UNAVAILABLE** #define OS\_TIMER\_ERR\_UNAVAILABLE (-31)  
Timer unavailable.  
Definition at line 121 of file osapi-error.h.

## 10.62 OSAL Error Info APIs

### Functions

- static long [OS\\_StatusToInteger \(osal\\_status\\_t Status\)](#)  
*Convert a status code to a native "long" type.*
- int32 [OS\\_GetErrorName \(int32 error\\_num, os\\_err\\_name\\_t \\*err\\_name\)](#)  
*Convert an error number to a string.*
- char \* [OS\\_StatusToString \(osal\\_status\\_t status, os\\_status\\_string\\_t \\*status\\_string\)](#)  
*Convert status to a string.*

#### 10.62.1 Detailed Description

#### 10.62.2 Function Documentation

**10.62.2.1 OS\_GetErrorName()** `int32 OS_GetErrorName (`  
    `int32 error_num,`  
    `os_err_name_t * err_name )`

Convert an error number to a string.

##### Parameters

in	<code>error_num</code>	Error number to convert
out	<code>err_name</code>	Buffer to store error string

##### Returns

Execution status, see [OSAL Return Code Defines](#)

##### Return values

<code>OS_SUCCESS</code>	if successfully converted to a string
<code>OS_INVALID_POINTER</code>	if err_name is NULL
<code>OS_ERROR</code>	if error could not be converted

**10.62.2.2 OS\_StatusToInteger()** `static long OS_StatusToInteger (`  
    `osal_status_t Status ) [inline], [static]`

Convert a status code to a native "long" type.

For printing or logging purposes, this converts the given status code to a "long" (signed integer) value. It should be used in conjunction with the "%ld" conversion specifier in printf-style statements.

##### Parameters

in	<code>Status</code>	Execution status, see <a href="#">OSAL Return Code Defines</a>
----	---------------------	--

**Returns**

Same status value converted to the "long" data type

Definition at line 164 of file osapi-error.h.

**10.62.2.3 OS\_StatusToString()** `char* OS_StatusToString (`  
`osal_status_t status,`  
`os_status_string_t * status_string )`

Convert status to a string.

**Parameters**

in	<i>status</i>	Status value to convert
out	<i>status_string</i>	Buffer to store status converted to string

**Returns**

Passed in string pointer

## 10.63 OSAL File Access Option Defines

### Macros

- #define OS\_READ\_ONLY 0
- #define OS\_WRITE\_ONLY 1
- #define OS\_READ\_WRITE 2

#### 10.63.1 Detailed Description

#### 10.63.2 Macro Definition Documentation

##### 10.63.2.1 OS\_READ\_ONLY #define OS\_READ\_ONLY 0

Read only file access

Definition at line 35 of file osapi-file.h.

##### 10.63.2.2 OS\_READ\_WRITE #define OS\_READ\_WRITE 2

Read write file access

Definition at line 37 of file osapi-file.h.

##### 10.63.2.3 OS\_WRITE\_ONLY #define OS\_WRITE\_ONLY 1

Write only file access

Definition at line 36 of file osapi-file.h.

## 10.64 OSAL Reference Point For Seek Offset Defines

### Macros

- #define OS\_SEEK\_SET 0
- #define OS\_SEEK\_CUR 1
- #define OS\_SEEK\_END 2

#### 10.64.1 Detailed Description

#### 10.64.2 Macro Definition Documentation

##### 10.64.2.1 OS\_SEEK\_CUR #define OS\_SEEK\_CUR 1

Seek offset current

Definition at line 44 of file osapi-file.h.

##### 10.64.2.2 OS\_SEEK\_END #define OS\_SEEK\_END 2

Seek offset end

Definition at line 45 of file osapi-file.h.

##### 10.64.2.3 OS\_SEEK\_SET #define OS\_SEEK\_SET 0

Seek offset set

Definition at line 43 of file osapi-file.h.

## 10.65 OSAL Standard File APIs

### Functions

- `int32 OS_OpenCreate (osal_id_t *filedes, const char *path, int32 flags, int32 access_mode)`  
*Open or create a file.*
- `int32 OS_close (osal_id_t filedes)`  
*Closes an open file handle.*
- `int32 OS_read (osal_id_t filedes, void *buffer, size_t nbytes)`  
*Read from a file handle.*
- `int32 OS_write (osal_id_t filedes, const void *buffer, size_t nbytes)`  
*Write to a file handle.*
- `int32 OS_TimedRead (osal_id_t filedes, void *buffer, size_t nbytes, int32 timeout)`  
*File/Stream input read with a timeout.*
- `int32 OS_TimedWrite (osal_id_t filedes, const void *buffer, size_t nbytes, int32 timeout)`  
*File/Stream output write with a timeout.*
- `int32 OS_chmod (const char *path, uint32 access_mode)`  
*Changes the permissions of a file.*
- `int32 OS_stat (const char *path, os_fstat_t *filestats)`  
*Obtain information about a file or directory.*
- `int32 OS_lseek (osal_id_t filedes, int32 offset, uint32 whence)`  
*Seeks to the specified position of an open file.*
- `int32 OS_remove (const char *path)`  
*Removes a file from the file system.*
- `int32 OS_rename (const char *old_filename, const char *new_filename)`  
*Renames a file.*
- `int32 OS_cp (const char *src, const char *dest)`  
*Copies a single file from src to dest.*
- `int32 OS_mv (const char *src, const char *dest)`  
*Move a single file from src to dest.*
- `int32 OS_FDGetInfo (osal_id_t filedes, OS_file_prop_t *fd_prop)`  
*Obtain information about an open file.*
- `int32 OS_FileOpenCheck (const char *Filename)`  
*Checks to see if a file is open.*
- `int32 OS_CloseAllFiles (void)`  
*Close all open files.*
- `int32 OS_CloseFileByName (const char *Filename)`  
*Close a file by filename.*

### 10.65.1 Detailed Description

### 10.65.2 Function Documentation

**10.65.2.1 OS\_chmod()** `int32 OS_chmod (`  
    `const char * path,`  
    `uint32 access_mode )`

Changes the permissions of a file.

**Parameters**

in	<i>path</i>	File to change (must not be null)
in	<i>access_mode</i>	Desired access mode - see <a href="#">OSAL File Access Option Defines</a>

**Note**

Some file systems do not implement permissions. If the underlying OS does not support this operation, then [OS\\_ERR\\_NOT\\_IMPLEMENTED](#) is returned.

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution. (return value only verified in coverage test)
<a href="#">OS_ERR_NOT_IMPLEMENTED</a>	if the filesystem does not support this call
<a href="#">OS_INVALID_POINTER</a>	if the path argument is NULL

**10.65.2.2 OS\_close()** `int32 OS_close ( osal_id_t filedes )`

Closes an open file handle.

This closes regular file handles and any other file-like resource, such as network streams or pipes.

**Parameters**

in	<i>filedes</i>	The handle ID to operate on
----	----------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the file descriptor passed in is invalid
<a href="#">OS_ERROR</a>	if an unexpected/unhandled error occurs (return value only verified in coverage test)

**10.65.2.3 OS\_CloseAllFiles()** `int32 OS_CloseAllFiles ( void )`

Close all open files.

Closes All open files that were opened through the OSAL

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERROR</a>	if one or more file close returned an error (return value only verified in coverage test)

**10.65.2.4 OS\_CloseFileByName()** `int32 OS_CloseFileByName (`

`const char * Filename )`

Close a file by filename.

Allows a file to be closed by name. This will only work if the name passed in is the same name used to open the file.

**Parameters**

<code>in</code>	<code>Filename</code>	The file to close (must not be null)
-----------------	-----------------------	--------------------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if the file is not found
<a href="#">OS_ERROR</a>	if the file close returned an error (return value only verified in coverage test)
<a href="#">OS_INVALID_POINTER</a>	if the filename argument is NULL

**10.65.2.5 OS\_cp()** `int32 OS_cp (`

`const char * src,`  
`const char * dest )`

Copies a single file from `src` to `dest`.

**Note**

The behavior of this API on an open file is not defined at the OSAL level due to dependencies on the underlying OS which may or may not allow the related operation based on a variety of potential configurations. For portability, it is recommended that applications ensure the file is closed prior to removal.

**Parameters**

<code>in</code>	<code>src</code>	The source file to operate on (must not be null)
<code>in</code>	<code>dest</code>	The destination file (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERROR</i>	if the file could not be accessed
<i>OS_INVALID_POINTER</i>	if src or dest are NULL
<i>OS_FS_ERR_PATH_INVALID</i>	if path cannot be parsed
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the paths given are too long to be stored locally
<i>OS_FS_ERR_NAME_TOO_LONG</i>	if the dest name is too long to be stored locally

```
10.65.2.6 OS_FDGetInfo() int32 OS_FDGetInfo (
    osal_id_t filedes,
    OS_file_prop_t * fd_prop )
```

Obtain information about an open file.

Copies the information of the given file descriptor into a structure passed in

**Parameters**

in	<i>filedes</i>	The handle ID to operate on
out	<i>fd_prop</i>	Storage buffer for file information (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the file descriptor passed in is invalid
<i>OS_INVALID_POINTER</i>	if the fd_prop argument is NULL

```
10.65.2.7 OS_FileOpenCheck() int32 OS_FileOpenCheck (
    const char * Filename )
```

Checks to see if a file is open.

This function takes a filename and determines if the file is open. The function will return success if the file is open.

**Parameters**

in	<i>Filename</i>	The file to operate on (must not be null)
----	-----------------	---

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	if the file is open
<i>OS_ERROR</i>	if the file is not open
<i>OS_INVALID_POINTER</i>	if the filename argument is NULL

**10.65.2.8 OS\_lseek()** `int32 OS_lseek (`

```
    osal_id_t filedes,  
    int32 offset,  
    uint32 whence )
```

Seeks to the specified position of an open file.

Sets the read/write pointer to a specific offset in a specific file.

**Parameters**

in	<i>filedes</i>	The handle ID to operate on
in	<i>offset</i>	The file offset to seek to
in	<i>whence</i>	The reference point for offset, see <a href="#">OSAL Reference Point For Seek Offset Defines</a>

**Returns**

Byte offset from the beginning of the file or appropriate error code, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_ERR_INVALID_ID</i>	if the file descriptor passed in is invalid
<i>OS_ERROR</i>	if OS call failed (return value only verified in coverage test)

**10.65.2.9 OS\_mv()** `int32 OS_mv (`

```
    const char * src,  
    const char * dest )
```

Move a single file from *src* to *dest*.

This first attempts to rename the file, which is faster if the source and destination reside on the same file system.

If this fails, it falls back to copying the file and removing the original.

**Note**

The behavior of this API on an open file is not defined at the OSAL level due to dependencies on the underlying OS which may or may not allow the related operation based on a variety of potential configurations. For portability, it is recommended that applications ensure the file is closed prior to removal.

**Parameters**

in	<i>src</i>	The source file to operate on (must not be null)
in	<i>dest</i>	The destination file (must not be null)

**Returns**Execution status, see [OSAL Return Code Defines](#)**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERROR</a>	if the file could not be renamed.
<a href="#">OS_INVALID_POINTER</a>	if src or dest are NULL
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if path cannot be parsed
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the paths given are too long to be stored locally
<a href="#">OS_FS_ERR_NAME_TOO_LONG</a>	if the dest name is too long to be stored locally

**10.65.2.10 OS\_OpenCreate()** `int32 OS_OpenCreate(`

```
    osal_id_t * filedes,
    const char * path,
    int32 flags,
    int32 access_mode )
```

Open or create a file.

Implements the same as OS\_open/OS\_creat but follows the OSAL paradigm of outputting the ID/descriptor separately from the return value, rather than relying on the user to convert it back.

**Parameters**

out	<i>filedes</i>	The handle ID (OS_OBJECT_ID_UNDEFINED on failure) (must not be null)
in	<i>path</i>	File name to create or open (must not be null)
in	<i>flags</i>	The file permissions - see <a href="#">OS_file_flag_t</a>
in	<i>access_mode</i>	Intended access mode - see <a href="#">OSAL File Access Option Defines</a>

**Returns**Execution status, see [OSAL Return Code Defines](#)**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERROR</a>	if the command was not executed properly
<a href="#">OS_INVALID_POINTER</a>	if pointer argument was NULL
<a href="#">OS_ERR_NO_FREE_IDS</a>	if all available file handles are in use
<a href="#">OS_FS_ERR_NAME_TOO_LONG</a>	if the filename portion of the path exceeds OS_MAX_FILE_NAME
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if the path argument is not valid
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the path argument exceeds OS_MAX_PATH_LEN

```
10.65.2.11 OS_read() int32 OS_read (
    osal_id_t filedes,
    void * buffer,
    size_t nbytes )
```

Read from a file handle.

Reads up to nbytes from a file, and puts them into buffer.

If the file position is at the end of file (or beyond, if the OS allows) then this function will return 0.

#### Parameters

in	<i>filedes</i>	The handle ID to operate on
out	<i>buffer</i>	Storage location for file data (must not be null)
in	<i>nbytes</i>	Maximum number of bytes to read (must not be zero)

#### Note

All OSAL error codes are negative int32 values. Failure of this call can be checked by testing if the result is less than 0.

#### Returns

A non-negative byte count or appropriate error code, see [OSAL Return Code Defines](#)

#### Return values

<a href="#"><i>OS_INVALID_POINTER</i></a>	if buffer is a null pointer
<a href="#"><i>OS_ERR_INVALID_SIZE</i></a>	if the passed-in size is not valid
<a href="#"><i>OS_ERROR</i></a>	if OS call failed (return value only verified in coverage test)
<a href="#"><i>OS_ERR_INVALID_ID</i></a>	if the file descriptor passed in is invalid
<i>0</i>	if at end of file/stream data

```
10.65.2.12 OS_remove() int32 OS_remove (
```

```
    const char * path )
```

Removes a file from the file system.

Removes a given filename from the drive

#### Note

The behavior of this API on an open file is not defined at the OSAL level due to dependencies on the underlying OS which may or may not allow the related operation based on a variety of potential configurations. For portability, it is recommended that applications ensure the file is closed prior to removal.

#### Parameters

in	<i>path</i>	The file to operate on (must not be null)
----	-------------	---

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERROR</i>	if there is no device or the driver returns error
<i>OS_INVALID_POINTER</i>	if path is NULL
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if path is too long to be stored locally
<i>OS_FS_ERR_PATH_INVALID</i>	if path cannot be parsed
<i>OS_FS_ERR_NAME_TOO_LONG</i>	if the name of the file to remove is too long

```
10.65.2.13 OS_rename() int32 OS_rename (
    const char * old_filename,
    const char * new_filename )
```

Renames a file.

Changes the name of a file, where the source and destination reside on the same file system.

**Note**

The behavior of this API on an open file is not defined at the OSAL level due to dependencies on the underlying OS which may or may not allow the related operation based on a variety of potential configurations. For portability, it is recommended that applications ensure the file is closed prior to removal.

**Parameters**

in	<i>old_filename</i>	The original filename (must not be null)
in	<i>new_filename</i>	The desired filename (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERROR</i>	if the file could not be opened or renamed.
<i>OS_INVALID_POINTER</i>	if old_filename or new_filename are NULL
<i>OS_FS_ERR_PATH_INVALID</i>	if path cannot be parsed
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the paths given are too long to be stored locally
<i>OS_FS_ERR_NAME_TOO_LONG</i>	if the new name is too long to be stored locally

```
10.65.2.14 OS_stat() int32 OS_stat (
    const char * path,
    os_fstat_t * filestats )
```

Obtain information about a file or directory.

Returns information about a file or directory in an [os\\_fstat\\_t](#) structure

#### Parameters

in	<i>path</i>	The file to operate on (must not be null)
out	<i>filestats</i>	Buffer to store file information (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if path or filestats is NULL
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the path is too long to be stored locally
<a href="#">OS_FS_ERR_NAME_TOO_LONG</a>	if the name of the file is too long to be stored
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if path cannot be parsed
<a href="#">OS_ERROR</a>	if the OS call failed

### 10.65.2.15 OS\_TimedRead() [int32](#) OS\_TimedRead (

```
    osal\_id\_t filedes,  
    void * buffer,  
    size_t nbytes,  
    int32 timeout )
```

File/Stream input read with a timeout.

This implements a time-limited read and is primarily intended for use with sockets but may also work with any other stream-like resource that the underlying OS supports, such as pipes or special devices.

If data is immediately available on the file/socket, this will return that data along with the actual number of bytes that were immediately available. It will not block.

If the file position is at the end of file or end of stream data (e.g. if the remote end has closed the connection), then this function will immediately return 0 without blocking for the timeout period.

If no data is immediately available, but the underlying resource/stream is still connected to a peer, this will wait up to the given timeout for additional data to appear. If no data appears within the timeout period, then this returns the [OS\\_ERROR\\_TIMEOUT](#) status code. This allows the caller to differentiate an open (but idle) socket connection from a connection which has been closed by the remote peer.

In all cases this will return successfully as soon as at least 1 byte of actual data is available. It will not attempt to read the entire input buffer.

If an EOF condition occurs prior to timeout, this function returns zero.

#### Parameters

in	<i>filedes</i>	The handle ID to operate on
out	<i>buffer</i>	Storage location for file data (must not be null)
in	<i>nbytes</i>	Maximum number of bytes to read (must not be zero)
in	<i>timeout</i>	Maximum time to wait, in milliseconds (OS_PEND = forever)

**Returns**

Byte count on success or appropriate error code, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_ERROR_TIMEOUT</i>	if no data became available during timeout period
<i>OS_ERR_INVALID_ID</i>	if the file descriptor passed in is invalid
<i>OS_ERR_INVALID_SIZE</i>	if the passed-in size is not valid
<i>OS_INVALID_POINTER</i>	if the passed-in buffer is not valid
<i>0</i>	if at end of file/stream data

**10.65.2.16 OS\_TimedWrite()** `int32 OS_TimedWrite(`

```
    osal_id_t filedes,
    const void * buffer,
    size_t nbytes,
    int32 timeout )
```

File/Stream output write with a timeout.

This implements a time-limited write and is primarily intended for use with sockets but may also work with any other stream-like resource that the underlying OS supports.

If output buffer space is immediately available on the file/socket, this will place data into the buffer and return the actual number of bytes that were queued for output. It will not block.

If no output buffer space is immediately available, this will wait up to the given timeout for space to become available. If no space becomes available within the timeout period, then this returns an error code (not zero).

In all cases this will return successfully as soon as at least 1 byte of actual data is output. It will *not* attempt to write the entire output buffer.

If an EOF condition occurs prior to timeout, this function returns zero.

**Parameters**

in	<i>filedes</i>	The handle ID to operate on
in	<i>buffer</i>	Source location for file data (must not be null)
in	<i>nbytes</i>	Maximum number of bytes to read (must not be zero)
in	<i>timeout</i>	Maximum time to wait, in milliseconds (OS_PEND = forever)

**Returns**

A non-negative byte count or appropriate error code, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_ERROR_TIMEOUT</i>	if no data became available during timeout period
<i>OS_ERR_INVALID_ID</i>	if the file descriptor passed in is invalid
<i>OS_ERR_INVALID_SIZE</i>	if the passed-in size is not valid
<i>OS_INVALID_POINTER</i>	if the passed-in buffer is not valid
<i>0</i>	if file/stream cannot accept any more data

```
10.65.2.17 OS_write() int32 OS_write (
    osal_id_t filedes,
    const void * buffer,
    size_t nbytes )
```

Write to a file handle.

Writes to a file. copies up to a maximum of nbytes of buffer to the file described in filedes

#### Parameters

in	<i>filedes</i>	The handle ID to operate on
in	<i>buffer</i>	Source location for file data (must not be null)
in	<i>nbytes</i>	Maximum number of bytes to read (must not be zero)

#### Note

All OSAL error codes are negative int32 values. Failure of this call can be checked by testing if the result is less than 0.

#### Returns

A non-negative byte count or appropriate error code, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_INVALID_POINTER</a>	if buffer is NULL
<a href="#">OS_ERR_INVALID_SIZE</a>	if the passed-in size is not valid
<a href="#">OS_ERROR</a>	if OS call failed (return value only verified in coverage test)
<a href="#">OS_ERR_INVALID_ID</a>	if the file descriptor passed in is invalid
0	if file/stream cannot accept any more data

## 10.66 OSAL File System Level APIs

### Functions

- `int32 OS_FileSysAddFixedMap (osal_id_t *filesys_id, const char *phys_path, const char *virt_path)`  
*Create a fixed mapping between an existing directory and a virtual OSAL mount point.*
- `int32 OS_mkfs (char *address, const char *devname, const char *volname, size_t blocksize, osal_blockcount_t numblocks)`  
*Makes a file system on the target.*
- `int32 OS_mount (const char *devname, const char *mountpoint)`  
*Mounts a file system.*
- `int32 OS_initfs (char *address, const char *devname, const char *volname, size_t blocksize, osal_blockcount_t numblocks)`  
*Initializes an existing file system.*
- `int32 OS_rmfs (const char *devname)`  
*Removes a file system.*
- `int32 OS_unmount (const char *mountpoint)`  
*Unmounts a mounted file system.*
- `int32 OS_FileSysStatVolume (const char *name, OS_statvfs_t *statbuf)`  
*Obtains information about size and free space in a volume.*
- `int32 OS_chkfs (const char *name, bool repair)`  
*Checks the health of a file system and repairs it if necessary.*
- `int32 OS_FS_GetPhysDriveName (char *PhysDriveName, const char *MountPoint)`  
*Obtains the physical drive name associated with a mount point.*
- `int32 OS_TranslatePath (const char *VirtualPath, char *LocalPath)`  
*Translates an OSAL Virtual file system path to a host Local path.*
- `int32 OS_GetFsInfo (os_fsinfo_t *filesys_info)`  
*Returns information about the file system.*

### 10.66.1 Detailed Description

### 10.66.2 Function Documentation

#### 10.66.2.1 OS\_chkfs() `int32 OS_chkfs (`

```
    const char * name,
    bool repair )
```

Checks the health of a file system and repairs it if necessary.

Checks the drives for inconsistencies and optionally also repairs it

#### Note

not all operating systems implement this function. If the underlying OS does not provide a facility to check the volume, then OS\_ERR\_NOT\_IMPLEMENTED will be returned.

#### Parameters

in	<code>name</code>	The device/path to operate on (must not be null)
in	<code>repair</code>	Whether to also repair inconsistencies

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution. (return value only verified in coverage test)
<i>OS_INVALID_POINTER</i>	Name is NULL
<i>OS_ERR_NOT_IMPLEMENTED</i>	Not implemented.
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the name is too long
<i>OS_ERROR</i>	Failed execution. (return value only verified in coverage test)

```
10.66.2.2 OS_FileSysAddFixedMap() int32 OS_FileSysAddFixedMap (
    osal_id_t * filesystem_id,
    const char * phys_path,
    const char * virt_path )
```

Create a fixed mapping between an existing directory and a virtual OSAL mount point.

This mimics the behavior of a "FS\_BASED" entry in the VolumeTable but is registered at runtime. It is intended to be called by the PSP/BSP prior to starting the application.

**Note**

OSAL virtual mount points are required to be a single, non-empty top-level directory name. Virtual path names always follow the form /<virt\_mount\_point>/<relative\_path>/<file>. Only the relative path may be omitted/empty (i.e. /<virt\_mount\_point>/<file>) but the virtual mount point must be present and not an empty string. In particular this means it is not possible to directly refer to files in the "root" of the native file system from OSAL. However it is possible to create a virtual map to the root, such as by calling:

```
OS_FileSysAddFixedMap (&fs_id, "/", "/root");
```

**Parameters**

out	<i>filesystem_id</i>	A buffer to store the ID of the file system mapping (must not be null)
in	<i>phys_path</i>	The native system directory (an existing mount point) (must not be null)
in	<i>virt_path</i>	The virtual mount point of this filesystem (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the overall <i>phys_path</i> is too long
<i>OS_ERR_NAME_TOO_LONG</i>	if the <i>phys_path</i> basename (filesystem name) is too long
<i>OS_INVALID_POINTER</i>	if any argument is NULL

```
10.66.2.3 OS_FileSysStatVolume() int32 OS_FileSysStatVolume (
    const char * name,
    OS_statvfs_t * statbuf )
```

Obtains information about size and free space in a volume.

Populates the supplied `OS_statvfs_t` structure, which includes the block size and total/free blocks in a file system volume.

This replaces two older OSAL calls:

`OS_fsBlocksFree()` is determined by reading the `blocks_free` output struct member `OS_fsBytesFree()` is determined by multiplying `blocks_free` by the `block_size` member

#### Parameters

in	<i>name</i>	The device/path to operate on (must not be null)
out	<i>statbuf</i>	Output structure to populate (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if name or statbuf is NULL
<code>OS_FS_ERR_PATH_TOO_LONG</code>	if the name is too long
<code>OS_ERROR</code>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

```
10.66.2.4 OS_FS_GetPhysDriveName() int32 OS_FS_GetPhysDriveName (
```

```
    char * PhysDriveName,
    const char * MountPoint )
```

Obtains the physical drive name associated with a mount point.

Returns the name of the physical volume associated with the drive, when given the OSAL mount point of the drive

#### Parameters

out	<i>PhysDriveName</i>	Buffer to store physical drive name (must not be null)
in	<i>MountPoint</i>	OSAL mount point (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if either parameter is NULL
<code>OS_ERR_NAME_NOT_FOUND</code>	if the MountPoint is not mounted in OSAL
<code>OS_FS_ERR_PATH_TOO_LONG</code>	if the MountPoint is too long

**10.66.2.5 OS\_GetFsInfo()** `int32 OS_GetFsInfo (`  
    `os_fsinfo_t * filesys_info )`

Returns information about the file system.

Returns information about the file system in an `os_fsinfo_t`. This includes the number of open files and file systems

#### Parameters

<code>out</code>	<code>filesys_info</code>	Buffer to store filesystem information (must not be null)
------------------	---------------------------	---

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if <code>filesys_info</code> is NULL

**10.66.2.6 OS\_initfs()** `int32 OS_initfs (`  
    `char * address,`  
    `const char * devname,`  
    `const char * volname,`  
    `size_t blocksize,`  
    `osal_blockcount_t numblocks )`

Initializes an existing file system.

Initializes a file system on the target.

#### Note

The "volname" parameter of RAM disks should always begin with the string "RAM", e.g. "RAMDISK" or "RA←M0","RAM1", etc if multiple devices are created. The underlying implementation uses this to select the correct filesystem type/format, and this may also be used to differentiate between RAM disks and real physical disks.

#### Parameters

<code>in</code>	<code>address</code>	The address at which to start the new disk. If <code>address == 0</code> , then space will be allocated by the OS
<code>in</code>	<code>devname</code>	The underlying kernel device to use, if applicable. (must not be null)
<code>in</code>	<code>volname</code>	The name of the volume (see note) (must not be null)
<code>in</code>	<code>blocksize</code>	The size of a single block on the drive
<code>in</code>	<code>numblocks</code>	The number of blocks to allocate for the drive

#### Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if devname or volname are NULL
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the name is too long
<i>OS_FS_ERR_DEVICE_NOT_FREE</i>	if the volume table is full
<i>OS_FS_ERR_DRIVE_NOT_CREATED</i>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

```
10.66.2.7 OS_mkfs() int32 OS_mkfs (
    char * address,
    const char * devname,
    const char * volname,
    size_t blocksize,
    osal_blockcount_t numblocks )
```

Makes a file system on the target.

Makes a file system on the target. Highly dependent on underlying OS and dependent on OS volume table definition.

## Note

The "volname" parameter of RAM disks should always begin with the string "RAM", e.g. "RAMDISK" or "RA←M0","RAM1", etc if multiple devices are created. The underlying implementation uses this to select the correct filesystem type/format, and this may also be used to differentiate between RAM disks and real physical disks.

## Parameters

in	<i>address</i>	The address at which to start the new disk. If address == 0 space will be allocated by the OS.
in	<i>devname</i>	The underlying kernel device to use, if applicable. (must not be null)
in	<i>volname</i>	The name of the volume (see note) (must not be null)
in	<i>blocksize</i>	The size of a single block on the drive
in	<i>numblocks</i>	The number of blocks to allocate for the drive

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if devname or volname is NULL
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the overall devname or volname is too long
<i>OS_FS_ERR_DEVICE_NOT_FREE</i>	if the volume table is full
<i>OS_FS_ERR_DRIVE_NOT_CREATED</i>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

```
10.66.2.8 OS_mount() int32 OS_mount (
```

```
    const char * devname,
    const char * mountpoint )
```

Mounts a file system.

Mounts a file system / block device at the given mount point.

#### Parameters

in	<i>devname</i>	The name of the drive to mount. devname is the same from <a href="#">OS_mkfs</a> (must not be null)
in	<i>mountpoint</i>	The name to call this disk from now on (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_NAME_NOT_FOUND</a>	if the device name does not exist in OSAL
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the mount point string is too long
<a href="#">OS_INVALID_POINTER</a>	if any argument is NULL
<a href="#">OS_ERROR</a>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

### 10.66.2.9 OS\_rmfs()

```
int32 OS_rmfs(
```

```
    const char * devname )
```

Removes a file system.

This function will remove or un-map the target file system. Note that this is not the same as un-mounting the file system.

#### Parameters

in	<i>devname</i>	The name of the "generic" drive (must not be null)
----	----------------	--

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if devname is NULL
<a href="#">OS_FS_ERR_PATH_TOO_LONG</a>	if the devname is too long
<a href="#">OS_ERR_NAME_NOT_FOUND</a>	if the devname does not exist in OSAL
<a href="#">OS_ERROR</a>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

```
10.66.2.10 OS_TranslatePath() int32 OS_TranslatePath (
    const char * VirtualPath,
    char * LocalPath )
```

Translates an OSAL Virtual file system path to a host Local path.  
 Translates a virtual path to an actual system path name

#### Note

The buffer provided in the LocalPath argument is required to be at least OS\_MAX\_PATH\_LEN characters in length.

#### Parameters

in	<i>VirtualPath</i>	OSAL virtual path name (must not be null)
out	<i>LocalPath</i>	Buffer to store native/translated path name (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if either parameter is NULL
<i>OS_FS_ERR_NAME_TOO_LONG</i>	if the filename component is too long
<i>OS_FS_ERR_PATH_INVALID</i>	if either parameter cannot be interpreted as a path
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if either input or output pathnames are too long

```
10.66.2.11 OS_unmount() int32 OS_unmount (
```

```
    const char * mountpoint )
```

Unmounts a mounted file system.

This function will unmount a drive from the file system and make all open file descriptors useless.

#### Note

Any open file descriptors referencing this file system should be closed prior to unmounting a drive

#### Parameters

in	<i>mountpoint</i>	The mount point to remove from <a href="#">OS_mount</a> (must not be null)
----	-------------------	--

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if name is NULL
<i>OS_FS_ERR_PATH_TOO_LONG</i>	if the absolute path given is too long

**Return values**

<i>OS_ERR_NAME_NOT_FOUND</i>	if the mountpoint is not mounted in OSAL
<i>OS_ERROR</i>	if an unexpected/unhandled OS error occurs (return value only verified in coverage test)

## 10.67 OSAL Heap APIs

### Functions

- `int32 OS_HeapGetInfo (OS_heap_prop_t *heap_prop)`

*Return current info on the heap.*

#### 10.67.1 Detailed Description

#### 10.67.2 Function Documentation

##### 10.67.2.1 `OS_HeapGetInfo()` `int32 OS_HeapGetInfo (` `OS_heap_prop_t * heap_prop )`

Return current info on the heap.

#### Parameters

<code>out</code>	<code>heap_prop</code>	Storage buffer for heap info
------------------	------------------------	------------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if the heap_prop argument is NULL

## 10.68 OSAL Object Type Defines

### Macros

- `#define OS_OBJECT_TYPE_UNDEFINED 0x00`  
*Object type undefined.*
- `#define OS_OBJECT_TYPE_OS_TASK 0x01`  
*Object task type.*
- `#define OS_OBJECT_TYPE_OS_QUEUE 0x02`  
*Object queue type.*
- `#define OS_OBJECT_TYPE_OS_COUNTSEM 0x03`  
*Object counting semaphore type.*
- `#define OS_OBJECT_TYPE_OS_BINSEM 0x04`  
*Object binary semaphore type.*
- `#define OS_OBJECT_TYPE_OS_MUTEX 0x05`  
*Object mutex type.*
- `#define OS_OBJECT_TYPE_OS_STREAM 0x06`  
*Object stream type.*
- `#define OS_OBJECT_TYPE_OS_DIR 0x07`  
*Object directory type.*
- `#define OS_OBJECT_TYPE_OS_TIMEBASE 0x08`  
*Object timebase type.*
- `#define OS_OBJECT_TYPE_OS_TIMECB 0x09`  
*Object timer callback type.*
- `#define OS_OBJECT_TYPE_OS_MODULE 0x0A`  
*Object module type.*
- `#define OS_OBJECT_TYPE_OS_FILESYS 0x0B`  
*Object file system type.*
- `#define OS_OBJECT_TYPE_OS_CONSOLE 0x0C`  
*Object console type.*
- `#define OS_OBJECT_TYPE_OS_CONDVAR 0x0D`  
*Object condition variable type.*
- `#define OS_OBJECT_TYPE_USER 0x10`  
*Object user type.*

### 10.68.1 Detailed Description

### 10.68.2 Macro Definition Documentation

**10.68.2.1 OS\_OBJECT\_TYPE\_OS\_BINSEM** `#define OS_OBJECT_TYPE_OS_BINSEM 0x04`  
Object binary semaphore type.  
Definition at line 42 of file osapi-idmap.h.

**10.68.2.2 OS\_OBJECT\_TYPE\_OS\_CONDVAR** `#define OS_OBJECT_TYPE_OS_CONDVAR 0x0D`  
Object condition variable type.  
Definition at line 51 of file osapi-idmap.h.

**10.68.2.3 OS\_OBJECT\_TYPE\_OS\_CONSOLE** #define OS\_OBJECT\_TYPE\_OS\_CONSOLE 0x0C  
Object console type.  
Definition at line 50 of file osapi-idmap.h.

**10.68.2.4 OS\_OBJECT\_TYPE\_OS\_COUNTSEM** #define OS\_OBJECT\_TYPE\_OS\_COUNTSEM 0x03  
Object counting semaphore type.  
Definition at line 41 of file osapi-idmap.h.

**10.68.2.5 OS\_OBJECT\_TYPE\_OS\_DIR** #define OS\_OBJECT\_TYPE\_OS\_DIR 0x07  
Object directory type.  
Definition at line 45 of file osapi-idmap.h.

**10.68.2.6 OS\_OBJECT\_TYPE\_OS\_FILESYS** #define OS\_OBJECT\_TYPE\_OS\_FILESYS 0x0B  
Object file system type.  
Definition at line 49 of file osapi-idmap.h.

**10.68.2.7 OS\_OBJECT\_TYPE\_OS\_MODULE** #define OS\_OBJECT\_TYPE\_OS\_MODULE 0x0A  
Object module type.  
Definition at line 48 of file osapi-idmap.h.

**10.68.2.8 OS\_OBJECT\_TYPE\_OS\_MUTEX** #define OS\_OBJECT\_TYPE\_OS\_MUTEX 0x05  
Object mutex type.  
Definition at line 43 of file osapi-idmap.h.

**10.68.2.9 OS\_OBJECT\_TYPE\_OS\_QUEUE** #define OS\_OBJECT\_TYPE\_OS\_QUEUE 0x02  
Object queue type.  
Definition at line 40 of file osapi-idmap.h.

**10.68.2.10 OS\_OBJECT\_TYPE\_OS\_STREAM** #define OS\_OBJECT\_TYPE\_OS\_STREAM 0x06  
Object stream type.  
Definition at line 44 of file osapi-idmap.h.

**10.68.2.11 OS\_OBJECT\_TYPE\_OS\_TASK** #define OS\_OBJECT\_TYPE\_OS\_TASK 0x01  
Object task type.  
Definition at line 39 of file osapi-idmap.h.

**10.68.2.12 OS\_OBJECT\_TYPE\_OS\_TIMEBASE** #define OS\_OBJECT\_TYPE\_OS\_TIMEBASE 0x08  
Object timebase type.  
Definition at line 46 of file osapi-idmap.h.

**10.68.2.13 OS\_OBJECT\_TYPE\_OS\_TIMECB** #define OS\_OBJECT\_TYPE\_OS\_TIMECB 0x09  
Object timer callback type.  
Definition at line 47 of file osapi-idmap.h.

**10.68.2.14 OS\_OBJECT\_TYPE\_UNDEFINED** #define OS\_OBJECT\_TYPE\_UNDEFINED 0x00  
Object type undefined.  
Definition at line 38 of file osapi-idmap.h.

**10.68.2.15 OS\_OBJECT\_TYPE\_USER** #define OS\_OBJECT\_TYPE\_USER 0x10  
Object user type.  
Definition at line 52 of file osapi-idmap.h.

## 10.69 OSAL Object ID Utility APIs

### Functions

- static unsigned long [OS\\_ObjectIdToInteger](#) ([osal\\_id\\_t](#) object\_id)  
*Obtain an integer value corresponding to an object ID.*
- static [osal\\_id\\_t OS\\_ObjectIdFromInteger](#) (unsigned long value)  
*Obtain an osal ID corresponding to an integer value.*
- static bool [OS\\_ObjectIdEqual](#) ([osal\\_id\\_t](#) object\_id1, [osal\\_id\\_t](#) object\_id2)  
*Check two OSAL object ID values for equality.*
- static bool [OS\\_ObjectIdDefined](#) ([osal\\_id\\_t](#) object\_id)  
*Check if an object ID is defined.*
- int32 [OS\\_GetResourceName](#) ([osal\\_id\\_t](#) object\_id, char \*buffer, size\_t buffer\_size)  
*Obtain the name of an object given an arbitrary object ID.*
- [osal\\_objtype\\_t OS\\_IdentifyObject](#) ([osal\\_id\\_t](#) object\_id)  
*Obtain the type of an object given an arbitrary object ID.*
- int32 [OS\\_ConvertToArrayIndex](#) ([osal\\_id\\_t](#) object\_id, [osal\\_index\\_t](#) \*ArrayIndex)  
*Converts an abstract ID into a number suitable for use as an array index.*
- int32 [OS\\_ObjectIdToArrayIndex](#) ([osal\\_objtype\\_t](#) idtype, [osal\\_id\\_t](#) object\_id, [osal\\_index\\_t](#) \*ArrayIndex)  
*Converts an abstract ID into a number suitable for use as an array index.*
- void [OS\\_ForEachObject](#) ([osal\\_id\\_t](#) creator\_id, [OS\\_ArgCallback\\_t](#) callback\_ptr, void \*callback\_arg)  
*call the supplied callback function for all valid object IDs*
- void [OS\\_ForEachObjectType](#) ([osal\\_objtype\\_t](#) objtype, [osal\\_id\\_t](#) creator\_id, [OS\\_ArgCallback\\_t](#) callback\_ptr, void \*callback\_arg)  
*call the supplied callback function for valid object IDs of a specific type*

### 10.69.1 Detailed Description

### 10.69.2 Function Documentation

**10.69.2.1 OS\_ConvertToArrayIndex()** [int32 OS\\_ConvertToArrayIndex](#) (  
  [osal\\_id\\_t](#) object\_id,  
  [osal\\_index\\_t](#) \* ArrayIndex )

Converts an abstract ID into a number suitable for use as an array index.

This will return a unique zero-based integer number in the range of [0,MAX) for any valid object ID. This may be used by application code as an array index for indexing into local tables.

#### Note

This does NOT verify the validity of the ID, that is left to the caller. This is only the conversion logic.

This routine accepts any object type, and returns a value based on the maximum number of objects for that type. This is equivalent to invoking [OS\\_ObjectIdToArrayIndex\(\)](#) with the idtype set to [OS\\_OBJECT\\_TYPE\\_UNDEFINED](#).

#### See also

[OS\\_ObjectIdToArrayIndex](#)

#### Parameters

in	<a href="#">object_id</a>	The object ID to operate on
out	<a href="#">*ArrayIndex</a>	The Index to return (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the object_id argument is not valid
<code>OS_INVALID_POINTER</code>	if the ArrayIndex is NULL

```
10.69.2.2 OS_ForEachObject() void OS_ForEachObject (
    osal_id_t creator_id,
    OS_ArgCallback_t callback_ptr,
    void * callback_arg )
```

call the supplied callback function for all valid object IDs

Loops through all defined OSAL objects of all types and calls callback\_ptr on each one If creator\_id is nonzero then only objects with matching creator id are processed.

**Parameters**

in	<i>creator_id</i>	Filter objects to those created by a specific task This may be passed as OS_OBJECT_CREATOR_ANY to return all objects
in	<i>callback_ptr</i>	Function to invoke for each matching object ID
in	<i>callback_arg</i>	Opaque Argument to pass to callback function (may be NULL)

```
10.69.2.3 OS_ForEachObjectType() void OS_ForEachObjectType (
    osal_objtype_t objtype,
    osal_id_t creator_id,
    OS_ArgCallback_t callback_ptr,
    void * callback_arg )
```

call the supplied callback function for valid object IDs of a specific type

Loops through all defined OSAL objects of a specific type and calls callback\_ptr on each one If creator\_id is nonzero then only objects with matching creator id are processed.

**Parameters**

in	<i>objtype</i>	The type of objects to iterate
in	<i>creator_id</i>	Filter objects to those created by a specific task This may be passed as OS_OBJECT_CREATOR_ANY to return all objects
in	<i>callback_ptr</i>	Function to invoke for each matching object ID
in	<i>callback_arg</i>	Opaque Argument to pass to callback function (may be NULL)

```
10.69.2.4 OS_GetResourceName() int32 OS_GetResourceName (
    osal_id_t object_id,
    char * buffer,
```

```
size_t buffer_size )
```

Obtain the name of an object given an arbitrary object ID.

All OSAL resources generally have a name associated with them. This allows application code to retrieve the name of any valid OSAL object ID.

#### Parameters

in	<i>object_id</i>	The object ID to operate on
out	<i>buffer</i>	Buffer in which to store the name (must not be null)
in	<i>buffer_size</i>	Size of the output storage buffer (must not be zero)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the passed-in ID is not a valid OSAL ID
<i>OS_INVALID_POINTER</i>	if the passed-in buffer is invalid
<i>OS_ERR_NAME_TOO_LONG</i>	if the name will not fit in the buffer provided

#### 10.69.2.5 OS\_IdentifyObject()

```
osal_objtype_t OS_IdentifyObject (
    osal_id_t object_id )
```

Obtain the type of an object given an arbitrary object ID.

Given an arbitrary object ID, get the type of the object

#### Parameters

in	<i>object_id</i>	The object ID to operate on
----	------------------	-----------------------------

#### Returns

The object type portion of the object\_id, see [OSAL Object Type Defines](#) for expected values

#### 10.69.2.6 OS\_ObjectIdDefined()

```
static bool OS_ObjectIdDefined (
    osal_id_t object_id ) [inline], [static]
```

Check if an object ID is defined.

The OSAL ID values should be treated as abstract values by applications, and not directly manipulated using standard C operators.

This returns false if the ID is NOT a defined resource (i.e. free/empty/invalid).

#### Note

OS\_ObjectIdDefined(OS\_OBJECT\_ID\_UNDEFINED) is always guaranteed to be false.

**Parameters**

in	<i>object_id</i>	The first object ID
----	------------------	---------------------

Definition at line 150 of file osapi-idmap.h.

References OS\_ObjectIdToInteger().

**10.69.2.7 OS\_ObjectIdEqual()** static bool OS\_ObjectIdEqual (   
     osal\_id\_t object\_id1,  
     osal\_id\_t object\_id2 ) [inline], [static]

Check two OSAL object ID values for equality.

The OSAL ID values should be treated as abstract values by applications, and not directly manipulated using standard C operators.

This checks two values for equality, replacing the "==" operator.

**Parameters**

in	<i>object_id1</i>	The first object ID
in	<i>object_id2</i>	The second object ID

**Returns**

true if the object IDs are equal

Definition at line 129 of file osapi-idmap.h.

References OS\_ObjectIdToInteger().

**10.69.2.8 OS\_ObjectIdFromInteger()** static osal\_id\_t OS\_ObjectIdFromInteger (   
     unsigned long value ) [inline], [static]

Obtain an osal ID corresponding to an integer value.

Provides the inverse of [OS\\_ObjectIdToInteger\(\)](#). Reconstitutes the original osal\_id\_t type from an integer representation.

**Parameters**

in	<i>value</i>	The integer representation of an OSAL ID
----	--------------	--

**Returns**

The ID value converted to an osal\_id\_t

Definition at line 102 of file osapi-idmap.h.

**10.69.2.9 OS\_ObjectIdToArrayIndex()** int32 OS\_ObjectIdToArrayIndex (   
     osal\_objtype\_t idtype,  
     osal\_id\_t object\_id,  
     osal\_index\_t \* ArrayIndex )

Converts an abstract ID into a number suitable for use as an array index.

This will return a unique zero-based integer number in the range of [0,MAX) for any valid object ID. This may be used by application code as an array index for indexing into local tables.

This routine operates on a specific object type, and returns a value based on the maximum number of objects for that type.

If the idtype is passed as `OS_OBJECT_TYPE_UNDEFINED`, then object type verification is skipped and any object ID will be accepted and converted to an index. In this mode, the range of the output depends on the actual passed-in object type.

If the idtype is passed as any other value, the passed-in ID value is first confirmed to be the correct type. This check will guarantee that the output is within an expected range; for instance, if the type is passed as `OS_OBJECT_TYPE_OS_TASK`, then the output index is guaranteed to be between 0 and `OS_MAX_TASKS`-1 after successful conversion.

#### Parameters

in	<i>idtype</i>	The object type to convert
in	<i>object_id</i>	The object ID to operate on
out	<code>*ArrayIndex</code>	The Index to return (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the object_id argument is not valid
<code>OS_INVALID_POINTER</code>	if the ArrayIndex is NULL

**10.69.2.10 OS\_ObjectIdToInteger()** `static unsigned long OS_ObjectIdToInteger ( osal_id_t object_id ) [inline], [static]`

Obtain an integer value corresponding to an object ID.

Obtains an integer representation of an object id, generally for the purpose of printing to the console or system logs. The returned value is of the type "unsigned long" for direct use with printf-style functions. It is recommended to use the "%lx" conversion specifier as the hexadecimal encoding clearly delineates the internal fields.

#### Note

This provides the raw integer value and is *not* suitable for use as an array index, as the result is not zero-based. See the [OS\\_ConvertToArrayIndex\(\)](#) to obtain a zero-based index value.

#### Parameters

in	<i>object_id</i>	The object ID
----	------------------	---------------

#### Returns

integer value representation of object ID

Definition at line 80 of file osapi-idmap.h.

Referenced by `OS_ObjectIdDefined()`, and `OS_ObjectIdEqual()`.

## 10.70 OSAL Dynamic Loader and Symbol APIs

### Functions

- `int32 OS_SymbolLookup (cpuaddr *symbol_address, const char *symbol_name)`  
*Find the Address of a Symbol.*
- `int32 OS_ModuleSymbolLookup (osal_id_t module_id, cpuaddr *symbol_address, const char *symbol_name)`  
*Find the Address of a Symbol within a module.*
- `int32 OS_SymbolTableDump (const char *filename, size_t size_limit)`  
*Dumps the system symbol table to a file.*
- `int32 OS_ModuleLoad (osal_id_t *module_id, const char *module_name, const char *filename, uint32 flags)`  
*Loads an object file.*
- `int32 OS_ModuleUnload (osal_id_t module_id)`  
*Unloads the module file.*
- `int32 OS_ModuleInfo (osal_id_t module_id, OS_module_prop_t *module_info)`  
*Obtain information about a module.*

#### 10.70.1 Detailed Description

#### 10.70.2 Function Documentation

**10.70.2.1 OS\_ModuleInfo()** `int32 OS_ModuleInfo (`  
    `osal_id_t module_id,`  
    `OS_module_prop_t * module_info )`

Obtain information about a module.

Returns information about the loadable module

#### Parameters

in	<code>module_id</code>	OSAL ID of the previously the loaded module
out	<code>module_info</code>	Buffer to store module information (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the module id invalid
<code>OS_INVALID_POINTER</code>	if the pointer to the ModuleInfo structure is invalid
<code>OS_ERROR</code>	if an other/unspecified error occurs (return value only verified in coverage test)

**10.70.2.2 OS\_ModuleLoad()** `int32 OS_ModuleLoad (`  
    `osal_id_t * module_id,`  
    `const char * module_name,`  
    `const char * filename,`

```
    uint32 flags )
```

Loads an object file.

Loads an object file into the running operating system

The "flags" parameter may influence how the loaded module symbols are made available for use in the application. See [OS\\_MODULE\\_FLAG\\_LOCAL\\_SYMBOLS](#) and [OS\\_MODULE\\_FLAG\\_GLOBAL\\_SYMBOLS](#) for descriptions.

#### Parameters

out	<i>module_id</i>	Non-zero OSAL ID corresponding to the loaded module
in	<i>module_name</i>	Name of module (must not be null)
in	<i>filename</i>	File containing the object code to load (must not be null)
in	<i>flags</i>	Options for the loaded module

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if one of the parameters is NULL
<a href="#">OS_ERR_NO_FREE_IDS</a>	if the module table is full
<a href="#">OS_ERR_NAME_TAKEN</a>	if the name is in use
<a href="#">OS_ERR_NAME_TOO_LONG</a>	if the module_name is too long
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if the filename argument is not valid
<a href="#">OS_ERROR</a>	if an other/unspecified error occurs (return value only verified in coverage test)

#### 10.70.2.3 OS\_ModuleSymbolLookup() [int32 OS\\_ModuleSymbolLookup \(](#)

```
    osal_id_t module_id,
    cpuaddr * symbol_address,
    const char * symbol_name )
```

Find the Address of a Symbol within a module.

This is similar to [OS\\_SymbolLookup\(\)](#) but for a specific module ID. This should be used to look up a symbol in a module that has been loaded with the [OS\\_MODULE\\_FLAG\\_LOCAL\\_SYMBOLS](#) flag.

#### Parameters

in	<i>module_id</i>	Module ID that should contain the symbol
out	<i>symbol_address</i>	Set to the address of the symbol (must not be null)
in	<i>symbol_name</i>	Name of the symbol to look up (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
----------------------------	-----------------------

**Return values**

<i>OS_ERROR</i>	if the symbol could not be found
<i>OS_INVALID_POINTER</i>	if one of the pointers passed in are NULL

**10.70.2.4 OS\_ModuleUnload()** `int32 OS_ModuleUnload ( osal_id_t module_id )`

Unloads the module file.

Unloads the module file from the running operating system

**Parameters**

<code>in</code>	<i>module_id</i>	OSAL ID of the previously the loaded module
-----------------	------------------	---

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the module id invalid
<i>OS_ERROR</i>	if an other/unspecified error occurs (return value only verified in coverage test)

**10.70.2.5 OS\_SymbolLookup()** `int32 OS_SymbolLookup (`

`cpuaddr * symbol_address,  
const char * symbol_name )`

Find the Address of a Symbol.

This calls to the OS dynamic symbol lookup implementation, and/or checks a static symbol table for a matching symbol name.

The static table is intended to support embedded targets that do not have module loading capability or have it disabled.

**Parameters**

<code>out</code>	<i>symbol_address</i>	Set to the address of the symbol (must not be null)
<code>in</code>	<i>symbol_name</i>	Name of the symbol to look up (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERROR</i>	if the symbol could not be found
<i>OS_INVALID_POINTER</i>	if one of the pointers passed in are NULL

```
10.70.2.6 OS_SymbolTableDump() int32 OS_SymbolTableDump (
    const char * filename,
    size_t size_limit )
```

Dumps the system symbol table to a file.

Dumps the system symbol table to the specified filename

#### Note

Not all RTOS implementations support this API. If the underlying module subsystem does not provide a facility to iterate through the symbol table, then the [OS\\_ERR\\_NOT\\_IMPLEMENTED](#) status code is returned.

#### Parameters

in	<i>filename</i>	File to write to (must not be null)
in	<i>size_limit</i>	Maximum number of bytes to write

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_NOT_IMPLEMENTED</a>	Not implemented.
<a href="#">OS_INVALID_POINTER</a>	if the filename argument is NULL
<a href="#">OS_FS_ERR_PATH_INVALID</a>	if the filename argument is not valid
<a href="#">OS_ERR_NAME_TOO_LONG</a>	if any of the symbol names are too long (return value only verified in coverage test)
<a href="#">OS_ERR_OUTPUT_TOO_LARGE</a>	if the size_limit was reached before completing all symbols (return value only verified in coverage test)
<a href="#">OS_ERROR</a>	if an other/unspecified error occurs (return value only verified in coverage test)

## 10.71 OSAL Mutex APIs

### Functions

- `int32 OS_MutSemCreate (osal_id_t *sem_id, const char *sem_name, uint32 options)`  
*Creates a mutex semaphore.*
- `int32 OS_MutSemGive (osal_id_t sem_id)`  
*Releases the mutex object referenced by sem\_id.*
- `int32 OS_MutSemTake (osal_id_t sem_id)`  
*Acquire the mutex object referenced by sem\_id.*
- `int32 OS_MutSemDelete (osal_id_t sem_id)`  
*Deletes the specified Mutex Semaphore.*
- `int32 OS_MutSemGetIdByName (osal_id_t *sem_id, const char *sem_name)`  
*Find an existing mutex ID by name.*
- `int32 OS_MutSemGetInfo (osal_id_t sem_id, OS_mut_sem_prop_t *mut_prop)`  
*Fill a property object buffer with details regarding the resource.*

### 10.71.1 Detailed Description

### 10.71.2 Function Documentation

#### 10.71.2.1 OS\_MutSemCreate() `int32 OS_MutSemCreate (`

```
    osal_id_t * sem_id,
    const char * sem_name,
    uint32 options )
```

Creates a mutex semaphore.

Mutex semaphores are always created in the unlocked (full) state.

#### Parameters

out	<code>sem_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
in	<code>sem_name</code>	the name of the new resource to create (must not be null)
in	<code>options</code>	reserved for future use. Should be passed as 0.

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if sem_id or sem_name are NULL
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>
<code>OS_ERR_NO_FREE_IDS</code>	if there are no more free mutex IDs
<code>OS_ERR_NAME_TAKEN</code>	if there is already a mutex with the same name
<code>OS_SEM_FAILURE</code>	if the OS call failed (return value only verified in coverage test)

**10.71.2.2 OS\_MutSemDelete()** `int32 OS_MutSemDelete ( osal_id_t sem_id )`

Deletes the specified Mutex Semaphore.

Delete the semaphore. This also frees the respective sem\_id such that it can be used again when another is created.

#### Parameters

in	<code>sem_id</code>	The object ID to delete
----	---------------------	-------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_ID</code>	if the id passed in is not a valid mutex
<code>OS_SEM_FAILURE</code>	if an unspecified error occurs (return value only verified in coverage test)

**10.71.2.3 OS\_MutSemGetIdByName()** `int32 OS_MutSemGetIdByName (`

```
osal_id_t * sem_id,
const char * sem_name )
```

Find an existing mutex ID by name.

This function tries to find a mutex sem Id given the name of a mut\_sem. The id is returned through sem\_id

#### Parameters

out	<code>sem_id</code>	will be set to the ID of the existing resource
in	<code>sem_name</code>	the name of the existing resource to find (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	is semid or sem_name are NULL pointers
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>
<code>OS_ERR_NAME_NOT_FOUND</code>	if the name was not found in the table

**10.71.2.4 OS\_MutSemGetInfo()** `int32 OS_MutSemGetInfo (`

```
osal_id_t sem_id,
OS_mut_sem_prop_t * mut_prop )
```

Fill a property object buffer with details regarding the resource.

This function will pass back a pointer to structure that contains all of the relevant info( name and creator) about the specified mutex semaphore.

#### Parameters

in	<i>sem_id</i>	The object ID to operate on
out	<i>mut_prop</i>	The property object buffer to fill (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid semaphore
<i>OS_INVALID_POINTER</i>	if the mut_prop pointer is null

### 10.71.2.5 OS\_MutSemGive() `int32 OS_MutSemGive ( osal_id_t sem_id )`

Releases the mutex object referenced by *sem\_id*.

If there are threads blocked on the mutex object referenced by mutex when this function is called, resulting in the mutex becoming available, the scheduling policy shall determine which thread shall acquire the mutex.

#### Parameters

in	<i>sem_id</i>	The object ID to operate on
----	---------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid mutex
<i>OS_SEM_FAILURE</i>	if an unspecified error occurs (return value only verified in coverage test)

### 10.71.2.6 OS\_MutSemTake() `int32 OS_MutSemTake ( osal_id_t sem_id )`

Acquire the mutex object referenced by *sem\_id*.

If the mutex is already locked, the calling thread shall block until the mutex becomes available. This operation shall return with the mutex object referenced by mutex in the locked state with the calling thread as its owner.

**Parameters**

in	<i>sem-&gt;_id</i>	The object ID to operate on
----	--------------------	-----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_ERR_INVALID_ID</i></a>	the id passed in is not a valid mutex
<a href="#"><i>OS_SEM_FAILURE</i></a>	if an unspecified error occurs (return value only verified in coverage test)

## 10.72 OSAL Network ID APIs

Provides some basic methods to query a network host name and ID.

### Functions

- `int32 OS_NetworkGetID (void)`  
*Gets the network ID of the local machine.*
- `int32 OS_NetworkGetHostName (char *host_name, size_t name_len)`  
*Gets the local machine network host name.*

#### 10.72.1 Detailed Description

Provides some basic methods to query a network host name and ID.

#### 10.72.2 Function Documentation

**10.72.2.1 OS\_NetworkGetHostName()** `int32 OS_NetworkGetHostName (`  
    `char * host_name,`  
    `size_t name_len )`

Gets the local machine network host name.

If configured in the underlying network stack, this function retrieves the local hostname of the system.

##### Parameters

<code>out</code>	<code>host_name</code>	Buffer to hold name information (must not be null)
<code>in</code>	<code>name_len</code>	Maximum length of host name buffer (must not be zero)

##### Returns

Execution status, see [OSAL Return Code Defines](#)

##### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERR_INVALID_SIZE</code>	if the name_len is zero
<code>OS_INVALID_POINTER</code>	if the host_name is NULL

**10.72.2.2 OS\_NetworkGetID()** `int32 OS_NetworkGetID (`  
    `void )`

Gets the network ID of the local machine.

The ID is an implementation-defined value and may not be consistent in meaning across different platform types.

##### Note

This API may be removed in a future version of OSAL due to inconsistencies between platforms.

**Returns**

The ID or fixed value of -1 if the host id could not be found. Note it is not possible to differentiate between error codes and valid network IDs here. It is assumed, however, that -1 is never a valid ID.

## 10.73 OSAL Printf APIs

### Functions

- void [OS\\_printf](#) (const char \*string,...) [OS\\_PRINTF\(1\)](#)  
*Abstraction for the system printf() call.*
- void [void OS\\_printf\\_disable](#) (void)  
*This function disables the output from OS\_printf.*
- void [OS\\_printf\\_enable](#) (void)  
*This function enables the output from OS\_printf.*

#### 10.73.1 Detailed Description

#### 10.73.2 Function Documentation

**10.73.2.1 OS\_printf()** void OS\_printf (  
    const char \* string,  
    ... )

Abstraction for the system printf() call.

This function abstracts out the printf type statements. This is useful for using OS- specific thots that will allow non-polled print statements for the real time systems.

Operates in a manner similar to the printf() call defined by the standard C library and takes all the parameters and formatting options of printf. This abstraction may implement additional buffering, if necessary, to improve the real-time performance of the call.

Strings (including terminator) longer than [OS\\_BUFFER\\_SIZE](#) will be truncated.

The output of this routine also may be dynamically enabled or disabled by the [OS\\_printf\\_enable\(\)](#) and [OS\\_printf\\_disable\(\)](#) calls, respectively.

#### Parameters

in	<i>string</i>	Format string, followed by additional arguments
----	---------------	---

**10.73.2.2 OS\_printf\_disable()** void void OS\_printf\_disable (  
    void )

This function disables the output from OS\_printf.

**10.73.2.3 OS\_printf\_enable()** void OS\_printf\_enable (  
    void )

This function enables the output from OS\_printf.

## 10.74 OSAL Message Queue APIs

### Functions

- `int32 OS_QueueCreate (osal_id_t *queue_id, const char *queue_name, osal_blockcount_t queue_depth, size_t data_size, uint32 flags)`

*Create a message queue.*
- `int32 OS_QueueDelete (osal_id_t queue_id)`

*Deletes the specified message queue.*
- `int32 OS_QueueGet (osal_id_t queue_id, void *data, size_t size, size_t *size_copied, int32 timeout)`

*Receive a message on a message queue.*
- `int32 OS_QueuePut (osal_id_t queue_id, const void *data, size_t size, uint32 flags)`

*Put a message on a message queue.*
- `int32 OS_QueueGetIdByName (osal_id_t *queue_id, const char *queue_name)`

*Find an existing queue ID by name.*
- `int32 OS_QueueGetInfo (osal_id_t queue_id, OS_queue_prop_t *queue_prop)`

*Fill a property object buffer with details regarding the resource.*

#### 10.74.1 Detailed Description

#### 10.74.2 Function Documentation

**10.74.2.1 OS\_QueueCreate()** `int32 OS_QueueCreate (`  
`osal_id_t * queue_id,`  
`const char * queue_name,`  
`osal_blockcount_t queue_depth,`  
`size_t data_size,`  
`uint32 flags )`

Create a message queue.

This is the function used to create a queue in the operating system. Depending on the underlying operating system, the memory for the queue will be allocated automatically or allocated by the code that sets up the queue. Queue names must be unique; if the name already exists this function fails. Names cannot be NULL.

#### Parameters

<code>out</code>	<code>queue_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
<code>in</code>	<code>queue_name</code>	the name of the new resource to create (must not be null)
<code>in</code>	<code>queue_depth</code>	the maximum depth of the queue
<code>in</code>	<code>data_size</code>	the size of each entry in the queue (must not be zero)
<code>in</code>	<code>flags</code>	options for the queue (reserved for future use, pass as 0)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if a pointer passed in is NULL
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>

## Return values

<i>OS_ERR_NO_FREE_IDS</i>	if there are already the max queues created
<i>OS_ERR_NAME_TAKEN</i>	if the name is already being used on another queue
<i>OS_ERR_INVALID_SIZE</i>	if data_size is 0
<i>OS_QUEUE_INVALID_SIZE</i>	if the queue depth exceeds the limit
<i>OS_ERROR</i>	if the OS create call fails

**10.74.2.2 OS\_QueueDelete()** `int32 OS_QueueDelete (``osal_id_t queue_id )`

Deletes the specified message queue.

This is the function used to delete a queue in the operating system. This also frees the respective queue\_id to be used again when another queue is created.

## Note

If There are messages on the queue, they will be lost and any subsequent calls to QueueGet or QueuePut to this queue will result in errors

## Parameters

in	<i>queue_id</i>	The object ID to delete
----	-----------------	-------------------------

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in does not exist
<i>OS_ERROR</i>	if the OS call returns an unexpected error (return value only verified in coverage test)

**10.74.2.3 OS\_QueueGet()** `int32 OS_QueueGet (``osal_id_t queue_id,`  
`void * data,`  
`size_t size,`  
`size_t * size_copied,`  
`int32 timeout )`

Receive a message on a message queue.

If a message is pending, it is returned immediately. Otherwise the calling task will block until a message arrives or the timeout expires.

## Parameters

in	<i>queue_id</i>	The object ID to operate on
----	-----------------	-----------------------------

**Parameters**

<i>out</i>	<i>data</i>	The buffer to store the received message (must not be null)
<i>in</i>	<i>size</i>	The size of the data buffer (must not be zero)
<i>out</i>	<i>size_copied</i>	Set to the actual size of the message (must not be null)
<i>in</i>	<i>timeout</i>	The maximum amount of time to block, or OS_PEND to wait forever

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_ERR_INVALID_ID</i></a>	if the given ID does not exist
<a href="#"><i>OS_INVALID_POINTER</i></a>	if a pointer passed in is NULL
<a href="#"><i>OS_QUEUE_EMPTY</i></a>	if the Queue has no messages on it to be received
<a href="#"><i>OS_QUEUE_TIMEOUT</i></a>	if the timeout was OS_PEND and the time expired
<a href="#"><i>OS_QUEUE_INVALID_SIZE</i></a>	if the size copied from the queue was not correct
<a href="#"><i>OS_ERROR</i></a>	if the OS call returns an unexpected error (return value only verified in coverage test)

**10.74.2.4 OS\_QueueGetIdByName()** `int32 OS_QueueGetIdByName (`

```
    osal_id_t * queue_id,
    const char * queue_name )
```

Find an existing queue ID by name.

This function tries to find a queue Id given the name of the queue. The id of the queue is passed back in `queue_id`.

**Parameters**

<i>out</i>	<i>queue_id</i>	will be set to the ID of the existing resource
<i>in</i>	<i>queue_name</i>	the name of the existing resource to find (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_INVALID_POINTER</i></a>	if the name or id pointers are NULL
<a href="#"><i>OS_ERR_NAME_TOO_LONG</i></a>	name length including null terminator greater than <a href="#"><i>OS_MAX_API_NAME</i></a>
<a href="#"><i>OS_ERR_NAME_NOT_FOUND</i></a>	the name was not found in the table

**10.74.2.5 OS\_QueueGetInfo()** `int32 OS_QueueGetInfo (`

```
    osal_id_t queue_id,
    OS_QUEUE_PROP_T * queue_prop )
```

Fill a property object buffer with details regarding the resource.

This function will pass back a pointer to structure that contains all of the relevant info (name and creator) about the specified queue.

#### Parameters

in	<i>queue_id</i>	The object ID to operate on
out	<i>queue_prop</i>	The property object buffer to fill (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if queue_prop is NULL
<i>OS_ERR_INVALID_ID</i>	if the ID given is not a valid queue

### 10.74.2.6 OS\_QueuePut() `int32 OS_QueuePut(`

```
    osal_id_t queue_id,
    const void * data,
    size_t size,
    uint32 flags )
```

Put a message on a message queue.

#### Parameters

in	<i>queue_id</i>	The object ID to operate on
in	<i>data</i>	The buffer containing the message to put (must not be null)
in	<i>size</i>	The size of the data buffer (must not be zero)
in	<i>flags</i>	Currently reserved/unused, should be passed as 0

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the queue id passed in is not a valid queue
<i>OS_INVALID_POINTER</i>	if the data pointer is NULL
<i>OS_QUEUE_INVALID_SIZE</i>	if the data message is too large for the queue
<i>OS_QUEUE_FULL</i>	if the queue cannot accept another message
<i>OS_ERROR</i>	if the OS call returns an unexpected error (return value only verified in coverage test)

## 10.75 OSAL Select APIs

### Functions

- `int32 OS_SelectMultiple (OS_FdSet *ReadSet, OS_FdSet *WriteSet, int32 msecs)`  
*Wait for events across multiple file handles.*
- `int32 OS_SelectSingle (osal_id_t objid, uint32 *StateFlags, int32 msecs)`  
*Wait for events on a single file handle.*
- `int32 OS_SelectFdZero (OS_FdSet *Set)`  
*Clear a FdSet structure.*
- `int32 OS_SelectFdAdd (OS_FdSet *Set, osal_id_t objid)`  
*Add an ID to an FdSet structure.*
- `int32 OS_SelectFdClear (OS_FdSet *Set, osal_id_t objid)`  
*Clear an ID from an FdSet structure.*
- `bool OS_SelectFdIsSet (const OS_FdSet *Set, osal_id_t objid)`  
*Check if an FdSet structure contains a given ID.*

#### 10.75.1 Detailed Description

#### 10.75.2 Function Documentation

##### 10.75.2.1 OS\_SelectFdAdd() `int32 OS_SelectFdAdd (`

```
    OS_FdSet * Set,
    osal_id_t objid )
```

Add an ID to an FdSet structure.

After this call the set will contain the given OSAL ID

#### Parameters

in, out	<code>Set</code>	Pointer to <code>OS_FdSet</code> object to operate on (must not be null)
in	<code>objid</code>	The handle ID to add to the set

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if argument is NULL
<code>OS_ERR_INVALID_ID</code>	if the objid is not a valid handle

##### 10.75.2.2 OS\_SelectFdClear() `int32 OS_SelectFdClear (`

```
    OS_FdSet * Set,
    osal_id_t objid )
```

Clear an ID from an FdSet structure.

After this call the set will no longer contain the given OSAL ID

**Parameters**

in, out	<i>Set</i>	Pointer to <a href="#">OS_FdSet</a> object to operate on (must not be null)
in	<i>objid</i>	The handle ID to remove from the set

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if argument is NULL
<a href="#">OS_ERR_INVALID_ID</a>	if the objid is not a valid handle

**10.75.2.3 OS\_SelectFdIsSet()** `bool OS_SelectFdIsSet (`  
    `const OS_FdSet * Set,`  
    `osal_id_t objid )`

Check if an FdSet structure contains a given ID.

**Parameters**

in	<i>Set</i>	Pointer to <a href="#">OS_FdSet</a> object to operate on (must not be null)
in	<i>objid</i>	The handle ID to check for in the set

**Returns**

Boolean set status

**Return values**

<i>true</i>	FdSet structure contains ID
<i>false</i>	FdSet structure does not contain ID

**10.75.2.4 OS\_SelectFdZero()** `int32 OS_SelectFdZero (`  
    `OS_FdSet * Set )`

Clear a FdSet structure.

After this call the set will contain no OSAL IDs

**Parameters**

out	<i>Set</i>	Pointer to <a href="#">OS_FdSet</a> object to clear (must not be null)
-----	------------	--

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if argument is NULL

**10.75.2.5 OS\_SelectMultiple()** *int32* *OS\_SelectMultiple* (

```
    OS_FdSet * ReadSet,
    OS_FdSet * WriteSet,
    int32 msecs )
```

Wait for events across multiple file handles.

Wait for any of the given sets of IDs to become readable or writable

This function will block until any of the following occurs:

- At least one OSAL ID in the ReadSet is readable
- At least one OSAL ID in the WriteSet is writable
- The timeout has elapsed

The sets are input/output parameters. On entry, these indicate the file handle(s) to wait for. On exit, these are set to the actual file handle(s) that have activity.

If the timeout occurs this returns an error code and all output sets should be empty.

**Note**

This does not lock or otherwise protect the file handles in the given sets. If a filehandle supplied via one of the FdSet arguments is closed or modified by another while this function is in progress, the results are undefined. Because of this limitation, it is recommended to use [OS\\_SelectSingle\(\)](#) whenever possible.

**Parameters**

<i>in, out</i>	<i>ReadSet</i>	Set of handles to check/wait to become readable
<i>in, out</i>	<i>WriteSet</i>	Set of handles to check/wait to become writable
<i>in</i>	<i>msecs</i>	Indicates the timeout. Positive values will wait up to that many milliseconds. Zero will not wait (poll). Negative values will wait forever (pend)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	If any handle in the ReadSet or WriteSet is readable or writable, respectively
<i>OS_ERROR_TIMEOUT</i>	If no handles in the ReadSet or WriteSet became readable or writable within the timeout
<i>OS_ERR_OPERATION_NOT_SUPPORTED</i>	if a specified handle does not support select
<i>OS_ERR_INVALID_ID</i>	if no valid handles were contained in the ReadSet/WriteSet

```
10.75.2.6 OS_SelectSingle() int32 OS_SelectSingle (
    osal_id_t objid,
    uint32 * StateFlags,
    int32 msecs )
```

Wait for events on a single file handle.

Wait for a single OSAL filehandle to change state

This function can be used to wait for a single OSAL stream ID to become readable or writable. On entry, the "StateFlags" parameter should be set to the desired state (OS\_STREAM\_STATE\_READABLE and/or OS\_STREAM\_STATE\_WRITABLE) and upon return the flags will be set to the state actually detected.

As this operates on a single ID, the filehandle is protected during this call, such that another thread accessing the same handle will return an error. However, it is important to note that once the call returns then other threads may then also read/write and affect the state before the current thread can service it.

To mitigate this risk the application may prefer to use the OS\_TimedRead/OS\_TimedWrite calls.

#### Parameters

in	<i>objid</i>	The handle ID to select on
in, out	<i>StateFlags</i>	State flag(s) (readable or writable) (must not be null)
in	<i>msecs</i>	Indicates the timeout. Positive values will wait up to that many milliseconds. Zero will not wait (poll). Negative values will wait forever (pend)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	If the handle is readable and/or writable, as requested
<a href="#">OS_ERROR_TIMEOUT</a>	If the handle did not become readable or writable within the timeout
<a href="#">OS_INVALID_POINTER</a>	if argument is NULL
<a href="#">OS_ERR_INVALID_ID</a>	if the objid is not a valid handle

## 10.76 OSAL Shell APIs

### Functions

- int32 `OS_ShellOutputToFile` (const char \*Cmd, `osal_id_t` filedes)

*Executes the command and sends output to a file.*

#### 10.76.1 Detailed Description

#### 10.76.2 Function Documentation

##### 10.76.2.1 `OS_ShellOutputToFile()`

```
int32 OS_ShellOutputToFile (
    const char * Cmd,
    osal_id_t filedes )
```

Executes the command and sends output to a file.

Takes a shell command in and writes the output of that command to the specified file. The output file must be opened previously with write access (OS\_WRITE\_ONLY or OS\_READ\_WRITE).

#### Parameters

in	<i>Cmd</i>	Command to pass to shell (must not be null)
in	<i>filedes</i>	File to send output to.

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_ERROR</code>	if the command was not executed properly
<code>OS_INVALID_POINTER</code>	if Cmd argument is NULL
<code>OS_ERR_INVALID_ID</code>	if the file descriptor passed in is invalid

## 10.77 OSAL Socket Address APIs

These functions provide a means to manipulate network addresses in a manner that is (mostly) agnostic to the actual network address type.

### Functions

- `int32 OS_SocketAddrInit (OS_SockAddr_t *Addr, OS_SocketDomain_t Domain)`  
*Initialize a socket address structure to hold an address of the given family.*
- `int32 OS_SocketAddrToString (char *buffer, size_t buflen, const OS_SockAddr_t *Addr)`  
*Get a string representation of a network host address.*
- `int32 OS_SocketAddrFromString (OS_SockAddr_t *Addr, const char *string)`  
*Set a network host address from a string representation.*
- `int32 OS_SocketAddrGetPort (uint16 *PortNum, const OS_SockAddr_t *Addr)`  
*Get the port number of a network address.*
- `int32 OS_SocketAddrSetPort (OS_SockAddr_t *Addr, uint16 PortNum)`  
*Set the port number of a network address.*

### 10.77.1 Detailed Description

These functions provide a means to manipulate network addresses in a manner that is (mostly) agnostic to the actual network address type.

Every network address should be representable as a string (i.e. dotted decimal IP, etc). This can serve as the "common denominator" to all address types.

### 10.77.2 Function Documentation

**10.77.2.1 OS\_SocketAddrFromString()** `int32 OS_SocketAddrFromString (`  
    `OS_SockAddr_t * Addr,`  
    `const char * string )`

Set a network host address from a string representation.

The specific format of the output string depends on the address family.

The address structure should have been previously initialized using [OS\\_SocketAddrInit\(\)](#) to set the address family type.

#### Note

For IPv4, this would typically be the dotted-decimal format (X.X.X.X). It is up to the discretion of the underlying implementation whether to accept hostnames, as this depends on the availability of DNS services. Since many embedded deployments do not have name services, this should not be relied upon.

#### Parameters

<code>out</code>	<code>Addr</code>	The address buffer to initialize (must not be null)
<code>in</code>	<code>string</code>	The string to initialize the address from (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERROR</i>	if the string cannot be converted to an address

**10.77.2.2 OS\_SocketAddrGetPort()** `int32 OS_SocketAddrGetPort (`

```
    uint16 * PortNum,
    const OS_SockAddr_t * Addr )
```

Get the port number of a network address.

For network protocols that have the concept of a port number (such as TCP/IP and UDP/IP) this function gets the port number from the address structure.

**Parameters**

<i>out</i>	<i>PortNum</i>	Buffer to store the port number (must not be null)
<i>in</i>	<i>Addr</i>	The network address buffer (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERR_BAD_ADDRESS</i>	if the address domain is not compatible

**10.77.2.3 OS\_SocketAddrInit()** `int32 OS_SocketAddrInit (`

```
    OS_SockAddr_t * Addr,
    OS_SocketDomain_t Domain )
```

Initialize a socket address structure to hold an address of the given family.

The address is set to a suitable default value for the family.

**Parameters**

<i>out</i>	<i>Addr</i>	The address buffer to initialize (must not be null)
<i>in</i>	<i>Domain</i>	The address family

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
-------------------	-----------------------

**Return values**

<i>OS_INVALID_POINTER</i>	if Addr argument is NULL
<i>OS_ERR_NOT_IMPLEMENTED</i>	if the system does not implement the requested domain

**10.77.2.4 OS\_SocketAddrSetPort()** `int32 OS_SocketAddrSetPort (`

```
    OS_SockAddr_t * Addr,  
    uint16 PortNum )
```

Set the port number of a network address.

For network protocols that have the concept of a port number (such as TCP/IP and UDP/IP) this function sets the port number from the address structure.

**Parameters**

<i>out</i>	<i>Addr</i>	The network address buffer (must not be null)
<i>in</i>	<i>PortNum</i>	The port number to set

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERR_BAD_ADDRESS</i>	if the address domain is not compatible

**10.77.2.5 OS\_SocketAddrToString()** `int32 OS_SocketAddrToString (`

```
    char * buffer,  
    size_t bufLen,  
    const OS_SockAddr_t * Addr )
```

Get a string representation of a network host address.

The specific format of the output string depends on the address family.

This string should be suitable to pass back into [OS\\_SocketAddrFromString\(\)](#) which should recreate the same network address, and it should also be meaningful to a user of printed or logged as a C string.

**Note**

For IPv4, this would typically be the dotted-decimal format (X.X.X.X).

**Parameters**

<i>out</i>	<i>buffer</i>	Buffer to hold the output string (must not be null)
<i>in</i>	<i>bufLen</i>	Maximum length of the output string (must not be zero)
<i>in</i>	<i>Addr</i>	The network address buffer to convert (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if argument is NULL
<code>OS_ERR_INVALID_SIZE</code>	if passed-in buflen is not valid
<code>OS_ERROR</code>	if the address cannot be converted to string, or string buffer too small

## 10.78 OSAL Socket Management APIs

These functions are loosely related to the BSD Sockets API but made to be more consistent with other OSAL API functions. That is, they operate on OSAL IDs (32-bit opaque number values) and return an OSAL error code.

### Functions

- `int32 OS_SocketOpen (osal_id_t *sock_id, OS_SocketDomain_t Domain, OS_SocketType_t Type)`  
*Opens a socket.*
- `int32 OS_SocketBind (osal_id_t sock_id, const OS_SockAddr_t *Addr)`  
*Binds a socket to a given local address and enter listening (server) mode.*
- `int32 OS_SocketListen (osal_id_t sock_id)`  
*Places the specified socket into a listening state.*
- `int32 OS_SocketBindAddress (osal_id_t sock_id, const OS_SockAddr_t *Addr)`  
*Binds a socket to a given local address.*
- `int32 OS_SocketConnect (osal_id_t sock_id, const OS_SockAddr_t *Addr, int32 timeout)`  
*Connects a socket to a given remote address.*
- `int32 OS_SocketShutdown (osal_id_t sock_id, OS_SocketShutdownMode_t Mode)`  
*Implement graceful shutdown of a stream socket.*
- `int32 OS_SocketAccept (osal_id_t sock_id, osal_id_t *connsock_id, OS_SockAddr_t *Addr, int32 timeout)`  
*Waits for and accept the next incoming connection on the given socket.*
- `int32 OS_SocketRecvFrom (osal_id_t sock_id, void *buffer, size_t buflen, OS_SockAddr_t *RemoteAddr, int32 timeout)`  
*Reads data from a message-oriented (datagram) socket.*
- `int32 OS_SocketSendTo (osal_id_t sock_id, const void *buffer, size_t buflen, const OS_SockAddr_t *RemoteAddr)`  
*Sends data to a message-oriented (datagram) socket.*
- `int32 OS_SocketGetIdByName (osal_id_t *sock_id, const char *sock_name)`  
*Gets an OSAL ID from a given name.*
- `int32 OS_SocketGetInfo (osal_id_t sock_id, OS_socket_prop_t *sock_prop)`  
*Gets information about an OSAL Socket ID.*

### 10.78.1 Detailed Description

These functions are loosely related to the BSD Sockets API but made to be more consistent with other OSAL API functions. That is, they operate on OSAL IDs (32-bit opaque number values) and return an OSAL error code.

OSAL Socket IDs are very closely related to File IDs and share the same ID number space. Additionally, the file `OS_read()` / `OS_write()` / `OS_close()` calls also work on sockets.

Note that all of functions may return `OS_ERR_NOT_IMPLEMENTED` if network support is not configured at compile time.

### 10.78.2 Function Documentation

#### 10.78.2.1 OS\_SocketAccept() `int32 OS_SocketAccept (`

```
    osal_id_t sock_id,
    osal_id_t * connsock_id,
    OS_SockAddr_t * Addr,
    int32 timeout )
```

Waits for and accept the next incoming connection on the given socket.

This is used for sockets operating in a "server" role. The socket must be a stream type (connection-oriented) and previously bound to a local address using [OS\\_SocketBind\(\)](#). This will block the caller up to the given timeout or until an incoming connection request occurs, whichever happens first.

The new stream connection is then returned to the caller and the original server socket ID can be reused for the next connection.

#### Parameters

in	<i>sock_id</i>	The server socket ID, previously bound using <a href="#">OS_SocketBind()</a>
out	<i>connsock_id</i>	The connection socket, a new ID that can be read/written (must not be null)
in	<i>Addr</i>	The remote address of the incoming connection (must not be null)
in	<i>timeout</i>	The maximum amount of time to wait, or OS_PEND to wait forever

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if argument is NULL
<a href="#">OS_ERR_INVALID_ID</a>	if the <i>sock_id</i> parameter is not valid
<a href="#">OS_ERR_INCORRECT_OBJ_TYPE</a>	if the handle is not a socket
<a href="#">OS_ERR_INCORRECT_OBJ_STATE</a>	if the socket is not bound or already connected

#### 10.78.2.2 OS\_SocketBind() `int32 OS_SocketBind(`

```
    osal_id_t sock_id,
    const OS_SockAddr_t * Addr )
```

Binds a socket to a given local address and enter listening (server) mode.

This is a convenience/compatibility routine to perform both [OS\\_SocketBindAddress\(\)](#) and [OS\\_SocketListen\(\)](#) operations in a single call, intended to simplify the setup for a server role.

If the socket is connectionless, then it only binds to the local address.

#### Parameters

in	<i>sock_id</i>	The socket ID
in	<i>Addr</i>	The local address to bind to (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the <i>sock_id</i> parameter is not valid

**Return values**

<a href="#">OS_INVALID_POINTER</a>	if argument is NULL
<a href="#">OS_ERR_INCORRECT_OBJ_STATE</a>	if the socket is already bound
<a href="#">OS_ERR_INCORRECT_OBJ_TYPE</a>	if the handle is not a socket

**10.78.2.3 OS\_SocketBindAddress()** `int32 OS_SocketBindAddress (`

```
    osal_id_t sock_id,  
    const OS_SockAddr_t * Addr )
```

Binds a socket to a given local address.

The specified socket will be bound to the local address and port, if available. This controls the source address reflected in network traffic transmitted via this socket.

After binding to the address, a stream socket may be followed by a call to either [OS\\_SocketListen\(\)](#) for a server role or to [OS\\_SocketConnect\(\)](#) for a client role.

**Parameters**

in	<i>sock_id</i>	The socket ID
in	<i>Addr</i>	The local address to bind to (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the <i>sock_id</i> parameter is not valid
<a href="#">OS_INVALID_POINTER</a>	if argument is NULL
<a href="#">OS_ERR_INCORRECT_OBJ_STATE</a>	if the socket is already bound
<a href="#">OS_ERR_INCORRECT_OBJ_TYPE</a>	if the handle is not a socket

**10.78.2.4 OS\_SocketConnect()** `int32 OS_SocketConnect (`

```
    osal_id_t sock_id,  
    const OS_SockAddr_t * Addr,  
    int32 timeout )
```

Connects a socket to a given remote address.

The socket will be connected to the remote address and port, if available. This only applies to stream-oriented sockets. Calling this on a datagram socket will return an error (these sockets should use SendTo/RecvFrom).

**Parameters**

in	<i>sock_id</i>	The socket ID
in	<i>Addr</i>	The remote address to connect to (must not be null)
in	<i>timeout</i>	The maximum amount of time to wait, or OS_PEND to wait forever

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if the socket is already connected
<i>OS_ERR_INVALID_ID</i>	if the <i>sock_id</i> parameter is not valid
<i>OS_ERR_INCORRECT_OBJ_TYPE</i>	if the handle is not a socket
<i>OS_INVALID_POINTER</i>	if <i>Addr</i> argument is NULL

**10.78.2.5 OS\_SocketGetIdByName()** `int32 OS_SocketGetIdByName (`

```
    osal_id_t * sock_id,
    const char * sock_name )
```

Gets an OSAL ID from a given name.

**Note**

OSAL Sockets use generated names according to the address and type.

**See also**

[OS\\_SocketGetInfo\(\)](#)

**Parameters**

<i>out</i>	<i>sock_id</i>	Buffer to hold result (must not be null)
<i>in</i>	<i>sock_name</i>	Name of socket to find (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	is id or name are NULL pointers
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <i>OS_MAX_API_NAME</i>
<i>OS_ERR_NAME_NOT_FOUND</i>	if the name was not found in the table

**10.78.2.6 OS\_SocketGetInfo()** `int32 OS_SocketGetInfo (`

```
    osal_id_t sock_id,
    OS_socket_prop_t * sock_prop )
```

Gets information about an OSAL Socket ID.

OSAL Sockets use generated names according to the address and type. This allows applications to find the name of a given socket.

**Parameters**

in	<i>sock_id</i>	The socket ID
out	<i>sock_prop</i>	Buffer to hold socket information (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid semaphore
<i>OS_INVALID_POINTER</i>	if the count_prop pointer is null

**10.78.2.7 OS\_SocketListen()** `int32 OS_SocketListen ( osal_id_t sock_id )`

Places the specified socket into a listening state.

This function only applies to connection-oriented (stream) sockets that are intended to be used in a server-side role. This places the socket into a state where it can accept incoming connections from clients.

**Parameters**

in	<i>sock_id</i>	The socket ID
----	----------------	---------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the sock_id parameter is not valid
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if the socket is already listening
<i>OS_ERR_INCORRECT_OBJ_TYPE</i>	if the handle is not a stream socket

**10.78.2.8 OS\_SocketOpen()** `int32 OS_SocketOpen ( osal_id_t * sock_id, OS_SocketDomain_t Domain, OS_SocketType_t Type )`

Opens a socket.

A new, unconnected and unbound socket is allocated of the given domain and type.

**Parameters**

out	<i>sock_id</i>	Buffer to hold the non-zero OSAL ID (must not be null)
in	<i>Domain</i>	The domain / address family of the socket (INET or INET6, etc)
in	<i>Type</i>	The type of the socket (STREAM or DATAGRAM)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERR_NOT_IMPLEMENTED</i>	if the system does not implement the requested socket/address domain

**10.78.2.9 OS\_SocketRecvFrom()** `int32 OS_SocketRecvFrom(`

```
    osal_id_t sock_id,
    void * buffer,
    size_t buflen,
    OS_SockAddr_t * RemoteAddr,
    int32 timeout )
```

Reads data from a message-oriented (datagram) socket.

If a message is already available on the socket, this should immediately return that data without blocking. Otherwise, it may block up to the given timeout.

**Parameters**

in	<i>sock_id</i>	The socket ID, previously bound using <a href="#">OS_SocketBind()</a>
out	<i>buffer</i>	Pointer to message data receive buffer (must not be null)
in	<i>buflen</i>	The maximum length of the message data to receive (must not be zero)
out	<i>RemoteAddr</i>	Buffer to store the remote network address (may be NULL)
in	<i>timeout</i>	The maximum amount of time to wait, or OS_PEND to wait forever

**Returns**

Count of actual bytes received or error status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERR_INVALID_SIZE</i>	if passed-in buflen is not valid
<i>OS_ERR_INVALID_ID</i>	if the <i>sock_id</i> parameter is not valid
<i>OS_ERR_INCORRECT_OBJ_TYPE</i>	if the handle is not a socket

```
10.78.2.10 OS_SocketSendTo() int32 OS_SocketSendTo (
    osal_id_t sock_id,
    const void * buffer,
    size_t buflen,
    const OS_SockAddr_t * RemoteAddr )
```

Sends data to a message-oriented (datagram) socket.

This sends data in a non-blocking mode. If the socket is not currently able to queue the message, such as if its outbound buffer is full, then this returns an error code.

#### Parameters

in	<i>sock_id</i>	The socket ID, which must be of the datagram type
in	<i>buffer</i>	Pointer to message data to send (must not be null)
in	<i>buflen</i>	The length of the message data to send (must not be zero)
in	<i>RemoteAddr</i>	Buffer containing the remote network address to send to

#### Returns

Count of actual bytes sent or error status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_INVALID_POINTER</i>	if argument is NULL
<i>OS_ERR_INVALID_SIZE</i>	if passed-in buflen is not valid
<i>OS_ERR_INVALID_ID</i>	if the <i>sock_id</i> parameter is not valid
<i>OS_ERR_INCORRECT_OBJ_TYPE</i>	if the handle is not a socket

```
10.78.2.11 OS_SocketShutdown() int32 OS_SocketShutdown (
    osal_id_t sock_id,
    OS_SocketShutdownMode_t Mode )
```

Implement graceful shutdown of a stream socket.

This can be utilized to indicate the end of data stream without immediately closing the socket, giving the remote side an indication that the data transfer is complete.

#### Parameters

in	<i>sock_id</i>	The socket ID
in	<i>Mode</i>	Whether to shutdown reading, writing, or both.

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the <i>sock_id</i> parameter is not valid

**Return values**

<i>OS_ERR_INVALID_ARGUMENT</i>	if the Mode argument is not one of the valid options
<i>OS_ERR_INCORRECT_OBJ_TYPE</i>	if the handle is not a socket
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if the socket is not connected

## 10.79 OSAL Task APIs

### Functions

- `int32 OS_TaskCreate (osal_id_t *task_id, const char *task_name, osal_task_entry function_pointer, osal_stackptr_t stack_pointer, size_t stack_size, osal_priority_t priority, uint32 flags)`  
*Creates a task and starts running it.*
- `int32 OS_TaskDelete (osal_id_t task_id)`  
*Deletes the specified Task.*
- `void OS_TaskExit (void)`  
*Exits the calling task.*
- `int32 OS_TaskInstallDeleteHandler (osal_task_entry function_pointer)`  
*Installs a handler for when the task is deleted.*
- `int32 OS_TaskDelay (uint32 millisecond)`  
*Delay a task for specified amount of milliseconds.*
- `int32 OS_TaskSetPriority (osal_id_t task_id, osal_priority_t new_priority)`  
*Sets the given task to a new priority.*
- `osal_id_t OS_TaskGetId (void)`  
*Obtain the task id of the calling task.*
- `int32 OS_TaskGetIdByName (osal_id_t *task_id, const char *task_name)`  
*Find an existing task ID by name.*
- `int32 OS_TaskGetInfo (osal_id_t task_id, OS_task_prop_t *task_prop)`  
*Fill a property object buffer with details regarding the resource.*
- `int32 OS_TaskFindIdBySystemData (osal_id_t *task_id, const void *sysdata, size_t sysdata_size)`  
*Reverse-lookup the OSAL task ID from an operating system ID.*

#### 10.79.1 Detailed Description

#### 10.79.2 Function Documentation

**10.79.2.1 OS\_TaskCreate()** `int32 OS_TaskCreate (`  
    `osal_id_t * task_id,`  
    `const char * task_name,`  
    `osal_task_entry function_pointer,`  
    `osal_stackptr_t stack_pointer,`  
    `size_t stack_size,`  
    `osal_priority_t priority,`  
    `uint32 flags )`

Creates a task and starts running it.

Creates a task and passes back the id of the task created. Task names must be unique; if the name already exists this function fails. Names cannot be NULL.

Portable applications should always specify the actual stack size in the stack\_size parameter, not 0. This size value is not enforced/checked by OSAL, but is simply passed through to the RTOS for stack creation. Some RTOS implementations may assume 0 means a default stack size while others may actually create a task with no stack.

Unlike stack\_size, the stack\_pointer is optional and can be specified as NULL. In that case, a stack of the requested size will be dynamically allocated from the system heap.

#### Parameters

<code>out</code>	<code>task_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
------------------	----------------------	---

**Parameters**

in	<i>task_name</i>	the name of the new resource to create (must not be null)
in	<i>function_pointer</i>	the entry point of the new task (must not be null)
in	<i>stack_pointer</i>	pointer to the stack for the task, or NULL to allocate a stack from the system memory heap
in	<i>stack_size</i>	the size of the stack (must not be zero)
in	<i>priority</i>	initial priority of the new task
in	<i>flags</i>	initial options for the new task

**Returns**Execution status, see [OSAL Return Code Defines](#)**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_INVALID_POINTER</i></a>	if any of the necessary pointers are NULL
<a href="#"><i>OS_ERR_INVALID_SIZE</i></a>	if the <i>stack_size</i> argument is zero
<a href="#"><i>OS_ERR_NAME_TOO_LONG</i></a>	name length including null terminator greater than <a href="#"><i>OS_MAX_API_NAME</i></a>
<a href="#"><i>OS_ERR_INVALID_PRIORITY</i></a>	if the priority is bad (return value only verified in coverage test)
<a href="#"><i>OS_ERR_NO_FREE_IDS</i></a>	if there can be no more tasks created
<a href="#"><i>OS_ERR_NAME_TAKEN</i></a>	if the name specified is already used by a task
<a href="#"><i>OS_ERROR</i></a>	if an unspecified/other error occurs (return value only verified in coverage test)

**10.79.2.2 OS\_TaskDelay()** `int32 OS_TaskDelay ( uint32 millisecond )`

Delay a task for specified amount of milliseconds.

Causes the current thread to be suspended from execution for the period of millisecond. This is a scheduled wait (clock\_nanosleep/rtems\_task\_wake\_after/taskDelay), not a "busy" wait.

**Parameters**

in	<i>millisecond</i>	Amount of time to delay
----	--------------------	-------------------------

**Returns**Execution status, see [OSAL Return Code Defines](#)**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_ERROR</i></a>	if an unspecified/other error occurs (return value only verified in coverage test)

**10.79.2.3 OS\_TaskDelete()** `int32 OS_TaskDelete (`

```
osal_id_t task_id )
```

Deletes the specified Task.

The task will be removed from the local tables. and the OS will be configured to stop executing the task at the next opportunity.

#### Parameters

in	<i>task_id</i>	The object ID to operate on
----	----------------	-----------------------------

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the ID given to it is invalid
<i>OS_ERROR</i>	if the OS delete call fails (return value only verified in coverage test)

**10.79.2.4 OS\_TaskExit()** void OS\_TaskExit (

```
void )
```

Exits the calling task.

The calling thread is terminated. This function does not return.

**10.79.2.5 OS\_TaskFindIdBySystemData()** int32 OS\_TaskFindIdBySystemData (

```
osal_id_t * task_id,
const void * sysdata,
size_t sysdata_size )
```

Reverse-lookup the OSAL task ID from an operating system ID.

This provides a method by which an external entity may find the OSAL task ID corresponding to a system-defined identifier (e.g. TASK\_ID, pthread\_t, rtems\_id, etc).

Normally OSAL does not expose the underlying OS-specific values to the application, but in some circumstances, such as exception handling, the OS may provide this information directly to a BSP handler outside of the normal OSAL API.

#### Parameters

out	<i>task_id</i>	The buffer where the task id output is stored (must not be null)
in	<i>sysdata</i>	Pointer to the system-provided identification data
in	<i>sysdata_size</i>	Size of the system-provided identification data

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution. (return value only verified in coverage test)
<i>OS_INVALID_POINTER</i>	if a pointer argument is NULL

```
10.79.2.6 OS_TaskGetId() osal_id_t OS_TaskGetId (
    void )
```

Obtain the task id of the calling task.

This function returns the task id of the calling task

#### Returns

Task ID, or zero if the operation failed (zero is never a valid task ID)

```
10.79.2.7 OS_TaskGetIdByName() int32 OS_TaskGetIdByName (
    osal_id_t * task_id,
    const char * task_name )
```

Find an existing task ID by name.

This function tries to find a task Id given the name of a task

#### Parameters

<code>out</code>	<code>task_id</code>	will be set to the ID of the existing resource
<code>in</code>	<code>task_name</code>	the name of the existing resource to find (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<code>OS_SUCCESS</code>	Successful execution.
<code>OS_INVALID_POINTER</code>	if the pointers passed in are NULL
<code>OS_ERR_NAME_TOO_LONG</code>	name length including null terminator greater than <code>OS_MAX_API_NAME</code>
<code>OS_ERR_NAME_NOT_FOUND</code>	if the name wasn't found in the table

```
10.79.2.8 OS_TaskGetInfo() int32 OS_TaskGetInfo (
    osal_id_t task_id,
    OS_task_prop_t * task_prop )
```

Fill a property object buffer with details regarding the resource.

This function will pass back a pointer to structure that contains all of the relevant info (creator, stack size, priority, name) about the specified task.

#### Parameters

<code>in</code>	<code>task_id</code>	The object ID to operate on
<code>out</code>	<code>task_prop</code>	The property object buffer to fill (must not be null)

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the ID passed to it is invalid
<i>OS_INVALID_POINTER</i>	if the task_prop pointer is NULL

**10.79.2.9 OS\_TaskInstallDeleteHandler()** `int32 OS_TaskInstallDeleteHandler ( osal_task_entry function_pointer )`

Installs a handler for when the task is deleted.

This function is used to install a callback that is called when the task is deleted. The callback is called when `OS_TaskDelete` is called with the task ID. A task delete handler is useful for cleaning up resources that a task creates, before the task is removed from the system.

**Parameters**

<i>in</i>	<i>function_pointer</i>	function to be called when task exits
-----------	-------------------------	---------------------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_ERR_INVALID_ID</i>	if the calling context is not an OSAL task
--------------------------	--

**10.79.2.10 OS\_TaskSetPriority()** `int32 OS_TaskSetPriority ( osal_id_t task_id, osal_priority_t new_priority )`

Sets the given task to a new priority.

**Parameters**

<i>in</i>	<i>task_id</i>	The object ID to operate on
<i>in</i>	<i>new_priority</i>	Set the new priority

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the ID passed to it is invalid

**Return values**

<i>OS_ERR_INVALID_PRIORITY</i>	if the priority is greater than the max allowed (return value only verified in coverage test)
<i>OS_ERROR</i>	if an unspecified/other error occurs (return value only verified in coverage test)

## 10.80 OSAL Time Base APIs

### Functions

- `int32 OS_TimeBaseCreate (osal_id_t *timebase_id, const char *timebase_name, OS_TimerSync_t external_sync)`  
*Create an abstract Time Base resource.*
- `int32 OS_TimeBaseSet (osal_id_t timebase_id, uint32 start_time, uint32 interval_time)`  
*Sets the tick period for simulated time base objects.*
- `int32 OS_TimeBaseDelete (osal_id_t timebase_id)`  
*Deletes a time base object.*
- `int32 OS_TimeBaseGetIdByName (osal_id_t *timebase_id, const char *timebase_name)`  
*Find the ID of an existing time base resource.*
- `int32 OS_TimeBaseGetInfo (osal_id_t timebase_id, OS_timebase_prop_t *timebase_prop)`  
*Obtain information about a timebase resource.*
- `int32 OS_TimeBaseGetFreeRun (osal_id_t timebase_id, uint32 *freerun_val)`  
*Read the value of the timebase free run counter.*

### 10.80.1 Detailed Description

### 10.80.2 Function Documentation

**10.80.2.1 OS\_TimeBaseCreate()** `int32 OS_TimeBaseCreate (`  
    `osal_id_t * timebase_id,`  
    `const char * timebase_name,`  
    `OS_TimerSync_t external_sync )`

Create an abstract Time Base resource.

An OSAL time base is an abstraction of a "timer tick" that can, in turn, be used for measurement of elapsed time between events.

Time bases can be simulated by the operating system using the OS kernel-provided timing facilities, or based on a hardware timing source if provided by the BSP.

A time base object has a servicing task associated with it, that runs at elevated priority and will thereby interrupt user-level tasks when timing ticks occur.

If the `external_sync` function is passed as NULL, the operating system kernel timing resources will be utilized for a simulated timer tick.

If the `external_sync` function is not NULL, this should point to a BSP-provided function that will block the calling task until the next tick occurs. This can be used for synchronizing with hardware events.

#### Note

When provisioning a tunable RTOS kernel, such as RTEMS, the kernel should be configured to support at least `(OS_MAX_TASKS + OS_MAX_TIMEBASES)` threads, to account for the helper threads associated with time base objects.

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

#### Parameters

<code>out</code>	<code>timebase_id</code>	will be set to the non-zero ID of the newly-created resource (must not be null)
<code>in</code>	<code>timebase_name</code>	The name of the time base (must not be null)
<code>in</code>	<code>external_sync</code>	A synchronization function for BSP hardware-based timer ticks

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_NAME_TAKEN</i>	if the name specified is already used
<i>OS_ERR_NO_FREE_IDS</i>	if there can be no more timebase resources created
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context
<i>OS_ERR_NAME_TOO_LONG</i>	if the timebase_name is too long
<i>OS_INVALID_POINTER</i>	if a pointer argument is NULL

**10.80.2.2 OS\_TimeBaseDelete()** `int32 OS_TimeBaseDelete ( osal_id_t timebase_id )`

Deletes a time base object.

The helper task and any other resources associated with the time base abstraction will be freed.

**Note**

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

**Parameters**

in	<i>timebase_id</i>	The timebase resource to delete
----	--------------------	---------------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid timebase
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context

**10.80.2.3 OS\_TimeBaseGetFreeRun()** `int32 OS_TimeBaseGetFreeRun ( osal_id_t timebase_id, uint32 * freerun_val )`

Read the value of the timebase free run counter.

Poll the timer free-running time counter in a lightweight fashion.

The free run count is a monotonically increasing value reflecting the total time elapsed since the timebase inception. Units are the same as the timebase itself, usually microseconds.

Applications may quickly and efficiently calculate relative time differences by polling this value and subtracting the previous counter value.

The absolute value of this counter is not relevant, because it will "roll over" after  $2^{32}$  units of time. For a timebase with microsecond units, this occurs approximately every 4294 seconds, or about 1.2 hours.

#### Note

To ensure consistency of results, the application should sample the value at a minimum of two times the roll over frequency, and calculate the difference between the consecutive samples.

#### Parameters

in	<i>timebase_id</i>	The timebase to operate on
out	<i>freerun_val</i>	Buffer to store the free run counter (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid timebase
<i>OS_INVALID_POINTER</i>	if pointer argument is NULL

**10.80.2.4 OS\_TimeBaseGetIdByName()** `int32 OS_TimeBaseGetIdByName (`  
`osal_id_t * timebase_id,`  
`const char * timebase_name )`

Find the ID of an existing time base resource.

Given a time base name, find and output the ID associated with it.

#### Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

#### Parameters

out	<i>timebase_id</i>	will be set to the non-zero ID of the matching resource (must not be null)
in	<i>timebase_name</i>	The name of the timebase resource to find (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if timebase_id or timebase_name are NULL pointers
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <i>OS_MAX_API_NAME</i>

## Return values

<i>OS_ERR_NAME_NOT_FOUND</i>	if the name was not found in the table
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context

```
10.80.2.5 OS_TimeBaseGetInfo() int32 OS_TimeBaseGetInfo (
    osal_id_t timebase_id,
    OS_timebase_prop_t * timebase_prop )
```

Obtain information about a timebase resource.

Fills the buffer referred to by the timebase\_prop parameter with relevant information about the time base resource. This function will pass back a pointer to structure that contains all of the relevant info( name and creator) about the specified timebase.

## Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

## Parameters

in	<i>timebase_id</i>	The timebase resource ID
out	<i>timebase_prop</i>	Buffer to store timebase properties (must not be null)

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid timebase
<i>OS_INVALID_POINTER</i>	if the timebase_prop pointer is null
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context

```
10.80.2.6 OS_TimeBaseSet() int32 OS_TimeBaseSet (
    osal_id_t timebase_id,
    uint32 start_time,
    uint32 interval_time )
```

Sets the tick period for simulated time base objects.

This sets the actual tick period for timing ticks that are simulated by the RTOS kernel (i.e. the "external\_sync" parameter on the call to [OS\\_TimeBaseCreate\(\)](#) is NULL).

The RTOS will be configured to wake up the helper thread at the requested interval.

This function has no effect for time bases that are using a BSP-provided external\_sync function.

## Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

**Parameters**

in	<i>timebase_id</i>	The timebase resource to configure
in	<i>start_time</i>	The amount of delay for the first tick, in microseconds.
in	<i>interval_time</i>	The amount of delay between ticks, in microseconds.

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the id passed in is not a valid timebase
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context
<i>OS_TIMER_ERR_INVALID_ARGS</i>	if start_time or interval_time are out of range

## 10.81 OSAL Timer APIs

### Functions

- `int32 OS_TimerCreate (osal_id_t *timer_id, const char *timer_name, uint32 *clock_accuracy, OS_TimerCallback_t callback_ptr)`  
*Create a timer object.*
- `int32 OS_TimerAdd (osal_id_t *timer_id, const char *timer_name, osal_id_t timebase_id, OS_ArgCallback_t callback_ptr, void *callback_arg)`  
*Add a timer object based on an existing TimeBase resource.*
- `int32 OS_TimerSet (osal_id_t timer_id, uint32 start_time, uint32 interval_time)`  
*Configures a periodic or one shot timer.*
- `int32 OS_TimerDelete (osal_id_t timer_id)`  
*Deletes a timer resource.*
- `int32 OS_TimerGetIdByName (osal_id_t *timer_id, const char *timer_name)`  
*Locate an existing timer resource by name.*
- `int32 OS_TimerGetInfo (osal_id_t timer_id, OS_timer_prop_t *timer_prop)`  
*Gets information about an existing timer.*

### 10.81.1 Detailed Description

### 10.81.2 Function Documentation

**10.81.2.1 OS\_TimerAdd()** `int32 OS_TimerAdd (`  
    `osal_id_t * timer_id,`  
    `const char * timer_name,`  
    `osal_id_t timebase_id,`  
    `OS_ArgCallback_t callback_ptr,`  
    `void * callback_arg )`

Add a timer object based on an existing TimeBase resource.

A timer object is a resource that invokes the specified application-provided function upon timer expiration. Timers may be one-shot or periodic in nature.

This function uses an existing time base object to service this timer, which must exist prior to adding the timer. The precision of the timer is the same as that of the underlying time base object. Multiple timer objects can be created referring to a single time base object.

This routine also uses a different callback function prototype from `OS_TimerCreate()`, allowing a single opaque argument to be passed to the callback routine. The OSAL implementation does not use this parameter, and may be set NULL.

The callback function for this method should be declared according to the `OS_ArgCallback_t` function pointer type. The `timer_id` is passed in to the function by the OSAL, and the `arg` parameter is passed through from the `callback_arg` argument on this call.

#### Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

#### See also

[OS\\_ArgCallback\\_t](#)

**Parameters**

out	<i>timer_id</i>	Will be set to the non-zero resource ID of the timer object (must not be null)
in	<i>timer_name</i>	Name of the timer object (must not be null)
in	<i>timebase_id</i>	The time base resource to use as a reference
in	<i>callback_ptr</i>	Application-provided function to invoke (must not be null)
in	<i>callback_arg</i>	Opaque argument to pass to callback function, may be NULL

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_INVALID_POINTER</a>	if any parameters are NULL
<a href="#">OS_ERR_INVALID_ID</a>	if the timebase_id parameter is not valid
<a href="#">OS_ERR_NAME_TOO_LONG</a>	name length including null terminator greater than <a href="#">OS_MAX_API_NAME</a>
<a href="#">OS_ERR_NAME_TAKEN</a>	if the name is already in use by another timer.
<a href="#">OS_ERR_NO_FREE_IDS</a>	if all of the timers are already allocated.
<a href="#">OS_ERR_INCORRECT_OBJ_STATE</a>	if invoked from a timer context
<a href="#">OS_TIMER_ERR_INTERNAL</a>	if there was an error programming the OS timer (return value only verified in coverage test)

```
10.81.2.2 OS_TimerCreate() int32 OS_TimerCreate (
    osal_id_t * timer_id,
    const char * timer_name,
    uint32 * clock_accuracy,
    OS_TimerCallback_t callback_ptr )
```

Create a timer object.

A timer object is a resource that invokes the specified application-provided function upon timer expiration. Timers may be one-shot or periodic in nature.

This function creates a dedicated (hidden) time base object to service this timer, which is created and deleted with the timer object itself. The internal time base is configured for an OS simulated timer tick at the same interval as the timer. The callback function should be declared according to the `OS_TimerCallback_t` function pointer type. The `timer_id` value is passed to the callback function.

**Note**

`clock_accuracy` comes from the underlying OS tick value. The nearest integer microsecond value is returned, so may not be exact.

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

**See also**

[OS\\_TimerCallback\\_t](#)

**Parameters**

out	<i>timer_id</i>	Will be set to the non-zero resource ID of the timer object (must not be null)
in	<i>timer_name</i>	Name of the timer object (must not be null)
out	<i>clock_accuracy</i>	Expected precision of the timer, in microseconds. This is the underlying tick value rounded to the nearest microsecond integer. (must not be null)
in	<i>callback_ptr</i>	The function pointer of the timer callback (must not be null).

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if any parameters are NULL
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <i>OS_MAX_API_NAME</i>
<i>OS_ERR_NAME_TAKEN</i>	if the name is already in use by another timer.
<i>OS_ERR_NO_FREE_IDS</i>	if all of the timers are already allocated.
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if invoked from a timer context
<i>OS_TIMER_ERR_INTERNAL</i>	if there was an error programming the OS timer (return value only verified in coverage test)

**10.81.2.3 OS\_TimerDelete()** `int32 OS_TimerDelete ( osal_id_t timer_id )`

Deletes a timer resource.

The application callback associated with the timer will be stopped, and the resources freed for future use.

**Note**

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

**Parameters**

in	<i>timer_id</i>	The timer ID to operate on
----	-----------------	----------------------------

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_ERR_INVALID_ID</i>	if the timer_id is invalid.
<i>OS_TIMER_ERR_INTERNAL</i>	if there was a problem deleting the timer in the host OS (return value only verified in coverage test)
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context

```
10.81.2.4 OS_TimerGetIdByName() int32 OS_TimerGetIdByName (
    osal_id_t * timer_id,
    const char * timer_name )
```

Locate an existing timer resource by name.

Outputs the ID associated with the given timer, if it exists.

#### Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

#### Parameters

out	<i>timer_id</i>	Will be set to the timer ID corresponding to the name (must not be null)
in	<i>timer_name</i>	The timer name to find (must not be null)

#### Returns

Execution status, see [OSAL Return Code Defines](#)

#### Return values

<i>OS_SUCCESS</i>	Successful execution.
<i>OS_INVALID_POINTER</i>	if timer_id or timer_name are NULL pointers
<i>OS_ERR_NAME_TOO_LONG</i>	name length including null terminator greater than <a href="#">OS_MAX_API_NAME</a>
<i>OS_ERR_NAME_NOT_FOUND</i>	if the name was not found in the table
<i>OS_ERR_INCORRECT_OBJ_STATE</i>	if called from timer/timebase context

```
10.81.2.5 OS_TimerGetInfo() int32 OS_TimerGetInfo (
```

```
    osal_id_t timer_id,
    OS_timer_prop_t * timer_prop )
```

Gets information about an existing timer.

This function takes timer\_id, and looks it up in the OS table. It puts all of the information known about that timer into a structure pointer to by timer\_prop.

## Parameters

---

### Note

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

## Parameters

in	<i>timer_id</i>	The timer ID to operate on
out	<i>timer_prop</i>	<p>Buffer containing timer properties (must not be null)</p> <ul style="list-style-type: none"> <li>• creator: the OS task ID of the task that created this timer</li> <li>• name: the string name of the timer</li> <li>• start_time: the start time in microseconds, if any</li> <li>• interval_time: the interval time in microseconds, if any</li> <li>• accuracy: the accuracy of the timer in microseconds</li> </ul>

## Returns

Execution status, see [OSAL Return Code Defines](#)

## Return values

<a href="#">OS_SUCCESS</a>	Successful execution.
<a href="#">OS_ERR_INVALID_ID</a>	if the id passed in is not a valid timer
<a href="#">OS_INVALID_POINTER</a>	if the timer_prop pointer is null
<a href="#">OS_ERR_INCORRECT_OBJ_STATE</a>	if called from timer/timebase context

```
10.81.2.6 OS_TimerSet() int32 OS_TimerSet (
    osal_id_t timer_id,
    uint32 start_time,
    uint32 interval_time )
```

Configures a periodic or one shot timer.

This function programs the timer with a start time and an optional interval time. The start time is the time in microseconds when the user callback function will be called. If the interval time is non-zero, the timer will be reprogrammed with that interval in microseconds to call the user callback function periodically. If the start time and interval time are zero, the function will return an error.

For a "one-shot" timer, the start\_time configures the expiration time, and the interval\_time should be passed as zero to indicate the timer is not to be automatically reset.

### Note

The resolution of the times specified is limited to the clock accuracy returned in the OS\_TimerCreate call. If the times specified in the start\_msec or interval\_msec parameters are less than the accuracy, they will be rounded up to the accuracy of the timer.

This configuration API must not be used from the context of a timer callback. Timers should only be configured from the context of normal OSAL tasks.

**Parameters**

in	<i>timer_id</i>	The timer ID to operate on
in	<i>start_time</i>	Time in microseconds to the first expiration
in	<i>interval_time</i>	Time in microseconds between subsequent intervals, value of zero will only call the user callback function once after the start_msec time.

**Returns**

Execution status, see [OSAL Return Code Defines](#)

**Return values**

<a href="#"><i>OS_SUCCESS</i></a>	Successful execution.
<a href="#"><i>OS_ERR_INVALID_ID</i></a>	if the timer_id is not valid.
<a href="#"><i>OS_TIMER_ERR_INTERNAL</i></a>	if there was an error programming the OS timer (return value only verified in coverage test)
<a href="#"><i>OS_ERR_INCORRECT_OBJ_STATE</i></a>	if called from timer/timebase context
<a href="#"><i>OS_TIMER_ERR_INVALID_ARGS</i></a>	if the start_time or interval_time is out of range, or both 0

## 11 Data Structure Documentation

### 11.1 CCSDS\_ExtendedHeader Struct Reference

CCSDS packet extended header.

```
#include <ccsds_hdr.h>
```

#### Data Fields

- **uint8 Subsystem [2]**  
*subsystem qualifier*
- **uint8 SystemId [2]**  
*system qualifier*

#### 11.1.1 Detailed Description

CCSDS packet extended header.

Definition at line 73 of file ccsds\_hdr.h.

#### 11.1.2 Field Documentation

##### 11.1.2.1 Subsystem `uint8 CCSDS_ExtendedHeader::Subsystem[2]`

subsystem qualifier

Definition at line 75 of file ccsds\_hdr.h.

##### 11.1.2.2 SystemId `uint8 CCSDS_ExtendedHeader::SystemId[2]`

system qualifier

Definition at line 82 of file ccsds\_hdr.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/msg/fsw/inc/ccsds_hdr.h`

### 11.2 CCSDS\_PrimaryHeader Struct Reference

CCSDS packet primary header.

```
#include <ccsds_hdr.h>
```

#### Data Fields

- **uint8 StreamId [2]**  
*packet identifier word (stream ID)*
- **uint8 Sequence [2]**  
*packet sequence word*
- **uint8 Length [2]**  
*packet length word*

#### 11.2.1 Detailed Description

CCSDS packet primary header.

Definition at line 51 of file ccsds\_hdr.h.

### 11.2.2 Field Documentation

#### 11.2.2.1 Length `uint8 CCSDS_PrimaryHeader::Length[2]`

packet length word

Definition at line 71 of file `ccsds_hdr.h`.

#### 11.2.2.2 Sequence `uint8 CCSDS_PrimaryHeader::Sequence[2]`

packet sequence word

Definition at line 66 of file `ccsds_hdr.h`.

#### 11.2.2.3 StreamId `uint8 CCSDS_PrimaryHeader::StreamId[2]`

packet identifier word (stream ID)

Definition at line 59 of file `ccsds_hdr.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/msg/fsw/inc/ccsds_hdr.h`

## 11.3 CFE\_ES\_AppInfo Struct Reference

Application Information.

```
#include <default_cfe_es_extern_typedefs.h>
```

### Data Fields

- `CFE_ResourceId_t Resourceld`  
*Application or Library ID for this resource.*
- `uint32 Type`  
*The type of App: CORE or EXTERNAL.*
- `char Name [CFE_MISSION_MAX_API_LEN]`  
*The Registered Name of the Application.*
- `char EntryPoint [CFE_MISSION_MAX_API_LEN]`  
*The Entry Point label for the Application.*
- `char FileName [CFE_MISSION_MAX_PATH_LEN]`  
*The Filename of the file containing the Application.*
- `CFE_ES_MemOffset_t StackSize`  
*The Stack Size of the Application.*
- `uint32 AddressesAreValid`  
*Indicates that the Code, Data, and BSS addresses/sizes are valid.*
- `CFE_ES_MemAddress_t CodeAddress`  
*The Address of the Application Code Segment.*
- `CFE_ES_MemOffset_t CodeSize`  
*The Code Size of the Application.*
- `CFE_ES_MemAddress_t DataAddress`  
*The Address of the Application Data Segment.*
- `CFE_ES_MemOffset_t DataSize`  
*The Data Size of the Application.*
- `CFE_ES_MemAddress_t BSSAddress`

- **CFE\_ES\_MemOffset\_t BSSSize**  
*The BSS Size of the Application.*
- **CFE\_ES\_MemAddress\_t StartAddress**  
*The Start Address of the Application.*
- **CFE\_ES\_ExceptionAction\_Enum\_t ExceptionAction**  
*What should occur if Application has an exception (Restart Application OR Restart Processor)*
- **CFE\_ES\_TaskPriority\_Atom\_t Priority**  
*The Priority of the Application.*
- **CFE\_ES\_TaskId\_t MainTaskId**  
*The Application's Main Task ID.*
- **uint32 ExecutionCounter**  
*The Application's Main Task Execution Counter.*
- **char MainTaskName [CFE\_MISSION\_MAX\_API\_LEN]**  
*The Application's Main Task ID.*
- **uint32 NumOfChildTasks**  
*Number of Child tasks for an App.*

### 11.3.1 Detailed Description

Application Information.

Structure that is used to provide information about an app. It is primarily used for the QueryOne and QueryAll Commands.

While this structure is primarily intended for Application info, it can also represent Library information where only a subset of the information applies.

Definition at line 441 of file default\_cfe\_es\_extern\_typedefs.h.

### 11.3.2 Field Documentation

#### 11.3.2.1 AddressesAreValid `uint32 CFE_ES_AppInfo::AddressesAreValid`

Indicates that the Code, Data, and BSS addresses/sizes are valid.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_AddrsValid

Definition at line 457 of file default\_cfe\_es\_extern\_typedefs.h.

#### 11.3.2.2 BSSAddress `CFE_ES_MemAddress_t CFE_ES_AppInfo::BSSAddress`

The Address of the Application BSS Segment.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_BSSAddress

Definition at line 467 of file default\_cfe\_es\_extern\_typedefs.h.

#### 11.3.2.3 BSSSize `CFE_ES_MemOffset_t CFE_ES_AppInfo::BSSSize`

The BSS Size of the Application.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_BSSSize

Definition at line 469 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.4 CodeAddress** `CFE_ES_MemAddress_t` `CFE_ES_AppInfo::CodeAddress`  
The Address of the Application Code Segment.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_CodeAddress`

Definition at line 459 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.5 CodeSize** `CFE_ES_MemOffset_t` `CFE_ES_AppInfo::CodeSize`  
The Code Size of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_CodeSize`

Definition at line 461 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.6 DataAddress** `CFE_ES_MemAddress_t` `CFE_ES_AppInfo::DataAddress`  
The Address of the Application Data Segment.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_DataAddress`

Definition at line 463 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.7 DataSize** `CFE_ES_MemOffset_t` `CFE_ES_AppInfo::DataSize`  
The Data Size of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_DataSize`

Definition at line 465 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.8 EntryPoint** `char` `CFE_ES_AppInfo::EntryPoint[CFE_MISSION_MAX_API_LEN]`  
The Entry Point label for the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_AppEntryPt[OS_MAX_API_NAME]`

Definition at line 450 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.9 ExceptionAction** `CFE_ES_ExceptionAction_Enum_t` `CFE_ES_AppInfo::ExceptionAction`  
What should occur if Application has an exception (Restart Application OR Restart Processor)

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ExceptnActn`

Definition at line 473 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.10 ExecutionCounter** `uint32` `CFE_ES_AppInfo::ExecutionCounter`  
The Application's Main Task Execution Counter.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ExecutionCtr`

Definition at line 480 of file `default_cfe_es_extern_typedefs.h`.

**11.3.2.11 FileName** `char CFE_ES_AppInfo::FileName[CFE_MISSION_MAX_PATH_LEN]`  
The Filename of the file containing the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_AppFilename[OS_MAX_PATH_LEN]`

Definition at line 452 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.12 MainTaskId** `CFE_ES_TaskId_t CFE_ES_AppInfo::MainTaskId`  
The Application's Main Task ID.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_MainTaskId`

Definition at line 478 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.13 MainTaskName** `char CFE_ES_AppInfo::MainTaskName[CFE_MISSION_MAX_API_LEN]`  
The Application's Main Task ID.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_MainTaskName[OS_MAX_API_NAME]`

Definition at line 482 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.14 Name** `char CFE_ES_AppInfo::Name[CFE_MISSION_MAX_API_LEN]`  
The Registered Name of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_AppName[OS_MAX_API_NAME]`

Definition at line 448 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.15 NumOfChildTasks** `uint32 CFE_ES_AppInfo::NumOfChildTasks`  
Number of Child tasks for an App.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ChildTasks`

Definition at line 484 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.16 Priority** `CFE_ES_TaskPriority_Atom_t CFE_ES_AppInfo::Priority`  
The Priority of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_Priority`

Definition at line 476 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.17 ResourceId** `CFE_ResourceId_t CFE_ES_AppInfo::ResourceId`  
Application or Library ID for this resource.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_AppID`

Definition at line 443 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.18 StackSize** `CFE_ES_MemOffset_t CFE_ES_AppInfo::StackSize`

The Stack Size of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_StackSize`

Definition at line 455 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.19 StartAddress** `CFE_ES_MemAddress_t CFE_ES_AppInfo::StartAddress`

The Start Address of the Application.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_StartAddr`

Definition at line 471 of file default\_cfe\_es\_extern\_typedefs.h.

**11.3.2.20 Type** `uint32 CFE_ES_AppInfo::Type`

The type of App: CORE or EXTERNAL.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_AppType`

Definition at line 445 of file default\_cfe\_es\_extern\_typedefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h

## 11.4 CFE\_ES\_AppNameCmd\_Payload Struct Reference

Generic application name command payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- char `Application [CFE_MISSION_MAX_API_LEN]`  
*ASCII text string containing Application or Library Name.*

#### 11.4.1 Detailed Description

Generic application name command payload.

For command details, see `CFE_ES_STOP_APP_CC`, `CFE_ES_RESTART_APP_CC`, `CFE_ES_QUERY_ONE_CC`

Definition at line 104 of file default\_cfe\_es\_msgdefs.h.

#### 11.4.2 Field Documentation

##### 11.4.2.1 Application

`char CFE_ES_AppNameCmd_Payload::Application[CFE_MISSION_MAX_API_LEN]`

ASCII text string containing Application or Library Name.

Definition at line 106 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.5 CFE\_ES\_AppReloadCmd\_Payload Struct Reference

Reload Application Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

## Data Fields

- char [Application \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*ASCII text string containing Application Name.*
- char [AppFileName \[CFE\\_MISSION\\_MAX\\_PATH\\_LEN\]](#)  
*Full path and filename of Application's executable image.*

### 11.5.1 Detailed Description

Reload Application Command Payload.

For command details, see [CFE\\_ES\\_RELOAD\\_APP\\_CC](#)

Definition at line 115 of file default\_cfe\_es\_msgdefs.h.

### 11.5.2 Field Documentation

#### 11.5.2.1 AppFileName char CFE\_ES\_AppReloadCmd\_Payload::AppFileName [CFE\_MISSION\_MAX\_PATH\_LEN]

Full path and filename of Application's executable image.

Definition at line 118 of file default\_cfe\_es\_msgdefs.h.

#### 11.5.2.2 Application char CFE\_ES\_AppReloadCmd\_Payload::Application [CFE\_MISSION\_MAX\_API\_LEN]

ASCII text string containing Application Name.

Definition at line 117 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.6 CFE\_ES\_BlockStats Struct Reference

Block statistics.

```
#include <default_cfe_es_extern_typedefs.h>
```

## Data Fields

- [CFE\\_ES\\_MemOffset\\_t BlockSize](#)  
*Number of bytes in each of these blocks.*
- [uint32 NumCreated](#)  
*Number of Memory Blocks of this size created.*
- [uint32 NumFree](#)  
*Number of Memory Blocks of this size that are free.*

### 11.6.1 Detailed Description

Block statistics.

Sub-Structure that is used to provide information about a specific block size/bucket within a memory pool.

Definition at line 538 of file default\_cfe\_es\_extern\_typedefs.h.

### 11.6.2 Field Documentation

**11.6.2.1 BlockSize** `CFE_ES_MemOffset_t CFE_ES_BlockStats::BlockSize`

Number of bytes in each of these blocks.

Definition at line 540 of file `default_cfe_es_extern_typedefs.h`.

**11.6.2.2 NumCreated** `uint32 CFE_ES_BlockStats::NumCreated`

Number of Memory Blocks of this size created.

Definition at line 541 of file `default_cfe_es_extern_typedefs.h`.

**11.6.2.3 NumFree** `uint32 CFE_ES_BlockStats::NumFree`

Number of Memory Blocks of this size that are free.

Definition at line 542 of file `default_cfe_es_extern_typedefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_extern_typedefs.h`

## 11.7 CFE\_ES\_CDSRegDumpRec Struct Reference

CDS Register Dump Record.

```
#include <default_cfe_es_extern_typedefs.h>
```

### Data Fields

- **CFE\_ES\_CDSHandle\_t Handle**  
*Handle of CDS.*
- **CFE\_ES\_MemOffset\_t Size**  
*Size, in bytes, of the CDS memory block.*
- **bool Table**  
*Flag that indicates whether CDS contains a Critical Table.*
- **char Name [CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN]**  
*Processor Unique Name of CDS.*
- **uint8 ByteAlignSpare [3]**  
*Spare bytes to ensure structure size is multiple of 4 bytes.*

### 11.7.1 Detailed Description

CDS Register Dump Record.

Structure that is used to provide information about a critical data store. It is primarily used for the Dump CDS registry ([CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#)) command.

#### Note

There is not currently a telemetry message directly containing this data structure, but it does define the format of the data file generated by the Dump CDS registry command. Therefore it should be considered part of the overall telemetry interface.

Definition at line 523 of file `default_cfe_es_extern_typedefs.h`.

### 11.7.2 Field Documentation

**11.7.2.1 ByteAlignSpare** `uint8 CFE_ES_CDSRegDumpRec::ByteAlignSpare[3]`  
Spare bytes to ensure structure size is multiple of 4 bytes.  
Definition at line 529 of file default\_cfe\_es\_extern\_typedefs.h.

**11.7.2.2 Handle** `CFE_ES_CDSHandle_t CFE_ES_CDSRegDumpRec::Handle`  
Handle of CDS.  
Definition at line 525 of file default\_cfe\_es\_extern\_typedefs.h.

**11.7.2.3 Name** `char CFE_ES_CDSRegDumpRec::Name[CFE_MISSION_ES_CDS_MAX_FULL_NAME_LEN]`  
Processor Unique Name of CDS.  
Definition at line 528 of file default\_cfe\_es\_extern\_typedefs.h.

**11.7.2.4 Size** `CFE_ES_MemOffset_t CFE_ES_CDSRegDumpRec::Size`  
Size, in bytes, of the CDS memory block.  
Definition at line 526 of file default\_cfe\_es\_extern\_typedefs.h.

**11.7.2.5 Table** `bool CFE_ES_CDSRegDumpRec::Table`  
Flag that indicates whether CDS contains a Critical Table.  
Definition at line 527 of file default\_cfe\_es\_extern\_typedefs.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h

## 11.8 CFE\_ES\_ClearERLogCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t CommandHeader**  
*Command header.*

### 11.8.1 Detailed Description

Definition at line 68 of file default\_cfe\_es\_msgstruct.h.

### 11.8.2 Field Documentation

**11.8.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_ES_ClearERLogCmd::CommandHeader`  
Command header.  
Definition at line 70 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.9 CFE\_ES\_ClearSysLogCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

*Command header.*

### 11.9.1 Detailed Description

Definition at line 63 of file default\_cfe\_es\_msgstruct.h.

### 11.9.2 Field Documentation

**11.9.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_ClearSysLogCmd::CommandHeader  
Command header.

Definition at line 65 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/[default\\_cfe\\_es\\_msgstruct.h](#)

## 11.10 CFE\_ES\_DeleteCDSCmd Struct Reference

Delete Critical Data Store Command.

```
#include <default_cfe_es_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

*Command header.*

- [CFE\\_ES\\_DeleteCDSCmd\\_Payload\\_t](#) Payload

*Command payload.*

### 11.10.1 Detailed Description

Delete Critical Data Store Command.

Definition at line 192 of file default\_cfe\_es\_msgstruct.h.

### 11.10.2 Field Documentation

**11.10.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_DeleteCDSCmd::CommandHeader  
Command header.

Definition at line 194 of file default\_cfe\_es\_msgstruct.h.

**11.10.2.2 Payload** [CFE\\_ES\\_DeleteCDSCmd\\_Payload\\_t](#) CFE\_ES\_DeleteCDSCmd::Payload  
Command payload.

Definition at line 195 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/[default\\_cfe\\_es\\_msgstruct.h](#)

## 11.11 CFE\_ES\_DeleteCDSCmd\_Payload Struct Reference

Delete Critical Data Store Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- char [CdsName](#) [[CFE\\_MISSION\\_ES\\_CDS\\_MAX\\_FULL\\_NAME\\_LEN](#)]  
*ASCII text string containing name of CDS to delete.*

#### 11.11.1 Detailed Description

Delete Critical Data Store Command Payload.

For command details, see [CFE\\_ES\\_DELETE\\_CDS\\_CC](#)

Definition at line 140 of file default\_cfe\_es\_msgdefs.h.

#### 11.11.2 Field Documentation

**11.11.2.1 CdsName** char CFE\_ES\_DeleteCDSCmd\_Payload::CdsName [[CFE\\_MISSION\\_ES\\_CDS\\_MAX\\_FULL\\_NAME\\_LEN](#)]  
ASCII text string containing name of CDS to delete.

Definition at line 143 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.12 CFE\_ES\_DumpCDSRegistryCmd Struct Reference

Dump CDS Registry Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) [CommandHeader](#)  
*Command header.*
- [CFE\\_ES\\_DumpCDSRegistryCmd\\_Payload\\_t](#) [Payload](#)  
*Command payload.*

#### 11.12.1 Detailed Description

Dump CDS Registry Command.

Definition at line 246 of file default\_cfe\_es\_msgstruct.h.

#### 11.12.2 Field Documentation

**11.12.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_DumpCDSRegistryCmd::CommandHeader  
Command header.

Definition at line 248 of file default\_cfe\_es\_msgstruct.h.

**11.12.2.2 Payload** `CFE_ES_DumpCDSRegistryCmd_Payload_t` `CFE_ES_DumpCDSRegistryCmd::Payload`  
Command payload.

Definition at line 249 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgstruct.h`

## 11.13 CFE\_ES\_DumpCDSRegistryCmd\_Payload Struct Reference

Dump CDS Registry Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `char DumpFilename [CFE_MISSION_MAX_PATH_LEN]`

*ASCII text string of full path and filename of file CDS Registry is to be written.*

### 11.13.1 Detailed Description

Dump CDS Registry Command Payload.

For command details, see [CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#)

Definition at line 225 of file default\_cfe\_es\_msgdefs.h.

### 11.13.2 Field Documentation

#### 11.13.2.1 DumpFilename `char CFE_ES_DumpCDSRegistryCmd_Payload::DumpFilename [CFE_MISSION_MAX_PATH_LEN]`

ASCII text string of full path and filename of file CDS Registry is to be written.

Definition at line 227 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.14 CFE\_ES\_FileNameCmd Struct Reference

Generic file name command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`

*Command header.*

- `CFE_ES_FileNameCmd_Payload_t Payload`

*Command payload.*

### 11.14.1 Detailed Description

Generic file name command.

Definition at line 96 of file default\_cfe\_es\_msgstruct.h.

### 11.14.2 Field Documentation

**11.14.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_FileNameCmd::CommandHeader  
Command header.  
Definition at line 98 of file default\_cfe\_es\_msgstruct.h.

**11.14.2.2 Payload** [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) CFE\_ES\_FileNameCmd::Payload  
Command payload.  
Definition at line 99 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.15 CFE\_ES\_FileNameCmd\_Payload Struct Reference

Generic file name command payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- char **FileName** [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
*ASCII text string containing full path and filename of file in which Application data is to be dumped.*

### 11.15.1 Detailed Description

Generic file name command payload.

This format is shared by several executive services commands. For command details, see [CFE\\_ES\\_QUERY\\_ALL\\_CC](#), [CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#), [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#), and [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#)

Definition at line 58 of file default\_cfe\_es\_msgdefs.h.

### 11.15.2 Field Documentation

**11.15.2.1 FileName** char CFE\_ES\_FileNameCmd\_Payload::FileName [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
ASCII text string containing full path and filename of file in which Application data is to be dumped.  
Definition at line 60 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.16 CFE\_ES\_HousekeepingTlm Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_TelemetryHeader\\_t](#) TelemetryHeader  
*Telemetry header.*
- [CFE\\_ES\\_HousekeepingTlm\\_Payload\\_t](#) Payload  
*Telemetry payload.*

### 11.16.1 Detailed Description

**Name** Executive Services Housekeeping Packet

Definition at line 279 of file default\_cfe\_es\_msgstruct.h.

## 11.16.2 Field Documentation

**11.16.2.1 Payload** `CFE_ES_HousekeepingTlm_Payload_t` `CFE_ES_HousekeepingTlm::Payload`  
Telemetry payload.

Definition at line 282 of file `default_cfe_es_msgstruct.h`.

**11.16.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_ES_HousekeepingTlm::TelemetryHeader`  
Telemetry header.

Definition at line 281 of file `default_cfe_es_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgstruct.h`

## 11.17 CFE\_ES\_HousekeepingTlm\_Payload Struct Reference

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `uint8 CommandCounter`  
*The ES Application Command Counter.*
- `uint8 CommandErrorCounter`  
*The ES Application Command Error Counter.*
- `uint16 CFECOREChecksum`  
*Checksum of cFE Core Code.*
- `uint8 CFEMajorVersion`  
*Major Version Number of cFE.*
- `uint8 CFEMinorVersion`  
*Minor Version Number of cFE.*
- `uint8 CFERevision`  
*Sub-Minor Version Number of cFE.*
- `uint8 CFEMissionRevision`  
*Mission Version Number of cFE.*
- `uint8 OSALMajorVersion`  
*OS Abstraction Layer Major Version Number.*
- `uint8 OSALMinorVersion`  
*OS Abstraction Layer Minor Version Number.*
- `uint8 OSALRevision`  
*OS Abstraction Layer Revision Number.*
- `uint8 OSALMissionRevision`  
*OS Abstraction Layer MissionRevision Number.*
- `uint8 PSPMajorVersion`  
*Platform Support Package Major Version Number.*
- `uint8 PSPMinorVersion`  
*Platform Support Package Minor Version Number.*
- `uint8 PSPRevision`  
*Platform Support Package Revision Number.*

- **uint8 PSPMissionRevision**  
*Platform Support Package MissionRevision Number.*
- **CFE\_ES\_MemOffset\_t SysLogBytesUsed**  
*Total number of bytes used in system log.*
- **CFE\_ES\_MemOffset\_t SysLogSize**  
*Total size of the system log.*
- **uint32 SysLogEntries**  
*Number of entries in the system log.*
- **uint32 SysLogMode**  
*Write/Overwrite Mode.*
- **uint32 ERLogIndex**  
*Current index of the ER Log (wraps around)*
- **uint32 ERLogEntries**  
*Number of entries made in the ER Log since the power on.*
- **uint32 RegisteredCoreApps**  
*Number of Applications registered with ES.*
- **uint32 RegisteredExternalApps**  
*Number of Applications registered with ES.*
- **uint32 RegisteredTasks**  
*Number of Tasks ( main AND child tasks ) registered with ES.*
- **uint32 RegisteredLibs**  
*Number of Libraries registered with ES.*
- **uint32 ResetType**  
*Reset type ( PROCESSOR or POWERON )*
- **uint32 ResetSubtype**  
*Reset Sub Type.*
- **uint32 ProcessorResets**  
*Number of processor resets since last power on.*
- **uint32 MaxProcessorResets**  
*Max processor resets before a power on is done.*
- **uint32 BootSource**  
*Boot source ( as provided from BSP )*
- **uint32 PerfState**  
*Current state of Performance Analyzer.*
- **uint32 PerfMode**  
*Current mode of Performance Analyzer.*
- **uint32 PerfTriggerCount**  
*Number of Times Performance Analyzer has Triggered.*
- **uint32 PerfFilterMask [CFE\_MISSION\_ES\_PERF\_MAX\_IDS/32]**  
*Current Setting of Performance Analyzer Filter Masks.*
- **uint32 PerfTriggerMask [CFE\_MISSION\_ES\_PERF\_MAX\_IDS/32]**  
*Current Setting of Performance Analyzer Trigger Masks.*
- **uint32 PerfDataStart**  
*Identifies First Stored Entry in Performance Analyzer Log.*
- **uint32 PerfDataEnd**  
*Identifies Last Stored Entry in Performance Analyzer Log.*
- **uint32 PerfDataCount**

*Number of Entries Put Into the Performance Analyzer Log.*

- `uint32 PerfDataToWrite`

*Number of Performance Analyzer Log Entries Left to be Written to Log Dump File.*

- `CFE_ES_MemOffset_t HeapBytesFree`

*Number of free bytes remaining in the OS heap.*

- `CFE_ES_MemOffset_t HeapBlocksFree`

*Number of free blocks remaining in the OS heap.*

- `CFE_ES_MemOffset_t HeapMaxBlockSize`

*Number of bytes in the largest free block.*

### 11.17.1 Detailed Description

**Name** Executive Services Housekeeping Packet

Definition at line 263 of file default\_cfe\_es\_msgdefs.h.

### 11.17.2 Field Documentation

**11.17.2.1 BootSource** `uint32 CFE_ES_HousekeepingTlm_Payload::BootSource`  
Boot source ( as provided from BSP )

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_BootSource

Definition at line 329 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.2 CFECOREChecksum** `uint16 CFE_ES_HousekeepingTlm_Payload::CFECOREChecksum`  
Checksum of cFE Core Code.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CKSUM

Definition at line 270 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.3 CFEMajorVersion** `uint8 CFE_ES_HousekeepingTlm_Payload::CFEMajorVersion`  
Major Version Number of cFE.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CFEMAJORVER

Definition at line 272 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.4 CFEMinorVersion** `uint8 CFE_ES_HousekeepingTlm_Payload::CFEMinorVersion`  
Minor Version Number of cFE.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CFEMINORVER

Definition at line 274 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.5 CFEMissionRevision** `uint8 CFE_ES_HousekeepingTlm_Payload::CFEMissionRevision`  
Mission Version Number of cFE.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CFEMISSIONREV

Definition at line 278 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.6 CFERevision** `uint8 CFE_ES_HousekeepingTlm_Payload::CFERevision`  
Sub-Minor Version Number of cFE.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CFEREVISION

Definition at line 276 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.7 CommandCounter** `uint8 CFE_ES_HousekeepingTlm_Payload::CommandCounter`  
The ES Application Command Counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CMDPC

Definition at line 265 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.8 CommandErrorCounter** `uint8 CFE_ES_HousekeepingTlm_Payload::CommandErrorCounter`  
The ES Application Command Error Counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_CMDEC

Definition at line 267 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.9 ERLogEntries** `uint32 CFE_ES_HousekeepingTlm_Payload::ERLogEntries`  
Number of entries made in the ER Log since the power on.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_ERLOGENTRIES

Definition at line 309 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.10 ERLogIndex** `uint32 CFE_ES_HousekeepingTlm_Payload::ERLogIndex`  
Current index of the ER Log (wraps around)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_ERLOGINDEX

Definition at line 307 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.11 HeapBlocksFree** `CFE_ES_MemOffset_t CFE_ES_HousekeepingTlm_Payload::HeapBlocksFree`  
Number of free blocks remaining in the OS heap.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_HeapBlocksFree

Definition at line 354 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.12 HeapBytesFree** `CFE_ES_MemOffset_t` `CFE_ES_HousekeepingTlm_Payload::HeapBytesFree`  
Number of free bytes remaining in the OS heap.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_HeapBytesFree`

Definition at line 352 of file `default_cfe_es_msgdefs.h`.

**11.17.2.13 HeapMaxBlockSize** `CFE_ES_MemOffset_t` `CFE_ES_HousekeepingTlm_Payload::HeapMaxBlockSize`  
Number of bytes in the largest free block.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_HeapMaxBlkSize`

Definition at line 356 of file `default_cfe_es_msgdefs.h`.

**11.17.2.14 MaxProcessorResets** `uint32` `CFE_ES_HousekeepingTlm_Payload::MaxProcessorResets`  
Max processor resets before a power on is done.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_MaxProcResets`

Definition at line 327 of file `default_cfe_es_msgdefs.h`.

**11.17.2.15 OSALMajorVersion** `uint8` `CFE_ES_HousekeepingTlm_Payload::OSALMajorVersion`  
OS Abstraction Layer Major Version Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_OSMAJORVER`

Definition at line 280 of file `default_cfe_es_msgdefs.h`.

**11.17.2.16 OSALMinorVersion** `uint8` `CFE_ES_HousekeepingTlm_Payload::OSALMinorVersion`  
OS Abstraction Layer Minor Version Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_OSMINORVER`

Definition at line 282 of file `default_cfe_es_msgdefs.h`.

**11.17.2.17 OSALMissionRevision** `uint8` `CFE_ES_HousekeepingTlm_Payload::OSALMissionRevision`  
OS Abstraction Layer MissionRevision Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_OSMISSIONREV`

Definition at line 286 of file `default_cfe_es_msgdefs.h`.

**11.17.2.18 OSALRevision** `uint8` `CFE_ES_HousekeepingTlm_Payload::OSALRevision`  
OS Abstraction Layer Revision Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_OSREVISION`

Definition at line 284 of file `default_cfe_es_msgdefs.h`.

**11.17.2.19 PerfDataCount** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfDataCount`  
Number of Entries Put Into the Performance Analyzer Log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfDataCnt`

Definition at line 347 of file `default_cfe_es_msgdefs.h`.

**11.17.2.20 PerfDataEnd** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfDataEnd`  
Identifies Last Stored Entry in Performance Analyzer Log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfDataEnd`

Definition at line 345 of file `default_cfe_es_msgdefs.h`.

**11.17.2.21 PerfDataStart** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfDataStart`  
Identifies First Stored Entry in Performance Analyzer Log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfDataStart`

Definition at line 343 of file `default_cfe_es_msgdefs.h`.

**11.17.2.22 PerfDataToWrite** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfDataToWrite`  
Number of Performance Analyzer Log Entries Left to be Written to Log Dump File.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfData2Write`

Definition at line 350 of file `default_cfe_es_msgdefs.h`.

**11.17.2.23 PerfFilterMask** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfFilterMask` [`CFE_MISSION_ES_PERF_MAX_IDS/32`]  
Current Setting of Performance Analyzer Filter Masks.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfFltrMask[MaskCnt]`

Definition at line 338 of file `default_cfe_es_msgdefs.h`.

**11.17.2.24 PerfMode** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfMode`  
Current mode of Performance Analyzer.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfMode`

Definition at line 334 of file `default_cfe_es_msgdefs.h`.

**11.17.2.25 PerfState** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfState`  
Current state of Performance Analyzer.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfState`

Definition at line 332 of file `default_cfe_es_msgdefs.h`.

**11.17.2.26 PerfTriggerCount** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfTriggerCount`  
Number of Times Performance Analyzer has Triggered.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfTrigCnt`

Definition at line 336 of file `default_cfe_es_msgdefs.h`.

**11.17.2.27 PerfTriggerMask** `uint32` `CFE_ES_HousekeepingTlm_Payload::PerfTriggerMask[CFE_MISSION_ES_PERF_MAX_IDS/32]`  
Current Setting of Performance Analyzer Trigger Masks.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PerfTrigMask[MaskCnt]`

Definition at line 341 of file `default_cfe_es_msgdefs.h`.

**11.17.2.28 ProcessorResets** `uint32` `CFE_ES_HousekeepingTlm_Payload::ProcessorResets`  
Number of processor resets since last power on.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ProcResetCnt`

Definition at line 325 of file `default_cfe_es_msgdefs.h`.

**11.17.2.29 PSPMajorVersion** `uint8` `CFE_ES_HousekeepingTlm_Payload::PSPMajorVersion`  
Platform Support Package Major Version Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PSPMAJORVER`

Definition at line 289 of file `default_cfe_es_msgdefs.h`.

**11.17.2.30 PSPMinorVersion** `uint8` `CFE_ES_HousekeepingTlm_Payload::PSPMinorVersion`  
Platform Support Package Minor Version Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PSPMINORVER`

Definition at line 291 of file `default_cfe_es_msgdefs.h`.

**11.17.2.31 PSPMissionRevision** `uint8` `CFE_ES_HousekeepingTlm_Payload::PSPMissionRevision`  
Platform Support Package MissionRevision Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PSPMISSIONREV`

Definition at line 295 of file `default_cfe_es_msgdefs.h`.

**11.17.2.32 PSPRevision** `uint8` `CFE_ES_HousekeepingTlm_Payload::PSPRevision`  
Platform Support Package Revision Number.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PSPREVISION`

Definition at line 293 of file `default_cfe_es_msgdefs.h`.

**11.17.2.33 RegisteredCoreApps** `uint32` `CFE_ES_HousekeepingTlm_Payload::RegisteredCoreApps`  
Number of Applications registered with ES.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_RegCoreApps`

Definition at line 312 of file `default_cfe_es_msgdefs.h`.

**11.17.2.34 RegisteredExternalApps** `uint32` `CFE_ES_HousekeepingTlm_Payload::RegisteredExternalApps`  
Number of Applications registered with ES.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_RegExtApps`

Definition at line 314 of file `default_cfe_es_msgdefs.h`.

**11.17.2.35 RegisteredLibs** `uint32` `CFE_ES_HousekeepingTlm_Payload::RegisteredLibs`  
Number of Libraries registered with ES.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_RegLibs`

Definition at line 318 of file `default_cfe_es_msgdefs.h`.

**11.17.2.36 RegisteredTasks** `uint32` `CFE_ES_HousekeepingTlm_Payload::RegisteredTasks`  
Number of Tasks ( main AND child tasks ) registered with ES.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_RegTasks`

Definition at line 316 of file `default_cfe_es_msgdefs.h`.

**11.17.2.37 ResetSubtype** `uint32` `CFE_ES_HousekeepingTlm_Payload::ResetSubtype`  
Reset Sub Type.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ResetSubtype`

Definition at line 323 of file `default_cfe_es_msgdefs.h`.

**11.17.2.38 ResetType** `uint32` `CFE_ES_HousekeepingTlm_Payload::ResetType`  
Reset type ( PROCESSOR or POWERON )

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_ResetType`

Definition at line 321 of file `default_cfe_es_msgdefs.h`.

**11.17.2.39 SysLogBytesUsed** `CFE_ES_MemOffset_t` `CFE_ES_HousekeepingTlm_Payload::SysLogBytesUsed`  
Total number of bytes used in system log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_SYSLOGBYTEUSED`

Definition at line 298 of file `default_cfe_es_msgdefs.h`.

**11.17.2.40 SysLogEntries** `uint32 CFE_ES_HousekeepingTlm_Payload::SysLogEntries`  
Number of entries in the system log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_SYSLOGENTRIES`

Definition at line 302 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.41 SysLogMode** `uint32 CFE_ES_HousekeepingTlm_Payload::SysLogMode`  
Write/Overwrite Mode.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_SYSLOGMODE`

Definition at line 304 of file default\_cfe\_es\_msgdefs.h.

**11.17.2.42 SysLogSize** `CFE_ES_MemOffset_t CFE_ES_HousekeepingTlm_Payload::SysLogSize`  
Total size of the system log.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_SYSLOGSIZE`

Definition at line 300 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.18 CFE\_ES\_MemPoolStats Struct Reference

Memory Pool Statistics.

```
#include <default_cfe_es_extern_typedefs.h>
```

### Data Fields

- **CFE\_ES\_MemOffset\_t PoolSize**  
*Size of Memory Pool (in bytes)*
- **uint32 NumBlocksRequested**  
*Number of times a memory block has been allocated.*
- **uint32 CheckErrCtr**  
*Number of errors detected when freeing a memory block.*
- **CFE\_ES\_MemOffset\_t NumFreeBytes**  
*Number of bytes never allocated to a block.*
- **CFE\_ES\_BlockStats\_t BlockStats [CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS]**  
*Contains stats on each block size.*

### 11.18.1 Detailed Description

Memory Pool Statistics.

Structure that is used to provide information about a memory pool. Used by the Memory Pool Stats telemetry message.

See also

`CFE_ES_SEND_MEM_POOL_STATS_CC`

Definition at line 553 of file default\_cfe\_es\_extern\_typedefs.h.

### 11.18.2 Field Documentation

**11.18.2.1 BlockStats** `CFE_ES_BlockStats_t` `CFE_ES_MemPoolStats::BlockStats[CFE_MISSION_ES_POOL_MAX_BUCKETS]`  
Contains stats on each block size.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_BlkStats[BLK_SIZES]`

Definition at line 563 of file default\_cfe\_es\_extern\_typedefs.h.

**11.18.2.2 CheckErrCtr** `uint32` `CFE_ES_MemPoolStats::CheckErrCtr`  
Number of errors detected when freeing a memory block.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_BlkErrCTR`

Definition at line 559 of file default\_cfe\_es\_extern\_typedefs.h.

**11.18.2.3 NumBlocksRequested** `uint32` `CFE_ES_MemPoolStats::NumBlocksRequested`  
Number of times a memory block has been allocated.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_BlkREQ`

Definition at line 557 of file default\_cfe\_es\_extern\_typedefs.h.

**11.18.2.4 NumFreeBytes** `CFE_ES_MemOffset_t` `CFE_ES_MemPoolStats::NumFreeBytes`  
Number of bytes never allocated to a block.

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_FreeBytes`

Definition at line 561 of file default\_cfe\_es\_extern\_typedefs.h.

**11.18.2.5 PoolSize** `CFE_ES_MemOffset_t` `CFE_ES_MemPoolStats::PoolSize`  
Size of Memory Pool (in bytes)

**Telemetry Mnemonic(s)** `$sc_$cpu_ES_PoolSize`

Definition at line 555 of file default\_cfe\_es\_extern\_typedefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h

## 11.19 CFE\_ES\_MemStatsTlm Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_ES_PoolStatsTlm_Payload_t Payload`  
*Telemetry payload.*

### 11.19.1 Detailed Description

**Name** Memory Pool Statistics Packet

Definition at line 270 of file default\_cfe\_es\_msgstruct.h.

### 11.19.2 Field Documentation

#### 11.19.2.1 Payload `CFE_ES_PoolStatsTlm_Payload_t` `CFE_ES_MemStatsTlm::Payload`

Telemetry payload.

Definition at line 273 of file default\_cfe\_es\_msgstruct.h.

#### 11.19.2.2 TelemetryHeader `CFE_MSG_TelemetryHeader_t` `CFE_ES_MemStatsTlm::TelemetryHeader`

Telemetry header.

Definition at line 272 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.20 CFE\_ES\_NoopCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*

### 11.20.1 Detailed Description

Definition at line 53 of file default\_cfe\_es\_msgstruct.h.

### 11.20.2 Field Documentation

#### 11.20.2.1 CommandHeader `CFE_MSG_CommandHeader_t` `CFE_ES_NoopCmd::CommandHeader`

Command header.

Definition at line 57 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.21 CFE\_ES\_OneAppTlm Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_ES_OneAppTlm_Payload_t Payload`  
*Telemetry payload.*

### 11.21.1 Detailed Description

**Name** Single Application Information Packet

Definition at line 261 of file default\_cfe\_es\_msgstruct.h.

### 11.21.2 Field Documentation

**11.21.2.1 Payload** [CFE\\_ES\\_OneAppTlm\\_Payload\\_t](#) CFE\_ES\_OneAppTlm::Payload  
Telemetry payload.

Definition at line 264 of file default\_cfe\_es\_msgstruct.h.

**11.21.2.2 TelemetryHeader** [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_ES\_OneAppTlm::TelemetryHeader  
Telemetry header.

Definition at line 263 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.22 CFE\_ES\_OneAppTlm\_Payload Struct Reference

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- [CFE\\_ES\\_AppInfo\\_t AppInfo](#)

*For more information, see [CFE\\_ES\\_AppInfo\\_t](#).*

### 11.22.1 Detailed Description

**Name** Single Application Information Packet

Definition at line 243 of file default\_cfe\_es\_msgdefs.h.

### 11.22.2 Field Documentation

**11.22.2.1 AppInfo** [CFE\\_ES\\_AppInfo\\_t](#) CFE\_ES\_OneAppTlm\_Payload::AppInfo

For more information, see [CFE\\_ES\\_AppInfo\\_t](#).

Definition at line 245 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.23 CFE\_ES\_OverWriteSysLogCmd Struct Reference

Overwrite/Discard System Log Configuration Command Payload.

```
#include <default_cfe_es_msgstruct.h>
```

**Data Fields**

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_ES\_OverWriteSysLogCmd\_Payload\_t** Payload  
*Command payload.*

**11.23.1 Detailed Description**

Overwrite/Discard System Log Configuration Command Payload.  
Definition at line 133 of file default\_cfe\_es\_msgstruct.h.

**11.23.2 Field Documentation****11.23.2.1 CommandHeader** **CFE\_MSG\_CommandHeader\_t** CFE\_ES\_OverWriteSysLogCmd::CommandHeader  
Command header.

Definition at line 135 of file default\_cfe\_es\_msgstruct.h.

**11.23.2.2 Payload** **CFE\_ES\_OverWriteSysLogCmd\_Payload\_t** CFE\_ES\_OverWriteSysLogCmd::Payload  
Command payload.

Definition at line 136 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

**11.24 CFE\_ES\_OverWriteSysLogCmd\_Payload Struct Reference**

Overwrite/Discard System Log Configuration Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

**Data Fields**

- **uint32** Mode  
*CFE\_ES\_LogMode\_DISCARD=Throw away most recent messages, CFE\_ES\_LogMode\_OVERWRITE=Overwrite oldest with most recent*

**11.24.1 Detailed Description**

Overwrite/Discard System Log Configuration Command Payload.  
For command details, see [CFE\\_ES\\_OVER\\_WRITE\\_SYS\\_LOG\\_CC](#)  
Definition at line 70 of file default\_cfe\_es\_msgdefs.h.

**11.24.2 Field Documentation****11.24.2.1 Mode** **uint32** CFE\_ES\_OverWriteSysLogCmd\_Payload::Mode

*CFE\_ES\_LogMode\_DISCARD=Throw away most recent messages, CFE\_ES\_LogMode\_OVERWRITE=Overwrite oldest with most recent*

Definition at line 72 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.25 CFE\_ES\_PoolAlign Union Reference

Pool Alignment.

```
#include <cfes_api_typedefs.h>
```

### Data Fields

- void \* **Ptr**  
*Aligned pointer.*
- long long int **LongInt**  
*Aligned Long Integer.*
- long double **LongDouble**  
*Aligned Long Double.*

### 11.25.1 Detailed Description

Pool Alignment.

Union that can be used for minimum memory alignment of ES memory pools on the target. It contains the longest native data types such that the alignment of this structure should reflect the largest possible alignment requirements for any data on this processor.

Definition at line 145 of file cfe\_es\_api\_typedefs.h.

### 11.25.2 Field Documentation

#### 11.25.2.1 **LongDouble** long double CFE\_ES\_PoolAlign::LongDouble

Aligned Long Double.

Definition at line 150 of file cfe\_es\_api\_typedefs.h.

#### 11.25.2.2 **LongInt** long long int CFE\_ES\_PoolAlign::LongInt

Aligned Long Integer.

Definition at line 149 of file cfe\_es\_api\_typedefs.h.

#### 11.25.2.3 **Ptr** void\* CFE\_ES\_PoolAlign::Ptr

Aligned pointer.

Definition at line 147 of file cfe\_es\_api\_typedefs.h.

The documentation for this union was generated from the following file:

- cfe/modules/core\_api/fsw/inc/cfe\_es\_api\_typedefs.h

## 11.26 CFE\_ES\_PoolStatsTim\_Payload Struct Reference

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- **CFE\_ES\_MemHandle\_t** PoolHandle  
*Handle of memory pool whose stats are being telemetered.*
- **CFE\_ES\_MemPoolStats\_t** PoolStats  
*For more info, see [CFE\\_ES\\_MemPoolStats\\_t](#).*

### 11.26.1 Detailed Description

**Name** Memory Pool Statistics Packet

Definition at line 251 of file default\_cfe\_es\_msgdefs.h.

### 11.26.2 Field Documentation

**11.26.2.1 PoolHandle** [CFE\\_ES\\_MemHandle\\_t](#) CFE\_ES\_PoolStatsTlm\_Payload::PoolHandle  
Handle of memory pool whose stats are being telemetered.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_ES\_PoolHandle

Definition at line 253 of file default\_cfe\_es\_msgdefs.h.

**11.26.2.2 PoolStats** [CFE\\_ES\\_MemPoolStats\\_t](#) CFE\_ES\_PoolStatsTlm\_Payload::PoolStats  
For more info, see [CFE\\_ES\\_MemPoolStats\\_t](#).

Definition at line 255 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.27 CFE\_ES\_QueryAllCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.27.1 Detailed Description

Definition at line 106 of file default\_cfe\_es\_msgstruct.h.

### 11.27.2 Field Documentation

**11.27.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_QueryAllCmd::CommandHeader  
Command header.

Definition at line 108 of file default\_cfe\_es\_msgstruct.h.

**11.27.2.2 Payload** [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) CFE\_ES\_QueryAllCmd::Payload  
Command payload.

Definition at line 109 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.28 CFE\_ES\_QueryAllTasksCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_ES\_FileNameCmd\_Payload\_t** Payload  
*Command payload.*

#### 11.28.1 Detailed Description

Definition at line 112 of file default\_cfe\_es\_msgstruct.h.

#### 11.28.2 Field Documentation

##### 11.28.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_QueryAllTasksCmd::CommandHeader

Command header.

Definition at line 114 of file default\_cfe\_es\_msgstruct.h.

##### 11.28.2.2 Payload [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) CFE\_ES\_QueryAllTasksCmd::Payload

Command payload.

Definition at line 115 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.29 CFE\_ES\_QueryOneCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_ES\_AppNameCmd\_Payload\_t** Payload  
*Command payload.*

#### 11.29.1 Detailed Description

Definition at line 165 of file default\_cfe\_es\_msgstruct.h.

#### 11.29.2 Field Documentation

##### 11.29.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_QueryOneCmd::CommandHeader

Command header.

Definition at line 167 of file default\_cfe\_es\_msgstruct.h.

**11.29.2.2 Payload** `CFE_ES_AppNameCmd_Payload_t` `CFE_ES_QueryOneCmd::Payload`  
Command payload.

Definition at line 168 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/es/config/default\\_cfe\\_es\\_msgstruct.h](#)

## 11.30 CFE\_ES\_ReloadAppCmd Struct Reference

Reload Application Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_ES_AppReloadCmd_Payload_t Payload`  
*Command payload.*

#### 11.30.1 Detailed Description

Reload Application Command.

Definition at line 174 of file default\_cfe\_es\_msgstruct.h.

#### 11.30.2 Field Documentation

**11.30.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_ES_ReloadAppCmd::CommandHeader`  
Command header.

Definition at line 176 of file default\_cfe\_es\_msgstruct.h.

**11.30.2.2 Payload** `CFE_ES_AppReloadCmd_Payload_t` `CFE_ES_ReloadAppCmd::Payload`  
Command payload.

Definition at line 177 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/es/config/default\\_cfe\\_es\\_msgstruct.h](#)

## 11.31 CFE\_ES\_ResetCountersCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*

#### 11.31.1 Detailed Description

Definition at line 58 of file default\_cfe\_es\_msgstruct.h.

### 11.31.2 Field Documentation

**11.31.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_ResetCountersCmd::CommandHeader  
Command header.

Definition at line 60 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.32 CFE\_ES\_ResetPRCountCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*

### 11.32.1 Detailed Description

Definition at line 73 of file default\_cfe\_es\_msgstruct.h.

### 11.32.2 Field Documentation

**11.32.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_ResetPRCountCmd::CommandHeader  
Command header.

Definition at line 75 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.33 CFE\_ES\_RestartAppCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_AppNameCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.33.1 Detailed Description

Definition at line 159 of file default\_cfe\_es\_msgstruct.h.

### 11.33.2 Field Documentation

**11.33.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_RestartAppCmd::CommandHeader  
Command header.  
Definition at line 161 of file default\_cfe\_es\_msgstruct.h.

**11.33.2.2 Payload** [CFE\\_ES\\_AppNameCmd\\_Payload\\_t](#) CFE\_ES\_RestartAppCmd::Payload  
Command payload.  
Definition at line 162 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.34 CFE\_ES\_RestartCmd Struct Reference

Restart cFE Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_RestartCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.34.1 Detailed Description

Restart cFE Command.

Definition at line 86 of file default\_cfe\_es\_msgstruct.h.

### 11.34.2 Field Documentation

**11.34.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_RestartCmd::CommandHeader  
Command header.  
Definition at line 88 of file default\_cfe\_es\_msgstruct.h.

**11.34.2.2 Payload** [CFE\\_ES\\_RestartCmd\\_Payload\\_t](#) CFE\_ES\_RestartCmd::Payload  
Command payload.  
Definition at line 89 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.35 CFE\_ES\_RestartCmd\_Payload Struct Reference

Restart cFE Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- uint16 RestartType  
*CFE\_PSP\_RST\_TYPE\_PROCESSOR=Processor Reset or CFE\_PSP\_RST\_TYPE\_POWERON=Power-On Reset*

### 11.35.1 Detailed Description

Restart cFE Command Payload.

For command details, see [CFE\\_ES\\_RESTART\\_CC](#)

Definition at line 44 of file default\_cfe\_es\_msgdefs.h.

### 11.35.2 Field Documentation

#### 11.35.2.1 RestartType `uint16 CFE_ES_RestartCmd_Payload::RestartType`

`CFE_PSP_RST_TYPE_PROCESSOR`=Processor Reset or `CFE_PSP_RST_TYPE_POWERON`=Power-On Reset

Definition at line 46 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/es/config/default\\_cfe\\_es\\_msgdefs.h](#)

## 11.36 CFE\_ES\_SendHkCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command header.*

### 11.36.1 Detailed Description

Definition at line 78 of file default\_cfe\_es\_msgstruct.h.

### 11.36.2 Field Documentation

#### 11.36.2.1 CommandHeader `CFE_MSG_CommandHeader_t CFE_ES_SendHkCmd::CommandHeader`

Command header.

Definition at line 80 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/es/config/default\\_cfe\\_es\\_msgstruct.h](#)

## 11.37 CFE\_ES\_SendMemPoolStatsCmd Struct Reference

Send Memory Pool Statistics Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command header.*
- [CFE\\_ES\\_SendMemPoolStatsCmd\\_Payload\\_t Payload](#)  
*Command payload.*

### 11.37.1 Detailed Description

Send Memory Pool Statistics Command.

Definition at line 237 of file default\_cfe\_es\_msgstruct.h.

### 11.37.2 Field Documentation

#### 11.37.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_SendMemPoolStatsCmd::CommandHeader

Command header.

Definition at line 239 of file default\_cfe\_es\_msgstruct.h.

#### 11.37.2.2 Payload [CFE\\_ES\\_SendMemPoolStatsCmd\\_Payload\\_t](#) CFE\_ES\_SendMemPoolStatsCmd::Payload

Command payload.

Definition at line 240 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.38 CFE\_ES\_SendMemPoolStatsCmd\_Payload Struct Reference

Send Memory Pool Statistics Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- char [Application](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]
  - *RESERVED - should be all zeroes*
- [CFE\\_ES\\_MemHandle\\_t](#) [PoolHandle](#)

*Handle of Pool whose statistics are to be telemetered.*

### 11.38.1 Detailed Description

Send Memory Pool Statistics Command Payload.

For command details, see [CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#)

Definition at line 213 of file default\_cfe\_es\_msgdefs.h.

### 11.38.2 Field Documentation

#### 11.38.2.1 Application char CFE\_ES\_SendMemPoolStatsCmd\_Payload::Application [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]

- RESERVED - should be all zeroes

Definition at line 215 of file default\_cfe\_es\_msgdefs.h.

#### 11.38.2.2 PoolHandle [CFE\\_ES\\_MemHandle\\_t](#) CFE\_ES\_SendMemPoolStatsCmd\_Payload::PoolHandle

Handle of Pool whose statistics are to be telemetered.

Definition at line 216 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.39 CFE\_ES\_SetMaxPRCountCmd Struct Reference

Set Maximum Processor Reset Count Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) `CommandHeader`  
*Command header.*
- [CFE\\_ES\\_SetMaxPRCountCmd\\_Payload\\_t](#) `Payload`  
*Command payload.*

### 11.39.1 Detailed Description

Set Maximum Processor Reset Count Command.

Definition at line 183 of file default\_cfe\_es\_msgstruct.h.

### 11.39.2 Field Documentation

#### 11.39.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_SetMaxPRCountCmd::CommandHeader

Command header.

Definition at line 185 of file default\_cfe\_es\_msgstruct.h.

#### 11.39.2.2 Payload [CFE\\_ES\\_SetMaxPRCountCmd\\_Payload\\_t](#) CFE\_ES\_SetMaxPRCountCmd::Payload

Command payload.

Definition at line 186 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.40 CFE\_ES\_SetMaxPRCountCmd\_Payload Struct Reference

Set Maximum Processor Reset Count Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `uint16 MaxPRCount`  
*New maximum number of Processor Resets before an automatic Power-On Reset is performed.*

### 11.40.1 Detailed Description

Set Maximum Processor Reset Count Command Payload.

For command details, see [CFE\\_ES\\_SET\\_MAX\\_PR\\_COUNT\\_CC](#)

Definition at line 128 of file default\_cfe\_es\_msgdefs.h.

### 11.40.2 Field Documentation

**11.40.2.1 MaxPRCount** `uint16 CFE_ES_SetMaxPRCountCmd_Payload::MaxPRCount`

New maximum number of Processor Resets before an automatic Power-On Reset is performed.

Definition at line 130 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.41 CFE\_ES\_SetPerfFilterMaskCmd Struct Reference

Set Performance Analyzer Filter Mask Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_ES_SetPerfFilterMaskCmd_Payload_t Payload`  
*Command payload.*

### 11.41.1 Detailed Description

Set Performance Analyzer Filter Mask Command.

Definition at line 219 of file default\_cfe\_es\_msgstruct.h.

### 11.41.2 Field Documentation

#### 11.41.2.1 CommandHeader `CFE_MSG_CommandHeader_t CFE_ES_SetPerfFilterMaskCmd::CommandHeader`

Command header.

Definition at line 221 of file default\_cfe\_es\_msgstruct.h.

#### 11.41.2.2 Payload `CFE_ES_SetPerfFilterMaskCmd_Payload_t CFE_ES_SetPerfFilterMaskCmd::Payload`

Command payload.

Definition at line 222 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgstruct.h`

## 11.42 CFE\_ES\_SetPerfFilterMaskCmd\_Payload Struct Reference

Set Performance Analyzer Filter Mask Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `uint32 FilterMaskNum`  
*Index into array of Filter Masks.*
- `uint32 FilterMask`  
*New Mask for specified entry in array of Filter Masks.*

### 11.42.1 Detailed Description

Set Performance Analyzer Filter Mask Command Payload.

For command details, see [CFE\\_ES\\_SET\\_PERF\\_FILTER\\_MASK\\_CC](#)

Definition at line 189 of file default\_cfe\_es\_msgdefs.h.

### 11.42.2 Field Documentation

#### 11.42.2.1 FilterMask `uint32` CFE\_ES\_SetPerfFilterMaskCmd\_Payload::FilterMask

New Mask for specified entry in array of Filter Masks.

Definition at line 192 of file default\_cfe\_es\_msgdefs.h.

#### 11.42.2.2 FilterMaskNum `uint32` CFE\_ES\_SetPerfFilterMaskCmd\_Payload::FilterMaskNum

Index into array of Filter Masks.

Definition at line 191 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgdefs.h

## 11.43 CFE\_ES\_SetPerfTriggerMaskCmd Struct Reference

Set Performance Analyzer Trigger Mask Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [`CFE\_MSG\_CommandHeader\_t`](#) CommandHeader  
*Command header.*
- [`CFE\_ES\_SetPerfTrigMaskCmd\_Payload\_t`](#) Payload  
*Command payload.*

### 11.43.1 Detailed Description

Set Performance Analyzer Trigger Mask Command.

Definition at line 228 of file default\_cfe\_es\_msgstruct.h.

### 11.43.2 Field Documentation

#### 11.43.2.1 CommandHeader `CFE_MSG_CommandHeader_t` CFE\_ES\_SetPerfTriggerMaskCmd::CommandHeader

Command header.

Definition at line 230 of file default\_cfe\_es\_msgstruct.h.

#### 11.43.2.2 Payload `CFE_ES_SetPerfTrigMaskCmd_Payload_t` CFE\_ES\_SetPerfTriggerMaskCmd::Payload

Command payload.

Definition at line 231 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.44 CFE\_ES\_SetPerfTrigMaskCmd\_Payload Struct Reference

Set Performance Analyzer Trigger Mask Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `uint32 TriggerMaskNum`  
*Index into array of Trigger Masks.*
- `uint32 TriggerMask`  
*New Mask for specified entry in array of Trigger Masks.*

### 11.44.1 Detailed Description

Set Performance Analyzer Trigger Mask Command Payload.

For command details, see [CFE\\_ES\\_SET\\_PERF\\_TRIGGER\\_MASK\\_CC](#)

Definition at line 201 of file default\_cfe\_es\_msgdefs.h.

### 11.44.2 Field Documentation

#### 11.44.2.1 TriggerMask `uint32 CFE_ES_SetPerfTrigMaskCmd_Payload::TriggerMask`

New Mask for specified entry in array of Trigger Masks.

Definition at line 204 of file default\_cfe\_es\_msgdefs.h.

#### 11.44.2.2 TriggerMaskNum `uint32 CFE_ES_SetPerfTrigMaskCmd_Payload::TriggerMaskNum`

Index into array of Trigger Masks.

Definition at line 203 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.45 CFE\_ES\_StartApp Struct Reference

Start Application Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_ES_StartAppCmd_Payload_t Payload`  
*Command payload.*

### 11.45.1 Detailed Description

Start Application Command.

Definition at line 142 of file default\_cfe\_es\_msgstruct.h.

### 11.45.2 Field Documentation

**11.45.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_StartApp::CommandHeader  
Command header.  
Definition at line 144 of file default\_cfe\_es\_msgstruct.h.

**11.45.2.2 Payload** [CFE\\_ES\\_StartAppCmd\\_Payload\\_t](#) CFE\_ES\_StartApp::Payload  
Command payload.  
Definition at line 145 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.46 CFE\_ES\_StartAppCmd\_Payload Struct Reference

Start Application Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- char [Application](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]  
*Name of Application to be started.*
- char [AppEntryPoint](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]  
*Symbolic name of Application's entry point.*
- char [AppFileName](#) [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
*Full path and filename of Application's executable image.*
- [CFE\\_ES\\_MemOffset\\_t](#) [StackSize](#)  
*Desired stack size for the new application.*
- [CFE\\_ES\\_ExceptionAction\\_Enum\\_t](#) [ExceptionAction](#)  
*[CFE\\_ES\\_ExceptionAction\\_RESTART\\_APP](#)=On exception, restart Application, [CFE\\_ES\\_ExceptionAction\\_PROC\\_RESTART](#)=On exception, perform a Processor Reset*
- [CFE\\_ES\\_TaskPriority\\_Atom\\_t](#) [Priority](#)  
*The new Applications runtime priority.*

### 11.46.1 Detailed Description

Start Application Command Payload.

For command details, see [CFE\\_ES\\_START\\_APP\\_CC](#)

Definition at line 82 of file default\_cfe\_es\_msgdefs.h.

### 11.46.2 Field Documentation

**11.46.2.1 AppEntryPoint** char CFE\_ES\_StartAppCmd\_Payload::AppEntryPoint [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]  
Symbolic name of Application's entry point.  
Definition at line 85 of file default\_cfe\_es\_msgdefs.h.

**11.46.2.2 AppFileName** char CFE\_ES\_StartAppCmd\_Payload::AppFileName [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
Full path and filename of Application's executable image.  
Definition at line 86 of file default\_cfe\_es\_msgdefs.h.

**11.46.2.3 Application** `char CFE_ES_StartAppCmd_Payload::Application[CFE_MISSION_MAX_API_LEN]`

Name of Application to be started.

Definition at line 84 of file `default_cfe_es_msgdefs.h`.

**11.46.2.4 ExceptionAction** `CFE_ES_ExceptionAction_Enum_t CFE_ES_StartAppCmd_Payload::ExceptionAction`

`CFE_ES_ExceptionAction_RESTART_APP`=On exception, restart Application, `CFE_ES_ExceptionAction_PROC_RESTART`=On exception, perform a Processor Reset

Definition at line 91 of file `default_cfe_es_msgdefs.h`.

**11.46.2.5 Priority** `CFE_ES_TaskPriority_Atom_t CFE_ES_StartAppCmd_Payload::Priority`

The new Applications runtime priority.

Definition at line 95 of file `default_cfe_es_msgdefs.h`.

**11.46.2.6 StackSize** `CFE_ES_MemOffset_t CFE_ES_StartAppCmd_Payload::StackSize`

Desired stack size for the new application.

Definition at line 89 of file `default_cfe_es_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.47 CFE\_ES\_StartPerfCmd\_Payload Struct Reference

Start Performance Analyzer Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `CFE_ES_PerfMode_Enum_t TriggerMode`

*Desired trigger position (Start, Center, End). Values defined by `CFE_ES_PerfMode`.*

### 11.47.1 Detailed Description

Start Performance Analyzer Command Payload.

For command details, see `CFE_ES_START_PERF_DATA_CC`

Definition at line 165 of file `default_cfe_es_msgdefs.h`.

### 11.47.2 Field Documentation

**11.47.2.1 TriggerMode** `CFE_ES_PerfMode_Enum_t CFE_ES_StartPerfCmd_Payload::TriggerMode`

Desired trigger position (Start, Center, End). Values defined by `CFE_ES_PerfMode`.

Definition at line 168 of file `default_cfe_es_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.48 CFE\_ES\_StartPerfDataCmd Struct Reference

Start Performance Analyzer Command.

```
#include <default_cfe_es_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_StartPerfCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.48.1 Detailed Description

Start Performance Analyzer Command.

Definition at line 201 of file default\_cfe\_es\_msgstruct.h.

### 11.48.2 Field Documentation

#### 11.48.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_StartPerfDataCmd::CommandHeader

Command header.

Definition at line 203 of file default\_cfe\_es\_msgstruct.h.

#### 11.48.2.2 Payload [CFE\\_ES\\_StartPerfCmd\\_Payload\\_t](#) CFE\_ES\_StartPerfDataCmd::Payload

Command payload.

Definition at line 204 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.49 CFE\_ES\_StopAppCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_AppNameCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.49.1 Detailed Description

Definition at line 153 of file default\_cfe\_es\_msgstruct.h.

### 11.49.2 Field Documentation

#### 11.49.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_StopAppCmd::CommandHeader

Command header.

Definition at line 155 of file default\_cfe\_es\_msgstruct.h.

**11.49.2.2 Payload** `CFE_ES_AppNameCmd_Payload_t` `CFE_ES_StopAppCmd::Payload`  
Command payload.

Definition at line 156 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgstruct.h`

## 11.50 CFE\_ES\_StopPerfCmd\_Payload Struct Reference

Stop Performance Analyzer Command Payload.

```
#include <default_cfe_es_msgdefs.h>
```

### Data Fields

- `char DataFileName [CFE_MISSION_MAX_PATH_LEN]`  
*ASCII text string of full path and filename of file Performance Analyzer data is to be written.*

#### 11.50.1 Detailed Description

Stop Performance Analyzer Command Payload.

For command details, see [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#)

Definition at line 177 of file default\_cfe\_es\_msgdefs.h.

#### 11.50.2 Field Documentation

**11.50.2.1 DataFileName** `char CFE_ES_StopPerfCmd_Payload::DataFileName [CFE_MISSION_MAX_PATH_LEN]`  
ASCII text string of full path and filename of file Performance Analyzer data is to be written.

Definition at line 179 of file default\_cfe\_es\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/es/config/default_cfe_es_msgdefs.h`

## 11.51 CFE\_ES\_StopPerfDataCmd Struct Reference

Stop Performance Analyzer Command.

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_ES_StopPerfCmd_Payload_t Payload`  
*Command payload.*

#### 11.51.1 Detailed Description

Stop Performance Analyzer Command.

Definition at line 210 of file default\_cfe\_es\_msgstruct.h.

#### 11.51.2 Field Documentation

**11.51.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_StopPerfDataCmd::CommandHeader  
Command header.  
Definition at line 212 of file default\_cfe\_es\_msgstruct.h.

**11.51.2.2 Payload** [CFE\\_ES\\_StopPerfCmd\\_Payload\\_t](#) CFE\_ES\_StopPerfDataCmd::Payload  
Command payload.  
Definition at line 213 of file default\_cfe\_es\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.52 CFE\_ES\_TaskInfo Struct Reference

Task Information.

```
#include <default_cfe_es_extern_typedefs.h>
```

### Data Fields

- [CFE\\_ES\\_TaskId\\_t TaskId](#)  
*Task Id.*
- [uint32 ExecutionCounter](#)  
*Task Execution Counter.*
- [char TaskName \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*Task Name.*
- [CFE\\_ES\\_AppId\\_t AppId](#)  
*Parent Application ID.*
- [charAppName \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*Parent Application Name.*
- [CFE\\_ES\\_MemOffset\\_t StackSize](#)
- [CFE\\_ES\\_TaskPriority\\_Atom\\_t Priority](#)
- [uint8 Spare \[2\]](#)

### 11.52.1 Detailed Description

Task Information.

Structure that is used to provide information about a task. It is primarily used for the Query All Tasks ([CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#)) command.

#### Note

There is not currently a telemetry message directly containing this data structure, but it does define the format of the data file generated by the Query All Tasks command. Therefore it should be considered part of the overall telemetry interface.

Definition at line 499 of file default\_cfe\_es\_extern\_typedefs.h.

### 11.52.2 Field Documentation

**11.52.2.1 AppId** [CFE\\_ES\\_AppId\\_t](#) CFE\_ES\_TaskInfo::AppId  
Parent Application ID.  
Definition at line 504 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.2 AppName** `char CFE_ES_TaskInfo::AppName[CFE_MISSION_MAX_API_LEN]`  
Parent Application Name.  
Definition at line 505 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.3 ExecutionCounter** `uint32 CFE_ES_TaskInfo::ExecutionCounter`  
Task Execution Counter.  
Definition at line 502 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.4 Priority** `CFE_ES_TaskPriority_Atom_t CFE_ES_TaskInfo::Priority`  
Priority of task  
Definition at line 507 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.5 Spare** `uint8 CFE_ES_TaskInfo::Spare[2]`  
Spare bytes for alignment  
Definition at line 508 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.6 StackSize** `CFE_ES_MemOffset_t CFE_ES_TaskInfo::StackSize`  
Size of task stack  
Definition at line 506 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.7 TaskId** `CFE_ES_TaskId_t CFE_ES_TaskInfo::TaskId`  
Task Id.  
Definition at line 501 of file default\_cfe\_es\_extern\_typedefs.h.

**11.52.2.8 TaskName** `char CFE_ES_TaskInfo::TaskName[CFE_MISSION_MAX_API_LEN]`  
Task Name.  
Definition at line 503 of file default\_cfe\_es\_extern\_typedefs.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h

## 11.53 CFE\_ES\_WriteERLogCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_ES_FileNameCmd_Payload_t Payload`  
*Command payload.*

### 11.53.1 Detailed Description

Definition at line 124 of file default\_cfe\_es\_msgstruct.h.

### 11.53.2 Field Documentation

**11.53.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_WriteERLogCmd::CommandHeader  
Command header.

Definition at line 126 of file default\_cfe\_es\_msgstruct.h.

**11.53.2.2 Payload** [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) CFE\_ES\_WriteERLogCmd::Payload  
Command payload.

Definition at line 127 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.54 CFE\_ES\_WriteSysLogCmd Struct Reference

```
#include <default_cfe_es_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.54.1 Detailed Description

Definition at line 118 of file default\_cfe\_es\_msgstruct.h.

### 11.54.2 Field Documentation

**11.54.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_ES\_WriteSysLogCmd::CommandHeader  
Command header.

Definition at line 120 of file default\_cfe\_es\_msgstruct.h.

**11.54.2.2 Payload** [CFE\\_ES\\_FileNameCmd\\_Payload\\_t](#) CFE\_ES\_WriteSysLogCmd::Payload  
Command payload.

Definition at line 121 of file default\_cfe\_es\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/es/config/default\_cfe\_es\_msgstruct.h

## 11.55 CFE\_EVS\_AddEventFilterCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.55.1 Detailed Description

Definition at line 203 of file default\_cfe\_evs\_msgstruct.h.

### 11.55.2 Field Documentation

#### 11.55.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_AddEventFilterCmd::CommandHeader

Command header.

Definition at line 205 of file default\_cfe\_evs\_msgstruct.h.

#### 11.55.2.2 Payload [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload\\_t](#) CFE\_EVS\_AddEventFilterCmd::Payload

Command payload.

Definition at line 206 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.56 CFE\_EVS\_AppDataCmd\_Payload Struct Reference

Write Event Services Application Information to File Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

## Data Fields

- char [AppDataFilename](#) [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
*Filename where application data is to be written.*

### 11.56.1 Detailed Description

Write Event Services Application Information to File Command Payload.

For command details, see [CFE\\_EVS\\_WRITE\\_APP\\_DATA\\_FILE\\_CC](#)

Definition at line 68 of file default\_cfe\_evs\_msgdefs.h.

### 11.56.2 Field Documentation

#### 11.56.2.1 AppDataFilename char CFE\_EVS\_AppDataCmd\_Payload::AppDataFilename [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]

Filename where application data is to be written.

Definition at line 70 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.57 CFE\_EVS\_AppNameBitMaskCmd\_Payload Struct Reference

Generic App Name and Bitmask Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- char [AppName \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*Application name to use in the command.*
- uint8 [BitMask](#)  
*BitMask to use in the command.*
- uint8 [Spare](#)  
*Pad to even byte.*

### 11.57.1 Detailed Description

Generic App Name and Bitmask Command Payload.

For command details, see [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#) and/or [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#)

Definition at line 140 of file default\_cfe\_evs\_msgdefs.h.

### 11.57.2 Field Documentation

#### 11.57.2.1 AppName `char CFE_EVS_AppNameBitMaskCmd_Payload::AppName [CFE_MISSION_MAX_API_LEN]`

Application name to use in the command.

Definition at line 142 of file default\_cfe\_evs\_msgdefs.h.

#### 11.57.2.2 BitMask `uint8 CFE_EVS_AppNameBitMaskCmd_Payload::BitMask`

BitMask to use in the command.

Definition at line 143 of file default\_cfe\_evs\_msgdefs.h.

#### 11.57.2.3 Spare `uint8 CFE_EVS_AppNameBitMaskCmd_Payload::Spare`

Pad to even byte.

Definition at line 144 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.58 CFE\_EVS\_AppNameCmd\_Payload Struct Reference

Generic App Name Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- char [AppName \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*Application name to use in the command.*

### 11.58.1 Detailed Description

Generic App Name Command Payload.

For command details, see [CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_RESET\\_APP\\_COUNTER\\_CC](#) and/or [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#)

Definition at line 117 of file default\_cfe\_evs\_msgdefs.h.

### 11.58.2 Field Documentation

#### 11.58.2.1 AppName `char CFE_EVS_AppNameCmd_Payload::AppName [CFE_MISSION_MAX_API_LEN]`

Application name to use in the command.

Definition at line 119 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.59 CFE\_EVS\_AppNameEventIDCmd\_Payload Struct Reference

Generic App Name and Event ID Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- `char AppName [CFE_MISSION_MAX_API_LEN]`  
*Application name to use in the command.*
- `uint16 EventID`  
*Event ID to use in the command.*

### 11.59.1 Detailed Description

Generic App Name and Event ID Command Payload.

For command details, see [CFE\\_EVS\\_RESET\\_FILTER\\_CC](#) and [CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

Definition at line 128 of file default\_cfe\_evs\_msgdefs.h.

### 11.59.2 Field Documentation

#### 11.59.2.1 AppName `char CFE_EVS_AppNameEventIDCmd_Payload::AppName [CFE_MISSION_MAX_API_LEN]`

Application name to use in the command.

Definition at line 130 of file default\_cfe\_evs\_msgdefs.h.

#### 11.59.2.2 EventID `uint16 CFE_EVS_AppNameEventIDCmd_Payload::EventID`

Event ID to use in the command.

Definition at line 131 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.60 CFE\_EVS\_AppNameEventIDMaskCmd\_Payload Struct Reference

Generic App Name, Event ID, Mask Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

## Data Fields

- char [AppName](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]  
*Application name to use in the command.*
- uint16 [EventID](#)  
*Event ID to use in the command.*
- uint16 [Mask](#)  
*Mask to use in the command.*

### 11.60.1 Detailed Description

Generic App Name, Event ID, Mask Command Payload.

For command details, see [CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#) and/or [CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#).  
Definition at line 154 of file [default\\_cfe\\_evs\\_msgdefs.h](#).

### 11.60.2 Field Documentation

#### 11.60.2.1 AppName [char CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload::AppName](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]

Application name to use in the command.

Definition at line 156 of file [default\\_cfe\\_evs\\_msgdefs.h](#).

#### 11.60.2.2 EventID [uint16 CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload::EventID](#)

Event ID to use in the command.

Definition at line 157 of file [default\\_cfe\\_evs\\_msgdefs.h](#).

#### 11.60.2.3 Mask [uint16 CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload::Mask](#)

Mask to use in the command.

Definition at line 158 of file [default\\_cfe\\_evs\\_msgdefs.h](#).

The documentation for this struct was generated from the following file:

- [cfe/modules/evs/config/default\\_cfe\\_evs\\_msgdefs.h](#)

## 11.61 CFE\_EVS\_AppTlmData Struct Reference

```
#include <default_cfe_evs_msgdefs.h>
```

## Data Fields

- [CFE\\_ES\\_AppId\\_t AppID](#)  
*Numerical application identifier.*
- uint16 [AppMessageSentCounter](#)  
*Application message sent counter.*
- uint8 [AppEnableStatus](#)  
*Application event service enable status.*
- uint8 [AppMessageSquelchedCounter](#)  
*Number of events squelched.*

### 11.61.1 Detailed Description

Definition at line 167 of file default\_cfe\_evs\_msgdefs.h.

### 11.61.2 Field Documentation

**11.61.2.1 AppEnableStatus** `uint8` `CFE_EVS_AppTlmData::AppEnableStatus`  
Application event service enable status.

**Telemetry Mnemonic(s)** `$sc_$cpu_EVS_APP[CFE_PLATFORM_ES_MAX_APPLICATIONS].APPENASTAT`

Definition at line 173 of file default\_cfe\_evs\_msgdefs.h.

**11.61.2.2 AppID** `CFE_ES_AppId_t` `CFE_EVS_AppTlmData::AppID`  
Numerical application identifier.

**Telemetry Mnemonic(s)** `$sc_$cpu_EVS_APP[CFE_PLATFORM_ES_MAX_APPLICATIONS].APPID`

Definition at line 169 of file default\_cfe\_evs\_msgdefs.h.

**11.61.2.3 AppMessageSentCounter** `uint16` `CFE_EVS_AppTlmData::AppMessageSentCounter`  
Application message sent counter.

**Telemetry Mnemonic(s)** `$sc_$cpu_EVS_APP[CFE_PLATFORM_ES_MAX_APPLICATIONS].APPMGSENTC`

Definition at line 171 of file default\_cfe\_evs\_msgdefs.h.

**11.61.2.4 AppMessageSquelchedCounter** `uint8` `CFE_EVS_AppTlmData::AppMessageSquelchedCounter`  
Number of events squelched.

**Telemetry Mnemonic(s)** `$sc_$cpu_EVS_APP[CFE_PLATFORM_ES_MAX_APPLICATIONS].SQUELCHEDC`

Definition at line 175 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.62 CFE\_EVS\_BinFilter Struct Reference

Event message filter definition structure.

```
#include <cfe_evs_api_typedefs.h>
```

### Data Fields

- `uint16 EventID`  
*Numerical event identifier.*
- `uint16 Mask`  
*Binary filter mask value.*

### 11.62.1 Detailed Description

Event message filter definition structure.

Definition at line 60 of file `cfe_evs_api_typedefs.h`.

### 11.62.2 Field Documentation

#### 11.62.2.1 EventID `uint16` CFE\_EVS\_BinFilter::EventID

Numerical event identifier.

Definition at line 62 of file `cfe_evs_api_typedefs.h`.

#### 11.62.2.2 Mask `uint16` CFE\_EVS\_BinFilter::Mask

Binary filter mask value.

Definition at line 63 of file `cfe_evs_api_typedefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/core_api/fsw/inc/cfe_evs_api_typedefs.h`

## 11.63 CFE\_EVS\_BitMaskCmd\_Payload Struct Reference

Generic Bitmask Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- `uint8 BitMask`  
*BitMask to use in the command.*
- `uint8 Spare`  
*Pad to even byte.*

### 11.63.1 Detailed Description

Generic Bitmask Command Payload.

For command details, see `CFE_EVS_ENABLE_EVENT_TYPE_CC`, `CFE_EVS_DISABLE_EVENT_TYPE_CC`, `CFE_EVS_ENABLE_PORTS_CC` and/or `CFE_EVS_DISABLE_PORTS_CC`

Definition at line 104 of file `default_cfe_evs_msgdefs.h`.

### 11.63.2 Field Documentation

#### 11.63.2.1 BitMask `uint8` CFE\_EVS\_BitMaskCmd\_Payload::BitMask

BitMask to use in the command.

Definition at line 106 of file `default_cfe_evs_msgdefs.h`.

#### 11.63.2.2 Spare `uint8` CFE\_EVS\_BitMaskCmd\_Payload::Spare

Pad to even byte.

Definition at line 107 of file `default_cfe_evs_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/evs/config/default_cfe_evs_msgdefs.h`

## 11.64 CFE\_EVS\_ClearLogCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)

*Command header.*

#### 11.64.1 Detailed Description

Definition at line 60 of file default\_cfe\_evs\_msgstruct.h.

#### 11.64.2 Field Documentation

##### 11.64.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t CFE\\_EVS\\_ClearLogCmd::CommandHeader](#)

Command header.

Definition at line 62 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.65 CFE\_EVS\_DeleteEventFilterCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)

*Command header.*

- [CFE\\_EVS\\_AppNameEventIDCmdu\\_Payload\\_t Payload](#)

*Command payload.*

#### 11.65.1 Detailed Description

Definition at line 175 of file default\_cfe\_evs\_msgstruct.h.

#### 11.65.2 Field Documentation

##### 11.65.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t CFE\\_EVS\\_DeleteEventFilterCmd::CommandHeader](#)

Command header.

Definition at line 177 of file default\_cfe\_evs\_msgstruct.h.

##### 11.65.2.2 Payload [CFE\\_EVS\\_AppNameEventIDCmdu\\_Payload\\_t CFE\\_EVS\\_DeleteEventFilterCmd::Payload](#)

Command payload.

Definition at line 178 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.66 CFE\_EVS\_DisableAppEventsCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_EVS\_AppNameCmd\_Payload\_t** Payload  
*Command payload.*

#### 11.66.1 Detailed Description

Definition at line 146 of file default\_cfe\_evs\_msgstruct.h.

#### 11.66.2 Field Documentation

##### 11.66.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_DisableAppEventsCmd::CommandHeader

Command header.

Definition at line 148 of file default\_cfe\_evs\_msgstruct.h.

##### 11.66.2.2 Payload [CFE\\_EVS\\_AppNameCmd\\_Payload\\_t](#) CFE\_EVS\_DisableAppEventsCmd::Payload

Command payload.

Definition at line 149 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.67 CFE\_EVS\_DisableEventTypeCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_EVS\_AppNameBitMaskCmd\_Payload\_t** Payload  
*Command payload.*

#### 11.67.1 Detailed Description

Definition at line 192 of file default\_cfe\_evs\_msgstruct.h.

#### 11.67.2 Field Documentation

##### 11.67.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_DisableEventTypeCmd::CommandHeader

Command header.

Definition at line 194 of file default\_cfe\_evs\_msgstruct.h.

**11.67.2.2 Payload** `CFE_EVS_AppNameBitMaskCmd_Payload_t` `CFE_EVS_DisableEventTypeCmd::Payload`  
Command payload.

Definition at line 195 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/evs/config/default\\_cfe\\_evs\\_msgstruct.h](#)

## 11.68 CFE\_EVS\_DisableEventTypeCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_EVS_BitMaskCmd_Payload_t Payload`  
*Command payload.*

### 11.68.1 Detailed Description

Definition at line 129 of file default\_cfe\_evs\_msgstruct.h.

### 11.68.2 Field Documentation

**11.68.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_EVS_DisableEventTypeCmd::CommandHeader`  
Command header.

Definition at line 131 of file default\_cfe\_evs\_msgstruct.h.

**11.68.2.2 Payload** `CFE_EVS_BitMaskCmd_Payload_t` `CFE_EVS_DisableEventTypeCmd::Payload`  
Command payload.

Definition at line 132 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/evs/config/default\\_cfe\\_evs\\_msgstruct.h](#)

## 11.69 CFE\_EVS\_DisablePortsCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_EVS_BitMaskCmd_Payload_t Payload`  
*Command payload.*

### 11.69.1 Detailed Description

Definition at line 117 of file default\_cfe\_evs\_msgstruct.h.

## 11.69.2 Field Documentation

**11.69.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_DisablePortsCmd::CommandHeader  
Command header.

Definition at line 119 of file default\_cfe\_evs\_msgstruct.h.

**11.69.2.2 Payload** [CFE\\_EVS\\_BitMaskCmd\\_Payload\\_t](#) CFE\_EVS\_DisablePortsCmd::Payload  
Command payload.

Definition at line 120 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.70 CFE\_EVS\_EnableAppEventsCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppNameCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.70.1 Detailed Description

Definition at line 140 of file default\_cfe\_evs\_msgstruct.h.

## 11.70.2 Field Documentation

**11.70.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_EnableAppEventsCmd::CommandHeader  
Command header.

Definition at line 142 of file default\_cfe\_evs\_msgstruct.h.

**11.70.2.2 Payload** [CFE\\_EVS\\_AppNameCmd\\_Payload\\_t](#) CFE\_EVS\_EnableAppEventsCmd::Payload  
Command payload.

Definition at line 143 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.71 CFE\_EVS\_EnableAppEventTypeCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppNameBitMaskCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.71.1 Detailed Description

Definition at line 186 of file default\_cfe\_evs\_msgstruct.h.

### 11.71.2 Field Documentation

#### 11.71.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_EnableEventTypeCmd::CommandHeader

Command header.

Definition at line 188 of file default\_cfe\_evs\_msgstruct.h.

#### 11.71.2.2 Payload [CFE\\_EVS\\_AppNameBitMaskCmd\\_Payload\\_t](#) CFE\_EVS\_EnableEventTypeCmd::Payload

Command payload.

Definition at line 189 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.72 CFE\_EVS\_EnableEventTypeCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_BitMaskCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.72.1 Detailed Description

Definition at line 123 of file default\_cfe\_evs\_msgstruct.h.

### 11.72.2 Field Documentation

#### 11.72.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_EnableEventTypeCmd::CommandHeader

Command header.

Definition at line 125 of file default\_cfe\_evs\_msgstruct.h.

**11.72.2.2 Payload** `CFE_EVS_BitMaskCmd_Payload_t` `CFE_EVS_EnableEventTypeCmd::Payload`  
Command payload.

Definition at line 126 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/evs/config/default_cfe_evs_msgstruct.h`

## 11.73 CFE\_EVS\_EnablePortsCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_EVS_BitMaskCmd_Payload_t Payload`  
*Command payload.*

### 11.73.1 Detailed Description

Definition at line 111 of file default\_cfe\_evs\_msgstruct.h.

### 11.73.2 Field Documentation

**11.73.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_EVS_EnablePortsCmd::CommandHeader`  
Command header.

Definition at line 113 of file default\_cfe\_evs\_msgstruct.h.

**11.73.2.2 Payload** `CFE_EVS_BitMaskCmd_Payload_t` `CFE_EVS_EnablePortsCmd::Payload`  
Command payload.

Definition at line 114 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/evs/config/default_cfe_evs_msgstruct.h`

## 11.74 CFE\_EVS\_HousekeepingTlm Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_EVS_HousekeepingTlm_Payload_t Payload`  
*Telemetry payload.*

### 11.74.1 Detailed Description

Definition at line 221 of file default\_cfe\_evs\_msgstruct.h.

### 11.74.2 Field Documentation

**11.74.2.1 Payload** `CFE_EVS_HousekeepingTlm_Payload_t` `CFE_EVS_HousekeepingTlm::Payload`  
Telemetry payload.

Definition at line 224 of file `default_cfe_evs_msgstruct.h`.

**11.74.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_EVS_HousekeepingTlm::TelemetryHeader`  
Telemetry header.

Definition at line 223 of file `default_cfe_evs_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/evs/config/default_cfe_evs_msgstruct.h`

## 11.75 CFE\_EVS\_HousekeepingTlm\_Payload Struct Reference

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- `uint8 CommandCounter`  
*EVS Command Counter.*
- `uint8 CommandErrorCounter`  
*EVS Command Error Counter.*
- `uint8 MessageFormatMode`  
*Event message format mode (short/long)*
- `uint8 MessageTruncCounter`  
*Event message truncation counter.*
- `uint8 UnregisteredAppCounter`  
*Unregistered application message send counter.*
- `uint8 OutputPort`  
*Output port mask.*
- `uint8 LogFullFlag`  
*Local event log full flag.*
- `uint8 LogMode`  
*Local event logging mode (overwrite/discard)*
- `uint16 MessageSendCounter`  
*Event message send counter.*
- `uint16 LogOverflowCounter`  
*Local event log overflow counter.*
- `uint8 LogEnabled`  
*Current event log enable/disable state.*
- `uint8 Spare1`  
*Padding for 32 bit boundary.*
- `uint8 Spare2`  
*Padding for 32 bit boundary.*
- `uint8 Spare3`  
*Padding for 32 bit boundary.*
- `CFE_EVS_AppTlmData_t AppData [CFE_MISSION_ES_MAX_APPLICATIONS]`  
*Array of registered application table data.*

### 11.75.1 Detailed Description

**Name** Event Services Housekeeping Telemetry Packet

Definition at line 182 of file default\_cfe\_evs\_msgdefs.h.

### 11.75.2 Field Documentation

**11.75.2.1 AppData** `CFE_EVS_AppTlmData_t CFE_EVS_HousekeepingTlm_Payload::AppData[CFE_MISSION_ES_MAX_APPLICATIONS]`  
Array of registered application table data.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_APP[CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS]

Definition at line 216 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.2 CommandCounter** `uint8 CFE_EVS_HousekeepingTlm_Payload::CommandCounter`  
EVS Command Counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_CMDPC

Definition at line 184 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.3 CommandErrorCounter** `uint8 CFE_EVS_HousekeepingTlm_Payload::CommandErrorCounter`  
EVS Command Error Counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_CMDEC

Definition at line 186 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.4 LogEnabled** `uint8 CFE_EVS_HousekeepingTlm_Payload::LogEnabled`  
Current event log enable/disable state.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_LOGENABLED

Definition at line 207 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.5 LogFullFlag** `uint8 CFE_EVS_HousekeepingTlm_Payload::LogFullFlag`  
Local event log full flag.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_LOGFULL

Definition at line 197 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.6 LogMode** `uint8 CFE_EVS_HousekeepingTlm_Payload::LogMode`  
Local event logging mode (overwrite/discard)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_LOGMODE

Definition at line 199 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.7 LogOverflowCounter** `uint16 CFE_EVS_HousekeepingTlm_Payload::LogOverflowCounter`  
Local event log overflow counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_LOGOVERFLOWC

Definition at line 204 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.8 MessageFormatMode** `uint8 CFE_EVS_HousekeepingTlm_Payload::MessageFormatMode`  
Event message format mode (short/long)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_MSGFMTMODE

Definition at line 188 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.9 MessageSendCounter** `uint16 CFE_EVS_HousekeepingTlm_Payload::MessageSendCounter`  
Event message send counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_MSGSENTC

Definition at line 202 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.10 MessageTruncCounter** `uint8 CFE_EVS_HousekeepingTlm_Payload::MessageTruncCounter`  
Event message truncation counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_MSGTRUNC

Definition at line 190 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.11 OutputPort** `uint8 CFE_EVS_HousekeepingTlm_Payload::OutputPort`  
Output port mask.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_OUTPUTPORT

Definition at line 195 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.12 Spare1** `uint8 CFE_EVS_HousekeepingTlm_Payload::Spare1`  
Padding for 32 bit boundary.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_HK\_SPARE1

Definition at line 209 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.13 Spare2** `uint8 CFE_EVS_HousekeepingTlm_Payload::Spare2`  
Padding for 32 bit boundary.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_HK\_SPARE2

Definition at line 211 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.14 Spare3** `uint8` `CFE_EVS_HousekeepingTlm_Payload::Spare3`  
Padding for 32 bit boundary.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_HK\_SPARE3

Definition at line 213 of file default\_cfe\_evs\_msgdefs.h.

**11.75.2.15 UnregisteredAppCounter** `uint8` `CFE_EVS_HousekeepingTlm_Payload::UnregisteredAppCounter`  
Unregistered application message send counter.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_UNREGAPPC

Definition at line 193 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.76 CFE\_EVS\_LogFileCmd\_Payload Struct Reference

Write Event Log to File Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- char `LogFilename` [`CFE_MISSION_MAX_PATH_LEN`]  
*Filename where log data is to be written.*

### 11.76.1 Detailed Description

Write Event Log to File Command Payload.

For command details, see [CFE\\_EVS\\_WRITE\\_LOG\\_DATA\\_FILE\\_CC](#)

Definition at line 57 of file default\_cfe\_evs\_msgdefs.h.

### 11.76.2 Field Documentation

**11.76.2.1 LogFilename** `char` `CFE_EVS_LogFileCmd_Payload::LogFilename` [`CFE_MISSION_MAX_PATH_LEN`]  
Filename where log data is to be written.

Definition at line 59 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.77 CFE\_EVS\_LongEventTlm Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t` `TelemetryHeader`  
*Telemetry header.*
- `CFE_EVS_LongEventTlm_Payload_t` `Payload`  
*Telemetry payload.*

### 11.77.1 Detailed Description

Definition at line 227 of file default\_cfe\_evs\_msgstruct.h.

### 11.77.2 Field Documentation

**11.77.2.1 Payload** [CFE\\_EVS\\_LongEventTlm\\_Payload\\_t](#) CFE\_EVS\_LongEventTlm::Payload  
Telemetry payload.

Definition at line 230 of file default\_cfe\_evs\_msgstruct.h.

**11.77.2.2 TelemetryHeader** [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_EVS\_LongEventTlm::TelemetryHeader  
Telemetry header.

Definition at line 229 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/[default\\_cfe\\_evs\\_msgstruct.h](#)

## 11.78 CFE\_EVS\_LongEventTlm\_Payload Struct Reference

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- [CFE\\_EVS\\_PacketID\\_t](#) PacketID
  - Event packet information.*
- char Message [[CFE\\_MISSION\\_EVS\\_MAX\\_MESSAGE\\_LENGTH](#)]
  - Event message string.*
- uint8 Spare1
  - Structure padding.*
- uint8 Spare2
  - Structure padding.*

### 11.78.1 Detailed Description

**Name** Event Message Telemetry Packet (Long format)

Definition at line 239 of file default\_cfe\_evs\_msgdefs.h.

### 11.78.2 Field Documentation

**11.78.2.1 Message** char CFE\_EVS\_LongEventTlm\_Payload::Message[[CFE\\_MISSION\\_EVS\\_MAX\\_MESSAGE\\_LENGTH](#)]  
Event message string.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_EVENT[[CFE\\_MISSION\\_EVS\\_MAX\\_MESSAGE\\_LENGTH](#)]

Definition at line 242 of file default\_cfe\_evs\_msgdefs.h.

**11.78.2.2 PacketID** `CFE_EVS_PacketID_t` `CFE_EVS_LongEventTlm_Payload::PacketID`  
Event packet information.  
Definition at line 241 of file default\_cfe\_evs\_msgdefs.h.

**11.78.2.3 Spare1** `uint8` `CFE_EVS_LongEventTlm_Payload::Spare1`  
Structure padding.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_SPARE1

Definition at line 244 of file default\_cfe\_evs\_msgdefs.h.

**11.78.2.4 Spare2** `uint8` `CFE_EVS_LongEventTlm_Payload::Spare2`  
Structure padding.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_SPARE2

Definition at line 246 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.79 CFE\_EVS\_NoopCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`

*Command header.*

#### 11.79.1 Detailed Description

Definition at line 50 of file default\_cfe\_evs\_msgstruct.h.

#### 11.79.2 Field Documentation

**11.79.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_EVS_NoopCmd::CommandHeader`  
Command header.  
Definition at line 54 of file default\_cfe\_evs\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.80 CFE\_EVS\_PacketID Struct Reference

```
#include <default_cfe_evs_msgdefs.h>
```

## Data Fields

- `char AppName [CFE_MISSION_MAX_API_LEN]`  
*Application name.*
- `uint16 EventID`  
*Numerical event identifier.*
- `uint16 EventType`  
*Numerical event type identifier.*
- `uint32 SpacecraftID`  
*Spacecraft identifier.*
- `uint32 ProcessorID`  
*Numerical processor identifier.*

### 11.80.1 Detailed Description

Telemetry packet structures

Definition at line 222 of file default\_cfe\_evs\_msgdefs.h.

### 11.80.2 Field Documentation

**11.80.2.1 AppName** `char CFE_EVS_PacketID::AppName [CFE_MISSION_MAX_API_LEN]`  
Application name.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_APPNAME[OS\_MAX\_API\_NAME]

Definition at line 224 of file default\_cfe\_evs\_msgdefs.h.

**11.80.2.2 EventID** `uint16 CFE_EVS_PacketID::EventID`  
Numerical event identifier.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_EVENTID

Definition at line 226 of file default\_cfe\_evs\_msgdefs.h.

**11.80.2.3 EventType** `uint16 CFE_EVS_PacketID::EventType`  
Numerical event type identifier.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_EVENTTYPE

Definition at line 228 of file default\_cfe\_evs\_msgdefs.h.

**11.80.2.4 ProcessorID** `uint32 CFE_EVS_PacketID::ProcessorID`  
Numerical processor identifier.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_PROCESSORID

Definition at line 232 of file default\_cfe\_evs\_msgdefs.h.

**11.80.2.5 SpacecraftID** `uint32 CFE_EVS_PacketID::SpacecraftID`  
Spacecraft identifier.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_EVS\_SCID

Definition at line 230 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.81 CFE\_EVS\_ResetAllFiltersCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t CommandHeader**  
*Command header.*
- **CFE\_EVS\_AppNameCmd\_Payload\_t Payload**  
*Command payload.*

#### 11.81.1 Detailed Description

Definition at line 158 of file default\_cfe\_evs\_msgstruct.h.

#### 11.81.2 Field Documentation

**11.81.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_EVS_ResetAllFiltersCmd::CommandHeader`  
Command header.

Definition at line 160 of file default\_cfe\_evs\_msgstruct.h.

**11.81.2.2 Payload** `CFE_EVS_AppNameCmd_Payload_t CFE_EVS_ResetAllFiltersCmd::Payload`  
Command payload.

Definition at line 161 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.82 CFE\_EVS\_ResetAppCounterCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t CommandHeader**  
*Command header.*
- **CFE\_EVS\_AppNameCmd\_Payload\_t Payload**  
*Command payload.*

#### 11.82.1 Detailed Description

Definition at line 152 of file default\_cfe\_evs\_msgstruct.h.

### 11.82.2 Field Documentation

**11.82.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_ResetAppCounterCmd::CommandHeader  
Command header.

Definition at line 154 of file default\_cfe\_evs\_msgstruct.h.

**11.82.2.2 Payload** [CFE\\_EVS\\_AppNameCmd\\_Payload\\_t](#) CFE\_EVS\_ResetAppCounterCmd::Payload  
Command payload.

Definition at line 155 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.83 CFE\_EVS\_ResetCountersCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*

### 11.83.1 Detailed Description

Definition at line 55 of file default\_cfe\_evs\_msgstruct.h.

### 11.83.2 Field Documentation

**11.83.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_ResetCountersCmd::CommandHeader  
Command header.

Definition at line 57 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.84 CFE\_EVS\_ResetFilterCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppNameEventIDCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.84.1 Detailed Description

Definition at line 169 of file default\_cfe\_evs\_msgstruct.h.

## 11.84.2 Field Documentation

**11.84.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_ResetFilterCmd::CommandHeader  
Command header.

Definition at line 171 of file default\_cfe\_evs\_msgstruct.h.

**11.84.2.2 Payload** [CFE\\_EVS\\_AppNameEventIDCmd\\_Payload\\_t](#) CFE\_EVS\_ResetFilterCmd::Payload  
Command payload.

Definition at line 172 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.85 CFE\_EVS\_SendHkCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*

### 11.85.1 Detailed Description

Definition at line 65 of file default\_cfe\_evs\_msgstruct.h.

## 11.85.2 Field Documentation

**11.85.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_SendHkCmd::CommandHeader  
Command header.

Definition at line 67 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.86 CFE\_EVS\_SetEventFormatCode\_Payload Struct Reference

Set Event Format Mode Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- [CFE\\_EVS\\_MsgFormat\\_Enum\\_t](#) MsgFormat  
*Mode to use in the command.*
- [uint8](#) Spare  
*Pad to even byte.*

### 11.86.1 Detailed Description

Set Event Format Mode Command Payload.

For command details, see [CFE\\_EVS\\_SET\\_EVENT\\_FORMAT\\_MODE\\_CC](#)

Definition at line 91 of file default\_cfe\_evs\_msgdefs.h.

### 11.86.2 Field Documentation

**11.86.2.1 MsgFormat** [CFE\\_EVS\\_MsgFormat\\_Enum\\_t](#) CFE\_EVS\_SetEventFormatCode\_Payload::MsgFormat  
Mode to use in the command.

Definition at line 93 of file default\_cfe\_evs\_msgdefs.h.

**11.86.2.2 Spare** [uint8](#) CFE\_EVS\_SetEventFormatCode\_Payload::Spare

Pad to even byte.

Definition at line 94 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.87 CFE\_EVS\_SetEventFormatModeCmd Struct Reference

Set Event Format Mode Command.

#include <default\_cfe\_evs\_msgstruct.h>

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_SetEventFormatMode\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.87.1 Detailed Description

Set Event Format Mode Command.

Definition at line 100 of file default\_cfe\_evs\_msgstruct.h.

### 11.87.2 Field Documentation

**11.87.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_SetEventFormatModeCmd::CommandHeader  
Command header.

Definition at line 102 of file default\_cfe\_evs\_msgstruct.h.

**11.87.2.2 Payload** [CFE\\_EVS\\_SetEventFormatMode\\_Payload\\_t](#) CFE\_EVS\_SetEventFormatModeCmd::Payload  
Command payload.

Definition at line 103 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.88 CFE\_EVS\_SetFilterCmd Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload\\_t](#) Payload  
*Command payload.*

#### 11.88.1 Detailed Description

Definition at line 209 of file default\_cfe\_evs\_msgstruct.h.

#### 11.88.2 Field Documentation

##### 11.88.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_SetFilterCmd::CommandHeader

Command header.

Definition at line 211 of file default\_cfe\_evs\_msgstruct.h.

##### 11.88.2.2 Payload [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload\\_t](#) CFE\_EVS\_SetFilterCmd::Payload

Command payload.

Definition at line 212 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.89 CFE\_EVS\_SetLogMode\_Payload Struct Reference

Set Log Mode Command Payload.

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- [CFE\\_EVS\\_LogMode\\_Enum\\_t](#) LogMode  
*Mode to use in the command.*
- [uint8](#) Spare  
*Pad to even byte.*

#### 11.89.1 Detailed Description

Set Log Mode Command Payload.

For command details, see [CFE\\_EVS\\_SET\\_LOG\\_MODE\\_CC](#)

Definition at line 79 of file default\_cfe\_evs\_msgdefs.h.

#### 11.89.2 Field Documentation

**11.89.2.1 LogMode** `CFE_EVS_LogMode_Enum_t` `CFE_EVS_SetLogMode_Payload::LogMode`  
Mode to use in the command.

Definition at line 81 of file default\_cfe\_evs\_msgdefs.h.

**11.89.2.2 Spare** `uint8` `CFE_EVS_SetLogMode_Payload::Spare`

Pad to even byte.

Definition at line 82 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.90 CFE\_EVS\_SetLogModeCmd Struct Reference

Set Log Mode Command.

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t` `CommandHeader`  
*Command header.*
- `CFE_EVS_SetLogMode_Payload_t` `Payload`  
*Command payload.*

### 11.90.1 Detailed Description

Set Log Mode Command.

Definition at line 91 of file default\_cfe\_evs\_msgstruct.h.

### 11.90.2 Field Documentation

**11.90.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_EVS_SetLogModeCmd::CommandHeader`  
Command header.

Definition at line 93 of file default\_cfe\_evs\_msgstruct.h.

**11.90.2.2 Payload** `CFE_EVS_SetLogMode_Payload_t` `CFE_EVS_SetLogModeCmd::Payload`  
Command payload.

Definition at line 94 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.91 CFE\_EVS\_ShortEventTlm Struct Reference

```
#include <default_cfe_evs_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t` `TelemetryHeader`  
*Telemetry header.*
- `CFE_EVS_ShortEventTlm_Payload_t` `Payload`  
*Telemetry payload.*

### 11.91.1 Detailed Description

Definition at line 233 of file default\_cfe\_evs\_msgstruct.h.

### 11.91.2 Field Documentation

#### 11.91.2.1 Payload [CFE\\_EVS\\_ShortEventTlm\\_Payload\\_t](#) CFE\_EVS\_ShortEventTlm::Payload

Telemetry payload.

Definition at line 236 of file default\_cfe\_evs\_msgstruct.h.

#### 11.91.2.2 TelemetryHeader [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_EVS\_ShortEventTlm::TelemetryHeader

Telemetry header.

Definition at line 235 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

## 11.92 CFE\_EVS\_ShortEventTlm\_Payload Struct Reference

```
#include <default_cfe_evs_msgdefs.h>
```

### Data Fields

- [CFE\\_EVS\\_PacketID\\_t](#) PacketID

*Event packet information.*

### 11.92.1 Detailed Description

**Name** Event Message Telemetry Packet (Short format)

Definition at line 253 of file default\_cfe\_evs\_msgdefs.h.

### 11.92.2 Field Documentation

#### 11.92.2.1 PacketID [CFE\\_EVS\\_PacketID\\_t](#) CFE\_EVS\_ShortEventTlm\_Payload::PacketID

Event packet information.

Definition at line 255 of file default\_cfe\_evs\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h

## 11.93 CFE\_EVS\_WriteAppDataFileCmd Struct Reference

Write Event Services Application Information to File Command.

```
#include <default_cfe_evs_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_AppDataCmd\\_Payload\\_t](#) Payload  
*Command payload.*

**11.93.1 Detailed Description**

Write Event Services Application Information to File Command.

Definition at line 82 of file default\_cfe\_evs\_msgstruct.h.

**11.93.2 Field Documentation****11.93.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_WriteAppDataFileCmd::CommandHeader**  
Command header.

Definition at line 84 of file default\_cfe\_evs\_msgstruct.h.

**11.93.2.2 Payload [CFE\\_EVS\\_AppDataCmd\\_Payload\\_t](#) CFE\_EVS\_WriteAppDataFileCmd::Payload**  
Command payload.

Definition at line 85 of file default\_cfe\_evs\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h

**11.94 CFE\_EVS\_WriteLogFileCmd Struct Reference**

Write Event Log to File Command.

```
#include <default_cfe_evs_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_EVS\\_LogFileCmd\\_Payload\\_t](#) Payload  
*Command payload.*

**11.94.1 Detailed Description**

Write Event Log to File Command.

Definition at line 73 of file default\_cfe\_evs\_msgstruct.h.

**11.94.2 Field Documentation****11.94.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_EVS\_WriteLogFileCmd::CommandHeader**  
Command header.

Definition at line 75 of file default\_cfe\_evs\_msgstruct.h.

**11.94.2.2 Payload** `CFE_EVS_LogFileCmd_Payload_t` `CFE_EVS_WriteLogFileCmd::Payload`  
Command payload.

Definition at line 76 of file `default_cfe_evs_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/evs/config/default_cfe_evs_msgstruct.h`

## 11.95 CFE\_FS\_FileWriteMetaData Struct Reference

External Metadata/State object associated with background file writes.

```
#include <cfe_fs_api_typedefs.h>
```

### Data Fields

- volatile bool `IsPending`
- char `FileName` [`CFE_MISSION_MAX_PATH_LEN`]
- `uint32 FileSubType`
- char `Description` [`CFE_FS_HDR_DESC_MAX_LEN`]
- `CFE_FS_FileWriteGetData_t GetData`
- `CFE_FS_FileWriteOnEvent_t OnEvent`

### 11.95.1 Detailed Description

External Metadata/State object associated with background file writes.

Applications intending to schedule background file write jobs should instantiate this object in static/global data memory.

This keeps track of the state of the file write request(s).

Definition at line 124 of file `cfe_fs_api_typedefs.h`.

### 11.95.2 Field Documentation

#### 11.95.2.1 Description `char CFE_FS_FileWriteMetaData::Description[CFE_FS_HDR_DESC_MAX_LEN]`

Description of file (for FS header)

Definition at line 132 of file `cfe_fs_api_typedefs.h`.

#### 11.95.2.2 FileName `char CFE_FS_FileWriteMetaData::FileName[CFE_MISSION_MAX_PATH_LEN]`

Name of file to write

Definition at line 128 of file `cfe_fs_api_typedefs.h`.

#### 11.95.2.3 FileSubType `uint32 CFE_FS_FileWriteMetaData::FileSubType`

Type of file to write (for FS header)

Definition at line 131 of file `cfe_fs_api_typedefs.h`.

#### 11.95.2.4 GetData `CFE_FS_FileWriteGetData_t CFE_FS_FileWriteMetaData::GetData`

Application callback to get a data record

Definition at line 134 of file `cfe_fs_api_typedefs.h`.

**11.95.2.5 IsPending** volatile bool CFE\_FS\_FileWriteMetaData::IsPending  
Whether request is pending (volatile as it may be checked outside lock)  
Definition at line 126 of file cfe\_fs\_api\_typedefs.h.

**11.95.2.6 OnEvent** CFE\_FS\_FileWriteOnEvent\_t CFE\_FS\_FileWriteMetaData::OnEvent  
Application callback for abstract event processing  
Definition at line 135 of file cfe\_fs\_api\_typedefs.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/core\_api/fsw/inc/cfe\_fs\_api\_typedefs.h

## 11.96 CFE\_FS\_Header Struct Reference

Standard cFE File header structure definition.

```
#include <default_cfe_fs_filedef.h>
```

### Data Fields

- uint32 **ContentType**  
*Identifies the content type (=cFE1'=0x63464531)*
- uint32 **SubType**  
*Type of ContentType, if necessary.*
- uint32 **Length**  
*Length of this header to support external processing.*
- uint32 **SpacecraftID**  
*Spacecraft that generated the file.*
- uint32 **ProcessorID**  
*Processor that generated the file.*
- uint32 **ApplicationID**  
*Application that generated the file.*
- uint32 **TimeSeconds**  
*File creation timestamp (seconds)*
- uint32 **TimeSubSeconds**  
*File creation timestamp (sub-seconds)*
- char **Description** [CFE\_FS\_HDR\_DESC\_MAX\_LEN]  
*File description.*

### 11.96.1 Detailed Description

Standard cFE File header structure definition.  
Definition at line 181 of file default\_cfe\_fs\_filedef.h.

### 11.96.2 Field Documentation

**11.96.2.1 ApplicationID** uint32 CFE\_FS\_Header::ApplicationID  
Application that generated the file.  
Definition at line 190 of file default\_cfe\_fs\_filedef.h.

**11.96.2.2 ContentType** `uint32` `CFE_FS_Header::ContentType`  
Identifies the content type (=‘cFE1’=0x63464531)  
Definition at line 183 of file default\_cfe\_fs\_filedef.h.

**11.96.2.3 Description** `char` `CFE_FS_Header::Description[CFE_FS_HDR_DESC_MAX_LEN]`  
File description.  
Definition at line 195 of file default\_cfe\_fs\_filedef.h.

**11.96.2.4 Length** `uint32` `CFE_FS_Header::Length`  
Length of this header to support external processing.  
Definition at line 187 of file default\_cfe\_fs\_filedef.h.

**11.96.2.5 ProcessorID** `uint32` `CFE_FS_Header::ProcessorID`  
Processor that generated the file.  
Definition at line 189 of file default\_cfe\_fs\_filedef.h.

**11.96.2.6 SpacecraftID** `uint32` `CFE_FS_Header::SpacecraftID`  
Spacecraft that generated the file.  
Definition at line 188 of file default\_cfe\_fs\_filedef.h.

**11.96.2.7 SubType** `uint32` `CFE_FS_Header::SubType`  
Type of ContentType, if necessary.  
Standard SubType definitions can be found [here](#)  
Definition at line 184 of file default\_cfe\_fs\_filedef.h.

**11.96.2.8 TimeSeconds** `uint32` `CFE_FS_Header::TimeSeconds`  
File creation timestamp (seconds)  
Definition at line 192 of file default\_cfe\_fs\_filedef.h.

**11.96.2.9 TimeSubSeconds** `uint32` `CFE_FS_Header::TimeSubSeconds`  
File creation timestamp (sub-seconds)  
Definition at line 193 of file default\_cfe\_fs\_filedef.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/fs/config/default\_cfe\_fs\_filedef.h

## 11.97 CFE\_SB\_AllSubscriptionsTlm Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_SB_AllSubscriptionsTlm_Payload_t Payload`  
*Telemetry payload.*

### 11.97.1 Detailed Description

Definition at line 145 of file default\_cfe\_sb\_msgstruct.h.

### 11.97.2 Field Documentation

**11.97.2.1 Payload** `CFE_SB_AllSubscriptionsTlm_Payload_t` `CFE_SB_AllSubscriptionsTlm::Payload`  
Telemetry payload.

Definition at line 148 of file default\_cfe\_sb\_msgstruct.h.

**11.97.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_SB_AllSubscriptionsTlm::TelemetryHeader`  
Telemetry header.

Definition at line 147 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/sb/config/default_cfe_sb_msgstruct.h`

## 11.98 CFE\_SB\_AllSubscriptionsTlm\_Payload Struct Reference

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- `uint32 PktSegment`  
*Pkt number(starts at 1) in the series.*
- `uint32 TotalSegments`  
*Total number of pkts needed to complete the request.*
- `uint32 Entries`  
*Number of entries in the pkt.*
- `CFE_SB_SubEntries_t Entry [CFE_SB_SUB_ENTRIES_PER_PKT]`  
*Array of `CFE_SB_SubEntries_t` entries.*

### 11.98.1 Detailed Description

**Name** SB Previous Subscriptions Packet

This structure defines the pkt(s) sent by SB that contains a list of all current subscriptions. This pkt is generated on cmd and intended to be used primarily by the Software Bus Networking Application (SBN). Typically, when the cmd is received there are more subscriptions than can fit in one pkt. The complete list of subscriptions is sent via a series of segmented pkts.

Definition at line 274 of file default\_cfe\_sb\_msgdefs.h.

### 11.98.2 Field Documentation

**11.98.2.1 Entries** `uint32` `CFE_SB_AllSubscriptionsTlm_Payload::Entries`  
Number of entries in the pkt.

Definition at line 278 of file default\_cfe\_sb\_msgdefs.h.

**11.98.2.2 Entry** `CFE_SB_SubEntries_t` `CFE_SB_AllSubscriptionsTlm_Payload::Entry` [`CFE_SB_SUB_ENTRIES_PER_PKT`]  
Array of `CFE_SB_SubEntries_t` entries.

Definition at line 279 of file `default_cfe_sb_msgdefs.h`.

**11.98.2.3 PktSegment** `uint32` `CFE_SB_AllSubscriptionsTlm_Payload::PktSegment`

Pkt number(starts at 1) in the series.

Definition at line 276 of file `default_cfe_sb_msgdefs.h`.

**11.98.2.4 TotalSegments** `uint32` `CFE_SB_AllSubscriptionsTlm_Payload::TotalSegments`

Total number of pkts needed to complete the request.

Definition at line 277 of file `default_cfe_sb_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/sb/config/default_cfe_sb_msgdefs.h`

## 11.99 CFE\_SB\_DisableRouteCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_SB_RouteCmd_Payload_t Payload`  
*Command payload.*

#### 11.99.1 Detailed Description

Definition at line 117 of file `default_cfe_sb_msgstruct.h`.

#### 11.99.2 Field Documentation

**11.99.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_SB_DisableRouteCmd::CommandHeader`  
Command header.

Definition at line 119 of file `default_cfe_sb_msgstruct.h`.

**11.99.2.2 Payload** `CFE_SB_RouteCmd_Payload_t` `CFE_SB_DisableRouteCmd::Payload`  
Command payload.

Definition at line 120 of file `default_cfe_sb_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/sb/config/default_cfe_sb_msgstruct.h`

## 11.100 CFE\_SB\_DisableSubReportingCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`

### 11.100.1 Detailed Description

Definition at line 67 of file default\_cfe\_sb\_msgstruct.h.

### 11.100.2 Field Documentation

#### 11.100.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_DisableSubReportingCmd::CommandHeader

Definition at line 69 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.101 CFE\_SB\_EnableRouteCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_SB\\_RouteCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.101.1 Detailed Description

Definition at line 111 of file default\_cfe\_sb\_msgstruct.h.

### 11.101.2 Field Documentation

#### 11.101.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_EnableRouteCmd::CommandHeader

Command header.

Definition at line 113 of file default\_cfe\_sb\_msgstruct.h.

#### 11.101.2.2 Payload [CFE\\_SB\\_RouteCmd\\_Payload\\_t](#) CFE\_SB\_EnableRouteCmd::Payload

Command payload.

Definition at line 114 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.102 CFE\_SB\_EnableSubReportingCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

### 11.102.1 Detailed Description

Definition at line 62 of file default\_cfe\_sb\_msgstruct.h.

### 11.102.2 Field Documentation

#### 11.102.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_EnableSubReportingCmd::CommandHeader

Definition at line 64 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.103 CFE\_SB\_HousekeepingTlm Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_TelemetryHeader\\_t](#) TelemetryHeader  
*Telemetry header.*
- [CFE\\_SB\\_HousekeepingTlm\\_Payload\\_t](#) Payload  
*Telemetry payload.*

### 11.103.1 Detailed Description

Definition at line 127 of file default\_cfe\_sb\_msgstruct.h.

### 11.103.2 Field Documentation

#### 11.103.2.1 Payload [CFE\\_SB\\_HousekeepingTlm\\_Payload\\_t](#) CFE\_SB\_HousekeepingTlm::Payload

Telemetry payload.

Definition at line 132 of file default\_cfe\_sb\_msgstruct.h.

#### 11.103.2.2 TelemetryHeader [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_SB\_HousekeepingTlm::TelemetryHeader

Telemetry header.

Definition at line 131 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.104 CFE\_SB\_HousekeepingTlm\_Payload Struct Reference

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- [uint8](#) CommandCounter  
*Count of valid commands received.*
- [uint8](#) CommandErrorCounter

*Count of invalid commands received.*

- `uint8 NoSubscribersCounter`  
*Count pkts sent with no subscribers.*
- `uint8 MsgSendErrorCounter`  
*Count of message send errors.*
- `uint8 MsgReceiveErrorCounter`  
*Count of message receive errors.*
- `uint8 InternalErrorCounter`  
*Count of queue read or write errors.*
- `uint8 CreatePipeErrorCounter`  
*Count of errors in create pipe API.*
- `uint8 SubscribeErrorCounter`  
*Count of errors in subscribe API.*
- `uint8 PipeOptsErrorCounter`  
*Count of errors in set/get pipe options API.*
- `uint8 DuplicateSubscriptionsCounter`  
*Count of duplicate subscriptions.*
- `uint8 GetPipeldByNameErrorCounter`  
*Count of errors in get pipe id by name API.*
- `uint8 Spare2Align [1]`  
*Spare bytes to ensure alignment.*
- `uint16 PipeOverflowErrorCounter`  
*Count of pipe overflow errors.*
- `uint16 MsgLimitErrorCounter`  
*Count of msg id to pipe errors.*
- `CFE_ES_MemHandle_t MemPoolHandle`  
*Handle to SB's Memory Pool.*
- `uint32 MemInUse`  
*Memory in use.*
- `uint32 UnmarkedMem`  
*cfg param CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES minus Peak Memory in use*

#### 11.104.1 Detailed Description

**Name** Software Bus task housekeeping Packet

Definition at line 67 of file default\_cfe\_sb\_msgdefs.h.

#### 11.104.2 Field Documentation

**11.104.2.1 CommandCounter** `uint8 CFE_SB_HousekeepingTlm_Payload::CommandCounter`  
Count of valid commands received.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_CMDPC

Definition at line 71 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.2 CommandErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::CommandErrorCounter`  
Count of invalid commands received.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_CMDEC`

Definition at line 73 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.3 CreatePipeErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::CreatePipeErrorCounter`  
Count of errors in create pipe API.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_NewPipeEC`

Definition at line 84 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.4 DuplicateSubscriptionsCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::DuplicateSubscriptions`←  
Counter  
Count of duplicate subscriptions.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_DupSubCnt`

Definition at line 90 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.5 GetPipeIdByNameErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::GetPipeIdByName`←  
ErrorCounter  
Count of errors in get pipe id by name API.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_GetPipeIDByNameEC`

Definition at line 92 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.6 InternalErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::InternalErrorCounter`  
Count of queue read or write errors.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_InternalEC`

Definition at line 82 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.7 MemInUse** `uint32` `CFE_SB_HousekeepingTlm_Payload::MemInUse`  
Memory in use.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_MemInUse`

Definition at line 105 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.8 MemPoolHandle** `CFE_ES_MemHandle_t` `CFE_SB_HousekeepingTlm_Payload::MemPoolHandle`  
Handle to SB's Memory Pool.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_MemPoolHdl`

Definition at line 102 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.9 MsgLimitErrorCounter** `uint16` `CFE_SB_HousekeepingTlm_Payload::MsgLimitErrorCounter`  
Count of msg id to pipe errors.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_MsgLimEC`

Definition at line 99 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.10 MsgReceiveErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::MsgReceiveErrorCounter`  
Count of message receive errors.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_MsgRecEC`

Definition at line 80 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.11 MsgSendErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::MsgSendErrorCounter`  
Count of message send errors.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_MsgSndEC`

Definition at line 77 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.12 NoSubscribersCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::NoSubscribersCounter`  
Count pkts sent with no subscribers.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_NoSubEC`

Definition at line 75 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.13 PipeOptsErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::PipeOptsErrorCounter`  
Count of errors in set/get pipe options API.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_PipeOptsEC`

Definition at line 88 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.14 PipeOverflowErrorCounter** `uint16` `CFE_SB_HousekeepingTlm_Payload::PipeOverflowError←`  
Counter  
Count of pipe overflow errors.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_PipeOvrEC`

Definition at line 97 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.15 Spare2Align** `uint8` `CFE_SB_HousekeepingTlm_Payload::Spare2Align[1]`  
Spare bytes to ensure alignment.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Spare2Align[2]`

Definition at line 94 of file `default_cfe_sb_msgdefs.h`.

**11.104.2.16 SubscribeErrorCounter** `uint8` `CFE_SB_HousekeepingTlm_Payload::SubscribeErrorCounter`  
Count of errors in subscribe API.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_SubscrEC

Definition at line 86 of file default\_cfe\_sb\_msgdefs.h.

**11.104.2.17 UnmarkedMem** `uint32` `CFE_SB_HousekeepingTlm_Payload::UnmarkedMem`  
cfg param CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES minus Peak Memory in use

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_UnMarkedMem

Definition at line 108 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.105 CFE\_SB\_Msg Union Reference

Software Bus generic message.

```
#include <cfe_sb_api_typedefs.h>
```

### Data Fields

- **CFE\_MSG\_Message\_t** `Msg`  
*Base message type without enforced alignment.*
- long long int `LongInt`  
*Align to support Long Integer.*
- long double `LongDouble`  
*Align to support Long Double.*

### 11.105.1 Detailed Description

Software Bus generic message.

Definition at line 142 of file cfe\_sb\_api\_typedefs.h.

### 11.105.2 Field Documentation

**11.105.2.1 LongDouble** long double `CFE_SB_Msg::LongDouble`  
Align to support Long Double.  
Definition at line 146 of file cfe\_sb\_api\_typedefs.h.

**11.105.2.2 LongInt** long long int `CFE_SB_Msg::LongInt`  
Align to support Long Integer.  
Definition at line 145 of file cfe\_sb\_api\_typedefs.h.

**11.105.2.3 Msg** [CFE\\_MSG\\_Message\\_t](#) CFE\_SB\_Msg::Msg

Base message type without enforced alignment.

Definition at line 144 of file cfe\_sb\_api\_typedefs.h.

Referenced by LC\_AppPipe(), LC\_CheckMsgForWPs(), LC\_NoopVerifyDispatch(), LC\_ResetAPStatsVerifyDispatch(), LC\_ResetCountersVerifyDispatch(), LC\_ResetWPStatsVerifyDispatch(), LC\_SampleAPVerifyDispatch(), LC\_SendHkVerifyDispatch(), LC\_SetAPPermOffVerifyDispatch(), LC\_SetAPStateVerifyDispatch(), LC\_SetLCStateVerifyDispatch(), and LC\_WPOffsetValid().

The documentation for this union was generated from the following file:

- cfe/modules/core\_api/fsw/inc/cfe\_sb\_api\_typedefs.h

**11.106 CFE\_SB\_MsgId\_t Struct Reference**

[CFE\\_SB\\_MsgId\\_t](#) type definition.

```
#include <default_cfe_sb_extern_typedefs.h>
```

**Data Fields**

- [CFE\\_SB\\_MsgId\\_Atom\\_t](#) Value

**11.106.1 Detailed Description**

[CFE\\_SB\\_MsgId\\_t](#) type definition.

Software Bus message identifier used in many SB APIs

Currently this is directly mapped to the underlying holding type (not wrapped) for compatibility with existing usage semantics in apps (mainly switch/case statements)

**Note**

In a future version it could become a type-safe wrapper similar to the route index, to avoid message IDs getting mixed between other integer values.

Definition at line 104 of file default\_cfe\_sb\_extern\_typedefs.h.

**11.106.2 Field Documentation****11.106.2.1 Value** [CFE\\_SB\\_MsgId\\_Atom\\_t](#) CFE\_SB\_MsgId\_t::Value

Definition at line 106 of file default\_cfe\_sb\_extern\_typedefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_extern\_typedefs.h

**11.107 CFE\_SB\_MsgMapFileEntry Struct Reference**

SB Map File Entry.

```
#include <default_cfe_sb_msgdefs.h>
```

**Data Fields**

- [CFE\\_SB\\_MsgId\\_t](#) MsgId

*Message Id which has been subscribed to.*

- [CFE\\_SB\\_Routeld\\_Atom\\_t](#) Index

*Routing raw index value (0 based, not Route ID)*

### 11.107.1 Detailed Description

SB Map File Entry.

Structure of one element of the map information in response to [CFE\\_SB\\_WRITE\\_MAP\\_INFO\\_CC](#)

Definition at line 226 of file default\_cfe\_sb\_msgdefs.h.

### 11.107.2 Field Documentation

#### 11.107.2.1 Index [CFE\\_SB\\_RouteId\\_Atom\\_t](#) CFE\_SB\_MsgMapFileEntry::Index

Routing raw index value (0 based, not Route ID)

Definition at line 229 of file default\_cfe\_sb\_msgdefs.h.

#### 11.107.2.2 MsgId [CFE\\_SB\\_MsgId\\_t](#) CFE\_SB\_MsgMapFileEntry::MsgId

Message Id which has been subscribed to.

Definition at line 228 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.108 CFE\_SB\_NoopCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

### 11.108.1 Detailed Description

Definition at line 52 of file default\_cfe\_sb\_msgstruct.h.

### 11.108.2 Field Documentation

#### 11.108.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_NoopCmd::CommandHeader

Definition at line 58 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.109 CFE\_SB\_PipeDepthStats Struct Reference

SB Pipe Depth Statistics.

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- [CFE\\_SB\\_Pipeld\\_t](#) Pipeld

*Pipe Id associated with the stats below.*

- [uint16](#) MaxQueueDepth

*Number of messages the pipe can hold.*

- `uint16 CurrentQueueDepth`  
*Number of messages currently on the pipe.*
- `uint16 PeakQueueDepth`  
*Peak number of messages that have been on the pipe.*
- `uint16 Spare`  
*Spare word to ensure alignment.*

### 11.109.1 Detailed Description

SB Pipe Depth Statistics.

Used in SB Statistics Telemetry Packet `CFE_SB_StatsTlm_t`

Definition at line 115 of file `default_cfe_sb_msgdefs.h`.

### 11.109.2 Field Documentation

#### 11.109.2.1 `CurrentQueueDepth` `uint16 CFE_SB_PipeDepthStats::CurrentQueueDepth`

Number of messages currently on the pipe.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES].SB_PDINUSE`

Definition at line 121 of file `default_cfe_sb_msgdefs.h`.

#### 11.109.2.2 `MaxQueueDepth` `uint16 CFE_SB_PipeDepthStats::MaxQueueDepth`

Number of messages the pipe can hold.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES].SB_PDEPTH`

Definition at line 119 of file `default_cfe_sb_msgdefs.h`.

#### 11.109.2.3 `PeakQueueDepth` `uint16 CFE_SB_PipeDepthStats::PeakQueueDepth`

Peak number of messages that have been on the pipe.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES].SB_PDPKINUSE`

Definition at line 123 of file `default_cfe_sb_msgdefs.h`.

#### 11.109.2.4 `PipeId` `CFE_SB_PipeId_t CFE_SB_PipeDepthStats::PipeId`

Pipe Id associated with the stats below.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES].SB_PDPIPEID`

Definition at line 117 of file `default_cfe_sb_msgdefs.h`.

#### 11.109.2.5 `Spare` `uint16 CFE_SB_PipeDepthStats::Spare`

Spare word to ensure alignment.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES].SB_PDSPARE`

Definition at line 125 of file `default_cfe_sb_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/sb/config/default_cfe_sb_msgdefs.h`

## 11.110 CFE\_SB\_PipeInfoEntry Struct Reference

SB Pipe Information File Entry.

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- `CFE_SB_PipeId_t PipeId`
- `CFE_ES_AppId_t AppId`
- `char PipeName [CFE_MISSION_MAX_API_LEN]`
- `charAppName [CFE_MISSION_MAX_API_LEN]`
- `uint16 MaxQueueDepth`
- `uint16 CurrentQueueDepth`
- `uint16 PeakQueueDepth`
- `uint16 SendErrors`
- `uint8 Opts`
- `uint8 Spare [3]`

### 11.110.1 Detailed Description

SB Pipe Information File Entry.

This statistics structure is output as part of the CFE SB "Send Pipe Info" command (CFE\_SB\_SEND\_PIPE\_INFO\_CC). Previous versions of CFE simply wrote the internal CFE\_SB\_PipeD\_t object to the file, but this also contains information such as pointers which are not relevant outside the running CFE process.

By defining the pipe info structure separately, it also provides some independence, such that the internal CFE\_SB\_PipeD\_t definition can evolve without changing the binary format of the information file.

Definition at line 144 of file default\_cfe\_sb\_msgdefs.h.

### 11.110.2 Field Documentation

#### 11.110.2.1 AppId `CFE_ES_AppId_t CFE_SB_PipeInfoEntry::AppId`

The runtime ID of the application that owns the pipe

Definition at line 147 of file default\_cfe\_sb\_msgdefs.h.

#### 11.110.2.2 AppName `char CFE_SB_PipeInfoEntry::AppName [CFE_MISSION_MAX_API_LEN]`

The Name of the application that owns the pipe

Definition at line 149 of file default\_cfe\_sb\_msgdefs.h.

#### 11.110.2.3 CurrentQueueDepth `uint16 CFE_SB_PipeInfoEntry::CurrentQueueDepth`

The current depth of the pipe

Definition at line 151 of file default\_cfe\_sb\_msgdefs.h.

#### 11.110.2.4 MaxQueueDepth `uint16 CFE_SB_PipeInfoEntry::MaxQueueDepth`

The allocated depth of the pipe (max capacity)

Definition at line 150 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.5 Opt** `uint8 CFE_SB_PipeInfoEntry::Opt`  
Pipe options set (bitmask)  
Definition at line 154 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.6 PeakQueueDepth** `uint16 CFE_SB_PipeInfoEntry::PeakQueueDepth`  
The peak depth of the pipe (high watermark)  
Definition at line 152 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.7 PipeId** `CFE_SB_PipeId_t CFE_SB_PipeInfoEntry::PipeId`  
The runtime ID of the pipe  
Definition at line 146 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.8 PipeName** `char CFE_SB_PipeInfoEntry::PipeName [CFE_MISSION_MAX_API_LEN]`  
The Name of the pipe  
Definition at line 148 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.9 SendErrors** `uint16 CFE_SB_PipeInfoEntry::SendErrors`  
Number of errors when writing to this pipe  
Definition at line 153 of file default\_cfe\_sb\_msgdefs.h.

**11.110.2.10 Spare** `uint8 CFE_SB_PipeInfoEntry::Spare[3]`  
Padding to make this structure a multiple of 4 bytes  
Definition at line 155 of file default\_cfe\_sb\_msgdefs.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.111 CFE\_SB\_Qos\_t Struct Reference

Quality Of Service Type Definition.

```
#include <default_cfe_sb_extern_typedefs.h>
```

### Data Fields

- **uint8 Priority**  
*Specify high(1) or low(0) message priority for off-board routing, currently unused.*
- **uint8 Reliability**  
*Specify high(1) or low(0) message transfer reliability for off-board routing, currently unused.*

### 11.111.1 Detailed Description

Quality Of Service Type Definition.

Currently an unused parameter in `CFE_SB_SubscribeEx` Intended to be used for interprocessor communication only  
Definition at line 121 of file default\_cfe\_sb\_extern\_typedefs.h.

### 11.111.2 Field Documentation

**11.111.2.1 Priority** `uint8 CFE_SB_Qos_t::Priority`

Specify high(1) or low(0) message priority for off-board routing, currently unused.

Definition at line 123 of file default\_cfe\_sb\_extern\_typedefs.h.

**11.111.2.2 Reliability** `uint8 CFE_SB_Qos_t::Reliability`

Specify high(1) or low(0) message transfer reliability for off-board routing, currently unused.

Definition at line 124 of file default\_cfe\_sb\_extern\_typedefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_extern\_typedefs.h

**11.112 CFE\_SB\_ResetCountersCmd Struct Reference**

```
#include <default_cfe_sb_msgstruct.h>
```

**Data Fields**

- `CFE_MSG_CommandHeader_t CommandHeader`

**11.112.1 Detailed Description**

Definition at line 57 of file default\_cfe\_sb\_msgstruct.h.

**11.112.2 Field Documentation****11.112.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_SB_ResetCountersCmd::CommandHeader`

Definition at line 59 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

**11.113 CFE\_SB\_RouteCmd\_Payload Struct Reference**

Enable/Disable Route Command Payload.

```
#include <default_cfe_sb_msgdefs.h>
```

**Data Fields**

- `CFE_SB_MsgId_t MsgId`  
*Message ID of route to be enabled or disabled `CFE_SB_MsgId_t`.*
- `CFE_SB_Pipeld_t Pipe`  
*Pipe ID of route to be enabled or disabled `CFE_SB_Pipeld_t`.*
- `uint8 Spare`  
*Spare byte to make command even number of bytes.*

**11.113.1 Detailed Description**

Enable/Disable Route Command Payload.

This structure contains a definition used by two SB commands, 'Enable Route' `CFE_SB_ENABLE_ROUTE_CC` and 'Disable Route' `CFE_SB_DISABLE_ROUTE_CC`. A route is the destination pipe for a particular message and is therefore defined as a MsgId and Pipeld combination.

Definition at line 53 of file default\_cfe\_sb\_msgdefs.h.

### 11.113.2 Field Documentation

#### 11.113.2.1 MsgId [CFE\\_SB\\_MsgId\\_t](#) CFE\_SB\_RouteCmd\_Payload::MsgId

Message ID of route to be enabled or disabled [CFE\\_SB\\_MsgId\\_t](#).

Definition at line 55 of file default\_cfe\_sb\_msgdefs.h.

#### 11.113.2.2 Pipe [CFE\\_SB\\_PipeId\\_t](#) CFE\_SB\_RouteCmd\_Payload::Pipe

Pipe ID of route to be enabled or disabled [CFE\\_SB\\_PipeId\\_t](#).

Definition at line 56 of file default\_cfe\_sb\_msgdefs.h.

#### 11.113.2.3 Spare [uint8](#) CFE\_SB\_RouteCmd\_Payload::Spare

Spare byte to make command even number of bytes.

Definition at line 57 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.114 CFE\_SB\_RoutingFileEntry Struct Reference

SB Routing File Entry.

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- [CFE\\_SB\\_MsgId\\_t](#) MsgId
  - Message Id portion of the route.*
- [CFE\\_SB\\_PipeId\\_t](#) PipelD
  - Pipe Id portion of the route.*
- [uint8](#) State
  - Route Enabled or Disabled.*
- [uint16](#) MsgCnt
  - Number of msgs with this MsgId sent to this PipelD.*
- char [AppName](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]
  - Pipe Depth Statistics.*
- char [PipeName](#) [[CFE\\_MISSION\\_MAX\\_API\\_LEN](#)]
  - Pipe Depth Statistics.*

### 11.114.1 Detailed Description

SB Routing File Entry.

Structure of one element of the routing information in response to [CFE\\_SB\\_WRITE\\_ROUTING\\_INFO\\_CC](#)

Definition at line 211 of file default\_cfe\_sb\_msgdefs.h.

### 11.114.2 Field Documentation

**11.114.2.1 AppName** `char CFE_SB_RoutingFileEntry::AppName[CFE_MISSION_MAX_API_LEN]`  
Pipe Depth Statistics.  
Definition at line 217 of file default\_cfe\_sb\_msgdefs.h.

**11.114.2.2 MsgCnt** `uint16 CFE_SB_RoutingFileEntry::MsgCnt`  
Number of msgs with this MsgId sent to this PipeId.  
Definition at line 216 of file default\_cfe\_sb\_msgdefs.h.

**11.114.2.3 MsgId** `CFE_SB_MsgId_t CFE_SB_RoutingFileEntry::MsgId`  
Message Id portion of the route.  
Definition at line 213 of file default\_cfe\_sb\_msgdefs.h.

**11.114.2.4 PipeId** `CFE_SB_PipeId_t CFE_SB_RoutingFileEntry::PipeId`  
Pipe Id portion of the route.  
Definition at line 214 of file default\_cfe\_sb\_msgdefs.h.

**11.114.2.5 PipeName** `char CFE_SB_RoutingFileEntry::PipeName[CFE_MISSION_MAX_API_LEN]`  
Pipe Depth Statistics.  
Definition at line 218 of file default\_cfe\_sb\_msgdefs.h.

**11.114.2.6 State** `uint8 CFE_SB_RoutingFileEntry::State`  
Route Enabled or Disabled.  
Definition at line 215 of file default\_cfe\_sb\_msgdefs.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.115 CFE\_SB\_SendHkCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`

#### 11.115.1 Detailed Description

Definition at line 82 of file default\_cfe\_sb\_msgstruct.h.

#### 11.115.2 Field Documentation

**11.115.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_SB_SendHkCmd::CommandHeader`  
Definition at line 84 of file default\_cfe\_sb\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.116 CFE\_SB\_SendPrevSubsCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

#### 11.116.1 Detailed Description

Definition at line 77 of file default\_cfe\_sb\_msgstruct.h.

#### 11.116.2 Field Documentation

##### 11.116.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_SendPrevSubsCmd::CommandHeader

Definition at line 79 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/[default\\_cfe\\_sb\\_msgstruct.h](#)

## 11.117 CFE\_SB\_SendSbStatsCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader

#### 11.117.1 Detailed Description

Definition at line 72 of file default\_cfe\_sb\_msgstruct.h.

#### 11.117.2 Field Documentation

##### 11.117.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_SendSbStatsCmd::CommandHeader

Definition at line 74 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/[default\\_cfe\\_sb\\_msgstruct.h](#)

## 11.118 CFE\_SB\_SingleSubscriptionTlm Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_TelemetryHeader\\_t](#) TelemetryHeader
  - Telemetry header.*
- [CFE\\_SB\\_SingleSubscriptionTlm\\_Payload\\_t](#) Payload
  - Telemetry payload.*

### 11.118.1 Detailed Description

Definition at line 139 of file default\_cfe\_sb\_msgstruct.h.

### 11.118.2 Field Documentation

**11.118.2.1 Payload** [CFE\\_SB\\_SingleSubscriptionTlm\\_Payload\\_t](#) CFE\_SB\_SingleSubscriptionTlm::Payload  
Telemetry payload.

Definition at line 142 of file default\_cfe\_sb\_msgstruct.h.

**11.118.2.2 TelemetryHeader** [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_SB\_SingleSubscriptionTlm::Telemetry↔  
Header

Telemetry header.

Definition at line 141 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.119 CFE\_SB\_SingleSubscriptionTlm\_Payload Struct Reference

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- [uint8 SubType](#)  
*Subscription or Unsubscription.*
- [CFE\\_SB\\_MsgId\\_t MsgId](#)  
*MsgId subscribed or unsubscribe to.*
- [CFE\\_SB\\_Qos\\_t Qos](#)  
*Quality of Service, used only for interprocessor communication.*
- [CFE\\_SB\\_PipeId\\_t Pipe](#)  
*Destination pipe id to send above msg id*

### 11.119.1 Detailed Description

**Name** SB Subscription Report Packet

This structure defines the pkt sent by SB when a subscription or a request to unsubscribe is received while subscription reporting is enabled. By default subscription reporting is disabled. This feature is intended to be used primarily by Software Bus Networking Application (SBN)

See also

[CFE\\_SB\\_ENABLE\\_SUB\\_REPORTING\\_CC](#), [CFE\\_SB\\_DISABLE\\_SUB\\_REPORTING\\_CC](#)

Definition at line 242 of file default\_cfe\_sb\_msgdefs.h.

### 11.119.2 Field Documentation

**11.119.2.1 MsgId** `CFE_SB_MsgId_t` `CFE_SB_SingleSubscriptionTlm_Payload::MsgId`  
MsgId subscribed or unsubscribe to.  
Definition at line 245 of file default\_cfe\_sb\_msgdefs.h.

**11.119.2.2 Pipe** `CFE_SB_PipeId_t` `CFE_SB_SingleSubscriptionTlm_Payload::Pipe`  
Destination pipe id to send above msg id

Definition at line 247 of file default\_cfe\_sb\_msgdefs.h.

**11.119.2.3 Qos** `CFE_SB_Qos_t` `CFE_SB_SingleSubscriptionTlm_Payload::Qos`  
Quality of Service, used only for interprocessor communication.  
Definition at line 246 of file default\_cfe\_sb\_msgdefs.h.

**11.119.2.4 SubType** `uint8` `CFE_SB_SingleSubscriptionTlm_Payload::SubType`  
Subscription or Unsubscription.

Definition at line 244 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/sb/config/default\\_cfe\\_sb\\_msgdefs.h](#)

## 11.120 CFE\_SB\_StatsTlm Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [`CFE\_MSG\_TelemetryHeader\_t` TelemetryHeader](#)  
*Telemetry header.*
- [`CFE\_SB\_StatsTlm\_Payload\_t` Payload](#)  
*Telemetry payload.*

### 11.120.1 Detailed Description

Definition at line 133 of file default\_cfe\_sb\_msgstruct.h.

### 11.120.2 Field Documentation

**11.120.2.1 Payload** `CFE_SB_StatsTlm_Payload_t` `CFE_SB_StatsTlm::Payload`  
Telemetry payload.  
Definition at line 136 of file default\_cfe\_sb\_msgstruct.h.

**11.120.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_SB_StatsTlm::TelemetryHeader`  
Telemetry header.  
Definition at line 135 of file default\_cfe\_sb\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [cfe/modules/sb/config/default\\_cfe\\_sb\\_msgstruct.h](#)

## 11.121 CFE\_SB\_StatsTlm\_Payload Struct Reference

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- `uint32 MsgIdsInUse`  
*Current number of MsgIds with a destination.*
- `uint32 PeakMsgIdsInUse`  
*Peak number of MsgIds with a destination.*
- `uint32 MaxMsgIdsAllowed`  
*cFE Cfg Param `CFE_PLATFORM_SB_MAX_MSG_IDS`*
- `uint32 PipesInUse`  
*Number of pipes currently in use.*
- `uint32 PeakPipesInUse`  
*Peak number of pipes since last reboot.*
- `uint32 MaxPipesAllowed`  
*cFE Cfg Param `CFE_PLATFORM_SB_MAX_PIPES`*
- `uint32 MemInUse`  
*Memory bytes currently in use for SB msg transfers.*
- `uint32 PeakMemInUse`  
*Peak memory bytes in use for SB msg transfers.*
- `uint32 MaxMemAllowed`  
*cFE Cfg Param `CFE_PLATFORM_SB_BUF_MEMORY_BYTES`*
- `uint32 SubscriptionsInUse`  
*Number of current subscriptions.*
- `uint32 PeakSubscriptionsInUse`  
*Peak number of subscriptions.*
- `uint32 MaxSubscriptionsAllowed`  
*product of `CFE_PLATFORM_SB_MAX_MSG_IDS` and `CFE_PLATFORM_SB_MAX_DEST_PER_PKT`*
- `uint32 SBBuffersInUse`  
*Number of SB message buffers currently in use.*
- `uint32 PeakSBBuffersInUse`  
*Max number of SB message buffers in use.*
- `uint32 MaxPipeDepthAllowed`  
*Maximum allowed pipe depth.*
- `CFE_SB_PipeDepthStats_t PipeDepthStats [CFE_MISSION_SB_MAX_PIPES]`  
*Pipe Depth Statistics `CFE_SB_PipeDepthStats_t`.*

### 11.121.1 Detailed Description

**Name** SB Statistics Telemetry Packet

SB Statistics packet sent in response to `CFE_SB_SEND_SB_STATS_CC`  
Definition at line 163 of file `default_cfe_sb_msgdefs.h`.

### 11.121.2 Field Documentation

**11.121.2.1 MaxMemAllowed** `uint32 CFE_SB_StatsTlm_Payload::MaxMemAllowed`  
cFE Cfg Param [CFE\\_PLATFORM\\_SB\\_BUFS\\_MEMORY\\_BYTES](#)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMBMALW

Definition at line 183 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.2 MaxMsgIdsAllowed** `uint32 CFE_SB_StatsTlm_Payload::MaxMsgIdsAllowed`  
cFE Cfg Param [CFE\\_PLATFORM\\_SB\\_MAX\\_MSG\\_IDS](#)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMMDALW

Definition at line 169 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.3 MaxPipeDepthAllowed** `uint32 CFE_SB_StatsTlm_Payload::MaxPipeDepthAllowed`  
Maximum allowed pipe depth.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMPDALW

Definition at line 199 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.4 MaxPipesAllowed** `uint32 CFE_SB_StatsTlm_Payload::MaxPipesAllowed`  
cFE Cfg Param [CFE\\_PLATFORM\\_SB\\_MAX\\_PIPES](#)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMPALW

Definition at line 176 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.5 MaxSubscriptionsAllowed** `uint32 CFE_SB_StatsTlm_Payload::MaxSubscriptionsAllowed`  
product of [CFE\\_PLATFORM\\_SB\\_MAX\\_MSG\\_IDS](#) and [CFE\\_PLATFORM\\_SB\\_MAX\\_DEST\\_PER\\_PKT](#)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMSALW

Definition at line 190 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.6 MemInUse** `uint32 CFE_SB_StatsTlm_Payload::MemInUse`  
Memory bytes currently in use for SB msg transfers.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMBMIU

Definition at line 179 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.7 MsgIdsInUse** `uint32 CFE_SB_StatsTlm_Payload::MsgIdsInUse`  
Current number of MsgIds with a destination.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMMIDIU

Definition at line 165 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.8 PeakMemInUse** `uint32` `CFE_SB_StatsTlm_Payload::PeakMemInUse`  
Peak memory bytes in use for SB msg transfers.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPBMIU`

Definition at line 181 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.9 PeakMsgIdsInUse** `uint32` `CFE_SB_StatsTlm_Payload::PeakMsgIdsInUse`  
Peak number of MsgIds with a destination.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPMIDIU`

Definition at line 167 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.10 PeakPipesInUse** `uint32` `CFE_SB_StatsTlm_Payload::PeakPipesInUse`  
Peak number of pipes since last reboot.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPIIU`

Definition at line 174 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.11 PeakSBBuffersInUse** `uint32` `CFE_SB_StatsTlm_Payload::PeakSBBuffersInUse`  
Max number of SB message buffers in use.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPSBBIU`

Definition at line 196 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.12 PeakSubscriptionsInUse** `uint32` `CFE_SB_StatsTlm_Payload::PeakSubscriptionsInUse`  
Peak number of subscriptions.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPSIU`

Definition at line 188 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.13 PipeDepthStats** `CFE_SB_PipeDepthStats_t` `CFE_SB_StatsTlm_Payload::PipeDepthStats[CFE_MISSION_SB_MAX_PIPES]`  
Pipe Depth Statistics `CFE_SB_PipeDepthStats_t`.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPDS[CFE_PLATFORM_SB_MAX_PIPES]`

Definition at line 202 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.14 PipesInUse** `uint32` `CFE_SB_StatsTlm_Payload::PipesInUse`  
Number of pipes currently in use.

**Telemetry Mnemonic(s)** `$sc_$cpu_SB_Stat.SB_SMPIU`

Definition at line 172 of file `default_cfe_sb_msgdefs.h`.

**11.121.2.15 SBBuffersInUse** `uint32` `CFE_SB_StatsTlm_Payload::SBBuffersInUse`  
Number of SB message buffers currently in use.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMSBBIU

Definition at line 194 of file default\_cfe\_sb\_msgdefs.h.

**11.121.2.16 SubscriptionsInUse** `uint32` `CFE_SB_StatsTlm_Payload::SubscriptionsInUse`  
Number of current subscriptions.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_SB\_Stat.SB\_SMSIU

Definition at line 186 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.122 CFE\_SB\_SubEntries Struct Reference

SB Previous Subscriptions Entry.

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- **CFE\_SB\_MsgId\_t MsgId**  
*MsgId portion of the subscription.*
- **CFE\_SB\_Qos\_t Qos**  
*Qos portion of the subscription.*
- **CFE\_SB\_PipeId\_t Pipe**  
*PipeId portion of the subscription.*

### 11.122.1 Detailed Description

SB Previous Subscriptions Entry.

This structure defines an entry used in the `CFE_SB_PrevSubsPkt_t` Intended to be used primarily by Software Bus Networking Application (SBN)

Used in structure definition `CFE_SB_AllSubscriptionsTlm_t`

Definition at line 258 of file default\_cfe\_sb\_msgdefs.h.

### 11.122.2 Field Documentation

**11.122.2.1 MsgId** `CFE_SB_MsgId_t` `CFE_SB_SubEntries::MsgId`  
MsgId portion of the subscription.  
Definition at line 260 of file default\_cfe\_sb\_msgdefs.h.

**11.122.2.2 Pipe** `CFE_SB_PipeId_t` `CFE_SB_SubEntries::Pipe`  
PipeId portion of the subscription.  
Definition at line 262 of file default\_cfe\_sb\_msgdefs.h.

**11.122.2.3 Qos** [CFE\\_SB\\_Qos\\_t](#) CFE\_SB\_SubEntries::Qos  
Qos portion of the subscription.

Definition at line 261 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.123 CFE\_SB\_WriteFileInfoCmd\_Payload Struct Reference

Write File Info Command Payload.

```
#include <default_cfe_sb_msgdefs.h>
```

### Data Fields

- char [Filename](#) [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]

*Path and Filename of data to be loaded.*

### 11.123.1 Detailed Description

Write File Info Command Payload.

This structure contains a generic definition used by SB commands that write to a file

Definition at line 40 of file default\_cfe\_sb\_msgdefs.h.

### 11.123.2 Field Documentation

**11.123.2.1 Filename** char CFE\_SB\_WriteFileInfoCmd\_Payload::Filename [[CFE\\_MISSION\\_MAX\\_PATH\\_LEN](#)]  
Path and Filename of data to be loaded.

Definition at line 42 of file default\_cfe\_sb\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h

## 11.124 CFE\_SB\_WriteMapInfoCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) [CommandHeader](#)

*Command header.*

- [CFE\\_SB\\_WriteFileInfoCmd\\_Payload\\_t](#) [Payload](#)

*Command payload.*

### 11.124.1 Detailed Description

Definition at line 102 of file default\_cfe\_sb\_msgstruct.h.

### 11.124.2 Field Documentation

**11.124.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_SB_WriteMapInfoCmd::CommandHeader`  
Command header.  
Definition at line 104 of file default\_cfe\_sb\_msgstruct.h.

**11.124.2.2 Payload** `CFE_SB_WriteFileInfoCmd_Payload_t` `CFE_SB_WriteMapInfoCmd::Payload`  
Command payload.  
Definition at line 105 of file default\_cfe\_sb\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [cfe/modules/sb/config/default\\_cfe\\_sb\\_msgstruct.h](#)

## 11.125 CFE\_SB\_WritePipeInfoCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_SB_WriteFileInfoCmd_Payload_t Payload`  
*Command payload.*

### 11.125.1 Detailed Description

Definition at line 96 of file default\_cfe\_sb\_msgstruct.h.

### 11.125.2 Field Documentation

**11.125.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_SB_WritePipeInfoCmd::CommandHeader`  
Command header.  
Definition at line 98 of file default\_cfe\_sb\_msgstruct.h.

**11.125.2.2 Payload** `CFE_SB_WriteFileInfoCmd_Payload_t` `CFE_SB_WritePipeInfoCmd::Payload`  
Command payload.  
Definition at line 99 of file default\_cfe\_sb\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [cfe/modules/sb/config/default\\_cfe\\_sb\\_msgstruct.h](#)

## 11.126 CFE\_SB\_WriteRoutingInfoCmd Struct Reference

```
#include <default_cfe_sb_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_SB_WriteFileInfoCmd_Payload_t Payload`  
*Command payload.*

### 11.126.1 Detailed Description

Definition at line 90 of file default\_cfe\_sb\_msgstruct.h.

### 11.126.2 Field Documentation

**11.126.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_SB\_WriteRoutingInfoCmd::CommandHeader  
Command header.

Definition at line 92 of file default\_cfe\_sb\_msgstruct.h.

**11.126.2.2 Payload** [CFE\\_SB\\_WriteFileInfoCmd\\_Payload\\_t](#) CFE\_SB\_WriteRoutingInfoCmd::Payload  
Command payload.

Definition at line 93 of file default\_cfe\_sb\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h

## 11.127 CFE\_TBL\_AbortLoadCmd Struct Reference

Abort Load Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TBL\\_AbortLoadCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.127.1 Detailed Description

Abort Load Command.

Definition at line 131 of file default\_cfe\_tbl\_msgstruct.h.

### 11.127.2 Field Documentation

**11.127.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_AbortLoadCmd::CommandHeader  
Command header.

Definition at line 133 of file default\_cfe\_tbl\_msgstruct.h.

**11.127.2.2 Payload** [CFE\\_TBL\\_AbortLoadCmd\\_Payload\\_t](#) CFE\_TBL\_AbortLoadCmd::Payload  
Command payload.

Definition at line 134 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.128 CFE\_TBL\_AbortLoadCmd\_Payload Struct Reference

Abort Load Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- char [TableName](#) [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]

*Full Name of Table whose load is to be aborted.*

### 11.128.1 Detailed Description

Abort Load Command Payload.

For command details, see [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

Definition at line 147 of file default\_cfe\_tbl\_msgdefs.h.

### 11.128.2 Field Documentation

#### 11.128.2.1 TableName char CFE\_TBL\_AbortLoadCmd\_Payload::TableName [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]

Full Name of Table whose load is to be aborted.

ASCII string containing full table name identifier of a table whose load is to be aborted

Definition at line 149 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h

## 11.129 CFE\_TBL\_ActivateCmd Struct Reference

Activate Table Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) [CommandHeader](#)

*Command header.*

- [CFE\\_TBL\\_ActivateCmd\\_Payload\\_t](#) [Payload](#)

*Command payload.*

### 11.129.1 Detailed Description

Activate Table Command.

Definition at line 95 of file default\_cfe\_tbl\_msgstruct.h.

### 11.129.2 Field Documentation

#### 11.129.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_ActivateCmd::CommandHeader

Command header.

Definition at line 97 of file default\_cfe\_tbl\_msgstruct.h.

**11.129.2.2 Payload** `CFE_TBL_ActivateCmd_Payload_t` `CFE_TBL_ActivateCmd::Payload`  
Command payload.

Definition at line 98 of file `default_cfe_tbl_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h`

## 11.130 CFE\_TBL\_ActivateCmd\_Payload Struct Reference

Activate Table Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- `char TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
*Full Name of Table to be activated.*

#### 11.130.1 Detailed Description

Activate Table Command Payload.

For command details, see [CFE\\_TBL\\_ACTIVATE\\_CC](#)

Definition at line 94 of file `default_cfe_tbl_msgdefs.h`.

#### 11.130.2 Field Documentation

**11.130.2.1 TableName** `char CFE_TBL_ActivateCmd_Payload::TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Full Name of Table to be activated.

ASCII string containing full table name identifier of table to be activated

Definition at line 96 of file `default_cfe_tbl_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h`

## 11.131 CFE\_TBL\_DelCDSCmd\_Payload Struct Reference

Delete Critical Table CDS Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- `char TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
*Full Name of Table whose CDS is to be deleted.*

#### 11.131.1 Detailed Description

Delete Critical Table CDS Command Payload.

For command details, see [CFE\\_TBL\\_DELETE\\_CDS\\_CC](#)

Definition at line 133 of file `default_cfe_tbl_msgdefs.h`.

#### 11.131.2 Field Documentation

**11.131.2.1 TableName** `char CFE_TBL_DelCDSCmd_Payload::TableName[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`

Full Name of Table whose CDS is to be deleted.

ASCII string containing full table name identifier of a critical table whose CDS is to be deleted

Definition at line 135 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h`

## 11.132 CFE\_TBL\_DeleteCDSCmd Struct Reference

Delete Critical Table CDS Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** `CommandHeader`  
*Command header.*
- **CFE\_TBL\_DelCDSCmd\_Payload\_t** `Payload`  
*Command payload.*

### 11.132.1 Detailed Description

Delete Critical Table CDS Command.

Definition at line 122 of file default\_cfe\_tbl\_msgstruct.h.

### 11.132.2 Field Documentation

#### 11.132.2.1 CommandHeader `CFE_MSG_CommandHeader_t` `CFE_TBL_DeleteCDSCmd::CommandHeader`

Command header.

Definition at line 124 of file default\_cfe\_tbl\_msgstruct.h.

#### 11.132.2.2 Payload `CFE_TBL_DelCDSCmd_Payload_t` `CFE_TBL_DeleteCDSCmd::Payload`

Command payload.

Definition at line 125 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h`

## 11.133 CFE\_TBL\_DumpCmd Struct Reference

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** `CommandHeader`  
*Command header.*
- **CFE\_TBL\_DumpCmd\_Payload\_t** `Payload`  
*Command payload.*

### 11.133.1 Detailed Description

/brief Dump Table Command

Definition at line 77 of file default\_cfe\_tbl\_msgstruct.h.

### 11.133.2 Field Documentation

#### 11.133.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_DumpCmd::CommandHeader

Command header.

Definition at line 79 of file default\_cfe\_tbl\_msgstruct.h.

#### 11.133.2.2 Payload [CFE\\_TBL\\_DumpCmd\\_Payload\\_t](#) CFE\_TBL\_DumpCmd::Payload

Command payload.

Definition at line 80 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.134 CFE\_TBL\_DumpCmd\_Payload Struct Reference

Dump Table Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- `uint16 ActiveTableFlag`  
*CFE\_TBL\_BufferSelect\_INACTIVE=Inactive Table, CFE\_TBL\_BufferSelect\_ACTIVE=Active Table*
- `char TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
*Full name of table to be dumped.*
- `char DumpFilename [CFE_MISSION_MAX_PATH_LEN]`  
*Full Filename where data is to be written.*

### 11.134.1 Detailed Description

Dump Table Command Payload.

For command details, see [CFE\\_TBL\\_DUMP\\_CC](#)

Definition at line 55 of file default\_cfe\_tbl\_msgdefs.h.

### 11.134.2 Field Documentation

#### 11.134.2.1 ActiveTableFlag `uint16` CFE\_TBL\_DumpCmd\_Payload::ActiveTableFlag

`CFE_TBL_BufferSelect_INACTIVE=Inactive Table, CFE_TBL_BufferSelect_ACTIVE=Active Table`

Selects either the "Inactive" (`CFE_TBL_BufferSelect_INACTIVE`) buffer or the "Active" (`CFE_TBL_BufferSelect_ACTIVE`) buffer to be dumped

Definition at line 57 of file default\_cfe\_tbl\_msgdefs.h.

**11.134.2.2 DumpFilename** `char CFE_TBL_DumpCmd_Payload::DumpFilename [CFE_MISSION_MAX_PATH_LEN]`  
Full Filename where data is to be written.

ASCII string containing full path of filename where data is to be dumped  
Definition at line 66 of file default\_cfe\_tbl\_msgdefs.h.

**11.134.2.3 TableName** `char CFE_TBL_DumpCmd_Payload::TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Full name of table to be dumped.

ASCII string containing full table name identifier of table to be dumped  
Definition at line 63 of file default\_cfe\_tbl\_msgdefs.h.  
The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h`

## 11.135 CFE\_TBL\_DumpRegistryCmd Struct Reference

Dump Registry Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_TBL_DumpRegistryCmd_Payload_t Payload`  
*Command payload.*

### 11.135.1 Detailed Description

Dump Registry Command.

Definition at line 104 of file default\_cfe\_tbl\_msgstruct.h.

### 11.135.2 Field Documentation

**11.135.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_TBL_DumpRegistryCmd::CommandHeader`  
Command header.

Definition at line 106 of file default\_cfe\_tbl\_msgstruct.h.

**11.135.2.2 Payload** `CFE_TBL_DumpRegistryCmd_Payload_t CFE_TBL_DumpRegistryCmd::Payload`  
Command payload.

Definition at line 107 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h`

## 11.136 CFE\_TBL\_DumpRegistryCmd\_Payload Struct Reference

Dump Registry Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

## Data Fields

- char [DumpFilename \[CFE\\_MISSION\\_MAX\\_PATH\\_LEN\]](#)

*Full Filename where dumped data is to be written.*

### 11.136.1 Detailed Description

Dump Registry Command Payload.

For command details, see [CFE\\_TBL\\_DUMP\\_REGISTRY\\_CC](#)

Definition at line 106 of file default\_cfe\_tbl\_msgdefs.h.

### 11.136.2 Field Documentation

#### 11.136.2.1 DumpFilename `char CFE_TBL_DumpRegistryCmd_Payload::DumpFilename [CFE_MISSION_MAX_PATH_LEN]`

Full Filenname where dumped data is to be written.

ASCII string containing full path of filename where registry is to be dumped

Definition at line 108 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/[default\\_cfe\\_tbl\\_msgdefs.h](#)

## 11.137 CFE\_TBL\_File\_Hdr Struct Reference

The definition of the header fields that are included in CFE Table Data files.

```
#include <default_cfe_tbl_extern_typedefs.h>
```

## Data Fields

- `uint32 Reserved`
- `uint32 Offset`
- `uint32 NumBytes`
- char [TableName \[CFE\\_MISSION\\_TBL\\_MAX\\_FULL\\_NAME\\_LEN\]](#)

### 11.137.1 Detailed Description

The definition of the header fields that are included in CFE Table Data files.

This header follows the CFE\_FS header and precedes the actual table data.

#### Note

The Offset and NumBytes fields in the table header are 32 bits for backward compatibility with existing CFE versions. This means that even on 64-bit CPUs, individual table files will be limited to 4GiB in size.

Definition at line 64 of file default\_cfe\_tbl\_extern\_typedefs.h.

### 11.137.2 Field Documentation

#### 11.137.2.1 NumBytes `uint32 CFE_TBL_File_Hdr::NumBytes`

Number of bytes to load into table

Definition at line 68 of file default\_cfe\_tbl\_extern\_typedefs.h.

**11.137.2.2 Offset** `uint32 CFE_TBL_File_Hdr::Offset`

Byte Offset at which load should commence

Definition at line 67 of file default\_cfe\_tbl\_extern\_typedefs.h.

**11.137.2.3 Reserved** `uint32 CFE_TBL_File_Hdr::Reserved`

Future Use: NumTblSegments in File?

Definition at line 66 of file default\_cfe\_tbl\_extern\_typedefs.h.

**11.137.2.4 TableName** `char CFE_TBL_File_Hdr::TableName[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`

Fully qualified name of table to load

Definition at line 69 of file default\_cfe\_tbl\_extern\_typedefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_extern\_typedefs.h

## 11.138 CFE\_TBL\_FileDef Struct Reference

Table File summary object.

```
#include <cfefiledef.h>
```

### Data Fields

- `char ObjectName [64]`  
*Name of instantiated variable that contains desired table image.*
- `char TableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
*Name of Table as defined onboard.*
- `char Description [CFE_FS_HDR_DESC_MAX_LEN]`  
*Description of table image that is included in cFE File Header.*
- `char TgtFilename [CFE_MISSION_MAX_FILE_LEN]`  
*Default filename to be used for output of elf2cfetbl utility.*
- `uint32 ObjectSize`  
*Size, in bytes, of instantiated object.*

### 11.138.1 Detailed Description

Table File summary object.

The definition of the file definition metadata that can be used by external tools (e.g. elf2cfetbl) to generate CFE table data files.

Definition at line 58 of file cfe\_tbl\_filedef.h.

### 11.138.2 Field Documentation

**11.138.2.1 Description** `char CFE_TBL_FileDef::Description[CFE_FS_HDR_DESC_MAX_LEN]`

Description of table image that is included in cFE File Header.

This is a free-form text string that can be any meaningful value

Definition at line 94 of file cfe\_tbl\_filedef.h.

**11.138.2.2 ObjectName** `char CFE_TBL_FileDef::ObjectName[64]`

Name of instantiated variable that contains desired table image.

**Note**

For consistency and future compatibility with auto-generated table files and table definitions, the "ObjectName" should match the table struct typedef name without the "\_t" suffix. For example, the limit checker action table (ADT) is defined by a type called "LC\_ADT\_t", the ObjectName should be "LC\_ADT".

This naming convention allows the type name to be inferred from the ObjectName (and vice-versa) without having to directly specify both the type name and object name here.

Although the traditional elf2cfetbl tool does not currently do any type checking, future tool versions may add more robust type verification and therefore need to know the type name as well as the object name.

Definition at line 76 of file `cfe_tbl_filedef.h`.

**11.138.2.3 ObjectSize** `uint32 CFE_TBL_FileDef::ObjectSize`

Size, in bytes, of instantiated object.

This may be used by tools to check for consistency between the actual defined table size and the expected table size.

This is set automatically via the `CFE_TBL_FILEDEF` macro.

Definition at line 112 of file `cfe_tbl_filedef.h`.

**11.138.2.4 TableName** `char CFE_TBL_FileDef::TableName[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`

Name of Table as defined onboard.

This should be in the form of "APP\_NAME.TABLE\_NAME" where APP\_NAME matches what the app is named at runtime (the 4th column of `cfe_es_startup.scr`) and TABLE\_NAME matches the 2nd parameter of the call to `CFE_TBL_Register()`. Preferably the TABLE\_NAME should also match the ObjectName here in this structure, although this is not strictly required, it helps keep things consistent.

Definition at line 87 of file `cfe_tbl_filedef.h`.

**11.138.2.5 TgtFilename** `char CFE_TBL_FileDef::TgtFilename[CFE_MISSION_MAX_FILE_LEN]`

Default filename to be used for output of `elf2cfetbl` utility.

This must match the expected table file name, which is the name of the source file but the ".c" extension replaced with ".tbl". This is the filename only - do not include a directory/path name here, it can be copied to any runtime directory on the target by external scripts, but should not be renamed.

Definition at line 104 of file `cfe_tbl_filedef.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/core_api/fsw/inc/cfe_tbl_filedef.h`

**11.139 CFE\_TBL\_HousekeepingTlm Struct Reference**

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_TBL_HousekeepingTlm_Payload_t Payload`  
*Telemetry payload.*

**11.139.1 Detailed Description**

Definition at line 154 of file `default_cfe_tbl_msgstruct.h`.

## 11.139.2 Field Documentation

**11.139.2.1 Payload** `CFE_TBL_HousekeepingTlm_Payload_t` `CFE_TBL_HousekeepingTlm::Payload`  
Telemetry payload.

Definition at line 157 of file `default_cfe_tbl_msgstruct.h`.

**11.139.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_TBL_HousekeepingTlm::TelemetryHeader`  
Telemetry header.

Definition at line 156 of file `default_cfe_tbl_msgstruct.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h`

## 11.140 CFE\_TBL\_HousekeepingTlm\_Payload Struct Reference

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- `uint8 CommandCounter`  
*Count of valid commands received.*
- `uint8 CommandErrorCounter`  
*Count of invalid commands received.*
- `uint16 NumTables`  
*Number of Tables Registered.*
- `uint16 NumLoadPending`  
*Number of Tables pending on Applications for their update.*
- `uint16 ValidationCounter`  
*Number of completed table validations.*
- `uint32 LastValCrc`  
*Data Integrity Value computed for last table validated.*
- `int32 LastValStatus`  
*Returned status from validation function for last table validated.*
- `bool ActiveBuffer`  
*Indicator of whether table buffer validated was 0=Inactive, 1=Active.*
- `char LastValTableName [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
*Name of last table validated.*
- `uint8 SuccessValCounter`  
*Total number of successful table validations.*
- `uint8 FailedValCounter`  
*Total number of unsuccessful table validations.*
- `uint8 NumValRequests`  
*Number of times Table Services has requested validations from Apps.*
- `uint8 NumFreeSharedBufs`  
*Number of free Shared Working Buffers.*
- `uint8 ByteAlignPad1`  
*Spare byte to ensure longword alignment.*

- **CFE\_ES\_MemHandle\_t MemPoolHandle**  
*Handle to TBL's memory pool.*
- **CFE\_TIME\_SysTime\_t LastUpdateTime**  
*Time of last table update.*
- **char LastUpdatedTable [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]**  
*Name of the last table updated.*
- **char LastFileLoaded [CFE\_MISSION\_MAX\_PATH\_LEN]**  
*Path and Name of last table image file loaded.*
- **char LastFileDumped [CFE\_MISSION\_MAX\_PATH\_LEN]**  
*Path and Name of last file dumped to.*
- **char LastTableLoaded [CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN]**  
*Name of the last table loaded.*

### 11.140.1 Detailed Description

**Name** Table Services Housekeeping Packet

Definition at line 178 of file default\_cfe\_tbl\_msgdefs.h.

### 11.140.2 Field Documentation

**11.140.2.1 ActiveBuffer** `bool CFE_TBL_HousekeepingTlm_Payload::ActiveBuffer`  
Indicator of whether table buffer validated was 0=Inactive, 1=Active.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastValBuf

Definition at line 205 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.2 ByteAlignPad1** `uint8 CFE_TBL_HousekeepingTlm_Payload::ByteAlignPad1`  
Spare byte to ensure longword alignment.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_ByteAlignPad1

Definition at line 221 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.3 CommandCounter** `uint8 CFE_TBL_HousekeepingTlm_Payload::CommandCounter`  
Count of valid commands received.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_CMDPC

Definition at line 183 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.4 CommandErrorCounter** `uint8 CFE_TBL_HousekeepingTlm_Payload::CommandErrorCounter`  
Count of invalid commands received.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_CMDEC

Definition at line 185 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.5 FailedValCounter** `uint8 CFE_TBL_HousekeepingTlm_Payload::FailedValCounter`  
Total number of unsuccessful table validations.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_ValFailedCtr

Definition at line 211 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.6 LastFileDumped** `char CFE_TBL_HousekeepingTlm_Payload::LastFileDumped[CFE_MISSION_MAX_PATH_LEN]`  
Path and Name of last file dumped to.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastFileDumped[OS\_MAX\_PATH\_LEN]

Definition at line 231 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.7 LastFileLoaded** `char CFE_TBL_HousekeepingTlm_Payload::LastFileLoaded[CFE_MISSION_MAX_PATH_LEN]`  
Path and Name of last table image file loaded.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastFileLoaded[OS\_MAX\_PATH\_LEN]

Definition at line 229 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.8 LastTableLoaded** `char CFE_TBL_HousekeepingTlm_Payload::LastTableLoaded[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Name of the last table loaded.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastTableLoaded[CFE\_TBL\_MAX\_FULL\_NAME\_LEN]

Definition at line 233 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.9 LastUpdatedTable** `char CFE_TBL_HousekeepingTlm_Payload::LastUpdatedTable[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Name of the last table updated.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastUpdTblName[CFE\_TB\_MAX\_FULL\_NAME\_LEN]

Definition at line 227 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.10 LastUpdateTime** `CFE_TIME_SysTime_t CFE_TBL_HousekeepingTlm_Payload::LastUpdateTime`  
Time of last table update.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastUpdTime, \$sc\_\$cpu\_TBL\_SECONDS, \$sc\_\$cpu\_TBL\_SUBSECONDS

Definition at line 225 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.11 LastValCrc** `uint32 CFE_TBL_HousekeepingTlm_Payload::LastValCrc`  
Data Integrity Value computed for last table validated.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_LastValCRC

Definition at line 201 of file default\_cfe\_tbl\_msgdefs.h.

**11.140.2.12 LastValStatus** `int32` `CFE_TBL_HousekeepingTlm_Payload::LastValStatus`  
Returned status from validation function for last table validated.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_LastVals`

Definition at line 203 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.13 LastValTableName** `char` `CFE_TBL_HousekeepingTlm_Payload::LastValTableName[CFE_MISSION_TBL_MAX_FULL_NAME]`  
Name of last table validated.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_LastValTblName[CFE_TB_MAX_FULL_NAME_LEN]`

Definition at line 207 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.14 MemPoolHandle** `CFE_ES_MemHandle_t` `CFE_TBL_HousekeepingTlm_Payload::MemPoolHandle`  
Handle to TBL's memory pool.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_MemPoolHandle`

Definition at line 223 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.15 NumFreeSharedBufs** `uint8` `CFE_TBL_HousekeepingTlm_Payload::NumFreeSharedBufs`  
Number of free Shared Working Buffers.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_NumFreeShrBuf`

Definition at line 219 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.16 NumLoadPending** `uint16` `CFE_TBL_HousekeepingTlm_Payload::NumLoadPending`  
Number of Tables pending on Applications for their update.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_NumUpdatesPend`

Definition at line 193 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.17 NumTables** `uint16` `CFE_TBL_HousekeepingTlm_Payload::NumTables`  
Number of Tables Registered.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_NumTables`

Definition at line 191 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.18 NumValRequests** `uint8` `CFE_TBL_HousekeepingTlm_Payload::NumValRequests`  
Number of times Table Services has requested validations from Apps.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_ValReqCtr`

Definition at line 213 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.19 SuccessValCounter** `uint8` `CFE_TBL_HousekeepingTlm_Payload::SuccessValCounter`  
Total number of successful table validations.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_ValSuccessCtr`

Definition at line 209 of file `default_cfe_tbl_msgdefs.h`.

**11.140.2.20 ValidationCounter** `uint16` `CFE_TBL_HousekeepingTlm_Payload::ValidationCounter`  
Number of completed table validations.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_ValCompltdCtr`

Definition at line 199 of file `default_cfe_tbl_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h`

## 11.141 CFE\_TBL\_Info Struct Reference

Table Info.

```
#include <cfe_tbl_api_typedefs.h>
```

### Data Fields

- `size_t Size`  
*Size, in bytes, of Table.*
- `uint32 NumUsers`  
*Number of Apps with access to the table.*
- `uint32 FileCreateTimeSecs`  
*File creation time from last file loaded into table.*
- `uint32 FileCreateTimeSubSecs`  
*File creation time from last file loaded into table.*
- `uint32 Crc`  
*Most recently calculated CRC by TBL services on table contents.*
- `CFE_TIME_SysTime_t TimeOfLastUpdate`  
*Time when Table was last updated.*
- `bool TableLoadedOnce`  
*Flag indicating whether table has been loaded once or not.*
- `bool DumpOnly`  
*Flag indicating Table is NOT to be loaded.*
- `bool DoubleBuffered`  
*Flag indicating Table has a dedicated inactive buffer.*
- `bool UserDefAddr`  
*Flag indicating Table address was defined by Owner Application.*
- `bool Critical`  
*Flag indicating Table contents are maintained in a CDS.*
- `char LastFileLoaded [CFE_MISSION_MAX_PATH_LEN]`  
*Filename of last file loaded into table.*

### 11.141.1 Detailed Description

Table Info.

Definition at line 109 of file cfe\_tbl\_api\_typedefs.h.

### 11.141.2 Field Documentation

#### 11.141.2.1 **Crc** `uint32` CFE\_TBL\_Info::Crc

Most recently calculated CRC by TBL services on table contents.

Definition at line 115 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.2 **Critical** `bool` CFE\_TBL\_Info::Critical

Flag indicating Table contents are maintained in a CDS.

Definition at line 121 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.3 **DoubleBuffered** `bool` CFE\_TBL\_Info::DoubleBuffered

Flag indicating Table has a dedicated inactive buffer.

Definition at line 119 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.4 **DumpOnly** `bool` CFE\_TBL\_Info::DumpOnly

Flag indicating Table is NOT to be loaded.

Definition at line 118 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.5 **FileCreateTimeSecs** `uint32` CFE\_TBL\_Info::FileCreateTimeSecs

File creation time from last file loaded into table.

Definition at line 113 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.6 **FileCreateTimeSubSecs** `uint32` CFE\_TBL\_Info::FileCreateTimeSubSecs

File creation time from last file loaded into table.

Definition at line 114 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.7 **LastFileLoaded** `char` CFE\_TBL\_Info::LastFileLoaded[`CFE_MISSION_MAX_PATH_LEN`]

Filename of last file loaded into table.

Definition at line 122 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.8 **NumUsers** `uint32` CFE\_TBL\_Info::NumUsers

Number of Apps with access to the table.

Definition at line 112 of file cfe\_tbl\_api\_typedefs.h.

#### 11.141.2.9 **Size** `size_t` CFE\_TBL\_Info::Size

Size, in bytes, of Table.

Definition at line 111 of file cfe\_tbl\_api\_typedefs.h.

**11.141.2.10 TableLoadedOnce** `bool CFE_TBL_Info::TableLoadedOnce`  
Flag indicating whether table has been loaded once or not.  
Definition at line 117 of file `cfe_tbl_api_typedefs.h`.

**11.141.2.11 TimeOfLastUpdate** `CFE_TIME_SysTime_t CFE_TBL_Info::TimeOfLastUpdate`  
Time when Table was last updated.  
Definition at line 116 of file `cfe_tbl_api_typedefs.h`.

**11.141.2.12 UserDefAddr** `bool CFE_TBL_Info::UserDefAddr`  
Flag indicating Table address was defined by Owner Application.  
Definition at line 120 of file `cfe_tbl_api_typedefs.h`.  
The documentation for this struct was generated from the following file:

- `cfe/modules/core_api/fsw/inc/cfe_tbl_api_typedefs.h`

## 11.142 CFE\_TBL\_LoadCmd Struct Reference

Load Table Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t CommandHeader**  
*Command header.*
- **CFE\_TBL\_LoadCmd\_Payload\_t Payload**  
*Command payload.*

### 11.142.1 Detailed Description

Load Table Command.

Definition at line 68 of file `default_cfe_tbl_msgstruct.h`.

### 11.142.2 Field Documentation

**11.142.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_TBL_LoadCmd::CommandHeader`  
Command header.  
Definition at line 70 of file `default_cfe_tbl_msgstruct.h`.

**11.142.2.2 Payload** `CFE_TBL_LoadCmd_Payload_t CFE_TBL_LoadCmd::Payload`  
Command payload.  
Definition at line 71 of file `default_cfe_tbl_msgstruct.h`.  
The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgstruct.h`

## 11.143 CFE\_TBL\_LoadCmd\_Payload Struct Reference

Load Table Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

**Data Fields**

- char [LoadFilename \[CFE\\_MISSION\\_MAX\\_PATH\\_LEN\]](#)  
*Filename (and path) of data to be loaded.*

**11.143.1 Detailed Description**

Load Table Command Payload.

For command details, see [CFE\\_TBL\\_LOAD\\_CC](#)

Definition at line 45 of file default\_cfe\_tbl\_msgdefs.h.

**11.143.2 Field Documentation****11.143.2.1 LoadFilename** char [CFE\\_TBL\\_LoadCmd\\_Payload::LoadFilename \[CFE\\_MISSION\\_MAX\\_PATH\\_LEN\]](#)

Filename (and path) of data to be loaded.

Definition at line 47 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h

**11.144 CFE\_TBL\_NoopCmd Struct Reference**

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command header.*

**11.144.1 Detailed Description**

Definition at line 50 of file default\_cfe\_tbl\_msgstruct.h.

**11.144.2 Field Documentation****11.144.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) [CFE\\_TBL\\_NoopCmd::CommandHeader](#)

Command header.

Definition at line 54 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

**11.145 CFE\_TBL\_NotifyCmd Struct Reference**

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command header.*
- [CFE\\_TBL\\_NotifyCmd\\_Payload\\_t Payload](#)  
*Command payload.*

### 11.145.1 Detailed Description

/brief Table Management Notification Command  
Definition at line 142 of file default\_cfe\_tbl\_msgstruct.h.

### 11.145.2 Field Documentation

#### 11.145.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_NotifyCmd::CommandHeader

Command header.

Definition at line 144 of file default\_cfe\_tbl\_msgstruct.h.

#### 11.145.2.2 Payload [CFE\\_TBL\\_NotifyCmd\\_Payload\\_t](#) CFE\_TBL\_NotifyCmd::Payload

Command payload.

Definition at line 145 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.146 CFE\_TBL\_NotifyCmd\_Payload Struct Reference

Table Management Notification Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- [uint32 Parameter](#)

*Application specified command parameter.*

### 11.146.1 Detailed Description

Table Management Notification Command Payload.

#### Description

Whenever an application that owns a table calls the [CFE\\_TBL\\_NotifyByMessage](#) API following the table registration, Table services will generate the following command message with the application specified message ID, command code and parameter whenever the table requires management (e.g. - loads and validations).

Definition at line 165 of file default\_cfe\_tbl\_msgdefs.h.

### 11.146.2 Field Documentation

#### 11.146.2.1 Parameter [uint32 CFE\\_TBL\\_NotifyCmd\\_Payload::Parameter](#)

Application specified command parameter.

Definition at line 167 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h

## 11.147 CFE\_TBL\_ResetCountersCmd Struct Reference

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*

**11.147.1 Detailed Description**

Definition at line 55 of file default\_cfe\_tbl\_msgstruct.h.

**11.147.2 Field Documentation****11.147.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_ResetCountersCmd::CommandHeader  
Command header.

Definition at line 57 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/[default\\_cfe\\_tbl\\_msgstruct.h](#)

**11.148 CFE\_TBL\_SendHkCmd Struct Reference**

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*

**11.148.1 Detailed Description**

Definition at line 60 of file default\_cfe\_tbl\_msgstruct.h.

**11.148.2 Field Documentation****11.148.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_SendHkCmd::CommandHeader  
Command header.

Definition at line 62 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/[default\\_cfe\\_tbl\\_msgstruct.h](#)

**11.149 CFE\_TBL\_SendRegistryCmd Struct Reference**

Send Table Registry Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

**Data Fields**

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TBL\\_SendRegistryCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.149.1 Detailed Description

Send Table Registry Command.

Definition at line 113 of file default\_cfe\_tbl\_msgstruct.h.

### 11.149.2 Field Documentation

**11.149.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_SendRegistryCmd::CommandHeader  
Command header.

Definition at line 115 of file default\_cfe\_tbl\_msgstruct.h.

**11.149.2.2 Payload** [CFE\\_TBL\\_SendRegistryCmd\\_Payload\\_t](#) CFE\_TBL\_SendRegistryCmd::Payload  
Command payload.

Definition at line 116 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.150 CFE\_TBL\_SendRegistryCmd\_Payload Struct Reference

Send Table Registry Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- char [TableName](#) [[CFE\\_MISSION\\_TBL\\_MAX\\_FULL\\_NAME\\_LEN](#)]

*Full Name of Table whose registry entry is to be telemetered.*

### 11.150.1 Detailed Description

Send Table Registry Command Payload.

For command details, see [CFE\\_TBL\\_SEND\\_REGISTRY\\_CC](#)

Definition at line 119 of file default\_cfe\_tbl\_msgdefs.h.

### 11.150.2 Field Documentation

**11.150.2.1 TableName** char CFE\_TBL\_SendRegistryCmd\_Payload::TableName [[CFE\\_MISSION\\_TBL\\_MAX\\_FULL\\_NAME\\_LEN](#)]  
Full Name of Table whose registry entry is to be telemetered.

ASCII string containing full table name identifier of table whose registry entry is to be telemetered via  
[CFE\\_TBL\\_TableRegistryTlm\\_t](#)

Definition at line 121 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h

## 11.151 CFE\_TBL\_TableRegistryTlm Struct Reference

```
#include <default_cfe_tbl_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_TelemetryHeader\\_t TelemetryHeader](#)  
*Telemetry header.*
- [CFE\\_TBL\\_TblRegPacket\\_Payload\\_t Payload](#)  
*Telemetry payload.*

### 11.151.1 Detailed Description

Definition at line 160 of file default\_cfe\_tbl\_msgstruct.h.

### 11.151.2 Field Documentation

#### 11.151.2.1 Payload [CFE\\_TBL\\_TblRegPacket\\_Payload\\_t](#) CFE\_TBL\_TableRegistryTlm::Payload

Telemetry payload.

Definition at line 163 of file default\_cfe\_tbl\_msgstruct.h.

#### 11.151.2.2 TelemetryHeader [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_TBL\_TableRegistryTlm::TelemetryHeader

Telemetry header.

Definition at line 162 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.152 CFE\_TBL\_TblRegPacket\_Payload Struct Reference

```
#include <default_cfe_tbl_msgdefs.h>
```

## Data Fields

- [CFE\\_ES\\_MemOffset\\_t Size](#)  
*Size, in bytes, of Table.*
- [uint32 Crc](#)  
*Most recently calculated CRC of Table.*
- [CFE\\_ES\\_MemAddress\\_t ActiveBufferAddr](#)  
*Address of Active Buffer.*
- [CFE\\_ES\\_MemAddress\\_t InactiveBufferAddr](#)  
*Address of Inactive Buffer.*
- [CFE\\_ES\\_MemAddress\\_t ValidationFuncPtr](#)  
*Ptr to Owner App's function that validates tbl contents.*
- [CFE\\_TIME\\_SysTime\\_t TimeOfLastUpdate](#)  
*Time when Table was last updated.*
- [uint32 FileCreateTimeSecs](#)  
*File creation time from last file loaded into table.*
- [uint32 FileCreateTimeSubSecs](#)  
*File creation time from last file loaded into table.*
- [bool TableLoadedOnce](#)  
*Flag indicating whether table has been loaded once or not.*

- bool [LoadPending](#)  
*Flag indicating an inactive buffer is ready to be copied.*
- bool [DumpOnly](#)  
*Flag indicating Table is NOT to be loaded.*
- bool [DoubleBuffered](#)  
*Flag indicating Table has a dedicated inactive buffer.*
- char [Name \[CFE\\_MISSION\\_TBL\\_MAX\\_FULL\\_NAME\\_LEN\]](#)  
*Processor specific table name.*
- char [LastFileLoaded \[CFE\\_MISSION\\_MAX\\_PATH\\_LEN\]](#)  
*Filename of last file loaded into table.*
- char [OwnerAppName \[CFE\\_MISSION\\_MAX\\_API\\_LEN\]](#)  
*Name of owning application.*
- bool [Critical](#)  
*Indicates whether table is Critical or not.*
- uint8 [ByteAlign4](#)  
*Spare byte to maintain byte alignment.*

### 11.152.1 Detailed Description

**Name** Table Registry Info Packet

Definition at line 240 of file default\_cfe\_tbl\_msgdefs.h.

### 11.152.2 Field Documentation

**11.152.2.1 ActiveBufferAddr** [CFE\\_ES\\_MemAddress\\_t](#) [CFE\\_TBL\\_TblRegPacket\\_Payload::ActiveBufferAddr](#)  
Address of Active Buffer.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_ActBufAdd

Definition at line 246 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.2 ByteAlign4** [uint8](#) [CFE\\_TBL\\_TblRegPacket\\_Payload::ByteAlign4](#)  
Spare byte to maintain byte alignment.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_Spare4

Definition at line 274 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.3 Crc** [uint32](#) [CFE\\_TBL\\_TblRegPacket\\_Payload::Crc](#)  
Most recently calculated CRC of Table.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TBL\_CRC

Definition at line 244 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.4 Critical** `bool CFE_TBL_TblRegPacket_Payload::Critical`  
Indicates whether table is Critical or not.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_Spare3`

Definition at line 272 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.5 DoubleBuffered** `bool CFE_TBL_TblRegPacket_Payload::DoubleBuffered`  
Flag indicating Table has a dedicated inactive buffer.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_DblBuffered`

Definition at line 264 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.6 DumpOnly** `bool CFE_TBL_TblRegPacket_Payload::DumpOnly`  
Flag indicating Table is NOT to be loaded.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_DumpOnly`

Definition at line 262 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.7 FileCreateTimeSecs** `uint32 CFE_TBL_TblRegPacket_Payload::FileCreateTimeSecs`  
File creation time from last file loaded into table.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_FILECSECONDS`

Definition at line 254 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.8 FileCreateTimeSubSecs** `uint32 CFE_TBL_TblRegPacket_Payload::FileCreateTimeSubSecs`  
File creation time from last file loaded into table.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_FILECSUBSECONDS`

Definition at line 256 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.9 InactiveBufferAddr** `CFE_ES_MemAddress_t CFE_TBL_TblRegPacket_Payload::InactiveBufferAddr`  
Address of Inactive Buffer.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_IActBufAdd`

Definition at line 248 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.10 LastFileLoaded** `char CFE_TBL_TblRegPacket_Payload::LastFileLoaded[CFE_MISSION_MAX_PATH_LEN]`  
Filename of last file loaded into table.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_LastFileUpd[OS_MAX_PATH_LEN]`

Definition at line 268 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.11 LoadPending** `bool CFE_TBL_TblRegPacket_Payload::LoadPending`  
Flag indicating an inactive buffer is ready to be copied.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_UpdatePndng`

Definition at line 260 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.12 Name** `char CFE_TBL_TblRegPacket_Payload::Name [CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Processor specific table name.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_Name[CFE_TB_MAX_FULL_NAME_LEN]`

Definition at line 266 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.13 OwnerAppName** `char CFE_TBL_TblRegPacket_Payload::OwnerAppName [CFE_MISSION_MAX_API_LEN]`  
Name of owning application.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_OwnerApp[OS_MAX_API_NAME]`

Definition at line 270 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.14 Size** `CFE_ES_MemOffset_t CFE_TBL_TblRegPacket_Payload::Size`  
Size, in bytes, of Table.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_SIZE`

Definition at line 242 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.15 TableLoadedOnce** `bool CFE_TBL_TblRegPacket_Payload::TableLoadedOnce`  
Flag indicating whether table has been loaded once or not.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_LoadedOnce`

Definition at line 258 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.16 TimeOfLastUpdate** `CFE_TIME_SysTime_t CFE_TBL_TblRegPacket_Payload::TimeOfLastUpdate`  
Time when Table was last updated.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_TimeLastUpd, $sc_$cpu_TBL_TLUSECONDS, $sc_$cpu_TBL_TLUSUB←  
SECONDS`

Definition at line 252 of file default\_cfe\_tbl\_msgdefs.h.

**11.152.2.17 ValidationFuncPtr** `CFE_ES_MemAddress_t CFE_TBL_TblRegPacket_Payload::ValidationFuncPtr`  
Ptr to Owner App's function that validates tbl contents.

**Telemetry Mnemonic(s)** `$sc_$cpu_TBL_ValFuncPtr`

Definition at line 250 of file default\_cfe\_tbl\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h

## 11.153 CFE\_TBL\_ValidateCmd Struct Reference

Validate Table Command.

```
#include <default_cfe_tbl_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TBL\\_ValidateCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.153.1 Detailed Description

Validate Table Command.

Definition at line 86 of file default\_cfe\_tbl\_msgstruct.h.

### 11.153.2 Field Documentation

#### 11.153.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TBL\_ValidateCmd::CommandHeader

Command header.

Definition at line 88 of file default\_cfe\_tbl\_msgstruct.h.

#### 11.153.2.2 Payload [CFE\\_TBL\\_ValidateCmd\\_Payload\\_t](#) CFE\_TBL\_ValidateCmd::Payload

Command payload.

Definition at line 89 of file default\_cfe\_tbl\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h

## 11.154 CFE\_TBL\_ValidateCmd\_Payload Struct Reference

Validate Table Command Payload.

```
#include <default_cfe_tbl_msgdefs.h>
```

### Data Fields

- [uint16](#) ActiveTableFlag  
*CFE\_TBL\_BufferSelect\_INACTIVE=Inactive Table, CFE\_TBL\_BufferSelect\_ACTIVE=Active Table*
- [char](#) TableName [[CFE\\_MISSION\\_TBL\\_MAX\\_FULL\\_NAME\\_LEN](#)]  
*Full Name of Table to be validated.*

### 11.154.1 Detailed Description

Validate Table Command Payload.

For command details, see [CFE\\_TBL\\_VALIDATE\\_CC](#)

Definition at line 76 of file default\_cfe\_tbl\_msgdefs.h.

### 11.154.2 Field Documentation

**11.154.2.1 ActiveTableFlag** `uint16 CFE_TBL_ValidateCmd_Payload::ActiveTableFlag`  
`CFE_TBL_BufferSelect_INACTIVE=Inactive Table, CFE_TBL_BufferSelect_ACTIVE=Active Table`  
Selects either the "Inactive" (`CFE_TBL_BufferSelect_INACTIVE`) buffer or the "Active" (`CFE_TBL_BufferSelect_ACTIVE`) buffer to be validated  
Definition at line 78 of file `default_cfe_tbl_msgdefs.h`.

**11.154.2.2 TableName** `char CFE_TBL_ValidateCmd_Payload::TableName[CFE_MISSION_TBL_MAX_FULL_NAME_LEN]`  
Full Name of Table to be validated.  
ASCII string containing full table name identifier of table to be validated  
Definition at line 84 of file `default_cfe_tbl_msgdefs.h`.  
The documentation for this struct was generated from the following file:

- `cfe/modules/tbl/config/default_cfe_tbl_msgdefs.h`

## 11.155 CFE\_TIME\_AddAdjustCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** `CommandHeader`  
*Command header.*
- **CFE\_TIME\_TimeCmd\_Payload\_t** `Payload`  
*Command payload.*

### 11.155.1 Detailed Description

Definition at line 146 of file `default_cfe_time_msgstruct.h`.

### 11.155.2 Field Documentation

**11.155.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_TIME_AddAdjustCmd::CommandHeader`  
Command header.  
Definition at line 148 of file `default_cfe_time_msgstruct.h`.

**11.155.2.2 Payload** `CFE_TIME_TimeCmd_Payload_t CFE_TIME_AddAdjustCmd::Payload`  
Command payload.  
Definition at line 149 of file `default_cfe_time_msgstruct.h`.  
The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.156 CFE\_TIME\_AddDelayCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.156.1 Detailed Description

Definition at line 122 of file default\_cfe\_time\_msgstruct.h.

### 11.156.2 Field Documentation

#### 11.156.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_AddDelayCmd::CommandHeader

Command header.

Definition at line 124 of file default\_cfe\_time\_msgstruct.h.

#### 11.156.2.2 Payload [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) CFE\_TIME\_AddDelayCmd::Payload

Command payload.

Definition at line 125 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.157 CFE\_TIME\_AddOneHzAdjustmentCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_OneHzAdjustmentCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.157.1 Detailed Description

Definition at line 169 of file default\_cfe\_time\_msgstruct.h.

### 11.157.2 Field Documentation

#### 11.157.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_AddOneHzAdjustmentCmd::CommandHeader

Command header.

Definition at line 171 of file default\_cfe\_time\_msgstruct.h.

**11.157.2.2 Payload** `CFE_TIME_OneHzAdjustmentCmd_Payload_t` `CFE_TIME_AddOneHzAdjustmentCmd::Payload`  
Command payload.

Definition at line 172 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.158 CFE\_TIME\_DiagnosticTlm Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry header.*
- `CFE_TIME_DiagnosticTlm_Payload_t Payload`  
*Telemetry payload.*

### 11.158.1 Detailed Description

Definition at line 198 of file default\_cfe\_time\_msgstruct.h.

### 11.158.2 Field Documentation

**11.158.2.1 Payload** `CFE_TIME_DiagnosticTlm_Payload_t` `CFE_TIME_DiagnosticTlm::Payload`  
Telemetry payload.

Definition at line 201 of file default\_cfe\_time\_msgstruct.h.

**11.158.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t` `CFE_TIME_DiagnosticTlm::TelemetryHeader`  
Telemetry header.

Definition at line 200 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.159 CFE\_TIME\_DiagnosticTlm\_Payload Struct Reference

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `CFE_TIME_SysTime_t AtToneMET`  
*MET at time of tone.*
- `CFE_TIME_SysTime_t AtToneSTCF`  
*STCF at time of tone.*
- `CFE_TIME_SysTime_t AtToneDelay`  
*Adjustment for slow tone detection.*
- `CFE_TIME_SysTime_t AtToneLatch`  
*Local clock latched at time of tone.*
- `int16 AtToneLeapSeconds`

- *Leap Seconds at time of tone.*
  - [CFE\\_TIME\\_ClockState\\_Enum\\_t ClockStateAPI](#)  
*Clock state as per API.*
  - [CFE\\_TIME\\_SysTime\\_t TimeSinceTone](#)  
*Time elapsed since the tone.*
  - [CFE\\_TIME\\_SysTime\\_t CurrentLatch](#)  
*Local clock latched just "now".*
  - [CFE\\_TIME\\_SysTime\\_t CurrentMET](#)  
*MET at this instant.*
  - [CFE\\_TIME\\_SysTime\\_t CurrentTAI](#)  
*TAI at this instant.*
  - [CFE\\_TIME\\_SysTime\\_t CurrentUTC](#)  
*UTC at this instant.*
- [int16 ClockSetState](#)  
*Time has been "set".*
- [int16 ClockFlyState](#)  
*Current fly-wheel state.*
- [int16 ClockSource](#)  
*Internal vs external, etc.*
- [int16 ClockSignal](#)  
*Primary vs redundant, etc.*
- [int16 ServerFlyState](#)  
*Used by clients only.*
- [int16 Forced2Fly](#)  
*Commanded into fly-wheel.*
- [uint16 ClockStateFlags](#)  
*Clock State Flags.*
- [int16 OneTimeDirection](#)  
*One time STCF adjustment direction (Add = 1, Sub = 2)*
- [int16 OneHzDirection](#)  
*1Hz STCF adjustment direction*
- [int16 DelayDirection](#)  
*Client latency adjustment direction.*
- [CFE\\_TIME\\_SysTime\\_t OneTimeAdjust](#)  
*Previous one-time STCF adjustment.*
- [CFE\\_TIME\\_SysTime\\_t OneHzAdjust](#)  
*Current 1Hz STCF adjustment.*
- [CFE\\_TIME\\_SysTime\\_t ToneSignalLatch](#)  
*Local Clock latched at most recent tone signal.*
- [CFE\\_TIME\\_SysTime\\_t ToneDataLatch](#)  
*Local Clock latched at arrival of tone data.*
- [uint32 ToneMatchCounter](#)  
*Tone signal / data verification count.*
- [uint32 ToneMatchErrorCounter](#)  
*Tone signal / data verification error count.*
- [uint32 ToneSignalCounter](#)  
*Tone signal detected SB message count.*

- `uint32 ToneDataCounter`  
*Time at the tone data SB message count.*
- `uint32 ToneIntCounter`  
*Tone signal ISR execution count.*
- `uint32 ToneIntErrorCounter`  
*Tone signal ISR error count.*
- `uint32 ToneTaskCounter`  
*Tone task execution count.*
- `uint32 VersionCounter`  
*Count of mods to time at tone reference data (version)*
- `uint32 LocalIntCounter`  
*Local 1Hz ISR execution count.*
- `uint32 LocalTaskCounter`  
*Local 1Hz task execution count.*
- `uint32 VirtualMET`  
*Software MET.*
- `uint32 MinElapsed`  
*Min tone signal / data pkt arrival window (Sub-seconds)*
- `uint32 MaxElapsed`  
*Max tone signal / data pkt arrival window (Sub-seconds)*
- `CFE_TIME_SysTime_t MaxLocalClock`  
*Max local clock value before rollover.*
- `uint32 ToneOverLimit`  
*Max between tone signal interrupts.*
- `uint32 ToneUnderLimit`  
*Min between tone signal interrupts.*
- `uint32 DataStoreStatus`  
*Data Store status (preserved across processor reset)*

### 11.159.1 Detailed Description

**Name** Time Services Diagnostics Packet

Definition at line 190 of file default\_cfe\_time\_msgdefs.h.

### 11.159.2 Field Documentation

**11.159.2.1 AtToneDelay** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::AtToneDelay`  
Adjustment for slow tone detection.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DLlatentS, \$sc\_\$cpu\_TIME\_DLlatentSS

Definition at line 199 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.2 AtToneLatch** `CFE_TIME_SysTime_t` `CFE_TIME_DiagnosticTlm_Payload::AtToneLatch`  
Local clock latched at time of tone.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTValidS, $sc_$cpu_TIME_DTValidSS`

Definition at line 201 of file `default_cfe_time_msgdefs.h`.

**11.159.2.3 AtToneLeapSeconds** `int16` `CFE_TIME_DiagnosticTlm_Payload::AtToneLeapSeconds`  
Leap Seconds at time of tone.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DLearpS`

Definition at line 204 of file `default_cfe_time_msgdefs.h`.

**11.159.2.4 AtToneMET** `CFE_TIME_SysTime_t` `CFE_TIME_DiagnosticTlm_Payload::AtToneMET`  
MET at time of tone.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTMETS, $sc_$cpu_TIME_DTMETSS`

Definition at line 195 of file `default_cfe_time_msgdefs.h`.

**11.159.2.5 AtToneSTCF** `CFE_TIME_SysTime_t` `CFE_TIME_DiagnosticTlm_Payload::AtToneSTCF`  
STCF at time of tone.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DSTCFS, $sc_$cpu_TIME_DSTCFSS`

Definition at line 197 of file `default_cfe_time_msgdefs.h`.

**11.159.2.6 ClockFlyState** `int16` `CFE_TIME_DiagnosticTlm_Payload::ClockFlyState`  
Current fly-wheel state.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DFlywheel`

Definition at line 228 of file `default_cfe_time_msgdefs.h`.

**11.159.2.7 ClockSetState** `int16` `CFE_TIME_DiagnosticTlm_Payload::ClockSetState`  
Time has been "set".

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DValid`

Definition at line 226 of file `default_cfe_time_msgdefs.h`.

**11.159.2.8 ClockSignal** `int16` `CFE_TIME_DiagnosticTlm_Payload::ClockSignal`  
Primary vs redundant, etc.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DSignal`

Definition at line 232 of file `default_cfe_time_msgdefs.h`.

**11.159.2.9 ClockSource** `int16 CFE_TIME_DiagnosticTlm_Payload::ClockSource`  
Internal vs external, etc.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DSource`

Definition at line 230 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.10 ClockStateAPI** `CFE_TIME_ClockState_Enum_t CFE_TIME_DiagnosticTlm_Payload::ClockStateAPI`  
Clock state as per API.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DAPIState`

Definition at line 206 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.11 ClockStateFlags** `uint16 CFE_TIME_DiagnosticTlm_Payload::ClockStateFlags`  
Clock State Flags.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DStateFlags, $sc_$cpu_TIME_DFlagSet, $sc_$cpu_TIME_DFlagFly,`  
`$sc_$cpu_TIME_DFlagSrc, $sc_$cpu_TIME_DFlagPri, $sc_$cpu_TIME_DFlagSfly, $sc_`  
`$cpu_TIME_DFlagCfly, $sc_$cpu_TIME_DFlagAdjd, $sc_$cpu_TIME_DFlag1Hzd, $sc_`  
`$cpu_TIME_DFlagClat, $sc_$cpu_TIME_DFlagSorC, $sc_$cpu_TIME_DFlagNIU`

Definition at line 242 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.12 CurrentLatch** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::CurrentLatch`  
Local clock latched just "now".

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DLocaIS, $sc_$cpu_TIME_DLocaSS`

Definition at line 214 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.13 CurrentMET** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::CurrentMET`  
MET at this instant.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DMETS, $sc_$cpu_TIME_DMETSS`

Definition at line 216 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.14 CurrentTAI** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::CurrentTAI`  
TAI at this instant.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTAIS, $sc_$cpu_TIME_DTAISS`

Definition at line 218 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.15 CurrentUTC** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::CurrentUTC`  
UTC at this instant.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DUTCS, $sc_$cpu_TIME_DUTCSS`

Definition at line 220 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.16 DataStoreStatus** `uint32` `CFE_TIME_DiagnosticTlm_Payload::DataStoreStatus`  
Data Store status (preserved across processor reset)

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DataStStat`

Definition at line 332 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.17 DelayDirection** `int16` `CFE_TIME_DiagnosticTlm_Payload::DelayDirection`  
Client latency adjustment direction.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DLlatentDir`

Definition at line 252 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.18 Forced2Fly** `int16` `CFE_TIME_DiagnosticTlm_Payload::Forced2Fly`  
Commanded into fly-wheel.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DCMD2Fly`

Definition at line 236 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.19 LocalIntCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::LocalIntCounter`  
Local 1Hz ISR execution count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_D1HzISRCNT`

Definition at line 290 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.20 LocalTaskCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::LocalTaskCounter`  
Local 1Hz task execution count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_D1HzTaskCNT`

Definition at line 292 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.21 MaxElapsed** `uint32` `CFE_TIME_DiagnosticTlm_Payload::MaxElapsed`  
Max tone signal / data pkt arrival window (Sub-seconds)

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DMaxWindow`

Definition at line 312 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.22 MaxLocalClock** `CFE_TIME_SysTime_t` `CFE_TIME_DiagnosticTlm_Payload::MaxLocalClock`  
Max local clock value before rollover.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DWrapS, $sc_$cpu_TIME_DWrapSs`

Definition at line 318 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.23 MinElapsed** `uint32 CFE_TIME_DiagnosticTlm_Payload::MinElapsed`  
Min tone signal / data pkt arrival window (Sub-seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DMinWindow

Definition at line 310 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.24 OneHzAdjust** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::OneHzAdjust`  
Current 1Hz STCF adjustment.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_D1HzAdjS, \$sc\_\$cpu\_TIME\_D1HzAdjSs

Definition at line 260 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.25 OneHzDirection** `int16 CFE_TIME_DiagnosticTlm_Payload::OneHzDirection`  
1Hz STCF adjustment direction

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_D1HzAdjDir

Definition at line 250 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.26 OneTimeAdjust** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::OneTimeAdjust`  
Previous one-time STCF adjustment.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DAdjustS, \$sc\_\$cpu\_TIME\_DAdjustSs

Definition at line 258 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.27 OneTimeDirection** `int16 CFE_TIME_DiagnosticTlm_Payload::OneTimeDirection`  
One time STCF adjustment direction (Add = 1, Sub = 2)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DAdjustDir

Definition at line 248 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.28 ServerFlyState** `int16 CFE_TIME_DiagnosticTlm_Payload::ServerFlyState`  
Used by clients only.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DSrvFly

Definition at line 234 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.29 TimeSinceTone** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::TimeSinceTone`  
Time elapsed since the tone.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DElapsedS, \$sc\_\$cpu\_TIME\_DElapsedSs

Definition at line 212 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.30 ToneDataCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneDataCounter`  
Time at the tone data SB message count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTatTCNT`

Definition at line 280 of file `default_cfe_time_msgdefs.h`.

**11.159.2.31 ToneDataLatch** `CFE_TIME_SysTime_t` `CFE_TIME_DiagnosticTlm_Payload::ToneDataLatch`  
Local Clock latched at arrival of tone data.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTDS`, `$sc_$cpu_TIME_DTDSs`

Definition at line 268 of file `default_cfe_time_msgdefs.h`.

**11.159.2.32 ToneIntCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneIntCounter`  
Tone signal ISR execution count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTsISRCNT`

Definition at line 282 of file `default_cfe_time_msgdefs.h`.

**11.159.2.33 ToneIntErrorCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneIntErrorCounter`  
Tone signal ISR error count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DTsISRERR`

Definition at line 284 of file `default_cfe_time_msgdefs.h`.

**11.159.2.34 ToneMatchCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneMatchCounter`  
Tone signal / data verification count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DVerifyCNT`

Definition at line 274 of file `default_cfe_time_msgdefs.h`.

**11.159.2.35 ToneMatchErrorCounter** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneMatchErrorCounter`  
Tone signal / data verification error count.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DVerifyER`

Definition at line 276 of file `default_cfe_time_msgdefs.h`.

**11.159.2.36 ToneOverLimit** `uint32` `CFE_TIME_DiagnosticTlm_Payload::ToneOverLimit`  
Max between tone signal interrupts.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_DMaxSs`

Definition at line 324 of file `default_cfe_time_msgdefs.h`.

**11.159.2.37 ToneSignalCounter** `uint32 CFE_TIME_DiagnosticTlm_Payload::ToneSignalCounter`  
Tone signal detected SB message count.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DTSDetCNT

Definition at line 278 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.38 ToneSignalLatch** `CFE_TIME_SysTime_t CFE_TIME_DiagnosticTlm_Payload::ToneSignalLatch`  
Local Clock latched at most recent tone signal.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DTTS, \$sc\_\$cpu\_TIME\_DTTSS

Definition at line 266 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.39 ToneTaskCounter** `uint32 CFE_TIME_DiagnosticTlm_Payload::ToneTaskCounter`  
Tone task execution count.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DTsTaskCNT

Definition at line 286 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.40 ToneUnderLimit** `uint32 CFE_TIME_DiagnosticTlm_Payload::ToneUnderLimit`  
Min between tone signal interrupts.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DMinSs

Definition at line 326 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.41 VersionCounter** `uint32 CFE_TIME_DiagnosticTlm_Payload::VersionCounter`  
Count of mods to time at tone reference data (version)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DVersionCNT

Definition at line 288 of file default\_cfe\_time\_msgdefs.h.

**11.159.2.42 VirtualMET** `uint32 CFE_TIME_DiagnosticTlm_Payload::VirtualMET`  
Software MET.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DLLogicalMET

Definition at line 298 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgdefs.h

## 11.160 CFE\_TIME\_FakeToneCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*

### 11.160.1 Detailed Description

Definition at line 71 of file default\_cfe\_time\_msgstruct.h.

### 11.160.2 Field Documentation

#### 11.160.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_FakeToneCmd::CommandHeader

Command header.

Definition at line 73 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/[default\\_cfe\\_time\\_msgstruct.h](#)

## 11.161 CFE\_TIME\_HousekeepingTlm Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_TelemetryHeader\\_t](#) TelemetryHeader  
*Telemetry header.*
- [CFE\\_TIME\\_HousekeepingTlm\\_Payload\\_t](#) Payload  
*Telemetry payload.*

### 11.161.1 Detailed Description

Definition at line 192 of file default\_cfe\_time\_msgstruct.h.

### 11.161.2 Field Documentation

#### 11.161.2.1 Payload [CFE\\_TIME\\_HousekeepingTlm\\_Payload\\_t](#) CFE\_TIME\_HousekeepingTlm::Payload

Telemetry payload.

Definition at line 195 of file default\_cfe\_time\_msgstruct.h.

#### 11.161.2.2 TelemetryHeader [CFE\\_MSG\\_TelemetryHeader\\_t](#) CFE\_TIME\_HousekeepingTlm::TelemetryHeader

Telemetry header.

Definition at line 194 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/[default\\_cfe\\_time\\_msgstruct.h](#)

## 11.162 CFE\_TIME\_HousekeepingTlm\_Payload Struct Reference

```
#include <default_cfe_time_msgdefs.h>
```

## Data Fields

- `uint8 CommandCounter`  
*Time Command Execution Counter.*
- `uint8 CommandErrorCounter`  
*Time Command Error Counter.*
- `uint16 ClockStateFlags`  
*State Flags.*
- `CFE_TIME_ClockState_Enum_t ClockStateAPI`  
*API State.*
- `int16 LeapSeconds`  
*Current Leaps Seconds.*
- `uint32 SecondsMET`  
*Current MET (seconds)*
- `uint32 SubsecsMET`  
*Current MET (sub-seconds)*
- `uint32 SecondsSTCF`  
*Current STCF (seconds)*
- `uint32 SubsecsSTCF`  
*Current STCF (sub-seconds)*
- `uint32 Seconds1HzAdj`  
*Current 1 Hz SCTF adjustment (seconds)*
- `uint32 Subsecs1HzAdj`  
*Current 1 Hz SCTF adjustment (sub-seconds)*
- `uint32 SecondsDelay`  
*Current 1 Hz SCTF Delay (seconds)*
- `uint32 SubsecsDelay`  
*Current 1 Hz SCTF Delay (sub-seconds)*

### 11.162.1 Detailed Description

**Name** Time Services Housekeeping Packet

Definition at line 127 of file default\_cfe\_time\_msgdefs.h.

### 11.162.2 Field Documentation

**11.162.2.1 ClockStateAPI** `CFE_TIME_ClockState_Enum_t CFE_TIME_HousekeepingTlm_Payload::ClockState`  
API  
API State.

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_DAPIState

Definition at line 142 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.2 ClockStateFlags** `uint16` `CFE_TIME_HousekeepingTlm_Payload::ClockStateFlags`  
State Flags.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_StateFlg, $sc_$cpu_TIME_FlagSet, $sc_$cpu_TIME_FlagFly, $sc_$cpu←_TIME_FlagSrc, $sc_$cpu_TIME_FlagPri, $sc_$cpu_TIME_FlagSfly, $sc_$cpu_TIME←FlagCfly, $sc_$cpu_TIME_FlagAdj, $sc_$cpu_TIME_Flag1Hzd, $sc_$cpu_TIME_FlagClat, $sc_$cpu_TIME_FlagSorC, $sc_$cpu_TIME_FlagNIU`

Definition at line 140 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.3 CommandCounter** `uint8` `CFE_TIME_HousekeepingTlm_Payload::CommandCounter`  
Time Command Execution Counter.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_CMDPC`

Definition at line 132 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.4 CommandErrorCounter** `uint8` `CFE_TIME_HousekeepingTlm_Payload::CommandErrorCounter`  
Time Command Error Counter.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_CMDEC`

Definition at line 134 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.5 LeapSeconds** `int16` `CFE_TIME_HousekeepingTlm_Payload::LeapSeconds`  
Current Leaps Seconds.

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_LeapSecs`

Definition at line 148 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.6 Seconds1HzAdj** `uint32` `CFE_TIME_HousekeepingTlm_Payload::Seconds1HzAdj`  
Current 1 Hz SCTF adjustment (seconds)

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_1HzAdjSecs`

Definition at line 168 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.7 SecondsDelay** `uint32` `CFE_TIME_HousekeepingTlm_Payload::SecondsDelay`  
Current 1 Hz SCTF Delay (seconds)

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_1HzAdjSecs`

Definition at line 178 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.8 SecondsMET** `uint32` `CFE_TIME_HousekeepingTlm_Payload::SecondsMET`  
Current MET (seconds)

**Telemetry Mnemonic(s)** `$sc_$cpu_TIME_METSecs`

Definition at line 154 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.9 SecondsSTCF** `uint32 CFE_TIME_HousekeepingTlm_Payload::SecondsSTCF`  
Current STCF (seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_STCFSecs

Definition at line 159 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.10 Subsecs1HzAdj** `uint32 CFE_TIME_HousekeepingTlm_Payload::Subsecs1HzAdj`  
Current 1 Hz SCTF adjustment (sub-seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_1HzAdjSSecs

Definition at line 170 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.11 SubsecsDelay** `uint32 CFE_TIME_HousekeepingTlm_Payload::SubsecsDelay`  
Current 1 Hz SCTF Delay (sub-seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_1HzAdjSSecs

Definition at line 180 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.12 SubsecsMET** `uint32 CFE_TIME_HousekeepingTlm_Payload::SubsecsMET`  
Current MET (sub-seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_METSubsecs

Definition at line 156 of file default\_cfe\_time\_msgdefs.h.

**11.162.2.13 SubsecsSTCF** `uint32 CFE_TIME_HousekeepingTlm_Payload::SubsecsSTCF`  
Current STCF (sub-seconds)

**Telemetry Mnemonic(s)** \$sc\_\$cpu\_TIME\_STCFSubsecs

Definition at line 161 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgdefs.h

## 11.163 CFE\_TIME\_LeapsCmd\_Payload Struct Reference

Set leap seconds command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `int16 LeapSeconds`

### 11.163.1 Detailed Description

Set leap seconds command payload.

Definition at line 56 of file default\_cfe\_time\_msgdefs.h.

## 11.163.2 Field Documentation

**11.163.2.1 LeapSeconds** `int16` `CFE_TIME_LeapsCmd_Payload::LeapSeconds`  
Definition at line 58 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgdefs.h`

## 11.164 CFE\_TIME\_NoopCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*

### 11.164.1 Detailed Description

Definition at line 46 of file default\_cfe\_time\_msgstruct.h.

## 11.164.2 Field Documentation

**11.164.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_TIME_NoopCmd::CommandHeader`  
Command header.

Definition at line 50 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.165 CFE\_TIME\_OneHzAdjustmentCmd\_Payload Struct Reference

Generic seconds, subseconds command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `uint32 Seconds`
- `uint32 Subseconds`

### 11.165.1 Detailed Description

Generic seconds, subseconds command payload.

Definition at line 105 of file default\_cfe\_time\_msgdefs.h.

## 11.165.2 Field Documentation

**11.165.2.1 Seconds** `uint32` `CFE_TIME_OneHzAdjustmentCmd_Payload::Seconds`  
Definition at line 107 of file default\_cfe\_time\_msgdefs.h.

**11.165.2.2 Subseconds** `uint32 CFE_TIME_OneHzAdjustmentCmd_Payload::Subseconds`

Definition at line 108 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgdefs.h

**11.166 CFE\_TIME\_OneHzCmd Struct Reference**

```
#include <default_cfe_time_msgstruct.h>
```

**Data Fields**

- `CFE_MSG_CommandHeader_t CommandHeader`

*Command header.*

**11.166.1 Detailed Description**

Definition at line 61 of file default\_cfe\_time\_msgstruct.h.

**11.166.2 Field Documentation****11.166.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_TIME_OneHzCmd::CommandHeader`

Command header.

Definition at line 63 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

**11.167 CFE\_TIME\_ResetCountersCmd Struct Reference**

```
#include <default_cfe_time_msgstruct.h>
```

**Data Fields**

- `CFE_MSG_CommandHeader_t CommandHeader`

*Command header.*

**11.167.1 Detailed Description**

Definition at line 51 of file default\_cfe\_time\_msgstruct.h.

**11.167.2 Field Documentation****11.167.2.1 CommandHeader** `CFE_MSG_CommandHeader_t CFE_TIME_ResetCountersCmd::CommandHeader`

Command header.

Definition at line 53 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.168 CFE\_TIME\_SendDiagnosticCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)

*Command header.*

#### 11.168.1 Detailed Description

Definition at line 56 of file default\_cfe\_time\_msgstruct.h.

#### 11.168.2 Field Documentation

##### 11.168.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SendDiagnosticCmd::CommandHeader

Command header.

Definition at line 58 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.169 CFE\_TIME\_SendHkCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)

*Command header.*

#### 11.169.1 Detailed Description

Definition at line 76 of file default\_cfe\_time\_msgstruct.h.

#### 11.169.2 Field Documentation

##### 11.169.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SendHkCmd::CommandHeader

Command header.

Definition at line 78 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.170 CFE\_TIME\_SetLeapSecondsCmd Struct Reference

Set leap seconds command.

```
#include <default_cfe_time_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_LeapsCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.170.1 Detailed Description

Set leap seconds command.

Definition at line 84 of file default\_cfe\_time\_msgstruct.h.

### 11.170.2 Field Documentation

**11.170.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SetLeapSecondsCmd::CommandHeader  
Command header.

Definition at line 86 of file default\_cfe\_time\_msgstruct.h.

**11.170.2.2 Payload** [CFE\\_TIME\\_LeapsCmd\\_Payload\\_t](#) CFE\_TIME\_SetLeapSecondsCmd::Payload  
Command payload.

Definition at line 87 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/[default\\_cfe\\_time\\_msgstruct.h](#)

## 11.171 CFE\_TIME\_SetMETCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

## Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.171.1 Detailed Description

Definition at line 134 of file default\_cfe\_time\_msgstruct.h.

### 11.171.2 Field Documentation

**11.171.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SetMETCmd::CommandHeader  
Command header.

Definition at line 136 of file default\_cfe\_time\_msgstruct.h.

**11.171.2.2 Payload** `CFE_TIME_TimeCmd_Payload_t` `CFE_TIME_SetMETCmd::Payload`  
Command payload.

Definition at line 137 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/time/config/default\\_cfe\\_time\\_msgstruct.h](#)

## 11.172 CFE\_TIME\_SetSignalCmd Struct Reference

Set tone signal source command.

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_TIME_SignalCmd_Payload_t Payload`  
*Command payload.*

### 11.172.1 Detailed Description

Set tone signal source command.

Definition at line 111 of file default\_cfe\_time\_msgstruct.h.

### 11.172.2 Field Documentation

**11.172.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_TIME_SetSignalCmd::CommandHeader`  
Command header.

Definition at line 113 of file default\_cfe\_time\_msgstruct.h.

**11.172.2.2 Payload** `CFE_TIME_SignalCmd_Payload_t` `CFE_TIME_SetSignalCmd::Payload`  
Command payload.

Definition at line 114 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [cfe/modules/time/config/default\\_cfe\\_time\\_msgstruct.h](#)

## 11.173 CFE\_TIME\_SetSourceCmd Struct Reference

Set time data source command.

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_TIME_SourceCmd_Payload_t Payload`  
*Command payload.*

### 11.173.1 Detailed Description

Set time data source command.

Definition at line 102 of file default\_cfe\_time\_msgstruct.h.

### 11.173.2 Field Documentation

**11.173.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SetSourceCmd::CommandHeader  
Command header.

Definition at line 104 of file default\_cfe\_time\_msgstruct.h.

**11.173.2.2 Payload** [CFE\\_TIME\\_SourceCmd\\_Payload\\_t](#) CFE\_TIME\_SetSourceCmd::Payload  
Command payload.

Definition at line 105 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.174 CFE\_TIME\_SetStateCmd Struct Reference

Set clock state command.

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_StateCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.174.1 Detailed Description

Set clock state command.

Definition at line 93 of file default\_cfe\_time\_msgstruct.h.

### 11.174.2 Field Documentation

**11.174.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SetStateCmd::CommandHeader  
Command header.

Definition at line 95 of file default\_cfe\_time\_msgstruct.h.

**11.174.2.2 Payload** [CFE\\_TIME\\_StateCmd\\_Payload\\_t](#) CFE\_TIME\_SetStateCmd::Payload  
Command payload.

Definition at line 96 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.175 CFE\_TIME\_SetSTCFCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_TIME\_TimeCmd\_Payload\_t** Payload  
*Command payload.*

### 11.175.1 Detailed Description

Definition at line 140 of file default\_cfe\_time\_msgstruct.h.

### 11.175.2 Field Documentation

#### 11.175.2.1 CommandHeader **CFE\_MSG\_CommandHeader\_t** CFE\_TIME\_SetSTCFCmd::CommandHeader

Command header.

Definition at line 142 of file default\_cfe\_time\_msgstruct.h.

#### 11.175.2.2 Payload **CFE\_TIME\_TimeCmd\_Payload\_t** CFE\_TIME\_SetSTCFCmd::Payload

Command payload.

Definition at line 143 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.176 CFE\_TIME\_SetTimeCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** CommandHeader  
*Command header.*
- **CFE\_TIME\_TimeCmd\_Payload\_t** Payload  
*Command payload.*

### 11.176.1 Detailed Description

Definition at line 158 of file default\_cfe\_time\_msgstruct.h.

### 11.176.2 Field Documentation

#### 11.176.2.1 CommandHeader **CFE\_MSG\_CommandHeader\_t** CFE\_TIME\_SetTimeCmd::CommandHeader

Command header.

Definition at line 160 of file default\_cfe\_time\_msgstruct.h.

**11.176.2.2 Payload** `CFE_TIME_TimeCmd_Payload_t` `CFE_TIME_SetTimeCmd::Payload`  
Command payload.

Definition at line 161 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.177 CFE\_TIME\_SignalCmd\_Payload Struct Reference

Set tone signal source command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `int16 ToneSource`  
*CFE\_TIME\_ToneSignalSelect\_PRIMARY*=Primary Source, *CFE\_TIME\_ToneSignalSelect\_REDUNDANT*=Redundant Source

### 11.177.1 Detailed Description

Set tone signal source command payload.

Definition at line 86 of file default\_cfe\_time\_msgdefs.h.

### 11.177.2 Field Documentation

**11.177.2.1 ToneSource** `int16 CFE_TIME_SignalCmd_Payload::ToneSource`  
*CFE\_TIME\_ToneSignalSelect\_PRIMARY*=Primary Source, *CFE\_TIME\_ToneSignalSelect\_REDUNDANT*=Redundant Source

Selects either the "Primary" or "Redundant" tone signal source

Definition at line 88 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgdefs.h`

## 11.178 CFE\_TIME\_SourceCmd\_Payload Struct Reference

Set time data source command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `int16 TimeSource`  
*CFE\_TIME\_SourceSelect\_INTERNAL*=Internal Source, *CFE\_TIME\_SourceSelect\_EXTERNAL*=External Source

### 11.178.1 Detailed Description

Set time data source command payload.

Definition at line 76 of file default\_cfe\_time\_msgdefs.h.

## 11.178.2 Field Documentation

### 11.178.2.1 TimeSource `int16 CFE_TIME_SourceCmd_Payload::TimeSource`

`CFE_TIME_SourceSelect_INTERNAL`=Internal Source, `CFE_TIME_SourceSelect_EXTERNAL`=External Source

Selects either the "Internal" and "External" clock source

Definition at line 78 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgdefs.h

## 11.179 CFE\_TIME\_StateCmd\_Payload Struct Reference

Set clock state command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `CFE_TIME_ClockState_Enum_t ClockState`

`CFE_TIME_ClockState_INVALID`=Spacecraft time has not been accurately set, `CFE_TIME_ClockState_VALID`=Spacecraft clock has been accurately set, `CFE_TIME_ClockState_FLYWHEEL`=Force into FLYWHEEL mode

### 11.179.1 Detailed Description

Set clock state command payload.

Definition at line 64 of file default\_cfe\_time\_msgdefs.h.

## 11.179.2 Field Documentation

### 11.179.2.1 ClockState `CFE_TIME_ClockState_Enum_t CFE_TIME_StateCmd_Payload::ClockState`

`CFE_TIME_ClockState_INVALID`=Spacecraft time has not been accurately set, `CFE_TIME_ClockState_VALID`=Spacecraft clock has been accurately set, `CFE_TIME_ClockState_FLYWHEEL`=Force into FLYWHEEL mode

Selects the current clock state

Definition at line 66 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgdefs.h

## 11.180 CFE\_TIME\_SubAdjustCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`

*Command header.*

- `CFE_TIME_TimeCmd_Payload_t Payload`

*Command payload.*

### 11.180.1 Detailed Description

Definition at line 152 of file default\_cfe\_time\_msgstruct.h.

### 11.180.2 Field Documentation

#### 11.180.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SubAdjustCmd::CommandHeader

Command header.

Definition at line 154 of file default\_cfe\_time\_msgstruct.h.

#### 11.180.2.2 Payload [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) CFE\_TIME\_SubAdjustCmd::Payload

Command payload.

Definition at line 155 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/[default\\_cfe\\_time\\_msgstruct.h](#)

## 11.181 CFE\_TIME\_SubDelayCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command header.*
- [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) Payload  
*Command payload.*

### 11.181.1 Detailed Description

Definition at line 128 of file default\_cfe\_time\_msgstruct.h.

### 11.181.2 Field Documentation

#### 11.181.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_SubDelayCmd::CommandHeader

Command header.

Definition at line 130 of file default\_cfe\_time\_msgstruct.h.

#### 11.181.2.2 Payload [CFE\\_TIME\\_TimeCmd\\_Payload\\_t](#) CFE\_TIME\_SubDelayCmd::Payload

Command payload.

Definition at line 131 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/[default\\_cfe\\_time\\_msgstruct.h](#)

## 11.182 CFE\_TIME\_SubOneHzAdjustmentCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

## Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_TIME_OneHzAdjustmentCmd_Payload_t Payload`  
*Command payload.*

### 11.182.1 Detailed Description

Definition at line 175 of file default\_cfe\_time\_msgstruct.h.

### 11.182.2 Field Documentation

#### 11.182.2.1 CommandHeader `CFE_MSG_CommandHeader_t CFE_TIME_SubOneHzAdjustmentCmd::CommandHeader`

Command header.

Definition at line 177 of file default\_cfe\_time\_msgstruct.h.

#### 11.182.2.2 Payload `CFE_TIME_OneHzAdjustmentCmd_Payload_t CFE_TIME_SubOneHzAdjustmentCmd::Payload`

Command payload.

Definition at line 178 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.183 CFE\_TIME\_SysTime Struct Reference

Data structure used to hold system time values.

```
#include <default_cfe_time_extern_typedefs.h>
```

## Data Fields

- `uint32 Seconds`  
*Number of seconds since epoch.*
- `uint32 Subseconds`  
*Number of subseconds since epoch (LSB =  $2^{-32}$  seconds)*

### 11.183.1 Detailed Description

Data structure used to hold system time values.

#### Description

The `CFE_TIME_SysTime_t` data structure is used to hold time values. Time is referred to as the elapsed time (in seconds and subseconds) since a specified epoch time. The subseconds field contains the number of  $2^{-32}$  second intervals that have elapsed since the epoch.

Definition at line 41 of file default\_cfe\_time\_extern\_typedefs.h.

### 11.183.2 Field Documentation

**11.183.2.1 Seconds** `uint32 CFE_TIME_SysTime::Seconds`

Number of seconds since epoch.

Definition at line 43 of file `default_cfe_time_extern_typedefs.h`.

Referenced by `LC_CheckMsgForWPs()`, `LC_ProcessWP()`, and `LC_ResetResultsWP()`.

**11.183.2.2 Subseconds** `uint32 CFE_TIME_SysTime::Subseconds`

Number of subseconds since epoch (LSB =  $2^{-32}$  seconds)

Definition at line 44 of file `default_cfe_time_extern_typedefs.h`.

Referenced by `LC_CheckMsgForWPs()`, `LC_ProcessWP()`, and `LC_ResetResultsWP()`.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_extern_typedefs.h`

## 11.184 CFE\_TIME\_TimeCmd\_Payload Struct Reference

Generic seconds, microseconds command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- `uint32 Seconds`
- `uint32 MicroSeconds`

#### 11.184.1 Detailed Description

Generic seconds, microseconds command payload.

Definition at line 96 of file `default_cfe_time_msgdefs.h`.

#### 11.184.2 Field Documentation

**11.184.2.1 MicroSeconds** `uint32 CFE_TIME_TimeCmd_Payload::MicroSeconds`

Definition at line 99 of file `default_cfe_time_msgdefs.h`.

**11.184.2.2 Seconds** `uint32 CFE_TIME_TimeCmd_Payload::Seconds`

Definition at line 98 of file `default_cfe_time_msgdefs.h`.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgdefs.h`

## 11.185 CFE\_TIME\_ToneDataCmd Struct Reference

Time at tone data command.

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command header.*
- `CFE_TIME_ToneDataCmd_Payload_t Payload`  
*Command payload.*

### 11.185.1 Detailed Description

Time at tone data command.

Definition at line 184 of file default\_cfe\_time\_msgstruct.h.

### 11.185.2 Field Documentation

#### 11.185.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) CFE\_TIME\_ToneDataCmd::CommandHeader

Command header.

Definition at line 186 of file default\_cfe\_time\_msgstruct.h.

#### 11.185.2.2 Payload [CFE\\_TIME\\_ToneDataCmd\\_Payload\\_t](#) CFE\_TIME\_ToneDataCmd::Payload

Command payload.

Definition at line 187 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- cfe/modules/time/config/default\_cfe\_time\_msgstruct.h

## 11.186 CFE\_TIME\_ToneDataCmd\_Payload Struct Reference

Time at tone data command payload.

```
#include <default_cfe_time_msgdefs.h>
```

### Data Fields

- [CFE\\_TIME\\_SysTime\\_t](#) AtToneMET  
*MET at time of tone.*
- [CFE\\_TIME\\_SysTime\\_t](#) AtToneSTCF  
*STCF at time of tone.*
- [int16](#) AtToneLeapSeconds  
*Leap Seconds at time of tone.*
- [CFE\\_TIME\\_ClockState\\_Enum\\_t](#) AtToneState  
*Clock state at time of tone.*

### 11.186.1 Detailed Description

Time at tone data command payload.

Definition at line 114 of file default\_cfe\_time\_msgdefs.h.

### 11.186.2 Field Documentation

#### 11.186.2.1 AtToneLeapSeconds [int16](#) CFE\_TIME\_ToneDataCmd\_Payload::AtToneLeapSeconds

Leap Seconds at time of tone.

Definition at line 118 of file default\_cfe\_time\_msgdefs.h.

**11.186.2.2 AtToneMET** `CFE_TIME_SysTime_t` `CFE_TIME_ToneDataCmd_Payload::AtToneMET`  
MET at time of tone.

Definition at line 116 of file default\_cfe\_time\_msgdefs.h.

**11.186.2.3 AtToneState** `CFE_TIME_ClockState_Enum_t` `CFE_TIME_ToneDataCmd_Payload::AtToneState`  
Clock state at time of tone.

Definition at line 119 of file default\_cfe\_time\_msgdefs.h.

**11.186.2.4 AtToneSTCF** `CFE_TIME_SysTime_t` `CFE_TIME_ToneDataCmd_Payload::AtToneSTCF`  
STCF at time of tone.

Definition at line 117 of file default\_cfe\_time\_msgdefs.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgdefs.h`

## 11.187 CFE\_TIME\_ToneSignalCmd Struct Reference

```
#include <default_cfe_time_msgstruct.h>
```

### Data Fields

- **CFE\_MSG\_CommandHeader\_t** `CommandHeader`  
*Command header.*

### 11.187.1 Detailed Description

Definition at line 66 of file default\_cfe\_time\_msgstruct.h.

### 11.187.2 Field Documentation

**11.187.2.1 CommandHeader** `CFE_MSG_CommandHeader_t` `CFE_TIME_ToneSignalCmd::CommandHeader`  
Command header.

Definition at line 68 of file default\_cfe\_time\_msgstruct.h.

The documentation for this struct was generated from the following file:

- `cfe/modules/time/config/default_cfe_time_msgstruct.h`

## 11.188 LC\_AdTEntry\_t Struct Reference

Actionpoint Definition Table (ADT) Entry.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- `uint8 DefaultState`  
*Default state for this AP (enumerated) States are defined in lc\_msgdefs.h*
- `uint8 MaxPassiveEvents`  
*Max number of events before filter.*
- `uint8 MaxPassFailEvents`

- **uint8 MaxFailPassEvents**  
*Max number of events before filter.*
- **uint16 RTSId**  
*RTS to request if this AP fails*
- **uint16 MaxFailsBeforeRTS**  
*How many consecutive failures before an RTS request is issued*
- **uint16 RPNEquation [LC\_MAX\_RPN\_EQU\_SIZE]**  
*Reverse Polish Equation that specifies when this actionpoint should fail*
- **uint16 EventType**  
*Event type used for event msg if AP fails: CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_EventType\_DEBUG, CFE\_EVS\_EventType\_ERROR, or CFE\_EVS\_EventType\_CRITICAL*
- **uint16 EventID**  
*Event ID used for event msg if AP fails See [lc\\_eventids.h](#) for those already in use*
- **char EventText [LC\_MAX\_ACTION\_TEXT]**  
*Text used for the event msg when this AP fails*

### 11.188.1 Detailed Description

Actionpoint Definition Table (ADT) Entry.  
Definition at line 42 of file default\_lc\_tblstruct.h.

### 11.188.2 Field Documentation

#### 11.188.2.1 DefaultState `uint8 LC_AdTEntry_t::DefaultState`

Default state for this AP (enumerated) States are defined in lc\_msgdefs.h

Definition at line 44 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ResetResultsAP(), and LC\_ValidateADT().

#### 11.188.2.2 EventID `uint16 LC_AdTEntry_t::EventID`

Event ID used for event msg if AP fails See [lc\\_eventids.h](#) for those already in use

Definition at line 66 of file default\_lc\_tblstruct.h.  
Referenced by LC\_SampleSingleAP().

#### 11.188.2.3 EventText `char LC_AdTEntry_t::EventText[LC_MAX_ACTION_TEXT]`

Text used for the event msg when this AP fails

Definition at line 69 of file default\_lc\_tblstruct.h.  
Referenced by LC\_SampleSingleAP().

**11.188.2.4 EventType** `uint16 LC_AdTEntry_t::EventType`

Event type used for event msg if AP fails: `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_EventType_DEBUG`, `CFE_EVS_EventType_ERROR`, or `CFE_EVS_EventType_CRITICAL`

Definition at line 60 of file `default_lc_tblstruct.h`.

Referenced by `LC_SampleSingleAP()`, and `LC_ValidateADT()`.

**11.188.2.5 MaxFailPassEvents** `uint8 LC_AdTEntry_t::MaxFailPassEvents`

Max number of events before filter.

- AP result transition from fail to pass

Definition at line 50 of file `default_lc_tblstruct.h`.

Referenced by `LC_SampleSingleAP()`.

**11.188.2.6 MaxFailsBeforeRTS** `uint16 LC_AdTEntry_t::MaxFailsBeforeRTS`

How many consecutive failures before an RTS request is issued

Definition at line 53 of file `default_lc_tblstruct.h`.

Referenced by `LC_SampleSingleAP()`, and `LC_ValidateADT()`.

**11.188.2.7 MaxPassFailEvents** `uint8 LC_AdTEntry_t::MaxPassFailEvents`

Max number of events before filter.

- AP result transition from pass to fail

Definition at line 48 of file `default_lc_tblstruct.h`.

Referenced by `LC_SampleSingleAP()`.

**11.188.2.8 MaxPassiveEvents** `uint8 LC_AdTEntry_t::MaxPassiveEvents`

Max number of events before filter.

- RTS not started because AP is passive

Definition at line 46 of file `default_lc_tblstruct.h`.

Referenced by `LC_SampleSingleAP()`.

**11.188.2.9 RPNEquation** `uint16 LC_AdTEntry_t::RPNEquation[LC_MAX_RPN_EQU_SIZE]`

Reverse Polish Equation that specifies when this actionpoint should fail

Definition at line 56 of file `default_lc_tblstruct.h`.

Referenced by `LC_EvaluateRPN()`, and `LC_ValidateADT()`.

**11.188.2.10 RTSId** `uint16 LC_ADTEEntry_t::RTSId`

RTS to request if this AP fails

Definition at line 52 of file default\_lc\_tblstruct.h.

Referenced by LC\_SampleSingleAP(), and LC\_ValidateADT().

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_tblstruct.h](#)

## 11.189 LC\_AppData\_t Struct Reference

LC Application Data Structure.

```
#include <lc_app.h>
```

### Data Fields

- `uint16 CmdCount`

*Command Counter*

- `uint16 CmdErrCount`

*Command Error Counter*

- `uint32 APSampleCount`

*Total count of Actionpoints sampled*

- `uint32 MonitoredMsgCount`

*Total count of messages monitored*

- `uint32 RTSExecCount`

*Total count of RTS sequences initiated.*

- `uint16 PassiveRTSExecCount`

*Total count of RTS sequences not initiated because the LC state is set to `LC_STATE_PASSIVE` or the state of the actionpoint that failed is set to `LC_APSTATE_PASSIVE`*

- `uint16 CDSSavedOnExit`

*Variable that tells us if we exited clean or not.*

- `uint8 CurrentLCState`

*Current LC application operating state.*

### 11.189.1 Detailed Description

LC Application Data Structure.

The application data is saved and restored from the CDS when the app is configured to use it

Definition at line 184 of file lc\_app.h.

### 11.189.2 Field Documentation

**11.189.2.1 APSampleCount** `uint32` `LC_AppData_t::APSampleCount`

Total count of Actionpoints sampled

Definition at line 189 of file `lc_app.h`.

Referenced by `LC_ResetCounters()`, `LC_SampleSingleAP()`, and `LC_SendHkCmd()`.

**11.189.2.2 CDSSavedOnExit** `uint16` `LC_AppData_t::CDSSavedOnExit`

Variable that tells us if we exited clean or not.

Definition at line 198 of file `lc_app.h`.

Referenced by `LC_AppMain()`, `LC_CreateTaskCDS()`, and `LC_UpdateTaskCDS()`.

**11.189.2.3 CmdCount** `uint16` `LC_AppData_t::CmdCount`

Command Counter

Definition at line 186 of file `lc_app.h`.

Referenced by `LC_NoopCmd()`, `LC_ResetAPStatsCmd()`, `LC_ResetCounters()`, `LC_ResetWPStatsCmd()`, `LC_SendHkCmd()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, and `LC_SetLCStateCmd()`.

**11.189.2.4 CmdErrCount** `uint16` `LC_AppData_t::CmdErrCount`

Command Error Counter

Definition at line 187 of file `lc_app.h`.

Referenced by `LC_AppPipe()`, `LC_ResetAPStatsCmd()`, `LC_ResetCounters()`, `LC_ResetWPStatsCmd()`, `LC_SendHkCmd()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, `LC_SetLCStateCmd()`, and `LC_VerifyMsgLength()`.

**11.189.2.5 CurrentLCState** `uint8` `LC_AppData_t::CurrentLCState`

Current LC application operating state.

Definition at line 199 of file `lc_app.h`.

Referenced by `LC_CheckMsgForWPs()`, `LC_CreateTaskCDS()`, `LC_LoadDefaultTables()`, `LC_SampleAPReq()`, `LC_SampleSingleAP()`, `LC_SendHkCmd()`, and `LC_SetLCStateCmd()`.

**11.189.2.6 MonitoredMsgCount** `uint32` `LC_AppData_t::MonitoredMsgCount`

Total count of messages monitored

Definition at line 190 of file `lc_app.h`.

Referenced by `LC_CheckMsgForWPs()`, `LC_ResetCounters()`, and `LC_SendHkCmd()`.

**11.189.2.7 PassiveRTSExecCount** `uint16` `LC_AppData_t::PassiveRTSExecCount`

Total count of RTS sequences not initiated because the LC state is set to `LC_STATE_PASSIVE` or the state of the actionpoint that failed is set to `LC_APSTATE_PASSIVE`

Definition at line 192 of file `lc_app.h`.

Referenced by `LC_ResetCounters()`, `LC_SampleSingleAP()`, and `LC_SendHkCmd()`.

**11.189.2.8 RTSExecCount** `uint32 LC_AppData_t::RTSExecCount`

Total count of RTS sequences initiated.

Definition at line 191 of file lc\_app.h.

Referenced by LC\_ResetCounters(), LC\_SampleSingleAP(), and LC\_SendHkCmd().

The documentation for this struct was generated from the following file:

- `apps/lc/fsw/src/lc_app.h`

## 11.190 LC\_ARTEEntry\_t Struct Reference

Actionpoint Results Table (ART) Entry.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- `uint8 ActionResult`

*Result for the last sample of this actionpoint*

- `uint8 CurrentState`

*Current state of this actionpoint*

- `uint16 Padding`

*Structure padding.*

- `uint32 PassiveAPCount`

*Total number of times RTS not invoked because this AP was passive*

- `uint32 FailToPassCount`

*How many times this actionpoint has transitioned from Fail to Pass*

- `uint32 PassToFailCount`

*How many times this actionpoint has transitioned from Pass to Fail*

- `uint32 ConsecutiveFailCount`

*Number of consecutive times this actionpoint has evaluated to Fail*

- `uint32 CumulativeFailCount`

*Total number of times this actionpoint has evaluated to Fail*

- `uint32 CumulativeRTSExecCount`

*Total number of times an RTS request has been sent for this actionpoint*

- `uint32 CumulativeEventMsgsSent`

*Total number of event messages sent*

### 11.190.1 Detailed Description

Actionpoint Results Table (ART) Entry.

Definition at line 160 of file default\_lc\_tblstruct.h.

### 11.190.2 Field Documentation

**11.190.2.1 ActionResult** `uint8 LC_ARTEEntry_t::ActionResult`

Result for the last sample of this actionpoint

Definition at line 162 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), LC\_SampleSingleAP(), and LC\_SendHkCmd().

**11.190.2.2 ConsecutiveFailCount** `uint32 LC_ARTEEntry_t::ConsecutiveFailCount`

Number of consecutive times this actionpoint has evaluated to Fail

Definition at line 174 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.3 CumulativeEventMsgsSent** `uint32 LC_ARTEEntry_t::CumulativeEventMsgsSent`

Total number of event messages sent

Definition at line 180 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.4 CumulativeFailCount** `uint32 LC_ARTEEntry_t::CumulativeFailCount`

Total number of times this actionpoint has evaluated to Fail

Definition at line 176 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.5 CumulativeRTSExecCount** `uint32 LC_ARTEEntry_t::CumulativeRTSExecCount`

Total number of times an RTS request has been sent for this actionpoint

Definition at line 178 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.6 CurrentState** `uint8 LC_ARTEEntry_t::CurrentState`

Current state of this actionpoint

Definition at line 164 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), LC\_SampleAPs(), LC\_SampleSingleAP(), LC\_SendHkCmd(), LC\_SetAPPermOffCmd(), and LC\_SetAPStateCmd().

**11.190.2.7 FailToPassCount** `uint32 LC_ARTEEntry_t::FailToPassCount`

How many times this actionpoint has transitioned from Fail to Pass

Definition at line 170 of file default\_lc\_tblstruct.h.

Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.8 Padding** `uint16 LC_ARTEEntry_t::Padding`

Structure padding.

Definition at line 166 of file default\_lc\_tblstruct.h.

**11.190.2.9 PassiveAPCount** `uint32 LC_ARTEntry_t::PassiveAPCount`  
Total number of times RTS not invoked because this AP was passive

Definition at line 168 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().

**11.190.2.10 PassToFailCount** `uint32 LC_ARTEntry_t::PassToFailCount`  
How many times this actionpoint has transitioned from Pass to Fail

Definition at line 172 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ResetResultsAP(), and LC\_SampleSingleAP().  
The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_tblstruct.h`

## 11.191 LC\_HkPacket\_t Struct Reference

Housekeeping Telemetry Structure Structure.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- `CFE_MSG_TelemetryHeader_t TelemetryHeader`  
*Telemetry Header.*
- `LC_HkTlm_Payload_t Payload`

### 11.191.1 Detailed Description

Housekeeping Telemetry Structure Structure.

Definition at line 296 of file default\_lc\_msgstruct.h.

### 11.191.2 Field Documentation

**11.191.2.1 Payload** `LC_HkTlm_Payload_t LC_HkPacket_t::Payload`  
Definition at line 300 of file default\_lc\_msgstruct.h.  
Referenced by LC\_SendHkCmd().

**11.191.2.2 TelemetryHeader** `CFE_MSG_TelemetryHeader_t LC_HkPacket_t::TelemetryHeader`  
Telemetry Header.  
Definition at line 298 of file default\_lc\_msgstruct.h.  
Referenced by LC\_SbInit(), and LC\_SendHkCmd().  
The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_msgstruct.h`

## 11.192 LC\_HkTlm\_Payload\_t Struct Reference

Housekeeping Payload Structure.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- `uint8 CmdCount`  
*LC Application Command Counter.*
- `uint8 CmdErrCount`  
*LC Application Command Error Counter.*
- `uint8 CurrentLCState`  
*Current LC application operating state.*
- `uint8 Pad8`  
*Structure padding.*
- `uint8 WPResults [LC_HKWR_NUM_BYTES]`  
*Packed watchpoint results data, 2 bits per watchpoint.*
- `uint8 APResults [LC_HKAR_NUM_BYTES]`  
*Packed actionpoint results data, 4 bits per actionpoint.*
- `uint16 PassiveRTSExecCount`  
*Total count of RTS sequences not initiated because the LC state is set to `LC_STATE_PASSIVE` or the state of the actionpoint that failed is set to `LC_APSTATE_PASSIVE`.*
- `uint16 WPsInUse`  
*How many watchpoints are currently in effect.*
- `uint16 ActiveAPs`  
*How many actionpoints are currently active.*
- `uint16 Pad16`  
*Structure padding.*
- `uint32 APSampleCount`  
*Total count of Actionpoints sampled.*
- `uint32 MonitoredMsgCount`  
*Total count of messages monitored for watchpoints.*
- `uint32 RTSExecCount`  
*Total count of RTS sequences initiated.*

### 11.192.1 Detailed Description

Housekeeping Payload Structure.

Definition at line 267 of file default\_lc\_msgstruct.h.

### 11.192.2 Field Documentation

#### 11.192.2.1 ActiveAPs `uint16` `LC_HkTlm_Payload_t::ActiveAPs`

How many actionpoints are currently active.

Definition at line 284 of file default\_lc\_msgstruct.h.

Referenced by `LC_SendHkCmd()`.

**11.192.2.2 APResults** `uint8 LC_HkTlm_Payload_t::APResults[LC_HKAR_NUM_BYTES]`

Packed actionpoint results data, 4 bits per actionpoint.

Definition at line 276 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.3 APSampleCount** `uint32 LC_HkTlm_Payload_t::APSampleCount`

Total count of Actionpoints sampled.

Definition at line 288 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.4 CmdCount** `uint8 LC_HkTlm_Payload_t::CmdCount`

LC Application Command Counter.

Definition at line 269 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.5 CmdErrCount** `uint8 LC_HkTlm_Payload_t::CmdErrCount`

LC Application Command Error Counter.

Definition at line 270 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.6 CurrentLCState** `uint8 LC_HkTlm_Payload_t::CurrentLCState`

Current LC application operating state.

Definition at line 271 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.7 MonitoredMsgCount** `uint32 LC_HkTlm_Payload_t::MonitoredMsgCount`

Total count of messages monitored for watchpoints.

Definition at line 289 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.8 Pad16** `uint16 LC_HkTlm_Payload_t::Pad16`

Structure padding.

Definition at line 286 of file default\_lc\_msgstruct.h.

**11.192.2.9 Pad8** `uint8 LC_HkTlm_Payload_t::Pad8`

Structure padding.

Definition at line 273 of file default\_lc\_msgstruct.h.

**11.192.2.10 PassiveRTSExecCount** `uint16 LC_HkTlm_Payload_t::PassiveRTSExecCount`

Total count of RTS sequences not initiated because the LC state is set to `LC_STATE_PASSIVE` or the state of the actionpoint that failed is set to `LC_APSTATE_PASSIVE`.

Definition at line 278 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.11 RTSExecCount** `uint32 LC_HkTlm_Payload_t::RTSExecCount`

Total count of RTS sequences initiated.

Definition at line 290 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.12 WPResults** `uint8 LC_HkTlm_Payload_t::WPResults[LC_HKWR_NUM_BYTES]`

Packed watchpoint results data, 2 bits per watchpoint.

Definition at line 275 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

**11.192.2.13 WPsinUse** `uint16 LC_HkTlm_Payload_t::WPsinUse`

How many watchpoints are currently in effect.

Definition at line 283 of file default\_lc\_msgstruct.h.

Referenced by LC\_SendHkCmd().

The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_msgstruct.h`

## 11.193 LC\_MListTag Struct Reference

Linked list of MessageID's with same hash function result.

```
#include <lc_app.h>
```

### Data Fields

- struct `LC_MListTag * Next`  
*Next linked list element.*
- `CFE_SB_MsgId_t MessageID`  
*MessageID for this link*
- `uint16 Spare`  
*Structure alignment pad*
- `LC_WatchPtList_t * WatchPtList`  
*Watchpoint list for this MessageID.*

### 11.193.1 Detailed Description

Linked list of MessageID's with same hash function result.

Definition at line 116 of file lc\_app.h.

### 11.193.2 Field Documentation

**11.193.2.1 MessageID** `CFE_SB_MsgId_t LC_MListTag::MessageID`

MessageID for this link

Definition at line 120 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), LC\_AppPipe(), LC\_CheckMsgForWPs(), LC\_CreateHashTable(), LC\_GetHashTableIndex(), LC\_ValidateWDT(), LC\_VerifyMsgLength(), and LC\_WPOffsetValid().

**11.193.2.2 Next** `struct LC_MListTag* LC_MListTag::Next`  
Next linked list element.  
Definition at line 118 of file lc\_app.h.  
Referenced by LC\_AddWatchpoint(), and LC\_CheckMsgForWPs().

**11.193.2.3 Spare** `uint16 LC_MListTag::Spare`  
Structure alignment pad

Definition at line 121 of file lc\_app.h.

**11.193.2.4 WatchPtList** `LC_WatchPtList_t* LC_MListTag::WatchPtList`  
Watchpoint list for this MessageID.  
Definition at line 123 of file lc\_app.h.  
Referenced by LC\_AddWatchpoint(), and LC\_CheckMsgForWPs().  
The documentation for this struct was generated from the following file:

- `apps/lc/fsw/src/lc_app.h`

## 11.194 LC\_MultiType\_t Union Reference

Alignment union.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- `uint32 Unsigned32`
- `int32 Signed32`
- `float Float32`
- `uint16 Unsigned16`
- `int16 Signed16`
- `uint8 Unsigned8`
- `int8 Signed8`
- `uint8 RawByte [4]`

### 11.194.1 Detailed Description

Alignment union.

A union type provides a way to have many different data types occupy the same memory and legally alias each other. This is used to store the watch data points, as they may be 8, 16, or 32 bits and this is defined in the table / not known until runtime.

Definition at line 82 of file default\_lc\_tblstruct.h.

### 11.194.2 Field Documentation

**11.194.2.1 Float32** `float LC_MultiType_t::Float32`  
Definition at line 86 of file default\_lc\_tblstruct.h.

**11.194.2.2 RawByte** `uint8 LC_MultiType_t::RawByte[4]`

Definition at line 91 of file default\_lc\_tblstruct.h.

**11.194.2.3 Signed16** `int16 LC_MultiType_t::Signed16`

Definition at line 88 of file default\_lc\_tblstruct.h.

Referenced by LC\_GetSizedWPData(), and LC\_OperatorCompare().

**11.194.2.4 Signed32** `int32 LC_MultiType_t::Signed32`

Definition at line 85 of file default\_lc\_tblstruct.h.

Referenced by LC\_OperatorCompare().

**11.194.2.5 Signed8** `int8 LC_MultiType_t::Signed8`

Definition at line 90 of file default\_lc\_tblstruct.h.

Referenced by LC\_GetSizedWPData(), and LC\_OperatorCompare().

**11.194.2.6 Unsigned16** `uint16 LC_MultiType_t::Unsigned16`

Definition at line 87 of file default\_lc\_tblstruct.h.

Referenced by LC\_GetSizedWPData(), and LC\_OperatorCompare().

**11.194.2.7 Unsigned32** `uint32 LC_MultiType_t::Unsigned32`

Definition at line 84 of file default\_lc\_tblstruct.h.

Referenced by LC\_GetSizedWPData(), and LC\_OperatorCompare().

**11.194.2.8 Unsigned8** `uint8 LC_MultiType_t::Unsigned8`

Definition at line 89 of file default\_lc\_tblstruct.h.

Referenced by LC\_OperatorCompare().

The documentation for this union was generated from the following file:

- `apps/lc/config/default_lc_tblstruct.h`

## 11.195 LC\_NoopCmd\_t Struct Reference

No-op Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- `CFE_MSG_CommandHeader_t CommandHeader`  
*Command Header.*

### 11.195.1 Detailed Description

No-op Command.

For command details see [LC\\_NOOP\\_CC](#)

Definition at line 72 of file default\_lc\_msgstruct.h.

### 11.195.2 Field Documentation

**11.195.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_NoopCmd\_t::CommandHeader  
Command Header.

Definition at line 74 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.196 LC\_OperData\_t Struct Reference

LC Operational Data Structure.

```
#include <lc_app.h>
```

### Data Fields

- [CFE\\_SB\\_Pipeld\\_t CmdPipe](#)  
*Command pipe ID*
- [LC\\_WDTEEntry\\_t \\* WDTPtr](#)  
*Watchpoint Definition Table Pointer.*
- [LC\\_ADTEntry\\_t \\* ADTPtr](#)  
*Actionpoint Definition Table Pointer.*
- [LC\\_WRTEEntry\\_t \\* WRTPtr](#)  
*Watchpoint Results Table Pointer*
- [LC\\_ARTEEntry\\_t \\* ARTPtr](#)  
*Actionpoint Results Table Pointer*
- [CFE\\_TBL\\_Handle\\_t WDTHandle](#)  
*Watchpoint Definition Table Handle*
- [CFE\\_TBL\\_Handle\\_t ADTHandle](#)  
*Actionpoint Definition Table Handle*
- [CFE\\_TBL\\_Handle\\_t WRTHandle](#)  
*Watchpoint Results Table Handle*
- [CFE\\_TBL\\_Handle\\_t ARTHandle](#)  
*Actionpoint Results Table Handle*
- [CFE\\_ES\\_CDSHandle\\_t WRTDataCDSHandle](#)  
*Watchpoint Results Table CDS Handle.*
- [CFE\\_ES\\_CDSHandle\\_t ARTDataCDSHandle](#)  
*Actionpoint Results Table CDS Handle.*
- [CFE\\_ES\\_CDSHandle\\_t AppDataCDSHandle](#)  
*Application Data CDS Handle*
- [uint16 WatchpointCount](#)

*Count of in-use watchpoints defined in the Watchpoint Definition Table*

- `uint16 MessageIDsCount`

*Count of unique MessageIDs referenced in the Watchpoint Definition Table*

- `LC_HkPacket_t HkPacket`

*Housekeeping telemetry packet*

- `uint32 TableResults`

*Table and CDS initialization results.*

- `LC_MessageList_t * HashTable [LC_HASH_TABLE_ENTRIES]`

*Each entry in the hash table is a linked list of all the MessageID's that the hash function converts to each index*

- `LC_MessageList_t MessageLinks [LC_MAX_WATCHPOINTS]`

*Message linked list elements.*

- `LC_WatchPtList_t WatchPtLinks [LC_MAX_WATCHPOINTS]`

*WatchPoint linked list elements.*

- `bool HaveActiveCDS`

*Critical Data Store in use flag*

### 11.196.1 Detailed Description

LC Operational Data Structure.

The operational data is not saved to the CDS

Definition at line 135 of file lc\_app.h.

### 11.196.2 Field Documentation

#### 11.196.2.1 ADTHandle `CFE_TBL_Handle_t LC_OperData_t::ADTHandle`

Actionpoint Definition Table Handle

Definition at line 148 of file lc\_app.h.

Referenced by `LC_CreateDefinitionTables()`, `LC_LoadDefaultTables()`, `LC_ManageTables()`, and `LC_TableInit()`.

#### 11.196.2.2 ADTPtr `LC_ADTEntry_t* LC_OperData_t::ADTPtr`

Actionpoint Definition Table Pointer.

Definition at line 142 of file lc\_app.h.

Referenced by `LC_EvaluateRPN()`, `LC_LoadDefaultTables()`, `LC_ManageTables()`, `LC_ResetResultsAP()`, `LC_SampleSingleAP()`, and `LC_TableInit()`.

#### 11.196.2.3 AppDataCDSHandle `CFE_ES_CDSHandle_t LC_OperData_t::AppDataCDSHandle`

Application Data CDS Handle

Definition at line 156 of file lc\_app.h.

Referenced by `LC_CreateTaskCDS()`, and `LC_UpdateTaskCDS()`.

**11.196.2.4 ARTDataCDSHandle** `CFE_ES_CDSHandle_t` `LC_OperData_t::ARTDataCDSHandle`  
Actionpoint Results Table CDS Handle.  
Definition at line 154 of file `lc_app.h`.  
Referenced by `LC_CreateTaskCDS()`, and `LC_UpdateTaskCDS()`.

**11.196.2.5 ARTHandle** `CFE_TBL_Handle_t` `LC_OperData_t::ARTHandle`  
Actionpoint Results Table Handle

Definition at line 151 of file `lc_app.h`.  
Referenced by `LC_CreateResultTables()`, and `LC_ManageTables()`.

**11.196.2.6 ARTPtr** `LC_ARTEntry_t*` `LC_OperData_t::ARTPtr`  
Actionpoint Results Table Pointer

Definition at line 145 of file `lc_app.h`.  
Referenced by `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_ResetResultsAP()`, `LC_SampleAPs()`, `LC_SampleSingleAP()`, `LC_SendHkCmd()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, and `LC_UpdateTaskCDS()`.

**11.196.2.7 CmdPipe** `CFE_SB_PipeId_t` `LC_OperData_t::CmdPipe`  
Command pipe ID

Definition at line 139 of file `lc_app.h`.  
Referenced by `LC_AddWatchpoint()`, `LC_AppMain()`, `LC_CreateHashTable()`, and `LC_SblInit()`.

**11.196.2.8 HashTable** `LC_MessageList_t*` `LC_OperData_t::HashTable[LC_HASH_TABLE_ENTRIES]`  
Each entry in the hash table is a linked list of all the MessageID's that the hash function converts to each index

Definition at line 168 of file `lc_app.h`.  
Referenced by `LC_AddWatchpoint()`, `LC_CheckMsgForWPs()`, and `LC_CreateHashTable()`.

**11.196.2.9 HaveActiveCDS** `bool` `LC_OperData_t::HaveActiveCDS`  
Critical Data Store in use flag

Definition at line 177 of file `lc_app.h`.  
Referenced by `LC_AppMain()`, `LC_CreateDefinitionTables()`, `LC_LoadDefaultTables()`, `LC_PerformMaintenance()`, and `LC_TableInit()`.

**11.196.2.10 HkPacket** `LC_HkPacket_t` `LC_OperData_t::HkPacket`  
Housekeeping telemetry packet

Definition at line 164 of file `lc_app.h`.  
Referenced by `LC_SblInit()`, and `LC_SendHkCmd()`.

**11.196.2.11 MessageIDsCount** `uint16` `LC_OperData_t::MessageIDsCount`

Count of unique MessageIDs referenced in the Watchpoint Definition Table

Definition at line 161 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), and LC\_CreateHashTable().

#### **11.196.2.12 MessageLinks** `LC_MessageList_t` `LC_OperData_t::MessageLinks[LC_MAX_WATCHPOINTS]`

Message linked list elements.

Definition at line 174 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), and LC\_CreateHashTable().

#### **11.196.2.13 TableResults** `uint32` `LC_OperData_t::TableResults`

Table and CDS initialization results.

Definition at line 166 of file lc\_app.h.

Referenced by LC\_CreateDefinitionTables(), LC\_CreateResultTables(), LC\_CreateTaskCDS(), LC\_LoadDefaultTables(), and LC\_TableInit().

#### **11.196.2.14 WatchpointCount** `uint16` `LC_OperData_t::WatchpointCount`

Count of in-use watchpoints defined in the Watchpoint Definition Table

Definition at line 158 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), LC\_CreateHashTable(), and LC\_SendHkCmd().

#### **11.196.2.15 WatchPtLinks** `LC_WatchPtList_t` `LC_OperData_t::WatchPtLinks[LC_MAX_WATCHPOINTS]`

WatchPoint linked list elements.

Definition at line 175 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), and LC\_CreateHashTable().

#### **11.196.2.16 WDTHandle** `CFE_TBL_Handle_t` `LC_OperData_t::WDTHandle`

Watchpoint Definition Table Handle

Definition at line 147 of file lc\_app.h.

Referenced by LC\_CreateDefinitionTables(), LC\_LoadDefaultTables(), LC\_ManageTables(), and LC\_TableInit().

#### **11.196.2.17 WDTPtr** `LC_WDTEntry_t*` `LC_OperData_t::WDTPtr`

Watchpoint Definition Table Pointer.

Definition at line 141 of file lc\_app.h.

Referenced by LC\_CreateHashTable(), LC\_FloatCompare(), LC\_GetSizedWPData(), LC\_LoadDefaultTables(), LC\_ManageTables(), LC\_OperatorCompare(), LC\_ProcessWP(), LC\_SignedCompare(), LC\_TableInit(), LC\_UnsignedCompare(), and LC\_WPOffsetValid().

#### **11.196.2.18 WRTDataCDSHandle** `CFE_ES_CDSHandle_t` `LC_OperData_t::WRTDataCDSHandle`

Watchpoint Results Table CDS Handle.

Definition at line 153 of file lc\_app.h.

Referenced by LC\_CreateTaskCDS(), and LC\_UpdateTaskCDS().

**11.196.2.19 WRTHandle** [CFE\\_TBL\\_Handle\\_t](#) LC\_OperData\_t::WRTHandle  
Watchpoint Results Table Handle

Definition at line 150 of file lc\_app.h.  
Referenced by LC\_CreateResultTables(), and LC\_ManageTables().

**11.196.2.20 WRTPtr** [LC\\_WRTEntry\\_t\\*](#) LC\_OperData\_t::WRTPtr  
Watchpoint Results Table Pointer

Definition at line 144 of file lc\_app.h.  
Referenced by LC\_CreateResultTables(), LC\_CreateTaskCDS(), LC\_EvaluateRPN(), LC\_GetSizedWPData(), LC\_ProcessWP(), LC\_ResetResultsWP(), LC\_SampleAPReq(), LC\_SendHkCmd(), LC\_UpdateTaskCDS(), and LC\_WP\_OffsetValid().

The documentation for this struct was generated from the following file:

- [apps/lc/fsw/src/lc\\_app.h](#)

## 11.197 LC\_ResetAPStats\_Payload\_t Struct Reference

Reset AP (Actionpoint) Statistics Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- **uint16 APNumber**  
*Which actionpoint(s) to change.*
- **uint16 Padding**  
*Structure padding*

### 11.197.1 Detailed Description

Reset AP (Actionpoint) Statistics Payload.

For command details see [LC\\_RESET\\_AP\\_STATS\\_CC](#)

Definition at line 161 of file default\_lc\_msgstruct.h.

### 11.197.2 Field Documentation

**11.197.2.1 APNumber** [uint16](#) LC\_ResetAPStats\_Payload\_t::APNumber  
Which actionpoint(s) to change.

Definition at line 163 of file default\_lc\_msgstruct.h.

Referenced by LC\_ResetAPStatsCmd().

**11.197.2.2 Padding** [uint16](#) LC\_ResetAPStats\_Payload\_t::Padding  
Structure padding

Definition at line 164 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.198 LC\_ResetAPStatsCmd\_t Struct Reference

Reset AP (Actionpoint) Statistics Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*
- [LC\\_ResetAPStats\\_Payload\\_t](#) Payload

### 11.198.1 Detailed Description

Reset AP (Actionpoint) Statistics Command.

For command details see [LC\\_RESET\\_AP\\_STATS\\_CC](#)

Definition at line 172 of file default\_lc\_msgstruct.h.

### 11.198.2 Field Documentation

#### 11.198.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_ResetAPStatsCmd\_t::CommandHeader

Command Header.

Definition at line 174 of file default\_lc\_msgstruct.h.

#### 11.198.2.2 Payload [LC\\_ResetAPStats\\_Payload\\_t](#) LC\_ResetAPStatsCmd\_t::Payload

Definition at line 176 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- apps/lc/config/[default\\_lc\\_msgstruct.h](#)

## 11.199 LC\_ResetCountersCmd\_t Struct Reference

Reset Counters Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*

### 11.199.1 Detailed Description

Reset Counters Command.

For command details see [LC\\_RESET\\_CC](#)

Definition at line 82 of file default\_lc\_msgstruct.h.

### 11.199.2 Field Documentation

**11.199.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_ResetCountersCmd\_t::CommandHeader  
Command Header.

Definition at line 84 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.200 LC\_ResetWPStats\_Payload\_t Struct Reference

Reset WP (Watchpoint) Statistics Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- **uint16 WPNumber**  
*Which watchpoint(s) to change.*
- **uint16 Padding**  
*Structure padding*

### 11.200.1 Detailed Description

Reset WP (Watchpoint) Statistics Payload.

For command details see [LC\\_RESET\\_WP\\_STATS\\_CC](#)

Definition at line 184 of file default\_lc\_msgstruct.h.

### 11.200.2 Field Documentation

**11.200.2.1 Padding** [uint16](#) LC\_ResetWPStats\_Payload\_t::Padding  
Structure padding

Definition at line 187 of file default\_lc\_msgstruct.h.

**11.200.2.2 WPNumber** [uint16](#) LC\_ResetWPStats\_Payload\_t::WPNumber

Which watchpoint(s) to change.

Definition at line 186 of file default\_lc\_msgstruct.h.

Referenced by [LC\\_ResetWPStatsCmd\(\)](#).

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.201 LC\_ResetWPStatsCmd\_t Struct Reference

Reset WP (Watchpoint) Statistics Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*
- [LC\\_ResetWPStats\\_Payload\\_t](#) Payload

### 11.201.1 Detailed Description

Reset WP (Watchpoint) Statistics Command.  
For command details see [LC\\_RESET\\_WP\\_STATS\\_CC](#)  
Definition at line 195 of file default\_lc\_msgstruct.h.

### 11.201.2 Field Documentation

**11.201.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_ResetWPStatsCmd\_t::CommandHeader  
Command Header.  
Definition at line 197 of file default\_lc\_msgstruct.h.

**11.201.2.2 Payload** [LC\\_ResetWPStats\\_Payload\\_t](#) LC\_ResetWPStatsCmd\_t::Payload  
Definition at line 199 of file default\_lc\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.202 LC\_RTSRequest\_Payload\_t Struct Reference

Payload to Start a Stored Command RTS.  
`#include <default_lc_msgstruct.h>`

### Data Fields

- **uint16 RTSId**  
*RTS Id to start.*
- **uint16 Padding**  
*Padding.*

### 11.202.1 Detailed Description

Payload to Start a Stored Command RTS.  
Definition at line 231 of file default\_lc\_msgstruct.h.

### 11.202.2 Field Documentation

**11.202.2.1 Padding** [uint16](#) LC\_RTSRequest\_Payload\_t::Padding  
Padding.  
Definition at line 234 of file default\_lc\_msgstruct.h.

**11.202.2.2 RTSId** [uint16](#) LC\_RTSRequest\_Payload\_t::RTSId  
RTS Id to start.  
Definition at line 233 of file default\_lc\_msgstruct.h.  
Referenced by [LC\\_ExecuteRTS\(\)](#).  
The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.203 LC\_RTSRequestCmd\_t Struct Reference

Send Command to Start a Stored Command RTS.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*
- [LC\\_RTSRequest\\_Payload\\_t](#) Payload

### 11.203.1 Detailed Description

Send Command to Start a Stored Command RTS.

This is a local declaration of the command message structure to initiate an RTS and has been placed here to allow the LC application to be built without including headers from any other applications (like Stored Commanding). A mission may choose to remove this and use a message structure declared elsewhere instead.

This also applies to the LC\_RTS\_REQ\_MID and LC\_RTS\_REQ\_CC constants (see lc\_mission\_cfg.h).

Definition at line 250 of file default\_lc\_msgstruct.h.

### 11.203.2 Field Documentation

#### 11.203.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_RTSRequestCmd\_t::CommandHeader

Command Header.

Definition at line 252 of file default\_lc\_msgstruct.h.

Referenced by LC\_ExecuteRTS().

#### 11.203.2.2 Payload [LC\\_RTSRequest\\_Payload\\_t](#) LC\_RTSRequestCmd\_t::Payload

Definition at line 254 of file default\_lc\_msgstruct.h.

Referenced by LC\_ExecuteRTS().

The documentation for this struct was generated from the following file:

- apps/lc/config/default\_lc\_msgstruct.h

## 11.204 LC\_SampleAP\_Payload\_t Struct Reference

Sample AP (Actionpoint) Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [uint16](#) StartIndex  
*Start actionpoint to sample.*
- [uint16](#) EndIndex  
*End actionpoint to sample.*
- [uint16](#) UpdateAge  
*Update WP results age (T or F)*
- [uint16](#) Padding  
*Structure padding*

### 11.204.1 Detailed Description

Sample AP (Actionpoint) Payload.

See [LC\\_SAMPLE\\_AP\\_MID](#)

Definition at line 207 of file default\_lc\_msgstruct.h.

### 11.204.2 Field Documentation

#### 11.204.2.1 EndIndex `uint16 LC_SampleAP_Payload_t::EndIndex`

End actionpoint to sample.

Definition at line 210 of file default\_lc\_msgstruct.h.

Referenced by `LC_SampleAPReq()`.

#### 11.204.2.2 Padding `uint16 LC_SampleAP_Payload_t::Padding`

Structure padding

Definition at line 213 of file default\_lc\_msgstruct.h.

#### 11.204.2.3 StartIndex `uint16 LC_SampleAP_Payload_t::StartIndex`

Start actionpoint to sample.

Definition at line 209 of file default\_lc\_msgstruct.h.

Referenced by `LC_SampleAPReq()`.

#### 11.204.2.4 UpdateAge `uint16 LC_SampleAP_Payload_t::UpdateAge`

Update WP results age (T or F)

Definition at line 212 of file default\_lc\_msgstruct.h.

Referenced by `LC_SampleAPReq()`.

The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_msgstruct.h`

## 11.205 LC\_SampleAPCmd\_t Struct Reference

Sample AP (Actionpoint) Request.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command Header.*
- [LC\\_SampleAP\\_Payload\\_t Payload](#)

### 11.205.1 Detailed Description

Sample AP (Actionpoint) Request.

See [LC\\_SAMPLE\\_AP\\_MID](#)

Definition at line 221 of file default\_lc\_msgstruct.h.

### 11.205.2 Field Documentation

**11.205.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_SampleAPCmd\_t::CommandHeader  
Command Header.

Definition at line 223 of file default\_lc\_msgstruct.h.

**11.205.2.2 Payload** [LC\\_SampleAP\\_Payload\\_t](#) LC\_SampleAPCmd\_t::Payload  
Definition at line 225 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- apps/lc/config/default\_lc\_msgstruct.h

## 11.206 LC\_SendHkCmd\_t Struct Reference

Send HK Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*

### 11.206.1 Detailed Description

Send HK Command.

For command details see [LC\\_SEND\\_HK\\_MID](#)

Definition at line 62 of file default\_lc\_msgstruct.h.

### 11.206.2 Field Documentation

**11.206.2.1 CommandHeader** [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_SendHkCmd\_t::CommandHeader  
Command Header.

Definition at line 64 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- apps/lc/config/default\_lc\_msgstruct.h

## 11.207 LC\_SetAPPermOff\_Payload\_t Struct Reference

Set AP (Actionpoint) Permanently Off Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [uint16](#) APNumber  
*Which actionpoint to change.*
- [uint16](#) Padding  
*Structure padding*

### 11.207.1 Detailed Description

Set AP (Actionpoint) Permanently Off Payload.  
For command details see [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#)  
Definition at line 138 of file default\_lc\_msgstruct.h.

### 11.207.2 Field Documentation

#### 11.207.2.1 APNumber `uint16 LC_SetAPPermOff_Payload_t::APNumber`

Which actionpoint to change.  
Definition at line 140 of file default\_lc\_msgstruct.h.  
Referenced by [LC\\_SetAPPermOffCmd\(\)](#).

#### 11.207.2.2 Padding `uint16 LC_SetAPPermOff_Payload_t::Padding`

Structure padding  
Definition at line 141 of file default\_lc\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.208 LC\_SetAPPermOffCmd\_t Struct Reference

Set AP (Actionpoint) Permanently Off Command.  
`#include <default_lc_msgstruct.h>`

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command Header.*
- [LC\\_SetAPPermOff\\_Payload\\_t Payload](#)

### 11.208.1 Detailed Description

Set AP (Actionpoint) Permanently Off Command.  
For command details see [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#)  
Definition at line 149 of file default\_lc\_msgstruct.h.

### 11.208.2 Field Documentation

#### 11.208.2.1 CommandHeader `CFE_MSG_CommandHeader_t LC_SetAPPermOffCmd_t::CommandHeader`

Command Header.  
Definition at line 151 of file default\_lc\_msgstruct.h.

#### 11.208.2.2 Payload `LC_SetAPPermOff_Payload_t LC_SetAPPermOffCmd_t::Payload`

Definition at line 153 of file default\_lc\_msgstruct.h.  
The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.209 LC\_SetAPState\_Payload\_t Struct Reference

Set AP (Actionpoint) State Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [uint16 APNumber](#)  
*Which actionpoint(s) to change.*
- [uint16 NewAPState](#)  
*New actionpoint state*

### 11.209.1 Detailed Description

Set AP (Actionpoint) State Payload.

For command details see [LC\\_SET\\_AP\\_STATE\\_CC](#)

Definition at line 115 of file default\_lc\_msgstruct.h.

### 11.209.2 Field Documentation

#### 11.209.2.1 APNumber [uint16 LC\\_SetAPState\\_Payload\\_t::APNumber](#)

Which actionpoint(s) to change.

Definition at line 117 of file default\_lc\_msgstruct.h.

Referenced by [LC\\_SetAPStateCmd\(\)](#).

#### 11.209.2.2 NewAPState [uint16 LC\\_SetAPState\\_Payload\\_t::NewAPState](#)

New actionpoint state

Definition at line 118 of file default\_lc\_msgstruct.h.

Referenced by [LC\\_SetAPStateCmd\(\)](#).

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.210 LC\_SetAPStateCmd\_t Struct Reference

Set AP (Actionpoint) State Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t CommandHeader](#)  
*Command Header.*
- [LC\\_SetAPState\\_Payload\\_t Payload](#)

### 11.210.1 Detailed Description

Set AP (Actionpoint) State Command.

For command details see [LC\\_SET\\_AP\\_STATE\\_CC](#)

Definition at line 126 of file default\_lc\_msgstruct.h.

### 11.210.2 Field Documentation

#### 11.210.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_SetAPStateCmd\_t::CommandHeader

Command Header.

Definition at line 128 of file default\_lc\_msgstruct.h.

#### 11.210.2.2 Payload [LC\\_SetAPState\\_Payload\\_t](#) LC\_SetAPStateCmd\_t::Payload

Definition at line 130 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.211 LC\_SetLCState\_Payload\_t Struct Reference

Set LC Application State Payload.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [uint16 NewLCState](#)  
*New LC application state*
- [uint16 Padding](#)  
*Structure padding*

#### 11.211.1 Detailed Description

Set LC Application State Payload.

For command details see [LC\\_SET\\_LC\\_STATE\\_CC](#)

Definition at line 92 of file default\_lc\_msgstruct.h.

### 11.211.2 Field Documentation

#### 11.211.2.1 NewLCState [uint16](#) LC\_SetLCState\_Payload\_t::NewLCState

New LC application state

Definition at line 94 of file default\_lc\_msgstruct.h.

Referenced by [LC\\_SetLCStateCmd\(\)](#).

#### 11.211.2.2 Padding [uint16](#) LC\_SetLCState\_Payload\_t::Padding

Structure padding

Definition at line 95 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- [apps/lc/config/default\\_lc\\_msgstruct.h](#)

## 11.212 LC\_SetLCStateCmd\_t Struct Reference

Set LC Application State Command.

```
#include <default_lc_msgstruct.h>
```

### Data Fields

- [CFE\\_MSG\\_CommandHeader\\_t](#) CommandHeader  
*Command Header.*
- [LC\\_SetLCState\\_Payload\\_t](#) Payload

### 11.212.1 Detailed Description

Set LC Application State Command.

For command details see [LC\\_SET\\_LC\\_STATE\\_CC](#)

Definition at line 103 of file default\_lc\_msgstruct.h.

### 11.212.2 Field Documentation

#### 11.212.2.1 CommandHeader [CFE\\_MSG\\_CommandHeader\\_t](#) LC\_SetLCStateCmd\_t::CommandHeader

Command Header.

Definition at line 105 of file default\_lc\_msgstruct.h.

#### 11.212.2.2 Payload [LC\\_SetLCState\\_Payload\\_t](#) LC\_SetLCStateCmd\_t::Payload

Definition at line 107 of file default\_lc\_msgstruct.h.

The documentation for this struct was generated from the following file:

- apps/lc/config/default\_lc\_msgstruct.h

## 11.213 LC\_WDTEEntry\_t Struct Reference

Watchpoint Definition Table (WDT) Entry.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- [uint8](#) DataType  
*Watchpoint Data Type (enumerated)*
- [uint8](#) OperatorID  
*Comparison type (enumerated)*
- [CFE\\_SB\\_MsgId\\_t](#) MessageID  
*Message ID for the message containing the watchpoint*
- [uint32](#) WatchpointOffset  
*Byte offset from the beginning of the message (including any headers) to the watchpoint*
- [uint32](#) BitMask  
*Value to be masked with watchpoint data prior to comparison*

- **LC\_MultiType\_t ComparisonValue**  
*Value watchpoint data is compared against*
- **uint32 ResultAgeWhenStale**  
*Number of LC Sample Actionpoint commands that must be processed after comparison before result goes stale*
- **uint32 CustomFuncArgument**  
*Data passed to the custom function when Operator\_ID is set to [LC\\_OPER\\_CUSTOM](#)*

### 11.213.1 Detailed Description

Watchpoint Definition Table (WDT) Entry.  
Definition at line 97 of file default\_lc\_tblstruct.h.

### 11.213.2 Field Documentation

#### 11.213.2.1 BitMask [uint32](#) LC\_WDTEntry\_t::BitMask

Value to be masked with watchpoint data prior to comparison

Definition at line 106 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP().

#### 11.213.2.2 ComparisonValue [LC\\_MultiType\\_t](#) LC\_WDTEntry\_t::ComparisonValue

Value watchpoint data is compared against

Definition at line 108 of file default\_lc\_tblstruct.h.  
Referenced by LC\_OperatorCompare().

#### 11.213.2.3 CustomFuncArgument [uint32](#) LC\_WDTEntry\_t::CustomFuncArgument

Data passed to the custom function when Operator\_ID is set to [LC\\_OPER\\_CUSTOM](#)

Definition at line 113 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP().

#### 11.213.2.4 DataType [uint8](#) LC\_WDTEntry\_t::DataType

Watchpoint Data Type (enumerated)

Definition at line 99 of file default\_lc\_tblstruct.h.  
Referenced by LC\_CreateHashTable(), LC\_GetSizedWPData(), LC\_OperatorCompare(), LC\_ProcessWP(), LC\_ValidateWDT(), and LC\_WPOffsetValid().

#### 11.213.2.5 MessageID [CFE\\_SB\\_MsgId\\_t](#) LC\_WDTEntry\_t::MessageID

Message ID for the message containing the watchpoint

Definition at line 101 of file default\_lc\_tblstruct.h.  
Referenced by LC\_CreateHashTable(), and LC\_ValidateWDT().

**11.213.2.6 OperatorID** `uint8 LC_WDTEntry_t::OperatorID`  
Comparison type (enumerated)

Definition at line 100 of file default\_lc\_tblstruct.h.

Referenced by LC\_FloatCompare(), LC\_ProcessWP(), LC\_SignedCompare(), LC\_UnsignedCompare(), and LC\_ValidateWDT().

**11.213.2.7 ResultAgeWhenStale** `uint32 LC_WDTEntry_t::ResultAgeWhenStale`

Number of LC Sample Actionpoint commands that must be processed after comparison before result goes stale

Definition at line 110 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP().

**11.213.2.8 WatchpointOffset** `uint32 LC_WDTEntry_t::WatchpointOffset`

Byte offset from the beginning of the message (including any headers) to the watchpoint

Definition at line 103 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_WPOffsetValid().

The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_tblstruct.h`

## 11.214 LC\_WListTag Struct Reference

Linked list of Watchpoints that reference the same MessageID.

```
#include <lc_app.h>
```

### Data Fields

- struct `LC_WListTag * Next`  
*Next linked list element.*
- `uint16 WatchIndex`  
*Watchpoint table index*
- `uint16 Spare`  
*Structure alignment pad*

### 11.214.1 Detailed Description

Linked list of Watchpoints that reference the same MessageID.

Definition at line 107 of file lc\_app.h.

### 11.214.2 Field Documentation

**11.214.2.1 Next** `struct LC_WListTag* LC_WListTag::Next`

Next linked list element.

Definition at line 109 of file lc\_app.h.

Referenced by LC\_AddWatchpoint(), LC\_CheckMsgForWPs(), and LC\_CreateHashTable().

**11.214.2.2 Spare** `uint16 LC_WListTag::Spare`

Structure alignment pad

Definition at line 112 of file lc\_app.h.

**11.214.2.3 WatchIndex** `uint16 LC_WListTag::WatchIndex`

Watchpoint table index

Definition at line 111 of file lc\_app.h.

Referenced by LC\_CheckMsgForWPs(), and LC\_CreateHashTable().

The documentation for this struct was generated from the following file:

- [apps/lc/fsw/src/lc\\_app.h](#)

## 11.215 LC\_WRTEntry\_t Struct Reference

Watchpoint Results Table (WRT) Entry.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- `uint8 WatchResult`

*Result for the last evaluation of this watchpoint (enumerated)*

- `uint8 Padding [3]`

*Structure padding.*

- `uint32 CountdownToStale`

*Number of LC Sample Actionpoint commands still to be processed before WatchResult becomes stale*

- `uint32 EvaluationCount`

*How many times this watchpoint has been evaluated*

- `uint32 FalseToTrueCount`

*How many times this watchpoint has transitioned from FALSE to TRUE*

- `uint32 ConsecutiveTrueCount`

*Number of consecutive times this watchpoint has evaluated to TRUE*

- `uint32 CumulativeTrueCount`

*Total number of times this watchpoint has evaluated to TRUE*

- `LC_WRTTransition_t LastFalseToTrue`

*Last transition from FALSE to TRUE*

- `LC_WRTTransition_t LastTrueToFalse`

*Last transition from TRUE to FALSE*

### 11.215.1 Detailed Description

Watchpoint Results Table (WRT) Entry.

Definition at line 135 of file default\_lc\_tblstruct.h.

### 11.215.2 Field Documentation

#### 11.215.2.1 ConsecutiveTrueCount `uint32 LC_WRTEntry_t::ConsecutiveTrueCount`

Number of consecutive times this watchpoint has evaluated to TRUE

Definition at line 149 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

#### 11.215.2.2 CountdownToStale `uint32 LC_WRTEntry_t::CountdownToStale`

Number of LC Sample Actionpoint commands still to be processed before WatchResult becomes stale

Definition at line 142 of file default\_lc\_tblstruct.h.

Referenced by LC\_GetSizedWPData(), LC\_ProcessWP(), LC\_ResetResultsWP(), LC\_SampleAPReq(), and LC\_WP\_OffsetValid().

#### 11.215.2.3 CumulativeTrueCount `uint32 LC_WRTEntry_t::CumulativeTrueCount`

Total number of times this watchpoint has evaluated to TRUE

Definition at line 151 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

#### 11.215.2.4 EvaluationCount `uint32 LC_WRTEntry_t::EvaluationCount`

How many times this watchpoint has been evaluated

Definition at line 145 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

#### 11.215.2.5 FalseToTrueCount `uint32 LC_WRTEntry_t::FalseToTrueCount`

How many times this watchpoint has transitioned from FALSE to TRUE

Definition at line 147 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

#### 11.215.2.6 LastFalseToTrue `LC_WRTTransition_t LC_WRTEntry_t::LastFalseToTrue`

Last transition from FALSE to TRUE

Definition at line 153 of file default\_lc\_tblstruct.h.

Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

**11.215.2.7 LastTrueToFalse** `LC_WRTTransition_t` `LC_WRTEntry_t::LastTrueToFalse`  
Last transition from TRUE to FALSE

Definition at line 154 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

**11.215.2.8 Padding** `uint8` `LC_WRTEntry_t::Padding[3]`

Structure padding.

Definition at line 140 of file default\_lc\_tblstruct.h.

**11.215.2.9 WatchResult** `uint8` `LC_WRTEntry_t::WatchResult`  
Result for the last evaluation of this watchpoint (enumerated)

Definition at line 137 of file default\_lc\_tblstruct.h.

Referenced by LC\_EvaluateRPN(), LC\_GetSizedWPData(), LC\_ProcessWP(), LC\_ResetResultsWP(), LC\_SampleAPReq(), LC\_SendHkCmd(), and LC\_WP\_OffsetValid().

The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_tblstruct.h`

## 11.216 LC\_WRTTransition\_t Struct Reference

Watchpoint Transition Structure.

```
#include <default_lc_tblstruct.h>
```

### Data Fields

- `uint32 Value`

*Watchpoint value at comparison that caused the transition*

- `uint8 DataType`

*Same as Watchpoint Data Type (enumerated)*

- `uint8 Padding [3]`

*Structure padding.*

- `CFE_TIME_SysTime_t Timestamp`

*Timestamp when the transition was detected*

### 11.216.1 Detailed Description

Watchpoint Transition Structure.

Definition at line 121 of file default\_lc\_tblstruct.h.

### 11.216.2 Field Documentation

**11.216.2.1 DataType** `uint8 LC_WRTTransition_t::DataType`  
Same as Watchpoint Data Type (enumerated)

Definition at line 125 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP().

**11.216.2.2 Padding** `uint8 LC_WRTTransition_t::Padding[3]`

Structure padding.

Definition at line 127 of file default\_lc\_tblstruct.h.

**11.216.2.3 Timestamp** `CFE_TIME_SysTime_t LC_WRTTransition_t::Timestamp`  
Timestamp when the transition was detected

Definition at line 129 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().

**11.216.2.4 Value** `uint32 LC_WRTTransition_t::Value`  
Watchpoint value at comparison that caused the transition

Definition at line 123 of file default\_lc\_tblstruct.h.  
Referenced by LC\_ProcessWP(), and LC\_ResetResultsWP().  
The documentation for this struct was generated from the following file:

- `apps/lc/config/default_lc_tblstruct.h`

## 11.217 OS\_bin\_sem\_prop\_t Struct Reference

OSAL binary semaphore properties.

```
#include <osapi-binsem.h>
```

### Data Fields

- `char name [OS_MAX_API_NAME]`
- `osal_id_t creator`
- `int32 value`

#### 11.217.1 Detailed Description

OSAL binary semaphore properties.

Definition at line 39 of file osapi-binsem.h.

#### 11.217.2 Field Documentation

**11.217.2.1 creator** `osal_id_t OS_bin_sem_prop_t::creator`  
Definition at line 42 of file osapi-binsem.h.

**11.217.2.2 name** char OS\_bin\_sem\_prop\_t::name[OS\_MAX\_API\_NAME]  
Definition at line 41 of file osapi-binsem.h.

**11.217.2.3 value** int32 OS\_bin\_sem\_prop\_t::value

Definition at line 43 of file osapi-binsem.h.

The documentation for this struct was generated from the following file:

- osal/src/os/inc/[osapi-binsem.h](#)

## 11.218 OS\_condvar\_prop\_t Struct Reference

OSAL condition variable properties.

```
#include <osapi-condvar.h>
```

### Data Fields

- char **name** [OS\_MAX\_API\_NAME]
- [osal\\_id\\_t](#) **creator**

### 11.218.1 Detailed Description

OSAL condition variable properties.

Definition at line 34 of file osapi-condvar.h.

### 11.218.2 Field Documentation

**11.218.2.1 creator** [osal\\_id\\_t](#) OS\_condvar\_prop\_t::creator

Definition at line 37 of file osapi-condvar.h.

**11.218.2.2 name** char OS\_condvar\_prop\_t::name[OS\_MAX\_API\_NAME]

Definition at line 36 of file osapi-condvar.h.

The documentation for this struct was generated from the following file:

- osal/src/os/inc/[osapi-condvar.h](#)

## 11.219 OS\_count\_sem\_prop\_t Struct Reference

OSAL counting semaphore properties.

```
#include <osapi-countsem.h>
```

### Data Fields

- char **name** [OS\_MAX\_API\_NAME]
- [osal\\_id\\_t](#) **creator**
- int32 **value**

### 11.219.1 Detailed Description

OSAL counting semaphore properties.

Definition at line 32 of file osapi-countsem.h.

### 11.219.2 Field Documentation

**11.219.2.1 creator** `osal_id_t OS_count_sem_prop_t::creator`  
Definition at line 35 of file osapi-countsem.h.

**11.219.2.2 name** `char OS_count_sem_prop_t::name[OS_MAX_API_NAME]`  
Definition at line 34 of file osapi-countsem.h.

**11.219.2.3 value** `int32 OS_count_sem_prop_t::value`  
Definition at line 36 of file osapi-countsem.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-countsem.h`

## 11.220 os\_dirent\_t Struct Reference

Directory entry.

```
#include <osapi-dir.h>
```

### Data Fields

- `char FileName [OS_MAX_FILE_NAME]`

### 11.220.1 Detailed Description

Directory entry.

Definition at line 32 of file osapi-dir.h.

### 11.220.2 Field Documentation

**11.220.2.1 FileName** `char os_dirent_t::FileName[OS_MAX_FILE_NAME]`  
Definition at line 34 of file osapi-dir.h.  
The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-dir.h`

## 11.221 OS\_FdSet Struct Reference

An abstract structure capable of holding several OSAL IDs.

```
#include <osapi-select.h>
```

### Data Fields

- `uint8 object_ids [((OS_MAX_NUM_OPEN_FILES+7)/8)]`

### 11.221.1 Detailed Description

An abstract structure capable of holding several OSAL IDs.

This is part of the select API and is manipulated using the related API calls. It should not be modified directly by applications.

Note: Math is to determine uint8 array size needed to represent single bit OS\_MAX\_NUM\_OPEN\_FILES objects, + 7 rounds up and 8 is the size of uint8.

See also

[OS\\_SelectFdZero\(\)](#), [OS\\_SelectFdAdd\(\)](#), [OS\\_SelectFdClear\(\)](#), [OS\\_SelectFdIsSet\(\)](#)

Definition at line 43 of file osapi-select.h.

### 11.221.2 Field Documentation

#### 11.221.2.1 object\_ids `uint8 OS_FdSet::object_ids[ (OS_MAX_NUM_OPEN_FILES+7) / 8 ]`

Definition at line 45 of file osapi-select.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-select.h](#)

## 11.222 OS\_file\_prop\_t Struct Reference

OSAL file properties.

#include <osapi-file.h>

### Data Fields

- char `Path [OS_MAX_PATH_LEN]`
- `osal_id_t User`
- `uint8 IsValid`

### 11.222.1 Detailed Description

OSAL file properties.

Definition at line 49 of file osapi-file.h.

### 11.222.2 Field Documentation

#### 11.222.2.1 IsValid `uint8 OS_file_prop_t::IsValid`

Definition at line 53 of file osapi-file.h.

#### 11.222.2.2 Path `char OS_file_prop_t::Path[OS_MAX_PATH_LEN]`

Definition at line 51 of file osapi-file.h.

#### 11.222.2.3 User `osal_id_t OS_file_prop_t::User`

Definition at line 52 of file osapi-file.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-file.h](#)

## 11.223 os\_fsinfo\_t Struct Reference

OSAL file system info.

```
#include <osapi-filesystems.h>
```

### Data Fields

- **uint32 MaxFds**  
*Total number of file descriptors.*
- **uint32 FreeFds**  
*Total number that are free.*
- **uint32 MaxVolumes**  
*Maximum number of volumes.*
- **uint32 FreeVolumes**  
*Total number of volumes free.*

### 11.223.1 Detailed Description

OSAL file system info.

Definition at line 35 of file osapi-filesystems.h.

### 11.223.2 Field Documentation

#### 11.223.2.1 FreeFds `uint32 os_fsinfo_t::FreeFds`

Total number that are free.

Definition at line 38 of file osapi-filesystems.h.

#### 11.223.2.2 FreeVolumes `uint32 os_fsinfo_t::FreeVolumes`

Total number of volumes free.

Definition at line 40 of file osapi-filesystems.h.

#### 11.223.2.3 MaxFds `uint32 os_fsinfo_t::MaxFds`

Total number of file descriptors.

Definition at line 37 of file osapi-filesystems.h.

#### 11.223.2.4 MaxVolumes `uint32 os_fsinfo_t::MaxVolumes`

Maximum number of volumes.

Definition at line 39 of file osapi-filesystems.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-filesystems.h`

## 11.224 os\_fstat\_t Struct Reference

File system status.

```
#include <osapi-file.h>
```

**Data Fields**

- `uint32 FileModeBits`
- `OS_time_t FileTime`
- `size_t FileSize`

**11.224.1 Detailed Description**

File system status.

**Note**

This used to be directly typedef'ed to the "struct stat" from the C library

Some C libraries (glibc in particular) actually define member names to reference into sub-structures, so attempting to reuse a name like "st\_mtime" might not work.

Definition at line 64 of file osapi-file.h.

**11.224.2 Field Documentation****11.224.2.1 FileModeBits `uint32 os_fstat_t::FileModeBits`**

Definition at line 66 of file osapi-file.h.

**11.224.2.2 FileSize `size_t os_fstat_t::FileSize`**

Definition at line 68 of file osapi-file.h.

**11.224.2.3 FileTime `OS_time_t os_fstat_t::FileTime`**

Definition at line 67 of file osapi-file.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-file.h`

**11.225 OS\_heap\_prop\_t Struct Reference**

OSAL heap properties.

```
#include <osapi-heap.h>
```

**Data Fields**

- `size_t free_bytes`
- `osal_blockcount_t free_blocks`
- `size_t largest_free_block`

**11.225.1 Detailed Description**

OSAL heap properties.

See also

[OS\\_HeapGetInfo\(\)](#)

Definition at line 36 of file osapi-heap.h.

### 11.225.2 Field Documentation

**11.225.2.1 free\_blocks** `osal_blockcount_t OS_heap_prop_t::free_blocks`  
Definition at line 39 of file osapi-heap.h.

**11.225.2.2 free\_bytes** `size_t OS_heap_prop_t::free_bytes`  
Definition at line 38 of file osapi-heap.h.

**11.225.2.3 largest\_free\_block** `size_t OS_heap_prop_t::largest_free_block`  
Definition at line 40 of file osapi-heap.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-heap.h`

## 11.226 OS\_module\_address\_t Struct Reference

OSAL module address properties.

```
#include <osapi-module.h>
```

### Data Fields

- `uint32 valid`
- `uint32 flags`
- `cpuaddr code_address`
- `cpuaddr code_size`
- `cpuaddr data_address`
- `cpuaddr data_size`
- `cpuaddr bss_address`
- `cpuaddr bss_size`

### 11.226.1 Detailed Description

OSAL module address properties.

Definition at line 78 of file osapi-module.h.

### 11.226.2 Field Documentation

**11.226.2.1 bss\_address** `cpuaddr OS_module_address_t::bss_address`  
Definition at line 86 of file osapi-module.h.

**11.226.2.2 bss\_size** `cpuaddr OS_module_address_t::bss_size`  
Definition at line 87 of file osapi-module.h.

**11.226.2.3 code\_address** `cpuaddr OS_module_address_t::code_address`  
Definition at line 82 of file osapi-module.h.

**11.226.2.4 code\_size** `cpuaddr OS_module_address_t::code_size`  
Definition at line 83 of file osapi-module.h.

**11.226.2.5 data\_address** `cpuaddr OS_module_address_t::data_address`  
Definition at line 84 of file osapi-module.h.

**11.226.2.6 data\_size** `cpuaddr OS_module_address_t::data_size`  
Definition at line 85 of file osapi-module.h.

**11.226.2.7 flags** `uint32 OS_module_address_t::flags`  
Definition at line 81 of file osapi-module.h.

**11.226.2.8 valid** `uint32 OS_module_address_t::valid`

Definition at line 80 of file osapi-module.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-module.h`

## 11.227 OS\_module\_prop\_t Struct Reference

OSAL module properties.

```
#include <osapi-module.h>
```

### Data Fields

- `cpuaddr entry_point`
- `cpuaddr host_module_id`
- `char filename [OS_MAX_PATH_LEN]`
- `char name [OS_MAX_API_NAME]`
- `OS_module_address_t addr`

### 11.227.1 Detailed Description

OSAL module properties.

Definition at line 91 of file osapi-module.h.

### 11.227.2 Field Documentation

**11.227.2.1 addr** `OS_module_address_t OS_module_prop_t::addr`  
Definition at line 97 of file osapi-module.h.

**11.227.2.2 entry\_point** `cpuaddr OS_module_prop_t::entry_point`  
Definition at line 93 of file osapi-module.h.

**11.227.2.3 filename** char OS\_module\_prop\_t::filename[OS\_MAX\_PATH\_LEN]  
Definition at line 95 of file osapi-module.h.

**11.227.2.4 host\_module\_id** cpuaddr OS\_module\_prop\_t::host\_module\_id  
Definition at line 94 of file osapi-module.h.

**11.227.2.5 name** char OS\_module\_prop\_t::name[OS\_MAX\_API\_NAME]  
Definition at line 96 of file osapi-module.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-module.h](#)

## 11.228 OS\_mut\_sem\_prop\_t Struct Reference

OSAL mutex properties.

```
#include <osapi-mutex.h>
```

### Data Fields

- char [name \[OS\\_MAX\\_API\\_NAME\]](#)
- [osal\\_id\\_t creator](#)

#### 11.228.1 Detailed Description

OSAL mutex properties.

Definition at line 32 of file osapi-mutex.h.

#### 11.228.2 Field Documentation

**11.228.2.1 creator** [osal\\_id\\_t](#) OS\_mut\_sem\_prop\_t::creator  
Definition at line 35 of file osapi-mutex.h.

**11.228.2.2 name** char OS\_mut\_sem\_prop\_t::name[OS\_MAX\_API\_NAME]  
Definition at line 34 of file osapi-mutex.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-mutex.h](#)

## 11.229 OS\_queue\_prop\_t Struct Reference

OSAL queue properties.

```
#include <osapi-queue.h>
```

### Data Fields

- char [name \[OS\\_MAX\\_API\\_NAME\]](#)
- [osal\\_id\\_t creator](#)

### 11.229.1 Detailed Description

OSAL queue properties.

Definition at line 32 of file osapi-queue.h.

### 11.229.2 Field Documentation

#### 11.229.2.1 **creator** `osal_id_t OS_queue_prop_t::creator`

Definition at line 35 of file osapi-queue.h.

#### 11.229.2.2 **name** `char OS_queue_prop_t::name[OS_MAX_API_NAME]`

Definition at line 34 of file osapi-queue.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-queue.h`

## 11.230 OS\_SockAddr\_t Struct Reference

Encapsulates a generic network address.

```
#include <osapi-sockets.h>
```

### Data Fields

- `size_t ActualLength`  
*Length of the actual address data.*
- `OS_SockAddrData_t AddrData`  
*Abstract Address data.*

### 11.230.1 Detailed Description

Encapsulates a generic network address.

This is just an abstract buffer type that holds a network address. It is allocated for the worst-case size defined by `OS SOCKADDR_MAX_LEN`, and the real size is stored within.

Definition at line 109 of file osapi-sockets.h.

### 11.230.2 Field Documentation

#### 11.230.2.1 **ActualLength** `size_t OS_SockAddr_t::ActualLength`

Length of the actual address data.

Definition at line 111 of file osapi-sockets.h.

#### 11.230.2.2 **AddrData** `OS_SockAddrData_t OS_SockAddr_t::AddrData`

Abstract Address data.

Definition at line 112 of file osapi-sockets.h.

The documentation for this struct was generated from the following file:

- `osal/src/os/inc/osapi-sockets.h`

## 11.231 OS\_SockAddrData\_t Union Reference

Storage buffer for generic network address.

```
#include <osapi-sockets.h>
```

### Data Fields

- `uint8 Buffer [OS SOCKADDR_MAX_LEN]`  
*Ensures length of at least OS SOCKADDR\_MAX\_LEN.*
- `uint32 AlignU32`  
*Ensures uint32 alignment.*
- `void * AlignPtr`  
*Ensures pointer alignment.*

### 11.231.1 Detailed Description

Storage buffer for generic network address.

This is a union type that helps to ensure a minimum alignment value for the data storage, such that it can be cast to the system-specific type without increasing alignment requirements.

Definition at line 95 of file osapi-sockets.h.

### 11.231.2 Field Documentation

#### 11.231.2.1 AlignPtr `void* OS_SockAddrData_t::AlignPtr`

Ensures pointer alignment.

Definition at line 99 of file osapi-sockets.h.

#### 11.231.2.2 AlignU32 `uint32 OS_SockAddrData_t::AlignU32`

Ensures uint32 alignment.

Definition at line 98 of file osapi-sockets.h.

#### 11.231.2.3 Buffer `uint8 OS_SockAddrData_t::Buffer[OS SOCKADDR_MAX_LEN]`

Ensures length of at least OS SOCKADDR\_MAX\_LEN.

Definition at line 97 of file osapi-sockets.h.

The documentation for this union was generated from the following file:

- `osal/src/os/inc/osapi-sockets.h`

## 11.232 OS\_socket\_prop\_t Struct Reference

Encapsulates socket properties.

```
#include <osapi-sockets.h>
```

### Data Fields

- `char name [OS_MAX_API_NAME]`  
*Name of the socket.*
- `osal_id_t creator`  
*OSAL TaskID which opened the socket.*

### 11.232.1 Detailed Description

Encapsulates socket properties.

This is for consistency with other OSAL resource types. Currently no extra properties are exposed here but this could change in a future revision of OSAL as needed.

Definition at line 122 of file osapi-sockets.h.

### 11.232.2 Field Documentation

#### 11.232.2.1 **creator** `osal_id_t OS_socket_prop_t::creator`

OSAL TaskID which opened the socket.

Definition at line 125 of file osapi-sockets.h.

#### 11.232.2.2 **name** `char OS_socket_prop_t::name[OS_MAX_API_NAME]`

Name of the socket.

Definition at line 124 of file osapi-sockets.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-sockets.h](#)

## 11.233 OS\_static\_symbol\_record\_t Struct Reference

Associates a single symbol name with a memory address.

```
#include <osapi-module.h>
```

### Data Fields

- `const char * Name`
- `void(* Address )(void)`
- `const char * Module`

### 11.233.1 Detailed Description

Associates a single symbol name with a memory address.

If the OS\_STATIC\_SYMBOL\_TABLE feature is enabled, then an array of these structures should be provided by the application. When the application needs to find a symbol address, the static table will be checked in addition to (or instead of) the OS/library-provided lookup function.

This static symbol allows systems that do not implement dynamic module loading to maintain the same semantics as dynamically loaded modules.

Definition at line 113 of file osapi-module.h.

### 11.233.2 Field Documentation

#### 11.233.2.1 **Address** `void(* OS_static_symbol_record_t::Address)(void)`

Definition at line 116 of file osapi-module.h.

#### 11.233.2.2 **Module** `const char* OS_static_symbol_record_t::Module`

Definition at line 117 of file osapi-module.h.

**11.233.2.3 Name** const char\* OS\_static\_symbol\_record\_t::Name  
Definition at line 115 of file osapi-module.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-module.h](#)

## 11.234 OS\_statvfs\_t Struct Reference

```
#include <osapi-filesystems.h>
```

### Data Fields

- `size_t block_size`
- `osal_blockcount_t total_blocks`
- `osal_blockcount_t blocks_free`

#### 11.234.1 Detailed Description

Definition at line 49 of file osapi-filesystems.h.

#### 11.234.2 Field Documentation

##### 11.234.2.1 `block_size` `size_t OS_statvfs_t::block_size`

Block size of underlying FS

Definition at line 51 of file osapi-filesystems.h.

##### 11.234.2.2 `blocks_free` `osal_blockcount_t OS_statvfs_t::blocks_free`

Available blocks in underlying FS

Definition at line 53 of file osapi-filesystems.h.

##### 11.234.2.3 `total_blocks` `osal_blockcount_t OS_statvfs_t::total_blocks`

Total blocks in underlying FS

Definition at line 52 of file osapi-filesystems.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-filesystems.h](#)

## 11.235 OS\_task\_prop\_t Struct Reference

OSAL task properties.

```
#include <osapi-task.h>
```

### Data Fields

- `char name [OS_MAX_API_NAME]`
- `osal_id_t creator`
- `size_t stack_size`
- `osal_priority_t priority`

### 11.235.1 Detailed Description

OSAL task properties.

Definition at line 57 of file osapi-task.h.

### 11.235.2 Field Documentation

#### 11.235.2.1 `creator` `osal_id_t` `OS_task_prop_t::creator`

Definition at line 60 of file osapi-task.h.

#### 11.235.2.2 `name` `char` `OS_task_prop_t::name[OS_MAX_API_NAME]`

Definition at line 59 of file osapi-task.h.

#### 11.235.2.3 `priority` `osal_priority_t` `OS_task_prop_t::priority`

Definition at line 62 of file osapi-task.h.

#### 11.235.2.4 `stack_size` `size_t` `OS_task_prop_t::stack_size`

Definition at line 61 of file osapi-task.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-task.h](#)

## 11.236 OS\_time\_t Struct Reference

OSAL time interval structure.

```
#include <osapi-clock.h>
```

### Data Fields

- [int64 ticks](#)

### 11.236.1 Detailed Description

OSAL time interval structure.

This is used to represent a basic time interval.

When used with OS\_GetLocalTime/OS\_SetLocalTime, this represents the interval from the OS's epoch point, typically 01 Jan 1970 00:00:00 UTC on systems that have a persistent real time clock (RTC), or the system boot time if there is no RTC available.

Applications should not directly access fields within this structure, as the definition may change in future versions of OSAL. Instead, applications should use the accessor/conversion methods defined below.

Definition at line 45 of file osapi-clock.h.

### 11.236.2 Field Documentation

**11.236.2.1 ticks int64 OS\_time\_t::ticks**

Ticks elapsed since reference point

Definition at line 47 of file osapi-clock.h.

Referenced by OS\_TimeAdd(), OS\_TimeAssembleFromMicroseconds(), OS\_TimeAssembleFromMilliseconds(), OS\_TimeAssembleFromNanoseconds(), OS\_TimeAssembleFromSubseconds(), OS\_TimeGetFractionalPart(), OS\_TimeGetTotalMicroseconds(), OS\_TimeGetTotalMilliseconds(), OS\_TimeGetTotalNanoseconds(), OS\_TimeGetTotalSeconds(), and OS\_TimeSubtract().

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-clock.h](#)

**11.237 OS\_timebase\_prop\_t Struct Reference**

Time base properties.

```
#include <osapi-timebase.h>
```

**Data Fields**

- [char name \[OS\\_MAX\\_API\\_NAME\]](#)
- [osal\\_id\\_t creator](#)
- [uint32 nominal\\_interval\\_time](#)
- [uint32 freerun\\_time](#)
- [uint32 accuracy](#)

**11.237.1 Detailed Description**

Time base properties.

Definition at line 37 of file osapi-timebase.h.

**11.237.2 Field Documentation****11.237.2.1 accuracy uint32 OS\_timebase\_prop\_t::accuracy**

Definition at line 43 of file osapi-timebase.h.

**11.237.2.2 creator osal\_id\_t OS\_timebase\_prop\_t::creator**

Definition at line 40 of file osapi-timebase.h.

**11.237.2.3 freerun\_time uint32 OS\_timebase\_prop\_t::freerun\_time**

Definition at line 42 of file osapi-timebase.h.

**11.237.2.4 name char OS\_timebase\_prop\_t::name[OS\_MAX\_API\_NAME]**

Definition at line 39 of file osapi-timebase.h.

**11.237.2.5 nominal\_interval\_time uint32 OS\_timebase\_prop\_t::nominal\_interval\_time**

Definition at line 41 of file osapi-timebase.h.

The documentation for this struct was generated from the following file:

- [osal/src/os/inc/osapi-timebase.h](#)

## 11.238 OS\_timer\_prop\_t Struct Reference

Timer properties.

```
#include <osapi-timer.h>
```

### Data Fields

- char name [OS\_MAX\_API\_NAME]
- osal\_id\_t creator
- uint32 start\_time
- uint32 interval\_time
- uint32 accuracy

#### 11.238.1 Detailed Description

Timer properties.

Definition at line 37 of file osapi-timer.h.

#### 11.238.2 Field Documentation

##### 11.238.2.1 **accuracy** uint32 OS\_timer\_prop\_t::accuracy

Definition at line 43 of file osapi-timer.h.

##### 11.238.2.2 **creator** osal\_id\_t OS\_timer\_prop\_t::creator

Definition at line 40 of file osapi-timer.h.

##### 11.238.2.3 **interval\_time** uint32 OS\_timer\_prop\_t::interval\_time

Definition at line 42 of file osapi-timer.h.

##### 11.238.2.4 **name** char OS\_timer\_prop\_t::name[OS\_MAX\_API\_NAME]

Definition at line 39 of file osapi-timer.h.

##### 11.238.2.5 **start\_time** uint32 OS\_timer\_prop\_t::start\_time

Definition at line 41 of file osapi-timer.h.

The documentation for this struct was generated from the following file:

- osal/src/os/inc/[osapi-timer.h](#)

## 12 File Documentation

### 12.1 apps/lc/config/default\_lc\_fcncodes.h File Reference

#### Macros

- #define LC\_NOOP\_CC 0  
*Noop.*
- #define LC\_RESET\_CC 1

- Reset Counters.*
- #define LC\_SET\_LC\_STATE\_CC 2  
*Set LC Application State.*
  - #define LC\_SET\_AP\_STATE\_CC 3  
*Set AP State.*
  - #define LC\_SET\_AP\_PERM\_OFF\_CC 4  
*Set AP Permanently Off.*
  - #define LC\_RESET\_AP\_STATS\_CC 5  
*Reset AP Statistics.*
  - #define LC\_RESET\_WP\_STATS\_CC 6  
*Reset WP Statistics.*
  - #define LC\_SET\_AP\_PERMOFF\_CC LC\_SET\_AP\_PERM\_OFF\_CC

### 12.1.1 Detailed Description

Specification for the CFS Limit Checker (LC) command and telemetry message function code definitions.

### 12.1.2 Macro Definition Documentation

**12.1.2.1 LC\_SET\_AP\_PERMOFF\_CC** #define LC\_SET\_AP\_PERMOFF\_CC LC\_SET\_AP\_PERM\_OFF\_CC  
Definition at line 277 of file default\_lc\_fcncodes.h.

## 12.2 apps/lc/config/default\_lc\_interface\_cfg.h File Reference

### Macros

- #define LC\_RTS\_REQ\_MID 0x18A9  
*RTS Request Message ID.*
- #define LC\_RTS\_REQ\_CC 4  
*RTS Request Command Code.*
- #define LC\_MAX\_WATCHPOINTS 176  
*Maximum number of watchpoints.*
- #define LC\_MAX\_ACTIONPOINTS 176  
*Maximum number of actionpoints.*
- #define LC\_MAX\_ACTION\_TEXT 32  
*Maximum actionpoint event text string size.*
- #define LC\_MAX\_RPN\_EQU\_SIZE 20  
*Maximum reverse polish (RPN) equation size.*

### 12.2.1 Detailed Description

CFS Limit Checker (LC) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and/or the public API, if applicable.

### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.3 apps/lc/config/default\_lc\_internal\_cfg.h File Reference

### Macros

- `#define LC_APP_NAME "LC"`  
*Application Name.*
- `#define LC_PIPE_DEPTH 12`  
*Command Pipe Depth.*
- `#define LC_STATE_POWER_ON_RESET LC_STATE_DISABLED`  
*LC state after power-on reset.*
- `#define LC_STATE_WHEN_CDS_RESTORED LC_STATE_FROM_CDS`  
*Save data to CDS compiler switch.*
- `#define LC_WDT_FILENAME "/cf/lc_def_wdt.tbl"`  
*Watchpoint Definition Table (WDT) filename.*
- `#define LC_ADT_FILENAME "/cf/lc_def_adt.tbl"`  
*Actionpoint Definition Table (ADT) filename.*
- `#define LC_MAX_VALID_ADT_RTSID 0xFFFF0`  
*Maximum valid ADT RTS ID.*
- `#define LC_FLOAT_TOLERANCE (1.0e-25)`  
*Floating Point Compare Tolerance.*
- `#define LC_MISSION_REV 0`  
*Mission specific version number for LC application.*

### LC Table Name Strings

- `#define LC_WDT_TABLENAME "LC_WDT"`
- `#define LC_ADT_TABLENAME "LC_ADT"`
- `#define LC_WRT_TABLENAME "LC_WRT"`
- `#define LC_ART_TABLENAME "LC_ART"`

#### 12.3.1 Detailed Description

CFS Limit Checker (LC) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.4 apps/lc/config/default\_lc\_mission\_cfg.h File Reference

```
#include "lc_interface_cfg.h"
```

#### 12.4.1 Detailed Description

CFS Limit Checker (LC) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and/or the public API, if applicable.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.5 apps/lc/config/default\_lc\_msg.h File Reference

```
#include "lc_interface_cfg.h"
#include "lc_msgdefs.h"
#include "lc_msgstruct.h"
```

### 12.5.1 Detailed Description

Specification for the CFS Limit Checker (LC) command and telemetry message data types.  
This is a compatibility header for the "lc\_msg.h" file that has traditionally provided the message definitions for cFS apps.

#### Note

This file may be overridden/superceded by mission-provided defintions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.6 apps/lc/config/default\_lc\_msgdefs.h File Reference

```
#include "lc_interface_cfg.h"
#include "lc_fcncodes.h"
```

### Macros

- #define LC\_ACTION\_NOT\_USED LC\_APSTATE\_NOT\_USED

#### LC Application States

- #define LC\_STATE\_ACTIVE 1  
*LC Application State Active.*
- #define LC\_STATE\_PASSIVE 2  
*LC Application State Passive.*
- #define LC\_STATE\_DISABLED 3  
*LC Application State Disabled.*
- #define LC\_STATE\_FROM\_CDS 4  
*Used for reset processing, not valid state.*

#### Actionpoint States

- #define LC\_APSTATE\_NOT\_USED 0xFF  
*Actionpoint unused, not valid command argument.*
- #define LC\_APSTATE\_ACTIVE 1  
*Actionpoint state active.*
- #define LC\_APSTATE\_PASSIVE 2  
*Actionpoint state passive.*
- #define LC\_APSTATE\_DISABLED 3  
*Actionpoint state disabled.*
- #define LC\_APSTATE\_PERMOFF 4  
*Actionpoint state permanently off, see [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#).*

#### Special Values for Commands

- #define LC\_ALL\_ACTIONPOINTS 0xFFFF  
*Special number indicating all actionpoints.*
- #define LC\_ALL\_WATCHPOINTS 0xFFFF  
*Special number indicating all watchpoints.*

### Housekeeping Packed Watch Results

- #define `LC_HKWR_FALSE` 0x00  
*Two bit value used for FALSE*
- #define `LC_HKWR_TRUE` 0x01  
*Two bit value used for TRUE*
- #define `LC_HKWR_ERROR` 0x02  
*Two bit value used for ERROR*
- #define `LC_HKWR_STALE` 0x03  
*Two bit value used for STALE*

### Housekeeping Packed Action Results

- #define `LC_HKAR_PASS` 0x00  
*Two bit value used for PASS*
- #define `LC_HKAR_FAIL` 0x01  
*Two bit value used for FAIL*
- #define `LC_HKAR_ERROR` 0x02  
*Two bit value used for ERROR*
- #define `LC_HKAR_STALE` 0x03  
*Two bit value used for STALE*

### Housekeeping Packed Action Results, State Identifiers

- #define `LC_HKAR_STATE_NOT_USED` 0x00  
*Two bit value used for NOT USED and PERMOFF.*
- #define `LC_HKAR_STATE_ACTIVE` 0x01  
*Two bit value used for ACTIVE*
- #define `LC_HKAR_STATE_PASSIVE` 0x02  
*Two bit value used for PASSIVE*
- #define `LC_HKAR_STATE_DISABLED` 0x03  
*Two bit value used for DISABLED*

### Housekeeping Packed Results, Array Sizes

- #define `LC_HKWR_NUM_BYTES` (((`LC_MAX_WATCHPOINTS` + 15) / 16) \* 4)  
*2 bits per WP and keeping \ array on longword boundary \*
- #define `LC_HKAR_NUM_BYTES` (((`LC_MAX_ACTIONPOINTS` + 7) / 8) \* 4)  
*4 bits per AP and keeping \ array on longword boundary \*

#### 12.6.1 Detailed Description

Specification for the CFS Limit Checker (LC) command and telemetry message constant definitions.

##### Note

These Macro definitions have been put in this file (instead of `lc_msg.h`) so this file can be included directly into ASIST build test scripts. ASIST RDL files can accept C language `#defines` but can't handle type definitions. As a result: DO NOT PUT ANY TYPEDEFS OR STRUCTURE DEFINITIONS IN THIS FILE! ADD THEM TO `lc_msg.h` IF NEEDED!

## 12.6.2 Macro Definition Documentation

**12.6.2.1 LC\_ACTION\_NOT\_USED** #define LC\_ACTION\_NOT\_USED LC\_APSTATE\_NOT\_USED  
Definition at line 121 of file default\_lc\_msgdefs.h.

**12.6.2.2 LC\_ALL\_ACTIONPOINTS** #define LC\_ALL\_ACTIONPOINTS 0xFFFF  
Special number indicating all actionpoints.  
Definition at line 71 of file default\_lc\_msgdefs.h.

**12.6.2.3 LC\_ALL\_WATCHPOINTS** #define LC\_ALL\_WATCHPOINTS 0xFFFF  
Special number indicating all watchpoints.  
Definition at line 72 of file default\_lc\_msgdefs.h.

**12.6.2.4 LC\_APSTATE\_ACTIVE** #define LC\_APSTATE\_ACTIVE 1  
Actionpoint state active.  
Definition at line 61 of file default\_lc\_msgdefs.h.

**12.6.2.5 LC\_APSTATE\_DISABLED** #define LC\_APSTATE\_DISABLED 3  
Actionpoint state disabled.  
Definition at line 63 of file default\_lc\_msgdefs.h.

**12.6.2.6 LC\_APSTATE\_NOT\_USED** #define LC\_APSTATE\_NOT\_USED 0xFF  
Actionpoint unused, not valid command argument.  
Definition at line 60 of file default\_lc\_msgdefs.h.

**12.6.2.7 LC\_APSTATE\_PASSIVE** #define LC\_APSTATE\_PASSIVE 2  
Actionpoint state passive.  
Definition at line 62 of file default\_lc\_msgdefs.h.

**12.6.2.8 LC\_APSTATE\_PERMOFF** #define LC\_APSTATE\_PERMOFF 4  
Actionpoint state permanently off, see [LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#).  
Definition at line 64 of file default\_lc\_msgdefs.h.

**12.6.2.9 LC\_HKAR\_ERROR** #define LC\_HKAR\_ERROR 0x02  
Two bit value used for ERROR  
  
Definition at line 91 of file default\_lc\_msgdefs.h.

**12.6.2.10 LC\_HKAR\_FAIL** #define LC\_HKAR\_FAIL 0x01  
Two bit value used for FAIL

Definition at line 90 of file default\_lc\_msgdefs.h.

**12.6.2.11 LC\_HKAR\_NUM\_BYTES** #define LC\_HKAR\_NUM\_BYTES (((LC\_MAX\_ACTIONPOINTS + 7) / 8) \* 4)  
4 bits per AP and keeping \ array on longword boundary \  
Definition at line 114 of file default\_lc\_msgdefs.h.

**12.6.2.12 LC\_HKAR\_PASS** #define LC\_HKAR\_PASS 0x00  
Two bit value used for PASS

Definition at line 89 of file default\_lc\_msgdefs.h.

**12.6.2.13 LC\_HKAR\_STALE** #define LC\_HKAR\_STALE 0x03  
Two bit value used for STALE

Definition at line 92 of file default\_lc\_msgdefs.h.

**12.6.2.14 LC\_HKAR\_STATE\_ACTIVE** #define LC\_HKAR\_STATE\_ACTIVE 0x01  
Two bit value used for ACTIVE

Definition at line 100 of file default\_lc\_msgdefs.h.

**12.6.2.15 LC\_HKAR\_STATE\_DISABLED** #define LC\_HKAR\_STATE\_DISABLED 0x03  
Two bit value used for DISABLED

Definition at line 102 of file default\_lc\_msgdefs.h.

**12.6.2.16 LC\_HKAR\_STATE\_NOT\_USED** #define LC\_HKAR\_STATE\_NOT\_USED 0x00  
Two bit value used for NOT USED and PERMOFF.  
Definition at line 99 of file default\_lc\_msgdefs.h.

**12.6.2.17 LC\_HKAR\_STATE\_PASSIVE** #define LC\_HKAR\_STATE\_PASSIVE 0x02  
Two bit value used for PASSIVE

Definition at line 101 of file default\_lc\_msgdefs.h.

**12.6.2.18 LC\_HKWR\_ERROR** #define LC\_HKWR\_ERROR 0x02  
Two bit value used for ERROR

Definition at line 81 of file default\_lc\_msgdefs.h.

**12.6.2.19 LC\_HKWR\_FALSE** #define LC\_HKWR\_FALSE 0x00  
Two bit value used for FALSE

Definition at line 79 of file default\_lc\_msgdefs.h.

**12.6.2.20 LC\_HKWR\_NUM\_BYTES** #define LC\_HKWR\_NUM\_BYTES (((LC\_MAX\_WATCHPOINTS + 15) / 16) \* 4)  
2 bits per WP and keeping \ array on longword boundary \  
Definition at line 109 of file default\_lc\_msgdefs.h.

**12.6.2.21 LC\_HKWR\_STALE** #define LC\_HKWR\_STALE 0x03  
Two bit value used for STALE

Definition at line 82 of file default\_lc\_msgdefs.h.

**12.6.2.22 LC\_HKWR\_TRUE** #define LC\_HKWR\_TRUE 0x01  
Two bit value used for TRUE

Definition at line 80 of file default\_lc\_msgdefs.h.

**12.6.2.23 LC\_STATE\_ACTIVE** #define LC\_STATE\_ACTIVE 1  
LC Application State Active.  
Definition at line 50 of file default\_lc\_msgdefs.h.

**12.6.2.24 LC\_STATE\_DISABLED** #define LC\_STATE\_DISABLED 3  
LC Application State Disabled.  
Definition at line 52 of file default\_lc\_msgdefs.h.

**12.6.2.25 LC\_STATE\_FROM\_CDS** #define LC\_STATE\_FROM\_CDS 4  
Used for reset processing, not valid state.  
Definition at line 53 of file default\_lc\_msgdefs.h.

**12.6.2.26 LC\_STATE\_PASSIVE** #define LC\_STATE\_PASSIVE 2  
LC Application State Passive.  
Definition at line 51 of file default\_lc\_msgdefs.h.

## 12.7 apps/lc/config/default\_lc\_msgids.h File Reference

### Macros

- #define LC\_CMD\_MID 0x18A4  
*Msg ID for cmds to LC*
- #define LC\_SEND\_HK\_MID 0x18A5  
*Msg ID to request LC housekeeping*

- #define LC\_SAMPLE\_AP\_MID 0x18A6  
*Msg ID to request actionpoint sample.*
- #define LC\_HK\_TLM\_MID 0x08A7  
*LC Housekeeping Telemetry.*

### 12.7.1 Detailed Description

CFS Limit Checker (LC) Application Message IDs

## 12.8 apps/lc/config/default\_lc\_msgstruct.h File Reference

```
#include "common_types.h"
#include "lc_msgdefs.h"
#include "cfe_msg_hdr.h"
```

### Data Structures

- struct [LC\\_SendHkCmd\\_t](#)  
*Send HK Command.*
- struct [LC\\_NoopCmd\\_t](#)  
*No-op Command.*
- struct [LC\\_ResetCountersCmd\\_t](#)  
*Reset Counters Command.*
- struct [LC\\_SetLCState\\_Payload\\_t](#)  
*Set LC Application State Payload.*
- struct [LC\\_SetLCStateCmd\\_t](#)  
*Set LC Application State Command.*
- struct [LC\\_SetAPState\\_Payload\\_t](#)  
*Set AP (Actionpoint) State Payload.*
- struct [LC\\_SetAPStateCmd\\_t](#)  
*Set AP (Actionpoint) State Command.*
- struct [LC\\_SetAPPermOff\\_Payload\\_t](#)  
*Set AP (Actionpoint) Permanently Off Payload.*
- struct [LC\\_SetAPPermOffCmd\\_t](#)  
*Set AP (Actionpoint) Permanently Off Command.*
- struct [LC\\_ResetAPStats\\_Payload\\_t](#)  
*Reset AP (Actionpoint) Statistics Payload.*
- struct [LC\\_ResetAPStatsCmd\\_t](#)  
*Reset AP (Actionpoint) Statistics Command.*
- struct [LC\\_ResetWPStats\\_Payload\\_t](#)  
*Reset WP (Watchpoint) Statistics Payload.*
- struct [LC\\_ResetWPStatsCmd\\_t](#)  
*Reset WP (Watchpoint) Statistics Command.*
- struct [LC\\_SampleAP\\_Payload\\_t](#)  
*Sample AP (Actionpoint) Payload.*
- struct [LC\\_SampleAPCmd\\_t](#)  
*Sample AP (Actionpoint) Request.*
- struct [LC\\_RTSRequest\\_Payload\\_t](#)

*Payload to Start a Stored Command RTS.*

- struct [LC\\_RTSRequestCmd\\_t](#)

*Send Command to Start a Stored Command RTS.*

- struct [LC\\_HkTlm\\_Payload\\_t](#)

*Housekeeping Payload Structure.*

- struct [LC\\_HkPacket\\_t](#)

*Housekeeping Telemetry Structure Structure.*

### 12.8.1 Detailed Description

Specification for the CFS Limit Checker (LC) command and telemetry message data types.

Provides default definitions for message structures

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

Constants and enumerated types related to these message structures are defined in lc\_msgdefs.h. They are kept separate to allow easy integration with ASIST RDL files which can't handle typedef declarations (see the main comment block in lc\_msgdefs.h for more info).

## 12.9 apps/lc/config/default\_lc\_platform\_cfg.h File Reference

```
#include "lc_mission_cfg.h"
#include "lc_internal_cfg.h"
```

### 12.9.1 Detailed Description

CFS Limit Checker (LC) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.10 apps/lc/config/default\_lc\_tbl.h File Reference

```
#include "lc_interface_cfg.h"
#include "lc_tbldefs.h"
#include "lc_tblstruct.h"
```

### 12.10.1 Detailed Description

Specification for the CFS Limit Checker (LC) table related data structures

## 12.11 apps/lc/config/default\_lc\_tbldefs.h File Reference

#### Macros

- #define [LC\\_NO\\_OPER](#) LC\_OPER\_NONE

- #define LC\_NO\_BITMASK LC\_BITMASK\_NONE
- #define LC\_ADTVAL\_NO\_ERR LC\_ADTVAL\_ERR\_NONE
- #define LC\_WDTVAL\_NO\_ERR LC\_WDTVAL\_ERR\_NONE
- #define LC\_DATA\_NOT\_USED LC\_DATA\_WATCH\_NOT\_USED
- #define LC\_DATA\_BYTE LC\_DATA\_WATCH\_BYTE
- #define LC\_DATA\_UBYTE LC\_DATA\_WATCH\_UBYTE
- #define LC\_DATA\_WORD\_BE LC\_DATA\_WATCH\_WORD\_BE
- #define LC\_DATA\_WORD\_LE LC\_DATA\_WATCH\_WORD\_LE
- #define LC\_DATA\_UWORD\_BE LC\_DATA\_WATCH\_UWORD\_BE
- #define LC\_DATA\_UWORD\_LE LC\_DATA\_WATCH\_UWORD\_LE
- #define LC\_DATA\_DWORD\_BE LC\_DATA\_WATCH\_DWORD\_BE
- #define LC\_DATA\_DWORD\_LE LC\_DATA\_WATCH\_DWORD\_LE
- #define LC\_DATA\_UDWORD\_BE LC\_DATA\_WATCH\_UDWORD\_BE
- #define LC\_DATA\_UDWORD\_LE LC\_DATA\_WATCH\_UDWORD\_LE
- #define LC\_DATA\_FLOAT\_BE LC\_DATA\_WATCH\_FLOAT\_BE
- #define LC\_DATA\_FLOAT\_LE LC\_DATA\_WATCH\_FLOAT\_LE

### LC CDS Saved on Exit Identifiers

- #define LC\_CDS\_SAVED 0xF0F0
  - CDS saved on exit.*
- #define LC\_CDS\_NOT\_SAVED 0x0F0F
  - CDS not saved on exit.*

### Watchpoint Definition Table (WDT) DataType Enumerated Types

- #define LC\_DATA\_WATCH\_NOT\_USED 0xFF
  - Use for empty entries.*
- #define LC\_DATA\_WATCH\_BYTE 1
  - 8 bit signed byte*
- #define LC\_DATA\_WATCH\_UBYTE 2
  - 8 bit unsigned byte*
- #define LC\_DATA\_WATCH\_WORD\_BE 3
  - 16 bit signed word big endian byte order*
- #define LC\_DATA\_WATCH\_WORD\_LE 4
  - 16 bit signed word little endian byte order*
- #define LC\_DATA\_WATCH\_UWORD\_BE 5
  - 16 bit unsigned word big endian byte order*
- #define LC\_DATA\_WATCH\_UWORD\_LE 6
  - 16 bit unsigned word little endian byte order*
- #define LC\_DATA\_WATCH\_DWORD\_BE 7
  - 32 bit signed double word big endian byte order*
- #define LC\_DATA\_WATCH\_DWORD\_LE 8
  - 32 bit signed double word little endian byte order*
- #define LC\_DATA\_WATCH\_UDWORD\_BE 9
  - 32 bit unsigned double word big endian byte order*
- #define LC\_DATA\_WATCH\_UDWORD\_LE 10
  - 32 bit unsigned double word little endian byte order*
- #define LC\_DATA\_WATCH\_FLOAT\_BE 11
  - 32 bit single precision IEEE-754 floating point number, \big endian byte order\*
- #define LC\_DATA\_WATCH\_FLOAT\_LE 12
  - 32 bit single precision IEEE-754 floating point number, \little endian byte order\*

### Watchpoint Definition Table (WDT) OperatorID Enumerated Types

- #define `LC_OPER_NONE` 0xFF  
*Use for empty entries*
- #define `LC_OPER_LT` 1  
*Less Than (<)*
- #define `LC_OPER_LE` 2  
*Less Than or Equal To (<=)*
- #define `LC_OPER_NE` 3  
*Not Equal (!=)*
- #define `LC_OPER_EQ` 4  
*Equal (==)*
- #define `LC_OPER_GE` 5  
*Greater Than or Equal To (>=)*
- #define `LC_OPER_GT` 6  
*Greater Than (>)*
- #define `LC_OPER_CUSTOM` 7  
*Use custom function*

#### Watchpoint Definition Table (WDT) BitMask Enumerated Types

- #define `LC_BITMASK_NONE` 0xFFFFFFFF  
*Use for no masking*

#### Actionpoint Definition Table (ADT) Reverse Polish Operators

- #define `LC_RPN_AND` 0xFFFF1  
*RPN and operator.*
- #define `LC_RPN_OR` 0xFFFF2  
*RPN or operator.*
- #define `LC_RPN_XOR` 0xFFFF3  
*RPN xor operator.*
- #define `LC_RPN_NOT` 0xFFFF4  
*RPN not operator.*
- #define `LC_RPN_EQUAL` 0xFFFF5  
*RPN equal operator.*

#### Watchpoint Results Table (WRT) WatchResult Enumerated Types

- #define `LC_WATCH_STALE` 0xFF  
*Watchpoint stale.*
- #define `LC_WATCH_FALSE` 0  
*Watchpoint false, must be zero for RPN evaluation.*
- #define `LC_WATCH_TRUE` 1  
*Watchpoint true, must be one for RPN evaluation.*
- #define `LC_WATCH_ERROR` 2  
*Watchpoint error.*

#### Actionpoint Results Table (ART) ActionResult Enumerated Types

- #define `LC_ACTION_STALE` 0xFF

- `#define LC_ACTION_PASS 0`  
*Actionpoint pass.*
- `#define LC_ACTION_FAIL 1`  
*Actionpoint fail.*
- `#define LC_ACTION_ERROR 2`  
*Actionpoint error.*

#### Watchpoint Definition Table (WDT) Validation Error Enumerated Types

- `#define LC_WDTVAL_ERR_NONE 0`  
*No error*
- `#define LC_WDTVAL_ERR_DATATYPE 1`  
*Invalid DataType*
- `#define LC_WDTVAL_ERR_OPER 2`  
*Invalid OperatorID*
- `#define LC_WDTVAL_ERR_MID 3`  
*Invalid MessageID*
- `#define LC_WDTVAL_ERR_FPNAN 4`  
*ComparisonValue is NAN float*
- `#define LC_WDTVAL_ERR_FPINF 5`  
*ComparisonValue is infinite float.*

#### Actionpoint Definition Table (ADT) Validation Error Enumerated Types

- `#define LC_ATDVAL_ERR_NONE 0`  
*No error*
- `#define LC_ATDVAL_ERR_DEFSTATE 1`  
*Invalid DefaultState*
- `#define LC_ATDVAL_ERR_RTSID 2`  
*Invalid RTSId*
- `#define LC_ATDVAL_ERR_FAILCNT 3`  
*MaxFailsBeforeRTS is zero*
- `#define LC_ATDVAL_ERR_EVTTYPE 4`  
*Invalid EventType*
- `#define LC_ATDVAL_ERR_RPN 5`  
*Invalid Reverse Polish Expression.*

##### 12.11.1 Detailed Description

Specification for the CFS Limit Checker (LC) table related constant definitions.

###### Note

These Macro definitions have been put in this file (instead of lc\_tbl.h) so this file can be included directly into ASIST build test scripts. ASIST RDL files can accept C language #defines but can't handle type definitions. As a result: DO NOT PUT ANY TYPEDEFS OR STRUCTURE DEFINITIONS IN THIS FILE! ADD THEM TO lc\_tbl.h IF NEEDED!

## 12.11.2 Macro Definition Documentation

### 12.11.2.1 **LC\_ACTION\_ERROR** #define LC\_ACTION\_ERROR 2

Actionpoint error.

Definition at line 122 of file default\_lc\_tbldefs.h.

### 12.11.2.2 **LC\_ACTION\_FAIL** #define LC\_ACTION\_FAIL 1

Actionpoint fail.

Definition at line 121 of file default\_lc\_tbldefs.h.

### 12.11.2.3 **LC\_ACTION\_PASS** #define LC\_ACTION\_PASS 0

Actionpoint pass.

Definition at line 120 of file default\_lc\_tbldefs.h.

### 12.11.2.4 **LC\_ACTION\_STALE** #define LC\_ACTION\_STALE 0xFF

Actionpoint stale.

Definition at line 119 of file default\_lc\_tbldefs.h.

### 12.11.2.5 **LC\_ADTVAL\_ERR\_DEFSTATE** #define LC\_ADTVAL\_ERR\_DEFSTATE 1

Invalid DefaultState

Definition at line 142 of file default\_lc\_tbldefs.h.

### 12.11.2.6 **LC\_ADTVAL\_ERR\_EVTTYPE** #define LC\_ADTVAL\_ERR\_EVTTYPE 4

Invalid EventType

Definition at line 145 of file default\_lc\_tbldefs.h.

### 12.11.2.7 **LC\_ADTVAL\_ERR\_FAILCNT** #define LC\_ADTVAL\_ERR\_FAILCNT 3

MaxFailsBeforeRTS is zero

Definition at line 144 of file default\_lc\_tbldefs.h.

### 12.11.2.8 **LC\_ADTVAL\_ERR\_NONE** #define LC\_ADTVAL\_ERR\_NONE 0

No error

Definition at line 141 of file default\_lc\_tbldefs.h.

### 12.11.2.9 **LC\_ADTVAL\_ERR\_RPN** #define LC\_ADTVAL\_ERR\_RPN 5

Invalid Reverse Polish Expression.

Definition at line 146 of file default\_lc\_tbldefs.h.

**12.11.2.10 LC\_ADTVAL\_ERR\_RTSID** #define LC\_ADTVAL\_ERR\_RTSID 2  
Invalid RTSID

Definition at line 143 of file default\_lc\_tbldefs.h.

**12.11.2.11 LC\_ADTVAL\_NO\_ERR** #define LC\_ADTVAL\_NO\_ERR LC\_ADTVAL\_ERR\_NONE  
Definition at line 153 of file default\_lc\_tbldefs.h.

**12.11.2.12 LC\_BITMASK\_NONE** #define LC\_BITMASK\_NONE 0xFFFFFFFF  
Use for no masking

Definition at line 91 of file default\_lc\_tbldefs.h.

**12.11.2.13 LC\_CDS\_NOT\_SAVED** #define LC\_CDS\_NOT\_SAVED 0x0F0F  
CDS not saved on exit.

Definition at line 45 of file default\_lc\_tbldefs.h.

**12.11.2.14 LC\_CDS\_SAVED** #define LC\_CDS\_SAVED 0xF0F0  
CDS saved on exit.

Definition at line 44 of file default\_lc\_tbldefs.h.

**12.11.2.15 LC\_DATA\_BYTE** #define LC\_DATA\_BYTE LC\_DATA\_WATCH\_BYTE  
Definition at line 157 of file default\_lc\_tbldefs.h.

**12.11.2.16 LC\_DATA\_DWORD\_BE** #define LC\_DATA\_DWORD\_BE LC\_DATA\_WATCH\_DWORD\_BE  
Definition at line 163 of file default\_lc\_tbldefs.h.

**12.11.2.17 LC\_DATA\_DWORD\_LE** #define LC\_DATA\_DWORD\_LE LC\_DATA\_WATCH\_DWORD\_LE  
Definition at line 164 of file default\_lc\_tbldefs.h.

**12.11.2.18 LC\_DATA\_FLOAT\_BE** #define LC\_DATA\_FLOAT\_BE LC\_DATA\_WATCH\_FLOAT\_BE  
Definition at line 167 of file default\_lc\_tbldefs.h.

**12.11.2.19 LC\_DATA\_FLOAT\_LE** #define LC\_DATA\_FLOAT\_LE LC\_DATA\_WATCH\_FLOAT\_LE  
Definition at line 168 of file default\_lc\_tbldefs.h.

**12.11.2.20 LC\_DATA\_NOT\_USED** #define LC\_DATA\_NOT\_USED LC\_DATA\_WATCH\_NOT\_USED  
Definition at line 156 of file default\_lc\_tbldefs.h.

**12.11.2.21 LC\_DATA\_UBYTE** #define LC\_DATA\_UBYTE [LC\\_DATA\\_WATCH\\_UBYTE](#)

Definition at line 158 of file default\_lc\_tbldefs.h.

**12.11.2.22 LC\_DATA\_UDWORD\_BE** #define LC\_DATA\_UDWORD\_BE [LC\\_DATA\\_WATCH\\_UDWORD\\_BE](#)

Definition at line 165 of file default\_lc\_tbldefs.h.

**12.11.2.23 LC\_DATA\_UDWORD\_LE** #define LC\_DATA\_UDWORD\_LE [LC\\_DATA\\_WATCH\\_UDWORD\\_LE](#)

Definition at line 166 of file default\_lc\_tbldefs.h.

**12.11.2.24 LC\_DATA\_UWORD\_BE** #define LC\_DATA\_UWORD\_BE [LC\\_DATA\\_WATCH\\_UWORD\\_BE](#)

Definition at line 161 of file default\_lc\_tbldefs.h.

**12.11.2.25 LC\_DATA\_UWORD\_LE** #define LC\_DATA\_UWORD\_LE [LC\\_DATA\\_WATCH\\_UWORD\\_LE](#)

Definition at line 162 of file default\_lc\_tbldefs.h.

**12.11.2.26 LC\_DATA\_WATCH\_BYTE** #define LC\_DATA\_WATCH\_BYTE 1

8 bit signed byte

Definition at line 53 of file default\_lc\_tbldefs.h.

**12.11.2.27 LC\_DATA\_WATCH\_DWORD\_BE** #define LC\_DATA\_WATCH\_DWORD\_BE 7

32 bit signed double word big endian byte order

Definition at line 59 of file default\_lc\_tbldefs.h.

**12.11.2.28 LC\_DATA\_WATCH\_DWORD\_LE** #define LC\_DATA\_WATCH\_DWORD\_LE 8

32 bit signed double word little endian byte order

Definition at line 60 of file default\_lc\_tbldefs.h.

**12.11.2.29 LC\_DATA\_WATCH\_FLOAT\_BE** #define LC\_DATA\_WATCH\_FLOAT\_BE 11

32 bit single precision IEEE-754 floating point number, \ big endian byte order \

Definition at line 63 of file default\_lc\_tbldefs.h.

**12.11.2.30 LC\_DATA\_WATCH\_FLOAT\_LE** #define LC\_DATA\_WATCH\_FLOAT\_LE 12

32 bit single precision IEEE-754 floating point number, \ little endian byte order \

Definition at line 67 of file default\_lc\_tbldefs.h.

**12.11.2.31 LC\_DATA\_WATCH\_NOT\_USED** #define LC\_DATA\_WATCH\_NOT\_USED 0xFF

Use for empty entries.

Definition at line 52 of file default\_lc\_tbldefs.h.

**12.11.2.32 LC\_DATA\_WATCH\_UBYTE** #define LC\_DATA\_WATCH\_UBYTE 2  
8 bit unsigned byte  
Definition at line 54 of file default\_lc\_tbldefs.h.

**12.11.2.33 LC\_DATA\_WATCH\_UDWORD\_BE** #define LC\_DATA\_WATCH\_UDWORD\_BE 9  
32 bit unsigned double word big endian byte order  
Definition at line 61 of file default\_lc\_tbldefs.h.

**12.11.2.34 LC\_DATA\_WATCH\_UDWORD\_LE** #define LC\_DATA\_WATCH\_UDWORD\_LE 10  
32 bit unsigned double word little endian byte order  
Definition at line 62 of file default\_lc\_tbldefs.h.

**12.11.2.35 LC\_DATA\_WATCH\_UWORD\_BE** #define LC\_DATA\_WATCH\_UWORD\_BE 5  
16 bit unsigned word big endian byte order  
Definition at line 57 of file default\_lc\_tbldefs.h.

**12.11.2.36 LC\_DATA\_WATCH\_UWORD\_LE** #define LC\_DATA\_WATCH\_UWORD\_LE 6  
16 bit unsigned word little endian byte order  
Definition at line 58 of file default\_lc\_tbldefs.h.

**12.11.2.37 LC\_DATA\_WATCH\_WORD\_BE** #define LC\_DATA\_WATCH\_WORD\_BE 3  
16 bit signed word big endian byte order  
Definition at line 55 of file default\_lc\_tbldefs.h.

**12.11.2.38 LC\_DATA\_WATCH\_WORD\_LE** #define LC\_DATA\_WATCH\_WORD\_LE 4  
16 bit signed word little endian byte order  
Definition at line 56 of file default\_lc\_tbldefs.h.

**12.11.2.39 LC\_DATA\_WORD\_BE** #define LC\_DATA\_WORD\_BE LC\_DATA\_WATCH\_WORD\_BE  
Definition at line 159 of file default\_lc\_tbldefs.h.

**12.11.2.40 LC\_DATA\_WORD\_LE** #define LC\_DATA\_WORD\_LE LC\_DATA\_WATCH\_WORD\_LE  
Definition at line 160 of file default\_lc\_tbldefs.h.

**12.11.2.41 LC\_NO\_BITMASK** #define LC\_NO\_BITMASK LC\_BITMASK\_NONE  
Definition at line 152 of file default\_lc\_tbldefs.h.

**12.11.2.42 LC\_NO\_OPER** #define LC\_NO\_OPER LC\_OPER\_NONE  
Definition at line 151 of file default\_lc\_tbldefs.h.

**12.11.2.43 LC\_OPER\_CUSTOM** #define LC\_OPER\_CUSTOM 7  
Use custom function

Definition at line 84 of file default\_lc\_tbldefs.h.

**12.11.2.44 LC\_OPER\_EQ** #define LC\_OPER\_EQ 4  
Equal (==)

Definition at line 81 of file default\_lc\_tbldefs.h.

**12.11.2.45 LC\_OPER\_GE** #define LC\_OPER\_GE 5  
Greater Than or Equal To (>=)  
Definition at line 82 of file default\_lc\_tbldefs.h.

**12.11.2.46 LC\_OPER\_GT** #define LC\_OPER\_GT 6  
Greater Than (>)

Definition at line 83 of file default\_lc\_tbldefs.h.

**12.11.2.47 LC\_OPER\_LE** #define LC\_OPER\_LE 2  
Less Than or Equal To (<=)

Definition at line 79 of file default\_lc\_tbldefs.h.

**12.11.2.48 LC\_OPER\_LT** #define LC\_OPER\_LT 1  
Less Than (<)

Definition at line 78 of file default\_lc\_tbldefs.h.

**12.11.2.49 LC\_OPER\_NE** #define LC\_OPER\_NE 3  
Not Equal (!=)

Definition at line 80 of file default\_lc\_tbldefs.h.

**12.11.2.50 LC\_OPER\_NONE** #define LC\_OPER\_NONE 0xFF  
Use for empty entries

Definition at line 77 of file default\_lc\_tbldefs.h.

**12.11.2.51 LC\_RPN\_AND** #define LC\_RPN\_AND 0xFFFF  
RPN and operator.  
Definition at line 98 of file default\_lc\_tbldefs.h.

**12.11.2.52 LC\_RPN\_EQUAL** #define LC\_RPN\_EQUAL 0xFFFF5  
RPN equal operator.  
Definition at line 102 of file default\_lc\_tbldefs.h.

**12.11.2.53 LC\_RPN\_NOT** #define LC\_RPN\_NOT 0xFFFF4  
RPN not operator.  
Definition at line 101 of file default\_lc\_tbldefs.h.

**12.11.2.54 LC\_RPN\_OR** #define LC\_RPN\_OR 0xFFFF2  
RPN or operator.  
Definition at line 99 of file default\_lc\_tbldefs.h.

**12.11.2.55 LC\_RPN\_XOR** #define LC\_RPN\_XOR 0xFFFF3  
RPN xor operator.  
Definition at line 100 of file default\_lc\_tbldefs.h.

**12.11.2.56 LC\_WATCH\_ERROR** #define LC\_WATCH\_ERROR 2  
Watchpoint error.  
Definition at line 112 of file default\_lc\_tbldefs.h.

**12.11.2.57 LC\_WATCH\_FALSE** #define LC\_WATCH\_FALSE 0  
Watchpoint false, must be zero for RPN evaluation.  
Definition at line 110 of file default\_lc\_tbldefs.h.

**12.11.2.58 LC\_WATCH\_STALE** #define LC\_WATCH\_STALE 0xFF  
Watchpoint stale.  
Definition at line 109 of file default\_lc\_tbldefs.h.

**12.11.2.59 LC\_WATCH\_TRUE** #define LC\_WATCH\_TRUE 1  
Watchpoint true, must be one for RPN evaluation.  
Definition at line 111 of file default\_lc\_tbldefs.h.

**12.11.2.60 LC\_WDTVAL\_ERR\_DATATYPE** #define LC\_WDTVAL\_ERR\_DATATYPE 1  
Invalid DataType  
Definition at line 130 of file default\_lc\_tbldefs.h.

**12.11.2.61 LC\_WDTVAL\_ERR\_FPINF** #define LC\_WDTVAL\_ERR\_FPINF 5  
ComparisonValue is infinite float.  
Definition at line 134 of file default\_lc\_tbldefs.h.

**12.11.2.62 LC\_WDTVAL\_ERR\_FPNAN** #define LC\_WDTVAL\_ERR\_FPNAN 4  
ComparisonValue is NAN float

Definition at line 133 of file default\_lc\_tbldefs.h.

**12.11.2.63 LC\_WDTVAL\_ERR\_MID** #define LC\_WDTVAL\_ERR\_MID 3  
Invalid MessageID

Definition at line 132 of file default\_lc\_tbldefs.h.

**12.11.2.64 LC\_WDTVAL\_ERR\_NONE** #define LC\_WDTVAL\_ERR\_NONE 0  
No error

Definition at line 129 of file default\_lc\_tbldefs.h.

**12.11.2.65 LC\_WDTVAL\_ERR\_OPER** #define LC\_WDTVAL\_ERR\_OPER 2  
Invalid OperatorID

Definition at line 131 of file default\_lc\_tbldefs.h.

**12.11.2.66 LC\_WDTVAL\_NO\_ERR** #define LC\_WDTVAL\_NO\_ERR LC\_WDTVAL\_ERR\_NONE  
Definition at line 154 of file default\_lc\_tbldefs.h.

## 12.12 apps/lc/config/default\_lc\_tblstruct.h File Reference

```
#include "common_types.h"
#include "lc_interface_cfg.h"
#include "cfe_sb_extern_typedefs.h"
#include "cfe_time_extern_typedefs.h"
```

### Data Structures

- struct [LC\\_ADTEEntry\\_t](#)  
*Actionpoint Definition Table (ADT) Entry.*
- union [LC\\_MultiType\\_t](#)  
*Alignment union.*
- struct [LC\\_WDTEEntry\\_t](#)  
*Watchpoint Definition Table (WDT) Entry.*
- struct [LC\\_WRTTransition\\_t](#)  
*Watchpoint Transition Structure.*
- struct [LC\\_WRTEEntry\\_t](#)  
*Watchpoint Results Table (WRT) Entry.*
- struct [LC\\_ARTEEntry\\_t](#)  
*Actionpoint Results Table (ART) Entry.*

### 12.12.1 Detailed Description

CFS Limit Checker (LC) Application Table Structure Definition  
Provides default definitions for LC table structures

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.13 apps/lc/docs/dox\_src/cfs\_lc.dox File Reference

## 12.14 apps/lc/fsw/inc/lc\_eventids.h File Reference

#### Macros

- #define `LC_RESERVED_EID` 0  
*Reserved EID.*
- #define `LC_TASK_EXIT_EID` 1  
*LC Application Fatal Termination Event ID.*
- #define `LC_INIT_INF_EID` 2  
*LC Initialization Event ID.*
- #define `LC_CR_PIPE_ERR_EID` 3  
*LC Create Command Pipe Failed Event ID.*
- #define `LC_SUB_HK_REQ_ERR_EID` 4  
*LC Subscribe To Housekeeping Request Failed Event ID.*
- #define `LC_SUB_GND_CMD_ERR_EID` 5  
*LC Subscribe To Ground Command Failed Event ID.*
- #define `LC_SUB_SAMPLE_CMD_ERR_EID` 6  
*LC Subscribe To Actionpoint Sample Command Failed Event ID.*
- #define `LC_WDT_REGISTER_ERR_EID` 7  
*LC Watchpoint Definition Table Registration Failed Event ID.*
- #define `LC_WDT_REREGISTER_ERR_EID` 8  
*LC Watchpoint Definition Table Reregistration Failed Event ID.*
- #define `LC_ADT_REGISTER_ERR_EID` 9  
*LC Actionpoint Definition Table Registration Failed Event ID.*
- #define `LC_WRT_REGISTER_ERR_EID` 10  
*LC Watchpoint Results Table Registration Failed Event ID.*
- #define `LC_ART_REGISTER_ERR_EID` 11  
*LC Actionpoint Results Table Registration Failed Event ID.*
- #define `LC_WRT_CDS_REGISTER_ERR_EID` 12  
*LC Watchpoint Result Table CDS Registration Failed Event ID.*
- #define `LC_ART_CDS_REGISTER_ERR_EID` 13  
*LC Actionpoint Result Table CDS Registration Failed Event ID.*
- #define `LC_APP_CDS_REGISTER_ERR_EID` 14  
*LC Application Data CDS Registration Failed Event ID.*
- #define `LC_WDT_LOAD_ERR_EID` 15  
*LC Watchpoint Definition Table Load From File Failed Event ID.*
- #define `LC_ADT_LOAD_ERR_EID` 16  
*LC Actionpoint Definition Table Load From File Failed Event ID.*
- #define `LC_WRT_GETADDR_ERR_EID` 17

- `#define LC_ART_GETADDR_ERR_EID 18`  
*LC Watchpoint Result Table Get Address Failed Event ID.*
- `#define LC_WDT_GETADDR_ERR_EID 19`  
*LC Actionpoint Result Table Get Address Failed Event ID.*
- `#define LC_ADT_GETADDR_ERR_EID 20`  
*LC Watchpoint Definition Table Get Address Failed Event ID.*
- `#define LC_CDS_RESTORED_INF_EID 21`  
*LC State Restored From CDS Event ID.*
- `#define LC_CDS_UPDATED_INF_EID 22`  
*LC Default State Initialized and Stored to CDS Event ID.*
- `#define LC_CDS_DISABLED_INF_EID 23`  
*LC Use Of CDS Disabled Event ID.*
- `#define LC_CC_ERR_EID 24`  
*LC Command Code Invalid Event ID.*
- `#define LC_APSAMPLE_APNUM_ERR_EID 25`  
*LC Sample Actionpoint Message Start Or End Number Invalid Event ID.*
- `#define LC_NOOP_INF_EID 26`  
*LC No-op Command Event ID.*
- `#define LC_RESET_DBG_EID 27`  
*LC Reset Counters Command Event ID.*
- `#define LC_LCSTATE_INF_EID 28`  
*LC Set Limit Checker State Command Event ID.*
- `#define LC_LCSTATE_ERR_EID 29`  
*LC Set Limit Checker State, State Invalid Event ID.*
- `#define LC_APSTATE_NEW_ERR_EID 30`  
*LC Set Actionpoint State New State Invalid Event ID.*
- `#define LC_APSTATE_CURR_ERR_EID 31`  
*LC Set Actionpoint State Current State Invalid Event ID.*
- `#define LC_APSTATE_APNUM_ERR_EID 32`  
*LC Set Actionpoint State Actionpoint Number Invalid Event ID.*
- `#define LC_APSTATE_INF_EID 33`  
*LC Set Actionpoint State Command Event ID.*
- `#define LC_APOFF_APNUM_ERR_EID 34`  
*LC Set Actionpoint Permanently Off Actionpoint Number Invalid Event ID.*
- `#define LC_APOFF_CURR_ERR_EID 35`  
*LC Set Actionpoint Permanently Off Actionpoint Not Disabled Event ID.*
- `#define LC_APOFF_INF_EID 36`  
*LC Set Actionpoint Permanently Off Command Event ID.*
- `#define LC_APSTATS_APNUM_ERR_EID 37`  
*LC Reset Actionpoint Stats Actionpoint Number Invalid Event ID.*
- `#define LC_APSTATS_INF_EID 38`  
*LC Reset Actionpoint Stats Command Event ID.*
- `#define LC_WPSTATS_WPNUM_ERR_EID 39`  
*LC Reset Watchpoint Stats Watchpoint Number Invalid Event ID.*
- `#define LC_WPSTATS_INF_EID 40`  
*LC Reset Watchpoint Stats Command Event ID.*

- #define **LC\_HKREQ\_LEN\_ERR\_EID** 41  
*LC Housekeeping Request Message Length Invalid Event ID.*
- #define **LC\_APSAMPLE\_LEN\_ERR\_EID** 42  
*LC Actionpoint Sample Message Length Invalid Event ID.*
- #define **LC\_LEN\_ERR\_EID** 43  
*LC Command Message Length Invalid Event ID.*
- #define **LC\_UNSUB\_WP\_ERR\_EID** 44  
*LC Watchpoint Message Unsubscribe Failed Event ID.*
- #define **LC\_SUB\_WP\_ERR\_EID** 45  
*LC Watchpoint Message Subscribe Failed Event ID.*
- #define **LC\_WRT\_NO\_SAVE\_ERR\_EID** 46  
*LC Watchpoint Results Table Not Saved To CDS On Exit Event ID.*
- #define **LC\_ART\_NO\_SAVE\_ERR\_EID** 47  
*LC Actionpoint Results Table Not Saved To CDS On Exit Event ID.*
- #define **LC\_APP\_NO\_SAVE\_START\_ERR\_EID** 48  
*LC Application Data Not Saved To CDS On Startup Event ID.*
- #define **LC\_MID\_INF\_EID** 49  
*LC Unreferenced Message ID Received Event ID.*
- #define **LC\_WP\_DATATYPE\_ERR\_EID** 50  
*LC Watchpoint Data Type Undefined Event ID.*
- #define **LC\_WP\_OPERID\_ERR\_EID** 51  
*LC Watchpoint Operator ID Invalid Event ID.*
- #define **LC\_WP\_NAN\_ERR\_EID** 52  
*LC Watchpoint Data Value Is Float NAN Event ID.*
- #define **LC\_WP\_OFFSET\_ERR\_EID** 53  
*LC Watchpoint Offset Value Invalid Event ID.*
- #define **LC\_WDTVAL\_FPERR\_EID** 54  
*LC Watchpoint Definition Table Validation Floating Point Check Failed Event ID.*
- #define **LC\_WDTVAL\_ERR\_EID** 55  
*LC Watchpoint Definition Table Validation Failed (Not Floating Point Check) Event ID.*
- #define **LC\_WDTVAL\_INF\_EID** 56  
*LC Watchpoint Definition Table Validation Results Event ID.*
- #define **LC\_APSAMPLE\_CURR\_ERR\_EID** 57  
*LC Sample Actionpoint Current Actionpoint State Invalid Event ID.*
- #define **LC\_AP\_PASSTOFAIL\_INF\_EID** 58  
*LC Actionpoint State Change From PASS To FAIL Event ID.*
- #define **LC\_PASSIVE\_FAIL\_DBG\_EID** 59  
*LC Actionpoint Failed While Limit Checker State Passive Event ID.*
- #define **LC\_AP\_PASSIVE\_FAIL\_INF\_EID** 60  
*LC Actionpoint Failed While Actionpoint State Passive Event ID.*
- #define **LC\_AP\_FAILTOPASS\_INF\_EID** 61  
*LC Actionpoint State Change From FAIL To PASS Event ID.*
- #define **LC\_ACTION\_ERROR\_ERR\_EID** 62  
*LC Actionpoint Evaluated To Error Event ID.*
- #define **LC\_INVALID\_RPN\_ERR\_EID** 63  
*LC Actionpoint RPN Expression Illegal Event ID.*
- #define **LC\_ADTVAL\_RPNERR\_EID** 64

- #define `LC_ADTVAL_ERR_EID` 65  
*LC Actionpoint Definition Table Validation RPN Equation Check Failed Event ID.*
- #define `LC_ADTVAL_INF_EID` 66  
*LC Actionpoint Definition Table Validation Failed (Not RPN Equation Check) Event ID.*
- #define `LC_CFCALL_ERR_EID` 67  
*LC Actionpoint Definition Table Validation Result Event ID.*
- #define `LC_WDT_REGISTER_CRIT_ERR_EID` 68  
*LC Watchdog Definition Table Critical Table Registration Failed Event ID.*
- #define `LC_ADT_REGISTER_CRIT_ERR_EID` 69  
*LC Actionpoint Definition Table Critical Table Registration Failed Event ID.*
- #define `LC_BASE_AP_EID` 1000  
*LC Actionpoint Definition Table Base ID.*

#### 12.14.1 Detailed Description

Specification for the CFS Limit Checker (LC) event identifiers.

### 12.15 apps/lc/fsw/inc/lc\_perfids.h File Reference

#### Macros

- #define `LC_APPMAIN_PERF_ID` 28  
*Main task performance ID.*
- #define `LC_WDT_SEARCH_PERF_ID` 43  
*Watchpoing definition table search performance ID.*

#### 12.15.1 Detailed Description

CFS Limit Checker (LC) Application Performance IDs

### 12.16 apps/lc/fsw/src/lc\_action.c File Reference

```
#include "lc_app.h"
#include "lc_action.h"
#include "lc_msgids.h"
#include "lc_eventids.h"
#include "lc_custom.h"
#include "lc_platform_cfg.h"
#include <string.h>
```

#### Macros

- #define `POP_RPN_DATA` ((StackPtr <= 0) ? (IllegalRPN = true) : (RPNStack[-StackPtr]))

## Functions

- void `LC_SampleAPs (uint16 StartIndex, uint16 EndIndex)`  
*Sample actionpoints.*
- void `LC_SampleSingleAP (uint16 APNumber)`  
*Sample single actionpoint.*
- `uint8 LC_EvaluateRPN (uint16 APNumber)`  
*Evaluate RPN.*
- `int32 LC_ValidateADT (void *TableData)`  
*Validate actionpoint definition table (ADT)*
- `int32 LC_ValidateRPN (const uint16 *RPNPtr, int32 *IndexValue, int32 *StackDepthValue)`  
*Validate RPN expression.*

### 12.16.1 Detailed Description

Functions used for CFS Limit Checker actionpoint processing

### 12.16.2 Macro Definition Documentation

**12.16.2.1 POP\_RPN\_DATA** `#define POP_RPN_DATA ((StackPtr <= 0) ? (IllegalRPN = true) : (RPN← Stack[--StackPtr]))`  
Definition at line 277 of file lc\_action.c.

### 12.16.3 Function Documentation

**12.16.3.1 LC\_EvaluateRPN()** `uint8 LC_EvaluateRPN (`  
`uint16 APNumber )`

Evaluate RPN.

#### Description

Support function for actionpoint processing that evaluates the reverse polish notation (RPN) equation for the specified actionpoint and returns the result

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<code>APNumber</code>	The actionpoint number to evaluate (zero based actionpoint definition table index)
----	-----------------------	--

#### Returns

Reverse polish notation result

#### Return values

<i>LC_ACTION_PASS</i>	Actionpoint pass.
<i>LC_ACTION_FAIL</i>	Actionpoint fail.
<i>LC_ACTION_STALE</i>	Actionpoint stale.
<i>LC_ACTION_ERROR</i>	Actionpoint error.

Definition at line 278 of file lc\_action.c.

References LC\_OperData\_t::ADTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_ACTION\_ERROR, LC\_ACTION\_FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_INVALID\_RPN\_ERR\_EID, LC\_MAX\_RPN\_EQU←\_SIZE, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_RPN\_AND, LC\_RPN\_EQUAL, LC\_RPN\_NOT, LC\_RPN\_OR, LC\_RPN\_XOR, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, POP\_RPN←\_DATA, LC\_AdTEntry\_t::RPNEquation, LC\_WRTEntry\_t::WatchResult, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SampleSingleAP().

Here is the call graph for this function:



**12.16.3.2 LC\_SampleAPs()** void LC\_SampleAPs (   
     *uint16 StartIndex,*   
     *uint16 EndIndex* )

Sample actionpoints.

#### Description

Support function for [LC\\_SampleAPReq](#) that will sample the selected actionpoints. The start and end arguments define which actionpoint(s) the command will sample. If both the start and end arguments are set to [LC\\_ALL\\_ACTIONPOINTS](#), the command will be interpreted as a request to sample all actionpoints (heritage). Otherwise, the start index must be less than or equal to the end index, and both must be within the bounds of the actionpoint table. The calling function ensures that the start index and the end index are within the bounds of the actionpoint table. If StartIndex > EndIndex, the function will (intentionally) silently fail.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>StartIndex</i>	The first actionpoint to sample (zero based actionpoint table index)
in	<i>EndIndex</i>	The last actionpoint to sample (zero based actionpoint table index)

#### See also

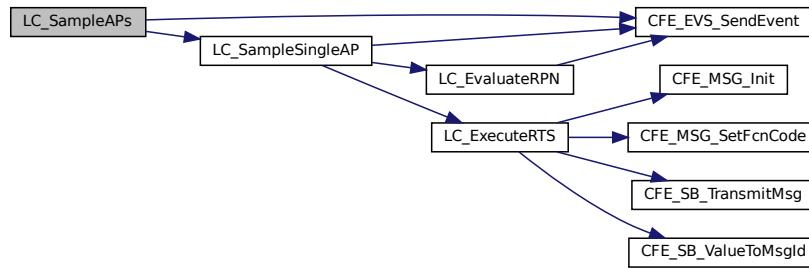
## LC\_SampleAPReq

Definition at line 42 of file lc\_action.c.

References LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_ARTEEntry\_t::CurrentState, LC\_ACTION\_NOT\_USED, LC\_APSSAMPLE\_CURR\_ERR\_EID, LC\_APSTATE\_PERMOFF, LC\_OperData, and LC\_SampleSingleAP().

Referenced by LC\_SampleAPReq().

Here is the call graph for this function:



```
12.16.3.3 LC_SampleSingleAP() void LC_SampleSingleAP (
```

## Sample single actionpoint.

## Description

Support function for actionpoint processing that will sample a single actionpoint and handle the result as needed.

The sample is only performed if the actionpoint is active or passive. Other states are ignored since this routine is called in a loop to process ALL actionpoints.

## Assumptions, External Events, and Notes:

None

## Parameters

in *APNumber* The actionpoint number to sample (zero based actionpoint definition table index)

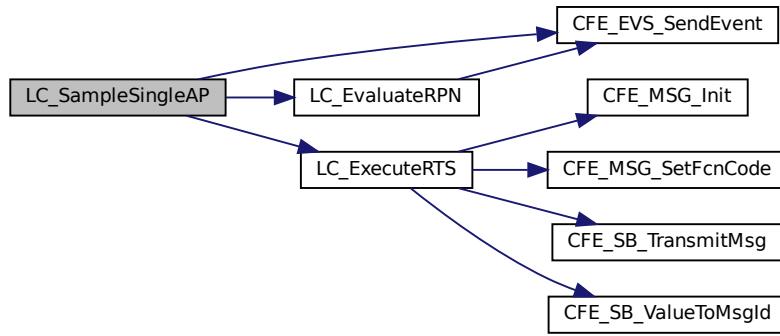
Definition at line 80 of file lc\_action.c.

References LC\_ARTEEntry\_t::ActionResult, LC\_OperData\_t::ADTPtr, LC\_AppData\_t::APSSampleCount, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_DEBUG, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH, LC\_ARTEEntry\_t::ConsecutiveFailCount, LC\_ARTEEntry\_t::CumulativeEventMsgsSent, LC\_ARTEEntry\_t::CumulativeFailCount, LC\_ARTEEntry\_t::CumulativeRTSExecCount, LC\_AppData\_t::CurrentLCState, LC\_ARTEEntry\_t::CurrentState, LC\_ADTEntry\_t::EventID, LC\_ADTEntry\_t::EventText, LC\_ADTEntry\_t::EventType, LC\_ARTEEntry\_t::FailToPassCount, LC\_ACTION\_ERROR\_\_ERR\_EID, LC\_ACTION\_FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_AP\_EVENT\_TAIL\_STR, LC\_AP\_FAULTTOPASS\_INF\_EID, LC\_AP\_PASSIVE\_FAIL\_INF\_EID, LC\_AP\_PASSTOFAIL\_INF\_EID, LC\_AppData, LC\_AP\_STATE\_ACTIVE, LC\_APSTATE\_PASSIVE, LC\_EvaluateRPN(), LC\_ExecuteRTS(), LC\_OperData, LC\_PASSIVE\_\_

\_FAIL\_DBG\_EID, LC\_STATE\_ACTIVE, LC\_ADTEEntry\_t::MaxFailPassEvents, LC\_ADTEEntry\_t::MaxFailsBeforeRTS, LC\_ADTEEntry\_t::MaxPassFailEvents, LC\_ADTEEntry\_t::MaxPassiveEvents, LC\_ARTEEntry\_t::PassiveAPCount, LC\_AppData\_t::PassToFailCount, LC\_AppData\_t::RTSExecCount, and LC\_ATEntry\_t::RTSId.

Referenced by LC\_SampleAPs().

Here is the call graph for this function:



#### 12.16.3.4 LC\_ValidateADT() `int32 LC_ValidateADT( void * TableData )`

Validate actionpoint definition table (ADT)

##### Description

This function is called by table services when a validation of the actionpoint definition table is required

##### Assumptions, External Events, and Notes:

None

##### Parameters

<code>in</code>	<code>*TableData</code>	Pointer to the table data to validate
-----------------	-------------------------	---------------------------------------

##### Returns

Actionpoint definition table validation status

##### Return values

<code>CFE_SUCCESS</code>	Successful execution. Operation was performed successfully
<code>LC_ADVAL_ERR_DEFSTATE</code>	Invalid DefaultState
<code>LC_ADVAL_ERR_RTSID</code>	Invalid RTSId

**Return values**

<a href="#"><i>LC_ADTVAL_ERR_FAILCNT</i></a>	MaxFailsBeforeRTS is zero
<a href="#"><i>LC_ADTVAL_ERR_EVTYPE</i></a>	Invalid EventType
<a href="#"><i>LC_ADTVAL_ERR_RPN</i></a>	Invalid Reverse Polish Expression.

**See also**

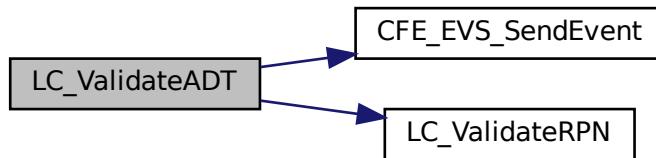
[LC\\_ValidateWDT](#)

Definition at line 472 of file `lc_action.c`.

References `CFE_EVS_EventType_CRITICAL`, `CFE_EVS_EventType_DEBUG`, `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `CFE_SUCCESS`, `LC_AdTEntry_t::DefaultState`, `LC_AdTEntry_t::EventType`, `LC_ADTVAL_ERR_DEFSTATE`, `LC_ADTVAL_ERR_EID`, `LC_ADTVAL_ERR_EVTYPE`, `LC_ADTVAL_ERR_FAILCNT`, `LC_ADTVAL_ERR_NONE`, `LC_ADTVAL_ERR_RPN`, `LC_ADTVAL_ERR_RTSID`, `LC_ADTVAL_INF_EID`, `LC_ADTVAL_RPNERR_EID`, `LC_APSTATE_ACTIVE`, `LC_APSTATE_DISABLED`, `LC_APSTAT_E_NOT_USED`, `LC_APSTATE_PASSIVE`, `LC_APSTATE_PERMOFF`, `LC_MAX_ACTIONPOINTS`, `LC_MAX_VALID_ADT_RTSID`, `LC_ValidateRPN()`, `LC_AdTEntry_t::MaxFailsBeforeRTS`, `LC_AdTEntry_t::RPNEquation`, and `LC_AdTEntry_t::RTSID`.

Referenced by `LC_CreateDefinitionTables()`.

Here is the call graph for this function:



**12.16.3.5 LC\_ValidateRPN()** `int32 LC_ValidateRPN (`  
 `const uint16 * RPNPtr,`  
 `int32 * IndexValue,`  
 `int32 * StackDepthValue )`

Validate RPN expression.

**Description**

Support function for actionpoint definition table validation that checks a reverse polish notation (RPN) equation for possible errors.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>RPNPtr</i>	Pointer to the RPN equation
in	<i>IndexValue</i>	A pointer where to store the equation index value if an error is detected
in	<i>StackDepthValue</i>	A pointer where to store the equation stack depth value if an error is detected

**Returns**

Actionpoint definition table reverse polish notation validation status

**Return values**

<i>LC_ADTVAL_ERR_NONE</i>	No error
<i>LC_ADTVAL_ERR_RPN</i>	Invalid Reverse Polish Expression.

**See also**

[LC\\_ValidateADT](#)

Definition at line 601 of file lc\_action.c.

References *LC\_ADTVAL\_ERR\_NONE*, *LC\_ADTVAL\_ERR\_RPN*, *LC\_MAX\_RPN\_EQU\_SIZE*, *LC\_MAX\_WATCHPOINT*, *LC\_RPN\_AND*, *LC\_RPN\_EQUAL*, *LC\_RPN\_NOT*, *LC\_RPN\_OR*, and *LC\_RPN\_XOR*.

Referenced by *LC\_ValidateADT()*.

## 12.17 apps/lc/fsw/src/lc\_action.h File Reference

```
#include "cfe.h"
#include "lc_tbl.h"
```

**Macros****LC Actionpoint Event Trailer**

- #define *LC\_AP\_EVENT\_TAIL\_STR* ": AP = %d, FailCount = %d, RTS = %d"  
*AP event trailer string.*
- #define *LC\_AP\_EVENT\_TAIL\_LEN* 36  
*Length of string including NUL.*

**Functions**

- void *LC\_SampleAPs* (*uint16* StartIndex, *uint16* EndIndex)  
*Sample actionpoints.*
- *int32* *LC\_ValidateADT* (*void* \*TableData)  
*Validate actionpoint definition table (ADT)*
- void *LC\_SampleSingleAP* (*uint16* APNumber)  
*Sample single actionpoint.*
- *uint8* *LC\_EvaluateRPN* (*uint16* APNumber)  
*Evaluate RPN.*
- *int32* *LC\_ValidateRPN* (*const uint16* \*RPNPtr, *int32* \*IndexValue, *int32* \*StackDepthValue)  
*Validate RPN expression.*

### 12.17.1 Detailed Description

Specification for the CFS Limit Checker (LC) routines that handle actionpoint processing

### 12.17.2 Macro Definition Documentation

#### 12.17.2.1 LC\_AP\_EVENT\_TAIL\_LEN #define LC\_AP\_EVENT\_TAIL\_LEN 36

Length of string including NUL.

Definition at line 45 of file lc\_action.h.

#### 12.17.2.2 LC\_AP\_EVENT\_TAIL\_STR #define LC\_AP\_EVENT\_TAIL\_STR ": AP = %d, FailCount = %d, RTS = %d"

AP event trailer string.

Definition at line 43 of file lc\_action.h.

### 12.17.3 Function Documentation

#### 12.17.3.1 LC\_EvaluateRPN() uint8 LC\_EvaluateRPN ( uint16 APNumber )

Evaluate RPN.

##### Description

Support function for actionpoint processing that evaluates the reverse polish notation (RPN) equation for the specified actionpoint and returns the result

##### Assumptions, External Events, and Notes:

None

##### Parameters

in	APNumber	The actionpoint number to evaluate (zero based actionpoint definition table index)
----	----------	--

##### Returns

Reverse polish notation result

##### Return values

<i>LC_ACTION_PASS</i>	Actionpoint pass.
<i>LC_ACTION_FAIL</i>	Actionpoint fail.
<i>LC_ACTION_STALE</i>	Actionpoint stale.
<i>LC_ACTION_ERROR</i>	Actionpoint error.

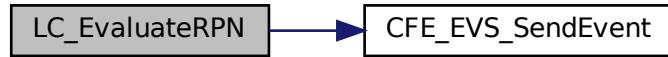
Definition at line 278 of file lc\_action.c.

References LC\_OperData\_t::ADTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_ACTION\_ERROR,

LC\_ACTION\_FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_INVALID\_RPN\_ERR\_EID, LC\_MAX\_RPN\_EQUI\_SIZE, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_RPN\_AND, LC\_RPN\_EQUAL, LC\_RPN\_NOT, LC\_RPN\_OR, LC\_RPN\_XOR, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, POP\_RPN\_DATA, LC\_AdTEntry\_t::RPNEquation, LC\_WRTEntry\_t::WatchResult, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SampleSingleAP().

Here is the call graph for this function:



**12.17.3.2 LC\_SampleAPs()**

```
void LC_SampleAPs (
    uint16 StartIndex,
    uint16 EndIndex )
```

Sample actionpoints.

#### Description

Support function for [LC\\_SampleAPReq](#) that will sample the selected actionpoints. The start and end arguments define which actionpoint(s) the command will sample. If both the start and end arguments are set to [LC\\_ALL\\_ACTIONPOINTS](#), the command will be interpreted as a request to sample all actionpoints (heritage). Otherwise, the start index must be less than or equal to the end index, and both must be within the bounds of the actionpoint table. The calling function ensures that the start index and the end index are within the bounds of the actionpoint table. If StartIndex > EndIndex, the function will (intentionally) silently fail.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>StartIndex</i>	The first actionpoint to sample (zero based actionpoint table index)
in	<i>EndIndex</i>	The last actionpoint to sample (zero based actionpoint table index)

#### See also

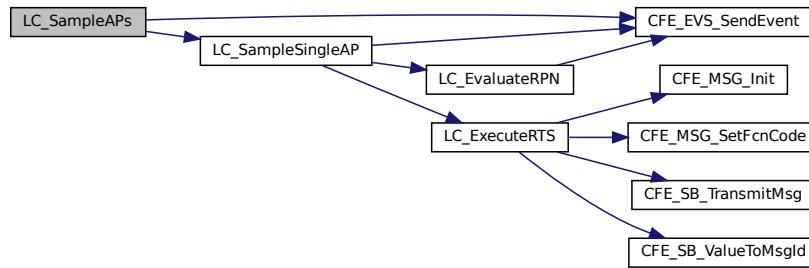
## LC\_SampleAPReq

Definition at line 42 of file lc\_action.c.

References LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_ARTEEntry\_t::CurrentState, LC\_ACTION\_NOT\_USED, LC\_APSSAMPLE\_CURR\_ERR\_EID, LC\_APSTATE\_PERMOFF, LC\_OperData, and LC\_SampleSingleAP().

Referenced by LC\_SampleAPReq().

Here is the call graph for this function:



```
12.17.3.3 LC_SampleSingleAP() void LC_SampleSingleAP (
```

Sample single actionpoint.

## Description

Support function for actionpoint processing that will sample a single actionpoint and handle the result as needed.

The sample is only performed if the actionpoint is active or passive. Other states are ignored since this routine is called in a loop to process ALL actionpoints.

## **Assumptions, External Events, and Notes:**

None

## Parameters

in *APNumber* The actionpoint number to sample (zero based actionpoint definition table index)

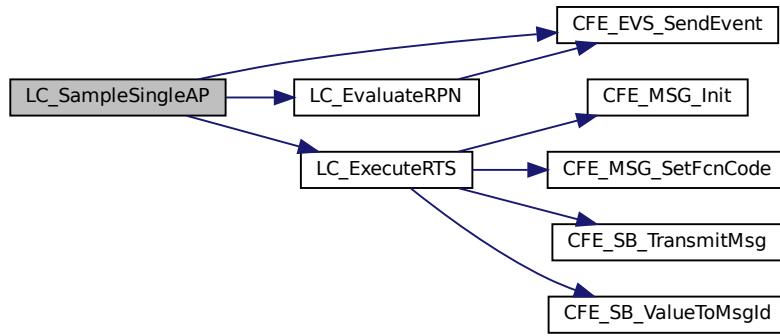
Definition at line 80 of file lc\_action.c.

References LC\_ARTEEntry\_t::ActionResult, LC\_OperData\_t::ADTPtr, LC\_AppData\_t::APSSampleCount, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_DEBUG, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH, LC\_ARTEEntry\_t::ConsecutiveFailCount, LC\_ARTEEntry\_t::CumulativeEventMsgsSent, LC\_ARTEEntry\_t::CumulativeFailCount, LC\_ARTEEntry\_t::CumulativeRTSExecCount, LC\_AppData\_t::CurrentLCState, LC\_ARTEEntry\_t::CurrentState, LC\_ADEEntry\_t::EventID, LC\_ADEEntry\_t::EventText, LC\_ADEEntry\_t::EventType, LC\_ARTEEntry\_t::FailToPassCount, LC\_ACTION\_ERROR\_ERR\_EID, LC\_ACTION\_FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_AP\_EVENT\_TAIL\_STR, LC\_AP\_FAULTTOPASS\_INF\_EID, LC\_AP\_PASSIVE\_FAIL\_INF\_EID, LC\_AP\_PASSTOFAIL\_INF\_EID, LC\_AppData, LC\_AP\_STATE\_ACTIVE, LC\_APSTATE\_PASSIVE, LC\_EvaluateRPN(), LC\_ExecuteRTS(), LC\_OperData, LC\_PASSIVE

\_FAIL\_DBG\_EID, LC\_STATE\_ACTIVE, LC\_ADTEEntry\_t::MaxFailPassEvents, LC\_ADTEEntry\_t::MaxFailsBeforeRTS, LC\_ADTEEntry\_t::MaxPassFailEvents, LC\_ADTEEntry\_t::MaxPassiveEvents, LC\_ARTEEntry\_t::PassiveAPCount, LC\_AppData\_t::PassToFailCount, LC\_AppData\_t::RTSExecCount, and LC\_ATEntry\_t::RTSId.

Referenced by LC\_SampleAPs().

Here is the call graph for this function:



#### 12.17.3.4 LC\_ValidateADT() `int32 LC_ValidateADT( void * TableData )`

Validate actionpoint definition table (ADT)

##### Description

This function is called by table services when a validation of the actionpoint definition table is required

##### Assumptions, External Events, and Notes:

None

##### Parameters

<code>in</code>	<code>*TableData</code>	Pointer to the table data to validate
-----------------	-------------------------	---------------------------------------

##### Returns

Actionpoint definition table validation status

##### Return values

<code>CFE_SUCCESS</code>	Successful execution. Operation was performed successfully
<code>LC_ADVAL_ERR_DEFSTATE</code>	Invalid DefaultState
<code>LC_ADVAL_ERR_RTSID</code>	Invalid RTSId

### Return values

<a href="#"><i>LC_ADTVAL_ERR_FAILCNT</i></a>	MaxFailsBeforeRTS is zero
<a href="#"><i>LC_ADTVAL_ERR_EVTYPE</i></a>	Invalid EventType
<a href="#"><i>LC_ADTVAL_ERR_RPN</i></a>	Invalid Reverse Polish Expression.

### See also

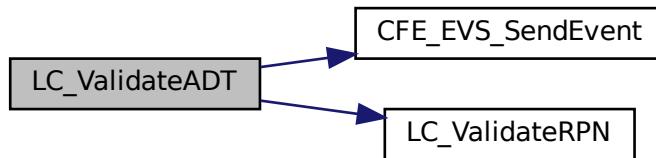
[LC\\_ValidateWDT](#)

Definition at line 472 of file `lc_action.c`.

References `CFE_EVS_EventType_CRITICAL`, `CFE_EVS_EventType_DEBUG`, `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `CFE_SUCCESS`, `LC_AdTEntry_t::DefaultState`, `LC_AdTEntry_t::EventType`, `LC_ADTVAL_ERR_DEFSTATE`, `LC_ADTVAL_ERR_EID`, `LC_ADTVAL_ERR_EVTYPE`, `LC_ADTVAL_ERR_FAILCNT`, `LC_ADTVAL_ERR_NONE`, `LC_ADTVAL_ERR_RPN`, `LC_ADTVAL_ERR_RTSID`, `LC_ADTVAL_INF_EID`, `LC_ADTVAL_RPNERR_EID`, `LC_APSTATE_ACTIVE`, `LC_APSTATE_DISABLED`, `LC_APSTAT_E_NOT_USED`, `LC_APSTATE_PASSIVE`, `LC_APSTATE_PERMOFF`, `LC_MAX_ACTIONPOINTS`, `LC_MAX_VALID_ADT_RTSID`, `LC_ValidateRPN()`, `LC_AdTEntry_t::MaxFailsBeforeRTS`, `LC_AdTEntry_t::RPNEquation`, and `LC_AdTEntry_t::RTSID`.

Referenced by `LC_CreateDefinitionTables()`.

Here is the call graph for this function:



**12.17.3.5 `LC_ValidateRPN()`** `int32 LC_ValidateRPN (`  
 `const uint16 * RPNPtr,`  
 `int32 * IndexValue,`  
 `int32 * StackDepthValue )`

Validate RPN expression.

### Description

Support function for actionpoint definition table validation that checks a reverse polish notation (RPN) equation for possible errors.

### Assumptions, External Events, and Notes:

None

**Parameters**

in	<i>RPNPtr</i>	Pointer to the RPN equation
in	<i>IndexValue</i>	A pointer where to store the equation index value if an error is detected
in	<i>StackDepthValue</i>	A pointer where to store the equation stack depth value if an error is detected

**Returns**

Actionpoint definition table reverse polish notation validation status

**Return values**

<i>LC_ADTVAL_ERR_NONE</i>	No error
<i>LC_ADTVAL_ERR_RPN</i>	Invalid Reverse Polish Expression.

**See also**

[LC\\_ValidateADT](#)

Definition at line 601 of file lc\_action.c.

References *LC\_ADTVAL\_ERR\_NONE*, *LC\_ADTVAL\_ERR\_RPN*, *LC\_MAX\_RPN\_EQU\_SIZE*, *LC\_MAX\_WATCHPOINTINTS*, *LC\_RPN\_AND*, *LC\_RPN\_EQUAL*, *LC\_RPN\_NOT*, *LC\_RPN\_OR*, and *LC\_RPN\_XOR*.

Referenced by *LC\_ValidateADT()*.

## 12.18 apps/lc/fsw/src/lc\_app.c File Reference

```
#include "lc_app.h"
#include "lc_eventids.h"
#include "lc_msgids.h"
#include "lc_perfids.h"
#include "lc_version.h"
#include "lc_cmds.h"
#include "lc_dispatch.h"
#include "lc_action.h"
#include "lc_watch.h"
#include "lc_utils.h"
#include "lc_platform_cfg.h"
#include "lc_mission_cfg.h"
#include "lc_verify.h"
```

**Functions**

- void [LC\\_AppMain](#) (void)
 

*CFS Limit Checker (LC) application entry point.*
- [CFE\\_Status\\_t LC\\_AppInit](#) (void)
 

*Initialize the CFS Limit Checker (LC) application.*
- [CFE\\_Status\\_t LC\\_EvsInit](#) (void)
 

*Initialize Event Services.*
- [CFE\\_Status\\_t LC\\_SblInit](#) (void)
 

*Initialize Software Bus.*

- [CFE\\_Status\\_t LC\\_TableInit](#) (void)  
*Initialize Table Services (includes CDS)*
- [CFE\\_Status\\_t LC\\_CreateResultTables](#) (void)  
*Create Watchpoint and Actionpoint Result Tables.*
- [CFE\\_Status\\_t LC\\_CreateDefinitionTables](#) (void)  
*Create Watchpoint and Actionpoint Definition Tables.*
- [CFE\\_Status\\_t LC\\_CreateTaskCDS](#) (void)  
*Create Result Table and Application Data CDS Areas.*
- [CFE\\_Status\\_t LC\\_LoadDefaultTables](#) (void)  
*Load Default Table Values.*

## Variables

- [LC\\_OperData\\_t LC\\_OperData](#)  
*Operational data.*
- [LC\\_AppData\\_t LC\\_AppData](#)  
*Application data.*

### 12.18.1 Detailed Description

The CFS Limit Checker (LC) is a table-driven application that provides telemetry monitoring and autonomous response capabilities to Core Flight Executive (cFE) based systems.

### 12.18.2 Function Documentation

#### 12.18.2.1 [LC\\_AppInit\(\)](#) `CFE_Status_t LC_AppInit (`     `void )`

Initialize the CFS Limit Checker (LC) application.

##### Description

Limit Checker application initialization routine. This function performs all the required startup steps to initialize (or restore from CDS) LC data structures and get the application registered with the cFE services so it can begin to receive command messages.

##### Assumptions, External Events, and Notes:

None

##### Returns

Execution status, see [cFE Return Code Defines](#)

##### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

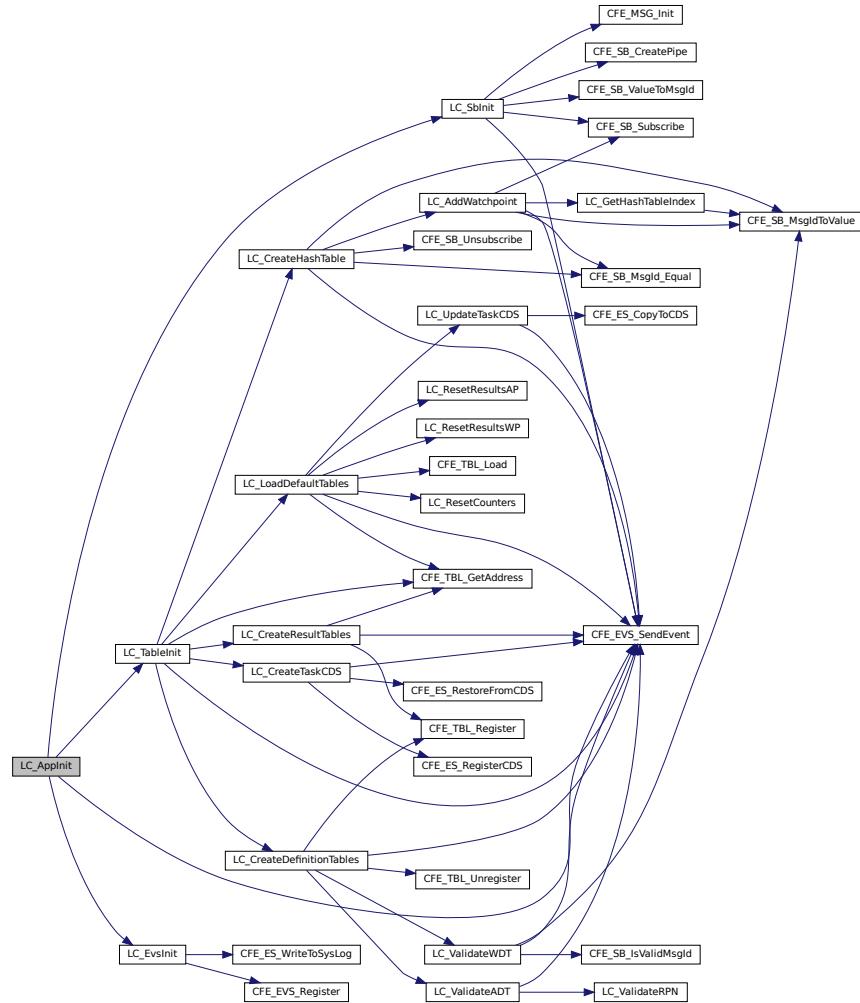
Definition at line 181 of file lc\_app.c.

References [CFE\\_EVS\\_EventType\\_INFORMATION](#), [CFE\\_EVS\\_SendEvent\(\)](#), [CFE\\_SUCCESS](#), [LC\\_AppData](#), [LC\\_EvsInit\(\)](#), [LC\\_INIT\\_INF\\_EID](#), [LC\\_MAJOR\\_VERSION](#), [LC\\_MINOR\\_VERSION](#), [LC\\_MISSION\\_REV](#), [LC\\_OperData](#), [LC](#)

C\_REVISION, LC\_SbInit(), and LC\_TableInit().

Referenced by LC\_AppMain().

Here is the call graph for this function:



**12.18.2.2 LC\_AppMain()** void LC\_AppMain ( void )

## CFS Limit Checker (LC) application entry point.

## Description

Limit Checker application entry point and main process loop.

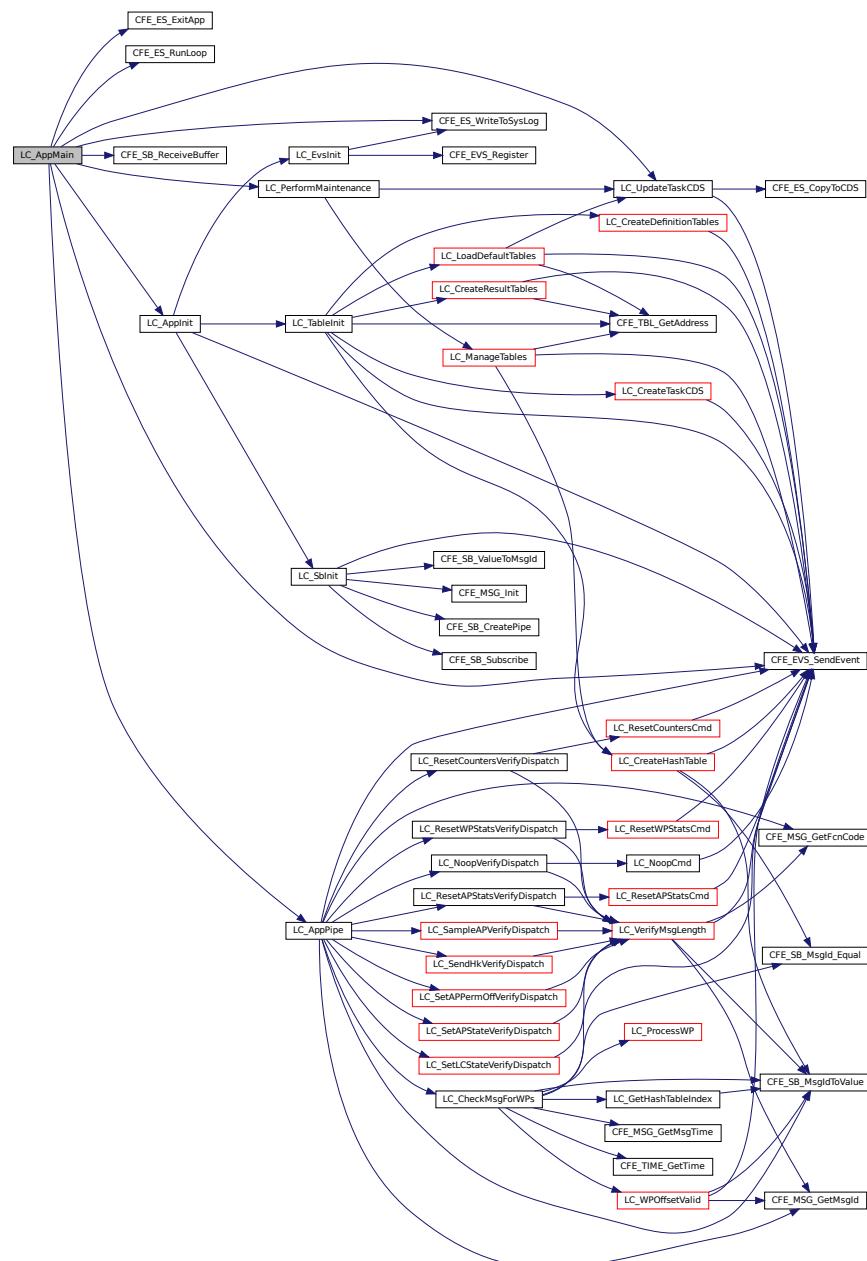
### Assumptions, External Events, and Notes:

None

Definition at line 56 of file lc\_app.c.

References LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_ExitApp(), CFE\_ES\_PerfLogEntry, CFE\_ES\_PerfLogExit, CFE\_ES\_RunLoop(), CFE\_ES\_RunStatus\_APP\_ERROR, CFE\_ES\_RunStatus\_APP\_RUN, CFE\_ES\_WriteToSysLog(), CFE\_EVS\_EventType\_CRITICAL, CFE\_EVS\_SendEvent(), CFE\_SB\_ReceiveBuffer(), CFE\_SB\_TIME\_OUT, CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HaveActiveCDS, LC\_AppData, LC\_AppInit(), LC\_APPMAIN, \_PERF\_ID, LC\_AppPipe(), LC\_CDS\_SAVED, LC\_OperData, LC\_PerformMaintenance(), LC\_SB\_TIMEOUT, LC\_TA\_SK\_EXIT\_EID, and LC\_UpdateTaskCDS().

Here is the call graph for this function:



```
12.18.2.3 LC_CreateDefinitionTables() CFE_Status_t LC_CreateDefinitionTables (
    void )
```

Create Watchpoint and Actionpoint Definition Tables.

#### Description

This function creates the loadable definition tables used by the LC application.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

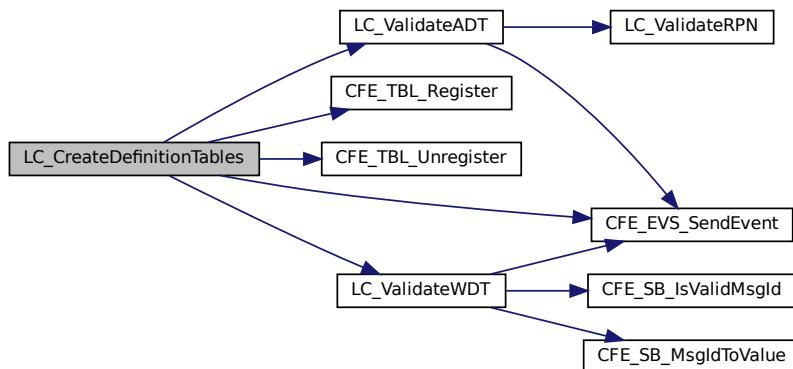
[LC\\_TableInit](#)

Definition at line 577 of file lc\_app.c.

References LC\_OperData\_t::ADTHandle, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_INFO\_RECOVERED\_TBL, CFE\_TBL\_OPT\_CRITICAL, CFE\_TBL\_OPT\_DEFAULT, CFE\_TBL\_Register(), CFE\_TBL\_Unregister(), LC\_OperData\_t::HaveActiveCDS, LC\_ADT\_CRITICAL\_TBL, LC\_ADT\_NOT\_CRITICAL, LC\_ADT\_REGISTER\_CRIT\_ERR\_EID, LC\_ADT\_REGISTER\_ERR\_EID, LC\_ADT\_TABLENAME, LC\_ADT\_TBL\_RESTORED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ValidateADT(), LC\_ValidateWDT(), LC\_WDT\_CRITICAL\_TBL, LC\_WDT\_NOT\_CRITICAL, LC\_WDT\_REGISTER\_CRIT\_ERR\_EID, LC\_WDT\_REGISTER\_ERR\_EID, LC\_WDT\_REREGISTER\_ERR\_EID, LC\_WDT\_TABLENAME, LC\_WDT\_TBL\_RESTORED, LC\_OperData\_t::TableResults, and LC\_OperData\_t::WDTHandle.

Referenced by LC\_TableInit().

Here is the call graph for this function:



**12.18.2.4 LC\_CreateResultTables()** [CFE\\_Status\\_t](#) LC\_CreateResultTables ( void )

Create Watchpoint and Actionpoint Result Tables.

#### Description

This function creates the dump only result tables used by the LC application.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [CFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

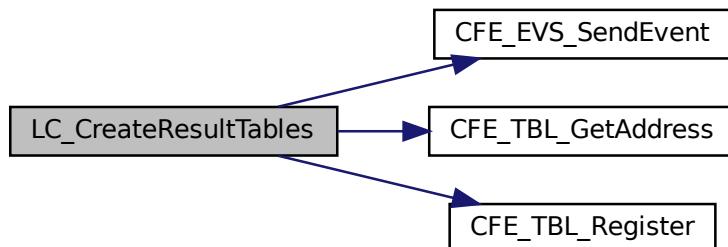
[LC\\_TableInit](#)

Definition at line 502 of file lc\_app.c.

References LC\_OperData\_t::ARTHandle, LC\_OperData\_t::ARTP, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_GetAddress(), CFE\_TBL\_OPT\_DUMP\_ONLY, CFE\_TBL\_OPT\_SNGL\_BUFFER, CFE\_TBL\_Register(), LC\_ART\_GETADDR\_ERR\_EID, LC\_ART\_REGISTER\_ERR\_EID, LC\_ART\_TABLENAMES, LC\_ART\_TBL\_CREATED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_WRT\_GETADDR\_ERR\_EID, LC\_WRT\_REGISTER\_ERR\_EID, LC\_WRT\_TABLENAME, LC\_WRT\_TBL\_CREATED, LC\_OperData\_t::TableResults, LC\_OperData\_t::WRTHandle, and LC\_OperData\_t::WRTPtr.

Referenced by [LC\\_TableInit\(\)](#).

Here is the call graph for this function:



```
12.18.2.5 LC_CreateTaskCDS() CFE_Status_t LC_CreateTaskCDS (
    void )
```

Create Result Table and Application Data CDS Areas.

#### Description

This function creates the loadable definition tables used by the LC application.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

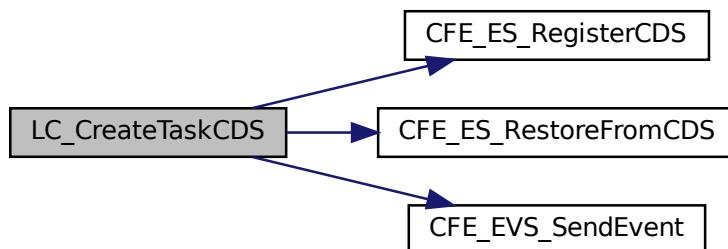
[LC\\_TableInit](#)

Definition at line 733 of file lc\_app.c.

References LC\_OperData\_t::AppDataCDSHandle, LC\_OperData\_t::ARTDataCDSHandle, LC\_OperData\_t::ARTPTr, LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_CDS\_ALREADY\_EXISTS, CFE\_ES\_RegisterCDS(), CFE\_ES\_RestoreFromCDS(), CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, LC\_AppData\_t::CurrentLCState, LC\_APP\_CDS\_CREATED, LC\_APP\_CDS\_REGISTER\_ERR\_EID, LC\_APP\_CDS\_RESTORED, LC\_AppData, LC\_APPDATA\_CDSNAME, LC\_ART\_CDS\_CREATED, LC\_ART\_CDS\_REGISTER\_ERR\_EID, LC\_ART\_CDS\_RESTORED, LC\_ART\_CDSNAME, LC\_CDS\_SAVED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_STATE\_WHEN\_CDS\_RESTORED, LC\_WRT\_CDS\_CREATED, LC\_WRT\_CDS\_REGISTER\_ERR\_EID, LC\_WRT\_CDS\_RESTORED, LC\_WRT\_CDSNAME, LC\_OperData\_t::TableResults, LC\_OperData\_t::WRTDataCDSHandle, and LC\_OperData\_t::WRTPtr.

Referenced by [LC\\_TableInit\(\)](#).

Here is the call graph for this function:



**12.18.2.6 LC\_EvsInit()** `CFE_Status_t` `LC_EvsInit (`  
    `void )`

Initialize Event Services.

#### Description

This function performs the steps required to setup cFE Events Services for use by the LC application

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

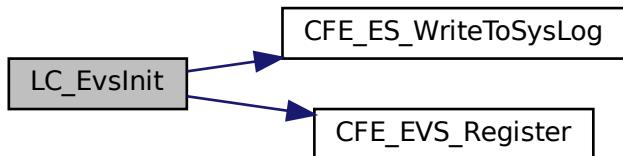
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 231 of file lc\_app.c.

References `CFE_ES_WriteToSysLog()`, `CFE_EVS_EventFilter_BINARY`, `CFE_EVS_Register()`, and `CFE_SUCCESS`.

Referenced by `LC_AppInit()`.

Here is the call graph for this function:



**12.18.2.7 LC\_LoadDefaultTables()** `CFE_Status_t` `LC_LoadDefaultTables (`  
    `void )`

Load Default Table Values.

#### Description

This function loads the definition tables from table files named in the LC platform configuration header file. The function also initializes the contents of the dump only results tables and initializes the global application data structure.

#### Assumptions, External Events, and Notes:

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

**See also**

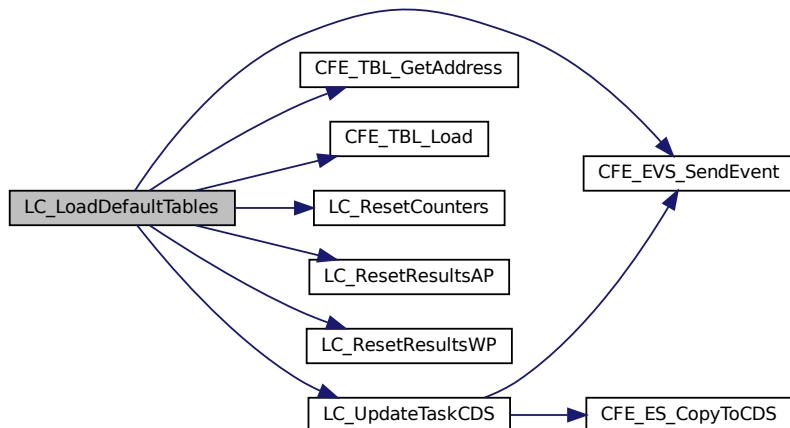
[LC\\_TableInit](#)

Definition at line 860 of file lc\_app.c.

References LC\_OperData\_t::ADTHandle, LC\_OperData\_t::ADTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_GetAddress(), CFE\_TBL\_INFO\_UPDATED, CFE\_TBL\_Load(), CFE\_TBL\_L\_SRC\_FILE, LC\_AppData\_t::CurrentLCState, LC\_OperData\_t::HaveActiveCDS, LC\_ADT\_DEFAULT\_TBL, LC\_ADT\_FILENAME, LC\_ADT\_GETADDR\_ERR\_EID, LC\_ADT\_LOAD\_ERR\_EID, LC\_APP\_DEFAULT\_DATA, LC\_AppData, LC\_ART\_DEFAULT\_DATA, LC\_CDS\_UPDATED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ResetCounters(), LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_STATE\_POWER\_ON\_RESET, LC\_UpdateTaskCDS(), LC\_WDT\_DEFAULT\_TBL, LC\_WDT\_FILENAME, LC\_WDT\_GETADDR\_ERR\_EID, LC\_WDT\_LOAD\_ERR\_EID, LC\_WRT\_DEFAULT\_DATA, LC\_OperData\_t::TableResults, LC\_OperData\_t::WDTHandle, and LC\_OperData\_t::WDTPtr.

Referenced by [LC\\_TableInit\(\)](#).

Here is the call graph for this function:



### 12.18.2.8 `LC_SbInit()`

```
CFE_Status_t LC_SbInit (
    void
)
```

Initialize Software Bus.

**Description**

This function performs the steps required to setup the cFE software bus for use by the LC application

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

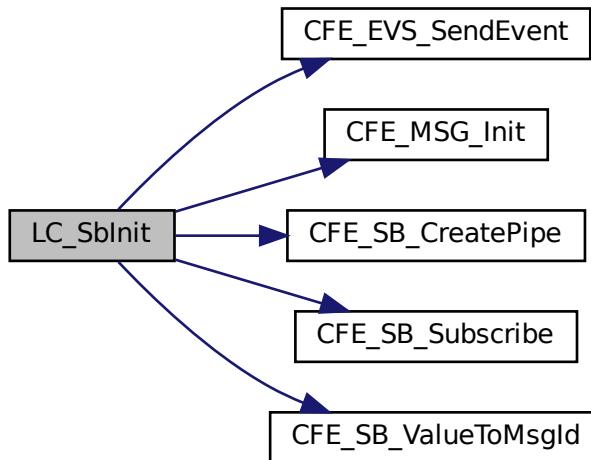
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 259 of file lc\_app.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_Init(), CFE\_SB\_CreatePipe(), CFE\_SB\_Subscribe(), CFE\_SB\_ValueToMsgId(), CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HkPacket, LC\_CMD\_MID, LC\_CR\_PIPE\_ERR\_EID, LC\_HK\_TLM\_MID, LC\_OperData, LC PIPE\_DEPTH, LC\_PIPE\_NAME, LC\_C\_SAMPLE\_AP\_MID, LC\_SEND\_HK\_MID, LC\_SUB\_GND\_CMD\_ERR\_EID, LC\_SUB\_HK\_REQ\_ERR\_EID, LC\_SUBLB\_SAMPLE\_CMD\_ERR\_EID, and LC\_HkPacket\_t::TelemetryHeader.

Referenced by LC\_AppInit().

Here is the call graph for this function:



### 12.18.2.9 `LC_TableInit()`

```
CFE_Status_t LC_TableInit (
    void )
```

Initialize Table Services (includes CDS)

**Description**

This function creates the tables used by the LC application and establishes the initial table values based on the configuration setting that enables the use of Critical Data Store (CDS) and the availability of stored data to restore.

Assumptions, External Events, and Notes:

None

Returns

Execution status, see [cFE Return Code Defines](#)

Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

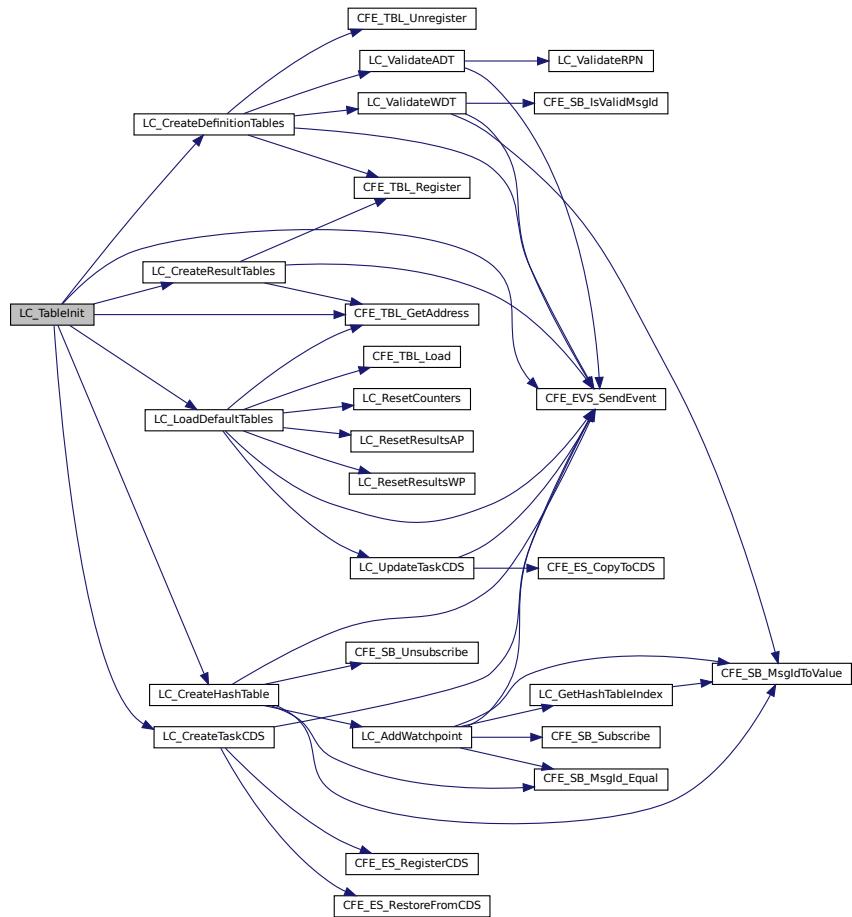
See also

[LC\\_SAVE\\_TO\\_CDS](#)

Definition at line 329 of file lc\_app.c.

References `LC_OperData_t::ADTHandle`, `LC_OperData_t::ADTPtr`, `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `CFE_SUCCESS`, `CFE_TBL_GetAddress()`, `CFE_TBL_INFO_UPDATED`, `LC_OperData_t::HaveActiveCDS`, `LC_ADT_GETADDR_ERR_EID`, `LC_ADT_TBL_RESTORED`, `LC_APP_CDS_RESTORED`, `LC_ART_CDS_RESTORED`, `LC_CDS_CREATED`, `LC_CDS_DISABLED_INF_EID`, `LC_CDS_ENABLED`, `LC_CDS_RESTORED`, `LC_CDS_RESTORED_INF_EID`, `LC_CDS_UPDATED`, `LC_CDS_UPDAT_ED_INF_EID`, `LC_CreateDefinitionTables()`, `LC_CreateHashTable()`, `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_LoadDefaultTables()`, `LC_OperData`, `LC_WDT_GETADDR_ERR_EID`, `LC_WDT_TBL_RESTORED`, `LC_WRT_CDS_RESTORED`, `LC_OperData_t::TableResults`, `LC_OperData_t::WDTHandle`, and `LC_OperData_t::WDTPtr`. Referenced by `LC_AppInit()`.

Here is the call graph for this function:



### 12.18.3 Variable Documentation

#### 12.18.3.1 LC\_AppData `LC_AppData_t` `LC_AppData`

Application data.

Definition at line 48 of file `lc_app.c`.

Referenced by `LC_AppInit()`, `LC_AppMain()`, `LC_AppPipe()`, `LC_CheckMsgForWPs()`, `LC_CreateTaskCDS()`, `LC_LoadDefaultTables()`, `LC_NoopCmd()`, `LC_ResetAPStatsCmd()`, `LC_ResetCounters()`, `LC_ResetWPStatsCmd()`, `LC_SampleAPReq()`, `LC_SampleSingleAP()`, `LC_SendHkCmd()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, `LC_SetLCStateCmd()`, `LC_UpdateTaskCDS()`, and `LC_VerifyMsgLength()`.

#### 12.18.3.2 LC\_OperData `LC_OperData_t` `LC_OperData`

Operational data.

Definition at line 47 of file `lc_app.c`.

Referenced by `LC_AddWatchpoint()`, `LC_AppInit()`, `LC_AppMain()`, `LC_CheckMsgForWPs()`, `LC_CreateDefinitionTables()`, `LC_CreateHashTable()`, `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_EvaluateRPN()`, `LC_Float`,

Compare(), LC\_GetSizedWPData(), LC\_LoadDefaultTables(), LC\_ManageTables(), LC\_OperatorCompare(), LC\_PerformMaintenance(), LC\_ProcessWP(), LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_SampleAPReq(), LC\_SampleAPs(), LC\_SampleSingleAP(), LC\_SbInit(), LC\_SendHkCmd(), LC\_SetAPPermOffCmd(), LC\_SetAPStateCmd(), LC\_SignedCompare(), LC\_TableInit(), LC\_UnsignedCompare(), LC\_UpdateTaskCDS(), and LC\_WPOffsetValid().

## 12.19 apps/lc/fsw/src/lc\_app.h File Reference

```
#include "cfe.h"
#include "lc_msg.h"
#include "lc_tbl.h"
```

### Data Structures

- struct [LC\\_WListTag](#)  
*Linked list of Watchpoints that reference the same MessageID.*
- struct [LC\\_MListTag](#)  
*Linked list of MessageID's with same hash function result.*
- struct [LC\\_OperData\\_t](#)  
*LC Operational Data Structure.*
- struct [LC\\_AppData\\_t](#)  
*LC Application Data Structure.*

### Macros

- #define [LC\\_SB\\_TIMEOUT](#) 1000  
*Wakeup for LC.*

### LC CDS Buffer Strings

- #define [LC\\_WRT\\_CDSNAME](#) "LC\_CDS\_WRT"
- #define [LC\\_ART\\_CDSNAME](#) "LC\_CDS\_ART"
- #define [LC\\_APPDATA\\_CDSNAME](#) "LC\_CDS\_AppData"

### LC Command Pipe Parameters

- #define [LC\\_PIPE\\_NAME](#) "LC\_CMD\_PIPE"

### Table and CDS Initialization Results

- #define [LC\\_CDS\\_ENABLED](#) 0x00000001
- #define [LC\\_CDS\\_CREATED](#) 0x00000002
- #define [LC\\_CDS\\_RESTORED](#) 0x00000004
- #define [LC\\_CDS\\_UPDATED](#) 0x00000008
- #define [LC\\_WRT\\_DEFAULT\\_DATA](#) 0x00000010
- #define [LC\\_WRT\\_CDS\\_CREATED](#) 0x00000020
- #define [LC\\_WRT\\_CDS\\_RESTORED](#) 0x00000040
- #define [LC\\_WRT\\_TBL\\_CREATED](#) 0x00000080
- #define [LC\\_ART\\_DEFAULT\\_DATA](#) 0x00000100
- #define [LC\\_ART\\_CDS\\_CREATED](#) 0x00000200
- #define [LC\\_ART\\_CDS\\_RESTORED](#) 0x00000400
- #define [LC\\_ART\\_TBL\\_CREATED](#) 0x00000800
- #define [LC\\_APP\\_DEFAULT\\_DATA](#) 0x00001000
- #define [LC\\_APP\\_CDS\\_CREATED](#) 0x00002000
- #define [LC\\_APP\\_CDS\\_RESTORED](#) 0x00004000

- #define LC\_WDT\_DEFAULT\_TBL 0x00010000
- #define LC\_WDT\_CRITICAL\_TBL 0x00020000
- #define LC\_WDT\_TBL\_RESTORED 0x00040000
- #define LC\_WDT\_NOT\_CRITICAL 0x00080000
- #define LC\_ADT\_DEFAULT\_TBL 0x00100000
- #define LC\_ADT\_CRITICAL\_TBL 0x00200000
- #define LC\_ADT\_TBL\_RESTORED 0x00400000
- #define LC\_ADT\_NOT\_CRITICAL 0x00800000

#### Hash table definitions - presumes MessageID as hash function input

- #define LC\_HASH\_TABLE\_ENTRIES 256  
*Hash table number of entries.*
- #define LC\_HASH\_TABLE\_MASK 0x00FF  
*Hash table mask.*

#### Typedefs

- typedef struct LC\_WListTag LC\_WatchPtList\_t  
*Linked list of Watchpoints that reference the same MessageID.*
- typedef struct LC\_MListTag LC\_MessageList\_t  
*Linked list of MessageID's with same hash function result.*

#### Functions

- void LC\_AppMain (void)  
*CFS Limit Checker (LC) application entry point.*
- CFE\_Status\_t LC\_AppInit (void)  
*Initialize the CFS Limit Checker (LC) application.*
- CFE\_Status\_t LC\_EvsInit (void)  
*Initialize Event Services.*
- CFE\_Status\_t LC\_SbInit (void)  
*Initialize Software Bus.*
- CFE\_Status\_t LC\_TableInit (void)  
*Initialize Table Services (includes CDS)*
- CFE\_Status\_t LC\_CreateResultTables (void)  
*Create Watchpoint and Actionpoint Result Tables.*
- CFE\_Status\_t LC\_CreateDefinitionTables (void)  
*Create Watchpoint and Actionpoint Definition Tables.*
- CFE\_Status\_t LC\_CreateTaskCDS (void)  
*Create Result Table and Application Data CDS Areas.*
- CFE\_Status\_t LC\_LoadDefaultTables (void)  
*Load Default Table Values.*

#### Variables

- LC\_OperData\_t LC\_OperData  
*Operational data.*
- LC\_AppData\_t LC\_AppData  
*Application data.*

### 12.19.1 Detailed Description

Unit specification for the Core Flight System (CFS) Limit Checker (LC) Application.

### 12.19.2 Macro Definition Documentation

#### 12.19.2.1 LC\_ADT\_CRITICAL\_TBL #define LC\_ADT\_CRITICAL\_TBL 0x00200000

Definition at line 84 of file lc\_app.h.

#### 12.19.2.2 LC\_ADT\_DEFAULT\_TBL #define LC\_ADT\_DEFAULT\_TBL 0x00100000

Definition at line 83 of file lc\_app.h.

#### 12.19.2.3 LC\_ADT\_NOT\_CRITICAL #define LC\_ADT\_NOT\_CRITICAL 0x00800000

Definition at line 86 of file lc\_app.h.

#### 12.19.2.4 LC\_ADT\_TBL\_RESTORED #define LC\_ADT\_TBL\_RESTORED 0x00400000

Definition at line 85 of file lc\_app.h.

#### 12.19.2.5 LC\_APP\_CDS\_CREATED #define LC\_APP\_CDS\_CREATED 0x00002000

Definition at line 75 of file lc\_app.h.

#### 12.19.2.6 LC\_APP\_CDS\_RESTORED #define LC\_APP\_CDS\_RESTORED 0x00004000

Definition at line 76 of file lc\_app.h.

#### 12.19.2.7 LC\_APP\_DEFAULT\_DATA #define LC\_APP\_DEFAULT\_DATA 0x00001000

Definition at line 74 of file lc\_app.h.

#### 12.19.2.8 LC\_APPDATA\_CDSNAME #define LC\_APPDATA\_CDSNAME "LC\_CDS\_AppData"

Definition at line 45 of file lc\_app.h.

#### 12.19.2.9 LC\_ART\_CDS\_CREATED #define LC\_ART\_CDS\_CREATED 0x00000200

Definition at line 70 of file lc\_app.h.

#### 12.19.2.10 LC\_ART\_CDS\_RESTORED #define LC\_ART\_CDS\_RESTORED 0x00000400

Definition at line 71 of file lc\_app.h.

#### 12.19.2.11 LC\_ART\_CDSNAME #define LC\_ART\_CDSNAME "LC\_CDS\_ART"

Definition at line 44 of file lc\_app.h.

**12.19.2.12 LC\_ART\_DEFAULT\_DATA** #define LC\_ART\_DEFAULT\_DATA 0x00000100  
Definition at line 69 of file lc\_app.h.

**12.19.2.13 LC\_ART\_TBL\_CREATED** #define LC\_ART\_TBL\_CREATED 0x00000800  
Definition at line 72 of file lc\_app.h.

**12.19.2.14 LC\_CDS\_CREATED** #define LC\_CDS\_CREATED 0x00000002  
Definition at line 60 of file lc\_app.h.

**12.19.2.15 LC\_CDS\_ENABLED** #define LC\_CDS\_ENABLED 0x00000001  
Definition at line 59 of file lc\_app.h.

**12.19.2.16 LC\_CDS\_RESTORED** #define LC\_CDS\_RESTORED 0x00000004  
Definition at line 61 of file lc\_app.h.

**12.19.2.17 LC\_CDS\_UPDATED** #define LC\_CDS\_UPDATED 0x00000008  
Definition at line 62 of file lc\_app.h.

**12.19.2.18 LC\_HASH\_TABLE\_ENTRIES** #define LC\_HASH\_TABLE\_ENTRIES 256  
Hash table number of entries.  
Definition at line 102 of file lc\_app.h.

**12.19.2.19 LC\_HASH\_TABLE\_MASK** #define LC\_HASH\_TABLE\_MASK 0x00FF  
Hash table mask.  
Definition at line 103 of file lc\_app.h.

**12.19.2.20 LC\_PIPE\_NAME** #define LC\_PIPE\_NAME "LC\_CMD\_PIPE"  
Definition at line 52 of file lc\_app.h.

**12.19.2.21 LC\_SB\_TIMEOUT** #define LC\_SB\_TIMEOUT 1000  
Wakeup for LC.

#### Description

Wakes up LC every 1 second for routine maintenance whether a message was received or not.

Definition at line 96 of file lc\_app.h.

**12.19.2.22 LC\_WDT\_CRITICAL\_TBL** #define LC\_WDT\_CRITICAL\_TBL 0x00020000  
Definition at line 79 of file lc\_app.h.

**12.19.2.23 LC\_WDT\_DEFAULT\_TBL** #define LC\_WDT\_DEFAULT\_TBL 0x00010000  
Definition at line 78 of file lc\_app.h.

**12.19.2.24 LC\_WDT\_NOT\_CRITICAL** #define LC\_WDT\_NOT\_CRITICAL 0x00080000  
Definition at line 81 of file lc\_app.h.

**12.19.2.25 LC\_WDT\_TBL\_RESTORED** #define LC\_WDT\_TBL\_RESTORED 0x00040000  
Definition at line 80 of file lc\_app.h.

**12.19.2.26 LC\_WRT\_CDS\_CREATED** #define LC\_WRT\_CDS\_CREATED 0x00000020  
Definition at line 65 of file lc\_app.h.

**12.19.2.27 LC\_WRT\_CDS\_RESTORED** #define LC\_WRT\_CDS\_RESTORED 0x00000040  
Definition at line 66 of file lc\_app.h.

**12.19.2.28 LC\_WRT\_CDSNAME** #define LC\_WRT\_CDSNAME "LC\_CDS\_WRT"  
Definition at line 43 of file lc\_app.h.

**12.19.2.29 LC\_WRT\_DEFAULT\_DATA** #define LC\_WRT\_DEFAULT\_DATA 0x00000010  
Definition at line 64 of file lc\_app.h.

**12.19.2.30 LC\_WRT\_TBL\_CREATED** #define LC\_WRT\_TBL\_CREATED 0x00000080  
Definition at line 67 of file lc\_app.h.

### 12.19.3 Typedef Documentation

**12.19.3.1 LC\_MessageList\_t** typedef struct [LC\\_MListTag](#) LC\_MessageList\_t  
Linked list of MessageID's with same hash function result.

**12.19.3.2 LC\_WatchPtList\_t** typedef struct [LC\\_WListTag](#) LC\_WatchPtList\_t  
Linked list of Watchpoints that reference the same MessageID.

### 12.19.4 Function Documentation

**12.19.4.1 LC\_AppInit()** [CFE\\_Status\\_t](#) LC\_AppInit (

    void )

Initialize the CFS Limit Checker (LC) application.

**Description**

Limit Checker application initialization routine. This function performs all the required startup steps to initialize (or restore from CDS) LC data structures and get the application registered with the cFE services so it can begin to receive command messages.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

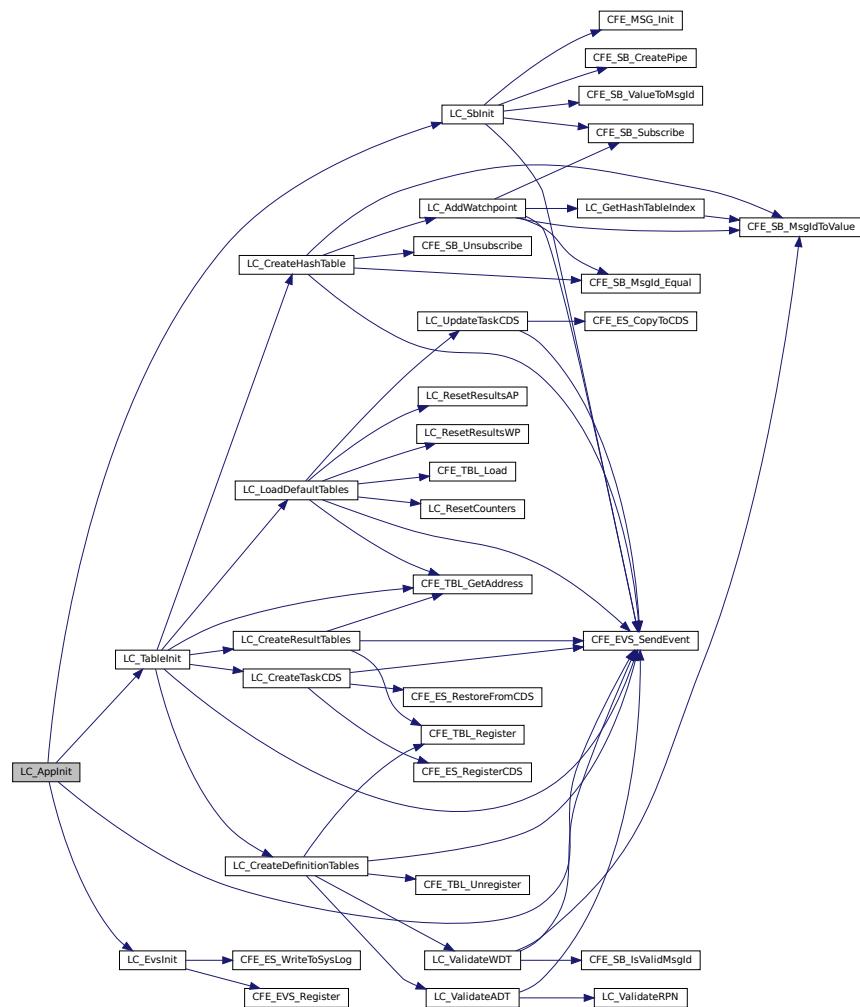
<a href="#">CFE_SUCCESS</a>	Successful execution.
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Definition at line 181 of file lc\_app.c.

References [CFE\\_EVS\\_EventType\\_INFORMATION](#), [CFE\\_EVS\\_SendEvent\(\)](#), [CFE\\_SUCCESS](#), [LC\\_AppData](#), [LC\\_EvsInit\(\)](#), [LC\\_INIT\\_INF\\_EID](#), [LC\\_MAJOR\\_VERSION](#), [LC\\_MINOR\\_VERSION](#), [LC\\_MISSION\\_REV](#), [LC\\_OperData](#), [LC\\_C\\_REVISION](#), [LC\\_SblInit\(\)](#), and [LC\\_TableInit\(\)](#).

Referenced by [LC\\_AppMain\(\)](#).

Here is the call graph for this function:



#### 12.19.4.2 LC\_AppMain()

```
void LC_AppMain (
    void )
```

CFS Limit Checker (LC) application entry point.

##### Description

Limit Checker application entry point and main process loop.

##### Assumptions, External Events, and Notes:

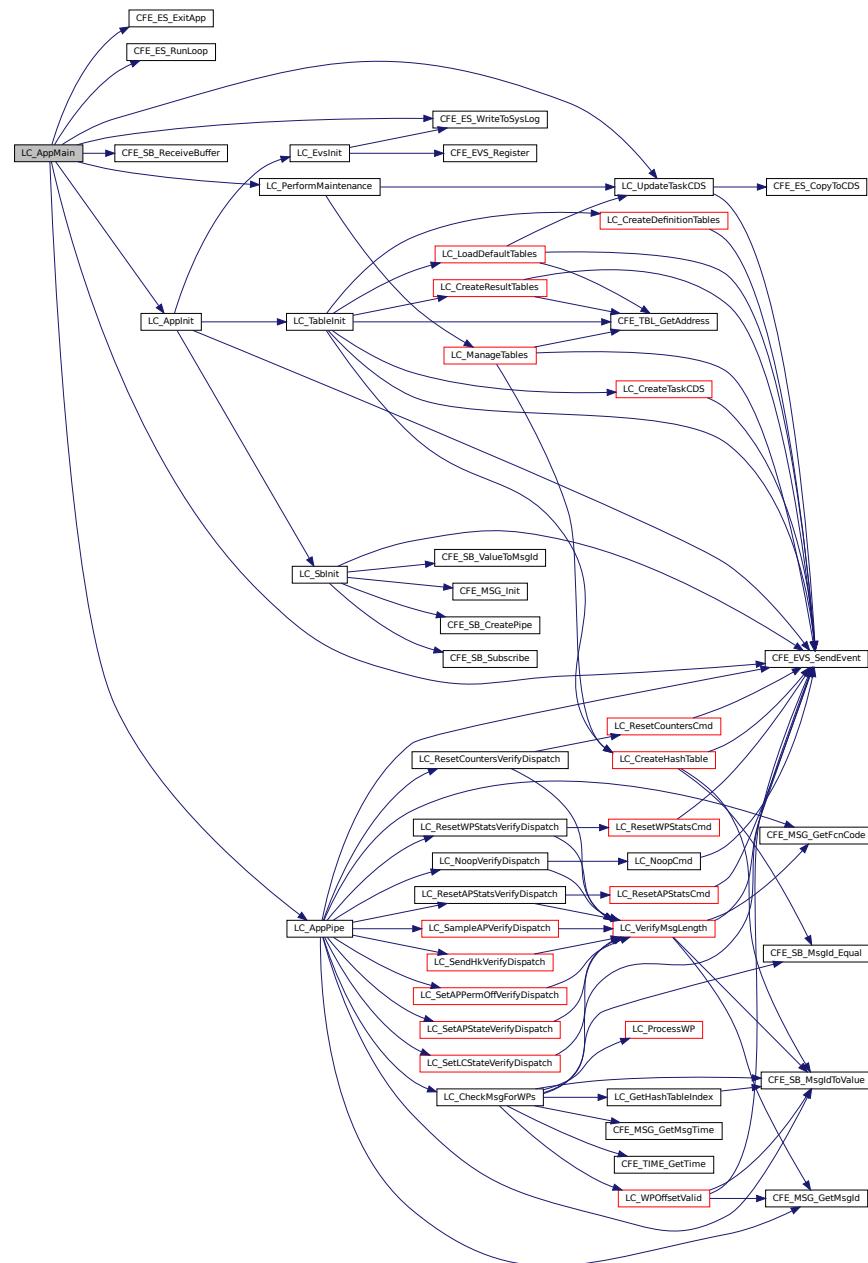
None

Definition at line 56 of file lc\_app.c.

References LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_ExitApp(), CFE\_ES\_PerfLogEntry, CFE\_ES\_PerfLogExit, CFE\_ES\_RunLoop(), CFE\_ES\_RunStatus\_APP\_ERROR, CFE\_ES\_RunStatus\_APP\_RUN, CFE\_ES\_WriteToSysLog(),

CFE\_EVS\_EventType\_CRITICAL, CFE\_EVS\_SendEvent(), CFE\_SB\_ReceiveBuffer(), CFE\_SB\_TIME\_OUT, CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HaveActiveCDS, LC\_AppData, LC\_AppInit(), LC\_APPMAIN, \_PERF\_ID, LC\_AppPipe(), LC\_CDS\_SAVED, LC\_OperData, LC\_PerformMaintenance(), LC\_SB\_TIMEOUT, LC\_TA, SK\_EXIT\_EID, and LC\_UpdateTaskCDS().

Here is the call graph for this function:



#### 12.19.4.3 LC\_CreateDefinitionTables()

```
CFE_Status_t LC_CreateDefinitionTables (
    void )
```

Create Watchpoint and Actionpoint Definition Tables.

#### Description

This function creates the loadable definition tables used by the LC application.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

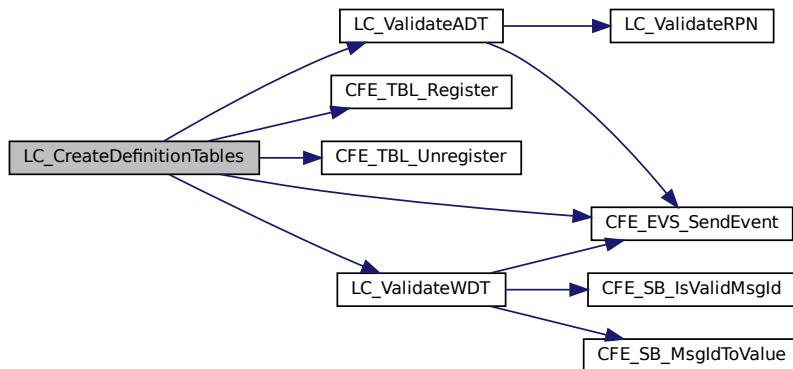
[LC\\_TableInit](#)

Definition at line 577 of file lc\_app.c.

References LC\_OperData\_t::ADTHandle, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_INFO\_RECOVERED\_TBL, CFE\_TBL\_OPT\_CRITICAL, CFE\_TBL\_OPT\_DEFAULT, CFE\_TBL\_Register(), CFE\_TBL\_Unregister(), LC\_OperData\_t::HaveActiveCDS, LC\_ADT\_CRITICAL\_TBL, LC\_ADT\_NOT\_CRITICAL, LC\_ADT\_REGISTER\_CRIT\_ERR\_EID, LC\_ADT\_REGISTER\_ERR\_EID, LC\_ADT\_TABLENAME, LC\_ADT\_TBL\_RESETORED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ValidateADT(), LC\_ValidateWDT(), LC\_WDT\_CRITICAL\_TBL, LC\_WDT\_NOT\_CRITICAL, LC\_WDT\_REGISTER\_CRIT\_ERR\_EID, LC\_WDT\_REGISTER\_ERR\_EID, LC\_WDT\_REGISTER\_ERR\_EID, LC\_WDT\_REREGISTER\_ERR\_EID, LC\_WDT\_TABLENAME, LC\_WDT\_TBL\_RESETORED, LC\_OperData\_t::TableResults, and LC\_OperData\_t::WDTHandle.

Referenced by [LC\\_TableInit\(\)](#).

Here is the call graph for this function:



**12.19.4.4 LC\_CreateResultTables()** `CFE_Status_t` `LC_CreateResultTables (`  
    `void )`

Create Watchpoint and Actionpoint Result Tables.

#### Description

This function creates the dump only result tables used by the LC application.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

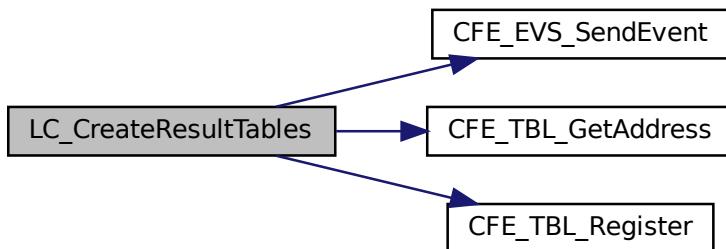
#### See also

[LC\\_TableInit](#)

Definition at line 502 of file lc\_app.c.

References `LC_OperData_t::ARTHandle`, `LC_OperData_t::ARTPtr`, `CFE_EVS_EventType_ERROR`, `CFE_EVS_SendEvent()`, `CFE_SUCCESS`, `CFE_TBL_GetAddress()`, `CFE_TBL_OPT_DUMP_ONLY`, `CFE_TBL_OPT_SNGL_BUFFER`, `CFE_TBL_Register()`, `LC_ART_GETADDR_ERR_EID`, `LC_ART_REGISTER_ERR_EID`, `LC_ART_TABLENAME`, `LC_ART_TBL_CREATED`, `LC_MAX_ACTIONPOINTS`, `LC_MAX_WATCHPOINTS`, `LC_OperData`, `LC_WRT_GETADDR_ERR_EID`, `LC_WRT_REGISTER_ERR_EID`, `LC_WRT_TABLENAME`, `LC_WRT_TBL_CREATED`, `LC_OperData_t::TableResults`, `LC_OperData_t::WRTHandle`, and `LC_OperData_t::WRTPtr`.  
Referenced by `LC_TableInit()`.

Here is the call graph for this function:



**12.19.4.5 LC\_CreateTaskCDS()** `CFE_Status_t` `LC_CreateTaskCDS (`  
    `void )`

Create Result Table and Application Data CDS Areas.

**Description**

This function creates the loadable definition tables used by the LC application.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [CFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

**See also**

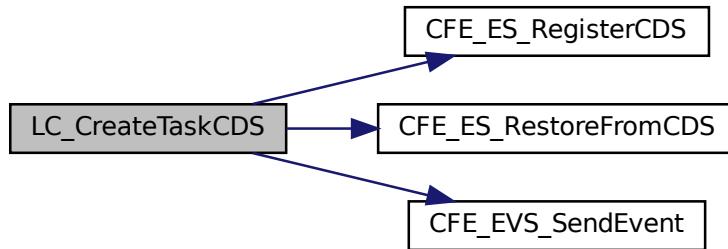
[LC\\_TableInit](#)

Definition at line 733 of file lc\_app.c.

References LC\_OperData\_t::AppDataCDSHandle, LC\_OperData\_t::ARTDataCDSHandle, LC\_OperData\_t::ARTPtr, LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_CDS\_ALREADY\_EXISTS, CFE\_ES\_RegisterCDS(), CFE\_ES\_RestoreFromCDS(), CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, LC\_AppData\_t::CurrentLCState, LC\_APP\_CDS\_CREATED, LC\_APP\_CDS\_REGISTER\_ERR\_EID, LC\_APP\_CDS\_RESTORED, LC\_AppData, LC\_APPDATA\_CDSNAME, LC\_ART\_CDS\_CREATED, LC\_ART\_CDS\_REGISTER\_ERR\_EID, LC\_ART\_CDS\_RESTORED, LC\_ART\_CDSNAME, LC\_CDS\_SAVED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_STATE\_WHEN\_CDS\_RESTORED, LC\_WRT\_CDS\_CREATED, LC\_WRT\_CDS\_REGISTER\_ERR\_EID, LC\_WRT\_CDS\_RESTORED, LC\_WRT\_CDSNAME, LC\_OperData\_t::TableResults, LC\_OperData\_t::WRTDataCDSHandle, and LC\_OperData\_t::WRTPrt.

Referenced by LC\_TableInit().

Here is the call graph for this function:



#### 12.19.4.6 LC\_EvsInit() [CFE\\_Status\\_t](#) LC\_EvsInit ( void )

Initialize Event Services.

**Description**

This function performs the steps required to setup cFE Events Services for use by the LC application

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

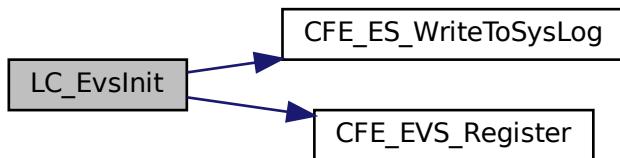
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 231 of file lc\_app.c.

References CFE\_ES\_WriteToSysLog(), CFE\_EVS\_EventFilter\_BINARY, CFE\_EVS\_Register(), and CFE\_SUCCESS.

Referenced by LC\_AppInit().

Here is the call graph for this function:

**12.19.4.7 LC\_LoadDefaultTables()** [CFE\\_Status\\_t](#) LC\_LoadDefaultTables ( void )

Load Default Table Values.

**Description**

This function loads the definition tables from table files named in the LC platform configuration header file. The function also initializes the contents of the dump only results tables and initializes the global application data structure.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

## Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

## See also

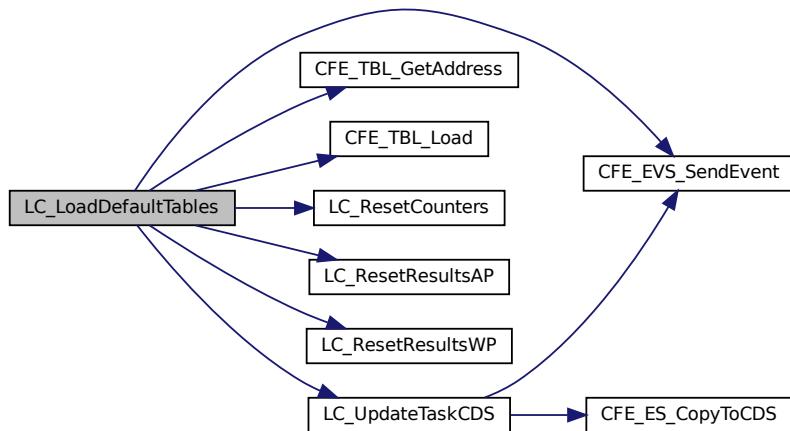
[LC\\_TableInit](#)

Definition at line 860 of file lc\_app.c.

References LC\_OperData\_t::ADTHandle, LC\_OperData\_t::ADTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_GetAddress(), CFE\_TBL\_INFO\_UPDATED, CFE\_TBL\_Load(), CFE\_TBL\_L\_SRC\_FILE, LC\_AppData\_t::CurrentLCState, LC\_OperData\_t::HaveActiveCDS, LC\_ADT\_DEFAULT\_TBL, LC\_ADT\_FILENAME, LC\_ADT\_GETADDR\_ERR\_EID, LC\_ADT\_LOAD\_ERR\_EID, LC\_APP\_DEFAULT\_DATA, LC\_AppData, LC\_ART\_DEFAULT\_DATA, LC\_CDS\_UPDATED, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ResetCounters(), LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_STATE\_POWER\_ON\_RESET, LC\_UpdateTaskCDS(), LC\_WDT\_DEFAULT\_TBL, LC\_WDT\_FILENAME, LC\_WDT\_GETADDR\_ERR\_EID, LC\_WDT\_LOAD\_ERR\_EID, LC\_WRT\_DEFAULT\_DATA, LC\_OperData\_t::TableResults, LC\_OperData\_t::WDTHandle, and LC\_OperData\_t::WDTPtr.

Referenced by LC\_TableInit().

Here is the call graph for this function:



#### 12.19.4.8 LC\_SbInit() [CFE\\_Status\\_t](#) LC\_SbInit ( void )

Initialize Software Bus.

## Description

This function performs the steps required to setup the cFE software bus for use by the LC application

## Assumptions, External Events, and Notes:

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

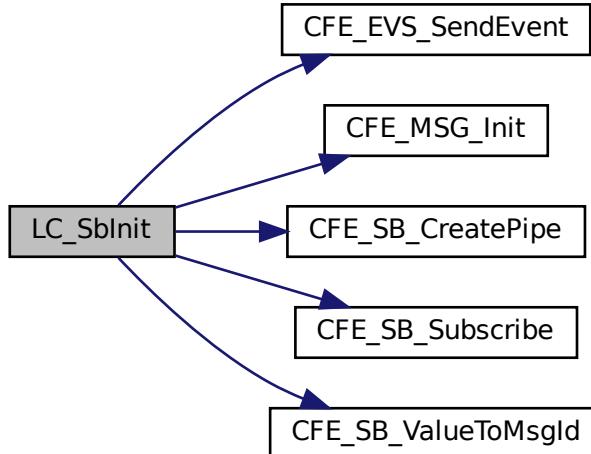
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 259 of file lc\_app.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_Init(), CFE\_SB\_CreatePipe(), CFE\_SSB\_Subscribe(), CFE\_SB\_ValueToMsgId(), CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HkPacket, LC\_CMD\_MID, LC\_CR\_PIPE\_ERR\_EID, LC\_HK\_TLM\_MID, LC\_OperData, LC PIPE\_DEPTH, LC\_PIPE\_NAME, LC\_C\_SAMPLE\_AP\_MID, LC\_SEND\_HK\_MID, LC\_SUB\_GND\_CMD\_ERR\_EID, LC\_SUB\_HK\_REQ\_ERR\_EID, LC\_SUBLB\_SAMPLE\_CMD\_ERR\_EID, and LC\_HkPacket\_t::TelemetryHeader.

Referenced by LC\_AppInit().

Here is the call graph for this function:



#### 12.19.4.9 LC\_TableInit() [CFE\\_Status\\_t](#) LC\_TableInit ( void )

Initialize Table Services (includes CDS)

**Description**

This function creates the tables used by the LC application and establishes the initial table values based on the configuration setting that enables the use of Critical Data Store (CDS) and the availability of stored data to restore.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

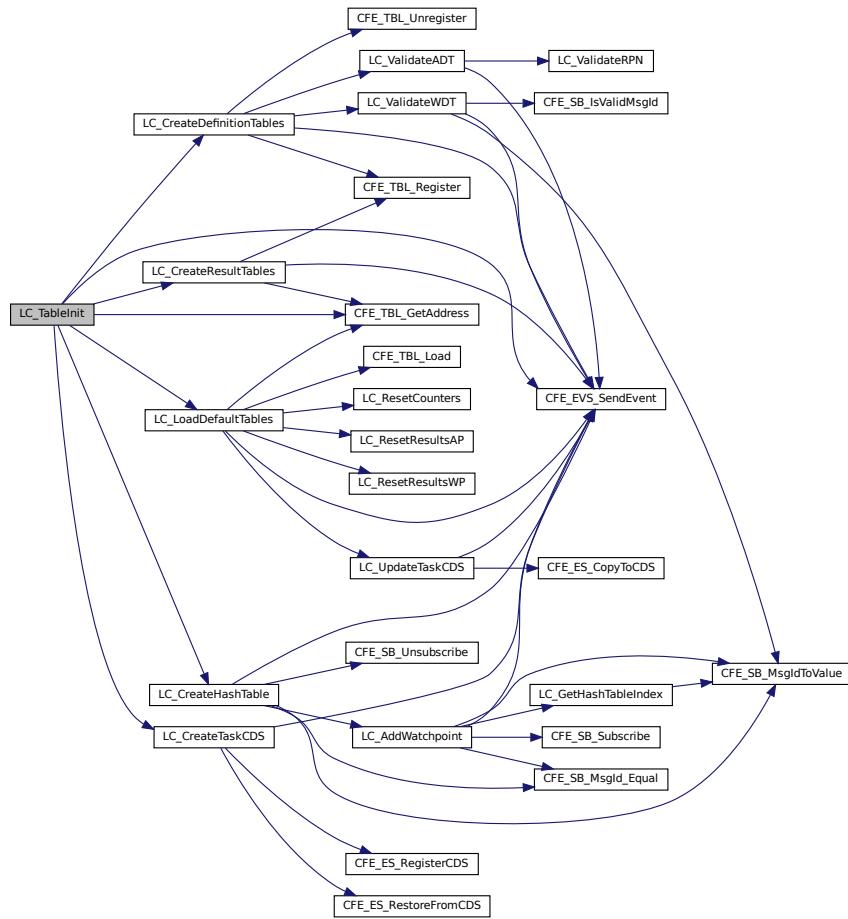
**See also**

[LC\\_SAVE\\_TO\\_CDS](#)

Definition at line 329 of file lc\_app.c.

References `LC_OperData_t::ADTHandle`, `LC_OperData_t::ADTPtr`, `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `CFE_SUCCESS`, `CFE_TBL_GetAddress()`, `CFE_TBL_INFO_UPDATED`, `LC_OperData_t::HaveActiveCDS`, `LC_ADT_GETADDR_ERR_EID`, `LC_ADT_TBL_RESTORED`, `LC_APP_CDS_RESTORED`, `LC_ART_CDS_RESTORED`, `LC_CDS_CREATED`, `LC_CDS_DISABLED_INF_EID`, `LC_CDS_ENABLED`, `LC_CDS_RESTORED`, `LC_CDS_RESTORED_INF_EID`, `LC_CDS_UPDATED`, `LC_CDS_UPDAT_ED_INF_EID`, `LC_CreateDefinitionTables()`, `LC_CreateHashTable()`, `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_LoadDefaultTables()`, `LC_OperData`, `LC_WDT_GETADDR_ERR_EID`, `LC_WDT_TBL_RESTORED`, `LC_WRT_CDS_RESTORED`, `LC_OperData_t::TableResults`, `LC_OperData_t::WDTHandle`, and `LC_OperData_t::WDTPtr`. Referenced by `LC_AppInit()`.

Here is the call graph for this function:



## 12.19.5 Variable Documentation

### 12.19.5.1 LC\_AppData `LC_AppData_t` `LC_AppData`

Application data.

Definition at line 48 of file `lc_app.c`.

Referenced by `LC_AppInit()`, `LC_AppMain()`, `LC_AppPipe()`, `LC_CheckMsgForWPs()`, `LC_CreateTaskCDS()`, `LC_LoadDefaultTables()`, `LC_NoopCmd()`, `LC_ResetAPStatsCmd()`, `LC_ResetCounters()`, `LC_ResetWPStatsCmd()`, `LC_SampleAPReq()`, `LC_SampleSingleAP()`, `LC_SendHkCmd()`, `LC_SetAPPermOffCmd()`, `LC_SetAPStateCmd()`, `LC_SetLCStateCmd()`, `LC_UpdateTaskCDS()`, and `LC_VerifyMsgLength()`.

### 12.19.5.2 LC\_OperData `LC_OperData_t` `LC_OperData`

Operational data.

Definition at line 47 of file `lc_app.c`.

Referenced by `LC_AddWatchpoint()`, `LC_AppInit()`, `LC_AppMain()`, `LC_CheckMsgForWPs()`, `LC_CreateDefinitionTables()`, `LC_CreateHashTable()`, `LC_CreateResultTables()`, `LC_CreateTaskCDS()`, `LC_EvaluateRPN()`, `LC_Float`,

Compare(), LC\_GetSizedWPData(), LC\_LoadDefaultTables(), LC\_ManageTables(), LC\_OperatorCompare(), LC\_PerformMaintenance(), LC\_ProcessWP(), LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_SampleAPReq(), LC\_SampleAPs(), LC\_SampleSingleAP(), LC\_SbInit(), LC\_SendHkCmd(), LC\_SetAPPermOffCmd(), LC\_SetAPStateCmd(), LC\_SignedCompare(), LC\_TableInit(), LC\_UnsignedCompare(), LC\_UpdateTaskCDS(), and LC\_WPOffsetValid().

## 12.20 apps/lc/fsw/src/lc\_cmds.c File Reference

```
#include "lc_app.h"
#include "lc_cmds.h"
#include "lc_msgids.h"
#include "lc_eventids.h"
#include "lc_version.h"
#include "lc_action.h"
#include "lc_watch.h"
#include "lc_platform_cfg.h"
#include "lc_utils.h"
```

### Macros

- #define **LC\_GET\_CMD\_PAYLOAD**(ptr, type) (&((const type \*)(ptr))->Payload)

### Functions

- void **LC\_SampleAPReq** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Sample actionpoints request.*
- **CFE\_Status\_t LC\_SendHkCmd** (const **CFE\_MSG\_CommandHeader\_t** \*MsgPtr)  
*Housekeeping request.*
- void **LC\_NoopCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Noop command.*
- void **LC\_ResetCountersCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Reset counters command.*
- void **LC\_ResetCounters** (void)  
*Reset HK counters.*
- void **LC\_SetLCStateCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Set LC state command.*
- void **LC\_SetAPStateCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Set AP state command.*
- void **LC\_SetAPPermOffCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Set AP permanently off command.*
- void **LC\_ResetAPStatsCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Reset AP statistics command.*
- void **LC\_ResetResultsAP** (**uint32** StartIndex, **uint32** EndIndex, bool ResetStatsCmd)  
*Reset AP results.*
- void **LC\_ResetWPStatsCmd** (const **CFE\_SB\_Buffer\_t** \*BufPtr)  
*Reset WP statistics command.*
- void **LC\_ResetResultsWP** (**uint32** StartIndex, **uint32** EndIndex, bool ResetStatsCmd)  
*Reset WP results.*

### 12.20.1 Detailed Description

CFS Limit Checker (LC) command handling routines

### 12.20.2 Macro Definition Documentation

```
12.20.2.1 LC_GET_CMD_PAYLOAD #define LC_GET_CMD_PAYLOAD (ptr,  
                           type) (&((const type *)(ptr))->Payload)
```

Definition at line 38 of file lc\_cmds.c.

### 12.20.3 Function Documentation

```
12.20.3.1 LC_NoopCmd() void LC_NoopCmd (  
    const CFE_SB_Buffer_t * BufPtr )
```

Noop command.

#### Description

Processes a noop ground command.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

#### See also

[LC\\_NOOP\\_CC](#)

Definition at line 266 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData, LC\_MAJOR\_VERSION, LC\_MINOR\_VERSION, LC\_MISSION\_REV, LC\_NOOP\_INF\_EID, and LC\_REVISION.

Referenced by LC\_NoopVerifyDispatch().

Here is the call graph for this function:



**12.20.3.2 LC\_ResetAPStatsCmd()** void LC\_ResetAPStatsCmd ( const CFE\_SB\_Buffer\_t \* BufPtr )

Reset AP statistics command.

#### Description

Processes a reset actionpoint statistics ground command.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

#### See also

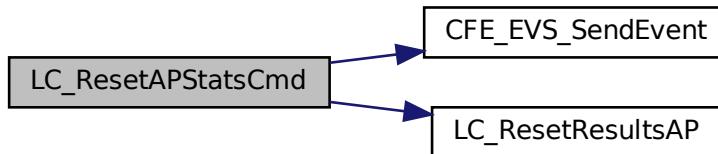
[LC\\_RESET\\_AP\\_STATS\\_CC](#)

Definition at line 515 of file lc\_cmds.c.

References LC\_ResetAPStats\_Payload\_t::APNumber, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFO, RIMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ALL\_ACTIONPOINTINTS, LC\_AppData, LC\_APSTATS\_APNUM\_ERR\_EID, LC\_APSTATS\_INF\_EID, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, and LC\_ResetResultsAP().

Referenced by LC\_ResetAPStatsVerifyDispatch().

Here is the call graph for this function:



**12.20.3.3 LC\_ResetCounters()** void LC\_ResetCounters ( void )

Reset HK counters.

#### Description

Utility function that resets housekeeping counters to zero

#### Assumptions, External Events, and Notes:

None

**See also**[LC\\_ResetCountersCmd](#)

Definition at line 291 of file lc\_cmds.c.

References LC\_AppData\_t::APSSampleCount, LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_AppData, LC\_AppData\_t::MonitoredMsgCount, LC\_AppData\_t::PassiveRTSExecCount, and LC\_AppData\_t::RTSExecCount.

Referenced by LC\_LoadDefaultTables(), and LC\_ResetCountersCmd().

**12.20.3.4 LC\_ResetCountersCmd()** void LC\_ResetCountersCmd ( const CFE\_SB\_Buffer\_t \* BufPtr )

Reset counters command.

**Description**

Processes a reset counters ground command which will reset the following LC application counters to zero:

- Command counter
- Command error counter
- Actionpoint sample counter
- Monitored message counter
- RTS execution counter
- Passive RTS execution counter

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

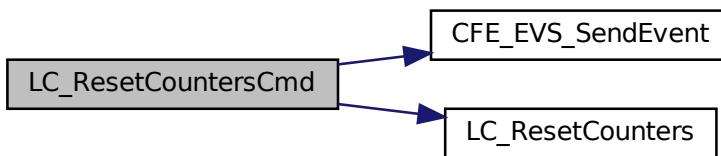
**See also**[LC\\_RESET\\_CC](#)

Definition at line 279 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_DEBUG, CFE\_EVS\_SendEvent(), LC\_RESET\_DBG\_EID, and LC\_ResetCounters().

Referenced by LC\_ResetCountersVerifyDispatch().

Here is the call graph for this function:



```
12.20.3.5 LC_ResetResultsAP() void LC_ResetResultsAP (
    uint32 StartIndex,
    uint32 EndIndex,
    bool ResetStatsCmd )
```

Reset AP results.

#### Description

Utility function that resets selected entries in actionpoint results table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>StartIndex</i>	Start of area to reset (base zero)
in	<i>EndIndex</i>	End of area to reset (base zero)
in	<i>ResetStatsCmd</i>	Reset AP stats command does not reset all fields

#### See also

[LC\\_ResetAPStatsCmd](#)

Definition at line 556 of file lc\_cmds.c.

References LC\_ARTEEntry\_t::ActionResult, LC\_OperData\_t::ADTPtr, LC\_OperData\_t::ARTPtr, LC\_ARTEEntry\_t::ConsecutiveFailCount, LC\_ARTEEntry\_t::CumulativeEventMsgsSent, LC\_ARTEEntry\_t::CumulativeFailCount, LC\_ARTEEntry\_t::CumulativeRTSExecCount, LC\_ARTEEntry\_t::CurrentState, LC\_ADTEEntry\_t::DefaultState, LC\_ARTEEntry\_t::FailToPassCount, LC\_ACTION\_STALE, LC\_OperData, LC\_ARTEEntry\_t::PassiveAPCount, and LC\_ARTEEntry\_t::PassToFailCount.

Referenced by LC\_LoadDefaultTables(), LC\_ManageTables(), and LC\_ResetAPStatsCmd().

```
12.20.3.6 LC_ResetResultsWP() void LC_ResetResultsWP (
    uint32 StartIndex,
    uint32 EndIndex,
    bool ResetStatsCmd )
```

Reset WP results.

#### Description

Utility function that resets selected entries in watchpoint results table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>StartIndex</i>	Start of area to reset (base zero)
in	<i>EndIndex</i>	End of area to reset (base zero)
in	<i>ResetStatsCmd</i>	Reset WP stats command does not reset all fields

See also

[LC\\_ResetWPStatsCmd](#)

Definition at line 627 of file lc\_cmds.c.

References LC\_WRTEntry\_t::ConsecutiveTrueCount, LC\_WRTEntry\_t::CountdownToStale, LC\_WRTEntry\_t::CumulativeTrueCount, LC\_WRTEntry\_t::EvaluationCount, LC\_WRTEntry\_t::FalseToTrueCount, LC\_WRTEntry\_t::LastFalseToTrue, LC\_WRTEntry\_t::LastTrueToFalse, LC\_OperData, LC\_WATCH\_STALE, CFE\_TIME\_SysTime::Seconds, CFE\_TIME\_SysTime::Subseconds, LC\_WRTTransition\_t::Timestamp, LC\_WRTTransition\_t::Value, LC\_WRTEntry\_t::WatchResult, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_LoadDefaultTables(), LC\_ManageTables(), and LC\_ResetWPStatsCmd().

**12.20.3.7 LC\_ResetWPStatsCmd()** void LC\_ResetWPStatsCmd (

    const CFE\_SB\_Buffer\_t \* BufPtr )

Reset WP statistics command.

#### Description

Processes a reset watchpoint statistics ground command.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

See also

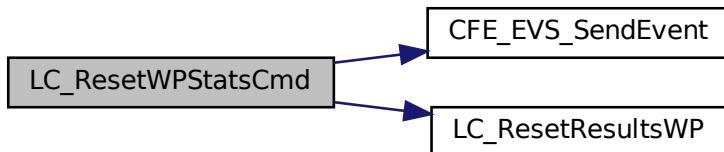
[LC\\_RESET\\_WP\\_STATS\\_CC](#)

Definition at line 586 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ALL\_WATCHPOINTS, LC\_AppData, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_WATCHPOINTS, LC\_ResetResultsWP(), LC\_WPSTATS\_INF\_EID, LC\_WPSTATS\_WPNUM\_E\_RR\_EID, and LC\_ResetWPStats\_Payload\_t::WPNumber.

Referenced by LC\_ResetWPStatsVerifyDispatch().

Here is the call graph for this function:



```
12.20.3.8 LC_SampleAPReq() void LC_SampleAPReq (
    const CFE_SB_Buffer_t * BufPtr )
```

Sample actionpoints request.

#### Description

Processes an on-board sample actionpoints request message.

#### Assumptions, External Events, and Notes:

This message does not affect the command execution counter

#### Parameters

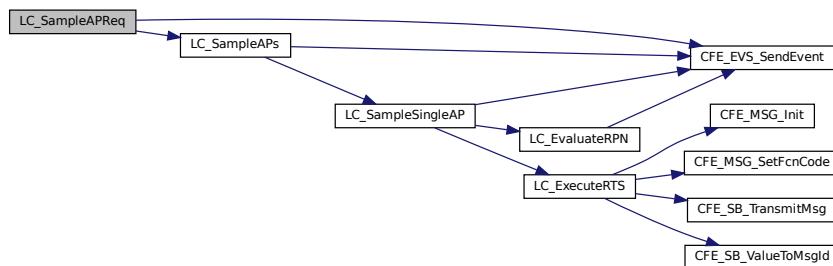
in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

Definition at line 45 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_WRTEEntry\_t::CountdownToStale, LC\_AppData\_t::CurrentLCState, LC\_SampleAP\_Payload\_t::EndIndex, LC\_ALL\_ACTIONPOINTS, LC\_AppData, LC\_APSPALMLE\_APNUM\_ERR\_EID, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_SampleAPs(), LC\_STATE\_DISABLED, LC\_WATCH\_STALE, LC\_SampleAP\_Payload\_t::StartIndex, LC\_SampleAP\_Payload\_t::UpdateAge, LC\_WRTEEntry\_t::WatchResult, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SampleAPVerifyDispatch().

Here is the call graph for this function:



```
12.20.3.9 LC_SendHkCmd() CFE_Status_t LC_SendHkCmd (
    const CFE_MSG_CommandHeader_t * MsgPtr )
```

Housekeeping request.

#### Description

Processes an on-board housekeeping request message.

#### Assumptions, External Events, and Notes:

This message does not affect the command execution counter

## Parameters

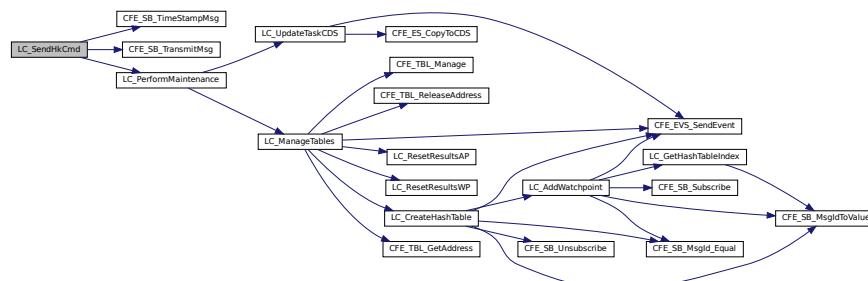
in	<i>MsgPtr</i>	Pointer to command header
----	---------------	---------------------------

Definition at line 115 of file lc\_cmds.c.

References LC\_ARTEEntry\_t::ActionResult, LC\_HkTlm\_Payload\_t::ActiveAPs, LC\_HkTlm\_Payload\_t::APResults, LC\_AppData\_t::APSampleCount, LC\_HkTlm\_Payload\_t::APSampleCount, LC\_OperData\_t::ARTPtr, CFE\_SB\_TimeStampMsg(), CFE\_SB\_TransmitMsg(), LC\_AppData\_t::CmdCount, LC\_HkTlm\_Payload\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_HkTlm\_Payload\_t::CmdErrCount, LC\_AppData\_t::CurrentLCState, LC\_HkTlm\_Payload\_t::CurrentLCState, LC\_ARTEEntry\_t::CurrentState, LC\_OperData\_t::HkPacket, LC\_ACTION\_ERROR, LC\_ACTION\_FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_AppData, LC\_APSTATE\_ACTIVE, LC\_APSTATE\_DISABLED, LC\_APSTATE\_NOT\_USED, LC\_APSTATE\_PASSIVE, LC\_APSTATE\_PERMOFF, LC\_HKAR\_ERROR, LC\_HKA\_R\_FAIL, LC\_HKAR\_PASS, LC\_HKAR\_STALE, LC\_HKAR\_STATE\_ACTIVE, LC\_HKAR\_STATE\_DISABLED, LC\_HKAR\_STATE\_NOT\_USED, LC\_HKAR\_STATE\_PASSIVE, LC\_HKWR\_ERROR, LC\_HKWR\_FALSE, LC\_HKWR\_STALE, LC\_HKWR\_TRUE, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_PerformMaintenance(), LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, LC\_AppData\_t::MonitoredMsgCount, LC\_HkTlm\_Payload\_t::MonitoredMsgCount, LC\_AppData\_t::PassiveRTSExecCount, LC\_HkTlm\_Payload\_t::PassiveRTSExecCount, LC\_HkPacket\_t::Payload, LC\_AppData\_t::RTSExecCount, LC\_HkTlm\_Payload\_t::RTSExecCount, LC\_HkPacket\_t::TelemetryHeader, LC\_OperData\_t::WatchpointCount, LC\_WRTEntry\_t::WatchResult, LC\_HkTlm\_Payload\_t::WPResults, LC\_HkTlm\_Payload\_t::WPsInUse, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SendHkVerifyDispatch().

Here is the call graph for this function:



**12.20.3.10 LC\_SetAPPermOffCmd()** void LC\_SetAPPermOffCmd ( const CFE\_SB\_Buffer\_t \* BufPtr )

Set AP permanently off command.

## Description

Processes a set actionpoint permanently off ground command.

## Assumptions, External Events, and Notes:

None

## Parameters

in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

See also

[LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#)

Definition at line 458 of file lc\_cmds.c.

References LC\_SetAPPermOff\_Payload\_t::APNumber, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ARTEEntry\_t::CurrentState, LC\_ALL\_ACTIONPOINTS, LC\_APOFF\_APNUM\_ERR\_EID, LC\_APOFF\_CUERR\_EID, LC\_APOFF\_INF\_EID, LC\_AppData, LC\_APSTATE\_DISABLED, LC\_APSTATE\_PERMOFF, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, and LC\_OperData.

Referenced by LC\_SetAPPermOffVerifyDispatch().

Here is the call graph for this function:



**12.20.3.11 LC\_SetAPStateCmd()** void LC\_SetAPStateCmd (   
     const CFE\_SB\_Buffer\_t \* BufPtr )

Set AP state command.

Description

Processes a set actionpoint state ground command.

Assumptions, External Events, and Notes:

None

Parameters

in	BufPtr	Pointer to Software Bus buffer
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See also

[LC\\_SET\\_AP\\_STATE\\_CC](#)

Definition at line 339 of file lc\_cmds.c.

References LC\_SetAPState\_Payload\_t::APNumber, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ARTEEntry\_t::CurrentState, LC\_ALL\_ACTIONPOINTS, LC\_AppData, LC\_APSTATE\_ACTIVE, LC\_APSTATE\_APNUM\_ERR\_EID, LC\_APSTATE\_CURR\_ERR\_EID, LC\_APSTATE\_DISABLED, LC\_APSTATE\_INF\_EID, LC\_APSTATE\_NEW\_ERR\_EID, LC\_APSTATE\_NOT\_USED, LC\_APSTATE\_PASSIVE, LC\_APSTATE\_PERMOFF, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, LC\_OperData, and LC\_SetAPState\_Payload\_t::NewAPState.

Referenced by LC\_SetAPStateVerifyDispatch().

Here is the call graph for this function:



**12.20.3.12 LC\_SetLCStateCmd()** void LC\_SetLCStateCmd ( const CFE\_SB\_Buffer\_t \* BufPtr )

Set LC state command.

#### Description

Processes a set LC application state ground command.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

#### See also

[LC\\_SET\\_LC\\_STATE\\_CC](#)

Definition at line 307 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_AppData\_t::CurrentLCState, LC\_AppData, LC\_GET\_CMD\_PAYLOAD, LC\_LCSTATE\_ERR\_EID, LC\_LCSTATE\_INF\_EID, LC\_STATE\_ACTIVE, LC\_STATE\_DISABLED, LC\_STATE\_PASSIVE, and LC\_SetLCState\_Payload\_t::NewLCState.

Referenced by LC\_SetLCStateVerifyDispatch().

Here is the call graph for this function:



## 12.21 apps/lc/fsw/src/lc\_cmds.h File Reference

```
#include "cfe.h"
```

### Functions

- void `LC_ResetCounters` (void)  
*Reset HK counters.*
- void `LC_ResetResultsAP` (`uint32` StartIndex, `uint32` EndIndex, bool ResetStatsCmd)  
*Reset AP results.*
- void `LC_ResetResultsWP` (`uint32` StartIndex, `uint32` EndIndex, bool ResetStatsCmd)  
*Reset WP results.*
- void `LC_SampleAPReq` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Sample actionpoints request.*
- `CFE_Status_t LC_SendHkCmd` (const `CFE_MSG_CommandHeader_t` \*MsgPtr)  
*Housekeeping request.*
- void `LC_NoopCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Noop command.*
- void `LC_ResetCountersCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Reset counters command.*
- void `LC_SetLCStateCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Set LC state command.*
- void `LC_SetAPStateCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Set AP state command.*
- void `LC_SetAPPermOffCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Set AP permanently off command.*
- void `LC_ResetAPStatsCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Reset AP statistics command.*
- void `LC_ResetWPStatsCmd` (const `CFE_SB_Buffer_t` \*BufPtr)  
*Reset WP statistics command.*

### 12.21.1 Detailed Description

Specification for the CFS Limit Checker (LC) routines that handle command processing

### 12.21.2 Function Documentation

#### 12.21.2.1 `LC_NoopCmd()` `void LC_NoopCmd (` `const CFE_SB_Buffer_t * BufPtr )`

Noop command.

##### Description

Processes a noop ground command.

##### Assumptions, External Events, and Notes:

None

**Parameters**

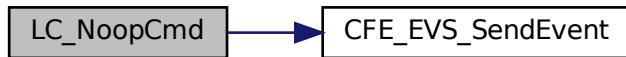
in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

**See also**[LC\\_NOOP\\_CC](#)

Definition at line 266 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData, LC\_MAJOR\_VERSION, LC\_MINOR\_VERSION, LC\_MISSION\_REV, LC\_NOOP\_INF\_EID, and LC\_REVISION. Referenced by LC\_NoopVerifyDispatch().

Here is the call graph for this function:



**12.21.2.2 LC\_ResetAPStatsCmd()** void LC\_ResetAPStatsCmd (   
     const CFE\_SB\_Buffer\_t \* BufPtr )

Reset AP statistics command.

**Description**

Processes a reset actionpoint statistics ground command.

**Assumptions, External Events, and Notes:**

None

**Parameters**

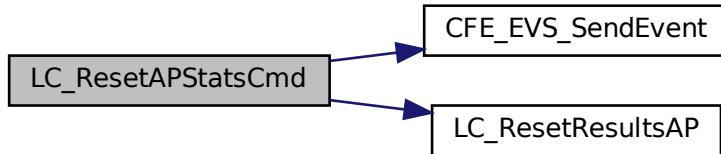
in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

**See also**[LC\\_RESET\\_AP\\_STATS\\_CC](#)

Definition at line 515 of file lc\_cmds.c.

References LC\_ResetAPStats\_Payload\_t::APNumber, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ALL\_ACTIONPOINTS, LC\_AppData, LC\_APSTATS\_APNUM\_ERR\_EID, LC\_APSTATS\_INF\_EID, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, and LC\_ResetResultsAP(). Referenced by LC\_ResetAPStatsVerifyDispatch().

Here is the call graph for this function:



**12.21.2.3 LC\_ResetCounters()** `void LC_ResetCounters ( void )`

Reset HK counters.

#### Description

Utility function that resets housekeeping counters to zero

#### Assumptions, External Events, and Notes:

None

#### See also

[LC\\_ResetCountersCmd](#)

Definition at line 291 of file lc\_cmds.c.

References LC\_AppData\_t::APSampleCount, LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_AppData, LC\_AppData\_t::MonitoredMsgCount, LC\_AppData\_t::PassiveRTSExecCount, and LC\_AppData\_t::RTSExecCount.

Referenced by LC\_LoadDefaultTables(), and LC\_ResetCountersCmd().

**12.21.2.4 LC\_ResetCountersCmd()** `void LC_ResetCountersCmd ( const CFE_SB_Buffer_t * BufPtr )`

Reset counters command.

#### Description

Processes a reset counters ground command which will reset the following LC application counters to zero:

- Command counter
- Command error counter
- Actionpoint sample counter
- Monitored message counter
- RTS execution counter
- Passive RTS execution counter

#### Assumptions, External Events, and Notes:

None

**Parameters**

in	<i>BufPtr</i>	Pointer to Software Bus buffer
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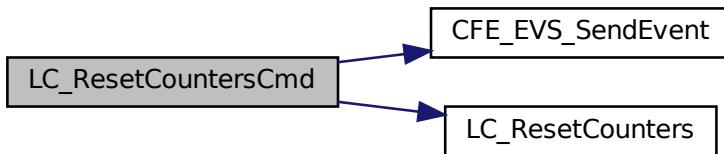
**See also**[LC\\_RESET\\_CC](#)

Definition at line 279 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_DEBUG, CFE\_EVS\_SendEvent(), LC\_RESET\_DBG\_EID, and LC\_ResetCounters().

Referenced by LC\_ResetCountersVerifyDispatch().

Here is the call graph for this function:

**12.21.2.5 LC\_ResetResultsAP()** void LC\_ResetResultsAP (

```
    uint32 StartIndex,  
    uint32 EndIndex,  
    bool ResetStatsCmd )
```

Reset AP results.

**Description**

Utility function that resets selected entries in actionpoint results table

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>StartIndex</i>	Start of area to reset (base zero)
in	<i>EndIndex</i>	End of area to reset (base zero)
in	<i>ResetStatsCmd</i>	Reset AP stats command does not reset all fields

## See also

[LC\\_ResetAPStatsCmd](#)

Definition at line 556 of file lc\_cmds.c.

References `LC_ARTEEntry_t::ActionResult`, `LC_OperData_t::ADTPtr`, `LC_OperData_t::ARTPtr`, `LC_ARTEEntry_t::ConsecutiveFailCount`, `LC_ARTEEntry_t::CumulativeEventMsgsSent`, `LC_ARTEEntry_t::CumulativeFailCount`, `LC_ARTEEntry_t::CumulativeRTSExecCount`, `LC_ARTEEntry_t::CurrentState`, `LC_ADTEEntry_t::DefaultState`, `LC_ARTEEntry_t::FailToPassCount`, `LC_ACTION_STALE`, `LC_OperData`, `LC_ARTEEntry_t::PassiveAPCount`, and `LC_ARTEEntry_t::PassToFailCount`.

Referenced by `LC_LoadDefaultTables()`, `LC_ManageTables()`, and `LC_ResetAPStatsCmd()`.

#### 12.21.2.6 **LC\_ResetResultsWP()** void LC\_ResetResultsWP (

```
    uint32 StartIndex,
    uint32 EndIndex,
    bool ResetStatsCmd )
```

Reset WP results.

## Description

Utility function that resets selected entries in watchpoint results table

## Assumptions, External Events, and Notes:

None

## Parameters

in	<i>StartIndex</i>	Start of area to reset (base zero)
in	<i>EndIndex</i>	End of area to reset (base zero)
in	<i>ResetStatsCmd</i>	Reset WP stats command does not reset all fields

## See also

[LC\\_ResetWPStatsCmd](#)

Definition at line 627 of file lc\_cmds.c.

References `LC_WRTEntry_t::ConsecutiveTrueCount`, `LC_WRTEntry_t::CountdownToStale`, `LC_WRTEntry_t::CumulativeTrueCount`, `LC_WRTEntry_t::EvaluationCount`, `LC_WRTEntry_t::FalseToTrueCount`, `LC_WRTEntry_t::LastFalseToTrue`, `LC_WRTEntry_t::LastTrueToFalse`, `LC_OperData`, `LC_WATCH_STALE`, `CFE_TIME_SysTime::Seconds`, `CFE_TIME_SysTime::Subseconds`, `LC_WRTTransition_t::Timestamp`, `LC_WRTTransition_t::Value`, `LC_WRTEntry_t::WatchResult`, and `LC_OperData_t::WRTPrt`.

Referenced by `LC_LoadDefaultTables()`, `LC_ManageTables()`, and `LC_ResetWPStatsCmd()`.

#### 12.21.2.7 **LC\_ResetWPStatsCmd()** void LC\_ResetWPStatsCmd (

```
    const CFE_SB_Buffer_t * BufPtr )
```

Reset WP statistics command.

## Description

Processes a reset watchpoint statistics ground command.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

**See also**

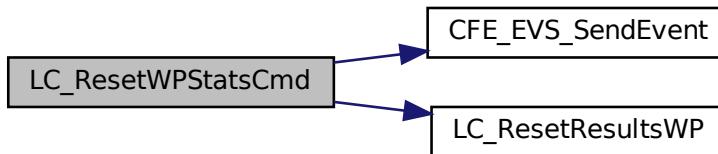
[LC\\_RESET\\_WP\\_STATS\\_CC](#)

Definition at line 586 of file `lc_cmds.c`.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `LC_AppData_t::CmdCount`, `LC_AppData_t::CmdErrCount`, `LC_ALL_WATCHPOINTS`, `LC_AppData`, `LC_GET_CMD_PAYLOAD`, `LC_MAX_WATCHPOINTS`, `LC_ResetResultsWP()`, `LC_WPSTATS_INF_EID`, `LC_WPSTATS_WPNUM_ER_EID`, and `LC_ResetWPStats_Payload_t::WPNumber`.

Referenced by `LC_ResetWPStatsVerifyDispatch()`.

Here is the call graph for this function:



**12.21.2.8 LC\_SampleAPReq()** `void LC_SampleAPReq (`  
`const CFE_SB_Buffer_t * BufPtr )`

Sample actionpoints request.

**Description**

Processes an on-board sample actionpoints request message.

**Assumptions, External Events, and Notes:**

This message does not affect the command execution counter

**Parameters**

in	<i>BufPtr</i>	Pointer to Software Bus buffer
----	---------------	--------------------------------

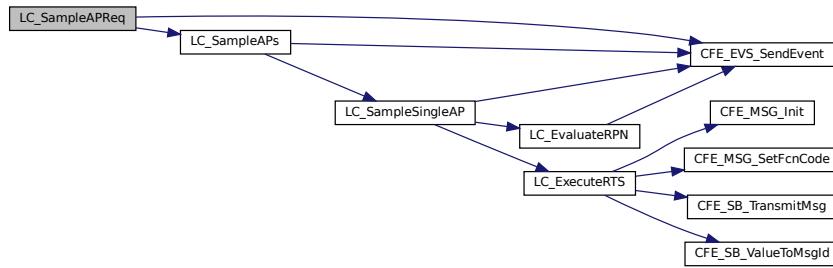
Definition at line 45 of file `lc_cmds.c`.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_SendEvent()`, `LC_WRTEntry_t::CountdownToStale`, `LC_App`,

Data\_t::CurrentLCState, LC\_SampleAP\_Payload\_t::EndIndex, LC\_ALL\_ACTIONPOINTS, LC\_AppData, LC\_APSTA↔  
 MPLE\_APNUM\_ERR\_EID, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC↔  
 OperData, LC\_SampleAPs(), LC\_STATE\_DISABLED, LC\_WATCH\_STALE, LC\_SampleAP\_Payload\_t::StartIndex, L↔  
 C\_SampleAP\_Payload\_t::UpdateAge, LC\_WRTEntry\_t::WatchResult, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SampleAPVerifyDispatch().

Here is the call graph for this function:



### 12.21.2.9 LC\_SendHkCmd() CFE\_Status\_t LC\_SendHkCmd ( const CFE\_MSG\_CommandHeader\_t \* MsgPtr )

Housekeeping request.

#### Description

Processes an on-board housekeeping request message.

#### Assumptions, External Events, and Notes:

This message does not affect the command execution counter

#### Parameters

in	MsgPtr	Pointer to command header
----	--------	---------------------------

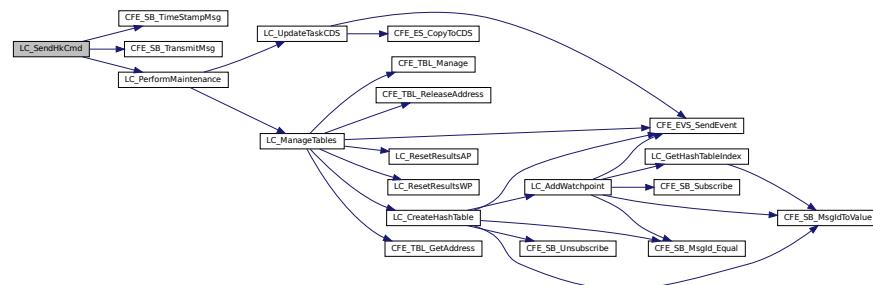
Definition at line 115 of file lc\_cmds.c.

References LC\_ARTEEntry\_t::ActionResult, LC\_HkTlm\_Payload\_t::ActiveAPs, LC\_HkTlm\_Payload\_t::APResults, L↔  
 C\_AppData\_t::APSampleCount, LC\_HkTlm\_Payload\_t::APSampleCount, LC\_OperData\_t::ARTPtr, CFE\_SB\_Time↔  
 StampMsg(), CFE\_SB\_TransmitMsg(), LC\_AppData\_t::CmdCount, LC\_HkTlm\_Payload\_t::CmdCount, LC\_AppData↔  
 \_t::CmdErrCount, LC\_HkTlm\_Payload\_t::CmdErrCount, LC\_AppData\_t::CurrentLCState, LC\_HkTlm\_Payload\_t::↔  
 CurrentLCState, LC\_ARTEEntry\_t::CurrentState, LC\_OperData\_t::HkPacket, LC\_ACTION\_ERROR, LC\_ACTION↔  
 FAIL, LC\_ACTION\_PASS, LC\_ACTION\_STALE, LC\_AppData, LC\_APSTATE\_ACTIVE, LC\_APSTATE\_DISABLED,  
 LC\_APSTATE\_NOT\_USED, LC\_APSTATE\_PASSIVE, LC\_APSTATE\_PERMOFF, LC\_HKAR\_ERROR, LC\_HKA↔  
 R\_FAIL, LC\_HKAR\_PASS, LC\_HKAR\_STALE, LC\_HKAR\_STATE\_ACTIVE, LC\_HKAR\_STATE\_DISABLED, LC↔  
 HKAR\_STATE\_NOT\_USED, LC\_HKAR\_STATE\_PASSIVE, LC\_HKWR\_ERROR, LC\_HKWR\_FALSE, LC\_HKWR↔  
 \_STALE, LC\_HKWR\_TRUE, LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_Perform↔  
 Maintenance(), LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, LC\_App↔  
 Data\_t::MonitoredMsgCount, LC\_HkTlm\_Payload\_t::MonitoredMsgCount, LC\_AppData\_t::PassiveRTSExecCount,  
 LC\_HkTlm\_Payload\_t::PassiveRTSExecCount, LC\_HkPacket\_t::Payload, LC\_AppData\_t::RTSExecCount, LC\_Hk↔  
 Tlm\_Payload\_t::RTSExecCount, LC\_HkPacket\_t::TelemetryHeader, LC\_OperData\_t::WatchpointCount, LC\_WRT↔

Entry\_t::WatchResult, LC\_HkTIm\_Payload\_t::WPResults, LC\_HkTIm\_Payload\_t::WPsInUse, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_SendHkVerifyDispatch().

Here is the call graph for this function:



```
12.21.2.10 LC_SetAPPermOffCmd() void LC_SetAPPermOffCmd ( const CFE_SB_Buffer_t * BufPtr )
```

Set AP permanently off command.

## Description

Processes a set actionpoint permanently off ground command.

## **Assumptions, External Events, and Notes:**

None

## Parameters

in *BufPtr* Pointer to Software Bus buffer

See also

[LC\\_SET\\_AP\\_PERM\\_OFF\\_CC](#)

Definition at line 458 of file lc\_cmds.c.

References LC\_SetAPPermOff\_Payload\_t::APNumber, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ARTEEntry\_t::CurrentState, LC\_ALL\_ACTIONPOINTS, LC\_APOFF\_APNUM\_ERR\_EID, LC\_APOFF\_CURError\_EID, LC\_APOFF\_INF\_EID, LC\_AppData, LC\_APSTATE\_DISABLED, LC\_APSTATE\_PERMOFF, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, and LC\_OperData.

Referenced by LC\_SetAPPermOffVerifyDispatch().

Here is the call graph for this function:



**12.21.2.11 LC\_SetAPStateCmd()** void LC\_SetAPStateCmd (

const CFE\_SB\_Buffer\_t \* BufPtr )

Set AP state command.

Description

Processes a set actionpoint state ground command.

Assumptions, External Events, and Notes:

None

Parameters

in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

See also

[LC\\_SET\\_AP\\_STATE\\_CC](#)

Definition at line 339 of file lc\_cmds.c.

References LC\_SetAPState\_Payload\_t::APNumber, LC\_OperData\_t::ARTPtr, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_ARTEEntry\_t::CurrentState, LC\_ALL\_ACTIONPOINTS, LC\_AppData, LC\_APSTATE\_ACTIVE, LC\_APSTATE\_APNUM\_ERR\_EID, LC\_APSTATE\_CURR\_ERR\_EID, LC\_APSTATE\_DISABLED, LC\_APSTATE\_INF\_EID, LC\_APSTATE\_NEW\_ERR\_EID, LC\_APSTATE\_NOT\_USED, LC\_APSTATE\_PASSIVE, LC\_APSTATE\_PERMOFF, LC\_GET\_CMD\_PAYLOAD, LC\_MAX\_ACTIONPOINTS, LC\_OperData, and LC\_SetAPState\_Payload\_t::NewAPState.

Referenced by LC\_SetAPStateVerifyDispatch().

Here is the call graph for this function:



**12.21.2.12 LC\_SetLCStateCmd()** void LC\_SetLCStateCmd ( const CFE\_SB\_Buffer\_t \* BufPtr )

Set LC state command.

#### Description

Processes a set LC application state ground command.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	BufPtr	Pointer to Software Bus buffer
----	--------	--------------------------------

#### See also

[LC\\_SET\\_LC\\_STATE\\_CC](#)

Definition at line 307 of file lc\_cmds.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), LC\_AppData\_t::CmdCount, LC\_AppData\_t::CmdErrCount, LC\_AppData\_t::CurrentLCState, LC\_AppData, LC\_GET\_CMD\_PAYLOAD, LC\_LCSTATE\_ERR\_EID, LC\_LCSTATE\_INF\_EID, LC\_STATE\_ACTIVE, LC\_STATE\_DISABLED, LC\_STATE\_PASSIVE, and LC\_SetLCState\_Payload\_t::NewLCState.

Referenced by LC\_SetLCStateVerifyDispatch().

Here is the call graph for this function:



## 12.22 apps/lc/fsw/src/lc\_custom.c File Reference

```
#include "lc_custom.h"
#include "lc_tbldefs.h"
#include "lc_eventids.h"
#include "lc_mission_cfg.h"
#include "lc_msg.h"
#include "lc_msgids.h"
```

### Functions

- void [LC\\_ExecuteRTS](#) (uint16 RTSId)  
*Execute RTS.*
- uint8 [LC\\_CustomFunction](#) (uint16 WatchIndex, uint32 ProcessedWPData, const CFE\_SB\_Buffer\_t \*BufPtr, uint32 WDTCustomFuncArg)  
*Mission specific custom function.*

### 12.22.1 Detailed Description

CFS Limit Checker (LC) mission specific code, including the custom function template.

### 12.22.2 Function Documentation

**12.22.2.1 LC\_CustomFunction()** uint8 LC\_CustomFunction (

```
    uint16 WatchIndex,
    uint32 ProcessedWPData,
    const CFE_SB_Buffer_t * BufPtr,
    uint32 WDTCustomFuncArg )
```

Mission specific custom function.

#### Description

This is the mission specific custom function entry point. It gets called whenever the OperatorID in a watchpoint definition table entry is set to [LC\\_OPER\\_CUSTOM](#) and must return one of the defined watchpoint evaluation result types

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number (zero based watchpoint definition table index) for the watchpoint definition that caused the call
in	<i>ProcessedWPData</i>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
in	<i>BufPtr</i>	A <a href="#">CFE_SB_Buffer_t*</a> pointer that references the software bus message that contained the watchpoint data. If the custom function needs the raw watchpoint data, it can use this pointer and the watchpoint definition to extract it.
in	<i>WDTCustomFuncArg</i>	This is the custom function argument for this watchpoint from the watchpoint definition table. It can be used for whatever purpose the mission developers want. LC doesn't use it.

**Returns**

Watchpoint evaluation result

**Return values**

<a href="#"><i>LC_WATCH_TRUE</i></a>	Watchpoint true, must be one for RPN evaluation.
<a href="#"><i>LC_WATCH_FALSE</i></a>	Watchpoint false, must be zero for RPN evaluation.
<a href="#"><i>LC_WATCH_ERROR</i></a>	Watchpoint error.

**See also**

[LC\\_WDTEEntry\\_t](#)

Definition at line 66 of file lc\_custom.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_CFCALL\_ERR\_EID, and LC\_WATCH\_FA←LSE.

Referenced by LC\_ProcessWP().

Here is the call graph for this function:



**12.22.2.2 LC\_ExecuteRTS()** `void LC_ExecuteRTS (`  
    `uint16 RTSId )`

Execute RTS.

**Description**

Support function for actionpoint processing that is called to send an RTS request when an actionpoint evaluation determines it has failed

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>RT←SId</i>	ID of the RTS to request
----	---------------	--------------------------

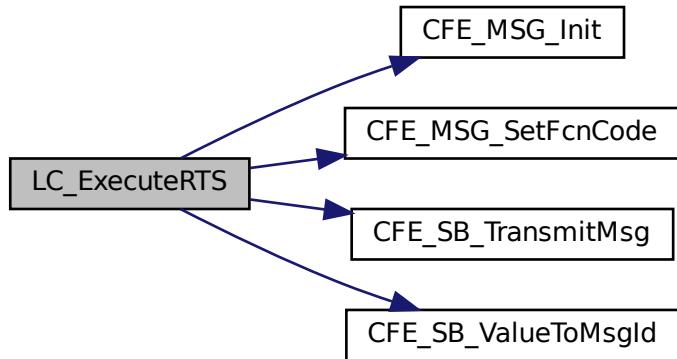
Definition at line 43 of file lc\_custom.c.

References CFE\_MSG\_Init(), CFE\_MSG\_SetFcnCode(), CFE\_SB\_TransmitMsg(), CFE\_SB\_ValueToMsgId(), LC\_R←TSRequestCmd\_t::CommandHeader, LC\_RTS\_REQ\_CC, LC\_RTS\_REQ\_MID, LC\_RTSRequestCmd\_t::Payload, and

LC\_RTSRequest\_Payload\_t::RTSId.

Referenced by LC\_SampleSingleAP().

Here is the call graph for this function:



## 12.23 apps/lc/fsw/src/lc\_custom.h File Reference

```
#include "cfe.h"
```

### Functions

- void [LC\\_ExecuteRTS](#) (uint16 RTSId)  
*Execute RTS.*
- uint8 [LC\\_CustomFunction](#) (uint16 WatchIndex, uint32 ProcessedWPData, const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr, uint32 WDTCustomFuncArg)  
*Mission specific custom function.*

#### 12.23.1 Detailed Description

Specification for the CFS Limit Checker (LC) mission specific custom function template

#### 12.23.2 Function Documentation

```
12.23.2.1 LC_CustomFunction() uint8 LC_CustomFunction (
    uint16 WatchIndex,
    uint32 ProcessedWPData,
    const CFE\_SB\_Buffer\_t * BufPtr,
    uint32 WDTCustomFuncArg )
```

Mission specific custom function.

## Description

This is the mission specific custom function entry point. It gets called whenever the OperatorID in a watchpoint definition table entry is set to [LC\\_OPER\\_CUSTOM](#) and must return one of the defined watchpoint evaluation result types

## Assumptions, External Events, and Notes:

None

## Parameters

in	<i>WatchIndex</i>	The watchpoint number (zero based watchpoint definition table index) for the watchpoint definition that caused the call
in	<i>ProcessedWPData</i>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
in	<i>BufPtr</i>	A <a href="#">CFE_SB_Buffer_t*</a> pointer that references the software bus message that contained the watchpoint data. If the custom function needs the raw watchpoint data, it can use this pointer and the watchpoint definition to extract it.
in	<i>WDTCustomFuncArg</i>	This is the custom function argument for this watchpoint from the watchpoint definition table. It can be used for whatever purpose the mission developers want. LC doesn't use it.

## Returns

Watchpoint evaluation result

## Return values

<a href="#">LC_WATCH_TRUE</a>	Watchpoint true, must be one for RPN evaluation.
<a href="#">LC_WATCH_FALSE</a>	Watchpoint false, must be zero for RPN evaluation.
<a href="#">LC_WATCH_ERROR</a>	Watchpoint error.

## See also

[LC\\_WDTEEntry\\_t](#)

Definition at line 66 of file lc\_custom.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_CFCALL\_ERR\_EID, and LC\_WATCH\_FA←LSE.

Referenced by LC\_ProcessWP().

Here is the call graph for this function:



```
12.23.2.2 LC_ExecuteRTS() void LC_ExecuteRTS (
    uint16 RTSId )
```

Execute RTS.

#### Description

Support function for actionpoint processing that is called to send an RTS request when an actionpoint evaluation determines it has failed

#### Assumptions, External Events, and Notes:

None

#### Parameters

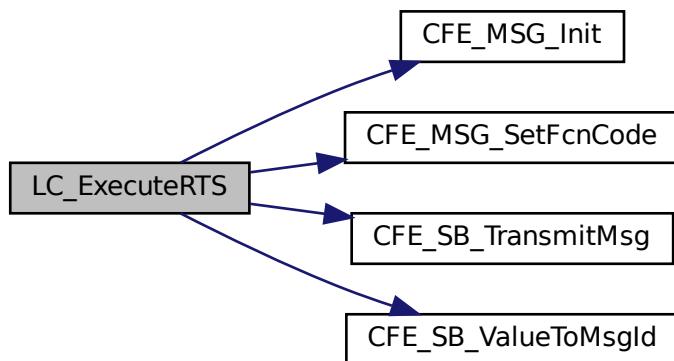
in	<i>RTS</i> ↔ <i>SId</i>	ID of the RTS to request
----	----------------------------	--------------------------

Definition at line 43 of file lc\_custom.c.

References CFE\_MSG\_Init(), CFE\_MSG\_SetFcnCode(), CFE\_SB\_TransmitMsg(), CFE\_SB\_ValueToMsgId(), LC\_RTSRequestCmd\_t::CommandHeader, LC\_RTS\_REQ\_CC, LC\_RTS\_REQ\_MID, LC\_RTSRequestCmd\_t::Payload, and LC\_RTSRequest\_Payload\_t::RTSId.

Referenced by LC\_SampleSingleAP().

Here is the call graph for this function:



## 12.24 apps/lc/fsw/src/lc\_dispatch.c File Reference

```
#include "lc_app.h"
#include "lc_cmds.h"
#include "lc_dispatch.h"
#include "lc_msgids.h"
#include "lc_eventids.h"
```

```
#include "lc_platform_cfg.h"
#include "lc_watch.h"
```

## Functions

- bool [LC\\_VerifyMsgLength](#) (const [CFE\\_MSG\\_Message\\_t](#) \*MsgPtr, size\_t ExpectedLength)
- void [LC\\_SampleAPVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_SendHkVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_NoopVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_ResetCountersVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_SetLCStateVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_SetAPStateVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_SetAPPermOffVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_ResetAPStatsVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- void [LC\\_ResetWPStatsVerifyDispatch](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)
- [CFE\\_Status\\_t LC\\_AppPipe](#) (const [CFE\\_SB\\_Buffer\\_t](#) \*BufPtr)

*Process a command pipe message.*

### 12.24.1 Detailed Description

CFS Limit Checker (LC) command dispatch routines

### 12.24.2 Function Documentation

**12.24.2.1 [LC\\_AppPipe\(\)](#)** [CFE\\_Status\\_t](#) [LC\\_AppPipe](#) (

```
    const CFE\_SB\_Buffer\_t * BufPtr )
```

*Process a command pipe message.*

#### Description

Processes a single software bus command pipe message. Checks the message and command IDs and calls the appropriate routine to handle the message.

All messageIDs other than [LC\\_CMD\\_MID](#), [LC\\_SEND\\_HK\\_MID](#), and [LC\\_SAMPLE\\_AP\\_MID](#) are assumed to be monitor packets.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<a href="#">BufPtr</a>	Pointer to Software Bus buffer
----	------------------------	--------------------------------

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

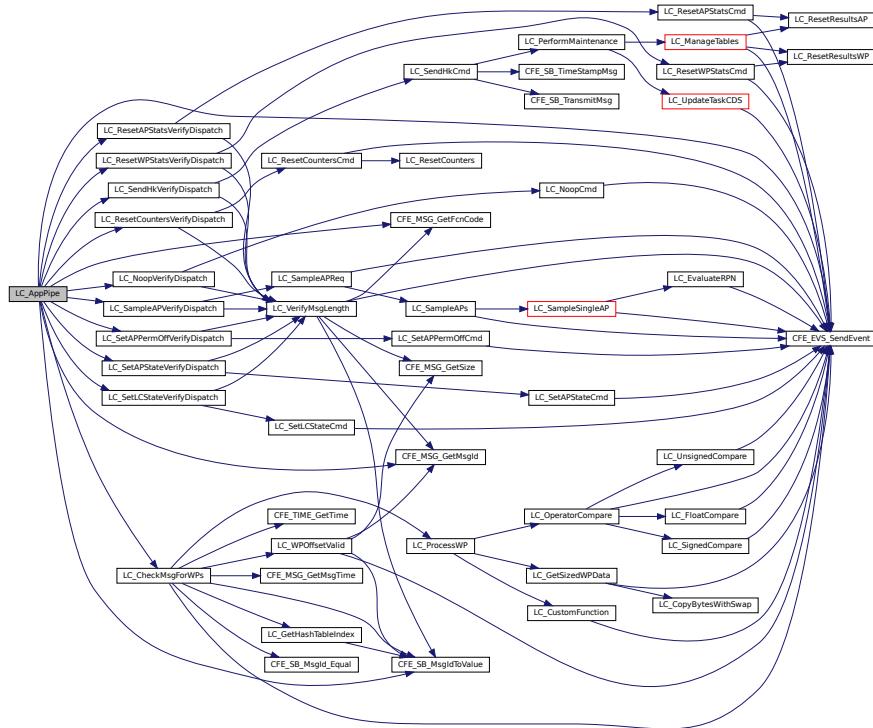
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 245 of file lc\_dispatch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetFcnCode(), CFE\_MSG\_GetMsgId(), CFE\_SB\_INVALID\_MSG\_ID, CFE\_SB\_MsgIdToValue(), CFE\_SUCCESS, LC\_AppData\_t::CmdErrCount, LC\_C\_AppData, LC\_CC\_ERR\_EID, LC\_CheckMsgForWPs(), LC\_CMD\_MID, LC\_NOOP\_CC, LC\_NoopVerifyDispatch(), LC\_RESET\_AP\_STATS\_CC, LC\_RESET\_CC, LC\_RESET\_WP\_STATS\_CC, LC\_ResetAPStatsVerifyDispatch(), LC\_ResetCountersVerifyDispatch(), LC\_ResetWPStatsVerifyDispatch(), LC\_SAMPLE\_AP\_MID, LC\_SampleAPVerifyDispatch(), LC\_SEND\_HK\_MID, LC\_SendHkVerifyDispatch(), LC\_SET\_AP\_PERM\_OFF\_CC, LC\_SET\_AP\_STAT\_E\_CC, LC\_SET\_LC\_STATE\_CC, LC\_SetAPPermOffVerifyDispatch(), LC\_SetAPStateVerifyDispatch(), LC\_SetLCStateVerifyDispatch(), LC\_MListTag::MessageID, and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppMain().

Here is the call graph for this function:



### 12.24.2.2 LC\_NoopVerifyDispatch()

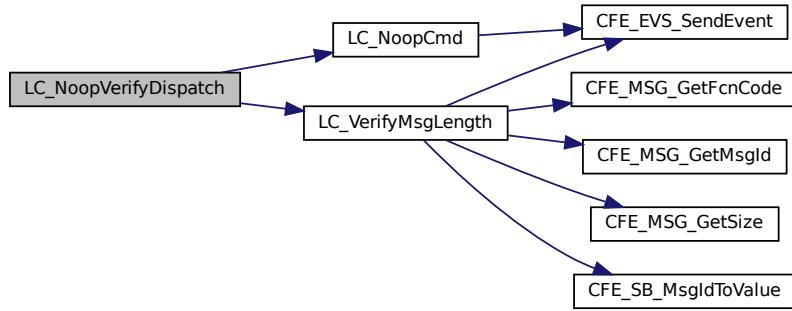
```
void LC_NoopVerifyDispatch (
    const CFE_SB_Buffer_t * BufPtr )
```

Definition at line 140 of file lc\_dispatch.c.

References LC\_NoopCmd(), LC\_VerifyMsgLength(), and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



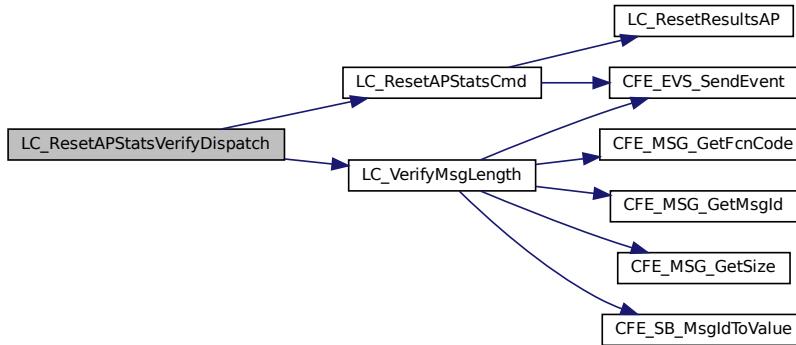
**12.24.2.3 LC\_ResetAPStatsVerifyDispatch()** `void LC_ResetAPStatsVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 215 of file lc\_dispatch.c.

References `LC_ResetAPStatsCmd()`, `LC_VerifyMsgLength()`, and `CFE_SB_Msg::Msg`.

Referenced by `LC_AppPipe()`.

Here is the call graph for this function:



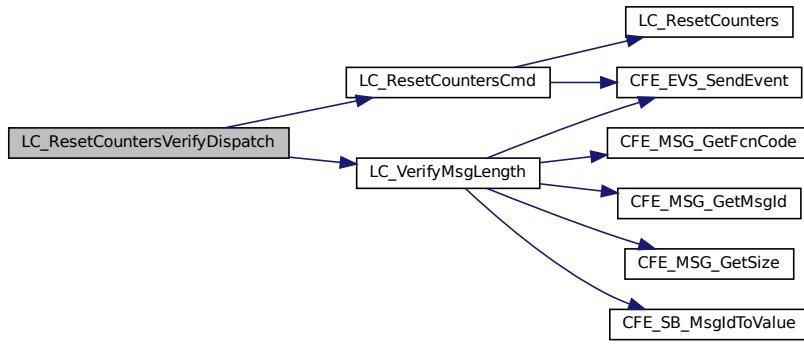
**12.24.2.4 LC\_ResetCountersVerifyDispatch()** `void LC_ResetCountersVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 155 of file lc\_dispatch.c.

References `LC_ResetCountersCmd()`, `LC_VerifyMsgLength()`, and `CFE_SB_Msg::Msg`.

Referenced by `LC_AppPipe()`.

Here is the call graph for this function:



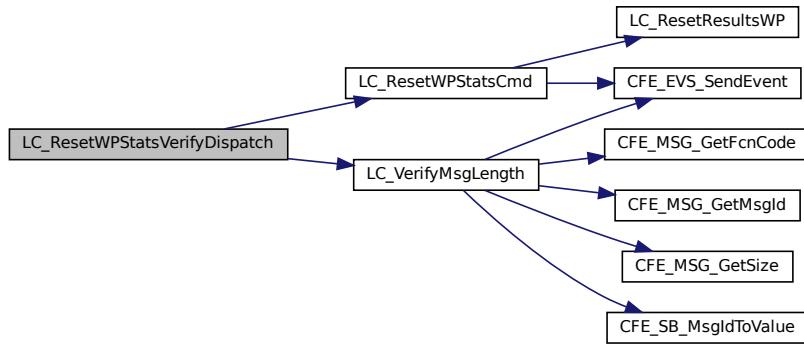
**12.24.2.5 LC\_ResetWPStatsVerifyDispatch()** `void LC_ResetWPStatsVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 230 of file lc\_dispatch.c.

References `LC_ResetWPStatsCmd()`, `LC_VerifyMsgLength()`, and `CFE_SB_Msg::Msg`.

Referenced by `LC_AppPipe()`.

Here is the call graph for this function:



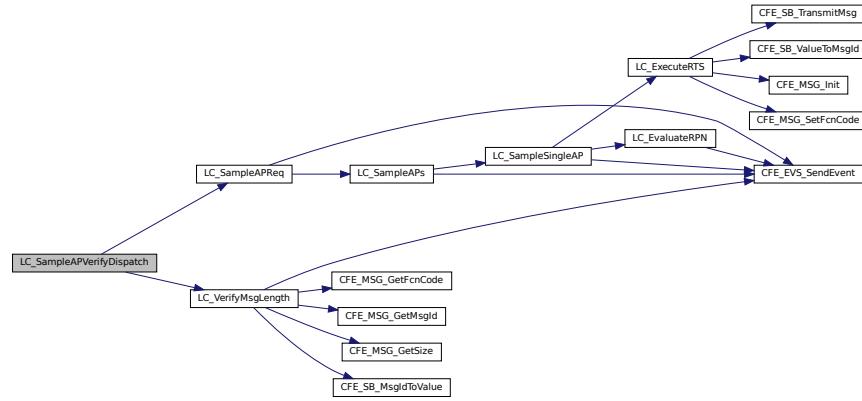
**12.24.2.6 LC\_SampleAPVerifyDispatch()** `void LC_SampleAPVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 104 of file lc\_dispatch.c.

References `LC_SampleAPReq()`, `LC_VerifyMsgLength()`, and `CFE_SB_Msg::Msg`.

Referenced by `LC_AppPipe()`.

Here is the call graph for this function:



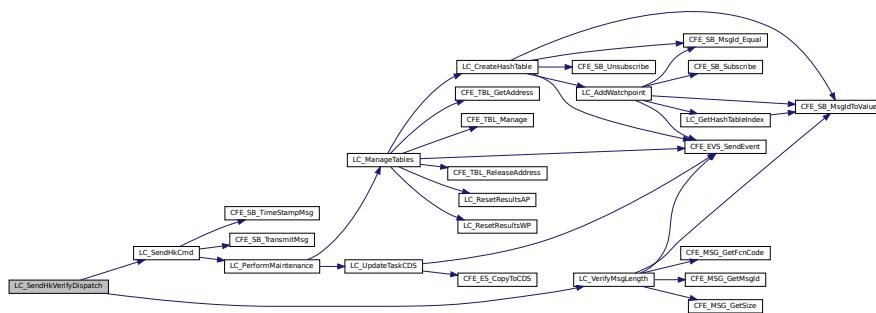
**12.24.2.7 LC\_SendHkVerifyDispatch()** `void LC_SendHkVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 122 of file lc\_dispatch.c.

References LC\_SendHkCmd(), LC\_VerifyMsgLength(), and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



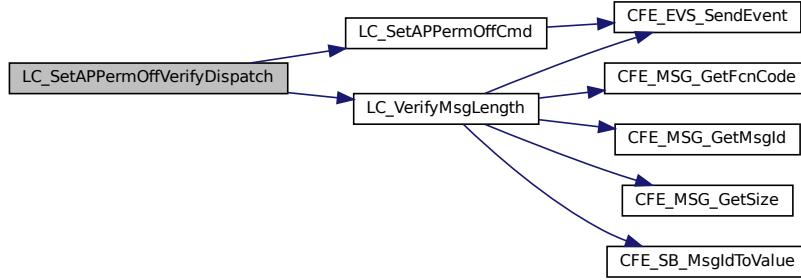
**12.24.2.8 LC\_SetAPPermOffVerifyDispatch()** `void LC_SetAPPermOffVerifyDispatch (const CFE_SB_Buffer_t * BufPtr )`

Definition at line 200 of file lc\_dispatch.c.

References LC\_SetAPPermOffCmd(), LC\_VerifyMsgLength(), and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



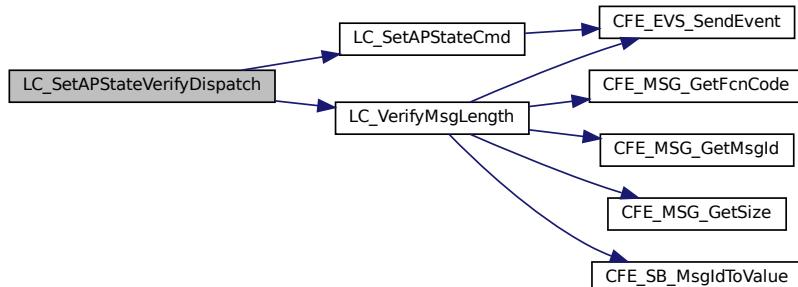
**12.24.2.9 LC\_SetAPStateVerifyDispatch()** void LC\_SetAPStateVerifyDispatch ( const CFE\_SB\_Buffer\_t \* BufPtr )

Definition at line 185 of file lc\_dispatch.c.

References LC\_SetAPStateCmd(), LC\_VerifyMsgLength(), and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



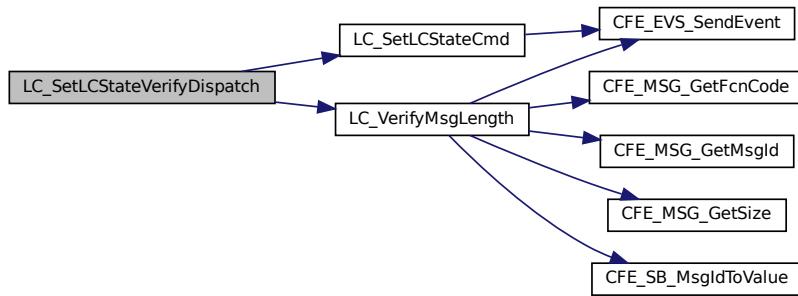
**12.24.2.10 LC\_SetLCStateVerifyDispatch()** void LC\_SetLCStateVerifyDispatch ( const CFE\_SB\_Buffer\_t \* BufPtr )

Definition at line 170 of file lc\_dispatch.c.

References LC\_SetLCStateCmd(), LC\_VerifyMsgLength(), and CFE\_SB\_Msg::Msg.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



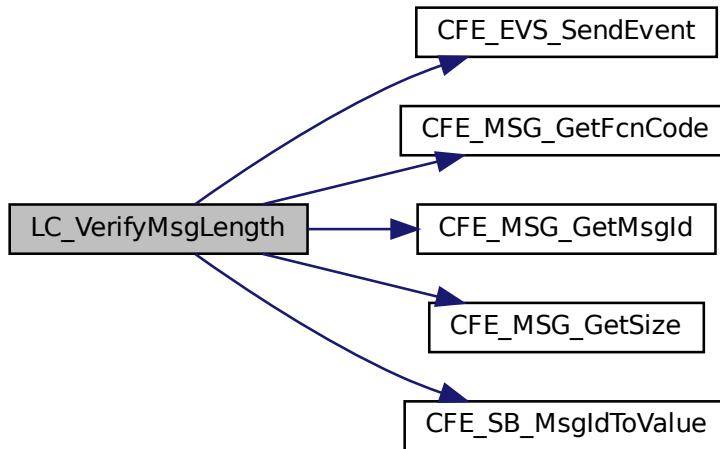
**12.24.2.11 LC\_VerifyMsgLength()** `bool LC_VerifyMsgLength (`  
`const CFE_MSG_Message_t * MsgPtr,`  
`size_t ExpectedLength )`

Definition at line 41 of file lc\_dispatch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetFcnCode(), CFE\_MSG\_GetMsgId(), CFE\_MSG\_GetSize(), CFE\_SB\_INVALID\_MSG\_ID, CFE\_SB\_MsgIdToValue(), LC\_AppData\_t::CmdErrCount, LC\_AppData, LC\_APSAMPLE\_LEN\_ERR\_EID, LC\_HKREQ\_LEN\_ERR\_EID, LC\_LEN\_ERR\_EID, LC\_SAM\_PLE\_AP\_MID, LC\_SEND\_HK\_MID, and LC\_MListTag::MessageID.

Referenced by LC\_NoopVerifyDispatch(), LC\_ResetAPStatsVerifyDispatch(), LC\_ResetCountersVerifyDispatch(), LC\_ResetWPStatsVerifyDispatch(), LC\_SampleAPVerifyDispatch(), LC\_SendHkVerifyDispatch(), LC\_SetAPPPermOffVerifyDispatch(), LC\_SetAPStateVerifyDispatch(), and LC\_SetLCStateVerifyDispatch().

Here is the call graph for this function:



## 12.25 apps/lc/fsw/src/lc\_dispatch.h File Reference

```
#include "cfe_sb_api_typedefs.h"
```

### Functions

- **CFE\_Status\_t LC\_AppPipe (const CFE\_SB\_Buffer\_t \*BufPtr)**  
*Process a command pipe message.*

#### 12.25.1 Detailed Description

Specification for the CFS Limit Checker (LC) routines that handle command processing

#### 12.25.2 Function Documentation

**12.25.2.1 LC\_AppPipe()** `CFE_Status_t LC_AppPipe (`  
    `const CFE_SB_Buffer_t * BufPtr )`

Process a command pipe message.

##### Description

Processes a single software bus command pipe message. Checks the message and command IDs and calls the appropriate routine to handle the message.

All messageIDs other than `LC_CMD_MID`, `LC_SEND_HK_MID`, and `LC_SAMPLE_AP_MID` are assumed to be monitor packets.

##### Assumptions, External Events, and Notes:

None

##### Parameters

in	<code>BufPtr</code>	Pointer to Software Bus buffer
----	---------------------	--------------------------------

##### Returns

Execution status, see [cFE Return Code Defines](#)

##### Return values

<code>CFE_SUCCESS</code>	Successful execution.
--------------------------	-----------------------

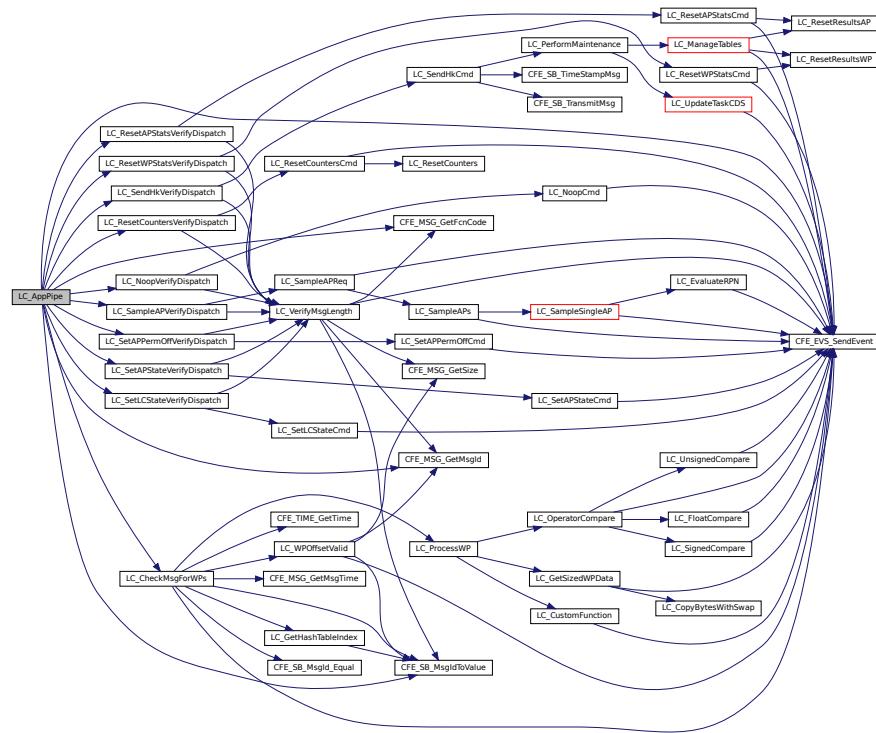
Definition at line 245 of file lc\_dispatch.c.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_SendEvent()`, `CFE_MSG_GetFcnCode()`, `CFE_MSG_GetMsgId()`, `CFE_SB_INVALID_MSG_ID`, `CFE_SB_MsgIdToValue()`, `CFE_SUCCESS`, `LC_AppData_t::CmdErrCount`, `L_C_AppData`, `LC_CC_ERR_EID`, `LC_CheckMsgForWPs()`, `LC_CMD_MID`, `LC_NOOP_CC`, `LC_NoopVerifyDispatch()`, `LC_RESET_AP_STATS_CC`, `LC_RESET_CC`, `LC_RESET_WP_STATS_CC`, `LC_ResetAPStatsVerifyDispatch()`, `L_C_ResetCountersVerifyDispatch()`, `LC_ResetWPStatsVerifyDispatch()`, `LC_SAMPLE_AP_MID`, `LC_SampleAPVerifyDispatch()`, `LC_SEND_HK_MID`, `LC_SendHkVerifyDispatch()`, `LC_SET_AP_PERM_OFF_CC`, `LC_SET_AP_STAT_E_CC`, `LC_SET_LC_STATE_CC`, `LC_SetAPPermOffVerifyDispatch()`, `LC_SetAPStateVerifyDispatch()`, `LC_SetLC`

`StateVerifyDispatch()`, `LC_MListTag::MessageID`, and `CFE_SB_Msg::Msg.`

Referenced by LC\_AppMain().

Here is the call graph for this function:



## 12.26 apps/lc/fsw/src/lc\_utils.c File Reference

```
#include "lc_app.h"
#include "lc_cmds.h"
#include "lc_msgids.h"
#include "lc_eventids.h"
#include "lc_version.h"
#include "lc_action.h"
#include "lc_watch.h"
#include "lc_platform_cfg.h"
#include "lc_utils.h"
```

## Functions

- **CFE\_Status\_t LC\_ManageTables (void)**  
*Manage LC application tables.*
  - **CFE\_Status\_t LC\_UpdateTaskCDS (void)**  
*Write to Critical Data Store (CDS)*
  - **CFE\_Status\_t LC\_PerformMaintenance (void)**  
*Perform Routine Maintenance.*

### 12.26.1 Detailed Description

CFS Limit Checker (LC) utility functions

### 12.26.2 Function Documentation

**12.26.2.1 LC\_ManageTables()** [CFE\\_Status\\_t](#) LC\_ManageTables (   
 void )

Manage LC application tables.

#### Description

Checks the status of the LC application tables and provides an opportunity to dump or reload tables.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

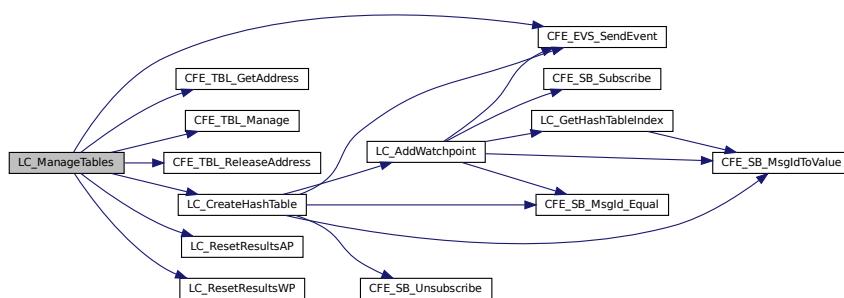
[LC\\_WDT\\_GETADDR\\_ERR\\_EID](#), [LC\\_ADT\\_GETADDR\\_ERR\\_EID](#)

Definition at line 44 of file lc\_utils.c.

References LC\_OperData\_t::ADTHandle, LC\_OperData\_t::ADTPtr, LC\_OperData\_t::ARTHandle, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_GetAddress(), CFE\_TBL\_INFO\_UPDATED, CFE\_TBL\_Manage(), CFE\_TBL\_ReleaseAddress(), LC\_ADT\_GETADDR\_ERR\_EID, LC\_CreateHashTable(), LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_WDT\_GETADDR\_ERR\_EID, LC\_OperData\_t::WDTHandle, LC\_OperData\_t::WDPtr, and LC\_OperData\_t::WRTHandle.

Referenced by LC\_PerformMaintenance().

Here is the call graph for this function:



**12.26.2.2 LC\_PerformMaintenance()** `CFE_Status_t LC_PerformMaintenance ( void )`

Perform Routine Maintenance.

#### Description

This function manages LC tables and updates the Task CDS.

#### Assumptions, External Events, and Notes:

This function is called during the housekeeping cycle and if the software bus times out receiving a message. The CDS is updated only at these times. One alternative was to do the CDS update every time the results tables were modified but that would result in the update occurring several times per second. By doing the update in the housekeeping and timeout cases, we cut down on the update frequency at the cost of the stored data being a couple of seconds old when a processor reset does occur.

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

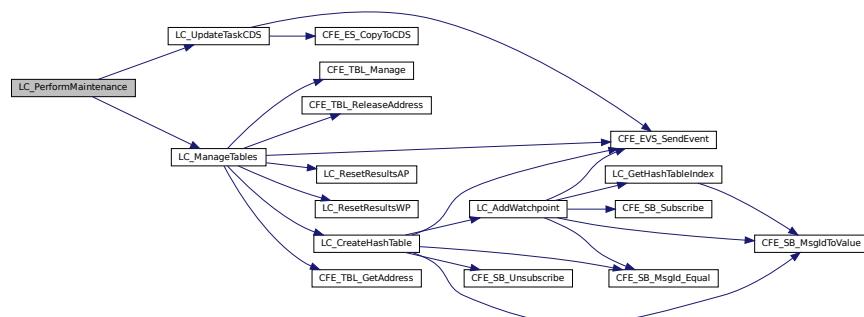
<code>CFE_SUCCESS</code>	Successful execution.
--------------------------	-----------------------

Definition at line 167 of file lc\_utils.c.

References `CFE_SUCCESS`, `LC_OperData_t::HaveActiveCDS`, `LC_ManageTables()`, `LC_OperData`, and `LC_UpdateTaskCDS()`.

Referenced by `LC_AppMain()`, and `LC_SendHkCmd()`.

Here is the call graph for this function:



**12.26.2.3 LC\_UpdateTaskCDS()** `CFE_Status_t LC_UpdateTaskCDS ( void )`

Write to Critical Data Store (CDS)

**Description**

This function updates the CDS areas containing the watchpoint results table, the actionpoint results table and the LC application global data.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [CFE Return Code Defines](#)

**Return values**

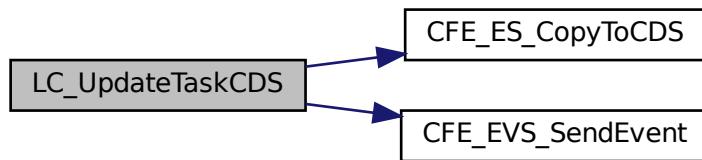
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 113 of file lc\_utils.c.

References LC\_OperData\_t::AppDataCDSHandle, LC\_OperData\_t::ARTDataCDSHandle, LC\_OperData\_t::ARTPPr, LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_CopyToCDS(), CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, LC\_APP\_NO\_SAVE\_START\_ERR\_EID, LC\_AppData, LC\_ART\_NO\_SAVE\_ERR\_EID, LC\_CDS\_SAVED, LC\_OperData, LC\_WRT\_NO\_SAVE\_ERR\_EID, LC\_OperData\_t::WRTDataCDSHandle, and LC\_OperData\_t::WRTPPr.

Referenced by LC\_AppMain(), LC\_LoadDefaultTables(), and LC\_PerformMaintenance().

Here is the call graph for this function:

**12.27 apps/lc/fsw/src/lc\_utils.h File Reference**

```
#include "cfe.h"
```

**Functions**

- [CFE\\_Status\\_t LC\\_ManageTables \(void\)](#)  
*Manage LC application tables.*
- [CFE\\_Status\\_t LC\\_UpdateTaskCDS \(void\)](#)  
*Write to Critical Data Store (CDS)*
- [CFE\\_Status\\_t LC\\_PerformMaintenance \(void\)](#)  
*Perform Routine Maintenance.*

### 12.27.1 Detailed Description

CFS Limit Checker (LC) utility functions

### 12.27.2 Function Documentation

**12.27.2.1 LC\_ManageTables()** [CFE\\_Status\\_t](#) LC\_ManageTables (   
 void )

Manage LC application tables.

#### Description

Checks the status of the LC application tables and provides an opportunity to dump or reload tables.

#### Assumptions, External Events, and Notes:

None

#### Returns

Execution status, see [cFE Return Code Defines](#)

#### Return values

<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

#### See also

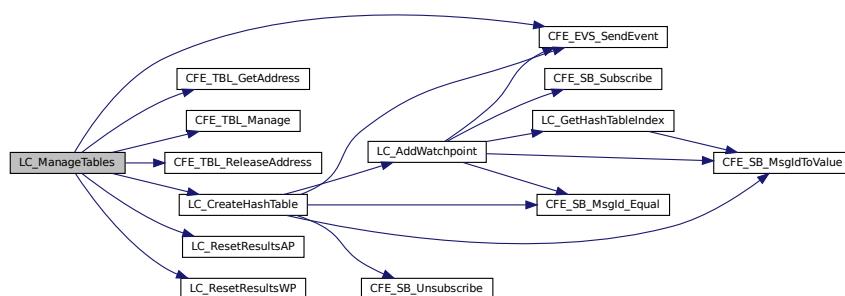
[LC\\_WDT\\_GETADDR\\_ERR\\_EID](#), [LC\\_ADT\\_GETADDR\\_ERR\\_EID](#)

Definition at line 44 of file lc\_utils.c.

References LC\_OperData\_t::ADTHandle, LC\_OperData\_t::ADTPtr, LC\_OperData\_t::ARTHandle, CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, CFE\_TBL\_GetAddress(), CFE\_TBL\_INFO\_UPDATED, CFE\_TBL\_Manage(), CFE\_TBL\_ReleaseAddress(), LC\_ADT\_GETADDR\_ERR\_EID, LC\_CreateHashTable(), LC\_MAX\_ACTIONPOINTS, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_ResetResultsAP(), LC\_ResetResultsWP(), LC\_WDT\_GETADDR\_ERR\_EID, LC\_OperData\_t::WDTHandle, LC\_OperData\_t::WDPtr, and LC\_OperData\_t::WRTHandle.

Referenced by LC\_PerformMaintenance().

Here is the call graph for this function:



**12.27.2.2 LC\_PerformMaintenance()** `CFE_Status_t LC_PerformMaintenance ( void )`

Perform Routine Maintenance.

#### Description

This function manages LC tables and updates the Task CDS.

#### Assumptions, External Events, and Notes:

This function is called during the housekeeping cycle and if the software bus times out receiving a message. The CDS is updated only at these times. One alternative was to do the CDS update every time the results tables were modified but that would result in the update occurring several times per second. By doing the update in the housekeeping and timeout cases, we cut down on the update frequency at the cost of the stored data being a couple of seconds old when a processor reset does occur.

#### Returns

Execution status, see [CFE Return Code Defines](#)

#### Return values

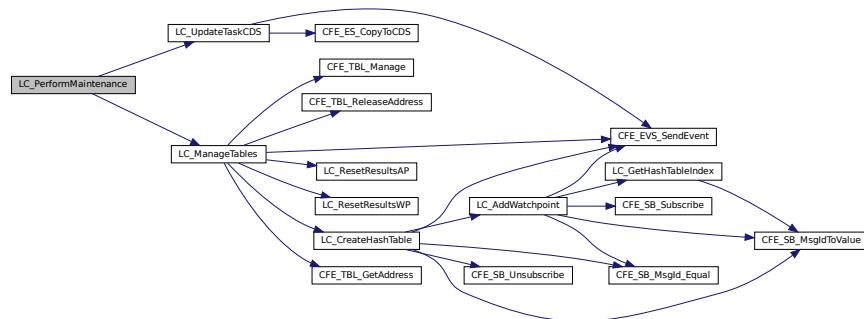
<code>CFE_SUCCESS</code>	Successful execution.
--------------------------	-----------------------

Definition at line 167 of file lc\_utils.c.

References `CFE_SUCCESS`, `LC_OperData_t::HaveActiveCDS`, `LC_ManageTables()`, `LC_OperData`, and `LC_UpdateTaskCDS()`.

Referenced by `LC_AppMain()`, and `LC_SendHkCmd()`.

Here is the call graph for this function:



**12.27.2.3 LC\_UpdateTaskCDS()** `CFE_Status_t LC_UpdateTaskCDS ( void )`

Write to Critical Data Store (CDS)

**Description**

This function updates the CDS areas containing the watchpoint results table, the actionpoint results table and the LC application global data.

**Assumptions, External Events, and Notes:**

None

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

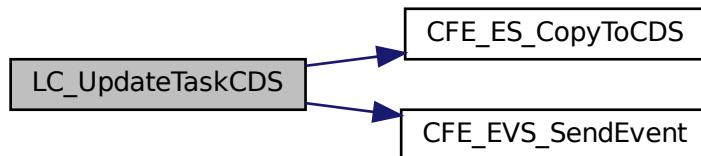
<a href="#">CFE_SUCCESS</a>	Successful execution.
-----------------------------	-----------------------

Definition at line 113 of file lc\_utils.c.

References LC\_OperData\_t::AppDataCDSHandle, LC\_OperData\_t::ARTDataCDSHandle, LC\_OperData\_t::ARTPPr, LC\_AppData\_t::CDSSavedOnExit, CFE\_ES\_CopyToCDS(), CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SUCCESS, LC\_APP\_NO\_SAVE\_START\_ERR\_EID, LC\_AppData, LC\_ART\_NO\_SAVE\_ERR\_EID, LC\_CDS\_SAVED, LC\_OperData, LC\_WRT\_NO\_SAVE\_ERR\_EID, LC\_OperData\_t::WRTDataCDSHandle, and LC\_OperData\_t::WRTPPr.

Referenced by LC\_AppMain(), LC\_LoadDefaultTables(), and LC\_PerformMaintenance().

Here is the call graph for this function:



## 12.28 apps/lc/fsw/src/lc\_verify.h File Reference

```
#include <stdint.h>
```

### 12.28.1 Detailed Description

Contains CFS Limit Checker (LC) macros that run preprocessor checks on mission and platform configurable parameters

## 12.29 apps/lc/fsw/src/lc\_version.h File Reference

### Macros

- #define [LC\\_MAJOR\\_VERSION](#) 2

- `#define LC_MINOR_VERSION 2`  
*Major version number.*
- `#define LC_REVISION 99`  
*Minor version number.*
- `#define LC_VERSION 9902`  
*Revision number.*

### 12.29.1 Detailed Description

Contains version tags for the Core Flight System (CFS) Limit Checker (LC) Application.

## 12.30 apps/lc/fsw/src/lc\_watch.c File Reference

```
#include "lc_app.h"
#include "lc_watch.h"
#include "lc_eventids.h"
#include "lc_custom.h"
#include "lc_perfids.h"
#include "lc_platform_cfg.h"
#include <float.h>
#include <math.h>
```

### Macros

- `#define isnan(x) ((x) != (x))`
- `#define isfinite(x) ((x) > -FLT_MAX && (x) < FLT_MAX)`

### Functions

- `uint32 LC_GetHashTableIndex (CFE_SB_MsgId_t MessageID)`  
*Convert messageID into hash table index.*
- `void LC_CreateHashTable (void)`  
*Create watchpoint hash table.*
- `LC_WatchPtList_t * LC_AddWatchpoint (CFE_SB_MsgId_t MessageID)`  
*Add one watchpoint linked list entry during creation of hash table.*
- `void LC_CheckMsgForWPs (CFE_SB_MsgId_t MessageID, const CFE_SB_Buffer_t *BufPtr)`  
*Check message for watchpoints.*
- `void LC_ProcessWP (uint16 WatchIndex, const CFE_SB_Buffer_t *BufPtr, CFE_TIME_SysTime_t Timestamp)`  
*Process a single watchpoint.*
- `uint8 LC_OperatorCompare (uint16 WatchIndex, uint32 ProcessedWPData)`  
*Operator comparison.*
- `uint8 LC_SignedCompare (uint16 WatchIndex, int32 WPValue, int32 CompareValue)`  
*Signed comparison.*
- `uint8 LC_UnsignedCompare (uint16 WatchIndex, uint32 WPValue, uint32 CompareValue)`  
*Unsigned comparison.*
- `uint8 LC_FloatCompare (uint16 WatchIndex, LC_MultiType_t *WPMultiType, LC_MultiType_t *CompareMultiType)`  
*Float comparison.*
- `bool LC_WPOffsetValid (uint16 WatchIndex, const CFE_SB_Buffer_t *BufPtr)`  
*Watchpoint offset valid.*

- void [LC\\_CopyBytesWithSwap](#) ([LC\\_MultiType\\_t](#) \*DestBuffer, const [uint8](#) \*SrcPtr, [LC\\_MultiType\\_t](#) \*SwapMap, [uint32](#) NumBytes)
- bool [LC\\_GetSizedWPData](#) ([uint16](#) WatchIndex, const [uint8](#) \*WPDataPtr, [uint32](#) \*SizedDataPtr)  
*Get sized data.*
- [int32 LC\\_ValidateWDT](#) (void \*TableData)  
*Validate watchpoint definition table (WDT)*

### 12.30.1 Detailed Description

Functions used for CFS Limit Checker watchpoint processing

### 12.30.2 Macro Definition Documentation

**12.30.2.1 `isfinite`** #define isfinite(  
    x ) ((x) > -FLT\_MAX && (x) < FLT\_MAX)

Definition at line 53 of file `lc_watch.c`.

**12.30.2.2 `isnan`** #define isnan(  
    x ) ((x) != (x))

Definition at line 50 of file `lc_watch.c`.

### 12.30.3 Function Documentation

**12.30.3.1 `LC_AddWatchpoint()`** [LC\\_WatchPtList\\_t](#)\* [LC\\_AddWatchpoint](#) (  
    const [CFE\\_SB\\_MsgId\\_t](#) MessageID )

Add one watchpoint linked list entry during creation of hash table.

#### Description

Utility function that adds another link to the watchpoint linked list for the specified messageID. The function will also add a messageID linked list entry to the hash table if this is the first reference to that messageID. The function will also subscribe to the messageID if this is the first reference to that messageID. The function will return a pointer to the watchpoint linked list entry just added.

The following code supports use of the watchpoint hash table:

1) [LC\\_GetHashTableIndex](#) - convert messageID to hash table index 2) [LC\\_CreateHashTable](#) - after load Watchpoint Definition Table 3) [LC\\_AddWatchpoint](#) - add one watchpoint to hash table 4) [LC\\_CheckMsgForWPs](#) - process all WP's that reference messageID

The following data structures support the hash table:

1) Hash table (256 entries) 2) Array of links for messageID linked lists (LC\_MAX\_WATCHPOINTS) 3) Array of links for watchpoint linked lists (LC\_MAX\_WATCHPOINTS)

Rather than search the entire Watchpoint Definition Table to find the watchpoints that reference a particular messageID, LC does the following:

1) Call hash table function (convert messageID to hash table index) 2) Get messageID linked list from indexed hash table entry 3) Search messageID list (max 8) for matching messageID 4) Get watchpoint linked list from matching messageID link 5) Done - only watchpoints that reference messageID are in list

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>MessageID</i>	SoftwareBus packet message ID
----	------------------	-------------------------------

**Returns**

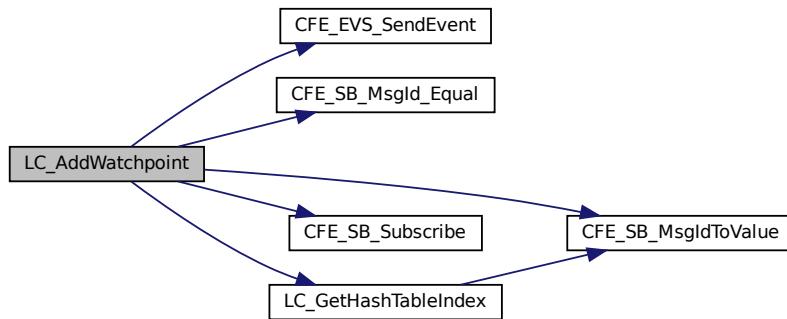
Pointer to the watchpoint linked list entry just added

Definition at line 164 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SB\_MsgId\_Equal(), CFE\_SB\_MsgIdToValue(), CFE\_SB\_Subscribe(), CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HashTable, LC\_GetHashTableIndex(), LC\_OperData, LC\_SUB\_WP\_ERR\_EID, LC\_MListTag::MessageID, LC\_OperData\_t::MessageIDsCount, LC\_OperData\_t::MessageLinks, LC\_WListTag::Next, LC\_MListTag::Next, LC\_OperData\_t::WatchpointCount, LC\_OperData\_t::WatchPtLinks, and LC\_MListTag::WatchPtList.

Referenced by LC\_CreateHashTable().

Here is the call graph for this function:

**12.30.3.2 LC\_CheckMsgForWPs()** void LC\_CheckMsgForWPs (

```

    CFE_SB_MsgId_t MessageID,
    const CFE_SB_Buffer_t * BufPtr )
```

Check message for watchpoints.

**Description**

Processes a single software bus command pipe message that doesn't match any LC predefined command or message ids, which indicates it's probably a watchpoint message. It will search the watchpoint definition table for matches to this MessageID and handle them as needed.

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>MessageID</i>	Message ID
in	<i>BufPtr</i>	Pointer to Software Bus buffer

See also

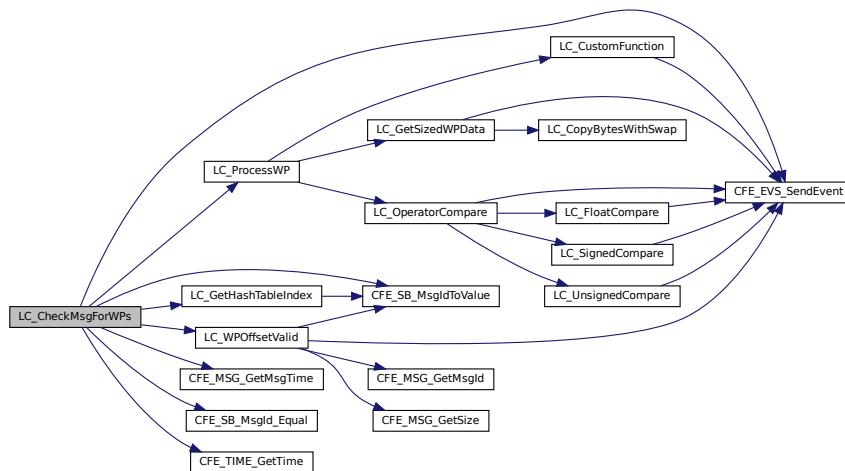
[LC\\_ProcessWP](#)

Definition at line 267 of file lc\_watch.c.

References CFE\_ES\_PerfLogEntry, CFE\_ES\_PerfLogExit, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetMsgTime(), CFE\_SB\_MsgId\_Equal(), CFE\_SB\_MsgIdToValue(), CFE\_TIME\_GetTime(), LC\_AppData\_t::CurrentLCState, LC\_OperData\_t::HashTable, LC\_AppData, LC\_GetHashTableIndex(), LC\_MID\_INF\_EID, LC\_OperData, LC\_ProcessWP(), LC\_STATE\_DISABLED, LC\_WDT\_SEARCH\_PERF\_ID, LC\_WPOffsetValid(), LC\_MListTag::MessageID, LC\_AppData\_t::MonitoredMsgCount, CFE\_SB\_Msg::Msg, LC\_WListTag::Next, LC\_MListTag::Next, CFE\_TIME\_SysTime::Seconds, CFE\_TIME\_SysTime::Subseconds, LC\_WListTag::WatchIndex, and LC\_MListTag::WatchPtList.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



**12.30.3.3 LC\_CopyBytesWithSwap()** `void LC_CopyBytesWithSwap (`  
 `LC_MultiType_t * DestBuffer,`  
 `const uint8 * SrcPtr,`  
 `LC_MultiType_t * SwapMap,`  
 `uint32 NumBytes )`

Definition at line 844 of file lc\_watch.c.

Referenced by LC\_GetSizedWPData().

**12.30.3.4 LC\_CreateHashTable()** `void LC_CreateHashTable (`  
 `void )`

Create watchpoint hash table.

**Description**

Creates a hash table to optimize the process of getting direct access to all the watchpoint table entries that reference a particular MessageID without having to search the entire table.

**Assumptions, External Events, and Notes:**

None

**See also**

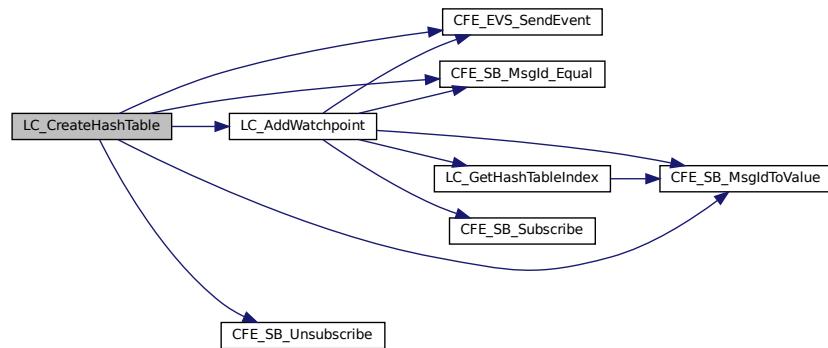
[LC\\_GetHashTableIndex](#), [LC\\_AddWatchpoint](#)

Definition at line 92 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SB\_INVALID\_MSG\_ID, CFE\_SB\_MsgIdEqual(), CFE\_SB\_MsgIdToValue(), CFE\_SB\_Unsubscribe(), CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_WDTEEntry\_t::DataType, LC\_OperData\_t::HashTable, LC\_AddWatchpoint(), LC\_DATA\_WATCH\_NOT\_USED, LC\_MAX\_WATCHPOINTS, LC\_OperData, LC\_UNSUB\_WP\_ERR\_EID, LC\_WDTEEntry\_t::MessageID, LC\_MListTag::MessageID, LC\_OperData\_t::MessageIDsCount, LC\_OperData\_t::MessageLinks, LC\_WListTag::Next, LC\_WListTag::WatchIndex, LC\_OperData\_t::WatchpointCount, LC\_OperData\_t::WatchPtLinks, and LC\_OperData\_t::WDTPr.

Referenced by LC\_ManageTables(), and LC\_TableInit().

Here is the call graph for this function:



**12.30.3.5 LC\_FloatCompare()** `uint8 LC_FloatCompare (`  
 `uint16 WatchIndex,`  
 `LC_MultiType_t * WPMultiType,`  
 `LC_MultiType_t * CompareMultiType )`

Float comparison.

**Description**

Support function for watchpoint processing that will perform a floating point watchpoint data comparison based upon the operator specified in the watchpoint definition table

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<code>WatchIndex</code>	The watchpoint number to compare (zero based watchpoint definition table index)
----	-------------------------	---

**Parameters**

in	<i>WPMultiType</i>	The watchpoint data extracted from the message that it was contained in. Stored in a multi-type union. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
in	<i>CompareMultiType</i>	The comparison value specified in the watchpoint definition table. Stored in a muti-type union so it can easily be accessed as a uint32 for validity checks

**Returns**

Comparison result

**Return values**

<i>LC_WATCH_TRUE</i>	Watchpoint true, must be one for RPN evaluation.
<i>LC_WATCH_FALSE</i>	Watchpoint false, must be zero for RPN evaluation.
<i>LC_WATCH_ERROR</i>	Watchpoint error.

Definition at line 674 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), isnan, LC\_FLOAT\_TOLERANCE, LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LE, LC\_OPER\_LT, LC\_OPER\_NE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_TRUE, LC\_WP\_NAN\_ERR\_EID, LC\_WP\_OPERID\_ERR\_EID, LC\_WDT\_Entry\_t::OperatorID, and LC\_OperData\_t::WDTPtr.

Referenced by LC\_OperatorCompare().

Here is the call graph for this function:



### 12.30.3.6 LC\_GetHashTableIndex() `uint32 LC_GetHashTableIndex (`

`CFE_SB_MsgId_t MessageID )`

Convert messageID into hash table index.

**Description**

Utility function for watchpoint processing that converts a messageID into an index into the watchpoint hash table.

The following code supports use of the watchpoint hash table:

- 1) `LC_GetHashTableIndex` - convert messageID to hash table index
- 2) `LC_CreateHashTable` - after load Watchpoint Definition Table
- 3) `LC_AddWatchpoint` - add one watchpoint to hash table
- 4) `LC_CheckMsgForWPs` - process all WP's that reference messageID

The following data structures support the hash table:

- 1) Hash table (256 entries)
- 2) Array of links for messageID linked lists (LC\_MAX\_WATCHPOINTS)
- 3) Array of links for watchpoint linked lists (LC\_MAX\_WATCHPOINTS)

Rather than search the entire Watchpoint Definition Table to find the watchpoints that reference a particular messageID, LC does the following:

- 1) Call hash table function (convert messageID to hash table index)
- 2) Get messageID linked list from indexed hash table entry
- 3) Search messageID list (max 8) for matching messageID
- 4) Get watchpoint linked list from matching messageID link
- 5) Done - only watchpoints that reference messageID are in list

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>MessageID</i>	SoftwareBus packet message ID
----	------------------	-------------------------------

#### Returns

Index into watchpoint hash table

Definition at line 62 of file lc\_watch.c.

References CFE\_SB\_MsgIdToValue(), LC\_HASH\_TABLE\_MASK, and LC\_MListTag::MessageID.

Referenced by LC\_AddWatchpoint(), and LC\_CheckMsgForWPs().

Here is the call graph for this function:



```

12.30.3.7 LC_GetSizedWPData() bool LC_GetSizedWPData (
    uint16 WatchIndex,
    const uint8 * WPDataPtr,
    uint32 * SizedDataPtr )

```

Get sized data.

#### Description

Support function for watchpoint processing that will extract the watchpoint data from a software bus message based upon the data type specified in the watchpoint definition table and store it in a uint32. If there are any endian differences between LC and the watchpoint data, this is where it will get fixed up.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to extract (zero based watchpoint definition table index)
in	<i>WPDataPtr</i>	A pointer to the first byte of the watchpoint data as it exists in the software bus message it was received in
Generated by	<i>SizedDataPtr</i>	A pointer to where the extracted watchpoint data should be stored

## Returns

Boolean execution status result

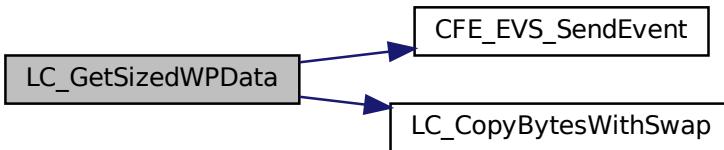
## Return values

<code>true</code>	No error
<code>false</code>	An error occurred

Definition at line 863 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_WRTEntry\_t::CountdownToStale, LC\_WD←TEntry\_t::DataType, LC\_16BIT\_BE\_VAL, LC\_16BIT\_LE\_VAL, LC\_32BIT\_BE\_VAL, LC\_32BIT\_LE\_VAL, LC\_Copy←BytesWithSwap(), LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WAT←CH\_UDWORD\_BE, LC\_DATA\_WATCH\_UDWORD\_LE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_U←WORD\_LE, LC\_DATA\_WATCH\_WORD\_BE, LC\_DATA\_WATCH\_WORD\_LE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WP\_DATATYPE\_ERR\_EID, LC\_MultiType\_t::Signed16, LC\_MultiType\_t::Signed8, LC\_MultiType\_t::Unsigned16, LC\_MultiType\_t::Unsigned32, LC\_WRTEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr. Referenced by LC\_ProcessWP().

Here is the call graph for this function:



**12.30.3.8 LC\_OperatorCompare()** `uint8 LC_OperatorCompare (`  
 `uint16 WatchIndex,`  
 `uint32 ProcessedWPData )`

Operator comparison.

## Description

Support function for watchpoint processing that will perform the watchpoint data comparison based upon the operator and data type specified in the watchpoint definition table

## Assumptions, External Events, and Notes:

None

## Parameters

<code>in</code>	<code>WatchIndex</code>	The watchpoint number to compare (zero based watchpoint definition table index)
<code>in</code>	<code>ProcessedWPData</code>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition

**Returns**

Operation comparison result from [LC\\_SignedCompare](#), [LC\\_UnsignedCompare](#), [LC\\_FloatCompare](#)

**Return values**

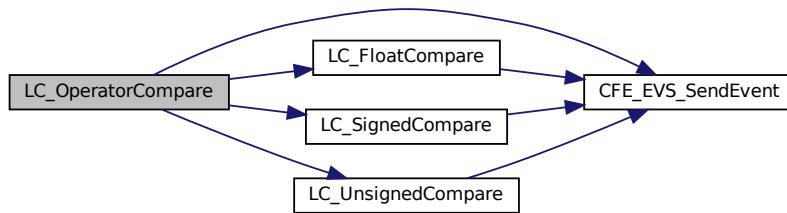
<a href="#">LC_WATCH_ERROR</a>	Watchpoint error.
--------------------------------	-------------------

Definition at line 460 of file lc\_watch.c.

References [CFE\\_EVS\\_EventType\\_ERROR](#), [CFE\\_EVS\\_SendEvent\(\)](#), [LC\\_WDTEEntry\\_t::ComparisonValue](#), [LC\\_WDTEEntry\\_t::DataType](#), [LC\\_DATA\\_WATCH\\_BYTE](#), [LC\\_DATA\\_WATCH\\_DWORD\\_BE](#), [LC\\_DATA\\_WATCH\\_DWORD\\_LE](#), [LC\\_DATA\\_WATCH\\_FLOAT\\_BE](#), [LC\\_DATA\\_WATCH\\_FLOAT\\_LE](#), [LC\\_DATA\\_WATCH\\_UBYTE](#), [LC\\_DATA\\_WATCH\\_UDWORD\\_BE](#), [LC\\_DATA\\_WATCH\\_UDWORD\\_LE](#), [LC\\_DATA\\_WATCH\\_UWORD\\_BE](#), [LC\\_DATA\\_WATCH\\_UWORD\\_LE](#), [LC\\_DataWatchWord\\_BE](#), [LC\\_DataWatchWord\\_LE](#), [LC\\_FloatCompare\(\)](#), [LC\\_OperData](#), [LC\\_SignedCompare\(\)](#), [LC\\_UnsignedCompare\(\)](#), [LC\\_WATCH\\_ERROR](#), [LC\\_WP\\_DATATYPE\\_ERR\\_EID](#), [LC\\_MultiType\\_t::Signed16](#), [LC\\_MultiType\\_t::Signed32](#), [LC\\_MultiType\\_t::Signed8](#), [LC\\_MultiType\\_t::Unsigned16](#), [LC\\_MultiType\\_t::Unsigned32](#), [LC\\_MultiType\\_t::Unsigned8](#), and [LC\\_OperData\\_t::WDTPtr](#).

Referenced by [LC\\_ProcessWP\(\)](#).

Here is the call graph for this function:

**12.30.3.9 LC\_ProcessWP()** `void LC_ProcessWP(`

```

    uint16 WatchIndex,
    const CFE_SB_Buffer_t * BufPtr,
    CFE_TIME_SysTime_t Timestamp )
  
```

Process a single watchpoint.

**Description**

Support function for watchpoint processing that will evaluate a single watchpoint

**Assumptions, External Events, and Notes:**

None

**Parameters**

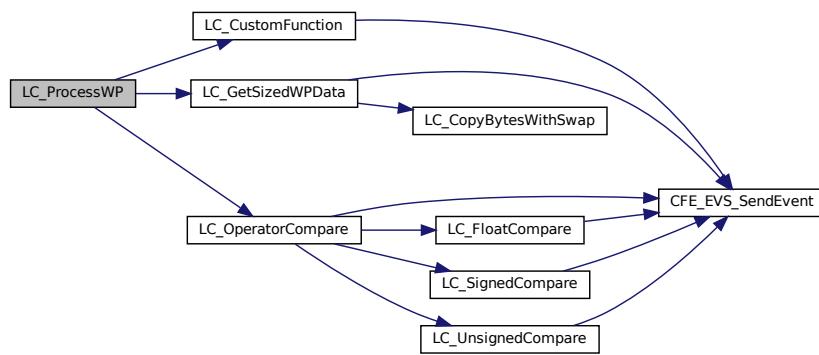
in	<i>WatchIndex</i>	The watchpoint number to evaluate (zero based watchpoint definition table index)
in	<i>BuPtr</i>	Pointer to Software Bus buffer
in	<i>Timestamp</i>	A <a href="#">CFE_TIME_SysTime_t</a> timestamp to use to update the watchpoint results data if a state transition is detected

Definition at line 354 of file lc\_watch.c.

References LC\_WDTEEntry\_t::BitMask, LC\_WRTEEntry\_t::ConsecutiveTrueCount, LC\_WDTEEntry\_t::CountdownToStale, LC\_WRTEEntry\_t::CumulativeTrueCount, LC\_WDTEEntry\_t::CustomFuncArgument, LC\_WDTEEntry\_t::DataType, LC\_WRTTransition\_t::DataType, LC\_WRTEEntry\_t::EvaluationCount, LC\_WRTEEntry\_t::FalseToTrueCount, LC\_WRTEEntry\_t::LastFalseToTrue, LC\_WRTEEntry\_t::LastTrueToFalse, LC\_CustomFunction(), LC\_GetSizedWPData(), LC\_OPER\_CUSTOM, LC\_OperatorCompare(), LC\_OperData, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, LC\_WDTEEntry\_t::OperatorID, LC\_WDTEEntry\_t::ResultAgeWhenStale, CFE\_TIME\_SysTime::Seconds, CFE\_TIME\_SysTime::Subseconds, LC\_WRTTransition\_t::Timestamp, LC\_WRTTransition\_t::Value, LC\_WDTEEntry\_t::WatchpointOffset, LC\_WRTEEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_CheckMsgForWPs().

Here is the call graph for this function:



**12.30.3.10 LC\_SignedCompare()** `uint8 LC_SignedCompare (`  
 `uint16 WatchIndex,`  
 `int32 WPValue,`  
 `int32 CompareValue )`

Signed comparison.

#### Description

Support function for watchpoint processing that will perform a signed watchpoint data comparison based upon the operator specified in the watchpoint definition table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<code>WatchIndex</code>	The watchpoint number to compare (zero based watchpoint definition table index)
in	<code>WPValue</code>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
in	<code>CompareValue</code>	The comparison value specified in the watchpoint definition table (sign extended, if needed, in an int32)

**Returns**

Comparison result

**Return values**

<i>LC_WATCH_TRUE</i>	Watchpoint true, must be one for RPN evaluation.
<i>LC_WATCH_FALSE</i>	Watchpoint false, must be zero for RPN evaluation.
<i>LC_WATCH_ERROR</i>	Watchpoint error.

Definition at line 568 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LE, LC\_OPER\_LT, LC\_OPER\_NE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_TRUE, LC\_WP\_OPERATORID\_ERR\_EID, LC\_WDTEEntry\_t::OperatorID, and LC\_OperData\_t::WDTPr.

Referenced by LC\_OperatorCompare().

Here is the call graph for this function:



**12.30.3.11 LC\_UnsignedCompare()** `uint8 LC_UnsignedCompare (`  
 `uint16 WatchIndex,`  
 `uint32 WPValue,`  
 `uint32 CompareValue )`

Unsigned comparison.

**Description**

Support function for watchpoint processing that will perform an unsigned watchpoint data comparison based upon the operator specified in the watchpoint definition table

**Assumptions, External Events, and Notes:**

None

**Parameters**

<code>in</code>	<code>WatchIndex</code>	The watchpoint number to compare (zero based watchpoint definition table index)
<code>in</code>	<code>WPValue</code>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
<code>in</code>	<code>CompareValue</code>	The comparison value specified in the watchpoint definition table (zero extended, if needed, in an uint32)

**Returns**

Comparison result

**Return values**

<a href="#"><i>LC_WATCH_TRUE</i></a>	Watchpoint true, must be one for RPN evaluation.
<a href="#"><i>LC_WATCH_FALSE</i></a>	Watchpoint false, must be zero for RPN evaluation.
<a href="#"><i>LC_WATCH_ERROR</i></a>	Watchpoint error.

Definition at line 621 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LE, LC\_OPER\_LT, LC\_OPER\_NE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WA←TCH\_TRUE, LC\_WP\_OPERID\_ERR\_EID, LC\_WDTEEntry\_t::OperatorID, and LC\_OperData\_t::WDTPr.

Referenced by LC\_OperatorCompare().

Here is the call graph for this function:



### 12.30.3.12 LC\_ValidateWDT() [\*int32\*](#) LC\_ValidateWDT( [\*void \\* TableData\*](#) )

Validate watchpoint definition table (WDT)

**Description**

This function is called by table services when a validation of the watchpoint definition table is required

**Assumptions, External Events, and Notes:**

None

**Parameters**

<a href="#"><i>in</i></a>	<a href="#"><i>TableData</i></a>	Pointer to the table data to validate
---------------------------	----------------------------------	---------------------------------------

**Returns**

Watchpoint definition table validation result

**Return values**

<a href="#"><i>CFE_SUCCESS</i></a>	Successful execution. Operation was performed successfully
------------------------------------	--

## Return values

<code>LC_WDTVAL_ERR_DATATYPE</code>	Invalid DataType
<code>LC_WDTVAL_ERR_OPER</code>	Invalid OperatorID
<code>LC_WDTVAL_ERR_MID</code>	Invalid MessageID
<code>LC_WDTVAL_ERR_FPNAN</code>	ComparisonValue is NAN float
<code>LC_WDTVAL_ERR_FPINF</code>	ComparisonValue is infinite float.

## See also

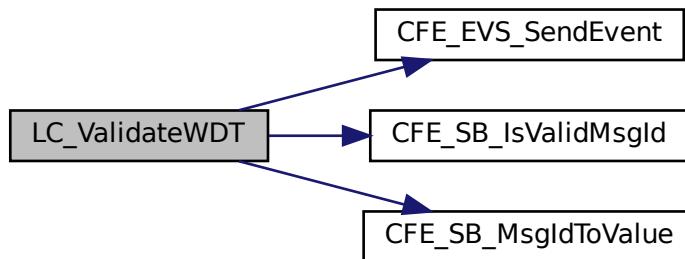
[LC\\_ValidateADT](#)

Definition at line 957 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), CFE\_SB\_IsValidMsgId(), CFE\_SB\_MsgIdToValue(), CFE\_SUCCESS, LC\_WDTEEntry\_t::DataType, isfinite, isnan, LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_NOT\_USED, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WATCH\_UDWORD\_BE, LC\_DATA\_WATCH\_UDWORD\_LE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_UWORD\_LE, LC\_DATA\_WATCH\_WORD\_BE, LC\_DATA\_WATCH\_WORD\_LE, LC\_MAX\_WATCHPOINTS, LC\_OPER\_CUSTOM, LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LT, LC\_OPER\_NE, LC\_WDTVAL\_ERR\_DATATYPE, LC\_WDTVAL\_ERR\_EID, LC\_WDTVAL\_ERR\_FPINF, LC\_WDTVAL\_ERR\_FPNAN, LC\_WDTVAL\_ERR\_MID, LC\_WDTVAL\_ERR\_NONE, LC\_WDTVAL\_ERR\_OPER, LC\_WDTVAL\_FPER\_EID, LC\_WDTVAL\_INF\_EID, LC\_WDTEEntry\_t::MessageID, LC\_MListTag::MessageID, and LC\_WDTEEntry\_t::OperatorID.

Referenced by LC\_CreateDefinitionTables().

Here is the call graph for this function:



```

12.30.3.13 LC_WPOffsetValid() bool LC_WPOffsetValid (
    uint16 WatchIndex,
    const CFE_SB_Buffer_t * BufPtr )
  
```

Watchpoint offset valid.

**Description**

Support function for watchpoint processing that will check if the watchpoint offset specified in the definition table would extend past the message that contains the watchpoint data

**Assumptions, External Events, and Notes:**

None

**Parameters**

in	<i>WatchIndex</i>	The watchpoint number to check (zero based watchpoint definition table index)
in	<i>BufPtr</i>	Pointer to Software Bus buffer

**Returns**

Offset validation result

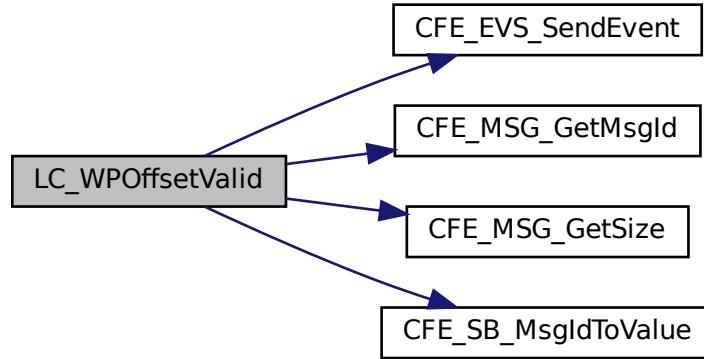
**Return values**

<i>true</i>	Offset is within the message size
<i>false</i>	Offset extends past message end

Definition at line 761 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetMsgId(), CFE\_MSG\_GetSize(), CFE\_SB\_INVALID\_MSG\_ID, CFE\_SB\_MsgIdToValue(), LC\_WRTEntry\_t::CountdownToStale, LC\_WDTEEntry\_t::DataT<sub>Y</sub>e, LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WATCH\_UDWORD\_BE, LC\_DATA\_WATCH\_UDWORD\_LE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_UWORD\_LE, LC\_DATA\_WATCH\_WORD\_BE, LC\_DATA\_WATCH\_WORD\_LE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WP\_DATATYPE\_ERR\_EID, LC\_WP\_OFFSET\_ERR\_EID, LC\_MListTag::MessageID, CFE\_SB\_Msg::Msg, LC\_WRTEntry\_t::WatchpointOffset, LC\_WRTEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr.  
Referenced by LC\_CheckMsgForWPs().

Here is the call graph for this function:



## 12.31 apps/lc/fsw/src/lc\_watch.h File Reference

```
#include "cfe.h"
#include "lc_app.h"
```

### Macros

#### Values used when converting watchpoint values to correctly sized data

- #define `LC_16BIT_BE_VAL` 0x0001  
*16 bit big endian conversion value*
- #define `LC_16BIT_LE_VAL` 0x0100  
*16 bit little endian conversion value*
- #define `LC_32BIT_BE_VAL` 0x00010203  
*32 bit big endian conversion value*
- #define `LC_32BIT_LE_VAL` 0x03020100  
*32 bit little endian conversion value*

#### Fields of the single-precision IEEE-754 floating point format

- #define `LC_IEEE_EXPONENT_MASK` 0x7F800000  
*IEEE-754 floating point exponent mask.*
- #define `LC_IEEE_FRACTION_MASK` 0x007FFFFF  
*IEEE-754 floating point fraction mask.*

### Functions

- void `LC_CheckMsgForWPs` (`CFE_SB_MsgId_t` MessageID, const `CFE_SB_Buffer_t` \*BufPtr)  
*Check message for watchpoints.*
- `int32 LC_ValidateWDT` (void \*TableData)  
*Validate watchpoint definition table (WDT)*

- void `LC_CreateHashTable` (void)  
*Create watchpoint hash table.*
- void `LC_ProcessWP` (uint16 WatchIndex, const `CFE_SB_Buffer_t` \*BufPtr, `CFE_TIME_SysTime_t` Timestamp)  
*Process a single watchpoint.*
- uint8 `LC_OperatorCompare` (uint16 WatchIndex, uint32 ProcessedWPData)  
*Operator comparison.*
- uint8 `LC_SignedCompare` (uint16 WatchIndex, int32 WPValue, int32 CompareValue)  
*Signed comparison.*
- uint8 `LC_UnsignedCompare` (uint16 WatchIndex, uint32 WPValue, uint32 CompareValue)  
*Unsigned comparison.*
- uint8 `LC_FloatCompare` (uint16 WatchIndex, `LC_MultiType_t` \*WPMultiType, `LC_MultiType_t` \*CompareMultiType)  
*Float comparison.*
- bool `LC_WPOffsetValid` (uint16 WatchIndex, const `CFE_SB_Buffer_t` \*BufPtr)  
*Watchpoint offset valid.*
- bool `LC_GetSizedWPData` (uint16 WatchIndex, const uint8 \*WPDataPtr, uint32 \*SizedDataPtr)  
*Get sized data.*
- uint32 `LC_GetHashTableIndex` (`CFE_SB_MsgId_t` MessageID)  
*Convert messageID into hash table index.*
- `LC_WatchPtList_t` \* `LC_AddWatchpoint` (const `CFE_SB_MsgId_t` MessageID)  
*Add one watchpoint linked list entry during creation of hash table.*

### 12.31.1 Detailed Description

Specification for the CFS Limit Checker (LC) routines that handle watchpoint processing

### 12.31.2 Macro Definition Documentation

**12.31.2.1 LC\_16BIT\_BE\_VAL** #define LC\_16BIT\_BE\_VAL 0x0001  
16 bit big endian conversion value  
Definition at line 42 of file lc\_watch.h.

**12.31.2.2 LC\_16BIT\_LE\_VAL** #define LC\_16BIT\_LE\_VAL 0x0100  
16 bit little endian conversion value  
Definition at line 43 of file lc\_watch.h.

**12.31.2.3 LC\_32BIT\_BE\_VAL** #define LC\_32BIT\_BE\_VAL 0x00010203  
32 bit big endian conversion value  
Definition at line 44 of file lc\_watch.h.

**12.31.2.4 LC\_32BIT\_LE\_VAL** #define LC\_32BIT\_LE\_VAL 0x03020100  
32 bit little endian conversion value  
Definition at line 45 of file lc\_watch.h.

**12.31.2.5 LC\_IEEE\_EXPONENT\_MASK** #define LC\_IEEE\_EXPONENT\_MASK 0x7F800000  
 IEEE-754 floating point exponent mask.  
 Definition at line 52 of file lc\_watch.h.

**12.31.2.6 LC\_IEEE\_FRACTION\_MASK** #define LC\_IEEE\_FRACTION\_MASK 0x007FFFFF  
 IEEE-754 floating point fraction mask.  
 Definition at line 53 of file lc\_watch.h.

### 12.31.3 Function Documentation

**12.31.3.1 LC\_AddWatchpoint()** LC\_WatchPtList\_t\* LC\_AddWatchpoint (

const CFE\_SB\_MsgId\_t MessageID )

Add one watchpoint linked list entry during creation of hash table.

#### Description

Utility function that adds another link to the watchpoint linked list for the specified messageID. The function will also add a messageID linked list entry to the hash table if this is the first reference to that messageID. The function will also subscribe to the messageID if this is the first reference to that messageID. The function will return a pointer to the watchpoint linked list entry just added.

The following code supports use of the watchpoint hash table:

1) [LC\\_GetHashTableIndex](#) - convert messageID to hash table index 2) [LC\\_CreateHashTable](#) - after load Watchpoint Definition Table 3) [LC\\_AddWatchpoint](#) - add one watchpoint to hash table 4) [LC\\_CheckMsgForWPs](#) - process all WP's that reference messageID

The following data structures support the hash table:

1) Hash table (256 entries) 2) Array of links for messageID linked lists (LC\_MAX\_WATCHPOINTS) 3) Array of links for watchpoint linked lists (LC\_MAX\_WATCHPOINTS)

Rather than search the entire Watchpoint Definition Table to find the watchpoints that reference a particular messageID, LC does the following:

1) Call hash table function (convert messageID to hash table index) 2) Get messageID linked list from indexed hash table entry 3) Search messageID list (max 8) for matching messageID 4) Get watchpoint linked list from matching messageID link 5) Done - only watchpoints that reference messageID are in list

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	MessageID	SoftwareBus packet message ID
----	-----------	-------------------------------

#### Returns

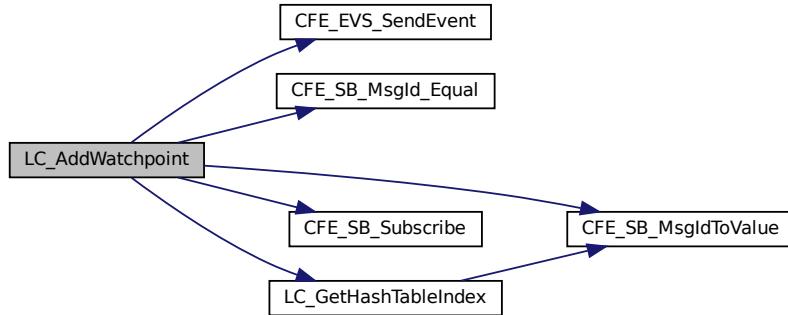
Pointer to the watchpoint linked list entry just added

Definition at line 164 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_SB\_MsgId\_Equal(), CFE\_SB\_MsgIdToValue(), CFE\_SB\_Subscribe(), CFE\_SUCCESS, LC\_OperData\_t::CmdPipe, LC\_OperData\_t::HashTable, LC\_GetHashTableIndex(), LC\_OperData, LC\_SUB\_WP\_ERR\_EID, LC\_MListTag::MessageID, LC\_OperData\_t::MessageIDsCount, LC\_OperData\_t::MessageLinks, LC\_WListTag::Next, LC\_MListTag::Next, LC\_OperData\_t::WatchpointCount, LC\_OperData\_t::WatchPtLinks, and LC\_MListTag::WatchPtList.

Referenced by LC\_CreateHashTable().

Here is the call graph for this function:



**12.31.3.2 LC\_CheckMsgForWPs()** `void LC_CheckMsgForWPs (`  
 `CFE_SB_MsgId_t MessageID,`  
 `const CFE_SB_Buffer_t * BufPtr )`

Check message for watchpoints.

#### Description

Processes a single software bus command pipe message that doesn't match any LC predefined command or message ids, which indicates it's probably a watchpoint message. It will search the watchpoint definition table for matches to this MessageID and handle them as needed.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>MessageID</i>	Message ID
in	<i>BufPtr</i>	Pointer to Software Bus buffer

#### See also

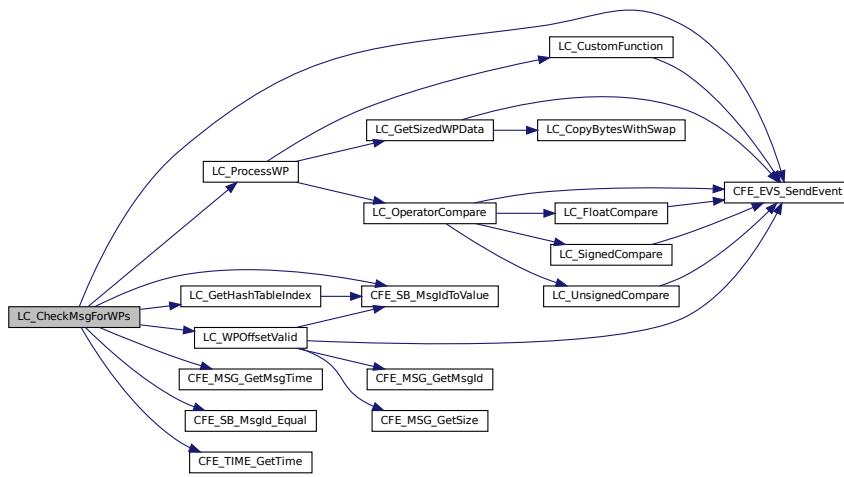
[LC\\_ProcessWP](#)

Definition at line 267 of file lc\_watch.c.

References CFE\_ES\_PerfLogEntry, CFE\_ES\_PerfLogExit, CFE\_EVS\_EventType\_INFORMATION, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetMsgTime(), CFE\_SB\_MsgId\_Equal(), CFE\_SB\_MsgIdToValue(), CFE\_TIME\_GetTime(), LC\_AppData\_t::CurrentLCState, LC\_OperData\_t::HashTable, LC\_AppData, LC\_GetHashTableIndex(), LC\_MID\_INF\_EID, LC\_OperData, LC\_ProcessWP(), LC\_STATE\_DISABLED, LC\_WDT\_SEARCH\_PERF\_ID, LC\_WPOffsetValid(), LC\_MListTag::MessageID, LC\_AppData\_t::MonitoredMsgCount, CFE\_SB\_Msg::Msg, LC\_WListTag::Next, LC\_MListTag::Next, CFE\_TIME\_SysTime::Seconds, CFE\_TIME\_SysTime::Subseconds, LC\_WListTag::WatchIndex, and LC\_MListTag::WatchPtList.

Referenced by LC\_AppPipe().

Here is the call graph for this function:



### 12.31.3.3 `LC_CreateHashTable()`

```
void LC_CreateHashTable (
    void )
```

Create watchpoint hash table.

#### Description

Creates a hash table to optimize the process of getting direct access to all the watchpoint table entries that reference a particular MessageID without having to search the entire table.

#### Assumptions, External Events, and Notes:

None

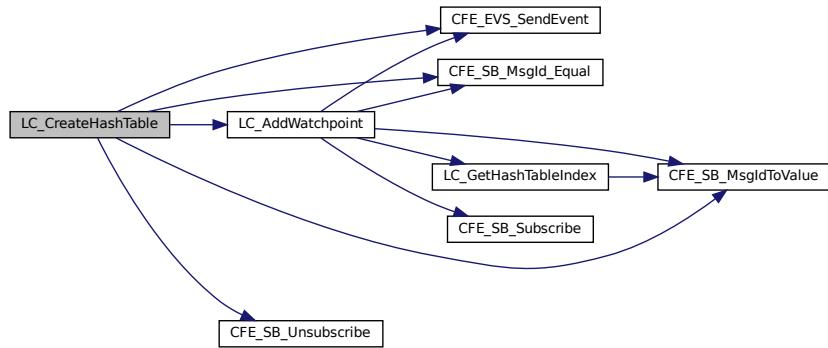
#### See also

[LC\\_GetHashTableIndex](#), [LC\\_AddWatchpoint](#)

Definition at line 92 of file `lc_watch.c`.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_SendEvent()`, `CFE_SB_INVALID_MSG_ID`, `CFE_SB_MsgIdEqual()`, `CFE_SB_MsgIdToValue()`, `CFE_SB_Unsubscribe()`, `CFE_SUCCESS`, `LC_OperData_t::CmdPipe`, `LC_WDTEEntry_t::DataType`, `LC_OperData_t::HashTable`, `LC_AddWatchpoint()`, `LC_DATA_WATCH_NOT_USED`, `LC_MAX_WATCHPOINTS`, `LC_OperData`, `LC_UNSUB_WP_ERR_EID`, `LC_WDTEEntry_t::MessageID`, `LC_MListTag::MessageID`, `LC_OperData_t::MessageIDsCount`, `LC_OperData_t::MessageLinks`, `LC_WListTag::Next`, `LC_WListTag::WatchIndex`, `LC_OperData_t::WatchpointCount`, `LC_OperData_t::WatchPtLinks`, and `LC_OperData_t::WDTPtr`. Referenced by `LC_ManageTables()`, and `LC_TableInit()`.

Here is the call graph for this function:



**12.31.3.4 LC\_FloatCompare()**

```

uint8 LC_FloatCompare (
    uint16 WatchIndex,
    LC_MultiType_t * WPMultiType,
    LC_MultiType_t * CompareMultiType )
  
```

Float comparison.

#### Description

Support function for watchpoint processing that will perform a floating point watchpoint data comparison based upon the operator specified in the watchpoint definition table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to compare (zero based watchpoint definition table index)
in	<i>WPMultiType</i>	The watchpoint data extracted from the message that it was contained in. Stored in a multi-type union. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
in	<i>CompareMultiType</i>	The comparison value specified in the watchpoint definition table. Stored in a multi-type union so it can easily be accessed as a uint32 for validity checks

#### Returns

Comparison result

#### Return values

<i>LC_WATCH_TRUE</i>	Watchpoint true, must be one for RPN evaluation.
<i>LC_WATCH_FALSE</i>	Watchpoint false, must be zero for RPN evaluation.
<i>LC_WATCH_ERROR</i>	Watchpoint error.

Definition at line 674 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), isnan, LC\_FLOAT\_TOLERANCE, LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LE, LC\_OPER\_LT, LC\_OPER\_NE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_TRUE, LC\_WP\_NAN\_ERR\_EID, LC\_WP\_OPERID\_ERR\_EID, LC\_WDT\_Entry\_t::OperatorID, and LC\_OperData\_t::WDTPtr.

Referenced by LC\_OperatorCompare().

Here is the call graph for this function:



### 12.31.3.5 LC\_GetHashTableIndex()

```
uint32 LC_GetHashTableIndex (
    CFE_SB_MsgId_t MessageID )
```

Convert messageID into hash table index.

#### Description

Utility function for watchpoint processing that converts a messageID into an index into the watchpoint hash table.

The following code supports use of the watchpoint hash table:

- 1) [LC\\_GetHashTableIndex](#) - convert messageID to hash table index
- 2) [LC\\_CreateHashTable](#) - after load Watchpoint Definition Table
- 3) [LC\\_AddWatchpoint](#) - add one watchpoint to hash table
- 4) [LC\\_CheckMsgForWPs](#) - process all WP's that reference messageID

The following data structures support the hash table:

- 1) Hash table (256 entries)
- 2) Array of links for messageID linked lists (LC\_MAX\_WATCHPOINTS)
- 3) Array of links for watchpoint linked lists (LC\_MAX\_WATCHPOINTS)

Rather than search the entire Watchpoint Definition Table to find the watchpoints that reference a particular messageID, LC does the following:

- 1) Call hash table function (convert messageID to hash table index)
- 2) Get messageID linked list from indexed hash table entry
- 3) Search messageID list (max 8) for matching messageID
- 4) Get watchpoint linked list from matching messageID link
- 5) Done - only watchpoints that reference messageID are in list

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>MessageID</i>	SoftwareBus packet message ID
----	------------------	-------------------------------

#### Returns

Index into watchpoint hash table

Definition at line 62 of file lc\_watch.c.

References CFE\_SB\_MsgIdToValue(), LC\_HASH\_TABLE\_MASK, and LC\_MListTag::MessageID.

Referenced by LC\_AddWatchpoint(), and LC\_CheckMsgForWPs().

Here is the call graph for this function:



**12.31.3.6 LC\_GetSizedWPData()** `bool LC_GetSizedWPData (`  
    `uint16 WatchIndex,`  
    `const uint8 * WPDataPtr,`  
    `uint32 * SizedDataPtr )`

Get sized data.

#### Description

Support function for watchpoint processing that will extract the watchpoint data from a software bus message based upon the data type specified in the watchpoint definition table and store it in a uint32. If there are any endian differences between LC and the watchpoint data, this is where it will get fixed up.

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to extract (zero based watchpoint definition table index)
in	<i>WPDataPtr</i>	A pointer to the first byte of the watchpoint data as it exists in the software bus message it was received in
in	<i>SizedDataPtr</i>	A pointer to where the extracted watchpoint data should be stored

#### Returns

Boolean execution status result

#### Return values

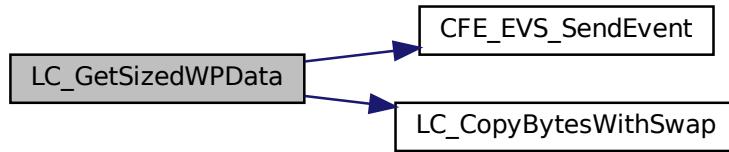
<i>true</i>	No error
<i>false</i>	An error occurred

Definition at line 863 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_WRTEntry\_t::CountdownToStale, LC\_WD↔TEntry\_t::DataType, LC\_16BIT\_BE\_VAL, LC\_16BIT\_LE\_VAL, LC\_32BIT\_BE\_VAL, LC\_32BIT\_LE\_VAL, LC\_Copy↔BytesWithSwap(), LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WAT↔CH\_UDWORD\_BE, LC\_DATA\_WATCH\_UDWORD\_LE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_U↔

WORD\_LE, LC\_DATA\_WATCH\_WORD\_BE, LC\_DATA\_WATCH\_WORD\_LE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WP\_DATATYPE\_ERR\_EID, LC\_MultiType\_t::Signed16, LC\_MultiType\_t::Signed8, LC\_MultiType\_t::Unsigned16, LC\_MultiType\_t::Unsigned32, LC\_WRTEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr. Referenced by LC\_ProcessWP().

Here is the call graph for this function:



**12.31.3.7 LC\_OperatorCompare()** `uint8 LC_OperatorCompare( uint16 WatchIndex, uint32 ProcessedWPData )`

Operator comparison.

#### Description

Support function for watchpoint processing that will perform the watchpoint data comparison based upon the operator and data type specified in the watchpoint definition table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to compare (zero based watchpoint definition table index)
in	<i>ProcessedWPData</i>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition

#### Returns

Operation comparison result from [LC\\_SignedCompare](#), [LC\\_UnsignedCompare](#), [LC\\_FloatCompare](#)

#### Return values

<a href="#">LC_WATCH_ERROR</a>	Watchpoint error.
--------------------------------	-------------------

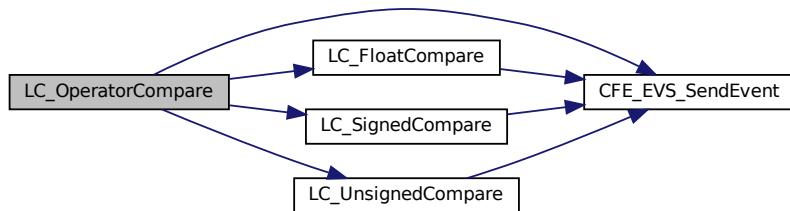
Definition at line 460 of file lc\_watch.c.

References [CFE\\_EVS\\_EventType\\_ERROR](#), [CFE\\_EVS\\_SendEvent\(\)](#), [LC\\_WDTEntry\\_t::ComparisonValue](#), [LC\\_WD](#)←

TEntry\_t::DataType, LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_UWORD\_LE, LC\_FLOAT\_COMPARE(), LC\_OperData, LC\_SignedCompare(), LC\_UnsignedCompare(), LC\_WATCH\_ERROR, LC\_WP\_DATATYPE\_ERR\_EID, LC\_MultiType\_t::Signed16, LC\_MultiType\_t::Signed32, LC\_MultiType\_t::Signed8, LC\_MultiType\_t::Unsigned16, LC\_MultiType\_t::Unsigned32, LC\_MultiType\_t::Unsigned8, and LC\_OperData\_t::WDTPtr.

Referenced by LC\_ProcessWP().

Here is the call graph for this function:



**12.31.3.8 LC\_ProcessWP()** `void LC_ProcessWP (`  
 `uint16 WatchIndex,`  
 `const CFE_SB_Buffer_t * BufPtr,`  
 `CFE_TIME_SysTime_t Timestamp )`

Process a single watchpoint.

#### Description

Support function for watchpoint processing that will evaluate a single watchpoint

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to evaluate (zero based watchpoint definition table index)
in	<i>BufPtr</i>	Pointer to Software Bus buffer
in	<i>Timestamp</i>	A <code>CFE_TIME_SysTime_t</code> timestamp to use to update the watchpoint results data if a state transition is detected

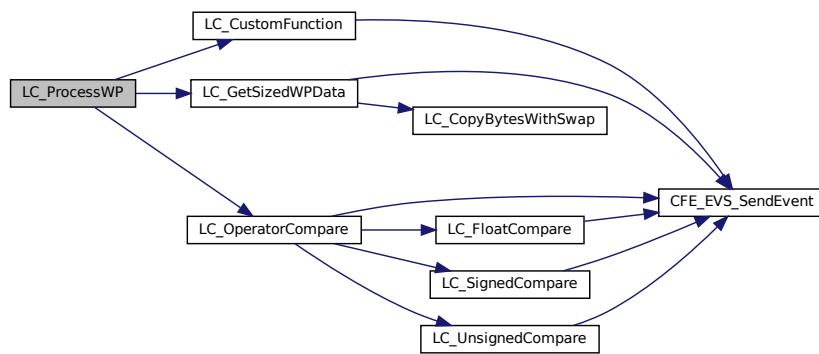
Definition at line 354 of file lc\_watch.c.

References LC\_WDTEEntry\_t::BitMask, LC\_WRTEntry\_t::ConsecutiveTrueCount, LC\_WRTEntry\_t::CountdownToStale, LC\_WRTEntry\_t::CumulativeTrueCount, LC\_WDTEEntry\_t::CustomFuncArgument, LC\_WDTEEntry\_t::DataType, LC\_WRTTransition\_t::DataType, LC\_WRTEntry\_t::EvaluationCount, LC\_WRTEntry\_t::FalseToTrueCount, LC\_WRTEntry\_t::LastFalseToTrue, LC\_WRTEntry\_t::LastTrueToFalse, LC\_CustomFunction(), LC\_GetSizedWPData(), LC\_OPER\_CUSTOM, LC\_OperatorCompare(), LC\_OperData, LC\_WATCH\_FALSE, LC\_WATCH\_STALE, LC\_WATCH\_TRUE, LC\_WDTEEntry\_t::OperatorID, LC\_WDTEEntry\_t::ResultAgeWhenStale, CFE\_TIME\_SysTime::Seconds, CFE\_TIME\_

SysTime::Subseconds, LC\_WRTTransition\_t::Timestamp, LC\_WRTTransition\_t::Value, LC\_WDTEEntry\_t::WatchpointOffset, LC\_WRTEEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr.

Referenced by LC\_CheckMsgForWPs().

Here is the call graph for this function:



**12.31.3.9 LC\_SignedCompare()**

```

uint8 LC_SignedCompare (
    uint16 WatchIndex,
    int32 WPValue,
    int32 CompareValue )
  
```

Signed comparison.

#### Description

Support function for watchpoint processing that will perform a signed watchpoint data comparison based upon the operator specified in the watchpoint definition table

#### Assumptions, External Events, and Notes:

None

#### Parameters

in	<i>WatchIndex</i>	The watchpoint number to compare (zero based watchpoint definition table index)
in	<i>WPValue</i>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianness fixing that LC might have done according to the watchpoint definition
in	<i>CompareValue</i>	The comparison value specified in the watchpoint definition table (sign extended, if needed, in an int32)

#### Returns

Comparison result

**Return values**

<i>LC_WATCH_TRUE</i>	Watchpoint true, must be one for RPN evaluation.
<i>LC_WATCH_FALSE</i>	Watchpoint false, must be zero for RPN evaluation.
<i>LC_WATCH_ERROR</i>	Watchpoint error.

Definition at line 568 of file `lc_watch.c`.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_SendEvent()`, `LC_OPER_EQ`, `LC_OPER_GE`, `LC_OPER_GT`, `LC_OPER_LE`, `LC_OPER_LT`, `LC_OPER_NE`, `LC_OperData`, `LC_WATCH_ERROR`, `LC_WATCH_FALSE`, `LC_WA_TCH_TRUE`, `LC_WP_OPERID_ERR_EID`, `LC_WDTEntry_t::OperatorID`, and `LC_OperData_t::WDTPr`.

Referenced by `LC_OperatorCompare()`.

Here is the call graph for this function:



**12.31.3.10 `LC_UnsignedCompare()`** `uint8 LC_UnsignedCompare (`  
 `uint16 WatchIndex,`  
 `uint32 WPValue,`  
 `uint32 CompareValue )`

Unsigned comparison.

**Description**

Support function for watchpoint processing that will perform an unsigned watchpoint data comparison based upon the operator specified in the watchpoint definition table

**Assumptions, External Events, and Notes:**

None

**Parameters**

<code>in</code>	<code>WatchIndex</code>	The watchpoint number to compare (zero based watchpoint definition table index)
<code>in</code>	<code>WPValue</code>	The watchpoint data extracted from the message that it was contained in. This is the data after any sizing, bit-masking, and endianess fixing that LC might have done according to the watchpoint definition
<code>in</code>	<code>CompareValue</code>	The comparison value specified in the watchpoint definition table (zero extended, if needed, in an <code>uint32</code> )

**Returns**

Comparison result

**Return values**

<i>LC_WATCH_TRUE</i>	Watchpoint true, must be one for RPN evaluation.
<i>LC_WATCH_FALSE</i>	Watchpoint false, must be zero for RPN evaluation.
<i>LC_WATCH_ERROR</i>	Watchpoint error.

Definition at line 621 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), LC\_OPER\_EQ, LC\_OPER\_GE, LC\_OPER\_GT, LC\_OPER\_LE, LC\_OPER\_LT, LC\_OPER\_NE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WATCH\_FALSE, LC\_WATCH\_TRUE, LC\_WP\_OPERATORID\_ERR\_EID, LC\_WDTEEntry\_t::OperatorID, and LC\_OperData\_t::WDTPr.

Referenced by LC\_OperatorCompare().

Here is the call graph for this function:



### 12.31.3.11 LC\_ValidateWDT() `int32 LC_ValidateWDT( void * TableData )`

Validate watchpoint definition table (WDT)

**Description**

This function is called by table services when a validation of the watchpoint definition table is required

**Assumptions, External Events, and Notes:**

None

**Parameters**

<code>in</code>	<code>TableData</code>	Pointer to the table data to validate
-----------------	------------------------	---------------------------------------

**Returns**

Watchpoint definition table validation result

**Return values**

<i>CFE_SUCCESS</i>	Successful execution. Operation was performed successfully
--------------------	--

## Return values

<code>LC_WDTVAL_ERR_DATATYPE</code>	Invalid DataType
<code>LC_WDTVAL_ERR_OPER</code>	Invalid OperatorID
<code>LC_WDTVAL_ERR_MID</code>	Invalid MessageID
<code>LC_WDTVAL_ERR_FPNAN</code>	ComparisonValue is NAN float
<code>LC_WDTVAL_ERR_FPINF</code>	ComparisonValue is infinite float.

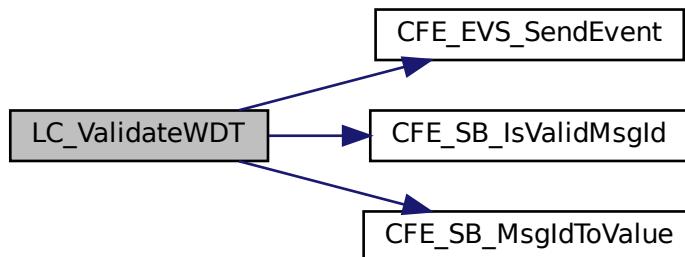
## See also

[LC\\_ValidateADT](#)

Definition at line 957 of file `lc_watch.c`.

References `CFE_EVS_EventType_ERROR`, `CFE_EVS_EventType_INFORMATION`, `CFE_EVS_SendEvent()`, `CFE_SB_IsValidMsgId()`, `CFE_SB_MsgIdToValue()`, `CFE_SUCCESS`, `LC_WDTEEntry_t::DataType`, `isfinite`, `isnan`, `LC_DATA_WATCH_BYT`E, `LC_DATA_WATCH_DWORD_BE`, `LC_DATA_WATCH_DWORD_LE`, `LC_DATA_WATCH_FL`OAT\_BE, `LC_DATA_WATCH_FLOAT_LE`, `LC_DATA_WATCH_NOT_USED`, `LC_DATA_WATCH_UBYTE`, `LC_DATA_WATCH_UDWORD_BE`, `LC_DATA_WATCH_UDWORD_LE`, `LC_DATA_WATCH_UWORD_BE`, `LC_DATA_WA`TCH\_UWORD\_LE, `LC_DATA_WATCH_WORD_BE`, `LC_DATA_WATCH_WORD_LE`, `LC_MAX_WATCHPOINTS`, `L`C\_OPER\_CUSTOM, `LC_OPER_EQ`, `LC_OPER_GE`, `LC_OPER_GT`, `LC_OPER_LE`, `LC_OPER_LT`, `LC_OPER_NE`, `LC_WDTVAL_ERR_DATATYPE`, `LC_WDTVAL_ERR_EID`, `LC_WDTVAL_ERR_FPINF`, `LC_WDTVAL_ERR_FPNAN`, `LC_WDTVAL_ERR_MID`, `LC_WDTVAL_ERR_NONE`, `LC_WDTVAL_ERR_OPER`, `LC_WDTVAL_FPERR_EID`, `LC_WDTVAL_INF_EID`, `LC_WDTEEntry_t::MessageID`, `LC_MListTag::MessageID`, and `LC_WDTEEntry_t::OperatorID`. Referenced by `LC_CreateDefinitionTables()`.

Here is the call graph for this function:



```

12.31.3.12 LC_WPOffsetValid() bool LC_WPOffsetValid (
    uint16 WatchIndex,
    const CFE_SB_Buffer_t * BufPtr )
  
```

Watchpoint offset valid.

### Description

Support function for watchpoint processing that will check if the watchpoint offset specified in the definition table would extend past the message that contains the watchpoint data

### Assumptions, External Events, and Notes:

None

### Parameters

in	<i>WatchIndex</i>	The watchpoint number to check (zero based watchpoint definition table index)
in	<i>BufPtr</i>	Pointer to Software Bus buffer

### Returns

Offset validation result

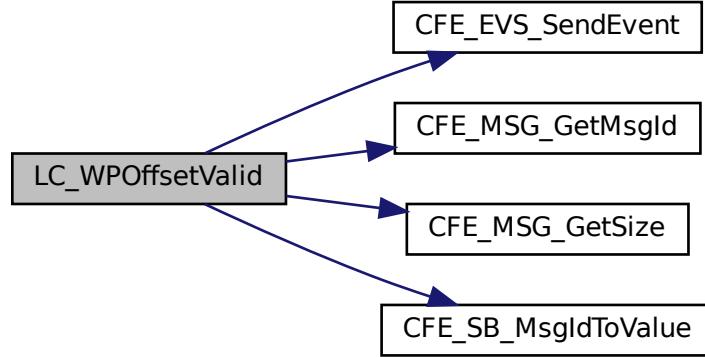
### Return values

<i>true</i>	Offset is within the message size
<i>false</i>	Offset extends past message end

Definition at line 761 of file lc\_watch.c.

References CFE\_EVS\_EventType\_ERROR, CFE\_EVS\_SendEvent(), CFE\_MSG\_GetMsgId(), CFE\_MSG\_GetSize(), CFE\_SB\_INVALID\_MSG\_ID, CFE\_SB\_MsgIdToValue(), LC\_WRTEntry\_t::CountdownToStale, LC\_WDTEEntry\_t::DataT<sub>Y</sub>e, LC\_DATA\_WATCH\_BYTE, LC\_DATA\_WATCH\_DWORD\_BE, LC\_DATA\_WATCH\_DWORD\_LE, LC\_DATA\_WATCH\_FLOAT\_BE, LC\_DATA\_WATCH\_FLOAT\_LE, LC\_DATA\_WATCH\_UBYTE, LC\_DATA\_WATCH\_UDWORD\_BE, LC\_DATA\_WATCH\_UDWORD\_LE, LC\_DATA\_WATCH\_UWORD\_BE, LC\_DATA\_WATCH\_UWORD\_LE, LC\_DATA\_WATCH\_WORD\_BE, LC\_DATA\_WATCH\_WORD\_LE, LC\_OperData, LC\_WATCH\_ERROR, LC\_WP\_DATATYPE\_ERR\_EID, LC\_WP\_OFFSET\_ERR\_EID, LC\_MListTag::MessageID, CFE\_SB\_Msg::Msg, LC\_WRTEntry\_t::WatchpointOffset, LC\_WRTEntry\_t::WatchResult, LC\_OperData\_t::WDTPtr, and LC\_OperData\_t::WRTPtr.  
Referenced by LC\_CheckMsgForWPs().

Here is the call graph for this function:



## 12.32 apps/lc/fsw/tables/lc\_def\_adt.c File Reference

```
#include "cfe_tbl_filedef.h"
#include "cfe_evs_extern_typedefs.h"
#include "lc_platform_cfg.h"
#include "lc_msgdefs.h"
#include "lc_tbl.h"
#include "lc_eventids.h"
```

### Variables

- [CFE\\_TBL\\_FileDef\\_t CFE\\_TBL\\_FileDef](#)
- [LC\\_ADTEEntry\\_t LC\\_ADT \[LC\\_MAX\\_ACTIONPOINTS\]](#)

#### 12.32.1 Detailed Description

Limit Checker (LC) default actionpoint definition table (ADT)

##### Note

This file provides a default ADT table that simply sets all actionpoint entries to "not used". It has been formatted to make it easy for mission developers to edit as needed (see the examples section below).

LC will append a trailer string to the end of the text specified in the "EventText" field with additional information. See [lc\\_action.h](#) for the format.

#### 12.32.2 Variable Documentation

##### 12.32.2.1 CFE\_TBL\_FileDef [CFE\\_TBL\\_FileDef\\_t CFE\\_TBL\\_FileDef](#)

###### Initial value:

```
= {"LC_ADT", LC\_APP\_NAME "." LC\_ADT\_TABLENAME, "LC actionpoint definition table",
```

```
"lc_def_adt.tbl", (sizeof(LC_ADTEEntry_t) * LC_MAX_ACTIONPOINTS)}
```

Definition at line 172 of file lc\_def\_adt.c.

### 12.32.2.2 LC\_ADT LC\_ADTEEntry\_t LC\_ADT[LC\_MAX\_ACTIONPOINTS]

Definition at line 178 of file lc\_def\_adt.c.

## 12.33 apps/lc/fsw/tables/lc\_def\_wdt.c File Reference

```
#include "cfe_tbl_filedef.h"
#include "cfe_sb_api_typedefs.h"
#include "lc_platform_cfg.h"
#include "lc_msgdefs.h"
#include "lc_tbl.h"
```

### Variables

- CFE\_TBL\_FileDef\_t CFE\_TBL\_FileDef
- LC\_WDTEEntry\_t LC\_WDT [LC\_MAX\_WATCHPOINTS]

### 12.33.1 Detailed Description

Limit Checker (LC) default watchpoint definition table (WDT)

#### Note

This file provides a default WDT table that simply sets all watchpoint entries to "not used". It has been formatted to make it easy for mission developers to edit as needed (see the examples section below).

### 12.33.2 Variable Documentation

#### 12.33.2.1 CFE\_TBL\_FileDef CFE\_TBL\_FileDef\_t CFE\_TBL\_FileDef

##### Initial value:

```
= {"LC_WDT", LC_APP_NAME "." LC_WDT_TABLENAME, "LC watchpoint definition table",
     "lc_def_wdt.tbl", (sizeof(LC_WDTEEntry_t) * LC_MAX_WATCHPOINTS)}
```

Definition at line 93 of file lc\_def\_wdt.c.

#### 12.33.2.2 LC\_WDT LC\_WDTEEntry\_t LC\_WDT[LC\_MAX\_WATCHPOINTS]

Definition at line 99 of file lc\_def\_wdt.c.

## 12.34 build/osal\_public\_api/inc/osconfig.h File Reference

### Macros

- #define OSAL\_CONFIG\_INCLUDE\_DYNAMIC\_LOADER  
*Configuration file Operating System Abstraction Layer.*
- #define OSAL\_CONFIG\_INCLUDE\_NETWORK
- #define OSAL\_CONFIG\_INCLUDE\_STATIC\_LOADER
- #define OSAL\_CONFIG\_CONSOLE\_ASYNC
- #define OS\_MAX\_TASKS 64

*The maximum number of tasks to support.*

- `#define OS_MAX_QUEUES 64`  
*The maximum number of queues to support.*
- `#define OS_MAX_COUNT_SEMAPHORES 20`  
*The maximum number of counting semaphores to support.*
- `#define OS_MAX_BIN_SEMAPHORES 20`  
*The maximum number of binary semaphores to support.*
- `#define OS_MAX_MUTEXES 20`  
*The maximum number of mutexes to support.*
- `#define OS_MAX_CONDVARS 4`  
*The maximum number of condition variables to support.*
- `#define OS_MAX_MODULES 20`  
*The maximum number of modules to support.*
- `#define OS_MAX_TIMEBASES 5`  
*The maximum number of timebases to support.*
- `#define OS_MAX_TIMERS 10`  
*The maximum number of timer callbacks to support.*
- `#define OS_MAX_NUM_OPEN_FILES 50`  
*The maximum number of concurrently open files to support.*
- `#define OS_MAX_NUM_OPEN_DIRS 4`  
*The maximum number of concurrently open directories to support.*
- `#define OS_MAX_FILE_SYSTEMS 14`  
*The maximum number of file systems to support.*
- `#define OS_MAX_SYM_LEN 64`  
*The maximum length of symbols.*
- `#define OS_MAX_FILE_NAME 20`  
*The maximum length of OSAL file names.*
- `#define OS_MAX_PATH_LEN 64`  
*The maximum length of OSAL path names.*
- `#define OS_MAX_API_NAME 20`  
*The maximum length of OSAL resource names.*
- `#define OS_SOCKADDR_MAX_LEN 28`  
*The maximum size of the socket address structure.*
- `#define OS_BUFFER_SIZE 172`  
*The maximum size of output produced by a single `OS_printf()`.*
- `#define OS_BUFFER_MSG_DEPTH 100`  
*The maximum number of `OS_printf()` output strings to buffer.*
- `#define OS_UTILITYTASK_PRIORITY 245`  
*Priority level of the background utility task.*
- `#define OS_UTILITYTASK_STACK_SIZE 2048`  
*The stack size of the background utility task.*
- `#define OS_MAX_CMD_LEN 1000`  
*The maximum size of a shell command.*
- `#define OS_QUEUE_MAX_DEPTH 50`  
*The maximum depth of OSAL queues.*
- `#define OS_SHELL_CMD_INPUT_FILE_NAME ""`  
*The name of the temporary file used to store shell commands.*
- `#define OS_PRINTF_CONSOLE_NAME ""`

*The name of the primary console device.*

- `#define OS_ADD_TASK_FLAGS 0`

*Flags added to all tasks on creation.*

- `#define OS_MAX_CONSOLES 1`

*The maximum number of console devices to support.*

- `#define OS_MODULE_FILE_EXTENSION ".so"`

*The system-specific file extension used on loadable module files.*

- `#define OS_FS_DEV_NAME_LEN 32`
- `#define OS_FS_PHYS_NAME_LEN 64`
- `#define OS_FS_VOL_NAME_LEN 32`

#### 12.34.1 Macro Definition Documentation

##### 12.34.1.1 OS\_ADD\_TASK\_FLAGS `#define OS_ADD_TASK_FLAGS 0`

Flags added to all tasks on creation.

Added to the task flags on creation

Supports adding floating point support for all tasks when the OS requires it

Definition at line 254 of file osconfig.h.

##### 12.34.1.2 OS\_BUFFER\_MSG\_DEPTH `#define OS_BUFFER_MSG_DEPTH 100`

The maximum number of `OS_printf()` output strings to buffer.

Based on the OSAL\_CONFIG\_PRINTF\_BUFFER\_DEPTH configuration option

Definition at line 187 of file osconfig.h.

##### 12.34.1.3 OS\_BUFFER\_SIZE `#define OS_BUFFER_SIZE 172`

The maximum size of output produced by a single `OS_printf()`

Based on the OSAL\_CONFIG\_PRINTF\_BUFFER\_SIZE configuration option

Definition at line 180 of file osconfig.h.

##### 12.34.1.4 OS\_FS\_DEV\_NAME\_LEN `#define OS_FS_DEV_NAME_LEN 32`

Device name length

Definition at line 281 of file osconfig.h.

##### 12.34.1.5 OS\_FS\_PHYS\_NAME\_LEN `#define OS_FS_PHYS_NAME_LEN 64`

Physical drive name length

Definition at line 282 of file osconfig.h.

##### 12.34.1.6 OS\_FS\_VOL\_NAME\_LEN `#define OS_FS_VOL_NAME_LEN 32`

Volume name length

Definition at line 283 of file osconfig.h.

**12.34.1.7 OS\_MAX\_API\_NAME** #define OS\_MAX\_API\_NAME 20

The maximum length of OSAL resource names.

Based on the OSAL\_CONFIG\_MAX\_API\_NAME configuration option

**Note**

This value must include a terminating NUL character

Definition at line 163 of file osconfig.h.

**12.34.1.8 OS\_MAX\_BIN\_SEMAPHORES** #define OS\_MAX\_BIN\_SEMAPHORES 20

The maximum number of binary semaphores to support.

Based on the OSAL\_CONFIG\_MAX\_BIN\_SEMAPHORES configuration option

Definition at line 65 of file osconfig.h.

**12.34.1.9 OS\_MAX\_CMD\_LEN** #define OS\_MAX\_CMD\_LEN 1000

The maximum size of a shell command.

This limit is only applicable if shell support is enabled.

Based on the OSAL\_CONFIG\_MAX\_CMD\_LEN configuration option

**Note**

This value must include a terminating NUL character

Definition at line 218 of file osconfig.h.

**12.34.1.10 OS\_MAX\_CONDVARS** #define OS\_MAX\_CONDVARS 4

The maximum number of condition variables to support.

Based on the OSAL\_CONFIG\_MAX\_CONDVARS configuration option

Definition at line 79 of file osconfig.h.

**12.34.1.11 OS\_MAX\_CONSOLES** #define OS\_MAX\_CONSOLES 1

The maximum number of console devices to support.

Fixed value based on current OSAL implementation, not user configurable.

Definition at line 269 of file osconfig.h.

**12.34.1.12 OS\_MAX\_COUNT\_SEMAPHORES** #define OS\_MAX\_COUNT\_SEMAPHORES 20

The maximum number of counting semaphores to support.

Based on the OSAL\_CONFIG\_MAX\_COUNT\_SEMAPHORES configuration option

Definition at line 58 of file osconfig.h.

**12.34.1.13 OS\_MAX\_FILE\_NAME** #define OS\_MAX\_FILE\_NAME 20

The maximum length of OSAL file names.

This limit applies specifically to the file name portion, not the directory portion, of a path name.

Based on the OSAL\_CONFIG\_MAX\_FILE\_NAME configuration option

**Note**

This value must include a terminating NUL character

Definition at line 142 of file osconfig.h.

**12.34.1.14 OS\_MAX\_FILE\_SYSTEMS** #define OS\_MAX\_FILE\_SYSTEMS 14  
The maximum number of file systems to support.  
Based on the OSAL\_CONFIG\_MAX\_FILE\_SYSTEMS configuration option  
Definition at line 121 of file osconfig.h.

**12.34.1.15 OS\_MAX\_MODULES** #define OS\_MAX\_MODULES 20  
The maximum number of modules to support.  
Based on the OSAL\_CONFIG\_MAX\_MODULES configuration option  
Definition at line 86 of file osconfig.h.

**12.34.1.16 OS\_MAX\_MUTEXES** #define OS\_MAX\_MUTEXES 20  
The maximum number of mutexes to support.  
Based on the OSAL\_CONFIG\_MAX\_MUTEXES configuration option  
Definition at line 72 of file osconfig.h.

**12.34.1.17 OS\_MAX\_NUM\_OPEN\_DIRS** #define OS\_MAX\_NUM\_OPEN\_DIRS 4  
The maximum number of concurrently open directories to support.  
Based on the OSAL\_CONFIG\_MAX\_NUM\_OPEN\_DIRS configuration option  
Definition at line 114 of file osconfig.h.

**12.34.1.18 OS\_MAX\_NUM\_OPEN\_FILES** #define OS\_MAX\_NUM\_OPEN\_FILES 50  
The maximum number of concurrently open files to support.  
Based on the OSAL\_CONFIG\_MAX\_NUM\_OPEN\_FILES configuration option  
Definition at line 107 of file osconfig.h.

**12.34.1.19 OS\_MAX\_PATH\_LEN** #define OS\_MAX\_PATH\_LEN 64  
The maximum length of OSAL path names.  
This limit applies to the overall length of a path name, including the file name and directory portions.  
Based on the OSAL\_CONFIG\_MAX\_PATH\_LEN configuration option

**Note**

This value must include a terminating NUL character

Definition at line 154 of file osconfig.h.

**12.34.1.20 OS\_MAX\_QUEUES** #define OS\_MAX\_QUEUES 64  
The maximum number of queues to support.  
Based on the OSAL\_CONFIG\_MAX\_QUEUES configuration option  
Definition at line 51 of file osconfig.h.

**12.34.1.21 OS\_MAX\_SYM\_LEN** #define OS\_MAX\_SYM\_LEN 64  
The maximum length of symbols.  
Based on the OSAL\_CONFIG\_MAX\_SYM\_LEN configuration option

**Note**

This value must include a terminating NUL character

Definition at line 130 of file osconfig.h.

**12.34.1.22 OS\_MAX\_TASKS #define OS\_MAX\_TASKS 64**

The maximum number of tasks to support.

Based on the OSAL\_CONFIG\_MAX\_TASKS configuration option

Definition at line 44 of file osconfig.h.

**12.34.1.23 OS\_MAX\_TIMEBASES #define OS\_MAX\_TIMEBASES 5**

The maximum number of timebases to support.

Based on the OSAL\_CONFIG\_MAX\_TIMEBASES configuration option

Definition at line 93 of file osconfig.h.

**12.34.1.24 OS\_MAX\_TIMERS #define OS\_MAX\_TIMERS 10**

The maximum number of timer callbacks to support.

Based on the OSAL\_CONFIG\_MAX\_TIMERS configuration option

Definition at line 100 of file osconfig.h.

**12.34.1.25 OS\_MODULE\_FILE\_EXTENSION #define OS\_MODULE\_FILE\_EXTENSION ".so"**

The system-specific file extension used on loadable module files.

Fixed value based on system selection, not user configurable.

Definition at line 276 of file osconfig.h.

**12.34.1.26 OS\_PRINTF\_CONSOLE\_NAME #define OS\_PRINTF\_CONSOLE\_NAME ""**

The name of the primary console device.

This is the device to which [OS\\_printf\(\)](#) output is written. The output may be configured to tag each line with this prefix for identification.

Based on the OSAL\_CONFIG\_PRINTF\_CONSOLE\_NAME configuration option

Definition at line 245 of file osconfig.h.

**12.34.1.27 OS\_QUEUE\_MAX\_DEPTH #define OS\_QUEUE\_MAX\_DEPTH 50**

The maximum depth of OSAL queues.

Based on the OSAL\_CONFIG\_QUEUE\_MAX\_DEPTH configuration option

Definition at line 225 of file osconfig.h.

**12.34.1.28 OS\_SHELL\_CMD\_INPUT\_FILE\_NAME #define OS\_SHELL\_CMD\_INPUT\_FILE\_NAME ""**

The name of the temporary file used to store shell commands.

This configuration is only applicable if shell support is enabled, and only necessary/relevant on some OS implementations.

Based on the OSAL\_CONFIG\_SHELL\_CMD\_INPUT\_FILE\_NAME configuration option

Definition at line 235 of file osconfig.h.

**12.34.1.29 OS SOCKADDR\_MAX\_LEN** #define OS SOCKADDR\_MAX\_LEN 28

The maximum size of the socket address structure.

This is part of the Socket API, and should be set large enough to hold the largest address type in use on the target system.

Based on the OSAL\_CONFIG\_SOCKADDR\_MAX\_LEN configuration option

Definition at line 173 of file osconfig.h.

**12.34.1.30 OS UTILITYTASK\_PRIORITY** #define OS UTILITYTASK\_PRIORITY 245

Priority level of the background utility task.

This task is responsible for writing buffered output of OS\_printf to the actual console device, and any other future maintenance task.

Based on the OSAL\_CONFIG\_UTILITYTASK\_PRIORITY configuration option

Definition at line 197 of file osconfig.h.

**12.34.1.31 OS UTILITYTASK\_STACK\_SIZE** #define OS UTILITYTASK\_STACK\_SIZE 2048

The stack size of the background utility task.

This task is responsible for writing buffered output of OS\_printf to the actual console device, and any other future maintenance task.

Based on the OSAL\_CONFIG\_UTILITYTASK\_STACK\_SIZE configuration option

Definition at line 207 of file osconfig.h.

**12.34.1.32 OSAL\_CONFIG\_CONSOLE\_ASYNC** #define OSAL\_CONFIG\_CONSOLE\_ASYNC

Definition at line 27 of file osconfig.h.

**12.34.1.33 OSAL\_CONFIG\_INCLUDE\_DYNAMIC\_LOADER** #define OSAL\_CONFIG\_INCLUDE\_DYNAMIC\_LOADER

Configuration file Operating System Abstraction Layer.

The specific definitions in this file may only be modified by setting the respective OSAL configuration options in the CMake build.

Any direct modifications to the generated copy will be overwritten each time CMake executes.

**Note**

This file was automatically generated by CMake from /home/runner/work/LC/LC/osal/default\_config.cmake

Definition at line 21 of file osconfig.h.

**12.34.1.34 OSAL\_CONFIG\_INCLUDE\_NETWORK** #define OSAL\_CONFIG\_INCLUDE\_NETWORK

Definition at line 22 of file osconfig.h.

**12.34.1.35 OSAL\_CONFIG\_INCLUDE\_STATIC\_LOADER** #define OSAL\_CONFIG\_INCLUDE\_STATIC\_LOADER

Definition at line 23 of file osconfig.h.

---

**12.35 cfe/cmake/sample\_defs/example\_mission\_cfg.h File Reference****Macros**

- #define CFE\_MISSION\_MAX\_PATH\_LEN 64
- #define CFE\_MISSION\_MAX\_FILE\_LEN 20

- #define CFE\_MISSION\_MAX\_API\_LEN 20
- #define CFE\_MISSION\_MAX\_NUM\_FILES 50
- #define CFE\_MISSION\_ES\_MAX\_APPLICATIONS 16
- #define CFE\_MISSION\_ES\_PERF\_MAX\_IDS 128
- #define CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS 17
- #define CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH 16
- #define CFE\_MISSION\_ES\_DEFAULT\_CRC CFE\_ES\_CrcType\_CRC\_16
- #define CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)

#### Checksum/CRC algorithm identifiers

- #define CFE\_MISSION\_ES\_CRC\_8 CFE\_ES\_CrcType\_CRC\_8 /\* 1 \*/
- #define CFE\_MISSION\_ES\_CRC\_16 CFE\_ES\_CrcType\_CRC\_16 /\* 2 \*/
- #define CFE\_MISSION\_ES\_CRC\_32 CFE\_ES\_CrcType\_CRC\_32 /\* 3 \*/
- #define CFE\_MISSION\_ES\_MAX\_MESSAGE\_LENGTH 122
- #define CFE\_FS\_HDR\_DESC\_MAX\_LEN 32
  - Max length of description field in a standard cFE File Header.*
- #define CFE\_FS\_FILE\_CONTENT\_ID 0x63464531
  - Magic Number for cFE compliant files (= 'cFE1')*
- #define CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE 32768
- #define CFE\_MISSION\_SB\_MAX\_PIPES 64
- #define CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH 16
- #define CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)
- #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI true
- #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC false
- #define CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE true
- #define CFE\_MISSION\_TIME\_AT\_TONE\_WAS true
- #define CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE false
- #define CFE\_MISSION\_TIME\_MIN\_ELAPSED 0
- #define CFE\_MISSION\_TIME\_MAX\_ELAPSED 200000
- #define CFE\_MISSION\_TIME\_DEF\_MET\_SECS 1000
- #define CFE\_MISSION\_TIME\_DEF\_MET\_SUBS 0
- #define CFE\_MISSION\_TIME\_DEF\_STCF\_SECS 1000000
- #define CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS 0
- #define CFE\_MISSION\_TIME\_DEF\_LEAPS 37
- #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS 0
- #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS 1000
- #define CFE\_MISSION\_TIME\_EPOCH\_YEAR 1980
- #define CFE\_MISSION\_TIME\_EPOCH\_DAY 1
- #define CFE\_MISSION\_TIME\_EPOCH\_HOUR 0
- #define CFE\_MISSION\_TIME\_EPOCH\_MINUTE 0
- #define CFE\_MISSION\_TIME\_EPOCH\_SECOND 0
- #define CFE\_MISSION\_TIME\_EPOCH\_MICROS 0
- #define CFE\_MISSION\_TIME\_FS\_FACTOR 789004800

##### 12.35.1 Detailed Description

This header file contains the mission configuration parameters and typedefs with mission scope.

This provides values for configurable items that affect the interface(s) of this module. This includes the CMD/T $\leftarrow$ LM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

**Note**

It is no longer necessary to provide this file directly in the defs directory, but if present, this file is still supported/usable for backward compatibility. To use this file, it should be called "cfe\_mission\_cfg.h".

Going forward, more fine-grained (module/purposes-specific) header files are included with each submodule. These may be overridden as necessary, but only if a definition within that file needs to be changed from the default. This approach will reduce the amount of duplicate/cloned definitions and better support alternative build configurations in the future.

Note that if this file is present, the fine-grained header files noted above will *not* be used.

### 12.35.2 Macro Definition Documentation

#### 12.35.2.1 CFE\_FS\_FILE\_CONTENT\_ID #define CFE\_FS\_FILE\_CONTENT\_ID 0x63464531

Magic Number for cFE compliant files (= 'cFE1')

Definition at line 313 of file example\_mission\_cfg.h.

#### 12.35.2.2 CFE\_FS\_HDR\_DESC\_MAX\_LEN #define CFE\_FS\_HDR\_DESC\_MAX\_LEN 32

Max length of description field in a standard cFE File Header.

Definition at line 311 of file example\_mission\_cfg.h.

#### 12.35.2.3 CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN #define CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)

**Purpose** Maximum Length of Full CDS Name in messages

**Description:**

Indicates the maximum length (in characters) of the entire CDS name of the following form: "ApplicationName.CDSName"

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 262 of file example\_mission\_cfg.h.

#### 12.35.2.4 CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH #define CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH 16

**Purpose** Maximum Length of CDS Name

**Description:**

Indicates the maximum length (in characters) of the CDS name ('CDSName') portion of a Full CDS Name of the following form: "ApplicationName.CDSName"

This length does not need to include an extra character for NULL termination.

## Limits

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 228 of file example\_mission\_cfg.h.

**12.35.2.5 CFE\_MISSION\_ES\_CRC\_16** #define CFE\_MISSION\_ES\_CRC\_16 CFE\_ES\_CrcType\_CRC\_16 /\* 2 \*/  
Definition at line 270 of file example\_mission\_cfg.h.

**12.35.2.6 CFE\_MISSION\_ES\_CRC\_32** #define CFE\_MISSION\_ES\_CRC\_32 CFE\_ES\_CrcType\_CRC\_32 /\* 3 \*/  
Definition at line 271 of file example\_mission\_cfg.h.

**12.35.2.7 CFE\_MISSION\_ES\_CRC\_8** #define CFE\_MISSION\_ES\_CRC\_8 CFE\_ES\_CrcType\_CRC\_8 /\* 1 \*/  
Definition at line 269 of file example\_mission\_cfg.h.

**12.35.2.8 CFE\_MISSION\_ES\_DEFAULT\_CRC** #define CFE\_MISSION\_ES\_DEFAULT\_CRC CFE\_ES\_CrcType\_CRC\_16

**Purpose** Mission Default CRC algorithm

### Description:

Indicates the which CRC algorithm should be used as the default for verifying the contents of Critical Data Stores and when calculating Table Image data integrity values.

## Limits

Currently only CFE\_ES\_CrcType\_CRC\_16 is supported (see brief in CFE\_ES\_CrcType\_Enum definition in [cfe\\_es\\_api\\_typedefs.h](#))

Definition at line 242 of file example\_mission\_cfg.h.

**12.35.2.9 CFE\_MISSION\_ES\_MAX\_APPLICATIONS** #define CFE\_MISSION\_ES\_MAX\_APPLICATIONS 16

**Purpose** Mission Max Apps in a message

### Description:

Indicates the maximum number of apps in a telemetry housekeeping message

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

## Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 173 of file example\_mission\_cfg.h.

**12.35.2.10 CFE\_MISSION\_ES\_PERF\_MAX\_IDS** #define CFE\_MISSION\_ES\_PERF\_MAX\_IDS 128

**Purpose** Define Max Number of Performance IDs for messages

Description:

Defines the maximum number of perf ids allowed in command/telemetry messages

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 190 of file example\_mission\_cfg.h.

**12.35.2.11 CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS** #define CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS 17

**Purpose** Maximum number of block sizes in pool structures

Description:

The upper limit for the number of block sizes supported in the generic pool implementation, which in turn implements the memory pools and CDS. This definition is used as the array size with the pool stats structure, and therefore should be consistent across all CPUs in a mission, as well as with the ground station.

There is also a platform-specific limit which may be fewer than this value.

Limits:

Must be at least one. No specific upper limit, but the number is anticipated to be reasonably small (i.e. tens, not hundreds). Large values have not been tested.

Definition at line 211 of file example\_mission\_cfg.h.

**12.35.2.12 CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH** #define CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH 122

**Purpose** Maximum Event Message Length

Description:

Indicates the maximum length (in characters) of the formatted text string portion of an event message

This length does not need to include an extra character for NULL termination.

Limits

Not Applicable

Definition at line 297 of file example\_mission\_cfg.h.

**12.35.2.13 CFE\_MISSION\_MAX\_API\_LEN** #define CFE\_MISSION\_MAX\_API\_LEN 20

**Purpose** cFE Maximum length for API names within data exchange structures

**Description:**

The value of this constant dictates the size of filenames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_API\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_API\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_API\_LEN value.

This length must include an extra character for NULL termination.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 125 of file example\_mission\_cfg.h.

**12.35.2.14 CFE\_MISSION\_MAX\_FILE\_LEN** #define CFE\_MISSION\_MAX\_FILE\_LEN 20

**Purpose** cFE Maximum length for filenames within data exchange structures

**Description:**

The value of this constant dictates the size of filenames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_FILE\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_FILE\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_FILE\_LEN value.

This length must include an extra character for NULL termination.

**Limits**

All CPUs within the same SB domain (mission) and ground tools must share the same definition. Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 99 of file example\_mission\_cfg.h.

**12.35.2.15 CFE\_MISSION\_MAX\_NUM\_FILES** #define CFE\_MISSION\_MAX\_NUM\_FILES 50

**Purpose** cFE Maximum number of files in a message/data exchange

**Description:**

The value of this constant dictates the maximum number of files within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_NUM\_OPEN\_FILES but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_NUM\_OPEN\_FILES in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_NUM\_OPEN\_FILES value.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 147 of file example\_mission\_cfg.h.

**12.35.2.16 CFE\_MISSION\_MAX\_PATH\_LEN #define CFE\_MISSION\_MAX\_PATH\_LEN 64****Purpose** cFE Maximum length for pathnames within data exchange structures**Description:**

The value of this constant dictates the size of pathnames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_PATH\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_PATH\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_PATH\_LEN value.

This length must include an extra character for NULL termination.

**Limits**

All CPUs within the same SB domain (mission) and ground tools must share the same definition. Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 72 of file example\_mission\_cfg.h.

**12.35.2.17 CFE\_MISSION\_SB\_MAX\_PIPES #define CFE\_MISSION\_SB\_MAX\_PIPES 64****Purpose** Maximum Number of pipes that SB command/telemetry messages may hold**Description:**

Dictates the maximum number of unique Pipes the SB message definitions will hold.

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 357 of file example\_mission\_cfg.h.

**12.35.2.18 CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE** #define CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE 32768

**Purpose** Maximum SB Message Size

**Description:**

The following definition dictates the maximum message size allowed on the software bus. SB checks the pkt length field in the header of all messages sent. If the pkt length field indicates the message is larger than this define, SB sends an event and rejects the send.

**Limits**

This parameter has a lower limit of 6 (CCSDS primary header size). There are no restrictions on the upper limit however, the maximum message size is system dependent and should be verified. Total message size values that are checked against this configuration are defined by a 16 bit data word.

Definition at line 340 of file example\_mission\_cfg.h.

**12.35.2.19 CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN** #define CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_L←  
EN (CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)

**Purpose** Maximum Length of Full Table Name in messages

**Description:**

Indicates the maximum length (in characters) of the entire table name within software bus messages, in "App←Name.TableName" notation.

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 402 of file example\_mission\_cfg.h.

**12.35.2.20 CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH** #define CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH 16

**Purpose** Maximum Table Name Length

**Description:**

Indicates the maximum length (in characters) of the table name ('TblName') portion of a Full Table Name of the following form: "ApplicationName.TblName"

This length does not need to include an extra character for NULL termination.

**Limits**

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 382 of file example\_mission\_cfg.h.

**12.35.2.21 CFE\_MISSION\_TIME\_AT\_TONE\_WAS** #define CFE\_MISSION\_TIME\_AT\_TONE\_WAS true

**Purpose** Default Time and Tone Order

Description:

Time Services may be configured to expect the time at the tone data packet to either precede or follow the tone signal. If the time at the tone data packet follows the tone signal, then the data within the packet describes what the time "was" at the tone. If the time at the tone data packet precedes the tone signal, then the data within the packet describes what the time "will be" at the tone. One, and only one, of the following symbols must be set to true:

- CFE\_MISSION\_TIME\_AT\_TONE\_WAS
- CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE Note: If Time Services is defined as using a simulated tone signal (see [CFE\\_MISSION\\_TIME\\_CFG\\_FAKE\\_TONE](#) above), then the tone data packet must follow the tone signal.

Limits

Either CFE\_MISSION\_TIME\_AT\_TONE\_WAS or CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE must be set to true. They may not both be true and they may not both be false.

Definition at line 468 of file example\_mission\_cfg.h.

**12.35.2.22 CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE** #define CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE false

Definition at line 469 of file example\_mission\_cfg.h.

**12.35.2.23 CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI** #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI true

**Purpose** Default Time Format

Description:

The following definitions select either UTC or TAI as the default (mission specific) time format. Although it is possible for an application to request time in a specific format, most callers should use [CFE\\_TIME\\_GetTime\(\)](#), which returns time in the default format. This avoids having to modify each individual caller when the default choice is changed.

Limits

if CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI is defined as true then CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC must be defined as false. if CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI is defined as false then CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC must be defined as true.

Definition at line 432 of file example\_mission\_cfg.h.

**12.35.2.24 CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC** #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC false

Definition at line 433 of file example\_mission\_cfg.h.

**12.35.2.25 CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE** #define CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE true

**Purpose** Default Time Format

**Description:**

The following definition enables the use of a simulated time at the tone signal using a software bus message.

**Limits**

Not Applicable

Definition at line 445 of file example\_mission\_cfg.h.

**12.35.2.26 CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS** #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS 0

Definition at line 527 of file example\_mission\_cfg.h.

**12.35.2.27 CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS 1000

Definition at line 528 of file example\_mission\_cfg.h.

**12.35.2.28 CFE\_MISSION\_TIME\_DEF\_LEAPS** #define CFE\_MISSION\_TIME\_DEF\_LEAPS 37

Definition at line 525 of file example\_mission\_cfg.h.

**12.35.2.29 CFE\_MISSION\_TIME\_DEF\_MET\_SECS** #define CFE\_MISSION\_TIME\_DEF\_MET\_SECS 1000

**Purpose** Default Time Values

**Description:**

Default time values are provided to avoid problems due to time calculations performed after startup but before commands can be processed. For example, if the default time format is UTC then it is important that the sum of MET and STCF always exceed the value of Leap Seconds to prevent the UTC time calculation ( $\text{time} = \text{MET} + \text{STCF} - \text{Leap Seconds}$ ) from resulting in a negative (very large) number.

Some past missions have also created known (albeit wrong) default timestamps. For example, assume the epoch is defined as Jan 1, 1970 and further assume the default time values are set to create a timestamp of Jan 1, 2000. Even though the year 2000 timestamps are wrong, it may be of value to keep the time within some sort of bounds acceptable to the software.

Note: Sub-second units are in micro-seconds (0 to 999,999) and all values must be defined

**Limits**

Not Applicable

Definition at line 519 of file example\_mission\_cfg.h.

**12.35.2.30 CFE\_MISSION\_TIME\_DEF\_MET\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_MET\_SUBS 0

Definition at line 520 of file example\_mission\_cfg.h.

**12.35.2.31 CFE\_MISSION\_TIME\_DEF\_STCF\_SECS** #define CFE\_MISSION\_TIME\_DEF\_STCF\_SECS 1000000  
Definition at line 522 of file example\_mission\_cfg.h.

**12.35.2.32 CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS 0  
Definition at line 523 of file example\_mission\_cfg.h.

**12.35.2.33 CFE\_MISSION\_TIME\_EPOCH\_DAY** #define CFE\_MISSION\_TIME\_EPOCH\_DAY 1  
Definition at line 546 of file example\_mission\_cfg.h.

**12.35.2.34 CFE\_MISSION\_TIME\_EPOCH\_HOUR** #define CFE\_MISSION\_TIME\_EPOCH\_HOUR 0  
Definition at line 547 of file example\_mission\_cfg.h.

**12.35.2.35 CFE\_MISSION\_TIME\_EPOCH\_MICROS** #define CFE\_MISSION\_TIME\_EPOCH\_MICROS 0  
Definition at line 550 of file example\_mission\_cfg.h.

**12.35.2.36 CFE\_MISSION\_TIME\_EPOCH\_MINUTE** #define CFE\_MISSION\_TIME\_EPOCH\_MINUTE 0  
Definition at line 548 of file example\_mission\_cfg.h.

**12.35.2.37 CFE\_MISSION\_TIME\_EPOCH\_SECOND** #define CFE\_MISSION\_TIME\_EPOCH\_SECOND 0  
Definition at line 549 of file example\_mission\_cfg.h.

**12.35.2.38 CFE\_MISSION\_TIME\_EPOCH\_YEAR** #define CFE\_MISSION\_TIME\_EPOCH\_YEAR 1980

**Purpose** Default EPOCH Values

**Description:**

Default ground time epoch values Note: these values are used only by the [CFE\\_TIME\\_Print\(\)](#) API function

**Limits**

Year - must be within 136 years Day - Jan 1 = 1, Feb 1 = 32, etc. Hour - 0 to 23 Minute - 0 to 59 Second - 0 to 59  
Micros - 0 to 999999

Definition at line 545 of file example\_mission\_cfg.h.

**12.35.2.39 CFE\_MISSION\_TIME\_FS\_FACTOR** #define CFE\_MISSION\_TIME\_FS\_FACTOR 789004800

**Purpose** Time File System Factor

**Description:**

Define the s/c vs file system time conversion constant...

Note: this value is intended for use only by CFE TIME API functions to convert time values based on the ground system epoch (s/c time) to and from time values based on the file system epoch (fs time).

FS time = S/C time + factor S/C time = FS time - factor

**Worksheet:**

S/C epoch = Jan 1, 2005 (LRO ground system epoch) FS epoch = Jan 1, 1980 (vxWorks DOS file system epoch)

Delta = 25 years, 0 days, 0 hours, 0 minutes, 0 seconds

Leap years = 1980, 1984, 1988, 1992, 1996, 2000, 2004 (divisible by 4 – except if by 100 – unless also by 400)

1 year = 31,536,000 seconds 1 day = 86,400 seconds 1 hour = 3,600 seconds 1 minute = 60 seconds

25 years = 788,400,000 seconds 7 extra leap days = 604,800 seconds

total delta = 789,004,800 seconds

**Limits**

Not Applicable

Definition at line 588 of file example\_mission\_cfg.h.

**12.35.2.40 CFE\_MISSION\_TIME\_MAX\_ELAPSED #define CFE\_MISSION\_TIME\_MAX\_ELAPSED 200000**

Definition at line 494 of file example\_mission\_cfg.h.

**12.35.2.41 CFE\_MISSION\_TIME\_MIN\_ELAPSED #define CFE\_MISSION\_TIME\_MIN\_ELAPSED 0****Purpose** Min and Max Time Elapsed**Description:**

Based on the definition of Time and Tone Order (CFE\_MISSION\_TIME\_AT\_TONE\_WAS/WILL\_BE) either the "time at the tone" signal or data packet will follow the other. This definition sets the valid window of time for the second of the pair to lag behind the first. Time Services will invalidate both the tone and packet if the second does not arrive within this window following the first.

For example, if the data packet follows the tone, it might be valid for the data packet to arrive between zero and 100,000 micro-seconds after the tone. But, if the tone follows the packet, it might be valid only if the packet arrived between 200,000 and 700,000 micro-seconds before the tone.

Note: units are in micro-seconds

**Limits**

0 to 999,999 decimal

Definition at line 493 of file example\_mission\_cfg.h.

**12.36 cfe/cmake/sample\_defs/example\_platform\_cfg.h File Reference****Macros**

- #define CFE\_PLATFORM\_ENDIAN CCSDS\_LITTLE\_ENDIAN
- #define CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MSEC 30000
- #define CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY 68
- #define CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING "/cf"
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING "/ram"

- #define CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS 32
- #define CFE\_PLATFORM\_ES\_MAX\_LIBRARIES 10
- #define CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES 20
- #define CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE 256
- #define CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE 3072
- #define CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE 30
- #define CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS 8
- #define CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE 1000
- #define CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT 5
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE 512
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS 4096
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED 30
- #define CFE\_PLATFORM\_ES\_CDS\_SIZE (128 \* 1024)
- #define CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE (1024 \* 1024)
- #define CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN 4
- #define CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE "/cf/cfe\_es\_startup.scr"
- #define CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE "/ram/cfe\_es\_startup.scr"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE "/ram/cfe\_es\_app\_info.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE "/ram/cfe\_es\_taskinfo.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE "/ram/cfe\_es\_syslog.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE "/ram/cfe\_erlog.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME "/ram/cfe\_es\_perf.dat"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE "/ram/cfe\_cds\_reg.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE 0
- #define CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE 1
- #define CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE 10000
- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE 0
- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE 0
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY 200
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE 4096
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY 20
- #define CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS 50
- #define CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE 8192
- #define CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES 512
- #define CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS 2
- #define CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS 17
- #define CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS 10
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01 8
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02 16
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03 32
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04 48
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05 64
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06 96
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07 128
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08 160
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09 256
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10 512

- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11 1024
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12 2048
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13 4096
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14 8192
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15 16384
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16 32768
- #define CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE 80000
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01 8
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02 16
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03 32
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04 48
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05 64
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06 96
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07 128
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08 160
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09 256
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10 512
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11 1024
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12 2048
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13 4096
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14 8192
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15 16384
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16 32768
- #define CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE 80000
- #define CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC 50
- #define CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC 1000
- #define CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY 61
- #define CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS 8
- #define CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST 32
- #define CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC 15
- #define CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE "/ram/cfe\_evs.log"
- #define CFE\_PLATFORM\_EVS\_LOG\_MAX 20
- #define CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATA\_FILE "/ram/cfe\_evs\_app.dat"
- #define CFE\_PLATFORM\_EVS\_PORT\_DEFAULT 0x0001
- #define CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG 0xE
- #define CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE 1
- #define CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE CFE\_EVS\_MsgFormat\_LONG
- #define CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS 256
- #define CFE\_PLATFORM\_SB\_MAX\_PIPES 64
- #define CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT 16
- #define CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT 4
- #define CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES 524288
- #define CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID 0x1FFF
- #define CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME "/ram/cfe\_sb\_route.dat"
- #define CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME "/ram/cfe\_sb\_pipe.dat"
- #define CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME "/ram/cfe\_sb\_msgmap.dat"
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT1 CFE\_SB\_SEND\_NO\_SUBS\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK1 CFE\_EVS\_FIRST\_4\_STOP
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT2 CFE\_SB\_DUP\_SUBSCRIPTION\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK2 CFE\_EVS\_FIRST\_4\_STOP

```
• #define CFE_PLATFORM_SB_FILTERED_EVENT3 CFE_SB_MSGID_LIM_ERR_EID
• #define CFE_PLATFORM_SB_FILTER_MASK3 CFE_EVS_FIRST_16_STOP
• #define CFE_PLATFORM_SB_FILTERED_EVENT4 CFE_SB_Q_FULL_ERR_EID
• #define CFE_PLATFORM_SB_FILTER_MASK4 CFE_EVS_FIRST_16_STOP
• #define CFE_PLATFORM_SB_FILTERED_EVENT5 0
• #define CFE_PLATFORM_SB_FILTER_MASK5 CFE_EVS_NO_FILTER
• #define CFE_PLATFORM_SB_FILTERED_EVENT6 0
• #define CFE_PLATFORM_SB_FILTER_MASK6 CFE_EVS_NO_FILTER
• #define CFE_PLATFORM_SB_FILTERED_EVENT7 0
• #define CFE_PLATFORM_SB_FILTER_MASK7 CFE_EVS_NO_FILTER
• #define CFE_PLATFORM_SB_FILTERED_EVENT8 0
• #define CFE_PLATFORM_SB_FILTER_MASK8 CFE_EVS_NO_FILTER
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_01 8
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_02 16
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_03 20
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_04 36
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_05 64
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_06 96
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_07 128
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_08 160
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_09 256
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_10 512
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_11 1024
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_12 2048
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_13 4096
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_14 8192
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_15 16384
• #define CFE_PLATFORM_SB_MEM_BLOCK_SIZE_16 32768
• #define CFE_PLATFORM_SB_MAX_BLOCK_SIZE (CFE_MISSION_SB_MAX_SB_MSG_SIZE + 128)
• #define CFE_PLATFORM_SB_START_TASK_PRIORITY 64
• #define CFE_PLATFORM_SB_START_TASK_STACK_SIZE CFE_PLATFORM_ES_DEFAULT_STACK_SIZE
• #define CFE_PLATFORM_TBL_START_TASK_PRIORITY 70
• #define CFE_PLATFORM_TBL_START_TASK_STACK_SIZE CFE_PLATFORM_ES_DEFAULT_STACK_SIZE
• #define CFE_PLATFORM_TBL_BUF_MEMORY_BYTES 524288
• #define CFE_PLATFORM_TBL_MAX_DBL_TABLE_SIZE 16384
• #define CFE_PLATFORM_TBL_MAX_SNGL_TABLE_SIZE 16384
• #define CFE_PLATFORM_TBL_MAX_NUM_TABLES 128
• #define CFE_PLATFORM_TBL_MAX_CRITICAL_TABLES 32
• #define CFE_PLATFORM_TBL_MAX_NUM_HANDLES 256
• #define CFE_PLATFORM_TBL_MAX_SIMULTANEOUS_LOADS 4
• #define CFE_PLATFORM_TBL_MAX_NUM_VALIDATIONS 10
• #define CFE_PLATFORM_TBL_DEFAULT_REG_DUMP_FILE "/ram/cfe_tbl_reg.log"
• #define CFE_PLATFORM_TBL_VALID_SCID_COUNT 0
• #define CFE_PLATFORM_TBL_U32FROM4CHARS(_C1, _C2, _C3, _C4) ((uint32)(_C1) << 24 | (uint32)(_C2)
<< 16 | (uint32)(_C3) << 8 | (uint32)(_C4))
• #define CFE_PLATFORM_TBL_VALID_SCID_1 (0x42)
• #define CFE_PLATFORM_TBL_VALID_SCID_2 (CFE_PLATFORM_TBL_U32FROM4CHARS('a', 'b', 'c', 'd'))
• #define CFE_PLATFORM_TBL_VALID_PRID_COUNT 0
• #define CFE_PLATFORM_TBL_VALID_PRID_1 (1)
• #define CFE_PLATFORM_TBL_VALID_PRID_2 (CFE_PLATFORM_TBL_U32FROM4CHARS('a', 'b', 'c', 'd'))
• #define CFE_PLATFORM_TBL_VALID_PRID_3 0
```

- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_4 0
- #define CFE\_PLATFORM\_TIME\_CFG\_SERVER true
- #define CFE\_PLATFORM\_TIME\_CFG\_CLIENT false
- #define CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL true
- #define CFE\_PLATFORM\_TIME\_CFG\_SIGNAL false
- #define CFE\_PLATFORM\_TIME\_CFG\_SOURCE false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME false
- #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS 0
- #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS 500000
- #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS 27
- #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS 0
- #define CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT 20000
- #define CFE\_PLATFORM\_TIME\_CFG\_START\_FLY 2
- #define CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY 8
- #define CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY 60
- #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY 25
- #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY 25
- #define CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE 4096
- #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE 8192

### 12.36.1 Detailed Description

This header file contains the internal configuration parameters and typedefs with platform scope.

This provides default values for configurable items that do NOT affect the interface(s) of this module. This includes internal parameters, path names, and limit value(s) that are relevant for a specific platform.

#### Note

It is no longer necessary to provide this file directly in the defs directory, but if present, this file is still supported/usable for backward compatibility. To use this file, it should be called "cfe\_platform\_cfg.h".

Going forward, more fine-grained (module/purposes-specific) header files are included with each submodule. These may be overridden as necessary, but only if a definition within that file needs to be changed from the default. This approach will reduce the amount of duplicate/cloned definitions and better support alternative build configurations in the future.

Note that if this file is present, the fine-grained header files noted above will *not* be used.

### 12.36.2 Macro Definition Documentation

#### 12.36.2.1 CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MSEC #define CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MS← EC 30000

**Purpose** CFE core application startup timeout

**Description:**

The upper limit for the amount of time that the cFE core applications (ES, SB, EVS, TIME, TBL) are each allotted to reach their respective "ready" states.

The CFE "main" thread starts individual tasks for each of the core applications (except FS). Each of these must perform some initialization work before the next core application can be started, so the main thread waits to ensure that the application has reached the "ready" state before starting the next application.

If any core application fails to start, then it indicates a major problem with the system and startup is aborted.

Units are in milliseconds

**Limits:**

Must be defined as an integer value that is greater than or equal to zero.

Definition at line 84 of file example\_platform\_cfg.h.

**12.36.2.2 CFE\_PLATFORM\_ENDIAN #define CFE\_PLATFORM\_ENDIAN CCSDS\_LITTLE\_ENDIAN****Purpose** Platform Endian Indicator**Description:**

The value of this constant indicates the endianess of the target system

**Limits**

This parameter has a lower limit of 0 and an upper limit of 1.

Definition at line 60 of file example\_platform\_cfg.h.

**12.36.2.3 CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT #define CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT 5****Purpose** Define ES Application Kill Timeout**Description:**

ES Application Kill Timeout. This parameter controls the number of "scan periods" that ES will wait for an application to Exit after getting the signal Delete, Reload or Restart. The sequence works as follows:

1. ES will set the control request for an App to Delete/Restart/Reload and set this kill timer to the value in this parameter.
2. If the App is responding and Calls it's RunLoop function, it will drop out of its main loop and call CFE\_ES→\_ExitApp. Once it calls Exit App, then ES can delete, restart, or reload the app the next time it scans the app table.
3. If the App is not responding, the ES App will decrement this Kill Timeout value each time it runs. If the timeout value reaches zero, ES will kill the app.

The Kill timeout value depends on the [CFE\\_PLATFORM\\_ES\\_APP\\_SCAN\\_RATE](#). If the Scan Rate is 1000, or 1 second, and this [CFE\\_PLATFORM\\_ES\\_APP\\_KILL\\_TIMEOUT](#) is set to 5, then it will take 5 seconds to kill a non-responding App. If the Scan Rate is 250, or 1/4 second, and the [CFE\\_PLATFORM\\_ES\\_APP\\_KILL\\_TIMEOUT](#) is set to 2, then it will take 1/2 second to time out.

**Limits**

There is a lower limit of 1 and an upper limit of 100 on this configuration parameter. Units are number of [CFE\\_PLATFORM\\_ES\\_APP\\_SCAN\\_RATE](#) cycles.

Definition at line 288 of file example\_platform\_cfg.h.

**12.36.2.4 CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE** #define CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE 1000

**Purpose** Define ES Application Control Scan Rate

**Description:**

ES Application Control Scan Rate. This parameter controls the speed that ES scans the Application Table looking for App Delete/Restart/Reload requests. All Applications are deleted, restarted, or reloaded by the ES Application. ES will periodically scan for control requests to process. The scan rate is controlled by this parameter, which is given in milliseconds. A value of 1000 means that ES will scan the Application Table once per second. Be careful not to set the value of this too low, because ES will use more CPU cycles scanning the table.

**Limits**

There is a lower limit of 100 and an upper limit of 20000 on this configuration parameter. millisecond units.

Definition at line 259 of file example\_platform\_cfg.h.

**12.36.2.5 CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE** #define CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE 80000

Definition at line 830 of file example\_platform\_cfg.h.

**12.36.2.6 CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES** #define CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES 512

**Purpose** Define Maximum Number of Registered CDS Blocks

**Description:**

Maximum number of registered CDS Blocks

**Limits**

There is a lower limit of 8. There are no restrictions on the upper limit however, the maximum number of CDS entries is system dependent and should be verified.

Definition at line 720 of file example\_platform\_cfg.h.

**12.36.2.7 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01 8

**Purpose** Define ES Critical Data Store Memory Pool Block Sizes

**Description:**

Intermediate ES Critical Data Store Memory Pool Block Sizes

**Limits**

These sizes MUST be increasing and MUST be an integral multiple of 4.

Definition at line 814 of file example\_platform\_cfg.h.

**12.36.2.8 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02 16

Definition at line 815 of file example\_platform\_cfg.h.

**12.36.2.9 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03 32

Definition at line 816 of file example\_platform\_cfg.h.

**12.36.2.10 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04 48

Definition at line 817 of file example\_platform\_cfg.h.

**12.36.2.11 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05 64

Definition at line 818 of file example\_platform\_cfg.h.

**12.36.2.12 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06 96

Definition at line 819 of file example\_platform\_cfg.h.

**12.36.2.13 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07 128

Definition at line 820 of file example\_platform\_cfg.h.

**12.36.2.14 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08 160

Definition at line 821 of file example\_platform\_cfg.h.

**12.36.2.15 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09 256

Definition at line 822 of file example\_platform\_cfg.h.

**12.36.2.16 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10 512

Definition at line 823 of file example\_platform\_cfg.h.

**12.36.2.17 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11 1024

Definition at line 824 of file example\_platform\_cfg.h.

**12.36.2.18 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12 2048

Definition at line 825 of file example\_platform\_cfg.h.

**12.36.2.19 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13 4096

Definition at line 826 of file example\_platform\_cfg.h.

**12.36.2.20 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14 8192

Definition at line 827 of file example\_platform\_cfg.h.

**12.36.2.21 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15 16384

Definition at line 828 of file example\_platform\_cfg.h.

**12.36.2.22 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16 32768

Definition at line 829 of file example\_platform\_cfg.h.

**12.36.2.23 CFE\_PLATFORM\_ES\_CDS\_SIZE** #define CFE\_PLATFORM\_ES\_CDS\_SIZE (128 \* 1024)

**Purpose** Define Critical Data Store Size

**Description:**

Defines the Critical Data Store (CDS) area size in bytes size. The CDS is one of four memory areas that are preserved during a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 8192 and an upper limit of UINT\_MAX (4 Gigabytes) on this configuration parameter.

Definition at line 365 of file example\_platform\_cfg.h.

**12.36.2.24 CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE "/ram/cfe\_es\_app\_info.log"

**Purpose** Default Application Information Filename

**Description:**

The value of this constant defines the filename used to store information pertaining to all of the Applications that are registered with Executive Services. This filename is used only when no filename is specified in the the command to query all system apps.

### Limits

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 447 of file example\_platform\_cfg.h.

**12.36.2.25 CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_CD←  
S\_REG\_DUMP\_FILE "/ram/cfe\_cds\_reg.log"

**Purpose** Default Critical Data Store Registry Filename

### Description:

The value of this constant defines the filename used to store the Critical Data Store Registry. This filename is used only when no filename is specified in the command to stop performance data collecting.

### Limits

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 521 of file example\_platform\_cfg.h.

**12.36.2.26 CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FI←  
LE "/ram/cfe\_erlog.log"

**Purpose** Default Exception and Reset (ER) Log Filename

### Description:

The value of this constant defines the filename used to store the Exception and Reset (ER) Log. This filename is used only when no filename is specified in the command to dump the ER log. No file specified in the cmd means the first character in the cmd filename is a NULL terminator (zero).

### Limits

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 493 of file example\_platform\_cfg.h.

**12.36.2.27 CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME** #define CFE\_PLATFORM\_ES\_DEFAULT\_←  
PERF\_DUMP\_FILENAME "/ram/cfe\_es\_perf.dat"

**Purpose** Default Performance Data Filename

### Description:

The value of this constant defines the filename used to store the Performance Data. This filename is used only when no filename is specified in the command to stop performance data collecting.

### Limits

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 507 of file example\_platform\_cfg.h.

**12.36.2.28 CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE** #define CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE 0

**Purpose** Define Default System Log Mode following Power On Reset

**Description:**

Defines the default mode for the operation of the ES System log following a power on reset. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest message in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. This constant may hold a value of either 0 or 1 depending on the desired default. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

There is a lower limit of 0 and an upper limit of 1 on this configuration parameter.

Definition at line 539 of file example\_platform\_cfg.h.

**12.36.2.29 CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE** #define CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE 1

**Purpose** Define Default System Log Mode following Processor Reset

**Description:**

Defines the default mode for the operation of the ES System log following a processor reset. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest message in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. This constant may hold a value of either 0 or 1 depending on the desired default. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

There is a lower limit of 0 and an upper limit of 1 on this configuration parameter.

Definition at line 557 of file example\_platform\_cfg.h.

**12.36.2.30 CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE** #define CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE 8192

**Purpose** Define Default Stack Size for an Application

**Description:**

This parameter defines a default stack size. This parameter is used by the cFE Core Applications.

**Limits**

There is a lower limit of 2048. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 707 of file example\_platform\_cfg.h.

**12.36.2.31 CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FI←  
LE "/ram/cfe\_es\_syslog.log"

**Purpose** Default System Log Filename

**Description:**

The value of this constant defines the filename used to store important information (as ASCII text strings) that might not be able to be sent in an Event Message. This filename is used only when no filename is specified in the command to dump the system log. No file specified in the cmd means the first character in the cmd filename is a NULL terminator (zero).

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 478 of file example\_platform\_cfg.h.

**12.36.2.32 CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LO←  
G\_FILE "/ram/cfe\_es\_taskinfo.log"

**Purpose** Default Application Information Filename

**Description:**

The value of this constant defines the filename used to store information pertaining to all of the Applications that are registered with Executive Services. This filename is used only when no filename is specified in the the command to query all system tasks.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 462 of file example\_platform\_cfg.h.

**12.36.2.33 CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES** #define CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES 20

**Purpose** Define Max Number of ER (Exception and Reset) log entries

**Description:**

Defines the maximum number of ER (Exception and Reset) log entries

**Limits**

There is a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of log entries is system dependent and should be verified.

Definition at line 186 of file example\_platform\_cfg.h.

**12.36.2.34 CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE** #define CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE 256

**Purpose** Maximum size of CPU Context in ES Error Log

**Description:**

This should be large enough to accommodate the CPU context information supplied by the PSP on the given platform.

**Limits:**

Must be greater than zero and a multiple of sizeof(uint32). Limited only by the available memory and the number of entries in the error log. Any context information beyond this size will be truncated.

Definition at line 200 of file example\_platform\_cfg.h.

**12.36.2.35 CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS** #define CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS 32

**Purpose** Define Max Number of Applications

**Description:**

Defines the maximum number of applications that can be loaded into the system. This number does not include child tasks.

**Limits**

There is a lower limit of 6. The lower limit corresponds to the cFE internal applications. There are no restrictions on the upper limit however, the maximum number of applications is system dependent and should be verified. AppIDs that are checked against this configuration are defined by a 32 bit data word.

Definition at line 159 of file example\_platform\_cfg.h.

**12.36.2.36 CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE** #define CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE 80000

Definition at line 803 of file example\_platform\_cfg.h.

**12.36.2.37 CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS** #define CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS 8

**Purpose** Define Max Number of Generic Counters

**Description:**

Defines the maximum number of Generic Counters that can be registered.

**Limits**

This parameter has a lower limit of 1 and an upper limit of 65535.

Definition at line 240 of file example\_platform\_cfg.h.

**12.36.2.38 CFE\_PLATFORM\_ES\_MAX\_LIBRARIES** #define CFE\_PLATFORM\_ES\_MAX\_LIBRARIES 10

**Purpose** Define Max Number of Shared libraries

**Description:**

Defines the maximum number of cFE Shared libraries that can be loaded into the system.

**Limits**

There is a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of libraries is system dependent and should be verified.

Definition at line 173 of file example\_platform\_cfg.h.

**12.36.2.39 CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS** #define CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS 10

**Purpose** Maximum number of memory pools

**Description:**

The upper limit for the number of memory pools that can concurrently exist within the system.

The CFE\_SB and CFE\_TBL core subsystems each define a memory pool.  
Individual applications may also create memory pools, so this value should be set sufficiently high enough to support the applications being used on this platform.

**Limits:**

Must be at least 2 to support CFE core - SB and TBL pools. No specific upper limit.

Definition at line 768 of file example\_platform\_cfg.h.

**12.36.2.40 CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS** #define CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS 2

**Purpose** Define Number of Processor Resets Before a Power On Reset

**Description:**

Number of Processor Resets before a Power On Reset is called. If set to 2, then 2 processor resets will occur, and the 3rd processor reset will be a power on reset instead.

**Limits**

There is a lower limit of 0. There are no restrictions on the upper limit however, the maximum number of processor resets may be system dependent and should be verified.

Definition at line 735 of file example\_platform\_cfg.h.

**12.36.2.41 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01 8

**Purpose** Define Default ES Memory Pool Block Sizes

**Description:**

Default Intermediate ES Memory Pool Block Sizes. If an application is using the CFE\_ES Memory Pool APIs (CFE\_ES\_PoolCreate, CFE\_ES\_PoolCreateNoSem, CFE\_ES\_GetPoolBuf and CFE\_ES\_PutPoolBuf) but finds these sizes inappropriate for their use, they may wish to use the CFE\_ES\_PoolCreateEx API to specify their own intermediate block sizes

**Limits**

These sizes MUST be increasing and MUST be an integral multiple of 4. Also, CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE must be larger than CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE and both CFE\_PLATFORM\_TB\_MAX\_SNGL\_TABLE\_SIZE and CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE. Note that if Table Services have been removed from the CFE, the table size limits are still enforced although the table size definitions may be reduced.

Definition at line 787 of file example\_platform\_cfg.h.

**12.36.2.42 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02 16

Definition at line 788 of file example\_platform\_cfg.h.

**12.36.2.43 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03 32

Definition at line 789 of file example\_platform\_cfg.h.

**12.36.2.44 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04 48

Definition at line 790 of file example\_platform\_cfg.h.

**12.36.2.45 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05 64

Definition at line 791 of file example\_platform\_cfg.h.

**12.36.2.46 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06 96

Definition at line 792 of file example\_platform\_cfg.h.

**12.36.2.47 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07 128

Definition at line 793 of file example\_platform\_cfg.h.

**12.36.2.48 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08 160

Definition at line 794 of file example\_platform\_cfg.h.

**12.36.2.49 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09 256

Definition at line 795 of file example\_platform\_cfg.h.

**12.36.2.50 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10 512  
Definition at line 796 of file example\_platform\_cfg.h.

**12.36.2.51 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11 1024  
Definition at line 797 of file example\_platform\_cfg.h.

**12.36.2.52 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12 2048  
Definition at line 798 of file example\_platform\_cfg.h.

**12.36.2.53 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13 4096  
Definition at line 799 of file example\_platform\_cfg.h.

**12.36.2.54 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14 8192  
Definition at line 800 of file example\_platform\_cfg.h.

**12.36.2.55 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15 16384  
Definition at line 801 of file example\_platform\_cfg.h.

**12.36.2.56 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16 32768  
Definition at line 802 of file example\_platform\_cfg.h.

**12.36.2.57 CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN** #define CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN 4

**Purpose** Define Memory Pool Alignment Size

**Description:**

Ensures that buffers obtained from a memory pool are aligned to a certain minimum block size. Note the allocator will always align to the minimum required by the CPU architecture. This may be set greater than the CPU requirement as desired for optimal performance.

For some architectures/applications it may be beneficial to set this to the cache line size of the target CPU, or to use special SIMD instructions that require a more stringent memory alignment.

**Limits**

This must always be a power of 2, as it is used as a binary address mask.

Definition at line 404 of file example\_platform\_cfg.h.

**12.36.2.58 CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING** #define CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING "/cf"

**Purpose** Default virtual path for persistent storage

**Description:**

This configures the default location in the virtual file system for persistent/non-volatile storage. Files such as the startup script, app/library dynamic modules, and configuration tables are expected to be stored in this directory.

Definition at line 127 of file example\_platform\_cfg.h.

**12.36.2.59 CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE** #define CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE "/cf/cfe\_es\_startup.scr"

**Purpose** ES Nonvolatile Startup Filename

**Description:**

The value of this constant defines the path and name of the file that contains a list of modules that will be loaded and started by the cFE after the cFE finishes its startup sequence.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 418 of file example\_platform\_cfg.h.

**12.36.2.60 CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE** #define CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE 30

**Purpose** Define Number of entries in the ES Object table

**Description:**

Defines the number of entries in the ES Object table. This table controls the core cFE startup.

**Limits**

There is a lower limit of 15. There are no restrictions on the upper limit however, the maximum object table size is system dependent and should be verified.

Definition at line 229 of file example\_platform\_cfg.h.

**12.36.2.61 CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY 20

**Purpose** Define Performance Analyzer Child Task Delay

**Description:**

This parameter defines the delay time (in milliseconds) between performance data file writes performed by the Executive Services Performance Analyzer Child Task.

**Limits**

It is recommended this parameter be greater than or equal to 20ms. This parameter is limited by the maximum value allowed by the data type. In this case, the data type is an unsigned 32-bit integer, so the valid range is 0 to 0xFFFFFFFF.

Definition at line 681 of file example\_platform\_cfg.h.

**12.36.2.62 CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY 200

**Purpose** Define Performance Analyzer Child Task Priority

**Description:**

This parameter defines the priority of the child task spawned by the Executive Services to write performance data to a file. Lower numbers are higher priority, with 1 being the highest priority in the case of a child task.

**Limits**

Valid range for a child task is 1 to 255 however, the priority cannot be higher (lower number) than the ES parent application priority.

Definition at line 652 of file example\_platform\_cfg.h.

**12.36.2.63 CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE 4096

**Purpose** Define Performance Analyzer Child Task Stack Size

**Description:**

This parameter defines the stack size of the child task spawned by the Executive Services to write performance data to a file.

**Limits**

It is recommended this parameter be greater than or equal to 4KB. This parameter is limited by the maximum value allowed by the data type. In this case, the data type is an unsigned 32-bit integer, so the valid range is 0 to 0xFFFFFFFF.

Definition at line 666 of file example\_platform\_cfg.h.

**12.36.2.64 CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE** #define CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE 10000

**Purpose** Define Max Size of Performance Data Buffer

**Description:**

Defines the maximum size of the performance data buffer. Units are number of performance data entries. An entry is defined by a 32 bit data word followed by a 64 bit time stamp.

**Limits**

There is a lower limit of 1025. There are no restrictions on the upper limit however, the maximum buffer size is system dependent and should be verified. The units are number of entries. An entry is defined by a 32 bit data word followed by a 64 bit time stamp.

Definition at line 573 of file example\_platform\_cfg.h.

**12.36.2.65 CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS** #define CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS 50

**Purpose** Define Performance Analyzer Child Task Number of Entries Between Delay

**Description:**

This parameter defines the number of performance analyzer entries the Performance Analyzer Child Task will write to the file between delays.

Definition at line 691 of file example\_platform\_cfg.h.

**12.36.2.66 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE

**Purpose** Define Filter Mask Setting for Enabling All Performance Entries

**Description:**

Defines the filter mask for enabling all performance entries. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 593 of file example\_platform\_cfg.h.

**12.36.2.67 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL

**Purpose** Define Default Filter Mask Setting for Performance Data Buffer

**Description:**

Defines the default filter mask for the performance data buffer. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 604 of file example\_platform\_cfg.h.

**12.36.2.68 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE 0

**Purpose** Define Filter Mask Setting for Disabling All Performance Entries

**Description:**

Defines the filter mask for disabling all performance entries. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 583 of file example\_platform\_cfg.h.

**12.36.2.69 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL** #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE

**Purpose** Define Filter Trigger Setting for Enabling All Performance Entries

**Description:**

Defines the trigger mask for enabling all performance data entries. The value is a bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 626 of file example\_platform\_cfg.h.

**12.36.2.70 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT** #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT ~CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE

**Purpose** Define Default Filter Trigger Setting for Performance Data Buffer

**Description:**

Defines the default trigger mask for the performance data buffer. The value is a 32-bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 637 of file example\_platform\_cfg.h.

**12.36.2.71 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE** #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE 0

**Purpose** Define Default Filter Trigger Setting for Disabling All Performance Entries

**Description:**

Defines the default trigger mask for disabling all performance data entries. The value is a bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 615 of file example\_platform\_cfg.h.

**12.36.2.72 CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS** #define CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS 17

**Purpose** Maximum number of block sizes in pool structures

**Description:**

The upper limit for the number of block sizes supported in the generic pool implementation, which in turn implements the memory pools and CDS.

**Limits:**

Must be at least one. No specific upper limit, but the number is anticipated to be reasonably small (i.e. tens, not hundreds). Large values have not been tested.

The ES and CDS block size lists must correlate with this value

Definition at line 750 of file example\_platform\_cfg.h.

**12.36.2.73 CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING "/ram"

**Purpose** Default virtual path for volatile storage

**Description:**

The **CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING** parameter is used to set the cFE mount path for the CFE RAM disk. This is a parameter for missions that do not want to use the default value of "/ram", or for missions that need to have a different value for different CPUs or Spacecraft. Note that the vxWorks OSAL cannot currently handle names that have more than one path separator in it. The names "/ram", "/ramdisk", "/disk123" will all work, but "/disks/ram" will not. Multiple separators can be used with the posix or RTEMS ports.

Definition at line 143 of file example\_platform\_cfg.h.

**12.36.2.74 CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS 4096

**Purpose** ES Ram Disk Number of Sectors

**Description:**

Defines the ram disk number of sectors. The ram disk is one of four memory areas that are preserved on a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 128. There are no restrictions on the upper limit however, the maximum number of RAM sectors is system dependent and should be verified.

Definition at line 324 of file example\_platform\_cfg.h.

**12.36.2.75 CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED 30

**Purpose** Percentage of Ram Disk Reserved for Decompressing Apps

**Description:**

The **CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED** parameter is used to make sure that the Volatile ( RAM ) Disk has a defined amount of free space during a processor reset. The cFE uses the Volatile disk to decompress cFE applications during system startup. If this Volatile disk happens to get filled with logs and misc files, then a processor reset may not work, because there will be no room to decompress cFE apps. To solve that problem, this parameter sets the "Low Water Mark" for disk space on a Processor reset. It should be set to allow the largest cFE Application to be decompressed. During a Processor reset, if there is not sufficient space left on the disk, it will be re-formatted in order to clear up some space.

This feature can be turned OFF by setting the parameter to 0.

**Limits**

There is a lower limit of 0 and an upper limit of 75 on this configuration parameter. Units are percentage. A setting of zero will turn this feature off.

Definition at line 348 of file example\_platform\_cfg.h.

```
12.36.2.76 CFE_PLATFORM_ES_RAM_DISK_SECTOR_SIZE #define CFE_PLATFORM_ES_RAM_DISK_SECTOR_SIZE 512
```

**Purpose** ES Ram Disk Sector Size

**Description:**

Defines the ram disk sector size. The ram disk is 1 of 4 memory areas that are preserved on a processor reset.  
NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 128. There are no restrictions on the upper limit however, the maximum RAM disk sector size is system dependent and should be verified.

Definition at line 306 of file example\_platform\_cfg.h.

```
12.36.2.77 CFE_PLATFORM_ES_START_TASK_PRIORITY #define CFE_PLATFORM_ES_START_TASK_PRIORITY 68
```

**Purpose** Define ES Task Priority

**Description:**

Defines the cFE\_ES Task priority.

**Limits**

Not Applicable

Definition at line 100 of file example\_platform\_cfg.h.

```
12.36.2.78 CFE_PLATFORM_ES_START_TASK_STACK_SIZE #define CFE_PLATFORM_ES_START_TASK_STACK_SIZE CFE_PLATFORM_ES_DEFAULT_STACK_SIZE
```

**Purpose** Define ES Task Stack Size

**Description:**

Defines the cFE\_ES Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 115 of file example\_platform\_cfg.h.

**12.36.2.79 CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC** #define CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC 1000

**Purpose** Startup script timeout

**Description:**

The upper limit for the total amount of time that all apps listed in the CFE ES startup script may take to all become ready.

Unlike the "core" app timeout, this is a soft limit; if the allotted time is exceeded, it probably indicates an issue with one of the apps, but does not cause CFE ES to take any additional action other than logging the event to the syslog.

Units are in milliseconds

**Limits:**

Must be defined as an integer value that is greater than or equal to zero.

Definition at line 870 of file example\_platform\_cfg.h.

**12.36.2.80 CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC** #define CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC 50

**Purpose** Poll timer for startup sync delay

**Description:**

During startup, some tasks may need to synchronize their own initialization with the initialization of other applications in the system.

CFE ES implements an API to accomplish this, that performs a task delay (sleep) while polling the overall system state until other tasks are ready.

This value controls the amount of time that the CFE\_ES\_ApplicationSyncDelay will sleep between each check of the system state. This should be large enough to allow other tasks to run, but not so large as to noticeably delay the startup completion.

Units are in milliseconds

**Limits:**

Must be defined as an integer value that is greater than or equal to zero.

Definition at line 852 of file example\_platform\_cfg.h.

**12.36.2.81 CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE** #define CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE 3072

**Purpose** Define Size of the cFE System Log.

**Description:**

Defines the size in bytes of the cFE system log. The system log holds variable length strings that are terminated by a linefeed and null character.

**Limits**

There is a lower limit of 512. There are no restrictions on the upper limit however, the maximum system log size is system dependent and should be verified.

Definition at line 215 of file example\_platform\_cfg.h.

```
12.36.2.82 CFE_PLATFORM_ES_USER_RESERVED_SIZE #define CFE_PLATFORM_ES_USER_RESERVED_SI←  
ZE (1024 * 1024)
```

**Purpose** Define User Reserved Memory Size

**Description:**

User Reserved Memory Size. This is the size in bytes of the cFE User reserved Memory area. This is a block of memory that is available for cFE application use. The address is obtained by calling [CFE\\_PSP\\_GetUserReservedArea](#). The User Reserved Memory is one of four memory areas that are preserved during a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 1024 and an upper limit of [UINT\\_MAX](#) (4 Gigabytes) on this configuration parameter.

Definition at line 385 of file example\_platform\_cfg.h.

```
12.36.2.83 CFE_PLATFORM_ES_VOLATILE_STARTUP_FILE #define CFE_PLATFORM_ES_VOLATILE_STARTUP←  
_FILE "/ram/cfe_es_startup.scr"
```

**Purpose** ES Volatile Startup Filename

**Description:**

The value of this constant defines the path and name of the file that contains a list of modules that will be loaded and started by the cFE after the cFE finishes its startup sequence.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 432 of file example\_platform\_cfg.h.

```
12.36.2.84 CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC #define CFE_PLATFORM_EVS_APP_EVENTS_PER←  
SEC 15
```

**Purpose** Sustained number of event messages per second per app before squelching

**Description:**

Sustained number of events that may be emitted per app per second.

**Limits**

This number must be less than or equal to [CFE\\_PLATFORM\\_EVS\\_MAX\\_APP\\_EVENT\\_BURST](#). Values lower than 8 may cause functional and unit test failures.

Definition at line 938 of file example\_platform\_cfg.h.

```
12.36.2.85 CFE_PLATFORM_EVS_DEFAULT_APP_DATA_FILE #define CFE_PLATFORM_EVS_DEFAULT_APP_DA←  
TA_FILE "/ram/cfe_evs_app.dat"
```

**Purpose** Default EVS Application Data Filename

**Description:**

The value of this constant defines the filename used to store the EVS Application Data(event counts/filtering information). This filename is used only when no filename is specified in the command to dump the event log.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 979 of file example\_platform\_cfg.h.

```
12.36.2.86 CFE_PLATFORM_EVS_DEFAULT_LOG_FILE #define CFE_PLATFORM_EVS_DEFAULT_LOG_FI←  
LE "/ram/cfe_evs.log"
```

**Purpose** Default Event Log Filename

**Description:**

The value of this constant defines the filename used to store the Event Services local event log. This filename is used only when no filename is specified in the command to dump the event log.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 952 of file example\_platform\_cfg.h.

```
12.36.2.87 CFE_PLATFORM_EVS_DEFAULT_LOG_MODE #define CFE_PLATFORM_EVS_DEFAULT_LOG_MODE 1
```

**Purpose** Default EVS Local Event Log Mode

**Description:**

Defines a state of overwrite(0) or discard(1) for the operation of the EVS local event log. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest event in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

The valid settings are 0 or 1

Definition at line 1026 of file example\_platform\_cfg.h.

**12.36.2.88 CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE** #define CFE\_PLATFORM\_EVS\_DEFAULT\_←  
MSG\_FORMAT\_MODE CFE\_EVS\_MsgFormat\_LONG

**Purpose** Default EVS Message Format Mode

**Description:**

Defines the default message format (long or short) for event messages being sent to the ground. Choose between CFE\_EVS\_MsgFormat\_LONG or CFE\_EVS\_MsgFormat\_SHORT.

**Limits**

The valid settings are CFE\_EVS\_MsgFormat\_LONG or CFE\_EVS\_MsgFormat\_SHORT

Definition at line 1039 of file example\_platform\_cfg.h.

**12.36.2.89 CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG** #define CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FL←  
AG 0xE

**Purpose** Default EVS Event Type Filter Mask

**Description:**

Defines a state of on or off for all four event types. The term event 'type' refers to the criticality level and may be Debug, Informational, Error or Critical. Each event type has a bit position. (bit 0 = Debug, bit 1 = Info, bit 2 = Error, bit 3 = Critical). This is a global setting, meaning it applies to all applications. To filter an event type, set its bit to zero. For example, 0xE means Debug = OFF, Info = ON, Error = ON, Critical = ON

**Limits**

The valid settings are 0x0 to 0xF.

Definition at line 1010 of file example\_platform\_cfg.h.

**12.36.2.90 CFE\_PLATFORM\_EVS\_LOG\_MAX** #define CFE\_PLATFORM\_EVS\_LOG\_MAX 20

**Purpose** Maximum Number of Events in EVS Local Event Log

**Description:**

Dictates the EVS local event log capacity. Units are the number of events.

**Limits**

There are no restrictions on the lower and upper limits however, the maximum log size is system dependent and should be verified.

Definition at line 964 of file example\_platform\_cfg.h.

**12.36.2.91 CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST** #define CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST 32

**Purpose** Maximum number of event before squelching

**Description:**

Maximum number of events that may be emitted per app per second. Setting this to 0 will cause events to be unrestricted.

**Limits**

This number must be less than or equal to INT\_MAX/1000

Definition at line 926 of file example\_platform\_cfg.h.

**12.36.2.92 CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS** #define CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS 8

**Purpose** Define Maximum Number of Event Filters per Application

**Description:**

Maximum number of events that may be filtered per application.

**Limits**

There are no restrictions on the lower and upper limits however, the maximum number of event filters is system dependent and should be verified.

Definition at line 914 of file example\_platform\_cfg.h.

**12.36.2.93 CFE\_PLATFORM\_EVS\_PORT\_DEFAULT** #define CFE\_PLATFORM\_EVS\_PORT\_DEFAULT 0x0001

**Purpose** Default EVS Output Port State

**Description:**

Defines the default port state (enabled or disabled) for the four output ports defined within the Event Service. Port 1 is usually the uart output terminal. To enable a port, set the proper bit to a 1. Bit 0 is port 1, bit 1 is port2 etc.

**Limits**

The valid settings are 0x0 to 0xF.

Definition at line 993 of file example\_platform\_cfg.h.

**12.36.2.94 CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY 61

**Purpose** Define EVS Task Priority

**Description:**

Defines the cFE\_EVS Task priority.

**Limits**

Not Applicable

Definition at line 886 of file example\_platform\_cfg.h.

**12.36.2.95 CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define EVS Task Stack Size

**Description:**

Defines the cFE\_EVS Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 901 of file example\_platform\_cfg.h.

**12.36.2.96 CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES** #define CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES 524288

**Purpose** Size of the SB buffer memory pool

**Description:**

Dictates the size of the SB memory pool. For each message the SB sends, the SB dynamically allocates from this memory pool, the memory needed to process the message. The memory needed to process each message is msg size + msg descriptor(CFE\_SB\_BufferD\_t). This memory pool is also used to allocate destination descriptors (CFE\_SB\_DestinationD\_t) during the subscription process. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'. Some memory statistics have been added to the SB housekeeping packet. NOTE: It is important to monitor these statistics to ensure the desired memory margin is met.

**Limits**

This parameter has a lower limit of 512 and an upper limit of `UINT_MAX` (4 Gigabytes).

Definition at line 1134 of file example\_platform\_cfg.h.

**12.36.2.97 CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME "/ram/cfe\_sb\_msgmap.dat"

**Purpose** Default Message Map Filename

**Description:**

The value of this constant defines the filename used to store the software bus message map information. This filename is used only when no filename is specified in the command. The message map is a lookup table (array of 16bit words) that has an element for each possible MsgId value and holds the routing table index for that MsgId. The Msg Map provides fast access to the destinations of a message.

**Limits**

The length of each string, including the NULL terminator cannot exceed the `OS_MAX_PATH_LEN` value.

Definition at line 1205 of file example\_platform\_cfg.h.

**12.36.2.98 CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT** #define CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT 4

**Purpose** Default Subscription Message Limit

**Description:**

Dictates the default Message Limit when using the [CFE\\_SB\\_Subscribe](#) API. This will limit the number of messages with a specific message ID that can be received through a subscription. This only changes the default; other message limits can be set on a per subscription basis using [CFE\\_SB\\_SubscribeEx](#).

**Limits**

This parameter has a lower limit of 4 and an upper limit of 65535.

Definition at line 1112 of file example\_platform\_cfg.h.

**12.36.2.99 CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FIL←  
ENAME "/ram/cfe\_sb\_pipe.dat"

**Purpose** Default Pipe Information Filename

**Description:**

The value of this constant defines the filename used to store the software bus pipe information. This filename is used only when no filename is specified in the command.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 1188 of file example\_platform\_cfg.h.

**12.36.2.100 CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_RO←  
UTING\_FILENAME "/ram/cfe\_sb\_route.dat"

**Purpose** Default Routing Information Filename

**Description:**

The value of this constant defines the filename used to store the software bus routing information. This filename is used only when no filename is specified in the command.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 1174 of file example\_platform\_cfg.h.

**12.36.2.101 CFE\_PLATFORM\_SB\_FILTER\_MASK1** #define CFE\_PLATFORM\_SB\_FILTER\_MASK1 [CFE\\_EVS\\_FIRST\\_4\\_STOP](#)  
Definition at line 1223 of file example\_platform\_cfg.h.

**12.36.2.102 CFE\_PLATFORM\_SB\_FILTER\_MASK2** #define CFE\_PLATFORM\_SB\_FILTER\_MASK2 CFE\_EVS\_FIRST\_4\_STOP  
Definition at line 1226 of file example\_platform\_cfg.h.

**12.36.2.103 CFE\_PLATFORM\_SB\_FILTER\_MASK3** #define CFE\_PLATFORM\_SB\_FILTER\_MASK3 CFE\_EVS\_FIRST\_16\_STOP  
Definition at line 1229 of file example\_platform\_cfg.h.

**12.36.2.104 CFE\_PLATFORM\_SB\_FILTER\_MASK4** #define CFE\_PLATFORM\_SB\_FILTER\_MASK4 CFE\_EVS\_FIRST\_16\_STOP  
Definition at line 1232 of file example\_platform\_cfg.h.

**12.36.2.105 CFE\_PLATFORM\_SB\_FILTER\_MASK5** #define CFE\_PLATFORM\_SB\_FILTER\_MASK5 CFE\_EVS\_NO\_FILTER  
Definition at line 1235 of file example\_platform\_cfg.h.

**12.36.2.106 CFE\_PLATFORM\_SB\_FILTER\_MASK6** #define CFE\_PLATFORM\_SB\_FILTER\_MASK6 CFE\_EVS\_NO\_FILTER  
Definition at line 1238 of file example\_platform\_cfg.h.

**12.36.2.107 CFE\_PLATFORM\_SB\_FILTER\_MASK7** #define CFE\_PLATFORM\_SB\_FILTER\_MASK7 CFE\_EVS\_NO\_FILTER  
Definition at line 1241 of file example\_platform\_cfg.h.

**12.36.2.108 CFE\_PLATFORM\_SB\_FILTER\_MASK8** #define CFE\_PLATFORM\_SB\_FILTER\_MASK8 CFE\_EVS\_NO\_FILTER  
Definition at line 1244 of file example\_platform\_cfg.h.

**12.36.2.109 CFE\_PLATFORM\_SB\_FILTERED\_EVENT1** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT1 CFE\_SB\_SEND\_NO\_SUBS\_EID

#### Purpose

SB Event Filtering

##### Description:

This group of configuration parameters dictates what SB events will be filtered through SB. The filtering will begin after the SB task initializes and stay in effect until a cmd to SB changes it. This allows the operator to set limits on the number of event messages that are sent during system initialization. NOTE: Set all unused event values and mask values to zero

##### Limits

This filtering applies only to SB events. These parameters have a lower limit of 0 and an upper limit of 65535.

Definition at line 1222 of file example\_platform\_cfg.h.

**12.36.2.110 CFE\_PLATFORM\_SB\_FILTERED\_EVENT2** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT2 CFE\_SB\_DUP\_SUBSCRIP\_EID  
Definition at line 1225 of file example\_platform\_cfg.h.

**12.36.2.111 CFE\_PLATFORM\_SB\_FILTERED\_EVENT3** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT3 CFE\_SB\_MSGID\_LIM\_ERR\_EID  
Definition at line 1228 of file example\_platform\_cfg.h.

**12.36.2.112 CFE\_PLATFORM\_SB\_FILTERED\_EVENT4** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT4 CFE\_SB\_Q\_FULL\_ERR\_EID  
Definition at line 1231 of file example\_platform\_cfg.h.

**12.36.2.113 CFE\_PLATFORM\_SB\_FILTERED\_EVENTS5** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENTS5 0  
Definition at line 1234 of file example\_platform\_cfg.h.

**12.36.2.114 CFE\_PLATFORM\_SB\_FILTERED\_EVENT6** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT6 0  
Definition at line 1237 of file example\_platform\_cfg.h.

**12.36.2.115 CFE\_PLATFORM\_SB\_FILTERED\_EVENT7** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT7 0  
Definition at line 1240 of file example\_platform\_cfg.h.

**12.36.2.116 CFE\_PLATFORM\_SB\_FILTERED\_EVENT8** #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT8 0  
Definition at line 1243 of file example\_platform\_cfg.h.

**12.36.2.117 CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID** #define CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID 0x1FFF

**Purpose** Highest Valid Message Id

**Description:**

The value of this constant dictates the range of valid message ID's, from 0 to CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID (inclusive).

Although this can be defined differently across platforms, each platform can only publish/subscribe to message ids within their allowable range. Typically this value is set the same across all mission platforms to avoid this complexity.

**Limits**

CFE\_SB\_INVALID\_MSG is set to the maximum representable number of type [CFE\\_SB\\_MsgId\\_t](#). CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID lower limit is 1, up to CFE\_SB\_INVALID\_MSG\_ID - 1.

When using the direct message map implementation for software bus routing, this value is used to size the map where a value of 0xFFFF results in a 16 KBytes map and 0xFFFF is 128 KBytes.

When using the hash implementation for software bus routing, a multiple of the CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS is used to size the message map. In that case the range selected here does not impact message map memory use, so it's reasonable to use up to the full range supported by the message ID implementation.

Definition at line 1160 of file example\_platform\_cfg.h.

**12.36.2.118 CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE** #define CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE (CFE\_MISSION\_SB\_MAX\_SB\_MESSAGE\_SIZE + 128)

Definition at line 1273 of file example\_platform\_cfg.h.

**12.36.2.119 CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT** #define CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT 16

**Purpose** Maximum Number of unique local destinations a single MsgId can have

**Description:**

Dictates the maximum number of unique local destinations a single MsgId can have.

**Limits**

This parameter has a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of destinations per packet is system dependent and should be verified. Destination number values that are checked against this configuration are defined by a 16 bit data word.

Definition at line 1097 of file example\_platform\_cfg.h.

**12.36.2.120 CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS** #define CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS 256

**Purpose** Maximum Number of Unique Message IDs SB Routing Table can hold

**Description:**

Dictates the maximum number of unique MsgIds the SB routing table will hold. This constant has a direct effect on the size of SB's tables and arrays. Keeping this count as low as possible will save memory. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'.

**Limits**

This must be a power of two if software bus message routing hash implementation is being used. Lower than 64 will cause unit test failures, and telemetry reporting is impacted below 32. There is no hard upper limit, but impacts memory footprint. For software bus message routing search implementation the number of msg ids subscribed to impacts performance.

Definition at line 1064 of file example\_platform\_cfg.h.

**12.36.2.121 CFE\_PLATFORM\_SB\_MAX\_PIPES** #define CFE\_PLATFORM\_SB\_MAX\_PIPES 64

**Purpose** Maximum Number of Unique Pipes SB Routing Table can hold

**Description:**

Dictates the maximum number of unique Pipes the SB routing table will hold. This constant has a direct effect on the size of SB's tables and arrays. Keeping this count as low as possible will save memory. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'.

**Limits**

This parameter has a lower limit of 1. This parameter must also be less than or equal to OS\_MAX\_QUEUES.

Definition at line 1081 of file example\_platform\_cfg.h.

**12.36.2.122 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01 8

**Purpose** Define SB Memory Pool Block Sizes

**Description:**

Software Bus Memory Pool Block Sizes

**Limits**

These sizes MUST be increasing and MUST be an integral multiple of 4. The number of block sizes defined cannot exceed [CFE\\_PLATFORM\\_ES\\_POOL\\_MAX\\_BUCKETS](#)

Definition at line 1257 of file example\_platform\_cfg.h.

**12.36.2.123 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02 16

Definition at line 1258 of file example\_platform\_cfg.h.

**12.36.2.124 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03 20

Definition at line 1259 of file example\_platform\_cfg.h.

**12.36.2.125 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04 36

Definition at line 1260 of file example\_platform\_cfg.h.

**12.36.2.126 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05 64

Definition at line 1261 of file example\_platform\_cfg.h.

**12.36.2.127 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06 96

Definition at line 1262 of file example\_platform\_cfg.h.

**12.36.2.128 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07 128

07 128

Definition at line 1263 of file example\_platform\_cfg.h.

**12.36.2.129 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08 160

08 160

Definition at line 1264 of file example\_platform\_cfg.h.

**12.36.2.130 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09 256

09 256

Definition at line 1265 of file example\_platform\_cfg.h.

**12.36.2.131 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10 512  
10 512

Definition at line 1266 of file example\_platform\_cfg.h.

**12.36.2.132 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11 1024  
11 1024

Definition at line 1267 of file example\_platform\_cfg.h.

**12.36.2.133 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12 2048  
12 2048

Definition at line 1268 of file example\_platform\_cfg.h.

**12.36.2.134 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13 4096  
13 4096

Definition at line 1269 of file example\_platform\_cfg.h.

**12.36.2.135 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14 8192  
14 8192

Definition at line 1270 of file example\_platform\_cfg.h.

**12.36.2.136 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15 16384  
15 16384

Definition at line 1271 of file example\_platform\_cfg.h.

**12.36.2.137 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16 32768  
16 32768

Definition at line 1272 of file example\_platform\_cfg.h.

**12.36.2.138 CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY 64  
TY 64

**Purpose** Define SB Task Priority

**Description:**

Defines the cFE\_SB Task priority.

**Limits**

Not Applicable

Definition at line 1284 of file example\_platform\_cfg.h.

**12.36.2.139 CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define SB Task Stack Size

**Description:**

Defines the cFE\_SB Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 1299 of file example\_platform\_cfg.h.

**12.36.2.140 CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES** #define CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES 524288

**Purpose** Size of Table Services Table Memory Pool

**Description:**

Defines the TOTAL size of the memory pool that cFE Table Services allocates from the system. The size must be large enough to provide memory for each registered table, the inactive buffers for double buffered tables and for the shared inactive buffers for single buffered tables.

**Limits**

The cFE does not place a limit on the size of this parameter.

Definition at line 1346 of file example\_platform\_cfg.h.

**12.36.2.141 CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE** #define CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE "/ram/cfe\_tbl\_reg.log"

**Purpose** Default Filename for a Table Registry Dump

**Description:**

Defines the file name used to store the table registry when no filename is specified in the dump registry command.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 1460 of file example\_platform\_cfg.h.

**12.36.2.142 CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES** #define CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES 32

**Purpose** Maximum Number of Critical Tables that can be Registered

**Description:**

Defines the maximum number of critical tables supported by this processor's Table Services.

**Limits**

This number must be less than 32767. It should be recognized that this parameter determines the size of the Critical Table Registry which is maintained in the Critical Data Store. An excessively high number will waste Critical Data Store memory. Therefore, this number must not exceed the value defined in CFE\_ES\_CDS\_MAX\_CRITICAL\_TABLES.

Definition at line 1401 of file example\_platform\_cfg.h.

**12.36.2.143 CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE** #define CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE 16384

**Purpose** Maximum Size Allowed for a Double Buffered Table

**Description:**

Defines the maximum allowed size (in bytes) of a double buffered table.

**Limits**

The cFE does not place a limit on the size of this parameter but it must be less than half of [CFE\\_PLATFORM\\_TBL\\_BUF\\_MEMORY\\_BLOCK\\_SIZE](#).

Definition at line 1358 of file example\_platform\_cfg.h.

**12.36.2.144 CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES 256

**Purpose** Maximum Number of Table Handles

**Description:**

Defines the maximum number of Table Handles.

**Limits**

This number must be less than 32767. This number must be at least as big as the number of tables ([CFE\\_PLATFORM\\_TBL\\_MAX\\_NUM\\_TABLES](#)) and should be set higher if tables are shared between applications.

Definition at line 1414 of file example\_platform\_cfg.h.

**12.36.2.145 CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES 128

**Purpose** Maximum Number of Tables Allowed to be Registered

Description:

Defines the maximum number of tables supported by this processor's Table Services.

Limits

This number must be less than 32767. It should be recognized that this parameter determines the size of the Table Registry. An excessively high number will waste memory.

Definition at line 1387 of file example\_platform\_cfg.h.

**12.36.2.146 CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDA←  
TIONS 10

**Purpose** Maximum Number of Simultaneous Table Validations

Description:

Defines the maximum number of pending validations that the Table Services can handle at any one time. When a table has a validation function, a validation request is made of the application to perform that validation. This number determines how many of those requests can be outstanding at any one time.

Limits

This number must be less than 32767. An excessively high number will degrade system performance and waste memory. A number less than 20 is suggested but not required.

Definition at line 1447 of file example\_platform\_cfg.h.

**12.36.2.147 CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS** #define CFE\_PLATFORM\_TBL\_MAX\_SIMUL←  
TANEOUS\_LOADS 4

**Purpose** Maximum Number of Simultaneous Loads to Support

Description:

Defines the maximum number of single buffered tables that can be loaded simultaneously. This number is used to determine the number of shared buffers to allocate.

Limits

This number must be less than 32767. An excessively high number will degrade system performance and waste memory. A number less than 5 is suggested but not required.

Definition at line 1429 of file example\_platform\_cfg.h.

```
12.36.2.148 CFE_PLATFORM_TBL_MAX_SNGL_TABLE_SIZE #define CFE_PLATFORM_TBL_MAX_SNGL_TABLE←  
_SIZE 16384
```

**Purpose** Maximum Size Allowed for a Single Buffered Table

Description:

Defines the maximum allowed size (in bytes) of a single buffered table. **NOTE:** This size determines the size of all shared table buffers. Therefore, this size will be multiplied by [CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#) below when allocating memory for shared tables.

Limits

The cFE does not place a limit on the size of this parameter but it must be small enough to allow for [CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#) number of tables to fit into [CFE\\_PLATFORM\\_TBL\\_BUF\\_MEMORY\\_BYT](#)

Definition at line 1374 of file example\_platform\_cfg.h.

```
12.36.2.149 CFE_PLATFORM_TBL_START_TASK_PRIORITY #define CFE_PLATFORM_TBL_START_TASK_PRIO←  
RITY 70
```

**Purpose** Define TBL Task Priority

Description:

Defines the cFE\_TBL Task priority.

Limits

Not Applicable

Definition at line 1315 of file example\_platform\_cfg.h.

```
12.36.2.150 CFE_PLATFORM_TBL_START_TASK_STACK_SIZE #define CFE_PLATFORM_TBL_START_TASK_S←  
TACK_SIZE CFE_PLATFORM_ES_DEFAULT_STACK_SIZE
```

**Purpose** Define TBL Task Stack Size

Description:

Defines the cFE\_TBL Task Stack Size

Limits

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 1330 of file example\_platform\_cfg.h.

```
12.36.2.151 CFE_PLATFORM_TBL_U32FROM4CHARS #define CFE_PLATFORM_TBL_U32FROM4CHARS ( _C1, _C2, _C3, _C4 ) ((uint32) (_C1) << 24 | (uint32) (_C2) << 16 | (uint32) (_C3) << 8 | (uint32) (_C4))
```

Definition at line 1482 of file example\_platform\_cfg.h.

```
12.36.2.152 CFE_PLATFORM_TBL_VALID_PRID_1 #define CFE_PLATFORM_TBL_VALID_PRID_1 (1)
```

**Purpose** Processor ID values used for table load validation

**Description:**

Defines the processor ID values used for validating the processor ID field in the table file header. To be valid, the spacecraft ID specified in the table file header must match one of the values defined here.

**Limits**

This value can be any 32 bit unsigned integer.

Definition at line 1531 of file example\_platform\_cfg.h.

```
12.36.2.153 CFE_PLATFORM_TBL_VALID_PRID_2 #define CFE_PLATFORM_TBL_VALID_PRID_2 (CFE_PLATFORM_TBL_U32FROM4CHARS ('b', 'c', 'd'))
```

Definition at line 1532 of file example\_platform\_cfg.h.

```
12.36.2.154 CFE_PLATFORM_TBL_VALID_PRID_3 #define CFE_PLATFORM_TBL_VALID_PRID_3 0
```

Definition at line 1533 of file example\_platform\_cfg.h.

```
12.36.2.155 CFE_PLATFORM_TBL_VALID_PRID_4 #define CFE_PLATFORM_TBL_VALID_PRID_4 0
```

Definition at line 1534 of file example\_platform\_cfg.h.

```
12.36.2.156 CFE_PLATFORM_TBL_VALID_PRID_COUNT #define CFE_PLATFORM_TBL_VALID_PRID_COUNT 0
```

**Purpose** Number of Processor ID's specified for validation

**Description:**

Defines the number of specified processor ID values that are verified during table loads. If the number is zero then no validation of the processor ID field in the table file header is performed when tables are loaded. Non-zero values indicate how many values from the list of processor ID's defined below are compared to the processor ID field in the table file header. The ELF2CFETBL tool may be used to create table files with specified processor ID values.

**Limits**

This number must be greater than or equal to zero and less than or equal to 4.

Definition at line 1517 of file example\_platform\_cfg.h.

**12.36.2.157 CFE\_PLATFORM\_TBL\_VALID\_SCID\_1** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_1 (0x42)

**Purpose** Spacecraft ID values used for table load validation

**Description:**

Defines the spacecraft ID values used for validating the spacecraft ID field in the table file header. To be valid, the spacecraft ID specified in the table file header must match one of the values defined here.

**Limits**

This value can be any 32 bit unsigned integer.

Definition at line 1497 of file example\_platform\_cfg.h.

**12.36.2.158 CFE\_PLATFORM\_TBL\_VALID\_SCID\_2** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_2 (CFE\_PLATFORM\_TBL\_U32FROM4CH<sup>'b', 'c', 'd'</sup>)

Definition at line 1498 of file example\_platform\_cfg.h.

**12.36.2.159 CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT 0

**Purpose** Number of Spacecraft ID's specified for validation

**Description:**

Defines the number of specified spacecraft ID values that are verified during table loads. If the number is zero then no validation of the spacecraft ID field in the table file header is performed when tables are loaded. Non-zero values indicate how many values from the list of spacecraft ID's defined below are compared to the spacecraft ID field in the table file header. The ELF2CFETBL tool may be used to create table files with specified spacecraft ID values.

**Limits**

This number must be greater than or equal to zero and less than or equal to 2.

Definition at line 1479 of file example\_platform\_cfg.h.

**12.36.2.160 CFE\_PLATFORM\_TIME\_CFG\_CLIENT** #define CFE\_PLATFORM\_TIME\_CFG\_CLIENT false

Definition at line 1554 of file example\_platform\_cfg.h.

**12.36.2.161 CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY** #define CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY 8

**Purpose** Define Periodic Time to Update Local Clock Tone Latch

**Description:**

Define Periodic Time to Update Local Clock Tone Latch. Applies only when in flywheel mode. This define dictates the period at which the simulated 'last tone' time is updated. Units are seconds.

**Limits**

Not Applicable

Definition at line 1711 of file example\_platform\_cfg.h.

**12.36.2.162 CFE\_PLATFORM\_TIME\_CFG\_SERVER** #define CFE\_PLATFORM\_TIME\_CFG\_SERVER true

**Purpose** Time Server or Time Client Selection

Description:

This configuration parameter selects whether the Time task functions as a time "server" or "client". A time server generates the "time at the tone" packet which is received by time clients.

Limits

Enable one, and only one by defining either CFE\_PLATFORM\_TIME\_CFG\_SERVER or CFE\_PLATFORM\_TIME\_CFG\_CLIENT AS true. The other must be defined as false.

Definition at line 1553 of file example\_platform\_cfg.h.

**12.36.2.163 CFE\_PLATFORM\_TIME\_CFG\_SIGNAL** #define CFE\_PLATFORM\_TIME\_CFG\_SIGNAL false

**Purpose** Include or Exclude the Primary/Redundant Tone Selection Cmd

Description:

Depending on the specific hardware system configuration, it may be possible to switch between a primary and redundant tone signal. If supported by hardware, this definition will enable command interfaces to select the active tone signal. Both Time Clients and Time Servers support this feature. Note: Set the CFE\_PLATFORM\_TIME\_CFG\_SIGNAL define to true to enable tone signal commands.

Limits

Not Applicable

Definition at line 1601 of file example\_platform\_cfg.h.

**12.36.2.164 CFE\_PLATFORM\_TIME\_CFG\_SOURCE** #define CFE\_PLATFORM\_TIME\_CFG\_SOURCE false

**Purpose** Include or Exclude the Internal/External Time Source Selection Cmd

Description:

By default, Time Servers maintain time using an internal MET which may be a h/w register or software counter, depending on available hardware. The following definition enables command interfaces to switch between an internal MET, or external time data received from one of several supported external time sources. Only a Time Server may be configured to use external time data. Note: Set the CFE\_PLATFORM\_TIME\_CFG\_SOURCE define to true to include the Time Source Selection Command (command allows selection between the internal or external time source). Then choose the external source with the CFE\_TIME\_CFG\_SRC\_??? define.

Limits

Only applies if **CFE\_PLATFORM\_TIME\_CFG\_SERVER** is set to true.

Definition at line 1621 of file example\_platform\_cfg.h.

**12.36.2.165 CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS** #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS false  
Definition at line 1638 of file example\_platform\_cfg.h.

**12.36.2.166 CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET** #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET false

**Purpose** Choose the External Time Source for Server only

**Description:**

If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true, then one of the following external time source types must also be set to true. Do not set any of the external time source types to true unless [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true.

**Limits**

1. If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true then one and only one of the following three external time sources can and must be set true: [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_MET](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_GPS](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_TIME](#)
2. Only applies if [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) is set to true.

Definition at line 1637 of file example\_platform\_cfg.h.

**12.36.2.167 CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME** #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME false  
Definition at line 1639 of file example\_platform\_cfg.h.

**12.36.2.168 CFE\_PLATFORM\_TIME\_CFG\_START\_FLY** #define CFE\_PLATFORM\_TIME\_CFG\_START\_FLY 2

**Purpose** Define Time to Start Flywheel Since Last Tone

**Description:**

Define time to enter flywheel mode (in seconds since last tone data update) Units are microseconds as measured with the local clock.

**Limits**

Not Applicable

Definition at line 1698 of file example\_platform\_cfg.h.

**12.36.2.169 CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT** #define CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT 20000

**Purpose** Define Timing Limits From One Tone To The Next

**Description:**

Defines limits to the timing of the 1Hz tone signal. A tone signal is valid only if it arrives within one second (plus or minus the tone limit) from the previous tone signal.Units are microseconds as measured with the local clock.

**Limits**

Not Applicable

Definition at line 1686 of file example\_platform\_cfg.h.

**12.36.2.170 CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL** #define CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL true

**Purpose** Time Tone In Big-Endian Order

**Description:**

If this configuration parameter is defined, the CFE time server will publish time tones with payloads in big-endian order, and time clients will expect the tones to be in big-endian order. This is useful for mixed-endian environments. This will become obsolete once EDS is available and the CFE time tone message is defined.

**Purpose** Local MET or Virtual MET Selection for Time Servers

**Description:**

Depending on the specific hardware system configuration, it may be possible for Time Servers to read the "local" MET from a h/w register rather than having to track the MET as the count of tone signal interrupts (virtual MET)

Time Clients must be defined as using a virtual MET. Also, a Time Server cannot be defined as having both a h/w MET and an external time source (they both cannot synchronize to the same tone).

Note: "disable" this define (set to false) only for Time Servers with local hardware that supports a h/w MET that is synchronized to the tone signal !!!

**Limits**

Only applies if [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) is set to true.

Definition at line 1586 of file example\_platform\_cfg.h.

**12.36.2.171 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS** #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS 0

**Purpose** Define the Max Delta Limits for Time Servers using an Ext Time Source

**Description:**

If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true and one of the external time sources is also set to true, then the delta time limits for range checking is used.

When a new time value is received from an external source, the value is compared against the "expected" time value. If the delta exceeds the following defined amount, then the new time data will be ignored. This range checking is only performed after the clock state has been commanded to "valid". Until then, external time data is accepted unconditionally.

**Limits**

Applies only if both [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) and [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) are set to true.

Definition at line 1658 of file example\_platform\_cfg.h.

**12.36.2.172 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUFS** #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUFS

BS 500000

Definition at line 1659 of file example\_platform\_cfg.h.

**12.36.2.173 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS** #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS 27

**Purpose** Define the Local Clock Rollover Value in seconds and subseconds

**Description:**

Specifies the capability of the local clock. Indicates the time at which the local clock rolls over.

**Limits**

Not Applicable

Definition at line 1671 of file example\_platform\_cfg.h.

**12.36.2.174 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS** #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS 0

Definition at line 1672 of file example\_platform\_cfg.h.

**12.36.2.175 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY 25

Definition at line 1728 of file example\_platform\_cfg.h.

**12.36.2.176 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE 8192

Definition at line 1747 of file example\_platform\_cfg.h.

**12.36.2.177 CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY 60

**Purpose** Define TIME Task Priorities

**Description:**

Defines the cFE\_TIME Task priority. Defines the cFE\_TIME Tone Task priority. Defines the cFE\_TIME 1HZ Task priority.

**Limits**

There is a lower limit of zero and an upper limit of 255 on these configuration parameters. Remember that the meaning of each task priority is inverted – a "lower" number has a "higher" priority.

Definition at line 1726 of file example\_platform\_cfg.h.

**12.36.2.178 CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define TIME Task Stack Sizes

**Description:**

Defines the cFE\_TIME Main Task Stack Size  
Defines the cFE\_TIME Tone Task Stack Size  
Defines the cFE\_TIME 1HZ Task Stack Size

**Limits**

There is a lower limit of 2048 on these configuration parameters. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 1745 of file example\_platform\_cfg.h.

**12.36.2.179 CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIO←  
RITY 25

Definition at line 1727 of file example\_platform\_cfg.h.

**12.36.2.180 CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_S←  
TACK\_SIZE 4096

Definition at line 1746 of file example\_platform\_cfg.h.

## 12.37 cfe/cmake/sample\_defs/sample\_perfids.h File Reference

**Macros**

- #define CFE\_MISSION\_ES\_PERF\_EXIT\_BIT 31  
*bit (31) is reserved by the perf utilities*

**cFE Performance Monitor IDs (Reserved IDs 0-31)**

- #define CFE\_MISSION\_ES\_MAIN\_PERF\_ID 1  
*Performance ID for Executive Services Task.*
- #define CFE\_MISSION\_EVS\_MAIN\_PERF\_ID 2  
*Performance ID for Events Services Task.*
- #define CFE\_MISSION\_TBL\_MAIN\_PERF\_ID 3  
*Performance ID for Table Services Task.*
- #define CFE\_MISSION\_SB\_MAIN\_PERF\_ID 4  
*Performance ID for Software Bus Services Task.*
- #define CFE\_MISSION\_SB\_MSG\_LIM\_PERF\_ID 5  
*Performance ID for Software Bus Msg Limit Errors.*
- #define CFE\_MISSION\_SB\_PIPE\_OFLOW\_PERF\_ID 27  
*Performance ID for Software Bus Pipe Overflow Errors.*
- #define CFE\_MISSION\_TIME\_MAIN\_PERF\_ID 6  
*Performance ID for Time Services Task.*
- #define CFE\_MISSION\_TIME\_TONE1HZISR\_PERF\_ID 7  
*Performance ID for 1 Hz Tone ISR.*
- #define CFE\_MISSION\_TIME\_LOCAL1HZISR\_PERF\_ID 8  
*Performance ID for 1 Hz Local ISR.*
- #define CFE\_MISSION\_TIME\_SEDMET\_PERF\_ID 9  
*Performance ID for Time ToneSendMET.*
- #define CFE\_MISSION\_TIME\_LOCAL1HZTASK\_PERF\_ID 10  
*Performance ID for 1 Hz Local Task.*
- #define CFE\_MISSION\_TIME\_TONE1HZTASK\_PERF\_ID 11  
*Performance ID for 1 Hz Tone Task.*

### 12.37.1 Detailed Description

Purpose: This file contains the cFE performance IDs

Design Notes: Each performance id is used to identify something that needs to be measured. Performance ids are limited to the range of 0 to CFE\_MISSION\_ES\_PERF\_MAX\_IDS - 1. Any performance ids outside of this range will be ignored and will be flagged as an error. Note that performance ids 0-31 are reserved for the cFE Core.

References:

### 12.37.2 Macro Definition Documentation

#### 12.37.2.1 CFE\_MISSION\_ES\_MAIN\_PERF\_ID #define CFE\_MISSION\_ES\_MAIN\_PERF\_ID 1

Performance ID for Executive Services Task.

Definition at line 42 of file sample\_perfids.h.

#### 12.37.2.2 CFE\_MISSION\_ES\_PERF\_EXIT\_BIT #define CFE\_MISSION\_ES\_PERF\_EXIT\_BIT 31

bit (31) is reserved by the perf utilities

Definition at line 38 of file sample\_perfids.h.

#### 12.37.2.3 CFE\_MISSION\_EVS\_MAIN\_PERF\_ID #define CFE\_MISSION\_EVS\_MAIN\_PERF\_ID 2

Performance ID for Events Services Task.

Definition at line 43 of file sample\_perfids.h.

#### 12.37.2.4 CFE\_MISSION\_SB\_MAIN\_PERF\_ID #define CFE\_MISSION\_SB\_MAIN\_PERF\_ID 4

Performance ID for Software Bus Services Task.

Definition at line 45 of file sample\_perfids.h.

#### 12.37.2.5 CFE\_MISSION\_SB\_MSG\_LIM\_PERF\_ID #define CFE\_MISSION\_SB\_MSG\_LIM\_PERF\_ID 5

Performance ID for Software Bus Msg Limit Errors.

Definition at line 46 of file sample\_perfids.h.

#### 12.37.2.6 CFE\_MISSION\_SB\_PIPE\_OFLOW\_PERF\_ID #define CFE\_MISSION\_SB\_PIPE\_OFLOW\_PERF\_ID 27

Performance ID for Software Bus Pipe Overflow Errors.

Definition at line 47 of file sample\_perfids.h.

#### 12.37.2.7 CFE\_MISSION\_TBL\_MAIN\_PERF\_ID #define CFE\_MISSION\_TBL\_MAIN\_PERF\_ID 3

Performance ID for Table Services Task.

Definition at line 44 of file sample\_perfids.h.

#### 12.37.2.8 CFE\_MISSION\_TIME\_LOCAL1HZISR\_PERF\_ID #define CFE\_MISSION\_TIME\_LOCAL1HZISR\_PERF\_ID 8

Performance ID for 1 Hz Local ISR.

Definition at line 51 of file sample\_perfids.h.

**12.37.2.9 CFE\_MISSION\_TIME\_LOCAL1HZTASK\_PERF\_ID** #define CFE\_MISSION\_TIME\_LOCAL1HZTASK\_PERF\_ID 10

Performance ID for 1 Hz Local Task.

Definition at line 54 of file sample\_perfids.h.

**12.37.2.10 CFE\_MISSION\_TIME\_MAIN\_PERF\_ID** #define CFE\_MISSION\_TIME\_MAIN\_PERF\_ID 6

Performance ID for Time Services Task.

Definition at line 49 of file sample\_perfids.h.

**12.37.2.11 CFE\_MISSION\_TIME\_SENDMET\_PERF\_ID** #define CFE\_MISSION\_TIME\_SENDMET\_PERF\_ID 9

Performance ID for Time ToneSendMET.

Definition at line 53 of file sample\_perfids.h.

**12.37.2.12 CFE\_MISSION\_TIME\_TONE1HZISR\_PERF\_ID** #define CFE\_MISSION\_TIME\_TONE1HZISR\_PERF\_ID 7

Performance ID for 1 Hz Tone ISR.

Definition at line 50 of file sample\_perfids.h.

**12.37.2.13 CFE\_MISSION\_TIME\_TONE1HZTASK\_PERF\_ID** #define CFE\_MISSION\_TIME\_TONE1HZTASK\_PERF\_ID 11

Performance ID for 1 Hz Tone Task.

Definition at line 55 of file sample\_perfids.h.

## 12.38 cfe/docs/src/cfe\_api.dox File Reference

### 12.39 cfe/docs/src/cfe\_es.dox File Reference

### 12.40 cfe/docs/src/cfe\_evs.dox File Reference

### 12.41 cfe/docs/src/cfe\_frontpage.dox File Reference

### 12.42 cfe/docs/src/cfe\_glossary.dox File Reference

### 12.43 cfe/docs/src/cfe\_sb.dox File Reference

### 12.44 cfe/docs/src/cfe\_tbl.dox File Reference

### 12.45 cfe/docs/src/cfe\_time.dox File Reference

### 12.46 cfe/docs/src/cfe\_xref.dox File Reference

### 12.47 cfe/docs/src/cfs\_versions.dox File Reference

## 12.48 cfe/modules/core\_api/config/default\_cfe\_core\_api\_base\_msgids.h File Reference

### Macros

- #define CFE\_CPU1\_CMD\_MID\_BASE 0x1800

*Platform command message ID base offset.*

- #define CFE\_CPU1\_TLM\_MID\_BASE 0x0800

*Platform telemetry message ID base offset.*

- #define CFE\_GLOBAL\_CMD\_MID\_BASE 0x1860

- `#define CFE_GLOBAL_TLM_MID_BASE 0x0860`  
*"Global" telemetry message ID base offset*
- `#define CFE_PLATFORM_CMD_TOPICID_TO_MIDV(topic) (CFE_CPU1_CMD_MID_BASE | (topic))`  
*Convert a command topic ID to a MsgID value.*
- `#define CFE_PLATFORM_TLM_TOPICID_TO_MIDV(topic) (CFE_CPU1_TLM_MID_BASE | (topic))`  
*Convert a telemetry topic ID to a MsgID value.*
- `#define CFE_GLOBAL_CMD_TOPICID_TO_MIDV(topic) (CFE_GLOBAL_CMD_MID_BASE | (topic))`  
*Convert a "global" command topic ID to a MsgID value.*
- `#define CFE_GLOBAL_TLM_TOPICID_TO_MIDV(topic) (CFE_GLOBAL_TLM_MID_BASE | (topic))`  
*Convert a "global" telemetry topic ID to a MsgID value.*

#### 12.48.1 Detailed Description

This header file contains the platform-specific base msg ID values and logic to convert a topic ID to a message ID value.

#### 12.48.2 Macro Definition Documentation

##### 12.48.2.1 CFE\_CPU1\_CMD\_MID\_BASE `#define CFE_CPU1_CMD_MID_BASE 0x1800`

Platform command message ID base offset.

Example mechanism for setting default command bits and deconflicting MIDs across multiple platforms in a mission. For any sufficiently complex mission this method is typically replaced by a centralized message ID management scheme.  
0x1800 - Nominal value for default message ID implementation (V1). This sets the command field and the secondary header present field. Typical V1 command MID range is 0x1800-1FFF. Additional cpus can deconflict message IDs by incrementing this value to provide sub-allocations (0x1900 for example). 0x0080 - Command bit for MISSION\_MSGID\_V2 message ID implementation (V2). Although this can be used for the value below due to the relatively small set of MIDs in the framework it will not scale so an alternative method of deconfliction is recommended.

Definition at line 46 of file default\_cfe\_core\_api\_base\_msgids.h.

##### 12.48.2.2 CFE\_CPU1\_TLM\_MID\_BASE `#define CFE_CPU1_TLM_MID_BASE 0x0800`

Platform telemetry message ID base offset.

0x0800 - Nominal for message ID V1 0x0000 - Potential value for MISSION\_MSGID\_V2, but limited to a range of 0x0000-0x007F since the command bit is 0x0080. Alternative method of deconfliction is recommended.

See [CFE\\_CPU1\\_CMD\\_MID\\_BASE](#) for more information

Definition at line 58 of file default\_cfe\_core\_api\_base\_msgids.h.

##### 12.48.2.3 CFE\_GLOBAL\_CMD\_MID\_BASE `#define CFE_GLOBAL_CMD_MID_BASE 0x1860`

"Global" command message ID base offset

0x1860 - Nominal value for message ID V1 0x00E0 - Potential value for MISSION\_MSGID\_V2, note command bit is 0x0080. Works in limited cases only, alternative method of deconfliction is recommended. See [CFE\\_CPU1\\_CMD\\_MID\\_BASE](#) for more information

Definition at line 69 of file default\_cfe\_core\_api\_base\_msgids.h.

**12.48.2.4 CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV** #define CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV(  
topic) (CFE\_GLOBAL\_CMD\_MID\_BASE | (topic))

Convert a "global" command topic ID to a MsgID value.

A global command is one that is not specific to an individual instance of CFE, but rather intended to be broadcast to all CFE instances at the same time.

This is otherwise identical to [CFE\\_PLATFORM\\_CMD\\_TOPICID\\_TO\\_MIDV](#)

Definition at line 116 of file default\_cfe\_core\_api\_base\_msgids.h.

**12.48.2.5 CFE\_GLOBAL\_TLM\_MID\_BASE** #define CFE\_GLOBAL\_TLM\_MID\_BASE 0x0860

"Global" telemetry message ID base offset

0x0860 - Nominal value for message ID V1 0x0060 - Potential value for MISSION\_MSGID\_V2, note command bit is 0x0080. Works in limited cases only, alternative method of deconfliction is recommended. See [CFE\\_CPU1\\_CMD\\_MID\\_BASE](#) for more information

Definition at line 80 of file default\_cfe\_core\_api\_base\_msgids.h.

**12.48.2.6 CFE\_GLOBAL\_TLM\_TOPICID\_TO\_MIDV** #define CFE\_GLOBAL\_TLM\_TOPICID\_TO\_MIDV(  
topic) (CFE\_GLOBAL\_TLM\_MID\_BASE | (topic))

Convert a "global" telemetry topic ID to a MsgID value.

A global telemetry is one that is not specific to an individual instance of CFE, but rather intended to be broadcast to all CFE instances at the same time.

This is otherwise identical to [CFE\\_PLATFORM\\_TLM\\_TOPICID\\_TO\\_MIDV](#)

Definition at line 126 of file default\_cfe\_core\_api\_base\_msgids.h.

**12.48.2.7 CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV** #define CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(  
topic) (CFE\_CPU1\_CMD\_MID\_BASE | (topic))

Convert a command topic ID to a MsgID value.

This defines the logic to convert a topic ID value into a message ID value. This operates on integer values and should resolve at compile time such that it can be used in e.g. switch/case statements.

#### Note

The result of this conversion is a simple integer, thus also needs to go through [CFE\\_SB\\_ValueToMsgId\(\)](#) to obtain a properly-typed [CFE\\_SB\\_MsgId\\_t](#) for interacting with SB APIs.

Definition at line 93 of file default\_cfe\_core\_api\_base\_msgids.h.

**12.48.2.8 CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV** #define CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(  
topic) (CFE\_CPU1\_TLM\_MID\_BASE | (topic))

Convert a telemetry topic ID to a MsgID value.

This defines the logic to convert a topic ID value into a message ID value. This operates on integer values and should resolve at compile time such that it can be used in e.g. switch/case statements.

#### Note

The result of this conversion is a simple integer, thus also needs to go through [CFE\\_SB\\_ValueToMsgId\(\)](#) to obtain a properly-typed [CFE\\_SB\\_MsgId\\_t](#) for interacting with SB APIs.

Definition at line 106 of file default\_cfe\_core\_api\_base\_msgids.h.

## 12.49 cfe/modules/core\_api/config/default\_cfe\_core\_api\_interface\_cfg.h File Reference

### Macros

- #define CFE\_MISSION\_MAX\_PATH\_LEN 64
- #define CFE\_MISSION\_MAX\_FILE\_LEN 20
- #define CFE\_MISSION\_MAX\_API\_LEN 20
- #define CFE\_MISSION\_MAX\_NUM\_FILES 50

### 12.49.1 Detailed Description

Purpose: This header file contains the mission configuration parameters and typedefs with mission scope.

### 12.49.2 Macro Definition Documentation

#### 12.49.2.1 CFE\_MISSION\_MAX\_API\_LEN #define CFE\_MISSION\_MAX\_API\_LEN 20

**Purpose** cFE Maximum length for API names within data exchange structures

##### Description:

The value of this constant dictates the size of filenames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_API\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_API\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_API\_LEN value.

This length must include an extra character for NULL termination.

##### Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 108 of file default\_cfe\_core\_api\_interface\_cfg.h.

#### 12.49.2.2 CFE\_MISSION\_MAX\_FILE\_LEN #define CFE\_MISSION\_MAX\_FILE\_LEN 20

**Purpose** cFE Maximum length for filenames within data exchange structures

##### Description:

The value of this constant dictates the size of filenames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_FILE\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_FILE\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_FILE\_LEN value.

This length must include an extra character for NULL termination.

### Limits

All CPUs within the same SB domain (mission) and ground tools must share the same definition. Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 82 of file default\_cfe\_core\_api\_interface\_cfg.h.

#### **12.49.2.3 CFE\_MISSION\_MAX\_NUM\_FILES** #define CFE\_MISSION\_MAX\_NUM\_FILES 50

##### **Purpose** cFE Maximum number of files in a message/data exchange

###### Description:

The value of this constant dictates the maximum number of files within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_NUM\_OPEN\_FILES but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_NUM\_OPEN\_FILES in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_NUM\_OPEN\_FILES value.

### Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 130 of file default\_cfe\_core\_api\_interface\_cfg.h.

#### **12.49.2.4 CFE\_MISSION\_MAX\_PATH\_LEN** #define CFE\_MISSION\_MAX\_PATH\_LEN 64

##### **Purpose** cFE Maximum length for pathnames within data exchange structures

###### Description:

The value of this constant dictates the size of pathnames within all structures used for external data exchange, such as Software bus messages and table definitions. This is typically the same as OS\_MAX\_PATH\_LEN but that is OSAL dependent – and as such it definable on a per-processor/OS basis and hence may be different across multiple processors. It is recommended to set this to the value of the largest OS\_MAX\_PATH\_LEN in use on any CPU on the mission.

This affects only the layout of command/telemetry messages and table definitions; internal allocation may use the platform-specific OS\_MAX\_PATH\_LEN value.

This length must include an extra character for NULL termination.

### Limits

All CPUs within the same SB domain (mission) and ground tools must share the same definition. Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 55 of file default\_cfe\_core\_api\_interface\_cfg.h.

## 12.50 cfe/modules/core\_api/config/default\_cfe\_mission\_cfg.h File Reference

```
#include "cfe_core_api_interface_cfg.h"
#include "cfe_es_mission_cfg.h"
#include "cfe_evs_mission_cfg.h"
#include "cfe_sb_mission_cfg.h"
#include "cfe_tbl_mission_cfg.h"
#include "cfe_time_mission_cfg.h"
#include "cfe_fs_mission_cfg.h"
```

### 12.50.1 Detailed Description

Purpose: This header file contains the mission configuration parameters and typedefs with mission scope.

## 12.51 cfe/modules/core\_api/config/default\_cfe\_msgids.h File Reference

```
#include "cfe_es_msgids.h"
#include "cfe_evs_msgids.h"
#include "cfe_sb_msgids.h"
#include "cfe_tbl_msgids.h"
#include "cfe_time_msgids.h"
```

### 12.51.1 Detailed Description

Purpose: This header file contains the Message Id's for messages used by the cFE core.

## 12.52 cfe/modules/core\_api/fsw/inc/cfe.h File Reference

```
#include "common_types.h"
#include "osapi.h"
#include "cfe_mission_cfg.h"
#include "cfe_error.h"
#include "cfe_es.h"
#include "cfe_evs.h"
#include "cfe_fs.h"
#include "cfe_sb.h"
#include "cfe_time.h"
#include "cfe_tbl.h"
#include "cfe_msg.h"
#include "cfe_resourceid.h"
#include "cfe_psp.h"
```

### 12.52.1 Detailed Description

Purpose: cFE header file

Author: David Kobe, the Hammers Company, Inc.

Notes: This header file centralizes the includes for all cFE Applications. It includes all header files necessary to completely define the cFE interface.

## 12.53 cfe/modules/core\_api/fsw/inc/cfe\_config.h File Reference

```
#include "common_types.h"
```

```
#include "cfe_config_api_typedefs.h"
#include "cfe_config_ids.h"
```

## Functions

- `uint32 CFE_Config_GetValue (CFE_ConfigId_t ConfigId)`  
*Obtain an integer value correlating to an CFE configuration ID.*
- `const void * CFE_Config_GetObjPointer (CFE_ConfigId_t ConfigId)`  
*Obtain a pointer value correlating to an CFE configuration ID.*
- `const char * CFE_Config_GetString (CFE_ConfigId_t ConfigId)`  
*Obtain a string value correlating to an CFE configuration ID.*
- `const char * CFE_Config_getName (CFE_ConfigId_t ConfigId)`  
*Obtain the name of a CFE configuration ID.*
- `CFE_ConfigId_t CFE_Config_getIdByName (const char *Name)`  
*Obtain the ID value associated with a configuration name.*
- `void CFE_Config_IterateAll (void *Arg, CFE_Config_Callback_t Callback)`  
*Iterate all known name/ID value pairs.*
- `void CFE_Config_GetVersionString (char *Buf, size_t Size, const char *Component, const char *SrcVersion, const char *CodeName, const char *LastOffcRel)`  
*Obtain the version string for a cFS component or app.*

### 12.53.1 Detailed Description

Title: cFE Status Code Definition Header File

Purpose: Common source of cFE API return status codes.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

### 12.53.2 Function Documentation

#### 12.53.2.1 CFE\_Config\_getIdByName() `CFE_ConfigId_t CFE_Config_getIdByName (` `const char * Name )`

Obtain the ID value associated with a configuration name.

##### Parameters

in	<code>Name</code>	The name of the ID to look up
----	-------------------	-------------------------------

##### Returns

ID associated with name

##### Return values

<code>CFE_CONFIGID_UNDEFINED</code>	if the name did not correspond to a key
-------------------------------------	---

**12.53.2.2 CFE\_Config\_GetName()** `const char* CFE_Config_GetName ( CFE_ConfigId_t ConfigId )`

Obtain the name of a CFE configuration ID.

Retrieves the printable name associated with the specified key.

#### Note

This function does not return NULL.

If the ID is not valid/known, then the implementation returns the special string '[unknown]' rather than NULL, so this function may be more easily used in printf() style calls.

#### Parameters

in	<i>ConfigId</i>	Configuration ID/Key to look up
	<i>Id</i>	

#### Returns

Name associated with key

**12.53.2.3 CFE\_Config\_GetObjPointer()** `const void* CFE_Config_GetObjPointer ( CFE_ConfigId_t ConfigId )`

Obtain a pointer value correlating to an CFE configuration ID.

Retrieves the pointer value associated with the specified key.

If no value has been set, or the key is not valid, this returns NULL.

#### Parameters

in	<i>ConfigId</i>	Configuration ID/Key to look up
	<i>Id</i>	

#### Returns

Value associated with key

#### Return values

NULL	if key is not defined or not set
------	----------------------------------

**12.53.2.4 CFE\_Config\_GetString()** `const char* CFE_Config_GetString ( CFE_ConfigId_t ConfigId )`

Obtain a string value correlating to an CFE configuration ID.

Retrieves the string value associated with the specified key.

If no value has been set, or the key is not valid, this returns the special string "UNDEFINED"

#### Note

This function does not return NULL, so it can be used directly in printf-style calls.

**Parameters**

in	<i>ConfigId</i>	Configuration ID/Key to look up
----	-----------------	---------------------------------

**Returns**

String value associated with key

**12.53.2.5 CFE\_Config\_GetValue()** `uint32 CFE_Config_GetValue ( CFE_ConfigId_t ConfigId )`

Obtain an integer value correlating to an CFE configuration ID.  
Retrieves the integer value associated with the specified key.  
If no value has been set, or the key is not valid, this returns 0.

**Parameters**

in	<i>ConfigId</i>	Configuration ID/Key to look up
----	-----------------	---------------------------------

**Returns**

Value associated with key

**Return values**

0	if key is not defined or not set
---	----------------------------------

**12.53.2.6 CFE\_Config\_GetVersionString()** `void CFE_Config_GetVersionString ( char * Buf, size_t Size, const char * Component, const char * SrcVersion, const char * CodeName, const char * LastOffcRel )`

Obtain the version string for a cFS component or app.  
Assembles a standardized version string associated with the specified component/app.

**Parameters**

in	<i>Buf</i>	Buffer to place version string in. Will be populated with standard version string containing the provided parameters (i.e.: "cFE DEVELOPMENT BUILD equuleus-rc1+dev0 (Codename equuleus), Last Official Release: cFE 6.7.0"
in	<i>Size</i>	Size of the provided buffer
in	<i>Component</i>	Component for which to get version string (i.e. "cFE")
in	<i>SrcVersion</i>	Source version identifier (i.e. "equuleus-rc1+dev0")
in	<i>CodeName</i>	Code name for the build (i.e. "equuleus")
in	<i>LastOffcRel</i>	Last official release (i.e. "6.7.0")

```
12.53.2.7 CFE_Config_IterateAll() void CFE_Config_IterateAll (
    void * Arg,
    CFE_Config_Callback_t Callback )
```

Iterate all known name/ID value pairs.

#### Parameters

in	Arg	User-supplied opaque argument to pass to callback
in	Callback	User-supplied callback function to invoke for each ID

## 12.54 cfe/modules/core\_api/fsw/inc/cfe\_config\_api\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_resourceid_api_typedefs.h"
```

#### Macros

- #define CFE\_CONFIGID\_C(val) ((CFE\_ConfigId\_t)CFE\_RESOURCEID\_WRAP(val))
- #define CFE\_CONFIGID\_UNDEFINED CFE\_CONFIGID\_C(CFE\_RESOURCEID\_UNDEFINED)

#### TypeDefs

- typedef CFE\_RESOURCEID\_BASE\_TYPE CFE\_ConfigId\_t  
*A type for Configuration IDs.*
- typedef void(\* CFE\_Config\_Callback\_t) (void \*Arg, CFE\_ConfigId\_t Id, const char \*Name)

#### 12.54.1 Detailed Description

Title: cFE Status Code Definition Header File

Purpose: Common source of cFE API return status codes.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

#### 12.54.2 Macro Definition Documentation

**12.54.2.1 CFE\_CONFIGID\_C** #define CFE\_CONFIGID\_C(  
    val ) ((CFE\_ConfigId\_t)CFE\_RESOURCEID\_WRAP(val))

Definition at line 48 of file cfe\_config\_api\_typedefs.h.

**12.54.2.2 CFE\_CONFIGID\_UNDEFINED** #define CFE\_CONFIGID\_UNDEFINED CFE\_CONFIGID\_C(CFE\_RESOURCEID\_UNDEFINED)  
Definition at line 49 of file cfe\_config\_api\_typedefs.h.

#### 12.54.3 Typedef Documentation

**12.54.3.1 CFE\_Config\_Callback\_t** `typedef void(* CFE_Config_Callback_t) (void *Arg, CFE_ConfigId_t Id, const char *Name)`  
Definition at line 51 of file cfe\_config\_api\_typedefs.h.

**12.54.3.2 CFE\_ConfigId\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ConfigId_t`  
A type for Configuration IDs.

This is the type that is used for any API accepting or returning a configuration key ID  
Definition at line 46 of file cfe\_config\_api\_typedefs.h.

## 12.55 cfe/modules/core\_api/fsw/inc/cfe\_endian.h File Reference

```
#include "common_types.h"
```

### Macros

- `#define CFE_MAKE_BIG16(n) (((n)&0x00FF) << 8) | (((n)&0xFF00) >> 8))`
- `#define CFE_MAKE_BIG32(n) (((n)&0x000000FF) << 24) | (((n)&0x0000FF00) << 8) | (((n)&0x00FF0000) >> 8) | (((n)&0xFF000000) >> 24))`

### 12.55.1 Detailed Description

Purpose: Define macros to enforce big-endian/network byte order for 16 and 32 bit integers

### 12.55.2 Macro Definition Documentation

**12.55.2.1 CFE\_MAKE\_BIG16** `#define CFE_MAKE_BIG16( n ) (((n)&0x00FF) << 8) | (((n)&0xFF00) >> 8))`  
Definition at line 64 of file cfe\_endian.h.

**12.55.2.2 CFE\_MAKE\_BIG32** `#define CFE_MAKE_BIG32( n ) (((n)&0x000000FF) << 24) | (((n)&0x0000FF00) << 8) | (((n)&0x00FF0000) >> 8) | (((n)&0xFF000000) >> 24))`  
Definition at line 65 of file cfe\_endian.h.

## 12.56 cfe/modules/core\_api/fsw/inc/cfe\_error.h File Reference

```
#include "osapi.h"
```

### Macros

- `#define CFE_STATUS_C(X) ((CFE_Status_t)(X))`  
*cFE Status macro for literal*
- `#define CFE_STATUS_STRING_LENGTH 11`  
*cFE Status converted to string length limit*
- `#define CFE_SEVERITY_BITMASK ((CFE_Status_t)0xc0000000)`  
*Error Severity Bitmask.*
- `#define CFE_SEVERITY_SUCCESS ((CFE_Status_t)0x00000000)`

- Severity Success.
  - #define CFE\_SEVERITY\_INFO ((CFE\_Status\_t)0x40000000)  
Severity Info.
- #define CFE\_SEVERITY\_ERROR ((CFE\_Status\_t)0xc0000000)  
Severity Error.
- #define CFE\_SERVICE\_BITMASK ((CFE\_Status\_t)0x0e000000)  
Error Service Bitmask.
- #define CFE\_EVENTS\_SERVICE ((CFE\_Status\_t)0x02000000)  
Event Service.
- #define CFE\_EXECUTIVE\_SERVICE ((CFE\_Status\_t)0x04000000)  
Executive Service.
- #define CFE\_FILE\_SERVICE ((CFE\_Status\_t)0x06000000)  
File Service.
- #define CFE\_GENERIC\_SERVICE ((CFE\_Status\_t)0x08000000)  
Generic Service.
- #define CFE\_SOFTWARE\_BUS\_SERVICE ((CFE\_Status\_t)0x0a000000)  
Software Bus Service.
- #define CFE\_TABLE\_SERVICE ((CFE\_Status\_t)0x0c000000)  
Table Service.
- #define CFE\_TIME\_SERVICE ((CFE\_Status\_t)0x0e000000)  
Time Service.
- #define CFE\_SUCCESS ((CFE\_Status\_t)0)  
Successful execution.
- #define CFE\_STATUS\_NO\_COUNTER\_INCREMENT ((CFE\_Status\_t)0x48000001)  
No Counter Increment.
- #define CFE\_STATUS\_WRONG\_MSG\_LENGTH ((CFE\_Status\_t)0xc8000002)  
Wrong Message Length.
- #define CFE\_STATUS\_UNKNOWN\_MSG\_ID ((CFE\_Status\_t)0xc8000003)  
Unknown Message ID.
- #define CFE\_STATUS\_BAD\_COMMAND\_CODE ((CFE\_Status\_t)0xc8000004)  
Bad Command Code.
- #define CFE\_STATUS\_EXTERNAL\_RESOURCE\_FAIL ((CFE\_Status\_t)0xc8000005)  
External failure.
- #define CFE\_STATUS\_REQUEST\_ALREADY\_PENDING ((int32)0xc8000006)  
Request already pending.
- #define CFE\_STATUS\_VALIDATION\_FAILURE ((int32)0xc8000007)  
Request or input value failed basic structural validation.
- #define CFE\_STATUS\_RANGE\_ERROR ((int32)0xc8000008)  
Request or input value is out of range.
- #define CFE\_STATUS\_INCORRECT\_STATE ((int32)0xc8000009)  
Cannot process request at this time.
- #define CFE\_STATUS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc800ffff)  
Not Implemented.
- #define CFE\_EVS\_UNKNOWN\_FILTER ((CFE\_Status\_t)0xc2000001)  
Unknown Filter.
- #define CFE\_EVS\_APP\_NOT\_REGISTERED ((CFE\_Status\_t)0xc2000002)  
Application Not Registered.

- #define CFE\_EVS\_APP\_ILLEGAL\_APP\_ID ((CFE\_Status\_t)0xc2000003)  
*Illegal Application ID.*
- #define CFE\_EVS\_APP\_FILTER\_OVERLOAD ((CFE\_Status\_t)0xc2000004)  
*Application Filter Overload.*
- #define CFE\_EVS\_RESET\_AREA\_POINTER ((CFE\_Status\_t)0xc2000005)  
*Reset Area Pointer Failure.*
- #define CFE\_EVS\_EVT\_NOT\_REGISTERED ((CFE\_Status\_t)0xc2000006)  
*Event Not Registered.*
- #define CFE\_EVS\_FILE\_WRITE\_ERROR ((CFE\_Status\_t)0xc2000007)  
*File Write Error.*
- #define CFE\_EVS\_INVALID\_PARAMETER ((CFE\_Status\_t)0xc2000008)  
*Invalid Pointer.*
- #define CFE\_EVS\_APP\_SQUELCHED ((CFE\_Status\_t)0xc2000009)  
*Event squelched.*
- #define CFE\_EVS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc200ffff)  
*Not Implemented.*
- #define CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID ((CFE\_Status\_t)0xc4000001)  
*Resource ID is not valid.*
- #define CFE\_ES\_ERR\_NAME\_NOT\_FOUND ((CFE\_Status\_t)0xc4000002)  
*Resource Name Error.*
- #define CFE\_ES\_ERR\_APP\_CREATE ((CFE\_Status\_t)0xc4000004)  
*Application Create Error.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_CREATE ((CFE\_Status\_t)0xc4000005)  
*Child Task Create Error.*
- #define CFE\_ES\_ERR\_SYS\_LOG\_FULL ((CFE\_Status\_t)0xc4000006)  
*System Log Full.*
- #define CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE ((CFE\_Status\_t)0xc4000008)  
*Memory Block Size Error.*
- #define CFE\_ES\_ERR\_LOAD\_LIB ((CFE\_Status\_t)0xc4000009)  
*Load Library Error.*
- #define CFE\_ES\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc400000a)  
*Bad Argument.*
- #define CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER ((CFE\_Status\_t)0xc400000b)  
*Child Task Register Error.*
- #define CFE\_ES\_CDS\_ALREADY\_EXISTS ((CFE\_Status\_t)0x4400000d)  
*CDS Already Exists.*
- #define CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY ((CFE\_Status\_t)0xc400000e)  
*CDS Insufficient Memory.*
- #define CFE\_ES\_CDS\_INVALID\_NAME ((CFE\_Status\_t)0xc400000f)  
*CDS Invalid Name.*
- #define CFE\_ES\_CDS\_INVALID\_SIZE ((CFE\_Status\_t)0xc4000010)  
*CDS Invalid Size.*
- #define CFE\_ES\_CDS\_INVALID ((CFE\_Status\_t)0xc4000012)  
*CDS Invalid.*
- #define CFE\_ES\_CDS\_ACCESS\_ERROR ((CFE\_Status\_t)0xc4000013)  
*CDS Access Error.*
- #define CFE\_ES\_FILE\_IO\_ERR ((CFE\_Status\_t)0xc4000014)

- File IO Error.*
- #define CFE\_ES\_RST\_ACCESS\_ERR ((CFE\_Status\_t)0xc4000015)  
*Reset Area Access Error.*
  - #define CFE\_ES\_ERR\_APP\_REGISTER ((CFE\_Status\_t)0xc4000017)  
*Application Register Error.*
  - #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE ((CFE\_Status\_t)0xc4000018)  
*Child Task Delete Error.*
  - #define CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_MAIN\_TASK ((CFE\_Status\_t)0xc4000019)  
*Child Task Delete Passed Main Task.*
  - #define CFE\_ES\_CDS\_BLOCK\_CRC\_ERR ((CFE\_Status\_t)0xc400001A)  
*CDS Block CRC Error.*
  - #define CFE\_ES\_MUT\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001B)  
*Mutex Semaphore Delete Error.*
  - #define CFE\_ES\_BIN\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001C)  
*Binary Semaphore Delete Error.*
  - #define CFE\_ES\_COUNT\_SEM\_DELETE\_ERR ((CFE\_Status\_t)0xc400001D)  
*Counting Semaphore Delete Error.*
  - #define CFE\_ES\_QUEUE\_DELETE\_ERR ((CFE\_Status\_t)0xc400001E)  
*Queue Delete Error.*
  - #define CFE\_ES\_FILE\_CLOSE\_ERR ((CFE\_Status\_t)0xc400001F)  
*File Close Error.*
  - #define CFE\_ES\_CDS\_WRONG\_TYPE\_ERR ((CFE\_Status\_t)0xc4000020)  
*CDS Wrong Type Error.*
  - #define CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR ((CFE\_Status\_t)0xc4000022)  
*CDS Owner Active Error.*
  - #define CFE\_ES\_APP\_CLEANUP\_ERR ((CFE\_Status\_t)0xc4000023)  
*Application Cleanup Error.*
  - #define CFE\_ES\_TIMER\_DELETE\_ERR ((CFE\_Status\_t)0xc4000024)  
*Timer Delete Error.*
  - #define CFE\_ES\_BUFFER\_NOT\_IN\_POOL ((CFE\_Status\_t)0xc4000025)  
*Buffer Not In Pool.*
  - #define CFE\_ES\_TASK\_DELETE\_ERR ((CFE\_Status\_t)0xc4000026)  
*Task Delete Error.*
  - #define CFE\_ES\_OPERATION\_TIMED\_OUT ((CFE\_Status\_t)0xc4000027)  
*Operation Timed Out.*
  - #define CFE\_ES\_LIB\_ALREADY\_LOADED ((CFE\_Status\_t)0x44000028)  
*Library Already Loaded.*
  - #define CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED ((CFE\_Status\_t)0x44000029)  
*System Log Message Truncated.*
  - #define CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE ((CFE\_Status\_t)0xc400002B)  
*Resource ID is not available.*
  - #define CFE\_ES\_POOL\_BLOCK\_INVALID ((CFE\_Status\_t)0xc400002C)  
*Invalid pool block.*
  - #define CFE\_ES\_ERR\_DUPLICATE\_NAME ((CFE\_Status\_t)0xc400002E)  
*Duplicate Name Error.*
  - #define CFE\_ES\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc400ffff)  
*Not Implemented.*

- #define CFE\_FS\_BAD\_ARGUMENT ((CFE\_Status\_t)0xc6000001)  
*Bad Argument.*
- #define CFE\_FS\_INVALID\_PATH ((CFE\_Status\_t)0xc6000002)  
*Invalid Path.*
- #define CFE\_FS\_FNAME\_TOO\_LONG ((CFE\_Status\_t)0xc6000003)  
*Filename Too Long.*
- #define CFE\_FS\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xc600ffff)  
*Not Implemented.*
- #define CFE\_SB\_TIME\_OUT ((CFE\_Status\_t)0xca000001)  
*Time Out.*
- #define CFE\_SB\_NO\_MESSAGE ((CFE\_Status\_t)0xca000002)  
*No Message.*
- #define CFE\_SB\_BAD\_ARGUMENT ((CFE\_Status\_t)0xca000003)  
*Bad Argument.*
- #define CFE\_SB\_MAX\_PIPES\_MET ((CFE\_Status\_t)0xca000004)  
*Max Pipes Met.*
- #define CFE\_SB\_PIPE\_CR\_ERR ((CFE\_Status\_t)0xca000005)  
*Pipe Create Error.*
- #define CFE\_SB\_PIPE\_RD\_ERR ((CFE\_Status\_t)0xca000006)  
*Pipe Read Error.*
- #define CFE\_SB\_MSG\_TOO\_BIG ((CFE\_Status\_t)0xca000007)  
*Message Too Big.*
- #define CFE\_SB\_BUF\_ALOC\_ERR ((CFE\_Status\_t)0xca000008)  
*Buffer Allocation Error.*
- #define CFE\_SB\_MAX\_MSGS\_MET ((CFE\_Status\_t)0xca000009)  
*Max Messages Met.*
- #define CFE\_SB\_MAX\_DESTS\_MET ((CFE\_Status\_t)0xca00000a)  
*Max Destinations Met.*
- #define CFE\_SB\_INTERNAL\_ERR ((CFE\_Status\_t)0xca00000c)  
*Internal Error.*
- #define CFE\_SB\_WRONG\_MSG\_TYPE ((CFE\_Status\_t)0xca00000d)  
*Wrong Message Type.*
- #define CFE\_SB\_BUFFER\_INVALID ((CFE\_Status\_t)0xca00000e)  
*Buffer Invalid.*
- #define CFE\_SB\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xca00ffff)  
*Not Implemented.*
- #define CFE\_TBL\_ERR\_INVALID\_HANDLE ((CFE\_Status\_t)0xcc000001)  
*Invalid Handle.*
- #define CFE\_TBL\_ERR\_INVALID\_NAME ((CFE\_Status\_t)0xcc000002)  
*Invalid Name.*
- #define CFE\_TBL\_ERR\_INVALID\_SIZE ((CFE\_Status\_t)0xcc000003)  
*Invalid Size.*
- #define CFE\_TBL\_INFO\_UPDATE\_PENDING ((CFE\_Status\_t)0x4c000004)  
*Update Pending.*
- #define CFE\_TBL\_ERR\_NEVER\_LOADED ((CFE\_Status\_t)0xcc000005)  
*Never Loaded.*
- #define CFE\_TBL\_ERR\_REGISTRY\_FULL ((CFE\_Status\_t)0xcc000006)

- Registry Full.*
- #define CFE\_TBL\_WARN\_DUPLICATE ((CFE\_Status\_t)0x4c000007)  
*Duplicate Warning.*
  - #define CFE\_TBL\_ERR\_NO\_ACCESS ((CFE\_Status\_t)0xcc000008)  
*No Access.*
  - #define CFE\_TBL\_ERR\_UNREGISTERED ((CFE\_Status\_t)0xcc000009)  
*Unregistered.*
  - #define CFE\_TBL\_ERR\_HANDLES\_FULL ((CFE\_Status\_t)0xcc00000B)  
*Handles Full.*
  - #define CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE ((CFE\_Status\_t)0xcc00000C)  
*Duplicate Table With Different Size.*
  - #define CFE\_TBL\_ERR\_DUPLICATE\_NOT OWNED ((CFE\_Status\_t)0xcc00000D)  
*Duplicate Table And Not Owned.*
  - #define CFE\_TBL\_INFO\_UPDATED ((CFE\_Status\_t)0x4c00000E)  
*Updated.*
  - #define CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL ((CFE\_Status\_t)0xcc00000F)  
*No Buffer Available.*
  - #define CFE\_TBL\_ERR\_DUMP\_ONLY ((CFE\_Status\_t)0xcc000010)  
*Dump Only Error.*
  - #define CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE ((CFE\_Status\_t)0xcc000011)  
*Illegal Source Type.*
  - #define CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS ((CFE\_Status\_t)0xcc000012)  
*Load In Progress.*
  - #define CFE\_TBL\_ERR\_FILE\_TOO\_LARGE ((CFE\_Status\_t)0xcc000014)  
*File Too Large.*
  - #define CFE\_TBL\_WARN\_SHORT\_FILE ((CFE\_Status\_t)0x4c000015)  
*Short File Warning.*
  - #define CFE\_TBL\_ERR\_BAD\_CONTENT\_ID ((CFE\_Status\_t)0xcc000016)  
*Bad Content ID.*
  - #define CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING ((CFE\_Status\_t)0x4c000017)  
*No Update Pending.*
  - #define CFE\_TBL\_INFO\_TABLE\_LOCKED ((CFE\_Status\_t)0x4c000018)  
*Table Locked.*
  - #define CFE\_TBL\_INFO\_VALIDATION\_PENDING ((CFE\_Status\_t)0x4c000019)
  - #define CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDING ((CFE\_Status\_t)0x4c00001A)
  - #define CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID ((CFE\_Status\_t)0xcc00001B)  
*Bad Subtype ID.*
  - #define CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT ((CFE\_Status\_t)0xcc00001C)  
*File Size Inconsistent.*
  - #define CFE\_TBL\_ERR\_NO\_STD\_HEADER ((CFE\_Status\_t)0xcc00001D)  
*No Standard Header.*
  - #define CFE\_TBL\_ERR\_NO\_TBL\_HEADER ((CFE\_Status\_t)0xcc00001E)  
*No Table Header.*
  - #define CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG ((CFE\_Status\_t)0xcc00001F)  
*Filename Too Long.*
  - #define CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE ((CFE\_Status\_t)0xcc000020)  
*File For Wrong Table.*

- #define CFE\_TBL\_ERR\_LOAD\_INCOMPLETE ((CFE\_Status\_t)0xcc000021)  
*Load Incomplete.*
- #define CFE\_TBL\_WARN\_PARTIAL\_LOAD ((CFE\_Status\_t)0x4c000022)  
*Partial Load Warning.*
- #define CFE\_TBL\_ERR\_PARTIAL\_LOAD ((CFE\_Status\_t)0xcc000023)  
*Partial Load Error.*
- #define CFE\_TBL\_INFO\_DUMP\_PENDING ((CFE\_Status\_t)0x4c000024)  
*Dump Pending.*
- #define CFE\_TBL\_ERR\_INVALID\_OPTIONS ((CFE\_Status\_t)0xcc000025)  
*Invalid Options.*
- #define CFE\_TBL\_WARN\_NOT\_CRITICAL ((CFE\_Status\_t)0x4c000026)  
*Not Critical Warning.*
- #define CFE\_TBL\_INFO\_RECOVERED\_TBL ((CFE\_Status\_t)0x4c000027)  
*Recovered Table.*
- #define CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID ((CFE\_Status\_t)0xcc000028)  
*Bad Spacecraft ID.*
- #define CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID ((CFE\_Status\_t)0xcc000029)  
*Bad Processor ID.*
- #define CFE\_TBL\_MESSAGE\_ERROR ((CFE\_Status\_t)0xcc00002a)  
*Message Error.*
- #define CFE\_TBL\_ERR\_SHORT\_FILE ((CFE\_Status\_t)0xcc00002b)
- #define CFE\_TBL\_ERR\_ACCESS ((CFE\_Status\_t)0xcc00002c)
- #define CFE\_TBL\_BAD\_ARGUMENT ((CFE\_Status\_t)0xcc00002d)  
*Bad Argument.*
- #define CFE\_TBL\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xcc00ffff)  
*Not Implemented.*
- #define CFE\_TIME\_NOT\_IMPLEMENTED ((CFE\_Status\_t)0xce00ffff)  
*Not Implemented.*
- #define CFE\_TIME\_INTERNAL\_ONLY ((CFE\_Status\_t)0xce000001)  
*Internal Only.*
- #define CFE\_TIME\_OUT\_OF\_RANGE ((CFE\_Status\_t)0xce000002)  
*Out Of Range.*
- #define CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS ((CFE\_Status\_t)0xce000003)  
*Too Many Sync Callbacks.*
- #define CFE\_TIME\_CALLBACK\_NOT\_REGISTERED ((CFE\_Status\_t)0xce000004)  
*Callback Not Registered.*
- #define CFE\_TIME\_BAD\_ARGUMENT ((CFE\_Status\_t)0xce000005)  
*Bad Argument.*

## Typedefs

- typedef int32 CFE\_Status\_t  
*cFE Status type for readability and eventually type safety*
- typedef char CFE\_StatusString\_t[CFE\_STATUS\_STRING\_LENGTH]  
*For the [CFE\\_ES\\_StatusToString\(\)](#) function, to ensure everyone is making an array of the same length.*

## Functions

- `char * CFE_ES_StatusToString (CFE_Status_t status, CFE_StatusString_t *status_string)`  
*Convert status to a string.*

### 12.56.1 Detailed Description

Title: cFE Status Code Definition Header File

Purpose: Common source of cFE API return status codes.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

### 12.56.2 Macro Definition Documentation

#### 12.56.2.1 CFE\_EVENTS\_SERVICE `#define CFE_EVENTS_SERVICE ((CFE_Status_t)0x02000000)`

Event Service.

Definition at line 126 of file cfe\_error.h.

#### 12.56.2.2 CFE\_EXECUTIVE\_SERVICE `#define CFE_EXECUTIVE_SERVICE ((CFE_Status_t)0x04000000)`

Executive Service.

Definition at line 127 of file cfe\_error.h.

#### 12.56.2.3 CFE\_FILE\_SERVICE `#define CFE_FILE_SERVICE ((CFE_Status_t)0x06000000)`

File Service.

Definition at line 128 of file cfe\_error.h.

#### 12.56.2.4 CFE\_GENERIC\_SERVICE `#define CFE_GENERIC_SERVICE ((CFE_Status_t)0x08000000)`

Generic Service.

Definition at line 129 of file cfe\_error.h.

#### 12.56.2.5 CFE\_SERVICE\_BITMASK `#define CFE_SERVICE_BITMASK ((CFE_Status_t)0x0e000000)`

Error Service Bitmask.

Definition at line 124 of file cfe\_error.h.

#### 12.56.2.6 CFE\_SEVERITY\_BITMASK `#define CFE_SEVERITY_BITMASK ((CFE_Status_t)0xc0000000)`

Error Severity Bitmask.

Definition at line 115 of file cfe\_error.h.

#### 12.56.2.7 CFE\_SEVERITY\_ERROR `#define CFE_SEVERITY_ERROR ((CFE_Status_t)0xc0000000)`

Severity Error.

Definition at line 119 of file cfe\_error.h.

**12.56.2.8 CFE\_SEVERITY\_INFO** #define CFE\_SEVERITY\_INFO ((CFE\_Status\_t)0x40000000)  
Severity Info.  
Definition at line 118 of file cfe\_error.h.

**12.56.2.9 CFE\_SEVERITY\_SUCCESS** #define CFE\_SEVERITY\_SUCCESS ((CFE\_Status\_t)0x00000000)  
Severity Success.  
Definition at line 117 of file cfe\_error.h.

**12.56.2.10 CFE\_SOFTWARE\_BUS\_SERVICE** #define CFE\_SOFTWARE\_BUS\_SERVICE ((CFE\_Status\_t)0x0a000000)  
Software Bus Service.  
Definition at line 130 of file cfe\_error.h.

**12.56.2.11 CFE\_STATUS\_C** #define CFE\_STATUS\_C(  
    X  )  ((CFE\_Status\_t)(X))  
cFE Status macro for literal  
Definition at line 48 of file cfe\_error.h.

**12.56.2.12 CFE\_STATUS\_STRING\_LENGTH** #define CFE\_STATUS\_STRING\_LENGTH 11  
cFE Status converted to string length limit  
Used for sizing CFE\_StatusString\_t intended for use in printing CFE\_Status\_t values Sized for 0x%08x and NULL  
Definition at line 56 of file cfe\_error.h.

**12.56.2.13 CFE\_TABLE\_SERVICE** #define CFE\_TABLE\_SERVICE ((CFE\_Status\_t)0x0c000000)  
Table Service.  
Definition at line 131 of file cfe\_error.h.

**12.56.2.14 CFE\_TIME\_SERVICE** #define CFE\_TIME\_SERVICE ((CFE\_Status\_t)0x0e000000)  
Time Service.  
Definition at line 132 of file cfe\_error.h.

## 12.56.3 Typedef Documentation

**12.56.3.1 CFE\_Status\_t** typedef int32 CFE\_Status\_t  
cFE Status type for readability and eventually type safety  
Definition at line 43 of file cfe\_error.h.

**12.56.3.2 CFE\_StatusString\_t** typedef char CFE\_StatusString\_t[CFE\_STATUS\_STRING\_LENGTH]  
For the [CFE\\_ES\\_StatusToString\(\)](#) function, to ensure everyone is making an array of the same length.  
Definition at line 62 of file cfe\_error.h.

## 12.56.4 Function Documentation

```
12.56.4.1 CFE_ES_StatusToString() char* CFE_ES_StatusToString (
    CFE_Status_t status,
    CFE_StatusString_t * status_string )
```

Convert status to a string.

#### Parameters

in	<i>status</i>	Status value to convert
out	<i>status_string</i>	Buffer to store status converted to string

#### Returns

Passed in string pointer

## 12.57 cfe/modules/core\_api/fsw/inc/cfe\_es.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
#include "cfe_es_api_typedefs.h"
#include "cfe_resourceid_api_typedefs.h"
```

#### Macros

- #define OS\_PRINTF(m, n)
- #define CFE\_ES\_DBIT(x) (1L << (x)) /\* Places a one at bit positions 0 thru 31 \*/
- #define CFE\_ES\_DTEST(i, x) (((i)&CFE\_ES\_DBIT(x)) != 0) /\* true iff bit x of i is set \*/
- #define CFE\_ES\_TEST\_LONG\_MASK(m, s) (CFE\_ES\_DTEST(m[(s) / 32], (s) % 32)) /\* Test a bit within an array of 32-bit integers. \*/
- #define CFE\_ES\_PerfLogEntry(id) (CFE\_ES\_PerfLogAdd(id, 0))
 *Entry marker for use with Software Performance Analysis Tool.*
- #define CFE\_ES\_PerfLogExit(id) (CFE\_ES\_PerfLogAdd(id, 1))
 *Exit marker for use with Software Performance Analysis Tool.*

#### Functions

- CFE\_Status\_t CFE\_ES\_AppID\_ToIndex (CFE\_ES\_AppId\_t AppID, uint32 \*Idx)
 *Obtain an index value correlating to an ES Application ID.*
- int32 CFE\_ES\_LibID\_ToIndex (CFE\_ES\_LibId\_t LibId, uint32 \*Idx)
 *Obtain an index value correlating to an ES Library ID.*
- CFE\_Status\_t CFE\_ES\_TaskID\_ToIndex (CFE\_ES\_TaskId\_t TaskID, uint32 \*Idx)
 *Obtain an index value correlating to an ES Task ID.*
- CFE\_Status\_t CFE\_ES\_CounterID\_ToIndex (CFE\_ES\_CounterId\_t CounterId, uint32 \*Idx)
 *Obtain an index value correlating to an ES Counter ID.*
- void CFE\_ES\_Main (uint32 StartType, uint32 StartSubtype, uint32 ModelId, const char \*StartFilePath)
 *cFE Main Entry Point used by Board Support Package to start cFE*
- CFE\_Status\_t CFE\_ES\_ResetCFE (uint32 ResetType)
 *Reset the cFE Core and all cFE Applications.*
- CFE\_Status\_t CFE\_ES\_RestartApp (CFE\_ES\_AppId\_t AppID)
 *Restart a single cFE Application.*
- CFE\_Status\_t CFE\_ES\_ReloadApp (CFE\_ES\_AppId\_t AppID, const char \*AppFileName)

*Reload a single cFE Application.*

- `CFE_Status_t CFE_ES_DeleteApp (CFE_ES_AppId_t AppID)`

*Delete a cFE Application.*

- `void CFE_ES_ExitApp (uint32 ExitStatus)`

*Exit a cFE Application.*

- `bool CFE_ES_RunLoop (uint32 *RunStatus)`

*Check for Exit, Restart, or Reload commands.*

- `CFE_Status_t CFE_ES_WaitForSystemState (uint32 MinSystemState, uint32 TimeOutMilliseconds)`

*Allow an Application to Wait for a minimum global system state.*

- `void CFE_ES_WaitForStartupSync (uint32 TimeOutMilliseconds)`

*Allow an Application to Wait for the "OPERATIONAL" global system state.*

- `void CFE_ES_IncrementTaskCounter (void)`

*Increments the execution counter for the calling task.*

- `int32 CFE_ES_GetResetType (uint32 *ResetSubtypePtr)`

*Return the most recent Reset Type.*

- `CFE_Status_t CFE_ES_GetAppID (CFE_ES_AppId_t *AppIdPtr)`

*Get an Application ID for the calling Application.*

- `CFE_Status_t CFE_ES_GetTaskID (CFE_ES_TaskId_t *TaskIdPtr)`

*Get the task ID of the calling context.*

- `CFE_Status_t CFE_ES_GetAppIDByName (CFE_ES_AppId_t *AppIdPtr, const char *AppName)`

*Get an Application ID associated with a specified Application name.*

- `CFE_Status_t CFE_ES_GetLibIDByName (CFE_ES_LibId_t *LibIdPtr, const char *LibName)`

*Get a Library ID associated with a specified Library name.*

- `CFE_Status_t CFE_ES_GetAppName (char *AppName, CFE_ES_AppId_t AppId, size_t BufferLength)`

*Get an Application name for a specified Application ID.*

- `CFE_Status_t CFE_ES_GetLibName (char *LibName, CFE_ES_LibId_t LibId, size_t BufferLength)`

*Get a Library name for a specified Library ID.*

- `CFE_Status_t CFE_ES_GetAppInfo (CFE_ES_AppInfo_t *AppInfo, CFE_ES_AppId_t AppId)`

*Get Application Information given a specified App ID.*

- `CFE_Status_t CFE_ES_GetTaskInfo (CFE_ES_TaskInfo_t *TaskInfo, CFE_ES_TaskId_t TaskId)`

*Get Task Information given a specified Task ID.*

- `int32 CFE_ES_GetLibInfo (CFE_ES_AppInfo_t *LibInfo, CFE_ES_LibId_t LibId)`

*Get Library Information given a specified Resource ID.*

- `int32 CFE_ES_GetModuleInfo (CFE_ES_AppInfo_t *ModuleInfo, CFE_Resourceld_t Resourceld)`

*Get Information given a specified Resource ID.*

- `CFE_Status_t CFE_ES_CreateChildTask (CFE_ES_TaskId_t *TaskIdPtr, const char *TaskName, CFE_ES_ChildTaskMainFuncPtr FunctionPtr, CFE_ES_StackPointer_t StackPtr, size_t StackSize, CFE_ES_TaskPriority_Atom_t Priority, uint32 Flags)`

*Creates a new task under an existing Application.*

- `CFE_Status_t CFE_ES_GetTaskIDByName (CFE_ES_TaskId_t *TaskIdPtr, const char *TaskName)`

*Get a Task ID associated with a specified Task name.*

- `CFE_Status_t CFE_ES_GetTaskName (char *TaskName, CFE_ES_TaskId_t TaskId, size_t BufferLength)`

*Get a Task name for a specified Task ID.*

- `CFE_Status_t CFE_ES_DeleteChildTask (CFE_ES_TaskId_t TaskId)`

*Deletes a task under an existing Application.*

- `void CFE_ES_ExitChildTask (void)`

*Exits a child task.*

- void [CFE\\_ES\\_BackgroundWakeups](#) (void)  
*Wakes up the CFE background task.*
- [CFE\\_Status\\_t CFE\\_ES\\_WriteToSysLog](#) (const char \*SpecStringPtr,...) OS\_PRINTF(1  
*Write a string to the cFE System Log.*
- [CFE\\_Status\\_t uint32 CFE\\_ES\\_CalculateCRC](#) (const void \*DataPtr, size\_t DataLength, uint32 InputCRC, CFE\_ES\_CrcType\_Enum\_t TypeCRC)  
*Calculate a CRC on a block of memory.*
- void [CFE\\_ES\\_ProcessAsyncEvent](#) (void)  
*Notification that an asynchronous event was detected by the underlying OS/PSP.*
- [CFE\\_Status\\_t CFE\\_ES\\_RegisterCDS](#) (CFE\_ES\_CDSHandle\_t \*CDSHandlePtr, size\_t BlockSize, const char \*Name)  
*Reserve space (or re-obtain previously reserved space) in the Critical Data Store (CDS)*
- [CFE\\_Status\\_t CFE\\_ES\\_GetCDSBlockIDByName](#) (CFE\_ES\_CDSHandle\_t \*BlockIdPtr, const char \*BlockName)  
*Get a CDS Block ID associated with a specified CDS Block name.*
- [CFE\\_Status\\_t CFE\\_ES\\_GetCDSBlockName](#) (char \*BlockName, CFE\_ES\_CDSHandle\_t BlockId, size\_t BufferLength)  
*Get a Block name for a specified Block ID.*
- [CFE\\_Status\\_t CFE\\_ES\\_CopyToCDS](#) (CFE\_ES\_CDSHandle\_t Handle, const void \*DataToCopy)  
*Save a block of data in the Critical Data Store (CDS)*
- [CFE\\_Status\\_t CFE\\_ES\\_RestoreFromCDS](#) (void \*RestoreToMemory, CFE\_ES\_CDSHandle\_t Handle)  
*Recover a block of data from the Critical Data Store (CDS)*
- [CFE\\_Status\\_t CFE\\_ES\\_PoolCreateNoSem](#) (CFE\_ES\_MemHandle\_t \*PoolID, void \*MemPtr, size\_t Size)  
*Initializes a memory pool created by an application without using a semaphore during processing.*
- [CFE\\_Status\\_t CFE\\_ES\\_PoolCreate](#) (CFE\_ES\_MemHandle\_t \*PoolID, void \*MemPtr, size\_t Size)  
*Initializes a memory pool created by an application while using a semaphore during processing.*
- [CFE\\_Status\\_t CFE\\_ES\\_PoolCreateEx](#) (CFE\_ES\_MemHandle\_t \*PoolID, void \*MemPtr, size\_t Size, uint16 NumBlockSizes, const size\_t \*BlockSizes, bool UseMutex)  
*Initializes a memory pool created by an application with application specified block sizes.*
- int32 [CFE\\_ES\\_PoolDelete](#) (CFE\_ES\_MemHandle\_t PoolID)  
*Deletes a memory pool that was previously created.*
- int32 [CFE\\_ES\\_GetPoolBuf](#) (CFE\_ES\_MemPoolBuf\_t \*BufPtr, CFE\_ES\_MemHandle\_t Handle, size\_t Size)  
*Gets a buffer from the memory pool created by [CFE\\_ES\\_PoolCreate](#) or [CFE\\_ES\\_PoolCreateNoSem](#).*
- [CFE\\_Status\\_t CFE\\_ES\\_GetPoolBufInfo](#) (CFE\_ES\_MemHandle\_t Handle, CFE\_ES\_MemPoolBuf\_t BufPtr)  
*Gets info on a buffer previously allocated via [CFE\\_ES\\_GetPoolBuf](#).*
- int32 [CFE\\_ES\\_PutPoolBuf](#) (CFE\_ES\_MemHandle\_t Handle, CFE\_ES\_MemPoolBuf\_t BufPtr)  
*Releases a buffer from the memory pool that was previously allocated via [CFE\\_ES\\_GetPoolBuf](#).*
- [CFE\\_Status\\_t CFE\\_ES\\_GetMemPoolStats](#) (CFE\_ES\_MemPoolStats\_t \*BufPtr, CFE\_ES\_MemHandle\_t Handle)  
*Extracts the statistics maintained by the memory pool software.*
- void [CFE\\_ES\\_PerfLogAdd](#) (uint32 Marker, uint32 EntryExit)  
*Adds a new entry to the data buffer.*
- [CFE\\_Status\\_t CFE\\_ES\\_RegisterGenCounter](#) (CFE\_ES\_CounterId\_t \*CounterIdPtr, const char \*CounterName)  
*Register a generic counter.*
- [CFE\\_Status\\_t CFE\\_ES\\_DeleteGenCounter](#) (CFE\_ES\_CounterId\_t CounterId)  
*Delete a generic counter.*
- [CFE\\_Status\\_t CFE\\_ES\\_IncrementGenCounter](#) (CFE\_ES\_CounterId\_t CounterId)  
*Increments the specified generic counter.*
- [CFE\\_Status\\_t CFE\\_ES\\_SetGenCount](#) (CFE\_ES\_CounterId\_t CounterId, uint32 Count)

*Set the specified generic counter.*

- **CFE\_Status\_t CFE\_ES\_GetGenCount** (*CFE\_ES\_CounterId\_t CounterId, uint32 \*Count*)

*Get the specified generic counter count.*

- **CFE\_Status\_t CFE\_ES\_GetGenCounterIDByName** (*CFE\_ES\_CounterId\_t \*CounterIdPtr, const char \*CounterName*)

*Get the Id associated with a generic counter name.*

- **CFE\_Status\_t CFE\_ES\_GetGenCounterName** (*char \*CounterName, CFE\_ES\_CounterId\_t CounterId, size\_t BufferLength*)

*Get a Counter name for a specified Counter ID.*

### 12.57.1 Detailed Description

Purpose: Unit specification for Executive Services library functions and macros.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

### 12.57.2 Macro Definition Documentation

#### 12.57.2.1 CFE\_ES\_DBIT #define CFE\_ES\_DBIT(

```
x ) (1L << (x)) /* Places a one at bit positions 0 thru 31 */
```

Definition at line 57 of file cfe\_es.h.

#### 12.57.2.2 CFE\_ES\_DTEST #define CFE\_ES\_DTEST(

```
i,  
x ) (((i)&CFE_ES_DBIT(x)) != 0) /* true iff bit x of i is set */
```

Definition at line 58 of file cfe\_es.h.

#### 12.57.2.3 CFE\_ES\_TEST\_LONG\_MASK #define CFE\_ES\_TEST\_LONG\_MASK(

```
m,  
s ) (CFE_ES_DTEST(m[(s) / 32], (s) % 32)) /* Test a bit within an array of 32-bit
```

integers. \*/

Definition at line 59 of file cfe\_es.h.

#### 12.57.2.4 OS\_PRINTF #define OS\_PRINTF(

```
m,  
n )
```

Definition at line 50 of file cfe\_es.h.

## 12.58 cfe/modules/core\_api/fsw/inc/cfe\_es\_api\_typedefs.h File Reference

```
#include "common_types.h"  
#include "cfe_es_extern_typedefs.h"
```

### Data Structures

- union **CFE\_ES\_PoolAlign**

*Pool Alignment.*

## Macros

- `#define CFE_ES_STATIC_POOL_TYPE(size)`  
*Static Pool Type.*
- `#define CFE_ES_MEMPOOLBUF_C(x) ((CFE_ES_MemPoolBuf_t)(x))`  
*Conversion macro to create buffer pointer from another type.*
- `#define CFE_ES_NO_MUTEX false`  
*Indicates that the memory pool selection will not use a semaphore.*
- `#define CFE_ES_USE_MUTEX true`  
*Indicates that the memory pool selection will use a semaphore.*

## Reset Type extensions

- `#define CFE_ES_APP_RESTART CFE_PSP_RST_TYPE_MAX`

## Conversions for ES resource IDs

- `#define CFE_ES_APPID_C(val) ((CFE_ES_AppId_t)CFE_RESOURCEID_WRAP(val))`
- `#define CFE_ES_TASKID_C(val) ((CFE_ES_TaskId_t)CFE_RESOURCEID_WRAP(val))`
- `#define CFE_ES_LIBID_C(val) ((CFE_ES_LibId_t)CFE_RESOURCEID_WRAP(val))`
- `#define CFE_ES_COUNTERID_C(val) ((CFE_ES_CounterId_t)CFE_RESOURCEID_WRAP(val))`
- `#define CFE_ES_MEMHANDLE_C(val) ((CFE_ES_MemHandle_t)CFE_RESOURCEID_WRAP(val))`
- `#define CFE_ES_CDSHANDLE_C(val) ((CFE_ES_CDSHandle_t)CFE_RESOURCEID_WRAP(val))`

## Type-specific initializers for "undefined" resource IDs

- `#define CFE_ES_APPID_UNDEFINED CFE_ES_APPID_C(CFE_RESOURCEID_UNDEFINED)`
- `#define CFE_ES_TASKID_UNDEFINED CFE_ES_TASKID_C(CFE_RESOURCEID_UNDEFINED)`
- `#define CFE_ES_LIBID_UNDEFINED CFE_ES_LIBID_C(CFE_RESOURCEID_UNDEFINED)`
- `#define CFE_ES_COUNTERID_UNDEFINED CFE_ES_COUNTERID_C(CFE_RESOURCEID_UNDEFINED)`
- `#define CFE_ES_MEMHANDLE_UNDEFINED CFE_ES_MEMHANDLE_C(CFE_RESOURCEID_UNDEFINED)`
- `#define CFE_ES_CDS_BAD_HANDLE CFE_ES_CDSHANDLE_C(CFE_RESOURCEID_UNDEFINED)`

## Task Stack Constants

- `#define CFE_ES_TASK_STACK_ALLOCATE NULL /* aka OS_TASK_STACK_ALLOCATE in proposed O↔SAL change */`  
*Indicates that the stack for the child task should be dynamically allocated.*

## Typedefs

- `typedef void(* CFE_ES_TaskEntryFuncPtr_t) (void)`  
*Required Prototype of Task Main Functions.*
- `typedef int32(* CFE_ES_LibraryEntryFuncPtr_t) (CFE_ES_LibId_t LibId)`  
*Required Prototype of Library Initialization Functions.*
- `typedef CFE_ES_TaskEntryFuncPtr_t CFE_ES_ChildTaskMainFuncPtr_t`  
*Compatible typedef for ES child task entry point.*
- `typedef void * CFE_ES_StackPointer_t`  
*Type for the stack pointer of tasks.*
- `typedef enum CFE_ES_CrcType_Enum CFE_ES_CrcType_Enum_t`  
*Checksum/CRC algorithm identifiers.*
- `typedef union CFE_ES_PoolAlign CFE_ES_PoolAlign_t`  
*Pool Alignment.*
- `typedef void * CFE_ES_MemPoolBuf_t`  
*Pointer type used for memory pool API.*

## Enumerations

- enum `CFE_ES_CrcType_Enum` {  
  `CFE_ES_CrcType_NONE` = 0, `CFE_ES_CrcType_16_ARC` = 1, `CFE_ES_CrcType_MAX` = 2, `CFE_ES_CrcType_CRC_16` = `CFE_ES_CrcType_16_ARC`,  
  `CFE_ES_CrcType_CRC_8` = `CFE_ES_CrcType_MAX` + 1, `CFE_ES_CrcType_CRC_32` = `CFE_ES_CrcType_MAX` + 2 }  
}

*Checksum/CRC algorithm identifiers.*

### 12.58.1 Detailed Description

Purpose: Unit specification for Executive Services library functions and macros.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

### 12.58.2 Macro Definition Documentation

#### 12.58.2.1 `CFE_ES_APP_RESTART` #define `CFE_ES_APP_RESTART` `CFE_PSP_RST_TYPE_MAX`

Application only was reset (extend the PSP enumeration here)

Definition at line 57 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.2 `CFE_ES_APPID_C` #define `CFE_ES_APPID_C` (   `val` ) ((`CFE_ES_AppId_t`)`CFE_RESOURCEID_WRAP`(`val`))

Definition at line 208 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.3 `CFE_ES_APPID_UNDEFINED` #define `CFE_ES_APPID_UNDEFINED` `CFE_ES_APPID_C(CFE_RESOURCEID_UNDEFINED)`

Definition at line 220 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.4 `CFE_ES_CDS_BAD_HANDLE` #define `CFE_ES_CDS_BAD_HANDLE` `CFE_ES_CDHANDLE_C(CFE_RESOURCEID_UNDEFINED)`

Definition at line 225 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.5 `CFE_ES_CDHANDLE_C` #define `CFE_ES_CDHANDLE_C` (   `val` ) ((`CFE_ES_CDHandle_t`)`CFE_RESOURCEID_WRAP`(`val`))

Definition at line 213 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.6 `CFE_ES_COUNTERID_C` #define `CFE_ES_COUNTERID_C` (   `val` ) ((`CFE_ES_CounterId_t`)`CFE_RESOURCEID_WRAP`(`val`))

Definition at line 211 of file `cfe_es_api_typedefs.h`.

#### 12.58.2.7 `CFE_ES_COUNTERID_UNDEFINED` #define `CFE_ES_COUNTERID_UNDEFINED` `CFE_ES_COUNTERID_C(CFE_RESOURCEID_UNDEFINED)`

Definition at line 223 of file `cfe_es_api_typedefs.h`.

**12.58.2.8 CFE\_ES\_LIBID\_C** #define CFE\_ES\_LIBID\_C(  
     val) ((CFE\_ES\_LibId\_t)CFE\_RESOURCEID\_WRAP(val))

Definition at line 210 of file cfe\_es\_api\_typedefs.h.

**12.58.2.9 CFE\_ES\_LIBID\_UNDEFINED** #define CFE\_ES\_LIBID\_UNDEFINED CFE\_ES\_LIBID\_C(CFE\_RESOURCEID\_UNDEFINED)

Definition at line 222 of file cfe\_es\_api\_typedefs.h.

**12.58.2.10 CFE\_ES\_MEMHANDLE\_C** #define CFE\_ES\_MEMHANDLE\_C(  
     val) ((CFE\_ES\_MemHandle\_t)CFE\_RESOURCEID\_WRAP(val))

Definition at line 212 of file cfe\_es\_api\_typedefs.h.

**12.58.2.11 CFE\_ES\_MEMHANDLE\_UNDEFINED** #define CFE\_ES\_MEMHANDLE\_UNDEFINED CFE\_ES\_MEMHANDLE\_C(CFE\_RESOURCEID\_UNDEFINED)

Definition at line 224 of file cfe\_es\_api\_typedefs.h.

**12.58.2.12 CFE\_ES\_MEMPOOLBUF\_C** #define CFE\_ES\_MEMPOOLBUF\_C(  
     x) ((CFE\_ES\_MemPoolBuf\_t)(x))

Conversion macro to create buffer pointer from another type.

In cases where the actual buffer pointer is computed, this macro aids in converting the computed address (typically an OSAL "cpuaddr" type) into a buffer pointer.

#### Note

Any address calculation needs to take machine alignment requirements into account.

Definition at line 193 of file cfe\_es\_api\_typedefs.h.

**12.58.2.13 CFE\_ES\_NO\_MUTEX** #define CFE\_ES\_NO\_MUTEX false

Indicates that the memory pool selection will not use a semaphore.

Definition at line 240 of file cfe\_es\_api\_typedefs.h.

**12.58.2.14 CFE\_ES\_STATIC\_POOL\_TYPE** #define CFE\_ES\_STATIC\_POOL\_TYPE(  
     size)

#### Value:

```
union
{
    CFE_ES_PoolAlign_t Align; \
    uint8              Data[size]; \
}
```

Static Pool Type.

A macro to help instantiate static memory pools that are correctly aligned. This resolves to a union type that contains a member called "Data" that will be correctly aligned to be a memory pool and sized according to the argument.

Definition at line 160 of file cfe\_es\_api\_typedefs.h.

**12.58.2.15 CFE\_ES\_TASK\_STACK\_ALLOCATE** #define CFE\_ES\_TASK\_STACK\_ALLOCATE NULL /\* aka OS\_TA↔SK\_STACK\_ALLOCATE in proposed OSAL change \*/

Indicates that the stack for the child task should be dynamically allocated.

This value may be supplied as the Stack Pointer argument to CFE\_ES\_ChildTaskCreate() to indicate that the stack should be dynamically allocated.

Definition at line 237 of file cfe\_es\_api\_typedefs.h.

**12.58.2.16 CFE\_ES\_TASKID\_C** #define CFE\_ES\_TASKID\_C(  
    val ) (([CFE\\_ES\\_TaskId\\_t](#))CFE\_RESOURCEID\_WRAP(val))

Definition at line 209 of file cfe\_es\_api\_typedefs.h.

**12.58.2.17 CFE\_ES\_TASKID\_UNDEFINED** #define CFE\_ES\_TASKID\_UNDEFINED [CFE\\_ES\\_TASKID\\_C\(CFE\\_RESOURCEID\\_UNDEFINED\)](#)

Definition at line 221 of file cfe\_es\_api\_typedefs.h.

**12.58.2.18 CFE\_ES\_USE\_MUTEX** #define CFE\_ES\_USE\_MUTEX true

Indicates that the memory pool selection will use a semaphore.

Definition at line 241 of file cfe\_es\_api\_typedefs.h.

### 12.58.3 Typedef Documentation

**12.58.3.1 CFE\_ES\_ChildTaskMainFuncPtr\_t** [typedef CFE\\_ES\\_TaskEntryFuncPtr\\_t CFE\\_ES\\_ChildTaskMainFuncPtr\\_t](#)

Compatible typedef for ES child task entry point.

All ES task functions (main + child) use the same entry point type.

Definition at line 77 of file cfe\_es\_api\_typedefs.h.

**12.58.3.2 CFE\_ES\_CrcType\_Enum\_t** [typedef enum CFE\\_ES\\_CrcType\\_Enum CFE\\_ES\\_CrcType\\_Enum\\_t](#)

Checksum/CRC algorithm identifiers.

Currently only CFE\_ES\_CrcType\_16\_ARC is supported.

All defined CRC algorithms should include a check value, which is the accepted result of computing the CRC across the fixed string "123456789"

**12.58.3.3 CFE\_ES\_LibraryEntryFuncPtr\_t** [typedef int32 \(\\* CFE\\_ES\\_LibraryEntryFuncPtr\\_t\) \(CFE\\_ES\\_LibId\\_t LibId\)](#)

Required Prototype of Library Initialization Functions.

Definition at line 69 of file cfe\_es\_api\_typedefs.h.

**12.58.3.4 CFE\_ES\_MemPoolBuf\_t** [typedef void\\* CFE\\_ES\\_MemPoolBuf\\_t](#)

Pointer type used for memory pool API.

This is used in the Get/Put API calls to refer to a pool buffer.

This pointer is expected to be type cast to the real object type after getting a new buffer. Using void\* allows this type conversion to occur easily.

#### Note

Older versions of CFE implemented the API using a uint32\*, which required explicit type casting everywhere it was called. Although the API type is now void\* to make usage easier, the pool buffers are aligned to machine requirements - typically 64 bits.

Definition at line 181 of file cfe\_es\_api\_typedefs.h.

**12.58.3.5 CFE\_ES\_PoolAlign\_t** `typedef union CFE_ES_PoolAlign CFE_ES_PoolAlign_t`  
 Pool Alignment.

Union that can be used for minimum memory alignment of ES memory pools on the target. It contains the longest native data types such that the alignment of this structure should reflect the largest possible alignment requirements for any data on this processor.

**12.58.3.6 CFE\_ES\_StackPointer\_t** `typedef void* CFE_ES_StackPointer_t`  
 Type for the stack pointer of tasks.

This type is used in the CFE ES task API.

Definition at line 84 of file `cfe_es_api_typedefs.h`.

**12.58.3.7 CFE\_ES\_TaskEntryFuncPtr\_t** `typedef void(* CFE_ES_TaskEntryFuncPtr_t) (void)`

Required Prototype of Task Main Functions.

Definition at line 68 of file `cfe_es_api_typedefs.h`.

#### 12.58.4 Enumeration Type Documentation

**12.58.4.1 CFE\_ES\_CrcType\_Enum** `enum CFE_ES_CrcType_Enum`

Checksum/CRC algorithm identifiers.

Currently only `CFE_ES_CrcType_16_ARC` is supported.

All defined CRC algorithms should include a check value, which is the accepted result of computing the CRC across the fixed string "123456789"

##### Enumerator

<code>CFE_ES_CrcType_NONE</code>	Reserved placeholder value. No computation is performed, always returns 0 as a result.
<code>CFE_ES_CrcType_16_ARC</code>	Implementation of CRC-16/ARC.  Polynomial: 0x8005 Initialization: 0x0000 Reflect Input/Output: true Check value: 0xbb3d XorOut: 0x0000
<code>CFE_ES_CrcType_MAX</code>	Placeholder for end of normal enumeration list This should reflect the number of algorithms defined.
<code>CFE_ES_CrcType_CRC_16</code>	CRC-16 historically implied CRC-16/ARC CRC-8 historically defined but not implemented, value must not be 0
<code>CFE_ES_CrcType_CRC_8</code>	CRC-32 historically defined but not implemented, value must not be 0
<code>CFE_ES_CrcType_CRC_32</code>	

Definition at line 94 of file `cfe_es_api_typedefs.h`.

#### 12.59 cfe/modules/core\_api/fsw/inc/cfe\_evs.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
```

```
#include "cfe_evs_api_typedefs.h"
#include "cfe_es_api_typedefs.h"
#include "cfe_time_api_typedefs.h"
```

## Macros

- #define CFE\_EVS\_Send(E, T, ...) CFE\_EVS\_SendEvent((E), CFE\_EVS\_EventType\_##T, \_\_VA\_ARGS\_\_)
- #define CFE\_EVS\_SendDbg(E, ...) CFE\_EVS\_Send(E, DEBUG, \_\_VA\_ARGS\_\_)
- #define CFE\_EVS\_SendInfo(E, ...) CFE\_EVS\_Send(E, INFORMATION, \_\_VA\_ARGS\_\_)
- #define CFE\_EVS\_SendErr(E, ...) CFE\_EVS\_Send(E, ERROR, \_\_VA\_ARGS\_\_)
- #define CFE\_EVS\_SendCrit(E, ...) CFE\_EVS\_Send(E, CRITICAL, \_\_VA\_ARGS\_\_)

## Functions

- CFE\_Status\_t CFE\_EVS\_Register (const void \*Filters, uint16 NumEventFilters, uint16 FilterScheme)  
*Register an application for receiving event services.*
- CFE\_Status\_t CFE\_EVS\_SendEvent (uint16 EventID, uint16 EventType, const char \*Spec,...) OS\_PRINTF(3  
*Generate a software event.*
- CFE\_Status\_t CFE\_Status\_t CFE\_EVS\_SendEventWithAppID (uint16 EventID, uint16 EventType, CFE\_ES\_AppId\_t AppID, const char \*Spec,...) OS\_PRINTF(4  
*Generate a software event given the specified Application ID.*
- CFE\_Status\_t CFE\_Status\_t CFE\_Status\_t CFE\_EVS\_SendTimedEvent (CFE\_TIME\_SysTime\_t Time, uint16 EventID, uint16 EventType, const char \*Spec,...) OS\_PRINTF(4  
*Generate a software event with a specific time tag.*
- CFE\_Status\_t CFE\_EVS\_ResetFilter (uint16 EventID)  
*Resets the calling application's event filter for a single event ID.*
- CFE\_Status\_t CFE\_EVS\_ResetAllFilters (void)  
*Resets all of the calling application's event filters.*

### 12.59.1 Detailed Description

Title: Event Services API Application Library Header File

Purpose: Unit specification for Event services library functions and macros.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

### 12.59.2 Macro Definition Documentation

**12.59.2.1 CFE\_EVS\_Send** #define CFE\_EVS\_Send(  
    E,  
    T,  
    ...    ) CFE\_EVS\_SendEvent ((E), CFE\_EVS\_EventType\_##T, \_\_VA\_ARGS\_\_)

Definition at line 46 of file cfe\_evs.h.

**12.59.2.2 CFE\_EVS\_SendCrit** #define CFE\_EVS\_SendCrit(  
    E,  
    ...    ) CFE\_EVS\_Send(E, CRITICAL, \_\_VA\_ARGS\_\_)

Definition at line 50 of file cfe\_evs.h.

```
12.59.2.3 CFE_EVS_SendDbg #define CFE_EVS_SendDbg( E,  
... ) CFE_EVS_Send(E, DEBUG, __VA_ARGS__)
```

Definition at line 47 of file cfe\_evs.h.

```
12.59.2.4 CFE_EVS_SendErr #define CFE_EVS_SendErr( E,  
... ) CFE_EVS_Send(E, ERROR, __VA_ARGS__)
```

Definition at line 49 of file cfe\_evs.h.

```
12.59.2.5 CFE_EVS_SendInfo #define CFE_EVS_SendInfo( E,  
... ) CFE_EVS_Send(E, INFORMATION, __VA_ARGS__)
```

Definition at line 48 of file cfe\_evs.h.

## 12.60 cfe/modules/core\_api/fsw/inc/cfe\_evs\_api\_typedefs.h File Reference

```
#include "common_types.h"  
#include "cfe_evs_extern_typedefs.h"
```

### Data Structures

- struct **CFE\_EVS\_BinFilter**

*Event message filter definition structure.*

### Macros

#### Common Event Filter Mask Values

*Message is sent if (previous event count) & MASK == 0*

- #define **CFE\_EVS\_NO\_FILTER** 0x0000  
*Stops any filtering. All messages are sent.*
- #define **CFE\_EVS\_FIRST\_ONE\_STOP** 0xFFFF  
*Sends the first event. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_TWO\_STOP** 0xFFFE  
*Sends the first 2 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_4\_STOP** 0xFFFFC  
*Sends the first 4 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_8\_STOP** 0xFFF8  
*Sends the first 8 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_16\_STOP** 0xFFF0  
*Sends the first 16 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_32\_STOP** 0xFFE0  
*Sends the first 32 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_FIRST\_64\_STOP** 0xFFC0  
*Sends the first 64 events. All remaining messages are filtered.*
- #define **CFE\_EVS\_EVERY\_OTHER\_ONE** 0x0001  
*Sends every other event.*
- #define **CFE\_EVS\_EVERY\_OTHER\_TWO** 0x0002  
*Sends two, filters one, sends two, filters one, etc.*
- #define **CFE\_EVS\_EVERY\_FOURTH\_ONE** 0x0003  
*Sends every fourth event message. All others are filtered.*

**Typedefs**

- **typedef struct CFE\_EVS\_BinFilter CFE\_EVS\_BinFilter\_t**  
*Event message filter definition structure.*

**12.60.1 Detailed Description**

Title: Event Services API Application Library Header File

Purpose: Unit specification for Event services library functions and macros.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

**12.60.2 Macro Definition Documentation****12.60.2.1 CFE\_EVS\_EVERY\_FOURTH\_ONE #define CFE\_EVS\_EVERY\_FOURTH\_ONE 0x0003**

Sends every fourth event message. All others are filtered.

Definition at line 54 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.2 CFE\_EVS\_EVERY\_OTHER\_ONE #define CFE\_EVS\_EVERY\_OTHER\_ONE 0x0001**

Sends every other event.

Definition at line 52 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.3 CFE\_EVS\_EVERY\_OTHER\_TWO #define CFE\_EVS\_EVERY\_OTHER\_TWO 0x0002**

Sends two, filters one, sends two, filters one, etc.

Definition at line 53 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.4 CFE\_EVS\_FIRST\_16\_STOP #define CFE\_EVS\_FIRST\_16\_STOP 0xFFFF0**

Sends the first 16 events. All remaining messages are filtered.

Definition at line 49 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.5 CFE\_EVS\_FIRST\_32\_STOP #define CFE\_EVS\_FIRST\_32\_STOP 0xFFE0**

Sends the first 32 events. All remaining messages are filtered.

Definition at line 50 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.6 CFE\_EVS\_FIRST\_4\_STOP #define CFE\_EVS\_FIRST\_4\_STOP 0xFFFFC**

Sends the first 4 events. All remaining messages are filtered.

Definition at line 47 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.7 CFE\_EVS\_FIRST\_64\_STOP #define CFE\_EVS\_FIRST\_64\_STOP 0xFFC0**

Sends the first 64 events. All remaining messages are filtered.

Definition at line 51 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.8 CFE\_EVS\_FIRST\_8\_STOP** #define CFE\_EVS\_FIRST\_8\_STOP 0xFFFF8

Sends the first 8 events. All remaining messages are filtered.

Definition at line 48 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.9 CFE\_EVS\_FIRST\_ONE\_STOP** #define CFE\_EVS\_FIRST\_ONE\_STOP 0xFFFFF

Sends the first event. All remaining messages are filtered.

Definition at line 45 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.10 CFE\_EVS\_FIRST\_TWO\_STOP** #define CFE\_EVS\_FIRST\_TWO\_STOP 0xFFFFE

Sends the first 2 events. All remaining messages are filtered.

Definition at line 46 of file cfe\_evs\_api\_typedefs.h.

**12.60.2.11 CFE\_EVS\_NO\_FILTER** #define CFE\_EVS\_NO\_FILTER 0x0000

Stops any filtering. All messages are sent.

Definition at line 44 of file cfe\_evs\_api\_typedefs.h.

### 12.60.3 Typedef Documentation

**12.60.3.1 CFE\_EVS\_BinFilter\_t** typedef struct CFE\_EVS\_BinFilter CFE\_EVS\_BinFilter\_t

Event message filter definition structure.

## 12.61 cfe/modules/core\_api/fsw/inc/cfe\_fs.h File Reference

```
#include "common_types.h"
#include "osconfig.h"
#include "cfe_platform_cfg.h"
#include "cfe_error.h"
#include "cfe_fs_api_typedefs.h"
#include "cfe_fs_extern_typedefs.h"
#include "cfe_time_api_typedefs.h"
```

### Functions

- **CFE\_Status\_t CFE\_FS\_ReadHeader (CFE\_FS\_Header\_t \*Hdr, osal\_id\_t FileDes)**  
*Read the contents of the Standard cFE File Header.*
- **void CFE\_FS\_InitHeader (CFE\_FS\_Header\_t \*Hdr, const char \*Description, uint32 SubType)**  
*Initializes the contents of the Standard cFE File Header.*
- **CFE\_Status\_t CFE\_FS\_WriteHeader (osal\_id\_t FileDes, CFE\_FS\_Header\_t \*Hdr)**  
*Write the specified Standard cFE File Header to the specified file.*
- **CFE\_Status\_t CFE\_FS\_SetTimestamp (osal\_id\_t FileDes, CFE\_TIME\_SysTime\_t NewTimestamp)**  
*Modifies the Time Stamp field in the Standard cFE File Header for the specified file.*
- **const char \* CFE\_FS\_GetDefaultMountPoint (CFE\_FS\_FileCategory\_t FileCategory)**  
*Get the default virtual mount point for a file category.*
- **const char \* CFE\_FS\_GetDefaultExtension (CFE\_FS\_FileCategory\_t FileCategory)**  
*Get the default filename extension for a file category.*

- `int32 CFE_FS_ParseInputFileNameEx` (`char *OutputBuffer, const char *InputBuffer, size_t OutputBufSize, size_t InputBufSize, const char *DefaultInput, const char *DefaultPath, const char *DefaultExtension`)  
*Parse a filename input from an input buffer into a local buffer.*
- `int32 CFE_FS_ParseInputFileName` (`char *OutputBuffer, const char *InputName, size_t OutputBufSize, CFE_FS_FileCategory_t FileCategory`)  
*Parse a filename string from the user into a local buffer.*
- `CFE_Status_t CFE_FS_ExtractFilenameFromPath` (`const char *OriginalPath, char *FileNameOnly`)  
*Extracts the filename from a unix style path and filename string.*
- `int32 CFE_FS_BackgroundFileDumpRequest` (`CFE_FS_FileWriteMetaData_t *Meta`)  
*Register a background file dump request.*
- `bool CFE_FS_BackgroundFileDumpIsPending` (`const CFE_FS_FileWriteMetaData_t *Meta`)  
*Query if a background file write request is currently pending.*

### 12.61.1 Detailed Description

Purpose: cFE File Services (FS) library API header file

Author: S.Walling/Microtel

## 12.62 cfe/modules/core\_api/fsw/inc/cfe\_fs\_api\_typedefs.h File Reference

```
#include "common_types.h"
#include "osconfig.h"
#include "cfe_mission_cfg.h"
#include "cfe_fs_extern_typedefs.h"
```

### Data Structures

- struct `CFE_FS_FileWriteMetaData`  
*External Metadata/State object associated with background file writes.*

### TypeDefs

- `typedef bool(* CFE_FS_FileWriteGetData_t)` (`void *Meta, uint32 RecordNum, void **Buffer, size_t *BufSize)`
- `typedef void(* CFE_FS_FileWriteOnEvent_t)` (`void *Meta, CFE_FS_FileWriteEvent_t Event, int32 Status, uint32 RecordNum, size_t BlockSize, size_t Position)`
- `typedef struct CFE_FS_FileWriteMetaData CFE_FS_FileWriteMetaData_t`  
*External Metadata/State object associated with background file writes.*

### Enumerations

- enum `CFE_FS_FileCategory_t`{  
`CFE_FS_FileCategory_UNDEFINED, CFE_FS_FileCategory_DYNAMIC_MODULE, CFE_FS_FileCategory_BINARY_DATA_DUMP,`  
`CFE_FS_FileCategory_TEXT_LOG,`  
`CFE_FS_FileCategory_SCRIPT, CFE_FS_FileCategory_TEMP, CFE_FS_FileCategory_MAX }`  
*Generalized file types/categories known to FS.*
- enum `CFE_FS_FileWriteEvent_t`{  
`CFE_FS_FileWriteEvent_UNDEFINED, CFE_FS_FileWriteEvent_COMPLETE, CFE_FS_FileWriteEvent_CREATE_ERROR,`  
`CFE_FS_FileWriteEvent_HEADER_WRITE_ERROR,`  
`CFE_FS_FileWriteEvent_RECORD_WRITE_ERROR, CFE_FS_FileWriteEvent_MAX }`

### 12.62.1 Detailed Description

Purpose: cFE File Services (FS) library API header file  
 Author: S.Walling/Microtel

### 12.62.2 Typedef Documentation

**12.62.2.1 CFE\_FS\_FileWriteGetData\_t** `typedef bool(* CFE_FS_FileWriteGetData_t) (void *Meta, uint32 RecordNum, void **Buffer, size_t *BufSize)`

Data Getter routine provided by requester

Outputs a data block. Should return true if the file is complete (last record/EOF), otherwise return false.

#### Parameters

<i>in, out</i>	<i>Meta</i>	Pointer to the metadata object
<i>in</i>	<i>RecordNum</i>	Incrementing record number counter
<i>out</i>	<i>Buffer</i>	Pointer to buffer data block, should be set by implementation
<i>out</i>	<i>BufSize</i>	Pointer to buffer data size, should be set by implementation

#### Returns

End of file status

#### Return values

<i>true</i>	if at last data record, and output file should be closed
<i>false</i>	if not at last record, more data records to write

#### Note

The implementation of this function must always set the "Buffer" and "BufSize" outputs. If no data is available, they may be set to NULL and 0, respectively.

Definition at line 98 of file `cfe_fs_api_typedefs.h`.

**12.62.2.2 CFE\_FS\_FileWriteMetaData\_t** `typedef struct CFE_FS_FileWriteMetaData CFE_FS_FileWriteMetaData_t`  
 External Metadata/State object associated with background file writes.

Applications intending to schedule background file write jobs should instantiate this object in static/global data memory.  
 This keeps track of the state of the file write request(s).

**12.62.2.3 CFE\_FS\_FileWriteOnEvent\_t** `typedef void(* CFE_FS_FileWriteOnEvent_t) (void *Meta, CFE_FS_FileWriteEvent_t Event, int32 Status, uint32 RecordNum, size_t BlockSize, size_t Position)`

Event generator routine provided by requester

Invoked from certain points in the file write process. Implementation may invoke `CFE_EVS_SendEvent()` appropriately to inform of progress.

#### Parameters

<i>in, out</i>	<i>Meta</i>	Pointer to the metadata object
----------------	-------------	--------------------------------

**Parameters**

in	<i>Event</i>	Generalized type of event to report (not actual event ID)
in	<i>Status</i>	Generalized status code (may be from OSAL or CFE)
in	<i>RecordNum</i>	Record number counter at which event occurred
in	<i>BlockSize</i>	Size of record being processed when event occurred (if applicable)
in	<i>Position</i>	File position/size when event occurred

Definition at line 114 of file cfe\_fs\_api\_typedefs.h.

**12.62.3 Enumeration Type Documentation****12.62.3.1 CFE\_FS\_FileCategory\_t enum CFE\_FS\_FileCategory\_t**

Generalized file types/categories known to FS.

This defines different categories of files, where they may reside in different default locations of the virtualized file system. This is different from, and should not be confused with, the "SubType" field in the FS header. This value is only used at runtime for FS APIs and should not actually appear in any output file or message.

**Enumerator**

CFE_FS_FileCategory_UNKNOWN	Placeholder, unknown file category
CFE_FS_FileCategory_DYNAMIC_MODULE	Dynamically loadable apps/libraries (e.g. .so, .o, .dll, etc)
CFE_FS_FileCategory_BINARY_DATA_DUMP	Binary log file generated by various data dump commands
CFE_FS_FileCategory_TEXT_LOG	Text-based log file generated by various commands
CFE_FS_FileCategory_SCRIPT	Text-based Script files (e.g. ES startup script)
CFE_FS_FileCategory_TEMP	Temporary/Ephemeral files
CFE_FS_FileCategory_MAX	Placeholder, keep last

Definition at line 49 of file cfe\_fs\_api\_typedefs.h.

**12.62.3.2 CFE\_FS\_FileWriteEvent\_t enum CFE\_FS\_FileWriteEvent\_t****Enumerator**

CFE_FS_FileWriteEvent_UNDEFINED	
CFE_FS_FileWriteEvent_COMPLETE	File is completed successfully
CFE_FS_FileWriteEvent_CREATE_ERROR	Unable to create/open file
CFE_FS_FileWriteEvent_HEADER_WRITE_ERROR	Unable to write FS header
CFE_FS_FileWriteEvent_RECORD_WRITE_ERROR	Unable to write data record
CFE_FS_FileWriteEvent_MAX	

Definition at line 69 of file cfe\_fs\_api\_typedefs.h.

**12.63 cfe/modules/core\_api/fsw/inc/cfe\_msg.h File Reference**

```
#include "common_types.h"
#include "cfe_error.h"
```

```
#include "cfe_msg_hdr.h"
#include "cfe_msg_api_typedefs.h"
#include "cfe_es_api_typedefs.h"
#include "cfe_sb_api_typedefs.h"
#include "cfe_time_api_typedefs.h"
```

## Functions

- **CFE\_Status\_t CFE\_MSG\_Init** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_SB\_MsgId\_t* MsgId, *CFE\_MSG\_Size\_t* Size)
   
*Initialize a message.*
- **CFE\_Status\_t CFE\_MSG\_GetSize** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Size\_t* \*Size)
   
*Gets the total size of a message.*
- **CFE\_Status\_t CFE\_MSG\_SetSize** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Size\_t* Size)
   
*Sets the total size of a message.*
- **CFE\_Status\_t CFE\_MSG.GetType** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Type\_t* \*Type)
   
*Gets the message type.*
- **CFE\_Status\_t CFE\_MSG\_SetType** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Type\_t* Type)
   
*Sets the message type.*
- **CFE\_Status\_t CFE\_MSG\_GetHeaderVersion** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_HeaderVersion\_t* \*Version)
   
*Gets the message header version.*
- **CFE\_Status\_t CFE\_MSG\_SetHeaderVersion** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_HeaderVersion\_t* Version)
   
*Sets the message header version.*
- **CFE\_Status\_t CFE\_MSG\_GetHasSecondaryHeader** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *bool* \*HasSecondary)
   
*Gets the message secondary header boolean.*
- **CFE\_Status\_t CFE\_MSG\_SetHasSecondaryHeader** (*CFE\_MSG\_Message\_t* \*MsgPtr, *bool* HasSecondary)
   
*Sets the message secondary header boolean.*
- **CFE\_Status\_t CFE\_MSG\_GetApld** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Apld\_t* \*Apld)
   
*Gets the message application ID.*
- **CFE\_Status\_t CFE\_MSG\_SetApld** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_Apld\_t* Apld)
   
*Sets the message application ID.*
- **CFE\_Status\_t CFE\_MSG\_GetSegmentationFlag** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_SegmentationFlag\_t* \*SegFlag)
   
*Gets the message segmentation flag.*
- **CFE\_Status\_t CFE\_MSG\_SetSegmentationFlag** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_SegmentationFlag\_t* SegFlag)
   
*Sets the message segmentation flag.*
- **CFE\_Status\_t CFE\_MSG\_GetSequenceCount** (*const CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_SequenceCount\_t* \*SeqCnt)
   
*Gets the message sequence count.*
- **CFE\_Status\_t CFE\_MSG\_SetSequenceCount** (*CFE\_MSG\_Message\_t* \*MsgPtr, *CFE\_MSG\_SequenceCount\_t* SeqCnt)
   
*Sets the message sequence count.*
- **CFE\_MSG\_SequenceCount\_t CFE\_MSG\_GetNextSequenceCount** (*CFE\_MSG\_SequenceCount\_t* SeqCnt)
   
*Gets the next sequence count value (rolls over if appropriate)*

- `CFE_Status_t CFE_MSG_GetEDSVersion (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_EDSVersion_t *Version)`  
*Gets the message EDS version.*
- `CFE_Status_t CFE_MSG_SetEDSVersion (CFE_MSG_Message_t *MsgPtr, CFE_MSG_EDSVersion_t Version)`  
*Sets the message EDS version.*
- `CFE_Status_t CFE_MSG_GetEndian (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Endian_t *Endian)`  
*Gets the message endian.*
- `CFE_Status_t CFE_MSG_SetEndian (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Endian_t Endian)`  
*Sets the message endian.*
- `CFE_Status_t CFE_MSG_GetPlaybackFlag (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_PlaybackFlag_t *PlayFlag)`  
*Gets the message playback flag.*
- `CFE_Status_t CFE_MSG_SetPlaybackFlag (CFE_MSG_Message_t *MsgPtr, CFE_MSG_PlaybackFlag_t PlayFlag)`  
*Sets the message playback flag.*
- `CFE_Status_t CFE_MSG_GetSubsystem (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_Subsystem_t *Subsystem)`  
*Gets the message subsystem.*
- `CFE_Status_t CFE_MSG_SetSubsystem (CFE_MSG_Message_t *MsgPtr, CFE_MSG_Subsystem_t Subsystem)`  
*Sets the message subsystem.*
- `CFE_Status_t CFE_MSG_GetSystem (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_System_t *System)`  
*Gets the message system.*
- `CFE_Status_t CFE_MSG_SetSystem (CFE_MSG_Message_t *MsgPtr, CFE_MSG_System_t System)`  
*Sets the message system.*
- `CFE_Status_t CFE_MSG_GenerateChecksum (CFE_MSG_Message_t *MsgPtr)`  
*Calculates and sets the checksum of a message.*
- `CFE_Status_t CFE_MSG_ValidateChecksum (const CFE_MSG_Message_t *MsgPtr, bool *isValid)`  
*Validates the checksum of a message.*
- `CFE_Status_t CFE_MSG_SetFcnCode (CFE_MSG_Message_t *MsgPtr, CFE_MSG_FcnCode_t FcnCode)`  
*Sets the function code field in a message.*
- `CFE_Status_t CFE_MSG_GetFcnCode (const CFE_MSG_Message_t *MsgPtr, CFE_MSG_FcnCode_t *FcnCode)`  
*Gets the function code field from a message.*
- `CFE_Status_t CFE_MSG_GetMsgTime (const CFE_MSG_Message_t *MsgPtr, CFE_TIME_SysTime_t *Time)`  
*Gets the time field from a message.*
- `CFE_Status_t CFE_MSG_SetMsgTime (CFE_MSG_Message_t *MsgPtr, CFE_TIME_SysTime_t NewTime)`  
*Sets the time field in a message.*
- `CFE_Status_t CFE_MSG_GetMsgId (const CFE_MSG_Message_t *MsgPtr, CFE_SB_MsgId_t *MsgId)`  
*Gets the message id from a message.*
- `CFE_Status_t CFE_MSG_SetMsgId (CFE_MSG_Message_t *MsgPtr, CFE_SB_MsgId_t MsgId)`  
*Sets the message id bits in a message.*
- `CFE_Status_t CFE_MSG_GetTypeFromMsgId (CFE_SB_MsgId_t MsgId, CFE_MSG_Type_t *Type)`  
*Gets message type using message ID.*
- `CFE_Status_t CFE_MSG_OriginationAction (CFE_MSG_Message_t *MsgPtr, size_t BufferSize, bool *IsAcceptable)`  
*Perform any necessary actions on a newly-created message, prior to sending.*
- `CFE_Status_t CFE_MSG_VerificationAction (const CFE_MSG_Message_t *MsgPtr, size_t BufferSize, bool *IsAcceptable)`  
*Checks message integrity/acceptability.*

### 12.63.1 Detailed Description

Message access APIs

## 12.64 cfe/modules/core\_api/fsw/inc/cfe\_msg\_api\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
```

### Macros

- #define CFE\_MSG\_BAD\_ARGUMENT CFE\_SB\_BAD\_ARGUMENT  
*Error - bad argument.*
- #define CFE\_MSG\_NOT\_IMPLEMENTED CFE\_SB\_NOT\_IMPLEMENTED  
*Error - not implemented.*
- #define CFE\_MSG\_WRONG\_MSG\_TYPE CFE\_SB\_WRONG\_MSG\_TYPE  
*Error - wrong type.*

### Typedefs

- typedef size\_t CFE\_MSG\_Size\_t  
*Message size, note CCSDS maximum is UINT16\_MAX+7.*
- typedef uint32 CFE\_MSG\_Checksum\_t  
*Message checksum (Oversized to avoid redefine)*
- typedef uint16 CFE\_MSG\_FcnCode\_t  
*Message function code.*
- typedef uint16 CFE\_MSG\_HeaderVersion\_t  
*Message header version.*
- typedef uint16 CFE\_MSG\_Apld\_t  
*Message application ID.*
- typedef uint16 CFE\_MSG\_SequenceCount\_t  
*Message sequence count.*
- typedef uint16 CFE\_MSG\_EDSVersion\_t  
*Message EDS version.*
- typedef uint16 CFE\_MSG\_Subsystem\_t  
*Message subsystem.*
- typedef uint16 CFE\_MSG\_System\_t  
*Message system.*
- typedef enum CFE\_MSG\_Type CFE\_MSG\_Type\_t  
*Message type.*
- typedef enum CFE\_MSG\_SegmentationFlag CFE\_MSG\_SegmentationFlag\_t  
*Segmentation flags.*
- typedef enum CFE\_MSG\_Endian CFE\_MSG\_Endian\_t  
*Endian flag.*
- typedef enum CFE\_MSG\_PlaybackFlag CFE\_MSG\_PlaybackFlag\_t  
*Playback flag.*
- typedef struct CFE\_MSG\_Message CFE\_MSG\_Message\_t  
*cFS generic base message*
- typedef struct CFE\_MSG\_CommandHeader CFE\_MSG\_CommandHeader\_t

*cFS command header*

- `typedef struct CFE_MSG_TelemetryHeader CFE_MSG_TelemetryHeader_t`  
*cFS telemetry header*

## Enumerations

- `enum CFE_MSG_Type { CFE_MSG_Type_Invalid, CFE_MSG_Type_Cmd, CFE_MSG_Type_Tlm }`  
*Message type.*
- `enum CFE_MSG_SegmentationFlag { CFE_MSG_SegFlag_Invalid, CFE_MSG_SegFlag_Continue, CFE_MSG_SegFlag_First, CFE_MSG_SegFlag_Last, CFE_MSG_SegFlag_Unsegmented }`  
*Segmentation flags.*
- `enum CFE_MSG_Endian { CFE_MSG_Endian_Invalid, CFE_MSG_Endian_Big, CFE_MSG_Endian_Little }`  
*Endian flag.*
- `enum CFE_MSG_PlaybackFlag { CFE_MSG_PlayFlag_Invalid, CFE_MSG_PlayFlag_Original, CFE_MSG_PlayFlag_Playback }`  
*Playback flag.*

### 12.64.1 Detailed Description

Typedefs for Message API

- Separate from API so these can be adjusted for custom implementations

### 12.64.2 Macro Definition Documentation

#### 12.64.2.1 CFE\_MSG\_BAD\_ARGUMENT `#define CFE_MSG_BAD_ARGUMENT CFE_SB_BAD_ARGUMENT`

Error - bad argument.

Definition at line 39 of file cfe\_msg\_api\_typedefs.h.

#### 12.64.2.2 CFE\_MSG\_NOT\_IMPLEMENTED `#define CFE_MSG_NOT_IMPLEMENTED CFE_SB_NOT_IMPLEMENTED`

Error - not implemented.

Definition at line 40 of file cfe\_msg\_api\_typedefs.h.

#### 12.64.2.3 CFE\_MSG\_WRONG\_MSG\_TYPE `#define CFE_MSG_WRONG_MSG_TYPE CFE_SB_WRONG_MSG_TYPE`

Error - wrong type.

Definition at line 41 of file cfe\_msg\_api\_typedefs.h.

### 12.64.3 Typedef Documentation

#### 12.64.3.1 CFE\_MSG\_Apld\_t `typedef uint16 CFE_MSG_ApId_t`

Message application ID.

Definition at line 50 of file cfe\_msg\_api\_typedefs.h.

**12.64.3.2 CFE\_MSG\_Checksum\_t** `typedef uint32 CFE_MSG_Checksum_t`  
Message checksum (Oversized to avoid redefine)  
Definition at line 47 of file `cfe_msg_api_typedefs.h`.

**12.64.3.3 CFE\_MSG\_CommandHeader\_t** `typedef struct CFE_MSG_CommandHeader CFE_MSG_CommandHeader_t`  
cFS command header  
Definition at line 107 of file `cfe_msg_api_typedefs.h`.

**12.64.3.4 CFE\_MSG\_EDSVersion\_t** `typedef uint16 CFE_MSG_EDSVersion_t`  
Message EDS version.  
Definition at line 52 of file `cfe_msg_api_typedefs.h`.

**12.64.3.5 CFE\_MSG\_Endian\_t** `typedef enum CFE_MSG_Endian CFE_MSG_Endian_t`  
Endian flag.

**12.64.3.6 CFE\_MSG\_FcnCode\_t** `typedef uint16 CFE_MSG_FcnCode_t`  
Message function code.  
Definition at line 48 of file `cfe_msg_api_typedefs.h`.

**12.64.3.7 CFE\_MSG\_HeaderVersion\_t** `typedef uint16 CFE_MSG_HeaderVersion_t`  
Message header version.  
Definition at line 49 of file `cfe_msg_api_typedefs.h`.

**12.64.3.8 CFE\_MSG\_Message\_t** `typedef struct CFE_MSG_Message CFE_MSG_Message_t`  
cFS generic base message  
Definition at line 102 of file `cfe_msg_api_typedefs.h`.

**12.64.3.9 CFE\_MSG\_PlaybackFlag\_t** `typedef enum CFE_MSG_PlaybackFlag CFE_MSG_PlaybackFlag_t`  
Playback flag.

**12.64.3.10 CFE\_MSG\_SegmentationFlag\_t** `typedef enum CFE_MSG_SegmentationFlag CFE_MSG_SegmentationFlag_t`  
Segmentation flags.

**12.64.3.11 CFE\_MSG\_SequenceCount\_t** `typedef uint16 CFE_MSG_SequenceCount_t`  
Message sequence count.  
Definition at line 51 of file `cfe_msg_api_typedefs.h`.

**12.64.3.12 CFE\_MSG\_Size\_t** `typedef size_t CFE_MSG_Size_t`  
Message size, note CCSDS maximum is `UINT16_MAX+7`.  
Definition at line 46 of file `cfe_msg_api_typedefs.h`.

**12.64.3.13 CFE\_MSG\_Subsystem\_t** `typedef uint16 CFE_MSG_Subsystem_t`

Message subsystem.

Definition at line 53 of file `cfe_msg_api_typedefs.h`.

**12.64.3.14 CFE\_MSG\_System\_t** `typedef uint16 CFE_MSG_System_t`

Message system.

Definition at line 54 of file `cfe_msg_api_typedefs.h`.

**12.64.3.15 CFE\_MSG\_TelemetryHeader\_t** `typedef struct CFE_MSG_TelemetryHeader CFE_MSG_TelemetryHeader_t`

cFS telemetry header

Definition at line 112 of file `cfe_msg_api_typedefs.h`.

**12.64.3.16 CFE\_MSG\_Type\_t** `typedef enum CFE_MSG_Type CFE_MSG_Type_t`

Message type.

## 12.64.4 Enumeration Type Documentation

**12.64.4.1 CFE\_MSG\_Endian** `enum CFE_MSG_Endian`

Endian flag.

Enumerator

<code>CFE_MSG_Endian_Invalid</code>	Invalid endian setting.
<code>CFE_MSG_Endian_Big</code>	Big endian.
<code>CFE_MSG_Endian_Little</code>	Little endian.

Definition at line 75 of file `cfe_msg_api_typedefs.h`.

**12.64.4.2 CFE\_MSG\_PlaybackFlag** `enum CFE_MSG_PlaybackFlag`

Playback flag.

Enumerator

<code>CFE_MSG_PlayFlag_Invalid</code>	Invalid playback setting.
<code>CFE_MSG_PlayFlag_Original</code>	Original.
<code>CFE_MSG_PlayFlag_Playback</code>	Playback.

Definition at line 83 of file `cfe_msg_api_typedefs.h`.

**12.64.4.3 CFE\_MSG\_SegmentationFlag** `enum CFE_MSG_SegmentationFlag`

Segmentation flags.

Enumerator

<code>CFE_MSG_SegFlag_Invalid</code>	Invalid segmentation flag.
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**Enumerator**

<code>CFE_MSG_SegFlag_Continue</code>	Continuation segment of User Data.
<code>CFE_MSG_SegFlag_First</code>	First segment of User Data.
<code>CFE_MSG_SegFlag_Last</code>	Last segment of User Data.
<code>CFE_MSG_SegFlag_Unsegmented</code>	Unsegmented data.

Definition at line 65 of file `cfe_msg_api_typedefs.h`.

**12.64.4.4 CFE\_MSG\_Type enum `CFE_MSG_Type`**

Message type.

**Enumerator**

<code>CFE_MSG_Type_Invalid</code>	Message type invalid, undefined, not implemented.
<code>CFE_MSG_Type_Cmd</code>	Command message type.
<code>CFE_MSG_Type_Tlm</code>	Telemetry message type.

Definition at line 57 of file `cfe_msg_api_typedefs.h`.

**12.65 cfe/modules/core\_api/fsw/inc/cfe\_resourceid.h File Reference**

```
#include "cfe_resourceid_api_typedefs.h"
```

**Functions**

- `uint32 CFE_ResourceId_GetBase (CFE_ResourceId_t ResourceId)`  
*Get the Base value (type/category) from a resource ID value.*
- `uint32 CFE_ResourceId_GetSerial (CFE_ResourceId_t ResourceId)`  
*Get the Serial Number (sequential ID) from a resource ID value.*
- `CFE_ResourceId_t CFE_ResourceId_FindNext (CFE_ResourceId_t StartId, uint32 TableSize, bool(*Check←Func)(CFE_ResourceId_t))`  
*Locate the next resource ID which does not map to an in-use table entry.*
- `int32 CFE_ResourceId_ToIndex (CFE_ResourceId_t Id, uint32 BaseValue, uint32 TableSize, uint32 *Idx)`  
*Internal routine to aid in converting an ES resource ID to an array index.*

**Resource ID test/conversion macros and inline functions**

- `#define CFE_RESOURCEID_TO ULONG(id) CFE_ResourceId_ToInteger(CFE_RESOURCEID_UNWRAP(id))`  
*Convert a derived (app-specific) ID directly into an "unsigned long".*
- `#define CFE_RESOURCEID_TEST_DEFINED(id) CFE_ResourceId_IsDefined(CFE_RESOURCEID_UNWRAP(id))`  
*Determine if a derived (app-specific) ID is defined or not.*
- `#define CFE_RESOURCEID_TEST_EQUAL(id1, id2) CFE_ResourceId_Equal(CFE_RESOURCEID_UNWRAP(id1), CFE_RESOURCEID_UNWRAP(id2))`  
*Determine if two derived (app-specific) IDs are equal.*
- `static unsigned long CFE_ResourceId_ToInteger (CFE_ResourceId_t id)`  
*Convert a resource ID to an integer.*

- static CFE\_Resourceld\_t [CFE\\_Resourceld\\_FromInteger](#) (unsigned long Value)  
*Convert an integer to a resource ID.*
- static bool [CFE\\_Resourceld\\_Equal](#) (CFE\_Resourceld\_t id1, CFE\_Resourceld\_t id2)  
*Compare two Resource ID values for equality.*
- static bool [CFE\\_Resourceld\\_IsDefined](#) (CFE\_Resourceld\_t id)  
*Check if a resource ID value is defined.*

### 12.65.1 Detailed Description

Contains global prototypes and definitions related to resource management and related CFE resource IDs. A CFE ES Resource ID is a common way to identify CFE-managed resources such as apps, tasks, counters, memory pools, CDS blocks, and other entities. Simple operations are provided as inline functions, which should alleviate the need to do direct manipulation of resource IDs:

- Check for undefined ID value
- Check for equality of two ID values
- Convert ID to simple integer (typically for printing/logging)
- Convert simple integer to ID (inverse of above)

### 12.65.2 Macro Definition Documentation

#### 12.65.2.1 CFE\_RESOURCEID\_TEST\_DEFINED #define CFE\_RESOURCEID\_TEST\_DEFINED (     *id* ) [CFE\\_ResourceId\\_IsDefined](#)(CFE\_RESOURCEID\_UNWRAP(*id*))

Determine if a derived (app-specific) ID is defined or not.

This generic routine is implemented as a macro so it is agnostic to the actual argument type, and it will evaluate correctly so long as the argument type is based on the CFE\_RESOURCEID\_BASE\_TYPE.

Definition at line 70 of file cfe\_resourceid.h.

#### 12.65.2.2 CFE\_RESOURCEID\_TEST\_EQUAL #define CFE\_RESOURCEID\_TEST\_EQUAL (     *id1*,     *id2* ) [CFE\\_ResourceId\\_Equal](#)(CFE\_RESOURCEID\_UNWRAP(*id1*), CFE\_RESOURCEID\_UNWRAP(*id2*))

Determine if two derived (app-specific) IDs are equal.

This generic routine is implemented as a macro so it is agnostic to the actual argument type, and it will evaluate correctly so long as the argument type is based on the CFE\_RESOURCEID\_BASE\_TYPE.

Definition at line 78 of file cfe\_resourceid.h.

#### 12.65.2.3 CFE\_RESOURCEID\_TO ULONG #define CFE\_RESOURCEID\_TO ULONG (     *id* ) [CFE\\_ResourceId\\_ToInteger](#)(CFE\_RESOURCEID\_UNWRAP(*id*))

Convert a derived (app-specific) ID directly into an "unsigned long".

This generic routine is implemented as a macro so it is agnostic to the actual argument type, and it will evaluate correctly so long as the argument type is based on the CFE\_RESOURCEID\_BASE\_TYPE.

There is no inverse of this macro, as it depends on the actual derived type desired. Applications needing to recreate an ID from an integer should use [CFE\\_Resourceld\\_FromInteger\(\)](#) combined with a cast/conversion to the correct/intended derived type, as needed.

**Note**

This evaluates as an "unsigned long" such that it can be used in printf()-style functions with the "%lx" modifier without extra casting, as this is the most typical use-case for representing an ID as an integer.

Definition at line 62 of file cfe\_resourceid.h.

### 12.65.3 Function Documentation

**12.65.3.1 CFE\_ResourceId\_Equal()** static bool CFE\_ResourceId\_Equal ( CFE\_ResourceId\_t id1, CFE\_ResourceId\_t id2 ) [inline], [static]

Compare two Resource ID values for equality.

**Parameters**

in	<i>id1</i>	Resource ID to check
in	<i>id2</i>	Resource ID to check

**Returns**

true if id1 and id2 are equal, false otherwise.

Definition at line 133 of file cfe\_resourceid.h.

Referenced by CFE\_ResourceId\_IsDefined().

**12.65.3.2 CFE\_ResourceId\_FindNext()** CFE\_ResourceId\_t CFE\_ResourceId\_FindNext ( CFE\_ResourceId\_t StartId, uint32 TableSize, bool (\*) (CFE\_ResourceId\_t) CheckFunc )

Locate the next resource ID which does not map to an in-use table entry.

This begins searching from StartId which should be the most recently issued ID for the resource category. This will then search for the next ID which does *not* map to a table entry that is in use. That is, it does not alias any valid ID when converted to an array index.

returns an undefined ID value if no open slots are available

**Parameters**

in	<i>StartId</i>	the last issued ID for the resource category (app, lib, etc).
in	<i>TableSize</i>	the maximum size of the target table
in	<i>CheckFunc</i>	a function to check if the given ID is available

**Returns**

Next ID value which does not map to a valid entry

**Return values**

<b>CFE_RESOURCEID_UNDEFINED</b>	if no open slots or bad arguments.
---------------------------------	------------------------------------

**12.65.3.3 CFE\_ResourceId\_FromInteger()** static CFE\_ResourceId\_t CFE\_ResourceId\_FromInteger ( unsigned long Value ) [inline], [static]

Convert an integer to a resource ID.

This is the inverse of [CFE\\_ResourceId\\_ToInteger\(\)](#), and reconstitutes the original CFE\_ResourceId\_t value from the integer representation.

This may be used, for instance, where an ID value is parsed from a text file or message using C library APIs such as scanf() or strtoul().

See also

[CFE\\_ResourceId\\_ToInteger\(\)](#)

Parameters

in	<i>Value</i>	Integer value to convert
----	--------------	--------------------------

Returns

ID value corresponding to integer

Definition at line 121 of file cfe\_resourceid.h.

**12.65.3.4 CFE\_ResourceId\_GetBase()** uint32 CFE\_ResourceId\_GetBase ( CFE\_ResourceId\_t ResourceId )

Get the Base value (type/category) from a resource ID value.

This masks out the ID serial number to obtain the base value, which is different for each resource type.

Note

The value is NOT shifted or otherwise adjusted.

Parameters

in	<i>ResourceId</i>	the resource ID to decode
----	-------------------	---------------------------

Returns

The base value associated with that ID

**12.65.3.5 CFE\_ResourceId\_GetSerial()** uint32 CFE\_ResourceId\_GetSerial ( CFE\_ResourceId\_t ResourceId )

Get the Serial Number (sequential ID) from a resource ID value.

This masks out the ID base value to obtain the serial number, which is different for each entity created.

Parameters

in	<i>ResourceId</i>	the resource ID to decode
----	-------------------	---------------------------

**Returns**

The serial number associated with that ID

**12.65.3.6 CFE\_ResourceId\_IsDefined()** `static bool CFE_ResourceId_IsDefined ( CFE_ResourceId_t id ) [inline], [static]`

Check if a resource ID value is defined.

The constant `CFE_RESOURCEID_UNDEFINED` represents an undefined ID value, such that the expression:

```
CFE_ResourceId_IsDefined(CFE_RESOURCEID_UNDEFINED)
```

Always returns false.

**Parameters**

in	<i>id</i>	Resource ID to check
----	-----------	----------------------

**Returns**

True if the ID may refer to a defined entity, false if invalid/undefined.

Definition at line 151 of file `cfe_resourceid.h`.

References `CFE_ResourceId_Equal()`, and `CFE_RESOURCEID_UNDEFINED`.

Here is the call graph for this function:



**12.65.3.7 CFE\_ResourceId\_ToIndex()** `int32 CFE_ResourceId_ToIndex (`

```
    CFE_ResourceId_t Id,
    uint32 BaseValue,
    uint32 TableSize,
    uint32 * Idx )
```

Internal routine to aid in converting an ES resource ID to an array index.

**Parameters**

in	<i>Id</i>	The resource ID
in	<i>BaseValue</i>	The respective ID base value corresponding to the ID type
in	<i>TableSize</i>	The actual size of the internal table (MAX index value + 1)
out	<i>Idx</i>	The output index

**Returns**

Execution status, see [cFE Return Code Defines](#)

**Return values**

<a href="#">CFE_SUCCESS</a>	Successful execution.
<a href="#">CFE_ES_BAD_ARGUMENT</a>	Bad Argument.
<a href="#">CFE_ES_ERR_RESOURCEID_NOT_VALID</a>	Resource ID is not valid.

**12.65.3.8 CFE\_ResourceId\_ToInteger()** static unsigned long CFE\_ResourceId\_ToInteger ( CFE\_ResourceId\_t id ) [inline], [static]

Convert a resource ID to an integer.

This is primarily intended for logging purposes, such as writing to debug console, event messages, or log files, using printf-like APIs.

For compatibility with C library APIs, this returns an "unsigned long" type and should be used with the "%lx" format specifier in a printf format string.

**Note**

No assumptions should be made about the actual integer value, such as its base/range. It may be printed, but should not be modified or tested/compared using other arithmetic ops, and should never be used as the index to an array or table. See the related function [CFE\\_ResourceId\\_ToIndex\(\)](#) for cases where a zero-based array/table index is needed.

**See also**

[CFE\\_ResourceId\\_FromInteger\(\)](#)

**Parameters**

in	<i>id</i>	Resource ID to convert
----	-----------	------------------------

**Returns**

Integer value corresponding to ID

Definition at line 102 of file cfe\_resourceid.h.

## 12.66 cfe/modules/core\_api/fsw/inc/cfe\_resourceid\_api\_typedefs.h File Reference

#include "cfe\_resourceid\_typedef.h"

**Macros****Resource ID predefined values**

- #define [CFE\\_RESOURCEID\\_UNDEFINED](#) ((CFE\_ResourceId\_t)CFE\_RESOURCEID\_WRAP(0))  
*A resource ID value that represents an undefined/unused resource.*
- #define [CFE\\_RESOURCEID\\_RESERVED](#) ((CFE\_ResourceId\_t)CFE\_RESOURCEID\_WRAP(0xFFFFFFFF))  
*A resource ID value that represents a reserved entry.*

### 12.66.1 Detailed Description

Contains global prototypes and definitions related to resource management and related CFE resource IDs. A CFE ES Resource ID is a common way to identify CFE-managed resources such as apps, tasks, counters, memory pools, CDS blocks, and other entities. Simple operations are provided as inline functions, which should alleviate the need to do direct manipulation of resource IDs:

- Check for undefined ID value
- Check for equality of two ID values
- Convert ID to simple integer (typically for printing/logging)
- Convert simple integer to ID (inverse of above)

### 12.66.2 Macro Definition Documentation

**12.66.2.1 CFE\_RESOURCEID\_RESERVED** `#define CFE_RESOURCEID_RESERVED ((CFE_ResourceId_t)CFE_R←  
ESOURCEID_WRAP(0xFFFFFFFF))`

A resource ID value that represents a reserved entry.

This is not a valid value for any resource type, but is used to mark table entries that are not available for use. For instance, this may be used while setting up an entry initially.

Definition at line 74 of file `cfe_resourceid_api_typedefs.h`.

**12.66.2.2 CFE\_RESOURCEID\_UNDEFINED** `#define CFE_RESOURCEID_UNDEFINED ((CFE_ResourceId_t)CFE←  
_RESOURCEID_WRAP(0))`

A resource ID value that represents an undefined/unused resource.

This constant may be used to initialize local variables of the `CFE_Resourceld_t` type to a safe value that will not alias a valid ID.

By design, this value is also the result of zeroing a `CFE_Resourceld_t` type via standard functions like `memset()`, such that objects initialized using this method will also be set to safe values.

Definition at line 65 of file `cfe_resourceid_api_typedefs.h`.

## 12.67 cfe/modules/core\_api/fsw/inc/cfe\_sb.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
#include "cfe_sb_api_typedefs.h"
#include "cfe_es_api_typedefs.h"
```

### Macros

- `#define CFE_BIT(x) (1 << (x))`

*Places a one at bit positions 0 - 31.*
- `#define CFE_SET(i, x) ((i) |= CFE_BIT(x))`

*Sets bit x of i.*
- `#define CFE_CLR(i, x) ((i) &= ~CFE_BIT(x))`

*Clears bit x of i.*
- `#define CFE_TST(i, x) (((i)&CFE_BIT(x)) != 0)`

*true(non zero) if bit x of i is set*

## Functions

- `CFE_Status_t CFE_SB_CreatePipe (CFE_SB_Pipeld_t *PipeldPtr, uint16 Depth, const char *PipeName)`  
*Creates a new software bus pipe.*
- `CFE_Status_t CFE_SB_DeletePipe (CFE_SB_Pipeld_t Pipeld)`  
*Delete a software bus pipe.*
- `CFE_Status_t CFE_SB_Pipeld_ToIndex (CFE_SB_Pipeld_t PipeID, uint32 *Idx)`  
*Obtain an index value correlating to an SB Pipe ID.*
- `CFE_Status_t CFE_SB_SetPipeOpts (CFE_SB_Pipeld_t Pipeld, uint8 Opts)`  
*Set options on a pipe.*
- `CFE_Status_t CFE_SB_GetPipeOpts (CFE_SB_Pipeld_t Pipeld, uint8 *OptsPtr)`  
*Get options on a pipe.*
- `CFE_Status_t CFE_SB_GetPipeName (char *PipeNameBuf, size_t PipeNameSize, CFE_SB_Pipeld_t Pipeld)`  
*Get the pipe name for a given id.*
- `CFE_Status_t CFE_SB_GetPipeldByName (CFE_SB_Pipeld_t *PipeldPtr, const char *PipeName)`  
*Get pipe id by pipe name.*
- `CFE_Status_t CFE_SB_SubscribeEx (CFE_SB_MsgId_t MsgId, CFE_SB_Pipeld_t Pipeld, CFE_SB_Qos_t Quality, uint16 MsgLim)`  
*Subscribe to a message on the software bus.*
- `CFE_Status_t CFE_SB_Subscribe (CFE_SB_MsgId_t MsgId, CFE_SB_Pipeld_t Pipeld)`  
*Subscribe to a message on the software bus with default parameters.*
- `CFE_Status_t CFE_SB_SubscribeLocal (CFE_SB_MsgId_t MsgId, CFE_SB_Pipeld_t Pipeld, uint16 MsgLim)`  
*Subscribe to a message while keeping the request local to a cpu.*
- `CFE_Status_t CFE_SB_Unsubscribe (CFE_SB_MsgId_t MsgId, CFE_SB_Pipeld_t Pipeld)`  
*Remove a subscription to a message on the software bus.*
- `CFE_Status_t CFE_SB_UnsubscribeLocal (CFE_SB_MsgId_t MsgId, CFE_SB_Pipeld_t Pipeld)`  
*Remove a subscription to a message on the software bus on the current CPU.*
- `CFE_Status_t CFE_SB_TransmitMsg (const CFE_MSG_Message_t *MsgPtr, bool IsOrigination)`  
*Transmit a message.*
- `CFE_Status_t CFE_SB_ReceiveBuffer (CFE_SB_Buffer_t **BufPtr, CFE_SB_Pipeld_t Pipeld, int32 TimeOut)`  
*Receive a message from a software bus pipe.*
- `CFE_SB_Buffer_t * CFE_SB_AllocateMessageBuffer (size_t MsgSize)`  
*Get a buffer pointer to use for "zero copy" SB sends.*
- `CFE_Status_t CFE_SB_ReleaseMessageBuffer (CFE_SB_Buffer_t *BufPtr)`  
*Release an unused "zero copy" buffer pointer.*
- `CFE_Status_t CFE_SB_TransmitBuffer (CFE_SB_Buffer_t *BufPtr, bool IsOrigination)`  
*Transmit a buffer.*
- `void CFE_SB_SetUserDataLength (CFE_MSG_Message_t *MsgPtr, size_t DataLength)`  
*Sets the length of user data in a software bus message.*
- `void CFE_SB_TimeStampMsg (CFE_MSG_Message_t *MsgPtr)`  
*Sets the time field in a software bus message with the current spacecraft time.*
- `int32 CFE_SB_MessageStringSet (char *DestStringPtr, const char *SourceStringPtr, size_t DestMaxSize, size_t SourceMaxSize)`  
*Copies a string into a software bus message.*
- `void * CFE_SB_GetUserData (CFE_MSG_Message_t *MsgPtr)`  
*Get a pointer to the user data portion of a software bus message.*
- `size_t CFE_SB_GetUserDataLength (const CFE_MSG_Message_t *MsgPtr)`  
*Gets the length of user data in a software bus message.*

- `int32 CFE_SB_MessageStringGet (char *DestStringPtr, const char *SourceStringPtr, const char *DefaultString, size_t DestMaxSize, size_t SourceMaxSize)`  
*Copies a string out of a software bus message.*
- `bool CFE_SB_IsValidMsgId (CFE_SB_MsgId_t MsgId)`  
*Identifies whether a given `CFE_SB_MsgId_t` is valid.*
- `static bool CFE_SB_MsgId_Equal (CFE_SB_MsgId_t MsgId1, CFE_SB_MsgId_t MsgId2)`  
*Identifies whether two `CFE_SB_MsgId_t` values are equal.*
- `static CFE_SB_MsgId_Atom_t CFE_SB_MsgIdToValue (CFE_SB_MsgId_t MsgId)`  
*Converts a `CFE_SB_MsgId_t` to a normal integer.*
- `static CFE_SB_MsgId_t CFE_SB_ValueToMsgId (CFE_SB_MsgId_Atom_t MsgIdValue)`  
*Converts a normal integer into a `CFE_SB_MsgId_t`.*
- `CFE_SB_MsgId_Atom_t CFE_SB_CmdTopicIdToMsgId (uint16 TopicId, uint16 InstanceNum)`  
*Converts a topic ID and instance number combination into a MsgID value integer.*
- `CFE_SB_MsgId_Atom_t CFE_SB_TlmTopicIdToMsgId (uint16 TopicId, uint16 InstanceNum)`  
*Converts a topic ID and instance number combination into a MsgID value integer.*
- `CFE_SB_MsgId_Atom_t CFE_SB_GlobalCmdTopicIdToMsgId (uint16 TopicId)`  
*Converts a topic ID to a MsgID value integer for Global commands.*
- `CFE_SB_MsgId_Atom_t CFE_SB_GlobalTlmTopicIdToMsgId (uint16 TopicId)`  
*Converts a topic ID to a MsgID value integer for Global telemetry.*
- `CFE_SB_MsgId_Atom_t CFE_SB_LocalCmdTopicIdToMsgId (uint16 TopicId)`  
*Converts a topic ID to a MsgID value integer for local commands.*
- `CFE_SB_MsgId_Atom_t CFE_SB_LocalTlmTopicIdToMsgId (uint16 TopicId)`  
*Converts a topic ID to a MsgID value integer for local telemetry.*

### 12.67.1 Detailed Description

Purpose: This header file contains all definitions for the cFE Software Bus Application Programmer's Interface.  
Author: R.McGraw/SSI

### 12.67.2 Macro Definition Documentation

**12.67.2.1 CFE\_BIT** `#define CFE_BIT(`  
`x ) (1 << (x))`

Places a one at bit positions 0 - 31.

Definition at line 44 of file cfe\_sb.h.

**12.67.2.2 CFE\_CLR** `#define CFE_CLR(`  
`i,`  
`x ) ((i) &= ~CFE_BIT(x))`

Clears bit x of i.

Definition at line 46 of file cfe\_sb.h.

**12.67.2.3 CFE\_SET** `#define CFE_SET(`  
`i,`  
`x ) ((i) |= CFE_BIT(x))`

Sets bit x of i.

Definition at line 45 of file cfe\_sb.h.

```
12.67.2.4 CFE_TST #define CFE_TST(  
    i,  
    x ) (((i)&CFE_BIT(x)) != 0)
```

true(non zero) if bit x of i is set

Definition at line 47 of file cfe\_sb.h.

## 12.68 cfe/modules/core\_api/fsw/inc/cfe\_sb\_api\_typedefs.h File Reference

```
#include "common_types.h"  
#include "cfe_sb_extern_typedefs.h"  
#include "cfe_msg_api_typedefs.h"  
#include "cfe_resourceid_api_typedefs.h"  
#include "cfe_msg_hdr.h"
```

### Data Structures

- union [CFE\\_SB\\_Msg](#)  
*Software Bus generic message.*

### Macros

- #define [CFE\\_SB\\_POLL](#) 0  
*Option used with [CFE\\_SB\\_ReceiveBuffer](#) to request immediate pipe status.*
- #define [CFE\\_SB\\_PEND\\_FOREVER](#) -1  
*Option used with [CFE\\_SB\\_ReceiveBuffer](#) to force a wait for next message.*
- #define [CFE\\_SB\\_SUBSCRIPTION](#) 0  
*Subtype specifier used in [CFE\\_SB\\_SingleSubscriptionTlm\\_t](#) by SBN App.*
- #define [CFE\\_SB\\_UNSUBSCRIPTION](#) 1  
*Subtype specified used in [CFE\\_SB\\_SingleSubscriptionTlm\\_t](#) by SBN App.*
- #define [CFE\\_SB\\_MSGID\\_WRAP\\_VALUE](#)(val)  
*Translation macro to convert from MsgId integer values to opaque/abstract API values.*
- #define [CFE\\_SB\\_MSGID\\_C](#)(val) (([CFE\\_SB\\_MsgId\\_t](#))[CFE\\_SB\\_MSGID\\_WRAP\\_VALUE](#)(val))  
*Translation macro to convert to MsgId integer values from a literal.*
- #define [CFE\\_SB\\_MSGID\\_UNWRAP\\_VALUE](#)(mid) ((mid).Value)  
*Translation macro to convert to MsgId integer values from opaque/abstract API values.*
- #define [CFE\\_SB\\_MSGID\\_RESERVED](#) [CFE\\_SB\\_MSGID\\_WRAP\\_VALUE](#)(0)  
*Reserved value for [CFE\\_SB\\_MsgId\\_t](#) that will not match any valid MsgId.*
- #define [CFE\\_SB\\_INVALID\\_MSG\\_ID](#) [CFE\\_SB\\_MSGID\\_C](#)(0)  
*A literal of the [CFE\\_SB\\_MsgId\\_t](#) type representing an invalid ID.*
- #define [CFE\\_SB\\_PIPEID\\_C](#)(val) (([CFE\\_SB\\_Pipeld\\_t](#))[CFE\\_RESOURCEID\\_WRAP](#)(val))  
*Cast/Convert a generic [CFE\\_Resourceld\\_t](#) to a [CFE\\_SB\\_Pipeld\\_t](#).*
- #define [CFE\\_SB\\_INVALID\\_PIPE](#) [CFE\\_SB\\_PIPEID\\_C](#)([CFE\\_RESOURCEID\\_UNDEFINED](#))  
*A [CFE\\_SB\\_Pipeld\\_t](#) value which is always invalid.*
- #define [CFE\\_SB PIPEOPTS IGNOREMINE](#) 0x00000001  
*Messages sent by the app that owns this pipe will not be sent to this pipe.*
- #define [CFE\\_SB\\_DEFAULT\\_QOS](#) (([CFE\\_SB\\_Qos\\_t](#)) {0})  
*Default Qos macro.*

## Typedefs

- **typedef union CFE\_SB\_Msg CFE\_SB\_Buffer\_t**  
*Software Bus generic message.*

### 12.68.1 Detailed Description

Purpose: This header file contains all definitions for the cFE Software Bus Application Programmer's Interface.  
Author: R.McGraw/SSI

### 12.68.2 Macro Definition Documentation

#### 12.68.2.1 CFE\_SB\_DEFAULT\_QOS #define CFE\_SB\_DEFAULT\_QOS ((CFE\_SB\_Qos\_t) {0})

Default Qos macro.

Definition at line 135 of file cfe\_sb\_api\_typedefs.h.

#### 12.68.2.2 CFE\_SB\_INVALID\_MSG\_ID #define CFE\_SB\_INVALID\_MSG\_ID CFE\_SB\_MSGID\_C(0)

A literal of the [CFE\\_SB\\_MsgId\\_t](#) type representing an invalid ID.

This value should be used for runtime initialization of [CFE\\_SB\\_MsgId\\_t](#) values.

#### Note

This may be a compound literal in a future revision. Per C99, compound literals are lvalues, not rvalues, so this value should not be used in static/compile-time data initialization. For static data initialization purposes (rvalue), [CFE\\_SB\\_MSGID\\_RESERVED](#) should be used instead. However, in the current implementation, they are equivalent.

Definition at line 113 of file cfe\_sb\_api\_typedefs.h.

#### 12.68.2.3 CFE\_SB\_INVALID\_PIPE #define CFE\_SB\_INVALID\_PIPE CFE\_SB\_PIPEID\_C(CFE\_RESOURCEID\_UNDEFINED)

A CFE\_SB\_Pipeld\_t value which is always invalid.

This may be used as a safe initializer for CFE\_SB\_Pipeld\_t values

Definition at line 125 of file cfe\_sb\_api\_typedefs.h.

#### 12.68.2.4 CFE\_SB\_MSGID\_C #define CFE\_SB\_MSGID\_C(     val ) ((CFE\_SB\_MsgId\_t)CFE\_SB\_MSGID\_WRAP\_VALUE(val))

Translation macro to convert to MsgId integer values from a literal.

This ensures that the literal is interpreted as the [CFE\\_SB\\_MsgId\\_t](#) type, rather than the default type associated with that literal (e.g. int/unsigned int).

#### Note

Due to constraints in C99 this style of initializer can only be used at runtime, not for static/compile-time initializers.

#### See also

[CFE\\_SB\\_ValueToMsgId\(\)](#)

Definition at line 80 of file cfe\_sb\_api\_typedefs.h.

**12.68.2.5 CFE\_SB\_MSGID\_RESERVED** #define CFE\_SB\_MSGID\_RESERVED CFE\_SB\_MSGID\_WRAP\_VALUE(0)

Reserved value for [CFE\\_SB\\_MsgId\\_t](#) that will not match any valid MsgId.

This rvalue macro can be used for static/compile-time data initialization to ensure that the initialized value does not alias to a valid MsgId object.

Definition at line 100 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.6 CFE\_SB\_MSGID\_UNWRAP\_VALUE** #define CFE\_SB\_MSGID\_UNWRAP\_VALUE(  
    mid) ((mid).Value)

Translation macro to convert to MsgId integer values from opaque/abstract API values.

This conversion exists in macro form to allow compile-time evaluation for constants, and should not be used directly in application code.

For applications, use the [CFE\\_SB\\_MsgIdToValue\(\)](#) inline function instead.

See also

[CFE\\_SB\\_MsgIdToValue\(\)](#)

Definition at line 92 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.7 CFE\_SB\_MSGID\_WRAP\_VALUE** #define CFE\_SB\_MSGID\_WRAP\_VALUE(  
    val)

Value:

```
{           \
    val        \
}
```

Translation macro to convert from MsgId integer values to opaque/abstract API values.

This conversion exists in macro form to allow compile-time evaluation for constants, and should not be used directly in application code.

For applications, use the [CFE\\_SB\\_ValueToMsgId\(\)](#) inline function instead.

See also

[CFE\\_SB\\_ValueToMsgId\(\)](#)

Definition at line 64 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.8 CFE\_SB\_PEND\_FOREVER** #define CFE\_SB\_PEND\_FOREVER -1

Option used with [CFE\\_SB\\_ReceiveBuffer](#) to force a wait for next message.

Definition at line 46 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.9 CFE\_SB\_PIPEID\_C** #define CFE\_SB\_PIPEID\_C(  
    val) (([CFE\\_SB\\_PipeId\\_t](#))CFE\_RESOURCEID\_WRAP(val))

Cast/Convert a generic CFE\_Resourceld\_t to a CFE\_SB\_PipeId\_t.

Definition at line 118 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.10 CFE\_SB\_POLL** #define CFE\_SB\_POLL 0

Option used with [CFE\\_SB\\_ReceiveBuffer](#) to request immediate pipe status.

Definition at line 45 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.11 CFE\_SB\_SUBSCRIPTION** #define CFE\_SB\_SUBSCRIPTION 0  
 Subtype specifier used in [CFE\\_SB\\_SingleSubscriptionTlm\\_t](#) by SBN App.  
 Definition at line 47 of file [cfe\\_sb\\_api\\_typedefs.h](#).

**12.68.2.12 CFE\_SB\_UNSUBSCRIPTION** #define CFE\_SB\_UNSUBSCRIPTION 1  
 Subtype specified used in [CFE\\_SB\\_SingleSubscriptionTlm\\_t](#) by SBN App.  
 Definition at line 48 of file [cfe\\_sb\\_api\\_typedefs.h](#).

### 12.68.3 Typedef Documentation

**12.68.3.1 CFE\_SB\_Buffer\_t** typedef union [CFE\\_SB\\_Msg](#) CFE\_SB\_Buffer\_t  
 Software Bus generic message.

## 12.69 cfe/modules/core\_api/fsw/inc/cfe\_tbl.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
#include "cfe_tbl_api_typedefs.h"
#include "cfe_sb_api_typedefs.h"
```

### Functions

- [CFE\\_Status\\_t CFE\\_TBL\\_Register \(CFE\\_TBL\\_Handle\\_t \\*TblHandlePtr, const char \\*Name, size\\_t Size, uint16 TblOptionFlags, CFE\\_TBL\\_CallbackFuncPtr\\_t TblValidationFuncPtr\)](#)  
*Register a table with cFE to obtain Table Management Services.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Share \(CFE\\_TBL\\_Handle\\_t \\*TblHandlePtr, const char \\*TblName\)](#)  
*Obtain handle of table registered by another application.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Unregister \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Unregister a table.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Load \(CFE\\_TBL\\_Handle\\_t TblHandle, CFE\\_TBL\\_SrcEnum\\_t SrcType, const void \\*SrcDataPtr\)](#)  
*Load a specified table with data from specified source.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Update \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Update contents of a specified table, if an update is pending.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Validate \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Perform steps to validate the contents of a table image.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Manage \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Perform standard operations to maintain a table.*
- [CFE\\_Status\\_t CFE\\_TBL\\_DumpToBuffer \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Copies the contents of a Dump Only Table to a shared buffer.*
- [CFE\\_Status\\_t CFE\\_TBL\\_Modified \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Notify cFE Table Services that table contents have been modified by the Application.*
- [CFE\\_Status\\_t CFE\\_TBL\\_GetAddress \(void \\*\\*TblPtr, CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Obtain the current address of the contents of the specified table.*
- [CFE\\_Status\\_t CFE\\_TBL\\_ReleaseAddress \(CFE\\_TBL\\_Handle\\_t TblHandle\)](#)  
*Release previously obtained pointer to the contents of the specified table.*

- `CFE_Status_t CFE_TBL_GetAddresses` (`void **TblPtrs[], uint16 NumTables, const CFE_TBL_Handle_t TblHandles[]`)  
*Obtain the current addresses of an array of specified tables.*
- `CFE_Status_t CFE_TBL_ReleaseAddresses` (`uint16 NumTables, const CFE_TBL_Handle_t TblHandles[]`)  
*Release the addresses of an array of specified tables.*
- `CFE_Status_t CFE_TBL_GetStatus` (`CFE_TBL_Handle_t TblHandle`)  
*Obtain current status of pending actions for a table.*
- `CFE_Status_t CFE_TBL_GetInfo` (`CFE_TBL_Info_t *TblInfoPtr, const char *TblName`)  
*Obtain characteristics/information of/about a specified table.*
- `CFE_Status_t CFE_TBL_NotifyByMessage` (`CFE_TBL_Handle_t TblHandle, CFE_SB_MsgId_t MsgId, CFE_MSG_FcnCode_t CommandCode, uint32 Parameter`)  
*Instruct cFE Table Services to notify Application via message when table requires management.*

### 12.69.1 Detailed Description

Title: Table Services API Application Library Header File

Purpose: Unit specification for Table services library functions and macros.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

Notes:

## 12.70 cfe/modules/core\_api/fsw/inc/cfe\_tbl\_api\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_tbl_extern_typedefs.h"
#include "cfe_time_extern_typedefs.h"
```

### Data Structures

- struct `CFE_TBL_Info`

*Table Info.*

### Macros

- `#define CFE_TBL_OPT_BUFFER_MSK (0x0001)`  
*Table buffer mask.*
- `#define CFE_TBL_OPT_SNGL_BUFFER (0x0000)`  
*Single buffer table.*
- `#define CFE_TBL_OPT_DBL_BUFFER (0x0001)`  
*Double buffer table.*
- `#define CFE_TBL_OPT_LD_DMP_MSK (0x0002)`  
*Table load/dump mask.*
- `#define CFE_TBL_OPT_LOAD_DUMP (0x0000)`  
*Load/Dump table.*
- `#define CFE_TBL_OPT_DUMP_ONLY (0x0002)`  
*Dump only table.*
- `#define CFE_TBL_OPT_USR_DEF_MSK (0x0004)`  
*Table user defined mask.*
- `#define CFE_TBL_OPT_NOT_USR_DEF (0x0000)`

- `#define CFE_TBL_OPT_USR_DEF_ADDR (0x0006)`
  - Not user defined table.*
- `#define CFE_TBL_OPT_CRITICAL_MSK (0x0008)`
  - User Defined table.,*
- `#define CFE_TBL_OPT_NOT_CRITICAL (0x0000)`
  - Table critical mask.*
- `#define CFE_TBL_OPT_CRITICAL (0x0008)`
  - Not critical table.*
- `#define CFE_TBL_OPT_DEFAULT (CFE_TBL_OPT_SNGL_BUFFER | CFE_TBL_OPT_LOAD_DUMP)`
  - Default table options.*
- `#define CFE_TBL_MAX_FULL_NAME_LEN (CFE_MISSION_TBL_MAX_FULL_NAME_LEN)`
  - Table maximum full name length.*
- `#define CFE_TBL_BAD_TABLE_HANDLE (CFE_TBL_Handle_t)0xFFFF`
  - Bad table handle.*

## Typedefs

- `typedef int32(* CFE_TBL_CallbackFuncPtr_t) (void *TblPtr)`
  - Table Callback Function.*
- `typedef int16 CFE_TBL_Handle_t`
  - Table Handle primitive.*
- `typedef enum CFE_TBL_SrcEnum CFE_TBL_SrcEnum_t`
  - Table Source.*
- `typedef struct CFE_TBL_Info CFE_TBL_Info_t`
  - Table Info.*

## Enumerations

- `enum CFE_TBL_SrcEnum { CFE_TBL_SRC_FILE = 0, CFE_TBL_SRC_ADDRESS }`
  - Table Source.*

### 12.70.1 Detailed Description

Title: Table Services API Application Library Header File

Purpose: Unit specification for Table services library functions and macros.

Design Notes:

References: Flight Software Branch C Coding Standard Version 1.0a

Notes:

### 12.70.2 Macro Definition Documentation

**12.70.2.1 CFE\_TBL\_BAD\_TABLE\_HANDLE** `#define CFE_TBL_BAD_TABLE_HANDLE (CFE_TBL_Handle_t)0xFFFF`  
 Bad table handle.

Definition at line 79 of file cfe\_tbl\_api\_typedefs.h.

**12.70.2.2 CFE\_TBL\_MAX\_FULL\_NAME\_LEN** #define CFE\_TBL\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN)  
Table maximum full name length.

The full length of table names is defined at the mission scope. This is defined here to support applications that depend on [cfe\\_tbl.h](#) providing this value.

Definition at line 76 of file [cfe\\_tbl\\_api\\_typedefs.h](#).

### 12.70.3 Typedef Documentation

**12.70.3.1 CFE\_TBL\_CallbackFuncPtr\_t** typedef int32 (\* CFE\_TBL\_CallbackFuncPtr\_t) (void \*TblPtr)

Table Callback Function.

Definition at line 84 of file [cfe\\_tbl\\_api\\_typedefs.h](#).

**12.70.3.2 CFE\_TBL\_Handle\_t** typedef int16 CFE\_TBL\_Handle\_t

Table Handle primitive.

Definition at line 87 of file [cfe\\_tbl\\_api\\_typedefs.h](#).

**12.70.3.3 CFE\_TBL\_Info\_t** typedef struct CFE\_TBL\_Info CFE\_TBL\_Info\_t

Table Info.

**12.70.3.4 CFE\_TBL\_SrcEnum\_t** typedef enum CFE\_TBL\_SrcEnum CFE\_TBL\_SrcEnum\_t

Table Source.

### 12.70.4 Enumeration Type Documentation

**12.70.4.1 CFE\_TBL\_SrcEnum** enum CFE\_TBL\_SrcEnum

Table Source.

Enumerator

CFE_TBL_SRC_FILE	File source When this option is selected, the SrcDataPtr will be interpreted as a pointer to a null terminated character string. The string should specify the full path and filename of the file containing the initial data contents of the table.
CFE_TBL_SRC_ADDRESS	Address source When this option is selected, the SrcDataPtr will be interpreted as a pointer to a memory location that is the beginning of the initialization data for loading the table OR, in the case of a "user defined" dump only table, the address of the active table itself. The block of memory is assumed to be of the same size specified in the <a href="#">CFE_TBL_Register</a> function Size parameter.

Definition at line 90 of file [cfe\\_tbl\\_api\\_typedefs.h](#).

## 12.71 cfe/modules/core\_api/fsw/inc/cfe\_tbl\_filedef.h File Reference

```
#include "cfe_mission_cfg.h"
#include "common_types.h"
#include "cfe_tbl_extern_typedefs.h"
#include "cfe_fs_extern_typedefs.h"
```

## Data Structures

- struct [CFE\\_TBL\\_FileDef](#)

*Table File summary object.*

## Macros

- #define [CFE\\_TBL\\_FILEDEF](#)(ObjName, TblName, Desc, Filename) [CFE\\_TBL\\_FileDef\\_t](#) [CFE\\_TBL\\_FileDef](#) = {#ObjName "\0", #TblName "\0", #Desc "\0", #Filename "\0", sizeof(ObjName)};

*Macro to assist in with table definition object declaration.*

## Typedefs

- typedef struct [CFE\\_TBL\\_FileDef](#) [CFE\\_TBL\\_FileDef\\_t](#)

*Table File summary object.*

### 12.71.1 Detailed Description

Title: ELF2CFETBL Utility Header File for Table Images

Purpose: This header file provides a data structure definition and macro definition required in source code that is intended to be compiled into a cFE compatible Table Image file.

Design Notes:

Typically, a user would include this file in a ".c" file that contains nothing but a desired instantiation of values for a table image along with the macro defined below. After compilation, the resultant elf file can be processed using the 'elf2cfetbl' utility to generate a file that can be loaded onto a cFE flight system and successfully loaded into a table using the cFE Table Services.

References: Flight Software Branch C Coding Standard Version 1.0a

Notes:

### 12.71.2 Macro Definition Documentation

**12.71.2.1 CFE\_TBL\_FILEDEF** #define [CFE\\_TBL\\_FILEDEF](#) (  
    *ObjName*,  
    *TblName*,  
    *Desc*,  
    *Filenam*e ) [CFE\\_TBL\\_FileDef\\_t](#) [CFE\\_TBL\\_FileDef](#) = {#*ObjName* "\0", #*TblName* "\0", #*Desc* "\0", #*Filenam*e "\0", sizeof(*ObjName*) };

Macro to assist in with table definition object declaration.

See notes in the [CFE\\_TBL\\_FileDef\\_t](#) structure type about naming conventions and recommended practices for the various fields.

The [CFE\\_TBL\\_FILEDEF](#) macro can be used to simplify the declaration of a table image when using the `elf2cfetbl` utility. Note that the macro adds a NULL at the end to ensure that it is null-terminated. (C allows a struct to be statically initialized with a string exactly the length of the array, which loses the null terminator.) This means the actual length limit of the fields are the above LEN - 1.

An example of the source code and how this macro would be used is as follows:

```
#include "cfe_tbl_filedef.h"  
typedef struct MyTblStruct  
{  
    int     Int1;  
    int     Int2;  
    int     Int3;  
    char   Char1;  
} MyTblStruct_t;
```

```
MyTblStruct_t MyTblStruct = { 0x01020304, 0x05060708, 0x090A0B0C, 0x0D };
CFE_TBL_FILEDEF(MyTblStruct, MyApp.TableName, Table Utility Test Table, MyTblDefault.bin )
Definition at line 149 of file cfe_tbl_filedef.h.
```

### 12.71.3 Typedef Documentation

#### 12.71.3.1 CFE\_TBL\_FileDef\_t [typedef struct CFE\\_TBL\\_FileDef CFE\\_TBL\\_FileDef\\_t](#)

Table File summary object.

The definition of the file definition metadata that can be used by external tools (e.g. elf2cfetbl) to generate CFE table data files.

## 12.72 cfe/modules/core\_api/fsw/inc/cfe\_time.h File Reference

```
#include "common_types.h"
#include "cfe_error.h"
#include "cfe_time_api_typedefs.h"
#include "cfe_es_api_typedefs.h"
```

### Macros

- #define [CFE\\_TIME\\_Copy\(m, t\)](#)  
*Time Copy.*

### Functions

- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetTime \(void\)](#)  
*Get the current spacecraft time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetTAI \(void\)](#)  
*Get the current TAI (MET + SCTF) time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetUTC \(void\)](#)  
*Get the current UTC (MET + SCTF - Leap Seconds) time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetMET \(void\)](#)  
*Get the current value of the Mission Elapsed Time (MET).*
- [uint32 CFE\\_TIME\\_GetMETseconds \(void\)](#)  
*Get the current seconds count of the mission-elapsed time.*
- [uint32 CFE\\_TIME\\_GetMETsubsecs \(void\)](#)  
*Get the current sub-seconds count of the mission-elapsed time.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_GetSTCF \(void\)](#)  
*Get the current value of the spacecraft time correction factor (STCF).*
- [int16 CFE\\_TIME\\_GetLeapSeconds \(void\)](#)  
*Get the current value of the leap seconds counter.*
- [CFE\\_TIME\\_ClockState\\_Enum\\_t CFE\\_TIME\\_GetClockState \(void\)](#)  
*Get the current state of the spacecraft clock.*
- [uint16 CFE\\_TIME\\_GetClockInfo \(void\)](#)  
*Provides information about the spacecraft clock.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_Add \(CFE\\_TIME\\_SysTime\\_t Time1, CFE\\_TIME\\_SysTime\\_t Time2\)](#)  
*Adds two time values.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_Subtract \(CFE\\_TIME\\_SysTime\\_t Time1, CFE\\_TIME\\_SysTime\\_t Time2\)](#)  
*Subtracts one time value from another.*

- Subtracts two time values.*
- [CFE\\_TIME\\_Compare\\_t CFE\\_TIME\\_Compare \(CFE\\_TIME\\_SysTime\\_t TimeA, CFE\\_TIME\\_SysTime\\_t TimeB\)](#)  
*Compares two time values.*
- [CFE\\_TIME\\_SysTime\\_t CFE\\_TIME\\_MET2SCTime \(CFE\\_TIME\\_SysTime\\_t METTime\)](#)  
*Convert specified MET into Spacecraft Time.*
- [uint32 CFE\\_TIME\\_Sub2MicroSecs \(uint32 SubSeconds\)](#)  
*Converts a sub-seconds count to an equivalent number of microseconds.*
- [uint32 CFE\\_TIME\\_Micro2SubSecs \(uint32 MicroSeconds\)](#)  
*Converts a number of microseconds to an equivalent sub-seconds count.*
- [void CFE\\_TIME\\_ExternalTone \(void\)](#)  
*Provides the 1 Hz signal from an external source.*
- [void CFE\\_TIME\\_ExternalMET \(CFE\\_TIME\\_SysTime\\_t NewMET\)](#)  
*Provides the Mission Elapsed Time from an external source.*
- [void CFE\\_TIME\\_ExternalGPS \(CFE\\_TIME\\_SysTime\\_t NewTime, int16 NewLeaps\)](#)  
*Provide the time from an external source that has data common to GPS receivers.*
- [void CFE\\_TIME\\_ExternalTime \(CFE\\_TIME\\_SysTime\\_t NewTime\)](#)  
*Provide the time from an external source that measures time relative to a known epoch.*
- [CFE\\_Status\\_t CFE\\_TIME\\_RegisterSynchCallback \(CFE\\_TIME\\_SynchCallbackPtr\\_t CallbackFuncPtr\)](#)  
*Registers a callback function that is called whenever time synchronization occurs.*
- [CFE\\_Status\\_t CFE\\_TIME\\_UnregisterSynchCallback \(CFE\\_TIME\\_SynchCallbackPtr\\_t CallbackFuncPtr\)](#)  
*Unregisters a callback function that is called whenever time synchronization occurs.*
- [void CFE\\_TIME\\_Print \(char \\*PrintBuffer, CFE\\_TIME\\_SysTime\\_t TimeToPrint\)](#)  
*Print a time value as a string.*
- [void CFE\\_TIME\\_Local1HzISR \(void\)](#)  
*This function is called via a timer callback set up at initialization of the TIME service.*

### 12.72.1 Detailed Description

Purpose: cFE Time Services (TIME) library API header file

Author: S.Walling/Microtel

Notes:

### 12.72.2 Macro Definition Documentation

#### 12.72.2.1 CFE\_TIME\_Copy #define CFE\_TIME\_Copy (

```
    m,
    t )
```

**Value:**

```
{           \
    (m)->Seconds = (t)->Seconds; \
    (m)->Subseconds = (t)->Subseconds; \
}
```

Time Copy.

Macro to copy systime into another systime. Preferred to use this macro as it does not require the two arguments to be exactly the same type, it will work with any two structures that define "Seconds" and "Subseconds" members.  
Definition at line 48 of file cfe\_time.h.

## 12.73 cfe/modules/core\_api/fsw/inc/cfe\_time\_api\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_time_extern_typedefs.h"
```

### Macros

- `#define CFE_TIME_PRINTED_STRING_SIZE 24`

*Required size of buffer to be passed into [CFE\\_TIME\\_Print](#) (includes null terminator)*

### TypeDefs

- `typedef enum CFE_TIME_Compare CFE_TIME_Compare_t`  
*Enumerated types identifying the relative relationships of two times.*
- `typedef int32(* CFE_TIME_SynchCallbackPtr_t) (void)`  
*Time Synchronization Callback Function Ptr Type.*

### Enumerations

- `enum CFE_TIME_Compare { CFE_TIME_A_LT_B = -1, CFE_TIME_EQUAL = 0, CFE_TIME_A_GT_B = 1 }`  
*Enumerated types identifying the relative relationships of two times.*

#### 12.73.1 Detailed Description

Purpose: cFE Time Services (TIME) library API header file

Author: S.Walling/Microtel

Notes:

#### 12.73.2 Macro Definition Documentation

##### 12.73.2.1 CFE\_TIME\_PRINTED\_STRING\_SIZE `#define CFE_TIME_PRINTED_STRING_SIZE 24`

Required size of buffer to be passed into [CFE\\_TIME\\_Print](#) (includes null terminator)

Definition at line 44 of file `cfe_time_api_typedefs.h`.

#### 12.73.3 Typedef Documentation

##### 12.73.3.1 CFE\_TIME\_Compare\_t `typedef enum CFE_TIME_Compare CFE_TIME_Compare_t`

Enumerated types identifying the relative relationships of two times.

#### Description

Since time fields contain numbers that are relative to an epoch time, then it is possible for a time value to be "negative". This can lead to some confusion about what relationship exists between two time values. To resolve this confusion, the cFE provides the API [CFE\\_TIME\\_Compare](#) which returns these enumerated values.

**12.73.3.2 CFE\_TIME\_SynchCallbackPtr\_t** `typedef int32 (* CFE_TIME_SynchCallbackPtr_t) (void)`  
 Time Synchronization Callback Function Ptr Type.

#### Description

Applications that wish to get direct notification of the receipt of the cFE Time Synchronization signal (typically a 1 Hz signal), must register a callback function with the following prototype via the [CFE\\_TIME\\_RegisterSynchCallback](#) API.

Definition at line 75 of file `cfe_time_api_typedefs.h`.

### 12.73.4 Enumeration Type Documentation

**12.73.4.1 CFE\_TIME\_Compare** `enum CFE_TIME_Compare`  
 Enumerated types identifying the relative relationships of two times.

#### Description

Since time fields contain numbers that are relative to an epoch time, then it is possible for a time value to be "negative". This can lead to some confusion about what relationship exists between two time values. To resolve this confusion, the cFE provides the API [CFE\\_TIME\\_Compare](#) which returns these enumerated values.

#### Enumerator

<code>CFE_TIME_A_LT_B</code>	The first specified time is considered to be before the second specified time.
<code>CFE_TIME_EQUAL</code>	The two specified times are considered to be equal.
<code>CFE_TIME_A_GT_B</code>	The first specified time is considered to be after the second specified time.

Definition at line 60 of file `cfe_time_api_typedefs.h`.

## 12.74 cfe/modules/core\_api/fsw/inc/cfe\_version.h File Reference

### Macros

- `#define CFE_BUILD_NUMBER 120`

*Development: Number of development git commits since CFE\_BUILD\_BASELINE.*
- `#define CFE_BUILD_BASELINE "equuleus-rc1"`

*Development: Reference git tag for build number.*
- `#define CFE_BUILD_DEV_CYCLE "equuleus-rc2"`

*Development: Release name for current development cycle.*
- `#define CFE_BUILD_CODENAME "Equuleus"`

*: Development: Code name for the current build*
- `#define CFE_MAJOR_VERSION 6`

*Major version number.*
- `#define CFE_MINOR_VERSION 7`

*Minor version number.*
- `#define CFE_REVISION 0`

*Revision version number. Value of 0 indicates a development version.*

- `#define CFE_LAST_OFFICIAL "v6.7.0"`  
*Last official release.*
- `#define CFE_MISSION_REV 0xFF`  
*Mission revision.*
- `#define CFE_STR_HELPER(x) #x`  
*Convert argument to string.*
- `#define CFE_STR(x) CFE_STR_HELPER(x)`  
*Expand macro before conversion.*
- `#define CFE_SRC_VERSION CFE_BUILD_BASELINE "+dev" CFE_STR(CFE_BUILD_NUMBER)`  
*Short Build Version String.*
- `#define CFE_CFG_MAX_VERSION_STR_LEN 256`  
*Max Version String length.*

#### 12.74.1 Detailed Description

Provide version identifiers for the cFE core. See [Version Numbers](#) for further details.

#### 12.74.2 Macro Definition Documentation

##### 12.74.2.1 CFE\_BUILD\_BASELINE `#define CFE_BUILD_BASELINE "equuleus-rc1"`

: Development: Reference git tag for build number.

Definition at line 30 of file `cfe_version.h`.

##### 12.74.2.2 CFE\_BUILD\_CODENAME `#define CFE_BUILD_CODENAME "Equuleus"`

: Development: Code name for the current build

Definition at line 32 of file `cfe_version.h`.

##### 12.74.2.3 CFE\_BUILD\_DEV\_CYCLE `#define CFE_BUILD_DEV_CYCLE "equuleus-rc2"`

: Development: Release name for current development cycle.

Definition at line 31 of file `cfe_version.h`.

##### 12.74.2.4 CFE\_BUILD\_NUMBER `#define CFE_BUILD_NUMBER 120`

: Development: Number of development git commits since CFE\_BUILD\_BASELINE.

Definition at line 29 of file `cfe_version.h`.

##### 12.74.2.5 CFE\_CFG\_MAX\_VERSION\_STR\_LEN `#define CFE_CFG_MAX_VERSION_STR_LEN 256`

: Max Version String length.

: Maximum length that a cFE version string can be.

Definition at line 69 of file `cfe_version.h`.

##### 12.74.2.6 CFE\_LAST\_OFFICIAL `#define CFE_LAST_OFFICIAL "v6.7.0"`

: Last official release.

Definition at line 42 of file `cfe_version.h`.

**12.74.2.7 CFE\_MAJOR\_VERSION** #define CFE\_MAJOR\_VERSION 6

Major version number.

Definition at line 35 of file cfe\_version.h.

**12.74.2.8 CFE\_MINOR\_VERSION** #define CFE\_MINOR\_VERSION 7

Minor version number.

Definition at line 36 of file cfe\_version.h.

**12.74.2.9 CFE\_MISSION\_REV** #define CFE\_MISSION\_REV 0xFF

Mission revision.

Values 1-254 are reserved for mission use to denote patches/customizations as needed. NOTE: Reserving 0 and 0xFF for cFS open-source development use (pending resolution of nasa/cFS#440)

Definition at line 51 of file cfe\_version.h.

**12.74.2.10 CFE\_REVISION** #define CFE\_REVISION 0

Revision version number. Value of 0 indicates a development version.

Definition at line 37 of file cfe\_version.h.

**12.74.2.11 CFE\_SRC\_VERSION** #define CFE\_SRC\_VERSION CFE\_BUILD\_BASELINE "+dev" CFE\_STR(CFE\_BUILD\_NUMBER)

Short Build Version String.

Short string identifying the build, see [Version Numbers](#) for suggested format for development and official releases.

Definition at line 62 of file cfe\_version.h.

**12.74.2.12 CFE\_STR** #define CFE\_STR(  
    x ) CFE\_STR\_HELPER(x)

Expand macro before conversion.

Definition at line 54 of file cfe\_version.h.

**12.74.2.13 CFE\_STR\_HELPER** #define CFE\_STR\_HELPER(  
    x ) #x

Convert argument to string.

Definition at line 53 of file cfe\_version.h.

## 12.75 cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h File Reference

```
#include "common_types.h"  
#include "cfe_resourceid_typedef.h"  
#include "cfe_mission_cfg.h"
```

### Data Structures

- struct [CFE\\_ES\\_AppInfo](#)

*Application Information.*

- struct [CFE\\_ES\\_TaskInfo](#)

*Task Information.*

- struct [CFE\\_ES\\_CDSRegDumpRec](#)

*CDS Register Dump Record.*

- struct [CFE\\_ES\\_BlockStats](#)

*Block statistics.*

- struct [CFE\\_ES\\_MemPoolStats](#)

*Memory Pool Statistics.*

## Macros

- #define [CFE\\_ES\\_MEMOFFSET\\_C](#)(x) (([CFE\\_ES\\_MemOffset\\_t](#))(x))

*Memory Offset initializer wrapper.*

- #define [CFE\\_ES\\_MEMOFFSET\\_TO\\_SIZE\\_T](#)(x) (([size\\_t](#))(x))

*Memory Offset to integer value ([size\\_t](#)) wrapper.*

- #define [CFE\\_ES\\_MEMADDRESS\\_C](#)(x) (([CFE\\_ES\\_MemAddress\\_t](#))(([cpuaddr](#))(x)&0xFFFFFFFF))

*Memory Address initializer wrapper.*

- #define [CFE\\_ES\\_MEMADDRESS\\_TO\\_PTR](#)(x) (([void \\*](#))([cpuaddr](#))(x))

*Memory Address to pointer wrapper.*

## Typedefs

- [typedef uint8 CFE\\_ES\\_LogMode\\_Enum\\_t](#)

*Identifies handling of log messages after storage is filled.*

- [typedef uint8 CFE\\_ES\\_ExceptionAction\\_Enum\\_t](#)

*Identifies action to take if exception occurs.*

- [typedef uint8 CFE\\_ES\\_AppType\\_Enum\\_t](#)

*Identifies type of CFE application.*

- [typedef uint32 CFE\\_ES\\_RunStatus\\_Enum\\_t](#)

*Run Status and Exit Status identifiers.*

- [typedef uint32 CFE\\_ES\\_SystemState\\_Enum\\_t](#)

*The overall cFE System State.*

- [typedef uint8 CFE\\_ES\\_LogEntryType\\_Enum\\_t](#)

*Type of entry in the Error and Reset (ER) Log.*

- [typedef uint32 CFE\\_ES\\_AppState\\_Enum\\_t](#)

*Application Run State.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_AppId\\_t](#)

*A type for Application IDs.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_TaskId\\_t](#)

*A type for Task IDs.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_LibId\\_t](#)

*A type for Library IDs.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_CounterId\\_t](#)

*A type for Counter IDs.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_MemHandle\\_t](#)

*Memory Handle type.*

- [typedef CFE\\_RESOURCEID\\_BASE\\_TYPE CFE\\_ES\\_CDSHandle\\_t](#)

*CDS Handle type.*

- [typedef uint16 CFE\\_ES\\_TaskPriority\\_Atom\\_t](#)

*Type used for task priority in CFE ES as including the commands/telemetry messages.*

- **typedef uint32 CFE\_ES\_MemOffset\_t**  
*Type used for memory sizes and offsets in commands and telemetry.*
- **typedef uint32 CFE\_ES\_MemAddress\_t**  
*Type used for memory addresses in command and telemetry messages.*
- **typedef struct CFE\_ES\_AppInfo CFE\_ES\_AppInfo\_t**  
*Application Information.*
- **typedef struct CFE\_ES\_TaskInfo CFE\_ES\_TaskInfo\_t**  
*Task Information.*
- **typedef struct CFE\_ES\_CDSRegDumpRec CFE\_ES\_CDSRegDumpRec\_t**  
*CDS Register Dump Record.*
- **typedef struct CFE\_ES\_BlockStats CFE\_ES\_BlockStats\_t**  
*Block statistics.*
- **typedef struct CFE\_ES\_MemPoolStats CFE\_ES\_MemPoolStats\_t**  
*Memory Pool Statistics.*

## Enumerations

- **enum CFE\_ES\_LogMode { CFE\_ES\_LogMode\_OVERWRITE = 0, CFE\_ES\_LogMode\_DISCARD = 1 }**  
*Label definitions associated with CFE\_ES\_LogMode\_Enum\_t.*
- **enum CFE\_ES\_ExceptionAction { CFE\_ES\_ExceptionAction\_RESTART\_APP = 0, CFE\_ES\_ExceptionAction\_PROC\_RESTART = 1 }**  
*Label definitions associated with CFE\_ES\_ExceptionAction\_Enum\_t.*
- **enum CFE\_ES\_AppType { CFE\_ES\_AppType\_CORE = 1, CFE\_ES\_AppType\_EXTERNAL = 2, CFE\_ES\_AppType\_LIBRARY = 3 }**  
*Label definitions associated with CFE\_ES\_AppType\_Enum\_t.*
- **enum CFE\_ES\_RunStatus { CFE\_ES\_RunStatus\_UNDEFINED = 0, CFE\_ES\_RunStatus\_APP\_RUN = 1, CFE\_ES\_RunStatus\_APP\_EXIT = 2, CFE\_ES\_RunStatus\_APP\_ERROR = 3, CFE\_ES\_RunStatus\_SYS\_EXCEPTION = 4, CFE\_ES\_RunStatus\_SYS\_RESTART = 5, CFE\_ES\_RunStatus\_SYS\_RELOAD = 6, CFE\_ES\_RunStatus\_SYS\_DELETE = 7, CFE\_ES\_RunStatus\_CORE\_APP\_INIT\_ERROR = 8, CFE\_ES\_RunStatus\_CORE\_APP\_RUNTIME\_ERROR = 9, CFE\_ES\_RunStatus\_MAX }**  
*Label definitions associated with CFE\_ES\_RunStatus\_Enum\_t.*
- **enum CFE\_ES\_SystemState { CFE\_ES\_SystemState\_UNDEFINED = 0, CFE\_ES\_SystemState\_EARLY\_INIT = 1, CFE\_ES\_SystemState\_CORE\_STARTUP = 2, CFE\_ES\_SystemState\_CORE\_READY = 3, CFE\_ES\_SystemState\_APPS\_INIT = 4, CFE\_ES\_SystemState\_OPERATIONAL = 5, CFE\_ES\_SystemState\_SHUTDOWN = 6, CFE\_ES\_SystemState\_MAX }**  
*Label definitions associated with CFE\_ES\_SystemState\_Enum\_t.*
- **enum CFE\_ES\_LogEntryType { CFE\_ES\_LogEntryType\_CORE = 1, CFE\_ES\_LogEntryType\_APPLICATION = 2 }**  
*Label definitions associated with CFE\_ES\_LogEntryType\_Enum\_t.*
- **enum CFE\_ES\_AppState { CFE\_ES\_AppState\_UNDEFINED = 0, CFE\_ES\_AppState\_EARLY\_INIT = 1, CFE\_ES\_AppState\_LATE\_INIT = 2, CFE\_ES\_AppState\_RUNNING = 3, CFE\_ES\_AppState\_WAITING = 4, CFE\_ES\_AppState\_STOPPED = 5, CFE\_ES\_AppState\_MAX }**  
*Label definitions associated with CFE\_ES\_AppState\_Enum\_t.*

### 12.75.1 Detailed Description

Declarations and prototypes for cfe\_es\_extern\_typedefs module

## 12.75.2 Macro Definition Documentation

**12.75.2.1 CFE\_ES\_MEMADDRESS\_C** `#define CFE_ES_MEMADDRESS_C (`  
`x ) ((CFE_ES_MemAddress_t)((cpuaddr)(x)&0xFFFFFFFF))`

Memory Address initializer wrapper.

A converter macro to use when initializing a CFE\_ES\_MemAddress\_t from a pointer value of a different type.  
Definition at line 417 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.2.2 CFE\_ES\_MEMADDRESS\_TO\_PTR** `#define CFE_ES_MEMADDRESS_TO_PTR (`  
`x ) ((void *) (cpuaddr)(x))`

Memory Address to pointer wrapper.

A converter macro to use when interpreting a CFE\_ES\_MemAddress\_t as a pointer value.  
Definition at line 425 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.2.3 CFE\_ES\_MEMOFFSET\_C** `#define CFE_ES_MEMOFFSET_C (`  
`x ) ((CFE_ES_MemOffset_t)(x))`

Memory Offset initializer wrapper.

A converter macro to use when initializing a CFE\_ES\_MemOffset\_t from an integer value of a different type.  
Definition at line 380 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.2.4 CFE\_ES\_MEMOFFSET\_TO\_SIZE\_T** `#define CFE_ES_MEMOFFSET_TO_SIZE_T (`  
`x ) ((size_t)(x))`

Memory Offset to integer value (size\_t) wrapper.

A converter macro to use when interpreting a CFE\_ES\_MemOffset\_t value as a "size\_t" type  
Definition at line 388 of file default\_cfe\_es\_extern\_typedefs.h.

## 12.75.3 Typedef Documentation

**12.75.3.1 CFE\_ES\_AppId\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_AppId_t`

A type for Application IDs.

This is the type that is used for any API accepting or returning an App ID

Definition at line 312 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.2 CFE\_ES\_AppInfo\_t** `typedef struct CFE_ES_AppInfo CFE_ES_AppInfo_t`

Application Information.

Structure that is used to provide information about an app. It is primarily used for the QueryOne and QueryAll Commands.

While this structure is primarily intended for Application info, it can also represent Library information where only a subset of the information applies.

**12.75.3.3 CFE\_ES\_AppState\_Enum\_t** `typedef uint32 CFE_ES_AppState_Enum_t`

Application Run State.

The normal progression of APP states: UNDEFINED -> EARLY\_INIT -> LATE\_INIT -> RUNNING -> WAITING -> STOPPED

**Note**

These are defined in order so that relational comparisons e.g. if (STATEA < STATEB) are possible

**See also**

enum [CFE\\_ES\\_AppState](#)

Definition at line 305 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.4 CFE\_ES\_AppType\_Enum\_t** `typedef uint8 CFE_ES_AppType_Enum_t`

Identifies type of CFE application.

**See also**

enum [CFE\\_ES\\_AppType](#)

Definition at line 104 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.5 CFE\_ES\_BlockStats\_t** `typedef struct CFE_ES_BlockStats CFE_ES_BlockStats_t`

Block statistics.

Sub-Structure that is used to provide information about a specific block size/bucket within a memory pool.

**12.75.3.6 CFE\_ES\_CDSHandle\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_CDSHandle_t`

CDS Handle type.

Data type used to hold Handles of Critical Data Stores. See [CFE\\_ES\\_RegisterCDS](#)

Definition at line 348 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.7 CFE\_ES\_CDSRegDumpRec\_t** `typedef struct CFE_ES_CDSRegDumpRec CFE_ES_CDSRegDumpRec_t`

CDS Register Dump Record.

Structure that is used to provide information about a critical data store. It is primarily used for the Dump CDS registry ([CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#)) command.

**Note**

There is not currently a telemetry message directly containing this data structure, but it does define the format of the data file generated by the Dump CDS registry command. Therefore it should be considered part of the overall telemetry interface.

**12.75.3.8 CFE\_ES\_CounterId\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_CounterId_t`

A type for Counter IDs.

This is the type that is used for any API accepting or returning a Counter ID

Definition at line 333 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.9 CFE\_ES\_ExceptionAction\_Enum\_t** `typedef uint8 CFE_ES_ExceptionAction_Enum_t`

Identifies action to take if exception occurs.

**See also**

enum [CFE\\_ES\\_ExceptionAction](#)

Definition at line 76 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.10 CFE\_ES\_LibId\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_LibId_t`

A type for Library IDs.

This is the type that is used for any API accepting or returning a Lib ID

Definition at line 326 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.11 CFE\_ES\_LogEntryType\_Enum\_t** `typedef uint8 CFE_ES_LogEntryType_Enum_t`

Type of entry in the Error and Reset (ER) Log.

See also

enum [CFE\\_ES\\_LogEntryType](#)

Definition at line 252 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.12 CFE\_ES\_LogMode\_Enum\_t** `typedef uint8 CFE_ES_LogMode_Enum_t`

Identifies handling of log messages after storage is filled.

See also

enum [CFE\\_ES\\_LogMode](#)

Definition at line 53 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.13 CFE\_ES\_MemAddress\_t** `typedef uint32 CFE_ES_MemAddress_t`

Type used for memory addresses in command and telemetry messages.

For backward compatibility with existing CFE code this should be uint32, but if running on a 64-bit platform, addresses in telemetry will be truncated to 32 bits and therefore will not be valid.

On 64-bit platforms this can be a 64-bit address which will allow the full memory address in commands and telemetry, but this will break compatibility with existing control systems, and may also change the alignment/padding of messages. In either case this must be an unsigned type.

FSW code should access this value via the macros provided, which converts to the native "cpuaddr" type provided by OSAL. This macro provides independence between the message representation and local representation of a memory address.

Definition at line 409 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.14 CFE\_ES\_MemHandle\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_MemHandle_t`

Memory Handle type.

Data type used to hold Handles of Memory Pools created via CFE\_ES\_PoolCreate and CFE\_ES\_PoolCreateNoSem

Definition at line 341 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.15 CFE\_ES\_MemOffset\_t** `typedef uint32 CFE_ES_MemOffset_t`

Type used for memory sizes and offsets in commands and telemetry.

For backward compatibility with existing CFE code this should be uint32, but all telemetry information will be limited to 4GB in size as a result.

On 64-bit platforms this can be a 64-bit value which will allow larger memory objects, but this will break compatibility with existing control systems, and may also change the alignment/padding of messages.

In either case this must be an unsigned type.

Definition at line 372 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.16 CFE\_ES\_MemPoolStats\_t** `typedef struct CFE_ES_MemPoolStats CFE_ES_MemPoolStats_t`  
Memory Pool Statistics.

Structure that is used to provide information about a memory pool. Used by the Memory Pool Stats telemetry message.

See also

[CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#)

**12.75.3.17 CFE\_ES\_RunStatus\_Enum\_t** `typedef uint32 CFE_ES_RunStatus_Enum_t`  
Run Status and Exit Status identifiers.

See also

enum [CFE\\_ES\\_RunStatus](#)

Definition at line 172 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.18 CFE\_ES\_SystemState\_Enum\_t** `typedef uint32 CFE_ES_SystemState_Enum_t`  
The overall cFE System State.

These values are used with the [CFE\\_ES\\_WaitForSystemState](#) API call to synchronize application startup.

Note

These are defined in order so that relational comparisons e.g. if (STATEA < STATEB) are possible

See also

enum [CFE\\_ES\\_SystemState](#)

Definition at line 229 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.19 CFE\_ES\_TaskId\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_ES_TaskId_t`  
A type for Task IDs.

This is the type that is used for any API accepting or returning a Task ID

Definition at line 319 of file default\_cfe\_es\_extern\_typedefs.h.

**12.75.3.20 CFE\_ES\_TaskInfo\_t** `typedef struct CFE_ES_TaskInfo CFE_ES_TaskInfo_t`  
Task Information.

Structure that is used to provide information about a task. It is primarily used for the Query All Tasks ([CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#)) command.

Note

There is not currently a telemetry message directly containing this data structure, but it does define the format of the data file generated by the Query All Tasks command. Therefore it should be considered part of the overall telemetry interface.

**12.75.3.21 CFE\_ES\_TaskPriority\_Atom\_t** `typedef uint16 CFE_ES_TaskPriority_Atom_t`  
Type used for task priority in CFE ES as including the commands/telemetry messages.

Note

the valid range is only 0-255 (same as OSAL) but a wider type is used for backward compatibility in binary formats of messages.

Definition at line 358 of file default\_cfe\_es\_extern\_typedefs.h.

## 12.75.4 Enumeration Type Documentation

### 12.75.4.1 CFE\_ES\_AppState enum [CFE\\_ES\\_AppState](#)

Label definitions associated with CFE\_ES\_AppState\_Enum\_t.

#### Enumerator

CFE_ES_AppState_UNDEFINED	Initial state before app thread is started.
CFE_ES_AppState_EARLY_INIT	App thread has started, app performing early initialization of its own data.
CFE_ES_AppState_LATE_INIT	Early/Local initialization is complete. First sync point.
CFE_ES_AppState_RUNNING	All initialization is complete. Second sync point.
CFE_ES_AppState_WAITING	Application is waiting on a Restart/Reload/Delete request.
CFE_ES_AppState_STOPPED	Application is stopped.
CFE_ES_AppState_MAX	Reserved entry, marker for the maximum state.

Definition at line 257 of file default\_cfe\_es\_extern\_typedefs.h.

### 12.75.4.2 CFE\_ES\_AppType enum [CFE\\_ES\\_AppType](#)

Label definitions associated with CFE\_ES\_AppType\_Enum\_t.

#### Enumerator

CFE_ES_AppType_CORE	CFE core application.
CFE_ES_AppType_EXTERNAL	CFE external application.
CFE_ES_AppType_LIBRARY	CFE library.

Definition at line 81 of file default\_cfe\_es\_extern\_typedefs.h.

### 12.75.4.3 CFE\_ES\_ExceptionAction enum [CFE\\_ES\\_ExceptionAction](#)

Label definitions associated with CFE\_ES\_ExceptionAction\_Enum\_t.

#### Enumerator

CFE_ES_ExceptionAction_RESTART_APP	Restart application if exception occurs.
CFE_ES_ExceptionAction_PROC_RESTART	Restart processor if exception occurs.

Definition at line 58 of file default\_cfe\_es\_extern\_typedefs.h.

### 12.75.4.4 CFE\_ES\_LogEntryType enum [CFE\\_ES\\_LogEntryType](#)

Label definitions associated with CFE\_ES\_LogEntryType\_Enum\_t.

#### Enumerator

CFE_ES_LogEntryType_CORE	Log entry from a core subsystem.
CFE_ES_LogEntryType_APPLICATION	Log entry from an application.

Definition at line 234 of file default\_cfe\_es\_extern\_typedefs.h.

#### **12.75.4.5 CFE\_ES\_LogMode** enum [CFE\\_ES\\_LogMode](#)

Label definitions associated with CFE\_ES\_LogMode\_Enum\_t.

Enumerator

CFE_ES_LogMode_OVERWRITE	Overwrite Log Mode.
CFE_ES_LogMode_DISCARD	Discard Log Mode.

Definition at line 35 of file default\_cfe\_es\_extern\_typedefs.h.

#### **12.75.4.6 CFE\_ES\_RunStatus** enum [CFE\\_ES\\_RunStatus](#)

Label definitions associated with CFE\_ES\_RunStatus\_Enum\_t.

Enumerator

CFE_ES_RunStatus_UNDEFINED	Reserved value, should not be used.
CFE_ES_RunStatus_APP_RUN	Indicates that the Application should continue to run.
CFE_ES_RunStatus_APP_EXIT	Indicates that the Application wants to exit normally.
CFE_ES_RunStatus_APP_ERROR	Indicates that the Application is quitting with an error.
CFE_ES_RunStatus_SYS_EXCEPTION	The cFE App caused an exception.
CFE_ES_RunStatus_SYS_RESTART	The system is requesting a restart of the cFE App.
CFE_ES_RunStatus_SYS_RELOAD	The system is requesting a reload of the cFE App.
CFE_ES_RunStatus_SYS_DELETE	The system is requesting that the cFE App is stopped.
CFE_ES_RunStatus_CORE_APP_INIT_ERROR	Indicates that the Core Application could not Init.
CFE_ES_RunStatus_CORE_APP_RUNTIME_ERROR	Indicates that the Core Application had a runtime failure.
CFE_ES_RunStatus_MAX	Reserved value, marker for the maximum state.

Definition at line 109 of file default\_cfe\_es\_extern\_typedefs.h.

#### **12.75.4.7 CFE\_ES\_SystemState** enum [CFE\\_ES\\_SystemState](#)

Label definitions associated with CFE\_ES\_SystemState\_Enum\_t.

Enumerator

CFE_ES_SystemState_UNDEFINED	reserved
CFE_ES_SystemState_EARLY_INIT	single threaded mode while setting up CFE itself
CFE_ES_SystemState_CORE_STARTUP	core apps (CFE_ES_ObjectTable) are starting (multi-threaded)
CFE_ES_SystemState_CORE_READY	core is ready, starting other external apps/libraries (if any)
CFE_ES_SystemState_APPS_INIT	startup apps have all completed their early init, but not necessarily operational yet
CFE_ES_SystemState_OPERATIONAL	normal operation mode; all apps are RUNNING
CFE_ES_SystemState_SHUTDOWN	reserved for future use, all apps would be STOPPED
CFE_ES_SystemState_MAX	Reserved value, marker for the maximum state.

Definition at line 177 of file default\_cfe\_es\_extern\_typedefs.h.

## 12.76 cfe/modules/es/config/default\_cfe\_es\_fcncodes.h File Reference

### Macros

#### Executive Services Command Codes

- #define CFE\_ES\_NOOP\_CC 0
- #define CFE\_ES\_RESET\_COUNTERS\_CC 1
- #define CFE\_ES\_RESTART\_CC 2
- #define CFE\_ES\_START\_APP\_CC 4
- #define CFE\_ES\_STOP\_APP\_CC 5
- #define CFE\_ES\_RESTART\_APP\_CC 6
- #define CFE\_ES\_RELOAD\_APP\_CC 7
- #define CFE\_ES\_QUERY\_ONE\_CC 8
- #define CFE\_ES\_QUERY\_ALL\_CC 9
- #define CFE\_ES\_CLEAR\_SYS\_LOG\_CC 10
- #define CFE\_ES\_WRITE\_SYS\_LOG\_CC 11
- #define CFE\_ES\_CLEAR\_ER\_LOG\_CC 12
- #define CFE\_ES\_WRITE\_ER\_LOG\_CC 13
- #define CFE\_ES\_START\_PERF\_DATA\_CC 14
- #define CFE\_ES\_STOP\_PERF\_DATA\_CC 15
- #define CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC 16
- #define CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC 17
- #define CFE\_ES\_OVER\_WRITE\_SYS\_LOG\_CC 18
- #define CFE\_ES\_RESET\_PR\_COUNT\_CC 19
- #define CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC 20
- #define CFE\_ES\_DELETE\_CDS\_CC 21
- #define CFE\_ES\_SEND\_MEM\_POOL\_STATS\_CC 22
- #define CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC 23
- #define CFE\_ES\_QUERY\_ALL\_TASKS\_CC 24

#### 12.76.1 Detailed Description

Specification for the CFE Executive Services (CFE\_ES) command function codes

##### Note

This file should be strictly limited to the command/function code (CC) macro definitions. Other definitions such as enums, typedefs, or other macros should be placed in the msgdefs.h or msg.h files.

#### 12.76.2 Macro Definition Documentation

##### 12.76.2.1 CFE\_ES\_CLEAR\_ER\_LOG\_CC #define CFE\_ES\_CLEAR\_ER\_LOG\_CC 12

**Name** Clears the contents of the Exception and Reset Log

##### Description

This command causes the contents of the Executive Services Exception and Reset Log to be cleared.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ClearERLog

**Command Structure**

[CFE\\_ES\\_ClearERLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- The [CFE\\_ES\\_ERLOG1\\_INF\\_EID](#) informational event message will be generated.
- **\$sc\_\$cpu\_ES\_ERLOGINDEX** - Index into Exception Reset Log goes to zero

**Error Conditions**

There are no error conditions for this command. If the Executive Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

**Criticality**

This command is not dangerous. However, any previously logged data will be lost.

**See also**

[CFE\\_ES\\_CLEAR\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#)

Definition at line 540 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.2 CFE\_ES\_CLEAR\_SYS\_LOG\_CC #define CFE\_ES\_CLEAR\_SYS\_LOG\_CC 10**

**Name** Clear Executive Services System Log

**Description**

This command clears the contents of the Executive Services System Log.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ClearSysLog

**Command Structure**

[CFE\\_ES\\_ClearSysLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- The [CFE\\_ES\\_SYSLOG1\\_INF\\_EID](#) informational event message will be generated.
- **\$sc\_\$cpu\_ES\_SYSLOGBYTEUSED** - System Log Bytes Used will go to zero
- **\$sc\_\$cpu\_ES\_SYSLOGENTRIES** - Number of System Log Entries will go to zero

**Error Conditions**

There are no error conditions for this command. If the Executive Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

### Criticality

This command is not dangerous. However, any previously logged data will be lost.

### See also

[CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_CLEAR\\_ER\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#), [CFE\\_ES\\_OVER\\_WRITE\\_SYS\\_LOG\\_CC](#)

Definition at line 463 of file default\_cfe\_es\_fcncodes.h.

### 12.76.2.3 CFE\_ES\_DELETE\_CDS\_CC #define CFE\_ES\_DELETE\_CDS\_CC 21

#### Name Delete Critical Data Store

##### Description

This command allows the user to delete a Critical Data Store that was created by an Application that is now no longer executing.

##### Command Mnemonic(s) \$sc\_\$cpu\_ES\_DeleteCDS

##### Command Structure

[CFE\\_ES\\_DeleteCDSCmd\\_t](#)

##### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_CDS\\_DELETED\\_INFO\\_EID](#) informational event message will be generated.
- The specified CDS should no longer appear in a CDS Registry dump generated upon receipt of the [CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#) command

##### Error Conditions

This command may fail for the following reason(s):

- The specified CDS is the CDS portion of a Critical Table
- The specified CDS is not found in the CDS Registry
- The specified CDS is associated with an Application that is still active
- An error occurred while accessing the CDS memory (see the System Log for more details)

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

##### Criticality

This command is not critical because it is not possible to delete a CDS that is associated with an active application. However, deleting a CDS does eliminate any "history" that an application may be wishing to keep.

### See also

[CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#), [CFE\\_TBL\\_DELETE\\_CDS\\_CC](#)

Definition at line 909 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.4 CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC** #define CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC 23**Name** Dump Critical Data Store Registry to a File**Description**

This command allows the user to dump the Critical Data Store Registry to an onboard file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_WriteCDS2File**Command Structure**

[CFE\\_ES\\_DumpCDSRegistryCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_CDS\\_REG\\_DUMP\\_INF\\_EID](#) debug event message will be generated.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_CDS\\_REG\\_DUMP\\_FILE](#) configuration parameter) will be updated with the latest information.

**Error Conditions**

This command may fail for the following reason(s):

- The file name specified could not be parsed
- Error occurred while creating or writing to the dump file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

This command is not inherently dangerous. It will create a new file in the file system (or overwrite an existing one) and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

**See also**

[CFE\\_ES\\_DELETE\\_CDS\\_CC](#), [CFE\\_TBL\\_DELETE\\_CDS\\_CC](#)

Definition at line 990 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.5 CFE\_ES\_NOOP\_CC** #define CFE\_ES\_NOOP\_CC 0**Name** Executive Services No-Op**Description**

This command performs no other function than to increment the command execution counter. The command may be used to verify general aliveness of the Executive Services task.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_NOOP

**Command Structure**

[CFE\\_ES\\_NoopCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- The [CFE\\_ES\\_BUILD\\_INF\\_EID](#) informational event message will be generated
- The [CFE\\_ES\\_NOOP\\_INF\\_EID](#) informational event message will be generated

**Error Conditions**

This command may fail for the following reason(s):

- The command packet length is incorrect

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- the [CFE\\_ES\\_LEN\\_ERR\\_EID](#) error event message will be generated

**Criticality**

None

**See also**

Definition at line 73 of file default\_cfe\_es\_fncodes.h.

**12.76.2.6 CFE\_ES\_OVER\_WRITE\_SYS\_LOG\_CC #define CFE\_ES\_OVER\_WRITE\_SYS\_LOG\_CC 18**

**Name** Set Executive Services System Log Mode to Discard/Overwrite

**Description**

This command allows the user to configure the Executive Services to either discard new System Log messages when it is full or to overwrite the oldest messages.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_OverwriteSysLogMode

**Command Structure**

[CFE\\_ES\\_OverWriteSysLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_ES\_SYSLOGMODE** - Current System Log Mode should reflect the commanded value
- The [CFE\\_ES\\_SYSLOGMODE\\_EID](#) debug event message will be generated.

### Error Conditions

This command may fail for the following reason(s):

- The desired mode is neither [CFE\\_ES\\_LogMode\\_OVERWRITE](#) or [CFE\\_ES\\_LogMode\\_DISCARD](#)

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

### Criticality

None. (It should be noted that "Overwrite" mode would allow a message identifying the cause of a problem to be lost by a subsequent flood of additional messages).

### See also

[CFE\\_ES\\_CLEAR\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#)

Definition at line 792 of file default\_cfe\_es\_fcncodes.h.

#### 12.76.2.7 CFE\_ES\_QUERY\_ALL\_CC #define CFE\_ES\_QUERY\_ALL\_CC 9

**Name** Writes all Executive Services Information on all loaded modules to a File

### Description

This command takes the information kept by Executive Services on all of the registered applications and libraries and writes it to the specified file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_WriteAppInfo2File

### Command Structure

[CFE\\_ES\\_QueryAllCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_ALL\\_APPS\\_EID](#) debug event message will be generated.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_APP\\_LOG\\_FILE](#) configuration parameter) will be updated with the latest information.

### Error Conditions

This command may fail for the following reason(s):

- The specified FileName cannot be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

### Criticality

This command is not inherently dangerous. It will create a new file in the file system (or overwrite an existing one) and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

### See also

[CFE\\_ES\\_QUERY\\_ONE\\_CC](#), [CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#)

Definition at line 428 of file default\_cfe\_es\_fcncodes.h.

## 12.76.2.8 CFE\_ES\_QUERY\_ALL\_TASKS\_CC #define CFE\_ES\_QUERY\_ALL\_TASKS\_CC 24

**Name** Writes a list of All Executive Services Tasks to a File

### Description

This command takes the information kept by Executive Services on all of the registered tasks and writes it to the specified file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_WriteTaskInfo2File

### Command Structure

[CFE\\_ES\\_QueryAllTasksCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- The [CFE\\_ES\\_TASKINFO\\_EID](#) debug event message will be generated.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_TASK\\_LOG\\_FILE](#) configuration parameter) will be updated with the latest information.

### Error Conditions

This command may fail for the following reason(s):

- The file name specified could not be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases

### Criticality

This command is not inherently dangerous. It will create a new file in the file system (or overwrite an existing one) and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

### See also

[CFE\\_ES\\_QUERY\\_ALL\\_CC](#), [CFE\\_ES\\_QUERY\\_ONE\\_CC](#)

Definition at line 1032 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.9 CFE\_ES\_QUERY\_ONE\_CC #define CFE\_ES\_QUERY\_ONE\_CC 8****Name** Request Executive Services Information on a specified module**Description**

This command takes the information kept by Executive Services on the specified application or library and telemeters it to the ground.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_QueryApp**Command Structure**[CFE\\_ES\\_QueryOneCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_ONE\\_APP\\_EID](#) debug event message will be generated.
- Receipt of the [CFE\\_ES\\_OneAppTlm\\_t](#) telemetry packet

**Error Conditions**

This command may fail for the following reason(s):

- The specified name is not recognized as an active application or library

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

None

**See also**[CFE\\_ES\\_QUERY\\_ALL\\_CC](#), [CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#)

Definition at line 386 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.10 CFE\_ES\_RELOAD\_APP\_CC #define CFE\_ES\_RELOAD\_APP\_CC 7****Name** Stops, Unloads, Loads from the command specified File and Restarts an Application**Description**

This command halts and removes the specified Application from the system. Then it immediately loads the Application from the command specified file and restarts it. This command is especially useful for restarting a Command Ingest Application since once it has been stopped, no further commands can come in to restart it.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ReloadApp

**Command Structure**

[CFE\\_ES\\_ReloadAppCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_ES_CMDPC` - command execution counter will increment
- The `CFE_ES_RELOAD_APP_DBG_EID` debug event message will be generated. NOTE: This event message only identifies that the reload process has been initiated, not that it has completed.

**Error Conditions**

This command may fail for the following reason(s):

- The specified application filename string cannot be parsed
- The specified application name is not recognized as an active application
- The specified application is one of the cFE's Core applications (ES, EVS, SB, TBL, TIME)

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_ES_CMDEC` - command error counter will increment
- A command specific error event message is issued for all error cases
- Additional information on the reason for command failure may be found in the System Log

**Criticality**

This command is not inherently dangerous, however the restarting of certain applications (e.g. - Spacecraft Attitude and Control) may have a detrimental effect on the spacecraft.

**See also**

[CFE\\_ES\\_START\\_APP\\_CC](#), [CFE\\_ES\\_STOP\\_APP\\_CC](#), [CFE\\_ES\\_RESTART\\_APP\\_CC](#)

Definition at line 350 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.11 CFE\_ES\_RESET\_COUNTERS\_CC #define CFE\_ES\_RESET\_COUNTERS\_CC 1**

**Name** Executive Services Reset Counters

**Description**

This command resets the following counters within the Executive Services housekeeping telemetry:

- Command Execution Counter
- Command Error Counter

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ResetCtrs

**Command Structure**

[CFE\\_ES\\_ResetCountersCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_ES_CMDPC` - command execution counter and error counter will be reset to zero
- The `CFE_ES_RESET_INF_EID` informational event message will be generated

### Error Conditions

There are no error conditions for this command. If the Executive Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

### Criticality

This command is not inherently dangerous. However, it is possible for ground systems and on-board safing procedures to be designed such that they react to changes in the counter values that are reset by this command.

### See also

[CFE\\_ES\\_RESET\\_PR\\_COUNT\\_CC](#)

Definition at line 110 of file default\_cfe\_es\_fcncodes.h.

## 12.76.2.12 CFE\_ES\_RESET\_PR\_COUNT\_CC #define CFE\_ES\_RESET\_PR\_COUNT\_CC 19

**Name** Resets the Processor Reset Counter to Zero

### Description

This command allows the user to reset the Processor Reset Counter to zero. The Processor Reset Counter counts the number of Processor Resets that have occurred so as to identify when a Processor Reset should automatically be upgraded to a full Power-On Reset.

**Command Mnemonic(s)** `$sc_$cpu_ES_ResetPRCn`

### Command Structure

`CFE_ES_ResetPRCountCmd_t`

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_ES_CMDPC` - command execution counter will increment
- `$sc_$cpu_ES_ProcResetCnt` - Current number of processor resets will go to zero
- The `CFE_ES_RESET_PR_COUNT_EID` informational event message will be generated.

### Error Conditions

There are no error conditions for this command. If the Executive Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

### Criticality

This command is not critical. The only impact would be that the system would have to have more processor resets before an automatic power-on reset occurred.

### See also

[CFE\\_ES\\_SET\\_MAX\\_PR\\_COUNT\\_CC](#), [CFE\\_ES\\_RESET\\_COUNTERS\\_CC](#)

Definition at line 829 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.13 CFE\_ES\_RESTART\_APP\_CC** #define CFE\_ES\_RESTART\_APP\_CC 6

**Name** Stops, Unloads, Loads using the previous File name, and Restarts an Application

**Description**

This command halts and removes the specified Application from the system. Then it immediately loads the Application from the same filename last used to start. This command is especially useful for restarting a Command Ingest Application since once it has been stopped, no further commands can come in to restart it.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ResetApp

**Command Structure**

[CFE\\_ES\\_RestartAppCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_RESTART\\_APP\\_DBG\\_EID](#) debug event message will be generated. NOTE: This event message only identifies that the restart process has been initiated, not that it has completed.

**Error Conditions**

This command may fail for the following reason(s):

- The original file is missing
- The specified application name is not recognized as an active application
- The specified application is one of the cFE's Core applications (ES, EVS, SB, TBL, TIME)

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases
- Additional information on the reason for command failure may be found in the System Log

**Criticality**

This command is not inherently dangerous, however the restarting of certain applications (e.g. - Spacecraft Attitude and Control) may have a detrimental effect on the spacecraft.

**See also**

[CFE\\_ES\\_START\\_APP\\_CC](#), [CFE\\_ES\\_STOP\\_APP\\_CC](#), [CFE\\_ES\\_RELOAD\\_APP\\_CC](#)

Definition at line 304 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.14 CFE\_ES\_RESTART\_CC #define CFE\_ES\_RESTART\_CC 2****Name** Executive Services Processor / Power-On Reset**Description**

This command restarts the cFE in one of two modes. The Power-On Reset will cause the cFE to restart as though the power were first applied to the processor. The Processor Reset will attempt to retain the contents of the volatile disk and the contents of the Critical Data Store. NOTE: If a requested Processor Reset should cause the Processor Reset Counter (**\$sc\_\$cpu\_ES\_ProcResetCnt**) to exceed OR EQUAL the limit **CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS** (which is reported in housekeeping telemetry as **\$sc\_<-\$cpu\_ES\_MaxProcResets**), the command is **AUTOMATICALLY** upgraded to a Power-On Reset.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_ProcessorReset, \$sc\_\$cpu\_ES\_PowerOnReset**Command Structure****CFE\_ES\_RestartCmd\_t****Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_ProcResetCnt** - processor reset counter will increment (processor reset) or reset to zero (power-on reset)
  - **\$sc\_\$cpu\_ES\_ResetType** - processor reset type will be updated
  - **\$sc\_\$cpu\_ES\_ResetSubtype** - processor reset subtype will be updated
  - New entries in the Exception Reset Log and System Log can be found
- NOTE: Verification of a Power-On Reset is shown through the loss of data nominally retained through a Processor Reset
- NOTE: Since the reset of the processor resets the command execution counter (**\$sc\_\$cpu\_ES\_CMDPC**), this counter **CANNOT** be used to verify command execution.

**Error Conditions**

This command may fail for the following reason(s):

- The **Restart Type** was not a recognized value.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- the **CFE\_ES\_BOOT\_ERR\_EID** error event message will be generated

**Criticality**

This command is, by definition, dangerous. Significant loss of data will occur. All processes and the cFE itself will be stopped and restarted. With the Power-On reset option, all data on the volatile disk and the contents of the Critical Data Store will be lost.

**See also****CFE\_ES\_RESET\_PR\_COUNT\_CC, CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC**

Definition at line 162 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.15 CFE\_ES\_SEND\_MEM\_POOL\_STATS\_CC** #define CFE\_ES\_SEND\_MEM\_POOL\_STATS\_CC 22**Name** Telemeter Memory Pool Statistics**Description**

This command allows the user to obtain a snapshot of the statistics maintained for a specified memory pool.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_PoolStats**Command Structure**

[CFE\\_ES\\_SendMemPoolStatsCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_TLM\\_POOL\\_STATS\\_INFO\\_EID](#) debug event message will be generated.
- The [Memory Pool Statistics Telemetry Packet](#) is produced

**Error Conditions**

This command may fail for the following reason(s):

- The specified handle is not associated with a known memory pool

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

**An incorrect Memory Pool Handle value can cause a system crash.** Extreme care should be taken to ensure the memory handle value used in the command is correct.

**See also**

Definition at line 948 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.16 CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC** #define CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC 20**Name** Configure the Maximum Number of Processor Resets before a Power-On Reset**Description**

This command allows the user to specify the number of Processor Resets that are allowed before the next Processor Reset is upgraded to a Power-On Reset.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_SetMaxPRCntr

#### Command Structure

[CFE\\_ES\\_SetMaxPRCountCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_ES_CMDPC` - command execution counter will increment
- `$sc_$cpu_ES_MaxProcResets` - Current maximum number of processor resets before an automatic power-on reset will go to the command specified value.
- The [CFE\\_ES\\_SET\\_MAX\\_PR\\_COUNT\\_EID](#) informational event message will be generated.

#### Error Conditions

There are no error conditions for this command. If the Executive Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

#### Criticality

If the operator were to set the Maximum Processor Reset Count to too high a value, the processor would require an inordinate number of consecutive processor resets before an automatic power-on reset would occur. This could potentially leave the spacecraft without any control for a significant amount of time if a processor reset fails to clear a problem.

#### See also

[CFE\\_ES\\_RESET\\_PR\\_COUNT\\_CC](#)

Definition at line 867 of file default\_cfe\_es\_fcncodes.h.

### 12.76.2.17 CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC #define CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC 16

**Name** Set Performance Analyzer's Filter Masks

#### Description

This command sets the Performance Analyzer's Filter Masks.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_LAFilterMask

#### Command Structure

[CFE\\_ES\\_SetPerfFilterMaskCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_ES_CMDPC` - command execution counter will increment
- `$sc_$cpu_ES_PerfFltrMask[MaskCnt]` - the current performance filter mask value(s) should reflect the commanded value
- The [CFE\\_ES\\_PERF\\_FILTMSKCMD\\_EID](#) debug event message will be generated.

## Error Conditions

This command may fail for the following reason(s):

- The Filter Mask ID number is out of range

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases

## Criticality

Changing the filter masks may cause a small change in the Performance Analyzer's CPU utilization.

## See also

[CFE\\_ES\\_START\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_TRIGGER\\_MASK\\_CC](#)

Definition at line 715 of file default\_cfe\_es\_fcncodes.h.

### 12.76.2.18 CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC #define CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC 17

**Name** Set Performance Analyzer's Trigger Masks

## Description

This command sets the Performance Analyzer's Trigger Masks.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_LATriggerMask

## Command Structure

[CFE\\_ES\\_SetPerfTriggerMaskCmd\\_t](#)

## Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_ES\_PerfTrigMask[MaskCnt]** - the current performance trigger mask value(s) should reflect the commanded value
- The [CFE\\_ES\\_PERF\\_TRIGMSKCMD\\_EID](#) debug event message will be generated.

## Error Conditions

This command may fail for the following reason(s):

- The Trigger Mask ID number is out of range

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases

## Criticality

Changing the trigger masks may cause a small change in the Performance Analyzer's CPU utilization.

## See also

[CFE\\_ES\\_START\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_FILTER\\_MASK\\_CC](#)

Definition at line 752 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.19 CFE\_ES\_START\_APP\_CC** #define CFE\_ES\_START\_APP\_CC 4**Name** Load and Start an Application**Description**

This command starts the specified application with the specified start address, stack size, etc options.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_StartApp**Command Structure**[CFE\\_ES\\_StartAppCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_START\\_INF\\_EID](#) informational event message will be generated

**Error Conditions**

This command may fail for the following reason(s):

- The specified application filename string cannot be parsed
- The specified application entry point is an empty string
- The specified application name is an empty string
- The specified priority is greater than 255
- The specified exception action is neither [CFE\\_ES\\_ExceptionAction\\_RESTART\\_APP](#) (0) or [CFE\\_ES\\_ExceptionAction\\_PROC](#) (1)
- The Operating System was unable to load the specified application file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

This command is not inherently dangerous although system resources could be taxed beyond their limits with the starting of erroneous or invalid applications.

**See also**[CFE\\_ES\\_STOP\\_APP\\_CC](#), [CFE\\_ES\\_RESTART\\_APP\\_CC](#), [CFE\\_ES\\_RELOAD\\_APP\\_CC](#)

Definition at line 205 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.20 CFE\_ES\_START\_PERF\_DATA\_CC** #define CFE\_ES\_START\_PERF\_DATA\_CC 14

**Name** Start Performance Analyzer

**Description**

This command causes the Performance Analyzer to begin collecting data using the specified trigger mode.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_StartLAData

**Command Structure**

[CFE\\_ES\\_StartPerfDataCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_ES\\_PerfState](#) - Current performance analyzer state will change to either WAITING FOR TRIGGER or, if conditions are appropriate fast enough, TRIGGERED.
- [\\$sc\\_\\$cpu\\_ES\\_PerfMode](#) - Performance Analyzer Mode will change to the commanded trigger mode (TRIGGER START, TRIGGER CENTER, or TRIGGER END).
- [\\$sc\\_\\$cpu\\_ES\\_PerfTrigCnt](#) - Performance Trigger Count will go to zero
- [\\$sc\\_\\$cpu\\_ES\\_PerfDataStart](#) - Data Start Index will go to zero
- [\\$sc\\_\\$cpu\\_ES\\_PerfDataEnd](#) - Data End Index will go to zero
- [\\$sc\\_\\$cpu\\_ES\\_PerfDataCnt](#) - Performance Data Counter will go to zero
- The [CFE\\_ES\\_PERF\\_STARTCMD\\_EID](#) debug event message will be generated.

**Error Conditions**

This command may fail for the following reason(s):

- A previous [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#) command has not completely finished.
- An invalid trigger mode is requested.

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

This command is not inherently dangerous but may cause a small increase in CPU utilization as the performance analyzer data is collected.

**See also**

[CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_FILTER\\_MASK\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_TRIGGER\\_MASK\\_CC](#)

Definition at line 628 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.21 CFE\_ES\_STOP\_APP\_CC** #define CFE\_ES\_STOP\_APP\_CC 5**Name** Stop and Unload Application**Description**

This command halts and removes the specified Application from the system. **NOTE:** This command should never be used on the Command Ingest application. This would prevent further commands from entering the system. If Command Ingest needs to be stopped and restarted, use [CFE\\_ES\\_RESTART\\_APP\\_CC](#) or [CFE\\_ES\\_RELOAD\\_APP\\_CC](#).

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_StopApp**Command Structure**[CFE\\_ES\\_StopAppCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDPC** - command execution counter will increment
- The [CFE\\_ES\\_STOP\\_DBG\\_EID](#) debug event message will be generated. NOTE: This event message only identifies that the stop request has been initiated, not that it has completed.
- Once the stop has successfully completed, the list of Applications and Tasks created in response to the [\\$sc\\_\\$cpu\\_ES\\_WriteAppInfo2File](#), [\\$sc\\_\\$cpu\\_ES\\_WriteTaskInfo2File](#) should no longer contain the specified application.
- **\$sc\_\$cpu\_ES\_RegTasks** - number of tasks will decrease after tasks associated with app (main task and any child tasks) are stopped
- **\$sc\_\$cpu\_ES\_RegExtApps** - external application counter will decrement after app is cleaned up

**Error Conditions**

This command may fail for the following reason(s):

- The specified application name is not recognized as an active application
- The specified application is one of the cFE's Core applications (ES, EVS, SB, TBL, TIME)

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_ES\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases
- Additional information on the reason for command failure may be found in the System Log

**Criticality**

This command is not inherently dangerous, however the removal of certain applications (e.g. - Spacecraft Attitude and Control) may have a detrimental effect on the spacecraft.

**See also**[CFE\\_ES\\_START\\_APP\\_CC](#), [CFE\\_ES\\_RESTART\\_APP\\_CC](#), [CFE\\_ES\\_RELOAD\\_APP\\_CC](#)

Definition at line 258 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.22 CFE\_ES\_STOP\_PERF\_DATA\_CC** #define CFE\_ES\_STOP\_PERF\_DATA\_CC 15

**Name** Stop Performance Analyzer and write data file

**Description**

This command stops the Performance Analyzer from collecting any more data, and writes all previously collected performance data to a log file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_StopLAData

**Command Structure**

[CFE\\_ES\\_StopPerfDataCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_ES\\_PerfState](#) - Current performance analyzer state will change to IDLE.
- The [CFE\\_ES\\_PERF\\_STOPCMD\\_EID](#) debug event message will be generated to indicate that data collection has been stopped. NOTE: Performance log data is written to the file as a background job. This event indicates that the file write process is initiated, not that it has completed.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_PERF\\_DUMP\\_FILENAME](#) configuration parameter) will be updated with the latest information.

**Error Conditions**

This command may fail for the following reason(s):

- The file name specified could not be parsed
- Log data from a previous Stop Performance Analyzer command is still being written to a file.

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

NOTE: The performance analyzer data collection will still be stopped in the event of an error parsing the log file name or writing the log file.

**Criticality**

This command is not inherently dangerous. However, depending on configuration, performance data log files may be large in size and thus may fill the available storage.

**See also**

[CFE\\_ES\\_START\\_PERF\\_DATA\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_FILTER\\_MASK\\_CC](#), [CFE\\_ES\\_SET\\_PERF\\_TRIGGER\\_MASK\\_CC](#)

Definition at line 678 of file `default_cfe_es_fcncodes.h`.

**12.76.2.23 CFE\_ES\_WRITE\_ER\_LOG\_CC #define CFE\_ES\_WRITE\_ER\_LOG\_CC 13**

**Name** Writes Exception and Reset Log to a File

**Description**

This command causes the contents of the Executive Services Exception and Reset Log to be written to the specified file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_WriteERLog2File

**Command Structure**

[CFE\\_ES\\_WriteERLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_ERLOG2\\_EID](#) debug event message will be generated.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_ER\\_LOG\\_FILE](#) configuration parameter) will be updated with the latest information.

**Error Conditions**

This command may fail for the following reason(s):

- A previous request to write the ER log has not yet completed
- The specified FileName cannot be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

This command is not inherently dangerous. It will create a new file in the file system (or overwrite an existing one) and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

**See also**

[CFE\\_ES\\_CLEAR\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_CLEAR\\_ER\\_LOG\\_CC](#)

Definition at line 583 of file default\_cfe\_es\_fcncodes.h.

**12.76.2.24 CFE\_ES\_WRITE\_SYS\_LOG\_CC** #define CFE\_ES\_WRITE\_SYS\_LOG\_CC 11

**Name** Writes contents of Executive Services System Log to a File

**Description**

This command causes the contents of the Executive Services System Log to be written to a log file.

**Command Mnemonic(s)** \$sc\_\$cpu\_ES\_WriteSysLog2File

**Command Structure**

[CFE\\_ES\\_WriteSysLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_ES\\_SYSLOG2\\_EID](#) debug event message will be generated.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_ES\\_DEFAULT\\_SYSLOG\\_FILE](#) configuration parameter) will be updated with the latest information.

**Error Conditions**

This command may fail for the following reason(s):

- The specified FileName cannot be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_ES\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases

**Criticality**

This command is not inherently dangerous. It will create a new file in the file system (or overwrite an existing one) and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

**See also**

[CFE\\_ES\\_CLEAR\\_SYS\\_LOG\\_CC](#), [CFE\\_ES\\_CLEAR\\_ER\\_LOG\\_CC](#), [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#), [CFE\\_ES\\_OVER\\_WRITE\\_SYSLOG](#)

Definition at line 506 of file default\_cfe\_es\_fcncodes.h.

## 12.77 cfe/modules/es/config/default\_cfe\_es\_interface\_cfg.h File Reference

**Macros**

- #define CFE\_MISSION\_ES\_MAX\_APPLICATIONS 16
- #define CFE\_MISSION\_ES\_PERF\_MAX\_IDS 128
- #define CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS 17
- #define CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH 16
- #define CFE\_MISSION\_ES\_DEFAULT\_CRC CFE\_ES\_CrcType\_16\_ARC
- #define CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)

**Checksum/CRC algorithm identifiers**

- #define CFE\_MISSION\_ES\_CRC\_8 CFE\_ES\_CrcType\_CRC\_8
- #define CFE\_MISSION\_ES\_CRC\_16 CFE\_ES\_CrcType\_CRC\_16
- #define CFE\_MISSION\_ES\_CRC\_32 CFE\_ES\_CrcType\_CRC\_32

### 12.77.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.77.2 Macro Definition Documentation

**12.77.2.1 CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN** #define CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN (CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH + CFE\_MISSION\_MAX\_API\_LEN + 4)

**Purpose** Maximum Length of Full CDS Name in messages

#### Description:

Indicates the maximum length (in characters) of the entire CDS name of the following form: "ApplicationName.CDSName"

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

#### Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 143 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.2 CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH** #define CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH 16

**Purpose** Maximum Length of CDS Name

#### Description:

Indicates the maximum length (in characters) of the CDS name ('CDSName') portion of a Full CDS Name of the following form: "ApplicationName.CDSName"

This length does not need to include an extra character for NULL termination.

#### Limits

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 109 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.3 CFE\_MISSION\_ES\_CRC\_16** #define CFE\_MISSION\_ES\_CRC\_16 CFE\_ES\_CrcType\_CRC\_16

Definition at line 151 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.4 CFE\_MISSION\_ES\_CRC\_32** #define CFE\_MISSION\_ES\_CRC\_32 CFE\_ES\_CrcType\_CRC\_32  
Definition at line 152 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.5 CFE\_MISSION\_ES\_CRC\_8** #define CFE\_MISSION\_ES\_CRC\_8 CFE\_ES\_CrcType\_CRC\_8  
Definition at line 150 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.6 CFE\_MISSION\_ES\_DEFAULT\_CRC** #define CFE\_MISSION\_ES\_DEFAULT\_CRC CFE\_ES\_CrcType\_16\_ARC

**Purpose** Mission Default CRC algorithm

**Description:**

Indicates the which CRC algorithm should be used as the default for verifying the contents of Critical Data Stores and when calculating Table Image data integrity values.

**Limits**

Currently only CFE\_ES\_CrcType\_16\_ARC is supported (see brief in CFE\_ES\_CrcType\_Enum definition in [cfe\\_es\\_api\\_typedefs.h](#))

Definition at line 123 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.7 CFE\_MISSION\_ES\_MAX\_APPLICATIONS** #define CFE\_MISSION\_ES\_MAX\_APPLICATIONS 16

**Purpose** Mission Max Apps in a message

**Description:**

Indicates the maximum number of apps in a telemetry housekeeping message

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 49 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.8 CFE\_MISSION\_ES\_PERF\_MAX\_IDS** #define CFE\_MISSION\_ES\_PERF\_MAX\_IDS 128

**Purpose** Define Max Number of Performance IDs for messages

**Description:**

Defines the maximum number of perf ids allowed.

Each performance id is used to identify something that needs to be measured. Performance ids are limited to the range of 0 to [CFE\\_MISSION\\_ES\\_PERF\\_MAX\\_IDS](#) - 1. Any performance ids outside of this range will be ignored and will be flagged as an error.

This affects the layout of telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 71 of file default\_cfe\_es\_interface\_cfg.h.

**12.77.2.9 CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS #define CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS 17**

**Purpose** Maximum number of block sizes in pool structures

Description:

The upper limit for the number of block sizes supported in the generic pool implementation, which in turn implements the memory pools and CDS. This definition is used as the array size with the pool stats structure, and therefore should be consistent across all CPUs in a mission, as well as with the ground station.

There is also a platform-specific limit which may be fewer than this value.

Limits:

Must be at least one. No specific upper limit, but the number is anticipated to be reasonably small (i.e. tens, not hundreds). Large values have not been tested.

Definition at line 92 of file default\_cfe\_es\_interface\_cfg.h.

**12.78 cfe/modules/es/config/default\_cfe\_es\_internal\_cfg.h File Reference****Macros**

- #define CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY 68
- #define CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING "/cf"
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING "/ram"
- #define CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS 32
- #define CFE\_PLATFORM\_ES\_MAX\_LIBRARIES 10
- #define CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES 20
- #define CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE 256
- #define CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE 3072
- #define CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE 30
- #define CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS 8
- #define CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE 1000
- #define CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT 5
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE 512
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS 4096
- #define CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED 30
- #define CFE\_PLATFORM\_ES\_CDS\_SIZE (128 \* 1024)
- #define CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE (1024 \* 1024)
- #define CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN 4
- #define CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE "/cf/cfe\_es\_startup.scr"
- #define CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE "/ram/cfe\_es\_startup.scr"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE "/ram/cfe\_es\_app\_info.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE "/ram/cfe\_es\_taskinfo.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE "/ram/cfe\_es\_syslog.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE "/ram/cfe\_erlog.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME "/ram/cfe\_es\_perf.dat"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE "/ram/cfe\_cds\_reg.log"
- #define CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE 0
- #define CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE 1
- #define CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE 10000
- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE 0

- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE 0
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY 200
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE 4096
- #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY 20
- #define CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS 50
- #define CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE 8192
- #define CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES 512
- #define CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS 2
- #define CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS 17
- #define CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS 10
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01 8
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02 16
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03 32
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04 48
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05 64
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06 96
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07 128
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08 160
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09 256
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10 512
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11 1024
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12 2048
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13 4096
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14 8192
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15 16384
- #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16 32768
- #define CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE 80000
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01 8
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02 16
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03 32
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04 48
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05 64
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06 96
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07 128
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08 160
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09 256
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10 512
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11 1024
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12 2048
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13 4096
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14 8192
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15 16384
- #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16 32768
- #define CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE 80000
- #define CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC 50
- #define CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC 1000

### 12.78.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.78.2 Macro Definition Documentation

#### 12.78.2.1 CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT #define CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT 5

**Purpose** Define ES Application Kill Timeout

##### Description:

ES Application Kill Timeout. This parameter controls the number of "scan periods" that ES will wait for an application to Exit after getting the signal Delete, Reload or Restart. The sequence works as follows:

1. ES will set the control request for an App to Delete/Restart/Reload and set this kill timer to the value in this parameter.
2. If the App is responding and Calls it's RunLoop function, it will drop out of its main loop and call CFE\_ES->\_ExitApp. Once it calls Exit App, then ES can delete, restart, or reload the app the next time it scans the app table.
3. If the App is not responding, the ES App will decrement this Kill Timeout value each time it runs. If the timeout value reaches zero, ES will kill the app.

The Kill timeout value depends on the [CFE\\_PLATFORM\\_ES\\_APP\\_SCAN\\_RATE](#). If the Scan Rate is 1000, or 1 second, and this [CFE\\_PLATFORM\\_ES\\_APP\\_KILL\\_TIMEOUT](#) is set to 5, then it will take 5 seconds to kill a non-responding App. If the Scan Rate is 250, or 1/4 second, and the [CFE\\_PLATFORM\\_ES\\_APP\\_KILL\\_TIMEOUT](#) is set to 2, then it will take 1/2 second to time out.

##### Limits

There is a lower limit of 1 and an upper limit of 100 on this configuration parameter. Units are number of [CFE\\_PLATFORM\\_ES\\_APP\\_SCAN\\_RATE](#) cycles.

Definition at line 232 of file default\_cfe\_es\_internal\_cfg.h.

#### 12.78.2.2 CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE #define CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE 1000

**Purpose** Define ES Application Control Scan Rate

##### Description:

ES Application Control Scan Rate. This parameter controls the speed that ES scans the Application Table looking for App Delete/Restart/Reload requests. All Applications are deleted, restarted, or reloaded by the ES Application. ES will periodically scan for control requests to process. The scan rate is controlled by this parameter, which is given in milliseconds. A value of 1000 means that ES will scan the Application Table once per second. Be careful not to set the value of this too low, because ES will use more CPU cycles scanning the table.

**Limits**

There is a lower limit of 100 and an upper limit of 20000 on this configuration parameter. millisecond units.

Definition at line 203 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.3 CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE** #define CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SI←  
ZE 80000

Definition at line 774 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.4 CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES** #define CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRI←  
ES 512

**Purpose** Define Maximum Number of Registered CDS Blocks

**Description:**

Maximum number of registered CDS Blocks

**Limits**

There is a lower limit of 8. There are no restrictions on the upper limit however, the maximum number of CDS entries is system dependent and should be verified.

Definition at line 664 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.5 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SI←  
ZE\_01 8

**Purpose** Define ES Critical Data Store Memory Pool Block Sizes

**Description:**

Intermediate ES Critical Data Store Memory Pool Block Sizes

**Limits**

These sizes MUST be increasing and MUST be an integral multiple of 4.

Definition at line 758 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.6 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SI←  
ZE\_02 16

Definition at line 759 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.7 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SI←  
ZE\_03 32

Definition at line 760 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.8 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04 48

Definition at line 761 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.9 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05 64

Definition at line 762 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.10 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06 96

Definition at line 763 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.11 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07 128

Definition at line 764 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.12 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08 160

Definition at line 765 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.13 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09 256

Definition at line 766 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.14 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10 512

Definition at line 767 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.15 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11 1024

Definition at line 768 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.16 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12 2048

Definition at line 769 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.17 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13 4096

Definition at line 770 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.18 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14 8192

Definition at line 771 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.19 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15 16384

Definition at line 772 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.20 CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16 32768

Definition at line 773 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.21 CFE\_PLATFORM\_ES\_CDS\_SIZE** #define CFE\_PLATFORM\_ES\_CDS\_SIZE (128 \* 1024)

**Purpose** Define Critical Data Store Size

**Description:**

Defines the Critical Data Store (CDS) area size in bytes size. The CDS is one of four memory areas that are preserved during a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 8192 and an upper limit of `UINT_MAX` (4 Gigabytes) on this configuration parameter.

Definition at line 309 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.22 CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE** #define CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE "/ram/cfe\_es\_app\_info.log"

**Purpose** Default Application Information Filename

**Description:**

The value of this constant defines the filename used to store information pertaining to all of the Applications that are registered with Executive Services. This filename is used only when no filename is specified in the command to query all system apps.

**Limits**

The length of each string, including the NULL terminator cannot exceed the `OS_MAX_PATH_LEN` value.

Definition at line 391 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.23 CFE_PLATFORM_ES_DEFAULT_CDS_REG_DUMP_FILE #define CFE_PLATFORM_ES_DEFAULT_CD←  
S_REG_DUMP_FILE "/ram/cfe_cds_reg.log"
```

**Purpose** Default Critical Data Store Registry Filename

**Description:**

The value of this constant defines the filename used to store the Critical Data Store Registry. This filename is used only when no filename is specified in the command to stop performance data collecting.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 465 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.24 CFE_PLATFORM_ES_DEFAULT_ER_LOG_FILE #define CFE_PLATFORM_ES_DEFAULT_ER_LOG_FI←  
LE "/ram/cfe_erlog.log"
```

**Purpose** Default Exception and Reset (ER) Log Filename

**Description:**

The value of this constant defines the filename used to store the Exception and Reset (ER) Log. This filename is used only when no filename is specified in the command to dump the ER log. No file specified in the cmd means the first character in the cmd filename is a NULL terminator (zero).

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 437 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.25 CFE_PLATFORM_ES_DEFAULT_PERF_DUMP_FILENAME #define CFE_PLATFORM_ES_DEFAULT_←  
PERF_DUMP_FILENAME "/ram/cfe_es_perf.dat"
```

**Purpose** Default Performance Data Filename

**Description:**

The value of this constant defines the filename used to store the Performance Data. This filename is used only when no filename is specified in the command to stop performance data collecting.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 451 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.26 CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE** #define CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE 0

**Purpose** Define Default System Log Mode following Power On Reset

**Description:**

Defines the default mode for the operation of the ES System log following a power on reset. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest message in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. This constant may hold a value of either 0 or 1 depending on the desired default. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

There is a lower limit of 0 and an upper limit of 1 on this configuration parameter.

Definition at line 483 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.27 CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE** #define CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE 1

**Purpose** Define Default System Log Mode following Processor Reset

**Description:**

Defines the default mode for the operation of the ES System log following a processor reset. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest message in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. This constant may hold a value of either 0 or 1 depending on the desired default. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

There is a lower limit of 0 and an upper limit of 1 on this configuration parameter.

Definition at line 501 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.28 CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE** #define CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE 8192

**Purpose** Define Default Stack Size for an Application

**Description:**

This parameter defines a default stack size. This parameter is used by the cFE Core Applications.

**Limits**

There is a lower limit of 2048. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 651 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.29 CFE_PLATFORM_ES_DEFAULT_SYSLOG_FILE #define CFE_PLATFORM_ES_DEFAULT_SYSLOG_FI←  
LE "/ram/cfe_es_syslog.log"
```

**Purpose** Default System Log Filename

**Description:**

The value of this constant defines the filename used to store important information (as ASCII text strings) that might not be able to be sent in an Event Message. This filename is used only when no filename is specified in the command to dump the system log. No file specified in the cmd means the first character in the cmd filename is a NULL terminator (zero).

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 422 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.30 CFE_PLATFORM_ES_DEFAULT_TASK_LOG_FILE #define CFE_PLATFORM_ES_DEFAULT_TASK_LO←  
G_FILE "/ram/cfe_es_taskinfo.log"
```

**Purpose** Default Application Information Filename

**Description:**

The value of this constant defines the filename used to store information pertaining to all of the Applications that are registered with Executive Services. This filename is used only when no filename is specified in the the command to query all system tasks.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 406 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.31 CFE_PLATFORM_ES_ER_LOG_ENTRIES #define CFE_PLATFORM_ES_ER_LOG_ENTRIES 20
```

**Purpose** Define Max Number of ER (Exception and Reset) log entries

**Description:**

Defines the maximum number of ER (Exception and Reset) log entries

**Limits**

There is a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of log entries is system dependent and should be verified.

Definition at line 130 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.32 CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE** #define CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE 256

**Purpose** Maximum size of CPU Context in ES Error Log

**Description:**

This should be large enough to accommodate the CPU context information supplied by the PSP on the given platform.

**Limits:**

Must be greater than zero and a multiple of sizeof(uint32). Limited only by the available memory and the number of entries in the error log. Any context information beyond this size will be truncated.

Definition at line 144 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.33 CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS** #define CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS 32

**Purpose** Define Max Number of Applications

**Description:**

Defines the maximum number of applications that can be loaded into the system. This number does not include child tasks.

**Limits**

There is a lower limit of 6. The lower limit corresponds to the cFE internal applications. There are no restrictions on the upper limit however, the maximum number of applications is system dependent and should be verified. AppIDs that are checked against this configuration are defined by a 32 bit data word.

Definition at line 103 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.34 CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE** #define CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE 80000

Definition at line 747 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.35 CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS** #define CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS 8

**Purpose** Define Max Number of Generic Counters

**Description:**

Defines the maximum number of Generic Counters that can be registered.

**Limits**

This parameter has a lower limit of 1 and an upper limit of 65535.

Definition at line 184 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.36 CFE\_PLATFORM\_ES\_MAX\_LIBRARIES** #define CFE\_PLATFORM\_ES\_MAX\_LIBRARIES 10

**Purpose** Define Max Number of Shared libraries

**Description:**

Defines the maximum number of cFE Shared libraries that can be loaded into the system.

**Limits**

There is a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of libraries is system dependent and should be verified.

Definition at line 117 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.37 CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS** #define CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS 10

**Purpose** Maximum number of memory pools

**Description:**

The upper limit for the number of memory pools that can concurrently exist within the system.

The CFE\_SB and CFE\_TBL core subsystems each define a memory pool.  
Individual applications may also create memory pools, so this value should be set sufficiently high enough to support the applications being used on this platform.

**Limits:**

Must be at least 2 to support CFE core - SB and TBL pools. No specific upper limit.

Definition at line 712 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.38 CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS** #define CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS 2

**Purpose** Define Number of Processor Resets Before a Power On Reset

**Description:**

Number of Processor Resets before a Power On Reset is called. If set to 2, then 2 processor resets will occur, and the 3rd processor reset will be a power on reset instead.

**Limits**

There is a lower limit of 0. There are no restrictions on the upper limit however, the maximum number of processor resets may be system dependent and should be verified.

Definition at line 679 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.39 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01 8

**Purpose** Define Default ES Memory Pool Block Sizes

**Description:**

Default Intermediate ES Memory Pool Block Sizes. If an application is using the CFE\_ES Memory Pool APIs (CFE\_ES\_PoolCreate, CFE\_ES\_PoolCreateNoSem, CFE\_ES\_GetPoolBuf and CFE\_ES\_PutPoolBuf) but finds these sizes inappropriate for their use, they may wish to use the CFE\_ES\_PoolCreateEx API to specify their own intermediate block sizes

**Limits**

These sizes MUST be increasing and MUST be an integral multiple of 4. Also, CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE must be larger than CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE and both CFE\_PLATFORM\_TB\_MAX\_SNGL\_TABLE\_SIZE and CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE. Note that if Table Services have been removed from the CFE, the table size limits are still enforced although the table size definitions may be reduced.

Definition at line 731 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.40 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02 16  
Definition at line 732 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.41 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03 32  
Definition at line 733 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.42 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04 48  
Definition at line 734 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.43 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05 64  
Definition at line 735 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.44 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06 96  
Definition at line 736 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.45 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07 128  
Definition at line 737 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.46 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08 160  
Definition at line 738 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.47 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09 256  
Definition at line 739 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.48 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10 512  
Definition at line 740 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.49 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11 1024  
Definition at line 741 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.50 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12 2048  
Definition at line 742 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.51 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13 4096  
Definition at line 743 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.52 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14 8192  
Definition at line 744 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.53 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15 16384  
Definition at line 745 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.54 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16 32768  
Definition at line 746 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.55 CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN** #define CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN 4

#### Purpose

Define Memory Pool Alignment Size

##### Description:

Ensures that buffers obtained from a memory pool are aligned to a certain minimum block size. Note the allocator will always align to the minimum required by the CPU architecture. This may be set greater than the CPU requirement as desired for optimal performance.

For some architectures/applications it may be beneficial to set this to the cache line size of the target CPU, or to use special SIMD instructions that require a more stringent memory alignment.

##### Limits

This must always be a power of 2, as it is used as a binary address mask.

Definition at line 348 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.56 CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING** #define CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING "/cf"

**Purpose** Default virtual path for persistent storage

**Description:**

This configures the default location in the virtual file system for persistent/non-volatile storage. Files such as the startup script, app/library dynamic modules, and configuration tables are expected to be stored in this directory.

Definition at line 71 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.57 CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE** #define CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE "/cf/cfe\_es\_startup.scr"

**Purpose** ES Nonvolatile Startup Filename

**Description:**

The value of this constant defines the path and name of the file that contains a list of modules that will be loaded and started by the cFE after the cFE finishes its startup sequence.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 362 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.58 CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE** #define CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE 30

**Purpose** Define Number of entries in the ES Object table

**Description:**

Defines the number of entries in the ES Object table. This table controls the core cFE startup.

**Limits**

There is a lower limit of 15. There are no restrictions on the upper limit however, the maximum object table size is system dependent and should be verified.

Definition at line 173 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.59 CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY 20

**Purpose** Define Performance Analyzer Child Task Delay

**Description:**

This parameter defines the delay time (in milliseconds) between performance data file writes performed by the Executive Services Performance Analyzer Child Task.

**Limits**

It is recommended this parameter be greater than or equal to 20ms. This parameter is limited by the maximum value allowed by the data type. In this case, the data type is an unsigned 32-bit integer, so the valid range is 0 to 0xFFFFFFFF.

Definition at line 625 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.60 CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY 200

**Purpose** Define Performance Analyzer Child Task Priority

**Description:**

This parameter defines the priority of the child task spawned by the Executive Services to write performance data to a file. Lower numbers are higher priority, with 1 being the highest priority in the case of a child task.

**Limits**

Valid range for a child task is 1 to 255 however, the priority cannot be higher (lower number) than the ES parent application priority.

Definition at line 596 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.61 CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE** #define CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE 4096

**Purpose** Define Performance Analyzer Child Task Stack Size

**Description:**

This parameter defines the stack size of the child task spawned by the Executive Services to write performance data to a file.

**Limits**

It is recommended this parameter be greater than or equal to 4KB. This parameter is limited by the maximum value allowed by the data type. In this case, the data type is an unsigned 32-bit integer, so the valid range is 0 to 0xFFFFFFFF.

Definition at line 610 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.62 CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE** #define CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE 10000

**Purpose** Define Max Size of Performance Data Buffer

**Description:**

Defines the maximum size of the performance data buffer. Units are number of performance data entries. An entry is defined by a 32 bit data word followed by a 64 bit time stamp.

**Limits**

There is a lower limit of 1025. There are no restrictions on the upper limit however, the maximum buffer size is system dependent and should be verified. The units are number of entries. An entry is defined by a 32 bit data word followed by a 64 bit time stamp.

Definition at line 517 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.63 CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS** #define CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS 50

**Purpose** Define Performance Analyzer Child Task Number of Entries Between Delay

**Description:**

This parameter defines the number of performance analyzer entries the Performance Analyzer Child Task will write to the file between delays.

Definition at line 635 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.64 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL ~CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE

**Purpose** Define Filter Mask Setting for Enabling All Performance Entries

**Description:**

Defines the filter mask for enabling all performance entries. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 537 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.65 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL

**Purpose** Define Default Filter Mask Setting for Performance Data Buffer

**Description:**

Defines the default filter mask for the performance data buffer. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 548 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.66 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE** #define CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE 0

**Purpose** Define Filter Mask Setting for Disabling All Performance Entries

**Description:**

Defines the filter mask for disabling all performance entries. The value is a bit mask. For each bit, 0 means the corresponding entry is disabled and 1 means it is enabled.

Definition at line 527 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.67 CFE_PLATFORM_ES_PERF_TRIGMASK_ALL #define CFE_PLATFORM_ES_PERF_TRIGMASK_ALL~  
LL ~CFE_PLATFORM_ES_PERF_TRIGMASK_NONE
```

**Purpose** Define Filter Trigger Setting for Enabling All Performance Entries

**Description:**

Defines the trigger mask for enabling all performance data entries. The value is a bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 570 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.68 CFE_PLATFORM_ES_PERF_TRIGMASK_INIT #define CFE_PLATFORM_ES_PERF_TRIGMASK_INIT~  
IT CFE_PLATFORM_ES_PERF_TRIGMASK_NONE
```

**Purpose** Define Default Filter Trigger Setting for Performance Data Buffer

**Description:**

Defines the default trigger mask for the performance data buffer. The value is a 32-bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 581 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.69 CFE_PLATFORM_ES_PERF_TRIGMASK_NONE #define CFE_PLATFORM_ES_PERF_TRIGMASK_NONE~  
NE 0
```

**Purpose** Define Default Filter Trigger Setting for Disabling All Performance Entries

**Description:**

Defines the default trigger mask for disabling all performance data entries. The value is a bit mask. For each bit, 0 means the trigger for the corresponding entry is disabled and 1 means it is enabled.

Definition at line 559 of file default\_cfe\_es\_internal\_cfg.h.

```
12.78.2.70 CFE_PLATFORM_ES_POOL_MAX_BUCKETS #define CFE_PLATFORM_ES_POOL_MAX_BUCKETS 17
```

**Purpose** Maximum number of block sizes in pool structures

**Description:**

The upper limit for the number of block sizes supported in the generic pool implementation, which in turn implements the memory pools and CDS.

**Limits:**

Must be at least one. No specific upper limit, but the number is anticipated to be reasonably small (i.e. tens, not hundreds). Large values have not been tested.

The ES and CDS block size lists must correlate with this value

Definition at line 694 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.71 CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING "/ram"

**Purpose** Default virtual path for volatile storage

**Description:**

The **CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING** parameter is used to set the cFE mount path for the CFE RAM disk. This is a parameter for missions that do not want to use the default value of "/ram", or for missions that need to have a different value for different CPUs or Spacecraft. Note that the vxWorks OSAL cannot currently handle names that have more than one path separator in it. The names "/ram", "/ramdisk", "/disk123" will all work, but "/disks/ram" will not. Multiple separators can be used with the posix or RTEMS ports.

Definition at line 87 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.72 CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS 4096

**Purpose** ES Ram Disk Number of Sectors

**Description:**

Defines the ram disk number of sectors. The ram disk is one of four memory areas that are preserved on a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 128. There are no restrictions on the upper limit however, the maximum number of RAM sectors is system dependent and should be verified.

Definition at line 268 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.73 CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED 30

**Purpose** Percentage of Ram Disk Reserved for Decompressing Apps

**Description:**

The **CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED** parameter is used to make sure that the Volatile ( RAM ) Disk has a defined amount of free space during a processor reset. The cFE uses the Volatile disk to decompress cFE applications during system startup. If this Volatile disk happens to get filled with logs and misc files, then a processor reset may not work, because there will be no room to decompress cFE apps. To solve that problem, this parameter sets the "Low Water Mark" for disk space on a Processor reset. It should be set to allow the largest cFE Application to be decompressed. During a Processor reset, if there is not sufficient space left on the disk, it will be re-formatted in order to clear up some space.

This feature can be turned OFF by setting the parameter to 0.

**Limits**

There is a lower limit of 0 and an upper limit of 75 on this configuration parameter. Units are percentage. A setting of zero will turn this feature off.

Definition at line 292 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.74 CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE** #define CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE 512

**Purpose** ES Ram Disk Sector Size

**Description:**

Defines the ram disk sector size. The ram disk is 1 of 4 memory areas that are preserved on a processor reset.  
NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 128. There are no restrictions on the upper limit however, the maximum RAM disk sector size is system dependent and should be verified.

Definition at line 250 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.75 CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY 68

**Purpose** Define ES Task Priority

**Description:**

Defines the cFE\_ES Task priority.

**Limits**

Not Applicable

Definition at line 44 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.76 CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define ES Task Stack Size

**Description:**

Defines the cFE\_ES Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 59 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.77 CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC** #define CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC 1000

**Purpose** Startup script timeout

**Description:**

The upper limit for the total amount of time that all apps listed in the CFE ES startup script may take to all become ready.

Unlike the "core" app timeout, this is a soft limit; if the allotted time is exceeded, it probably indicates an issue with one of the apps, but does not cause CFE ES to take any additional action other than logging the event to the syslog.  
Units are in milliseconds

**Limits:**

Must be defined as an integer value that is greater than or equal to zero.

Definition at line 814 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.78 CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC** #define CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC 50

**Purpose** Poll timer for startup sync delay

**Description:**

During startup, some tasks may need to synchronize their own initialization with the initialization of other applications in the system.

CFE ES implements an API to accomplish this, that performs a task delay (sleep) while polling the overall system state until other tasks are ready.

This value controls the amount of time that the CFE\_ES\_ApplicationSyncDelay will sleep between each check of the system state. This should be large enough to allow other tasks to run, but not so large as to noticeably delay the startup completion.

Units are in milliseconds

**Limits:**

Must be defined as an integer value that is greater than or equal to zero.

Definition at line 796 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.79 CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE** #define CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE 3072

**Purpose** Define Size of the cFE System Log.

**Description:**

Defines the size in bytes of the cFE system log. The system log holds variable length strings that are terminated by a linefeed and null character.

**Limits**

There is a lower limit of 512. There are no restrictions on the upper limit however, the maximum system log size is system dependent and should be verified.

Definition at line 159 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.80 CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE** #define CFE\_PLATFORM\_ES\_USER\_RESERVED\_SI←  
ZE (1024 \* 1024)

**Purpose** Define User Reserved Memory Size

**Description:**

User Reserved Memory Size. This is the size in bytes of the cFE User reserved Memory area. This is a block of memory that is available for cFE application use. The address is obtained by calling [CFE\\_PSP\\_GetUserReservedArea](#). The User Reserved Memory is one of four memory areas that are preserved during a processor reset. NOTE: Changing this value changes memory allocation, and may require changes to platform specific values (in CFE\_PSP) such as USER\_RESERVED\_MEM in VxWorks depending on the memory areas being used for preserved data and on OS specific behavior.

**Limits**

There is a lower limit of 1024 and an upper limit of [UINT\\_MAX](#) (4 Gigabytes) on this configuration parameter.

Definition at line 329 of file default\_cfe\_es\_internal\_cfg.h.

**12.78.2.81 CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE** #define CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP←  
\_FILE "/ram/cfe\_es\_startup.scr"

**Purpose** ES Volatile Startup Filename

**Description:**

The value of this constant defines the path and name of the file that contains a list of modules that will be loaded and started by the cFE after the cFE finishes its startup sequence.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 376 of file default\_cfe\_es\_internal\_cfg.h.

## 12.79 cfe/modules/es/config/default\_cfe\_es\_mission\_cfg.h File Reference

```
#include "cfe_es_interface_cfg.h"
```

### 12.79.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.80 cfe/modules/es/config/default\_cfe\_es\_msg.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_es_fcncodes.h"
#include "cfe_es_msgdefs.h"
#include "cfe_es_msgstruct.h"
```

### 12.80.1 Detailed Description

Specification for the CFE Executive Services (CFE\_ES) command and telemetry message data types. This is a compatibility header for the "cfe\_es\_msg.h" file that has traditionally provided the message definitions for cFS apps.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.81 cfe/modules/es/config/default\_cfe\_es\_msgdefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_es_extern_typedefs.h"
#include "cfe_es_fcncodes.h"
```

### Data Structures

- struct [CFE\\_ES\\_RestartCmd\\_Payload](#)  
*Restart cFE Command Payload.*
- struct [CFE\\_ES\\_FileNameCmd\\_Payload](#)  
*Generic file name command payload.*
- struct [CFE\\_ES\\_OverWriteSysLogCmd\\_Payload](#)  
*Overwrite/Discard System Log Configuration Command Payload.*
- struct [CFE\\_ES\\_StartAppCmd\\_Payload](#)  
*Start Application Command Payload.*
- struct [CFE\\_ES\\_AppNameCmd\\_Payload](#)  
*Generic application name command payload.*
- struct [CFE\\_ES\\_AppReloadCmd\\_Payload](#)  
*Reload Application Command Payload.*
- struct [CFE\\_ES\\_SetMaxPRCountCmd\\_Payload](#)  
*Set Maximum Processor Reset Count Command Payload.*
- struct [CFE\\_ES\\_DeleteCDSCmd\\_Payload](#)  
*Delete Critical Data Store Command Payload.*
- struct [CFE\\_ES\\_StartPerfCmd\\_Payload](#)  
*Start Performance Analyzer Command Payload.*
- struct [CFE\\_ES\\_StopPerfCmd\\_Payload](#)  
*Stop Performance Analyzer Command Payload.*
- struct [CFE\\_ES\\_SetPerfFilterMaskCmd\\_Payload](#)  
*Set Performance Analyzer Filter Mask Command Payload.*
- struct [CFE\\_ES\\_SetPerfTrigMaskCmd\\_Payload](#)  
*Set Performance Analyzer Trigger Mask Command Payload.*
- struct [CFE\\_ES\\_SendMemPoolStatsCmd\\_Payload](#)  
*Send Memory Pool Statistics Command Payload.*
- struct [CFE\\_ES\\_DumpCDSRegistryCmd\\_Payload](#)  
*Dump CDS Registry Command Payload.*
- struct [CFE\\_ES\\_OneAppTlm\\_Payload](#)
- struct [CFE\\_ES\\_PoolStatsTlm\\_Payload](#)
- struct [CFE\\_ES\\_HousekeepingTlm\\_Payload](#)

## TypeDefs

- `typedef struct CFE_ES_RestartCmd_Payload CFE_ES_RestartCmd_Payload_t`  
*Restart cFE Command Payload.*
- `typedef struct CFE_ES_FileNameCmd_Payload CFE_ES_FileNameCmd_Payload_t`  
*Generic file name command payload.*
- `typedef struct CFE_ES_OverWriteSysLogCmd_Payload CFE_ES_OverWriteSysLogCmd_Payload_t`  
*Overwrite/Discard System Log Configuration Command Payload.*
- `typedef struct CFE_ES_StartAppCmd_Payload CFE_ES_StartAppCmd_Payload_t`  
*Start Application Command Payload.*
- `typedef struct CFE_ES_AppNameCmd_Payload CFE_ES_AppNameCmd_Payload_t`  
*Generic application name command payload.*
- `typedef struct CFE_ES_AppReloadCmd_Payload CFE_ES_AppReloadCmd_Payload_t`  
*Reload Application Command Payload.*
- `typedef struct CFE_ES_SetMaxPRCountCmd_Payload CFE_ES_SetMaxPRCountCmd_Payload_t`  
*Set Maximum Processor Reset Count Command Payload.*
- `typedef struct CFE_ES_DeleteCDSCmd_Payload CFE_ES_DeleteCDSCmd_Payload_t`  
*Delete Critical Data Store Command Payload.*
- `typedef uint32 CFE_ES_PerfMode_Enum_t`
- `typedef struct CFE_ES_StartPerfCmd_Payload CFE_ES_StartPerfCmd_Payload_t`  
*Start Performance Analyzer Command Payload.*
- `typedef struct CFE_ES_StopPerfCmd_Payload CFE_ES_StopPerfCmd_Payload_t`  
*Stop Performance Analyzer Command Payload.*
- `typedef struct CFE_ES_SetPerfFilterMaskCmd_Payload CFE_ES_SetPerfFilterMaskCmd_Payload_t`  
*Set Performance Analyzer Filter Mask Command Payload.*
- `typedef struct CFE_ES_SetPerfTrigMaskCmd_Payload CFE_ES_SetPerfTrigMaskCmd_Payload_t`  
*Set Performance Analyzer Trigger Mask Command Payload.*
- `typedef struct CFE_ES_SendMemPoolStatsCmd_Payload CFE_ES_SendMemPoolStatsCmd_Payload_t`  
*Send Memory Pool Statistics Command Payload.*
- `typedef struct CFE_ES_DumpCDSRegistryCmd_Payload CFE_ES_DumpCDSRegistryCmd_Payload_t`  
*Dump CDS Registry Command Payload.*
- `typedef struct CFE_ES_OneAppTlm_Payload CFE_ES_OneAppTlm_Payload_t`
- `typedef struct CFE_ES_PoolStatsTlm_Payload CFE_ES_PoolStatsTlm_Payload_t`
- `typedef struct CFE_ES_HousekeepingTlm_Payload CFE_ES_HousekeepingTlm_Payload_t`

## Enumerations

- `enum CFE_ES_PerfMode { CFE_ES_PerfTrigger_START = 0, CFE_ES_PerfTrigger_CENTER, CFE_ES_PerfTrigger_END }`

*Labels for values to use in `CFE_ES_StartPerfCmd_Payload.TriggerMode`.*

### 12.81.1 Detailed Description

Specification for the CFE Executive Services (CFE\_ES) command and telemetry message constant definitions. For CFE\_ES this is only the function/command code definitions

### 12.81.2 Typedef Documentation

**12.81.2.1 CFE\_ES\_AppNameCmd\_Payload\_t** `typedef struct CFE_ES_AppNameCmd_Payload CFE_ES_AppNameCmd_Payload_t`  
Generic application name command payload.

For command details, see [CFE\\_ES\\_STOP\\_APP\\_CC](#), [CFE\\_ES\\_RESTART\\_APP\\_CC](#), [CFE\\_ES\\_QUERY\\_ONE\\_CC](#)

**12.81.2.2 CFE\_ES\_AppReloadCmd\_Payload\_t** `typedef struct CFE_ES_AppReloadCmd_Payload CFE_ES_AppReloadCmd_Payload_t`  
Reload Application Command Payload.

For command details, see [CFE\\_ES\\_RELOAD\\_APP\\_CC](#)

**12.81.2.3 CFE\_ES\_DeleteCDSCmd\_Payload\_t** `typedef struct CFE_ES_DeleteCDSCmd_Payload CFE_ES_DeleteCDSCmd_Payload_t`  
Delete Critical Data Store Command Payload.

For command details, see [CFE\\_ES\\_DELETE\\_CDS\\_CC](#)

**12.81.2.4 CFE\_ES\_DumpCDSRegistryCmd\_Payload\_t** `typedef struct CFE_ES_DumpCDSRegistryCmd_Payload CFE_ES_DumpCDSRegistryCmd_Payload_t`  
Dump CDS Registry Command Payload.

For command details, see [CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#)

**12.81.2.5 CFE\_ES\_FileNameCmd\_Payload\_t** `typedef struct CFE_ES_FileNameCmd_Payload CFE_ES_FileNameCmd_Payload_t`  
Generic file name command payload.

This format is shared by several executive services commands. For command details, see [CFE\\_ES\\_QUERY\\_ALL\\_CC](#),  
[CFE\\_ES\\_QUERY\\_ALL\\_TASKS\\_CC](#), [CFE\\_ES\\_WRITE\\_SYS\\_LOG\\_CC](#), and [CFE\\_ES\\_WRITE\\_ER\\_LOG\\_CC](#)

**12.81.2.6 CFE\_ES\_HousekeepingTlm\_Payload\_t** `typedef struct CFE_ES_HousekeepingTlm_Payload CFE_ES_HousekeepingTlm_Payload_t`

**Name** Executive Services Housekeeping Packet

**12.81.2.7 CFE\_ES\_OneAppTlm\_Payload\_t** `typedef struct CFE_ES_OneAppTlm_Payload CFE_ES_OneAppTlm_Payload_t`

**Name** Single Application Information Packet

**12.81.2.8 CFE\_ES\_OverWriteSysLogCmd\_Payload\_t** `typedef struct CFE_ES_OverWriteSysLogCmd_Payload CFE_ES_OverWriteSysLogCmd_Payload_t`

Overwrite/Discard System Log Configuration Command Payload.

For command details, see [CFE\\_ES\\_OVER\\_WRITE\\_SYS\\_LOG\\_CC](#)

**12.81.2.9 CFE\_ES\_PerfMode\_Elem\_t** `typedef uint32 CFE_ES_PerfMode_Elem_t`

Definition at line 157 of file default\_cfe\_es\_msgdefs.h.

**12.81.2.10 CFE\_ES\_PoolStatsTlm\_Payload\_t** `typedef struct CFE_ES_PoolStatsTlm_Payload CFE_ES_PoolStatsTlm_Payload_t`

**Name** Memory Pool Statistics Packet

**12.81.2.11 CFE\_ES\_RestartCmd\_Payload\_t** `typedef struct CFE_ES_RestartCmd_Payload CFE_ES_RestartCmd_Payload_t`  
Restart cFE Command Payload.

For command details, see [CFE\\_ES\\_RESTART\\_CC](#)

**12.81.2.12 CFE\_ES\_SendMemPoolStatsCmd\_Payload\_t** `typedef struct CFE_ES_SendMemPoolStatsCmd_Payload CFE_ES_SendMemPoolStatsCmd_Payload_t`  
Send Memory Pool Statistics Command Payload.  
For command details, see [CFE\\_ES\\_SEND\\_MEM\\_POOL\\_STATS\\_CC](#)

**12.81.2.13 CFE\_ES\_SetMaxPRCountCmd\_Payload\_t** `typedef struct CFE_ES_SetMaxPRCountCmd_Payload CFE_ES_SetMaxPRCountCmd_Payload_t`  
Set Maximum Processor Reset Count Command Payload.  
For command details, see [CFE\\_ES\\_SET\\_MAX\\_PR\\_COUNT\\_CC](#)

**12.81.2.14 CFE\_ES\_SetPerfFilterMaskCmd\_Payload\_t** `typedef struct CFE_ES_SetPerfFilterMaskCmd_Payload CFE_ES_SetPerfFilterMaskCmd_Payload_t`  
Set Performance Analyzer Filter Mask Command Payload.  
For command details, see [CFE\\_ES\\_SET\\_PERF\\_FILTER\\_MASK\\_CC](#)

**12.81.2.15 CFE\_ES\_SetPerfTrigMaskCmd\_Payload\_t** `typedef struct CFE_ES_SetPerfTrigMaskCmd_Payload CFE_ES_SetPerfTrigMaskCmd_Payload_t`  
Set Performance Analyzer Trigger Mask Command Payload.  
For command details, see [CFE\\_ES\\_SET\\_PERF\\_TRIGGER\\_MASK\\_CC](#)

**12.81.2.16 CFE\_ES\_StartAppCmd\_Payload\_t** `typedef struct CFE_ES_StartAppCmd_Payload CFE_ES_StartAppCmd_Payload_t`  
Start Application Command Payload.  
For command details, see [CFE\\_ES\\_START\\_APP\\_CC](#)

**12.81.2.17 CFE\_ES\_StartPerfCmd\_Payload\_t** `typedef struct CFE_ES_StartPerfCmd_Payload CFE_ES_StartPerfCmd_Payload_t`  
Start Performance Analyzer Command Payload.  
For command details, see [CFE\\_ES\\_START\\_PERF\\_DATA\\_CC](#)

**12.81.2.18 CFE\_ES\_StopPerfCmd\_Payload\_t** `typedef struct CFE_ES_StopPerfCmd_Payload CFE_ES_StopPerfCmd_Payload_t`  
Stop Performance Analyzer Command Payload.  
For command details, see [CFE\\_ES\\_STOP\\_PERF\\_DATA\\_CC](#)

### 12.81.3 Enumeration Type Documentation

**12.81.3.1 CFE\_ES\_PerfMode** `enum CFE_ES_PerfMode`  
Labels for values to use in `CFE_ES_StartPerfCmd_Payload.TriggerMode`.

See also

[CFE\\_ES\\_StartPerfCmd\\_Payload](#)

Enumerator

<code>CFE_ES_PerfTrigger_START</code>	
<code>CFE_ES_PerfTrigger_CENTER</code>	
<code>CFE_ES_PerfTrigger_END</code>	

Definition at line 150 of file default\_cfe\_es\_msgdefs.h.

## 12.82 cfe/modules/es/config/default\_cfe\_es\_msgids.h File Reference

```
#include "cfe_core_api_base_msgids.h"
#include "cfe_es_topicids.h"
```

### Macros

- #define CFE\_ES\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_CMD\_TOPICID)  
/\* 0x1806 \*/
- #define CFE\_ES\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_SEND\_HK\_TOPICID)  
/\* 0x1808 \*/
- #define CFE\_ES\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_HK\_TLM\_TOPICID)  
/\* 0x0800 \*/
- #define CFE\_ES\_APP\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_APP\_TLM\_TOPICID)  
/\* 0x080B \*/
- #define CFE\_ES\_MEMSTATS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_MEMSTATS\_TLM\_TOPICID)  
/\* 0x0810 \*/

### 12.82.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Message IDs

### 12.82.2 Macro Definition Documentation

**12.82.2.1 CFE\_ES\_APP\_TLM\_MID** #define CFE\_ES\_APP\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_APP\_TLM\_TOPICID)  
/\* 0x080B \*/  
Definition at line 39 of file default\_cfe\_es\_msgids.h.

**12.82.2.2 CFE\_ES\_CMD\_MID** #define CFE\_ES\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_CMD\_TOPICID)  
/\* 0x1806 \*/  
Definition at line 32 of file default\_cfe\_es\_msgids.h.

**12.82.2.3 CFE\_ES\_HK\_TLM\_MID** #define CFE\_ES\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_HK\_TLM\_TOPICID)  
/\* 0x0800 \*/  
Definition at line 38 of file default\_cfe\_es\_msgids.h.

**12.82.2.4 CFE\_ES\_MEMSTATS\_TLM\_MID** #define CFE\_ES\_MEMSTATS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_MEMSTATS\_TLM\_TOPICID)  
/\* 0x0810 \*/  
Definition at line 40 of file default\_cfe\_es\_msgids.h.

**12.82.2.5 CFE\_ES\_SEND\_HK\_MID** #define CFE\_ES\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_ES\_SEND\_HK\_TOPICID)  
/\* 0x1808 \*/  
Definition at line 33 of file default\_cfe\_es\_msgids.h.

## 12.83 cfe/modules/es/config/default\_cfe\_es\_msgstruct.h File Reference

```
#include "cfe_es_msgdefs.h"
#include "cfe_msg_hdr.h"
#include "cfe_mission_cfg.h"
```

### Data Structures

- struct [CFE\\_ES\\_NoopCmd](#)
- struct [CFE\\_ES\\_ResetCountersCmd](#)
- struct [CFE\\_ES\\_ClearSysLogCmd](#)
- struct [CFE\\_ES\\_ClearERLogCmd](#)
- struct [CFE\\_ES\\_ResetPRCountCmd](#)
- struct [CFE\\_ES\\_SendHkCmd](#)
- struct [CFE\\_ES\\_RestartCmd](#)

*Restart cFE Command.*
- struct [CFE\\_ES\\_FileNameCmd](#)

*Generic file name command.*
- struct [CFE\\_ES\\_QueryAllCmd](#)
- struct [CFE\\_ES\\_QueryAllTasksCmd](#)
- struct [CFE\\_ES\\_WriteSysLogCmd](#)
- struct [CFE\\_ES\\_WriteERLogCmd](#)
- struct [CFE\\_ES\\_OverWriteSysLogCmd](#)

*Overwrite/Discard System Log Configuration Command Payload.*
- struct [CFE\\_ES\\_StartApp](#)

*Start Application Command.*
- struct [CFE\\_ES\\_StopAppCmd](#)
- struct [CFE\\_ES\\_RestartAppCmd](#)
- struct [CFE\\_ES\\_QueryOneCmd](#)
- struct [CFE\\_ES\\_ReloadAppCmd](#)

*Reload Application Command.*
- struct [CFE\\_ES\\_SetMaxPRCountCmd](#)

*Set Maximum Processor Reset Count Command.*
- struct [CFE\\_ES\\_DeleteCDSCmd](#)

*Delete Critical Data Store Command.*
- struct [CFE\\_ES\\_StartPerfDataCmd](#)

*Start Performance Analyzer Command.*
- struct [CFE\\_ES\\_StopPerfDataCmd](#)

*Stop Performance Analyzer Command.*
- struct [CFE\\_ES\\_SetPerfFilterMaskCmd](#)

*Set Performance Analyzer Filter Mask Command.*
- struct [CFE\\_ES\\_SetPerfTriggerMaskCmd](#)

*Set Performance Analyzer Trigger Mask Command.*
- struct [CFE\\_ES\\_SendMemPoolStatsCmd](#)

*Send Memory Pool Statistics Command.*
- struct [CFE\\_ES\\_DumpCDSRegistryCmd](#)

*Dump CDS Registry Command.*
- struct [CFE\\_ES\\_OneAppTlm](#)
- struct [CFE\\_ES\\_MemStatsTlm](#)
- struct [CFE\\_ES\\_HousekeepingTlm](#)

## Typedefs

- typedef struct [CFE\\_ES\\_NoopCmd](#) CFE\_ES\_NoopCmd\_t
  - typedef struct [CFE\\_ES\\_ResetCountersCmd](#) CFE\_ES\_ResetCountersCmd\_t
  - typedef struct [CFE\\_ES\\_ClearSysLogCmd](#) CFE\_ES\_ClearSysLogCmd\_t
  - typedef struct [CFE\\_ES\\_ClearERLogCmd](#) CFE\_ES\_ClearERLogCmd\_t
  - typedef struct [CFE\\_ES\\_ResetPRCountCmd](#) CFE\_ES\_ResetPRCountCmd\_t
  - typedef struct [CFE\\_ES\\_SendHkCmd](#) CFE\_ES\_SendHkCmd\_t
  - typedef struct [CFE\\_ES\\_RestartCmd](#) CFE\_ES\_RestartCmd\_t
    - Restart cFE Command.*
- typedef struct [CFE\\_ES\\_FileNameCmd](#) CFE\_ES\_FileNameCmd\_t
  - Generic file name command.*
- typedef struct [CFE\\_ES\\_QueryAllCmd](#) CFE\_ES\_QueryAllCmd\_t
  - typedef struct [CFE\\_ES\\_QueryAllTasksCmd](#) CFE\_ES\_QueryAllTasksCmd\_t
  - typedef struct [CFE\\_ES\\_WriteSysLogCmd](#) CFE\_ES\_WriteSysLogCmd\_t
  - typedef struct [CFE\\_ES\\_WriteERLogCmd](#) CFE\_ES\_WriteERLogCmd\_t
  - typedef struct [CFE\\_ES\\_OverWriteSysLogCmd](#) CFE\_ES\_OverWriteSysLogCmd\_t
    - Overwrite/Discard System Log Configuration Command Payload.*
- typedef struct [CFE\\_ES\\_StartApp](#) CFE\_ES\_StartAppCmd\_t
  - Start Application Command.*
- typedef struct [CFE\\_ES\\_StopAppCmd](#) CFE\_ES\_StopAppCmd\_t
  - typedef struct [CFE\\_ES\\_RestartAppCmd](#) CFE\_ES\_RestartAppCmd\_t
  - typedef struct [CFE\\_ES\\_QueryOneCmd](#) CFE\_ES\_QueryOneCmd\_t
  - typedef struct [CFE\\_ES\\_ReloadAppCmd](#) CFE\_ES\_ReloadAppCmd\_t
    - Reload Application Command.*
- typedef struct [CFE\\_ES\\_SetMaxPRCountCmd](#) CFE\_ES\_SetMaxPRCountCmd\_t
  - Set Maximum Processor Reset Count Command.*
- typedef struct [CFE\\_ES\\_DeleteCDSCmd](#) CFE\_ES\_DeleteCDSCmd\_t
  - Delete Critical Data Store Command.*
- typedef struct [CFE\\_ES\\_StartPerfDataCmd](#) CFE\_ES\_StartPerfDataCmd\_t
  - Start Performance Analyzer Command.*
- typedef struct [CFE\\_ES\\_StopPerfDataCmd](#) CFE\_ES\_StopPerfDataCmd\_t
  - Stop Performance Analyzer Command.*
- typedef struct [CFE\\_ES\\_SetPerfFilterMaskCmd](#) CFE\_ES\_SetPerfFilterMaskCmd\_t
  - Set Performance Analyzer Filter Mask Command.*
- typedef struct [CFE\\_ES\\_SetPerfTriggerMaskCmd](#) CFE\_ES\_SetPerfTriggerMaskCmd\_t
  - Set Performance Analyzer Trigger Mask Command.*
- typedef struct [CFE\\_ES\\_SendMemPoolStatsCmd](#) CFE\_ES\_SendMemPoolStatsCmd\_t
  - Send Memory Pool Statistics Command.*
- typedef struct [CFE\\_ES\\_DumpCDSRegistryCmd](#) CFE\_ES\_DumpCDSRegistryCmd\_t
  - Dump CDS Registry Command.*
- typedef struct [CFE\\_ES\\_OneAppTlm](#) CFE\_ES\_OneAppTlm\_t
  - typedef struct [CFE\\_ES\\_MemStatsTlm](#) CFE\_ES\_MemStatsTlm\_t
  - typedef struct [CFE\\_ES\\_HousekeepingTlm](#) CFE\_ES\_HousekeepingTlm\_t

### 12.83.1 Detailed Description

Purpose: cFE Executive Services (ES) Command and Telemetry packet definition file.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

## 12.83.2 Typedef Documentation

**12.83.2.1 CFE\_ES\_ClearERLogCmd\_t** `typedef struct CFE_ES_ClearERLogCmd CFE_ES_ClearERLogCmd_t`

**12.83.2.2 CFE\_ES\_ClearSysLogCmd\_t** `typedef struct CFE_ES_ClearSysLogCmd CFE_ES_ClearSysLogCmd_t`

**12.83.2.3 CFE\_ES\_DeleteCDSCmd\_t** `typedef struct CFE_ES_DeleteCDSCmd CFE_ES_DeleteCDSCmd_t`  
Delete Critical Data Store Command.

**12.83.2.4 CFE\_ES\_DumpCDSRegistryCmd\_t** `typedef struct CFE_ES_DumpCDSRegistryCmd CFE_ES_DumpCDSRegistryCmd_t`  
Dump CDS Registry Command.

**12.83.2.5 CFE\_ES\_FileNameCmd\_t** `typedef struct CFE_ES_FileNameCmd CFE_ES_FileNameCmd_t`  
Generic file name command.

**12.83.2.6 CFE\_ES\_HousekeepingTlm\_t** `typedef struct CFE_ES_HousekeepingTlm CFE_ES_HousekeepingTlm_t`  
**Name** Executive Services Housekeeping Packet

**12.83.2.7 CFE\_ES\_MemStatsTlm\_t** `typedef struct CFE_ES_MemStatsTlm CFE_ES_MemStatsTlm_t`  
**Name** Memory Pool Statistics Packet

**12.83.2.8 CFE\_ES\_NoopCmd\_t** `typedef struct CFE_ES_NoopCmd CFE_ES_NoopCmd_t`

**12.83.2.9 CFE\_ES\_OneAppTlm\_t** `typedef struct CFE_ES_OneAppTlm CFE_ES_OneAppTlm_t`  
**Name** Single Application Information Packet

**12.83.2.10 CFE\_ES\_OverWriteSysLogCmd\_t** `typedef struct CFE_ES_OverWriteSysLogCmd CFE_ES_OverWriteSysLogCmd_t`  
Overwrite/Discard System Log Configuration Command Payload.

**12.83.2.11 CFE\_ES\_QueryAllCmd\_t** `typedef struct CFE_ES_QueryAllCmd CFE_ES_QueryAllCmd_t`

**12.83.2.12 CFE\_ES\_QueryAllTasksCmd\_t** `typedef struct CFE_ES_QueryAllTasksCmd CFE_ES_QueryAllTasksCmd_t`

**12.83.2.13 CFE\_ES\_QueryOneCmd\_t** `typedef struct CFE_ES_QueryOneCmd CFE_ES_QueryOneCmd_t`

**12.83.2.14 CFE\_ES\_ReloadAppCmd\_t** `typedef struct CFE_ES_ReloadAppCmd CFE_ES_ReloadAppCmd_t`  
Reload Application Command.

**12.83.2.15 CFE\_ES\_ResetCountersCmd\_t** `typedef struct CFE_ES_ResetCountersCmd CFE_ES_ResetCountersCmd_t`

**12.83.2.16 CFE\_ES\_ResetPRCountCmd\_t** `typedef struct CFE_ES_ResetPRCountCmd CFE_ES_ResetPRCountCmd_t`

**12.83.2.17 CFE\_ES\_RestartAppCmd\_t** `typedef struct CFE_ES_RestartAppCmd CFE_ES_RestartAppCmd_t`

**12.83.2.18 CFE\_ES\_RestartCmd\_t** `typedef struct CFE_ES_RestartCmd CFE_ES_RestartCmd_t`  
Restart cFE Command.

**12.83.2.19 CFE\_ES\_SendHkCmd\_t** `typedef struct CFE_ES_SendHkCmd CFE_ES_SendHkCmd_t`

**12.83.2.20 CFE\_ES\_SendMemPoolStatsCmd\_t** `typedef struct CFE_ES_SendMemPoolStatsCmd CFE_ES_SendMemPoolStatsCmd_t`  
Send Memory Pool Statistics Command.

**12.83.2.21 CFE\_ES\_SetMaxPRCountCmd\_t** `typedef struct CFE_ES_SetMaxPRCountCmd CFE_ES_SetMaxPRCountCmd_t`  
Set Maximum Processor Reset Count Command.

**12.83.2.22 CFE\_ES\_SetPerfFilterMaskCmd\_t** `typedef struct CFE_ES_SetPerfFilterMaskCmd CFE_ES_SetPerfFilterMaskCmd_t`  
Set Performance Analyzer Filter Mask Command.

**12.83.2.23 CFE\_ES\_SetPerfTriggerMaskCmd\_t** `typedef struct CFE_ES_SetPerfTriggerMaskCmd CFE_ES_SetPerfTriggerMaskCmd_t`  
Set Performance Analyzer Trigger Mask Command.

**12.83.2.24 CFE\_ES\_StartAppCmd\_t** `typedef struct CFE_ES_StartApp CFE_ES_StartAppCmd_t`  
Start Application Command.

**12.83.2.25 CFE\_ES\_StartPerfDataCmd\_t** `typedef struct CFE_ES_StartPerfDataCmd CFE_ES_StartPerfDataCmd_t`  
Start Performance Analyzer Command.

**12.83.2.26 CFE\_ES\_StopAppCmd\_t** `typedef struct CFE_ES_StopAppCmd CFE_ES_StopAppCmd_t`

**12.83.2.27 CFE\_ES\_StopPerfDataCmd\_t** `typedef struct CFE_ES_StopPerfDataCmd CFE_ES_StopPerfDataCmd_t`  
Stop Performance Analyzer Command.

**12.83.2.28 CFE\_ES\_WriteERLogCmd\_t** `typedef struct CFE_ES_WriteERLogCmd CFE_ES_WriteERLogCmd_t`

**12.83.2.29 CFE\_ES\_WriteSysLogCmd\_t** `typedef struct CFE_ES_WriteSysLogCmd CFE_ES_WriteSysLogCmd_t`

## 12.84 cfe/modules/es/config/default\_cfe\_es\_platform\_cfg.h File Reference

```
#include "cfe_es_mission_cfg.h"
#include "cfe_es_internal_cfg.h"
```

### 12.84.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.85 cfe/modules/es/config/default\_cfe\_es\_topicids.h File Reference

### Macros

- `#define CFE_MISSION_ES_CMD_TOPICID 6`
- `#define CFE_MISSION_ES_SEND_HK_TOPICID 8`
- `#define CFE_MISSION_ES_HK_TLM_TOPICID 0`
- `#define CFE_MISSION_ES_APP_TLM_TOPICID 11`
- `#define CFE_MISSION_ES_MEMSTATS_TLM_TOPICID 16`

### 12.85.1 Detailed Description

CFE Executive Services (CFE\_ES) Application Topic IDs

### 12.85.2 Macro Definition Documentation

**12.85.2.1 CFE\_MISSION\_ES\_APP\_TLM\_TOPICID** `#define CFE_MISSION_ES_APP_TLM_TOPICID 11`  
Definition at line 48 of file default\_cfe\_es\_topicids.h.

**12.85.2.2 CFE\_MISSION\_ES\_CMD\_TOPICID** `#define CFE_MISSION_ES_CMD_TOPICID 6`

**Purpose** cFE Portable Message Numbers for Commands

**Description:**

Portable message numbers for the cFE ES command messages

**Limits**

Not Applicable

Definition at line 35 of file default\_cfe\_es\_topicids.h.

**12.85.2.3 CFE\_MISSION\_ES\_HK\_TLM\_TOPICID** #define CFE\_MISSION\_ES\_HK\_TLM\_TOPICID 0**Purpose** cFE Portable Message Numbers for Telemetry**Description:**

Portable message numbers for the cFE ES telemetry messages

**Limits**

Not Applicable

Definition at line 47 of file default\_cfe\_es\_topicids.h.

**12.85.2.4 CFE\_MISSION\_ES\_MEMSTATS\_TLM\_TOPICID** #define CFE\_MISSION\_ES\_MEMSTATS\_TLM\_TOPICID 16

Definition at line 49 of file default\_cfe\_es\_topicids.h.

**12.85.2.5 CFE\_MISSION\_ES\_SEND\_HK\_TOPICID** #define CFE\_MISSION\_ES\_SEND\_HK\_TOPICID 8

Definition at line 36 of file default\_cfe\_es\_topicids.h.

## 12.86 cfe/modules/es/fsw/inc/cfe\_es\_eventids.h File Reference

### Macros

#### ES event IDs

- #define **CFE\_ES\_INIT\_INF\_EID** 1  
*ES Initialization Event ID.*
- #define **CFE\_ES\_INITSTATS\_INF\_EID** 2  
*ES Initialization Statistics Information Event ID.*
- #define **CFE\_ES\_NOOP\_INF\_EID** 3  
*ES No-op Command Success Event ID.*
- #define **CFE\_ES\_RESET\_INF\_EID** 4  
*ES Reset Counters Command Success Event ID.*
- #define **CFE\_ES\_START\_INF\_EID** 6  
*ES Start Application Command Success Event ID.*
- #define **CFE\_ES\_STOP\_DBG\_EID** 7  
*ES Stop Application Command Request Success Event ID.*
- #define **CFE\_ES\_STOP\_INF\_EID** 8  
*ES Stop Application Completed Event ID.*
- #define **CFE\_ES\_RESTART\_APP\_DBG\_EID** 9  
*ES Restart Application Command Request Success Event ID.*
- #define **CFE\_ES\_RESTART\_APP\_INF\_EID** 10

- #define `CFE_ES_RELOAD_APP_DBG_EID` 11  
*ES Restart Application Completed Event ID.*
- #define `CFE_ES_RELOAD_APP_INF_EID` 12  
*ES Reload Application Command Request Success Event ID.*
- #define `CFE_ES_EXIT_APP_INF_EID` 13  
*ES Reload Application Complete Event ID.*
- #define `CFE_ES_ERREXIT_APP_INF_EID` 14  
*ES Nominal Exit Application Complete Event ID.*
- #define `CFE_ES_ONE_APP_EID` 15  
*ES Error Exit Application Complete Event ID.*
- #define `CFE_ES_ALL_APPS_EID` 16  
*ES Query One Application Command Success Event ID.*
- #define `CFE_ES_SYSLOG1_INF_EID` 17  
*ES Query All Applications Command Success Event ID.*
- #define `CFE_ES_SYSLOG2_EID` 18  
*ES Clear System Log Command Success Event ID.*
- #define `CFE_ES_ERLOG1_INF_EID` 19  
*ES Write System Log Command Success Event ID.*
- #define `CFE_ES_ERLOG2_EID` 20  
*ES Clear Exception Reset Log Command Success Event ID.*
- #define `CFE_ES_MID_ERR_EID` 21  
*ES Write Exception Reset Log Complete Event ID.*
- #define `CFE_ES_CC1_ERR_EID` 22  
*ES Invalid Message ID Received Event ID.*
- #define `CFE_ES_LEN_ERR_EID` 23  
*ES Invalid Command Code Received Event ID.*
- #define `CFE_ES_BOOT_ERR_EID` 24  
*ES Invalid Command Length Event ID.*
- #define `CFE_ES_START_ERR_EID` 26  
*ES Restart Command Invalid Restart Type Event ID.*
- #define `CFE_ES_START_INVALID_FILENAME_ERR_EID` 27  
*ES Start Application Command Application Creation Failed Event ID.*
- #define `CFE_ES_START_INVALID_ENTRY_POINT_ERR_EID` 28  
*ES Start Application Command Invalid Filename Event ID.*
- #define `CFE_ES_START_NULL_APP_NAME_ERR_EID` 29  
*ES Start Application Command Entry Point NULL Event ID.*
- #define `CFE_ES_START_PRIORITY_ERR_EID` 31  
*ES Start Application Command App Name NULL Event ID.*
- #define `CFE_ES_START_EXC_ACTION_ERR_EID` 32  
*ES Start Application Command Priority Too Large Event ID.*
- #define `CFE_ES_ERREXIT_APP_ERR_EID` 33  
*ES Start Application Command Exception Action Invalid Event ID.*
- #define `CFE_ES_STOP_ERR1_EID` 35  
*ES Stop Application Command Request Failed Event ID.*
- #define `CFE_ES_STOP_ERR2_EID` 36  
*ES Stop Application Command Get AppID By Name Failed Event ID.*
- #define `CFE_ES_STOP_ERR3_EID` 37  
*ES Stop Application Command Cleanup Failed Event ID.*
- #define `CFE_ES_RESTART_APP_ERR1_EID` 38  
*ES Stop Application Command Get AppID By Name Failed Event ID.*
- #define `CFE_ES_RESTART_APP_ERR2_EID` 39  
*ES Restart Application Command Request Failed Event ID.*
- #define `CFE_ES_RESTART_APP_ERR3_EID` 40  
*ES Restart Application Command Get AppID By Name Failed Event ID.*
- #define `CFE_ES_RESTART_APP_ERR4_EID` 41  
*ES Restart Application Startup Failed Event ID.*

- #define CFE\_ES\_RESTART\_APP\_ERR4\_EID 41  
*ES Restart Application Cleanup Failed Event ID.*
- #define CFE\_ES\_RELOAD\_APP\_ERR1\_EID 42  
*ES Reload Application Command Request Failed Event ID.*
- #define CFE\_ES\_RELOAD\_APP\_ERR2\_EID 43  
*ES Reload Application Command Get AppID By Name Failed Event ID.*
- #define CFE\_ES\_RELOAD\_APP\_ERR3\_EID 44  
*ES Reload Application Startup Failed Event ID.*
- #define CFE\_ES\_RELOAD\_APP\_ERR4\_EID 45  
*ES Reload Application Cleanup Failed Event ID.*
- #define CFE\_ES\_EXIT\_APP\_ERR\_EID 46  
*ES Exit Application Cleanup Failed Event ID.*
- #define CFE\_ES\_PCR\_ERR1\_EID 47  
*ES Process Control Invalid Exception State Event ID.*
- #define CFE\_ES\_PCR\_ERR2\_EID 48  
*ES Process Control Unknown State Event ID.*
- #define CFE\_ES\_ONE\_ERR\_EID 49  
*ES Query One Application Data Command Transmit Message Failed Event ID.*
- #define CFE\_ES\_ONE\_APPID\_ERR\_EID 50  
*ES Query One Application Data Command Get AppID By Name Failed Event ID.*
- #define CFE\_ES\_OSCREATE\_ERR\_EID 51  
*ES Query All Application Data Command File Creation Failed Event ID.*
- #define CFE\_ES\_WRHDR\_ERR\_EID 52  
*ES Query All Application Data Command File Write Header Failed Event ID.*
- #define CFE\_ES\_TASKWR\_ERR\_EID 53  
*ES Query All Application Data Command File Write App Data Failed Event ID.*
- #define CFE\_ES\_SYSLOG2\_ERR\_EID 55  
*ES Write System Log Command Filename Parse or File Creation Failed Event ID.*
- #define CFE\_ES\_ERLOG2\_ERR\_EID 56  
*ES Write Exception Reset Log Command Request or File Creation Failed Event ID.*
- #define CFE\_ES\_PERF\_STARTCMD\_EID 57  
*ES Start Performance Analyzer Data Collection Command Success Event ID.*
- #define CFE\_ES\_PERF\_STARTCMD\_ERR\_EID 58  
*ES Start Performance Analyzer Data Collection Command Idle Check Failed Event ID.*
- #define CFE\_ES\_PERF\_STARTCMD\_TRIG\_ERR\_EID 59  
*ES Start Performance Analyzer Data Collection Command Invalid Trigger Event ID.*
- #define CFE\_ES\_PERF\_STOPCMD\_EID 60  
*ES Stop Performance Analyzer Data Collection Command Request Success Event ID.*
- #define CFE\_ES\_PERF\_STOPCMD\_ERR2\_EID 62  
*ES Stop Performance Analyzer Data Collection Command Idle Check Failed Event ID.*
- #define CFE\_ES\_PERF\_FILTMSKCMD\_EID 63  
*ES Set Performance Analyzer Filter Mask Command Success Event ID.*
- #define CFE\_ES\_PERF\_FILTMSKERR\_EID 64  
*ES Set Performance Analyzer Filter Mask Command Invalid Index Event ID.*
- #define CFE\_ES\_PERF\_TRIGMSKCMD\_EID 65  
*ES Set Performance Analyzer Trigger Mask Command Success Event ID.*
- #define CFE\_ES\_PERF\_TRIGMSKERR\_EID 66  
*ES Set Performance Analyzer Trigger Mask Command Invalid Mask Event ID.*
- #define CFE\_ES\_PERF\_LOG\_ERR\_EID 67  
*ES Stop Performance Analyzer Data Collection Command Filename Parse or File Create Failed Event ID.*
- #define CFE\_ES\_PERF\_DATAWRITTEN\_EID 68  
*Performance Log Write Success Event ID.*
- #define CFE\_ES\_CDS\_REGISTER\_ERR\_EID 69  
*ES Register CDS API Failed Event ID.*
- #define CFE\_ES\_SYSLOGMODE\_EID 70

- `#define CFE_ES_ERR_SYSLOGMODE_EID 71`  
*ES Set System Log Overwrite Mode Command Success Event ID.*
- `#define CFE_ES_RESET_PR_COUNT_EID 72`  
*ES Set Processor Reset Counter to Zero Command Success Event ID.*
- `#define CFE_ES_SET_MAX_PR_COUNT_EID 73`  
*ES Set Maximum Processor Reset Limit Command Success Event ID.*
- `#define CFE_ES_FILEWRITE_ERR_EID 74`  
*ES File Write Failed Event ID.*
- `#define CFE_ES_CDS_DELETE_ERR_EID 76`  
*ES Delete CDS Command Delete Failed Event ID.*
- `#define CFE_ES_CDS_NAME_ERR_EID 77`  
*ES Delete CDS Command Lookup CDS Failed Event ID.*
- `#define CFE_ES_CDS_DELETED_INFO_EID 78`  
*ES Delete CDS Command Success Event ID.*
- `#define CFE_ES_CDS_DELETE_TBL_ERR_EID 79`  
*ES Delete CDS Command For Critical Table Event ID.*
- `#define CFE_ES_CDS_OWNER_ACTIVE_EID 80`  
*ES Delete CDS Command With Active Owner Event ID.*
- `#define CFE_ES_TLM_POOL_STATS_INFO_EID 81`  
*ES Telemeter Memory Statistics Command Success Event ID.*
- `#define CFE_ES_INVALID_POOL_HANDLE_ERR_EID 82`  
*ES Telemeter Memory Statistics Command Invalid Handle Event ID.*
- `#define CFE_ES_CDS_REG_DUMP_INF_EID 83`  
*ES Write Critical Data Store Registry Command Success Event ID.*
- `#define CFE_ES_CDS_DUMP_ERR_EID 84`  
*ES Write Critical Data Store Registry Command Record Write Failed Event ID.*
- `#define CFE_ES_WRITE_CFE_HDR_ERR_EID 85`  
*ES Write Critical Data Store Registry Command Header Write Failed Event ID.*
- `#define CFE_ES_CREATING_CDS_DUMP_ERR_EID 86`  
*ES Write Critical Data Store Registry Command Filename Parse or File Create Failed Event ID.*
- `#define CFE_ES_TASKINFO_EID 87`  
*ES Write All Task Data Command Success Event ID.*
- `#define CFE_ES_TASKINFO_OSCREATE_ERR_EID 88`  
*ES Write All Task Data Command Filename Parse or File Create Failed Event ID.*
- `#define CFE_ES_TASKINFO_WRHDR_ERR_EID 89`  
*ES Write All Task Data Command Write Header Failed Event ID.*
- `#define CFE_ES_TASKINFO_WR_ERR_EID 90`  
*ES Write All Task Data Command Write Data Failed Event ID.*
- `#define CFE_ES_VERSION_INF_EID 91`  
*CFS Version Information Event ID*
- `#define CFE_ES_BUILD_INF_EID 92`  
*CFS Build Information Event ID*
- `#define CFE_ES_ERLOG_PENDING_ERR_EID 93`  
*ES Write Exception Reset Log Command Already In Progress Event ID.*

### 12.86.1 Detailed Description

cFE Executive Services Event IDs

### 12.86.2 Macro Definition Documentation

**12.86.2.1 CFE\_ES\_ALL\_APPS\_EID** #define CFE\_ES\_ALL\_APPS\_EID 16  
ES Query All Applications Command Success Event ID.

Type: DEBUG

Cause:

[ES Query All Applications Command](#) success.  
Definition at line 206 of file cfe\_es\_eventids.h.

**12.86.2.2 CFE\_ES\_BOOT\_ERR\_EID** #define CFE\_ES\_BOOT\_ERR\_EID 24  
ES Restart Command Invalid Restart Type Event ID.

Type: ERROR

Cause:

[ES cFE Restart Command](#) failure due to invalid restart type.  
Definition at line 294 of file cfe\_es\_eventids.h.

**12.86.2.3 CFE\_ES\_BUILD\_INF\_EID** #define CFE\_ES\_BUILD\_INF\_EID 92  
cFS Build Information Event ID

Type: INFORMATION

Cause:

ES Initialization complete and response to [ES NO-OP Command](#).  
The Build field identifies the build date, time, hostname and user identifier of the build host machine for the current running binary. The first string is the build date/time, and the second string is formatted as "user@hostname"  
This additionally reports the configuration name that was selected by the user, which may affect various platform/mission limits.  
By default, if not specified/overridden, the default values of these variables will be: BUILDDATE ==> the output of "date +%Y%m%d%H%M" HOSTNAME ==> the output of "hostname" USER ==> the output of "whoami"  
The values can be overridden by setting an environment variable with the names above to the value desired for the field when running "make".  
Definition at line 1047 of file cfe\_es\_eventids.h.

**12.86.2.4 CFE\_ES\_CC1\_ERR\_EID** #define CFE\_ES\_CC1\_ERR\_EID 22  
ES Invalid Command Code Received Event ID.

Type: ERROR

Cause:

Invalid command code for message ID [CFE\\_ES\\_CMD\\_MID](#) received on the ES message pipe.  
Definition at line 272 of file cfe\_es\_eventids.h.

**12.86.2.5 CFE\_ES\_CDS\_DELETE\_ERR\_EID** #define CFE\_ES\_CDS\_DELETE\_ERR\_EID 76  
ES Delete CDS Command Delete Failed Event ID.

Type: ERROR

Cause:

[ES Delete CDS Command](#) failed while deleting, see reported status code or system log for details.  
Definition at line 834 of file cfe\_es\_eventids.h.

**12.86.2.6 CFE\_ES\_CDS\_DELETE\_TBL\_ERR\_EID** #define CFE\_ES\_CDS\_DELETE\_TBL\_ERR\_EID 79  
ES Delete CDS Command For Critical Table Event ID.

Type: ERROR

Cause:

[Delete CDS Command](#) failure due to the specified CDS name being a critical table. Critical Table images can only be deleted via a Table Services command, [CFE\\_TBL\\_DELETE\\_CDS\\_CC](#).  
Definition at line 871 of file cfe\_es\_eventids.h.

**12.86.2.7 CFE\_ES\_CDS\_DELETED\_INFO\_EID** #define CFE\_ES\_CDS\_DELETED\_INFO\_EID 78  
ES Delete CDS Command Success Event ID.

Type: INFORMATION

Cause:

[ES Delete CDS Command](#) success.  
Definition at line 857 of file cfe\_es\_eventids.h.

**12.86.2.8 CFE\_ES\_CDS\_DUMP\_ERR\_EID** #define CFE\_ES\_CDS\_DUMP\_ERR\_EID 84  
ES Write Critical Data Store Registry Command Record Write Failed Event ID.

Type: ERROR

Cause:

[ES Write Critical Data Store Registry Command](#) failed to write CDS record.  
Definition at line 929 of file cfe\_es\_eventids.h.

**12.86.2.9 CFE\_ES\_CDS\_NAME\_ERR\_EID** #define CFE\_ES\_CDS\_NAME\_ERR\_EID 77  
ES Delete CDS Command Lookup CDS Failed Event ID.

Type: ERROR

Cause:

[ES Delete CDS Command](#) failed due to the specified CDS name not found in the CDS Registry.  
Definition at line 846 of file cfe\_es\_eventids.h.

**12.86.2.10 CFE\_ES\_CDS\_OWNER\_ACTIVE\_EID** #define CFE\_ES\_CDS\_OWNER\_ACTIVE\_EID 80  
ES Delete CDS Command With Active Owner Event ID.

Type: ERROR

Cause:

[ES Delete CDS Command](#) failure due to the specifies CDS name is registered to an active application.  
Definition at line 883 of file cfe\_es\_eventids.h.

**12.86.2.11 CFE\_ES\_CDS\_REG\_DUMP\_INF\_EID** #define CFE\_ES\_CDS\_REG\_DUMP\_INF\_EID 83  
ES Write Critical Data Store Registry Command Success Event ID.

Type: DEBUG

Cause:

[ES Write Critical Data Store Registry Command](#) success.  
Definition at line 917 of file cfe\_es\_eventids.h.

**12.86.2.12 CFE\_ES\_CDS\_REGISTER\_ERR\_EID** #define CFE\_ES\_CDS\_REGISTER\_ERR\_EID 69  
ES Register CDS API Failed Event ID.

Type: ERROR

Cause:

[CFE\\_ES\\_RegisterCDS](#) API failure, see reported status code or system log for details.  
Definition at line 766 of file cfe\_es\_eventids.h.

**12.86.2.13 CFE\_ES\_CREATING\_CDS\_DUMP\_ERR\_EID** #define CFE\_ES\_CREATING\_CDS\_DUMP\_ERR\_EID 86  
ES Write Critical Data Store Registry Command Filename Parse or File Create Failed Event ID.

Type: ERROR

Cause:

[ES Write Critical Data Store Registry Command](#) failed to parse filename or open/create the file. OVERLOADED  
Definition at line 953 of file cfe\_es\_eventids.h.

**12.86.2.14 CFE\_ES\_ERLOG1\_INF\_EID** #define CFE\_ES\_ERLOG1\_INF\_EID 19  
ES Clear Exception Reset Log Command Success Event ID.

Type: INFORMATION

Cause:

[ES Clear Exception Reset Log Command](#) success.  
Definition at line 239 of file cfe\_es\_eventids.h.

**12.86.2.15 CFE\_ES\_ERLOG2\_EID** #define CFE\_ES\_ERLOG2\_EID 20  
ES Write Exception Reset Log Complete Event ID.

Type: DEBUG

Cause:

Request to write the Exception Reset log successfully completed.  
Definition at line 250 of file cfe\_es\_eventids.h.

**12.86.2.16 CFE\_ES\_ERLOG2\_ERR\_EID** #define CFE\_ES\_ERLOG2\_ERR\_EID 56  
ES Write Exception Reset Log Command Request or File Creation Failed Event ID.

Type: ERROR

Cause:

[ES Write Exception Reset Log Command](#) request failed or file creation failed. OVERLOADED  
Definition at line 626 of file cfe\_es\_eventids.h.

**12.86.2.17 CFE\_ES\_ERLOG\_PENDING\_ERR\_EID** #define CFE\_ES\_ERLOG\_PENDING\_ERR\_EID 93  
ES Write Exception Reset Log Command Already In Progress Event ID.

Type: ERROR

Cause:

[ES Write Exception Reset Log Command](#) failure due to a write already being in progress.  
Definition at line 1059 of file cfe\_es\_eventids.h.

**12.86.2.18 CFE\_ES\_ERR\_SYSLOGMODE\_EID** #define CFE\_ES\_ERR\_SYSLOGMODE\_EID 71  
ES Set System Log Overwrite Mode Command Failed Event ID.

Type: ERROR

Cause:

[ES Set System Log Overwrite Mode Command](#) failed due to invalid mode requested.  
Definition at line 789 of file cfe\_es\_eventids.h.

**12.86.2.19 CFE\_ES\_ERREXIT\_APP\_ERR\_EID** #define CFE\_ES\_ERREXIT\_APP\_ERR\_EID 33  
ES Error Exit Application Cleanup Failed Event ID.

Type: ERROR

Cause:

Error request to exit an application failed during application cleanup. Application and related resources will be in undefined state.  
Definition at line 379 of file cfe\_es\_eventids.h.

**12.86.2.20 CFE\_ES\_ERREXIT\_APP\_INF\_EID** #define CFE\_ES\_ERREXIT\_APP\_INF\_EID 14  
ES Error Exit Application Complete Event ID.

Type: INFORMATION

Cause:

Error request to exit an application successfully completed. This event indicates the Application exited due to an error condition. The details of the error that occurred should be given by the Application through an event message, System Log entry, or both.

Definition at line 184 of file cfe\_es\_eventids.h.

**12.86.2.21 CFE\_ES\_EXIT\_APP\_ERR\_EID** #define CFE\_ES\_EXIT\_APP\_ERR\_EID 46  
ES Exit Application Cleanup Failed Event ID.

Type: ERROR

Cause:

Nominal request to exit an application failed during application cleanup. Application and related resources will be in undefined state.

Definition at line 522 of file cfe\_es\_eventids.h.

**12.86.2.22 CFE\_ES\_EXIT\_APP\_INF\_EID** #define CFE\_ES\_EXIT\_APP\_INF\_EID 13  
ES Nominal Exit Application Complete Event ID.

Type: INFORMATION

Cause:

Nominal request to exit an application successfully completed. This event indicates the Application exited due to a nominal exit condition.

Definition at line 170 of file cfe\_es\_eventids.h.

**12.86.2.23 CFE\_ES\_FILEWRITE\_ERR\_EID** #define CFE\_ES\_FILEWRITE\_ERR\_EID 74  
ES File Write Failed Event ID.

Type: ERROR

Cause:

ES File Write failure writing data to file. OVERLOADED

Definition at line 822 of file cfe\_es\_eventids.h.

**12.86.2.24 CFE\_ES\_INIT\_INF\_EID** #define CFE\_ES\_INIT\_INF\_EID 1  
ES Initialization Event ID.

Type: INFORMATION

Cause:

Executive Services Task initialization complete.  
Definition at line 42 of file cfe\_es\_eventids.h.

**12.86.2.25 CFE\_ES\_INITSTATS\_INF\_EID** #define CFE\_ES\_INITSTATS\_INF\_EID 2  
ES Initialization Statistics Information Event ID.

Type: INFORMATION

Cause:

Executive Services Task initialization complete.  
Definition at line 53 of file cfe\_es\_eventids.h.

**12.86.2.26 CFE\_ES\_INVALID\_POOL\_HANDLE\_ERR\_EID** #define CFE\_ES\_INVALID\_POOL\_HANDLE\_ERR\_EID 82  
ES Telemeter Memory Statistics Command Invalid Handle Event ID.

Type: ERROR

Cause:

[ES Telemeter Memory Statistics Command](#) failure due to an invalid memory handle.  
Definition at line 906 of file cfe\_es\_eventids.h.

**12.86.2.27 CFE\_ES\_LEN\_ERR\_EID** #define CFE\_ES\_LEN\_ERR\_EID 23  
ES Invalid Command Length Event ID.

Type: ERROR

Cause:

Invalid length for the command code in message ID [CFE\\_ES\\_CMD\\_MID](#) received on the ES message pipe.  
Definition at line 283 of file cfe\_es\_eventids.h.

**12.86.2.28 CFE\_ES\_MID\_ERR\_EID** #define CFE\_ES\_MID\_ERR\_EID 21  
ES Invalid Message ID Received Event ID.

Type: ERROR

Cause:

Invalid message ID received on the ES message pipe.  
Definition at line 261 of file cfe\_es\_eventids.h.

**12.86.2.29 CFE\_ES\_NOOP\_INF\_EID** #define CFE\_ES\_NOOP\_INF\_EID 3  
ES No-op Command Success Event ID.

Type: INFORMATION

Cause:

[ES No-op Command](#) success.  
Definition at line 64 of file cfe\_es\_eventids.h.

**12.86.2.30 CFE\_ES\_ONE\_APP\_EID** #define CFE\_ES\_ONE\_APP\_EID 15  
ES Query One Application Command Success Event ID.

Type: DEBUG

Cause:

[ES Query One Application Command](#) success.  
Definition at line 195 of file cfe\_es\_eventids.h.

**12.86.2.31 CFE\_ES\_ONE\_APPID\_ERR\_EID** #define CFE\_ES\_ONE\_APPID\_ERR\_EID 50  
ES Query One Application Data Command Get AppID By Name Failed Event ID.

Type: ERROR

Cause:

[ES Query One Application Data Command](#) failed to get application ID from application name. Message will not be sent.  
Definition at line 569 of file cfe\_es\_eventids.h.

**12.86.2.32 CFE\_ES\_ONE\_ERR\_EID** #define CFE\_ES\_ONE\_ERR\_EID 49  
ES Query One Application Data Command Transmit Message Failed Event ID.

Type: ERROR

Cause:

[ES Query One Application Data Command](#) failed during message transmission.  
Definition at line 557 of file cfe\_es\_eventids.h.

**12.86.2.33 CFE\_ES\_OSCREATE\_ERR\_EID** #define CFE\_ES\_OSCREATE\_ERR\_EID 51  
ES Query All Application Data Command File Creation Failed Event ID.

Type: ERROR

Cause:

[ES Query All Application Data Command](#) failed to create file.  
Definition at line 580 of file cfe\_es\_eventids.h.

**12.86.2.34 CFE\_ES\_PCR\_ERR1\_EID** #define CFE\_ES\_PCR\_ERR1\_EID 47  
ES Process Control Invalid Exception State Event ID.

Type: ERROR

Cause:

Invalid Exception state encountered when processing requests for application state changes. Exceptions are processed immediately, so this state should never occur during routine processing.  
Definition at line 534 of file cfe\_es\_eventids.h.

**12.86.2.35 CFE\_ES\_PCR\_ERR2\_EID** #define CFE\_ES\_PCR\_ERR2\_EID 48  
ES Process Control Unknown State Event ID.

Type: ERROR

Cause:

Unknown state encountered when processing requests for application state changes.  
Definition at line 545 of file cfe\_es\_eventids.h.

**12.86.2.36 CFE\_ES\_PERF\_DATAWRITTEN\_EID** #define CFE\_ES\_PERF\_DATAWRITTEN\_EID 68  
Performance Log Write Success Event ID.

Type: DEBUG

Cause:

Request to write the performance log successfully completed.  
Definition at line 755 of file cfe\_es\_eventids.h.

**12.86.2.37 CFE\_ES\_PERF\_FILTMSKCMD\_EID** #define CFE\_ES\_PERF\_FILTMSKCMD\_EID 63  
ES Set Performance Analyzer Filter Mask Command Success Event ID.

Type: DEBUG

Cause:

[ES Set Performance Analyzer Filter Mask Command](#) success.  
Definition at line 697 of file cfe\_es\_eventids.h.

**12.86.2.38 CFE\_ES\_PERF\_FILTMSKERR\_EID** #define CFE\_ES\_PERF\_FILTMSKERR\_EID 64  
ES Set Performance Analyzer Filter Mask Command Invalid Index Event ID.

Type: ERROR

Cause:

[ES Set Performance Analyzer Filter Mask Command](#) failed filter index range check.  
Definition at line 709 of file cfe\_es\_eventids.h.

**12.86.2.39 CFE\_ES\_PERF\_LOG\_ERR\_EID** #define CFE\_ES\_PERF\_LOG\_ERR\_EID 67  
ES Stop Performance Analyzer Data Collection Command Filename Parse or File Create Failed Event ID.

Type: ERROR

Cause:

[ES Stop Performance Analyzer Data Collection Command](#) failed either parsing the file name or during open/creation of the file. OVERLOADED  
Definition at line 744 of file cfe\_es\_eventids.h.

**12.86.2.40 CFE\_ES\_PERF\_STARTCMD\_EID** #define CFE\_ES\_PERF\_STARTCMD\_EID 57  
ES Start Performance Analyzer Data Collection Command Success Event ID.

Type: DEBUG

Cause:

[ES Start Performance Analyzer Data Collection Command](#) success.  
Definition at line 637 of file cfe\_es\_eventids.h.

**12.86.2.41 CFE\_ES\_PERF\_STARTCMD\_ERR\_EID** #define CFE\_ES\_PERF\_STARTCMD\_ERR\_EID 58  
ES Start Performance Analyzer Data Collection Command Idle Check Failed Event ID.

Type: ERROR

Cause:

[ES Start Performance Analyzer Data Collection Command](#) failed due to already being started.  
Definition at line 649 of file cfe\_es\_eventids.h.

**12.86.2.42 CFE\_ES\_PERF\_STARTCMD\_TRIG\_ERR\_EID** #define CFE\_ES\_PERF\_STARTCMD\_TRIG\_ERR\_EID 59  
ES Start Performance Analyzer Data Collection Command Invalid Trigger Event ID.

Type: ERROR

Cause:

[ES Start Performance Analyzer Data Collection Command](#) failed due to invalid trigger mode.  
Definition at line 661 of file cfe\_es\_eventids.h.

**12.86.2.43 CFE\_ES\_PERF\_STOPCMD\_EID** #define CFE\_ES\_PERF\_STOPCMD\_EID 60  
ES Stop Performance Analyzer Data Collection Command Request Success Event ID.

Type: DEBUG

Cause:

[ES Stop Performance Analyzer Data Collection Command](#) success. Note this event signifies the request to stop and write the performance data has been successfully submitted. The successful completion will generate a [CFE\\_ES\\_PERF\\_DATAWRITTEN\\_EID](#) event.

Definition at line 674 of file cfe\_es\_eventids.h.

**12.86.2.44 CFE\_ES\_PERF\_STOPCMD\_ERR2\_EID** #define CFE\_ES\_PERF\_STOPCMD\_ERR2\_EID 62  
ES Stop Performance Analyzer Data Collection Command Request Idle Check Failed Event ID.

Type: ERROR

Cause:

[ES Stop Performance Analyzer Data Collection Command](#) failed due to a write already in progress.  
Definition at line 686 of file cfe\_es\_eventids.h.

**12.86.2.45 CFE\_ES\_PERF\_TRIGMSKCMD\_EID** #define CFE\_ES\_PERF\_TRIGMSKCMD\_EID 65  
ES Set Performance Analyzer Trigger Mask Command Success Event ID.

Type: DEBUG

Cause:

[ES Set Performance Analyzer Trigger Mask Command](#) success.  
Definition at line 720 of file cfe\_es\_eventids.h.

**12.86.2.46 CFE\_ES\_PERF\_TRIGMSKERR\_EID** #define CFE\_ES\_PERF\_TRIGMSKERR\_EID 66  
ES Set Performance Analyzer Trigger Mask Command Invalid Mask Event ID.

Type: ERROR

Cause:

[ES Set Performance Analyzer Trigger Mask Command](#) failed the mask range check.  
Definition at line 732 of file cfe\_es\_eventids.h.

**12.86.2.47 CFE\_ES\_RELOAD\_APP\_DBG\_EID** #define CFE\_ES\_RELOAD\_APP\_DBG\_EID 11  
ES Reload Application Command Request Success Event ID.

Type: DEBUG

Cause:

[ES Reload Application Command](#) success. Note this event signifies the request to reload the application has been successfully submitted. The successful completion will generate a [CFE\\_ES\\_RELOAD\\_APP\\_INF\\_EID](#) event.  
Definition at line 147 of file cfe\_es\_eventids.h.

**12.86.2.48 CFE\_ES\_RELOAD\_APP\_ERR1\_EID** #define CFE\_ES\_RELOAD\_APP\_ERR1\_EID 42  
ES Reload Application Command Request Failed Event ID.

Type: ERROR

Cause:

[ES Reload Application Command](#) request failed.

Definition at line 473 of file cfe\_es\_eventids.h.

**12.86.2.49 CFE\_ES\_RELOAD\_APP\_ERR2\_EID** #define CFE\_ES\_RELOAD\_APP\_ERR2\_EID 43  
ES Reload Application Command Get AppID By Name Failed Event ID.

Type: ERROR

Cause:

[ES Reload Application Command](#) failed to get application ID from application name. The application will not be reloaded.

Definition at line 485 of file cfe\_es\_eventids.h.

**12.86.2.50 CFE\_ES\_RELOAD\_APP\_ERR3\_EID** #define CFE\_ES\_RELOAD\_APP\_ERR3\_EID 44  
ES Reload Application Startup Failed Event ID.

Type: ERROR

Cause:

Request to reload an application failed during application startup. The application will not be reloaded.

Definition at line 497 of file cfe\_es\_eventids.h.

**12.86.2.51 CFE\_ES\_RELOAD\_APP\_ERR4\_EID** #define CFE\_ES\_RELOAD\_APP\_ERR4\_EID 45  
ES Reload Application Cleanup Failed Event ID.

Type: ERROR

Cause:

Request to reload an application failed during application cleanup. The application will not be reloaded and will be in an undefined state along with its associated resources.

Definition at line 510 of file cfe\_es\_eventids.h.

**12.86.2.52 CFE\_ES\_RELOAD\_APP\_INF\_EID** #define CFE\_ES\_RELOAD\_APP\_INF\_EID 12  
ES Reload Application Complete Event ID.

Type: INFORMATION

Cause:

Request to reload an application successfully completed.  
Definition at line 158 of file cfe\_es\_eventids.h.

**12.86.2.53 CFE\_ES\_RESET\_INF\_EID** #define CFE\_ES\_RESET\_INF\_EID 4  
ES Reset Counters Command Success Event ID.

Type: INFORMATION

Cause:

[ES Reset Counters Command](#) success.  
Definition at line 75 of file cfe\_es\_eventids.h.

**12.86.2.54 CFE\_ES\_RESET\_PR\_COUNT\_EID** #define CFE\_ES\_RESET\_PR\_COUNT\_EID 72  
ES Set Processor Reset Counter to Zero Command Success Event ID.

Type: INFORMATION

Cause:

[ES Set Processor Reset Counter to Zero Command](#) success.  
Definition at line 800 of file cfe\_es\_eventids.h.

**12.86.2.55 CFE\_ES\_RESTART\_APP\_DBG\_EID** #define CFE\_ES\_RESTART\_APP\_DBG\_EID 9  
ES Restart Application Command Request Success Event ID.

Type: DEBUG

Cause:

[ES Restart Application Command](#) success. Note this event signifies the request to restart the application has been successfully submitted. The successful completion will generate a [CFE\\_ES\\_RESTART\\_APP\\_INF\\_EID](#) event.  
Definition at line 123 of file cfe\_es\_eventids.h.

**12.86.2.56 CFE\_ES\_RESTART\_APP\_ERR1\_EID** #define CFE\_ES\_RESTART\_APP\_ERR1\_EID 38  
ES Restart Application Command Request Failed Event ID.

Type: ERROR

Cause:

[ES Restart Application Command](#) request failed.

Definition at line 425 of file cfe\_es\_eventids.h.

**12.86.2.57 CFE\_ES\_RESTART\_APP\_ERR2\_EID** #define CFE\_ES\_RESTART\_APP\_ERR2\_EID 39  
ES Restart Application Command Get AppID By Name Failed Event ID.

Type: ERROR

Cause:

[ES Restart Application Command](#) failed to get application ID from application name. The application will not be restarted.

Definition at line 437 of file cfe\_es\_eventids.h.

**12.86.2.58 CFE\_ES\_RESTART\_APP\_ERR3\_EID** #define CFE\_ES\_RESTART\_APP\_ERR3\_EID 40  
ES Restart Application Startup Failed Event ID.

Type: ERROR

Cause:

Request to restart an application failed during application startup. The application will not be restarted.

Definition at line 449 of file cfe\_es\_eventids.h.

**12.86.2.59 CFE\_ES\_RESTART\_APP\_ERR4\_EID** #define CFE\_ES\_RESTART\_APP\_ERR4\_EID 41  
ES Restart Application Cleanup Failed Event ID.

Type: ERROR

Cause:

Request to restart an application failed during application cleanup. The application will not be restarted and will be in an undefined state along with its associated resources.

Definition at line 462 of file cfe\_es\_eventids.h.

**12.86.2.60 CFE\_ES\_RESTART\_APP\_INF\_EID** #define CFE\_ES\_RESTART\_APP\_INF\_EID 10  
ES Restart Application Completed Event ID.

Type: INFORMATION

Cause:

Request to restart an application successfully completed.  
Definition at line 134 of file cfe\_es\_eventids.h.

**12.86.2.61 CFE\_ES\_SET\_MAX\_PR\_COUNT\_EID** #define CFE\_ES\_SET\_MAX\_PR\_COUNT\_EID 73  
ES Set Maximum Processor Reset Limit Command Success Event ID.

Type: INFORMATION

Cause:

[ES Set Maximum Processor Reset Limit Command](#) success.  
Definition at line 811 of file cfe\_es\_eventids.h.

**12.86.2.62 CFE\_ES\_START\_ERR\_EID** #define CFE\_ES\_START\_ERR\_EID 26  
ES Start Application Command Application Creation Failed Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure during application creation after successful parameter validation.  
Definition at line 306 of file cfe\_es\_eventids.h.

**12.86.2.63 CFE\_ES\_START\_EXC\_ACTION\_ERR\_EID** #define CFE\_ES\_START\_EXC\_ACTION\_ERR\_EID 32  
ES Start Application Command Exception Action Invalid Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure due to invalid application exception action.  
Definition at line 367 of file cfe\_es\_eventids.h.

**12.86.2.64 CFE\_ES\_START\_INF\_EID** #define CFE\_ES\_START\_INF\_EID 6  
ES Start Application Command Success Event ID.

Type: INFORMATION

Cause:

[ES Start Application Command](#) success.  
Definition at line 86 of file cfe\_es\_eventids.h.

**12.86.2.65 CFE\_ES\_START\_INVALID\_ENTRY\_POINT\_ERR\_EID** #define CFE\_ES\_START\_INVALID\_ENTRY\_POI←  
NT\_ERR\_EID 28  
ES Start Application Command Entry Point NULL Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure due to a NULL Application Entry Point.  
Definition at line 330 of file cfe\_es\_eventids.h.

**12.86.2.66 CFE\_ES\_START\_INVALID\_FILENAME\_ERR\_EID** #define CFE\_ES\_START\_INVALID\_FILENAME\_ERR←  
\_EID 27  
ES Start Application Command Invalid Filename Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure due to invalid filename.  
Definition at line 318 of file cfe\_es\_eventids.h.

**12.86.2.67 CFE\_ES\_START\_NULL\_APP\_NAME\_ERR\_EID** #define CFE\_ES\_START\_NULL\_APP\_NAME\_ERR\_E←  
ID 29  
ES Start Application Command App Name NULL Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure due to NULL Application Name.  
Definition at line 342 of file cfe\_es\_eventids.h.

**12.86.2.68 CFE\_ES\_START\_PRIORITY\_ERR\_EID** #define CFE\_ES\_START\_PRIORITY\_ERR\_EID 31  
ES Start Application Command Priority Too Large Event ID.

Type: ERROR

Cause:

[ES Start Application Command](#) failure due to a requested application priority greater than the maximum priority allowed for tasks as defined by the OS Abstraction Layer (OS\_MAX\_PRIORITY).

Definition at line 355 of file cfe\_es\_eventids.h.

**12.86.2.69 CFE\_ES\_STOP\_DBG\_EID** #define CFE\_ES\_STOP\_DBG\_EID 7  
ES Stop Application Command Request Success Event ID.

Type: DEBUG

Cause:

[ES Stop Application Command](#) success. Note this event signifies the request to delete the application has been successfully submitted. The successful completion will generate a [CFE\\_ES\\_STOP\\_INF\\_EID](#) event.

Definition at line 99 of file cfe\_es\_eventids.h.

**12.86.2.70 CFE\_ES\_STOP\_ERR1\_EID** #define CFE\_ES\_STOP\_ERR1\_EID 35  
ES Stop Application Command Request Failed Event ID.

Type: ERROR

Cause:

[ES Stop Application Command](#) request failed.

Definition at line 390 of file cfe\_es\_eventids.h.

**12.86.2.71 CFE\_ES\_STOP\_ERR2\_EID** #define CFE\_ES\_STOP\_ERR2\_EID 36  
ES Stop Application Command Get AppID By Name Failed Event ID.

Type: ERROR

Cause:

[ES Stop Application Command](#) failed to get application ID from application name. The application will not be deleted.

Definition at line 402 of file cfe\_es\_eventids.h.

**12.86.2.72 CFE\_ES\_STOP\_ERR3\_EID** #define CFE\_ES\_STOP\_ERR3\_EID 37  
ES Stop Application Cleanup Failed Event ID.

Type: ERROR

Cause:

Request to delete an application failed during application cleanup. Application and related resources will be in undefined state.

Definition at line 414 of file cfe\_es\_eventids.h.

**12.86.2.73 CFE\_ES\_STOP\_INF\_EID** #define CFE\_ES\_STOP\_INF\_EID 8  
ES Stop Application Completed Event ID.

Type: INFORMATION

Cause:

Request to delete an application successfully completed.

Definition at line 110 of file cfe\_es\_eventids.h.

**12.86.2.74 CFE\_ES\_SYSLOG1\_INF\_EID** #define CFE\_ES\_SYSLOG1\_INF\_EID 17  
ES Clear System Log Command Success Event ID.

Type: INFORMATION

Cause:

[ES Clear System Log Command](#) success.

Definition at line 217 of file cfe\_es\_eventids.h.

**12.86.2.75 CFE\_ES\_SYSLOG2\_EID** #define CFE\_ES\_SYSLOG2\_EID 18  
ES Write System Log Command Success Event ID.

Type: DEBUG

Cause:

[ES Write System Log Command](#) success.

Definition at line 228 of file cfe\_es\_eventids.h.

**12.86.2.76 CFE\_ES\_SYSLOG2\_ERR\_EID** #define CFE\_ES\_SYSLOG2\_ERR\_EID 55  
ES Write System Log Command Filename Parse or File Creation Failed Event ID.

Type: ERROR

Cause:

[ES Write System Log Command](#) failed parsing file name or creating the file. OVERLOADED  
Definition at line 614 of file cfe\_es\_eventids.h.

**12.86.2.77 CFE\_ES\_SYSLOGMODE\_EID** #define CFE\_ES\_SYSLOGMODE\_EID 70  
ES Set System Log Overwrite Mode Command Success Event ID.

Type: DEBUG

Cause:

[ES Set System Log Overwrite Mode Command](#) success.  
Definition at line 777 of file cfe\_es\_eventids.h.

**12.86.2.78 CFE\_ES\_TASKINFO\_EID** #define CFE\_ES\_TASKINFO\_EID 87  
ES Write All Task Data Command Success Event ID.

Type: DEBUG

Cause:

[ES Write All Task Data Command](#) success.  
Definition at line 964 of file cfe\_es\_eventids.h.

**12.86.2.79 CFE\_ES\_TASKINFO\_OSCREATE\_ERR\_EID** #define CFE\_ES\_TASKINFO\_OSCREATE\_ERR\_EID 88  
ES Write All Task Data Command Filename Parse or File Create Failed Event ID.

Type: ERROR

Cause:

[ES Write All Task Data Command](#) failed to parse the filename or open/create the file.  
Definition at line 976 of file cfe\_es\_eventids.h.

**12.86.2.80 CFE\_ES\_TASKINFO\_WR\_ERR\_EID** #define CFE\_ES\_TASKINFO\_WR\_ERR\_EID 90  
ES Write All Task Data Command Write Data Failed Event ID.

Type: ERROR

Cause:

[ES Write All Task Data Command](#) failed to write task data to file.  
Definition at line 1000 of file cfe\_es\_eventids.h.

**12.86.2.81 CFE\_ES\_TASKINFO\_WRHDR\_ERR\_EID** #define CFE\_ES\_TASKINFO\_WRHDR\_ERR\_EID 89  
ES Write All Task Data Command Write Header Failed Event ID.

Type: ERROR

Cause:

[ES Write All Task Data Command](#) failed to write file header.  
Definition at line 988 of file cfe\_es\_eventids.h.

**12.86.2.82 CFE\_ES\_TASKWR\_ERR\_EID** #define CFE\_ES\_TASKWR\_ERR\_EID 53  
ES Query All Application Data Command File Write App Data Failed Event ID.

Type: ERROR

Cause:

[ES Query All Application Data Command](#) failed to write file application data.  
Definition at line 602 of file cfe\_es\_eventids.h.

**12.86.2.83 CFE\_ES\_TLM\_POOL\_STATS\_INFO\_EID** #define CFE\_ES\_TLM\_POOL\_STATS\_INFO\_EID 81  
ES Telemeter Memory Statistics Command Success Event ID.

Type: DEBUG

Cause:

[ES Telemeter Memory Statistics Command](#) success.  
Definition at line 894 of file cfe\_es\_eventids.h.

**12.86.2.84 CFE\_ES\_VERSION\_INF\_EID** #define CFE\_ES\_VERSION\_INF\_EID 91  
cFS Version Information Event ID

Type: INFORMATION

Cause:

ES Initialization complete and response to [ES NO-OP Command](#).

A separate version info event will be generated for every module which is statically linked into the CFE core executable (e.g. OSAL, PSP, MSG, SBR, etc).

The version information reported in this event is derived from the source revision control system at build time, as opposed to manually-assigned semantic version numbers. It is intended to uniquely identify the actual source code that is currently running, to the extent this is possible.

The Mission version information also identifies the build configuration name, if available.

Definition at line 1021 of file cfe\_es\_eventids.h.

**12.86.2.85 CFE\_ES\_WRHDR\_ERR\_EID** #define CFE\_ES\_WRHDR\_ERR\_EID 52  
ES Query All Application Data Command File Write Header Failed Event ID.

Type: ERROR

Cause:

[ES Query All Application Data Command](#) failed to write file header.

Definition at line 591 of file cfe\_es\_eventids.h.

**12.86.2.86 CFE\_ES\_WRITE\_CFE\_HDR\_ERR\_EID** #define CFE\_ES\_WRITE\_CFE\_HDR\_ERR\_EID 85  
ES Write Critical Data Store Registry Command Header Write Failed Event ID.

Type: ERROR

Cause:

[ES Write Critical Data Store Registry Command](#) failed to write header.

Definition at line 941 of file cfe\_es\_eventids.h.

**12.87 cfe/modules/evs/config/default\_cfe\_evs\_extern\_typedefs.h File Reference**

```
#include "common_types.h"
```

## Typedefs

- `typedef uint8 CFE_EVS_MsgFormat_Enum_t`  
*Identifies format of log messages.*
- `typedef uint8 CFE_EVS_LogMode_Enum_t`  
*Identifies handling of log messages after storage is filled.*
- `typedef uint16 CFE_EVS_EventType_Enum_t`  
*Identifies type of event message.*
- `typedef uint8 CFE_EVS_EventFilter_Enum_t`  
*Identifies event filter schemes.*
- `typedef uint8 CFE_EVS_EventOutput_Enum_t`  
*Identifies event output port.*

## Enumerations

- enum `CFE_EVS_MsgFormat` { `CFE_EVS_MsgFormat_SHORT` = 0, `CFE_EVS_MsgFormat_LONG` = 1 }  
*Label definitions associated with CFE\_EVS\_MsgFormat\_Enum\_t.*
- enum `CFE_EVS_LogMode` { `CFE_EVS_LogMode_OVERWRITE` = 0, `CFE_EVS_LogMode_DISCARD` = 1 }  
*Label definitions associated with CFE\_EVS\_LogMode\_Enum\_t.*
- enum `CFE_EVS_EventType` { `CFE_EVS_EventType_DEBUG` = 1, `CFE_EVS_EventType_INFORMATION` = 2, `CFE_EVS_EventType_ERROR` = 3, `CFE_EVS_EventType_CRITICAL` = 4 }  
*Label definitions associated with CFE\_EVS\_EventType\_Enum\_t.*
- enum `CFE_EVS_EventFilter` { `CFE_EVS_EventFilter_BINARY` = 0 }  
*Label definitions associated with CFE\_EVS\_EventFilter\_Enum\_t.*
- enum `CFE_EVS_EventOutput` { `CFE_EVS_EventOutput_PORT1` = 1, `CFE_EVS_EventOutput_PORT2` = 2, `CFE_EVS_EventOutput_PORT3` = 3, `CFE_EVS_EventOutput_PORT4` = 4 }  
*Label definitions associated with CFE\_EVS\_EventOutput\_Enum\_t.*

### 12.87.1 Detailed Description

Declarations and prototypes for cfe\_evs\_extern\_typedefs module

### 12.87.2 Typedef Documentation

#### 12.87.2.1 CFE\_EVS\_EventFilter\_Enum\_t `typedef uint8 CFE_EVS_EventFilter_Enum_t`

Identifies event filter schemes.

See also

enum `CFE_EVS_EventFilter`

Definition at line 125 of file default\_cfe\_evs\_extern\_typedefs.h.

#### 12.87.2.2 CFE\_EVS\_EventOutput\_Enum\_t `typedef uint8 CFE_EVS_EventOutput_Enum_t`

Identifies event output port.

See also

enum `CFE_EVS_EventOutput`

Definition at line 158 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.2.3 CFE\_EVS\_EventType\_Enum\_t** `typedef uint16 CFE_EVS_EventType_Enum_t`  
Identifies type of event message.

See also

enum [CFE\\_EVS\\_EventType](#)

Definition at line 107 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.2.4 CFE\_EVS\_LogMode\_Enum\_t** `typedef uint8 CFE_EVS_LogMode_Enum_t`  
Identifies handling of log messages after storage is filled.

See also

enum [CFE\\_EVS\\_LogMode](#)

Definition at line 74 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.2.5 CFE\_EVS\_MsgFormat\_Enum\_t** `typedef uint8 CFE_EVS_MsgFormat_Enum_t`  
Identifies format of log messages.

See also

enum [CFE\\_EVS\\_MsgFormat](#)

Definition at line 51 of file default\_cfe\_evs\_extern\_typedefs.h.

### 12.87.3 Enumeration Type Documentation

**12.87.3.1 CFE\_EVS\_EventFilter** `enum CFE_EVS_EventFilter`  
Label definitions associated with CFE\_EVS\_EventFilter\_Enum\_t.

Enumerator

<code>CFE_EVS_EventFilter_BINARY</code>	Binary event filter.
---	----------------------

Definition at line 112 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.3.2 CFE\_EVS\_EventOutput** `enum CFE_EVS_EventOutput`  
Label definitions associated with CFE\_EVS\_EventOutput\_Enum\_t.

Enumerator

<code>CFE_EVS_EventOutput_PORT1</code>	Output Port 1.
<code>CFE_EVS_EventOutput_PORT2</code>	Output Port 2.
<code>CFE_EVS_EventOutput_PORT3</code>	Output Port 3.
<code>CFE_EVS_EventOutput_PORT4</code>	Output Port 4.

Definition at line 130 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.3.3 CFE\_EVS\_EventType** enum [CFE\\_EVS\\_EventType](#)  
Label definitions associated with CFE\_EVS\_EventType\_Enum\_t.

Enumerator

CFE_EVS_EventType_DEBUG	Events that are intended only for debugging, not nominal operations.
CFE_EVS_EventType_INFORMATION	Events that identify a state change or action that is not an error.
CFE_EVS_EventType_ERROR	Events that identify an error but are not catastrophic (e.g. - bad command).
CFE_EVS_EventType_CRITICAL	Events that identify errors that are unrecoverable autonomously.

Definition at line 79 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.3.4 CFE\_EVS\_LogMode** enum [CFE\\_EVS\\_LogMode](#)  
Label definitions associated with CFE\_EVS\_LogMode\_Enum\_t.

Enumerator

CFE_EVS_LogMode_OVERWRITE	Overwrite Log Mode.
CFE_EVS_LogMode_DISCARD	Discard Log Mode.

Definition at line 56 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.87.3.5 CFE\_EVS\_MsgFormat** enum [CFE\\_EVS\\_MsgFormat](#)  
Label definitions associated with CFE\_EVS\_MsgFormat\_Enum\_t.

Enumerator

CFE_EVS_MsgFormat_SHORT	Short Format Messages.
CFE_EVS_MsgFormat_LONG	Long Format Messages.

Definition at line 33 of file default\_cfe\_evs\_extern\_typedefs.h.

**12.88 cfe/modules/evs/config/default\_cfe\_evs\_fcncodes.h File Reference****Macros****Event Services Command Codes**

- #define [CFE\\_EVS\\_NOOP\\_CC](#) 0
- #define [CFE\\_EVS\\_RESET\\_COUNTERS\\_CC](#) 1
- #define [CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#) 2
- #define [CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#) 3
- #define [CFE\\_EVS\\_SET\\_EVENT\\_FORMAT\\_MODE\\_CC](#) 4
- #define [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#) 5
- #define [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#) 6
- #define [CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#) 7
- #define [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#) 8
- #define [CFE\\_EVS\\_RESET\\_APP\\_COUNTER\\_CC](#) 9
- #define [CFE\\_EVS\\_SET\\_FILTER\\_CC](#) 10
- #define [CFE\\_EVS\\_ENABLE\\_PORTS\\_CC](#) 11
- #define [CFE\\_EVS\\_DISABLE\\_PORTS\\_CC](#) 12

- #define CFE\_EVS\_RESET\_FILTER\_CC 13
- #define CFE\_EVS\_RESET\_ALL\_FILTERS\_CC 14
- #define CFE\_EVS\_ADD\_EVENT\_FILTER\_CC 15
- #define CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC 16
- #define CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC 17
- #define CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC 18
- #define CFE\_EVS\_SET\_LOG\_MODE\_CC 19
- #define CFE\_EVS\_CLEAR\_LOG\_CC 20

### 12.88.1 Detailed Description

Specification for the CFE Event Services (CFE\_EVS) command function codes

#### Note

This file should be strictly limited to the command/function code (CC) macro definitions. Other definitions such as enums, typedefs, or other macros should be placed in the msgdefs.h or msg.h files.

### 12.88.2 Macro Definition Documentation

#### 12.88.2.1 CFE\_EVS\_ADD\_EVENT\_FILTER\_CC #define CFE\_EVS\_ADD\_EVENT\_FILTER\_CC 15

**Name** Add Application Event Filter

#### Description

This command adds the given filter for the given application identifier and event identifier. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_AddEvtFltr

#### Command Structure

[CFE\\_EVS\\_AddEventFilterCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of [CFE\\_EVS\\_ADDFILTER\\_EID](#) debug event message

#### Error Conditions

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services
- Specified event ID is already added to the application event filter
- Maximum number of event IDs already added to filter

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

**Criticality**

None.

**See also**

[CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#),  
[CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

Definition at line 693 of file default\_cfe\_evs\_fcncodes.h.

### 12.88.2.2 CFE\_EVS\_CLEAR\_LOG\_CC #define CFE\_EVS\_CLEAR\_LOG\_CC 20

**Name** Clear Event Log

**Description**

This command clears the contents of the local event log.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_ClrLog

**Command Structure**

[CFE\\_EVS\\_ClearLogCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_EVS\_LOGFULL** - The LogFullFlag in the Housekeeping telemetry will be cleared
- **\$sc\_\$cpu\_EVS\_LOGOVERFLOWC** - The LogOverflowCounter in the Housekeeping telemetry will be reset to 0

**Error Conditions**

There are no error conditions for this command. If the Event Services receives the command, the log is cleared.

**Criticality**

Clearing the local event log is not particularly hazardous, as the result may be making available space to record valuable event data. However, inappropriately clearing the local event log could result in a loss of critical information. Note: the event log is a back-up log to the on-board recorder.

**See also**

[CFE\\_EVS\\_WRITE\\_LOG\\_DATA\\_FILE\\_CC](#), [CFE\\_EVS\\_SET\\_LOG\\_MODE\\_CC](#)

Definition at line 873 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.3 CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC #define CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC 16****Name** Delete Application Event Filter**Description**

This command removes the given filter for the given application identifier and event identifier. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_DelEvtFltr**Command Structure**[CFE\\_EVS\\_DeleteEventFilterCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_DELFILTER\\_EID](#) debug event message

**Error Conditions**

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services
- Specified event ID is not found in the application event filter

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

**Criticality**

None.

**See also**

[CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#),  
[CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#)

Definition at line 728 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.4 CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC #define CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC 6****Name** Disable Application Event Type**Description**

This command disables the command specified event type for the command specified application, preventing the application from sending event messages of the command specified event type through Event Service. An Event Type is defined to be a classification of an Event Message such as debug, informational, critical, and error. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_DisAppEvtType, \$sc\_\$cpu\_EVS\_DisAppEvtTypeMask

### Command Structure

[CFE\\_EVS\\_DisableAppEventTypeCmd\\_t](#) The following bit positions apply to structure member named 'BitMask'.  
Bit 0 - Debug Bit 1 - Informational Bit 2 - Error Bit 3 - Critical A one in a bit position means the event type will be disabled (or filtered) for the specified application. A zero in a bit position means the filtering state is unchanged for the specified application.

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_DISAPPENTTYPE\\_EID](#) debug event message
- The clearing of the Event Type Active Flag in The Event Type Active Flag in EVS App Data File

### Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set
- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

### Criticality

Disabling an application's event type is not particularly hazardous, as the result may be shutting off unnecessary event messages and possible event flooding of the system. However, inappropriately disabling an application's event type could result in a loss of critical information and missed behavior for the ground system.

### See also

[CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#),  
[CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#)

Definition at line 353 of file default\_cfe\_evs\_fcncodes.h.

## 12.88.2.5 CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC #define CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC 8

**Name** Disable Event Services for an Application

### Description

This command disables the command specified application from sending events through Event Service. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_DisAppEvGen

### Command Structure

[CFE\\_EVS\\_DisableAppEventsCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will increment
- The generation of `CFE_EVS_DISAPPEVT_EID` debug event message

### Error Conditions

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_EVS_CMDEC` - command error counter will increment
- An Error specific event message

### Criticality

Disabling an application's events is not particularly hazardous, as the result may be shutting off unnecessary event messages and possible event flooding of the system. However, inappropriately disabling an application's events could result in a loss of critical information and missed behavior for the ground system.

### See also

`CFE_EVS_ENABLE_EVENT_TYPE_CC`, `CFE_EVS_DISABLE_EVENT_TYPE_CC`, `CFE_EVS_ENABLE_APP_EVENT_TYPE_CC`,  
`CFE_EVS_DISABLE_APP_EVENT_TYPE_CC`, `CFE_EVS_ENABLE_APP_EVENTS_CC`

Definition at line 431 of file default\_cfe\_evs\_fcncodes.h.

#### 12.88.2.6 CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC #define CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC 3

##### Name

Disable Event Type

##### Description

This command disables the command specified Event Type preventing event messages of this type to be sent through Event Service. An Event Type is defined to be a classification of an Event Message such as debug, informational, error and critical. This command is a global disable of a particular event type, it applies to all applications.

##### Command Mnemonic(s)

`$sc_$cpu_EVS_DisEventType`, `$sc_$cpu_EVS_DisEventTypeMask`

##### Command Structure

`CFE_EVS_DisableEventTypeCmd_t` The following bit positions apply to structure member named 'BitMask'. Bit 0 - Debug Bit 1 - Informational Bit 2 - Error Bit 3 - Critical A one in a bit position means the event type will be disabled (or filtered). A zero in a bit position means the filtering state is unchanged.

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will increment
- The generation of `CFE_EVS_DISEVTTYPE_EID` debug message

### Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

### Criticality

Disabling an event type is not particularly hazardous, as the result may be shutting off unnecessary event messages and possible event flooding of the system. However, inappropriately disabling an event type could result in a loss of critical information and missed behavior for the ground system.

### See also

[CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#),  
[CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#)

Definition at line 201 of file default\_cfe\_evs\_fcncodes.h.

## 12.88.2.7 CFE\_EVS\_DISABLE\_PORTS\_CC #define CFE\_EVS\_DISABLE\_PORTS\_CC 12

**Name** Disable Event Services Output Ports

### Description

This command disables the specified port from outputting event messages.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_DisPort, \$sc\_\$cpu\_EVS\_DisPortMask

### Command Structure

[CFE\\_EVS\\_DisablePortsCmd\\_t](#) The following bit positions apply to structure member named 'BitMask'. Bit 0 - Port 1 Bit 1 - Port 2 Bit 2 - Port 3 Bit 3 - Port 4 A one in a bit position means the port will be disabled. A zero in a bit position means the port state is unchanged.

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of [CFE\\_EVS\\_DISPORT\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

### Criticality

None.

### See also

[CFE\\_EVS\\_ENABLE\\_PORTS\\_CC](#)

Definition at line 587 of file default\_cfe\_evs\_fcncodes.h.

## 12.88.2.8 CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC #define CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC 5

**Name** Enable Application Event Type

### Description

This command enables the command specified event type for the command specified application, allowing the application to send event messages of the command specified event type through Event Service. An Event Type is defined to be a classification of an Event Message such as debug, informational, critical, and error. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_EnaAppEvtType, \$sc\_\$cpu\_EVS\_EnaAppEvtTypeMask

### Command Structure

[CFE\\_EVS\\_EnableAppEventTypeCmd\\_t](#) The following bit positions apply to structure member named 'BitMask'. Bit 0 - Debug Bit 1 - Informational Bit 2 - Error Bit 3 - Critical A one in a bit position means the event type will be enabled (or unfiltered) for the specified application. A zero in a bit position means the filtering state is unchanged for the specified application.

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_ENAAPPEVTTYPE\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set
- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

### Criticality

Enabling an application event type is not particularly hazardous, as the result may be turning on necessary event messages and communication to the ground system. However, inappropriately enabling an application's event type could result in flooding of the ground system.

### See also

[CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#)  
[CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#)

Definition at line 300 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.9 CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC** #define CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC 7

**Name** Enable Event Services for an Application

**Description**

This command enables the command specified application to send events through the Event Service. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_EnaAppEvGen

**Command Structure**

[CFE\\_EVS\\_EnableAppEventsCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_ENAAPPEVT\\_EID](#) debug event message
- The setting of the Active Flag in The Active Flag in EVS App Data File

**Error Conditions**

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

**Criticality**

Enabling an application events is not particularly hazardous, as the result may be turning on necessary event messages and communication to the ground system. However, inappropriately enabling an application's events could result in flooding of the ground system.

**See also**

[CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#),  
[CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#)

Definition at line 392 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.10 CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC** #define CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC 2

**Name** Enable Event Type

## Description

This command enables the command specified Event Type allowing event messages of this type to be sent through Event Service. An Event Type is defined to be a classification of an Event Message such as debug, informational, error and critical. This command is a global enable of a particular event type, it applies to all applications.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_EnaEventType, \$sc\_\$cpu\_EVS\_EnaEventTypeMask

## Command Structure

**CFE\_EVS\_EnableEventTypeCmd\_t** The following bit positions apply to structure member named 'BitMask'. Bit 0 - Debug Bit 1 - Informational Bit 2 - Error Bit 3 - Critical A one in a bit position means the event type will be enabled (or unfiltered). A zero in a bit position means the filtering state is unchanged.

## Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of **CFE\_EVS\_ENAEVTTYPE\_EID** debug message

## Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

## Criticality

Enabling an event type is not particularly hazardous, as the result may be turning on necessary event messages and communication to the ground system. However, inappropriately enabling an event type could result in flooding of the system.

## See also

[CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#),  
[CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#)

Definition at line 152 of file default\_cfe\_evs\_fcncodes.h.

### 12.88.2.11 CFE\_EVS\_ENABLE\_PORTS\_CC #define CFE\_EVS\_ENABLE\_PORTS\_CC 11

**Name** Enable Event Services Output Ports

## Description

This command enables the command specified port to output event messages

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_EnaPort, \$sc\_\$cpu\_EVS\_EnaPortMask

### Command Structure

**CFE\_EVS\_EnablePortsCmd\_t** The following bit positions apply to structure member named 'BitMask'. Bit 0 - Port 1 Bit 1 - Port 2 Bit 2 - Port 3 Bit 3 - Port 4 A one in a bit position means the port will be enabled. A zero in a bit position means the port state is unchanged.

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of **CFE\_EVS\_ENAPORT\_EID** debug event message

### Error Conditions

This command may fail for the following reason(s):

- BitMask field invalid - mask cannot be zero, and only bits 0-3 may be set

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

### Criticality

None.

### See also

[CFE\\_EVS\\_DISABLE\\_PORTS\\_CC](#)

Definition at line 548 of file default\_cfe\_evs\_fncodes.h.

## 12.88.2.12 CFE\_EVS\_NOOP\_CC #define CFE\_EVS\_NOOP\_CC 0

**Name** Event Services No-Op

### Description

This command performs no other function than to increment the command execution counter. The command may be used to verify general aliveness of the Event Services task.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_NOOP

### Command Structure

[CFE\\_EVS\\_NoopCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The **CFE\_EVS\_NOOP\_EID** informational event message will be generated

### Error Conditions

There are no error conditions for this command. If the Event Services receives the command, the event is sent (although it may be filtered by EVS itself) and the counter is incremented unconditionally.

### Criticality

None

### See also

Definition at line 65 of file default\_cfe\_evs\_fcncodes.h.

## 12.88.2.13 CFE\_EVS\_RESET\_ALL\_FILTERS\_CC #define CFE\_EVS\_RESET\_ALL\_FILTERS\_CC 14

**Name** Reset All Event Filters for an Application

### Description

This command resets all of the command specified applications event filters. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_RstAllFltrs

### Command Structure

[CFE\\_EVS\\_ResetAllFiltersCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_RSTALLFILTER\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

### Criticality

None.

### See also

[CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_FILTER\\_CC](#), [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#),  
[CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

Definition at line 657 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.14 CFE\_EVS\_RESET\_APP\_COUNTER\_CC** #define CFE\_EVS\_RESET\_APP\_COUNTER\_CC 9**Name** Reset Application Event Counters**Description**

This command sets the command specified application's event counter to zero. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_RstAppCtrs**Command Structure**[CFE\\_EVS\\_ResetAppCounterCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_RSTEVTCNT\\_EID](#) debug event message

**Error Conditions**

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

**Criticality**

This command is not inherently dangerous. However, it is possible for ground systems and on-board safing procedures to be designed such that they react to changes in the counter value that is reset by this command.

**See also**[CFE\\_EVS\\_RESET\\_COUNTERS\\_CC](#)

Definition at line 467 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.15 CFE\_EVS\_RESET\_COUNTERS\_CC** #define CFE\_EVS\_RESET\_COUNTERS\_CC 1**Name** Event Services Reset Counters**Description**

This command resets the following counters within the Event Services housekeeping telemetry:

- Command Execution Counter (\$sc\_\$cpu\_EVS\_CMDPC)
- Command Error Counter (\$sc\_\$cpu\_EVS\_CMDEC)

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_ResetCtrs

#### Command Structure

[CFE\\_EVS\\_ResetCountersCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will be reset to 0
- `$sc_$cpu_EVS_CMDEC` - command error counter will be reset to 0
- The [CFE\\_EVS\\_RSTCNT\\_EID](#) debug event message will be generated

#### Error Conditions

There are no error conditions for this command. If the Event Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

#### Criticality

This command is not inherently dangerous. However, it is possible for ground systems and on-board safing procedures to be designed such that they react to changes in the counter values that are reset by this command.

#### See also

[CFE\\_EVS\\_RESET\\_APP\\_COUNTER\\_CC](#)

Definition at line 104 of file default\_cfe\_evs\_fcncodes.h.

### 12.88.2.16 CFE\_EVS\_RESET\_FILTER\_CC #define CFE\_EVS\_RESET\_FILTER\_CC 13

**Name** Reset an Event Filter for an Application

#### Description

This command resets the command specified application's event filter for the command specified event ID. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_RstBinFltrCtr

#### Command Structure

[CFE\\_EVS\\_ResetFilterCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will increment
- The generation of [CFE\\_EVS\\_RSTFILTER\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services
- Specified event ID is not found in the application event filter

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_EVS_CMDEC` - command error counter will increment
- An Error specific event message

### Criticality

None.

### See also

[CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#), [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#),  
[CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

Definition at line 623 of file default\_cfe\_evs\_fncodes.h.

### 12.88.2.17 CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC #define CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC 4

**Name** Set Event Format Mode

#### Description

This command sets the event format mode to the command specified value. The event format mode may be either short or long. A short event format detaches the Event Data from the event message and only includes the following information in the event packet: Processor ID, Application ID, Event ID, and Event Type. Refer to section 5.3.3.4 for a description of the Event Service event packet contents. Event Data is defined to be data describing an Event that is supplied to the cFE Event Service. ASCII text strings are used as the primary format for Event Data because heritage ground systems use string compares as the basis for their automated alert systems. Two systems, ANSR and SERS were looked at for interface definitions. The short event format is used to accommodate experiences with limited telemetry bandwidth. The long event format includes all event information included within the short format along with the Event Data.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_SetEvtFmt

#### Command Structure

[CFE\\_EVS\\_SetEventFormatModeCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will increment
- The generation of [CFE\\_EVS\\_SETEVTFMTMOD\\_EID](#) debug message

### Error Conditions

This command may fail for the following reason(s):

- Invalid MsgFormat mode selection

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

### Criticality

Setting the event format mode is not particularly hazardous, as the result may be saving necessary bandwidth. However, inappropriately setting the event format mode could result in a loss of information and missed behavior for the ground system

### See also

Definition at line 248 of file default\_cfe\_evs\_fcncodes.h.

#### 12.88.2.18 CFE\_EVS\_SET\_FILTER\_CC #define CFE\_EVS\_SET\_FILTER\_CC 10

**Name** Set Application Event Filter

### Description

This command sets the command specified application's event filter mask to the command specified value for the command specified event. Note: In order for this command to take effect, applications must be registered for Event Service.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_SetBinFltrMask

### Command Structure

[CFE\\_EVS\\_SetFilterCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of [CFE\\_EVS\\_SETFILTERMSK\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- Application name is not valid or not registered with event services
- Specified event ID is not found in the application event filter

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

### Criticality

Setting an application event filter mask is not particularly hazardous, as the result may be shutting off unnecessary event messages and possible event flooding of the system. However, inappropriately setting an application's event filter mask could result in a loss of critical information and missed behavior for the ground system or flooding of the ground system.

### See also

[CFE\\_EVS\\_RESET\\_FILTER\\_CC](#), [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#), [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#),  
[CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

Definition at line 509 of file default\_cfe\_evs\_fcncodes.h.

## 12.88.2.19 CFE\_EVS\_SET\_LOG\_MODE\_CC #define CFE\_EVS\_SET\_LOG\_MODE\_CC 19

**Name** Set Logging Mode

### Description

This command sets the logging mode to the command specified value.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_SetLogMode

### Command Structure

`CFE_EVS_SetLogModeCmd_t`

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_EVS_CMDPC` - command execution counter will increment
- The generation of `CFE_EVS_LOGMODE_EID` debug event message

### Error Conditions

This command may fail for the following reason(s):

- Invalid LogMode selected - must be either `CFE_EVS_LogMode_OVERWRITE` or `CFE_EVS_LogMode_DISCARD`

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_EVS_CMDEC` - command error counter will increment
- An Error specific event message

### Criticality

Setting the event logging mode is not particularly hazardous, as the result may be saving valuable event data. However, inappropriately setting the log mode could result in a loss of critical information. Note: the event log is a back-up log to the on-board recorder.

### See also

[CFE\\_EVS\\_WRITE\\_LOG\\_DATA\\_FILE\\_CC](#), [CFE\\_EVS\\_CLEAR\\_LOG\\_CC](#)

Definition at line 838 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.20 CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC #define CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC 17**

**Name** Write Event Services Application Information to File

**Description**

This command writes all application data to a file for all applications that have registered with the EVS. The application data includes the Application ID, Active Flag, Event Count, Event Types Active Flag, and Filter Data.

**Command Mnemonic(s)** \$sc\_\$cpu\_EVS\_WriteAppData2File

**Command Structure**

[CFE\\_EVS\\_WriteAppDataFileCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDPC** - command execution counter will increment
- The generation of [CFE\\_EVS\\_WRDAT\\_EID](#) debug event message
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_EVS\\_DEFAULT\\_APP\\_DATA\\_FILE](#) configuration parameter) will be updated with the latest information.

**Error Conditions**

This command may fail for the following reason(s):

- The specified FileName cannot be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_EVS\_CMDEC** - command error counter will increment
- An Error specific event message

**Criticality**

Writing a file is not particularly hazardous, but if proper file management is not taken, then the file system can fill up if this command is used repeatedly.

**See also**

[CFE\\_EVS\\_WRITE\\_LOG\\_DATA\\_FILE\\_CC](#), [CFE\\_EVS\\_SET\\_LOG\\_MODE\\_CC](#)

Definition at line 767 of file default\_cfe\_evs\_fcncodes.h.

**12.88.2.21 CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC #define CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC 18**

**Name** Write Event Log to File

## Description

This command requests the Event Service to generate a file containing the contents of the local event log.

## Command Mnemonic(s) \$sc\_\$cpu\_EVS\_WriteLog2File

### Command Structure

[CFE\\_EVS\\_WriteLogFileCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDPC](#) - command execution counter will increment
- The generation of [CFE\\_EVS\\_WRLOG\\_EID](#) debug event message

### Error Conditions

This command may fail for the following reason(s):

- The specified FileName cannot be parsed
- An Error occurs while trying to write to the file

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_EVS\\_CMDEC](#) - command error counter will increment
- An Error specific event message

### Criticality

Writing a file is not particularly hazardous, but if proper file management is not taken, then the file system can fill up if this command is used repeatedly.

### See also

[CFE\\_EVS\\_WRITE\\_APP\\_DATA\\_FILE\\_CC](#), [CFE\\_EVS\\_SET\\_LOG\\_MODE\\_CC](#), [CFE\\_EVS\\_CLEAR\\_LOG\\_CC](#)

Definition at line 802 of file default\_cfe\_evs\_fcncodes.h.

## 12.89 cfe/modules/evs/config/default\_cfe\_evs\_interface\_cfg.h File Reference

### Macros

- `#define CFE_MISSION_EVS_MAX_MESSAGE_LENGTH 122`

### 12.89.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.89.2 Macro Definition Documentation

**12.89.2.1 CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH** `#define CFE_MISSION_EVS_MAX_MESSAGE_LENGTH 122`

**Purpose** Maximum Event Message Length

**Description:**

Indicates the maximum length (in characters) of the formatted text string portion of an event message

This length does not need to include an extra character for NULL termination.

**Limits**

Not Applicable

Definition at line 47 of file default\_cfe\_evs\_interface\_cfg.h.

## 12.90 cfe/modules/evs/config/default\_cfe\_evs\_internal\_cfg.h File Reference

### Macros

- `#define CFE_PLATFORM_EVS_START_TASK_PRIORITY 61`
- `#define CFE_PLATFORM_EVS_START_TASK_STACK_SIZE CFE_PLATFORM_ES_DEFAULT_STACK_SIZE`
- `#define CFE_PLATFORM_EVS_MAX_EVENT_FILTERS 8`
- `#define CFE_PLATFORM_EVS_MAX_APP_EVENT_BURST 32`
- `#define CFE_PLATFORM_EVS_APP_EVENTS_PER_SEC 15`
- `#define CFE_PLATFORM_EVS_DEFAULT_LOG_FILE "/ram/cfe_evs.log"`
- `#define CFE_PLATFORM_EVS_LOG_MAX 20`
- `#define CFE_PLATFORM_EVS_DEFAULT_APP_DATA_FILE "/ram/cfe_evs_app.dat"`
- `#define CFE_PLATFORM_EVS_PORT_DEFAULT 0x0001`
- `#define CFE_PLATFORM_EVS_DEFAULT_TYPE_FLAG 0xE`
- `#define CFE_PLATFORM_EVS_DEFAULT_LOG_MODE 1`
- `#define CFE_PLATFORM_EVS_DEFAULT_MSG_FORMAT_MODE CFE_EVS_MsgFormat_LONG`

### 12.90.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.90.2 Macro Definition Documentation

**12.90.2.1 CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC** #define CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC  
EC 15

**Purpose** Sustained number of event messages per second per app before squelching

**Description:**

Sustained number of events that may be emitted per app per second.

**Limits**

This number must be less than or equal to [CFE\\_PLATFORM\\_EVS\\_MAX\\_APP\\_EVENT\\_BURST](#). Values lower than 8 may cause functional and unit test failures.

Definition at line 96 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.2 CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATA\_FILE** #define CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATAFILE "/ram/cfe\_evs\_app.dat"

**Purpose** Default EVS Application Data Filename

**Description:**

The value of this constant defines the filename used to store the EVS Application Data(event counts/filtering information). This filename is used only when no filename is specified in the command to dump the event log.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 137 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.3 CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE** #define CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE "/ram/cfe\_evs.log"

**Purpose** Default Event Log Filename

**Description:**

The value of this constant defines the filename used to store the Event Services local event log. This filename is used only when no filename is specified in the command to dump the event log.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 110 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.4 CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE** #define CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE 1

**Purpose** Default EVS Local Event Log Mode

**Description:**

Defines a state of overwrite(0) or discard(1) for the operation of the EVS local event log. The log may operate in either Overwrite mode = 0, where once the log becomes full the oldest event in the log will be overwritten, or Discard mode = 1, where once the log becomes full the contents of the log are preserved and the new event is discarded. Overwrite Mode = 0, Discard Mode = 1.

**Limits**

The valid settings are 0 or 1

Definition at line 184 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.5 CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE** #define CFE\_PLATFORM\_EVS\_DEFAULT\_MS←  
G\_FORMAT\_MODE CFE\_EVS\_MsgFormat\_LONG

**Purpose** Default EVS Message Format Mode

**Description:**

Defines the default message format (long or short) for event messages being sent to the ground. Choose between [CFE\\_EVS\\_MsgFormat\\_LONG](#) or [CFE\\_EVS\\_MsgFormat\\_SHORT](#).

**Limits**

The valid settings are [CFE\\_EVS\\_MsgFormat\\_LONG](#) or [CFE\\_EVS\\_MsgFormat\\_SHORT](#)

Definition at line 197 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.6 CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG** #define CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FL←  
AG 0xE

**Purpose** Default EVS Event Type Filter Mask

**Description:**

Defines a state of on or off for all four event types. The term event 'type' refers to the criticality level and may be Debug, Informational, Error or Critical. Each event type has a bit position. (bit 0 = Debug, bit 1 = Info, bit 2 = Error, bit 3 = Critical). This is a global setting, meaning it applies to all applications. To filter an event type, set its bit to zero. For example, 0xE means Debug = OFF, Info = ON, Error = ON, Critical = ON

**Limits**

The valid settings are 0x0 to 0xF.

Definition at line 168 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.7 CFE\_PLATFORM\_EVS\_LOG\_MAX** #define CFE\_PLATFORM\_EVS\_LOG\_MAX 20

**Purpose** Maximum Number of Events in EVS Local Event Log

**Description:**

Dictates the EVS local event log capacity. Units are the number of events.

**Limits**

There are no restrictions on the lower and upper limits however, the maximum log size is system dependent and should be verified.

Definition at line 122 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.8 CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST** #define CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST 32

**Purpose** Maximum number of event before squelching

**Description:**

Maximum number of events that may be emitted per app per second. Setting this to 0 will cause events to be unrestricted.

**Limits**

This number must be less than or equal to INT\_MAX/1000

Definition at line 84 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.9 CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS** #define CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS 8

**Purpose** Define Maximum Number of Event Filters per Application

**Description:**

Maximum number of events that may be filtered per application.

**Limits**

There are no restrictions on the lower and upper limits however, the maximum number of event filters is system dependent and should be verified.

Definition at line 72 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.10 CFE\_PLATFORM\_EVS\_PORT\_DEFAULT** #define CFE\_PLATFORM\_EVS\_PORT\_DEFAULT 0x0001

**Purpose** Default EVS Output Port State

**Description:**

Defines the default port state (enabled or disabled) for the four output ports defined within the Event Service. Port 1 is usually the uart output terminal. To enable a port, set the proper bit to a 1. Bit 0 is port 1, bit 1 is port2 etc.

**Limits**

The valid settings are 0x0 to 0xF.

Definition at line 151 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.11 CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY 61

**Purpose** Define EVS Task Priority

**Description:**

Defines the cFE\_EVS Task priority.

**Limits**

Not Applicable

Definition at line 44 of file default\_cfe\_evs\_internal\_cfg.h.

**12.90.2.12 CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define EVS Task Stack Size

**Description:**

Defines the cFE\_EVS Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 59 of file default\_cfe\_evs\_internal\_cfg.h.

## 12.91 cfe/modules/evs/config/default\_cfe\_evs\_mission\_cfg.h File Reference

```
#include "cfe_evs_interface_cfg.h"
```

### 12.91.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.92 cfe/modules/evs/config/default\_cfe\_evs\_msg.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_evs_fcncodes.h"
#include "cfe_evs_msgdefs.h"
#include "cfe_evs_msgstruct.h"
```

### 12.92.1 Detailed Description

Specification for the CFE Event Services (CFE\_EVS) command and telemetry message data types. This is a compatibility header for the "cfe\_evs\_msg.h" file that has traditionally provided the message definitions for cFS apps.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.93 cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_es_extern_typedefs.h"
#include "cfe_evs_extern_typedefs.h"
#include "cfe_evs_fcncodes.h"
```

### Data Structures

- struct [CFE\\_EVS\\_LogFileCmd\\_Payload](#)  
*Write Event Log to File Command Payload.*
- struct [CFE\\_EVS\\_AppDataCmd\\_Payload](#)  
*Write Event Services Application Information to File Command Payload.*
- struct [CFE\\_EVS\\_SetLogMode\\_Payload](#)  
*Set Log Mode Command Payload.*
- struct [CFE\\_EVS\\_SetEventFormatCode\\_Payload](#)  
*Set Event Format Mode Command Payload.*
- struct [CFE\\_EVS\\_BitMaskCmd\\_Payload](#)  
*Generic Bitmask Command Payload.*
- struct [CFE\\_EVS\\_AppNameCmd\\_Payload](#)  
*Generic App Name Command Payload.*
- struct [CFE\\_EVS\\_AppNameEventIDCmd\\_Payload](#)  
*Generic App Name and Event ID Command Payload.*
- struct [CFE\\_EVS\\_AppNameBitMaskCmd\\_Payload](#)  
*Generic App Name and Bitmask Command Payload.*
- struct [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload](#)  
*Generic App Name, Event ID, Mask Command Payload.*
- struct [CFE\\_EVS\\_AppTlmData](#)
- struct [CFE\\_EVS\\_HousekeepingTlm\\_Payload](#)
- struct [CFE\\_EVS\\_PacketID](#)
- struct [CFE\\_EVS\\_LongEventTlm\\_Payload](#)
- struct [CFE\\_EVS\\_ShortEventTlm\\_Payload](#)

### Macros

- #define [CFE\\_EVS\\_DEBUG\\_BIT](#) 0x0001
- #define [CFE\\_EVS\\_INFORMATION\\_BIT](#) 0x0002
- #define [CFE\\_EVS\\_ERROR\\_BIT](#) 0x0004
- #define [CFE\\_EVS\\_CRITICAL\\_BIT](#) 0x0008

- #define CFE\_EVS\_PORT1\_BIT 0x0001
- #define CFE\_EVS\_PORT2\_BIT 0x0002
- #define CFE\_EVS\_PORT3\_BIT 0x0004
- #define CFE\_EVS\_PORT4\_BIT 0x0008

## Typedefs

- typedef struct CFE\_EVS\_LogFileCmd\_Payload CFE\_EVS\_LogFileCmd\_Payload\_t  
*Write Event Log to File Command Payload.*
- typedef struct CFE\_EVS\_AppDataCmd\_Payload CFE\_EVS\_AppDataCmd\_Payload\_t  
*Write Event Services Application Information to File Command Payload.*
- typedef struct CFE\_EVS\_SetLogMode\_Payload CFE\_EVS\_SetLogMode\_Payload\_t  
*Set Log Mode Command Payload.*
- typedef struct CFE\_EVS\_SetEventFormatCode\_Payload CFE\_EVS\_SetEventFormatMode\_Payload\_t  
*Set Event Format Mode Command Payload.*
- typedef struct CFE\_EVS\_BitMaskCmd\_Payload CFE\_EVS\_BitMaskCmd\_Payload\_t  
*Generic Bitmask Command Payload.*
- typedef struct CFE\_EVS\_AppNameCmd\_Payload CFE\_EVS\_AppNameCmd\_Payload\_t  
*Generic App Name Command Payload.*
- typedef struct CFE\_EVS\_AppNameEventIDCmd\_Payload CFE\_EVS\_AppNameEventIDCmd\_Payload\_t  
*Generic App Name and Event ID Command Payload.*
- typedef struct CFE\_EVS\_AppNameBitMaskCmd\_Payload CFE\_EVS\_AppNameBitMaskCmd\_Payload\_t  
*Generic App Name and Bitmask Command Payload.*
- typedef struct CFE\_EVS\_AppNameEventIDMaskCmd\_Payload CFE\_EVS\_AppNameEventIDMaskCmd\_Payload\_t  
*Generic App Name, Event ID, Mask Command Payload.*
- typedef struct CFE\_EVS\_AppTlmData CFE\_EVS\_AppTlmData\_t
- typedef struct CFE\_EVS\_HousekeepingTlm\_Payload CFE\_EVS\_HousekeepingTlm\_Payload\_t
- typedef struct CFE\_EVS\_PacketID CFE\_EVS\_PacketID\_t
- typedef struct CFE\_EVS\_LongEventTlm\_Payload CFE\_EVS\_LongEventTlm\_Payload\_t
- typedef struct CFE\_EVS\_ShortEventTlm\_Payload CFE\_EVS\_ShortEventTlm\_Payload\_t

### 12.93.1 Detailed Description

Specification for the CFE Event Services (CFE\_EVS) command and telemetry message constant definitions.  
For CFE\_EVS this is only the function/command code definitions

### 12.93.2 Macro Definition Documentation

#### 12.93.2.1 CFE\_EVS\_CRITICAL\_BIT #define CFE\_EVS\_CRITICAL\_BIT 0x0008

Definition at line 39 of file default\_cfe\_evs\_msgdefs.h.

#### 12.93.2.2 CFE\_EVS\_DEBUG\_BIT #define CFE\_EVS\_DEBUG\_BIT 0x0001

Definition at line 36 of file default\_cfe\_evs\_msgdefs.h.

#### 12.93.2.3 CFE\_EVS\_ERROR\_BIT #define CFE\_EVS\_ERROR\_BIT 0x0004

Definition at line 38 of file default\_cfe\_evs\_msgdefs.h.

**12.93.2.4 CFE\_EVS\_INFORMATION\_BIT** #define CFE\_EVS\_INFORMATION\_BIT 0x0002  
Definition at line 37 of file default\_cfe\_evs\_msgdefs.h.

**12.93.2.5 CFE\_EVS\_PORT1\_BIT** #define CFE\_EVS\_PORT1\_BIT 0x0001  
Definition at line 42 of file default\_cfe\_evs\_msgdefs.h.

**12.93.2.6 CFE\_EVS\_PORT2\_BIT** #define CFE\_EVS\_PORT2\_BIT 0x0002  
Definition at line 43 of file default\_cfe\_evs\_msgdefs.h.

**12.93.2.7 CFE\_EVS\_PORT3\_BIT** #define CFE\_EVS\_PORT3\_BIT 0x0004  
Definition at line 44 of file default\_cfe\_evs\_msgdefs.h.

**12.93.2.8 CFE\_EVS\_PORT4\_BIT** #define CFE\_EVS\_PORT4\_BIT 0x0008  
Definition at line 45 of file default\_cfe\_evs\_msgdefs.h.

### 12.93.3 Typedef Documentation

**12.93.3.1 CFE\_EVS\_AppDataCmd\_Payload\_t** typedef struct [CFE\\_EVS\\_AppDataCmd\\_Payload](#) CFE\_EVS\_AppDataCmd\_Payload\_t  
Write Event Services Application Information to File Command Payload.  
For command details, see [CFE\\_EVS\\_WRITE\\_APP\\_DATA\\_FILE\\_CC](#)

**12.93.3.2 CFE\_EVS\_AppNameBitMaskCmd\_Payload\_t** typedef struct [CFE\\_EVS\\_AppNameBitMaskCmd\\_Payload](#)  
[CFE\\_EVS\\_AppNameBitMaskCmd\\_Payload\\_t](#)  
Generic App Name and Bitmask Command Payload.  
For command details, see [CFE\\_EVS\\_ENABLE\\_APP\\_EVENT\\_TYPE\\_CC](#) and/or [CFE\\_EVS\\_DISABLE\\_APP\\_EVENT\\_TYPE\\_CC](#)

**12.93.3.3 CFE\_EVS\_AppNameCmd\_Payload\_t** typedef struct [CFE\\_EVS\\_AppNameCmd\\_Payload](#) CFE\_EVS\_AppNameCmd\_Payload\_t  
Generic App Name Command Payload.  
For command details, see [CFE\\_EVS\\_ENABLE\\_APP\\_EVENTS\\_CC](#), [CFE\\_EVS\\_DISABLE\\_APP\\_EVENTS\\_CC](#),  
[CFE\\_EVS\\_RESET\\_APP\\_COUNTER\\_CC](#) and/or [CFE\\_EVS\\_RESET\\_ALL\\_FILTERS\\_CC](#)

**12.93.3.4 CFE\_EVS\_AppNameEventIDCmd\_Payload\_t** typedef struct [CFE\\_EVS\\_AppNameEventIDCmd\\_Payload](#)  
[CFE\\_EVS\\_AppNameEventIDCmd\\_Payload\\_t](#)  
Generic App Name and Event ID Command Payload.  
For command details, see [CFE\\_EVS\\_RESET\\_FILTER\\_CC](#) and [CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

**12.93.3.5 CFE\_EVS\_AppNameEventIDMaskCmd\_Payload\_t** typedef struct [CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload](#)  
[CFE\\_EVS\\_AppNameEventIDMaskCmd\\_Payload\\_t](#)  
Generic App Name, Event ID, Mask Command Payload.  
For command details, see [CFE\\_EVS\\_SET\\_FILTER\\_CC](#), [CFE\\_EVS\\_ADD\\_EVENT\\_FILTER\\_CC](#) and/or [CFE\\_EVS\\_DELETE\\_EVENT\\_FILTER\\_CC](#)

**12.93.3.6 CFE\_EVS\_AppTlmData\_t** typedef struct [CFE\\_EVS\\_AppTlmData](#) CFE\_EVS\_AppTlmData\_t

**12.93.3.7 CFE\_EVS\_BitMaskCmd\_Payload\_t** `typedef struct CFE_EVS_BitMaskCmd_Payload CFE_EVS_BitMaskCmd_Payload_t`  
 Generic Bitmask Command Payload.

For command details, see [CFE\\_EVS\\_ENABLE\\_EVENT\\_TYPE\\_CC](#), [CFE\\_EVS\\_DISABLE\\_EVENT\\_TYPE\\_CC](#),  
[CFE\\_EVS\\_ENABLE\\_PORTS\\_CC](#) and/or [CFE\\_EVS\\_DISABLE\\_PORTS\\_CC](#)

**12.93.3.8 CFE\_EVS\_HousekeepingTlm\_Payload\_t** `typedef struct CFE_EVS_HousekeepingTlm_Payload CFE_EVS_HousekeepingTlm_Payload_t`

**Name** Event Services Housekeeping Telemetry Packet

**12.93.3.9 CFE\_EVS\_LogFileCmd\_Payload\_t** `typedef struct CFE_EVS_LogFileCmd_Payload CFE_EVS_LogFileCmd_Payload_t`  
 Write Event Log to File Command Payload.

For command details, see [CFE\\_EVS\\_WRITE\\_LOG\\_DATA\\_FILE\\_CC](#)

**12.93.3.10 CFE\_EVS\_LongEventTlm\_Payload\_t** `typedef struct CFE_EVS_LongEventTlm_Payload CFE_EVS_LongEventTlm_Payload_t`

**Name** Event Message Telemetry Packet (Long format)

**12.93.3.11 CFE\_EVS\_PacketID\_t** `typedef struct CFE_EVS_PacketID CFE_EVS_PacketID_t`  
 Telemetry packet structures

**12.93.3.12 CFE\_EVS\_SetEventFormatMode\_Payload\_t** `typedef struct CFE_EVS_SetEventFormatCode_Payload CFE_EVS_SetEventFormatMode_Payload_t`

Set Event Format Mode Command Payload.

For command details, see [CFE\\_EVS\\_SET\\_EVENT\\_FORMAT\\_MODE\\_CC](#)

**12.93.3.13 CFE\_EVS\_SetLogMode\_Payload\_t** `typedef struct CFE_EVS_SetLogMode_Payload CFE_EVS_SetLogMode_Payload_t`  
 Set Log Mode Command Payload.

For command details, see [CFE\\_EVS\\_SET\\_LOG\\_MODE\\_CC](#)

**12.93.3.14 CFE\_EVS\_ShortEventTlm\_Payload\_t** `typedef struct CFE_EVS_ShortEventTlm_Payload CFE_EVS_ShortEventTlm_Payload_t`

**Name** Event Message Telemetry Packet (Short format)

## 12.94 cfe/modules/evs/config/default\_cfe\_evs\_msgids.h File Reference

```
#include "cfe_core_api_base_msgids.h"
#include "cfe_evs_topicids.h"
```

### Macros

- #define CFE\_EVS\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_EVS\_CMD\_TOPICID)  
   /\* 0x1801 \*/
- #define CFE\_EVS\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_EVS\_SEND\_HK\_TOPICID)  
   /\* 0x1809 \*/
- #define CFE\_EVS\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_EVS\_HK\_TLM\_TOPICID)  
   /\* 0x0801 \*/
- #define CFE\_EVS\_LONG\_EVENT\_MSG\_MID
- #define CFE\_EVS\_SHORT\_EVENT\_MSG\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_EVS\_SHORT\_EVENT\_MID)  
   /\* 0x0809 \*/

### 12.94.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Message IDs

### 12.94.2 Macro Definition Documentation

#### 12.94.2.1 CFE\_EVS\_CMD\_MID #define CFE\_EVS\_CMD\_MID

/\* 0x1801 \*/

Definition at line 32 of file default\_cfe\_evs\_msgids.h.

#### 12.94.2.2 CFE\_EVS\_HK\_TLM\_MID #define CFE\_EVS\_HK\_TLM\_MID

/\* 0x0801 \*/

Definition at line 38 of file default\_cfe\_evs\_msgids.h.

#### 12.94.2.3 CFE\_EVS\_LONG\_EVENT\_MSG\_MID #define CFE\_EVS\_LONG\_EVENT\_MSG\_MID

**Value:**

CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_EVS\_LONG\_EVENT\_MSG\_TOPICID) /\* 0x0808 \*/

Definition at line 39 of file default\_cfe\_evs\_msgids.h.

#### 12.94.2.4 CFE\_EVS\_SEND\_HK\_MID #define CFE\_EVS\_SEND\_HK\_MID

/\* 0x1809 \*/

Definition at line 33 of file default\_cfe\_evs\_msgids.h.

#### 12.94.2.5 CFE\_EVS\_SHORT\_EVENT\_MSG\_MID #define CFE\_EVS\_SHORT\_EVENT\_MSG\_MID

/\* 0x0809 \*/

Definition at line 41 of file default\_cfe\_evs\_msgids.h.

## 12.95 cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h File Reference

```
#include "common_types.h"
#include "cfe_evs_msgdefs.h"
#include "cfe_evs_extern_typedefs.h"
#include "cfe_msg_hdr.h"
```

### Data Structures

- struct [CFE\\_EVS\\_NoopCmd](#)
- struct [CFE\\_EVS\\_ResetCountersCmd](#)
- struct [CFE\\_EVS\\_ClearLogCmd](#)
- struct [CFE\\_EVS\\_SendHkCmd](#)
- struct [CFE\\_EVS\\_WriteLogFileCmd](#)  
*Write Event Log to File Command.*
- struct [CFE\\_EVS\\_WriteAppDataFileCmd](#)  
*Write Event Services Application Information to File Command.*
- struct [CFE\\_EVS\\_SetLogModeCmd](#)

*Set Log Mode Command.*

- struct [CFE\\_EVS\\_SetEventFormatModeCmd](#)  
*Set Event Format Mode Command.*
- struct [CFE\\_EVS\\_EnablePortsCmd](#)
- struct [CFE\\_EVS\\_DisablePortsCmd](#)
- struct [CFE\\_EVS\\_EnableEventTypeCmd](#)
- struct [CFE\\_EVS\\_DisableEventTypeCmd](#)
- struct [CFE\\_EVS\\_EnableAppEventsCmd](#)
- struct [CFE\\_EVS\\_DisableAppEventsCmd](#)
- struct [CFE\\_EVS\\_ResetAppCounterCmd](#)
- struct [CFE\\_EVS\\_ResetAllFiltersCmd](#)
- struct [CFE\\_EVS\\_ResetFilterCmd](#)
- struct [CFE\\_EVS\\_DeleteEventFilterCmd](#)
- struct [CFE\\_EVS\\_EnableAppEventTypeCmd](#)
- struct [CFE\\_EVS\\_DisableAppEventTypeCmd](#)
- struct [CFE\\_EVS\\_AddEventFilterCmd](#)
- struct [CFE\\_EVS\\_SetFilterCmd](#)
- struct [CFE\\_EVS\\_HousekeepingTlm](#)
- struct [CFE\\_EVS\\_LongEventTlm](#)
- struct [CFE\\_EVS\\_ShortEventTlm](#)

## Typedefs

- typedef struct [CFE\\_EVS\\_NoopCmd](#) CFE\_EVS\_NoopCmd\_t
- typedef struct [CFE\\_EVS\\_ResetCountersCmd](#) CFE\_EVS\_ResetCountersCmd\_t
- typedef struct [CFE\\_EVS\\_ClearLogCmd](#) CFE\_EVS\_ClearLogCmd\_t
- typedef struct [CFE\\_EVS\\_SendHkCmd](#) CFE\_EVS\_SendHkCmd\_t
- typedef struct [CFE\\_EVS\\_WriteLogFileCmd](#) CFE\_EVS\_WriteLogFileCmd\_t  
*Write Event Log to File Command.*
- typedef struct [CFE\\_EVS\\_WriteAppDataFileCmd](#) CFE\_EVS\_WriteAppDataFileCmd\_t  
*Write Event Services Application Information to File Command.*
- typedef struct [CFE\\_EVS\\_SetLogModeCmd](#) CFE\_EVS\_SetLogModeCmd\_t  
*Set Log Mode Command.*
- typedef struct [CFE\\_EVS\\_SetEventFormatModeCmd](#) CFE\_EVS\_SetEventFormatModeCmd\_t  
*Set Event Format Mode Command.*
- typedef struct [CFE\\_EVS\\_EnablePortsCmd](#) CFE\_EVS\_EnablePortsCmd\_t
- typedef struct [CFE\\_EVS\\_DisablePortsCmd](#) CFE\_EVS\_DisablePortsCmd\_t
- typedef struct [CFE\\_EVS\\_EnableEventTypeCmd](#) CFE\_EVS\_EnableEventTypeCmd\_t
- typedef struct [CFE\\_EVS\\_DisableEventTypeCmd](#) CFE\_EVS\_DisableEventTypeCmd\_t
- typedef struct [CFE\\_EVS\\_EnableAppEventsCmd](#) CFE\_EVS\_EnableAppEventsCmd\_t
- typedef struct [CFE\\_EVS\\_DisableAppEventsCmd](#) CFE\_EVS\_DisableAppEventsCmd\_t
- typedef struct [CFE\\_EVS\\_ResetAppCounterCmd](#) CFE\_EVS\_ResetAppCounterCmd\_t
- typedef struct [CFE\\_EVS\\_ResetAllFiltersCmd](#) CFE\_EVS\_ResetAllFiltersCmd\_t
- typedef struct [CFE\\_EVS\\_ResetFilterCmd](#) CFE\_EVS\_ResetFilterCmd\_t
- typedef struct [CFE\\_EVS\\_DeleteEventFilterCmd](#) CFE\_EVS\_DeleteEventFilterCmd\_t
- typedef struct [CFE\\_EVS\\_EnableAppEventTypeCmd](#) CFE\_EVS\_EnableAppEventTypeCmd\_t
- typedef struct [CFE\\_EVS\\_DisableAppEventTypeCmd](#) CFE\_EVS\_DisableAppEventTypeCmd\_t
- typedef struct [CFE\\_EVS\\_AddEventFilterCmd](#) CFE\_EVS\_AddEventFilterCmd\_t
- typedef struct [CFE\\_EVS\\_SetFilterCmd](#) CFE\_EVS\_SetFilterCmd\_t
- typedef struct [CFE\\_EVS\\_HousekeepingTlm](#) CFE\_EVS\_HousekeepingTlm\_t
- typedef struct [CFE\\_EVS\\_LongEventTlm](#) CFE\_EVS\_LongEventTlm\_t
- typedef struct [CFE\\_EVS\\_ShortEventTlm](#) CFE\_EVS\_ShortEventTlm\_t

### 12.95.1 Detailed Description

Purpose: cFE Executive Services (EVS) Command and Telemetry packet definition file.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

### 12.95.2 Typedef Documentation

**12.95.2.1 CFE\_EVS\_AddEventFilterCmd\_t** `typedef struct CFE_EVS_AddEventFilterCmd CFE_EVS_AddEventFilterCmd_t`

**12.95.2.2 CFE\_EVS\_ClearLogCmd\_t** `typedef struct CFE_EVS_ClearLogCmd CFE_EVS_ClearLogCmd_t`

**12.95.2.3 CFE\_EVS\_DeleteEventFilterCmd\_t** `typedef struct CFE_EVS_DeleteEventFilterCmd CFE_EVS_DeleteEventFilterCmd_t`

**12.95.2.4 CFE\_EVS\_DisableAppEventsCmd\_t** `typedef struct CFE_EVS_DisableAppEventsCmd CFE_EVS_DisableAppEventsCmd_t`

**12.95.2.5 CFE\_EVS\_DisableAppEventTypeCmd\_t** `typedef struct CFE_EVS_DisableAppEventTypeCmd CFE_EVS_DisableAppEventTypeCmd_t`

**12.95.2.6 CFE\_EVS\_DisableEventTypeCmd\_t** `typedef struct CFE_EVS_DisableEventTypeCmd CFE_EVS_DisableEventTypeCmd_t`

**12.95.2.7 CFE\_EVS\_DisablePortsCmd\_t** `typedef struct CFE_EVS_DisablePortsCmd CFE_EVS_DisablePortsCmd_t`

**12.95.2.8 CFE\_EVS\_EnableAppEventsCmd\_t** `typedef struct CFE_EVS_EnableAppEventsCmd CFE_EVS_EnableAppEventsCmd_t`

**12.95.2.9 CFE\_EVS\_EnableAppEventTypeCmd\_t** `typedef struct CFE_EVS_EnableAppEventTypeCmd CFE_EVS_EnableAppEventTypeCmd_t`

**12.95.2.10 CFE\_EVS\_EnableEventTypeCmd\_t** `typedef struct CFE_EVS_EnableEventTypeCmd CFE_EVS_EnableEventTypeCmd_t`

**12.95.2.11 CFE\_EVS\_EnablePortsCmd\_t** `typedef struct CFE_EVS_EnablePortsCmd CFE_EVS_EnablePortsCmd_t`

**12.95.2.12 CFE\_EVS\_HousekeepingTlm\_t** `typedef struct CFE_EVS_HousekeepingTlm CFE_EVS_HousekeepingTlm_t`

**12.95.2.13 CFE\_EVS\_LongEventTlm\_t** `typedef struct CFE_EVS_LongEventTlm CFE_EVS_LongEventTlm_t`

**12.95.2.14 CFE\_EVS\_NoopCmd\_t** `typedef struct CFE_EVS_NoopCmd CFE_EVS_NoopCmd_t`

**12.95.2.15 CFE\_EVS\_ResetAllFiltersCmd\_t** `typedef struct CFE_EVS_ResetAllFiltersCmd CFE_EVS_ResetAllFiltersCmd_t`

**12.95.2.16 CFE\_EVS\_ResetAppCounterCmd\_t** `typedef struct CFE_EVS_ResetAppCounterCmd CFE_EVS_ResetAppCounterCmd_t`

**12.95.2.17 CFE\_EVS\_ResetCountersCmd\_t** `typedef struct CFE_EVS_ResetCountersCmd CFE_EVS_ResetCountersCmd_t`

**12.95.2.18 CFE\_EVS\_ResetFilterCmd\_t** `typedef struct CFE_EVS_ResetFilterCmd CFE_EVS_ResetFilterCmd_t`

**12.95.2.19 CFE\_EVS\_SendHkCmd\_t** `typedef struct CFE_EVS_SendHkCmd CFE_EVS_SendHkCmd_t`

**12.95.2.20 CFE\_EVS\_SetEventFormatModeCmd\_t** `typedef struct CFE_EVS_SetEventFormatModeCmd CFE_EVS_SetEventFormatModeCmd_t`  
Set Event Format Mode Command.

**12.95.2.21 CFE\_EVS\_SetFilterCmd\_t** `typedef struct CFE_EVS_SetFilterCmd CFE_EVS_SetFilterCmd_t`

**12.95.2.22 CFE\_EVS\_SetLogModeCmd\_t** `typedef struct CFE_EVS_SetLogModeCmd CFE_EVS_SetLogModeCmd_t`  
Set Log Mode Command.

**12.95.2.23 CFE\_EVS\_ShortEventTlm\_t** `typedef struct CFE_EVS_ShortEventTlm CFE_EVS_ShortEventTlm_t`

**12.95.2.24 CFE\_EVS\_WriteAppDataFileCmd\_t** `typedef struct CFE_EVS_WriteAppDataFileCmd CFE_EVS_WriteAppDataFileCmd_t`  
Write Event Services Application Information to File Command.

**12.95.2.25 CFE\_EVS\_WriteLogFileCmd\_t** `typedef struct CFE_EVS_WriteLogFileCmd CFE_EVS_WriteLogFileCmd_t`  
Write Event Log to File Command.

## 12.96 cfe/modules/evs/config/default\_cfe\_evs\_platform\_cfg.h File Reference

```
#include "cfe_evs_mission_cfg.h"
#include "cfe_evs_internal_cfg.h"
```

### 12.96.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.97 cfe/modules/evs/config/default\_cfe\_evs\_topicids.h File Reference

### Macros

- #define CFE\_MISSION\_EVS\_CMD\_TOPICID 1
- #define CFE\_MISSION\_EVS\_SEND\_HK\_TOPICID 9
- #define CFE\_MISSION\_EVS\_HK\_TLM\_TOPICID 1
- #define CFE\_MISSION\_EVS\_LONG\_EVENT\_MSG\_TOPICID 8
- #define CFE\_MISSION\_EVS\_SHORT\_EVENT\_MSG\_TOPICID 9

### 12.97.1 Detailed Description

CFE Event Services (CFE\_EVS) Application Topic IDs

### 12.97.2 Macro Definition Documentation

#### 12.97.2.1 CFE\_MISSION\_EVS\_CMD\_TOPICID #define CFE\_MISSION\_EVS\_CMD\_TOPICID 1

**Purpose** cFE Portable Message Numbers for Commands

Description:

Portable message numbers for the cFE EVS command messages

Limits

Not Applicable

Definition at line 35 of file default\_cfe\_evs\_topicids.h.

#### 12.97.2.2 CFE\_MISSION\_EVS\_HK\_TLM\_TOPICID #define CFE\_MISSION\_EVS\_HK\_TLM\_TOPICID 1

**Purpose** cFE Portable Message Numbers for Telemetry

Description:

Portable message numbers for the cFE EVS telemetry messages

Limits

Not Applicable

Definition at line 47 of file default\_cfe\_evs\_topicids.h.

#### 12.97.2.3 CFE\_MISSION\_EVS\_LONG\_EVENT\_MSG\_TOPICID #define CFE\_MISSION\_EVS\_LONG\_EVENT\_MSG\_TOPICID 8

Definition at line 48 of file default\_cfe\_evs\_topicids.h.

#### 12.97.2.4 CFE\_MISSION\_EVS\_SEND\_HK\_TOPICID #define CFE\_MISSION\_EVS\_SEND\_HK\_TOPICID 9

Definition at line 36 of file default\_cfe\_evs\_topicids.h.

**12.97.2.5 CFE\_MISSION\_EVS\_SHORT\_EVENT\_MSG\_TOPICID** #define CFE\_MISSION\_EVS\_SHORT\_EVENT\_MS←  
G\_TOPICID 9  
Definition at line 49 of file default\_cfe\_evs\_topicids.h.

## 12.98 cfe/modules/evs/fsw/inc/cfe\_evs\_eventids.h File Reference

### Macros

#### EVS event IDs

- #define **CFE\_EVS\_NOOP\_EID** 0  
*EVS No-op Command Success Event ID.*
- #define **CFE\_EVS\_STARTUP\_EID** 1  
*EVS Initialization Event ID.*
- #define **CFE\_EVS\_ERR\_WRLOGFILE\_EID** 2  
*EVS Write Event Log Command File Write Entry Failed Event ID.*
- #define **CFE\_EVS\_ERR\_CRLOGFILE\_EID** 3  
*EVS Write Event Log Command Filename Parse or File Create Failed Event ID.*
- #define **CFE\_EVS\_ERR\_MSGID\_EID** 5  
*EVS Invalid Message ID Received Event ID.*
- #define **CFE\_EVS\_ERR\_EVTIDNOREGS\_EID** 6  
*EVS Command Event Not Registered For Filtering Event ID.*
- #define **CFE\_EVS\_ERR\_APPNOREGS\_EID** 7  
*EVS Command Application Not Registered With EVS Event ID.*
- #define **CFE\_EVS\_ERR\_ILLAPPIDRANGE\_EID** 8  
*EVS Command Get Application Data Failure Event ID.*
- #define **CFE\_EVS\_ERR\_NOAPPIDFOUND\_EID** 9  
*EVS Command Get Application ID Failure Event ID.*
- #define **CFE\_EVS\_ERR\_ILLEGALFMTMOD\_EID** 10  
*EVS Set Event Format Command Invalid Format Event ID.*
- #define **CFE\_EVS\_ERR\_MAXREGSFILTER\_EID** 11  
*EVS Add Filter Command Max Filters Exceeded Event ID.*
- #define **CFE\_EVS\_ERR\_WRDATFILE\_EID** 12  
*EVS Write Application Data Command Write Data Failure Event ID.*
- #define **CFE\_EVS\_ERR\_CRDATFILE\_EID** 13  
*EVS Write Application Data Command Filename Parse or File Create Failed Event ID.*
- #define **CFE\_EVS\_WRITE\_HEADER\_ERR\_EID** 14  
*EVS Write File Header to Log File Failure Event ID.*
- #define **CFE\_EVS\_ERR\_CC\_EID** 15  
*EVS Invalid Command Code Received Event ID.*
- #define **CFE\_EVS\_RSTCNT\_EID** 16  
*EVS Reset Counters Command Success Event ID.*
- #define **CFE\_EVS\_SETFILTERMSK\_EID** 17  
*EVS Set Filter Command Success Event ID.*
- #define **CFE\_EVS\_ENAPORT\_EID** 18  
*EVS Enable Ports Command Success Event ID.*
- #define **CFE\_EVS\_DISPORT\_EID** 19  
*EVS Disable Ports Command Success Event ID.*
- #define **CFE\_EVS\_ENAEVTTYPE\_EID** 20  
*EVS Enable Event Type Command Success Event ID.*
- #define **CFE\_EVS\_DISEVTTYPE\_EID** 21  
*EVS Disable Event Type Command Success Event ID.*
- #define **CFE\_EVS\_SETEVTFMTMOD\_EID** 22  
*EVS Set Event Format Mode Command Success Event ID.*
- #define **CFE\_EVS\_ENAAPPEVTTYPE\_EID** 23

- #define **CFE\_EVS\_DISAPPENTTYPE\_EID** 24  
    *EVS Enable App Event Type Command Success Event ID.*
- #define **CFE\_EVS\_ENAAPPEVT\_EID** 25  
    *EVS Disable App Event Type Command Success Event ID.*
- #define **CFE\_EVS\_DISAPPEVT\_EID** 26  
    *EVS Enable App Events Command Success Event ID.*
- #define **CFE\_EVS\_RSTEVCNT\_EID** 27  
    *EVS Reset App Event Counter Command Success Event ID.*
- #define **CFE\_EVS\_RSTFILTER\_EID** 28  
    *EVS Reset App Event Filter Command Success Event ID.*
- #define **CFE\_EVS\_RSTALLFILTER\_EID** 29  
    *EVS Reset All Filters Command Success Event ID.*
- #define **CFE\_EVS\_ADDFILTER\_EID** 30  
    *EVS Add Event Filter Command Success Event ID.*
- #define **CFE\_EVS\_DELFILTER\_EID** 31  
    *EVS Delete Event Filter Command Success Event ID.*
- #define **CFE\_EVS\_WRDAT\_EID** 32  
    *EVS Write Application Data Command Success Event ID.*
- #define **CFE\_EVS\_WRLOG\_EID** 33  
    *EVS Write Event Log Command Success Event ID.*
- #define **CFE\_EVS\_EVT\_FILTERED\_EID** 37  
    *EVS Add Filter Command Duplicate Registration Event ID.*
- #define **CFE\_EVS\_LOGMODE\_EID** 38  
    *EVS Set Log Mode Command Success Event ID.*
- #define **CFE\_EVS\_ERR\_LOGMODE\_EID** 39  
    *EVS Set Log Mode Command Invalid Mode Event ID.*
- #define **CFE\_EVS\_ERR\_INVALID\_BITMASK\_EID** 40  
    *EVS Port Or Event Type Bitmask Invalid Event ID.*
- #define **CFE\_EVS\_ERR\_UNREGISTERED\_EVS\_APP** 41  
    *EVS Send Event API App Not Registered With EVS Event ID.*
- #define **CFE\_EVS\_FILTER\_MAX\_EID** 42  
    *EVS Filter Max Count Reached Event ID.*
- #define **CFE\_EVS\_LEN\_ERR\_EID** 43  
    *EVS Invalid Command Length Event ID.*
- #define **CFE\_EVS\_SQUELCHED\_ERR\_EID** 44  
    *EVS Events Squelched Error Event ID.*

### 12.98.1 Detailed Description

cFE Event Services Event IDs

### 12.98.2 Macro Definition Documentation

**12.98.2.1 CFE\_EVS\_ADDFILTER\_EID** #define CFE\_EVS\_ADDFILTER\_EID 30  
EVS Add Event Filter Command Success Event ID.

Type: DEBUG

Cause:

**EVS Add Event Filter Command** success.  
Definition at line 367 of file cfe\_evs\_eventids.h.

**12.98.2.2 CFE\_EVS\_DELFILTER\_EID** #define CFE\_EVS\_DELFILTER\_EID 31  
EVS Delete Event Filter Command Success Event ID.

Type: DEBUG

Cause:

[EVS Delete Event Filter Command](#) success.  
Definition at line 378 of file cfe\_evs\_eventids.h.

**12.98.2.3 CFE\_EVS\_DISAPPENNTTYPE\_EID** #define CFE\_EVS\_DISAPPENNTTYPE\_EID 24  
EVS Disable App Event Type Command Success Event ID.

Type: DEBUG

Cause:

[EVS Disable App Event Type Command](#) success.  
Definition at line 301 of file cfe\_evs\_eventids.h.

**12.98.2.4 CFE\_EVS\_DISAPPEVT\_EID** #define CFE\_EVS\_DISAPPEVT\_EID 26  
EVS Disable App Events Command Success Event ID.

Type: DEBUG

Cause:

[EVS Disable App Events Command](#) success.  
Definition at line 323 of file cfe\_evs\_eventids.h.

**12.98.2.5 CFE\_EVS\_DISEVTTYPE\_EID** #define CFE\_EVS\_DISEVTTYPE\_EID 21  
EVS Disable Event Type Command Success Event ID.

Type: DEBUG

Cause:

[EVS Disable Event Type Command](#) success.  
Definition at line 268 of file cfe\_evs\_eventids.h.

**12.98.2.6 CFE\_EVS\_DISPORT\_EID** #define CFE\_EVS\_DISPORT\_EID 19  
EVS Disable Ports Command Success Event ID.

Type: DEBUG

Cause:

[EVS Disable Ports Command](#) success.  
Definition at line 246 of file cfe\_evs\_eventids.h.

**12.98.2.7 CFE\_EVS\_ENAAPPEVT\_EID** #define CFE\_EVS\_ENAAPPEVT\_EID 25  
EVS Enable App Events Command Success Event ID.

Type: DEBUG

Cause:

[EVS Enable App Events Command](#) success.  
Definition at line 312 of file cfe\_evs\_eventids.h.

**12.98.2.8 CFE\_EVS\_ENAAPPEVTTYPE\_EID** #define CFE\_EVS\_ENAAPPEVTTYPE\_EID 23  
EVS Enable App Event Type Command Success Event ID.

Type: DEBUG

Cause:

[EVS Enable App Event Type Command](#) success.  
Definition at line 290 of file cfe\_evs\_eventids.h.

**12.98.2.9 CFE\_EVS\_ENAEVTTYPE\_EID** #define CFE\_EVS\_ENAEVTTYPE\_EID 20  
EVS Enable Event Type Command Success Event ID.

Type: DEBUG

Cause:

[EVS Enable Event Type Command](#) success.  
Definition at line 257 of file cfe\_evs\_eventids.h.

**12.98.2.10 CFE\_EVS\_ENAPORT\_EID** #define CFE\_EVS\_ENAPORT\_EID 18  
EVS Enable Ports Command Success Event ID.

Type: DEBUG

Cause:

[EVS Enable Ports Command](#) success.

Definition at line 235 of file cfe\_evs\_eventids.h.

**12.98.2.11 CFE\_EVS\_ERR\_APPNOREGS\_EID** #define CFE\_EVS\_ERR\_APPNOREGS\_EID 7  
EVS Command Application Not Registered With EVS Event ID.

Type: ERROR

Cause:

An EVS command handler failure due to the referenced application not being registered with EVS. OVERLOADED  
Definition at line 110 of file cfe\_evs\_eventids.h.

**12.98.2.12 CFE\_EVS\_ERR\_CC\_EID** #define CFE\_EVS\_ERR\_CC\_EID 15  
EVS Invalid Command Code Received Event ID.

Type: ERROR

Cause:

Invalid command code for message ID [CFE\\_EVS\\_CMD\\_MID](#) received on the EVS message pipe.  
Definition at line 202 of file cfe\_evs\_eventids.h.

**12.98.2.13 CFE\_EVS\_ERR\_CRDATFILE\_EID** #define CFE\_EVS\_ERR\_CRDATFILE\_EID 13  
EVS Write Application Data Command Filename Parse or File Create Failed Event ID.

Type: ERROR

Cause:

[Write Application Data Command](#) failed to parse the filename or open/create the file. OVERLOADED  
Definition at line 180 of file cfe\_evs\_eventids.h.

**12.98.2.14 CFE\_EVS\_ERR\_CRLOGFILE\_EID** #define CFE\_EVS\_ERR\_CRLOGFILE\_EID 3  
EVS Write Event Log Command Filename Parse or File Create Failed Event ID.

Type: ERROR

Cause:

[EVS Write Event Log Command](#) failure parsing the file name or during open/creation of the file. OVERLOADED  
Definition at line 77 of file cfe\_evs\_eventids.h.

**12.98.2.15 CFE\_EVS\_ERR\_EVTIDNOREGS\_EID** #define CFE\_EVS\_ERR\_EVTIDNOREGS\_EID 6  
EVS Command Event Not Registered For Filtering Event ID.

Type: ERROR

Cause:

An EVS command handler failure due to the event not being registered for filtering. OVERLOADED  
Definition at line 99 of file cfe\_evs\_eventids.h.

**12.98.2.16 CFE\_EVS\_ERR\_ILLAPPIDRANGE\_EID** #define CFE\_EVS\_ERR\_ILLAPPIDRANGE\_EID 8  
EVS Command Get Application Data Failure Event ID.

Type: ERROR

Cause:

An EVS command handler failure retrieving the application data. OVERLOADED  
Definition at line 121 of file cfe\_evs\_eventids.h.

**12.98.2.17 CFE\_EVS\_ERR\_ILLEGALFMTMOD\_EID** #define CFE\_EVS\_ERR\_ILLEGALFMTMOD\_EID 10  
EVS Set Event Format Command Invalid Format Event ID.

Type: ERROR

Cause:

[EVS Set Event Format Command](#) failure due to invalid format argument.  
Definition at line 144 of file cfe\_evs\_eventids.h.

**12.98.2.18 CFE\_EVS\_ERR\_INVALID\_BITMASK\_EID** #define CFE\_EVS\_ERR\_INVALID\_BITMASK\_EID 40  
EVS Port Or Event Type Bitmask Invalid Event ID.

Type: ERROR

Cause:

Invalid bitmask for EVS port or event type. OVERLOADED  
Definition at line 446 of file cfe\_evs\_eventids.h.

**12.98.2.19 CFE\_EVS\_ERR\_LOGMODE\_EID** #define CFE\_EVS\_ERR\_LOGMODE\_EID 39  
EVS Set Log Mode Command Invalid Mode Event ID.

Type: ERROR

Cause:

[EVS Set Log Mode Command](#) failure due to invalid log mode.  
Definition at line 435 of file cfe\_evs\_eventids.h.

**12.98.2.20 CFE\_EVS\_ERR\_MAXREGSFILTER\_EID** #define CFE\_EVS\_ERR\_MAXREGSFILTER\_EID 11  
EVS Add Filter Command Max Filters Exceeded Event ID.

Type: ERROR

Cause:

[EVS Add Filter Command](#) failure due to exceeding the maximum number of filters.  
Definition at line 156 of file cfe\_evs\_eventids.h.

**12.98.2.21 CFE\_EVS\_ERR\_MSGID\_EID** #define CFE\_EVS\_ERR\_MSGID\_EID 5  
EVS Invalid Message ID Received Event ID.

Type: ERROR

Cause:

Invalid message ID received on the EVS message pipe.  
Definition at line 88 of file cfe\_evs\_eventids.h.

**12.98.2.22 CFE\_EVS\_ERR\_NOAPPIDFOUND\_EID** #define CFE\_EVS\_ERR\_NOAPPIDFOUND\_EID 9  
EVS Command Get Application ID Failure Event ID.

Type: ERROR

Cause:

An EVS command handler failure retrieving the application ID. OVERLOADED  
Definition at line 132 of file cfe\_evs\_eventids.h.

**12.98.2.23 CFE\_EVS\_ERR\_UNREGISTERED\_EVS\_APP** #define CFE\_EVS\_ERR\_UNREGISTERED\_EVS\_APP 41  
EVS Send Event API App Not Registered With EVS Event ID.

Type: ERROR

Cause:

An EVS Send Event API called for application not registered with EVS.  
Definition at line 457 of file cfe\_evs\_eventids.h.

**12.98.2.24 CFE\_EVS\_ERR\_WRDATFILE\_EID** #define CFE\_EVS\_ERR\_WRDATFILE\_EID 12  
EVS Write Application Data Command Write Data Failure Event ID.

Type: ERROR

Cause:

[Write Application Data Command](#) failure to write application EVS data.  
Definition at line 168 of file cfe\_evs\_eventids.h.

**12.98.2.25 CFE\_EVS\_ERR\_WRLOGFILE\_EID** #define CFE\_EVS\_ERR\_WRLOGFILE\_EID 2  
EVS Write Event Log Command File Write Entry Failed Event ID.

Type: ERROR

Cause:

[EVS Write Event Log Command](#) failure writing data to the file.  
Definition at line 65 of file cfe\_evs\_eventids.h.

**12.98.2.26 CFE\_EVS\_EVT\_FILTERED\_EID** #define CFE\_EVS\_EVT\_FILTERED\_EID 37  
EVS Add Filter Command Duplicate Registration Event ID.

Type: ERROR

Cause:

[EVS Add Filter Command](#) failure due to event already being registered for filtering.  
Definition at line 412 of file cfe\_evs\_eventids.h.

**12.98.2.27 CFE\_EVS\_FILTER\_MAX\_EID** #define CFE\_EVS\_FILTER\_MAX\_EID 42  
EVS Filter Max Count Reached Event ID.

Type: INFORMATIONAL

Cause:

Filter count for the event reached CFE\_EVS\_MAX\_FILTER\_COUNT and is latched until filter is reset.  
Definition at line 468 of file cfe\_evs\_eventids.h.

**12.98.2.28 CFE\_EVS\_LEN\_ERR\_EID** #define CFE\_EVS\_LEN\_ERR\_EID 43  
EVS Invalid Command Length Event ID.

Type: ERROR

Cause:

Invalid length for the command code in message ID [CFE\\_EVS\\_CMD\\_MID](#) received on the EVS message pipe.  
Definition at line 479 of file cfe\_evs\_eventids.h.

**12.98.2.29 CFE\_EVS\_LOGMODE\_EID** #define CFE\_EVS\_LOGMODE\_EID 38  
EVS Set Log Mode Command Success Event ID.

Type: DEBUG

Cause:

[EVS Set Log Mode Command](#) success.  
Definition at line 423 of file cfe\_evs\_eventids.h.

**12.98.2.30 CFE\_EVS\_NOOP\_EID** #define CFE\_EVS\_NOOP\_EID 0  
EVS No-op Command Success Event ID.

Type: INFORMATION

Cause:

[EVS NO-OP command](#) success.

Definition at line 42 of file cfe\_evs\_eventids.h.

**12.98.2.31 CFE\_EVS\_RSTALLFILTER\_EID** #define CFE\_EVS\_RSTALLFILTER\_EID 29  
EVS Reset All Filters Command Success Event ID.

Type: DEBUG

Cause:

[EVS Reset All Filters Command](#) success.

Definition at line 356 of file cfe\_evs\_eventids.h.

**12.98.2.32 CFE\_EVS\_RSTCNT\_EID** #define CFE\_EVS\_RSTCNT\_EID 16  
EVS Reset Counters Command Success Event ID.

Type: DEBUG

Cause:

[EVS Reset Counters Command](#) success.

Definition at line 213 of file cfe\_evs\_eventids.h.

**12.98.2.33 CFE\_EVS\_RSTEVTCNT\_EID** #define CFE\_EVS\_RSTEVTCNT\_EID 27  
EVS Reset App Event Counter Command Success Event ID.

Type: DEBUG

Cause:

[EVS Reset App Event Counter Command](#) success.

Definition at line 334 of file cfe\_evs\_eventids.h.

**12.98.2.34 CFE\_EVS\_RSTFILTER\_EID** #define CFE\_EVS\_RSTFILTER\_EID 28  
EVS Reset App Event Filter Command Success Event ID.

Type: DEBUG

Cause:

[EVS Reset App Event Filter Command](#) success.  
Definition at line 345 of file cfe\_evs\_eventids.h.

**12.98.2.35 CFE\_EVS\_SETEVTFMTMOD\_EID** #define CFE\_EVS\_SETEVTFMTMOD\_EID 22  
EVS Set Event Format Mode Command Success Event ID.

Type: DEBUG

Cause:

[EVS Set Event Format Mode Command](#) success.  
Definition at line 279 of file cfe\_evs\_eventids.h.

**12.98.2.36 CFE\_EVS\_SETFILTERMSK\_EID** #define CFE\_EVS\_SETFILTERMSK\_EID 17  
EVS Set Filter Command Success Event ID.

Type: DEBUG

Cause:

[EVS Set Filter Command](#) success.  
Definition at line 224 of file cfe\_evs\_eventids.h.

**12.98.2.37 CFE\_EVS\_SQUELCHED\_ERR\_EID** #define CFE\_EVS\_SQUELCHED\_ERR\_EID 44  
EVS Events Squelched Error Event ID.

Type: ERROR

Cause:

Events generated in app at a rate in excess of [CFE\\_PLATFORM\\_EVS\\_MAX\\_APP\\_EVENT\\_BURST](#) in one moment or  
[CFE\\_PLATFORM\\_EVS\\_APP\\_EVENTS\\_PER\\_SEC](#) sustained  
Definition at line 492 of file cfe\_evs\_eventids.h.

**12.98.2.38 CFE\_EVS\_STARTUP\_EID** #define CFE\_EVS\_STARTUP\_EID 1  
EVS Initialization Event ID.

Type: INFORMATION

Cause:

Event Services Task initialization complete.  
Definition at line 53 of file cfe\_evs\_eventids.h.

**12.98.2.39 CFE\_EVS\_WRDAT\_EID** #define CFE\_EVS\_WRDAT\_EID 32  
EVS Write Application Data Command Success Event ID.

Type: DEBUG

Cause:

[EVS Write Application Data Command](#) success.  
Definition at line 389 of file cfe\_evs\_eventids.h.

**12.98.2.40 CFE\_EVS\_WRITE\_HEADER\_ERR\_EID** #define CFE\_EVS\_WRITE\_HEADER\_ERR\_EID 14  
EVS Write File Header to Log File Failure Event ID.

Type: ERROR

Cause:

Bytes written during Write File Header to Log File was not equal to the expected header size.  
Definition at line 191 of file cfe\_evs\_eventids.h.

**12.98.2.41 CFE\_EVS\_WRLOG\_EID** #define CFE\_EVS\_WRLOG\_EID 33  
EVS Write Event Log Command Success Event ID.

Type: DEBUG

Cause:

[EVS Write Event Log Command](#) success.  
Definition at line 400 of file cfe\_evs\_eventids.h.

## 12.99 cfe/modules/fs/config/default\_cfe\_fs\_extern\_typedefs.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_fs_filedef.h"
```

### 12.99.1 Detailed Description

Declarations and prototypes for cfe\_fs\_extern\_typedefs module

## 12.100 cfe/modules/fs/config/default\_cfe\_fs\_filedef.h File Reference

```
#include "common_types.h"
#include "cfe_fs_interface_cfg.h"
```

### Data Structures

- struct [CFE\\_FS\\_Header](#)

*Standard cFE File header structure definition.*

### TypeDefs

- typedef uint32 CFE\_FS\_SubType\_Enum\_t
  - Content descriptor for File Headers.*
- typedef struct [CFE\\_FS\\_Header](#) CFE\_FS\_Header\_t
  - Standard cFE File header structure definition.*

### Enumerations

- enum CFE\_FS\_SubType {  
    CFE\_FS\_SubType\_ES\_ERLOG = 1, CFE\_FS\_SubType\_ES\_SYSLOG = 2, CFE\_FS\_SubType\_ES\_QUERYALL  
    = 3, CFE\_FS\_SubType\_ES\_PERFDATA = 4,  
    CFE\_FS\_SubType\_ES\_CDS\_REG = 6, CFE\_FS\_SubType\_TBL\_REG = 9, CFE\_FS\_SubType\_TBL\_IMG = 8,  
    CFE\_FS\_SubType\_EVS\_APPDATA = 15,  
    CFE\_FS\_SubType\_EVS\_EVENTLOG = 16, CFE\_FS\_SubType\_SB\_PIPEDATA = 20, CFE\_FS\_SubType\_SB\_ROUTEDATA  
    = 21, CFE\_FS\_SubType\_SB\_MAPDATA = 22,  
    CFE\_FS\_SubType\_ES\_QUERYALLTASKS = 23 }

*File subtypes used within cFE.*

### 12.100.1 Detailed Description

Declarations and prototypes for cfe\_fs\_extern\_typedefs module

### 12.100.2 Typedef Documentation

#### 12.100.2.1 CFE\_FS\_Header\_t [typedef struct CFE\\_FS\\_Header](#) CFE\_FS\_Header\_t

Standard cFE File header structure definition.

**12.100.2.2 CFE\_FS\_SubType\_Enum\_t** `typedef uint32 CFE_FS_SubType_Enum_t`  
Content descriptor for File Headers.

See also

enum [CFE\\_FS\\_SubType](#)

Definition at line 176 of file default\_cfe\_fs\_filedef.h.

### 12.100.3 Enumeration Type Documentation

#### 12.100.3.1 CFE\_FS\_SubType enum [CFE\\_FS\\_SubType](#)

File subtypes used within cFE.

This defines all the file subtypes used by cFE. Note apps can extend as needed but need to avoid conflicts (app context not currently included in the file header).

Enumerator

<code>CFE_FS_SubType_ES_ERLOG</code>	Executive Services Exception/Reset Log Type. Executive Services Exception/Reset Log File which is generated in response to a <a href="#">\$sc_\$cpu_ES_WriteERLog2File</a> command.
<code>CFE_FS_SubType_ES_SYSLOG</code>	Executive Services System Log Type. Executive Services System Log File which is generated in response to a <a href="#">\$sc_\$cpu_ES_WriteSysLog2File</a> command.
<code>CFE_FS_SubType_ES_QUERYALL</code>	Executive Services Information on All Applications File. Executive Services Information on All Applications File which is generated in response to a <a href="#">\$sc_\$cpu_ES_WriteApplInfo2File</a> command.
<code>CFE_FS_SubType_ES_PERFDATA</code>	Executive Services Performance Data File. Executive Services Performance Analyzer Data File which is generated in response to a <a href="#">\$sc_\$cpu_ES_StopLAData</a> command.
<code>CFE_FS_SubType_ES_CDS_REG</code>	Executive Services Critical Data Store Registry Dump File. Executive Services Critical Data Store Registry Dump File which is generated in response to a <a href="#">\$sc_\$cpu_ES_WriteCDS2File</a> command.
<code>CFE_FS_SubType_TBL_REG</code>	Table Services Registry Dump File. Table Services Registry Dump File which is generated in response to a <a href="#">\$sc_\$cpu_TBL_WriteReg2File</a> command.
<code>CFE_FS_SubType_TBL_IMG</code>	Table Services Table Image File. Table Services Table Image File which is generated either on the ground or in response to a <a href="#">\$sc_\$cpu_TBL_DUMP</a> command.
<code>CFE_FS_SubType_EVS_APPDATA</code>	Event Services Application Data Dump File. Event Services Application Data Dump File which is generated in response to a <a href="#">\$sc_\$cpu_EVS_WriteAppData2File</a> command.
<code>CFE_FS_SubType_EVS_EVENTLOG</code>	Event Services Local Event Log Dump File. Event Services Local Event Log Dump File which is generated in response to a <a href="#">\$sc_\$cpu_EVS_WriteLog2File</a> command.
<code>CFE_FS_SubType_SB_PIPEDATA</code>	Software Bus Pipe Data Dump File. Software Bus Pipe Data Dump File which is generated in response to a <a href="#">\$sc_\$cpu_SB_WritePipe2File</a> command.
<code>CFE_FS_SubType_SB_ROUTEDATA</code>	Software Bus Message Routing Data Dump File. Software Bus Message Routing Data Dump File which is generated in response to a <a href="#">\$sc_\$cpu_SB_WriteRouting2File</a> command.

**Enumerator**

CFE_FS_SubType_SB_MAPDATA	Software Bus Message Mapping Data Dump File. Software Bus Message Mapping Data Dump File which is generated in response to a <a href="#">\$sc_\$cpu_SB_WriteMap2File</a> command.
CFE_FS_SubType_ES_QUERYALLTASKS	Executive Services Query All Tasks Data File. Executive Services Query All Tasks Data File which is generated in response to a <a href="#">\$sc_\$cpu_ES_WriteTaskInfo2File</a> command.

Definition at line 39 of file default\_cfe\_fs\_filedef.h.

## 12.101 cfe/modules/fs/config/default\_cfe\_fs\_interface\_cfg.h File Reference

**Macros**

- `#define CFE_FS_HDR_DESC_MAX_LEN 32`  
*Max length of description field in a standard cFE File Header.*
- `#define CFE_FS_FILE_CONTENT_ID 0x63464531`  
*Magic Number for cFE compliant files (= 'cFE1')*

### 12.101.1 Detailed Description

Declarations and prototypes for cfe\_fs\_extern\_typedefs module

### 12.101.2 Macro Definition Documentation

#### 12.101.2.1 CFE\_FS\_FILE\_CONTENT\_ID `#define CFE_FS_FILE_CONTENT_ID 0x63464531`

Magic Number for cFE compliant files (= 'cFE1')

Definition at line 39 of file default\_cfe\_fs\_interface\_cfg.h.

#### 12.101.2.2 CFE\_FS\_HDR\_DESC\_MAX\_LEN `#define CFE_FS_HDR_DESC_MAX_LEN 32`

Max length of description field in a standard cFE File Header.

Definition at line 37 of file default\_cfe\_fs\_interface\_cfg.h.

## 12.102 cfe/modules/fs/config/default\_cfe\_fs\_mission\_cfg.h File Reference

```
#include "cfe_fs_interface_cfg.h"
```

### 12.102.1 Detailed Description

CFE File Services (CFE\_FS) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.103 cfe/modules/msg/fsw/inc/ccsds\_hdr.h File Reference

```
#include "common_types.h"
```

### Data Structures

- struct [CCSDS\\_PrimaryHeader](#)  
*CCSDS packet primary header.*
- struct [CCSDS\\_ExtendedHeader](#)  
*CCSDS packet extended header.*

### TypeDefs

- typedef struct [CCSDS\\_PrimaryHeader](#) CCSDS\_PrimaryHeader\_t  
*CCSDS packet primary header.*
- typedef struct [CCSDS\\_ExtendedHeader](#) CCSDS\_ExtendedHeader\_t  
*CCSDS packet extended header.*

### 12.103.1 Detailed Description

Define CCSDS packet header types

- Avoid direct access for portability, use APIs
- Used to construct message structures

### 12.103.2 Typedef Documentation

**12.103.2.1 CCSDS\_ExtendedHeader\_t** [typedef struct CCSDS\\_ExtendedHeader](#) CCSDS\_ExtendedHeader\_t  
CCSDS packet extended header.

**12.103.2.2 CCSDS\_PrimaryHeader\_t** [typedef struct CCSDS\\_PrimaryHeader](#) CCSDS\_PrimaryHeader\_t  
CCSDS packet primary header.

## 12.104 cfe/modules/resourceid/fsw/inc/cfe\_core\_resourceid\_basevalues.h File Reference

```
#include "cfe_resourceid_basevalue.h"
```

### Enumerations

- enum {  
[CFE\\_RESOURCEID\\_ES\\_TASKID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_OS\_TASK, [CFE\\_RESOURCEID\\_ES\\_APPID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 1, [CFE\\_RESOURCEID\\_ES\\_LIBID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 2, [CFE\\_RESOURCEID\\_ES\\_COUNTID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 3, [CFE\\_RESOURCEID\\_ES\\_POOLID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 4, [CFE\\_RESOURCEID\\_ES\\_CDSBLOCKID\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 5, [CFE\\_RESOURCEID\\_SB\\_PIPEID\\_RESOURCE\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 6, [CFE\\_RESOURCEID\\_CONFIGID\\_BASE\\_OFFSET](#) = OS\_OBJECT\_TYPE\_USER + 7}

- enum {
 `CFE_ES_TASKID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_TASKID\_BASE\_OFFSET),
 `CFE_ES_APPID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_APPID\_BASE\_OFFSET),
 `CFE_ES_LIBID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_LIBID\_BASE\_OFFSET),
 `CFE_ES_COUNTID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_COUNTID\_BASE\_OFFSET),
 `CFE_ES_POOLID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_POOLID\_BASE\_OFFSET),
 `CFE_ES_CDSBLOCKID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_ES\_CD\_BLOCKID\_BASE\_OFFSET),
 `CFE_SB_PIPEID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_SB\_PIPEID\_RESOURCE\_BASE\_OFFSET),
 `CFE_CONFIGID_BASE` = CFE\_RESOURCEID\_MAKE\_BASE(CFE\_RESOURCEID\_CONFIGID\_BASE\_OFFSET)
 }

#### 12.104.1 Detailed Description

Contains CFE internal prototypes and definitions related to resource management and related CFE resource IDs. A CFE ES Resource ID is a common way to identify CFE-managed resources such as apps, tasks, counters, memory pools, CDS blocks, and other entities.

### 12.105 cfe/modules/resourceid/fsw/inc/cfe\_resourceid\_basevalue.h File Reference

```
#include "cfe_resourceid_typedef.h"
#include "osapi-idmap.h"
```

#### Macros

- #define `CFE_RESOURCEID_SHIFT` OS\_OBJECT\_TYPE\_SHIFT
- #define `CFE_RESOURCEID_MAX` OS\_OBJECT\_INDEX\_MASK
- #define `CFE_RESOURCEID_MAKE_BASE`(offset) (CFE\_RESOURCEID\_MARK | ((offset) << `CFE_RESOURCEID_SHIFT`))

*A macro to generate a CFE resource ID base value from an offset.*

#### 12.105.1 Detailed Description

An implementation of CFE resource ID base values/limits that will be compatible with OSAL IDs. This is intended as a transitional tool to provide runtime value uniqueness, particularly when the "simple" (compatible) resource ID implementation is used. In this mode, compiler type checking is disabled, and so OSAL IDs can be silently interchanged with CFE IDs.

However, by ensuring uniqueness in the runtime values, any ID handling errors may at least be detectable at runtime. This still works fine with the "strict" resource ID option, but is less important as the compiler type checking should prevent this type of error before the code even runs.

The downside to this implementation is that it has a dependency on the OSAL ID structure.

#### 12.105.2 Macro Definition Documentation

##### 12.105.2.1 `CFE_RESOURCEID_MAKE_BASE` #define CFE\_RESOURCEID\_MAKE\_BASE( offset ) (CFE\_RESOURCEID\_MARK | ((offset) << `CFE_RESOURCEID_SHIFT`))

A macro to generate a CFE resource ID base value from an offset.

Each CFE ID range is effectively an extension of OSAL ID ranges by starting at OS\_OBJECT\_TYPE\_USER.

Definition at line 73 of file cfe\_resourceid\_basevalue.h.

**12.105.2.2 CFE\_RESOURCEID\_MAX** #define CFE\_RESOURCEID\_MAX OS\_OBJECT\_INDEX\_MASK  
Definition at line 65 of file cfe\_resourceid\_basevalue.h.

**12.105.2.3 CFE\_RESOURCEID\_SHIFT** #define CFE\_RESOURCEID\_SHIFT OS\_OBJECT\_TYPE\_SHIFT  
Definition at line 64 of file cfe\_resourceid\_basevalue.h.

## 12.106 cfe/modules/sb/config/default\_cfe\_sb\_extern\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_resourceid_typedef.h"
```

### Data Structures

- struct [CFE\\_SB\\_MsgId\\_t](#)  
*CFE\_SB\_MsgId\_t type definition.*
- struct [CFE\\_SB\\_Qos\\_t](#)  
*Quality Of Service Type Definition.*

### Macros

- #define [CFE\\_SB\\_SUB\\_ENTRIES\\_PER\\_PKT](#) 20  
*Configuration parameter used by SBN App.*

### TypeDefs

- typedef uint8 [CFE\\_SB\\_QosPriority\\_Enum\\_t](#)  
*Selects the priority level for message routing.*
- typedef uint8 [CFE\\_SB\\_QosReliability\\_Enum\\_t](#)  
*Selects the reliability level for message routing.*
- typedef uint16 [CFE\\_SB\\_Routeld\\_Atom\\_t](#)  
*An integer type that should be used for indexing into the Routing Table.*
- typedef uint32 [CFE\\_SB\\_MsgId\\_Atom\\_t](#)  
*CFE\_SB\_MsgId\_Atom\_t primitive type definition.*
- typedef CFE\_RESOURCEID\_BASE\_TYPE [CFE\\_SB\\_Pipeld\\_t](#)  
*CFE\_SB\_Pipeld\_t to primitive type definition.*

### Enumerations

- enum [CFE\\_SB\\_QosPriority](#) { [CFE\\_SB\\_QosPriority\\_LOW](#) = 0, [CFE\\_SB\\_QosPriority\\_HIGH](#) = 1 }  
*Label definitions associated with CFE\_SB\_QosPriority\_Enum\_t.*
- enum [CFE\\_SB\\_QosReliability](#) { [CFE\\_SB\\_QosReliability\\_LOW](#) = 0, [CFE\\_SB\\_QosReliability\\_HIGH](#) = 1 }  
*Label definitions associated with CFE\_SB\_QosReliability\_Enum\_t.*

### 12.106.1 Detailed Description

Declarations and prototypes for cfe\_sb\_extern\_typedefs module

### 12.106.2 Macro Definition Documentation

**12.106.2.1 CFE\_SB\_SUB\_ENTRIES\_PER\_PKT** `#define CFE_SB_SUB_ENTRIES_PER_PKT 20`  
 Configuration parameter used by SBN App.  
 Definition at line 32 of file default\_cfe\_sb\_extern\_typedefs.h.

### 12.106.3 Typedef Documentation

**12.106.3.1 CFE\_SB\_MsgId\_Atom\_t** `typedef uint32 CFE_SB_MsgId_Atom_t`  
 CFE\_SB\_MsgId\_Atom\_t primitive type definition.

This is an integer type capable of holding any Message ID value Note: This value is limited via [CFE\\_PLATFORM\\_SB\\_HIGHEST\\_VALID\\_MESSAGE\\_ID](#).  
 Definition at line 91 of file default\_cfe\_sb\_extern\_typedefs.h.

**12.106.3.2 CFE\_SB\_Pipeld\_t** `typedef CFE_RESOURCEID_BASE_TYPE CFE_SB_PipeId_t`  
 CFE\_SB\_Pipeld\_t to primitive type definition.

Software Bus pipe identifier used in many SB APIs, as well as SB Telemetry messages and data files.  
 Definition at line 114 of file default\_cfe\_sb\_extern\_typedefs.h.

**12.106.3.3 CFE\_SB\_QosPriority\_Enum\_t** `typedef uint8 CFE_SB_QosPriority_Enum_t`  
 Selects the priority level for message routing.

See also

enum [CFE\\_SB\\_QosPriority](#)

Definition at line 55 of file default\_cfe\_sb\_extern\_typedefs.h.

**12.106.3.4 CFE\_SB\_QosReliability\_Enum\_t** `typedef uint8 CFE_SB_QosReliability_Enum_t`  
 Selects the reliability level for message routing.

See also

enum [CFE\\_SB\\_QosReliability](#)

Definition at line 78 of file default\_cfe\_sb\_extern\_typedefs.h.

**12.106.3.5 CFE\_SB\_Routeld\_Atom\_t** `typedef uint16 CFE_SB_RouteId_Atom_t`  
 An integer type that should be used for indexing into the Routing Table.  
 Definition at line 83 of file default\_cfe\_sb\_extern\_typedefs.h.

### 12.106.4 Enumeration Type Documentation

**12.106.4.1 CFE\_SB\_QosPriority** `enum CFE_SB_QosPriority`  
 Label definitions associated with CFE\_SB\_QosPriority\_Enum\_t.

Enumerator

<code>CFE_SB_QosPriority_LOW</code>	Normal priority level.
<code>CFE_SB_QosPriority_HIGH</code>	High priority.

Definition at line 37 of file default\_cfe\_sb\_extern\_typedefs.h.

#### 12.106.4.2 CFE\_SB\_QosReliability enum CFE\_SB\_QosReliability

Label definitions associated with CFE\_SB\_QosReliability\_Enum\_t.

Enumerator

CFE_SB_QosReliability_LOW	Normal (best-effort) reliability.
CFE_SB_QosReliability_HIGH	High reliability.

Definition at line 60 of file default\_cfe\_sb\_extern\_typedefs.h.

### 12.107 cfe/modules/sb/config/default\_cfe\_sb\_fcncodes.h File Reference

#### Macros

- #define CFE\_SB\_NOOP\_CC 0
- #define CFE\_SB\_RESET\_COUNTERS\_CC 1
- #define CFE\_SB\_SEND\_SB\_STATS\_CC 2
- #define CFE\_SB\_WRITE\_ROUTING\_INFO\_CC 3
- #define CFE\_SB\_ENABLE\_ROUTE\_CC 4
- #define CFE\_SB\_DISABLE\_ROUTE\_CC 5
- #define CFE\_SB\_WRITE\_PIPE\_INFO\_CC 7
- #define CFE\_SB\_WRITE\_MAP\_INFO\_CC 8
- #define CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC 9
- #define CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC 10
- #define CFE\_SB\_SEND\_PREV\_SUBS\_CC 11

#### 12.107.1 Detailed Description

Specification for the CFE Event Services (CFE\_SB) command function codes

#### Note

This file should be strictly limited to the command/function code (CC) macro definitions. Other definitions such as enums, typedefs, or other macros should be placed in the msgdefs.h or msg.h files.

#### 12.107.2 Macro Definition Documentation

##### 12.107.2.1 CFE\_SB\_DISABLE\_ROUTE\_CC #define CFE\_SB\_DISABLE\_ROUTE\_CC 5

**Name** Disable Software Bus Route

#### Description

This command will disable a particular destination. The destination is specified in terms of MsgID and PipeID. The MsgId and PipeID are parameters in the command. All destinations are enabled by default.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_DisRoute

**Command Structure**

[CFE\\_SB\\_DisableRouteCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_SB\\_CMDPC](#) - command execution counter will increment
- View routing information [CFE\\_SB\\_WRITE\\_ROUTING\\_INFO\\_CC](#) to verify enable/disable state change
- The [CFE\\_SB\\_DSBL RTE2 EID](#) debug event message will be generated
- Destination will stop receiving messages

**Error Conditions**

This command may fail for the following reason(s):

- the MsgId or PipeId parameters do not pass validation
- the destination does not exist.

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_SB\\_CMDEC](#) - command error counter will increment
- A command specific error event message is issued for all error cases. See [CFE\\_SB\\_DSBL RTE1 EID](#) or [CFE\\_SB\\_DSBL RTE3 EID](#)

**Criticality**

This command is not intended to be used in nominal conditions. It is possible to get into a state where a destination cannot be re-enabled without resetting the processor. For instance, sending this command with [CFE\\_SB\\_CMD\\_MID](#) and the SB\_Cmd\_Pipe would inhibit any ground commanding to the software bus until the processor was reset. There are similar problems that may occur when using this command.

Definition at line 271 of file default\_cfe\_sb\_fcncodes.h.

### 12.107.2.2 CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC #define CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC 10

**Name** Disable Subscription Reporting Command

**Description**

This command will disable subscription reporting and is intended to be used only by the CFS SBN (Software Bus Networking) Application. It is not intended to be sent from the ground or used by operations. When subscription reporting is enabled, SB will generate and send a software bus packet for each subscription received. The software bus packet that is sent contains the information received in the subscription API. This subscription report is needed by SBN if offboard routing is required.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_DisSubRptg

**Command Structure**

[CFE\\_SB\\_DisableSubReportingCmd\\_t](#)

**Command Verification**

Successful execution of this command will result in the suppression of packets (with the [CFE\\_SB\\_ONESUB\\_TLM\\_MID](#) MsgId) for each subscription received by SB through the subscription APIs.

**Error Conditions**

None

**Criticality**

None

**See also**

[CFE\\_SB\\_SingleSubscriptionTlm\\_t](#), [CFE\\_SB\\_ENABLE\\_SUB\\_REPORTING\\_CC](#), [CFE\\_SB\\_SEND\\_PREV\\_SUBS\\_CC](#)

Definition at line 428 of file default\_cfe\_sb\_fcncodes.h.

**12.107.2.3 CFE\_SB\_ENABLE\_ROUTE\_CC #define CFE\_SB\_ENABLE\_ROUTE\_CC 4**

**Name** Enable Software Bus Route

**Description**

This command will enable a particular destination. The destination is specified in terms of MsgID and PipeID. The MsgId and PipeID are parameters in the command. All destinations are enabled by default. This command is needed only after a [CFE\\_SB\\_DISABLE\\_ROUTE\\_CC](#) command is used.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_EnaRoute

**Command Structure**

[CFE\\_SB\\_EnableRouteCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDPC** - command execution counter will increment
- View routing information [CFE\\_SB\\_WRITE\\_ROUTING\\_INFO\\_CC](#) to verify enable/disable state change
- The [CFE\\_SB\\_ENBL RTE2 EID](#) debug event message will be generated
- Destination will begin receiving messages

**Error Conditions**

This command may fail for the following reason(s):

- the MsgId or PipeId parameters do not pass validation
- the destination does not exist.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases. See [CFE\\_SB\\_ENBL RTE1 EID](#) or [CFE\\_SB\\_ENBL RTE3 EID](#)

**Criticality**

This command is not inherently dangerous.

Definition at line 230 of file default\_cfe\_sb\_fcncodes.h.

**12.107.2.4 CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC #define CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC 9****Name** Enable Subscription Reporting Command**Description**

This command will enable subscription reporting and is intended to be used only by the CFS SBN (Software Bus Networking) Application. It is not intended to be sent from the ground or used by operations. When subscription reporting is enabled, SB will generate and send a software bus packet for each subscription received. The software bus packet that is sent contains the information received in the subscription API. This subscription report is needed by SBN if offboard routing is required.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_EnaSubRptg**Command Structure**[CFE\\_SB\\_EnableSubReportingCmd\\_t](#)**Command Verification**

Successful execution of this command will result in the sending of a packet (with the [CFE\\_SB\\_ONESUB\\_TLM\\_MID](#) MsgId) for each subscription received by SB through the subscription APIs.

**Error Conditions**

None

**Criticality**

None

**See also**[CFE\\_SB\\_SingleSubscriptionTlm\\_t](#), [CFE\\_SB\\_DISABLE\\_SUB\\_REPORTING\\_CC](#), [CFE\\_SB\\_SEND\\_PREV\\_SUBS\\_CC](#)

Definition at line 395 of file default\_cfe\_sb\_fcncodes.h.

**12.107.2.5 CFE\_SB\_NOOP\_CC #define CFE\_SB\_NOOP\_CC 0****Name** Software Bus No-Op**Description**

This command performs no other function than to increment the command execution counter. The command may be used to verify general aliveness of the Software Bus task.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_NOOP**Command Structure**[CFE\\_SB\\_NoopCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_SB_CMDPC` - command execution counter will increment
- The [CFE\\_SB\\_CMD0\\_RCVD\\_EID](#) informational event message will be generated

### Error Conditions

There are no error conditions for this command. If the Software Bus receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

### Criticality

None

### See also

Definition at line 66 of file default\_cfe\_sb\_fcncodes.h.

## 12.107.2.6 CFE\_SB\_RESET\_COUNTERS\_CC #define CFE\_SB\_RESET\_COUNTERS\_CC 1

### Name

Software Bus Reset Counters

### Description

This command resets the following counters within the Software Bus housekeeping telemetry:

- Command Execution Counter (`$sc_$cpu_SB_CMDPC`)
- Command Error Counter (`$sc_$cpu_SB_CMDEC`)
- No Subscribers Counter (`$sc_$cpu_SB_NoSubEC`)
- Duplicate Subscriptions Counter (`$sc_$cpu_SB_DupSubCnt`)
- Msg Send Error Counter (`$sc_$cpu_SB_MsgSndEC`)
- Msg Receive Error Counter (`$sc_$cpu_SB_MsgRecEC`)
- Internal Error Counter (`$sc_$cpu_SB_InternalEC`)
- Create Pipe Error Counter (`$sc_$cpu_SB_NewPipeEC`)
- Subscribe Error Counter (`$sc_$cpu_SB_SubscrEC`)
- Pipe Overflow Error Counter (`$sc_$cpu_SB_PipeOvrEC`)
- Msg Limit Error Counter (`$sc_$cpu_SB_MsgLimEC`)

### Command Mnemonic(s)

`$sc_$cpu_SB_ResetCtrs`

### Command Structure

[CFE\\_SB\\_ResetCountersCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDPC** - command execution counter will be reset to 0
- All other counters listed in description will be reset to 0
- The [CFE\\_SB\\_CMD1\\_RCVD\\_EID](#) informational event message will be generated

### Error Conditions

There are no error conditions for this command. If the Software Bus receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

### Criticality

This command is not inherently dangerous. However, it is possible for ground systems and on-board safing procedures to be designed such that they react to changes in the counter values that are reset by this command.

### See also

Definition at line 113 of file default\_cfe\_sb\_fcncodes.h.

## 12.107.2.7 CFE\_SB\_SEND\_PREV\_SUBS\_CC #define CFE\_SB\_SEND\_PREV\_SUBS\_CC 11

**Name** Send Previous Subscriptions Command

**This command generates a series of packets that contain information**

regarding all subscriptions previously received by SB. This command is intended to be used only by the CFS SBN(Software Bus Networking) Application. It is not intended to be sent from the ground or used by operations. When this command is received the software bus will generate and send a series of packets containing information about all subscription previously received.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_SendPrevSubs

### Command Structure

[CFE\\_SB\\_SendPrevSubsCmd\\_t](#)

### Command Verification

Successful execution of this command will result in a series of packets (with the [CFE\\_SB\\_ALLSUBS\\_TLM\\_MID](#) MsgId) being sent on the software bus.

### Error Conditions

None

### Criticality

None

### See also

[CFE\\_SB\\_AllSubscriptionsTlm\\_t](#), [CFE\\_SB\\_ENABLE\\_SUB\\_REPORTING\\_CC](#), [CFE\\_SB\\_DISABLE\\_SUB\\_REPORTING\\_CC](#)

Definition at line 460 of file default\_cfe\_sb\_fcncodes.h.

**12.107.2.8 CFE\_SB\_SEND\_SB\_STATS\_CC** #define CFE\_SB\_SEND\_SB\_STATS\_CC 2**Name** Send Software Bus Statistics**Description**

This command will cause the SB task to send a statistics packet containing current utilization figures and high water marks which may be useful for checking the margin of the SB platform configuration settings.

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_DumpStats**Command Structure**[CFE\\_SB\\_SendSbStatsCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_SB\\_CMDPC](#) - command execution counter will increment
- Receipt of statistics packet with MsgId [CFE\\_SB\\_STATS\\_TLM\\_MID](#)
- The [CFE\\_SB SND\\_STATS\\_EID](#) debug event message will be generated

**Error Conditions**

There are no error conditions for this command. If the Software Bus receives the command, the debug event is sent and the counter is incremented unconditionally.

**Criticality**

This command is not inherently dangerous. It will create and send a message on the software bus. If performed repeatedly, it is possible that receiver pipes may overflow.

**See also**

Definition at line 147 of file default\_cfe\_sb\_fcncodes.h.

**12.107.2.9 CFE\_SB\_WRITE\_MAP\_INFO\_CC** #define CFE\_SB\_WRITE\_MAP\_INFO\_CC 8**Name** Write Map Info to a File**This command will create a file containing the software bus message**

map information. The message map is a lookup table (an array of uint16s) that allows fast access to the correct routing table element during a software bus send operation. This is diagnostic information that may be needed due to the dynamic nature of the cFE software bus. An absolute path and filename may be specified in the command. If this command field contains an empty string (NULL terminator as the first character) the default file path and name is used. The default file path and name is defined in the platform configuration file as [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_MAP\\_FILENAME](#).

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_WriteMap2File

#### Command Structure

[CFE\\_SB\\_WriteMapInfoCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDPC** - command execution counter will increment. NOTE: the command counter is incremented when the request is accepted, before writing the file, which is performed as a background task.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_MAP\\_FILENAME](#) configuration parameter) will be updated with the latest information.
- The [CFE\\_SB SND RTG EID](#) debug event message will be generated

#### Error Conditions

This command may fail for the following reason(s):

- A previous request to write a software bus information file has not yet completed
- The specified FileName cannot be parsed

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases. See [CFE\\_SB SND RTG ERR1 EID](#) and [CFE\\_SB\\_FILEWRITE\\_ERR\\_EID](#)

#### Criticality

This command is not inherently dangerous. It will create a new file in the file system and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

Definition at line 362 of file default\_cfe\_sb\_fcncodes.h.

### 12.107.2.10 CFE\_SB\_WRITE\_PIPE\_INFO\_CC #define CFE\_SB\_WRITE\_PIPE\_INFO\_CC 7

**Name** Write Pipe Info to a File

#### Description

This command will create a file containing the software bus pipe information. The pipe information contains information about every pipe that has been created through the [CFE\\_SB\\_CreatePipe](#) API. An absolute path and filename may be specified in the command. If this command field contains an empty string (NULL terminator as the first character) the default file path and name is used. The default file path and name is defined in the platform configuration file as [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_PIPE\\_FILENAME](#).

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_WritePipe2File

#### Command Structure

[CFE\\_SB\\_WritePipeInfoCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDPC** - command execution counter will increment. NOTE: the command counter is incremented when the request is accepted, before writing the file, which is performed as a background task.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_PIPE\\_FILENAME](#) configuration parameter) will be updated with the latest information.
- The [CFE\\_SB SND RTG EID](#) debug event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- A previous request to write a software bus information file has not yet completed
- The specified FileName cannot be parsed

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases. See [CFE\\_SB SND RTG ERR1 EID](#) and [CFE\\_SB FILEWRITE\\_ERR EID](#)

### Criticality

This command is not inherently dangerous. It will create a new file in the file system and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

Definition at line 316 of file default\_cfe\_sb\_fcncodes.h.

## 12.107.2.11 CFE\_SB\_WRITE\_ROUTING\_INFO\_CC #define CFE\_SB\_WRITE\_ROUTING\_INFO\_CC 3

**Name** Write Software Bus Routing Info to a File

### Description

This command will create a file containing the software bus routing information. The routing information contains information about every subscription that has been received through the SB subscription APIs. An absolute path and filename may be specified in the command. If this command field contains an empty string (NULL terminator as the first character) the default file path and name is used. The default file path and name is defined in the platform configuration file as [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_ROUTING\\_FILENAME](#).

**Command Mnemonic(s)** \$sc\_\$cpu\_SB\_WriteRouting2File

### Command Structure

[CFE\\_SB\\_WriteRoutingInfoCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_SB\_CMDPC** - command execution counter will increment. NOTE: the command counter is incremented when the request is accepted, before writing the file, which is performed as a background task.
- The file specified in the command (or the default specified by the [CFE\\_PLATFORM\\_SB\\_DEFAULT\\_ROUTING\\_FILENAME](#) configuration parameter) will be updated with the latest information.
- The [CFE\\_SB SND RTG EID](#) debug event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- A previous request to write a software bus information file has not yet completed
- The specified FileName cannot be parsed

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_SB_CMDEC` - command error counter will increment
- A command specific error event message is issued for all error cases. See [CFE\\_SB SND RTG\\_ERR1\\_EID](#) and [CFE\\_SB\\_FILEWRITE\\_ERR\\_EID](#)

### Criticality

This command is not inherently dangerous. It will create a new file in the file system and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

Definition at line 192 of file default\_cfe\_sb\_fcncodes.h.

## 12.108 cfe/modules/sb/config/default\_cfe\_sb\_interface\_cfg.h File Reference

### Macros

- `#define CFE_MISSION_SB_MAX_SB_MSG_SIZE 32768`
- `#define CFE_MISSION_SB_MAX_PIPES 64`

### 12.108.1 Detailed Description

CFE Software Bus (CFE\_SB) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.108.2 Macro Definition Documentation

#### 12.108.2.1 CFE\_MISSION\_SB\_MAX\_PIPES `#define CFE_MISSION_SB_MAX_PIPES 64`

**Purpose** Maximum Number of pipes that SB command/telemetry messages may hold

##### Description:

Dictates the maximum number of unique Pipes the SB message definitions will hold.

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

##### Limits

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

Definition at line 67 of file default\_cfe\_sb\_interface\_cfg.h.

**12.108.2.2 CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE** #define CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE 32768

**Purpose** Maximum SB Message Size

**Description:**

The following definition dictates the maximum message size allowed on the software bus. SB checks the pkt length field in the header of all messages sent. If the pkt length field indicates the message is larger than this define, SB sends an event and rejects the send.

**Limits**

This parameter has a lower limit of 6 (CCSDS primary header size). There are no restrictions on the upper limit however, the maximum message size is system dependent and should be verified. Total message size values that are checked against this configuration are defined by a 16 bit data word.

Definition at line 50 of file default\_cfe\_sb\_interface\_cfg.h.

**12.109 cfe/modules/sb/config/default\_cfe\_sb\_internal\_cfg.h File Reference**

**Macros**

- #define CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS 256
- #define CFE\_PLATFORM\_SB\_MAX\_PIPES 64
- #define CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT 16
- #define CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT 4
- #define CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES 524288
- #define CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID 0x1FFF
- #define CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME "/ram/cfe\_sb\_route.dat"
- #define CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME "/ram/cfe\_sb\_pipe.dat"
- #define CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME "/ram/cfe\_sb\_msgmap.dat"
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT1 CFE\_SB\_SEND\_NO\_SUBS\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK1 CFE\_EVS\_FIRST\_4\_STOP
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT2 CFE\_SB\_DUP\_SUBSCRIPTION\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK2 CFE\_EVS\_FIRST\_4\_STOP
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT3 CFE\_SB\_MSGID\_LIM\_ERR\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK3 CFE\_EVS\_FIRST\_16\_STOP
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT4 CFE\_SB\_Q\_FULL\_ERR\_EID
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK4 CFE\_EVS\_FIRST\_16\_STOP
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT5 0
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK5 CFE\_EVS\_NO\_FILTER
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT6 0
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK6 CFE\_EVS\_NO\_FILTER
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT7 0
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK7 CFE\_EVS\_NO\_FILTER
- #define CFE\_PLATFORM\_SB\_FILTERED\_EVENT8 0
- #define CFE\_PLATFORM\_SB\_FILTER\_MASK8 CFE\_EVS\_NO\_FILTER
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01 8
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02 16
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03 20
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04 36
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05 64
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06 96

- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07 128
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08 160
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09 256
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10 512
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11 1024
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12 2048
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13 4096
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14 8192
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15 16384
- #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16 32768
- #define CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE (CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE + 128)
- #define CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY 64
- #define CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

### 12.109.1 Detailed Description

CFE Software Bus (CFE\_SB) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.109.2 Macro Definition Documentation

**12.109.2.1 CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES** #define CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYT↔  
ES 524288

**Purpose** Size of the SB buffer memory pool

**Description:**

Dictates the size of the SB memory pool. For each message the SB sends, the SB dynamically allocates from this memory pool, the memory needed to process the message. The memory needed to process each message is msg size + msg descriptor(CFE\_SB\_BufferD\_t). This memory pool is also used to allocate destination descriptors (CFE\_SB\_DestinationD\_t) during the subscription process. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'. Some memory statistics have been added to the SB housekeeping packet. NOTE: It is important to monitor these statistics to ensure the desired memory margin is met.

**Limits**

This parameter has a lower limit of 512 and an upper limit of UINT\_MAX (4 Gigabytes).

Definition at line 123 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.2 CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILE↔  
NAME "/ram/cfe\_sb\_msgmap.dat"

**Purpose** Default Message Map Filename

**Description:**

The value of this constant defines the filename used to store the software bus message map information. This filename is used only when no filename is specified in the command. The message map is a lookup table (array of 16bit words) that has an element for each possible MsgId value and holds the routing table index for that MsgId. The Msg Map provides fast access to the destinations of a message.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 194 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.3 CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT** #define CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT 4

**Purpose** Default Subscription Message Limit

**Description:**

Dictates the default Message Limit when using the [CFE\\_SB\\_Subscribe](#) API. This will limit the number of messages with a specific message ID that can be received through a subscription. This only changes the default; other message limits can be set on a per subscription basis using [CFE\\_SB\\_SubscribeEx](#).

**Limits**

This parameter has a lower limit of 4 and an upper limit of 65535.

Definition at line 101 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.4 CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FIL↔  
ENAME "/ram/cfe\_sb\_pipe.dat"

**Purpose** Default Pipe Information Filename

**Description:**

The value of this constant defines the filename used to store the software bus pipe information. This filename is used only when no filename is specified in the command.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 177 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.5 CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME** #define CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME "/ram/cfe\_sb\_route.dat"

**Purpose** Default Routing Information Filename

**Description:**

The value of this constant defines the filename used to store the software bus routing information. This filename is used only when no filename is specified in the command.

**Limits**

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 163 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.6 CFE\_PLATFORM\_SB\_FILTER\_MASK1** #define CFE\_PLATFORM\_SB\_FILTER\_MASK1 CFE\_EVS\_FIRST\_4\_STOP  
Definition at line 212 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.7 CFE\_PLATFORM\_SB\_FILTER\_MASK2** #define CFE\_PLATFORM\_SB\_FILTER\_MASK2 CFE\_EVS\_FIRST\_4\_STOP  
Definition at line 215 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.8 CFE\_PLATFORM\_SB\_FILTER\_MASK3** #define CFE\_PLATFORM\_SB\_FILTER\_MASK3 CFE\_EVS\_FIRST\_16\_STOP  
Definition at line 218 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.9 CFE\_PLATFORM\_SB\_FILTER\_MASK4** #define CFE\_PLATFORM\_SB\_FILTER\_MASK4 CFE\_EVS\_FIRST\_16\_STOP  
Definition at line 221 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.10 CFE\_PLATFORM\_SB\_FILTER\_MASK5** #define CFE\_PLATFORM\_SB\_FILTER\_MASK5 CFE\_EVS\_NO\_FILTER  
Definition at line 224 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.11 CFE\_PLATFORM\_SB\_FILTER\_MASK6** #define CFE\_PLATFORM\_SB\_FILTER\_MASK6 CFE\_EVS\_NO\_FILTER  
Definition at line 227 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.12 CFE\_PLATFORM\_SB\_FILTER\_MASK7** #define CFE\_PLATFORM\_SB\_FILTER\_MASK7 CFE\_EVS\_NO\_FILTER  
Definition at line 230 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.13 CFE\_PLATFORM\_SB\_FILTER\_MASK8** #define CFE\_PLATFORM\_SB\_FILTER\_MASK8 CFE\_EVS\_NO\_FILTER  
Definition at line 233 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.14 CFE\_PLATFORM\_SB\_FILTERED\_EVENT1**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT1 CFE_SB_SEND_NO_SUBS_EID
```

**Purpose** SB Event Filtering

**Description:**

This group of configuration parameters dictates what SB events will be filtered through SB. The filtering will begin after the SB task initializes and stay in effect until a cmd to SB changes it. This allows the operator to set limits on the number of event messages that are sent during system initialization. NOTE: Set all unused event values and mask values to zero

**Limits**

This filtering applies only to SB events. These parameters have a lower limit of 0 and an upper limit of 65535.

Definition at line 211 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.15 CFE\_PLATFORM\_SB\_FILTERED\_EVENT2**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT2 CFE_SB_DUP_SUBSCRIP_EID
```

Definition at line 214 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.16 CFE\_PLATFORM\_SB\_FILTERED\_EVENT3**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT3 CFE_SB_MSGID_LIM_ERR_EID
```

Definition at line 217 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.17 CFE\_PLATFORM\_SB\_FILTERED\_EVENT4**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT4 CFE_SB_Q_FULL_ERR_EID
```

Definition at line 220 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.18 CFE\_PLATFORM\_SB\_FILTERED\_EVENT5**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT5 0
```

Definition at line 223 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.19 CFE\_PLATFORM\_SB\_FILTERED\_EVENT6**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT6 0
```

Definition at line 226 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.20 CFE\_PLATFORM\_SB\_FILTERED\_EVENT7**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT7 0
```

Definition at line 229 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.21 CFE\_PLATFORM\_SB\_FILTERED\_EVENT8**

```
#define CFE_PLATFORM_SB_FILTERED_EVENT8 0
```

Definition at line 232 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.22 CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID**

```
#define CFE_PLATFORM_SB_HIGHEST_VALID_MSGID
```

ID 0x1FFF

**Purpose** Highest Valid Message Id

**Description:**

The value of this constant dictates the range of valid message ID's, from 0 to CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID (inclusive).

Although this can be defined differently across platforms, each platform can only publish/subscribe to message ids within their allowable range. Typically this value is set the same across all mission platforms to avoid this complexity.

**Limits**

CFE\_SB\_INVALID\_MSG is set to the maximum representable number of type [CFE\\_SB\\_MsgId\\_t](#). CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID lower limit is 1, up to CFE\_SB\_INVALID\_MSG\_ID - 1.

When using the direct message map implementation for software bus routing, this value is used to size the map where a value of 0xFFFF results in a 16 KBytes map and 0xFFFF is 128 KBytes.

When using the hash implementation for software bus routing, a multiple of the CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS is used to size the message map. In that case the range selected here does not impact message map memory use, so it's reasonable to use up to the full range supported by the message ID implementation.

Definition at line 149 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.23 CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE #define CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE ([CFE\\_MISSION\\_SB\\_MAX\\_SB\\_MESSAGE\\_BLOCK\\_SIZE](#) + 128)**

Definition at line 262 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.24 CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT #define CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT 16**

**Purpose** Maximum Number of unique local destinations a single MsgId can have

**Description:**

Dictates the maximum number of unique local destinations a single MsgId can have.

**Limits**

This parameter has a lower limit of 1. There are no restrictions on the upper limit however, the maximum number of destinations per packet is system dependent and should be verified. Destination number values that are checked against this configuration are defined by a 16 bit data word.

Definition at line 86 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.25 CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS #define CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS 256**

**Purpose** Maximum Number of Unique Message IDs SB Routing Table can hold

**Description:**

Dictates the maximum number of unique MsgIds the SB routing table will hold. This constant has a direct effect on the size of SB's tables and arrays. Keeping this count as low as possible will save memory. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'.

## Limits

This must be a power of two if software bus message routing hash implementation is being used. Lower than 64 will cause unit test failures, and telemetry reporting is impacted below 32. There is no hard upper limit, but impacts memory footprint. For software bus message routing search implementation the number of msg ids subscribed to impacts performance.

Definition at line 53 of file default\_cfe\_sb\_internal\_cfg.h.

### **12.109.2.26 CFE\_PLATFORM\_SB\_MAX\_PIPES** #define CFE\_PLATFORM\_SB\_MAX\_PIPES 64

**Purpose** Maximum Number of Unique Pipes SB Routing Table can hold

#### Description:

Dictates the maximum number of unique Pipes the SB routing table will hold. This constant has a direct effect on the size of SB's tables and arrays. Keeping this count as low as possible will save memory. To see the run-time, high-water mark and the current utilization figures regarding this parameter, send an SB command to 'Send Statistics Pkt'.

## Limits

This parameter has a lower limit of 1. This parameter must also be less than or equal to OS\_MAX\_QUEUES.

Definition at line 70 of file default\_cfe\_sb\_internal\_cfg.h.

### **12.109.2.27 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01 8

**Purpose** Define SB Memory Pool Block Sizes

#### Description:

Software Bus Memory Pool Block Sizes

## Limits

These sizes MUST be increasing and MUST be an integral multiple of 4. The number of block sizes defined cannot exceed [CFE\\_PLATFORM\\_ES\\_POOL\\_MAX\\_BUCKETS](#)

Definition at line 246 of file default\_cfe\_sb\_internal\_cfg.h.

### **12.109.2.28 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02 16

Definition at line 247 of file default\_cfe\_sb\_internal\_cfg.h.

### **12.109.2.29 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03 20

Definition at line 248 of file default\_cfe\_sb\_internal\_cfg.h.

### **12.109.2.30 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04 36

Definition at line 249 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.31 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05 64  
Definition at line 250 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.32 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06 96  
Definition at line 251 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.33 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07 128  
Definition at line 252 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.34 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08 160  
Definition at line 253 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.35 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09 256  
Definition at line 254 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.36 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10 512  
Definition at line 255 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.37 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11 1024  
Definition at line 256 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.38 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12 2048  
Definition at line 257 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.39 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13 4096  
Definition at line 258 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.40 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14 8192  
Definition at line 259 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.41 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15 16384  
Definition at line 260 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.42 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16** #define CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16 32768  
Definition at line 261 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.43 CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY 64

**Purpose** Define SB Task Priority

**Description:**

Defines the cFE\_SB Task priority.

**Limits**

Not Applicable

Definition at line 273 of file default\_cfe\_sb\_internal\_cfg.h.

**12.109.2.44 CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define SB Task Stack Size

**Description:**

Defines the cFE\_SB Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 288 of file default\_cfe\_sb\_internal\_cfg.h.

## 12.110 cfe/modules/sb/config/default\_cfe\_sb\_mission\_cfg.h File Reference

```
#include "cfe_sb_interface_cfg.h"
```

### 12.110.1 Detailed Description

CFE Event Services (CFE\_SB) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.111 cfe/modules/sb/config/default\_cfe\_sb\_msg.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_sb_fcncodes.h"
#include "cfe_sb_msgdefs.h"
#include "cfe_sb_msgstruct.h"
```

### 12.111.1 Detailed Description

Specification for the CFE Event Services (CFE\_SB) command and telemetry message data types.  
This is a compatibility header for the "cfe\_sb\_msg.h" file that has traditionally provided the message definitions for cFS apps.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.112 cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_es_extern_typedefs.h"
#include "cfe_sb_extern_typedefs.h"
#include "cfe_sb_fcncodes.h"
```

### Data Structures

- struct [CFE\\_SB\\_WriteFileInfoCmd\\_Payload](#)  
*Write File Info Command Payload.*
- struct [CFE\\_SB\\_RouteCmd\\_Payload](#)  
*Enable/Disable Route Command Payload.*
- struct [CFE\\_SB\\_HousekeepingTlm\\_Payload](#)
- struct [CFE\\_SB\\_PipeDepthStats](#)  
*SB Pipe Depth Statistics.*
- struct [CFE\\_SB\\_PipeInfoEntry](#)  
*SB Pipe Information File Entry.*
- struct [CFE\\_SB\\_StatsTlm\\_Payload](#)
- struct [CFE\\_SB\\_RoutingFileEntry](#)  
*SB Routing File Entry.*
- struct [CFE\\_SB\\_MsgMapFileEntry](#)  
*SB Map File Entry.*
- struct [CFE\\_SB\\_SingleSubscriptionTlm\\_Payload](#)
- struct [CFE\\_SB\\_SubEntries](#)  
*SB Previous Subscriptions Entry.*
- struct [CFE\\_SB\\_AllSubscriptionsTlm\\_Payload](#)

## Typedefs

- `typedef struct CFE_SB_WriteFileInfoCmd_Payload CFE_SB_WriteFileInfoCmd_Payload_t`  
*Write File Info Command Payload.*
- `typedef struct CFE_SB_RouteCmd_Payload CFE_SB_RouteCmd_Payload_t`  
*Enable/Disable Route Command Payload.*
- `typedef struct CFE_SB_HousekeepingTlm_Payload CFE_SB_HousekeepingTlm_Payload_t`
- `typedef struct CFE_SB_PipeDepthStats CFE_SB_PipeDepthStats_t`  
*SB Pipe Depth Statistics.*
- `typedef struct CFE_SB_PipeInfoEntry CFE_SB_PipeInfoEntry_t`  
*SB Pipe Information File Entry.*
- `typedef struct CFE_SB_StatsTlm_Payload CFE_SB_StatsTlm_Payload_t`
- `typedef struct CFE_SB_RoutingFileEntry CFE_SB_RoutingFileEntry_t`  
*SB Routing File Entry.*
- `typedef struct CFE_SB_MsgMapFileEntry CFE_SB_MsgMapFileEntry_t`  
*SB Map File Entry.*
- `typedef struct CFE_SB_SingleSubscriptionTlm_Payload CFE_SB_SingleSubscriptionTlm_Payload_t`
- `typedef struct CFE_SB_SubEntries CFE_SB_SubEntries_t`  
*SB Previous Subscriptions Entry.*
- `typedef struct CFE_SB_AllSubscriptionsTlm_Payload CFE_SB_AllSubscriptionsTlm_Payload_t`

### 12.112.1 Detailed Description

Specification for the CFE Event Services (CFE\_SB) command and telemetry message constant definitions.  
For CFE\_SB this is only the function/command code definitions

### 12.112.2 Typedef Documentation

#### 12.112.2.1 `CFE_SB_AllSubscriptionsTlm_Payload_t` `typedef struct CFE_SB_AllSubscriptionsTlm_Payload CFE_SB_AllSubscriptionsTlm_Payload_t`

**Name** SB Previous Subscriptions Packet

This structure defines the pkt(s) sent by SB that contains a list of all current subscriptions. This pkt is generated on cmd and intended to be used primarily by the Software Bus Networking Application (SBN). Typically, when the cmd is received there are more subscriptions than can fit in one pkt. The complete list of subscriptions is sent via a series of segmented pkts.

#### 12.112.2.2 `CFE_SB_HousekeepingTlm_Payload_t` `typedef struct CFE_SB_HousekeepingTlm_Payload CFE_SB_HousekeepingTlm_Payload_t`

**Name** Software Bus task housekeeping Packet

#### 12.112.2.3 `CFE_SB_MsgMapFileEntry_t` `typedef struct CFE_SB_MsgMapFileEntry CFE_SB_MsgMapFileEntry_t`

SB Map File Entry.

Structure of one element of the map information in response to `CFE_SB_WRITE_MAP_INFO_CC`

#### 12.112.2.4 `CFE_SB_PipeDepthStats_t` `typedef struct CFE_SB_PipeDepthStats CFE_SB_PipeDepthStats_t`

SB Pipe Depth Statistics.

Used in SB Statistics Telemetry Packet `CFE_SB_StatsTlm_t`

**12.112.2.5 CFE\_SB\_PipeInfoEntry\_t** `typedef struct CFE_SB_PipeInfoEntry CFE_SB_PipeInfoEntry_t`  
 SB Pipe Information File Entry.

This statistics structure is output as part of the CFE SB "Send Pipe Info" command (CFE\_SB\_SEND\_PIPE\_INFO\_CC). Previous versions of CFE simply wrote the internal CFE\_SB\_PipeD\_t object to the file, but this also contains information such as pointers which are not relevant outside the running CFE process.

By defining the pipe info structure separately, it also provides some independence, such that the internal CFE\_SB\_PipeD\_t definition can evolve without changing the binary format of the information file.

**12.112.2.6 CFE\_SB\_RouteCmd\_Payload\_t** `typedef struct CFE_SB_RouteCmd_Payload CFE_SB_RouteCmd_Payload_t`  
 Enable/Disable Route Command Payload.

This structure contains a definition used by two SB commands, 'Enable Route' [CFE\\_SB\\_ENABLE\\_ROUTE\\_CC](#) and 'Disable Route' [CFE\\_SB\\_DISABLE\\_ROUTE\\_CC](#). A route is the destination pipe for a particular message and is therefore defined as a MsgId and PipelD combination.

**12.112.2.7 CFE\_SB\_RoutingFileEntry\_t** `typedef struct CFE_SB_RoutingFileEntry CFE_SB_RoutingFileEntry_t`  
 SB Routing File Entry.

Structure of one element of the routing information in response to [CFE\\_SB\\_WRITE\\_ROUTING\\_INFO\\_CC](#)

**12.112.2.8 CFE\_SB\_SingleSubscriptionTlm\_Payload\_t** `typedef struct CFE_SB_SingleSubscriptionTlm_Payload CFE_SB_SingleSubscriptionTlm_Payload_t`

**Name** SB Subscription Report Packet

This structure defines the pkt sent by SB when a subscription or a request to unsubscribe is received while subscription reporting is enabled. By default subscription reporting is disabled. This feature is intended to be used primarily by Software Bus Networking Application (SBN)

See also

[CFE\\_SB\\_ENABLE\\_SUB\\_REPORTING\\_CC](#), [CFE\\_SB\\_DISABLE\\_SUB\\_REPORTING\\_CC](#)

**12.112.2.9 CFE\_SB\_StatsTlm\_Payload\_t** `typedef struct CFE_SB_StatsTlm_Payload CFE_SB_StatsTlm_Payload_t`

**Name** SB Statistics Telemetry Packet

SB Statistics packet sent in response to [CFE\\_SB\\_SEND\\_SB\\_STATS\\_CC](#)

**12.112.2.10 CFE\_SB\_SubEntries\_t** `typedef struct CFE_SB_SubEntries CFE_SB_SubEntries_t`  
 SB Previous Subscriptions Entry.

This structure defines an entry used in the CFE\_SB\_PrevSubsPkt\_t Intended to be used primarily by Software Bus Networking Application (SBN)

Used in structure definition [CFE\\_SB\\_AllSubscriptionsTlm\\_t](#)

**12.112.2.11 CFE\_SB\_WriteFileInfoCmd\_Payload\_t** `typedef struct CFE_SB_WriteFileInfoCmd_Payload CFE_SB_WriteFileInfoCmd_Payload_t`

Write File Info Command Payload.

This structure contains a generic definition used by SB commands that write to a file

**12.113 cfe/modules/sb/config/default\_cfe\_sb\_msgids.h File Reference**

```
#include "cfe_core_api_base_msgids.h"
#include "cfe_sb_topicids.h"
```

## Macros

- #define CFE\_SB\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_CMD\_TOPICID)  
/\* 0x1803 \*/
- #define CFE\_SB\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_SEND\_HK\_TOPICID)  
/\* 0x180B \*/
- #define CFE\_SB\_SUB\_RPT\_CTRL\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID)  
/\* 0x180E \*/
- #define CFE\_SB\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_HK\_TLM\_TOPICID)  
/\* 0x0803 \*/
- #define CFE\_SB\_STATS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID)  
/\* 0x080A \*/
- #define CFE\_SB\_ALLSUBS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID)  
/\* 0x080D \*/
- #define CFE\_SB\_ONESUB\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID)  
/\* 0x080E \*/

### 12.113.1 Detailed Description

CFE Event Services (CFE\_SB) Application Message IDs

### 12.113.2 Macro Definition Documentation

**12.113.2.1 CFE\_SB\_ALLSUBS\_TLM\_MID** #define CFE\_SB\_ALLSUBS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID)  
/\* 0x080D \*/  
Definition at line 41 of file default\_cfe\_sb\_msgids.h.

**12.113.2.2 CFE\_SB\_CMD\_MID** #define CFE\_SB\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_CMD\_TOPICID)  
/\* 0x1803 \*/  
Definition at line 32 of file default\_cfe\_sb\_msgids.h.

**12.113.2.3 CFE\_SB\_HK\_TLM\_MID** #define CFE\_SB\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_HK\_TLM\_TOPICID)  
/\* 0x0803 \*/  
Definition at line 39 of file default\_cfe\_sb\_msgids.h.

**12.113.2.4 CFE\_SB\_ONESUB\_TLM\_MID** #define CFE\_SB\_ONESUB\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID)  
/\* 0x080E \*/  
Definition at line 42 of file default\_cfe\_sb\_msgids.h.

**12.113.2.5 CFE\_SB\_SEND\_HK\_MID** #define CFE\_SB\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_SEND\_HK\_TOPICID)  
/\* 0x180B \*/  
Definition at line 33 of file default\_cfe\_sb\_msgids.h.

**12.113.2.6 CFE\_SB\_STATS\_TLM\_MID** #define CFE\_SB\_STATS\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID)  
/\* 0x080A \*/  
Definition at line 40 of file default\_cfe\_sb\_msgids.h.

**12.113.2.7 CFE\_SB\_SUB\_RPT\_CTRL\_MID** #define CFE\_SB\_SUB\_RPT\_CTRL\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISS  
/\* 0x180E \*/  
Definition at line 34 of file default\_cfe\_sb\_msgids.h.

## 12.114 cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h File Reference

```
#include "cfe_sb_msgdefs.h"  
#include "cfe_msg_hdr.h"
```

### Data Structures

- struct [CFE\\_SB\\_NoopCmd](#)
- struct [CFE\\_SB\\_ResetCountersCmd](#)
- struct [CFE\\_SB\\_EnableSubReportingCmd](#)
- struct [CFE\\_SB\\_DisableSubReportingCmd](#)
- struct [CFE\\_SB\\_SendSbStatsCmd](#)
- struct [CFE\\_SB\\_SendPrevSubsCmd](#)
- struct [CFE\\_SB\\_SendHkCmd](#)
- struct [CFE\\_SB\\_WriteRoutingInfoCmd](#)
- struct [CFE\\_SB\\_WritePipeInfoCmd](#)
- struct [CFE\\_SB\\_WriteMapInfoCmd](#)
- struct [CFE\\_SB\\_EnableRouteCmd](#)
- struct [CFE\\_SB\\_DisableRouteCmd](#)
- struct [CFE\\_SB\\_HousekeepingTlm](#)
- struct [CFE\\_SB\\_StatsTlm](#)
- struct [CFE\\_SB\\_SingleSubscriptionTlm](#)
- struct [CFE\\_SB\\_AllSubscriptionsTlm](#)

### Typedefs

- typedef struct [CFE\\_SB\\_NoopCmd](#) [CFE\\_SB\\_NoopCmd\\_t](#)
- typedef struct [CFE\\_SB\\_ResetCountersCmd](#) [CFE\\_SB\\_ResetCountersCmd\\_t](#)
- typedef struct [CFE\\_SB\\_EnableSubReportingCmd](#) [CFE\\_SB\\_EnableSubReportingCmd\\_t](#)
- typedef struct [CFE\\_SB\\_DisableSubReportingCmd](#) [CFE\\_SB\\_DisableSubReportingCmd\\_t](#)
- typedef struct [CFE\\_SB\\_SendSbStatsCmd](#) [CFE\\_SB\\_SendSbStatsCmd\\_t](#)
- typedef struct [CFE\\_SB\\_SendPrevSubsCmd](#) [CFE\\_SB\\_SendPrevSubsCmd\\_t](#)
- typedef struct [CFE\\_SB\\_SendHkCmd](#) [CFE\\_SB\\_SendHkCmd\\_t](#)
- typedef struct [CFE\\_SB\\_WriteRoutingInfoCmd](#) [CFE\\_SB\\_WriteRoutingInfoCmd\\_t](#)
- typedef struct [CFE\\_SB\\_WritePipeInfoCmd](#) [CFE\\_SB\\_WritePipeInfoCmd\\_t](#)
- typedef struct [CFE\\_SB\\_WriteMapInfoCmd](#) [CFE\\_SB\\_WriteMapInfoCmd\\_t](#)
- typedef struct [CFE\\_SB\\_EnableRouteCmd](#) [CFE\\_SB\\_EnableRouteCmd\\_t](#)
- typedef struct [CFE\\_SB\\_DisableRouteCmd](#) [CFE\\_SB\\_DisableRouteCmd\\_t](#)
- typedef struct [CFE\\_SB\\_HousekeepingTlm](#) [CFE\\_SB\\_HousekeepingTlm\\_t](#)
- typedef struct [CFE\\_SB\\_StatsTlm](#) [CFE\\_SB\\_StatsTlm\\_t](#)
- typedef struct [CFE\\_SB\\_SingleSubscriptionTlm](#) [CFE\\_SB\\_SingleSubscriptionTlm\\_t](#)
- typedef struct [CFE\\_SB\\_AllSubscriptionsTlm](#) [CFE\\_SB\\_AllSubscriptionsTlm\\_t](#)

### 12.114.1 Detailed Description

Purpose: cFE Executive Services (SB) Command and Telemetry packet definition file.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

## 12.114.2 Typedef Documentation

**12.114.2.1 CFE\_SB\_AllSubscriptionsTlm\_t** `typedef struct CFE_SB_AllSubscriptionsTlm CFE_SB_AllSubscriptionsTlm_t`

**12.114.2.2 CFE\_SB\_DisableRouteCmd\_t** `typedef struct CFE_SB_DisableRouteCmd CFE_SB_DisableRouteCmd_t`

**12.114.2.3 CFE\_SB\_DisableSubReportingCmd\_t** `typedef struct CFE_SB_DisableSubReportingCmd CFE_SB_DisableSubReportin`

**12.114.2.4 CFE\_SB\_EnableRouteCmd\_t** `typedef struct CFE_SB_EnableRouteCmd CFE_SB_EnableRouteCmd_t`

**12.114.2.5 CFE\_SB\_EnableSubReportingCmd\_t** `typedef struct CFE_SB_EnableSubReportingCmd CFE_SB_EnableSubReportin`

**12.114.2.6 CFE\_SB\_HousekeepingTlm\_t** `typedef struct CFE_SB_HousekeepingTlm CFE_SB_HousekeepingTlm_t`

**12.114.2.7 CFE\_SB\_NoopCmd\_t** `typedef struct CFE_SB_NoopCmd CFE_SB_NoopCmd_t`

**12.114.2.8 CFE\_SB\_ResetCountersCmd\_t** `typedef struct CFE_SB_ResetCountersCmd CFE_SB_ResetCountersCmd_t`

**12.114.2.9 CFE\_SB\_SendHkCmd\_t** `typedef struct CFE_SB_SendHkCmd CFE_SB_SendHkCmd_t`

**12.114.2.10 CFE\_SB\_SendPrevSubsCmd\_t** `typedef struct CFE_SB_SendPrevSubsCmd CFE_SB_SendPrevSubsCmd_t`

**12.114.2.11 CFE\_SB\_SendSbStatsCmd\_t** `typedef struct CFE_SB_SendSbStatsCmd CFE_SB_SendSbStatsCmd_t`

**12.114.2.12 CFE\_SB\_SingleSubscriptionTlm\_t** `typedef struct CFE_SB_SingleSubscriptionTlm CFE_SB_SingleSubscription`

**12.114.2.13 CFE\_SB\_StatsTlm\_t** `typedef struct CFE_SB_StatsTlm CFE_SB_StatsTlm_t`

**12.114.2.14 CFE\_SB\_WriteMapInfoCmd\_t** `typedef struct CFE_SB_WriteMapInfoCmd CFE_SB_WriteMapInfoCmd_t`

**12.114.2.15 CFE\_SB\_WritePipeInfoCmd\_t** `typedef struct CFE_SB_WritePipeInfoCmd CFE_SB_WritePipeInfoCmd_t`

**12.114.2.16 CFE\_SB\_WriteRoutingInfoCmd\_t** `typedef struct CFE_SB_WriteRoutingInfoCmd CFE_SB_WriteRoutingInfoCmd_t`

## 12.115 cfe/modules/sb/config/default\_cfe\_sb\_platform\_cfg.h File Reference

```
#include "cfe_sb_mission_cfg.h"
#include "cfe_sb_internal_cfg.h"
```

### 12.115.1 Detailed Description

CFE Software Bus (CFE\_SB) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.116 cfe/modules/sb/config/default\_cfe\_sb\_topicids.h File Reference

### Macros

- #define CFE\_MISSION\_SB\_CMD\_TOPICID 3
- #define CFE\_MISSION\_SB\_SEND\_HK\_TOPICID 11
- #define CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID 14
- #define CFE\_MISSION\_SB\_HK\_TLM\_TOPICID 3
- #define CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID 10
- #define CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID 13
- #define CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID 14

### 12.116.1 Detailed Description

CFE Software Bus (CFE\_SB) Application Topic IDs

### 12.116.2 Macro Definition Documentation

**12.116.2.1 CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID** #define CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID 13  
Definition at line 50 of file default\_cfe\_sb\_topicids.h.

**12.116.2.2 CFE\_MISSION\_SB\_CMD\_TOPICID** #define CFE\_MISSION\_SB\_CMD\_TOPICID 3

**Purpose** cFE Portable Message Numbers for Commands

**Description:**

Portable message numbers for the cFE command messages

**Limits**

Not Applicable

Definition at line 35 of file default\_cfe\_sb\_topicids.h.

**12.116.2.3 CFE\_MISSION\_SB\_HK\_TLM\_TOPICID** #define CFE\_MISSION\_SB\_HK\_TLM\_TOPICID 3

**Purpose** cFE Portable Message Numbers for Telemetry

**Description:**

Portable message numbers for the cFE telemetry messages

**Limits**

Not Applicable

Definition at line 48 of file default\_cfe\_sb\_topicids.h.

**12.116.2.4 CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID** #define CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID 14

Definition at line 51 of file default\_cfe\_sb\_topicids.h.

**12.116.2.5 CFE\_MISSION\_SB\_SEND\_HK\_TOPICID** #define CFE\_MISSION\_SB\_SEND\_HK\_TOPICID 11

Definition at line 36 of file default\_cfe\_sb\_topicids.h.

**12.116.2.6 CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID** #define CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID 10

Definition at line 49 of file default\_cfe\_sb\_topicids.h.

**12.116.2.7 CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID** #define CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID 14

Definition at line 37 of file default\_cfe\_sb\_topicids.h.

## 12.117 cfe/modules/sb/fsw/inc/cfe\_sb\_eventids.h File Reference

**Macros**

**SB event IDs**

- #define **CFE\_SB\_INIT\_EID** 1  
*SB Initialization Event ID.*
- #define **CFE\_SB\_CR\_PIPE\_BAD\_ARG\_EID** 2  
*SB Create Pipe API Bad Argument Event ID.*
- #define **CFE\_SB\_MAX\_PIPES\_MET\_EID** 3  
*SB Create Pipe API Max Pipes Exceeded Event ID.*
- #define **CFE\_SB\_CR\_PIPE\_ERR\_EID** 4  
*SB Create Pipe API Queue Create Failure Event ID.*
- #define **CFE\_SB\_PIPE\_ADDED\_EID** 5  
*SB Create Pipe API Success Event ID.*
- #define **CFE\_SB\_SUB\_ARG\_ERR\_EID** 6  
*SB Subscribe API Bad Argument Event ID.*
- #define **CFE\_SB\_DUP\_SUBSCRIP\_EID** 7  
*SB Subscribe API Duplicate MsgId Subscription Event ID.*
- #define **CFE\_SB\_MAX\_MSGS\_MET\_EID** 8  
*SB Subscribe API Max Subscriptions Exceeded Event ID.*
- #define **CFE\_SB\_MAX\_DESTS\_MET\_EID** 9

- #define CFE\_SB\_SUBSCRIPTION\_RCVD\_EID 10  
*SB Subscribe API Max Destinations Exceeded Event ID.*
- #define CFE\_SB\_UNSUB\_ARG\_ERR\_EID 11  
*SB Subscribe API Success Event ID.*
- #define CFE\_SB\_UNSUB\_NO\_SUBS\_EID 12  
*SB Unsubscribe API Bad Argument Event ID.*
- #define CFE\_SB\_SEND\_BAD\_ARG\_EID 13  
*SB Unsubscribe API No MsgId Subscription Event ID.*
- #define CFE\_SB\_SEND\_NO\_SUBS\_EID 14  
*SB Transmit API Bad Argument Event ID.*
- #define CFE\_SB\_MSG\_TOO\_BIG\_EID 15  
*SB Transmit API No MsgId Subscribers Event ID.*
- #define CFE\_SB\_GET\_BUF\_ERR\_EID 16  
*SB Transmit API Message Size Limit Exceeded Event ID.*
- #define CFE\_SB\_MSGID\_LIM\_ERR\_EID 17  
*SB Transmit API MsgId Pipe Limit Exceeded Event ID.*
- #define CFE\_SB\_RCV\_BAD\_ARG\_EID 18  
*SB Receive Buffer API Bad Argument Event ID.*
- #define CFE\_SB\_BAD\_PIPEID\_EID 19  
*SB Receive Buffer API Invalid Pipe Event ID.*
- #define CFE\_SB\_DEST\_BLK\_ERR\_EID 20  
*SB Subscribe API Get Destination Block Failure Event ID.*
- #define CFE\_SB\_SEND\_INV\_MSGID\_EID 21  
*SB Transmit API Invalid MsgId Event ID.*
- #define CFE\_SB\_SUBSCRIPTION\_RPT\_EID 22  
*SB Subscription Report Sent Event ID.*
- #define CFE\_SB\_HASHCOLLISION\_EID 23  
*SB Subscribe API Message Table Hash Collision Event ID.*
- #define CFE\_SB\_Q\_FULL\_ERR\_EID 25  
*SB Transmit API Pipe Overflow Event ID.*
- #define CFE\_SB\_Q\_WR\_ERR\_EID 26  
*SB Transmit API Queue Write Failure Event ID.*
- #define CFE\_SB\_Q\_RD\_ERR\_EID 27  
*SB Transmit API Queue Read Failure Event ID.*
- #define CFE\_SB\_CMD0\_RCVD\_EID 28  
*SB No-op Command Success Event ID.*
- #define CFE\_SB\_CMD1\_RCVD\_EID 29  
*SB Reset Counters Command Success Event ID.*
- #define CFE\_SB SND\_STATS\_EID 32  
*SB Send Statistics Command Success Event ID.*
- #define CFE\_SB\_ENBL RTE1\_EID 33  
*SB Enable Route Command Invalid MsgId/PipeID Pair Event ID.*
- #define CFE\_SB\_ENBL RTE2\_EID 34  
*SB Enable Route Command Success Event ID.*
- #define CFE\_SB\_ENBL RTE3\_EID 35  
*SB Enable Route Command Invalid MsgId or Pipe Event ID.*
- #define CFE\_SB\_DSBL RTE1\_EID 36  
*SB Disable Route Command Invalid MsgId/PipeID Pair Event ID.*
- #define CFE\_SB\_DSBL RTE2\_EID 37  
*SB Disable Route Command Success Event ID.*
- #define CFE\_SB\_DSBL RTE3\_EID 38  
*SB Disable Route Command Invalid MsgId or Pipe Event ID.*
- #define CFE\_SB SND RTG\_EID 39  
*SB File Write Success Event ID.*

- #define `CFE_SB SND RTG_ERR1_EID` 40  
*SB File Write Create File Failure Event ID.*
- #define `CFE_SB BAD CMD_CODE_EID` 42  
*SB Invalid Command Code Received Event ID.*
- #define `CFE_SB BAD MSGID_EID` 43  
*SB Invalid Message ID Received Event ID.*
- #define `CFE_SB FULL SUB_PKT_EID` 44  
*SB Send Previous Subscriptions Command Full Packet Sent Event ID.*
- #define `CFE_SB PART SUB_PKT_EID` 45  
*SB Send Previous Subscriptions Command Partial Packet Sent Event ID.*
- #define `CFE_SB DEL PIPE_ERR1_EID` 46  
*SB Pipe Delete API Bad Argument Event ID.*
- #define `CFE_SB PIPE_DELETED_EID` 47  
*SB Pipe Delete API Success Event ID.*
- #define `CFE_SB SUBSCRIPTION_REMOVED_EID` 48  
*SB Unsubscribe API Success Event ID.*
- #define `CFE_SB FILEWRITE_ERR_EID` 49  
*SB File Write Failed Event ID.*
- #define `CFE_SB SUB_INV_PIPE_EID` 50  
*SB Subscribe API Invalid Pipe Event ID.*
- #define `CFE_SB SUB_INV_CALLER_EID` 51  
*SB Subscribe API Not Owner Event ID.*
- #define `CFE_SB UNSUB_INV_PIPE_EID` 52  
*SB Unsubscribe API Invalid Pipe Event ID.*
- #define `CFE_SB UNSUB_INV_CALLER_EID` 53  
*SB Unsubscribe API Not Owner Event ID.*
- #define `CFE_SB DEL PIPE_ERR2_EID` 54  
*SB Delete Pipe API Not Owner Event ID.*
- #define `CFE_SB SETPIPEOPTS_ID_ERR_EID` 55  
*SB Set Pipe Opts API Invalid Pipe Event ID.*
- #define `CFE_SB SETPIPEOPTS_OWNER_ERR_EID` 56  
*SB Set Pipe Opts API Not Owner Event ID.*
- #define `CFE_SB SETPIPEOPTS_EID` 57  
*SB Set Pipe Opts API Success Event ID.*
- #define `CFE_SB GETPIPEOPTS_ID_ERR_EID` 58  
*SB Get Pipe Opts API Invalid Pipe Event ID.*
- #define `CFE_SB GETPIPEOPTS_PTR_ERR_EID` 59  
*SB Get Pipe Opts API Invalid Pointer Event ID.*
- #define `CFE_SB GETPIPEOPTS_EID` 60  
*SB Get Pipe Opts API Success Event ID.*
- #define `CFE_SB GETPIPENAME_EID` 62  
*SB Get Pipe Name API Success Event ID.*
- #define `CFE_SB GETPIPENAME_NULL_PTR_EID` 63  
*SB Get Pipe Name API Invalid Pointer Event ID.*
- #define `CFE_SB GETPIPENAME_ID_ERR_EID` 64  
*SB Get Pipe Name API Invalid Pipe or Resource Event ID.*
- #define `CFE_SB GETPIPEIDBYNAME_EID` 65  
*SB Get Pipe ID By Name API Success Event ID.*
- #define `CFE_SB GETPIPEIDBYNAME_NULL_PTR_EID` 66  
*SB Get Pipe ID By Name API Invalid Pointer Event ID.*
- #define `CFE_SB GETPIPEIDBYNAME_NAME_ERR_EID` 67  
*SB Get Pipe ID By Name API Name Not Found Or ID Not Matched Event ID.*
- #define `CFE_SB LEN_ERR_EID` 68  
*SB Invalid Command Length Event ID.*
- #define `CFE_SB CR_PIPE_NAME_TAKEN_EID` 69

- #define [CFE\\_SB\\_CR\\_PIPE\\_NO\\_FREE\\_EID](#) 70  
*SB Create Pipe API Name Taken Event ID.*
- #define [CFE\\_SB\\_SEND\\_MESSAGE\\_INTEGRITY\\_FAIL\\_EID](#) 71  
*SB Create Pipe API Queues Exhausted Event ID.*
- #define [CFE\\_SB\\_RCV\\_MESSAGE\\_INTEGRITY\\_FAIL\\_EID](#) 72  
*SB integrity actions on transmit message failure event.*
- #define [CFE\\_SB\\_RCV\\_MESSAGE\\_INTEGRITY\\_FAIL\\_EID](#) 72  
*SB validation of received message failure event.*

### 12.117.1 Detailed Description

cFE Software Bus Services Event IDs

### 12.117.2 Macro Definition Documentation

**12.117.2.1 CFE\_SB\_BAD\_CMD\_CODE\_EID** #define CFE\_SB\_BAD\_CMD\_CODE\_EID 42  
SB Invalid Command Code Received Event ID.

Type: ERROR

Cause:

Invalid command code for message ID [CFE\\_SB\\_CMD\\_MID](#) or [CFE\\_SB\\_SUB\\_RPT\\_CTRL\\_MID](#) received on the SB message pipe. OVERLOADED

Definition at line 461 of file cfe\_sb\_eventids.h.

**12.117.2.2 CFE\_SB\_BAD\_MSGID\_EID** #define CFE\_SB\_BAD\_MSGID\_EID 43  
SB Invalid Message ID Received Event ID.

Type: ERROR

Cause:

Invalid message ID received on the SB message pipe.

Definition at line 472 of file cfe\_sb\_eventids.h.

**12.117.2.3 CFE\_SB\_BAD\_PIPEID\_EID** #define CFE\_SB\_BAD\_PIPEID\_EID 19  
SB Receive Buffer API Invalid Pipe Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_ReceiveBuffer](#) API failure due to an invalid Pipe ID.

Definition at line 244 of file cfe\_sb\_eventids.h.

**12.117.2.4 CFE\_SB\_CMD0\_RCVD\_EID** #define CFE\_SB\_CMD0\_RCVD\_EID 28  
SB No-op Command Success Event ID.

Type: INFORMATION

Cause:

[SB NO-OP Command](#) success.

Definition at line 335 of file cfe\_sb\_eventids.h.

**12.117.2.5 CFE\_SB\_CMD1\_RCVD\_EID** #define CFE\_SB\_CMD1\_RCVD\_EID 29  
SB Reset Counters Command Success Event ID.

Type: DEBUG

Cause:

[SB Reset Counters Command](#) success.

Definition at line 346 of file cfe\_sb\_eventids.h.

**12.117.2.6 CFE\_SB\_CR\_PIPE\_BAD\_ARG\_EID** #define CFE\_SB\_CR\_PIPE\_BAD\_ARG\_EID 2  
SB Create Pipe API Bad Argument Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_CreatePipe](#) API failure due to a bad input argument.

Definition at line 53 of file cfe\_sb\_eventids.h.

**12.117.2.7 CFE\_SB\_CR\_PIPE\_ERR\_EID** #define CFE\_SB\_CR\_PIPE\_ERR\_EID 4  
SB Create Pipe API Queue Create Failure Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_CreatePipe](#) API failure creating the queue.

Definition at line 75 of file cfe\_sb\_eventids.h.

**12.117.2.8 CFE\_SB\_CR\_PIPE\_NAME\_TAKEN\_EID** #define CFE\_SB\_CR\_PIPE\_NAME\_TAKEN\_EID 69  
SB Create Pipe API Name Taken Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_CreatePipe](#) API failure due to pipe name taken.  
Definition at line 750 of file cfe\_sb\_eventids.h.

**12.117.2.9 CFE\_SB\_CR\_PIPE\_NO\_FREE\_EID** #define CFE\_SB\_CR\_PIPE\_NO\_FREE\_EID 70  
SB Create Pipe API Queues Exhausted Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_CreatePipe](#) API failure due to no free queues.  
Definition at line 761 of file cfe\_sb\_eventids.h.

**12.117.2.10 CFE\_SB\_DEL\_PIPE\_ERR1\_EID** #define CFE\_SB\_DEL\_PIPE\_ERR1\_EID 46  
SB Pipe Delete API Bad Argument Event ID.

Type: ERROR

Cause:

An SB Delete Pipe API failed due to an invalid input argument.  
Definition at line 507 of file cfe\_sb\_eventids.h.

**12.117.2.11 CFE\_SB\_DEL\_PIPE\_ERR2\_EID** #define CFE\_SB\_DEL\_PIPE\_ERR2\_EID 54  
SB Delete Pipe API Not Owner Event ID.

Type: ERROR

Cause:

An SB Delete Pipe API failed due to not being the pipe owner.  
Definition at line 595 of file cfe\_sb\_eventids.h.

**12.117.2.12 CFE\_SB\_DEST\_BLK\_ERR\_EID** #define CFE\_SB\_DEST\_BLK\_ERR\_EID 20  
SB Subscribe API Get Destination Block Failure Event ID.

Type: ERROR

Cause:

An SB Subscribe API call failed to get a destination block.  
Definition at line 255 of file cfe\_sb\_eventids.h.

**12.117.2.13 CFE\_SB\_DSBL RTE1\_EID** #define CFE\_SB\_DSBL RTE1\_EID 36  
SB Disable Route Command Invalid MsgId/PipeId Pair Event ID.

Type: ERROR

Cause:

[SB Disable Route Command](#) failure due to the Message ID not being subscribed to the pipe.  
Definition at line 404 of file cfe\_sb\_eventids.h.

**12.117.2.14 CFE\_SB\_DSBL RTE2\_EID** #define CFE\_SB\_DSBL RTE2\_EID 37  
SB Disable Route Command Success Event ID.

Type: DEBUG

Cause:

[SB Disable Route Command](#) success.  
Definition at line 415 of file cfe\_sb\_eventids.h.

**12.117.2.15 CFE\_SB\_DSBL RTE3\_EID** #define CFE\_SB\_DSBL RTE3\_EID 38  
SB Disable Route Command Invalid MsgId or Pipe Event ID.

Type: ERROR

Cause:

[SB Disable Route Command](#) failure due to an invalid MsgId or Pipe.  
Definition at line 427 of file cfe\_sb\_eventids.h.

**12.117.2.16 CFE\_SB\_DUP\_SUBSCRIP\_EID** #define CFE\_SB\_DUP\_SUBSCRIP\_EID 7  
SB Subscribe API Duplicate MsgId Subscription Event ID.

Type: INFORMATION

Cause:

An SB Subscribe API was called with a Message ID that was already subscribed on the pipe on the pipe.  
Definition at line 109 of file cfe\_sb\_eventids.h.

**12.117.2.17 CFE\_SB\_ENBL RTE1\_EID** #define CFE\_SB\_ENBL RTE1\_EID 33  
SB Enable Route Command Invalid MsgId/PipeID Pair Event ID.

Type: ERROR

Cause:

[SB Enable Route Command](#) failure due to the Message ID not being subscribed to the pipe.  
Definition at line 369 of file cfe\_sb\_eventids.h.

**12.117.2.18 CFE\_SB\_ENBL RTE2\_EID** #define CFE\_SB\_ENBL RTE2\_EID 34  
SB Enable Route Command Success Event ID.

Type: DEBUG

Cause:

[SB Enable Route Command](#) success.  
Definition at line 380 of file cfe\_sb\_eventids.h.

**12.117.2.19 CFE\_SB\_ENBL RTE3\_EID** #define CFE\_SB\_ENBL RTE3\_EID 35  
SB Enable Route Command Invalid MsgId or Pipe Event ID.

Type: ERROR

Cause:

[SB Enable Route Command](#) failure due to an invalid MsgId or Pipe.  
Definition at line 392 of file cfe\_sb\_eventids.h.

**12.117.2.20 CFE\_SB\_FILEWRITE\_ERR\_EID** #define CFE\_SB\_FILEWRITE\_ERR\_EID 49  
SB File Write Failed Event ID.

Type: ERROR

Cause:

An SB file write failure encountered when writing to the file.  
Definition at line 540 of file cfe\_sb\_eventids.h.

**12.117.2.21 CFE\_SB\_FULL\_SUB\_PKT\_EID** #define CFE\_SB\_FULL\_SUB\_PKT\_EID 44  
SB Send Previous Subscriptions Command Full Packet Sent Event ID.

Type: DEBUG

Cause:

[SB Send Previous Subscriptions Command](#) processing sent a full subscription packet.  
Definition at line 484 of file cfe\_sb\_eventids.h.

**12.117.2.22 CFE\_SB\_GET\_BUF\_ERR\_EID** #define CFE\_SB\_GET\_BUF\_ERR\_EID 16  
SB Transmit API Buffer Request Failure Event ID.

Type: ERROR

Cause:

An SB Transmit API call buffer request failed.  
Definition at line 210 of file cfe\_sb\_eventids.h.

**12.117.2.23 CFE\_SB\_GETPIPEIDBYNAME\_EID** #define CFE\_SB\_GETPIPEIDBYNAME\_EID 65  
SB Get Pipe ID By Name API Success Event ID.

Type: DEBUG

Cause:

[CFE\\_SB\\_GetPipeIdByName](#) success.  
Definition at line 705 of file cfe\_sb\_eventids.h.

**12.117.2.24 CFE\_SB\_GETPIPEIDBYNAME\_NAME\_ERR\_EID** #define CFE\_SB\_GETPIPEIDBYNAME\_NAME\_ERR\_EID 67

SB Get Pipe ID By Name API Name Not Found Or ID Not Matched Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeIdByName](#) failure due to name not found or ID mismatch. OVERLOADED  
Definition at line 727 of file cfe\_sb\_eventids.h.

**12.117.2.25 CFE\_SB\_GETPIPEIDBYNAME\_NULL\_ERR\_EID** #define CFE\_SB\_GETPIPEIDBYNAME\_NULL\_ERR\_EID 66

SB Get Pipe ID By Name API Invalid Pointer Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeIdByName](#) failure due to invalid pointer.  
Definition at line 716 of file cfe\_sb\_eventids.h.

**12.117.2.26 CFE\_SB\_GETPIPENAME\_EID** #define CFE\_SB\_GETPIPENAME\_EID 62

SB Get Pipe Name API Success Event ID.

Type: DEBUG

Cause:

[CFE\\_SB\\_GetPipeName](#) success.  
Definition at line 672 of file cfe\_sb\_eventids.h.

**12.117.2.27 CFE\_SB\_GETPIPENAME\_ID\_ERR\_EID** #define CFE\_SB\_GETPIPENAME\_ID\_ERR\_EID 64

SB Get Pipe Name API Invalid Pipe or Resource Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeName](#) failure due to invalid pipe ID or failure in retrieving resource name. OVERLOADED  
Definition at line 694 of file cfe\_sb\_eventids.h.

**12.117.2.28 CFE\_SB\_GETPIPENAME\_NULL\_PTR\_EID** #define CFE\_SB\_GETPIPENAME\_NULL\_PTR\_EID 63  
SB Get Pipe Name API Invalid Pointer Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeName](#) failure due to invalid pointer.  
Definition at line 683 of file cfe\_sb\_eventids.h.

**12.117.2.29 CFE\_SB\_GETPIPEOPTS\_EID** #define CFE\_SB\_GETPIPEOPTS\_EID 60  
SB Get Pipe Opt API Success Event ID.

Type: DEBUG

Cause:

[CFE\\_SB\\_GetPipeOpt](#) success.  
Definition at line 661 of file cfe\_sb\_eventids.h.

**12.117.2.30 CFE\_SB\_GETPIPEOPTS\_ID\_ERR\_EID** #define CFE\_SB\_GETPIPEOPTS\_ID\_ERR\_EID 58  
SB Get Pipe Opt API Invalid Pipe Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeOpt](#) failure due to invalid pipe ID.  
Definition at line 639 of file cfe\_sb\_eventids.h.

**12.117.2.31 CFE\_SB\_GETPIPEOPTS\_PTR\_ERR\_EID** #define CFE\_SB\_GETPIPEOPTS\_PTR\_ERR\_EID 59  
SB Get Pipe Opt API Invalid Pointer Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_GetPipeOpt](#) failure due to invalid pointer.  
Definition at line 650 of file cfe\_sb\_eventids.h.

**12.117.2.32 CFE\_SB\_HASHCOLLISION\_EID** #define CFE\_SB\_HASHCOLLISION\_EID 23  
SB Subscribe API Message Table Hash Collision Event ID.

Type: DEBUG

Cause:

An SB Subscribe API call caused a message table hash collision, which will impact message transmission performance. This can be resolved by deconflicting MsgId values or increasing [CFE\\_PLATFORM\\_SB\\_MAX\\_MSG\\_IDS](#).  
Definition at line 290 of file cfe\_sb\_eventids.h.

**12.117.2.33 CFE\_SB\_INIT\_EID** #define CFE\_SB\_INIT\_EID 1  
SB Initialization Event ID.

Type: INFORMATION

Cause:

Software Bus Services Task initialization complete.  
Definition at line 42 of file cfe\_sb\_eventids.h.

**12.117.2.34 CFE\_SB\_LEN\_ERR\_EID** #define CFE\_SB\_LEN\_ERR\_EID 68  
SB Invalid Command Length Event ID.

Type: ERROR

Cause:

Invalid length for the command code in message ID [CFE\\_SB\\_CMD\\_MID](#) or [CFE\\_SB\\_SUB\\_RPT\\_CTRL\\_MID](#) received on the SB message pipe.  
Definition at line 739 of file cfe\_sb\_eventids.h.

**12.117.2.35 CFE\_SB\_MAX\_DESTS\_MET\_EID** #define CFE\_SB\_MAX\_DESTS\_MET\_EID 9  
SB Subscribe API Max Destinations Exceeded Event ID.

Type: ERROR

Cause:

An SB Subscribe API was called with a message id that already has the maximum allowed number of destinations.  
Definition at line 133 of file cfe\_sb\_eventids.h.

**12.117.2.36 CFE\_SB\_MAX\_MSGS\_MET\_EID** #define CFE\_SB\_MAX\_MSGS\_MET\_EID 8  
SB Subscribe API Max Subscriptions Exceeded Event ID.

Type: ERROR

Cause:

An SB Subscribe API was called on a pipe that already has the maximum allowed number of subscriptions.  
Definition at line 121 of file cfe\_sb\_eventids.h.

**12.117.2.37 CFE\_SB\_MAX\_PIPES\_MET\_EID** #define CFE\_SB\_MAX\_PIPES\_MET\_EID 3  
SB Create Pipe API Max Pipes Exceeded Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_CreatePipe](#) API failure to do maximum number of pipes being exceeded.  
Definition at line 64 of file cfe\_sb\_eventids.h.

**12.117.2.38 CFE\_SB\_MSG\_TOO\_BIG\_EID** #define CFE\_SB\_MSG\_TOO\_BIG\_EID 15  
SB Transmit API Message Size Limit Exceeded Event ID.

Type: ERROR

Cause:

An SB Transmit API was called with a message that is too big.  
Definition at line 199 of file cfe\_sb\_eventids.h.

**12.117.2.39 CFE\_SB\_MSGID\_LIM\_ERR\_EID** #define CFE\_SB\_MSGID\_LIM\_ERR\_EID 17  
SB Transmit API MsgId Pipe Limit Exceeded Event ID.

Type: ERROR

Cause:

An SB Transmit API call failed to deliver the MsgId to a pipe due to the limit for the number of messages with that MsgId for that pipe being exceeded.  
Definition at line 222 of file cfe\_sb\_eventids.h.

**12.117.2.40 CFE\_SB\_PART\_SUB\_PKT\_EID** #define CFE\_SB\_PART\_SUB\_PKT\_EID 45  
SB Send Previous Subscriptions Command Partial Packet Sent Event ID.

Type: DEBUG

Cause:

[SB Send Previous Subscriptions Command](#) processing sent a partial subscription packet.  
Definition at line 496 of file cfe\_sb\_eventids.h.

**12.117.2.41 CFE\_SB\_PIPE\_ADDED\_EID** #define CFE\_SB\_PIPE\_ADDED\_EID 5  
SB Create Pipe API Success Event ID.

Type: DEBUG

Cause:

[CFE\\_SB\\_CreatePipe](#) API successfully completed.  
Definition at line 86 of file cfe\_sb\_eventids.h.

**12.117.2.42 CFE\_SB\_PIPE\_DELETED\_EID** #define CFE\_SB\_PIPE\_DELETED\_EID 47  
SB Pipe Delete API Success Event ID.

Type: DEBUG

Cause:

An SB Delete Pipe API successfully completed.  
Definition at line 518 of file cfe\_sb\_eventids.h.

**12.117.2.43 CFE\_SB\_Q\_FULL\_ERR\_EID** #define CFE\_SB\_Q\_FULL\_ERR\_EID 25  
SB Transmit API Pipe Overflow Event ID.

Type: ERROR

Cause:

An SB Transmit API call failed to deliver the Message ID to a pipe due to the pipe queue being full.  
Definition at line 302 of file cfe\_sb\_eventids.h.

**12.117.2.44 CFE\_SB\_Q\_RD\_ERR\_EID** #define CFE\_SB\_Q\_RD\_ERR\_EID 27  
SB Transmit API Queue Read Failure Event ID.

Type: ERROR

Cause:

An SB Transmit API call failed due to a pipe queue read failure.  
Definition at line 324 of file cfe\_sb\_eventids.h.

**12.117.2.45 CFE\_SB\_Q\_WR\_ERR\_EID** #define CFE\_SB\_Q\_WR\_ERR\_EID 26  
SB Transmit API Queue Write Failure Event ID.

Type: ERROR

Cause:

An SB Transmit API call failed due to a pipe queue write failure.  
Definition at line 313 of file cfe\_sb\_eventids.h.

**12.117.2.46 CFE\_SB\_RCV\_BAD\_ARG\_EID** #define CFE\_SB\_RCV\_BAD\_ARG\_EID 18  
SB Receive Buffer API Bad Argument Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_ReceiveBuffer](#) API failure due to a bad input argument.  
Definition at line 233 of file cfe\_sb\_eventids.h.

**12.117.2.47 CFE\_SB\_RCV\_MESSAGE\_INTEGRITY\_FAIL\_EID** #define CFE\_SB\_RCV\_MESSAGE\_INTEGRITY\_FAI←  
L\_EID 72  
SB validation of received message failure event.

Type: ERROR

Cause:

A CFE SB receive transaction has rejected a message due to failure of the associated message integrity action(s).  
Definition at line 785 of file cfe\_sb\_eventids.h.

**12.117.2.48 CFE\_SB\_SEND\_BAD\_ARG\_EID** #define CFE\_SB\_SEND\_BAD\_ARG\_EID 13  
SB Transmit API Bad Argument Event ID.

Type: ERROR

Cause:

An SB Transmit API failed due to an invalid input argument.  
Definition at line 177 of file cfe\_sb\_eventids.h.

**12.117.2.49 CFE\_SB\_SEND\_INV\_MSGID\_EID** #define CFE\_SB\_SEND\_INV\_MSGID\_EID 21  
SB Transmit API Invalid MsgId Event ID.

Type: ERROR

Cause:

An SB Transmit API was called with an invalid message ID.  
Definition at line 266 of file cfe\_sb\_eventids.h.

**12.117.2.50 CFE\_SB\_SEND\_MESSAGE\_INTEGRITY\_FAIL\_EID** #define CFE\_SB\_SEND\_MESSAGE\_INTEGRITY\_FAIL\_EID 71  
SB integrity actions on transmit message failure event.

Type: ERROR

Cause:

A CFE SB transmit transaction has rejected a message due to failure of the associated message integrity action(s).  
Definition at line 773 of file cfe\_sb\_eventids.h.

**12.117.2.51 CFE\_SB\_SEND\_NO\_SUBS\_EID** #define CFE\_SB\_SEND\_NO\_SUBS\_EID 14  
SB Transmit API No MsgId Subscribers Event ID.

Type: INFORMATION

Cause:

An SB Transmit API was called with a Message ID with no subscriptions.  
Definition at line 188 of file cfe\_sb\_eventids.h.

**12.117.2.52 CFE\_SB\_SETPipeOPTS\_EID** #define CFE\_SB\_SETPipeOPTS\_EID 57  
SB Set Pipe Opt API Success Event ID.

Type: DEBUG

Cause:

[CFE\\_SB\\_SetPipeOpt](#) success.

Definition at line 628 of file cfe\_sb\_eventids.h.

**12.117.2.53 CFE\_SB\_SETPipeOPTS\_ID\_ERR\_EID** #define CFE\_SB\_SETPipeOPTS\_ID\_ERR\_EID 55  
SB Set Pipe Opt API Invalid Pipe Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_SetPipeOpt](#) API failure due to an invalid pipe ID

Definition at line 606 of file cfe\_sb\_eventids.h.

**12.117.2.54 CFE\_SB\_SETPipeOPTS\_OWNER\_ERR\_EID** #define CFE\_SB\_SETPipeOPTS\_OWNER\_ERR\_EID 56  
SB Set Pipe Opt API Not Owner Event ID.

Type: ERROR

Cause:

[CFE\\_SB\\_SetPipeOpt](#) API failure due to not being the pipe owner.

Definition at line 617 of file cfe\_sb\_eventids.h.

**12.117.2.55 CFE\_SB\_SND\_RTG\_EID** #define CFE\_SB\_SND\_RTG\_EID 39  
SB File Write Success Event ID.

Type: DEBUG

Cause:

An SB file write successfully completed. OVERLOADED

Definition at line 438 of file cfe\_sb\_eventids.h.

**12.117.2.56 CFE\_SB SND RTG\_ERR1\_EID** #define CFE\_SB SND RTG\_ERR1\_EID 40  
SB File Write Create File Failure Event ID.

Type: ERROR

Cause:

An SB file write failure due to file creation error. OVERLOADED  
Definition at line 449 of file cfe\_sb\_eventids.h.

**12.117.2.57 CFE\_SB SND STATS\_EID** #define CFE\_SB SND STATS\_EID 32  
SB Send Statistics Command Success Event ID.

Type: DEBUG

Cause:

[SB Send Statistics Command](#) success.  
Definition at line 357 of file cfe\_sb\_eventids.h.

**12.117.2.58 CFE\_SB SUB ARG\_ERR\_EID** #define CFE\_SB SUB ARG\_ERR\_EID 6  
SB Subscribe API Bad Argument Event ID.

Type: ERROR

Cause:

An SB Subscribe API failed due to an invalid input argument.  
Definition at line 97 of file cfe\_sb\_eventids.h.

**12.117.2.59 CFE\_SB SUB INV\_CALLER\_EID** #define CFE\_SB SUB INV\_CALLER\_EID 51  
SB Subscribe API Not Owner Event ID.

Type: ERROR

Cause:

An SB Subscribe API failed due to not being the pipe owner.  
Definition at line 562 of file cfe\_sb\_eventids.h.

**12.117.2.60 CFE\_SB\_SUB\_INV\_PIPE\_EID** #define CFE\_SB\_SUB\_INV\_PIPE\_EID 50  
SB Subscribe API Invalid Pipe Event ID.

Type: ERROR

Cause:

An SB Subscribe API failed due to an invalid pipe ID.  
Definition at line 551 of file cfe\_sb\_eventids.h.

**12.117.2.61 CFE\_SB\_SUBSCRIPTION\_RCVD\_EID** #define CFE\_SB\_SUBSCRIPTION\_RCVD\_EID 10  
SB Subscribe API Success Event ID.

Type: DEBUG

Cause:

An SB Subscribe API completed successfully.  
Definition at line 144 of file cfe\_sb\_eventids.h.

**12.117.2.62 CFE\_SB\_SUBSCRIPTION\_REMOVED\_EID** #define CFE\_SB\_SUBSCRIPTION\_REMOVED\_EID 48  
SB Unsubscribe API Success Event ID.

Type: DEBUG

Cause:

An SB Unsubscribe API successfully completed.  
Definition at line 529 of file cfe\_sb\_eventids.h.

**12.117.2.63 CFE\_SB\_SUBSCRIPTION\_RPT\_EID** #define CFE\_SB\_SUBSCRIPTION\_RPT\_EID 22  
SB Subscription Report Sent Event ID.

Type: DEBUG

Cause:

SB Subscription Report sent in response to a successful subscription.  
Definition at line 277 of file cfe\_sb\_eventids.h.

**12.117.2.64 CFE\_SB\_UNSUB\_ARG\_ERR\_EID** #define CFE\_SB\_UNSUB\_ARG\_ERR\_EID 11  
SB Unsubscribe API Bad Argument Event ID.

Type: ERROR

Cause:

An SB Unsubscribe API failed due to an invalid input argument.

Definition at line 155 of file cfe\_sb\_eventids.h.

**12.117.2.65 CFE\_SB\_UNSUB\_INV\_CALLER\_EID** #define CFE\_SB\_UNSUB\_INV\_CALLER\_EID 53  
SB Unsubscribe API Not Owner Event ID.

Type: ERROR

Cause:

An SB Unsubscribe API failed due to not being the pipe owner.

Definition at line 584 of file cfe\_sb\_eventids.h.

**12.117.2.66 CFE\_SB\_UNSUB\_INV\_PIPE\_EID** #define CFE\_SB\_UNSUB\_INV\_PIPE\_EID 52  
SB Unsubscribe API Invalid Pipe Event ID.

Type: ERROR

Cause:

An SB Unsubscribe API failed due to an invalid pipe ID.

Definition at line 573 of file cfe\_sb\_eventids.h.

**12.117.2.67 CFE\_SB\_UNSUB\_NO\_SUBS\_EID** #define CFE\_SB\_UNSUB\_NO\_SUBS\_EID 12  
SB Unsubscribe API No MsgId Subscription Event ID.

Type: INFORMATION

Cause:

An SB Unsubscribe API was called with a Message ID that wasn't subscribed on the pipe

Definition at line 166 of file cfe\_sb\_eventids.h.

## 12.118 cfe/modules/tbl/config/default\_cfe\_tbl\_extern\_typedefs.h File Reference

```
#include "common_types.h"
#include "cfe_es_extern_typedefs.h"
#include "cfe_mission_cfg.h"
```

### Data Structures

- struct [CFE\\_TBL\\_File\\_Hdr](#)

*The definition of the header fields that are included in CFE Table Data files.*

### TypeDefs

- typedef uint16 [CFE\\_TBL\\_BufferSelect\\_Enum\\_t](#)

*Selects the buffer to operate on for validate or dump commands.*

- typedef struct [CFE\\_TBL\\_File\\_Hdr](#) [CFE\\_TBL\\_File\\_Hdr\\_t](#)

*The definition of the header fields that are included in CFE Table Data files.*

### Enumerations

- enum [CFE\\_TBL\\_BufferSelect](#) { [CFE\\_TBL\\_BufferSelect\\_INACTIVE](#) = 0, [CFE\\_TBL\\_BufferSelect\\_ACTIVE](#) = 1 }

*Label definitions associated with CFE\_TBL\_BufferSelect\_Enum\_t.*

#### 12.118.1 Detailed Description

Declarations and prototypes for cfe\_tbl\_extern\_typedefs module

#### 12.118.2 Typedef Documentation

##### 12.118.2.1 [CFE\\_TBL\\_BufferSelect\\_Enum\\_t](#) typedef uint16 [CFE\\_TBL\\_BufferSelect\\_Enum\\_t](#)

Selects the buffer to operate on for validate or dump commands.

See also

enum [CFE\\_TBL\\_BufferSelect](#)

Definition at line 53 of file default\_cfe\_tbl\_extern\_typedefs.h.

##### 12.118.2.2 [CFE\\_TBL\\_File\\_Hdr\\_t](#) typedef struct [CFE\\_TBL\\_File\\_Hdr](#) [CFE\\_TBL\\_File\\_Hdr\\_t](#)

The definition of the header fields that are included in CFE Table Data files.

This header follows the CFE\_FS header and precedes the actual table data.

Note

The Offset and NumBytes fields in the table header are to 32 bits for backward compatibility with existing CFE versions. This means that even on 64-bit CPUs, individual table files will be limited to 4GiB in size.

#### 12.118.3 Enumeration Type Documentation

##### 12.118.3.1 [CFE\\_TBL\\_BufferSelect](#) enum [CFE\\_TBL\\_BufferSelect](#)

Label definitions associated with CFE\_TBL\_BufferSelect\_Enum\_t.

**Enumerator**

CFE_TBL_BufferSelect_INACTIVE	Select the Inactive buffer for validate or dump.
CFE_TBL_BufferSelect_ACTIVE	Select the Active buffer for validate or dump.

Definition at line 35 of file default\_cfe\_tbl\_extern\_typedefs.h.

## 12.119 cfe/modules/tbl/config/default\_cfe\_tbl\_fcncodes.h File Reference

**Macros****Table Services Command Codes**

- #define CFE\_TBL\_NOOP\_CC 0
- #define CFE\_TBL\_RESET\_COUNTERS\_CC 1
- #define CFE\_TBL\_LOAD\_CC 2
- #define CFE\_TBL\_DUMP\_CC 3
- #define CFE\_TBL\_VALIDATE\_CC 4
- #define CFE\_TBL\_ACTIVATE\_CC 5
- #define CFE\_TBL\_DUMP\_REGISTRY\_CC 6
- #define CFE\_TBL\_SEND\_REGISTRY\_CC 7
- #define CFE\_TBL\_DELETE\_CDS\_CC 8
- #define CFE\_TBL\_ABORT\_LOAD\_CC 9

### 12.119.1 Detailed Description

Specification for the CFE Event Services (CFE\_TBL) command function codes

**Note**

This file should be strictly limited to the command/function code (CC) macro definitions. Other definitions such as enums, typedefs, or other macros should be placed in the msgdefs.h or msg.h files.

### 12.119.2 Macro Definition Documentation

#### 12.119.2.1 CFE\_TBL\_ABORT\_LOAD\_CC #define CFE\_TBL\_ABORT\_LOAD\_CC 9

**Name** Abort Table Load**Description**

This command will cause Table Services to discard the contents of a table buffer that was previously loaded with the data in a file as specified by a Table Load command. For single buffered tables, the allocated shared working buffer is freed and becomes available for other Table Load commands.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_LOADABORT**Command Structure****CFE\_TBL\_AbortLoadCmd\_t**

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- The [CFE\\_TBL\\_LOAD\\_ABORT\\_INF\\_EID](#) informational event message is generated
- If the load was aborted for a single buffered table, the **\$sc\_\$cpu\_TBL\_NumFreeShrBuf** telemetry point should increment

### Error Conditions

This command may fail for the following reason(s):

- The specified table name was not found in the table registry.
- The specified table did not have a load in progress to be aborted.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDEC** - command error counter will increment
- Error specific event message

### Criticality

This command will cause the loss of data put into an inactive table buffer.

### See also

[CFE\\_TBL\\_LOAD\\_CC](#), [CFE\\_TBL\\_DUMP\\_CC](#), [CFE\\_TBL\\_VALIDATE\\_CC](#), [CFE\\_TBL\\_ACTIVATE\\_CC](#)

Definition at line 461 of file `default_cfe_tbl_fcncodes.h`.

## 12.119.2.2 CFE\_TBL\_ACTIVATE\_CC #define CFE\_TBL\_ACTIVATE\_CC 5

**Name** Activate Table

### Description

This command will cause Table Services to notify a table's owner that an update is pending. The owning application will then update the contents of the active table buffer with the contents of the associated inactive table buffer at a time of their convenience.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_ACTIVATE

### Command Structure

[CFE\\_TBL\\_ActivateCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- The [CFE\\_TBL\\_UPDATE\\_SUCCESS\\_INF\\_EID](#) informational event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- The specified table name was not found in the table registry.
- The table was registered as a "dump only" type and thus cannot be activated
- The table buffer has not been validated.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDEC** - command error counter will increment
- Command specific error event message are issued for all error cases

### Criticality

This command will cause the contents of the specified table to be updated with the contents in the inactive table buffer.

### See also

[CFE\\_TBL\\_LOAD\\_CC](#), [CFE\\_TBL\\_DUMP\\_CC](#), [CFE\\_TBL\\_VALIDATE\\_CC](#), [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

Definition at line 299 of file default\_cfe\_tbl\_fcncodes.h.

### 12.119.2.3 CFE\_TBL\_DELETE\_CDS\_CC #define CFE\_TBL\_DELETE\_CDS\_CC 8

**Name** Delete Critical Table from Critical Data Store

#### Description

This command will delete the Critical Data Store (CDS) associated with the specified Critical Table. Note that any table still present in the Table Registry is unable to be deleted from the Critical Data Store. All Applications that are accessing the critical table must release and unregister their access before the CDS can be deleted.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_DeleteCDS

#### Command Structure

[CFE\\_TBL\\_DeleteCDSCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- The [CFE\\_TBL\\_CDS\\_DELETED\\_INFO\\_EID](#) informational event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- The specified table name was not found in the critical data store registry
- The specified table name WAS found in the table registry (all registrations/sharing of the table must be unregistered before the table's CDS can be deleted)
- The table's owning application is still active

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDEC** - command error counter will increment
- Error specific event message

### Criticality

This command will cause the loss of the specified table's contents before the owning Application was terminated.

### See also

[CFE\\_ES\\_DUMP\\_CDS\\_REGISTRY\\_CC](#), [CFE\\_ES\\_DELETE\\_CDS\\_CC](#)

Definition at line 422 of file default\_cfe\_tbl\_fcncodes.h.

## 12.119.2.4 CFE\_TBL\_DUMP\_CC #define CFE\_TBL\_DUMP\_CC 3

**Name** Dump Table

### Description

This command will cause the Table Services to put the contents of the specified table buffer into the command specified file.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_DUMP

### Command Structure

[CFE\\_TBL\\_DumpCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- Either the [CFE\\_TBL\\_OVERWRITE\\_DUMP\\_INF\\_EID](#) OR the [CFE\\_TBL\\_WRITE\\_DUMP\\_INF\\_EID](#) informational event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- A single buffered table's inactive buffer was requested to be dumped and no such buffer is currently allocated.
- Error occurred during write operation to file. Possible causes might be insufficient space in the file system or the filename or file path is improperly specified.
- The specified table name was not found in the table registry.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDEC** - command error counter will increment
- A command specific error event message is issued for all error cases

### Criticality

This command is not inherently dangerous. It will create a new file in the file system and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

### See also

[CFE\\_TBL\\_LOAD\\_CC](#), [CFE\\_TBL\\_VALIDATE\\_CC](#), [CFE\\_TBL\\_ACTIVATE\\_CC](#), [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

Definition at line 202 of file default\_cfe\_tbl\_fcncodes.h.

**12.119.2.5 CFE\_TBL\_DUMP\_REGISTRY\_CC #define CFE\_TBL\_DUMP\_REGISTRY\_CC 6****Name** Dump Table Registry**Description**

This command will cause Table Services to write some of the contents of the Table Registry to the command specified file. This allows the operator to see the current state and configuration of all tables that have been registered with the cFE.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_WriteReg2File**Command Structure**[CFE\\_TBL\\_DumpRegistryCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TBL\\_CMDPC](#) - command execution counter will increment
- The generation of either [CFE\\_TBL\\_OVERWRITE\\_REG\\_DUMP\\_INF\\_EID](#) or [CFE\\_TBL\\_WRITE\\_REG\\_DUMP\\_INF\\_EID](#) debug event messages
- The specified file should appear (or be updated) at the specified location in the file system

**Error Conditions**

This command may fail for the following reason(s):

- A table registry dump is already in progress, not yet completed
- The specified DumpFilename could not be parsed
- Error occurred during write operation to file. Possible causes might be insufficient space in the file system or the filename or file path is improperly specified.

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TBL\\_CMDEC](#) - command error counter will increment
- An Error specific event message

**Criticality**

This command is not inherently dangerous. It will create a new file in the file system and could, if performed repeatedly without sufficient file management by the operator, fill the file system.

**See also**[CFE\\_TBL\\_SEND\\_REGISTRY\\_CC](#)

Definition at line 343 of file default\_cfe\_tbl\_fcncodes.h.

**12.119.2.6 CFE\_TBL\_LOAD\_CC** #define CFE\_TBL\_LOAD\_CC 2**Name** Load Table**Description**

This command loads the contents of the specified file into an inactive buffer for the table specified within the file.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_Load**Command Structure**[CFE\\_TBL\\_LoadCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TBL\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_TBL\\_FILE\\_LOADED\\_INF\\_EID](#) informational event message will be generated

**Error Conditions**

This command can fail for the following reasons:

- Table name found in table image file's table header is not found in table registry (ie - The table associated with the table image in the file has not been registered by an application).
- The table image file has an invalid or incorrect size. The size of the image file must match the size field within in the header, and must also match the expected size of the table indicated in the registry.
- No working buffers are available for the load. This would indicate that too many single-buffered table loads are in progress at the same time.
- An attempt is being made to load an uninitialized table with a file containing only a partial table image.
- The table image file was unable to be opened. Either the file does not exist at the specified location, the filename is in error, or the file system has been corrupted.

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TBL\\_CMDEC](#) - command error counter will increment
- Command specific error event messages are issued for all error cases

**Criticality**

This command is not inherently dangerous. It is performing the first step of loading a table and can be aborted (using the Abort Table Load command described below) without affecting the contents of the active table image.

**See also**[CFE\\_TBL\\_DUMP\\_CC](#), [CFE\\_TBL\\_VALIDATE\\_CC](#), [CFE\\_TBL\\_ACTIVATE\\_CC](#), [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

Definition at line 159 of file default\_cfe\_tbl\_fcncodes.h.

**12.119.2.7 CFE\_TBL\_NOOP\_CC** #define CFE\_TBL\_NOOP\_CC 0**Name** Table No-Op**Description**

This command performs no other function than to increment the command execution counter. The command may be used to verify general aliveness of the Table Services task.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_NOOP**Command Structure**[CFE\\_TBL\\_NoopCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TBL\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_TBL\\_NOOP\\_INF\\_EID](#) informational event message will be generated

**Error Conditions**

There are no error conditions for this command. If the Table Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

**Criticality**

None

**See also**

Definition at line 68 of file default\_cfe\_tbl\_fcncodes.h.

**12.119.2.8 CFE\_TBL\_RESET\_COUNTERS\_CC** #define CFE\_TBL\_RESET\_COUNTERS\_CC 1**Name** Table Reset Counters**Description**

This command resets the following counters within the Table Services housekeeping telemetry:

- Command Execution Counter (\$sc\_\$cpu\_TBL\_CMDPC)
- Command Error Counter (\$sc\_\$cpu\_TBL\_CMDEC)
- Successful Table Validations Counter (\$sc\_\$cpu\_TBL\_ValSuccessCtr)
- Failed Table Validations Counter (\$sc\_\$cpu\_TBL\_ValFailedCtr)
- Number of Table Validations Requested (\$sc\_\$cpu\_TBL\_ValReqCtr)
- Number of completed table validations (\$sc\_\$cpu\_TBL\_ValCompldCtr)

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_ResetCtrs

**Command Structure**

[CFE\\_TBL\\_ResetCountersCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will be reset to 0
- The [CFE\\_TBL\\_RESET\\_INF\\_EID](#) debug event message will be generated

**Error Conditions**

There are no error conditions for this command. If the Table Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

**Criticality**

This command is not inherently dangerous. However, it is possible for ground systems and on-board safing procedures to be designed such that they react to changes in the counter values that are reset by this command.

**See also**

Definition at line 109 of file default\_cfe\_tbl\_fcncodes.h.

**12.119.2.9 CFE\_TBL\_SEND\_REGISTRY\_CC #define CFE\_TBL\_SEND\_REGISTRY\_CC 7**

**Name** Telemeter One Table Registry Entry

**Description**

This command will cause Table Services to telemeter the contents of the Table Registry for the command specified table.

**Command Mnemonic(s)** \$sc\_\$cpu\_TBL\_TLMReg

**Command Structure**

[CFE\\_TBL\\_SendRegistryCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- Receipt of a Table Registry Info Packet (see [CFE\\_TBL\\_TableRegistryTlm\\_t](#))
- The [CFE\\_TBL\\_TLM\\_REG\\_CMD\\_INF\\_EID](#) debug event message will be generated

### Error Conditions

This command may fail for the following reason(s):

- The specified table name was not found in the table registry.

Evidence of failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDEC** - command error counter will increment
- Error specific event message

### Criticality

This command is not inherently dangerous. It will generate additional telemetry.

### See also

[CFE\\_TBL\\_DUMP\\_REGISTRY\\_CC](#)

Definition at line 378 of file default\_cfe\_tbl\_fcncodes.h.

## 12.119.2.10 CFE\_TBL\_VALIDATE\_CC #define CFE\_TBL\_VALIDATE\_CC 4

### Name Validate Table

### Description

This command will cause Table Services to calculate the Data Integrity Value for the specified table and to notify the owning application that the table's validation function should be executed. The results of both the Data Integrity Value computation and the validation function are reported in Table Services Housekeeping Telemetry.

### Command Mnemonic(s) \$sc\_\$cpu\_TBL\_VALIDATE

### Command Structure

[CFE\\_TBL\\_ValidateCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TBL\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_TBL\_ValReqCtr** - table validation request counter will increment
- **\$sc\_\$cpu\_TBL\_LastValCRC** - calculated data integrity value will be updated
- The [CFE\\_TBL\\_VAL\\_REQ\\_MADE\\_INF\\_EID](#) debug event message (indicating the application is being notified of a validation request)

If the specified table has an associated validation function, then the following telemetry will also change:

- Either **\$sc\_\$cpu\_TBL\_ValSuccessCtr** OR **\$sc\_\$cpu\_TBL\_ValFailedCtr** will increment
- **\$sc\_\$cpu\_TBL\_ValCompltdCtr** - table validations performed counter will increment
- **\$sc\_\$cpu\_TBL\_LastVals** - table validation function return status will update
- The [CFE\\_TBL\\_VALIDATION\\_INF\\_EID](#) informational event message (indicating the validation function return status) will be generated

### Error Conditions

This command may fail for the following reason(s):

- A single buffered table's inactive buffer was requested to be validated and no such buffer is currently allocated.
- Too many validations have been requested simultaneously. The operator must wait for one or more applications to perform their table validation functions before trying again.
- The specified table name was not found in the table registry.

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_TBL_CMDEC` - command error counter will increment
- Command specific error event message are issued for all error cases

### Criticality

The success or failure of a table validation does not have any immediate impact on table contents. The results are sent to the operator in telemetry and the operator must determine whether the results are acceptable and send a command to activate the validated table image.

### See also

[CFE\\_TBL\\_LOAD\\_CC](#), [CFE\\_TBL\\_DUMP\\_CC](#), [CFE\\_TBL\\_ACTIVATE\\_CC](#), [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

Definition at line 259 of file default\_cfe\_tbl\_fcncodes.h.

## 12.120 cfe/modules/tbl/config/default\_cfe\_tbl\_interface\_cfg.h File Reference

### Macros

- `#define CFE_MISSION_TBL_MAX_NAME_LENGTH 16`
- `#define CFE_MISSION_TBL_MAX_FULL_NAME_LEN (CFE_MISSION_TBL_MAX_NAME_LENGTH + CFE_MISSION_MAX_API_LEN + 4)`

### 12.120.1 Detailed Description

CFE Table Services (CFE\_TBL) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.120.2 Macro Definition Documentation

**12.120.2.1 CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN** `#define CFE_MISSION_TBL_MAX_FULL_NAME_L←  
EN (CFE_MISSION_TBL_MAX_NAME_LENGTH + CFE_MISSION_MAX_API_LEN + 4)`

**Purpose** Maximum Length of Full Table Name in messages

**Description:**

Indicates the maximum length (in characters) of the entire table name within software bus messages, in "App←Name.TableName" notation.

This affects the layout of command/telemetry messages but does not affect run time behavior or internal allocation.

**Limits**

All CPUs within the same SB domain (mission) must share the same definition Note this affects the size of messages, so it must not cause any message to exceed the max length.

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 69 of file default\_cfe\_tbl\_interface\_cfg.h.

**12.120.2.2 CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH #define CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH 16****Purpose** Maximum Table Name Length**Description:**

Indicates the maximum length (in characters) of the table name ('TblName') portion of a Full Table Name of the following form: "ApplicationName.TblName"

This length does not need to include an extra character for NULL termination.

**Limits**

This value should be kept as a multiple of 4, to maintain alignment of any possible neighboring fields without implicit padding.

Definition at line 49 of file default\_cfe\_tbl\_interface\_cfg.h.

**12.121 cfe/modules/tbl/config/default\_cfe\_tbl\_internal\_cfg.h File Reference****Macros**

- #define CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY 70
- #define CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES 524288
- #define CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE 16384
- #define CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE 16384
- #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES 128
- #define CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES 32
- #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES 256
- #define CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS 4
- #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS 10
- #define CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE "/ram/cfe\_tbl\_reg.log"
- #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT 0
- #define CFE\_PLATFORM\_TBL\_U32FROM4CHARS(\_C1, \_C2, \_C3, \_C4) ((uint32)(\_C1) << 24 | (uint32)(\_C2) << 16 | (uint32)(\_C3) << 8 | (uint32)(\_C4))
- #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_1 (0x42)
- #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_2 (CFE\_PLATFORM\_TBL\_U32FROM4CHARS('a', 'b', 'c', 'd'))
- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT 0
- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_1 (1)
- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_2 (CFE\_PLATFORM\_TBL\_U32FROM4CHARS('a', 'b', 'c', 'd'))
- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_3 0
- #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_4 0

### 12.121.1 Detailed Description

CFE Table Services (CFE\_TBL) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.121.2 Macro Definition Documentation

**12.121.2.1 CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES** #define CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYT←  
ES 524288

**Purpose** Size of Table Services Table Memory Pool

#### Description:

Defines the TOTAL size of the memory pool that cFE Table Services allocates from the system. The size must be large enough to provide memory for each registered table, the inactive buffers for double buffered tables and for the shared inactive buffers for single buffered tables.

#### Limits

The cFE does not place a limit on the size of this parameter.

Definition at line 75 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.2 CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE** #define CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_D←  
UMP\_FILE "/ram/cfe\_tbl\_reg.log"

**Purpose** Default Filename for a Table Registry Dump

#### Description:

Defines the file name used to store the table registry when no filename is specified in the dump registry command.

#### Limits

The length of each string, including the NULL terminator cannot exceed the [OS\\_MAX\\_PATH\\_LEN](#) value.

Definition at line 189 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.3 CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES** #define CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TA←  
BLES 32

**Purpose** Maximum Number of Critical Tables that can be Registered

**Description:**

Defines the maximum number of critical tables supported by this processor's Table Services.

**Limits**

This number must be less than 32767. It should be recognized that this parameter determines the size of the Critical Table Registry which is maintained in the Critical Data Store. An excessively high number will waste Critical Data Store memory. Therefore, this number must not exceed the value defined in CFE\_ES\_CDS\_MAX\_CRITICAL\_TABLES.

Definition at line 130 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.4 CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE** #define CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE 16384

**Purpose** Maximum Size Allowed for a Double Buffered Table**Description:**

Defines the maximum allowed size (in bytes) of a double buffered table.

**Limits**

The cFE does not place a limit on the size of this parameter but it must be less than half of [CFE\\_PLATFORM\\_TBL\\_BUF\\_MEMORY\\_BLOCK\\_SIZE](#).

Definition at line 87 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.5 CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES 256

**Purpose** Maximum Number of Table Handles**Description:**

Defines the maximum number of Table Handles.

**Limits**

This number must be less than 32767. This number must be at least as big as the number of tables ([CFE\\_PLATFORM\\_TBL\\_MAX\\_NUM\\_TABLES](#)) and should be set higher if tables are shared between applications.

Definition at line 143 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.6 CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES 128

**Purpose** Maximum Number of Tables Allowed to be Registered**Description:**

Defines the maximum number of tables supported by this processor's Table Services.

**Limits**

This number must be less than 32767. It should be recognized that this parameter determines the size of the Table Registry. An excessively high number will waste memory.

Definition at line 116 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.7 CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS** #define CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS 10

**Purpose** Maximum Number of Simultaneous Table Validations

**Description:**

Defines the maximum number of pending validations that the Table Services can handle at any one time. When a table has a validation function, a validation request is made of the application to perform that validation. This number determines how many of those requests can be outstanding at any one time.

**Limits**

This number must be less than 32767. An excessively high number will degrade system performance and waste memory. A number less than 20 is suggested but not required.

Definition at line 176 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.8 CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS** #define CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS 4

**Purpose** Maximum Number of Simultaneous Loads to Support

**Description:**

Defines the maximum number of single buffered tables that can be loaded simultaneously. This number is used to determine the number of shared buffers to allocate.

**Limits**

This number must be less than 32767. An excessively high number will degrade system performance and waste memory. A number less than 5 is suggested but not required.

Definition at line 158 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.9 CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE** #define CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE 16384

**Purpose** Maximum Size Allowed for a Single Buffered Table

**Description:**

Defines the maximum allowed size (in bytes) of a single buffered table. **NOTE:** This size determines the size of all shared table buffers. Therefore, this size will be multiplied by [CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#) below when allocating memory for shared tables.

**Limits**

The cFE does not place a limit on the size of this parameter but it must be small enough to allow for [CFE\\_PLATFORM\\_TBL\\_MAX\\_SIMULTANEOUS\\_LOADS](#) number of tables to fit into [CFE\\_PLATFORM\\_TBL\\_BUF\\_MEMORY\\_BYT](#)

Definition at line 103 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.10 CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TBL\_START\_TASK\_PRIO←  
RITY 70

**Purpose** Define TBL Task Priority

**Description:**

Defines the cFE\_TBL Task priority.

**Limits**

Not Applicable

Definition at line 44 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.11 CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TBL\_START\_TASK\_S←  
TACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define TBL Task Stack Size

**Description:**

Defines the cFE\_TBL Task Stack Size

**Limits**

There is a lower limit of 2048 on this configuration parameter. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 59 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.12 CFE\_PLATFORM\_TBL\_U32FROM4CHARS** #define CFE\_PLATFORM\_TBL\_U32FROM4CHARS (←  
\_C1,  
\_C2,  
\_C3,  
\_C4 ) ((uint32) (\_C1) << 24 | (uint32) (\_C2) << 16 | (uint32) (\_C3) << 8 | (uint32) (←  
\_C4))

Definition at line 211 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.13 CFE\_PLATFORM\_TBL\_VALID\_PRID\_1** #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_1 (1)

**Purpose** Processor ID values used for table load validation

**Description:**

Defines the processor ID values used for validating the processor ID field in the table file header. To be valid, the spacecraft ID specified in the table file header must match one of the values defined here.

**Limits**

This value can be any 32 bit unsigned integer.

Definition at line 260 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.14 CFE\_PLATFORM\_TBL\_VALID\_PRID\_2** #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_2 (CFE\_PLATFORM\_TBL\_U32FROM4CH  
'b', 'c', 'd'))

Definition at line 261 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.15 CFE\_PLATFORM\_TBL\_VALID\_PRID\_3** #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_3 0

Definition at line 262 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.16 CFE\_PLATFORM\_TBL\_VALID\_PRID\_4** #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_4 0

Definition at line 263 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.17 CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT** #define CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT 0

**Purpose** Number of Processor ID's specified for validation

**Description:**

Defines the number of specified processor ID values that are verified during table loads. If the number is zero then no validation of the processor ID field in the table file header is performed when tables are loaded. Non-zero values indicate how many values from the list of processor ID's defined below are compared to the processor ID field in the table file header. The ELF2CFETBL tool may be used to create table files with specified processor ID values.

**Limits**

This number must be greater than or equal to zero and less than or equal to 4.

Definition at line 246 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.18 CFE\_PLATFORM\_TBL\_VALID\_SCID\_1** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_1 (0x42)

**Purpose** Spacecraft ID values used for table load validation

**Description:**

Defines the spacecraft ID values used for validating the spacecraft ID field in the table file header. To be valid, the spacecraft ID specified in the table file header must match one of the values defined here.

**Limits**

This value can be any 32 bit unsigned integer.

Definition at line 226 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.19 CFE\_PLATFORM\_TBL\_VALID\_SCID\_2** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_2 (CFE\_PLATFORM\_TBL\_U32FROM4CH  
'b', 'c', 'd'))

Definition at line 227 of file default\_cfe\_tbl\_internal\_cfg.h.

**12.121.2.20 CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT** #define CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT 0

**Purpose** Number of Spacecraft ID's specified for validation

**Description:**

Defines the number of specified spacecraft ID values that are verified during table loads. If the number is zero then no validation of the spacecraft ID field in the table file header is performed when tables are loaded. Non-zero values indicate how many values from the list of spacecraft ID's defined below are compared to the spacecraft ID field in the table file header. The ELF2CFETBL tool may be used to create table files with specified spacecraft ID values.

**Limits**

This number must be greater than or equal to zero and less than or equal to 2.

Definition at line 208 of file default\_cfe\_tbl\_internal\_cfg.h.

## 12.122 cfe/modules/tbl/config/default\_cfe\_tbl\_mission\_cfg.h File Reference

```
#include "cfe_tbl_interface_cfg.h"
```

### 12.122.1 Detailed Description

CFE Event Services (CFE\_TBL) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.123 cfe/modules/tbl/config/default\_cfe\_tbl\_msg.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_tbl_fcncodes.h"
#include "cfe_tbl_msgdefs.h"
#include "cfe_tbl_msgstruct.h"
```

### 12.123.1 Detailed Description

Specification for the CFE Event Services (CFE\_TBL) command and telemetry message data types.

This is a compatibility header for the "cfe\_tbl\_msg.h" file that has traditionally provided the message definitions for cFS apps.

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.124 cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_es_extern_typedefs.h"
#include "cfe_time_extern_typedefs.h"
#include "cfe_tbl_fcncodes.h"
```

### Data Structures

- struct [CFE\\_TBL\\_LoadCmd\\_Payload](#)  
*Load Table Command Payload.*
- struct [CFE\\_TBL\\_DumpCmd\\_Payload](#)  
*Dump Table Command Payload.*
- struct [CFE\\_TBL\\_ValidateCmd\\_Payload](#)  
*Validate Table Command Payload.*
- struct [CFE\\_TBL\\_ActivateCmd\\_Payload](#)  
*Activate Table Command Payload.*
- struct [CFE\\_TBL\\_DumpRegistryCmd\\_Payload](#)  
*Dump Registry Command Payload.*
- struct [CFE\\_TBL\\_SendRegistryCmd\\_Payload](#)  
*Send Table Registry Command Payload.*
- struct [CFE\\_TBL\\_DelCDSCmd\\_Payload](#)  
*Delete Critical Table CDS Command Payload.*
- struct [CFE\\_TBL\\_AbortLoadCmd\\_Payload](#)  
*Abort Load Command Payload.*
- struct [CFE\\_TBL\\_NotifyCmd\\_Payload](#)  
*Table Management Notification Command Payload.*
- struct [CFE\\_TBL\\_HousekeepingTlm\\_Payload](#)
- struct [CFE\\_TBL\\_TblRegPacket\\_Payload](#)

### Typedefs

- typedef struct [CFE\\_TBL\\_LoadCmd\\_Payload](#) [CFE\\_TBL\\_LoadCmd\\_Payload\\_t](#)  
*Load Table Command Payload.*
- typedef struct [CFE\\_TBL\\_DumpCmd\\_Payload](#) [CFE\\_TBL\\_DumpCmd\\_Payload\\_t](#)  
*Dump Table Command Payload.*
- typedef struct [CFE\\_TBL\\_ValidateCmd\\_Payload](#) [CFE\\_TBL\\_ValidateCmd\\_Payload\\_t](#)  
*Validate Table Command Payload.*
- typedef struct [CFE\\_TBL\\_ActivateCmd\\_Payload](#) [CFE\\_TBL\\_ActivateCmd\\_Payload\\_t](#)  
*Activate Table Command Payload.*
- typedef struct [CFE\\_TBL\\_DumpRegistryCmd\\_Payload](#) [CFE\\_TBL\\_DumpRegistryCmd\\_Payload\\_t](#)  
*Dump Registry Command Payload.*
- typedef struct [CFE\\_TBL\\_SendRegistryCmd\\_Payload](#) [CFE\\_TBL\\_SendRegistryCmd\\_Payload\\_t](#)  
*Send Table Registry Command Payload.*
- typedef struct [CFE\\_TBL\\_DelCDSCmd\\_Payload](#) [CFE\\_TBL\\_DelCDSCmd\\_Payload\\_t](#)  
*Delete Critical Table CDS Command Payload.*
- typedef struct [CFE\\_TBL\\_AbortLoadCmd\\_Payload](#) [CFE\\_TBL\\_AbortLoadCmd\\_Payload\\_t](#)  
*Abort Load Command Payload.*

- **typedef struct CFE\_TBL\_NotifyCmd\_Payload CFE\_TBL\_NotifyCmd\_Payload\_t**  
*Table Management Notification Command Payload.*
- **typedef struct CFE\_TBL\_HousekeepingTlm\_Payload CFE\_TBL\_HousekeepingTlm\_Payload\_t**
- **typedef struct CFE\_TBL\_TblRegPacket\_Payload CFE\_TBL\_TblRegPacket\_Payload\_t**

#### 12.124.1 Detailed Description

Specification for the CFE Event Services (CFE\_TBL) command and telemetry message constant definitions. For CFE\_TBL this is only the function/command code definitions

#### 12.124.2 Typedef Documentation

**12.124.2.1 CFE\_TBL\_AbortLoadCmd\_Payload\_t** `typedef struct CFE_TBL_AbortLoadCmd_Payload CFE_TBL_AbortLoadCmd_Payload`  
Abort Load Command Payload.  
For command details, see [CFE\\_TBL\\_ABORT\\_LOAD\\_CC](#)

**12.124.2.2 CFE\_TBL\_ActivateCmd\_Payload\_t** `typedef struct CFE_TBL_ActivateCmd_Payload CFE_TBL_ActivateCmd_Payload`  
Activate Table Command Payload.  
For command details, see [CFE\\_TBL\\_ACTIVATE\\_CC](#)

**12.124.2.3 CFE\_TBL\_DelCDSCmd\_Payload\_t** `typedef struct CFE_TBL_DelCDSCmd_Payload CFE_TBL_DelCDSCmd_Payload`  
Delete Critical Table CDS Command Payload.  
For command details, see [CFE\\_TBL\\_DELETE\\_CDS\\_CC](#)

**12.124.2.4 CFE\_TBL\_DumpCmd\_Payload\_t** `typedef struct CFE_TBL_DumpCmd_Payload CFE_TBL_DumpCmd_Payload`  
Dump Table Command Payload.  
For command details, see [CFE\\_TBL\\_DUMP\\_CC](#)

**12.124.2.5 CFE\_TBL\_DumpRegistryCmd\_Payload\_t** `typedef struct CFE_TBL_DumpRegistryCmd_Payload CFE_TBL_DumpRegistryCmd_Payload`  
`CFE_TBL_DumpRegistryCmd_Payload_t`  
Dump Registry Command Payload.  
For command details, see [CFE\\_TBL\\_DUMP\\_REGISTRY\\_CC](#)

**12.124.2.6 CFE\_TBL\_HousekeepingTlm\_Payload\_t** `typedef struct CFE_TBL_HousekeepingTlm_Payload CFE_TBL_HousekeepingTlm_Payload`  
`CFE_TBL_HousekeepingTlm_Payload_t`

**Name** Table Services Housekeeping Packet

**12.124.2.7 CFE\_TBL\_LoadCmd\_Payload\_t** `typedef struct CFE_TBL_LoadCmd_Payload CFE_TBL_LoadCmd_Payload`  
Load Table Command Payload.  
For command details, see [CFE\\_TBL\\_LOAD\\_CC](#)

**12.124.2.8 CFE\_TBL\_NotifyCmd\_Payload\_t** `typedef struct CFE_TBL_NotifyCmd_Payload CFE_TBL_NotifyCmd_Payload`  
Table Management Notification Command Payload.

**Description**

Whenever an application that owns a table calls the [CFE\\_TBL\\_NotifyByMessage](#) API following the table registration, Table services will generate the following command message with the application specified message ID, command code and parameter whenever the table requires management (e.g. - loads and validations).

**12.124.2.9 CFE\_TBL\_SendRegistryCmd\_Payload\_t** `typedef struct CFE_TBL_SendRegistryCmd_Payload CFE_TBL_SendRegistryCmd_Payload_t`  
Send Table Registry Command Payload.  
For command details, see [CFE\\_TBL\\_SEND\\_REGISTRY\\_CC](#)

**12.124.2.10 CFE\_TBL\_TblRegPacket\_Payload\_t** `typedef struct CFE_TBL_TblRegPacket_Payload CFE_TBL_TblRegPacket_Pay`

**Name** Table Registry Info Packet

**12.124.2.11 CFE\_TBL\_ValidateCmd\_Payload\_t** `typedef struct CFE_TBL_ValidateCmd_Payload CFE_TBL_ValidateCmd_Payload_t`  
Validate Table Command Payload.  
For command details, see [CFE\\_TBL\\_VALIDATE\\_CC](#)

## 12.125 cfe/modules/tbl/config/default\_cfe\_tbl\_msgids.h File Reference

```
#include "cfe_core_api_base_msgids.h"
#include "cfe_tbl_topicids.h"
```

### Macros

- `#define CFE_TBL_CMD_MID CFE_PLATFORM_CMD_TOPICID_TO_MIDV(CFE_MISSION_TBL_CMD_TOPICID)`  
/\* 0x1804 \*/
- `#define CFE_TBL_SEND_HK_MID CFE_PLATFORM_CMD_TOPICID_TO_MIDV(CFE_MISSION_TBL_SEND_HK_TOPICID)`  
/\* 0x180C \*/
- `#define CFE_TBL_HK_TLM_MID CFE_PLATFORM_TLM_TOPICID_TO_MIDV(CFE_MISSION_TBL_HK_TLM_TOPICID)`  
/\* 0x0804 \*/
- `#define CFE_TBL_REG_TLM_MID CFE_PLATFORM_TLM_TOPICID_TO_MIDV(CFE_MISSION_TBL_REG_TLM_TOPICID)`  
/\* 0x080C \*/

### 12.125.1 Detailed Description

CFE Event Services (CFE\_TBL) Application Message IDs

### 12.125.2 Macro Definition Documentation

**12.125.2.1 CFE\_TBL\_CMD\_MID** `#define CFE_TBL_CMD_MID CFE_PLATFORM_CMD_TOPICID_TO_MIDV(CFE_MISSION_TBL_CMD_TOPICID)`  
/\* 0x1804 \*/  
Definition at line 32 of file default\_cfe\_tbl\_msgids.h.

**12.125.2.2 CFE\_TBL\_HK\_TLM\_MID** `#define CFE_TBL_HK_TLM_MID CFE_PLATFORM_TLM_TOPICID_TO_MIDV(CFE_MISSION_TBL_HK_TLM_TOPICID)`  
/\* 0x0804 \*/  
Definition at line 38 of file default\_cfe\_tbl\_msgids.h.

**12.125.2.3 CFE\_TBL\_REG\_TLM\_MID** `#define CFE_TBL_REG_TLM_MID CFE_PLATFORM_TLM_TOPICID_TO_MIDV(CFE_MISSION_TBL_REG_TLM_TOPICID)`  
/\* 0x080C \*/  
Definition at line 39 of file default\_cfe\_tbl\_msgids.h.

**12.125.2.4 CFE\_TBL\_SEND\_HK\_MID** #define CFE\_TBL\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TBL\_S  
/\* 0x180C \*/  
Definition at line 33 of file default\_cfe\_tbl\_msgids.h.

## 12.126 cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h File Reference

```
#include "cfe_tbl_msgdefs.h"
#include "cfe_msg_hdr.h"
```

### Data Structures

- struct [CFE\\_TBL\\_NoopCmd](#)
- struct [CFE\\_TBL\\_ResetCountersCmd](#)
- struct [CFE\\_TBL\\_SendHkCmd](#)
- struct [CFE\\_TBL\\_LoadCmd](#)
  - Load Table Command.*
- struct [CFE\\_TBL\\_DumpCmd](#)
- struct [CFE\\_TBL\\_ValidateCmd](#)
  - Validate Table Command.*
- struct [CFE\\_TBL\\_ActivateCmd](#)
  - Activate Table Command.*
- struct [CFE\\_TBL\\_DumpRegistryCmd](#)
  - Dump Registry Command.*
- struct [CFE\\_TBL\\_SendRegistryCmd](#)
  - Send Table Registry Command.*
- struct [CFE\\_TBL\\_DeleteCDSCmd](#)
  - Delete Critical Table CDS Command.*
- struct [CFE\\_TBL\\_AbortLoadCmd](#)
  - Abort Load Command.*
- struct [CFE\\_TBL\\_NotifyCmd](#)
- struct [CFE\\_TBL\\_HousekeepingTlm](#)
- struct [CFE\\_TBL\\_TableRegistryTlm](#)

### Typedefs

- typedef struct [CFE\\_TBL\\_NoopCmd](#) CFE\_TBL\_NoopCmd\_t
- typedef struct [CFE\\_TBL\\_ResetCountersCmd](#) CFE\_TBL\_ResetCountersCmd\_t
- typedef struct [CFE\\_TBL\\_SendHkCmd](#) CFE\_TBL\_SendHkCmd\_t
- typedef struct [CFE\\_TBL\\_LoadCmd](#) CFE\_TBL\_LoadCmd\_t
  - Load Table Command.*
- typedef struct [CFE\\_TBL\\_DumpCmd](#) CFE\_TBL\_DumpCmd\_t
- typedef struct [CFE\\_TBL\\_ValidateCmd](#) CFE\_TBL\_ValidateCmd\_t
  - Validate Table Command.*
- typedef struct [CFE\\_TBL\\_ActivateCmd](#) CFE\_TBL\_ActivateCmd\_t
  - Activate Table Command.*
- typedef struct [CFE\\_TBL\\_DumpRegistryCmd](#) CFE\_TBL\_DumpRegistryCmd\_t
  - Dump Registry Command.*
- typedef struct [CFE\\_TBL\\_SendRegistryCmd](#) CFE\_TBL\_SendRegistryCmd\_t
  - Send Table Registry Command.*

- **typedef struct CFE\_TBL\_DeleteCDSCmd** **CFE\_TBL\_DeleteCDSCmd\_t**  
*Delete Critical Table CDS Command.*
- **typedef struct CFE\_TBL\_AbortLoadCmd** **CFE\_TBL\_AbortLoadCmd\_t**  
*Abort Load Command.*
- **typedef struct CFE\_TBL\_NotifyCmd** **CFE\_TBL\_NotifyCmd\_t**
- **typedef struct CFE\_TBL\_HousekeepingTlm** **CFE\_TBL\_HousekeepingTlm\_t**
- **typedef struct CFE\_TBL\_TableRegistryTlm** **CFE\_TBL\_TableRegistryTlm\_t**

### 12.126.1 Detailed Description

Purpose: cFE Executive Services (TBL) Command and Telemetry packet definition file.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide

Notes:

### 12.126.2 Typedef Documentation

**12.126.2.1 CFE\_TBL\_AbortLoadCmd\_t** **typedef struct CFE\_TBL\_AbortLoadCmd** **CFE\_TBL\_AbortLoadCmd\_t**  
Abort Load Command.

**12.126.2.2 CFE\_TBL\_ActivateCmd\_t** **typedef struct CFE\_TBL\_ActivateCmd** **CFE\_TBL\_ActivateCmd\_t**  
Activate Table Command.

**12.126.2.3 CFE\_TBL\_DeleteCDSCmd\_t** **typedef struct CFE\_TBL\_DeleteCDSCmd** **CFE\_TBL\_DeleteCDSCmd\_t**  
Delete Critical Table CDS Command.

**12.126.2.4 CFE\_TBL\_DumpCmd\_t** **typedef struct CFE\_TBL\_DumpCmd** **CFE\_TBL\_DumpCmd\_t**  
/brief Dump Table Command

**12.126.2.5 CFE\_TBL\_DumpRegistryCmd\_t** **typedef struct CFE\_TBL\_DumpRegistryCmd** **CFE\_TBL\_DumpRegistryCmd\_t**  
Dump Registry Command.

**12.126.2.6 CFE\_TBL\_HousekeepingTlm\_t** **typedef struct CFE\_TBL\_HousekeepingTlm** **CFE\_TBL\_HousekeepingTlm\_t**

**12.126.2.7 CFE\_TBL\_LoadCmd\_t** **typedef struct CFE\_TBL\_LoadCmd** **CFE\_TBL\_LoadCmd\_t**  
Load Table Command.

**12.126.2.8 CFE\_TBL\_NoopCmd\_t** **typedef struct CFE\_TBL\_NoopCmd** **CFE\_TBL\_NoopCmd\_t**

**12.126.2.9 CFE\_TBL\_NotifyCmd\_t** **typedef struct CFE\_TBL\_NotifyCmd** **CFE\_TBL\_NotifyCmd\_t**  
/brief Table Management Notification Command

**12.126.2.10 CFE\_TBL\_ResetCountersCmd\_t** `typedef struct CFE_TBL_ResetCountersCmd CFE_TBL_ResetCountersCmd_t`

**12.126.2.11 CFE\_TBL\_SendHkCmd\_t** `typedef struct CFE_TBL_SendHkCmd CFE_TBL_SendHkCmd_t`

**12.126.2.12 CFE\_TBL\_SendRegistryCmd\_t** `typedef struct CFE_TBL_SendRegistryCmd CFE_TBL_SendRegistryCmd_t`  
Send Table Registry Command.

**12.126.2.13 CFE\_TBL\_TableRegistryTlm\_t** `typedef struct CFE_TBL_TableRegistryTlm CFE_TBL_TableRegistryTlm_t`

**12.126.2.14 CFE\_TBL\_ValidateCmd\_t** `typedef struct CFE_TBL_ValidateCmd CFE_TBL_ValidateCmd_t`  
Validate Table Command.

## 12.127 cfe/modules/tbl/config/default\_cfe\_tbl\_platform\_cfg.h File Reference

```
#include "cfe_tbl_mission_cfg.h"
#include "cfe_tbl_internal_cfg.h"
```

### 12.127.1 Detailed Description

CFE Table Services (CFE\_TBL) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.128 cfe/modules/tbl/config/default\_cfe\_tbl\_topicids.h File Reference

### Macros

- `#define CFE_MISSION_TBL_CMD_TOPICID 4`
- `#define CFE_MISSION_TBL_SEND_HK_TOPICID 12`
- `#define CFE_MISSION_TBL_HK_TLM_TOPICID 4`
- `#define CFE_MISSION_TBL_REG_TLM_TOPICID 12`

### 12.128.1 Detailed Description

CFE Table Services (CFE\_TBL) Application Topic IDs

### 12.128.2 Macro Definition Documentation

**12.128.2.1 CFE\_MISSION\_TBL\_CMD\_TOPICID** #define CFE\_MISSION\_TBL\_CMD\_TOPICID 4

**Purpose** cFE Portable Message Numbers for Commands

**Description:**

Portable message numbers for the cFE command messages

**Limits**

Not Applicable

Definition at line 35 of file default\_cfe\_tbl\_topicids.h.

**12.128.2.2 CFE\_MISSION\_TBL\_HK\_TLM\_TOPICID** #define CFE\_MISSION\_TBL\_HK\_TLM\_TOPICID 4

**Purpose** cFE Portable Message Numbers for Telemetry

**Description:**

Portable message numbers for the cFE telemetry messages

**Limits**

Not Applicable

Definition at line 47 of file default\_cfe\_tbl\_topicids.h.

**12.128.2.3 CFE\_MISSION\_TBL\_REG\_TLM\_TOPICID** #define CFE\_MISSION\_TBL\_REG\_TLM\_TOPICID 12

Definition at line 48 of file default\_cfe\_tbl\_topicids.h.

**12.128.2.4 CFE\_MISSION\_TBL\_SEND\_HK\_TOPICID** #define CFE\_MISSION\_TBL\_SEND\_HK\_TOPICID 12

Definition at line 36 of file default\_cfe\_tbl\_topicids.h.

## 12.129 cfe/modules/tbl/fsw/inc/cfe\_tbl\_eventids.h File Reference

**Macros**

### TBL event IDs

- #define **CFE\_TBL\_INIT\_INF\_EID** 1  
*TBL Initialization Event ID.*
- #define **CFE\_TBL\_NOOP\_INF\_EID** 10  
*TBL No-op Command Success Event ID.*
- #define **CFE\_TBL\_RESET\_INF\_EID** 11  
*TBL Reset Counters Command Success Event ID.*
- #define **CFE\_TBL\_FILE\_LOADED\_INF\_EID** 12  
*TBL Load Table Command Success Event ID.*
- #define **CFE\_TBL\_OVERWRITE\_DUMP\_INF\_EID** 13  
*TBL Write Table To Existing File Success Event ID.*
- #define **CFE\_TBL\_WRITE\_DUMP\_INF\_EID** 14  
*TBL Write Table To New File Success Event ID.*

- #define `CFE_TBL_OVERWRITE_REG_DUMP_INF_EID` 15  
*TBL Write Table Registry To Existing File Success Event ID.*
- #define `CFE_TBL_VAL_REQ_MADE_INF_EID` 16  
*TBL Validate Table Request Success Event ID.*
- #define `CFE_TBL_LOAD_PEND_REQ_INF_EID` 17  
*TBL Load Table Pending Notification Success Event ID.*
- #define `CFE_TBL_TLM_REG_CMD_INF_EID` 18  
*TBL Telemeter Table Registry Entry Command Success Event ID.*
- #define `CFE_TBL_LOAD_ABORT_INF_EID` 21  
*TBL Abort Table Load Success Event ID.*
- #define `CFE_TBL_WRITE_REG_DUMP_INF_EID` 22  
*TBL Write Table Registry To New File Success Event ID.*
- #define `CFE_TBL_ASSUMED_VALID_INF_EID` 23  
*TBL Validate Table Valid Due To No Validation Function Event ID.*
- #define `CFE_TBL_LOAD_SUCCESS_INF_EID` 35  
*TBL Load Table API Success Event ID.*
- #define `CFE_TBL_VALIDATION_INF_EID` 36  
*TBL Validate Table Success Event ID.*
- #define `CFE_TBL_UPDATE_SUCCESS_INF_EID` 37  
*TBL Update Table Success Event ID.*
- #define `CFE_TBL_CDS_DELETED_INFO_EID` 38  
*TBL Delete Table CDS Command Success Event ID.*
- #define `CFE_TBL_MID_ERR_EID` 50  
*TBL Invalid Message ID Received Event ID.*
- #define `CFE_TBL_CC1_ERR_EID` 51  
*TBL Invalid Command Code Received Event ID.*
- #define `CFE_TBL_LEN_ERR_EID` 52  
*TBL Invalid Command Length Event ID.*
- #define `CFE_TBL_FILE_ACCESS_ERR_EID` 53  
*TBL Load Table File Open Failure Event ID.*
- #define `CFE_TBL_FILE_STD_HDR_ERR_EID` 54  
*TBL Load Table File Read Standard Header Failure Event ID.*
- #define `CFE_TBL_FILE_TBL_HDR_ERR_EID` 55  
*TBL Load Table File Read Table Header Failure Event ID.*
- #define `CFE_TBL_FAIL_HK_SEND_ERR_EID` 56  
*TBL Send Housekeeping Command Transmit Failure Event ID.*
- #define `CFE_TBL_NO SUCH_TABLE_ERR_EID` 57  
*TBL Table Name Not Found Event ID.*
- #define `CFE_TBL_FILE_TYPE_ERR_EID` 58  
*TBL Load Table Invalid File Content ID Event ID.*
- #define `CFE_TBL_FILE_SUBTYPE_ERR_EID` 59  
*TBL Load Table Invalid File Subtype Event ID.*
- #define `CFE_TBL_NO_WORK_BUFFERS_ERR_EID` 60  
*TBL Load Or Dump Table No Working Buffers Available Event ID.*
- #define `CFE_TBL_CREATING_DUMP_FILE_ERR_EID` 62  
*TBL Write File Creation Failure Event ID.*
- #define `CFE_TBL_WRITE_CFE_HDR_ERR_EID` 63  
*TBL Write Standard File Header Failure Event ID.*
- #define `CFE_TBL_WRITE_TBL_HDR_ERR_EID` 64  
*TBL Write Table File Header Failure Event ID.*
- #define `CFE_TBL_WRITE_TBL_IMG_ERR_EID` 65  
*TBL Write Table File Data Failure Event ID.*
- #define `CFE_TBL_NO_INACTIVE_BUFFER_ERR_EID` 66  
*TBL Validate Or Write Table Command No Inactive Buffer Event ID.*
- #define `CFE_TBL_TOO_MANY_VALIDATIONS_ERR_EID` 67

- #define `CFE_TBL_WRITE_TBL_REG_ERR_EID` 68  
*TBL Validate Table Command Result Storage Exceeded Event ID.*
- #define `CFE_TBL_LOAD_ABORT_ERR_EID` 69  
*TBL Write Table Registry File Data Failure Event ID.*
- #define `CFE_TBL_ACTIVATE_ERR_EID` 70  
*TBL Abort Table Load No Load Started Event ID.*
- #define `CFE_TBL_FILE_INCOMPLETE_ERR_EID` 71  
*TBL Activate Table Command No Inactive Buffer Event ID.*
- #define `CFE_TBL_LOAD_EXCEEDS_SIZE_ERR_EID` 72  
*TBL Load Table Incomplete Load Event ID.*
- #define `CFE_TBL_ZERO_LENGTH_LOAD_ERR_EID` 73  
*TBL Load Table File Exceeds Table Size Event ID.*
- #define `CFE_TBL_PARTIAL_LOAD_ERR_EID` 74  
*TBL Load Table Uninitialized Partial Load Event ID.*
- #define `CFE_TBL_FILE_TOO_BIG_ERR_EID` 75  
*TBL Load Table File Excess Data Event ID.*
- #define `CFE_TBL_TOO_MANY_DUMPS_ERR_EID` 76  
*TBL Write Table Command Dump Only Control Blocks Exceeded Event ID.*
- #define `CFE_TBL_DUMP_PENDING_ERR_EID` 77  
*TBL Write Table Command Already In Progress Event ID.*
- #define `CFE_TBL_ACTIVATE_DUMP_ONLY_ERR_EID` 78  
*TBL Activate Table Command For Dump Only Table Event ID.*
- #define `CFE_TBL_LOADING_A_DUMP_ONLY_ERR_EID` 79  
*TBL Load Table For Dump Only Table Event ID.*
- #define `CFE_TBL_ILLEGAL_BUFF_PARAM_ERR_EID` 80  
*TBL Validate Or Write Table Command Invalid Buffer Event ID.*
- #define `CFE_TBL_UNVALIDATED_ERR_EID` 81  
*TBL Activate Table Command Inactive Image Not Validated Event ID.*
- #define `CFE_TBL_IN_REGISTRY_ERR_EID` 82  
*TBL Delete Table CDS Command For Registered Table Event ID.*
- #define `CFE_TBL_NOT_CRITICAL_TBL_ERR_EID` 83  
*TBL Delete Table CDS Command Invalid CDS Type Event ID.*
- #define `CFE_TBL_NOT_IN_CRIT_REG_ERR_EID` 84  
*TBL Delete Table CDS Command Not In Critical Table Registry Event ID.*
- #define `CFE_TBL_CDS_NOT_FOUND_ERR_EID` 85  
*TBL Delete Table CDS Command Not In CDS Registry Event ID.*
- #define `CFE_TBL_CDS_DELETE_ERR_EID` 86  
*TBL Delete Table CDS Command Internal Error Event ID.*
- #define `CFE_TBL_CDS_OWNER_ACTIVE_ERR_EID` 87  
*TBL Delete Table CDS Command App Active Event ID.*
- #define `CFE_TBL_LOADING_PENDING_ERR_EID` 88  
*TBL Load Table Command Load Pending Event ID.*
- #define `CFE_TBL_FAIL_NOTIFY_SEND_ERR_EID` 89  
*TBL Send Notification Transmit Failed Event ID.*
- #define `CFE_TBL_REGISTER_ERR_EID` 90  
*TBL Register Table Failed Event ID.*
- #define `CFE_TBL_SHARE_ERR_EID` 91  
*TBL Share Table Failed Event ID.*
- #define `CFE_TBL_UNREGISTER_ERR_EID` 92  
*TBL Unregister Table Failed Event ID.*
- #define `CFE_TBL_LOAD_VAL_ERR_EID` 93  
*TBL Validation Function Invalid Return Code Event ID.*
- #define `CFE_TBL_LOAD_TYPE_ERR_EID` 94  
*TBL Load Table API Invalid Source Type Event ID.*

- #define [CFE\\_TBL\\_UPDATE\\_ERR\\_EID](#) 95  
*TBL Update Table Failed Event ID.*
- #define [CFE\\_TBL\\_VALIDATION\\_ERR\\_EID](#) 96  
*TBL Validate Table Validation Failed Event ID.*
- #define [CFE\\_TBL\\_SPACECRAFT\\_ID\\_ERR\\_EID](#) 97  
*TBL Read Header Invalid Spacecraft ID Event ID.*
- #define [CFE\\_TBL\\_PROCESSOR\\_ID\\_ERR\\_EID](#) 98  
*TBL Read Header Invalid Processor ID Event ID.*
- #define [CFE\\_TBL\\_LOAD\\_IN\\_PROGRESS\\_ERR\\_EID](#) 100  
*TBL Load Table API Load Already In Progress Event ID.*
- #define [CFE\\_TBL\\_LOAD\\_FILENAME\\_LONG\\_ERR\\_EID](#) 101  
*TBL Load Table Filename Too Long Event ID.*
- #define [CFE\\_TBL\\_LOAD\\_TBLNAME\\_MISMATCH\\_ERR\\_EID](#) 102  
*TBL Load Table Name Mismatch Event ID.*
- #define [CFE\\_TBL\\_HANDLE\\_ACCESS\\_ERR\\_EID](#) 103  
*TBL Load Table API Access Violation Event ID.*

### 12.129.1 Detailed Description

cFE Table Services Event IDs

### 12.129.2 Macro Definition Documentation

**12.129.2.1 CFE\_TBL\_ACTIVATE\_DUMP\_ONLY\_ERR\_EID** #define CFE\_TBL\_ACTIVATE\_DUMP\_ONLY\_ERR\_EID 78  
TBL Activate Table Command For Dump Only Table Event ID.

Type: ERROR

Cause:

[TBL Activate Table Command](#) failure due to table being dump only.  
Definition at line 544 of file cfe\_tbl\_eventids.h.

**12.129.2.2 CFE\_TBL\_ACTIVATE\_ERR\_EID** #define CFE\_TBL\_ACTIVATE\_ERR\_EID 70  
TBL Activate Table Command No Inactive Buffer Event ID.

Type: ERROR

Cause:

[TBL Activate Table Command](#) failure due to no associated inactive buffer.  
Definition at line 450 of file cfe\_tbl\_eventids.h.

**12.129.2.3 CFE\_TBL\_ASSUMED\_VALID\_INF\_EID** #define CFE\_TBL\_ASSUMED\_VALID\_INF\_EID 23  
TBL Validate Table Valid Due To No Validation Function Event ID.

Type: INFORMATION

Cause:

[TBL Validate Table Command](#) marking table as valid due to no validation function being registered.  
Definition at line 180 of file cfe\_tbl\_eventids.h.

**12.129.2.4 CFE\_TBL\_CC1\_ERR\_EID** #define CFE\_TBL\_CC1\_ERR\_EID 51  
TBL Invalid Command Code Received Event ID.

Type: ERROR

Cause:

Invalid command code for message ID [CFE\\_TBL\\_CMD\\_MID](#) received on the TBL message pipe.  
Definition at line 246 of file cfe\_tbl\_eventids.h.

**12.129.2.5 CFE\_TBL\_CDS\_DELETE\_ERR\_EID** #define CFE\_TBL\_CDS\_DELETE\_ERR\_EID 86  
TBL Delete Table CDS Command Internal Error Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to an internal error. See the system log for more information.  
Definition at line 640 of file cfe\_tbl\_eventids.h.

**12.129.2.6 CFE\_TBL\_CDS\_DELETED\_INFO\_EID** #define CFE\_TBL\_CDS\_DELETED\_INFO\_EID 38  
TBL Delete Table CDS Command Success Event ID.

Type: INFORMATION

Cause:

[TBL Delete Table CDS Command](#) success.  
Definition at line 224 of file cfe\_tbl\_eventids.h.

**12.129.2.7 CFE\_TBL\_CDS\_NOT\_FOUND\_ERR\_EID** #define CFE\_TBL\_CDS\_NOT\_FOUND\_ERR\_EID 85  
TBL Delete Table CDS Command Not In CDS Registry Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to the table name not found in the CDS registry.  
Definition at line 628 of file cfe\_tbl\_eventids.h.

**12.129.2.8 CFE\_TBL\_CDS\_OWNER\_ACTIVE\_ERR\_EID** #define CFE\_TBL\_CDS\_OWNER\_ACTIVE\_ERR\_EID 87  
TBL Delete Table CDS Command App Active Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to the owning application being active.  
Definition at line 652 of file cfe\_tbl\_eventids.h.

**12.129.2.9 CFE\_TBL\_CREATING\_DUMP\_FILE\_ERR\_EID** #define CFE\_TBL\_CREATING\_DUMP\_FILE\_ERR\_EID 62  
TBL Write File Creation Failure Event ID.

Type: ERROR

Cause:

TBL Write Table or Table Registry File failed to create file. OVERLOADED  
Definition at line 357 of file cfe\_tbl\_eventids.h.

**12.129.2.10 CFE\_TBL\_DUMP\_PENDING\_ERR\_EID** #define CFE\_TBL\_DUMP\_PENDING\_ERR\_EID 77  
TBL Write Table Command Already In Progress Event ID.

Type: ERROR

Cause:

[TBL Write Table Command](#) failure due to a dump already in progress for the same table.  
Definition at line 532 of file cfe\_tbl\_eventids.h.

**12.129.2.11 CFE\_TBL\_FAIL\_HK\_SEND\_ERR\_EID** #define CFE\_TBL\_FAIL\_HK\_SEND\_ERR\_EID 56  
TBL Send Housekeeping Command Transmit Failure Event ID.

Type: ERROR

Cause:

[TBL Send Housekeeping Command](#) failure transmitting the housekeeping message.  
Definition at line 302 of file cfe\_tbl\_eventids.h.

**12.129.2.12 CFE\_TBL\_FAIL\_NOTIFY\_SEND\_ERR\_EID** #define CFE\_TBL\_FAIL\_NOTIFY\_SEND\_ERR\_EID 89  
TBL Send Notification Transmit Failed Event ID.

Type: ERROR

Cause:

TBL send notification transmit message failure.  
Definition at line 674 of file cfe\_tbl\_eventids.h.

**12.129.2.13 CFE\_TBL\_FILE\_ACCESS\_ERR\_EID** #define CFE\_TBL\_FILE\_ACCESS\_ERR\_EID 53  
TBL Load Table File Open Failure Event ID.

Type: ERROR

Cause:

Load Table failure opening the file. OVERLOADED  
Definition at line 268 of file cfe\_tbl\_eventids.h.

**12.129.2.14 CFE\_TBL\_FILE\_INCOMPLETE\_ERR\_EID** #define CFE\_TBL\_FILE\_INCOMPLETE\_ERR\_EID 71  
TBL Load Table Incomplete Load Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to inability to read the size of data specified in the table header from file. OVERLOADED  
Definition at line 462 of file cfe\_tbl\_eventids.h.

**12.129.2.15 CFE\_TBL\_FILE\_LOADED\_INF\_EID** #define CFE\_TBL\_FILE\_LOADED\_INF\_EID 12  
TBL Load Table Command Success Event ID.

Type: INFORMATION

Cause:

[TBL Load Table Command](#) successfully loaded the new table data to the working buffer.  
Definition at line 76 of file cfe\_tbl\_eventids.h.

**12.129.2.16 CFE\_TBL\_FILE\_STD\_HDR\_ERR\_EID** #define CFE\_TBL\_FILE\_STD\_HDR\_ERR\_EID 54  
TBL Load Table File Read Standard Header Failure Event ID.

Type: ERROR

Cause:

Load Table failure reading the file standard header.  
Definition at line 279 of file cfe\_tbl\_eventids.h.

**12.129.2.17 CFE\_TBL\_FILE\_SUBTYPE\_ERR\_EID** #define CFE\_TBL\_FILE\_SUBTYPE\_ERR\_EID 59  
TBL Load Table Invalid File Subtype Event ID.

Type: ERROR

Cause:

TBL Load Table Failure due to invalid file subtype.  
Definition at line 335 of file cfe\_tbl\_eventids.h.

**12.129.2.18 CFE\_TBL\_FILE\_TBL\_HDR\_ERR\_EID** #define CFE\_TBL\_FILE\_TBL\_HDR\_ERR\_EID 55  
TBL Load Table File Read Table Header Failure Event ID.

Type: ERROR

Cause:

Load Table failure reading the file table header.  
Definition at line 290 of file cfe\_tbl\_eventids.h.

**12.129.2.19 CFE\_TBL\_FILE\_TOO\_BIG\_ERR\_EID** #define CFE\_TBL\_FILE\_TOO\_BIG\_ERR\_EID 75  
TBL Load Table File Excess Data Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to the file header specified size of data being smaller than the actual data contained in the file. OVERLOADED

Definition at line 508 of file cfe\_tbl\_eventids.h.

**12.129.2.20 CFE\_TBL\_FILE\_TYPE\_ERR\_EID** #define CFE\_TBL\_FILE\_TYPE\_ERR\_EID 58  
TBL Load Table Invalid File Content ID Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to invalid file content ID.

Definition at line 324 of file cfe\_tbl\_eventids.h.

**12.129.2.21 CFE\_TBL\_HANDLE\_ACCESS\_ERR\_EID** #define CFE\_TBL\_HANDLE\_ACCESS\_ERR\_EID 103  
TBL Load Table API Access Violation Event ID.

Type: ERROR

Cause:

[CFE\\_TBL\\_Load](#) API failure due to the application not owning the table.

Definition at line 817 of file cfe\_tbl\_eventids.h.

**12.129.2.22 CFE\_TBL\_ILLEGAL\_BUFF\_PARAM\_ERR\_EID** #define CFE\_TBL\_ILLEGAL\_BUFF\_PARAM\_ERR\_EID 80  
TBL Validate Or Write Table Command Invalid Buffer Event ID.

Type: ERROR

Cause:

[TBL Validate Table Command](#) or [TBL Write Table Command](#) failure due to an invalid buffer selection. OVERLOADED  
Definition at line 568 of file cfe\_tbl\_eventids.h.

**12.129.2.23 CFE\_TBL\_IN\_REGISTRY\_ERR\_EID** #define CFE\_TBL\_IN\_REGISTRY\_ERR\_EID 82  
TBL Delete Table CDS Command For Registered Table Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to the table being currently registered.  
Definition at line 592 of file cfe\_tbl\_eventids.h.

**12.129.2.24 CFE\_TBL\_INIT\_INF\_EID** #define CFE\_TBL\_INIT\_INF\_EID 1  
TB Initialization Event ID.

Type: INFORMATION

Cause:

Table Services Task initialization complete.  
Definition at line 42 of file cfe\_tbl\_eventids.h.

**12.129.2.25 CFE\_TBL\_LEN\_ERR\_EID** #define CFE\_TBL\_LEN\_ERR\_EID 52  
TBL Invalid Command Length Event ID.

Type: ERROR

Cause:

Invalid length for the message ID and command code received on the TBL message pipe.  
Definition at line 257 of file cfe\_tbl\_eventids.h.

**12.129.2.26 CFE\_TBL\_LOAD\_ABORT\_ERR\_EID** #define CFE\_TBL\_LOAD\_ABORT\_ERR\_EID 69  
TBL Abort Table Load No Load Started Event ID.

Type: ERROR

Cause:

[TBL Abort Table Load Command](#) failure due to no load in progress.  
Definition at line 438 of file cfe\_tbl\_eventids.h.

**12.129.2.27 CFE\_TBL\_LOAD\_ABORT\_INF\_EID** #define CFE\_TBL\_LOAD\_ABORT\_INF\_EID 21  
TBL Abort Table Load Success Event ID.

Type: INFORMATION

Cause:

[TBL Abort Table Load Command](#) success.

Definition at line 157 of file cfe\_tbl\_eventids.h.

**12.129.2.28 CFE\_TBL\_LOAD\_EXCEEDS\_SIZE\_ERR\_EID** #define CFE\_TBL\_LOAD\_EXCEEDS\_SIZE\_ERR\_EID 72  
TBL Load Table File Exceeds Table Size Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to the file header specified offset and/or size of data exceeding the table size. OVERLOADED  
Definition at line 474 of file cfe\_tbl\_eventids.h.

**12.129.2.29 CFE\_TBL\_LOAD\_FILENAME\_LONG\_ERR\_EID** #define CFE\_TBL\_LOAD\_FILENAME\_LONG\_ERR\_EID 101  
TBL Load Table Filename Too Long Event ID.

Type: ERROR

Cause:

Load table filename too long.

Definition at line 795 of file cfe\_tbl\_eventids.h.

**12.129.2.30 CFE\_TBL\_LOAD\_IN\_PROGRESS\_ERR\_EID** #define CFE\_TBL\_LOAD\_IN\_PROGRESS\_ERR\_EID 100  
TBL Load Table API Load Already In Progress Event ID.

Type: ERROR

Cause:

[CFE\\_TBL\\_Load](#) API failure due to load already in progress.

Definition at line 784 of file cfe\_tbl\_eventids.h.

**12.129.2.31 CFE\_TBL\_LOAD\_PEND\_REQ\_INF\_EID** #define CFE\_TBL\_LOAD\_PEND\_REQ\_INF\_EID 17  
TBL Load Table Pending Notification Success Event ID.

Type: DEBUG

Cause:

TBL load table pending notification successfully sent.  
Definition at line 134 of file cfe\_tbl\_eventids.h.

**12.129.2.32 CFE\_TBL\_LOAD\_SUCCESS\_INF\_EID** #define CFE\_TBL\_LOAD\_SUCCESS\_INF\_EID 35  
TBL Load Table API Success Event ID.

Type: DEBUG (the first time) and INFORMATION (normally)

Cause:

[CFE\\_TBL\\_Load](#) API success for dump only or normal table. OVERLOADED  
Definition at line 191 of file cfe\_tbl\_eventids.h.

**12.129.2.33 CFE\_TBL\_LOAD\_TBLNAME\_MISMATCH\_ERR\_EID** #define CFE\_TBL\_LOAD\_TBLNAME\_MISMATCH\_ERR\_EID 102  
TBL Load Table Name Mismatch Event ID.

Type: ERROR

Cause:

Load table name in the table file header does not match the specified table name.  
Definition at line 806 of file cfe\_tbl\_eventids.h.

**12.129.2.34 CFE\_TBL\_LOAD\_TYPE\_ERR\_EID** #define CFE\_TBL\_LOAD\_TYPE\_ERR\_EID 94  
TBL Load Table API Invalid Source Type Event ID.

Type: ERROR

Cause:

[CFE\\_TBL\\_Load](#) API valid due to invalid source type.  
Definition at line 729 of file cfe\_tbl\_eventids.h.

**12.129.2.35 CFE\_TBL\_LOAD\_VAL\_ERR\_EID** #define CFE\_TBL\_LOAD\_VAL\_ERR\_EID 93  
TBL Validation Function Invalid Return Code Event ID.

Type: ERROR

Cause:

Invalid table validation function return code.  
Definition at line 718 of file cfe\_tbl\_eventids.h.

**12.129.2.36 CFE\_TBL\_LOADING\_A\_DUMP\_ONLY\_ERR\_EID** #define CFE\_TBL\_LOADING\_A\_DUMP\_ONLY\_ERR\_EID 79  
TBL Load Table For Dump Only Table Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to table being dump only. OVERLOADED  
Definition at line 555 of file cfe\_tbl\_eventids.h.

**12.129.2.37 CFE\_TBL\_LOADING\_PENDING\_ERR\_EID** #define CFE\_TBL\_LOADING\_PENDING\_ERR\_EID 88  
TBL Load Table Command Load Pending Event ID.

Type: ERROR

Cause:

[TBL Load Table Command](#) failed due to a load already pending.  
Definition at line 663 of file cfe\_tbl\_eventids.h.

**12.129.2.38 CFE\_TBL\_MID\_ERR\_EID** #define CFE\_TBL\_MID\_ERR\_EID 50  
TBL Invalid Message ID Received Event ID.

Type: ERROR

Cause:

Invalid message ID received on the TBL message pipe.  
Definition at line 235 of file cfe\_tbl\_eventids.h.

**12.129.2.39 CFE\_TBL\_NO\_INACTIVE\_BUFFER\_ERR\_EID** #define CFE\_TBL\_NO\_INACTIVE\_BUFFER\_ERR\_EID 66  
TBL Validate Or Write Table Command No Inactive Buffer Event ID.

Type: ERROR

Cause:

[TBL Validate Table Command](#) or [TBL Write Table Command](#) failure due to requesting non-existent inactive buffer. OVERLOADED  
Definition at line 403 of file cfe\_tbl\_eventids.h.

**12.129.2.40 CFE\_TBL\_NO SUCH\_TABLE\_ERR\_EID** #define CFE\_TBL\_NO SUCH\_TABLE\_ERR\_EID 57  
TBL Table Name Not Found Event ID.

Type: ERROR

Cause:

TBL command handler unable to find table name. OVERLOADED  
Definition at line 313 of file cfe\_tbl\_eventids.h.

**12.129.2.41 CFE\_TBL\_NO\_WORK\_BUFFERS\_ERR\_EID** #define CFE\_TBL\_NO\_WORK\_BUFFERS\_ERR\_EID 60  
TBL Load Or Dump Table No Working Buffers Available Event ID.

Type: ERROR

Cause:

TBL Load or Dump failure due to no working buffers available or internal error. OVERLOADED  
Definition at line 346 of file cfe\_tbl\_eventids.h.

**12.129.2.42 CFE\_TBL\_NOOP\_INF\_EID** #define CFE\_TBL\_NOOP\_INF\_EID 10  
TBL No-op Command Success Event ID.

Type: INFORMATION

Cause:

[NO-OP TBL No-op Command](#) success.  
Definition at line 53 of file cfe\_tbl\_eventids.h.

**12.129.2.43 CFE\_TBL\_NOT\_CRITICAL\_TBL\_ERR\_EID** #define CFE\_TBL\_NOT\_CRITICAL\_TBL\_ERR\_EID 83  
TBL Delete Table CDS Command Invalid CDS Type Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to CDS being in the table registry but not registered as a table within ES.  
Definition at line 604 of file cfe\_tbl\_eventids.h.

**12.129.2.44 CFE\_TBL\_NOT\_IN\_CRIT\_REG\_ERR\_EID** #define CFE\_TBL\_NOT\_IN\_CRIT\_REG\_ERR\_EID 84  
TBL Delete Table CDS Command Not In Critical Table Registry Event ID.

Type: ERROR

Cause:

[TBL Delete Table CDS Command](#) failure due to the table not being in the critical table registry.  
Definition at line 616 of file cfe\_tbl\_eventids.h.

**12.129.2.45 CFE\_TBL\_OVERWRITE\_DUMP\_INF\_EID** #define CFE\_TBL\_OVERWRITE\_DUMP\_INF\_EID 13  
TBL Write Table To Existing File Success Event ID.

Type: INFORMATION

Cause:

TBL write table to an existing file success.  
Definition at line 87 of file cfe\_tbl\_eventids.h.

**12.129.2.46 CFE\_TBL\_OVERWRITE\_REG\_DUMP\_INF\_EID** #define CFE\_TBL\_OVERWRITE\_REG\_DUMP\_INF\_EID 15  
TBL Write Table Registry To Existing File Success Event ID.

Type: DEBUG

Cause:

TBL Write Table Registry to an existing file completed successfully.  
Definition at line 109 of file cfe\_tbl\_eventids.h.

**12.129.2.47 CFE\_TBL\_PARTIAL\_LOAD\_ERR\_EID** #define CFE\_TBL\_PARTIAL\_LOAD\_ERR\_EID 74  
TBL Load Table Uninitialized Partial Load Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to attempting a partial load to an uninitialized table. OVERLOADED  
Definition at line 496 of file cfe\_tbl\_eventids.h.

**12.129.2.48 CFE\_TBL\_PROCESSOR\_ID\_ERR\_EID** #define CFE\_TBL\_PROCESSOR\_ID\_ERR\_EID 98  
TBL Read Header Invalid Processor ID Event ID.

Type: ERROR

Cause:

Invalid processor ID in table file header.  
Definition at line 773 of file cfe\_tbl\_eventids.h.

**12.129.2.49 CFE\_TBL\_REGISTER\_ERR\_EID** #define CFE\_TBL\_REGISTER\_ERR\_EID 90  
TBL Register Table Failed Event ID.

Type: ERROR

Cause:

TBL table registration failure. See system log for more information.  
Definition at line 685 of file cfe\_tbl\_eventids.h.

**12.129.2.50 CFE\_TBL\_RESET\_INF\_EID** #define CFE\_TBL\_RESET\_INF\_EID 11  
TBL Reset Counters Command Success Event ID.

Type: DEBUG

Cause:

[TBL Reset Counters Command](#) success.  
Definition at line 64 of file cfe\_tbl\_eventids.h.

**12.129.2.51 CFE\_TBL\_SHARE\_ERR\_EID** #define CFE\_TBL\_SHARE\_ERR\_EID 91  
TBL Share Table Failed Event ID.

Type: ERROR

Cause:

TBL share table failure. See system log for more information.  
Definition at line 696 of file cfe\_tbl\_eventids.h.

**12.129.2.52 CFE\_TBL\_SPACECRAFT\_ID\_ERR\_EID** #define CFE\_TBL\_SPACECRAFT\_ID\_ERR\_EID 97  
TBL Read Header Invalid Spacecraft ID Event ID.

Type: ERROR

Cause:

Invalid spacecraft ID in table file header.  
Definition at line 762 of file cfe\_tbl\_eventids.h.

**12.129.2.53 CFE\_TBL\_TLM\_REG\_CMD\_INF\_EID** #define CFE\_TBL\_TLM\_REG\_CMD\_INF\_EID 18  
TBL Telemeter Table Registry Entry Command Success Event ID.

Type: DEBUG

Cause:

[TBL Telemeter Table Registry Entry command](#) successfully set the table registry index to telemeter in the next house-keeping packet.  
Definition at line 146 of file cfe\_tbl\_eventids.h.

**12.129.2.54 CFE\_TBL\_TOO\_MANY\_DUMPS\_ERR\_EID** #define CFE\_TBL\_TOO\_MANY\_DUMPS\_ERR\_EID 76  
TBL Write Table Command Dump Only Control Blocks Exceeded Event ID.

Type: ERROR

Cause:

[TBL Write Table Command](#) failure due to exceeding the allocated number of control blocks available to write a dump only table.  
Definition at line 520 of file cfe\_tbl\_eventids.h.

**12.129.2.55 CFE\_TBL\_TOO\_MANY\_VALIDATIONS\_ERR\_EID** #define CFE\_TBL\_TOO\_MANY\_VALIDATIONS\_ERR\_EID 67

TBL Validate Table Command Result Storage Exceeded Event ID.

Type: ERROR

Cause:

[TBL Validate Table Command](#) failure due to exceeding result storage.

Definition at line 415 of file cfe\_tbl\_eventids.h.

**12.129.2.56 CFE\_TBL\_UNREGISTER\_ERR\_EID** #define CFE\_TBL\_UNREGISTER\_ERR\_EID 92

TBL Unregister Table Failed Event ID.

Type: ERROR

Cause:

TBL unregister table failure. See system log for more information.

Definition at line 707 of file cfe\_tbl\_eventids.h.

**12.129.2.57 CFE\_TBL\_UNVALIDATED\_ERR\_EID** #define CFE\_TBL\_UNVALIDATED\_ERR\_EID 81

TBL Activate Table Command Inactive Image Not Validated Event ID.

Type: ERROR

Cause:

[TBL Activate Table Command](#) failure due to the inactive image not being validated.

Definition at line 580 of file cfe\_tbl\_eventids.h.

**12.129.2.58 CFE\_TBL\_UPDATE\_ERR\_EID** #define CFE\_TBL\_UPDATE\_ERR\_EID 95

TBL Update Table Failed Event ID.

Type: ERROR

Cause:

TBL update table failure due to an internal error. OVERLOADED

Definition at line 740 of file cfe\_tbl\_eventids.h.

**12.129.2.59 CFE\_TBL\_UPDATE\_SUCCESS\_INF\_EID** #define CFE\_TBL\_UPDATE\_SUCCESS\_INF\_EID 37  
TBL Update Table Success Event ID.

Type: INFORMATION

Cause:

Table update successfully completed.

Definition at line 213 of file cfe\_tbl\_eventids.h.

**12.129.2.60 CFE\_TBL\_VAL\_REQ\_MADE\_INF\_EID** #define CFE\_TBL\_VAL\_REQ\_MADE\_INF\_EID 16  
TBL Validate Table Request Success Event ID.

Type: DEBUG

Cause:

[TBL Validate Table Command](#) success. Note this event signifies the request to validate the table has been successfully submitted. Completion will generate a [CFE\\_TBL\\_VALIDATION\\_INF\\_EID](#) or [CFE\\_TBL\\_VALIDATION\\_ERR\\_EID](#) event messages.

Definition at line 123 of file cfe\_tbl\_eventids.h.

**12.129.2.61 CFE\_TBL\_VALIDATION\_ERR\_EID** #define CFE\_TBL\_VALIDATION\_ERR\_EID 96  
TBL Validate Table Validation Failed Event ID.

Type: ERROR

Cause:

TBL validate table function indicates validation failed. OVERLOADED

Definition at line 751 of file cfe\_tbl\_eventids.h.

**12.129.2.62 CFE\_TBL\_VALIDATION\_INF\_EID** #define CFE\_TBL\_VALIDATION\_INF\_EID 36  
TBL Validate Table Success Event ID.

Type: INFORMATION

Cause:

Table active or inactive image successfully validated by the registered validation function. OVERLOADED

Definition at line 202 of file cfe\_tbl\_eventids.h.

**12.129.2.63 CFE\_TBL\_WRITE\_CFE\_HDR\_ERR\_EID** #define CFE\_TBL\_WRITE\_CFE\_HDR\_ERR\_EID 63  
TBL Write Standard File Header Failure Event ID.

Type: ERROR

Cause:

TBL Write Table or Table Registry File failure writing the standard file header. OVERLOADED  
Definition at line 368 of file cfe\_tbl\_eventids.h.

**12.129.2.64 CFE\_TBL\_WRITE\_DUMP\_INF\_EID** #define CFE\_TBL\_WRITE\_DUMP\_INF\_EID 14  
TBL Write Table To New File Success Event ID.

Type: INFORMATION

Cause:

TBL write table to a new file success.  
Definition at line 98 of file cfe\_tbl\_eventids.h.

**12.129.2.65 CFE\_TBL\_WRITE\_REG\_DUMP\_INF\_EID** #define CFE\_TBL\_WRITE\_REG\_DUMP\_INF\_EID 22  
TBL Write Table Registry To New File Success Event ID.

Type: DEBUG

Cause:

TBL Write Table Registry to a new file completed successfully.  
Definition at line 168 of file cfe\_tbl\_eventids.h.

**12.129.2.66 CFE\_TBL\_WRITE\_TBL\_HDR\_ERR\_EID** #define CFE\_TBL\_WRITE\_TBL\_HDR\_ERR\_EID 64  
TBL Write Table File Header Failure Event ID.

Type: ERROR

Cause:

TBL Write Table failure writing the table image file header.  
Definition at line 379 of file cfe\_tbl\_eventids.h.

**12.129.2.67 CFE\_TBL\_WRITE\_TBL\_IMG\_ERR\_EID** #define CFE\_TBL\_WRITE\_TBL\_IMG\_ERR\_EID 65  
TBL Write Table File Data Failure Event ID.

Type: ERROR

Cause:

TBL Write Table failure writing the table data.  
Definition at line 390 of file cfe\_tbl\_eventids.h.

**12.129.2.68 CFE\_TBL\_WRITE\_TBL\_REG\_ERR\_EID** #define CFE\_TBL\_WRITE\_TBL\_REG\_ERR\_EID 68  
TBL Write Table Registry File Data Failure Event ID.

Type: ERROR

Cause:

TB Write Table Registry failure writing file data.  
Definition at line 426 of file cfe\_tbl\_eventids.h.

**12.129.2.69 CFE\_TBL\_ZERO\_LENGTH\_LOAD\_ERR\_EID** #define CFE\_TBL\_ZERO\_LENGTH\_LOAD\_ERR\_EID 73  
TBL Load Table File Zero Length Event ID.

Type: ERROR

Cause:

TBL Load Table failure due to the file header specified size of data being zero.  
Definition at line 485 of file cfe\_tbl\_eventids.h.

## 12.130 cfe/modules/time/config/default\_cfe\_time\_extern\_typedefs.h File Reference

```
#include "common_types.h"
```

### Data Structures

- struct [CFE\\_TIME\\_SysTime](#)

*Data structure used to hold system time values.*

## Typedefs

- **typedef struct CFE\_TIME\_SysTime CFE\_TIME\_SysTime\_t**  
*Data structure used to hold system time values.*
- **typedef uint8 CFE\_TIME\_FlagBit\_Enum\_t**  
*Bit positions of the various clock state flags.*
- **typedef int16 CFE\_TIME\_ClockState\_Enum\_t**  
*Enumerated types identifying the quality of the current time.*
- **typedef uint8 CFE\_TIME\_SourceSelect\_Enum\_t**  
*Clock Source Selection Parameters.*
- **typedef uint8 CFE\_TIME\_ToneSignalSelect\_Enum\_t**  
*Tone Signal Selection Parameters.*
- **typedef uint8 CFE\_TIME\_AdjustDirection\_Enum\_t**  
*STCF adjustment direction (for both one-time and 1Hz adjustments)*
- **typedef uint8 CFE\_TIME\_FlywheelState\_Enum\_t**  
*Fly-wheel status values.*
- **typedef uint8 CFE\_TIME\_SetState\_Enum\_t**  
*Clock status values (has the clock been set to correct time)*

## Enumerations

- **enum CFE\_TIME\_FlagBit {**  
`CFE_TIME_FlagBit_CLKSET = 0, CFE_TIME_FlagBit_FLYING = 1, CFE_TIME_FlagBit_SRCINT = 2,`  
`CFE_TIME_FlagBit_SIGPRI = 3,`  
`CFE_TIME_FlagBit_SRVFLY = 4, CFE_TIME_FlagBit_CMDFLY = 5, CFE_TIME_FlagBit_ADDADJ = 6,`  
`CFE_TIME_FlagBit_ADD1HZ = 7,`  
`CFE_TIME_FlagBit_ADDTCL = 8, CFE_TIME_FlagBit_SERVER = 9, CFE_TIME_FlagBit_GDTONE = 10 }`  
*Label definitions associated with CFE\_TIME\_FlagBit\_Enum\_t.*
- **enum CFE\_TIME\_ClockState { CFE\_TIME\_ClockState\_INVALID = -1, CFE\_TIME\_ClockState\_VALID = 0,**  
`CFE_TIME_ClockState_FLYWHEEL = 1 }`  
*Label definitions associated with CFE\_TIME\_ClockState\_Enum\_t.*
- **enum CFE\_TIME\_SourceSelect { CFE\_TIME\_SourceSelect\_INTERNAL = 1, CFE\_TIME\_SourceSelect\_EXTERNAL = 2 }**  
*Label definitions associated with CFE\_TIME\_SourceSelect\_Enum\_t.*
- **enum CFE\_TIME\_ToneSignalSelect { CFE\_TIME\_ToneSignalSelect\_PRIMARY = 1, CFE\_TIME\_ToneSignalSelect\_REDUNDANT = 2 }**  
*Label definitions associated with CFE\_TIME\_ToneSignalSelect\_Enum\_t.*
- **enum CFE\_TIME\_AdjustDirection { CFE\_TIME\_AdjustDirection\_ADD = 1, CFE\_TIME\_AdjustDirection\_SUBTRACT = 2 }**  
*Label definitions associated with CFE\_TIME\_AdjustDirection\_Enum\_t.*
- **enum CFE\_TIME\_FlywheelState { CFE\_TIME\_FlywheelState\_NO\_FLY = 0, CFE\_TIME\_FlywheelState\_IS\_FLY = 1 }**  
*Label definitions associated with CFE\_TIME\_FlywheelState\_Enum\_t.*
- **enum CFE\_TIME\_SetState { CFE\_TIME\_SetState\_NOT\_SET = 0, CFE\_TIME\_SetState\_WAS\_SET = 1 }**  
*Label definitions associated with CFE\_TIME\_SetState\_Enum\_t.*

### 12.130.1 Detailed Description

Declarations and prototypes for cfe\_time\_extern\_typedefs module

## 12.130.2 Typedef Documentation

**12.130.2.1 CFE\_TIME\_AdjustDirection\_Enum\_t** `typedef uint8 CFE_TIME_AdjustDirection_Enum_t`  
STCF adjustment direction (for both one-time and 1Hz adjustments)

See also

enum [CFE\\_TIME\\_AdjustDirection](#)

Definition at line 234 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.2 CFE\_TIME\_ClockState\_Enum\_t** `typedef int16 CFE_TIME_ClockState_Enum_t`  
Enumerated types identifying the quality of the current time.

Description

The [CFE\\_TIME\\_ClockState\\_Enum\\_t](#) enumerations identify the three recognized states of the current time. If the clock has never been successfully synchronized with the primary onboard clock source, the time is considered to be [CFE\\_TIME\\_ClockState\\_INVALID](#). If the time is currently synchronized (i.e. - the primary synchronization mechanism has not been dropped for any significant amount of time), then the current time is considered to be [CFE\\_TIME\\_ClockState\\_VALID](#). If the time had, at some point in the past, been synchronized, but the synchronization with the primary onboard clock has since been lost, then the time is considered to be [CFE\\_TIME\\_ClockState\\_FLYWHEEL](#). Since different clocks drift at different rates from one another, the accuracy of the time while in [CFE\\_TIME\\_ClockState\\_FLYWHEEL](#) is dependent upon the time spent in that state.

See also

enum [CFE\\_TIME\\_ClockState](#)

Definition at line 165 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.3 CFE\_TIME\_FlagBit\_Enum\_t** `typedef uint8 CFE_TIME_FlagBit_Enum_t`  
Bit positions of the various clock state flags.

See also

enum [CFE\\_TIME\\_FlagBit](#)

Definition at line 113 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.4 CFE\_TIME\_FlywheelState\_Enum\_t** `typedef uint8 CFE_TIME_FlywheelState_Enum_t`  
Fly-wheel status values.

See also

enum [CFE\\_TIME\\_FlywheelState](#)

Definition at line 257 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.5 CFE\_TIME\_SetState\_Enum\_t** `typedef uint8 CFE_TIME_SetState_Enum_t`  
Clock status values (has the clock been set to correct time)

See also

enum [CFE\\_TIME\\_SetState](#)

Definition at line 280 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.6 CFE\_TIME\_SourceSelect\_Enum\_t** `typedef uint8 CFE_TIME_SourceSelect_Enum_t`  
Clock Source Selection Parameters.

See also

enum [CFE\\_TIME\\_SourceSelect](#)

Definition at line 188 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.2.7 CFE\_TIME\_SysTime\_t** `typedef struct CFE_TIME_SysTime CFE_TIME_SysTime_t`  
Data structure used to hold system time values.

Description

The `CFE_TIME_SysTime_t` data structure is used to hold time values. Time is referred to as the elapsed time (in seconds and subseconds) since a specified epoch time. The subseconds field contains the number of  $2^{(-32)}$  second intervals that have elapsed since the epoch.

**12.130.2.8 CFE\_TIME\_ToneSignalSelect\_Enum\_t** `typedef uint8 CFE_TIME_ToneSignalSelect_Enum_t`  
Tone Signal Selection Parameters.

See also

enum [CFE\\_TIME\\_ToneSignalSelect](#)

Definition at line 211 of file default\_cfe\_time\_extern\_typedefs.h.

### 12.130.3 Enumeration Type Documentation

**12.130.3.1 CFE\_TIME\_AdjustDirection** `enum CFE_TIME_AdjustDirection`  
Label definitions associated with `CFE_TIME_AdjustDirection_Enum_t`.

Enumerator

<code>CFE_TIME_AdjustDirection_ADD</code>	Add time adjustment.
<code>CFE_TIME_AdjustDirection_SUBTRACT</code>	Subtract time adjustment.

Definition at line 216 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.2 CFE\_TIME\_ClockState** `enum CFE_TIME_ClockState`  
Label definitions associated with `CFE_TIME_ClockState_Enum_t`.

**Enumerator**

CFE_TIME_ClockState_INVALID	The spacecraft time has not been set since the last clock reset. Times returned by clock routines have no relationship to any ground-based time reference.
CFE_TIME_ClockState_VALID	The spacecraft time has been set at least once since the last clock reset, and it is synchronized with the primary on-board time base. Times returned by clock routines can be trusted.
CFE_TIME_ClockState_FLYWHEEL	The spacecraft time has been set at least once since the last clock reset, but it is not currently synchronized with the primary on-board time base. Times returned by clock routines are a "best guess" based on a non-optimal oscillator.

Definition at line 118 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.3 CFE\_TIME\_FlagBit enum CFE\_TIME\_FlagBit**

Label definitions associated with CFE\_TIME\_FlagBit\_Enum\_t.

**Enumerator**

CFE_TIME_FlagBit_CLKSET	The spacecraft time has been set.
CFE_TIME_FlagBit_FLYING	This instance of Time Services is flywheeling.
CFE_TIME_FlagBit_SRCINT	The clock source is set to internal.
CFE_TIME_FlagBit_SIGPRI	The clock signal is set to primary.
CFE_TIME_FlagBit_SRVFLY	The Time Server is in flywheel mode.
CFE_TIME_FlagBit_CMDFLY	This instance of Time Services was commanded into flywheel mode.
CFE_TIME_FlagBit_ADDADJ	One time STCF Adjustment is to be done in positive direction.
CFE_TIME_FlagBit_ADD1HZ	1 Hz STCF Adjustment is to be done in a positive direction
CFE_TIME_FlagBit_ADDTCL	Time Client Latency is applied in a positive direction.
CFE_TIME_FlagBit_SERVER	This instance of Time Services is a Time Server.
CFE_TIME_FlagBit_GDTONE	The tone received is good compared to the last tone received.

Definition at line 50 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.4 CFE\_TIME\_FlywheelState enum CFE\_TIME\_FlywheelState**

Label definitions associated with CFE\_TIME\_FlywheelState\_Enum\_t.

**Enumerator**

CFE_TIME_FlywheelState_NO_FLY	Not in flywheel state.
CFE_TIME_FlywheelState_IS_FLY	In flywheel state.

Definition at line 239 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.5 CFE\_TIME\_SetState enum CFE\_TIME\_SetState**

Label definitions associated with CFE\_TIME\_SetState\_Enum\_t.

## Enumerator

CFE_TIME_SetState_NOT_SET	Spacecraft time has not been set.
CFE_TIME_SetState_WAS_SET	Spacecraft time has been set.

Definition at line 262 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.6 CFE\_TIME\_SourceSelect enum CFE\_TIME\_SourceSelect**

Label definitions associated with CFE\_TIME\_SourceSelect\_Enum\_t.

## Enumerator

CFE_TIME_SourceSelect_INTERNAL	Use Internal Source.
CFE_TIME_SourceSelect_EXTERNAL	Use External Source.

Definition at line 170 of file default\_cfe\_time\_extern\_typedefs.h.

**12.130.3.7 CFE\_TIME\_ToneSignalSelect enum CFE\_TIME\_ToneSignalSelect**

Label definitions associated with CFE\_TIME\_ToneSignalSelect\_Enum\_t.

## Enumerator

CFE_TIME_ToneSignalSelect_PRIMARY	Primary Source.
CFE_TIME_ToneSignalSelect_REDUNDANT	Redundant Source.

Definition at line 193 of file default\_cfe\_time\_extern\_typedefs.h.

**12.131 cfe/modules/time/config/default\_cfe\_time\_fcncodes.h File Reference**

## Macros

## Time Services Command Codes

- #define CFE\_TIME\_NOOP\_CC 0 /\* no-op command \*/
- #define CFE\_TIME\_RESET\_COUNTERS\_CC 1 /\* reset counters \*/
- #define CFE\_TIME\_SEND\_DIAGNOSTIC\_CC 2 /\* request diagnostic hk telemetry \*/
- #define CFE\_TIME\_SET\_SOURCE\_CC 3 /\* set clock source (int vs ext) \*/
- #define CFE\_TIME\_SET\_STATE\_CC 4 /\* set clock state \*/
- #define CFE\_TIME\_ADD\_DELAY\_CC 5 /\* add tone delay value \*/
- #define CFE\_TIME\_SUB\_DELAY\_CC 6 /\* sub tone delay value \*/
- #define CFE\_TIME\_SET\_TIME\_CC 7 /\* set time \*/
- #define CFE\_TIME\_SET\_MET\_CC 8 /\* set MET \*/
- #define CFE\_TIME\_SET\_STCF\_CC 9 /\* set STCF \*/
- #define CFE\_TIME\_SET\_LEAP\_SECONDS\_CC 10 /\* set Leap Seconds \*/
- #define CFE\_TIME\_ADD\_ADJUST\_CC 11 /\* add one time STCF adjustment \*/
- #define CFE\_TIME\_SUB\_ADJUST\_CC 12 /\* subtract one time STCF adjustment \*/
- #define CFE\_TIME\_ADD\_ONE\_HZ\_ADJUSTMENT\_CC 13 /\* add 1Hz STCF adjustment \*/
- #define CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC 14 /\* subtract 1Hz STCF adjustment \*/
- #define CFE\_TIME\_SET\_SIGNAL\_CC 15 /\* set clock signal (pri vs red) \*/

### 12.131.1 Detailed Description

Specification for the CFE Time Services (CFE\_TIME) command function codes

#### Note

This file should be strictly limited to the command/function code (CC) macro definitions. Other definitions such as enums, typedefs, or other macros should be placed in the msgdefs.h or msg.h files.

### 12.131.2 Macro Definition Documentation

**12.131.2.1 CFE\_TIME\_ADD\_ADJUST\_CC** #define CFE\_TIME\_ADD\_ADJUST\_CC 11 /\* add one time STCF adjustment \*/

**Name** Add Delta to Spacecraft Time Correlation Factor

#### Description

This command adjusts the Spacecraft Time Correlation Factor (STCF) by adding the specified value. The new STCF takes effect immediately upon execution of this command.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_AddSTCFAadj

#### Command Structure

[CFE\\_TIME\\_AddAdjustCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSecs](#) - Housekeeping Telemetry point indicating new STCF seconds value
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSubsecs](#) - Housekeeping Telemetry point indicating new STCF subseconds value
- The [CFE\\_TIME\\_DELTA\\_EID](#) informational event message will be generated

#### Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_DELTA\\_ERR\\_EID](#) or [CFE\\_TIME\\_DELTA\\_CFG\\_EID](#))

#### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

#### See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#),  
[CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)

Definition at line 521 of file default\_cfe\_time\_fcncodes.h.

### 12.131.2.2 CFE\_TIME\_ADD\_DELAY\_CC #define CFE\_TIME\_ADD\_DELAY\_CC 5 /\* add tone delay value \*/

**Name** Add Time to Tone Time Delay

#### Description

This command is used to factor out a known, predictable latency between the Time Server and a particular Time Client. The correction is applied (added) to the current time calculation for Time Clients, so this command has no meaning for Time Servers. Each Time Client can have a unique latency setting. The latency value is a positive number of seconds and microseconds that represent the deviation from the time maintained by the Time Server.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_AddClockLat

#### Command Structure

[CFE\\_TIME\\_AddDelayCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_DLlatentS](#), [\\$sc\\_\\$cpu\\_TIME\\_DLlatentSs](#) - Housekeeping Telemetry point indicating command specified values
- [\\$sc\\_\\$cpu\\_TIME\\_DLlatentDir](#) - Diagnostic Telemetry point indicating commanded latency direction
- The [CFE\\_TIME\\_DELAY\\_EID](#) informational event message will be generated

#### Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Client

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_DELAY\\_CFG\\_EID](#) or [CFE\\_TIME\\_DELAY\\_ERR\\_EID](#))

#### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

#### See also

[CFE\\_TIME\\_SUB\\_DELAY\\_CC](#)

Definition at line 290 of file default\_cfe\_time\_fcncodes.h.

```
12.131.2.3 CFE_TIME_ADD_ONE_HZ_ADJUSTMENT_CC #define CFE_TIME_ADD_ONE_HZ_ADJUSTMENT_CC 13
/* add 1Hz STCF adjustment */
```

**Name** Add Delta to Spacecraft Time Correlation Factor each 1Hz

#### Description

This command has been updated to take actual sub-seconds ( $1/2^{32}$  seconds) rather than micro-seconds as an input argument. This change occurred after the determination was made that one micro-second is too large an increment for a constant 1Hz adjustment.

This command continuously adjusts the Spacecraft Time Correlation Factor (STCF) every second, by adding the specified value. The adjustment to the STCF is applied in the Time Service local 1Hz interrupt handler. As the local 1Hz interrupt is not synchronized to the tone signal, one cannot say when the adjustment will occur, other than once a second, at about the same time relative to the tone.

There was some debate about whether the maximum 1Hz clock drift correction factor would ever need to exceed some small fraction of a second. But, the decision was made to provide the capability to make 1Hz adjustments greater than one second and leave it to the ground system to provide mission specific limits.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_Add1HzSTCF

#### Command Structure

[CFE\\_TIME\\_AddOneHzAdjustmentCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSecs](#) - Housekeeping Telemetry point indicating new STCF seconds value
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSubsecs](#) - Housekeeping Telemetry point indicating new STCF subseconds value
- The [CFE\\_TIME\\_ONEHZ\\_EID](#) informational event message will be generated

#### Error Conditions

- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event message will be issued ([CFE\\_TIME\\_ONEHZ\\_CFG\\_EID](#))

#### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

#### See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)

Definition at line 601 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.4 CFE\_TIME\_NOOP\_CC** #define CFE\_TIME\_NOOP\_CC 0 /\* no-op command \*/**Name** Time No-Op**Description**

This command performs no other function than to increment the command execution counter. The command may be used to verify general aliveness of the Time Services task.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_NOOP**Command Structure**[CFE\\_TIME\\_NoopCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- The [CFE\\_TIME\\_NOOP\\_EID](#) informational event message will be generated

**Error Conditions**

There are no error conditions for this command. If the Time Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is incremented unconditionally.

**Criticality**

None

**See also**

Definition at line 66 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.5 CFE\_TIME\_RESET\_COUNTERS\_CC** #define CFE\_TIME\_RESET\_COUNTERS\_CC 1 /\* reset counters \*/**Name** Time Reset Counters**Description**

This command resets the following counters within the Time Services [Housekeeping Telemetry](#) :

- Command Execution Counter (\$sc\_\$cpu\_TIME\_CMDPC)
- Command Error Counter (\$sc\_\$cpu\_TIME\_CMDEC) This command also resets the following counters within the Time Services [Diagnostic Telemetry](#) :
  - Tone Signal Detected Software Bus Message Counter (\$sc\_\$cpu\_TIME\_DTSDetCNT)
  - Time at the Tone Data Software Bus Message Counter (\$sc\_\$cpu\_TIME\_DTatTCNT)
  - Tone Signal/Data Verify Counter (\$sc\_\$cpu\_TIME\_DVerifyCNT)
  - Tone Signal/Data Error Counter (\$sc\_\$cpu\_TIME\_DVerifyER)

- Tone Signal Interrupt Counter (\$sc\_\$cpu\_TIME\_DTsISRCNT)
- Tone Signal Interrupt Error Counter (\$sc\_\$cpu\_TIME\_DTsISRERR)
- Tone Signal Task Counter (\$sc\_\$cpu\_TIME\_DTsTaskCNT)
- Local 1 Hz Interrupt Counter (\$sc\_\$cpu\_TIME\_D1HzISRCNT)
- Local 1 Hz Task Counter (\$sc\_\$cpu\_TIME\_D1HzTaskCNT)
- Reference Time Version Counter (\$sc\_\$cpu\_TIME\_DVersionCNT)

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_ResetCtrs

#### Command Structure

[CFE\\_TIME\\_ResetCountersCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDPC** - command execution counter will reset to 0
- **\$sc\_\$cpu\_TIME\_CMDEC** - command error counter will reset to 0
- The [CFE\\_TIME\\_RESET\\_EID](#) informational event message will be generated

#### Error Conditions

There are no error conditions for this command. If the Time Services receives the command, the event is sent (although it may be filtered by EVS) and the counter is reset unconditionally.

#### Criticality

None

#### See also

Definition at line 111 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.6 CFE\_TIME\_SEND\_DIAGNOSTIC\_CC** #define CFE\_TIME\_SEND\_DIAGNOSTIC\_CC 2 /\* request diagnostic hk telemetry \*/

**Name** Request TIME Diagnostic Telemetry

#### Description

This command requests that the Time Service generate a message containing various data values not included in the normal Time Service housekeeping message. The command requests only a single copy of the diagnostic message. Refer to [CFE\\_TIME\\_DiagnosticTlm\\_t](#) for a description of the Time Service diagnostic message contents.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_RequestDiag

#### Command Structure

[CFE\\_TIME\\_SendDiagnosticCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDPC** - command execution counter will increment
- Sequence Counter for **CFE\_TIME\_DiagnosticTlm\_t** will increment
- The **CFE\_TIME\_DIAG\_EID** debug event message will be generated

### Error Conditions

There are no error conditions for this command. If the Time Services receives the command, the event and telemetry is sent (although one or both may be filtered by EVS and TO) and the counter is incremented unconditionally.

### Criticality

None

### See also

Definition at line 145 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.7 CFE\_TIME\_SET\_LEAP\_SECONDS\_CC** #define CFE\_TIME\_SET\_LEAP\_SECONDS\_CC 10 /\* set Leap Seconds \*/

**Name** Set Leap Seconds

### Description

This command sets the spacecraft Leap Seconds to the specified value. Leap Seconds may be positive or negative, and there is no limit to the value except, of course, the limit imposed by the 16 bit signed integer data type. The new Leap Seconds value takes effect immediately upon execution of this command.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetClockLeap

### Command Structure

**CFE\_TIME\_SetLeapSecondsCmd\_t**

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_TIME\_LeapSecs** - Housekeeping Telemetry point indicating new Leap seconds value
- The **CFE\_TIME\_LEAPS\_EID** informational event message will be generated

### Error Conditions

- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDEC** - command error counter will increment
- Error specific event messages will be issued (**CFE\_TIME\_LEAPS\_CFG\_EID**)

### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

### See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#), [CFE\\_TIME\\_SET\\_MET\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#)

Definition at line 485 of file default\_cfe\_time\_fcncodes.h.

#### 12.131.2.8 CFE\_TIME\_SET\_MET\_CC `#define CFE_TIME_SET_MET_CC 8 /* set MET */`

**Name** Set Mission Elapsed Time

### Description

This command sets the Mission Elapsed Timer (MET) to the specified value.

Note that the MET (as implemented for cFE Time Service) is a logical representation and not a physical timer. Thus, setting the MET is not dependent on whether the hardware supports a MET register that can be written to.

Note also that Time Service "assumes" that during normal operation, the MET is synchronized to the tone signal. Therefore, unless operating in FLYWHEEL mode, the sub-seconds portion of the MET will be set to zero at the next tone signal interrupt.

The new MET takes effect immediately upon execution of this command.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetClockMET

### Command Structure

[CFE\\_TIME\\_SetMETCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_TIME\_METSecs** - Housekeeping Telemetry point indicating new MET seconds value
- **\$sc\_\$cpu\_TIME\_METSubsecs** - Housekeeping Telemetry point indicating new MET subseconds value
- The [CFE\\_TIME\\_MET\\_EID](#) informational event message will be generated

### Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDEC** - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_MET\\_CFG\\_EID](#) or [CFE\\_TIME\\_MET\\_ERR\\_EID](#))

### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

### See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

Definition at line 413 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.9 CFE\_TIME\_SET\_SIGNAL\_CC** #define CFE\_TIME\_SET\_SIGNAL\_CC 15 /\* set clock signal (pri vs red) \*/

**Name** Set Tone Signal Source

### Description

This command selects the Time Service tone signal source. Although the list of potential tone signal sources is mission specific, a common choice is the selection of primary or redundant tone signal. The selection may be available to both the Time Server and Time Clients, depending on hardware configuration.

Notes:

- This command is only valid when the [CFE\\_PLATFORM\\_TIME\\_CFG\\_SIGNAL](#) configuration parameter in the `cfe_platform_cfg.h` file has been set to true.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetSignal

### Command Structure

[CFE\\_TIME\\_SetSignalCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry:

- `$sc_$cpu_TIME_CMDPC` - command execution counter will increment
- `$sc_$cpu_TIME_DSignal` - Diagnostic Telemetry point will indicate the command specified value
- The [CFE\\_TIME\\_SIGNAL\\_EID](#) informational event message will be generated

### Error Conditions

- Invalid Signal selection (a value other than [CFE\\_TIME\\_ToneSignalSelect\\_PRIMARY](#) or [CFE\\_TIME\\_ToneSignalSelect\\_REDUNDANT](#) was specified)
- Multiple Tone Signal Sources not available on this platform

Evidence of failure may be found in the following telemetry:

- `$sc_$cpu_TIME_CMDEC` - Command Error counter will increment
- Error specific event message (either [CFE\\_TIME\\_SIGNAL\\_CFG\\_EID](#) or [CFE\\_TIME\\_SIGNAL\\_ERR\\_EID](#))

### Criticality

Although tone signal source selection is important, this command is not critical

### See also

[CFE\\_TIME\\_SET\\_STATE\\_CC](#), [CFE\\_TIME\\_SET\\_SOURCE\\_CC](#)

Definition at line 691 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.10 CFE\_TIME\_SET\_SOURCE\_CC** #define CFE\_TIME\_SET\_SOURCE\_CC 3 /\* set clock source (int vs ext) \*/

**Name** Set Time Source

**Description**

This command selects the Time Service clock source. Although the list of potential clock sources is mission specific and defined via configuration parameters, this command provides a common method for switching between the local processor clock and an external source for time data.

When commanded to accept external time data (GPS, MET, spacecraft time, etc.), the Time Server will enable input via an API function specific to the configuration definitions for the particular source. When commanded to use internal time data, the Time Server will ignore the external data. However, the Time Server will continue to use the API function as the trigger to generate a "time at the tone" command packet regardless of the internal/external command selection.

Notes:

- Operating in FLYWHEEL mode is not considered a choice related to clock source, but rather an element of the clock state. See below for a description of the [CFE\\_TIME\\_SET\\_STATE\\_CC](#) command.
- This command is only valid when the [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) configuration parameter in the cfe\_platform\_cfg.h file has been set to true.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetSource

**Command Structure**

[CFE\\_TIME\\_SetSourceCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_DSource](#) - Diagnostic Telemetry point will indicate the command specified value
- The [CFE\\_TIME\\_SOURCE\\_EID](#) informational event message will be generated

**Error Conditions**

- Invalid Source selection (a value other than [CFE\\_TIME\\_SourceSelect\\_INTERNAL](#) or [CFE\\_TIME\\_SourceSelect\\_EXTERNAL](#) was specified)
- Time source selection not allowed on this platform

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - Command Error counter will increment
- Error specific event message (either [CFE\\_TIME\\_SOURCE\\_CFG\\_EID](#) or [CFE\\_TIME\\_SOURCE\\_ERR\\_EID](#))

**Criticality**

Although clock source selection is important, this command is not critical.

**See also**

[CFE\\_TIME\\_SET\\_STATE\\_CC](#), [CFE\\_TIME\\_SET\\_SIGNAL\\_CC](#)

Definition at line 195 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.11 CFE\_TIME\_SET\_STATE\_CC #define CFE\_TIME\_SET\_STATE\_CC 4 /\* set clock state \*/**

**Name** Set Time State

**Description**

This command indirectly affects the Time Service on-board determination of clock state. Clock state is a combination of factors, most significantly whether the spacecraft time has been accurately set, and whether Time Service is operating in FLYWHEEL mode.

This command may be used to notify the Time Server that spacecraft time is now correct, or that time is no longer correct. This information will be distributed to Time Clients, and in turn, to any interested sub-systems.

Also, this command may be used to force a Time Server or Time Client into FLYWHEEL mode. Use of FLYWHEEL mode is mainly for debug purposes although in extreme circumstances, it may be of value to force Time Service not to rely on normal time updates. Note that when commanded into FLYWHEEL mode, the Time Service will remain so until receipt of another "set state" command setting the state into a mode other than FLYWHEEL.

Note also that setting the clock state to VALID or INVALID on a Time Client that is currently getting time updates from the Time Server will have very limited effect. As soon as the Time Client receives the next time update, the VALID/INVALID selection will be set to that of the Time Server. However, setting a Time Client to FLYWHEEL cannot be overridden by the Time Server since the Time Client will ignore time updates from the Time Server while in FLYWHEEL mode.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetState

**Command Structure**

[CFE\\_TIME\\_SetStateCmd\\_t](#)

**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_StateFlg](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagSet](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagFly](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagSrc](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagPri](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagSfly](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagCfly](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagAdjd](#), [\\$sc\\_\\$cpu\\_TIME\\_Flag1Hzd](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagClat](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagSorC](#), [\\$sc\\_\\$cpu\\_TIME\\_FlagNIU](#) - Housekeeping Telemetry point "may" indicate the command specified value (see above)
- The [CFE\\_TIME\\_STATE\\_EID](#) informational event message will be generated

**Error Conditions**

- Invalid State selection (a value other than [CFE\\_TIME\\_ClockState\\_INVALID](#), [CFE\\_TIME\\_ClockState\\_VALID](#) or [CFE\\_TIME\\_ClockState\\_FLYWHEEL](#) was specified)
- Time source selection not allowed on this platform

Evidence of failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - Command Error counter will increment
- Error specific event message ([CFE\\_TIME\\_STATE\\_ERR\\_EID](#))

### Criticality

Setting Time Service into FLYWHEEL mode is not particularly hazardous, as the result may be that the calculation of spacecraft time is done using a less than optimal timer. However, inappropriately setting the clock state to V $\leftarrow$  ALID (indicating that spacecraft time is accurate) may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

### See also

[CFE\\_TIME\\_SET\\_SOURCE\\_CC](#), [CFE\\_TIME\\_SET\\_SIGNAL\\_CC](#)

Definition at line 252 of file default\_cfe\_time\_fcncodes.h.

### 12.131.2.12 CFE\_TIME\_SET\_STCF\_CC #define CFE\_TIME\_SET\_STCF\_CC 9 /\* set STCF \*/

**Name** Set Spacecraft Time Correlation Factor

#### Description

This command sets the Spacecraft Time Correlation Factor (STCF) to the specified value. This command differs from the previously described SET CLOCK in the nature of the command argument. This command sets the STCF value directly, rather than extracting the STCF from a value representing the total of MET, STCF and optionally, Leap Seconds. The new STCF takes effect immediately upon execution of this command.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetClockSTCF

#### Command Structure

[CFE\\_TIME\\_SetSTCFCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSecs](#) - Housekeeping Telemetry point indicating new STCF seconds value
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSubsecs](#) - Housekeeping Telemetry point indicating new STCF subseconds value
- The [CFE\\_TIME\\_STCF\\_EID](#) informational event message will be generated

#### Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_STCF\\_CFG\\_EID](#) or [CFE\\_TIME\\_STCF\\_ERR\\_EID](#))

### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

### See also

[CFE\\_TIME\\_SET\\_TIME\\_CC](#), [CFE\\_TIME\\_SET\\_MET\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

Definition at line 450 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.13 CFE\_TIME\_SET\_TIME\_CC** #define CFE\_TIME\_SET\_TIME\_CC 7 /\* set time \*/**Name** Set Spacecraft Time**Description**

This command sets the spacecraft clock to a new value, regardless of the current setting (time jam). The new time value represents the desired offset from the mission-defined time epoch and takes effect immediately upon execution of this command. Time Service will calculate a new STCF value based on the current MET and the desired new time using one of the following:

If Time Service is configured to compute current time as TAI

- **STCF = (new time) - (current MET)**
- **(current time) = (current MET) + STCF**

If Time Service is configured to compute current time as UTC

- **STCF = ((new time) - (current MET)) + (Leap Seconds)**
- **(current time) = ((current MET) + STCF) - (Leap Seconds)**

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SetClock**Command Structure**[CFE\\_TIME\\_SetTimeCmd\\_t](#)**Command Verification**

Successful execution of this command may be verified with the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDPC** - command execution counter will increment
- **\$sc\_\$cpu\_TIME\_STCFSecs** - Housekeeping Telemetry point indicating newly calculated STCF seconds value
- **\$sc\_\$cpu\_TIME\_STCFSubsecs** - Housekeeping Telemetry point indicating newly calculated STCF subseconds value
- The [CFE\\_TIME\\_TIME\\_EID](#) informational event message will be generated

**Error Conditions**

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- **\$sc\_\$cpu\_TIME\_CMDEC** - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_TIME\\_CFG\\_EID](#) or [CFE\\_TIME\\_TIME\\_ERR\\_EID](#))

**Criticality**

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

**See also**[CFE\\_TIME\\_SET\\_MET\\_CC](#), [CFE\\_TIME\\_SET\\_STCF\\_CC](#), [CFE\\_TIME\\_SET\\_LEAP\\_SECONDS\\_CC](#)

Definition at line 373 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.14 CFE\_TIME\_SUB\_ADJUST\_CC** #define CFE\_TIME\_SUB\_ADJUST\_CC 12 /\* subtract one time S↔ TCF adjustment \*/

**Name** Subtract Delta from Spacecraft Time Correlation Factor

#### Description

This command adjusts the Spacecraft Time Correlation Factor (STCF) by subtracting the specified value. The new STCF takes effect immediately upon execution of this command.

**Command Mnemonic(s)** \$sc\_\$cpu\_TIME\_SubSTCFAAdj

#### Command Structure

[CFE\\_TIME\\_SubAdjustCmd\\_t](#)

#### Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSecs](#) - Housekeeping Telemetry point indicating new STCF seconds value
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSubsecs](#) - Housekeeping Telemetry point indicating new STCF subseconds value
- The [CFE\\_TIME\\_DELTA\\_EID](#) informational event message will be generated

#### Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_DELTA\\_ERR\\_EID](#) or [CFE\\_TIME\\_DELTA\\_CFG\\_EID](#))

#### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

#### See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#), [CFE\\_TIME\\_SUB\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)

Definition at line 555 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.15 CFE\_TIME\_SUB\_DELAY\_CC** #define CFE\_TIME\_SUB\_DELAY\_CC 6 /\* sub tone delay value \*/

**Name** Subtract Time from Tone Time Delay

## Description

This command is used to factor out a known, predictable latency between the Time Server and a particular Time Client. The correction is applied (subtracted) to the current time calculation for Time Clients, so this command has no meaning for Time Servers. Each Time Client can have a unique latency setting. The latency value is a positive number of seconds and microseconds that represent the deviation from the time maintained by the Time Server.

Note that it is unimaginable that the seconds value will ever be anything but zero.

## Command Mnemonic(s)

\$sc\_\$cpu\_TIME\_SubClockLat

## Command Structure

[CFE\\_TIME\\_SubDelayCmd\\_t](#)

## Command Verification

Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_DLATENTS](#), [\\$sc\\_\\$cpu\\_TIME\\_DLATENTSS](#) - Housekeeping Telemetry point indicating command specified values
- [\\$sc\\_\\$cpu\\_TIME\\_DLATENTDIR](#) - Diagnostic Telemetry point indicating commanded latency direction
- The [CFE\\_TIME\\_DELAY\\_EID](#) informational event message will be generated

## Error Conditions

- An invalid number of microseconds was specified (must be less than 1 million)
- Platform receiving the command is not a Time Client

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event messages will be issued ([CFE\\_TIME\\_DELAY\\_CFG\\_EID](#) or [CFE\\_TIME\\_DELAY\\_ERR\\_EID](#))

## Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

## See also

[CFE\\_TIME\\_ADD\\_DELAY\\_CC](#)

Definition at line 328 of file default\_cfe\_time\_fcncodes.h.

**12.131.2.16 CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC** #define CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC 14  
/\* subtract 1Hz STCF adjustment \*/

**Name** Subtract Delta from Spacecraft Time Correlation Factor each 1Hz

### Description

This command has been updated to take actual sub-seconds ( $1/2^{32}$  seconds) rather than micro-seconds as an input argument. This change occurred after the determination was made that one micro-second is too large an increment for a constant 1Hz adjustment.

This command continuously adjusts the Spacecraft Time Correlation Factor (STCF) every second, by subtracting the specified value. The adjustment to the STCF is applied in the Time Service local 1Hz interrupt handler. As the local 1Hz interrupt is not synchronized to the tone signal, one cannot say when the adjustment will occur, other than once a second, at about the same time relative to the tone.

There was some debate about whether the maximum 1Hz clock drift correction factor would ever need to exceed some small fraction of a second. But, the decision was made to provide the capability to make 1Hz adjustments greater than one second and leave it to the ground system to provide mission specific limits.

### Command Mnemonic(s)

[\\$sc\\_\\$cpu\\_TIME\\_Sub1HzSTCF](#)

### Command Structure

[CFE\\_TIME\\_SubOneHzAdjustmentCmd\\_t](#)

### Command Verification

Successful execution of this command may be verified with the following telemetry: Successful execution of this command may be verified with the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDPC](#) - command execution counter will increment
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSecs](#) - Housekeeping Telemetry point indicating new STCF seconds value
- [\\$sc\\_\\$cpu\\_TIME\\_STCFSubsecs](#) - Housekeeping Telemetry point indicating new STCF subseconds value
- The [CFE\\_TIME\\_ONEHZ\\_EID](#) informational event message will be generated

### Error Conditions

- Platform receiving the command is not a Time Server

Evidence of Failure may be found in the following telemetry:

- [\\$sc\\_\\$cpu\\_TIME\\_CMDEC](#) - command error counter will increment
- Error specific event message will be issued ([CFE\\_TIME\\_ONEHZ\\_CFG\\_EID](#))

### Criticality

Inappropriately setting the clock may result in other sub-systems performing incorrect time based calculations. The specific risk is dependent upon the behavior of those sub-systems.

### See also

[CFE\\_TIME\\_ADD\\_ADJUST\\_CC](#), [CFE\\_TIME\\_SUB\\_ADJUST\\_CC](#), [CFE\\_TIME\\_ADD\\_ONE\\_HZ\\_ADJUSTMENT\\_CC](#)

Definition at line 649 of file default\_cfe\_time\_fncodes.h.

## 12.132 cfe/modules/time/config/default\_cfe\_time\_interface\_cfg.h File Reference

### Macros

- #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI true
- #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC false
- #define CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE true
- #define CFE\_MISSION\_TIME\_AT\_TONE\_WAS true
- #define CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE false
- #define CFE\_MISSION\_TIME\_MIN\_ELAPSED 0
- #define CFE\_MISSION\_TIME\_MAX\_ELAPSED 200000
- #define CFE\_MISSION\_TIME\_DEF\_MET\_SECS 1000
- #define CFE\_MISSION\_TIME\_DEF\_MET\_SUBS 0
- #define CFE\_MISSION\_TIME\_DEF\_STCF\_SECS 1000000
- #define CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS 0
- #define CFE\_MISSION\_TIME\_DEF\_LEAPS 37
- #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS 0
- #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS 1000
- #define CFE\_MISSION\_TIME\_EPOCH\_YEAR 1980
- #define CFE\_MISSION\_TIME\_EPOCH\_DAY 1
- #define CFE\_MISSION\_TIME\_EPOCH\_HOUR 0
- #define CFE\_MISSION\_TIME\_EPOCH\_MINUTE 0
- #define CFE\_MISSION\_TIME\_EPOCH\_SECOND 0
- #define CFE\_MISSION\_TIME\_EPOCH\_MICROS 0
- #define CFE\_MISSION\_TIME\_FS\_FACTOR 789004800

### 12.132.1 Detailed Description

CFE Time Services (CFE\_TIME) Application Public Definitions

This provides default values for configurable items that affect the interface(s) of this module. This includes the CMD/TLM message interface, tables definitions, and any other data products that serve to exchange information with other entities.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.132.2 Macro Definition Documentation

#### 12.132.2.1 CFE\_MISSION\_TIME\_AT\_TONE\_WAS #define CFE\_MISSION\_TIME\_AT\_TONE\_WAS true

**Purpose** Default Time and Tone Order

**Description:**

Time Services may be configured to expect the time at the tone data packet to either precede or follow the tone signal. If the time at the tone data packet follows the tone signal, then the data within the packet describes what the time "was" at the tone. If the time at the tone data packet precedes the tone signal, then the data within the packet describes what the time "will be" at the tone. One, and only one, of the following symbols must be set to true:

- CFE\_MISSION\_TIME\_AT\_TONE\_WAS
- CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE Note: If Time Services is defined as using a simulated tone signal (see [CFE\\_MISSION\\_TIME\\_CFG\\_FAKE\\_TONE](#) above), then the tone data packet must follow the tone signal.

**Limits**

Either CFE\_MISSION\_TIME\_AT\_TONE\_WAS or CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE must be set to true. They may not both be true and they may not both be false.

Definition at line 88 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.2 CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE** #define CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE false  
Definition at line 89 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.3 CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI** #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI true

**Purpose** Default Time Format

**Description:**

The following definitions select either UTC or TAI as the default (mission specific) time format. Although it is possible for an application to request time in a specific format, most callers should use [CFE\\_TIME\\_GetTime\(\)](#), which returns time in the default format. This avoids having to modify each individual caller when the default choice is changed.

**Limits**

if CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI is defined as true then CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC must be defined as false. if CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI is defined as false then CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC must be defined as true.

Definition at line 52 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.4 CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC** #define CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC false  
Definition at line 53 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.5 CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE** #define CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE true

**Purpose** Default Time Format

**Description:**

The following definition enables the use of a simulated time at the tone signal using a software bus message.

**Limits**

Not Applicable

Definition at line 65 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.6 CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS** #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS 0  
Definition at line 147 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.7 CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS 1000  
Definition at line 148 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.8 CFE\_MISSION\_TIME\_DEF\_LEAPS** #define CFE\_MISSION\_TIME\_DEF\_LEAPS 37  
Definition at line 145 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.9 CFE\_MISSION\_TIME\_DEF\_MET\_SECS** #define CFE\_MISSION\_TIME\_DEF\_MET\_SECS 1000

**Purpose** Default Time Values

**Description:**

Default time values are provided to avoid problems due to time calculations performed after startup but before commands can be processed. For example, if the default time format is UTC then it is important that the sum of MET and STCF always exceed the value of Leap Seconds to prevent the UTC time calculation ( $\text{time} = \text{MET} + \text{STCF} - \text{Leap Seconds}$ ) from resulting in a negative (very large) number.

Some past missions have also created known (albeit wrong) default timestamps. For example, assume the epoch is defined as Jan 1, 1970 and further assume the default time values are set to create a timestamp of Jan 1, 2000. Even though the year 2000 timestamps are wrong, it may be of value to keep the time within some sort of bounds acceptable to the software.

Note: Sub-second units are in micro-seconds (0 to 999,999) and all values must be defined

**Limits**

Not Applicable

Definition at line 139 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.10 CFE\_MISSION\_TIME\_DEF\_MET\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_MET\_SUBS 0  
Definition at line 140 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.11 CFE\_MISSION\_TIME\_DEF\_STCF\_SECS** #define CFE\_MISSION\_TIME\_DEF\_STCF\_SECS 1000000  
Definition at line 142 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.12 CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS** #define CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS 0  
Definition at line 143 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.13 CFE\_MISSION\_TIME\_EPOCH\_DAY** #define CFE\_MISSION\_TIME\_EPOCH\_DAY 1  
Definition at line 166 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.14 CFE\_MISSION\_TIME\_EPOCH\_HOUR** #define CFE\_MISSION\_TIME\_EPOCH\_HOUR 0  
Definition at line 167 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.15 CFE\_MISSION\_TIME\_EPOCH\_MICROS** #define CFE\_MISSION\_TIME\_EPOCH\_MICROS 0  
Definition at line 170 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.16 CFE\_MISSION\_TIME\_EPOCH\_MINUTE** #define CFE\_MISSION\_TIME\_EPOCH\_MINUTE 0  
Definition at line 168 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.17 CFE\_MISSION\_TIME\_EPOCH\_SECOND** #define CFE\_MISSION\_TIME\_EPOCH\_SECOND 0  
Definition at line 169 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.18 CFE\_MISSION\_TIME\_EPOCH\_YEAR** #define CFE\_MISSION\_TIME\_EPOCH\_YEAR 1980

**Purpose** Default EPOCH Values

**Description:**

Default ground time epoch values Note: these values are used only by the [CFE\\_TIME\\_Print\(\)](#) API function

**Limits**

Year - must be within 136 years Day - Jan 1 = 1, Feb 1 = 32, etc. Hour - 0 to 23 Minute - 0 to 59 Second - 0 to 59  
Micros - 0 to 999999

Definition at line 165 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.19 CFE\_MISSION\_TIME\_FS\_FACTOR** #define CFE\_MISSION\_TIME\_FS\_FACTOR 789004800

**Purpose** Time File System Factor

**Description:**

Define the s/c vs file system time conversion constant...

Note: this value is intended for use only by CFE TIME API functions to convert time values based on the ground system epoch (s/c time) to and from time values based on the file system epoch (fs time).

FS time = S/C time + factor S/C time = FS time - factor

Worksheet:

S/C epoch = Jan 1, 2005 (LRO ground system epoch) FS epoch = Jan 1, 1980 (vxWorks DOS file system epoch)

Delta = 25 years, 0 days, 0 hours, 0 minutes, 0 seconds

Leap years = 1980, 1984, 1988, 1992, 1996, 2000, 2004 (divisible by 4 – except if by 100 – unless also by 400)

1 year = 31,536,000 seconds 1 day = 86,400 seconds 1 hour = 3,600 seconds 1 minute = 60 seconds

25 years = 788,400,000 seconds 7 extra leap days = 604,800 seconds

total delta = 789,004,800 seconds

**Limits**

Not Applicable

Definition at line 208 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.20 CFE\_MISSION\_TIME\_MAX\_ELAPSED** #define CFE\_MISSION\_TIME\_MAX\_ELAPSED 200000

Definition at line 114 of file default\_cfe\_time\_interface\_cfg.h.

**12.132.2.21 CFE\_MISSION\_TIME\_MIN\_ELAPSED** #define CFE\_MISSION\_TIME\_MIN\_ELAPSED 0

**Purpose** Min and Max Time Elapsed

**Description:**

Based on the definition of Time and Tone Order (CFE\_MISSION\_TIME\_AT\_TONE\_WAS/WILL\_BE) either the "time at the tone" signal or data packet will follow the other. This definition sets the valid window of time for the second of the pair to lag behind the first. Time Services will invalidate both the tone and packet if the second does not arrive within this window following the first.

For example, if the data packet follows the tone, it might be valid for the data packet to arrive between zero and 100,000 micro-seconds after the tone. But, if the tone follows the packet, it might be valid only if the packet arrived between 200,000 and 700,000 micro-seconds before the tone.

Note: units are in micro-seconds

**Limits**

0 to 999,999 decimal

Definition at line 113 of file default\_cfe\_time\_interface\_cfg.h.

**12.133 cfe/modules/time/config/default\_cfe\_time\_internal\_cfg.h File Reference**

**Macros**

- #define CFE\_PLATFORM\_TIME\_CFG\_SERVER true
- #define CFE\_PLATFORM\_TIME\_CFG\_CLIENT false
- #define CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL true
- #define CFE\_PLATFORM\_TIME\_CFG\_SIGNAL false
- #define CFE\_PLATFORM\_TIME\_CFG\_SOURCE false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS false
- #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME false
- #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS 0
- #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS 500000
- #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS 27
- #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS 0
- #define CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT 20000
- #define CFE\_PLATFORM\_TIME\_CFG\_START\_FLY 2
- #define CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY 8
- #define CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY 60
- #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY 25
- #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY 25
- #define CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE
- #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE 4096
- #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE 8192

**12.133.1 Detailed Description**

CFE Time Service (CFE\_TIME) Application Private Config Definitions

This provides default values for configurable items that are internal to this module and do NOT affect the interface(s) of this module. Changes to items in this file only affect the local module and will be transparent to external entities that are using the public interface(s).

**Note**

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

### 12.133.2 Macro Definition Documentation

**12.133.2.1 CFE\_PLATFORM\_TIME\_CFG\_CLIENT** #define CFE\_PLATFORM\_TIME\_CFG\_CLIENT false  
Definition at line 48 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.2 CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY** #define CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY 8

**Purpose** Define Periodic Time to Update Local Clock Tone Latch

**Description:**

Define Periodic Time to Update Local Clock Tone Latch. Applies only when in flywheel mode. This define dictates the period at which the simulated 'last tone' time is updated. Units are seconds.

**Limits**

Not Applicable

Definition at line 205 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.3 CFE\_PLATFORM\_TIME\_CFG\_SERVER** #define CFE\_PLATFORM\_TIME\_CFG\_SERVER true

**Purpose** Time Server or Time Client Selection

**Description:**

This configuration parameter selects whether the Time task functions as a time "server" or "client". A time server generates the "time at the tone" packet which is received by time clients.

**Limits**

Enable one, and only one by defining either CFE\_PLATFORM\_TIME\_CFG\_SERVER or CFE\_PLATFORM\_TIME\_CFG\_CLIENT AS true. The other must be defined as false.

Definition at line 47 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.4 CFE\_PLATFORM\_TIME\_CFG\_SIGNAL** #define CFE\_PLATFORM\_TIME\_CFG\_SIGNAL false

**Purpose** Include or Exclude the Primary/Redundant Tone Selection Cmd

**Description:**

Depending on the specific hardware system configuration, it may be possible to switch between a primary and redundant tone signal. If supported by hardware, this definition will enable command interfaces to select the active tone signal. Both Time Clients and Time Servers support this feature. Note: Set the CFE\_PLATFORM\_TIME\_CFG\_SIGNAL define to true to enable tone signal commands.

**Limits**

Not Applicable

Definition at line 95 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.5 CFE\_PLATFORM\_TIME\_CFG\_SOURCE #define CFE\_PLATFORM\_TIME\_CFG\_SOURCE false**

**Purpose** Include or Exclude the Internal/External Time Source Selection Cmd

Description:

By default, Time Servers maintain time using an internal MET which may be a h/w register or software counter, depending on available hardware. The following definition enables command interfaces to switch between an internal MET, or external time data received from one of several supported external time sources. Only a Time Server may be configured to use external time data. Note: Set the CFE\_PLATFORM\_TIME\_CFG\_SOURCE define to true to include the Time Source Selection Command (command allows selection between the internal or external time source). Then choose the external source with the CFE\_TIME\_CFG\_SRC\_??? define.

Limits

Only applies if [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) is set to true.

Definition at line 115 of file [default\\_cfe\\_time\\_internal\\_cfg.h](#).

**12.133.2.6 CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS false**

Definition at line 132 of file [default\\_cfe\\_time\\_internal\\_cfg.h](#).

**12.133.2.7 CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET false**

**Purpose** Choose the External Time Source for Server only

Description:

If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true, then one of the following external time source types must also be set to true. Do not set any of the external time source types to true unless [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true.

Limits

1. If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true then one and only one of the following three external time sources can and must be set true: [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_MET](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_GPS](#), [CFE\\_PLATFORM\\_TIME\\_CFG\\_SRC\\_TIME](#)
2. Only applies if [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) is set to true.

Definition at line 131 of file [default\\_cfe\\_time\\_internal\\_cfg.h](#).

**12.133.2.8 CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME #define CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME false**

Definition at line 133 of file [default\\_cfe\\_time\\_internal\\_cfg.h](#).

**12.133.2.9 CFE\_PLATFORM\_TIME\_CFG\_START\_FLY #define CFE\_PLATFORM\_TIME\_CFG\_START\_FLY 2**

**Purpose** Define Time to Start Flywheel Since Last Tone

**Description:**

Define time to enter flywheel mode (in seconds since last tone data update) Units are microseconds as measured with the local clock.

**Limits**

Not Applicable

Definition at line 192 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.10 CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT** `#define CFE_PLATFORM_TIME_CFG_TONE_LIMIT 20000`**Purpose** Define Timing Limits From One Tone To The Next**Description:**

Defines limits to the timing of the 1Hz tone signal. A tone signal is valid only if it arrives within one second (plus or minus the tone limit) from the previous tone signal.Units are microseconds as measured with the local clock.

**Limits**

Not Applicable

Definition at line 180 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.11 CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL** `#define CFE_PLATFORM_TIME_CFG_VIRTUAL true`**Purpose** Time Tone In Big-Endian Order**Description:**

If this configuration parameter is defined, the CFE time server will publish time tones with payloads in big-endian order, and time clients will expect the tones to be in big-endian order. This is useful for mixed-endian environments. This will become obsolete once EDS is available and the CFE time tone message is defined.

**Purpose** Local MET or Virtual MET Selection for Time Servers**Description:**

Depending on the specific hardware system configuration, it may be possible for Time Servers to read the "local" MET from a h/w register rather than having to track the MET as the count of tone signal interrupts (virtual MET)

Time Clients must be defined as using a virtual MET. Also, a Time Server cannot be defined as having both a h/w MET and an external time source (they both cannot synchronize to the same tone).

Note: "disable" this define (set to false) only for Time Servers with local hardware that supports a h/w MET that is synchronized to the tone signal !!!

**Limits**

Only applies if **CFE\_PLATFORM\_TIME\_CFG\_SERVER** is set to true.

Definition at line 80 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.12 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS** #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS 0

**Purpose** Define the Max Delta Limits for Time Servers using an Ext Time Source

Description:

If [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) is set to true and one of the external time sources is also set to true, then the delta time limits for range checking is used.

When a new time value is received from an external source, the value is compared against the "expected" time value. If the delta exceeds the following defined amount, then the new time data will be ignored. This range checking is only performed after the clock state has been commanded to "valid". Until then, external time data is accepted unconditionally.

Limits

Applies only if both [CFE\\_PLATFORM\\_TIME\\_CFG\\_SERVER](#) and [CFE\\_PLATFORM\\_TIME\\_CFG\\_SOURCE](#) are set to true.

Definition at line 152 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.13 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS** #define CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SU←  
BS 500000

Definition at line 153 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.14 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS** #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS 27

**Purpose** Define the Local Clock Rollover Value in seconds and subseconds

Description:

Specifies the capability of the local clock. Indicates the time at which the local clock rolls over.

Limits

Not Applicable

Definition at line 165 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.15 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS** #define CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS 0  
Definition at line 166 of file default\_cfe\_time\_internal\_cfg.h.**12.133.2.16 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_P←  
RIORITY 25

Definition at line 222 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.17 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_ONEHZ\_TASK←  
\_STACK\_SIZE 8192

Definition at line 241 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.18 CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY 60

**Purpose** Define TIME Task Priorities

**Description:**

Defines the cFE\_TIME Task priority. Defines the cFE\_TIME Tone Task priority. Defines the cFE\_TIME 1HZ Task priority.

**Limits**

There is a lower limit of zero and an upper limit of 255 on these configuration parameters. Remember that the meaning of each task priority is inverted – a "lower" number has a "higher" priority.

Definition at line 220 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.19 CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE

**Purpose** Define TIME Task Stack Sizes

**Description:**

Defines the cFE\_TIME Main Task Stack Size Defines the cFE\_TIME Tone Task Stack Size Defines the cFE\_TIME 1HZ Task Stack Size

**Limits**

There is a lower limit of 2048 on these configuration parameters. There are no restrictions on the upper limit however, the maximum stack size is system dependent and should be verified. Most operating systems provide tools for measuring the amount of stack used by a task during operation. It is always a good idea to verify that no more than 1/2 of the stack is used.

Definition at line 239 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.20 CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY** #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY 25

Definition at line 221 of file default\_cfe\_time\_internal\_cfg.h.

**12.133.2.21 CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE** #define CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE 4096

Definition at line 240 of file default\_cfe\_time\_internal\_cfg.h.

## 12.134 cfe/modules/time/config/default\_cfe\_time\_mission\_cfg.h File Reference

#include "cfe\_time\_interface\_cfg.h"

### 12.134.1 Detailed Description

CFE Time Services (CFE\_TIME) Application Mission Configuration Header File

This is a compatibility header for the "mission\_cfg.h" file that has traditionally provided public config definitions for each CFS app.

#### Note

This file may be overridden/superceded by mission-provided defintions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.135 cfe/modules/time/config/default\_cfe\_time\_msg.h File Reference

```
#include "cfe_mission_cfg.h"
#include "cfe_time_fcncodes.h"
#include "cfe_time_msgdefs.h"
#include "cfe_time_msgstruct.h"
```

### 12.135.1 Detailed Description

Specification for the CFE Time Services (CFE\_TIME) command and telemetry message data types.

This is a compatibility header for the "cfe\_time\_msg.h" file that has traditionally provided the message definitions for cFS apps.

#### Note

This file may be overridden/superceded by mission-provided defintions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.136 cfe/modules/time/config/default\_cfe\_time\_msgdefs.h File Reference

```
#include "common_types.h"
#include "cfe_mission_cfg.h"
#include "cfe_time_extern_typedefs.h"
#include "cfe_time_fcncodes.h"
```

### Data Structures

- struct [CFE\\_TIME\\_LeapsCmd\\_Payload](#)  
*Set leap seconds command payload.*
- struct [CFE\\_TIME\\_StateCmd\\_Payload](#)  
*Set clock state command payload.*
- struct [CFE\\_TIME\\_SourceCmd\\_Payload](#)  
*Set time data source command payload.*
- struct [CFE\\_TIME\\_SignalCmd\\_Payload](#)  
*Set tone signal source command payload.*
- struct [CFE\\_TIME\\_TimeCmd\\_Payload](#)  
*Generic seconds, microseconds command payload.*
- struct [CFE\\_TIME\\_OneHzAdjustmentCmd\\_Payload](#)  
*Generic seconds, subseconds command payload.*
- struct [CFE\\_TIME\\_ToneDataCmd\\_Payload](#)  
*Time at tone data command payload.*
- struct [CFE\\_TIME\\_HousekeepingTlm\\_Payload](#)
- struct [CFE\\_TIME\\_DiagnosticTlm\\_Payload](#)

## Macros

- #define CFE\_TIME\_FLAG\_CLKSET 0x8000  
*The spacecraft time has been set.*
- #define CFE\_TIME\_FLAG\_FLYING 0x4000  
*This instance of Time Services is flywheeling.*
- #define CFE\_TIME\_FLAG\_SRCINT 0x2000  
*The clock source is set to "internal".*
- #define CFE\_TIME\_FLAG\_SIGPRI 0x1000  
*The clock signal is set to "primary".*
- #define CFE\_TIME\_FLAG\_SRVFLY 0x0800  
*The Time Server is in flywheel mode.*
- #define CFE\_TIME\_FLAG\_CMDFLY 0x0400  
*This instance of Time Services was commanded into flywheel mode.*
- #define CFE\_TIME\_FLAG\_ADDADJ 0x0200  
*One time STCF Adjustment is to be done in positive direction.*
- #define CFE\_TIME\_FLAG\_ADD1HZ 0x0100  
*1 Hz STCF Adjustment is to be done in a positive direction*
- #define CFE\_TIME\_FLAG\_ADDTCL 0x0080  
*Time Client Latency is applied in a positive direction.*
- #define CFE\_TIME\_FLAG\_SERVER 0x0040  
*This instance of Time Services is a Time Server.*
- #define CFE\_TIME\_FLAG\_GDTONE 0x0020  
*The tone received is good compared to the last tone received.*
- #define CFE\_TIME\_FLAG\_REFERR 0x0010  
*GetReference read error, will be set if unable to get a consistent ref value.*
- #define CFE\_TIME\_FLAG\_UNUSED 0x000F  
*Reserved flags - should be zero.*

## Typedefs

- typedef struct CFE\_TIME\_LeapsCmd\_Payload CFE\_TIME\_LeapsCmd\_Payload\_t  
*Set leap seconds command payload.*
- typedef struct CFE\_TIME\_StateCmd\_Payload CFE\_TIME\_StateCmd\_Payload\_t  
*Set clock state command payload.*
- typedef struct CFE\_TIME\_SourceCmd\_Payload CFE\_TIME\_SourceCmd\_Payload\_t  
*Set time data source command payload.*
- typedef struct CFE\_TIME\_SignalCmd\_Payload CFE\_TIME\_SignalCmd\_Payload\_t  
*Set tone signal source command payload.*
- typedef struct CFE\_TIME\_TimeCmd\_Payload CFE\_TIME\_TimeCmd\_Payload\_t  
*Generic seconds, microseconds command payload.*
- typedef struct CFE\_TIME\_OneHzAdjustmentCmd\_Payload CFE\_TIME\_OneHzAdjustmentCmd\_Payload\_t  
*Generic seconds, subseconds command payload.*
- typedef struct CFE\_TIME\_ToneDataCmd\_Payload CFE\_TIME\_ToneDataCmd\_Payload\_t  
*Time at tone data command payload.*
- typedef struct CFE\_TIME\_HousekeepingTlm\_Payload CFE\_TIME\_HousekeepingTlm\_Payload\_t
- typedef struct CFE\_TIME\_DiagnosticTlm\_Payload CFE\_TIME\_DiagnosticTlm\_Payload\_t

### 12.136.1 Detailed Description

Specification for the CFE Time Services (CFE\_TIME) command and telemetry message constant definitions. For CFE\_TIME this is only the function/command code definitions

### 12.136.2 Typedef Documentation

#### 12.136.2.1 **CFE\_TIME\_DiagnosticTlm\_Payload\_t** `typedef struct CFE_TIME_DiagnosticTlm_Payload CFE_TIME_DiagnosticTlm_Payload_t`

**Name** Time Services Diagnostics Packet

#### 12.136.2.2 **CFE\_TIME\_HousekeepingTlm\_Payload\_t** `typedef struct CFE_TIME_HousekeepingTlm_Payload CFE_TIME_HousekeepingTlm_Payload_t`

**Name** Time Services Housekeeping Packet

#### 12.136.2.3 **CFE\_TIME\_LeapsCmd\_Payload\_t** `typedef struct CFE_TIME_LeapsCmd_Payload CFE_TIME_LeapsCmd_Payload_t` Set leap seconds command payload.

#### 12.136.2.4 **CFE\_TIME\_OneHzAdjustmentCmd\_Payload\_t** `typedef struct CFE_TIME_OneHzAdjustmentCmd_Payload CFE_TIME_OneHzAdjustmentCmd_Payload_t` Generic seconds, subseconds command payload.

#### 12.136.2.5 **CFE\_TIME\_SignalCmd\_Payload\_t** `typedef struct CFE_TIME_SignalCmd_Payload CFE_TIME_SignalCmd_Payload_t` Set tone signal source command payload.

#### 12.136.2.6 **CFE\_TIME\_SourceCmd\_Payload\_t** `typedef struct CFE_TIME_SourceCmd_Payload CFE_TIME_SourceCmd_Payload_t` Set time data source command payload.

#### 12.136.2.7 **CFE\_TIME\_StateCmd\_Payload\_t** `typedef struct CFE_TIME_StateCmd_Payload CFE_TIME_StateCmd_Payload_t` Set clock state command payload.

#### 12.136.2.8 **CFE\_TIME\_TimeCmd\_Payload\_t** `typedef struct CFE_TIME_TimeCmd_Payload CFE_TIME_TimeCmd_Payload_t` Generic seconds, microseconds command payload.

#### 12.136.2.9 **CFE\_TIME\_ToneDataCmd\_Payload\_t** `typedef struct CFE_TIME_ToneDataCmd_Payload CFE_TIME_ToneDataCmd_Payload_t` Time at tone data command payload.

### 12.137 cfe/modules/time/config/default\_cfe\_time\_msgids.h File Reference

```
#include "cfe_core_api_base_msgids.h"
#include "cfe_time_topicids.h"
```

## Macros

- #define CFE\_TIME\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_CMD\_TOPICID)  
/\* 0x1805 \*/
- #define CFE\_TIME\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_SEND\_HK\_TOPICID)  
/\* 0x180D \*/
- #define CFE\_TIME\_TONE\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_TONE\_CMD\_TOPICID)  
/\* 0x1810 \*/
- #define CFE\_TIME\_ONEHZ\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_ONEHZ\_CMD\_TOPICID)  
/\* 0x1811 \*/
- #define CFE\_TIME\_DATA\_CMD\_MID CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID)  
/\* 0x1860 \*/
- #define CFE\_TIME\_SEND\_CMD\_MID CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_SEND\_CMD\_TOPICID)  
/\* 0x1862 \*/
- #define CFE\_TIME\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID)  
/\* 0x0805 \*/
- #define CFE\_TIME\_DIAG\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID)  
/\* 0x0806 \*/
- #define CFE\_TIME\_1HZ\_CMD\_MID CFE\_TIME\_ONEHZ\_CMD\_MID

### 12.137.1 Detailed Description

CFE Time Services (CFE\_TIME) Application Message IDs

### 12.137.2 Macro Definition Documentation

**12.137.2.1 CFE\_TIME\_1HZ\_CMD\_MID** #define CFE\_TIME\_1HZ\_CMD\_MID CFE\_TIME\_ONEHZ\_CMD\_MID  
Definition at line 55 of file default\_cfe\_time\_msgids.h.

**12.137.2.2 CFE\_TIME\_CMD\_MID** #define CFE\_TIME\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_CMD\_TOPICID)  
/\* 0x1805 \*/  
Definition at line 32 of file default\_cfe\_time\_msgids.h.

**12.137.2.3 CFE\_TIME\_DATA\_CMD\_MID** #define CFE\_TIME\_DATA\_CMD\_MID CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID)  
/\* 0x1860 \*/  
Definition at line 40 of file default\_cfe\_time\_msgids.h.

**12.137.2.4 CFE\_TIME\_DIAG\_TLM\_MID** #define CFE\_TIME\_DIAG\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID)  
/\* 0x0806 \*/  
Definition at line 47 of file default\_cfe\_time\_msgids.h.

**12.137.2.5 CFE\_TIME\_HK\_TLM\_MID** #define CFE\_TIME\_HK\_TLM\_MID CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID)  
/\* 0x0805 \*/  
Definition at line 46 of file default\_cfe\_time\_msgids.h.

**12.137.2.6 CFE\_TIME\_ONEHZ\_CMD\_MID** #define CFE\_TIME\_ONEHZ\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_MID)  
/\* 0x1811 \*/  
Definition at line 35 of file default\_cfe\_time\_msgids.h.

**12.137.2.7 CFE\_TIME\_SEND\_CMD\_MID** #define CFE\_TIME\_SEND\_CMD\_MID CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_MID)  
/\* 0x1862 \*/  
Definition at line 41 of file default\_cfe\_time\_msgids.h.

**12.137.2.8 CFE\_TIME\_SEND\_HK\_MID** #define CFE\_TIME\_SEND\_HK\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_MID)  
/\* 0x180D \*/  
Definition at line 33 of file default\_cfe\_time\_msgids.h.

**12.137.2.9 CFE\_TIME\_TONE\_CMD\_MID** #define CFE\_TIME\_TONE\_CMD\_MID CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV(CFE\_MISSION\_TIME\_MID)  
/\* 0x1810 \*/  
Definition at line 34 of file default\_cfe\_time\_msgids.h.

## 12.138 cfe/modules/time/config/default\_cfe\_time\_msgstruct.h File Reference

```
#include "cfe_time_msgdefs.h"
#include "cfe_msg_hdr.h"
```

### Data Structures

- struct [CFE\\_TIME\\_NoopCmd](#)
- struct [CFE\\_TIME\\_ResetCountersCmd](#)
- struct [CFE\\_TIME\\_SendDiagnosticCmd](#)
- struct [CFE\\_TIME\\_OneHzCmd](#)
- struct [CFE\\_TIME\\_ToneSignalCmd](#)
- struct [CFE\\_TIME\\_FakeToneCmd](#)
- struct [CFE\\_TIME\\_SendHkCmd](#)
- struct [CFE\\_TIME\\_SetLeapSecondsCmd](#)  
*Set leap seconds command.*
- struct [CFE\\_TIME\\_SetStateCmd](#)  
*Set clock state command.*
- struct [CFE\\_TIME\\_SetSourceCmd](#)  
*Set time data source command.*
- struct [CFE\\_TIME\\_SetSignalCmd](#)  
*Set tone signal source command.*
- struct [CFE\\_TIME\\_AddDelayCmd](#)
- struct [CFE\\_TIME\\_SubDelayCmd](#)
- struct [CFE\\_TIME\\_SetMETCCmd](#)
- struct [CFE\\_TIME\\_SetSTCFCmd](#)
- struct [CFE\\_TIME\\_AddAdjustCmd](#)
- struct [CFE\\_TIME\\_SubAdjustCmd](#)
- struct [CFE\\_TIME\\_SetTimeCmd](#)
- struct [CFE\\_TIME\\_AddOneHzAdjustmentCmd](#)
- struct [CFE\\_TIME\\_SubOneHzAdjustmentCmd](#)

- struct [CFE\\_TIME\\_ToneDataCmd](#)  
*Time at tone data command.*
- struct [CFE\\_TIME\\_HousekeepingTlm](#)
- struct [CFE\\_TIME\\_DiagnosticTlm](#)

## Typedefs

- typedef struct [CFE\\_TIME\\_NoopCmd](#) CFE\_TIME\_NoopCmd\_t
- typedef struct [CFE\\_TIME\\_ResetCountersCmd](#) CFE\_TIME\_ResetCountersCmd\_t
- typedef struct [CFE\\_TIME\\_SendDiagnosticCmd](#) CFE\_TIME\_SendDiagnosticCmd\_t
- typedef struct [CFE\\_TIME\\_OneHzCmd](#) CFE\_TIME\_OneHzCmd\_t
- typedef struct [CFE\\_TIME\\_ToneSignalCmd](#) CFE\_TIME\_ToneSignalCmd\_t
- typedef struct [CFE\\_TIME\\_FakeToneCmd](#) CFE\_TIME\_FakeToneCmd\_t
- typedef struct [CFE\\_TIME\\_SendHkCmd](#) CFE\_TIME\_SendHkCmd\_t
- typedef struct [CFE\\_TIME\\_SetLeapSecondsCmd](#) CFE\_TIME\_SetLeapSecondsCmd\_t  
*Set leap seconds command.*
- typedef struct [CFE\\_TIME\\_SetStateCmd](#) CFE\_TIME\_SetStateCmd\_t  
*Set clock state command.*
- typedef struct [CFE\\_TIME\\_SetSourceCmd](#) CFE\_TIME\_SetSourceCmd\_t  
*Set time data source command.*
- typedef struct [CFE\\_TIME\\_SetSignalCmd](#) CFE\_TIME\_SetSignalCmd\_t  
*Set tone signal source command.*
- typedef struct [CFE\\_TIME\\_AddDelayCmd](#) CFE\_TIME\_AddDelayCmd\_t
- typedef struct [CFE\\_TIME\\_SubDelayCmd](#) CFE\_TIME\_SubDelayCmd\_t
- typedef struct [CFE\\_TIME\\_SetMETCmd](#) CFE\_TIME\_SetMETCmd\_t
- typedef struct [CFE\\_TIME\\_SetSTCFCmd](#) CFE\_TIME\_SetSTCFCmd\_t
- typedef struct [CFE\\_TIME\\_AddAdjustCmd](#) CFE\_TIME\_AddAdjustCmd\_t
- typedef struct [CFE\\_TIME\\_SubAdjustCmd](#) CFE\_TIME\_SubAdjustCmd\_t
- typedef struct [CFE\\_TIME\\_SetTimeCmd](#) CFE\_TIME\_SetTimeCmd\_t
- typedef struct [CFE\\_TIME\\_AddOneHzAdjustmentCmd](#) CFE\_TIME\_AddOneHzAdjustmentCmd\_t
- typedef struct [CFE\\_TIME\\_SubOneHzAdjustmentCmd](#) CFE\_TIME\_SubOneHzAdjustmentCmd\_t
- typedef struct [CFE\\_TIME\\_ToneDataCmd](#) CFE\_TIME\_ToneDataCmd\_t  
*Time at tone data command.*
- typedef struct [CFE\\_TIME\\_HousekeepingTlm](#) CFE\_TIME\_HousekeepingTlm\_t
- typedef struct [CFE\\_TIME\\_DiagnosticTlm](#) CFE\_TIME\_DiagnosticTlm\_t

### 12.138.1 Detailed Description

Purpose: cFE Executive Services (TIME) Command and Telemetry packet definition file.

References: Flight Software Branch C Coding Standard Version 1.0a cFE Flight Software Application Developers Guide  
Notes:

### 12.138.2 Typedef Documentation

#### 12.138.2.1 CFE\_TIME\_AddAdjustCmd\_t [typedef struct CFE\\_TIME\\_AddAdjustCmd](#) CFE\_TIME\_AddAdjustCmd\_t

#### 12.138.2.2 CFE\_TIME\_AddDelayCmd\_t [typedef struct CFE\\_TIME\\_AddDelayCmd](#) CFE\_TIME\_AddDelayCmd\_t

**12.138.2.3 CFE\_TIME\_AddOneHzAdjustmentCmd\_t** `typedef struct CFE_TIME_AddOneHzAdjustmentCmd CFE_TIME_AddOneHzAdjustmentCmd_t`

**12.138.2.4 CFE\_TIME\_DiagnosticTlm\_t** `typedef struct CFE_TIME_DiagnosticTlm CFE_TIME_DiagnosticTlm_t`

**12.138.2.5 CFE\_TIME\_FakeToneCmd\_t** `typedef struct CFE_TIME_FakeToneCmd CFE_TIME_FakeToneCmd_t`

**12.138.2.6 CFE\_TIME\_HousekeepingTlm\_t** `typedef struct CFE_TIME_HousekeepingTlm CFE_TIME_HousekeepingTlm_t`

**12.138.2.7 CFE\_TIME\_NoopCmd\_t** `typedef struct CFE_TIME_NoopCmd CFE_TIME_NoopCmd_t`

**12.138.2.8 CFE\_TIME\_OneHzCmd\_t** `typedef struct CFE_TIME_OneHzCmd CFE_TIME_OneHzCmd_t`

**12.138.2.9 CFE\_TIME\_ResetCountersCmd\_t** `typedef struct CFE_TIME_ResetCountersCmd CFE_TIME_ResetCountersCmd_t`

**12.138.2.10 CFE\_TIME\_SendDiagnosticCmd\_t** `typedef struct CFE_TIME_SendDiagnosticCmd CFE_TIME_SendDiagnosticCmd_t`

**12.138.2.11 CFE\_TIME\_SendHkCmd\_t** `typedef struct CFE_TIME_SendHkCmd CFE_TIME_SendHkCmd_t`

**12.138.2.12 CFE\_TIME\_SetLeapSecondsCmd\_t** `typedef struct CFE_TIME_SetLeapSecondsCmd CFE_TIME_SetLeapSecondsCmd_t`  
Set leap seconds command.

**12.138.2.13 CFE\_TIME\_SetMETCmd\_t** `typedef struct CFE_TIME_SetMETCmd CFE_TIME_SetMETCmd_t`

**12.138.2.14 CFE\_TIME\_SetSignalCmd\_t** `typedef struct CFE_TIME_SetSignalCmd CFE_TIME_SetSignalCmd_t`  
Set tone signal source command.

**12.138.2.15 CFE\_TIME\_SetSourceCmd\_t** `typedef struct CFE_TIME_SetSourceCmd CFE_TIME_SetSourceCmd_t`  
Set time data source command.

**12.138.2.16 CFE\_TIME\_SetStateCmd\_t** `typedef struct CFE_TIME_SetStateCmd CFE_TIME_SetStateCmd_t`  
Set clock state command.

**12.138.2.17 CFE\_TIME\_SetSTCFCmd\_t** `typedef struct CFE_TIME_SetSTCFCmd CFE_TIME_SetSTCFCmd_t`

**12.138.2.18 CFE\_TIME\_SetTimeCmd\_t** `typedef struct CFE_TIME_SetTimeCmd CFE_TIME_SetTimeCmd_t`

**12.138.2.19 CFE\_TIME\_SubAdjustCmd\_t** `typedef struct CFE_TIME_SubAdjustCmd CFE_TIME_SubAdjustCmd_t`

**12.138.2.20 CFE\_TIME\_SubDelayCmd\_t** `typedef struct CFE_TIME_SubDelayCmd CFE_TIME_SubDelayCmd_t`

**12.138.2.21 CFE\_TIME\_SubOneHzAdjustmentCmd\_t** `typedef struct CFE_TIME_SubOneHzAdjustmentCmd CFE_TIME_SubOneHzAdjustmentCmd_t`

**12.138.2.22 CFE\_TIME\_ToneDataCmd\_t** `typedef struct CFE_TIME_ToneDataCmd CFE_TIME_ToneDataCmd_t`  
Time at tone data command.

**12.138.2.23 CFE\_TIME\_ToneSignalCmd\_t** `typedef struct CFE_TIME_ToneSignalCmd CFE_TIME_ToneSignalCmd_t`

## 12.139 cfe/modules/time/config/default\_cfe\_time\_platform\_cfg.h File Reference

```
#include "cfe_time_mission_cfg.h"
#include "cfe_time_internal_cfg.h"
```

### 12.139.1 Detailed Description

CFE Time Services (CFE\_TIME) Application Platform Configuration Header File

This is a compatibility header for the "platform\_cfg.h" file that has traditionally provided both public and private config definitions for each CFS app.

These definitions are now provided in two separate files, one for the public/mission scope and one for internal scope.

#### Note

This file may be overridden/superceded by mission-provided definitions either by overriding this header or by generating definitions from a command/data dictionary tool.

## 12.140 cfe/modules/time/config/default\_cfe\_time\_topicids.h File Reference

### Macros

- `#define CFE_MISSION_TIME_CMD_TOPICID 5`
- `#define CFE_MISSION_TIME_SEND_HK_TOPICID 13`
- `#define CFE_MISSION_TIME_TONE_CMD_TOPICID 16`
- `#define CFE_MISSION_TIME_ONEHZ_CMD_TOPICID 17`
- `#define CFE_MISSION_TIME_DATA_CMD_TOPICID 0`
- `#define CFE_MISSION_TIME_SEND_CMD_TOPICID 2`
- `#define CFE_MISSION_TIME_HK_TLM_TOPICID 5`
- `#define CFE_MISSION_TIME_DIAG_TLM_TOPICID 6`

### 12.140.1 Detailed Description

CFE Time Services (CFE\_TIME) Application Topic IDs

## 12.140.2 Macro Definition Documentation

### 12.140.2.1 CFE\_MISSION\_TIME\_CMD\_TOPICID #define CFE\_MISSION\_TIME\_CMD\_TOPICID 5

**Purpose** cFE Portable Message Numbers for Commands

**Description:**

Portable message numbers for the cFE command messages

**Limits**

Not Applicable

Definition at line 35 of file default\_cfe\_time\_topicids.h.

### 12.140.2.2 CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID #define CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID 0

**Purpose** cFE Portable Message Numbers for Global Messages

**Description:**

Portable message numbers for the cFE global messages

**Limits**

Not Applicable

Definition at line 49 of file default\_cfe\_time\_topicids.h.

### 12.140.2.3 CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID #define CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID 6

Definition at line 62 of file default\_cfe\_time\_topicids.h.

### 12.140.2.4 CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID #define CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID 5

**Purpose** cFE Portable Message Numbers for Telemetry

**Description:**

Portable message numbers for the cFE telemetry messages

**Limits**

Not Applicable

Definition at line 61 of file default\_cfe\_time\_topicids.h.

### 12.140.2.5 CFE\_MISSION\_TIME\_ONEHZ\_CMD\_TOPICID #define CFE\_MISSION\_TIME\_ONEHZ\_CMD\_TOPICID 17

Definition at line 38 of file default\_cfe\_time\_topicids.h.

**12.140.2.6 CFE\_MISSION\_TIME\_SEND\_CMD\_TOPICID** #define CFE\_MISSION\_TIME\_SEND\_CMD\_TOPICID 2  
Definition at line 50 of file default\_cfe\_time\_topicids.h.

**12.140.2.7 CFE\_MISSION\_TIME\_SEND\_HK\_TOPICID** #define CFE\_MISSION\_TIME\_SEND\_HK\_TOPICID 13  
Definition at line 36 of file default\_cfe\_time\_topicids.h.

**12.140.2.8 CFE\_MISSION\_TIME\_TONE\_CMD\_TOPICID** #define CFE\_MISSION\_TIME\_TONE\_CMD\_TOPICID 16  
Definition at line 37 of file default\_cfe\_time\_topicids.h.

## 12.141 cfe/modules/time/fsw/inc/cfe\_time\_eventids.h File Reference

### Macros

#### TIME event IDs

- #define [CFE\\_TIME\\_INIT\\_EID](#) 1  
*TIME Initialization Event ID.*
- #define [CFE\\_TIME\\_NOOP\\_EID](#) 4  
*TIME No-op Command Success Event ID.*
- #define [CFE\\_TIME\\_RESET\\_EID](#) 5  
*TIME Reset Counters Command Success Event ID.*
- #define [CFE\\_TIME\\_DIAG\\_EID](#) 6  
*TIME Request Diagnostics Command Success Event ID.*
- #define [CFE\\_TIME\\_STATE\\_EID](#) 7  
*TIME Set Time State Command Success Event ID.*
- #define [CFE\\_TIME\\_SOURCE\\_EID](#) 8  
*TIME Set Time Source Command Success Event ID.*
- #define [CFE\\_TIME\\_SIGNAL\\_EID](#) 9  
*TIME Set Tone Source Command Success Event ID.*
- #define [CFE\\_TIME\\_DELAY\\_EID](#) 11  
*TIME Add or Subtract Delay Command Success Event ID.*
- #define [CFE\\_TIME\\_TIME\\_EID](#) 12  
*TIME Set Time Command Success Event ID.*
- #define [CFE\\_TIME\\_MET\\_EID](#) 13  
*TIME Set Mission Elapsed Time Command Success Event ID.*
- #define [CFE\\_TIME\\_STCF\\_EID](#) 14  
*TIME Set Spacecraft Time Correlation Factor Command Success Event ID.*
- #define [CFE\\_TIME\\_DELTA\\_EID](#) 15  
*TIME Add or Subtract Single STCF Adjustment Command Success Event ID.*
- #define [CFE\\_TIME\\_ONEHZ\\_EID](#) 16  
*TIME Add or Subtract STCF Adjustment Each Second Command Success Event ID.*
- #define [CFE\\_TIME\\_LEAPS\\_EID](#) 17  
*TIME Set Leap Seconds Command Success Event ID.*
- #define [CFE\\_TIME\\_FLY\\_ON\\_EID](#) 20  
*TIME Entered FLYWHEEL Mode Event ID.*
- #define [CFE\\_TIME\\_FLY\\_OFF\\_EID](#) 21  
*TIME Exited FLYWHEEL Mode Event ID.*
- #define [CFE\\_TIME\\_ID\\_ERR\\_EID](#) 26  
*TIME Invalid Message ID Received Event ID.*
- #define [CFE\\_TIME\\_CC\\_ERR\\_EID](#) 27  
*TIME Invalid Command Code Received Event ID.*
- #define [CFE\\_TIME\\_STATE\\_ERR\\_EID](#) 30  
*TIME Set Clock State Command Invalid State Event ID.*

- #define `CFE_TIME_SOURCE_ERR_EID` 31  
*TIME Set Clock Source Command Invalid Source Event ID.*
- #define `CFE_TIME_SIGNAL_ERR_EID` 32  
*TIME Set Clock Tone Source Command Invalid Source Event ID.*
- #define `CFE_TIME_DELAY_ERR_EID` 33  
*TIME Add or Subtract Tone Delay Command Invalid Time Value Event ID.*
- #define `CFE_TIME_TIME_ERR_EID` 34  
*TIME Set Spacecraft Time Command Invalid Time Value Event ID.*
- #define `CFE_TIME_MET_ERR_EID` 35  
*TIME Set Mission Elapsed Time Command Invalid Time Value Event ID.*
- #define `CFE_TIME_STCF_ERR_EID` 36  
*TIME Set Spacecraft Time Correlation Factor Command Invalid Time Value Event ID.*
- #define `CFE_TIME_DELTA_ERR_EID` 37  
*TIME Add or Subtract Single STCF Adjustment Command Invalid Time Value Event ID.*
- #define `CFE_TIME_SOURCE_CFG_EID` 40  
*TIME Set Clock Source Command Incompatible Mode Event ID.*
- #define `CFE_TIME_SIGNAL_CFG_EID` 41  
*TIME Set Clock Signal Command Incompatible Mode Event ID.*
- #define `CFE_TIME_DELAY_CFG_EID` 42  
*TIME Add or Subtract Tone Delay Command Incompatible Mode Event ID.*
- #define `CFE_TIME_TIME_CFG_EID` 43  
*TIME Set Spacecraft Time Command Incompatible Mode Event ID.*
- #define `CFE_TIME_MET_CFG_EID` 44  
*TIME Set Mission Elapsed Time Command Incompatible Mode Event ID.*
- #define `CFE_TIME_STCF_CFG_EID` 45  
*TIME Set Spacecraft Time Correlation Factor Command Incompatible Mode Event ID.*
- #define `CFE_TIME_LEAPS_CFG_EID` 46  
*TIME Set Leap Seconds Command Incompatible Mode Event ID.*
- #define `CFE_TIME_DELTA_CFG_EID` 47  
*TIME Add or Subtract Single STCF Adjustment Command Incompatible Mode Event ID.*
- #define `CFE_TIME_ONEHZ_CFG_EID` 48  
*TIME Add or Subtract STCF Adjustment Each Second Command Incompatible Mode Event ID.*
- #define `CFE_TIME_LEN_ERR_EID` 49  
*TIME Invalid Command Length Event ID.*

### 12.141.1 Detailed Description

cFE Time Services Event IDs

### 12.141.2 Macro Definition Documentation

**12.141.2.1 CFE\_TIME\_CC\_ERR\_EID** #define `CFE_TIME_CC_ERR_EID` 27  
TIME Invalid Command Code Received Event ID.

Type: ERROR

Cause:

Invalid command code for message ID `CFE_TIME_CMD_MID` received on the TIME message pipe.  
Definition at line 232 of file `cfe_time_eventids.h`.

**12.141.2.2 CFE\_TIME\_DELAY\_CFG\_EID** #define CFE\_TIME\_DELAY\_CFG\_EID 42  
TIME Add or Subtract Tone Delay Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Add Tone Delay Command](#) OR [TIME Subtract Tone Delay Command](#) failure due to being in an incompatible mode.

Definition at line 364 of file cfe\_time\_eventids.h.

**12.141.2.3 CFE\_TIME\_DELAY\_EID** #define CFE\_TIME\_DELAY\_EID 11  
TIME Add or Subtract Delay Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Add Time Delay Command](#) OR a [Subtract Time Delay Command](#) success.

Definition at line 120 of file cfe\_time\_eventids.h.

**12.141.2.4 CFE\_TIME\_DELAY\_ERR\_EID** #define CFE\_TIME\_DELAY\_ERR\_EID 33  
TIME Add or Subtract Tone Delay Command Invalid Time Value Event ID.

Type: ERROR

Cause:

[TIME Add Tone Delay Command](#) OR [TIME Subtract Tone Delay Command](#) failure due to an invalid time value.

Definition at line 278 of file cfe\_time\_eventids.h.

**12.141.2.5 CFE\_TIME\_DELTA\_CFG\_EID** #define CFE\_TIME\_DELTA\_CFG\_EID 47  
TIME Add or Subtract Single STCF Adjustment Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Add Single STCF Adjustment Command](#) OR [TIME Subtract Single STCF Adjustment Command](#) failure due to being in an incompatible mode.

Definition at line 425 of file cfe\_time\_eventids.h.

**12.141.2.6 CFE\_TIME\_DELTA\_EID** #define CFE\_TIME\_DELTA\_EID 15  
TIME Add or Subtract Single STCF Adjustment Command Success Event ID.

Type: INFORMATION

Cause:

TIME Add Single STCF Adjustment Command OR TIME Subtract Single STCF Adjustment Command success.  
Definition at line 165 of file cfe\_time\_eventids.h.

**12.141.2.7 CFE\_TIME\_DELTA\_ERR\_EID** #define CFE\_TIME\_DELTA\_ERR\_EID 37  
TIME Add or Subtract Single STCF Adjustment Command Invalid Time Value Event ID.

Type: ERROR

Cause:

TIME Add Single STCF Adjustment Command OR TIME Subtract Single STCF Adjustment Command failure due to  
an invalid time value.  
Definition at line 327 of file cfe\_time\_eventids.h.

**12.141.2.8 CFE\_TIME\_DIAG\_EID** #define CFE\_TIME\_DIAG\_EID 6  
TIME Request Diagnostics Command Success Event ID.

Type: DEBUG

Cause:

TIME Request Diagnostics Command success.  
Definition at line 75 of file cfe\_time\_eventids.h.

**12.141.2.9 CFE\_TIME\_FLY\_OFF\_EID** #define CFE\_TIME\_FLY\_OFF\_EID 21  
TIME Exited FLYWHEEL Mode Event ID.

Type: INFORMATION

Cause:

TIME Exited FLYWHEEL Mode.  
Definition at line 210 of file cfe\_time\_eventids.h.

**12.141.2.10 CFE\_TIME\_FLY\_ON\_EID** #define CFE\_TIME\_FLY\_ON\_EID 20  
TIME Entered FLYWHEEL Mode Event ID.

Type: INFORMATION

Cause:

TIME Entered FLYWHEEL Mode.  
Definition at line 199 of file cfe\_time\_eventids.h.

**12.141.2.11 CFE\_TIME\_ID\_ERR\_EID** #define CFE\_TIME\_ID\_ERR\_EID 26  
TIME Invalid Message ID Received Event ID.

Type: ERROR

Cause:

Invalid message ID received on the TIME message pipe.  
Definition at line 221 of file cfe\_time\_eventids.h.

**12.141.2.12 CFE\_TIME\_INIT\_EID** #define CFE\_TIME\_INIT\_EID 1  
TIME Initialization Event ID.

Type: INFORMATION

Cause:

Time Services Task Initialization complete.  
Definition at line 42 of file cfe\_time\_eventids.h.

**12.141.2.13 CFE\_TIME\_LEAPS\_CFG\_EID** #define CFE\_TIME\_LEAPS\_CFG\_EID 46  
TIME Set Leap Seconds Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Set Leap Seconds Command](#) failure due to being in an incompatible mode.  
Definition at line 412 of file cfe\_time\_eventids.h.

**12.141.2.14 CFE\_TIME\_LEAPS\_EID** #define CFE\_TIME\_LEAPS\_EID 17  
TIME Set Leap Seconds Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Leap Seconds Command](#) success.  
Definition at line 188 of file cfe\_time\_eventids.h.

**12.141.2.15 CFE\_TIME\_LEN\_ERR\_EID** #define CFE\_TIME\_LEN\_ERR\_EID 49  
TIME Invalid Command Length Event ID.

Type: ERROR

Cause:

Invalid length for the command code in message ID [CFE\\_TIME\\_CMD\\_MID](#) received on the TIME message pipe.  
Definition at line 450 of file cfe\_time\_eventids.h.

**12.141.2.16 CFE\_TIME\_MET\_CFG\_EID** #define CFE\_TIME\_MET\_CFG\_EID 44  
TIME Set Mission Elapsed Time Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Set Mission Elapsed Time Command](#) failure due to being in an incompatible mode.  
Definition at line 388 of file cfe\_time\_eventids.h.

**12.141.2.17 CFE\_TIME\_MET\_EID** #define CFE\_TIME\_MET\_EID 13  
TIME Set Mission Elapsed Time Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Mission Elapsed Time Command](#) success.  
Definition at line 142 of file cfe\_time\_eventids.h.

**12.141.2.18 CFE\_TIME\_MET\_ERR\_EID** #define CFE\_TIME\_MET\_ERR\_EID 35  
TIME Set Mission Elapsed Time Command Invalid Time Value Event ID.

Type: ERROR

Cause:

[TIME Set Mission Elapsed Time Command](#) failure due to an invalid time value.  
Definition at line 302 of file cfe\_time\_eventids.h.

**12.141.2.19 CFE\_TIME\_NOOP\_EID** #define CFE\_TIME\_NOOP\_EID 4  
TIME No-op Command Success Event ID.

Type: INFORMATION

Cause:

[TIME NO-OP Command](#) success.  
Definition at line 53 of file cfe\_time\_eventids.h.

**12.141.2.20 CFE\_TIME\_ONEHZ\_CFG\_EID** #define CFE\_TIME\_ONEHZ\_CFG\_EID 48  
TIME Add or Subtract STCF Adjustment Each Second Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Add STCF Adjustment Each Second Command](#) OR [TIME Subtract STCF Adjustment Each Second Command](#) failure due to being in an incompatible mode.  
Definition at line 438 of file cfe\_time\_eventids.h.

**12.141.2.21 CFE\_TIME\_ONEHZ\_EID** #define CFE\_TIME\_ONEHZ\_EID 16  
TIME Add or Subtract STCF Adjustment Each Second Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Add STCF Adjustment Each Second Command](#) OR [TIME Subtract STCF Adjustment Each Second Command](#) success.  
Definition at line 177 of file cfe\_time\_eventids.h.

**12.141.2.22 CFE\_TIME\_RESET\_EID** #define CFE\_TIME\_RESET\_EID 5  
TIME Reset Counters Command Success Event ID.

Type: DEBUG

Cause:

[TIME Reset Counters Command](#) success.  
Definition at line 64 of file cfe\_time\_eventids.h.

**12.141.2.23 CFE\_TIME\_SIGNAL\_CFG\_EID** #define CFE\_TIME\_SIGNAL\_CFG\_EID 41  
TIME Set Clock Signal Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Set Clock Signal Command](#) failure due to being in an incompatible mode.  
Definition at line 351 of file cfe\_time\_eventids.h.

**12.141.2.24 CFE\_TIME\_SIGNAL\_EID** #define CFE\_TIME\_SIGNAL\_EID 9  
TIME Set Tone Source Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Clock Tone Source Command](#) success.  
Definition at line 108 of file cfe\_time\_eventids.h.

**12.141.2.25 CFE\_TIME\_SIGNAL\_ERR\_EID** #define CFE\_TIME\_SIGNAL\_ERR\_EID 32  
TIME Set Clock Tone Source Command Invalid Source Event ID.

Type: ERROR

Cause:

[Set Clock Tone Source Command](#) failed due to invalid source requested.  
Definition at line 265 of file cfe\_time\_eventids.h.

**12.141.2.26 CFE\_TIME\_SOURCE\_CFG\_EID** #define CFE\_TIME\_SOURCE\_CFG\_EID 40  
TIME Set Clock Source Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Set Clock Source Command](#) failure due to being in an incompatible mode.  
Definition at line 339 of file cfe\_time\_eventids.h.

**12.141.2.27 CFE\_TIME\_SOURCE\_EID** #define CFE\_TIME\_SOURCE\_EID 8  
TIME Set Time Source Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Time Source Command](#) success.  
Definition at line 97 of file cfe\_time\_eventids.h.

**12.141.2.28 CFE\_TIME\_SOURCE\_ERR\_EID** #define CFE\_TIME\_SOURCE\_ERR\_EID 31  
TIME Set Clock Source Command Invalid Source Event ID.

Type: ERROR

Cause:

[TIME Set Clock Source Command](#) failed due to invalid source requested.  
Definition at line 254 of file cfe\_time\_eventids.h.

**12.141.2.29 CFE\_TIME\_STATE\_EID** #define CFE\_TIME\_STATE\_EID 7  
TIME Set Time State Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Time State Command](#) success.  
Definition at line 86 of file cfe\_time\_eventids.h.

**12.141.2.30 CFE\_TIME\_STATE\_ERR\_EID** #define CFE\_TIME\_STATE\_ERR\_EID 30  
TIME Set Clock State Command Invalid State Event ID.

Type: ERROR

Cause:

[TIME Set Clock State Command](#) failed due to invalid state requested.  
Definition at line 243 of file cfe\_time\_eventids.h.

**12.141.2.31 CFE\_TIME\_STCF\_CFG\_EID** #define CFE\_TIME\_STCF\_CFG\_EID 45  
TIME Set Spacecraft Time Correlation Factor Command Incompatible Mode Event ID.

Type: ERROR

Cause:

[TIME Set Spacecraft Time Correlation Factor Command](#) failure due to being in an incompatible mode.  
Definition at line 400 of file cfe\_time\_eventids.h.

**12.141.2.32 CFE\_TIME\_STCF\_EID** #define CFE\_TIME\_STCF\_EID 14  
TIME Set Spacecraft Time Correlation Factor Command Success Event ID.

Type: INFORMATION

Cause:

[TIME Set Spacecraft Time Correlation Factor Command](#) success.  
Definition at line 153 of file cfe\_time\_eventids.h.

**12.141.2.33 CFE\_TIME\_STCF\_ERR\_EID** #define CFE\_TIME\_STCF\_ERR\_EID 36  
TIME Set Spacecraft Time Correlation Factor Command Invalid Time Value Event ID.

Type: ERROR

Cause:

[TIME Set Spacecraft Time Correlation Factor Command](#) failure due to an invalid time value.  
Definition at line 314 of file cfe\_time\_eventids.h.

**12.141.2.34 CFE\_TIME\_TIME\_CFG\_EID** #define CFE\_TIME\_TIME\_CFG\_EID 43  
TIME Set Spacecraft Time Command Incompatible Mode Event ID.

Type: ERROR

Cause:

TIME Set Spacecraft Time Command failure due to being in an incompatible mode.  
Definition at line 376 of file cfe\_time\_eventids.h.

**12.141.2.35 CFE\_TIME\_TIME\_EID** #define CFE\_TIME\_TIME\_EID 12  
TIME Set Time Command Success Event ID.

Type: INFORMATION

Cause:

TIME Set Time Command success.  
Definition at line 131 of file cfe\_time\_eventids.h.

**12.141.2.36 CFE\_TIME\_TIME\_ERR\_EID** #define CFE\_TIME\_TIME\_ERR\_EID 34  
TIME Set Spacecraft Time Command Invalid Time Value Event ID.

Type: ERROR

Cause:

TIME Set Spacecraft Time Command failure due to an invalid time value.  
Definition at line 290 of file cfe\_time\_eventids.h.

## 12.142 osal/docs/src/osal\_frontpage.dox File Reference

## 12.143 osal/docs/src/osal\_fs.dox File Reference

## 12.144 osal/docs/src/osal\_timer.dox File Reference

## 12.145 osal/src/os/inc/common\_types.h File Reference

```
#include <stdint.h>
#include <stddef.h>
#include <stdbool.h>
```

## Macros

- `#define CompileTimeAssert(Condition, Message) typedef char Message[(Condition) ? 1 : -1]`
- `#define _EXTENSION_`
- `#define OS_USED`
- `#define OS_PRINTF(n, m)`
- `#define OSAL_SIZE_C(X) ((size_t)(X))`
- `#define OSAL_BLOCKCOUNT_C(X) ((osal_blockcount_t)(X))`
- `#define OSAL_INDEX_C(X) ((osal_index_t)(X))`
- `#define OSAL_OBJTYPE_C(X) ((osal_objtype_t)(X))`
- `#define OSAL_STATUS_C(X) ((osal_status_t)(X))`

## Typedefs

- `typedef int8_t int8`
- `typedef int16_t int16`
- `typedef int32_t int32`
- `typedef int64_t int64`
- `typedef uint8_t uint8`
- `typedef uint16_t uint16`
- `typedef uint32_t uint32`
- `typedef uint64_t uint64`
- `typedef intptr_t intptr`
- `typedef uintptr_t cpuaddr`
- `typedef size_t cpusize`
- `typedef ptrdiff_t cpudiff`
- `typedef uint32 osal_id_t`
- `typedef size_t osal_blockcount_t`
- `typedef uint32 osal_index_t`
- `typedef uint32 osal_objtype_t`
- `typedef int32 osal_status_t`
- `typedef void(* OS_ArgCallback_t) (osal_id_t object_id, void *arg)`

*General purpose OSAL callback function.*

## Functions

- `CompileTimeAssert (sizeof(uint8)==1, TypeUint8WrongSize)`
- `CompileTimeAssert (sizeof(uint16)==2, TypeUint16WrongSize)`
- `CompileTimeAssert (sizeof(uint32)==4, TypeUint32WrongSize)`
- `CompileTimeAssert (sizeof(uint64)==8, TypeUint64WrongSize)`
- `CompileTimeAssert (sizeof(int8)==1, Typeint8WrongSize)`
- `CompileTimeAssert (sizeof(int16)==2, Typeint16WrongSize)`
- `CompileTimeAssert (sizeof(int32)==4, Typeint32WrongSize)`
- `CompileTimeAssert (sizeof(int64)==8, Typeint64WrongSize)`
- `CompileTimeAssert (sizeof(cpuaddr) >=sizeof(void *), TypePtrWrongSize)`

### 12.145.1 Detailed Description

Purpose: Unit specification for common types.

Design Notes: Assumes make file has defined processor family

## 12.145.2 Macro Definition Documentation

### 12.145.2.1 `_EXTENSION_` #define \_EXTENSION\_

Definition at line 65 of file common\_types.h.

### 12.145.2.2 `CompileTimeAssert` #define CompileTimeAssert(

*Condition,*

*Message* ) typedef char Message[(*Condition*) ? 1 : -1]

Definition at line 48 of file common\_types.h.

### 12.145.2.3 `OS_PRINTF` #define OS\_PRINTF(

*n,*

*m* )

Definition at line 67 of file common\_types.h.

### 12.145.2.4 `OS_USED` #define OS\_USED

Definition at line 66 of file common\_types.h.

### 12.145.2.5 `OSAL_BLOCKCOUNT_C` #define OSAL\_BLOCKCOUNT\_C(

*X* ) ((*osal\_blockcount\_t*)(*X*))

Definition at line 172 of file common\_types.h.

### 12.145.2.6 `OSAL_INDEX_C` #define OSAL\_INDEX\_C(

*X* ) ((*osal\_index\_t*)(*X*))

Definition at line 173 of file common\_types.h.

### 12.145.2.7 `OSAL_OBJTYPE_C` #define OSAL\_OBJTYPE\_C(

*X* ) ((*osal\_objtype\_t*)(*X*))

Definition at line 174 of file common\_types.h.

### 12.145.2.8 `OSAL_SIZE_C` #define OSAL\_SIZE\_C(

*X* ) ((*size\_t*)(*X*))

Definition at line 171 of file common\_types.h.

### 12.145.2.9 `OSAL_STATUS_C` #define OSAL\_STATUS\_C(

*X* ) ((*osal\_status\_t*)(*X*))

Definition at line 175 of file common\_types.h.

## 12.145.3 Typedef Documentation

**12.145.3.1 cpuaddr** `typedef uintptr_t cpuaddr`

Definition at line 88 of file common\_types.h.

**12.145.3.2 cpudiff** `typedef ptrdiff_t cpudiff`

Definition at line 90 of file common\_types.h.

**12.145.3.3 cpusize** `typedef size_t cpusize`

Definition at line 89 of file common\_types.h.

**12.145.3.4 int16** `typedef int16_t int16`

Definition at line 80 of file common\_types.h.

**12.145.3.5 int32** `typedef int32_t int32`

Definition at line 81 of file common\_types.h.

**12.145.3.6 int64** `typedef int64_t int64`

Definition at line 82 of file common\_types.h.

**12.145.3.7 int8** `typedef int8_t int8`

Definition at line 79 of file common\_types.h.

**12.145.3.8 intptr** `typedef intptr_t intptr`

Definition at line 87 of file common\_types.h.

**12.145.3.9 OS\_ArgCallback\_t** `typedef void(* OS_ArgCallback_t) (osal_id_t object_id, void *arg)`

General purpose OSAL callback function.

This may be used by multiple APIS

Definition at line 143 of file common\_types.h.

**12.145.3.10 osal\_blockcount\_t** `typedef size_t osal_blockcount_t`

A type used to represent a number of blocks or buffers

This is used with file system and queue implementations.

Definition at line 116 of file common\_types.h.

**12.145.3.11 osal\_id\_t** `typedef uint32 osal_id_t`

A type to be used for OSAL resource identifiers. This typedef is backward compatible with the IDs from older versions of OSAL

Definition at line 108 of file common\_types.h.

**12.145.3.12 osal\_index\_t** `typedef uint32 osal_index_t`

A type used to represent an index into a table structure

This is used when referring directly to a table index as opposed to an object ID. It is primarily intended for internal use, but is also output from public APIs such as [OS\\_ObjectIdToArrayIndex\(\)](#).

Definition at line 126 of file common\_types.h.

**12.145.3.13 osal\_objtype\_t** `typedef uint32 osal_objtype_t`

A type used to represent the runtime type or category of an OSAL object

Definition at line 131 of file common\_types.h.

**12.145.3.14 osal\_status\_t** `typedef int32 osal_status_t`

The preferred type to represent OSAL status codes defined in [osapi-error.h](#)

Definition at line 136 of file common\_types.h.

**12.145.3.15 uint16** `typedef uint16_t uint16`

Definition at line 84 of file common\_types.h.

**12.145.3.16 uint32** `typedef uint32_t uint32`

Definition at line 85 of file common\_types.h.

**12.145.3.17 uint64** `typedef uint64_t uint64`

Definition at line 86 of file common\_types.h.

**12.145.3.18 uint8** `typedef uint8_t uint8`

Definition at line 83 of file common\_types.h.

## 12.145.4 Function Documentation

**12.145.4.1 CompileTimeAssert() [1/9]** `CompileTimeAssert (`

```
    sizeof(cpuaddr) >=sizeof(void *) ,  
    TypePtrWrongSize )
```

**12.145.4.2 CompileTimeAssert() [2/9]** `CompileTimeAssert (`

```
    sizeof(int16) ==2,  
    Typeint16WrongSize )
```

**12.145.4.3 CompileTimeAssert() [3/9]** `CompileTimeAssert (`

```
    sizeof(int32) ==4,  
    Typeint32WrongSize )
```

**12.145.4.4 CompileTimeAssert() [4/9]** `CompileTimeAssert (`  
    `sizeof(int64) = 8,`  
    `Typeint64WrongSize )`

**12.145.4.5 CompileTimeAssert() [5/9]** `CompileTimeAssert (`  
    `sizeof(int8) = 1,`  
    `Typeint8WrongSize )`

**12.145.4.6 CompileTimeAssert() [6/9]** `CompileTimeAssert (`  
    `sizeof(uint16) = 2,`  
    `TypeUint16WrongSize )`

**12.145.4.7 CompileTimeAssert() [7/9]** `CompileTimeAssert (`  
    `sizeof(uint32) = 4,`  
    `TypeUint32WrongSize )`

**12.145.4.8 CompileTimeAssert() [8/9]** `CompileTimeAssert (`  
    `sizeof(uint64) = 8,`  
    `TypeUint64WrongSize )`

**12.145.4.9 CompileTimeAssert() [9/9]** `CompileTimeAssert (`  
    `sizeof(uint8) = 1,`  
    `TypeUint8WrongSize )`

## 12.146 osal/src/os/inc/osapi-binsem.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct [OS\\_bin\\_sem\\_prop\\_t](#)  
*OSAL binary semaphore properties.*

### Macros

- #define [OS\\_SEM\\_FULL](#) 1  
*Semaphore full state.*
- #define [OS\\_SEM\\_EMPTY](#) 0  
*Semaphore empty state.*

### Functions

- [int32 OS\\_BinSemCreate \(osal\\_id\\_t \\*sem\\_id, const char \\*sem\\_name, uint32 sem\\_initial\\_value, uint32 options\)](#)  
*Creates a binary semaphore.*
- [int32 OS\\_BinSemFlush \(osal\\_id\\_t sem\\_id\)](#)

*Unblock all tasks pending on the specified semaphore.*

- `int32 OS_BinSemGive (osal_id_t sem_id)`  
*Increment the semaphore value.*
- `int32 OS_BinSemTake (osal_id_t sem_id)`  
*Decrement the semaphore value.*
- `int32 OS_BinSemTimedWait (osal_id_t sem_id, uint32 msecs)`  
*Decrement the semaphore value with a timeout.*
- `int32 OS_BinSemDelete (osal_id_t sem_id)`  
*Deletes the specified Binary Semaphore.*
- `int32 OS_BinSemGetIdByName (osal_id_t *sem_id, const char *sem_name)`  
*Find an existing semaphore ID by name.*
- `int32 OS_BinSemGetInfo (osal_id_t sem_id, OS_bin_sem_prop_t *bin_prop)`  
*Fill a property object buffer with details regarding the resource.*

#### 12.146.1 Detailed Description

Declarations and prototypes for binary semaphores

### 12.147 osal/src/os/inc/osapi-bsp.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

#### Functions

- `void OS_BSP_SetResourceTypeConfig (uint32 ResourceType, uint32 ConfigOptionValue)`
- `uint32 OS_BSP_GetResourceTypeConfig (uint32 ResourceType)`
- `uint32 OS_BSP_GetArgC (void)`
- `char *const * OS_BSP_GetArgV (void)`
- `void OS_BSP_SetExitCode (int32 code)`

#### 12.147.1 Detailed Description

Declarations and prototypes for OSAL BSP

### 12.148 osal/src/os/inc/osapi-clock.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

#### Data Structures

- struct `OS_time_t`  
*OSAL time interval structure.*

#### Enumerations

- enum { `OS_TIME_TICK_RESOLUTION_NS` = 100, `OS_TIME_TICKS_PER_SECOND` = 1000000000 / `OS_TIME_TICK_RESOLUTION_NS`, `OS_TIME_TICKS_PER_MSEC` = 1000000 / `OS_TIME_TICK_RESOLUTION_NS`, `OS_TIME_TICKS_PER_USEC` = 1000 / `OS_TIME_TICK_RESOLUTION_NS` }

*Multippliers/divisors to convert ticks into standardized units.*

## Functions

- `int32 OS_GetLocalTime (OS_time_t *time_struct)`  
*Get the local time.*
- `int32 OS_SetLocalTime (const OS_time_t *time_struct)`  
*Set the local time.*
- `static int64 OS_TimeGetTotalSeconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to whole number of seconds.*
- `static OS_time_t OS_TimeFromTotalSeconds (int64 tm)`  
*Get an `OS_time_t` interval object from an integer number of seconds.*
- `static int64 OS_TimeGetTotalMilliseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to millisecond units.*
- `static OS_time_t OS_TimeFromTotalMilliseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of milliseconds.*
- `static int64 OS_TimeGetTotalMicroseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to microsecond units.*
- `static OS_time_t OS_TimeFromTotalMicroseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of microseconds.*
- `static int64 OS_TimeGetTotalNanoseconds (OS_time_t tm)`  
*Get interval from an `OS_time_t` object normalized to nanosecond units.*
- `static OS_time_t OS_TimeFromTotalNanoseconds (int64 tm)`  
*Get an `OS_time_t` interval object from a integer number of nanoseconds.*
- `static int64 OS_TimeGetFractionalPart (OS_time_t tm)`  
*Get subseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetSubsecondsPart (OS_time_t tm)`  
*Get 32-bit normalized subseconds (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetMillisecondsPart (OS_time_t tm)`  
*Get milliseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetMicrosecondsPart (OS_time_t tm)`  
*Get microseconds portion (fractional part only) from an `OS_time_t` object.*
- `static uint32 OS_TimeGetNanosecondsPart (OS_time_t tm)`  
*Get nanoseconds portion (fractional part only) from an `OS_time_t` object.*
- `static OS_time_t OS_TimeAssembleFromNanoseconds (int64 seconds, uint32 nanoseconds)`  
*Assemble/Convert a number of seconds + nanoseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromMicroseconds (int64 seconds, uint32 microseconds)`  
*Assemble/Convert a number of seconds + microseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromMilliseconds (int64 seconds, uint32 milliseconds)`  
*Assemble/Convert a number of seconds + milliseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAssembleFromSubseconds (int64 seconds, uint32 subseconds)`  
*Assemble/Convert a number of seconds + subseconds into an `OS_time_t` interval.*
- `static OS_time_t OS_TimeAdd (OS_time_t time1, OS_time_t time2)`  
*Computes the sum of two time intervals.*
- `static OS_time_t OS_TimeSubtract (OS_time_t time1, OS_time_t time2)`  
*Computes the difference between two time intervals.*

### 12.148.1 Detailed Description

Declarations and prototypes for osapi-clock module

## 12.148.2 Enumeration Type Documentation

### 12.148.2.1 anonymous enum anonymous enum

Multipliers/divisors to convert ticks into standardized units.

Various fixed conversion factor constants used by the conversion routines

A 100ns tick time allows max intervals of about +/- 14000 years in a 64-bit signed integer value.

#### Note

Applications should not directly use these values, but rather use conversion routines below to obtain standardized units (seconds/microseconds/etc).

#### Enumerator

OS_TIME_TICK_RESOLUTION_NS	
OS_TIME_TICKS_PER_SECOND	
OS_TIME_TICKS_PER_MSEC	
OS_TIME_TICKS_PER_USEC	

Definition at line 61 of file osapi-clock.h.

## 12.149 osal/src/os/inc/osapi-common.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Typedefs

- `typedef int32(* OS_EventHandler_t) (OS_Event_t event, osal_id_t object_id, void *data)`  
*A callback routine for event handling.*

### Enumerations

- `enum OS_Event_t {`  
 `OS_EVENT_RESERVED = 0, OS_EVENT_RESOURCE_ALLOCATED, OS_EVENT_RESOURCE_CREATED,`  
 `OS_EVENT_RESOURCE_DELETED,`  
 `OS_EVENT_TASK_STARTUP, OS_EVENT_MAX }`

*A set of events that can be used with BSP event callback routines.*

### Functions

- `void OS_Application_Startup (void)`  
*Application startup.*
- `void OS_Application_Run (void)`  
*Application run.*
- `int32 OS_API_Init (void)`  
*Initialization of API.*
- `void OS_API_Teardown (void)`  
*Teardown/de-initialization of OSAL API.*

- void [OS\\_IdleLoop](#) (void)  
*Background thread implementation - waits forever for events to occur.*
- void [OS\\_DeleteAllObjects](#) (void)  
*delete all resources created in OSAL.*
- void [OS\\_ApplicationShutdown](#) (uint8 flag)  
*Initiate orderly shutdown.*
- void [OS\\_ApplicationExit](#) (int32 Status)  
*Exit/Abort the application.*
- int32 [OS\\_RegisterEventHandler](#) (OS\_EventHandler\_t handler)  
*Callback routine registration.*

### 12.149.1 Detailed Description

Declarations and prototypes for general OSAL functions that are not part of a subsystem

### 12.149.2 Typedef Documentation

**12.149.2.1 OS\_EventHandler\_t** `typedef int32(* OS_EventHandler_t) (OS_Event_t event, osal_id_t object_id, void *data)`  
A callback routine for event handling.

#### Parameters

in	<i>event</i>	The event that occurred
in	<i>object_id</i>	The associated object_id, or 0 if not associated with an object
in, out	<i>data</i>	An abstract data/context object associated with the event, or NULL.

#### Returns

status Execution status, see [OSAL Return Code Defines](#).

Definition at line 98 of file osapi-common.h.

### 12.149.3 Enumeration Type Documentation

**12.149.3.1 OS\_Event\_t** `enum OS_Event_t`

A set of events that can be used with BSP event callback routines.

#### Enumerator

<code>OS_EVENT_RESERVED</code>	no-op/reserved event id value
<code>OS_EVENT_RESOURCE_ALLOCATED</code>	resource/id has been newly allocated but not yet created. This event is invoked from WITHIN the locked region, in the context of the task which is allocating the resource. If the handler returns non-success, the error will be returned to the caller and the creation process is aborted.

**Enumerator**

OS_EVENT_RESOURCE_CREATED	resource/id has been fully created/finalized. Invoked outside locked region, in the context of the task which created the resource. Data object is not used, passed as NULL. Return value is ignored - this is for information purposes only.
OS_EVENT_RESOURCE_DELETED	resource/id has been deleted. Invoked outside locked region, in the context of the task which deleted the resource. Data object is not used, passed as NULL. Return value is ignored - this is for information purposes only.
OS_EVENT_TASK_STARTUP	New task is starting. Invoked outside locked region, in the context of the task which is currently starting, before the entry point is called. Data object is not used, passed as NULL. If the handler returns non-success, task startup is aborted and the entry point is not called.
OS_EVENT_MAX	placeholder for end of enum, not used

Definition at line 34 of file osapi-common.h.

## 12.150 osal/src/os/inc/osapi-condvar.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
#include "osapi-clock.h"
```

### Data Structures

- struct **OS\_condvar\_prop\_t**  
*OSAL condition variable properties.*

### Functions

- int32 **OS\_CondVarCreate** (osal\_id\_t \*var\_id, const char \*var\_name, uint32 options)  
*Creates a condition variable resource.*
- int32 **OS\_CondVarLock** (osal\_id\_t var\_id)  
*Locks/Acquires the underlying mutex associated with a condition variable.*
- int32 **OS\_CondVarUnlock** (osal\_id\_t var\_id)  
*Unlocks/Releases the underlying mutex associated with a condition variable.*
- int32 **OS\_CondVarSignal** (osal\_id\_t var\_id)  
*Signals the condition variable resource referenced by var\_id.*
- int32 **OS\_CondVarBroadcast** (osal\_id\_t var\_id)  
*Broadcasts the condition variable resource referenced by var\_id.*
- int32 **OS\_CondVarWait** (osal\_id\_t var\_id)  
*Waits on the condition variable object referenced by var\_id.*
- int32 **OS\_CondVarTimedWait** (osal\_id\_t var\_id, const **OS\_time\_t** \*abs\_wakeup\_time)  
*Time-limited wait on the condition variable object referenced by var\_id.*
- int32 **OS\_CondVarDelete** (osal\_id\_t var\_id)

*Deletes the specified condition variable.*

- `int32 OS_CondVarGetIdByName (osal_id_t *var_id, const char *var_name)`  
*Find an existing condition variable ID by name.*
- `int32 OS_CondVarGetInfo (osal_id_t var_id, OS_condvar_prop_t *condvar_prop)`  
*Fill a property object buffer with details regarding the resource.*

### 12.150.1 Detailed Description

Declarations and prototypes for condition variables

## 12.151 osal/src/os/inc/osapi-constants.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Macros

- `#define OS_PEND (-1)`
- `#define OS_CHECK (0)`
- `#define OS_OBJECT_ID_UNDEFINED ((osal_id_t){0})`  
*Initializer for the osal\_id\_t type which will not match any valid value.*
- `#define OS_OBJECT_CREATOR_ANY OS_OBJECT_ID_UNDEFINED`  
*Constant that may be passed to `OS_ForEachObject()`/`OS_ForEachObjectType()` to match any creator (i.e. get all objects)*
- `#define OS_MAX_LOCAL_PATH_LEN (OS_MAX_PATH_LEN + OS_FS_PHYS_NAME_LEN)`  
*Maximum length of a local/native path name string.*

### 12.151.1 Detailed Description

General constants for OSAL that are shared across subsystems

### 12.151.2 Macro Definition Documentation

#### 12.151.2.1 OS\_CHECK `#define OS_CHECK (0)`

Definition at line 35 of file osapi-constants.h.

#### 12.151.2.2 OS\_MAX\_LOCAL\_PATH\_LEN `#define OS_MAX_LOCAL_PATH_LEN (OS_MAX_PATH_LEN + OS_FS_PHYS_NAME_LEN)`

Maximum length of a local/native path name string.

This is a concatenation of the OSAL virtual path with the system mount point or device name

Definition at line 54 of file osapi-constants.h.

#### 12.151.2.3 OS\_OBJECT\_CREATOR\_ANY `#define OS_OBJECT_CREATOR_ANY OS_OBJECT_ID_UNDEFINED`

Constant that may be passed to `OS_ForEachObject()`/`OS_ForEachObjectType()` to match any creator (i.e. get all objects)

Definition at line 46 of file osapi-constants.h.

**12.151.2.4 OS\_OBJECT\_ID\_UNDEFINED** #define OS\_OBJECT\_ID\_UNDEFINED ((osal\_id\_t) {0})  
Initializer for the osal\_id\_t type which will not match any valid value.  
Definition at line 40 of file osapi-constants.h.

**12.151.2.5 OS\_PEND** #define OS\_PEND (-1)  
Definition at line 34 of file osapi-constants.h.

## 12.152 osal/src/os/inc/osapi-countsem.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct [OS\\_count\\_sem\\_prop\\_t](#)  
*OSAL counting semaphore properties.*

### Functions

- [int32 OS\\_CountSemCreate \(osal\\_id\\_t \\*sem\\_id, const char \\*sem\\_name, uint32 sem\\_initial\\_value, uint32 options\)](#)  
*Creates a counting semaphore.*
- [int32 OS\\_CountSemGive \(osal\\_id\\_t sem\\_id\)](#)  
*Increment the semaphore value.*
- [int32 OS\\_CountSemTake \(osal\\_id\\_t sem\\_id\)](#)  
*Decrement the semaphore value.*
- [int32 OS\\_CountSemTimedWait \(osal\\_id\\_t sem\\_id, uint32 msecs\)](#)  
*Decrement the semaphore value with timeout.*
- [int32 OS\\_CountSemDelete \(osal\\_id\\_t sem\\_id\)](#)  
*Deletes the specified counting Semaphore.*
- [int32 OS\\_CountSemGetIdByName \(osal\\_id\\_t \\*sem\\_id, const char \\*sem\\_name\)](#)  
*Find an existing semaphore ID by name.*
- [int32 OS\\_CountSemGetInfo \(osal\\_id\\_t sem\\_id, OS\\_count\\_sem\\_prop\\_t \\*count\\_prop\)](#)  
*Fill a property object buffer with details regarding the resource.*

### 12.152.1 Detailed Description

Declarations and prototypes for counting semaphores

## 12.153 osal/src/os/inc/osapi-dir.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct [os\\_dirent\\_t](#)  
*Directory entry.*

## Macros

- `#define OS_DIRENTRY_NAME(x) ((x).FileName)`  
*Access filename part of the dirent structure.*

## Functions

- `int32 OS_DirectoryOpen (osal_id_t *dir_id, const char *path)`  
*Opens a directory.*
- `int32 OS_DirectoryClose (osal_id_t dir_id)`  
*Closes an open directory.*
- `int32 OS_DirectoryRewind (osal_id_t dir_id)`  
*Rewinds an open directory.*
- `int32 OS_DirectoryRead (osal_id_t dir_id, os_dirent_t *dirent)`  
*Reads the next name in the directory.*
- `int32 OS_mkdir (const char *path, uint32 access)`  
*Makes a new directory.*
- `int32 OS_rmdir (const char *path)`  
*Removes a directory from the file system.*

### 12.153.1 Detailed Description

Declarations and prototypes for directories

### 12.153.2 Macro Definition Documentation

#### 12.153.2.1 OS\_DIRENTRY\_NAME `#define OS_DIRENTRY_NAME (` `x ) ((x).FileName)`

Access filename part of the dirent structure.

Definition at line 38 of file osapi-dir.h.

## 12.154 osal/src/os/inc/osapi-error.h File Reference

```
#include "common_types.h"
```

## Macros

- `#define OS_ERROR_NAME_LENGTH 35`  
*Error string name length.*
- `#define OS_STATUS_STRING_LENGTH 12`  
*Status converted to string length limit.*
- `#define OS_SUCCESS (0)`  
*Successful execution.*
- `#define OS_ERROR (-1)`  
*Failed execution.*
- `#define OS_INVALID_POINTER (-2)`  
*Invalid pointer.*
- `#define OS_ERROR_ADDRESS_MISALIGNED (-3)`

- `#define OS_ERROR_TIMEOUT (-4)`  
*Error timeout.*
- `#define OS_INVALID_INT_NUM (-5)`  
*Invalid Interrupt number.*
- `#define OS_SEM_FAILURE (-6)`  
*Semaphore failure.*
- `#define OS_SEM_TIMEOUT (-7)`  
*Semaphore timeout.*
- `#define OS_QUEUE_EMPTY (-8)`  
*Queue empty.*
- `#define OS_QUEUE_FULL (-9)`  
*Queue full.*
- `#define OS_QUEUE_TIMEOUT (-10)`  
*Queue timeout.*
- `#define OS_QUEUE_INVALID_SIZE (-11)`  
*Queue invalid size.*
- `#define OS_QUEUE_ID_ERROR (-12)`  
*Queue ID error.*
- `#define OS_ERR_NAME_TOO_LONG (-13)`  
*name length including null terminator greater than `OS_MAX_API_NAME`*
- `#define OS_ERR_NO_FREE_IDS (-14)`  
*No free IDs.*
- `#define OS_ERR_NAME_TAKEN (-15)`  
*Name taken.*
- `#define OS_ERR_INVALID_ID (-16)`  
*Invalid ID.*
- `#define OS_ERR_NAME_NOT_FOUND (-17)`  
*Name not found.*
- `#define OS_ERR_SEM_NOT_FULL (-18)`  
*Semaphore not full.*
- `#define OS_ERR_INVALID_PRIORITY (-19)`  
*Invalid priority.*
- `#define OS_INVALID_SEM_VALUE (-20)`  
*Invalid semaphore value.*
- `#define OS_ERR_FILE (-27)`  
*File error.*
- `#define OS_ERR_NOT_IMPLEMENTED (-28)`  
*Not implemented.*
- `#define OS_TIMER_ERR_INVALID_ARGS (-29)`  
*Timer invalid arguments.*
- `#define OS_TIMER_ERR_TIMER_ID (-30)`  
*Timer ID error.*
- `#define OS_TIMER_ERR_UNAVAILABLE (-31)`  
*Timer unavailable.*
- `#define OS_TIMER_ERR_INTERNAL (-32)`  
*Timer internal error.*

- #define `OS_ERR_OBJECT_IN_USE` (-33)  
*Object in use.*
- #define `OS_ERR_BAD_ADDRESS` (-34)  
*Bad address.*
- #define `OS_ERR_INCORRECT_OBJ_STATE` (-35)  
*Incorrect object state.*
- #define `OS_ERR_INCORRECT_OBJ_TYPE` (-36)  
*Incorrect object type.*
- #define `OS_ERR_STREAM_DISCONNECTED` (-37)  
*Stream disconnected.*
- #define `OS_ERR_OPERATION_NOT_SUPPORTED` (-38)  
*Requested operation not support on supplied object(s)*
- #define `OS_ERR_INVALID_SIZE` (-40)  
*Invalid Size.*
- #define `OS_ERR_OUTPUT_TOO_LARGE` (-41)  
*Size of output exceeds limit*
- #define `OS_ERR_INVALID_ARGUMENT` (-42)  
*Invalid argument value (other than ID or size)*
- #define `OS_FS_ERR_PATH_TOO_LONG` (-103)  
*FS path too long.*
- #define `OS_FS_ERR_NAME_TOO_LONG` (-104)  
*FS name too long.*
- #define `OS_FS_ERR_DRIVE_NOT_CREATED` (-106)  
*FS drive not created.*
- #define `OS_FS_ERR_DEVICE_NOT_FREE` (-107)  
*FS device not free.*
- #define `OS_FS_ERR_PATH_INVALID` (-108)  
*FS path invalid.*

## Typedefs

- typedef char `os_err_name_t`[`OS_ERROR_NAME_LENGTH`]  
*For the `OS_GetErrorName()` function, to ensure everyone is making an array of the same length.*
- typedef char `os_status_string_t`[`OS_STATUS_STRING_LENGTH`]  
*For the `OS_StatusToString()` function, to ensure everyone is making an array of the same length.*

## Functions

- static long `OS_StatusToInteger` (`osal_status_t` Status)  
*Convert a status code to a native "long" type.*
- int32 `OS_GetErrorName` (int32 error\_num, `os_err_name_t` \*err\_name)  
*Convert an error number to a string.*
- char \* `OS_StatusToString` (`osal_status_t` status, `os_status_string_t` \*status\_string)  
*Convert status to a string.*

### 12.154.1 Detailed Description

OSAL error code definitions

## 12.154.2 Macro Definition Documentation

### 12.154.2.1 OS\_ERROR\_NAME\_LENGTH `#define OS_ERROR_NAME_LENGTH 35`

Error string name length.

The sizes of strings in OSAL functions are built with this limit in mind. Always check the uses of os\_err\_name\_t when changing this value.

Definition at line 35 of file osapi-error.h.

### 12.154.2.2 OS\_STATUS\_STRING\_LENGTH `#define OS_STATUS_STRING_LENGTH 12`

Status converted to string length limit.

Used for sizing os\_status\_string\_t intended for use in printing osal\_status\_t values Sized to fit LONG\_MIN including NULL termination

Definition at line 55 of file osapi-error.h.

## 12.154.3 Typedef Documentation

### 12.154.3.1 os\_err\_name\_t `typedef char os_err_name_t[OS_ERROR_NAME_LENGTH]`

For the [OS\\_GetErrorName\(\)](#) function, to ensure everyone is making an array of the same length.

Implementation note for developers:

The sizes of strings in OSAL functions are built with this [OS\\_ERROR\\_NAME\\_LENGTH](#) limit in mind. Always check the uses of os\_err\_name\_t when changing this value.

Definition at line 47 of file osapi-error.h.

### 12.154.3.2 os\_status\_string\_t `typedef char os_status_string_t[OS_STATUS_STRING_LENGTH]`

For the [OS\\_StatusToString\(\)](#) function, to ensure everyone is making an array of the same length.

Definition at line 61 of file osapi-error.h.

## 12.155 osal/src/os/inc/osapi-file.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
#include "osapi-clock.h"
```

### Data Structures

- struct [OS\\_file\\_prop\\_t](#)

*OSAL file properties.*

- struct [os\\_fstat\\_t](#)

*File system status.*

### Macros

- `#define OS_READ_ONLY 0`
- `#define OS_WRITE_ONLY 1`
- `#define OS_READ_WRITE 2`
- `#define OS_SEEK_SET 0`

- #define OS\_SEEK\_CUR 1
- #define OS\_SEEK\_END 2
- #define OS\_FILESTAT\_MODE(x) ((x). FileModeBits)
 

*Access file stat mode bits.*
- #define OS\_FILESTAT\_ISDIR(x) ((x). FileModeBits & OS\_FILESTAT\_MODE\_DIR)
 

*File stat is directory logical.*
- #define OS\_FILESTAT\_EXEC(x) ((x). FileModeBits & OS\_FILESTAT\_MODE\_EXEC)
 

*File stat is executable logical.*
- #define OS\_FILESTAT\_WRITE(x) ((x). FileModeBits & OS\_FILESTAT\_MODE\_WRITE)
 

*File stat is write enabled logical.*
- #define OS\_FILESTAT\_READ(x) ((x). FileModeBits & OS\_FILESTAT\_MODE\_READ)
 

*File stat is read enabled logical.*
- #define OS\_FILESTAT\_SIZE(x) ((x).FileSize)
 

*Access file stat size field.*
- #define OS\_FILESTAT\_TIME(x) (OS\_TimeGetTotalSeconds((x).FileTime))
 

*Access file stat time field as a whole number of seconds.*

## Enumerations

- enum { OS\_FILESTAT\_MODE\_EXEC = 0x00001, OS\_FILESTAT\_MODE\_WRITE = 0x00002, OS\_FILESTAT\_MODE\_READ = 0x00004, OS\_FILESTAT\_MODE\_DIR = 0x10000 }
 

*File stat mode bits.*
- enum OS\_file\_flag\_t { OS\_FILE\_FLAG\_NONE = 0x00, OS\_FILE\_FLAG\_CREATE = 0x01, OS\_FILE\_FLAG\_TRUNCATE = 0x02 }
 

*Flags that can be used with opening of a file (bitmask)*

## Functions

- int32 OS\_OpenCreate (osal\_id\_t \*filedes, const char \*path, int32 flags, int32 access\_mode)
 

*Open or create a file.*
- int32 OS\_close (osal\_id\_t filedes)
 

*Closes an open file handle.*
- int32 OS\_read (osal\_id\_t filedes, void \*buffer, size\_t nbytes)
 

*Read from a file handle.*
- int32 OS\_write (osal\_id\_t filedes, const void \*buffer, size\_t nbytes)
 

*Write to a file handle.*
- int32 OS\_TimedRead (osal\_id\_t filedes, void \*buffer, size\_t nbytes, int32 timeout)
 

*File/Stream input read with a timeout.*
- int32 OS\_TimedWrite (osal\_id\_t filedes, const void \*buffer, size\_t nbytes, int32 timeout)
 

*File/Stream output write with a timeout.*
- int32 OS\_chmod (const char \*path, uint32 access\_mode)
 

*Changes the permissions of a file.*
- int32 OS\_stat (const char \*path, os\_fstat\_t \*filestats)
 

*Obtain information about a file or directory.*
- int32 OS\_lseek (osal\_id\_t filedes, int32 offset, uint32 whence)
 

*Seeks to the specified position of an open file.*
- int32 OS\_remove (const char \*path)
 

*Removes a file from the file system.*
- int32 OS\_rename (const char \*old\_filename, const char \*new\_filename)

*Renames a file.*

- `int32 OS_cp (const char *src, const char *dest)`  
*Copies a single file from src to dest.*
- `int32 OS_mv (const char *src, const char *dest)`  
*Move a single file from src to dest.*
- `int32 OS_FDGetInfo (osal_id_t filedes, OS_file_prop_t *fd_prop)`  
*Obtain information about an open file.*
- `int32 OS_FileOpenCheck (const char *Filename)`  
*Checks to see if a file is open.*
- `int32 OS_CloseAllFiles (void)`  
*Close all open files.*
- `int32 OS_CloseFileByName (const char *Filename)`  
*Close a file by filename.*

### 12.155.1 Detailed Description

Declarations and prototypes for file objects

### 12.155.2 Macro Definition Documentation

**12.155.2.1 OS\_FILESTAT\_EXEC** `#define OS_FILESTAT_EXEC (`  
  `x ) ((x). FileModeBits & OS_FILESTAT_MODE_EXEC)`

File stat is executable logical.

Definition at line 92 of file osapi-file.h.

**12.155.2.2 OS\_FILESTAT\_ISDIR** `#define OS_FILESTAT_ISDIR (`  
  `x ) ((x). FileModeBits & OS_FILESTAT_MODE_DIR)`

File stat is directory logical.

Definition at line 90 of file osapi-file.h.

**12.155.2.3 OS\_FILESTAT\_MODE** `#define OS_FILESTAT_MODE (`  
  `x ) ((x). FileModeBits)`

Access file stat mode bits.

Definition at line 88 of file osapi-file.h.

**12.155.2.4 OS\_FILESTAT\_READ** `#define OS_FILESTAT_READ (`  
  `x ) ((x). FileModeBits & OS_FILESTAT_MODE_READ)`

File stat is read enabled logical.

Definition at line 96 of file osapi-file.h.

**12.155.2.5 OS\_FILESTAT\_SIZE** `#define OS_FILESTAT_SIZE (`  
  `x ) ((x).FileSize)`

Access file stat size field.

Definition at line 98 of file osapi-file.h.

```
12.155.2.6 OS_FILESTAT_TIME #define OS_FILESTAT_TIME (x) (OS_TimeGetTotalSeconds((x).FileTime))
```

Access file stat time field as a whole number of seconds.

Definition at line 100 of file osapi-file.h.

```
12.155.2.7 OS_FILESTAT_WRITE #define OS_FILESTAT_WRITE ((x). FileModeBits & OS_FILESTAT_MODE_WRITE)
```

File stat is write enabled logical.

Definition at line 94 of file osapi-file.h.

### 12.155.3 Enumeration Type Documentation

**12.155.3.1 anonymous enum** anonymous enum

File stat mode bits.

We must also define replacements for the stat structure's mode bits. This is currently just a small subset since the OSAL just presents a very simplified view of the filesystem to the upper layers. And since not all OS'es are POSIX, the more POSIX-specific bits are not relevant anyway.

Enumerator

OS_FILESTAT_MODE_EXEC	
OS_FILESTAT_MODE_WRITE	
OS_FILESTAT_MODE_READ	
OS_FILESTAT_MODE_DIR	

Definition at line 79 of file osapi-file.h.

**12.155.3.2 OS\_file\_flag\_t** enum OS\_file\_flag\_t

Flags that can be used with opening of a file (bitmask)

Enumerator

OS_FILE_FLAG_NONE	
OS_FILE_FLAG_CREATE	
OS_FILE_FLAG_TRUNCATE	

Definition at line 105 of file osapi-file.h.

## 12.156 osal/src/os/inc/osapi-filesystem.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct [os\\_fsinfo\\_t](#)

*OSAL file system info.*

- struct [OS\\_statvfs\\_t](#)

## Macros

- `#define OS_CHK_ONLY 0`
- `#define OS_REPAIR 1`

## Functions

- `int32 OS_FileSysAddFixedMap (osal_id_t *filesys_id, const char *phys_path, const char *virt_path)`  
*Create a fixed mapping between an existing directory and a virtual OSAL mount point.*
- `int32 OS_mkfs (char *address, const char *devname, const char *volname, size_t blocksize, osal_blockcount_t numblocks)`  
*Makes a file system on the target.*
- `int32 OS_mount (const char *devname, const char *mountpoint)`  
*Mounts a file system.*
- `int32 OS_initfs (char *address, const char *devname, const char *volname, size_t blocksize, osal_blockcount_t numblocks)`  
*Initializes an existing file system.*
- `int32 OS_rmfs (const char *devname)`  
*Removes a file system.*
- `int32 OS_unmount (const char *mountpoint)`  
*Unmounts a mounted file system.*
- `int32 OS_FileSysStatVolume (const char *name, OS_statvfs_t *statbuf)`  
*Obtains information about size and free space in a volume.*
- `int32 OS_chkfs (const char *name, bool repair)`  
*Checks the health of a file system and repairs it if necessary.*
- `int32 OS_FS_GetPhysDriveName (char *PhysDriveName, const char *MountPoint)`  
*Obtains the physical drive name associated with a mount point.*
- `int32 OS_TranslatePath (const char *VirtualPath, char *LocalPath)`  
*Translates an OSAL Virtual file system path to a host Local path.*
- `int32 OS_GetFsInfo (os_fsinfo_t *filesys_info)`  
*Returns information about the file system.*

### 12.156.1 Detailed Description

Declarations and prototypes for file systems

### 12.156.2 Macro Definition Documentation

#### 12.156.2.1 OS\_CHK\_ONLY `#define OS_CHK_ONLY 0`

Unused, API takes bool

Definition at line 31 of file osapi-filesystems.h.

#### 12.156.2.2 OS\_REPAIR `#define OS_REPAIR 1`

Unused, API takes bool

Definition at line 32 of file osapi-filesystems.h.

## 12.157 osal/src/os/inc/osapi-heap.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct `OS_heap_prop_t`  
*OSAL heap properties.*

### Functions

- `int32 OS_HeapGetInfo (OS_heap_prop_t *heap_prop)`  
*Return current info on the heap.*

#### 12.157.1 Detailed Description

Declarations and prototypes for heap functions

## 12.158 osal/src/os/inc/osapi-idmap.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Macros

- `#define OS_OBJECT_INDEX_MASK 0xFFFF`  
*Object index mask.*
- `#define OS_OBJECT_TYPE_SHIFT 16`  
*Object type shift.*
- `#define OS_OBJECT_TYPE_UNDEFINED 0x00`  
*Object type undefined.*
- `#define OS_OBJECT_TYPE_OS_TASK 0x01`  
*Object task type.*
- `#define OS_OBJECT_TYPE_OS_QUEUE 0x02`  
*Object queue type.*
- `#define OS_OBJECT_TYPE_OS_COUNTSEM 0x03`  
*Object counting semaphore type.*
- `#define OS_OBJECT_TYPE_OS_BINSEM 0x04`  
*Object binary semaphore type.*
- `#define OS_OBJECT_TYPE_OS_MUTEX 0x05`  
*Object mutex type.*
- `#define OS_OBJECT_TYPE_OS_STREAM 0x06`  
*Object stream type.*
- `#define OS_OBJECT_TYPE_OS_DIR 0x07`  
*Object directory type.*
- `#define OS_OBJECT_TYPE_OS_TIMEBASE 0x08`  
*Object timebase type.*
- `#define OS_OBJECT_TYPE_OS_TIMECB 0x09`

*Object timer callback type.*

- #define OS\_OBJECT\_TYPE\_OS\_MODULE 0x0A  
*Object module type.*
- #define OS\_OBJECT\_TYPE\_OS\_FILESYS 0x0B  
*Object file system type.*
- #define OS\_OBJECT\_TYPE\_OS\_CONSOLE 0x0C  
*Object console type.*
- #define OS\_OBJECT\_TYPE\_OS\_CONDVAR 0x0D  
*Object condition variable type.*
- #define OS\_OBJECT\_TYPE\_USER 0x10  
*Object user type.*

## Functions

- static unsigned long OS\_ObjectIdToInteger (osal\_id\_t object\_id)  
*Obtain an integer value corresponding to an object ID.*
- static osal\_id\_t OS\_ObjectIdFromInteger (unsigned long value)  
*Obtain an osal ID corresponding to an integer value.*
- static bool OS\_ObjectIdEqual (osal\_id\_t object\_id1, osal\_id\_t object\_id2)  
*Check two OSAL object ID values for equality.*
- static bool OS\_ObjectIdDefined (osal\_id\_t object\_id)  
*Check if an object ID is defined.*
- int32 OS\_GetResourceName (osal\_id\_t object\_id, char \*buffer, size\_t buffer\_size)  
*Obtain the name of an object given an arbitrary object ID.*
- osal\_objtype\_t OS\_IdentifyObject (osal\_id\_t object\_id)  
*Obtain the type of an object given an arbitrary object ID.*
- int32 OS\_ConvertToArrayIndex (osal\_id\_t object\_id, osal\_index\_t \*ArrayIndex)  
*Converts an abstract ID into a number suitable for use as an array index.*
- int32 OS\_ObjectIdToArrayIndex (osal\_objtype\_t idtype, osal\_id\_t object\_id, osal\_index\_t \*ArrayIndex)  
*Converts an abstract ID into a number suitable for use as an array index.*
- void OS\_ForEachObject (osal\_id\_t creator\_id, OS\_ArgCallback\_t callback\_ptr, void \*callback\_arg)  
*call the supplied callback function for all valid object IDs*
- void OS\_ForEachObjectOfType (osal\_objtype\_t objtype, osal\_id\_t creator\_id, OS\_ArgCallback\_t callback\_ptr, void \*callback\_arg)  
*call the supplied callback function for valid object IDs of a specific type*

### 12.158.1 Detailed Description

Declarations and prototypes for object IDs

### 12.158.2 Macro Definition Documentation

#### 12.158.2.1 OS\_OBJECT\_INDEX\_MASK #define OS\_OBJECT\_INDEX\_MASK 0xFFFF

Object index mask.

Definition at line 32 of file osapi-idmap.h.

**12.158.2.2 OS\_OBJECT\_TYPE\_SHIFT** #define OS\_OBJECT\_TYPE\_SHIFT 16  
Object type shift.  
Definition at line 33 of file osapi-idmap.h.

## 12.159 osal/src/os/inc/osapi-macros.h File Reference

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "osconfig.h"
#include "common_types.h"
#include "osapi-printf.h"
```

### Macros

- #define **BUGREPORT**(...) OS\_printf(\_\_VA\_ARGS\_\_)
- #define **BUGCHECK**(cond, errcode)
  - Basic Bug-Checking macro.*
- #define **ARGCHECK**(cond, errcode)
  - Generic argument checking macro for non-critical values.*
- #define **LENGTHCHECK**(str, len, errcode) **ARGCHECK**(memchr(str, '\0', len), errcode)
  - String length limit check macro.*
- #define **BUGCHECK\_VOID**(cond) **BUGCHECK**(cond, )
  - Bug-Check macro for void functions.*

### 12.159.1 Detailed Description

Macro definitions that are used across all OSAL subsystems

### 12.159.2 Macro Definition Documentation

**12.159.2.1 ARGCHECK** #define ARGCHECK(  
  cond,  
  errcode )

**Value:**

```
if (! (cond)) \
{ \
    return errcode; \
}
```

Generic argument checking macro for non-critical values.

This macro checks a conditional that is expected to be true, and return a value if it evaluates false.

ARGCHECK can be used to check for out of range or other invalid argument conditions which may (validly) occur at runtime and do not necessarily indicate bugs in the application.

These argument checks are NOT considered fatal errors. The application continues to run normally. This does not report the error on the console.

As such, ARGCHECK actions are always compiled in - not selectable at compile-time.

**See also**

[BUGCHECK](#) for checking critical values that indicate bugs

Definition at line 131 of file osapi-macros.h.

```
12.159.2.2 BUGCHECK #define BUGCHECK(  
    cond,  
    errcode )
```

**Value:**

```
if (! (cond))  
{  
    BUGREPORT("\n**BUG** %s():%d:check \'%s\' FAILED --> %s\n\n", __func__, __LINE__, #cond, #errcode); \  
    return errcode;  
}
```

Basic Bug-Checking macro.

This macro checks a conditional, and if it is FALSE, then it generates a report - which may in turn contain additional actions.

BUGCHECK should only be used for conditions which are critical and must always be true. If such a condition is ever false then it indicates a bug in the application which must be resolved. It may or may not be possible to continue operation if a bugcheck fails.

**See also**

[ARGCHECK](#) for checking non-critical values

Definition at line 105 of file osapi-macros.h.

```
12.159.2.3 BUGCHECK_VOID #define BUGCHECK_VOID(  
    cond ) BUGCHECK(cond, )
```

Bug-Check macro for void functions.

The basic BUGCHECK macro returns a value, which needs to be empty for functions that do not have a return value. In this case the second argument (errcode) is intentionally left blank.

Definition at line 155 of file osapi-macros.h.

```
12.159.2.4 BUGREPORT #define BUGREPORT(  
    ... ) OS_printf(__VA_ARGS__)
```

Definition at line 88 of file osapi-macros.h.

```
12.159.2.5 LENGTHCHECK #define LENGTHCHECK(  
    str,  
    len,  
    errcode ) ARGCHECK(memchr(str, '\0', len), errcode)
```

String length limit check macro.

This macro is a specialized version of ARGCHECK that confirms a string will fit into a buffer of the specified length, and return an error code if it will not.

**Note**

this uses ARGCHECK, thus treating a string too long as a normal runtime (i.e. non-bug) error condition with a typical error return to the caller.

Definition at line 146 of file osapi-macros.h.

## 12.160 osal/src/os/inc/osapi-module.h File Reference

```
#include "osconfig.h"  
#include "common_types.h"
```

## Data Structures

- struct [OS\\_module\\_address\\_t](#)  
*OSAL module address properties.*
- struct [OS\\_module\\_prop\\_t](#)  
*OSAL module properties.*
- struct [OS\\_static\\_symbol\\_record\\_t](#)  
*Associates a single symbol name with a memory address.*

## Macros

- #define [OS\\_MODULE\\_FLAG\\_GLOBAL\\_SYMBOLS](#) 0x00  
*Requests [OS\\_ModuleLoad\(\)](#) to add the symbols to the global symbol table.*
- #define [OS\\_MODULE\\_FLAG\\_LOCAL\\_SYMBOLS](#) 0x01  
*Requests [OS\\_ModuleLoad\(\)](#) to keep the symbols local/private to this module.*

## Functions

- [int32 OS\\_SymbolLookup \(cpuaddr \\*symbol\\_address, const char \\*symbol\\_name\)](#)  
*Find the Address of a Symbol.*
- [int32 OS\\_ModuleSymbolLookup \(osal\\_id\\_t module\\_id, cpuaddr \\*symbol\\_address, const char \\*symbol\\_name\)](#)  
*Find the Address of a Symbol within a module.*
- [int32 OS\\_SymbolTableDump \(const char \\*filename, size\\_t size\\_limit\)](#)  
*Dumps the system symbol table to a file.*
- [int32 OS\\_ModuleLoad \(osal\\_id\\_t \\*module\\_id, const char \\*module\\_name, const char \\*filename, uint32 flags\)](#)  
*Loads an object file.*
- [int32 OS\\_ModuleUnload \(osal\\_id\\_t module\\_id\)](#)  
*Unloads the module file.*
- [int32 OS\\_ModuleInfo \(osal\\_id\\_t module\\_id, OS\\_module\\_prop\\_t \\*module\\_info\)](#)  
*Obtain information about a module.*

### 12.160.1 Detailed Description

Declarations and prototypes for module subsystem

### 12.160.2 Macro Definition Documentation

#### 12.160.2.1 OS\_MODULE\_FLAG\_GLOBAL\_SYMBOLS `#define OS_MODULE_FLAG_GLOBAL_SYMBOLS 0x00`

Requests [OS\\_ModuleLoad\(\)](#) to add the symbols to the global symbol table.

When supplied as the "flags" argument to [OS\\_ModuleLoad\(\)](#), this indicates that the symbols in the loaded module should be added to the global symbol table. This will make symbols in this library available for use when resolving symbols in future module loads.

This is the default mode of operation for [OS\\_ModuleLoad\(\)](#).

#### Note

On some operating systems, use of this option may make it difficult to unload the module in the future, if the symbols are in use by other entities.

Definition at line 49 of file osapi-module.h.

**12.160.2.2 OS\_MODULE\_FLAG\_LOCAL\_SYMBOLS** #define OS\_MODULE\_FLAG\_LOCAL\_SYMBOLS 0x01

Requests [OS\\_ModuleLoad\(\)](#) to keep the symbols local/private to this module.

When supplied as the "flags" argument to [OS\\_ModuleLoad\(\)](#), this indicates that the symbols in the loaded module should NOT be added to the global symbol table. This means the symbols in the loaded library will not be available for use by other modules.

Use this option is recommended for cases where no other entities will need to reference symbols within this module. This helps ensure that the module can be more safely unloaded in the future, by preventing other modules from binding to it. It also helps reduce the likelihood of symbol name conflicts among modules.

**Note**

To look up symbols within a module loaded with this flag, use [OS\\_SymbolLookupInModule\(\)](#) instead of [OS\\_SymbolLookup\(\)](#). Also note that references obtained using this method are not tracked by the OS; the application must ensure that all references obtained in this manner have been cleaned up/released before unloading the module.

Definition at line 71 of file osapi-module.h.

**12.161 osal/src/os/inc/osapi-mutex.h File Reference**

```
#include "osconfig.h"
#include "common_types.h"
```

**Data Structures**

- struct [OS\\_mut\\_sem\\_prop\\_t](#)

*OSAL mutex properties.*

**Functions**

- int32 [OS\\_MutSemCreate](#) (osal\_id\_t \*sem\_id, const char \*sem\_name, uint32 options)  
*Creates a mutex semaphore.*
- int32 [OS\\_MutSemGive](#) (osal\_id\_t sem\_id)  
*Releases the mutex object referenced by sem\_id.*
- int32 [OS\\_MutSemTake](#) (osal\_id\_t sem\_id)  
*Acquire the mutex object referenced by sem\_id.*
- int32 [OS\\_MutSemDelete](#) (osal\_id\_t sem\_id)  
*Deletes the specified Mutex Semaphore.*
- int32 [OS\\_MutSemGetIdByName](#) (osal\_id\_t \*sem\_id, const char \*sem\_name)  
*Find an existing mutex ID by name.*
- int32 [OS\\_MutSemGetInfo](#) (osal\_id\_t sem\_id, [OS\\_mut\\_sem\\_prop\\_t](#) \*mut\_prop)  
*Fill a property object buffer with details regarding the resource.*

**12.161.1 Detailed Description**

Declarations and prototypes for mutexes

**12.162 osal/src/os/inc/osapi-network.h File Reference**

```
#include "osconfig.h"
#include "common_types.h"
```

## Functions

- `int32 OS_NetworkGetID (void)`  
*Gets the network ID of the local machine.*
- `int32 OS_NetworkGetHostName (char *host_name, size_t name_len)`  
*Gets the local machine network host name.*

### 12.162.1 Detailed Description

Declarations and prototypes for network subsystem

## 12.163 osal/src/os/inc/osapi-printf.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

## Functions

- `void OS_printf (const char *string,...) OS_PRINTF(1)`  
*Abstraction for the system printf() call.*
- `void void OS_printf_disable (void)`  
*This function disables the output from OS\_printf.*
- `void OS_printf_enable (void)`  
*This function enables the output from OS\_printf.*

### 12.163.1 Detailed Description

Declarations and prototypes for printf/console output

## 12.164 osal/src/os/inc/osapi-queue.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

## Data Structures

- `struct OS_queue_prop_t`  
*OSAL queue properties.*

## Functions

- `int32 OS_QueueCreate (osal_id_t *queue_id, const char *queue_name, osal_blockcount_t queue_depth, size_t data_size, uint32 flags)`  
*Create a message queue.*
- `int32 OS_QueueDelete (osal_id_t queue_id)`  
*Deletes the specified message queue.*
- `int32 OS_QueueGet (osal_id_t queue_id, void *data, size_t size, size_t *size_copied, int32 timeout)`  
*Receive a message on a message queue.*
- `int32 OS_QueuePut (osal_id_t queue_id, const void *data, size_t size, uint32 flags)`  
*Put a message on a message queue.*

- `int32 OS_QueueGetIdByName (osal_id_t *queue_id, const char *queue_name)`  
*Find an existing queue ID by name.*
- `int32 OS_QueueGetInfo (osal_id_t queue_id, OS_queue_prop_t *queue_prop)`  
*Fill a property object buffer with details regarding the resource.*

#### 12.164.1 Detailed Description

Declarations and prototypes for queue subsystem

### 12.165 osal/src/os/inc/osapi-select.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

#### Data Structures

- struct `OS_FdSet`  
*An abstract structure capable of holding several OSAL IDs.*

#### Enumerations

- enum `OS_StreamState_t` {  
  `OS_STREAM_STATE_BOUND` = 0x01, `OS_STREAM_STATE_CONNECTED` = 0x02, `OS_STREAM_STATE_READABLE` = 0x04, `OS_STREAM_STATE_WRITABLE` = 0x08,  
  `OS_STREAM_STATE_LISTENING` = 0x10 }  
  
*For the `OS_SelectSingle()` function's in/out `StateFlags` parameter, the state(s) of the stream and the result of the select is a combination of one or more of these states.*

#### Functions

- `int32 OS_SelectMultiple (OS_FdSet *ReadSet, OS_FdSet *WriteSet, int32 msecs)`  
*Wait for events across multiple file handles.*
- `int32 OS_SelectSingle (osal_id_t objid, uint32 *StateFlags, int32 msecs)`  
*Wait for events on a single file handle.*
- `int32 OS_SelectFdZero (OS_FdSet *Set)`  
*Clear a FdSet structure.*
- `int32 OS_SelectFdAdd (OS_FdSet *Set, osal_id_t objid)`  
*Add an ID to an FdSet structure.*
- `int32 OS_SelectFdClear (OS_FdSet *Set, osal_id_t objid)`  
*Clear an ID from an FdSet structure.*
- `bool OS_SelectFdIsSet (const OS_FdSet *Set, osal_id_t objid)`  
*Check if an FdSet structure contains a given ID.*

#### 12.165.1 Detailed Description

Declarations and prototypes for select abstraction

#### 12.165.2 Enumeration Type Documentation

**12.165.2.1 OS\_StreamState\_t enum OS\_StreamState\_t**

For the [OS\\_SelectSingle\(\)](#) function's in/out StateFlags parameter, the state(s) of the stream and the result of the select is a combination of one or more of these states.

See also

[OS\\_SelectSingle\(\)](#)

#### Enumerator

OS_STREAM_STATE_BOUND	whether the stream is bound
OS_STREAM_STATE_CONNECTED	whether the stream is connected
OS_STREAM_STATE_READABLE	whether the stream is readable
OS_STREAM_STATE_WRITABLE	whether the stream is writable
OS_STREAM_STATE_LISTENING	whether the stream is listening

Definition at line 55 of file osapi-select.h.

## 12.166 osal/src/os/inc/osapi-shell.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

#### Functions

- int32 [OS\\_ShellOutputToFile](#) (const char \*Cmd, [osal\\_id\\_t](#) filedes)

*Executes the command and sends output to a file.*

### 12.166.1 Detailed Description

Declarations and prototypes for shell abstraction

## 12.167 osal/src/os/inc/osapi-sockets.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

#### Data Structures

- union [OS\\_SockAddrData\\_t](#)

*Storage buffer for generic network address.*
- struct [OS\\_SockAddr\\_t](#)

*Encapsulates a generic network address.*
- struct [OS\\_socket\\_prop\\_t](#)

*Encapsulates socket properties.*

#### Macros

- #define [OS SOCKADDR\\_MAX\\_LEN](#) 28

## Enumerations

- enum `OS_SocketDomain_t` { `OS_SocketDomain_INVALID`, `OS_SocketDomain_INET`, `OS_SocketDomain_INET6`, `OS_SocketDomain_MAX` }  
*Socket domain.*
- enum `OS_SocketType_t` { `OS_SocketType_INVALID`, `OS_SocketType_DATAGRAM`, `OS_SocketType_STREAM`, `OS_SocketType_MAX` }  
*Socket type.*
- enum `OS_SocketShutdownMode_t` { `OS_SocketShutdownMode_NONE` = 0, `OS_SocketShutdownMode_SHUT_READ` = 1, `OS_SocketShutdownMode_SHUT_WRITE` = 2, `OS_SocketShutdownMode_SHUT_RDWR` = 3 }  
*Shutdown Mode.*

## Functions

- `int32 OS_SocketAddrInit (OS_SockAddr_t *Addr, OS_SocketDomain_t Domain)`  
*Initialize a socket address structure to hold an address of the given family.*
- `int32 OS_SocketAddrToString (char *buffer, size_t buflen, const OS_SockAddr_t *Addr)`  
*Get a string representation of a network host address.*
- `int32 OS_SocketAddrFromString (OS_SockAddr_t *Addr, const char *string)`  
*Set a network host address from a string representation.*
- `int32 OS_SocketAddrGetPort (uint16 *PortNum, const OS_SockAddr_t *Addr)`  
*Get the port number of a network address.*
- `int32 OS_SocketAddrSetPort (OS_SockAddr_t *Addr, uint16 PortNum)`  
*Set the port number of a network address.*
- `int32 OS_SocketOpen (osal_id_t *sock_id, OS_SocketDomain_t Domain, OS_SocketType_t Type)`  
*Opens a socket.*
- `int32 OS_SocketBind (osal_id_t sock_id, const OS_SockAddr_t *Addr)`  
*Binds a socket to a given local address and enter listening (server) mode.*
- `int32 OS_SocketListen (osal_id_t sock_id)`  
*Places the specified socket into a listening state.*
- `int32 OS_SocketBindAddress (osal_id_t sock_id, const OS_SockAddr_t *Addr)`  
*Binds a socket to a given local address.*
- `int32 OS_SocketConnect (osal_id_t sock_id, const OS_SockAddr_t *Addr, int32 timeout)`  
*Connects a socket to a given remote address.*
- `int32 OS_SocketShutdown (osal_id_t sock_id, OS_SocketShutdownMode_t Mode)`  
*Implement graceful shutdown of a stream socket.*
- `int32 OS_SocketAccept (osal_id_t sock_id, osal_id_t *connsock_id, OS_SockAddr_t *Addr, int32 timeout)`  
*Waits for and accept the next incoming connection on the given socket.*
- `int32 OS_SocketRecvFrom (osal_id_t sock_id, void *buffer, size_t buflen, OS_SockAddr_t *RemoteAddr, int32 timeout)`  
*Reads data from a message-oriented (datagram) socket.*
- `int32 OS_SocketSendTo (osal_id_t sock_id, const void *buffer, size_t buflen, const OS_SockAddr_t *Remote← Addr)`  
*Sends data to a message-oriented (datagram) socket.*
- `int32 OS_SocketGetIdByName (osal_id_t *sock_id, const char *sock_name)`  
*Gets an OSAL ID from a given name.*
- `int32 OS_SocketGetInfo (osal_id_t sock_id, OS_socket_prop_t *sock_prop)`  
*Gets information about an OSAL Socket ID.*

### 12.167.1 Detailed Description

Declarations and prototypes for sockets abstraction

### 12.167.2 Macro Definition Documentation

#### 12.167.2.1 OS\_SOCKADDR\_MAX\_LEN `#define OS_SOCKADDR_MAX_LEN 28`

Definition at line 45 of file osapi-sockets.h.

### 12.167.3 Enumeration Type Documentation

#### 12.167.3.1 OS\_SocketDomain\_t `enum OS_SocketDomain_t`

Socket domain.

Enumerator

<code>OS_SocketDomain_INVALID</code>	Invalid.
<code>OS_SocketDomain_INET</code>	IPv4 address family, most commonly used)
<code>OS_SocketDomain_INET6</code>	IPv6 address family, depends on OS/network stack support.
<code>OS_SocketDomain_MAX</code>	Maximum.

Definition at line 60 of file osapi-sockets.h.

#### 12.167.3.2 OS\_SocketShutdownMode\_t `enum OS_SocketShutdownMode_t`

Shutdown Mode.

Enumerator

<code>OS_SocketShutdownMode_NONE</code>	Reserved value, no effect.
<code>OS_SocketShutdownMode_SHUT_READ</code>	Disable future reading.
<code>OS_SocketShutdownMode_SHUT_WRITE</code>	Disable future writing.
<code>OS_SocketShutdownMode_SHUT_RDWR</code>	Disable future reading or writing.

Definition at line 79 of file osapi-sockets.h.

#### 12.167.3.3 OS\_SocketType\_t `enum OS_SocketType_t`

Socket type.

Enumerator

<code>OS_SocketType_INVALID</code>	Invalid.
<code>OS_SocketType_DATAGRAM</code>	A connectionless, message-oriented socket.
<code>OS_SocketType_STREAM</code>	A stream-oriented socket with the concept of a connection.
<code>OS_SocketType_MAX</code>	Maximum.

Definition at line 69 of file osapi-sockets.h.

## 12.168 osal/src/os/inc/osapi-task.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct **OS\_task\_prop\_t**

*OSAL task properties.*

### Macros

- #define **OS\_MAX\_TASK\_PRIORITY** 255  
*Upper limit for OSAL task priorities.*
- #define **OS\_FP\_ENABLED** 1  
*Floating point enabled state for a task.*
- #define **OSAL\_PRIORITY\_C(X)** ((**osal\_priority\_t**) {X})
- #define **OSAL\_STACKPTR\_C(X)** ((**osal\_stackptr\_t**) {X})
- #define **OSAL\_TASK\_STACK\_ALLOCATE** **OSAL\_STACKPTR\_C(NULL)**

### Typedefs

- typedef **uint8\_t osal\_priority\_t**  
*Type to be used for OSAL task priorities.*
- typedef **void \* osal\_stackptr\_t**  
*Type to be used for OSAL stack pointer.*
- typedef **void osal\_task**  
*For task entry point.*

### Functions

- typedef **osal\_task** ((**\*osal\_task\_entry**)(void))  
*For task entry point.*
- **int32 OS\_TaskCreate (osal\_id\_t \*task\_id, const char \*task\_name, osal\_task\_entry function\_pointer, osal\_stackptr\_t stack\_pointer, size\_t stack\_size, osal\_priority\_t priority, uint32 flags)**  
*Creates a task and starts running it.*
- **int32 OS\_TaskDelete (osal\_id\_t task\_id)**  
*Deletes the specified Task.*
- **void OS\_TaskExit (void)**  
*Exits the calling task.*
- **int32 OS\_TaskInstallDeleteHandler (osal\_task\_entry function\_pointer)**  
*Installs a handler for when the task is deleted.*
- **int32 OS\_TaskDelay (uint32 millisecond)**  
*Delay a task for specified amount of milliseconds.*
- **int32 OS\_TaskSetPriority (osal\_id\_t task\_id, osal\_priority\_t new\_priority)**  
*Sets the given task to a new priority.*
- **osal\_id\_t OS\_TaskGetId (void)**

*Obtain the task id of the calling task.*

- `int32 OS_TaskGetIdByName (osal_id_t *task_id, const char *task_name)`  
*Find an existing task ID by name.*
- `int32 OS_TaskGetInfo (osal_id_t task_id, OS_task_prop_t *task_prop)`  
*Fill a property object buffer with details regarding the resource.*
- `int32 OS_TaskFindIdBySystemData (osal_id_t *task_id, const void *sysdata, size_t sysdata_size)`  
*Reverse-lookup the OSAL task ID from an operating system ID.*

### 12.168.1 Detailed Description

Declarations and prototypes for task abstraction

### 12.168.2 Macro Definition Documentation

#### 12.168.2.1 OS\_FP\_ENABLED `#define OS_FP_ENABLED 1`

Floating point enabled state for a task.

Definition at line 35 of file osapi-task.h.

#### 12.168.2.2 OS\_MAX\_TASK\_PRIORITY `#define OS_MAX_TASK_PRIORITY 255`

Upper limit for OSAL task priorities.

Definition at line 32 of file osapi-task.h.

#### 12.168.2.3 OSAL\_PRIORITY\_C `#define OSAL_PRIORITY_C( X ) ((osal_priority_t) {X})`

Definition at line 46 of file osapi-task.h.

#### 12.168.2.4 OSAL\_STACKPTR\_C `#define OSAL_STACKPTR_C( X ) ((osal_stackptr_t) {X})`

Definition at line 53 of file osapi-task.h.

#### 12.168.2.5 OSAL\_TASK\_STACK\_ALLOCATE `#define OSAL_TASK_STACK_ALLOCATE OSAL_STACKPTR_C(NULL)`

Definition at line 54 of file osapi-task.h.

### 12.168.3 Typedef Documentation

#### 12.168.3.1 osal\_priority\_t `typedef uint8_t osal_priority_t`

Type to be used for OSAL task priorities.

OSAL priorities are in reverse order, and range from 0 (highest; will preempt all other tasks) to 255 (lowest; will not preempt any other task).

Definition at line 44 of file osapi-task.h.

**12.168.3.2 osal\_stackptr\_t** `typedef void* osal_stackptr_t`

Type to be used for OSAL stack pointer.

Definition at line 51 of file osapi-task.h.

**12.168.3.3 osal\_task** `typedef void osal_task`

For task entry point.

Definition at line 68 of file osapi-task.h.

**12.168.4 Function Documentation****12.168.4.1 osal\_task()** `typedef osal_task (`

`(*) (void) osal_task_entry )`

For task entry point.

**12.169 osal/src/os/inc/osapi-timebase.h File Reference**

```
#include "osconfig.h"
#include "common_types.h"
```

**Data Structures**

- struct `OS_timebase_prop_t`

*Time base properties.*

**TypeDefs**

- `typedef uint32(* OS_TimerSync_t) (osal_id_t timer_id)`

*Timer sync.*

**Functions**

- `int32 OS_TimeBaseCreate (osal_id_t *timebase_id, const char *timebase_name, OS_TimerSync_t external_sync)`  
*Create an abstract Time Base resource.*
- `int32 OS_TimeBaseSet (osal_id_t timebase_id, uint32 start_time, uint32 interval_time)`  
*Sets the tick period for simulated time base objects.*
- `int32 OS_TimeBaseDelete (osal_id_t timebase_id)`  
*Deletes a time base object.*
- `int32 OS_TimeBaseGetIdByName (osal_id_t *timebase_id, const char *timebase_name)`  
*Find the ID of an existing time base resource.*
- `int32 OS_TimeBaseGetInfo (osal_id_t timebase_id, OS_timebase_prop_t *timebase_prop)`  
*Obtain information about a timebase resource.*
- `int32 OS_TimeBaseGetFreeRun (osal_id_t timebase_id, uint32 *freerun_val)`  
*Read the value of the timebase free run counter.*

**12.169.1 Detailed Description**

Declarations and prototypes for timebase abstraction

## 12.169.2 Typedef Documentation

### 12.169.2.1 OS\_TimerSync\_t `typedef uint32 (* OS_TimerSync_t) (osal_id_t timer_id)`

Timer sync.

Definition at line 34 of file osapi-timebase.h.

## 12.170 osal/src/os/inc/osapi-timer.h File Reference

```
#include "osconfig.h"
#include "common_types.h"
```

### Data Structures

- struct `OS_timer_prop_t`

*Timer properties.*

### Typedefs

- `typedef void(* OS_TimerCallback_t) (osal_id_t timer_id)`

*Timer callback.*

### Functions

- `int32 OS_TimerCreate (osal_id_t *timer_id, const char *timer_name, uint32 *clock_accuracy, OS_TimerCallback_t callback_ptr)`

*Create a timer object.*
- `int32 OS_TimerAdd (osal_id_t *timer_id, const char *timer_name, osal_id_t timebase_id, OS_ArgCallback_t callback_ptr, void *callback_arg)`

*Add a timer object based on an existing TimeBase resource.*
- `int32 OS_TimerSet (osal_id_t timer_id, uint32 start_time, uint32 interval_time)`

*Configures a periodic or one shot timer.*
- `int32 OS_TimerDelete (osal_id_t timer_id)`

*Deletes a timer resource.*
- `int32 OS_TimerGetIdByName (osal_id_t *timer_id, const char *timer_name)`

*Locate an existing timer resource by name.*
- `int32 OS_TimerGetInfo (osal_id_t timer_id, OS_timer_prop_t *timer_prop)`

*Gets information about an existing timer.*

### 12.170.1 Detailed Description

Declarations and prototypes for timer abstraction (app callbacks)

## 12.170.2 Typedef Documentation

### 12.170.2.1 OS\_TimerCallback\_t `typedef void(* OS_TimerCallback_t) (osal_id_t timer_id)`

Timer callback.

Definition at line 34 of file osapi-timer.h.

## 12.171 osal/src/os/inc/osapi-version.h File Reference

```
#include "common_types.h"
```

### Macros

- #define OS\_BUILD\_NUMBER 62
- #define OS\_BUILD\_BASELINE "equuleus-rc1"
- #define OS\_BUILD\_DEV\_CYCLE "equuleus-rc2"

*Development: Release name for current development cycle.*
- #define OS\_BUILD\_CODENAME "Equuleus"

*: Development: Code name for the current build*
- #define OS\_MAJOR\_VERSION 5

*Major version number.*
- #define OS\_MINOR\_VERSION 0

*Minor version number.*
- #define OS\_REVISION 0

*Revision version number. Value of 99 indicates a development version.*
- #define OS\_LAST\_OFFICIAL "v5.0.0"

*Last official release.*
- #define OS\_MISSION\_REV 0xFF

*Mission revision.*
- #define OS\_STR\_HELPER(x) #x

*Helper function to concatenate strings from integer.*
- #define OS\_STR(x) OS\_STR\_HELPER(x)

*Helper function to concatenate strings from integer.*
- #define OS\_VERSION OS\_BUILD\_BASELINE "+dev" OS\_STR(OS\_BUILD\_NUMBER)

*Development Build Version Number.*
- #define OSAL\_API\_VERSION ((OS\_MAJOR\_VERSION \* 10000) + (OS\_MINOR\_VERSION \* 100) + OS\_REVISION)

*Combines the revision components into a single value.*
- #define OS\_CFG\_MAX\_VERSION\_STR\_LEN 256

*Max Version String length.*

### Functions

- const char \* OS\_GetVersionString (void)
- const char \* OS\_GetVersionCodeName (void)
- void OS\_GetVersionNumber (uint8 VersionNumbers[4])

*Obtain the OSAL numeric version number.*
- uint32 OS\_GetBuildNumber (void)

*Obtain the OSAL library numeric build number.*

### 12.171.1 Detailed Description

Provide version identifiers for Operating System Abstraction Layer

#### Note

OSAL follows the same version semantics as cFS, which in turn is based on the Semantic Versioning 2.0 Specification. For more information, see the documentation provided with cFE.

## 12.171.2 Macro Definition Documentation

**12.171.2.1 OS\_BUILD\_BASELINE** `#define OS_BUILD_BASELINE "equuleus-rc1"`  
Definition at line 38 of file osapi-version.h.

**12.171.2.2 OS\_BUILD\_CODENAME** `#define OS_BUILD_CODENAME "Equuleus"`  
: Development: Code name for the current build  
Definition at line 40 of file osapi-version.h.

**12.171.2.3 OS\_BUILD\_DEV\_CYCLE** `#define OS_BUILD_DEV_CYCLE "equuleus-rc2"`  
Development: Release name for current development cycle.  
Definition at line 39 of file osapi-version.h.

**12.171.2.4 OS\_BUILD\_NUMBER** `#define OS_BUILD_NUMBER 62`  
Definition at line 37 of file osapi-version.h.

**12.171.2.5 OS\_CFG\_MAX\_VERSION\_STR\_LEN** `#define OS_CFG_MAX_VERSION_STR_LEN 256`  
Max Version String length.  
Maximum length that an OSAL version string can be.  
Definition at line 154 of file osapi-version.h.

**12.171.2.6 OS\_LAST\_OFFICIAL** `#define OS_LAST_OFFICIAL "v5.0.0"`  
Last official release.  
Definition at line 52 of file osapi-version.h.

**12.171.2.7 OS\_MAJOR\_VERSION** `#define OS_MAJOR_VERSION 5`  
Major version number.  
Definition at line 45 of file osapi-version.h.

**12.171.2.8 OS\_MINOR\_VERSION** `#define OS_MINOR_VERSION 0`  
Minor version number.  
Definition at line 46 of file osapi-version.h.

**12.171.2.9 OS\_MISSION\_REV** `#define OS_MISSION_REV 0xFF`  
Mission revision.  
Reserved for mission use to denote patches/customizations as needed. Values 1-254 are reserved for mission use to denote patches/customizations as needed. NOTE: Reserving 0 and 0xFF for cFS open-source development use (pending resolution of nasa/cFS#440)  
Definition at line 61 of file osapi-version.h.

**12.171.2.10 OS\_REVISION** #define OS\_REVISION 0  
Revision version number. Value of 99 indicates a development version.  
Definition at line 47 of file osapi-version.h.

**12.171.2.11 OS\_STR** #define OS\_STR(  
    x ) OS\_STR\_HELPER(x)  
Helper function to concatenate strings from integer.  
Definition at line 67 of file osapi-version.h.

**12.171.2.12 OS\_STR\_HELPER** #define OS\_STR\_HELPER(  
    x ) #x  
Helper function to concatenate strings from integer.  
Definition at line 66 of file osapi-version.h.

**12.171.2.13 OS\_VERSION** #define OS\_VERSION OS\_BUILD\_BASELINE "+dev" OS\_STR(OS\_BUILD\_NUMBER)  
Development Build Version Number.  
Baseline git tag + Number of commits since baseline.

Definition at line 72 of file osapi-version.h.

**12.171.2.14 OSAL\_API\_VERSION** #define OSAL\_API\_VERSION ((OS\_MAJOR\_VERSION \* 10000) + (OS\_MINOR\_VERSION  
\* 100) + OS\_REVISION)  
Combines the revision components into a single value.  
Applications can check against this number  
e.g. "#if OSAL\_API\_VERSION >= 40100" would check if some feature added in OSAL 4.1 is present.  
Definition at line 79 of file osapi-version.h.

### 12.171.3 Function Documentation

**12.171.3.1 OS\_GetBuildNumber()** uint32 OS\_GetBuildNumber (  
    void )

Obtain the OSAL library numeric build number.  
The build number is a monotonically increasing number that (coarsely) reflects the number of commits/changes that have been merged since the epoch release. During development cycles this number should increase after each subsequent merge/modification.  
Like other version information, this is a fixed number assigned at compile time.

#### Returns

The OSAL library build number

**12.171.3.2 OS\_GetVersionCodeName()** const char\* OS\_GetVersionCodeName (  
    void )

Gets the OSAL version code name  
All NASA CFE/CFS components (including CFE framework, OSAL and PSP) that work together will share the same code name.

**Returns**

OSAL code name. This is a fixed value string and is never NULL.

**12.171.3.3 OS\_GetVersionNumber()** `void OS_GetVersionNumber (`

```
    uint8 VersionNumbers[4] )
```

Obtain the OSAL numeric version number.

This retrieves the numeric OSAL version identifier as an array of 4 uint8 values.

The array of numeric values is in order of precedence: [0] = Major Number [1] = Minor Number [2] = Revision Number [3] = Mission Revision

The "Mission Revision" (last output) also indicates whether this is an official release, a patched release, or a development version. 0 indicates an official release 1-254 local patch level (reserved for mission use) 255 indicates a development build

**Parameters**

<code>out</code>	<code>VersionNumbers</code>	A fixed-size array to be filled with the version numbers
------------------	-----------------------------	--

**12.171.3.4 OS\_GetVersionString()** `const char* OS_GetVersionString (`

```
    void )
```

Gets the OSAL version/baseline ID as a string

This returns the content of the `OS_VERSION` macro defined above, and is specifically just the baseline and development build ID (if applicable), without any extra info.

**Returns**

Basic version identifier. This is a fixed value string and is never NULL.

**12.172 osal/src/os/inc/osapi.h File Reference**

```
#include <stdio.h>
#include <stdlib.h>
#include <stdarg.h>
#include "common_types.h"
#include "osapi-version.h"
#include "osconfig.h"
#include "osapi-binsem.h"
#include "osapi-clock.h"
#include "osapi-common.h"
#include "osapi-condvar.h"
#include "osapi-constants.h"
#include "osapi-countsem.h"
#include "osapi-dir.h"
#include "osapi-error.h"
#include "osapi-file.h"
#include "osapi-fs.h"
#include "osapi-heap.h"
#include "osapi-macros.h"
#include "osapi-idmap.h"
#include "osapi-module.h"
#include "osapi-mutex.h"
```

```
#include "osapi-network.h"
#include "osapi-printf.h"
#include "osapi-queue.h"
#include "osapi-select.h"
#include "osapi-shell.h"
#include "osapi-sockets.h"
#include "osapi-task.h"
#include "osapi-timebase.h"
#include "osapi-timer.h"
#include "osapi-bsp.h"
```

### 12.172.1 Detailed Description

Purpose: Contains functions prototype definitions and variables declarations for the OS Abstraction Layer, Core OS module

### 12.173 psp/fsw/inc/cfe\_psp.h File Reference

```
#include "common_types.h"
#include "osapi.h"
#include "cfe_psp_error.h"
```

#### Macros

- #define CFE\_PSP\_PANIC\_STARTUP 1
- #define CFE\_PSP\_PANIC\_VOLATILE\_DISK 2
- #define CFE\_PSP\_PANIC\_MEMORY\_ALLOC 3
- #define CFE\_PSP\_PANIC\_NONVOL\_DISK 4
- #define CFE\_PSP\_PANIC\_STARTUP\_SEM 5
- #define CFE\_PSP\_PANIC\_CORE\_APP 6
- #define CFE\_PSP\_PANIC\_GENERAL\_FAILURE 7
- #define BUFF\_SIZE 256
- #define SIZE\_BYTE 1
- #define SIZE\_HALF 2
- #define SIZE\_WORD 3
- #define CFE\_PSP\_MEM\_RAM 1
- #define CFE\_PSP\_MEM\_EEPROM 2
- #define CFE\_PSP\_MEM\_ANY 3
- #define CFE\_PSP\_MEM\_INVALID 4
- #define CFE\_PSP\_MEM\_ATTR\_WRITE 0x01
- #define CFE\_PSP\_MEM\_ATTR\_READ 0x02
- #define CFE\_PSP\_MEM\_ATTR\_READWRITE 0x03
- #define CFE\_PSP\_MEM\_SIZE\_BYTE 0x01
- #define CFE\_PSP\_MEM\_SIZE\_WORD 0x02
- #define CFE\_PSP\_MEM\_SIZE\_DWORD 0x04
- #define CFE\_PSP\_SOFT\_TIMEBASE\_NAME "cFS-Master"

*The name of the software/RTOS timebase for general system timers.*

#### Reset Types

- #define CFE\_PSP\_RST\_TYPE\_PROCESSOR 1

- #define CFE\_PSP\_RST\_TYPE\_POWERON 2
- #define CFE\_PSP\_RST\_TYPE\_MAX 3

### Reset Sub-Types

- #define CFE\_PSP\_RST\_SUBTYPE\_POWER\_CYCLE 1  
*Reset caused by power having been removed and restored.*
- #define CFE\_PSP\_RST\_SUBTYPE\_PUSH\_BUTTON 2  
*Reset caused by reset button on the board.*
- #define CFE\_PSP\_RST\_SUBTYPE\_HW\_SPECIAL\_COMMAND 3  
*Reset was caused by a reset line having been stimulated by a hardware special command.*
- #define CFE\_PSP\_RST\_SUBTYPE\_HW\_WATCHDOG 4  
*Reset was caused by a watchdog timer expiring.*
- #define CFE\_PSP\_RST\_SUBTYPE\_RESET\_COMMAND 5  
*Reset was caused by cFE ES processing a [Reset Command](#).*
- #define CFE\_PSP\_RST\_SUBTYPE\_EXCEPTION 6  
*Reset was caused by a Processor Exception.*
- #define CFE\_PSP\_RST\_SUBTYPE\_UNDEFINED\_RESET 7  
*Reset was caused in an unknown manner.*
- #define CFE\_PSP\_RST\_SUBTYPE\_HWDEBUG\_RESET 8  
*Reset was caused by a JTAG or BDM connection.*
- #define CFE\_PSP\_RST\_SUBTYPE\_BANKSWITCH\_RESET 9  
*Reset reverted to a cFE POWERON due to a boot bank switch.*
- #define CFE\_PSP\_RST\_SUBTYPE\_MAX 10  
*Placeholder to indicate 1+ the maximum value that the PSP will ever use.*

### Functions

- void CFE\_PSP\_Main (void)  
*PSP Entry Point to initialize the OSAL and start up the cFE.*
- void CFE\_PSP\_GetTime (OS\_time\_t \*LocalTime)  
*Sample/Read a monotonic platform clock with normalization.*
- void CFE\_PSP\_Restart (uint32 resetType)  
*Entry point back to the BSP to restart the processor.*
- uint32 CFE\_PSP\_GetRestartType (uint32 \*restartSubType)  
*Returns the last reset type.*
- void CFE\_PSP\_FlushCaches (uint32 type, void \*address, uint32 size)  
*This is a BSP-specific cache flush routine.*
- uint32 CFE\_PSP\_GetProcessorId (void)  
*Returns the CPU ID as defined by the specific board and BSP.*
- uint32 CFE\_PSP\_GetSpacecraftId (void)  
*Returns the Spacecraft ID (if any)*
- const char \* CFE\_PSP\_GetProcessorName (void)  
*Returns the processor name.*
- uint32 CFE\_PSP\_Get\_Timer\_Tick (void)  
*Returns the underlying OS timer tick value.*
- uint32 CFE\_PSP\_GetTimerTicksPerSecond (void)
- uint32 CFE\_PSP\_GetTimerLow32Rollover (void)
- void CFE\_PSP\_Get\_Timebase (uint32 \*Tbu, uint32 \*Tbl)  
*Sample/Read a monotonic platform clock without normalization.*
- uint32 CFE\_PSP\_Get\_Dec (void)  
*CFE\_PSP\_Get\_Dec.*

- `int32 CFE_PSP_GetCDSSize (uint32 *SizeOfCDS)`  
*Fetches the size of the OS Critical Data Store area.*
- `int32 CFE_PSP_WriteToCDS (const void *PtrToDataToWrite, uint32 CDSOffset, uint32 NumBytes)`  
*Writes to the CDS Block.*
- `int32 CFE_PSP_ReadFromCDS (void *PtrToDataToRead, uint32 CDSOffset, uint32 NumBytes)`  
*Reads from the CDS Block.*
- `int32 CFE_PSP_GetResetArea (cpuaddr *PtrToResetArea, uint32 *SizeOfResetArea)`  
*Returns the location and size of the ES Reset information area.*
- `int32 CFE_PSP.GetUserReservedArea (cpuaddr *PtrToUserArea, uint32 *SizeOfUserArea)`  
*Returns the location and size of the memory used for the cFE user-reserved area.*
- `int32 CFE_PSP_GetVolatileDiskMem (cpuaddr *PtrToVolDisk, uint32 *SizeOfVolDisk)`  
*Returns the location and size of the memory used for the cFE volatile disk.*
- `int32 CFE_PSP_GetKernelTextSegmentInfo (cpuaddr *PtrToKernelSegment, uint32 *SizeOfKernelSegment)`  
*Returns the location and size of the kernel memory.*
- `int32 CFE_PSP_GetCFETextSegmentInfo (cpuaddr *PtrToCFESEgment, uint32 *SizeOfCFESEgment)`  
*Returns the location and size of the kernel memory.*
- `void CFE_PSP_WatchdogInit (void)`  
*Configures the watchdog timer.*
- `void CFE_PSP_WatchdogEnable (void)`  
*Enables the watchdog timer.*
- `void CFE_PSP_WatchdogDisable (void)`  
*Disables the watchdog timer.*
- `void CFE_PSP_WatchdogService (void)`  
*Services the watchdog timer according to the value set in WatchDogSet.*
- `uint32 CFE_PSP_WatchdogGet (void)`  
*Gets the watchdog time in milliseconds.*
- `void CFE_PSP_WatchdogSet (uint32 WatchdogValue)`  
*Sets the watchdog time in milliseconds.*
- `void CFE_PSP_Panic (int32 ErrorCode)`  
*Aborts the cFE startup.*
- `int32 CFE_PSP_InitSSR (uint32 bus, uint32 device, char *DeviceName)`  
*Initializes the Solid State recorder memory for a particular platform.*
- `int32 CFE_PSP_Decompress (char *srcFileName, char *dstFileName)`  
*Uncompresses the source file to the file specified in the destination file name.*
- `void CFE_PSP_AttachExceptions (void)`  
*Sets up the exception environment for the chosen platform.*
- `void CFE_PSP_SetDefaultExceptionEnvironment (void)`  
*Defines the CPU and FPU exceptions that are enabled for each cFE Task/App.*
- `uint32 CFE_PSP_Exception_GetCount (void)`  
*Returns the unread exception count.*
- `int32 CFE_PSP_Exception_GetSummary (uint32 *ContextLogId, osal_id_t *TaskId, char *ReasonBuf, uint32 ReasonSize)`  
*Retrieves a summary of an exception log entry.*
- `int32 CFE_PSP_Exception_CopyContext (uint32 ContextLogId, void *ContextBuf, uint32 ContextSize)`  
*Retrieves exception log entry context information.*
- `int32 CFE_PSP_PortRead8 (cpuaddr PortAddress, uint8 *ByteValue)`  
*Read one byte of memory.*

- `int32 CFE_PSP_PortWrite8 (cpuaddr PortAddress, uint8 ByteValue)`  
*Write one byte of memory.*
- `int32 CFE_PSP_PortRead16 (cpuaddr PortAddress, uint16 *uint16Value)`  
*Read 2 bytes of memory.*
- `int32 CFE_PSP_PortWrite16 (cpuaddr PortAddress, uint16 uint16Value)`  
*Write 2 bytes of memory.*
- `int32 CFE_PSP_PortRead32 (cpuaddr PortAddress, uint32 *uint32Value)`  
*Read 4 bytes of memory.*
- `int32 CFE_PSP_PortWrite32 (cpuaddr PortAddress, uint32 uint32Value)`  
*Write 4 bytes of memory.*
- `int32 CFE_PSP_MemRead8 (cpuaddr MemoryAddress, uint8 *ByteValue)`  
*Read one byte of memory.*
- `int32 CFE_PSP_MemWrite8 (cpuaddr MemoryAddress, uint8 ByteValue)`  
*Write one byte of memory.*
- `int32 CFE_PSP_MemRead16 (cpuaddr MemoryAddress, uint16 *uint16Value)`  
*Read 2 bytes of memory.*
- `int32 CFE_PSP_MemWrite16 (cpuaddr MemoryAddress, uint16 uint16Value)`  
*Write 2 bytes of memory.*
- `int32 CFE_PSP_MemRead32 (cpuaddr MemoryAddress, uint32 *uint32Value)`  
*Read 4 bytes of memory.*
- `int32 CFE_PSP_MemWrite32 (cpuaddr MemoryAddress, uint32 uint32Value)`  
*Write 4 bytes of memory.*
- `int32 CFE_PSP_MemCpy (void *dest, const void *src, uint32 n)`  
*Copy 'n' bytes from 'src' to 'dest'.*
- `int32 CFE_PSP_MemSet (void *dest, uint8 value, uint32 n)`  
*Copy 'n' bytes of value 'value' to 'dest'.*
- `int32 CFE_PSP_MemValidateRange (cpuaddr Address, size_t Size, uint32 MemoryType)`  
*Validates the memory range and type using the global CFE\_PSP\_MemoryTable.*
- `uint32 CFE_PSP_MemRanges (void)`  
*Returns the number of memory ranges in the CFE\_PSP\_MemoryTable.*
- `int32 CFE_PSP_MemRangeSet (uint32 RangeNum, uint32 MemoryType, cpuaddr StartAddr, size_t Size, size_t WordSize, uint32 Attributes)`  
*Populates one of the records in the CFE\_PSP\_MemoryTable.*
- `int32 CFE_PSP_MemRangeGet (uint32 RangeNum, uint32 *MemoryType, cpuaddr *StartAddr, size_t *Size, size_t *WordSize, uint32 *Attributes)`  
*Retrieves one of the records in the CFE\_PSP\_MemoryTable.*
- `int32 CFE_PSP_EepromWrite8 (cpuaddr MemoryAddress, uint8 ByteValue)`  
*Write one byte (ByteValue) to EEPROM address MemoryAddress.*
- `int32 CFE_PSP_EepromWrite16 (cpuaddr MemoryAddress, uint16 uint16Value)`  
*Write two bytes (uint16Value) to EEPROM address MemoryAddress.*
- `int32 CFE_PSP_EepromWrite32 (cpuaddr MemoryAddress, uint32 uint32Value)`  
*Write four bytes (uint32Value) to EEPROM address MemoryAddress.*
- `int32 CFE_PSP_EepromWriteEnable (uint32 Bank)`  
*Enable the EEPROM for write operation.*
- `int32 CFE_PSP_EepromWriteDisable (uint32 Bank)`  
*Disable the EEPROM from write operation.*
- `int32 CFE_PSP_EepromPowerUp (uint32 Bank)`

*Power up the EEPROM.*

- `int32 CFE_PSP_EepromPowerDown (uint32 Bank)`

*Power down the EEPROM.*

- `const char * CFE_PSP_GetVersionString (void)`

*Obtain the PSP version/baseline identifier string.*

- `const char * CFE_PSP_GetVersionCodeName (void)`

*Obtain the version code name.*

- `void CFE_PSP_GetVersionNumber (uint8 VersionNumbers[4])`

*Retrieves the numeric PSP version identifier as an array of uint8 values.*

- `uint32 CFE_PSP_GetBuildNumber (void)`

*Obtain the PSP library numeric build number.*

### 12.173.1 Macro Definition Documentation

#### 12.173.1.1 `BUFF_SIZE` #define BUFF\_SIZE 256

Definition at line 62 of file cfe\_psp.h.

#### 12.173.1.2 `CFE_PSP_MEM_ANY` #define CFE\_PSP\_MEM\_ANY 3

Definition at line 72 of file cfe\_psp.h.

#### 12.173.1.3 `CFE_PSP_MEM_ATTR_READ` #define CFE\_PSP\_MEM\_ATTR\_READ 0x02

Definition at line 79 of file cfe\_psp.h.

#### 12.173.1.4 `CFE_PSP_MEM_ATTR_READWRITE` #define CFE\_PSP\_MEM\_ATTR\_READWRITE 0x03

Definition at line 80 of file cfe\_psp.h.

#### 12.173.1.5 `CFE_PSP_MEM_ATTR_WRITE` #define CFE\_PSP\_MEM\_ATTR\_WRITE 0x01

Definition at line 78 of file cfe\_psp.h.

#### 12.173.1.6 `CFE_PSP_MEM_EEPROM` #define CFE\_PSP\_MEM\_EEPROM 2

Definition at line 71 of file cfe\_psp.h.

#### 12.173.1.7 `CFE_PSP_MEM_INVALID` #define CFE\_PSP\_MEM\_INVALID 4

Definition at line 73 of file cfe\_psp.h.

#### 12.173.1.8 `CFE_PSP_MEM_RAM` #define CFE\_PSP\_MEM\_RAM 1

Definition at line 70 of file cfe\_psp.h.

#### 12.173.1.9 `CFE_PSP_MEM_SIZE_BYTE` #define CFE\_PSP\_MEM\_SIZE\_BYTE 0x01

Definition at line 85 of file cfe\_psp.h.

**12.173.1.10 CFE\_PSP\_MEM\_SIZE\_DWORD** #define CFE\_PSP\_MEM\_SIZE\_DWORD 0x04  
Definition at line 87 of file cfe\_psp.h.

**12.173.1.11 CFE\_PSP\_MEM\_SIZE\_WORD** #define CFE\_PSP\_MEM\_SIZE\_WORD 0x02  
Definition at line 86 of file cfe\_psp.h.

**12.173.1.12 CFE\_PSP\_PANIC\_CORE\_APP** #define CFE\_PSP\_PANIC\_CORE\_APP 6  
Definition at line 56 of file cfe\_psp.h.

**12.173.1.13 CFE\_PSP\_PANIC\_GENERAL\_FAILURE** #define CFE\_PSP\_PANIC\_GENERAL\_FAILURE 7  
Definition at line 57 of file cfe\_psp.h.

**12.173.1.14 CFE\_PSP\_PANIC\_MEMORY\_ALLOC** #define CFE\_PSP\_PANIC\_MEMORY\_ALLOC 3  
Definition at line 53 of file cfe\_psp.h.

**12.173.1.15 CFE\_PSP\_PANIC\_NONVOL\_DISK** #define CFE\_PSP\_PANIC\_NONVOL\_DISK 4  
Definition at line 54 of file cfe\_psp.h.

**12.173.1.16 CFE\_PSP\_PANIC\_STARTUP** #define CFE\_PSP\_PANIC\_STARTUP 1  
Definition at line 51 of file cfe\_psp.h.

**12.173.1.17 CFE\_PSP\_PANIC\_STARTUP\_SEM** #define CFE\_PSP\_PANIC\_STARTUP\_SEM 5  
Definition at line 55 of file cfe\_psp.h.

**12.173.1.18 CFE\_PSP\_PANIC\_VOLATILE\_DISK** #define CFE\_PSP\_PANIC\_VOLATILE\_DISK 2  
Definition at line 52 of file cfe\_psp.h.

**12.173.1.19 CFE\_PSP\_RST\_SUBTYPE\_BANKSWITCH\_RESET** #define CFE\_PSP\_RST\_SUBTYPE\_BANKSWITCH\_RESET 9  
Reset reverted to a cFE POWERON due to a boot bank switch.  
Definition at line 122 of file cfe\_psp.h.

**12.173.1.20 CFE\_PSP\_RST\_SUBTYPE\_EXCEPTION** #define CFE\_PSP\_RST\_SUBTYPE\_EXCEPTION 6  
Reset was caused by a Processor Exception.  
Definition at line 116 of file cfe\_psp.h.

**12.173.1.21 CFE\_PSP\_RST\_SUBTYPE\_HW\_SPECIAL\_COMMAND** #define CFE\_PSP\_RST\_SUBTYPE\_HW\_SPECIAL\_COMMAND 3  
Reset was caused by a reset line having been stimulated by a hardware special command.  
Definition at line 110 of file cfe\_psp.h.

**12.173.1.22 CFE\_PSP\_RST\_SUBTYPE\_HW\_WATCHDOG** #define CFE\_PSP\_RST\_SUBTYPE\_HW\_WATCHDOG 4  
Reset was caused by a watchdog timer expiring.  
Definition at line 112 of file cfe\_psp.h.

**12.173.1.23 CFE\_PSP\_RST\_SUBTYPE\_HWDEBUG\_RESET** #define CFE\_PSP\_RST\_SUBTYPE\_HWDEBUG\_RESET 8  
Reset was caused by a JTAG or BDM connection.  
Definition at line 120 of file cfe\_psp.h.

**12.173.1.24 CFE\_PSP\_RST\_SUBTYPE\_MAX** #define CFE\_PSP\_RST\_SUBTYPE\_MAX 10  
Placeholder to indicate 1+ the maximum value that the PSP will ever use.  
Definition at line 124 of file cfe\_psp.h.

**12.173.1.25 CFE\_PSP\_RST\_SUBTYPE\_POWER\_CYCLE** #define CFE\_PSP\_RST\_SUBTYPE\_POWER\_CYCLE 1  
Reset caused by power having been removed and restored.  
Definition at line 106 of file cfe\_psp.h.

**12.173.1.26 CFE\_PSP\_RST\_SUBTYPE\_PUSH\_BUTTON** #define CFE\_PSP\_RST\_SUBTYPE\_PUSH\_BUTTON 2  
Reset caused by reset button on the board.  
Definition at line 108 of file cfe\_psp.h.

**12.173.1.27 CFE\_PSP\_RST\_SUBTYPE\_RESET\_COMMAND** #define CFE\_PSP\_RST\_SUBTYPE\_RESET\_COMMAND 5  
Reset was caused by cFE ES processing a [Reset Command](#) .  
Definition at line 114 of file cfe\_psp.h.

**12.173.1.28 CFE\_PSP\_RST\_SUBTYPE\_UNDEFINED\_RESET** #define CFE\_PSP\_RST\_SUBTYPE\_UNDEFINED\_RESET 7  
Reset was caused in an unknown manner.  
Definition at line 118 of file cfe\_psp.h.

**12.173.1.29 CFE\_PSP\_RST\_TYPE\_MAX** #define CFE\_PSP\_RST\_TYPE\_MAX 3  
Placeholder to indicate 1+ the maximum value that the PSP will ever use.  
Definition at line 96 of file cfe\_psp.h.

**12.173.1.30 CFE\_PSP\_RST\_TYPE\_POWERON** #define CFE\_PSP\_RST\_TYPE\_POWERON 2  
All memory has been cleared  
Definition at line 95 of file cfe\_psp.h.

**12.173.1.31 CFE\_PSP\_RST\_TYPE\_PROCESSOR** #define CFE\_PSP\_RST\_TYPE\_PROCESSOR 1  
Volatile disk, CDS and User Reserved memory may be valid  
Definition at line 94 of file cfe\_psp.h.

**12.173.1.32 CFE\_PSP\_SOFT\_TIMEBASE\_NAME** #define CFE\_PSP\_SOFT\_TIMEBASE\_NAME "cFS-Master"  
 The name of the software/RTOS timebase for general system timers.  
 This name may be referred to by CFE TIME and/or SCH when setting up its own timers.  
 Definition at line 132 of file cfe\_psp.h.

**12.173.1.33 SIZE\_BYTE** #define SIZE\_BYTE 1  
 Definition at line 63 of file cfe\_psp.h.

**12.173.1.34 SIZE\_HALF** #define SIZE\_HALF 2  
 Definition at line 64 of file cfe\_psp.h.

**12.173.1.35 SIZE\_WORD** #define SIZE\_WORD 3  
 Definition at line 65 of file cfe\_psp.h.

## 12.173.2 Function Documentation

**12.173.2.1 CFE\_PSP\_AttachExceptions()** void CFE\_PSP\_AttachExceptions ( void )

Sets up the exception environment for the chosen platform.

On a board, this can be configured to look at a debug flag or switch in order to keep the standard OS exception handlers, rather than restarting the system.

**12.173.2.2 CFE\_PSP\_Decompress()** int32 CFE\_PSP\_Decompress ( char \* srcFileName, char \* dstFileName )

Uncompresses the source file to the file specified in the destination file name.

### Note

The Decompress uses the "gzip" algorithm. Files can be compressed using the "gzip" program available on almost all host platforms.

### Parameters

<i>srcFileName</i>	Source file to decompress
<i>dstFileName</i>	Destination file name

**12.173.2.3 CFE\_PSP\_EepromPowerDown()** int32 CFE\_PSP\_EepromPowerDown ( uint32 Bank )

Power down the EEPROM.

### Parameters

in	<i>Bank</i>	The bank of EEPROM to power down
----	-------------	----------------------------------

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.4 CFE\_PSP\_EepromPowerUp()** `int32 CFE_PSP_EepromPowerUp ( uint32 Bank )`

Power up the EEPROM.

**Parameters**

<i>in</i>	<i>Bank</i>	The bank of EEPROM to power up
-----------	-------------	--------------------------------

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.5 CFE\_PSP\_EepromWrite16()** `int32 CFE_PSP_EepromWrite16 ( cpuaddr MemoryAddress, uint16 uint16Value )`

Write two bytes (*uint16Value*) to EEPROM address *MemoryAddress*.

**Parameters**

<i>out</i>	<i>MemoryAddress</i>	Memory address to write to
<i>in</i>	<i>uint16Value</i>	Value to write to memory

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_TIMEOUT</i>	write operation did not go through after a specific timeout.
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.6 CFE\_PSP\_EepromWrite32()** `int32 CFE_PSP_EepromWrite32 ( cpuaddr MemoryAddress, uint32 uint32Value )`

Write four bytes (*uint32Value*) to EEPROM address *MemoryAddress*.

**Parameters**

<i>out</i>	<i>MemoryAddress</i>	Memory address to write to
------------	----------------------	----------------------------

**Parameters**

in	<i>uint32Value</i>	Value to write to memory
----	--------------------	--------------------------

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_TIMEOUT</i>	write operation did not go through after a specific timeout.
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.7 CFE\_PSP\_EepromWrite8()** `int32 CFE_PSP_EepromWrite8 (`  
`cpuaddr MemoryAddress,`  
`uint8 ByteValue )`

Write one byte (ByteValue) to EEPROM address MemoryAddress.

**Parameters**

out	<i>MemoryAddress</i>	Memory address to write to
in	<i>ByteValue</i>	Value to write to memory

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_TIMEOUT</i>	write operation did not go through after a specific timeout.
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.8 CFE\_PSP\_EepromWriteDisable()** `int32 CFE_PSP_EepromWriteDisable (`  
`uint32 Bank )`

Disable the EEPROM from write operation.

**Parameters**

in	<i>Bank</i>	The bank of EEPROM to disable
----	-------------	-------------------------------

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.9 CFE\_PSP\_EepromWriteEnable()** `int32 CFE_PSP_EepromWriteEnable (`  
`uint32 Bank )`

Enable the EEPROM for write operation.

Parameters

in	<i>Bank</i>	The bank of EEPROM to enable
----	-------------	------------------------------

Return values

<code>CFE_PSP_SUCCESS</code>	on success
<code>CFE_PSP_ERROR_NOT_IMPLEMENTED</code>	if not implemented

**12.173.2.10 CFE\_PSP\_Exception\_CopyContext()** `int32 CFE_PSP_Exception_CopyContext (`

`uint32 ContextLogId,`  
`void * ContextBuf,`  
`uint32 ContextSize )`

Retrieves exception log entry context information.

Parameters

in	<i>ContextLogId</i>	ID of the exception log entry to copy
out	<i>ContextBuf</i>	Pointer to the buffer where the context information is to be copied to
in	<i>ContextSize</i>	Maximum size of context information data to copy

Returns

Size of the copied data

Return values

<code>CFE_PSP_NO_EXCEPTION_DATA</code>	if data has expired from the memory log
--	---

**12.173.2.11 CFE\_PSP\_Exception\_GetCount()** `uint32 CFE_PSP_Exception_GetCount (`  
`void )`

Returns the unread exception count.

Returns

The unread exception count

**12.173.2.12 CFE\_PSP\_Exception\_GetSummary()** `int32 CFE_PSP_Exception_GetSummary (`  
`uint32 * ContextLogId,`  
`osal_id_t * TaskId,`

```
    char * ReasonBuf,
    uint32 ReasonSize )
```

Retrieves a summary of an exception log entry.

#### Note

This function returns CFE\_PSP\_SUCCESS to indicate that an entry was popped from the queue. This doesn't necessarily mean that the output fields have valid data, but it does mean they are initialized to something.

#### Parameters

in	<i>Context← LogId</i>	ID of the exception log entry to get a summary for
in, out	<i>TaskId</i>	Pointer to the TaskID buffer
out	<i>ReasonBuf</i>	Pointer to the buffer that will store the exception summary string
in	<i>ReasonSize</i>	Maximum size of the summary string to retrieve

#### Return values

<i>CFE_PSP_SUCCESS</i>	on success (see note above)
<i>CFE_PSP_NO_EXCEPTION_DATA</i>	if no context available for reading

**12.173.2.13 CFE\_PSP\_FlushCaches()** void CFE\_PSP\_FlushCaches (

```
    uint32 type,
    void * address,
    uint32 size )
```

This is a BSP-specific cache flush routine.

Provides a common interface to flush the processor caches. This routine is in the BSP because it is sometimes implemented in hardware and sometimes taken care of by the RTOS.

#### Parameters

in	<i>type</i>	
in	<i>address</i>	
in	<i>size</i>	

**12.173.2.14 CFE\_PSP\_Get\_Dec()** uint32 CFE\_PSP\_Get\_Dec (

```
    void )
```

CFE\_PSP\_Get\_Dec.

**12.173.2.15 CFE\_PSP\_Get\_Timebase()** void CFE\_PSP\_Get\_Timebase (

```
    uint32 * Tbu,
    uint32 * Tbl )
```

Sample/Read a monotonic platform clock without normalization.

Provides a common interface to system timebase. This routine is in the BSP because it is sometimes implemented in hardware and sometimes taken care of by the RTOS.

This is defined as a free-running, monotonically-increasing tick counter. The epoch is not defined, but typically is the system boot time, and the value increases indefinitely as the system runs. The tick period/rate is also not defined. Rollover events - where the range of representable values is exceeded - are theoretically possible, but would take many years of continuous uptime to occur (typically hundreds of years, if not thousands). System designers should ensure that the actual tick rate and resulting timebase range is sufficiently large to ensure that rollover is not a concern.

#### Note

This is a "raw" value from the underlying platform with minimal/no conversions or normalization applied. Neither the epoch nor the resolution of this tick counter is specified, and it may vary from platform to platform. Use the [CFE\\_PSP\\_GetTime\(\)](#) function to sample the timebase and also convert the units into a normalized/more consistent form.

#### See also

[CFE\\_PSP\\_GetTime\(\)](#)

#### Parameters

out	<i>Tbu</i>	Buffer to hold the upper 32 bits of a 64-bit tick counter
out	<i>Tbl</i>	Buffer to hold the lower 32 bits of a 64-bit tick counter

**12.173.2.16 CFE\_PSP\_Get\_Timer\_Tick()** `uint32 CFE_PSP_Get_Timer_Tick ( void )`

Returns the underlying OS timer tick value.

It is used for the performance monitoring software

**12.173.2.17 CFE\_PSP\_GetBuildNumber()** `uint32 CFE_PSP_GetBuildNumber ( void )`

Obtain the PSP library numeric build number.

The build number is a monotonically increasing number that (coarsely) reflects the number of commits/changes that have been merged since the epoch release. During development cycles this number should increase after each subsequent merge/modification.

Like other version information, this is a fixed number assigned at compile time.

#### Returns

The OSAL library build number

**12.173.2.18 CFE\_PSP\_GetCDSSize()** `int32 CFE_PSP_GetCDSSize ( uint32 * SizeOfCDS )`

Fetches the size of the OS Critical Data Store area.

#### Parameters

out	<i>SizeOfCDS</i>	Pointer to the variable that will store the size of the CDS
-----	------------------	---

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.19 CFE\_PSP\_GetCFETextSegmentInfo()** `int32 CFE_PSP_GetCFETextSegmentInfo ( cpuaddr * PtrToCFEsegment, uint32 * SizeOfCFEsegment )`

Returns the location and size of the kernel memory.

This function returns the start and end address of the CFE text segment. It may not be implemented on all architectures.

**Parameters**

<code>out</code>	<code>PtrToCFEsegment</code>	Pointer to the variable that will store the location of the cFE text segment
<code>out</code>	<code>SizeOfCFEsegment</code>	Pointer to the variable that will store the size of the cFE text segment

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.20 CFE\_PSP\_GetKernelTextSegmentInfo()** `int32 CFE_PSP_GetKernelTextSegmentInfo ( cpuaddr * PtrToKernelSegment, uint32 * SizeOfKernelSegment )`

Returns the location and size of the kernel memory.

This function returns the start and end address of the kernel text segment. It may not be implemented on all architectures.

**Parameters**

<code>out</code>	<code>PtrToKernelSegment</code>	Pointer to the variable that will store the location of the kernel text segment
<code>out</code>	<code>SizeOfKernelSegment</code>	Pointer to the variable that will store the size of the kernel text segment

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error or CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED if not implemented

**12.173.2.21 CFE\_PSP\_GetProcessorId()** `uint32 CFE_PSP_GetProcessorId ( void )`

Returns the CPU ID as defined by the specific board and BSP.

**Returns**

The processor ID

**12.173.2.22 CFE\_PSP\_GetProcessorName()** `const char* CFE_PSP_GetProcessorName ( void )`

Returns the processor name.

**Returns**

The processor name

**12.173.2.23 CFE\_PSP\_GetResetArea()** `int32 CFE_PSP_GetResetArea (`  
 `cpuaddr * PtrToResetArea,`  
 `uint32 * SizeOfResetArea )`

Returns the location and size of the ES Reset information area.

This area is preserved during a processor reset and is used to store the ER Log, System Log and reset-related variables

**Parameters**

<code>out</code>	<code>PtrToResetArea</code>	Pointer to the variable that will store the location of the reset area
<code>out</code>	<code>SizeOfResetArea</code>	Pointer to the variable that will store the reset area size

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.24 CFE\_PSP\_GetRestartType()** `uint32 CFE_PSP_GetRestartType (`  
 `uint32 * restartSubType )`

Returns the last reset type.

**Note**

If a pointer to a valid memory space is passed in, it returns the reset sub-type in that memory. Right now the reset types are application-specific. For the cFE they are defined in the [cfe\\_es.h](#) file.

**Parameters**

<code>restartSubType</code>	
-----------------------------	--

**12.173.2.25 CFE\_PSP\_GetSpacecraftId()** `uint32 CFE_PSP_GetSpacecraftId (`  
 `void )`

Returns the Spacecraft ID (if any)

**Returns**

The Spacecraft ID

**12.173.2.26 CFE\_PSP\_GetTime()** `void CFE_PSP_GetTime (`  
 `OS_time_t * LocalTime )`

Sample/Read a monotonic platform clock with normalization.

Outputs an `OS_time_t` value indicating the time elapsed since an epoch. The epoch is not defined, but typically represents the system boot time. The value increases continuously over time and cannot be reset by software.

This is similar to the [CFE\\_PSP\\_Get\\_Timebase\(\)](#), but additionally it normalizes the output value to an `OS_time_t`, thereby providing consistent units to the calling application. Any OSAL-provided routine that accepts `OS_time_t` inputs may be used to convert this value into other standardized time units.

**Note**

This should refer to the same time domain as [CFE\\_PSP\\_Get\\_Timebase\(\)](#), the primary difference being the format and units of the output value.

**See also**

[CFE\\_PSP\\_Get\\_Timebase\(\)](#)

**Parameters**

<code>out</code>	<code>LocalTime</code>	Value of PSP tick counter as <a href="#">OS_time_t</a>
------------------	------------------------	--

### **12.173.2.27 CFE\_PSP\_GetTimerLow32Rollover()** `uint32 CFE_PSP_GetTimerLow32Rollover ( void )`

Provides the number that the least significant 32 bits of the 64-bit time stamp returned by CFE\_PSP\_Get\_Timebase rolls over. If the lower 32 bits rolls at 1 second, then the CFE\_PSP\_TIMER\_LOW32\_ROLLOVER will be 1000000. If the lower 32 bits rolls at its maximum value ( $2^{32}$ ) then CFE\_PSP\_TIMER\_LOW32\_ROLLOVER will be 0.

**Returns**

The number that the least significant 32 bits of the 64-bit time stamp returned by CFE\_PSP\_Get\_Timebase rolls over.

### **12.173.2.28 CFE\_PSP\_GetTimerTicksPerSecond()** `uint32 CFE_PSP_GetTimerTicksPerSecond ( void )`

Provides the resolution of the least significant 32 bits of the 64-bit time stamp returned by CFE\_PSP\_Get\_Timebase in timer ticks per second. The timer resolution for accuracy should not be any slower than 1000000 ticks per second or 1 us (microsecond) per tick

**Returns**

The number of timer ticks per second of the time stamp returned by CFE\_PSP\_Get\_Timebase

### **12.173.2.29 CFE\_PSP.GetUserReservedArea()** `int32 CFE_PSP.GetUserReservedArea ( cpuaddr * PtrToUserArea, uint32 * SizeOfUserArea )`

Returns the location and size of the memory used for the cFE user-reserved area.

**Parameters**

<code>out</code>	<code>PtrToUserArea</code>	Pointer to the variable that will store the location of the user-reserved area
<code>out</code>	<code>SizeOfUserArea</code>	Pointer to the variable that will store the size of the user-reserved area

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.30 CFE\_PSP\_GetVersionCodeName()** const char\* CFE\_PSP\_GetVersionCodeName ( void )

Obtain the version code name.

This retrieves the PSP code name. This is a compatibility indicator for the overall NASA cFS ecosystem. All modular components which are intended to interoperate should report the same code name.

**Returns**

Code name. This is a fixed string and cannot be NULL.

**12.173.2.31 CFE\_PSP\_GetVersionNumber()** void CFE\_PSP\_GetVersionNumber ( uint8 VersionNumbers[4] )

Retrieves the numeric PSP version identifier as an array of uint8 values.

The array of numeric values is in order of precedence: [0] = Major Number [1] = Minor Number [2] = Revision Number [3] = Mission Revision

The "Mission Revision" (last output) also indicates whether this is an official release, a patched release, or a development version. 0 indicates an official release 1-254 local patch level (reserved for mission use) 255 indicates a development build

**Parameters**

out	VersionNumbers	A fixed-size array to be filled with the version numbers
-----	----------------	--

**12.173.2.32 CFE\_PSP\_GetVersionString()** const char\* CFE\_PSP\_GetVersionString ( void )

Obtain the PSP version/baseline identifier string.

This retrieves the PSP version identifier string without extra info

**Returns**

Version string. This is a fixed string and cannot be NULL.

**12.173.2.33 CFE\_PSP\_GetVolatileDiskMem()** int32 CFE\_PSP\_GetVolatileDiskMem ( cpuid \* PtrToVolDisk, uint32 \* SizeOfVolDisk )

Returns the location and size of the memory used for the cFE volatile disk.

**Parameters**

out	PtrToVolDisk	Pointer to the variable that will store the location of the cFE volatile disk
out	SizeOfVolDisk	Pointer to the variable that will store the size of the cFE volatile disk

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.34 CFE\_PSP\_InitSSR()** int32 CFE\_PSP\_InitSSR ( uint32 bus,

```
    uint32 device,
    char * DeviceName )
```

Initializes the Solid State recorder memory for a particular platform.

#### Note

For the MCP750, this simply initializes the Hard Disk device.

#### Parameters

in	<i>bus</i>	
in	<i>device</i>	
in	<i>DeviceName</i>	

#### Return values

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR</i>	on error

### 12.173.2.35 CFE\_PSP\_Main() `void CFE_PSP_Main ( void )`

PSP Entry Point to initialize the OSAL and start up the cFE.

This is the entry point that the real-time OS calls to start our software. This routine will do any BSP/OS-specific setup, then call the entry point of the flight software (i.e. the cFE main entry point).

#### Note

The flight software (i.e. cFE) should not call this routine.

### 12.173.2.36 CFE\_PSP\_MemCpy() `int32 CFE_PSP_MemCpy ( void * dest,`

```
    const void * src,
    uint32 n )
```

Copy 'n' bytes from 'src' to 'dest'.

Copies 'n' bytes from memory address pointed to by 'src' to memory address pointed to by 'dest'.

#### Note

For now we are using the standard C library call 'memcpy' but if we find we need to make it more efficient then we'll implement it in assembly.

#### Parameters

out	<i>dest</i>	Pointer to the destination address to copy to
in	<i>src</i>	Pointer to the address to copy from
in	<i>n</i>	Number of bytes to copy

**Returns**

Always returns CFE\_PSP\_SUCCESS

**12.173.2.37 CFE\_PSP\_MemRangeGet()** `int32 CFE_PSP_MemRangeGet (`  
`uint32 RangeNum,`  
`uint32 * MemoryType,`  
`cpuaddr * StartAddr,`  
`size_t * Size,`  
`size_t * WordSize,`  
`uint32 * Attributes )`

Retrieves one of the records in the CFE\_PSP\_MemoryTable.

**Note**

Because the table is fixed size, the entries are accessed by using the integer index.

**Parameters**

in	<i>RangeNum</i>	A 32-bit integer (starting with 0) specifying the MemoryTable entry.
out	<i>MemoryType</i>	A pointer to the 32-bit integer where the Memory Type is stored. Any defined CFE_PSP_MEM_* enumeration can be specified
out	<i>StartAddr</i>	Pointer to the 32-bit integer where the 32-bit starting address of the memory range is stored.
out	<i>Size</i>	A pointer to the 32-bit integer where the 32-bit size of the memory range is stored.
out	<i>WordSize</i>	A pointer to the 32-bit integer where the minimum addressable size of the range: (CFE_PSP_MEM_SIZE_BYTE, CFE_PSP_MEM_SIZE_WORD, CFE_PSP_MEM_SIZE_DWORD)
out	<i>Attributes</i>	The attributes of the Memory Range: (CFE_PSP_MEM_ATTR_WRITE, CFE_PSP_MEM_ATTR_READ, CFE_PSP_MEM_ATTR_READWRITE)

**Return values**

<code>CFE_PSP_SUCCESS</code>	Memory range returned successfully.
<code>CFE_PSP_INVALID_POINTER</code>	Parameter error
<code>CFE_PSP_INVALID_MEM_RANGE</code>	The index into the table is invalid

**12.173.2.38 CFE\_PSP\_MemRanges()** `uint32 CFE_PSP_MemRanges (`  
`void )`

Returns the number of memory ranges in the CFE\_PSP\_MemoryTable.

**Returns**

Positive integer number of entries in the memory range table

**12.173.2.39 CFE\_PSP\_MemRangeSet()** `int32 CFE_PSP_MemRangeSet (`  
`uint32 RangeNum,`

```

    uint32 MemoryType,
    cpuaddr StartAddr,
    size_t Size,
    size_t WordSize,
    uint32 Attributes )

```

Populates one of the records in the CFE\_PSP\_MemoryTable.

#### Note

Because the table is fixed size, the entries are set by using the integer index. No validation is done with the address or size.

#### Parameters

in	<i>RangeNum</i>	A 32-bit integer (starting with 0) specifying the MemoryTable entry.
in	<i>MemoryType</i>	The memory type to validate, including but not limited to: CFE_PSP_MEM_RAM, CFE_PSP_MEM_EEPROM, or CFE_PSP_MEM_ANY Any defined CFE_PSP_MEM_* enumeration can be specified
in	<i>StartAddr</i>	A 32-bit starting address of the memory range
in	<i>Size</i>	A 32-bit size of the memory range (Address + Size = End Address)
in	<i>WordSize</i>	The minimum addressable size of the range: (CFE_PSP_MEM_SIZE_BYTE, CFE_PSP_MEM_SIZE_WORD, CFE_PSP_MEM_SIZE_DWORD)
in	<i>Attributes</i>	The attributes of the Memory Range: (CFE_PSP_MEM_ATTR_WRITE, CFE_PSP_MEM_ATTR_READ, CFE_PSP_MEM_ATTR_READWRITE)

#### Return values

<i>CFE_PSP_SUCCESS</i>	Memory range set successfully.
<i>CFE_PSP_INVALID_MEM_RANGE</i>	The index into the table is invalid
<i>CFE_PSP_INVALID_MEM_ADDR</i>	Starting address is not valid
<i>CFE_PSP_INVALID_MEM_TYPE</i>	Memory type associated with the range does not match the passed-in type.
<i>CFE_PSP_INVALID_MEM_WORDSIZE</i>	The WordSize parameter is not one of the predefined types.
<i>CFE_PSP_INVALID_MEM_ATTR</i>	The Attributes parameter is not one of the predefined types.
<i>OP_INVALID_MEM_SIZE</i>	The Memory range associated with the address is not large enough to contain Address + Size.

**12.173.2.40 CFE\_PSP\_MemRead16()** `int32 CFE_PSP_MemRead16 (`  
 `cpuaddr MemoryAddress,`  
 `uint16 * uint16Value )`

Read 2 bytes of memory.

#### Parameters

in	<i>MemoryAddress</i>	Address to be read
out	<i>uint16Value</i>	The address content will be copied to the location pointed to by this argument

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.41 CFE\_PSP\_MemRead32()** `int32 CFE_PSP_MemRead32 (`  
`cpuaddr MemoryAddress,`  
`uint32 * uint32Value )`

Read 4 bytes of memory.

**Parameters**

<i>in</i>	<i>MemoryAddress</i>	Address to be read
<i>out</i>	<i>uint32Value</i>	The address content will be copied to the location pointed to by this argument

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.42 CFE\_PSP\_MemRead8()** `int32 CFE_PSP_MemRead8 (`  
`cpuaddr MemoryAddress,`  
`uint8 * ByteValue )`

Read one byte of memory.

**Parameters**

<i>in</i>	<i>MemoryAddress</i>	Address to be read
<i>out</i>	<i>ByteValue</i>	The address content will be copied to the location pointed to by this argument

**Returns**

Always returns CFE\_PSP\_SUCCESS (if implemented)

**Return values**

<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented
--------------------------------------	--------------------

**12.173.2.43 CFE\_PSP\_MemSet()** `int32 CFE_PSP_MemSet (`  
`void * dest,`  
`uint8 value,`

```
    uint32 n )
```

Copy 'n' bytes of value 'value' to 'dest'.

Copies 'n' number of bytes of value 'value' to memory address pointed to by 'dest'.

#### Note

For now we are using the standard C library call 'memset' but if we find we need to make it more efficient then we'll implement it in assembly.

#### Parameters

out	<i>dest</i>	Pointer to the destination address to copy to
in	<i>value</i>	Value to set
in	<i>n</i>	Number of bytes to copy

#### Returns

Always returns CFE\_PSP\_SUCCESS

**12.173.2.44 CFE\_PSP\_MemValidateRange()** `int32 CFE_PSP_MemValidateRange (`  
 `cpuaddr Address,`  
 `size_t Size,`  
 `uint32 MemoryType )`

Validates the memory range and type using the global CFE\_PSP\_MemoryTable.

#### Parameters

in	<i>Address</i>	A 32-bit starting address of the memory range
in	<i>Size</i>	A 32-bit size of the memory range (Address + Size = End Address)
in	<i>MemoryType</i>	The memory type to validate, including but not limited to: CFE_PSP_MEM_RAM, CFE_PSP_MEM_EEPROM, or CFE_PSP_MEM_ANY Any defined CFE_PSP_MEM_* enumeration can be specified

#### Return values

<code>CFE_PSP_SUCCESS</code>	Memory range and type information is valid and can be used.
<code>CFE_PSP_INVALID_MEM_ADDR</code>	Starting address is not valid
<code>CFE_PSP_INVALID_MEM_TYPE</code>	Memory type associated with the range does not match the passed-in type.
<code>CFE_PSP_INVALID_MEM_RANGE</code>	The Memory range associated with the address is not large enough to contain Address + Size.

**12.173.2.45 CFE\_PSP\_MemWrite16()** `int32 CFE_PSP_MemWrite16 (`  
 `cpuaddr MemoryAddress,`  
 `uint16 uint16Value )`

Write 2 bytes of memory.

**Parameters**

out	<i>MemoryAddress</i>	Address to be written to
in	<i>uint16Value</i>	The content pointed to by this argument will be copied to the address

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.46 CFE\_PSP\_MemWrite32()** *int32 CFE\_PSP\_MemWrite32 (*

*cpuaddr MemoryAddress,  
uint32 uint32Value )*

Write 4 bytes of memory.

**Parameters**

out	<i>MemoryAddress</i>	Address to be written to
in	<i>uint32Value</i>	The content pointed to by this argument will be copied to the address

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.47 CFE\_PSP\_MemWrite8()** *int32 CFE\_PSP\_MemWrite8 (*

*cpuaddr MemoryAddress,  
uint8 ByteValue )*

Write one byte of memory.

**Parameters**

out	<i>MemoryAddress</i>	Address to be written to
in	<i>ByteValue</i>	The content pointed to by this argument will be copied to the address

**Returns**

Always returns CFE\_PSP\_SUCCESS (if implemented)

**Return values**

<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented
--------------------------------------	--------------------

```
12.173.2.48 CFE_PSP_Panic() void CFE_PSP_Panic (
    int32 ErrorCode )
```

Aborts the cFE startup.

Provides a common interface to abort the cFE startup process and return back to the OS.

#### Note

This is called by the cFE Core startup code when it needs to abort the cFE startup. This should not be called by applications.

#### Parameters

in	ErrorCode	Reason for exiting
----	-----------	--------------------

```
12.173.2.49 CFE_PSP_PortRead16() int32 CFE_PSP_PortRead16 (
    cpuaddr PortAddress,
    uint16 * uint16Value )
```

Read 2 bytes of memory.

#### Parameters

in	PortAddress	Address to be read
out	uint16Value	The address content will be copied to the location pointed to by this argument

#### Return values

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

```
12.173.2.50 CFE_PSP_PortRead32() int32 CFE_PSP_PortRead32 (
    cpuaddr PortAddress,
    uint32 * uint32Value )
```

Read 4 bytes of memory.

#### Parameters

in	PortAddress	Address to be read
out	uint32Value	The address content will be copied to the location pointed to by this argument

#### Return values

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.

**Return values**

<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented
--------------------------------------	--------------------

**12.173.2.51 CFE\_PSP\_PortRead8()** `int32 CFE_PSP_PortRead8 (`  
`cpuaddr PortAddress,`  
`uint8 * ByteValue )`

Read one byte of memory.

**Parameters**

<code>in</code>	<i>PortAddress</i>	Address to be read
<code>out</code>	<i>ByteValue</i>	The address content will be copied to the location pointed to by this argument

**Returns**

Always returns `CFE_PSP_SUCCESS` (if implemented)

**Return values**

<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented
--------------------------------------	--------------------

**12.173.2.52 CFE\_PSP\_PortWrite16()** `int32 CFE_PSP_PortWrite16 (`  
`cpuaddr PortAddress,`  
`uint16 uint16Value )`

Write 2 bytes of memory.

**Parameters**

<code>out</code>	<i>PortAddress</i>	Address to be written to
<code>in</code>	<i>uint16Value</i>	the content pointed to by this argument will be copied to the address

**Return values**

<code>CFE_PSP_SUCCESS</code>	on success
<code>CFE_PSP_ERROR_ADDRESS_MISALIGNED</code>	if the address is not aligned to a 16-bit addressing scheme.
<code>CFE_PSP_ERROR_NOT_IMPLEMENTED</code>	if not implemented

**12.173.2.53 CFE\_PSP\_PortWrite32()** `int32 CFE_PSP_PortWrite32 (`  
`cpuaddr PortAddress,`  
`uint32 uint32Value )`

Write 4 bytes of memory.

**Parameters**

<i>out</i>	<i>PortAddress</i>	Address to be written to
<i>in</i>	<i>uint32Value</i>	The content pointed to by this argument will be copied to the address

**Return values**

<i>CFE_PSP_SUCCESS</i>	on success
<i>CFE_PSP_ERROR_ADDRESS_MISALIGNED</i>	if the address is not aligned to a 16-bit addressing scheme.
<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented

**12.173.2.54 CFE\_PSP\_PortWrite8()** `int32 CFE_PSP_PortWrite8( cpuaddr PortAddress, uint8 ByteValue )`

Write one byte of memory.

**Parameters**

<i>out</i>	<i>PortAddress</i>	Address to be written to
<i>in</i>	<i>ByteValue</i>	The content pointed to by this argument will be copied to the address

**Returns**

Always returns CFE\_PSP\_SUCCESS (if implemented)

**Return values**

<i>CFE_PSP_ERROR_NOT_IMPLEMENTED</i>	if not implemented
--------------------------------------	--------------------

**12.173.2.55 CFE\_PSP\_ReadFromCDS()** `int32 CFE_PSP_ReadFromCDS( void * PtrToDataToRead, uint32 CDSOffset, uint32 NumBytes )`

Reads from the CDS Block.

**Parameters**

<i>out</i>	<i>PtrToDataToRead</i>	Pointer to the location that will store the data to be read from the CDS
<i>in</i>	<i>CDSOffset</i>	CDS offset
<i>in</i>	<i>NumBytes</i>	Number of bytes to read

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

**12.173.2.56 CFE\_PSP\_Restart()** void CFE\_PSP\_Restart ( uint32 resetType )

Entry point back to the BSP to restart the processor.

The flight software calls this routine to restart the processor.

#### Parameters

in	resetType	Type of reset
----	-----------	---------------

**12.173.2.57 CFE\_PSP\_SetDefaultExceptionEnvironment()** void CFE\_PSP\_SetDefaultExceptionEnvironment ( void )

Defines the CPU and FPU exceptions that are enabled for each cFE Task/App.

This function sets a default exception environment that can be used

#### Note

The exception environment is local to each task. Therefore, this must be Called for each task that wants to do floating point and catch exceptions.

**12.173.2.58 CFE\_PSP\_WatchdogDisable()** void CFE\_PSP\_WatchdogDisable ( void )

Disables the watchdog timer.

**12.173.2.59 CFE\_PSP\_WatchdogEnable()** void CFE\_PSP\_WatchdogEnable ( void )

Enables the watchdog timer.

**12.173.2.60 CFE\_PSP\_WatchdogGet()** uint32 CFE\_PSP\_WatchdogGet ( void )

Gets the watchdog time in milliseconds.

#### Returns

The current watchdog value

**12.173.2.61 CFE\_PSP\_WatchdogInit()** void CFE\_PSP\_WatchdogInit ( void )

Configures the watchdog timer.

To set up the timer resolution and/or other settings custom to this platform.

**12.173.2.62 CFE\_PSP\_WatchdogService()** void CFE\_PSP\_WatchdogService ( void )

Services the watchdog timer according to the value set in WatchDogSet.

Load the watchdog timer with a count that corresponds to the millisecond time given in the parameter.

**Note**

Currently an ExpireTime value of zero will result in the minimum reset time of 4.5 seconds. All other ExpireTime values will result in a reset time of 5.5 seconds.

**12.173.2.63 CFE\_PSP\_WatchdogSet()** `void CFE_PSP_WatchdogSet (`  
 `uint32 WatchdogValue )`

Sets the watchdog time in milliseconds.

**Parameters**

in	<i>WatchdogValue</i>	New watchdog value to set
----	----------------------	---------------------------

**12.173.2.64 CFE\_PSP\_WriteToCDS()** `int32 CFE_PSP_WriteToCDS (`  
 `const void * PtrToDataToWrite,`  
 `uint32 CDSOffset,`  
 `uint32 NumBytes )`

Writes to the CDS Block.

**Parameters**

in	<i>PtrToDataToWrite</i>	Pointer to the data that will be written to the CDS
in	<i>CDSOffset</i>	CDS offset
in	<i>NumBytes</i>	Number of bytes to write

**Returns**

0 (OS\_SUCCESS or CFE\_PSP\_SUCCESS) on success, -1 (OS\_ERROR or CFE\_PSP\_ERROR) on error

## 12.174 psp/fsw/inc/cfe\_psp\_error.h File Reference

cFE PSP Error header

```
#include "common_types.h"
```

**Macros**

- #define `CFE_PSP_STATUS_C(X)` ((`CFE_PSP_Status_t`)(X))  
*PSP Status macro for literal.*
- #define `CFE_PSP_STATUS_STRING_LENGTH` 12  
*PSP Status converted to string length limit.*
- #define `CFE_PSP_SUCCESS` (`CFE_PSP_STATUS_C(0)`)
- #define `CFE_PSP_ERROR` (`CFE_PSP_STATUS_C(-1)`)
- #define `CFE_PSP_INVALID_POINTER` (`CFE_PSP_STATUS_C(-2)`)
- #define `CFE_PSP_ERROR_ADDRESS_MISALIGNED` (`CFE_PSP_STATUS_C(-3)`)
- #define `CFE_PSP_ERROR_TIMEOUT` (`CFE_PSP_STATUS_C(-4)`)
- #define `CFE_PSP_INVALID_INT_NUM` (`CFE_PSP_STATUS_C(-5)`)
- #define `CFE_PSP_INVALID_MEM_ADDR` (`CFE_PSP_STATUS_C(-21)`)
- #define `CFE_PSP_INVALID_MEM_TYPE` (`CFE_PSP_STATUS_C(-22)`)

- #define CFE\_PSP\_INVALID\_MEM\_RANGE (CFE\_PSP\_STATUS\_C(-23))
- #define CFE\_PSP\_INVALID\_MEM\_WORDSIZE (CFE\_PSP\_STATUS\_C(-24))
- #define CFE\_PSP\_INVALID\_MEM\_SIZE (CFE\_PSP\_STATUS\_C(-25))
- #define CFE\_PSP\_INVALID\_MEM\_ATTR (CFE\_PSP\_STATUS\_C(-26))
- #define CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED (CFE\_PSP\_STATUS\_C(-27))
- #define CFE\_PSP\_INVALID\_MODULE\_NAME (CFE\_PSP\_STATUS\_C(-28))
- #define CFE\_PSP\_INVALID\_MODULE\_ID (CFE\_PSP\_STATUS\_C(-29))
- #define CFE\_PSP\_NO\_EXCEPTION\_DATA (CFE\_PSP\_STATUS\_C(-30))

## Typedefs

- typedef int32 CFE\_PSP\_Status\_t
  - PSP Status type for readability and potentially type safety.*
- typedef char CFE\_PSP\_StatusString\_t[CFE\_PSP\_STATUS\_STRING\_LENGTH]
  - For the [CFE\\_PSP\\_StatusToString\(\)](#) function, to ensure everyone is making an array of the same length.*

## Functions

- char \* [CFE\\_PSP\\_StatusToString](#) (CFE\_PSP\_Status\_t status, CFE\_PSP\_StatusString\_t \*status\_string)
  - Convert status to a string.*

### 12.174.1 Detailed Description

cFE PSP Error header

### 12.174.2 Macro Definition Documentation

**12.174.2.1 CFE\_PSP\_ERROR** #define CFE\_PSP\_ERROR (CFE\_PSP\_STATUS\_C(-1))  
Definition at line 66 of file cfe\_psp\_error.h.

**12.174.2.2 CFE\_PSP\_ERROR\_ADDRESS\_MISALIGNED** #define CFE\_PSP\_ERROR\_ADDRESS\_MISALIGNED (CFE\_PSP\_STATUS\_C(-3))  
Definition at line 68 of file cfe\_psp\_error.h.

**12.174.2.3 CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED** #define CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED (CFE\_PSP\_STATUS\_C(-27))  
Definition at line 77 of file cfe\_psp\_error.h.

**12.174.2.4 CFE\_PSP\_ERROR\_TIMEOUT** #define CFE\_PSP\_ERROR\_TIMEOUT (CFE\_PSP\_STATUS\_C(-4))  
Definition at line 69 of file cfe\_psp\_error.h.

**12.174.2.5 CFE\_PSP\_INVALID\_INT\_NUM** #define CFE\_PSP\_INVALID\_INT\_NUM (CFE\_PSP\_STATUS\_C(-5))  
Definition at line 70 of file cfe\_psp\_error.h.

**12.174.2.6 CFE\_PSP\_INVALID\_MEM\_ADDR** #define CFE\_PSP\_INVALID\_MEM\_ADDR (CFE\_PSP\_STATUS\_C(-21))  
Definition at line 71 of file cfe\_psp\_error.h.

**12.174.2.7 CFE\_PSP\_INVALID\_MEM\_ATTR** #define CFE\_PSP\_INVALID\_MEM\_ATTR ([CFE\\_PSP\\_STATUS\\_C](#)(-26))  
Definition at line 76 of file cfe\_psp\_error.h.

**12.174.2.8 CFE\_PSP\_INVALID\_MEM\_RANGE** #define CFE\_PSP\_INVALID\_MEM\_RANGE ([CFE\\_PSP\\_STATUS\\_C](#)(-23))  
Definition at line 73 of file cfe\_psp\_error.h.

**12.174.2.9 CFE\_PSP\_INVALID\_MEM\_SIZE** #define CFE\_PSP\_INVALID\_MEM\_SIZE ([CFE\\_PSP\\_STATUS\\_C](#)(-25))  
Definition at line 75 of file cfe\_psp\_error.h.

**12.174.2.10 CFE\_PSP\_INVALID\_MEM\_TYPE** #define CFE\_PSP\_INVALID\_MEM\_TYPE ([CFE\\_PSP\\_STATUS\\_C](#)(-22))  
Definition at line 72 of file cfe\_psp\_error.h.

**12.174.2.11 CFE\_PSP\_INVALID\_MEM\_WORDSIZE** #define CFE\_PSP\_INVALID\_MEM\_WORDSIZE ([CFE\\_PSP\\_STATUS\\_C](#)(-24))  
Definition at line 74 of file cfe\_psp\_error.h.

**12.174.2.12 CFE\_PSP\_INVALID\_MODULE\_ID** #define CFE\_PSP\_INVALID\_MODULE\_ID ([CFE\\_PSP\\_STATUS\\_C](#)(-29))  
Definition at line 79 of file cfe\_psp\_error.h.

**12.174.2.13 CFE\_PSP\_INVALID\_MODULE\_NAME** #define CFE\_PSP\_INVALID\_MODULE\_NAME ([CFE\\_PSP\\_STATUS\\_C](#)(-28))  
Definition at line 78 of file cfe\_psp\_error.h.

**12.174.2.14 CFE\_PSP\_INVALID\_POINTER** #define CFE\_PSP\_INVALID\_POINTER ([CFE\\_PSP\\_STATUS\\_C](#)(-2))  
Definition at line 67 of file cfe\_psp\_error.h.

**12.174.2.15 CFE\_PSP\_NO\_EXCEPTION\_DATA** #define CFE\_PSP\_NO\_EXCEPTION\_DATA ([CFE\\_PSP\\_STATUS\\_C](#)(-30))  
Definition at line 80 of file cfe\_psp\_error.h.

**12.174.2.16 CFE\_PSP\_STATUS\_C** #define CFE\_PSP\_STATUS\_C(  
    X ) (([CFE\\_PSP\\_Status\\_t](#)) (X ))

PSP Status macro for literal.

Definition at line 36 of file cfe\_psp\_error.h.

**12.174.2.17 CFE\_PSP\_STATUS\_STRING\_LENGTH** #define CFE\_PSP\_STATUS\_STRING\_LENGTH 12  
PSP Status converted to string length limit.  
Used for sizing CFE\_PSP\_StatusString\_t intended for use in printing CFE\_PSP\_Status\_t values Sized for Id (LONG←\_MIN) including NULL  
Definition at line 44 of file cfe\_psp\_error.h.

**12.174.2.18 CFE\_PSP\_SUCCESS** #define CFE\_PSP\_SUCCESS ([CFE\\_PSP\\_STATUS\\_C](#)(0))  
Definition at line 65 of file cfe\_psp\_error.h.

### 12.174.3 Typedef Documentation

**12.174.3.1 CFE\_PSP\_Status\_t** `typedef int32 CFE_PSP_Status_t`  
PSP Status type for readability and potentially type safety.  
Definition at line 31 of file cfe\_psp\_error.h.

**12.174.3.2 CFE\_PSP\_StatusString\_t** `typedef char CFE_PSP_StatusString_t[CFE_PSP_STATUS_STRING_LENGTH]`  
For the `CFE_PSP_StatusToString()` function, to ensure everyone is making an array of the same length.  
Definition at line 50 of file cfe\_psp\_error.h.

### 12.174.4 Function Documentation

**12.174.4.1 CFE\_PSP\_StatusToString()** `char* CFE_PSP_StatusToString (`  
`CFE_PSP_Status_t status,`  
`CFE_PSP_StatusString_t * status_string )`

Convert status to a string.

#### Parameters

in	<i>status</i>	Status value to convert
out	<i>status_string</i>	Buffer to store status converted to string

#### Returns

Passed in string pointer

## Index

\_EXTENSION\_  
    common\_types.h, 1230

accuracy  
    OS\_timebase\_prop\_t, 685  
    OS\_timer\_prop\_t, 686

ActionResult  
    LC\_ARTEEntry\_t, 643

ActiveAPs  
    LC\_HkTlm\_Payload\_t, 646

ActiveBuffer  
    CFE\_TBL\_HousekeepingTlm\_Payload, 595

ActiveBufferAddr  
    CFE\_TBL\_TblRegPacket\_Payload, 606

ActiveTableFlag  
    CFE\_TBL\_DumpCmd\_Payload, 589  
    CFE\_TBL\_ValidateCmd\_Payload, 609

ActualLength  
    OS\_SockAddr\_t, 680

addr  
    OS\_module\_prop\_t, 678

AddrData  
    OS\_SockAddr\_t, 680

Address  
    OS\_static\_symbol\_record\_t, 682

AddressesAreValid  
    CFE\_ES\_AppInfo, 487

ADTHandle  
    LC\_OperData\_t, 652

ADTPtr  
    LC\_OperData\_t, 652

AlignPtr  
    OS\_SockAddrData\_t, 681

AlignU32  
    OS\_SockAddrData\_t, 681

APNumber  
    LC\_ResetAPStats\_Payload\_t, 655  
    LC\_SetAPPPermOff\_Payload\_t, 662  
    LC\_SetAPState\_Payload\_t, 663

AppData  
    CFE\_EVS\_HousekeepingTlm\_Payload, 543

AppDataCDSHandle  
    LC\_OperData\_t, 652

AppDataFilename  
    CFE\_EVS\_AppDataCmd\_Payload, 530

AppEnableStatus  
    CFE\_EVS\_AppTlmData, 534

AppEntryPoint  
    CFE\_ES\_StartAppCmd\_Payload, 523

AppFileName  
    CFE\_ES\_AppReloadCmd\_Payload, 491

                CFE\_ES\_StartAppCmd\_Payload, 523

AppID  
    CFE\_EVS\_AppTlmData, 534

AppId  
    CFE\_ES\_TaskInfo, 527  
    CFE\_SB\_PipeInfoEntry, 571

AppInfo  
    CFE\_ES\_OneAppTlm\_Payload, 509

Application  
    CFE\_ES\_AppNameCmd\_Payload, 490  
    CFE\_ES\_AppReloadCmd\_Payload, 491  
    CFE\_ES\_SendMemPoolStatsCmd\_Payload, 518  
    CFE\_ES\_StartAppCmd\_Payload, 523

ApplicationID  
    CFE\_FS\_Header, 558

AppMessageSentCounter  
    CFE\_EVS\_AppTlmData, 534

AppMessageSquelchedCounter  
    CFE\_EVS\_AppTlmData, 534

AppName  
    CFE\_ES\_TaskInfo, 527  
    CFE\_EVS\_AppNameBitMaskCmd\_Payload, 531  
    CFE\_EVS\_AppNameCmd\_Payload, 532  
    CFE\_EVS\_AppNameEventIDCmd\_Payload, 532  
    CFE\_EVS\_AppNameEventIDMaskCmd\_Payload, 533  
    CFE\_EVS\_PacketID, 548  
    CFE\_SB\_PipeInfoEntry, 571  
    CFE\_SB\_RoutingFileEntry, 574

apps/lc/config/default\_lc\_fncodes.h, 686

apps/lc/config/default\_lc\_interface\_cfg.h, 687

apps/lc/config/default\_lc\_internal\_cfg.h, 688

apps/lc/config/default\_lc\_mission\_cfg.h, 688

apps/lc/config/default\_lc\_msg.h, 689

apps/lc/config/default\_lc\_msghDefs.h, 689

apps/lc/config/default\_lc\_msgids.h, 693

apps/lc/config/default\_lc\_msghStruct.h, 694

apps/lc/config/default\_lc\_platform\_cfg.h, 695

apps/lc/config/default\_lc\_tbl.h, 695

apps/lc/config/default\_lc\_tblDefs.h, 695

apps/lc/config/default\_lc\_tblStruct.h, 705

apps/lc/docs/dox\_src/cfs\_lc.dox, 706

apps/lc/fsw/inc/lc\_eventids.h, 706

apps/lc/fsw/inc/lc\_perfids.h, 709

apps/lc/fsw/src/lc\_action.c, 709

apps/lc/fsw/src/lc\_action.h, 715

apps/lc/fsw/src/lc\_app.c, 721

apps/lc/fsw/src/lc\_app.h, 733

apps/lc/fsw/src/lc\_cmds.c, 749

apps/lc/fsw/src/lc\_cmds.h, 759

apps/lc/fsw/src/lc\_custom.c, 769

apps/lc/fsw/src/lc\_custom.h, 771  
 apps/lc/fsw/src/lc\_dispatch.c, 773  
 apps/lc/fsw/src/lc\_dispatch.h, 781  
 apps/lc/fsw/src/lc\_utils.c, 782  
 apps/lc/fsw/src/lc\_utils.h, 785  
 apps/lc/fsw/src/lc\_verify.h, 788  
 apps/lc/fsw/src/lc\_version.h, 788  
 apps/lc/fsw/src/lc\_watch.c, 789  
 apps/lc/fsw/src/lc\_watch.h, 803  
 apps/lc/fsw/tables/lc\_def\_adt.c, 818  
 apps/lc/fsw/tables/lc\_def\_wdt.c, 819  
**APResults**  
     LC\_HkTlm\_Payload\_t, 646  
**APSSampleCount**  
     LC\_AppData\_t, 641  
     LC\_HkTlm\_Payload\_t, 647  
**ARGCHECK**  
     osapi-macros.h, 1251  
**ARTDataCDSHandle**  
     LC\_OperData\_t, 652  
**ARTHandle**  
     LC\_OperData\_t, 653  
**ARTPtr**  
     LC\_OperData\_t, 653  
**AtToneDelay**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 614  
**AtToneLatch**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 614  
**AtToneLeapSeconds**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 615  
     CFE\_TIME\_ToneDataCmd\_Payload, 637  
**AtToneMET**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 615  
     CFE\_TIME\_ToneDataCmd\_Payload, 637  
**AtToneState**  
     CFE\_TIME\_ToneDataCmd\_Payload, 638  
**AtToneSTCF**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 615  
     CFE\_TIME\_ToneDataCmd\_Payload, 638  
**BitMask**  
     CFE\_EVS\_AppNameBitMaskCmd\_Payload, 531  
     CFE\_EVS\_BitMaskCmd\_Payload, 535  
     LC\_WDTEEntry\_t, 666  
**block\_size**  
     OS\_statvfs\_t, 683  
**blocks\_free**  
     OS\_statvfs\_t, 683  
**BlockSize**  
     CFE\_ES\_BlockStats, 491  
**BlockStats**  
     CFE\_ES\_MemPoolStats, 507  
**BootSource**  
     CFE\_ES\_HousekeepingTlm\_Payload, 500  
**bss\_address**  
     OS\_module\_address\_t, 677  
**bss\_size**  
     OS\_module\_address\_t, 677  
**BSSAddress**  
     CFE\_ES\_AppInfo, 487  
**BSSSize**  
     CFE\_ES\_AppInfo, 487  
**BUFF\_SIZE**  
     cfe\_psp.h, 1272  
**Buffer**  
     OS\_SockAddrData\_t, 681  
**BUGCHECK**  
     osapi-macros.h, 1251  
**BUGCHECK\_VOID**  
     osapi-macros.h, 1252  
**BUGREPORT**  
     osapi-macros.h, 1252  
**build/osal\_public\_api/inc/osconfig.h**, 819  
**ByteAlign4**  
     CFE\_TBL\_TblRegPacket\_Payload, 606  
**ByteAlignPad1**  
     CFE\_TBL\_HousekeepingTlm\_Payload, 595  
**ByteAlignSpare**  
     CFE\_ES\_CDSRegDumpRec, 492  
**CCSDS\_ExtendedHeader**, 485  
     Subsystem, 485  
     SystemId, 485  
**CCSDS\_ExtendedHeader\_t**  
     ccsds\_hdr.h, 1084  
**ccsds\_hdr.h**  
     CCSDS\_ExtendedHeader\_t, 1084  
     CCSDS\_PrimaryHeader\_t, 1084  
**CCSDS\_PrimaryHeader**, 485  
     Length, 486  
     Sequence, 486  
     StreamId, 486  
**CCSDS\_PrimaryHeader\_t**  
     ccsds\_hdr.h, 1084  
**CdsName**  
     CFE\_ES\_DeleteCDSCmd\_Payload, 495  
**CDSSavedOnExit**  
     LC\_AppData\_t, 642  
**cFE Access Table Content APIs**, 328  
     CFE\_TBL\_GetAddress, 328  
     CFE\_TBL\_GetAddresses, 329  
     CFE\_TBL\_ReleaseAddress, 330  
     CFE\_TBL\_ReleaseAddresses, 331  
**cFE Application Behavior APIs**, 207  
     CFE\_ES\_ExitApp, 207  
     CFE\_ES\_IncrementTaskCounter, 207  
     CFE\_ES\_RunLoop, 208  
     CFE\_ES\_WaitForStartupSync, 209

- CFE\_ES\_WaitForSystemState, 209
- cFE Application Control APIs, 204
  - CFE\_ES\_DeleteApp, 204
  - CFE\_ES\_ReloadApp, 204
  - CFE\_ES\_RestartApp, 205
- cFE Child Task APIs, 220
  - CFE\_ES\_CreateChildTask, 220
  - CFE\_ES\_DeleteChildTask, 221
  - CFE\_ES\_ExitChildTask, 222
  - CFE\_ES\_GetTaskIDByName, 222
  - CFE\_ES\_GetTaskName, 223
- cFE Clock State Flag Defines, 359
  - CFE\_TIME\_FLAG\_ADD1HZ, 359
  - CFE\_TIME\_FLAG\_ADDADJ, 359
  - CFE\_TIME\_FLAG\_ADDTCL, 359
  - CFE\_TIME\_FLAG\_CLKSET, 359
  - CFE\_TIME\_FLAG\_CMDFLY, 360
  - CFE\_TIME\_FLAG\_FLYING, 360
  - CFE\_TIME\_FLAG\_GDTONE, 360
  - CFE\_TIME\_FLAG\_REFERR, 360
  - CFE\_TIME\_FLAG\_SERVER, 360
  - CFE\_TIME\_FLAG\_SIGPRI, 360
  - CFE\_TIME\_FLAG\_SRCINT, 360
  - CFE\_TIME\_FLAG\_SRVFLY, 360
  - CFE\_TIME\_FLAG\_UNUSED, 360
- cFE Critical Data Store APIs, 227
  - CFE\_ES\_CopyToCDS, 227
  - CFE\_ES\_GetCDSBlockIDByName, 228
  - CFE\_ES\_GetCDSBlockName, 228
  - CFE\_ES\_RegisterCDS, 229
  - CFE\_ES\_RestoreFromCDS, 230
- cFE Entry/Exit APIs, 202
  - CFE\_ES\_Main, 202
  - CFE\_ES\_ResetCFE, 202
- cFE External Time Source APIs, 349
  - CFE\_TIME\_ExternalGPS, 349
  - CFE\_TIME\_ExternalMET, 350
  - CFE\_TIME\_ExternalTime, 350
  - CFE\_TIME\_ExternalTone, 351
  - CFE\_TIME\_RegisterSynchCallback, 351
  - CFE\_TIME\_UnregisterSynchCallback, 352
- cFE File Header Management APIs, 256
  - CFE\_FS\_InitHeader, 256
  - CFE\_FS\_ReadHeader, 256
  - CFE\_FS\_SetTimestamp, 257
  - CFE\_FS\_WriteHeader, 258
- cFE File Utility APIs, 260
  - CFE\_FS\_BackgroundFileDumpsPending, 260
  - CFE\_FS\_BackgroundFileDumpRequest, 261
  - CFE\_FS\_ExtractFilenameFromPath, 261
  - CFE\_FS\_GetDefaultExtension, 262
  - CFE\_FS\_GetDefaultMountPoint, 262
  - CFE\_FS\_ParseInputFileName, 262
  - CFE\_FS\_ParseInputFileNameEx, 263
- cFE Generic Counter APIs, 241
  - CFE\_ES\_DeleteGenCounter, 241
  - CFE\_ES\_GetGenCount, 242
  - CFE\_ES\_GetGenCounterIDByName, 242
  - CFE\_ES\_GetGenCounterName, 243
  - CFE\_ES\_IncrementGenCounter, 244
  - CFE\_ES\_RegisterGenCounter, 244
  - CFE\_ES\_SetGenCount, 245
- cFE Generic Message APIs, 265
  - CFE\_MSG\_Init, 265
- cFE Get Current Time APIs, 338
  - CFE\_TIME\_GetMET, 338
  - CFE\_TIME\_GetMETseconds, 338
  - CFE\_TIME\_GetMETsubsecs, 339
  - CFE\_TIME\_GetTAI, 339
  - CFE\_TIME\_GetTime, 340
  - CFE\_TIME\_GetUTC, 340
- cFE Get Table Information APIs, 333
  - CFE\_TBL\_GetInfo, 333
  - CFE\_TBL\_GetStatus, 334
  - CFE\_TBL\_NotifyByMessage, 334
- cFE Get Time Information APIs, 341
  - CFE\_TIME\_GetClockInfo, 341
  - CFE\_TIME\_GetClockState, 341
  - CFE\_TIME\_GetLeapSeconds, 342
  - CFE\_TIME\_GetSTCF, 342
- cFE Information APIs, 211
  - CFE\_ES\_GetAppID, 211
  - CFE\_ES\_GetAppIDByName, 212
  - CFE\_ES\_GetAppInfo, 212
  - CFE\_ES\_GetAppName, 213
  - CFE\_ES\_GetLibIDByName, 214
  - CFE\_ES\_GetLibInfo, 214
  - CFE\_ES\_GetLibName, 215
  - CFE\_ES\_GetModuleInfo, 216
  - CFE\_ES\_GetResetType, 217
  - CFE\_ES\_GetTaskID, 217
  - CFE\_ES\_GetTaskInfo, 218
- cFE Manage Table Content APIs, 322
  - CFE\_TBL\_DumpToBuffer, 322
  - CFE\_TBL\_Load, 323
  - CFE\_TBL\_Manage, 324
  - CFE\_TBL\_Modified, 325
  - CFE\_TBL\_Update, 326
  - CFE\_TBL\_Validate, 326
- cFE Memory Manager APIs, 232
  - CFE\_ES\_GetMemPoolStats, 232
  - CFE\_ES\_GetPoolBuf, 233
  - CFE\_ES\_GetPoolBufInfo, 233
  - CFE\_ES\_PoolCreate, 234
  - CFE\_ES\_PoolCreateEx, 235
  - CFE\_ES\_PoolCreateNoSem, 236
  - CFE\_ES\_PoolDelete, 237
  - CFE\_ES\_PutPoolBuf, 238

- cFE Message Characteristics APIs, 306  
 CFE\_SB\_GetUserData, 306  
 CFE\_SB\_GetUserDataLength, 306  
 CFE\_SB\_MessageStringGet, 307  
 CFE\_SB\_MessageStringSet, 308  
 CFE\_SB\_SetUserDataLength, 309  
 CFE\_SB\_TimeStampMsg, 309
- cFE Message Extended Header APIs, 275  
 CFE\_MSG\_GetEDSVersion, 275  
 CFE\_MSG\_GetEndian, 276  
 CFE\_MSG\_GetPlaybackFlag, 276  
 CFE\_MSG\_GetSubsystem, 277  
 CFE\_MSG\_GetSystem, 277  
 CFE\_MSG\_SetEDSVersion, 278  
 CFE\_MSG\_SetEndian, 278  
 CFE\_MSG\_SetPlaybackFlag, 279  
 CFE\_MSG\_SetSubsystem, 279  
 CFE\_MSG\_SetSystem, 280
- cFE Message ID APIs, 311  
 CFE\_SB\_CmdTopicIdToMsgId, 311  
 CFE\_SB\_GlobalCmdTopicIdToMsgId, 311  
 CFE\_SB\_GlobalTlmTopicIdToMsgId, 312  
 CFE\_SB\_IsValidMsgId, 312  
 CFE\_SB\_LocalCmdTopicIdToMsgId, 313  
 CFE\_SB\_LocalTlmTopicIdToMsgId, 313  
 CFE\_SB\_MsgId\_Equal, 313  
 CFE\_SB\_MsgIdToValue, 314  
 CFE\_SB\_TlmTopicIdToMsgId, 314  
 CFE\_SB\_ValueToMsgId, 315
- cFE Message Id APIs, 286  
 CFE\_MSG\_GetMsgId, 286  
 CFE\_MSG.GetTypeFromMsgId, 286  
 CFE\_MSG\_SetMsgId, 287
- cFE Message Integrity APIs, 288  
 CFE\_MSG\_OriginationAction, 288  
 CFE\_MSG\_VerificationAction, 289
- cFE Message Primary Header APIs, 266  
 CFE\_MSG\_GetApld, 266  
 CFE\_MSG\_GetHasSecondaryHeader, 267  
 CFE\_MSG\_GetHeaderVersion, 267  
 CFE\_MSG\_GetNextSequenceCount, 268  
 CFE\_MSG\_GetSegmentationFlag, 268  
 CFE\_MSG\_GetSequenceCount, 269  
 CFE\_MSG.GetSize, 269  
 CFE\_MSG.GetType, 270  
 CFE\_MSG\_SetApld, 270  
 CFE\_MSG\_SetHasSecondaryHeader, 271  
 CFE\_MSG\_SetHeaderVersion, 271  
 CFE\_MSG\_SetSegmentationFlag, 272  
 CFE\_MSG\_SetSequenceCount, 272  
 CFE\_MSG\_SetSize, 273  
 CFE\_MSG\_SetType, 273
- cFE Message Secondary Header APIs, 281  
 CFE\_MSG\_GenerateChecksum, 281
- CFE\_MSG\_GetFcnCode, 282  
 CFE\_MSG\_GetMsgTime, 282  
 CFE\_MSG\_SetFcnCode, 283  
 CFE\_MSG\_SetMsgTime, 283  
 CFE\_MSG\_ValidateChecksum, 284
- cFE Message Subscription Control APIs, 295  
 CFE\_SB\_Subscribe, 295  
 CFE\_SB\_SubscribeEx, 296  
 CFE\_SB\_SubscribeLocal, 297  
 CFE\_SB\_Unsubscribe, 297  
 CFE\_SB\_UnsubscribeLocal, 298
- cFE Miscellaneous APIs, 224  
 CFE\_ES\_BackgroundWakeUp, 224  
 CFE\_ES\_CalculateCRC, 224  
 CFE\_ES\_ProcessAsyncEvent, 225  
 CFE\_ES\_WriteToSysLog, 225
- cFE Miscellaneous Time APIs, 354  
 CFE\_TIME\_Local1HzISR, 354  
 CFE\_TIME\_Print, 354
- cFE Performance Monitor APIs, 239  
 CFE\_ES\_PerfLogAdd, 240  
 CFE\_ES\_PerfLogEntry, 239  
 CFE\_ES\_PerfLogExit, 239
- cFE Pipe Management APIs, 290  
 CFE\_SB\_CreatePipe, 290  
 CFE\_SB\_DeletePipe, 291  
 CFE\_SB\_GetPipeIdByName, 291  
 CFE\_SB\_GetPipeName, 292  
 CFE\_SB\_GetPipeOpts, 293  
 CFE\_SB\_PipeId\_ToIndex, 293  
 CFE\_SB\_SetPipeOpts, 294
- cFE Registration APIs, 247, 317  
 CFE\_EVS\_Register, 247  
 CFE\_TBL\_Register, 317  
 CFE\_TBL\_Share, 319  
 CFE\_TBL\_Unregister, 320
- cFE Reset Event Filter APIs, 254  
 CFE\_EVS\_ResetAllFilters, 254  
 CFE\_EVS\_ResetFilter, 254
- cFE Resource ID APIs, 199  
 CFE\_ES\_AppID\_ToIndex, 199  
 CFE\_ES\_CounterID\_ToIndex, 199  
 CFE\_ES\_LibID\_ToIndex, 200  
 CFE\_ES\_TaskID\_ToIndex, 201
- cFE Resource ID base values, 357  
 CFE\_CONFIGID\_BASE, 358  
 CFE\_ES\_APPID\_BASE, 357  
 CFE\_ES\_CDSBLOCKID\_BASE, 358  
 CFE\_ES\_COUNTID\_BASE, 357  
 CFE\_ES\_LIBID\_BASE, 357  
 CFE\_ES\_POOLID\_BASE, 358  
 CFE\_ES\_TASKID\_BASE, 357  
 CFE\_RESOURCEID\_CONFIGID\_BASE\_OFFSET, 357

CFE\_RESOURCEID\_ES\_APPID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_ES\_CDSBLOCKID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_ES\_COUNTID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_ES\_LIBID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_ES\_POOLID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_ES\_TASKID\_BASE\_OFFSET, 357  
CFE\_RESOURCEID\_SB\_PIPEID\_RESOURCE\_BASE\_OFFSET, 357  
CFE\_SB\_PIPEID\_BASE, 358

cFE Return Code Defines, 176

CFE\_ES\_APP\_CLEANUP\_ERR, 181  
CFE\_ES\_BAD\_ARGUMENT, 181  
CFE\_ES\_BIN\_SEM\_DELETE\_ERR, 181  
CFE\_ES\_BUFFER\_NOT\_IN\_POOL, 181  
CFE\_ES\_CDS\_ACCESS\_ERROR, 181  
CFE\_ES\_CDS\_ALREADY\_EXISTS, 182  
CFE\_ES\_CDS\_BLOCK\_CRC\_ERR, 182  
CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY, 182  
CFE\_ES\_CDS\_INVALID, 182  
CFE\_ES\_CDS\_INVALID\_NAME, 182  
CFE\_ES\_CDS\_INVALID\_SIZE, 182  
CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR, 182  
CFE\_ES\_CDS\_WRONG\_TYPE\_ERR, 182  
CFE\_ES\_COUNT\_SEM\_DELETE\_ERR, 183  
CFE\_ES\_ERR\_APP\_CREATE, 183  
CFE\_ES\_ERR\_APP\_REGISTER, 183  
CFE\_ES\_ERR\_CHILD\_TASK\_CREATE, 183  
CFE\_ES\_ERR\_CHILD\_TASK\_DELETE, 183  
CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_MAIN\_TASK, 183  
CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER, 183  
CFE\_ES\_ERR\_DUPLICATE\_NAME, 183  
CFE\_ES\_ERR\_LOAD\_LIB, 184  
CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE, 184  
CFE\_ES\_ERR\_NAME\_NOT\_FOUND, 184  
CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID, 184  
CFE\_ES\_ERR\_SYS\_LOG\_FULL, 184  
CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED, 184  
CFE\_ES\_FILE\_CLOSE\_ERR, 184  
CFE\_ES\_FILE\_IO\_ERR, 184  
CFE\_ES\_LIB\_ALREADY\_LOADED, 185  
CFE\_ES\_MUT\_SEM\_DELETE\_ERR, 185  
CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE, 185  
CFE\_ES\_NOT\_IMPLEMENTED, 185  
CFE\_ES\_OPERATION\_TIMED\_OUT, 185  
CFE\_ES\_POOL\_BLOCK\_INVALID, 185  
CFE\_ES\_QUEUE\_DELETE\_ERR, 185  
CFE\_ES\_RST\_ACCESS\_ERR, 185

CFE\_ES\_TASK\_DELETE\_ERR, 185  
CFE\_ES\_TIMER\_DELETE\_ERR, 186  
CFE\_EVS\_APP\_FILTER\_OVERLOAD, 186  
CFE\_EVS\_APP\_ILLEGAL\_APP\_ID, 186  
CFE\_EVS\_APP\_NOT\_REGISTERED, 186  
CFE\_EVS\_APP\_SQUELCHED, 186  
CFE\_EVS\_EVT\_NOT\_REGISTERED, 186  
CFE\_EVS\_FILE\_WRITE\_ERROR, 186  
CFE\_EVS\_INVALID\_PARAMETER, 186  
CFE\_EVS\_NOT\_IMPLEMENTED, 187  
CFE\_EVS\_RESET\_AREA\_POINTER, 187  
CFE\_EVS\_UNKNOWN\_FILTER, 187

CFE\_FS\_BAD\_ARGUMENT, 187  
CFE\_FS\_FNAME\_TOO\_LONG, 187  
CFE\_FS\_INVALID\_PATH, 187  
CFE\_FS\_NOT\_IMPLEMENTED, 187

CFE\_SB\_BAD\_ARGUMENT, 187  
CFE\_SB\_BUFS\_ALOC\_ERR, 187  
CFE\_SB\_BUFFER\_INVALID, 188  
CFE\_SB\_INTERNAL\_ERR, 188  
CFE\_SB\_MAX\_DESTS\_MET, 188  
CFE\_SB\_MAX\_MSGS\_MET, 188  
CFE\_SB\_MAX\_PIPES\_MET, 188  
CFE\_SB\_MSG\_TOO\_BIG, 188  
CFE\_SB\_NO\_MESSAGE, 188  
CFE\_SB\_NOT\_IMPLEMENTED, 189

CFE\_SB\_PIPE\_CR\_ERR, 189  
CFE\_SB\_PIPE\_RD\_ERR, 189  
CFE\_SB\_TIME\_OUT, 189  
CFE\_SB\_WRONG\_MSG\_TYPE, 189

CFE\_STATUS\_BAD\_COMMAND\_CODE, 189  
CFE\_STATUS\_EXTERNAL\_RESOURCE\_FAIL, 189  
CFE\_STATUS\_INCORRECT\_STATE, 190  
CFE\_STATUS\_NO\_COUNTER\_INCREMENT, 190  
CFE\_STATUS\_NOT\_IMPLEMENTED, 190  
CFE\_STATUS\_RANGE\_ERROR, 190

CFE\_STATUS\_REQUEST\_ALREADY\_PENDING, 190

CFE\_STATUS\_UNKNOWN\_MSG\_ID, 190  
CFE\_STATUS\_VALIDATION\_FAILURE, 190  
CFE\_STATUS\_WRONG\_MSG\_LENGTH, 191  
CFE\_SUCCESS, 191

CFE\_TBL\_BAD\_ARGUMENT, 191  
CFE\_TBL\_ERR\_ACCESS, 191  
CFE\_TBL\_ERR\_BAD\_CONTENT\_ID, 191  
CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID, 191  
CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID, 191  
CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID, 191  
CFE\_TBL\_ERR\_DUMP\_ONLY, 192  
CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE, 192  
CFE\_TBL\_ERR\_DUPLICATE\_NOT\_OWNED, 192  
CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE, 192  
CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT, 192  
CFE\_TBL\_ERR\_FILE\_TOO\_LARGE, 192

- CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG, 192  
 CFE\_TBL\_ERR\_HANDLES\_FULL, 192  
 CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE, 193  
 CFE\_TBL\_ERR\_INVALID\_HANDLE, 193  
 CFE\_TBL\_ERR\_INVALID\_NAME, 193  
 CFE\_TBL\_ERR\_INVALID\_OPTIONS, 193  
 CFE\_TBL\_ERR\_INVALID\_SIZE, 193  
 CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS, 193  
 CFE\_TBL\_ERR\_LOAD\_INCOMPLETE, 194  
 CFE\_TBL\_ERR\_NEVER\_LOADED, 194  
 CFE\_TBL\_ERR\_NO\_ACCESS, 194  
 CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL, 194  
 CFE\_TBL\_ERR\_NO\_STD\_HEADER, 194  
 CFE\_TBL\_ERR\_NO\_TBL\_HEADER, 194  
 CFE\_TBL\_ERR\_PARTIAL\_LOAD, 194  
 CFE\_TBL\_ERR\_REGISTRY\_FULL, 194  
 CFE\_TBL\_ERR\_SHORT\_FILE, 195  
 CFE\_TBL\_ERR\_UNREGISTERED, 195  
 CFE\_TBL\_INFO\_DUMP\_PENDING, 195  
 CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING, 195  
 CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDING, 195  
 CFE\_TBL\_INFO\_RECOVERED\_TBL, 195  
 CFE\_TBL\_INFO\_TABLE\_LOCKED, 195  
 CFE\_TBL\_INFO\_UPDATE\_PENDING, 195  
 CFE\_TBL\_INFO\_UPDATED, 196  
 CFE\_TBL\_INFO\_VALIDATION\_PENDING, 196  
 CFE\_TBL\_MESSAGE\_ERROR, 196  
 CFE\_TBL\_NOT\_IMPLEMENTED, 196  
 CFE\_TBL\_WARN\_DUPLICATE, 196  
 CFE\_TBL\_WARN\_NOT\_CRITICAL, 196  
 CFE\_TBL\_WARN\_PARTIAL\_LOAD, 196  
 CFE\_TBL\_WARN\_SHORT\_FILE, 197  
 CFE\_TIME\_BAD\_ARGUMENT, 197  
 CFE\_TIME\_CALLBACK\_NOT\_REGISTERED, 197  
 CFE\_TIME\_INTERNAL\_ONLY, 197  
 CFE\_TIME\_NOT\_IMPLEMENTED, 197  
 CFE\_TIME\_OUT\_OF\_RANGE, 197  
 CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS,  
 197
- cFE SB Pipe options, 316  
 CFE\_SB\_PIPEOPTS\_IGNOREMINE, 316
- cFE Send Event APIs, 249  
 CFE\_EVS\_SendEvent, 249  
 CFE\_EVS\_SendEventWithApplID, 250  
 CFE\_EVS\_SendTimedEvent, 251
- cFE Send/Receive Message APIs, 300  
 CFE\_SB\_ReceiveBuffer, 300  
 CFE\_SB\_TransmitMsg, 301
- cFE Table Type Defines, 336  
 CFE\_TBL\_OPT\_BUFFER\_MSK, 336  
 CFE\_TBL\_OPT\_CRITICAL, 336  
 CFE\_TBL\_OPT\_CRITICAL\_MSK, 336  
 CFE\_TBL\_OPT\_DBL\_BUFFER, 336  
 CFE\_TBL\_OPT\_DEFAULT, 337
- CFE\_TBL\_OPT\_DUMP\_ONLY, 337  
 CFE\_TBL\_OPT\_LD\_DMP\_MSK, 337  
 CFE\_TBL\_OPT\_LOAD\_DUMP, 337  
 CFE\_TBL\_OPT\_NOT\_CRITICAL, 337  
 CFE\_TBL\_OPT\_NOT\_USR\_DEF, 337  
 CFE\_TBL\_OPT\_SNGL\_BUFFER, 337  
 CFE\_TBL\_OPT\_USR\_DEF\_ADDR, 337  
 CFE\_TBL\_OPT\_USR\_DEF\_MSK, 337
- cFE Time Arithmetic APIs, 344  
 CFE\_TIME\_Add, 344  
 CFE\_TIME\_Compare, 344  
 CFE\_TIME\_Subtract, 345
- cFE Time Conversion APIs, 347  
 CFE\_TIME\_MET2SCTime, 347  
 CFE\_TIME\_Micro2SubSecs, 347  
 CFE\_TIME\_Sub2MicroSecs, 348
- cFE Zero Copy APIs, 303  
 CFE\_SB\_AllocateMessageBuffer, 303  
 CFE\_SB\_ReleaseMessageBuffer, 303  
 CFE\_SB\_TransmitBuffer, 304
- cfe/cmake/sample\_defs/example\_mission\_cfg.h, 825  
 cfe/cmake/sample\_defs/example\_platform\_cfg.h, 836  
 cfe/cmake/sample\_defs/sample\_perfids.h, 880  
 cfe/docs/src/cfe\_api.dox, 882  
 cfe/docs/src/cfe\_es.dox, 882  
 cfe/docs/src/cfe\_evs.dox, 882  
 cfe/docs/src/cfe\_frontpage.dox, 882  
 cfe/docs/src/cfe\_glossary.dox, 882  
 cfe/docs/src/cfe\_sb.dox, 882  
 cfe/docs/src/cfe\_tbl.dox, 882  
 cfe/docs/src/cfe\_time.dox, 882  
 cfe/docs/src/cfe\_xref.dox, 882  
 cfe/docs/src/cfs\_versions.dox, 882  
 cfe/modules/core\_api/config/default\_cfe\_core\_api\_base\_msgids.h,  
 882  
 cfe/modules/core\_api/config/default\_cfe\_core\_api\_interface\_cfg.h,  
 885  
 cfe/modules/core\_api/config/default\_cfe\_mission\_cfg.h,  
 887  
 cfe/modules/core\_api/config/default\_cfe\_msgids.h, 887  
 cfe/modules/core\_api/fsw/inc/cfe.h, 887  
 cfe/modules/core\_api/fsw/inc/cfe\_config.h, 887  
 cfe/modules/core\_api/fsw/inc/cfe\_config\_api\_typedefs.h,  
 891  
 cfe/modules/core\_api/fsw/inc/cfe\_endian.h, 892  
 cfe/modules/core\_api/fsw/inc/cfe\_error.h, 892  
 cfe/modules/core\_api/fsw/inc/cfe\_es.h, 901  
 cfe/modules/core\_api/fsw/inc/cfe\_es\_api\_typedefs.h, 904  
 cfe/modules/core\_api/fsw/inc/cfe\_evs.h, 909  
 cfe/modules/core\_api/fsw/inc/cfe\_evs\_api\_typedefs.h, 911  
 cfe/modules/core\_api/fsw/inc/cfe\_fs.h, 913  
 cfe/modules/core\_api/fsw/inc/cfe\_fs\_api\_typedefs.h, 914  
 cfe/modules/core\_api/fsw/inc/cfe\_msg.h, 916

cfe/modules/core\_api/fsw/inc/cfe\_msg\_api\_typedefs.h, 919  
cfe/modules/core\_api/fsw/inc/cfe\_resourceid.h, 923  
cfe/modules/core\_api/fsw/inc/cfe\_resourceid\_api\_typedefs.h, 928  
cfe/modules/core\_api/fsw/inc/cfe\_sb.h, 929  
cfe/modules/core\_api/fsw/inc/cfe\_sb\_api\_typedefs.h, 932  
cfe/modules/core\_api/fsw/inc/cfe\_tbl.h, 935  
cfe/modules/core\_api/fsw/inc/cfe\_tbl\_api\_typedefs.h, 936  
cfe/modules/core\_api/fsw/inc/cfe\_tbl\_filedef.h, 938  
cfe/modules/core\_api/fsw/inc/cfe\_time.h, 940  
cfe/modules/core\_api/fsw/inc/cfe\_time\_api\_typedefs.h, 942  
cfe/modules/core\_api/fsw/inc/cfe\_version.h, 943  
cfe/modules/es/config/default\_cfe\_es\_extern\_typedefs.h, 945  
cfe/modules/es/config/default\_cfe\_es\_fcncodes.h, 954  
cfe/modules/es/config/default\_cfe\_es\_interface\_cfg.h, 974  
cfe/modules/es/config/default\_cfe\_es\_internal\_cfg.h, 977  
cfe/modules/es/config/default\_cfe\_es\_mission\_cfg.h, 997  
cfe/modules/es/config/default\_cfe\_es\_msg.h, 997  
cfe/modules/es/config/default\_cfe\_es\_msgdefs.h, 998  
cfe/modules/es/config/default\_cfe\_es\_msgids.h, 1002  
cfe/modules/es/config/default\_cfe\_es\_msgstruct.h, 1003  
cfe/modules/es/config/default\_cfe\_es\_platform\_cfg.h, 1007  
cfe/modules/es/config/default\_cfe\_es\_topicids.h, 1007  
cfe/modules/es/fsw/inc/cfe\_es\_eventids.h, 1008  
cfe/modules/evs/config/default\_cfe\_evs\_extern\_typedefs.h, 1033  
cfe/modules/evs/config/default\_cfe\_evs\_fcncodes.h, 1036  
cfe/modules/evs/config/default\_cfe\_evs\_interface\_cfg.h, 1054  
cfe/modules/evs/config/default\_cfe\_evs\_internal\_cfg.h, 1055  
cfe/modules/evs/config/default\_cfe\_evs\_mission\_cfg.h, 1059  
cfe/modules/evs/config/default\_cfe\_evs\_msg.h, 1059  
cfe/modules/evs/config/default\_cfe\_evs\_msgdefs.h, 1060  
cfe/modules/evs/config/default\_cfe\_evs\_msgids.h, 1063  
cfe/modules/evs/config/default\_cfe\_evs\_msgstruct.h, 1064  
cfe/modules/evs/config/default\_cfe\_evs\_platform\_cfg.h, 1067  
cfe/modules/evs/config/default\_cfe\_evs\_topicids.h, 1068  
cfe/modules/evs/fsw/inc/cfe\_evs\_eventids.h, 1069  
cfe/modules/fs/config/default\_cfe\_fs\_extern\_typedefs.h, 1081  
cfe/modules/fs/config/default\_cfe\_fs\_filedef.h, 1081  
cfe/modules/fs/config/default\_cfe\_fs\_interface\_cfg.h, 1083  
cfe/modules/fs/config/default\_cfe\_fs\_mission\_cfg.h, 1083  
cfe/modules/msg/fsw/inc/ccsds\_hdr.h, 1084  
cfe/modules/resourceid/fsw/inc/cfe\_core\_resourceid\_basevalues.h, 1084  
cfe/modules/resourceid/fsw/inc/cfe\_resourceid\_basevalue.h, 1085  
cfe/modules/sb/config/default\_cfe\_sb\_extern\_typedefs.h, 1086  
cfe/modules/sb/config/default\_cfe\_sb\_fcncodes.h, 1088  
cfe/modules/sb/config/default\_cfe\_sb\_interface\_cfg.h, 1097  
cfe/modules/sb/config/default\_cfe\_sb\_internal\_cfg.h, 1098  
cfe/modules/sb/config/default\_cfe\_sb\_mission\_cfg.h, 1106  
cfe/modules/sb/config/default\_cfe\_sb\_msg.h, 1107  
cfe/modules/sb/config/default\_cfe\_sb\_msgdefs.h, 1107  
cfe/modules/sb/config/default\_cfe\_sb\_msgids.h, 1109  
cfe/modules/sb/config/default\_cfe\_sb\_msgstruct.h, 1111  
cfe/modules/sb/config/default\_cfe\_sb\_platform\_cfg.h, 1113  
cfe/modules/sb/config/default\_cfe\_sb\_topicids.h, 1113  
cfe/modules/sb/fsw/inc/cfe\_sb\_eventids.h, 1114  
cfe/modules/tbl/config/default\_cfe\_tbl\_extern\_typedefs.h, 1134  
cfe/modules/tbl/config/default\_cfe\_tbl\_fcncodes.h, 1135  
cfe/modules/tbl/config/default\_cfe\_tbl\_interface\_cfg.h, 1144  
cfe/modules/tbl/config/default\_cfe\_tbl\_internal\_cfg.h, 1145  
cfe/modules/tbl/config/default\_cfe\_tbl\_mission\_cfg.h, 1151  
cfe/modules/tbl/config/default\_cfe\_tbl\_msg.h, 1151  
cfe/modules/tbl/config/default\_cfe\_tbl\_msgdefs.h, 1152  
cfe/modules/tbl/config/default\_cfe\_tbl\_msgids.h, 1154  
cfe/modules/tbl/config/default\_cfe\_tbl\_msgstruct.h, 1155  
cfe/modules/tbl/config/default\_cfe\_tbl\_platform\_cfg.h, 1157  
cfe/modules/tbl/config/default\_cfe\_tbl\_topicids.h, 1157  
cfe/modules/tbl/fsw/inc/cfe\_tbl\_eventids.h, 1158  
cfe/modules/time/config/default\_cfe\_time\_extern\_typedefs.h, 1178  
cfe/modules/time/config/default\_cfe\_time\_fcncodes.h, 1183  
cfe/modules/time/config/default\_cfe\_time\_interface\_cfg.h, 1199  
cfe/modules/time/config/default\_cfe\_time\_internal\_cfg.h, 1203  
cfe/modules/time/config/default\_cfe\_time\_mission\_cfg.h, 1208  
cfe/modules/time/config/default\_cfe\_time\_msg.h, 1209  
cfe/modules/time/config/default\_cfe\_time\_msgdefs.h, 1209  
cfe/modules/time/config/default\_cfe\_time\_msgids.h, 1211  
cfe/modules/time/config/default\_cfe\_time\_msgstruct.h, 1213  
cfe/modules/time/config/default\_cfe\_time\_platform\_cfg.h, 1216  
cfe/modules/time/config/default\_cfe\_time\_topicids.h, 1216

cfe/modules/time/fsw/inc/cfe\_time\_eventids.h, 1218  
**CFE\_BIT**  
  cfe\_sb.h, 931  
**CFE\_BUILD\_BASELINE**  
  cfe\_version.h, 944  
**CFE\_BUILD\_CODENAME**  
  cfe\_version.h, 944  
**CFE\_BUILD\_DEV\_CYCLE**  
  cfe\_version.h, 944  
**CFE\_BUILD\_NUMBER**  
  cfe\_version.h, 944  
**CFE\_CFG\_MAX\_VERSION\_STR\_LEN**  
  cfe\_version.h, 944  
**CFE\_CLR**  
  cfe\_sb.h, 931  
**cfe\_config.h**  
  CFE\_Config\_GetIdByName, 888  
  CFE\_Config\_GetName, 888  
  CFE\_Config\_GetObjPointer, 889  
  CFE\_ConfigGetString, 889  
  CFE\_ConfigGetValue, 890  
  CFE\_ConfigGetVersionString, 890  
  CFE\_ConfigIterateAll, 891  
**cfe\_config\_api\_typedefs.h**  
  CFE\_Config\_Callback\_t, 891  
  CFE\_CONFIGID\_C, 891  
  CFE\_ConfigId\_t, 892  
  CFE\_CONFIGID\_UNDEFINED, 891  
**CFE\_Config\_Callback\_t**  
  cfe\_config\_api\_typedefs.h, 891  
**CFE\_Config\_GetIdByName**  
  cfe\_config.h, 888  
**CFE\_Config\_GetName**  
  cfe\_config.h, 888  
**CFE\_Config\_GetObjPointer**  
  cfe\_config.h, 889  
**CFE\_ConfigGetString**  
  cfe\_config.h, 889  
**CFE\_ConfigGetValue**  
  cfe\_config.h, 890  
**CFE\_ConfigGetVersionString**  
  cfe\_config.h, 890  
**CFE\_ConfigIterateAll**  
  cfe\_config.h, 891  
**CFE\_CONFIGID\_BASE**  
  cFE Resource ID base values, 358  
**CFE\_CONFIGID\_C**  
  cfe\_config\_api\_typedefs.h, 891  
**CFE\_ConfigId\_t**  
  cfe\_config\_api\_typedefs.h, 892  
**CFE\_CONFIGID\_UNDEFINED**  
  cfe\_config\_api\_typedefs.h, 891  
**CFE\_CPU1\_CMD\_MID\_BASE**  
  default\_cfe\_core\_api\_base\_msgids.h, 883  
**CFE\_CPU1\_TLM\_MID\_BASE**  
  default\_cfe\_core\_api\_base\_msgids.h, 883  
**cfe\_endian.h**  
  CFE\_MAKE\_BIG16, 892  
  CFE\_MAKE\_BIG32, 892  
**cfe\_error.h**  
  CFE\_ES\_StatusToString, 900  
  CFE\_EVENTS\_SERVICE, 899  
  CFE\_EXECUTIVE\_SERVICE, 899  
  CFE\_FILE\_SERVICE, 899  
  CFE\_GENERIC\_SERVICE, 899  
  CFE\_SERVICE\_BITMASK, 899  
  CFE\_SEVERITY\_BITMASK, 899  
  CFE\_SEVERITY\_ERROR, 899  
  CFE\_SEVERITY\_INFO, 899  
  CFE\_SEVERITY\_SUCCESS, 900  
  CFE\_SOFTWARE\_BUS\_SERVICE, 900  
  CFE\_STATUS\_C, 900  
  CFE\_STATUS\_STRING\_LENGTH, 900  
  CFE\_Status\_t, 900  
  CFE\_StatusString\_t, 900  
  CFE\_TABLE\_SERVICE, 900  
  CFE\_TIME\_SERVICE, 900  
**cfe\_es.h**  
  CFE\_ES\_DBIT, 904  
  CFE\_ES\_DTEST, 904  
  CFE\_ES\_TEST\_LONG\_MASK, 904  
  OS\_PRINTF, 904  
**CFE\_ES\_ALL\_APPS\_EID**  
  cfe\_es\_eventids.h, 1011  
**cfe\_es\_api\_typedefs.h**  
  CFE\_ES\_APP\_RESTART, 906  
  CFE\_ES\_APPID\_C, 906  
  CFE\_ES\_APPID\_UNDEFINED, 906  
  CFE\_ES\_CDS\_BAD\_HANDLE, 906  
  CFE\_ES\_CDSHANDLE\_C, 906  
  CFE\_ES\_ChildTaskMainFuncPtr\_t, 908  
  CFE\_ES\_COUNTERID\_C, 906  
  CFE\_ES\_COUNTERID\_UNDEFINED, 906  
  CFE\_ES\_CrcType\_16\_ARC, 909  
  CFE\_ES\_CrcType\_CRC\_16, 909  
  CFE\_ES\_CrcType\_CRC\_32, 909  
  CFE\_ES\_CrcType\_CRC\_8, 909  
  CFE\_ES\_CrcType\_Enum, 909  
  CFE\_ES\_CrcType\_Enum\_t, 908  
  CFE\_ES\_CrcType\_MAX, 909  
  CFE\_ES\_CrcType\_NONE, 909  
  CFE\_ES\_LIBID\_C, 906  
  CFE\_ES\_LIBID\_UNDEFINED, 907  
  CFE\_ES\_LibraryEntryFuncPtr\_t, 908  
  CFE\_ES\_MEMHANDLE\_C, 907  
  CFE\_ES\_MEMHANDLE\_UNDEFINED, 907  
  CFE\_ES\_MEMPOOLBUF\_C, 907  
  CFE\_ES\_MemPoolBuf\_t, 908

CFE\_ES\_NO\_MUTEX, 907  
CFE\_ES\_PoolAlign\_t, 908  
CFE\_ES\_StackPointer\_t, 909  
CFE\_ES\_STATIC\_POOL\_TYPE, 907  
CFE\_ES\_TASK\_STACK\_ALLOCATE, 907  
CFE\_ES\_TaskEntryFuncPtr\_t, 909  
CFE\_ES\_TASKID\_C, 908  
CFE\_ES\_TASKID\_UNDEFINED, 908  
CFE\_ES\_USE\_MUTEX, 908  
CFE\_ES\_APP\_CLEANUP\_ERR  
    cFE Return Code Defines, 181  
CFE\_ES\_APP\_RESTART  
    cfe\_es\_api\_typedefs.h, 906  
CFE\_ES\_APP\_TLM\_MID  
    default\_cfe\_es\_msgids.h, 1002  
CFE\_ES\_APPID\_BASE  
    cFE Resource ID base values, 357  
CFE\_ES\_APPID\_C  
    cfe\_es\_api\_typedefs.h, 906  
CFE\_ES\_AppId\_t  
    default\_cfe\_es\_extern\_typedefs.h, 948  
CFE\_ES\_AppId\_ToIndex  
    cFE Resource ID APIs, 199  
CFE\_ES\_APPID\_UNDEFINED  
    cfe\_es\_api\_typedefs.h, 906  
CFE\_ES\_AppInfo, 486  
    AddressesAreValid, 487  
    BSSAddress, 487  
    BSSSize, 487  
    CodeAddress, 487  
    CodeSize, 488  
    DataAddress, 488  
    DataSize, 488  
    EntryPoint, 488  
    ExceptionAction, 488  
    ExecutionCounter, 488  
    FileName, 488  
    MainTaskId, 489  
    MainTaskName, 489  
    Name, 489  
    NumOfChildTasks, 489  
    Priority, 489  
    ResourceId, 489  
    StackSize, 489  
    StartAddress, 490  
    Type, 490  
CFE\_ES\_AppInfo\_t  
    default\_cfe\_es\_extern\_typedefs.h, 948  
CFE\_ES\_AppNameCmd\_Payload, 490  
    Application, 490  
CFE\_ES\_AppNameCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 999  
CFE\_ES\_AppReloadCmd\_Payload, 490  
    AppFileName, 491  
                Application, 491  
CFE\_ES\_AppReloadCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1000  
CFE\_ES\_AppState  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_EARLY\_INIT  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_Enum\_t  
    default\_cfe\_es\_extern\_typedefs.h, 948  
CFE\_ES\_AppState\_LATE\_INIT  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_MAX  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_RUNNING  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_STOPPED  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_UNDEFINED  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppState\_WAITING  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppType  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppType\_CORE  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppType\_Enum\_t  
    default\_cfe\_es\_extern\_typedefs.h, 949  
CFE\_ES\_AppType\_EXTERNAL  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_AppType\_LIBRARY  
    default\_cfe\_es\_extern\_typedefs.h, 952  
CFE\_ES\_BackgroundWakeups  
    cFE Miscellaneous APIs, 224  
CFE\_ES\_BAD\_ARGUMENT  
    cFE Return Code Defines, 181  
CFE\_ES\_BIN\_SEM\_DELETE\_ERR  
    cFE Return Code Defines, 181  
CFE\_ES\_BlockStats, 491  
    BlockSize, 491  
    NumCreated, 492  
    NumFree, 492  
CFE\_ES\_BlockStats\_t  
    default\_cfe\_es\_extern\_typedefs.h, 949  
CFE\_ES\_BOOT\_ERR\_EID  
    cfe\_es\_eventids.h, 1012  
CFE\_ES\_BUFFER\_NOT\_IN\_POOL  
    cFE Return Code Defines, 181  
CFE\_ES\_BUILD\_INF\_EID  
    cfe\_es\_eventids.h, 1012  
CFE\_ES\_CalculateCRC  
    cFE Miscellaneous APIs, 224  
CFE\_ES\_CC1\_ERR\_EID  
    cfe\_es\_eventids.h, 1012  
CFE\_ES\_CDS\_ACCESS\_ERROR

cFE Return Code Defines, [181](#)  
**CFE\_ES\_CDS\_ALREADY\_EXISTS**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_BAD\_HANDLE**  
 cfe\_es\_api\_typedefs.h, [906](#)  
**CFE\_ES\_CDS\_BLOCK\_CRC\_ERR**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_DELETE\_ERR\_EID**  
 cfe\_es\_eventids.h, [1013](#)  
**CFE\_ES\_CDS\_DELETE\_TBL\_ERR\_EID**  
 cfe\_es\_eventids.h, [1013](#)  
**CFE\_ES\_CDS\_DELETED\_INFO\_EID**  
 cfe\_es\_eventids.h, [1013](#)  
**CFE\_ES\_CDS\_DUMP\_ERR\_EID**  
 cfe\_es\_eventids.h, [1013](#)  
**CFE\_ES\_CDS\_INSUFFICIENT\_MEMORY**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_INVALID**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_INVALID\_NAME**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_INVALID\_SIZE**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_NAME\_ERR\_EID**  
 cfe\_es\_eventids.h, [1014](#)  
**CFE\_ES\_CDS\_OWNER\_ACTIVE\_EID**  
 cfe\_es\_eventids.h, [1014](#)  
**CFE\_ES\_CDS\_OWNER\_ACTIVE\_ERR**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDS\_REG\_DUMP\_INF\_EID**  
 cfe\_es\_eventids.h, [1014](#)  
**CFE\_ES\_CDS\_REGISTER\_ERR\_EID**  
 cfe\_es\_eventids.h, [1014](#)  
**CFE\_ES\_CDS\_WRONG\_TYPE\_ERR**  
 cFE Return Code Defines, [182](#)  
**CFE\_ES\_CDSBLOCKID\_BASE**  
 cFE Resource ID base values, [358](#)  
**CFE\_ES\_CDSHANDLE\_C**  
 cfe\_es\_api\_typedefs.h, [906](#)  
**CFE\_ES\_CDCHandle\_t**  
 default\_cfe\_es\_extern\_typedefs.h, [949](#)  
**CFE\_ES\_CDSRegDumpRec**, [492](#)  
 ByteAlignSpare, [492](#)  
 Handle, [493](#)  
 Name, [493](#)  
 Size, [493](#)  
 Table, [493](#)  
**CFE\_ES\_CDSRegDumpRec\_t**  
 default\_cfe\_es\_extern\_typedefs.h, [949](#)  
**CFE\_ES\_ChildTaskMainFuncPtr\_t**  
 cfe\_es\_api\_typedefs.h, [908](#)  
**CFE\_ES\_CLEAR\_ER\_LOG\_CC**  
 default\_cfe\_es\_fcncodes.h, [954](#)  
**CFE\_ES\_CLEAR\_SYS\_LOG\_CC**

default\_cfe\_es\_fcncodes.h, [955](#)  
**CFE\_ES\_ClearERLogCmd**, [493](#)  
 CommandHeader, [493](#)  
**CFE\_ES\_ClearERLogCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1005](#)  
**CFE\_ES\_ClearSysLogCmd**, [493](#)  
 CommandHeader, [494](#)  
**CFE\_ES\_ClearSysLogCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1005](#)  
**CFE\_ES\_CMD\_MID**  
 default\_cfe\_es\_msgids.h, [1002](#)  
**CFE\_ES\_CopyToCDS**  
 cFE Critical Data Store APIs, [227](#)  
**CFE\_ES\_COUNT\_SEM\_DELETE\_ERR**  
 cFE Return Code Defines, [183](#)  
**CFE\_ES\_COUNTERID\_C**  
 cfe\_es\_api\_typedefs.h, [906](#)  
**CFE\_ES\_CounterId\_t**  
 default\_cfe\_es\_extern\_typedefs.h, [949](#)  
**CFE\_ES\_CounterID\_ToIndex**  
 cFE Resource ID APIs, [199](#)  
**CFE\_ES\_COUNTERID\_UNDEFINED**  
 cfe\_es\_api\_typedefs.h, [906](#)  
**CFE\_ES\_COUNTID\_BASE**  
 cFE Resource ID base values, [357](#)  
**CFE\_ES\_CrcType\_16\_ARC**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_CRC\_16**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_CRC\_32**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_CRC\_8**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_Enum**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_Enum\_t**  
 cfe\_es\_api\_typedefs.h, [908](#)  
**CFE\_ES\_CrcType\_MAX**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CrcType\_NONE**  
 cfe\_es\_api\_typedefs.h, [909](#)  
**CFE\_ES\_CreateChildTask**  
 cFE Child Task APIs, [220](#)  
**CFE\_ES\_CREATING\_CDS\_DUMP\_ERR\_EID**  
 cfe\_es\_eventids.h, [1015](#)  
**CFE\_ES\_DBIT**  
 cfe\_es.h, [904](#)  
**CFE\_ES\_DELETE\_CDS\_CC**  
 default\_cfe\_es\_fcncodes.h, [956](#)  
**CFE\_ES\_DeleteApp**  
 cFE Application Control APIs, [204](#)  
**CFE\_ES\_DeleteCDSCmd**, [494](#)  
 CommandHeader, [494](#)  
 Payload, [494](#)

CFE\_ES\_DeleteCDSCmd\_Payload, 495  
    CdsName, 495

CFE\_ES\_DeleteCDSCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1000

CFE\_ES\_DeleteCDSCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1005

CFE\_ES\_DeleteChildTask  
    cFE Child Task APIs, 221

CFE\_ES\_DeleteGenCounter  
    cFE Generic Counter APIs, 241

CFE\_ES\_DTEST  
    cfe\_es.h, 904

CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC  
    default\_cfe\_es\_fnccodes.h, 956

CFE\_ES\_DumpCDSRegistryCmd, 495  
    CommandHeader, 495  
    Payload, 495

CFE\_ES\_DumpCDSRegistryCmd\_Payload, 496  
    DumpFilename, 496

CFE\_ES\_DumpCDSRegistryCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1000

CFE\_ES\_DumpCDSRegistryCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1005

CFE\_ES\_ERLOG1\_INF\_EID  
    cfe\_es\_eventids.h, 1015

CFE\_ES\_ERLOG2\_EID  
    cfe\_es\_eventids.h, 1015

CFE\_ES\_ERLOG2\_ERR\_EID  
    cfe\_es\_eventids.h, 1015

CFE\_ES\_ERLOG\_PENDING\_ERR\_EID  
    cfe\_es\_eventids.h, 1016

CFE\_ES\_ERR\_APP\_CREATE  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_APP\_REGISTER  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_CHILD\_TASK\_CREATE  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_CHILD\_TASK\_DELETE  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_CHILD\_TASK\_DELETE\_MAIN\_TASK  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_CHILD\_TASK\_REGISTER  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_DUPLICATE\_NAME  
    cFE Return Code Defines, 183

CFE\_ES\_ERR\_LOAD\_LIB  
    cFE Return Code Defines, 184

CFE\_ES\_ERR\_MEM\_BLOCK\_SIZE  
    cFE Return Code Defines, 184

CFE\_ES\_ERR\_NAME\_NOT\_FOUND  
    cFE Return Code Defines, 184

CFE\_ES\_ERR\_RESOURCEID\_NOT\_VALID  
    cFE Return Code Defines, 184

CFE\_ES\_ERR\_SYS\_LOG\_FULL

    cFE Return Code Defines, 184

CFE\_ES\_ERR\_SYS\_LOG\_TRUNCATED  
    cFE Return Code Defines, 184

CFE\_ES\_ERR\_SYSLOGMODE\_EID  
    cfe\_es\_eventids.h, 1016

CFE\_ES\_ERREXIT\_APP\_ERR\_EID  
    cfe\_es\_eventids.h, 1016

CFE\_ES\_ERREXIT\_APP\_INF\_EID  
    cfe\_es\_eventids.h, 1016

cfe\_es\_eventids.h  
    CFE\_ES\_ALL\_APPS\_EID, 1011  
    CFE\_ES\_BOOT\_ERR\_EID, 1012  
    CFE\_ES\_BUILD\_INF\_EID, 1012  
    CFE\_ES\_CC1\_ERR\_EID, 1012  
    CFE\_ES\_CDS\_DELETE\_ERR\_EID, 1013  
    CFE\_ES\_CDS\_DELETE\_TBL\_ERR\_EID, 1013  
    CFE\_ES\_CDS\_DELETED\_INFO\_EID, 1013  
    CFE\_ES\_CDS\_DUMP\_ERR\_EID, 1013  
    CFE\_ES\_CDS\_NAME\_ERR\_EID, 1014  
    CFE\_ES\_CDS\_OWNER\_ACTIVE\_EID, 1014  
    CFE\_ES\_CDS\_REG\_DUMP\_INF\_EID, 1014  
    CFE\_ES\_CDS\_REGISTER\_ERR\_EID, 1014  
    CFE\_ES\_CREATING\_CDS\_DUMP\_ERR\_EID, 1015  
    CFE\_ES\_ERLOG1\_INF\_EID, 1015  
    CFE\_ES\_ERLOG2\_EID, 1015  
    CFE\_ES\_ERLOG2\_ERR\_EID, 1015  
    CFE\_ES\_ERLOG\_PENDING\_ERR\_EID, 1016  
    CFE\_ES\_ERR\_SYSLOGMODE\_EID, 1016  
    CFE\_ES\_ERREXIT\_APP\_ERR\_EID, 1016  
    CFE\_ES\_ERREXIT\_APP\_INF\_EID, 1016  
    CFE\_ES\_EXIT\_APP\_ERR\_EID, 1017  
    CFE\_ES\_EXIT\_APP\_INF\_EID, 1017  
    CFE\_ES\_FILEWRITE\_ERR\_EID, 1017  
    CFE\_ES\_INIT\_INF\_EID, 1017  
    CFE\_ES\_INITSTATS\_INF\_EID, 1018  
    CFE\_ES\_INVALID\_POOL\_HANDLE\_ERR\_EID,  
        1018  
    CFE\_ES\_LEN\_ERR\_EID, 1018  
    CFE\_ES\_MID\_ERR\_EID, 1018  
    CFE\_ES\_NOOP\_INF\_EID, 1019  
    CFE\_ES\_ONE\_APP\_EID, 1019  
    CFE\_ES\_ONE\_APPID\_ERR\_EID, 1019  
    CFE\_ES\_ONE\_ERR\_EID, 1019  
    CFE\_ES\_OSCREATE\_ERR\_EID, 1020  
    CFE\_ES\_PCR\_ERR1\_EID, 1020  
    CFE\_ES\_PCR\_ERR2\_EID, 1020  
    CFE\_ES\_PERF\_DATAWRITTEN\_EID, 1020  
    CFE\_ES\_PERF\_FILTMSKCMD\_EID, 1021  
    CFE\_ES\_PERF\_FILTMSKERR\_EID, 1021  
    CFE\_ES\_PERF\_LOG\_ERR\_EID, 1021  
    CFE\_ES\_PERF\_STARTCMD\_EID, 1021  
    CFE\_ES\_PERF\_STARTCMD\_ERR\_EID, 1022  
    CFE\_ES\_PERF\_STARTCMD\_TRIG\_ERR\_EID,  
        1022

CFE\_ES\_PERF\_STOPCMD\_EID, [1022](#)  
 CFE\_ES\_PERF\_STOPCMD\_ERR2\_EID, [1022](#)  
 CFE\_ES\_PERF\_TRIGMSKCMD\_EID, [1023](#)  
 CFE\_ES\_PERF\_TRIGMSKERR\_EID, [1023](#)  
 CFE\_ES\_RELOAD\_APP\_DBG\_EID, [1023](#)  
 CFE\_ES\_RELOAD\_APP\_ERR1\_EID, [1023](#)  
 CFE\_ES\_RELOAD\_APP\_ERR2\_EID, [1024](#)  
 CFE\_ES\_RELOAD\_APP\_ERR3\_EID, [1024](#)  
 CFE\_ES\_RELOAD\_APP\_ERR4\_EID, [1024](#)  
 CFE\_ES\_RELOAD\_APP\_INF\_EID, [1024](#)  
 CFE\_ES\_RESET\_INF\_EID, [1025](#)  
 CFE\_ES\_RESET\_PR\_COUNT\_EID, [1025](#)  
 CFE\_ES\_RESTART\_APP\_DBG\_EID, [1025](#)  
 CFE\_ES\_RESTART\_APP\_ERR1\_EID, [1025](#)  
 CFE\_ES\_RESTART\_APP\_ERR2\_EID, [1026](#)  
 CFE\_ES\_RESTART\_APP\_ERR3\_EID, [1026](#)  
 CFE\_ES\_RESTART\_APP\_ERR4\_EID, [1026](#)  
 CFE\_ES\_RESTART\_APP\_INF\_EID, [1026](#)  
 CFE\_ES\_SET\_MAX\_PR\_COUNT\_EID, [1027](#)  
 CFE\_ES\_START\_ERR\_EID, [1027](#)  
 CFE\_ES\_START\_EXC\_ACTION\_ERR\_EID, [1027](#)  
 CFE\_ES\_START\_INF\_EID, [1027](#)  
 CFE\_ES\_START\_INVALID\_ENTRY\_POINT\_ERR\_EID, [1028](#)  
 CFE\_ES\_START\_INVALID\_FILENAME\_ERR\_EID, [1028](#)  
 CFE\_ES\_START\_NULL\_APP\_NAME\_ERR\_EID, [1028](#)  
 CFE\_ES\_START\_PRIORITY\_ERR\_EID, [1028](#)  
 CFE\_ES\_STOP\_DBG\_EID, [1029](#)  
 CFE\_ES\_STOP\_ERR1\_EID, [1029](#)  
 CFE\_ES\_STOP\_ERR2\_EID, [1029](#)  
 CFE\_ES\_STOP\_ERR3\_EID, [1029](#)  
 CFE\_ES\_STOP\_INF\_EID, [1030](#)  
 CFE\_ES\_SYSLOG1\_INF\_EID, [1030](#)  
 CFE\_ES\_SYSLOG2\_EID, [1030](#)  
 CFE\_ES\_SYSLOG2\_ERR\_EID, [1030](#)  
 CFE\_ES\_SYSLOGMODE\_EID, [1031](#)  
 CFE\_ES\_TASKINFO\_EID, [1031](#)  
 CFE\_ES\_TASKINFO\_OSCREATE\_ERR\_EID, [1031](#)  
 CFE\_ES\_TASKINFO\_WR\_ERR\_EID, [1031](#)  
 CFE\_ES\_TASKINFO\_WRHDR\_ERR\_EID, [1032](#)  
 CFE\_ES\_TASKWR\_ERR\_EID, [1032](#)  
 CFE\_ES\_TLM\_POOL\_STATS\_INFO\_EID, [1032](#)  
 CFE\_ES\_VERSION\_INF\_EID, [1032](#)  
 CFE\_ES\_WRHDR\_ERR\_EID, [1033](#)  
 CFE\_ES\_WRITE\_CFE\_HDR\_ERR\_EID, [1033](#)  
 CFE\_ES\_ExceptionAction  
     default\_cfe\_es\_extern\_typedefs.h, [952](#)  
 CFE\_ES\_ExceptionAction\_Enum\_t  
     default\_cfe\_es\_extern\_typedefs.h, [949](#)  
 CFE\_ES\_ExceptionAction\_PROC\_RESTART  
     default\_cfe\_es\_extern\_typedefs.h, [952](#)  
 CFE\_ES\_ExceptionAction\_RESTART\_APP  
     default\_cfe\_es\_extern\_typedefs.h, [952](#)  
     cFE Application Behavior APIs, [207](#)  
 CFE\_ES\_ExitChildTask  
     cFE Child Task APIs, [222](#)  
 CFE\_ES\_FILE\_CLOSE\_ERR  
     cFE Return Code Defines, [184](#)  
 CFE\_ES\_FILE\_IO\_ERR  
     cFE Return Code Defines, [184](#)  
 CFE\_ES\_FileNameCmd, [496](#)  
     CommandHeader, [496](#)  
     Payload, [497](#)  
 CFE\_ES\_FileNameCmd\_Payload, [497](#)  
     FileName, [497](#)  
 CFE\_ES\_FileNameCmd\_Payload\_t  
     default\_cfe\_es\_msgdefs.h, [1000](#)  
 CFE\_ES\_FileNameCmd\_t  
     default\_cfe\_es\_msgstruct.h, [1005](#)  
 CFE\_ES\_FILEWRITE\_ERR\_EID  
     cfe\_es\_eventids.h, [1017](#)  
 CFE\_ES\_GetAppID  
     cFE Information APIs, [211](#)  
 CFE\_ES\_GetAppIDByName  
     cFE Information APIs, [212](#)  
 CFE\_ES\_GetAppInfo  
     cFE Information APIs, [212](#)  
 CFE\_ES\_GetAppName  
     cFE Information APIs, [213](#)  
 CFE\_ES\_GetCDSBlockIDByName  
     cFE Critical Data Store APIs, [228](#)  
 CFE\_ES\_GetCDSBlockName  
     cFE Critical Data Store APIs, [228](#)  
 CFE\_ES\_GetGenCount  
     cFE Generic Counter APIs, [242](#)  
 CFE\_ES\_GetGenCounterIDByName  
     cFE Generic Counter APIs, [242](#)  
 CFE\_ES\_GetGenCounterName  
     cFE Generic Counter APIs, [243](#)  
 CFE\_ES\_GetLibIDByName  
     cFE Information APIs, [214](#)  
 CFE\_ES\_GetLibInfo  
     cFE Information APIs, [214](#)  
 CFE\_ES\_GetLibName  
     cFE Information APIs, [215](#)  
 CFE\_ES\_GetMemPoolStats  
     cFE Memory Manager APIs, [232](#)  
 CFE\_ES\_GetModuleInfo  
     cFE Information APIs, [216](#)  
 CFE\_ES\_GetPoolBuf  
     cFE Memory Manager APIs, [233](#)

CFE\_ES\_GetPoolBufInfo  
cFE Memory Manager APIs, 233

CFE\_ES\_GetResetType  
cFE Information APIs, 217

CFE\_ES\_GetTaskID  
cFE Information APIs, 217

CFE\_ES\_GetTaskIDByName  
cFE Child Task APIs, 222

CFE\_ES\_GetTaskInfo  
cFE Information APIs, 218

CFE\_ES\_GetTaskName  
cFE Child Task APIs, 223

CFE\_ES\_HK\_TLM\_MID  
default\_cfe\_es\_msgids.h, 1002

CFE\_ES\_HousekeepingTlm, 497

- Payload, 498
- TelemetryHeader, 498

CFE\_ES\_HousekeepingTlm\_Payload, 498

- BootSource, 500
- CFECoreChecksum, 500
- CFEMajorVersion, 500
- CFEMinorVersion, 500
- CFEMissionRevision, 500
- CFERevision, 501
- CommandCounter, 501
- CommandErrorCounter, 501
- ERLogEntries, 501
- ERLogIndex, 501
- HeapBlocksFree, 501
- HeapBytesFree, 501
- HeapMaxBlockSize, 502
- MaxProcessorResets, 502
- OSALMajorVersion, 502
- OSALMinorVersion, 502
- OSALMissionRevision, 502
- OSALRevision, 502
- PerfDataCount, 502
- PerfDataEnd, 503
- PerfDataStart, 503
- PerfDataToWrite, 503
- PerfFilterMask, 503
- PerfMode, 503
- PerfState, 503
- PerfTriggerCount, 503
- PerfTriggerMask, 504
- ProcessorResets, 504
- PSPMajorVersion, 504
- PSPMinorVersion, 504
- PSPMissionRevision, 504
- PSPRevision, 504
- RegisteredCoreApps, 504
- RegisteredExternalApps, 505
- RegisteredLibs, 505
- RegisteredTasks, 505

ResetSubtype, 505

ResetType, 505

SysLogBytesUsed, 505

SysLogEntries, 505

SysLogMode, 506

SysLogSize, 506

CFE\_ES\_HousekeepingTlm\_Payload\_t  
default\_cfe\_es\_msgdefs.h, 1000

CFE\_ES\_HousekeepingTlm\_t  
default\_cfe\_es\_msgstruct.h, 1005

CFE\_ES\_IncrementGenCounter  
cFE Generic Counter APIs, 244

CFE\_ES\_IncrementTaskCounter  
cFE Application Behavior APIs, 207

CFE\_ES\_INIT\_INF\_EID  
cfe\_es\_eventids.h, 1017

CFE\_ES\_INITSTATS\_INF\_EID  
cfe\_es\_eventids.h, 1018

CFE\_ES\_INVALID\_POOL\_HANDLE\_ERR\_EID  
cfe\_es\_eventids.h, 1018

CFE\_ES\_LEN\_ERR\_EID  
cfe\_es\_eventids.h, 1018

CFE\_ES\_LIB\_ALREADY\_LOADED  
cFE Return Code Defines, 185

CFE\_ES\_LIBID\_BASE  
cFE Resource ID base values, 357

CFE\_ES\_LIBID\_C  
cfe\_es\_api\_typedefs.h, 906

CFE\_ES\_LibId\_t  
default\_cfe\_es\_extern\_typedefs.h, 949

CFE\_ES\_LibID\_ToIndex  
cFE Resource ID APIs, 200

CFE\_ES\_LIBID\_UNDEFINED  
cfe\_es\_api\_typedefs.h, 907

CFE\_ES\_LibraryEntryFuncPtr\_t  
cfe\_es\_api\_typedefs.h, 908

CFE\_ES\_LogEntryType  
default\_cfe\_es\_extern\_typedefs.h, 952

CFE\_ES\_LogEntryType\_APPLICATION  
default\_cfe\_es\_extern\_typedefs.h, 952

CFE\_ES\_LogEntryType\_CORE  
default\_cfe\_es\_extern\_typedefs.h, 952

CFE\_ES\_LogEntryType\_Enum\_t  
default\_cfe\_es\_extern\_typedefs.h, 950

CFE\_ES\_LogMode  
default\_cfe\_es\_extern\_typedefs.h, 953

CFE\_ES\_LogMode\_DISCARD  
default\_cfe\_es\_extern\_typedefs.h, 953

CFE\_ES\_LogMode\_Enum\_t  
default\_cfe\_es\_extern\_typedefs.h, 950

CFE\_ES\_LogMode\_OVERWRITE  
default\_cfe\_es\_extern\_typedefs.h, 953

CFE\_ES\_Main  
cFE Entry/Exit APIs, 202

**CFE\_ES\_MEMADDRESS\_C**  
 default\_cfe\_es\_extern\_typedefs.h, 948  
**CFE\_ES\_MemAddress\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 950  
**CFE\_ES\_MEMADDRESS\_TO\_PTR**  
 default\_cfe\_es\_extern\_typedefs.h, 948  
**CFE\_ES\_MEMHANDLE\_C**  
 cfe\_es\_api\_typedefs.h, 907  
**CFE\_ES\_MemHandle\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 950  
**CFE\_ES\_MEMHANDLE\_UNDEFINED**  
 cfe\_es\_api\_typedefs.h, 907  
**CFE\_ES\_MEMOFFSET\_C**  
 default\_cfe\_es\_extern\_typedefs.h, 948  
**CFE\_ES\_MemOffset\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 950  
**CFE\_ES\_MEMOFFSET\_TO\_SIZE\_T**  
 default\_cfe\_es\_extern\_typedefs.h, 948  
**CFE\_ES\_MEMPOOLBUF\_C**  
 cfe\_es\_api\_typedefs.h, 907  
**CFE\_ES\_MemPoolBuf\_t**  
 cfe\_es\_api\_typedefs.h, 908  
**CFE\_ES\_MemPoolStats**, 506  
 BlockStats, 507  
 CheckErrCtr, 507  
 NumBlocksRequested, 507  
 NumFreeBytes, 507  
 PoolSize, 507  
**CFE\_ES\_MemPoolStats\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 950  
**CFE\_ES\_MEMSTATS\_TLM\_MID**  
 default\_cfe\_es\_msgids.h, 1002  
**CFE\_ES\_MemStatsTlm**, 507  
 Payload, 508  
 TelemetryHeader, 508  
**CFE\_ES\_MemStatsTlm\_t**  
 default\_cfe\_es\_msgstruct.h, 1005  
**CFE\_ES\_MID\_ERR\_EID**  
 cfe\_es\_eventids.h, 1018  
**CFE\_ES\_MUT\_SEM\_DELETE\_ERR**  
 cFE Return Code Defines, 185  
**CFE\_ES\_NO\_MUTEX**  
 cfe\_es\_api\_typedefs.h, 907  
**CFE\_ES\_NO\_RESOURCE\_IDS\_AVAILABLE**  
 cFE Return Code Defines, 185  
**CFE\_ES\_NOOP\_CC**  
 default\_cfe\_es\_fcncodes.h, 957  
**CFE\_ES\_NOOP\_INF\_EID**  
 cfe\_es\_eventids.h, 1019  
**CFE\_ES\_NoopCmd**, 508  
 CommandHeader, 508  
**CFE\_ES\_NoopCmd\_t**  
 default\_cfe\_es\_msgstruct.h, 1005  
**CFE\_ES\_NOT\_IMPLEMENTED**  
 cFE Return Code Defines, 185  
**CFE\_ES\_ONE\_APP\_EID**  
 cfe\_es\_eventids.h, 1019  
**CFE\_ES\_ONE\_APPID\_ERR\_EID**  
 cfe\_es\_eventids.h, 1019  
**CFE\_ES\_ONE\_ERR\_EID**  
 cfe\_es\_eventids.h, 1019  
**CFE\_ES\_OneAppTlm**, 508  
 Payload, 509  
 TelemetryHeader, 509  
**CFE\_ES\_OneAppTlm\_Payload**, 509  
 ApplInfo, 509  
**CFE\_ES\_OneAppTlm\_Payload\_t**  
 default\_cfe\_es\_msgdefs.h, 1000  
**CFE\_ES\_OneAppTlm\_t**  
 default\_cfe\_es\_msgstruct.h, 1005  
**CFE\_ES\_OPERATION\_TIMED\_OUT**  
 cFE Return Code Defines, 185  
**CFE\_ES\_OSCREATE\_ERR\_EID**  
 cfe\_es\_eventids.h, 1020  
**CFE\_ES\_OVER\_WRITE\_SYS\_LOG\_CC**  
 default\_cfe\_es\_fcncodes.h, 958  
**CFE\_ES\_OverWriteSysLogCmd**, 509  
 CommandHeader, 510  
 Payload, 510  
**CFE\_ES\_OverWriteSysLogCmd\_Payload**, 510  
 Mode, 510  
**CFE\_ES\_OverWriteSysLogCmd\_Payload\_t**  
 default\_cfe\_es\_msgdefs.h, 1000  
**CFE\_ES\_OverWriteSysLogCmd\_t**  
 default\_cfe\_es\_msgstruct.h, 1005  
**CFE\_ES\_PCR\_ERR1\_EID**  
 cfe\_es\_eventids.h, 1020  
**CFE\_ES\_PCR\_ERR2\_EID**  
 cfe\_es\_eventids.h, 1020  
**CFE\_ES\_PERF\_DATAWRITTEN\_EID**  
 cfe\_es\_eventids.h, 1020  
**CFE\_ES\_PERF\_FILTMSKCMD\_EID**  
 cfe\_es\_eventids.h, 1021  
**CFE\_ES\_PERF\_FILTMSKERR\_EID**  
 cfe\_es\_eventids.h, 1021  
**CFE\_ES\_PERF\_LOG\_ERR\_EID**  
 cfe\_es\_eventids.h, 1021  
**CFE\_ES\_PERF\_STARTCMD\_EID**  
 cfe\_es\_eventids.h, 1021  
**CFE\_ES\_PERF\_STARTCMD\_ERR\_EID**  
 cfe\_es\_eventids.h, 1022  
**CFE\_ES\_PERF\_STARTCMD\_TRIG\_ERR\_EID**  
 cfe\_es\_eventids.h, 1022  
**CFE\_ES\_PERF\_STOPCMD\_EID**  
 cfe\_es\_eventids.h, 1022  
**CFE\_ES\_PERF\_STOPCMD\_ERR2\_EID**  
 cfe\_es\_eventids.h, 1022  
**CFE\_ES\_PERF\_TRIGMSKCMD\_EID**

cfe\_es\_eventids.h, 1023  
CFE\_ES\_PERF\_TRIGMSKERR\_EID  
    cfe\_es\_eventids.h, 1023  
CFE\_ES\_PerfLogAdd  
    cFE Performance Monitor APIs, 240  
CFE\_ES\_PerfLogEntry  
    cFE Performance Monitor APIs, 239  
CFE\_ES\_PerfLogExit  
    cFE Performance Monitor APIs, 239  
CFE\_ES\_PerfMode  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_PerfMode\_Enum\_t  
    default\_cfe\_es\_msgdefs.h, 1000  
CFE\_ES\_PerfTrigger\_CENTER  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_PerfTrigger\_END  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_PerfTrigger\_START  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_POOL\_BLOCK\_INVALID  
    cFE Return Code Defines, 185  
CFE\_ES\_PoolAlign, 511  
    LongDouble, 511  
    LongInt, 511  
    Ptr, 511  
CFE\_ES\_PoolAlign\_t  
    cfe\_es\_api\_typedefs.h, 908  
CFE\_ES\_PoolCreate  
    cFE Memory Manager APIs, 234  
CFE\_ES\_PoolCreateEx  
    cFE Memory Manager APIs, 235  
CFE\_ES\_PoolCreateNoSem  
    cFE Memory Manager APIs, 236  
CFE\_ES\_PoolDelete  
    cFE Memory Manager APIs, 237  
CFE\_ES\_POOLID\_BASE  
    cFE Resource ID base values, 358  
CFE\_ES\_PoolStatsTlm\_Payload, 511  
    PoolHandle, 512  
    PoolStats, 512  
CFE\_ES\_PoolStatsTlm\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1000  
CFE\_ES\_ProcessAsyncEvent  
    cFE Miscellaneous APIs, 225  
CFE\_ES\_PutPoolBuf  
    cFE Memory Manager APIs, 238  
CFE\_ES\_QUERY\_ALL\_CC  
    default\_cfe\_es\_fcncodes.h, 959  
CFE\_ES\_QUERY\_ALL\_TASKS\_CC  
    default\_cfe\_es\_fcncodes.h, 960  
CFE\_ES\_QUERY\_ONE\_CC  
    default\_cfe\_es\_fcncodes.h, 960  
CFE\_ES\_QueryAllCmd, 512  
    CommandHeader, 512  
                Payload, 512  
CFE\_ES\_QueryAllCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1005  
CFE\_ES\_QueryAllTasksCmd, 513  
    CommandHeader, 513  
        Payload, 513  
CFE\_ES\_QueryAllTasksCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1005  
CFE\_ES\_QueryOneCmd, 513  
    CommandHeader, 513  
        Payload, 513  
CFE\_ES\_QueryOneCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1005  
CFE\_ES\_QUEUE\_DELETE\_ERR  
    cFE Return Code Defines, 185  
CFE\_ES\_RegisterCDS  
    cFE Critical Data Store APIs, 229  
CFE\_ES\_RegisterGenCounter  
    cFE Generic Counter APIs, 244  
CFE\_ES\_RELOAD\_APP\_CC  
    default\_cfe\_es\_fcncodes.h, 961  
CFE\_ES\_RELOAD\_APP\_DBG\_EID  
    cfe\_es\_eventids.h, 1023  
CFE\_ES\_RELOAD\_APP\_ERR1\_EID  
    cfe\_es\_eventids.h, 1023  
CFE\_ES\_RELOAD\_APP\_ERR2\_EID  
    cfe\_es\_eventids.h, 1024  
CFE\_ES\_RELOAD\_APP\_ERR3\_EID  
    cfe\_es\_eventids.h, 1024  
CFE\_ES\_RELOAD\_APP\_ERR4\_EID  
    cfe\_es\_eventids.h, 1024  
CFE\_ES\_RELOAD\_APP\_INF\_EID  
    cfe\_es\_eventids.h, 1024  
CFE\_ES\_ReloadApp  
    cFE Application Control APIs, 204  
CFE\_ES\_ReloadAppCmd, 514  
    CommandHeader, 514  
        Payload, 514  
CFE\_ES\_ReloadAppCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_RESET\_COUNTERS\_CC  
    default\_cfe\_es\_fcncodes.h, 962  
CFE\_ES\_RESET\_INF\_EID  
    cfe\_es\_eventids.h, 1025  
CFE\_ES\_RESET\_PR\_COUNT\_CC  
    default\_cfe\_es\_fcncodes.h, 963  
CFE\_ES\_RESET\_PR\_COUNT\_EID  
    cfe\_es\_eventids.h, 1025  
CFE\_ES\_ResetCFE  
    cFE Entry/Exit APIs, 202  
CFE\_ES\_ResetCountersCmd, 514  
    CommandHeader, 514  
CFE\_ES\_ResetCountersCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006

**CFE\_ES\_ResetPRCountCmd**, [515](#)  
 CommandHeader, [515](#)  
**CFE\_ES\_ResetPRCountCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_RESTART\_APP\_CC**  
 default\_cfe\_es\_fcncodes.h, [963](#)  
**CFE\_ES\_RESTART\_APP\_DBG\_EID**  
 cfe\_es\_eventids.h, [1025](#)  
**CFE\_ES\_RESTART\_APP\_ERR1\_EID**  
 cfe\_es\_eventids.h, [1025](#)  
**CFE\_ES\_RESTART\_APP\_ERR2\_EID**  
 cfe\_es\_eventids.h, [1026](#)  
**CFE\_ES\_RESTART\_APP\_ERR3\_EID**  
 cfe\_es\_eventids.h, [1026](#)  
**CFE\_ES\_RESTART\_APP\_ERR4\_EID**  
 cfe\_es\_eventids.h, [1026](#)  
**CFE\_ES\_RESTART\_APP\_INF\_EID**  
 cfe\_es\_eventids.h, [1026](#)  
**CFE\_ES\_RESTART\_CC**  
 default\_cfe\_es\_fcncodes.h, [964](#)  
**CFE\_ES\_RestartApp**  
 cFE Application Control APIs, [205](#)  
**CFE\_ES\_RestartAppCmd**, [515](#)  
 CommandHeader, [515](#)  
 Payload, [516](#)  
**CFE\_ES\_RestartAppCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_RestartCmd**, [516](#)  
 CommandHeader, [516](#)  
 Payload, [516](#)  
**CFE\_ES\_RestartCmd\_Payload**, [516](#)  
 RestartType, [517](#)  
**CFE\_ES\_RestartCmd\_Payload\_t**  
 default\_cfe\_es\_msgdefs.h, [1000](#)  
**CFE\_ES\_RestartCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_RestoreFromCDS**  
 cFE Critical Data Store APIs, [230](#)  
**CFE\_ES\_RST\_ACCESS\_ERR**  
 cFE Return Code Defines, [185](#)  
**CFE\_ES\_RunLoop**  
 cFE Application Behavior APIs, [208](#)  
**CFE\_ES\_RunStatus**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_APP\_ERROR**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_APP\_EXIT**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_APP\_RUN**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_CORE\_APP\_INIT\_ERROR**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_CORE\_APP\_RUNTIME\_ERROR**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_Enum\_t**  
 default\_cfe\_es\_extern\_typedefs.h, [951](#)  
**CFE\_ES\_RunStatus\_MAX**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_SYS\_DELETE**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_SYS\_EXCEPTION**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_SYS\_RELOAD**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_SYS\_RESTART**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_RunStatus\_UNDEFINED**  
 default\_cfe\_es\_extern\_typedefs.h, [953](#)  
**CFE\_ES\_SEND\_HK\_MID**  
 default\_cfe\_es\_msgids.h, [1002](#)  
**CFE\_ES\_SEND\_MEM\_POOL\_STATS\_CC**  
 default\_cfe\_es\_fcncodes.h, [965](#)  
**CFE\_ES\_SendHkCmd**, [517](#)  
 CommandHeader, [517](#)  
**CFE\_ES\_SendHkCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_SendMemPoolStatsCmd**, [517](#)  
 CommandHeader, [518](#)  
 Payload, [518](#)  
**CFE\_ES\_SendMemPoolStatsCmd\_Payload**, [518](#)  
 Application, [518](#)  
 PoolHandle, [518](#)  
**CFE\_ES\_SendMemPoolStatsCmd\_Payload\_t**  
 default\_cfe\_es\_msgdefs.h, [1000](#)  
**CFE\_ES\_SendMemPoolStatsCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC**  
 default\_cfe\_es\_fcncodes.h, [966](#)  
**CFE\_ES\_SET\_MAX\_PR\_COUNT\_EID**  
 cfe\_es\_eventids.h, [1027](#)  
**CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC**  
 default\_cfe\_es\_fcncodes.h, [967](#)  
**CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC**  
 default\_cfe\_es\_fcncodes.h, [968](#)  
**CFE\_ES\_SetGenCount**  
 cFE Generic Counter APIs, [245](#)  
**CFE\_ES\_SetMaxPRCountCmd**, [519](#)  
 CommandHeader, [519](#)  
 Payload, [519](#)  
**CFE\_ES\_SetMaxPRCountCmd\_Payload**, [519](#)  
 MaxPRCount, [519](#)  
**CFE\_ES\_SetMaxPRCountCmd\_Payload\_t**  
 default\_cfe\_es\_msgdefs.h, [1001](#)  
**CFE\_ES\_SetMaxPRCountCmd\_t**  
 default\_cfe\_es\_msgstruct.h, [1006](#)  
**CFE\_ES\_SetPerfFilterMaskCmd**, [520](#)  
 CommandHeader, [520](#)  
 Payload, [520](#)

CFE\_ES\_SetPerfFilterMaskCmd\_Payload, 520  
    FilterMask, 521  
    FilterMaskNum, 521  
CFE\_ES\_SetPerfFilterMaskCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_SetPerfFilterMaskCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_SetPerfTriggerMaskCmd, 521  
    CommandHeader, 521  
    Payload, 521  
CFE\_ES\_SetPerfTriggerMaskCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_SetPerfTrigMaskCmd\_Payload, 522  
    TriggerMask, 522  
    TriggerMaskNum, 522  
CFE\_ES\_SetPerfTrigMaskCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_StackPointer\_t  
    cfe\_es\_api\_typedefs.h, 909  
CFE\_ES\_START\_APP\_CC  
    default\_cfe\_es\_fcncodes.h, 968  
CFE\_ES\_START\_ERR\_EID  
    cfe\_es\_eventids.h, 1027  
CFE\_ES\_START\_EXC\_ACTION\_ERR\_EID  
    cfe\_es\_eventids.h, 1027  
CFE\_ES\_START\_INF\_EID  
    cfe\_es\_eventids.h, 1027  
CFE\_ES\_START\_INVALID\_ENTRY\_POINT\_ERR\_EID  
    cfe\_es\_eventids.h, 1028  
CFE\_ES\_START\_INVALID\_FILENAME\_ERR\_EID  
    cfe\_es\_eventids.h, 1028  
CFE\_ES\_START\_NULL\_APP\_NAME\_ERR\_EID  
    cfe\_es\_eventids.h, 1028  
CFE\_ES\_START\_PERF\_DATA\_CC  
    default\_cfe\_es\_fcncodes.h, 969  
CFE\_ES\_START\_PRIORITY\_ERR\_EID  
    cfe\_es\_eventids.h, 1028  
CFE\_ES\_StartApp, 522  
    CommandHeader, 522  
    Payload, 523  
CFE\_ES\_StartAppCmd\_Payload, 523  
    AppEntryPoint, 523  
    AppFileName, 523  
    Application, 523  
    ExceptionAction, 524  
    Priority, 524  
    StackSize, 524  
CFE\_ES\_StartAppCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_StartAppCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_StartPerfCmd\_Payload, 524  
    TriggerMode, 524  
CFE\_ES\_StartPerfCmd\_Payload\_t  
    default\_cfe\_es\_msgstruct.h, 1001  
CFE\_ES\_StopAppCmd, 525  
    CommandHeader, 525  
    Payload, 525  
CFE\_ES\_StopAppCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_StopPerfCmd\_Payload, 526  
    DataFileName, 526  
CFE\_ES\_StopPerfCmd\_Payload\_t  
    default\_cfe\_es\_msgdefs.h, 1001  
CFE\_ES\_StopPerfDataCmd, 526  
    CommandHeader, 526  
    Payload, 527  
CFE\_ES\_StopPerfDataCmd\_t  
    default\_cfe\_es\_msgstruct.h, 1006  
CFE\_ES\_SYSLOG1\_INF\_EID  
    cfe\_es\_eventids.h, 1030  
CFE\_ES\_SYSLOG2\_EID  
    cfe\_es\_eventids.h, 1030  
CFE\_ES\_SYSLOG2\_ERR\_EID  
    cfe\_es\_eventids.h, 1030  
CFE\_ES\_SYSLOGMODE\_EID  
    cfe\_es\_eventids.h, 1031  
CFE\_ES\_SystemState  
    default\_cfe\_es\_extern\_typedefs.h, 953  
CFE\_ES\_SystemState\_APPS\_INIT  
    default\_cfe\_es\_extern\_typedefs.h, 953  
CFE\_ES\_SystemState\_CORE\_READY  
    default\_cfe\_es\_extern\_typedefs.h, 953  
CFE\_ES\_SystemState\_CORE\_STARTUP  
    default\_cfe\_es\_extern\_typedefs.h, 953

**CFE\_ES\_SystemState\_EARLY\_INIT**  
 default\_cfe\_es\_extern\_typedefs.h, 953  
**CFE\_ES\_SystemState\_Enum\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 951  
**CFE\_ES\_SystemState\_MAX**  
 default\_cfe\_es\_extern\_typedefs.h, 953  
**CFE\_ES\_SystemState\_OPERATIONAL**  
 default\_cfe\_es\_extern\_typedefs.h, 953  
**CFE\_ES\_SystemState\_SHUTDOWN**  
 default\_cfe\_es\_extern\_typedefs.h, 953  
**CFE\_ES\_SystemState\_UNDEFINED**  
 default\_cfe\_es\_extern\_typedefs.h, 953  
**CFE\_ES\_TASK\_DELETE\_ERR**  
 cFE Return Code Defines, 185  
**CFE\_ES\_TASK\_STACK\_ALLOCATE**  
 cfe\_es\_api\_typedefs.h, 907  
**CFE\_ES\_TaskEntryFuncPtr\_t**  
 cfe\_es\_api\_typedefs.h, 909  
**CFE\_ES\_TASKID\_BASE**  
 cFE Resource ID base values, 357  
**CFE\_ES\_TASKID\_C**  
 cfe\_es\_api\_typedefs.h, 908  
**CFE\_ES\_TaskId\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 951  
**CFE\_ES\_TaskID\_TolIndex**  
 cFE Resource ID APIs, 201  
**CFE\_ES\_TASKID\_UNDEFINED**  
 cfe\_es\_api\_typedefs.h, 908  
**CFE\_ES\_TaskInfo**, 527  
 AppId, 527  
 AppName, 527  
 ExecutionCounter, 528  
 Priority, 528  
 Spare, 528  
 StackSize, 528  
 TaskId, 528  
 TaskName, 528  
**CFE\_ES\_TASKINFO\_EID**  
 cfe\_es\_eventids.h, 1031  
**CFE\_ES\_TASKINFO\_OSCREATE\_ERR\_EID**  
 cfe\_es\_eventids.h, 1031  
**CFE\_ES\_TaskInfo\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 951  
**CFE\_ES\_TASKINFO\_WR\_ERR\_EID**  
 cfe\_es\_eventids.h, 1031  
**CFE\_ES\_TASKINFO\_WRHDR\_ERR\_EID**  
 cfe\_es\_eventids.h, 1032  
**CFE\_ES\_TaskPriority\_Atom\_t**  
 default\_cfe\_es\_extern\_typedefs.h, 951  
**CFE\_ES\_TASKWR\_ERR\_EID**  
 cfe\_es\_eventids.h, 1032  
**CFE\_ES\_TEST\_LONG\_MASK**  
 cfe\_es.h, 904  
**CFE\_ES\_TIMER\_DELETE\_ERR**  
 cFE Return Code Defines, 186  
**CFE\_ES\_TLM\_POOL\_STATS\_INFO\_EID**  
 cfe\_es\_eventids.h, 1032  
**CFE\_ES\_USE\_MUTEX**  
 cfe\_es\_api\_typedefs.h, 908  
**CFE\_ES\_VERSION\_INF\_EID**  
 cfe\_es\_eventids.h, 1032  
**CFE\_ES\_WaitForStartupSync**  
 cFE Application Behavior APIs, 209  
**CFE\_ES\_WaitForSystemState**  
 cFE Application Behavior APIs, 209  
**CFE\_ES\_WRHDR\_ERR\_EID**  
 cfe\_es\_eventids.h, 1033  
**CFE\_ES\_WRITE\_CFE\_HDR\_ERR\_EID**  
 cfe\_es\_eventids.h, 1033  
**CFE\_ES\_WRITE\_ER\_LOG\_CC**  
 default\_cfe\_es\_fcncodes.h, 972  
**CFE\_ES\_WRITE\_SYS\_LOG\_CC**  
 default\_cfe\_es\_fcncodes.h, 973  
**CFE\_ES\_WriteERLogCmd**, 528  
 CommandHeader, 529  
 Payload, 529  
**CFE\_ES\_WriteERLogCmd\_t**  
 default\_cfe\_es\_msgstruct.h, 1007  
**CFE\_ES\_WriteSysLogCmd**, 529  
 CommandHeader, 529  
 Payload, 529  
**CFE\_ES\_WriteSysLogCmd\_t**  
 default\_cfe\_es\_msgstruct.h, 1007  
**CFE\_ES\_WriteToSysLog**  
 cFE Miscellaneous APIs, 225  
**CFE\_EVENTS\_SERVICE**  
 cfe\_error.h, 899  
**cfe\_evs.h**  
 CFE\_EVS\_Send, 910  
 CFE\_EVS\_SendCrit, 910  
 CFE\_EVS\_SendDbg, 910  
 CFE\_EVS\_SendErr, 911  
 CFE\_EVS\_SendInfo, 911  
**CFE\_EVS\_ADD\_EVENT\_FILTER\_CC**  
 default\_cfe\_evs\_fcncodes.h, 1037  
**CFE\_EVS\_AddEventFilterCmd**, 529  
 CommandHeader, 530  
 Payload, 530  
**CFE\_EVS\_AddEventFilterCmd\_t**  
 default\_cfe\_evs\_msgstruct.h, 1066  
**CFE\_EVS\_ADDFILTER\_EID**  
 cfe\_evs\_eventids.h, 1070  
**cfe\_evs\_api\_typedefs.h**  
 CFE\_EVS\_BinFilter\_t, 913  
 CFE\_EVS\_EVERY\_FOURTH\_ONE, 912  
 CFE\_EVS\_EVERY\_OTHER\_ONE, 912  
 CFE\_EVS\_EVERY\_OTHER\_TWO, 912  
 CFE\_EVS\_FIRST\_16\_STOP, 912

CFE\_EVS\_FIRST\_32\_STOP, 912  
CFE\_EVS\_FIRST\_4\_STOP, 912  
CFE\_EVS\_FIRST\_64\_STOP, 912  
CFE\_EVS\_FIRST\_8\_STOP, 912  
CFE\_EVS\_FIRST\_ONE\_STOP, 913  
CFE\_EVS\_FIRST\_TWO\_STOP, 913  
CFE\_EVS\_NO\_FILTER, 913  
CFE\_EVS\_APP\_FILTER\_OVERLOAD  
    cFE Return Code Defines, 186  
CFE\_EVS\_APP\_ILLEGAL\_APP\_ID  
    cFE Return Code Defines, 186  
CFE\_EVS\_APP\_NOT\_REGISTERED  
    cFE Return Code Defines, 186  
CFE\_EVS\_APP\_SQUELCHED  
    cFE Return Code Defines, 186  
CFE\_EVS\_AppDataCmd\_Payload, 530  
    AppNameFilename, 530  
CFE\_EVS\_AppDataCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_AppNameBitMaskCmd\_Payload, 531  
    AppName, 531  
    BitMask, 531  
    Spare, 531  
CFE\_EVS\_AppNameBitMaskCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_AppNameCmd\_Payload, 531  
    AppName, 532  
CFE\_EVS\_AppNameCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_AppNameEventIDCmd\_Payload, 532  
    AppName, 532  
    EventID, 532  
CFE\_EVS\_AppNameEventIDCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_AppNameEventIDMaskCmd\_Payload, 532  
    AppName, 533  
    EventID, 533  
    Mask, 533  
CFE\_EVS\_AppNameEventIDMaskCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_AppTlmData, 533  
    AppEnableStatus, 534  
    AppID, 534  
    AppMessageSentCounter, 534  
    AppMessageSquelchedCounter, 534  
CFE\_EVS\_AppTlmData\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_BinFilter, 534  
    EventID, 535  
    Mask, 535  
CFE\_EVS\_BinFilter\_t  
    cfe\_evs\_api\_typedefs.h, 913  
CFE\_EVS\_BitMaskCmd\_Payload, 535  
    BitMask, 535  
            Spare, 535  
CFE\_EVS\_BitMaskCmd\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1062  
CFE\_EVS\_CLEAR\_LOG\_CC  
    default\_cfe\_evs\_fcncodes.h, 1038  
CFE\_EVS\_ClearLogCmd, 536  
    CommandHeader, 536  
CFE\_EVS\_ClearLogCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_CMD\_MID  
    default\_cfe\_evs\_msgids.h, 1064  
CFE\_EVS\_CRITICAL\_BIT  
    default\_cfe\_evs\_msgdefs.h, 1061  
CFE\_EVS\_DEBUG\_BIT  
    default\_cfe\_evs\_msgdefs.h, 1061  
CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC  
    default\_cfe\_evs\_fcncodes.h, 1038  
CFE\_EVS\_DeleteEventFilterCmd, 536  
    CommandHeader, 536  
    Payload, 536  
CFE\_EVS\_DeleteEventFilterCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_DELFILTER\_EID  
    cfe\_evs\_eventids.h, 1070  
CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1039  
CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC  
    default\_cfe\_evs\_fcncodes.h, 1040  
CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1041  
CFE\_EVS\_DISABLE\_PORTS\_CC  
    default\_cfe\_evs\_fcncodes.h, 1042  
CFE\_EVS\_DisableAppEventsCmd, 537  
    CommandHeader, 537  
    Payload, 537  
CFE\_EVS\_DisableAppEventsCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_DisableAppEventTypeCmd, 537  
    CommandHeader, 537  
    Payload, 537  
CFE\_EVS\_DisableAppEventTypeCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_DisableEventTypeCmd, 538  
    CommandHeader, 538  
    Payload, 538  
CFE\_EVS\_DisableEventTypeCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_DisablePortsCmd, 538  
    CommandHeader, 539  
    Payload, 539  
CFE\_EVS\_DisablePortsCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1066  
CFE\_EVS\_DISAPPENTTYPE\_EID  
    cfe\_evs\_eventids.h, 1071

CFE\_EVS\_DISAPPEVT\_EID  
     cfe\_evs\_eventids.h, 1071

CFE\_EVS\_DISEVTTYPE\_EID  
     cfe\_evs\_eventids.h, 1071

CFE\_EVS\_DISPRT\_EID  
     cfe\_evs\_eventids.h, 1071

CFE\_EVS\_ENAAPPEVT\_EID  
     cfe\_evs\_eventids.h, 1072

CFE\_EVS\_ENAAPPEVTTYPE\_EID  
     cfe\_evs\_eventids.h, 1072

CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC  
     default\_cfe\_evs\_fcncodes.h, 1043

CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC  
     default\_cfe\_evs\_fcncodes.h, 1043

CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC  
     default\_cfe\_evs\_fcncodes.h, 1044

CFE\_EVS\_ENABLE\_PORTS\_CC  
     default\_cfe\_evs\_fcncodes.h, 1045

CFE\_EVS\_EnableAppEventsCmd, 539  
     CommandHeader, 539  
     Payload, 539

CFE\_EVS\_EnableAppEventsCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_EnableAppEventTypeCmd, 539  
     CommandHeader, 540  
     Payload, 540

CFE\_EVS\_EnableAppEventTypeCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_EnableEventTypeCmd, 540  
     CommandHeader, 540  
     Payload, 540

CFE\_EVS\_EnableEventTypeCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_EnablePortsCmd, 541  
     CommandHeader, 541  
     Payload, 541

CFE\_EVS\_EnablePortsCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_ENAEVTTYPE\_EID  
     cfe\_evs\_eventids.h, 1072

CFE\_EVS\_ENAPORT\_EID  
     cfe\_evs\_eventids.h, 1072

CFE\_EVS\_ERR\_APPNOREGS\_EID  
     cfe\_evs\_eventids.h, 1073

CFE\_EVS\_ERR\_CC\_EID  
     cfe\_evs\_eventids.h, 1073

CFE\_EVS\_ERR\_CRDATFILE\_EID  
     cfe\_evs\_eventids.h, 1073

CFE\_EVS\_ERR\_CRLOGFILE\_EID  
     cfe\_evs\_eventids.h, 1073

CFE\_EVS\_ERR\_EVTIDMOREGS\_EID  
     cfe\_evs\_eventids.h, 1074

CFE\_EVS\_ERR\_ILLAPPIDRANGE\_EID  
     cfe\_evs\_eventids.h, 1074

CFE\_EVS\_ERR\_ILLEGALFMTMOD\_EID  
     cfe\_evs\_eventids.h, 1074

CFE\_EVS\_ERR\_INVALID\_BITMASK\_EID  
     cfe\_evs\_eventids.h, 1074

CFE\_EVS\_ERR\_LOGMODE\_EID  
     cfe\_evs\_eventids.h, 1075

CFE\_EVS\_ERR\_MAXREGSFILTER\_EID  
     cfe\_evs\_eventids.h, 1075

CFE\_EVS\_ERR\_MSGID\_EID  
     cfe\_evs\_eventids.h, 1075

CFE\_EVS\_ERR\_NOAPPIDFOUND\_EID  
     cfe\_evs\_eventids.h, 1075

CFE\_EVS\_ERR\_UNREGISTERED\_EVS\_APP  
     cfe\_evs\_eventids.h, 1076

CFE\_EVS\_ERR\_WRDATFILE\_EID  
     cfe\_evs\_eventids.h, 1076

CFE\_EVS\_ERR\_WRLogFile\_EID  
     cfe\_evs\_eventids.h, 1076

CFE\_EVS\_ERROR\_BIT  
     default\_cfe\_evs\_msgdefs.h, 1061

CFE\_EVS\_EventFilter  
     default\_cfe\_evs\_extern\_typedefs.h, 1035

CFE\_EVS\_EventFilter\_BINARY  
     default\_cfe\_evs\_extern\_typedefs.h, 1035

CFE\_EVS\_EventFilter\_Enum\_t  
     default\_cfe\_evs\_extern\_typedefs.h, 1034

cfe\_evs\_eventids.h  
     CFE\_EVS\_ADDFILTER\_EID, 1070  
     CFE\_EVS\_DELFILTER\_EID, 1070  
     CFE\_EVS\_DISAPPENTTYPE\_EID, 1071  
     CFE\_EVS\_DISAPPEVT\_EID, 1071  
     CFE\_EVS\_DISEVTTYPE\_EID, 1071  
     CFE\_EVS\_DISPRT\_EID, 1071  
     CFE\_EVS\_ENAAPPEVT\_EID, 1072  
     CFE\_EVS\_ENAAPPEVTTYPE\_EID, 1072  
     CFE\_EVS\_ENAEVTTYPE\_EID, 1072  
     CFE\_EVS\_ENAPORT\_EID, 1072  
     CFE\_EVS\_ERR\_APPNOREGS\_EID, 1073  
     CFE\_EVS\_ERR\_CC\_EID, 1073  
     CFE\_EVS\_ERR\_CRDATFILE\_EID, 1073  
     CFE\_EVS\_ERR\_CRLogFile\_EID, 1073  
     CFE\_EVS\_ERR\_EVTIDMOREGS\_EID, 1074  
     CFE\_EVS\_ERR\_ILLAPPIDRANGE\_EID, 1074  
     CFE\_EVS\_ERR\_ILLEGALFMTMOD\_EID, 1074  
     CFE\_EVS\_ERR\_INVALID\_BITMASK\_EID, 1074  
     CFE\_EVS\_ERR\_LOGMODE\_EID, 1075  
     CFE\_EVS\_ERR\_MAXREGSFILTER\_EID, 1075  
     CFE\_EVS\_ERR\_MSGID\_EID, 1075  
     CFE\_EVS\_ERR\_NOAPPIDFOUND\_EID, 1075  
     CFE\_EVS\_ERR\_UNREGISTERED\_EVS\_APP, 1076  
     CFE\_EVS\_ERR\_WRDATFILE\_EID, 1076  
     CFE\_EVS\_ERR\_WRLogFile\_EID, 1076  
     CFE\_EVS\_EVT\_FILTERED\_EID, 1076

CFE\_EVS\_FILTER\_MAX\_EID, 1077  
CFE\_EVS\_LEN\_ERR\_EID, 1077  
CFE\_EVS\_LOGMODE\_EID, 1077  
CFE\_EVS\_NOOP\_EID, 1077  
CFE\_EVS\_RSTALLFILTER\_EID, 1078  
CFE\_EVS\_RSTCNT\_EID, 1078  
CFE\_EVS\_RSTEVTCNT\_EID, 1078  
CFE\_EVS\_RSTFILTER\_EID, 1078  
CFE\_EVS\_SETEVTFMTMOD\_EID, 1079  
CFE\_EVS\_SETFILTERMSK\_EID, 1079  
CFE\_EVS\_SQUELCHED\_ERR\_EID, 1079  
CFE\_EVS\_STARTUP\_EID, 1079  
CFE\_EVS\_WRDAT\_EID, 1080  
CFE\_EVS\_WRITE\_HEADER\_ERR\_EID, 1080  
CFE\_EVS\_WRLOG\_EID, 1080  
**CFE\_EVS\_EventOutput**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventOutput\_Enum\_t**  
    default\_cfe\_evs\_extern\_typedefs.h, 1034  
**CFE\_EVS\_EventOutput\_PORT1**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventOutput\_PORT2**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventOutput\_PORT3**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventOutput\_PORT4**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventType**  
    default\_cfe\_evs\_extern\_typedefs.h, 1035  
**CFE\_EVS\_EventType\_CRITICAL**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_EventType\_DEBUG**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_EventType\_Enum\_t**  
    default\_cfe\_evs\_extern\_typedefs.h, 1034  
**CFE\_EVS\_EventType\_ERROR**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_EventType\_INFORMATION**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_EVERY\_FOURTH\_ONE**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_EVERY\_OTHER\_ONE**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_EVERY\_OTHER\_TWO**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_EVT\_FILTERED\_EID**  
    cfe\_evs\_eventids.h, 1076  
**CFE\_EVS\_EVT\_NOT\_REGISTERED**  
    cFE Return Code Defines, 186  
**CFE\_EVS\_FILE\_WRITE\_ERROR**  
    cFE Return Code Defines, 186  
**CFE\_EVS\_FILTER\_MAX\_EID**  
    cfe\_evs\_eventids.h, 1077  
**CFE\_EVS\_FIRST\_16\_STOP**  
    cfe\_evs\_eventids.h, 1077  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_FIRST\_32\_STOP**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_FIRST\_4\_STOP**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_FIRST\_64\_STOP**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_FIRST\_8\_STOP**  
    cfe\_evs\_api\_typedefs.h, 912  
**CFE\_EVS\_FIRST\_ONE\_STOP**  
    cfe\_evs\_api\_typedefs.h, 913  
**CFE\_EVS\_FIRST\_TWO\_STOP**  
    cfe\_evs\_api\_typedefs.h, 913  
**CFE\_EVS\_HK\_TLM\_MID**  
    default\_cfe\_evs\_msgids.h, 1064  
**CFE\_EVS\_HousekeepingTlm**, 541  
    Payload, 542  
    TelemetryHeader, 542  
**CFE\_EVS\_HousekeepingTlm\_Payload**, 542  
    AppData, 543  
    CommandCounter, 543  
    CommandErrorCounter, 543  
    LogEnabled, 543  
    LogFullFlag, 543  
    LogMode, 543  
    LogOverflowCounter, 543  
    MessageFormatMode, 544  
    MessageSendCounter, 544  
    MessageTruncCounter, 544  
    OutputPort, 544  
    Spare1, 544  
    Spare2, 544  
    Spare3, 544  
    UnregisteredAppCounter, 545  
**CFE\_EVS\_HousekeepingTlm\_Payload\_t**  
    default\_cfe\_evs\_msgdefs.h, 1063  
**CFE\_EVS\_HousekeepingTlm\_t**  
    default\_cfe\_evs\_msgstruct.h, 1066  
**CFE\_EVS\_INFORMATION\_BIT**  
    default\_cfe\_evs\_msgdefs.h, 1061  
**CFE\_EVS\_INVALID\_PARAMETER**  
    cFE Return Code Defines, 186  
**CFE\_EVS\_LEN\_ERR\_EID**  
    cfe\_evs\_eventids.h, 1077  
**CFE\_EVS\_LogFileCmd\_Payload**, 545  
    LogFilename, 545  
**CFE\_EVS\_LogFileCmd\_Payload\_t**  
    default\_cfe\_evs\_msgdefs.h, 1063  
**CFE\_EVS\_LogMode**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_LogMode\_DISCARD**  
    default\_cfe\_evs\_extern\_typedefs.h, 1036  
**CFE\_EVS\_LOGMODE\_EID**  
    cfe\_evs\_eventids.h, 1077

CFE\_EVS\_LogMode\_Enum\_t  
     default\_cfe\_evs\_extern\_typedefs.h, 1035

CFE\_EVS\_LogMode\_OVERWRITE  
     default\_cfe\_evs\_extern\_typedefs.h, 1036

CFE\_EVS\_LONG\_EVENT\_MSG\_MID  
     default\_cfe\_evs\_msgids.h, 1064

CFE\_EVS\_LongEventTlm, 545  
     Payload, 546  
     TelemetryHeader, 546

CFE\_EVS\_LongEventTlm\_Payload, 546  
     Message, 546  
     PacketID, 546  
     Spare1, 547  
     Spare2, 547

CFE\_EVS\_LongEventTlm\_Payload\_t  
     default\_cfe\_evs\_msgdefs.h, 1063

CFE\_EVS\_LongEventTlm\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_MsgFormat  
     default\_cfe\_evs\_extern\_typedefs.h, 1036

CFE\_EVS\_MsgFormat\_Enum\_t  
     default\_cfe\_evs\_extern\_typedefs.h, 1035

CFE\_EVS\_MsgFormat\_LONG  
     default\_cfe\_evs\_extern\_typedefs.h, 1036

CFE\_EVS\_MsgFormat\_SHORT  
     default\_cfe\_evs\_extern\_typedefs.h, 1036

CFE\_EVS\_NO\_FILTER  
     cfe\_evs\_api\_typedefs.h, 913

CFE\_EVS\_NOOP\_CC  
     default\_cfe\_evs\_fcncodes.h, 1046

CFE\_EVS\_NOOP\_EID  
     cfe\_evs\_eventids.h, 1077

CFE\_EVS\_NoopCmd, 547  
     CommandHeader, 547

CFE\_EVS\_NoopCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_NOT\_IMPLEMENTED  
     cFE Return Code Defines, 187

CFE\_EVS\_PacketID, 547  
     AppName, 548  
     EventID, 548  
     EventType, 548  
     ProcessorID, 548  
     SpacecraftID, 548

CFE\_EVS\_PacketID\_t  
     default\_cfe\_evs\_msgdefs.h, 1063

CFE\_EVS\_PORT1\_BIT  
     default\_cfe\_evs\_msgdefs.h, 1062

CFE\_EVS\_PORT2\_BIT  
     default\_cfe\_evs\_msgdefs.h, 1062

CFE\_EVS\_PORT3\_BIT  
     default\_cfe\_evs\_msgdefs.h, 1062

CFE\_EVS\_PORT4\_BIT  
     default\_cfe\_evs\_msgdefs.h, 1062

CFE\_EVS\_Register  
     cFE Registration APIs, 247

CFE\_EVS\_RESET\_ALL\_FILTERS\_CC  
     default\_cfe\_evs\_fcncodes.h, 1047

CFE\_EVS\_RESET\_APP\_COUNTER\_CC  
     default\_cfe\_evs\_fcncodes.h, 1047

CFE\_EVS\_RESET\_AREA\_POINTER  
     cFE Return Code Defines, 187

CFE\_EVS\_RESET\_COUNTERS\_CC  
     default\_cfe\_evs\_fcncodes.h, 1048

CFE\_EVS\_RESET\_FILTER\_CC  
     default\_cfe\_evs\_fcncodes.h, 1049

CFE\_EVS\_ResetAllFilters  
     cFE Reset Event Filter APIs, 254

CFE\_EVS\_ResetAllFiltersCmd, 549  
     CommandHeader, 549  
     Payload, 549

CFE\_EVS\_ResetAllFiltersCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1066

CFE\_EVS\_ResetAppCounterCmd, 549  
     CommandHeader, 550  
     Payload, 550

CFE\_EVS\_ResetAppCounterCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1067

CFE\_EVS\_ResetCountersCmd, 550  
     CommandHeader, 550

CFE\_EVS\_ResetCountersCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1067

CFE\_EVS\_ResetFilter  
     cFE Reset Event Filter APIs, 254

CFE\_EVS\_ResetFilterCmd, 550  
     CommandHeader, 551  
     Payload, 551

CFE\_EVS\_ResetFilterCmd\_t  
     default\_cfe\_evs\_msgstruct.h, 1067

CFE\_EVS\_RSTALLFILTER\_EID  
     cfe\_evs\_eventids.h, 1078

CFE\_EVS\_RSTCNT\_EID  
     cfe\_evs\_eventids.h, 1078

CFE\_EVS\_RSTEVCNT\_EID  
     cfe\_evs\_eventids.h, 1078

CFE\_EVS\_RSTFILTER\_EID  
     cfe\_evs\_eventids.h, 1078

CFE\_EVS\_Send  
     cfe\_evs.h, 910

CFE\_EVS\_SEND\_HK\_MID  
     default\_cfe\_evs\_msgids.h, 1064

CFE\_EVS\_SendCrit  
     cfe\_evs.h, 910

CFE\_EVS\_SendDbg  
     cfe\_evs.h, 910

CFE\_EVS\_SendErr  
     cfe\_evs.h, 911

CFE\_EVS\_SendEvent

cFE Send Event APIs, 249  
CFE\_EVS\_SendEventWithAppID  
    cFE Send Event APIs, 250  
CFE\_EVS\_SendHkCmd, 551  
    CommandHeader, 551  
CFE\_EVS\_SendHkCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_SendInfo  
    cfe\_evs.h, 911  
CFE\_EVS\_SendTimedEvent  
    cFE Send Event APIs, 251  
CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1050  
CFE\_EVS\_SET\_FILTER\_CC  
    default\_cfe\_evs\_fcncodes.h, 1051  
CFE\_EVS\_SET\_LOG\_MODE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1052  
CFE\_EVS\_SetEventFormatCode\_Payload, 551  
    MsgFormat, 552  
    Spare, 552  
CFE\_EVS\_SetEventFormatMode\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1063  
CFE\_EVS\_SetEventFormatModeCmd, 552  
    CommandHeader, 552  
    Payload, 552  
CFE\_EVS\_SetEventFormatModeCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_SETEVTFMTMOD\_EID  
    cfe\_evs\_eventids.h, 1079  
CFE\_EVS\_SetFilterCmd, 553  
    CommandHeader, 553  
    Payload, 553  
CFE\_EVS\_SetFilterCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_SETFILTERMSK\_EID  
    cfe\_evs\_eventids.h, 1079  
CFE\_EVS\_SetLogMode\_Payload, 553  
    LogMode, 553  
    Spare, 554  
CFE\_EVS\_SetLogMode\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1063  
CFE\_EVS\_SetLogModeCmd, 554  
    CommandHeader, 554  
    Payload, 554  
CFE\_EVS\_SetLogModeCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_SHORT\_EVENT\_MSG\_MID  
    default\_cfe\_evs\_msgids.h, 1064  
CFE\_EVS\_ShortEventTlm, 554  
    Payload, 555  
    TelemetryHeader, 555  
CFE\_EVS\_ShortEventTlm\_Payload, 555  
    PacketID, 555  
CFE\_EVS\_ShortEventTlm\_Payload\_t  
    default\_cfe\_evs\_msgdefs.h, 1063  
CFE\_EVS\_ShortEventTlm\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_SQUELCHED\_ERR\_EID  
    cfe\_evs\_eventids.h, 1079  
CFE\_EVS\_STARTUP\_EID  
    cfe\_evs\_eventids.h, 1079  
CFE\_EVS\_UNKNOWN\_FILTER  
    cFE Return Code Defines, 187  
CFE\_EVS\_WRDAT\_EID  
    cfe\_evs\_eventids.h, 1080  
CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1052  
CFE\_EVS\_WRITE\_HEADER\_ERR\_EID  
    cfe\_evs\_eventids.h, 1080  
CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC  
    default\_cfe\_evs\_fcncodes.h, 1053  
CFE\_EVS\_WriteAppDataFileCmd, 555  
    CommandHeader, 556  
    Payload, 556  
CFE\_EVS\_WriteAppDataFileCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_WriteLogFileCmd, 556  
    CommandHeader, 556  
    Payload, 556  
CFE\_EVS\_WriteLogFileCmd\_t  
    default\_cfe\_evs\_msgstruct.h, 1067  
CFE\_EVS\_WRLLOG\_EID  
    cfe\_evs\_eventids.h, 1080  
CFE\_EXECUTIVE\_SERVICE  
    cfe\_error.h, 899  
CFE\_FILE\_SERVICE  
    cfe\_error.h, 899  
cfe\_fs\_api\_typedefs.h  
    CFE\_FS\_FileCategory\_BINARY\_DATA\_DUMP, 916  
    CFE\_FS\_FileCategory\_DYNAMIC\_MODULE, 916  
    CFE\_FS\_FileCategory\_MAX, 916  
    CFE\_FS\_FileCategory\_SCRIPT, 916  
    CFE\_FS\_FileCategory\_t, 916  
    CFE\_FS\_FileCategory\_TEMP, 916  
    CFE\_FS\_FileCategory\_TEXT\_LOG, 916  
    CFE\_FS\_FileCategory\_UNKNOWN, 916  
    CFE\_FS\_FileWriteEvent\_COMPLETE, 916  
    CFE\_FS\_FileWriteEvent\_CREATE\_ERROR, 916  
    CFE\_FS\_FileWriteEvent\_HEADER\_WRITE\_ERROR,  
        916  
    CFE\_FS\_FileWriteEvent\_MAX, 916  
    CFE\_FS\_FileWriteEvent\_RECORD\_WRITE\_ERROR,  
        916  
    CFE\_FS\_FileWriteEvent\_t, 916  
    CFE\_FS\_FileWriteEvent\_UNDEFINED, 916  
    CFE\_FS\_FileWriteGetData\_t, 915  
    CFE\_FS\_FileWriteMetaData\_t, 915  
    CFE\_FS\_FileWriteOnEvent\_t, 915

**CFE\_FS\_BackgroundFileDumpIsPending**  
 cFE File Utility APIs, [260](#)  
**CFE\_FS\_BackgroundFileDumpRequest**  
 cFE File Utility APIs, [261](#)  
**CFE\_FS\_BAD\_ARGUMENT**  
 cFE Return Code Defines, [187](#)  
**CFE\_FS\_ExtractFilenameFromPath**  
 cFE File Utility APIs, [261](#)  
**CFE\_FS\_FILE\_CONTENT\_ID**  
 default\_cfe\_fs\_interface\_cfg.h, [1083](#)  
 example\_mission\_cfg.h, [827](#)  
**CFE\_FS\_FileCategory\_BINARY\_DATA\_DUMP**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_DYNAMIC\_MODULE**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_MAX**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_SCRIPT**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_t**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_TEMP**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_TEXT\_LOG**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileCategory\_UNKNOWN**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_COMPLETE**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_CREATE\_ERROR**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_HEADER\_WRITE\_ERROR**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_MAX**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_RECORD\_WRITE\_ERROR**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_t**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteEvent\_UNDEFINED**  
 cfe\_fs\_api\_typedefs.h, [916](#)  
**CFE\_FS\_FileWriteGetData\_t**  
 cfe\_fs\_api\_typedefs.h, [915](#)  
**CFE\_FS\_FileWriteMetaData**, [557](#)  
 Description, [557](#)  
 FileName, [557](#)  
 FileSubType, [557](#)  
 GetData, [557](#)  
 IsPending, [557](#)  
 OnEvent, [558](#)  
**CFE\_FS\_FileWriteMetaData\_t**  
 cfe\_fs\_api\_typedefs.h, [915](#)  
**CFE\_FS\_FileWriteOnEvent\_t**  
 cfe\_fs\_api\_typedefs.h, [915](#)

**CFE\_FS\_FNAME\_TOO\_LONG**  
 cFE Return Code Defines, [187](#)  
**CFE\_FS\_GetDefaultExtension**  
 cFE File Utility APIs, [262](#)  
**CFE\_FS\_GetDefaultMountPoint**  
 cFE File Utility APIs, [262](#)  
**CFE\_FS\_HDR\_DESC\_MAX\_LEN**  
 default\_cfe\_fs\_interface\_cfg.h, [1083](#)  
 example\_mission\_cfg.h, [827](#)  
**CFE\_FS\_Header**, [558](#)  
 ApplicationID, [558](#)  
 ContentType, [558](#)  
 Description, [559](#)  
 Length, [559](#)  
 ProcessorID, [559](#)  
 SpacecraftID, [559](#)  
 SubType, [559](#)  
 TimeSeconds, [559](#)  
 TimeSubSeconds, [559](#)  
**CFE\_FS\_Header\_t**  
 default\_cfe\_fs\_filedef.h, [1081](#)  
**CFE\_FS\_InitHeader**  
 cFE File Header Management APIs, [256](#)  
**CFE\_FS\_INVALID\_PATH**  
 cFE Return Code Defines, [187](#)  
**CFE\_FS\_NOT\_IMPLEMENTED**  
 cFE Return Code Defines, [187](#)  
**CFE\_FS\_ParseInputFileName**  
 cFE File Utility APIs, [262](#)  
**CFE\_FS\_ParseInputFileNameEx**  
 cFE File Utility APIs, [263](#)  
**CFE\_FS\_ReadHeader**  
 cFE File Header Management APIs, [256](#)  
**CFE\_FS\_SetTimestamp**  
 cFE File Header Management APIs, [257](#)  
**CFE\_FS\_SubType**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_Enum\_t**  
 default\_cfe\_fs\_filedef.h, [1081](#)  
**CFE\_FS\_SubType\_ES\_CDS\_REG**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_ES\_ERLOG**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_ES\_PERFDATA**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_ES\_QUERYALLTASKS**  
 default\_cfe\_fs\_filedef.h, [1083](#)  
**CFE\_FS\_SubType\_ES\_SYSLOG**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_EVS\_APPDATA**  
 default\_cfe\_fs\_filedef.h, [1082](#)  
**CFE\_FS\_SubType\_EVS\_EVENTLOG**



default\_cfe\_sb\_topicids.h, [1113](#)  
**CFE\_MISSION\_SB\_MAIN\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_SB\_MAX\_PIPES**  
 default\_cfe\_sb\_interface\_cfg.h, [1097](#)  
 example\_mission\_cfg.h, [831](#)  
**CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE**  
 default\_cfe\_sb\_interface\_cfg.h, [1097](#)  
 example\_mission\_cfg.h, [831](#)  
**CFE\_MISSION\_SB\_MSG\_LIM\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID**  
 default\_cfe\_sb\_topicids.h, [1114](#)  
**CFE\_MISSION\_SB\_PIPE\_OFLOW\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_SB\_SEND\_HK\_TOPICID**  
 default\_cfe\_sb\_topicids.h, [1114](#)  
**CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID**  
 default\_cfe\_sb\_topicids.h, [1114](#)  
**CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID**  
 default\_cfe\_sb\_topicids.h, [1114](#)  
**CFE\_MISSION\_TBL\_CMD\_TOPICID**  
 default\_cfe\_tbl\_topicids.h, [1157](#)  
**CFE\_MISSION\_TBL\_HK\_TLM\_TOPICID**  
 default\_cfe\_tbl\_topicids.h, [1158](#)  
**CFE\_MISSION\_TBL\_MAIN\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN**  
 default\_cfe\_tbl\_interface\_cfg.h, [1144](#)  
 example\_mission\_cfg.h, [832](#)  
**CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH**  
 default\_cfe\_tbl\_interface\_cfg.h, [1145](#)  
 example\_mission\_cfg.h, [832](#)  
**CFE\_MISSION\_TBL\_REG\_TLM\_TOPICID**  
 default\_cfe\_tbl\_topicids.h, [1158](#)  
**CFE\_MISSION\_TBL\_SEND\_HK\_TOPICID**  
 default\_cfe\_tbl\_topicids.h, [1158](#)  
**CFE\_MISSION\_TIME\_AT\_TONE\_WAS**  
 default\_cfe\_time\_interface\_cfg.h, [1199](#)  
 example\_mission\_cfg.h, [832](#)  
**CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [833](#)  
**CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [833](#)  
**CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [833](#)  
**CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [833](#)  
**CFE\_MISSION\_TIME\_CMD\_TOPICID**  
 default\_cfe\_time\_topicids.h, [1217](#)  
**CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID**  
 default\_cfe\_time\_topicids.h, [1217](#)  
**CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS**  
 default\_cfe\_time\_interface\_cfg.h, [1200](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_LEAPS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_MET\_SECS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_MET\_SUBS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_STCF\_SECS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [834](#)  
**CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID**  
 default\_cfe\_time\_topicids.h, [1217](#)  
**CFE\_MISSION\_TIME\_EPOCH\_DAY**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_EPOCH\_HOUR**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_EPOCH\_MICROS**  
 default\_cfe\_time\_interface\_cfg.h, [1201](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_EPOCH\_MINUTE**  
 default\_cfe\_time\_interface\_cfg.h, [1202](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_EPOCH\_SECOND**  
 default\_cfe\_time\_interface\_cfg.h, [1202](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_EPOCH\_YEAR**  
 default\_cfe\_time\_interface\_cfg.h, [1202](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_FS\_FACTOR**  
 default\_cfe\_time\_interface\_cfg.h, [1202](#)  
 example\_mission\_cfg.h, [835](#)  
**CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID**  
 default\_cfe\_time\_topicids.h, [1217](#)  
**CFE\_MISSION\_TIME\_LOCAL1HZISR\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_TIME\_LOCAL1HZTASK\_PERF\_ID**  
 sample\_perfids.h, [881](#)  
**CFE\_MISSION\_TIME\_MAIN\_PERF\_ID**  
 sample\_perfids.h, [882](#)

CFE\_MISSION\_TIME\_MAX\_ELAPSED  
  default\_cfe\_time\_interface\_cfg.h, 1202  
  example\_mission\_cfg.h, 836  
CFE\_MISSION\_TIME\_MIN\_ELAPSED  
  default\_cfe\_time\_interface\_cfg.h, 1202  
  example\_mission\_cfg.h, 836  
CFE\_MISSION\_TIME\_ONEHZ\_CMD\_TOPICID  
  default\_cfe\_time\_topicids.h, 1217  
CFE\_MISSION\_TIME\_SEND\_CMD\_TOPICID  
  default\_cfe\_time\_topicids.h, 1217  
CFE\_MISSION\_TIME\_SEND\_HK\_TOPICID  
  default\_cfe\_time\_topicids.h, 1218  
CFE\_MISSION\_TIME\_SEDMET\_PERF\_ID  
  sample\_perfids.h, 882  
CFE\_MISSION\_TIME\_TONE1HZISR\_PERF\_ID  
  sample\_perfids.h, 882  
CFE\_MISSION\_TIME\_TONE1HZTASK\_PERF\_ID  
  sample\_perfids.h, 882  
CFE\_MISSION\_TIME\_TONE\_CMD\_TOPICID  
  default\_cfe\_time\_topicids.h, 1218  
cfe\_msg\_api\_typedefs.h  
  CFE\_MSG\_Apld\_t, 920  
  CFE\_MSG\_BAD\_ARGUMENT, 920  
  CFE\_MSG\_Checksum\_t, 920  
  CFE\_MSG\_CommandHeader\_t, 921  
  CFE\_MSG\_EDSVersion\_t, 921  
  CFE\_MSG\_Endian, 922  
  CFE\_MSG\_Endian\_Big, 922  
  CFE\_MSG\_Endian\_Invalid, 922  
  CFE\_MSG\_Endian\_Little, 922  
  CFE\_MSG\_Endian\_t, 921  
  CFE\_MSG\_FcnCode\_t, 921  
  CFE\_MSG\_HeaderVersion\_t, 921  
  CFE\_MSG\_Message\_t, 921  
  CFE\_MSG\_NOT\_IMPLEMENTED, 920  
  CFE\_MSG\_PlaybackFlag, 922  
  CFE\_MSG\_PlaybackFlag\_t, 921  
  CFE\_MSG\_PlayFlag\_Invalid, 922  
  CFE\_MSG\_PlayFlag\_Original, 922  
  CFE\_MSG\_PlayFlag\_Playback, 922  
  CFE\_MSG\_SegFlag\_Continue, 923  
  CFE\_MSG\_SegFlag\_First, 923  
  CFE\_MSG\_SegFlag\_Invalid, 922  
  CFE\_MSG\_SegFlag\_Last, 923  
  CFE\_MSG\_SegFlag\_Unsegmented, 923  
  CFE\_MSG\_SegmentationFlag, 922  
  CFE\_MSG\_SegmentationFlag\_t, 921  
  CFE\_MSG\_SequenceCount\_t, 921  
  CFE\_MSG\_Size\_t, 921  
  CFE\_MSG\_Subsystem\_t, 921  
  CFE\_MSG\_System\_t, 922  
  CFE\_MSG\_TelemetryHeader\_t, 922  
  CFE\_MSG\_Type, 923  
  CFE\_MSG\_Type\_Cmd, 923  
  CFE\_MSG\_Type\_Invalid, 923  
  CFE\_MSG\_Type\_t, 922  
  CFE\_MSG\_Type\_TIm, 923  
  CFE\_MSG\_WRONG\_MSG\_TYPE, 920  
CFE\_MSG\_Apld\_t  
  cfe\_msg\_api\_typedefs.h, 920  
CFE\_MSG\_BAD\_ARGUMENT  
  cfe\_msg\_api\_typedefs.h, 920  
CFE\_MSG\_Checksum\_t  
  cfe\_msg\_api\_typedefs.h, 920  
CFE\_MSG\_CommandHeader\_t  
  cfe\_msg\_api\_typedefs.h, 921  
CFE\_MSG\_EDSVersion\_t  
  cfe\_msg\_api\_typedefs.h, 921  
CFE\_MSG\_Endian  
  cfe\_msg\_api\_typedefs.h, 922  
CFE\_MSG\_Endian\_Big  
  cfe\_msg\_api\_typedefs.h, 922  
CFE\_MSG\_Endian\_Invalid  
  cfe\_msg\_api\_typedefs.h, 922  
CFE\_MSG\_Endian\_Little  
  cfe\_msg\_api\_typedefs.h, 922  
CFE\_MSG\_Endian\_t  
  cfe\_msg\_api\_typedefs.h, 921  
CFE\_MSG\_FcnCode\_t  
  cfe\_msg\_api\_typedefs.h, 921  
CFE\_MSG\_GenerateChecksum  
  cFE Message Secondary Header APIs, 281  
CFE\_MSG\_GetApld  
  cFE Message Primary Header APIs, 266  
CFE\_MSG\_GetEDSVersion  
  cFE Message Extended Header APIs, 275  
CFE\_MSG\_GetEndian  
  cFE Message Extended Header APIs, 276  
CFE\_MSG\_GetFcnCode  
  cFE Message Secondary Header APIs, 282  
CFE\_MSG\_GetHasSecondaryHeader  
  cFE Message Primary Header APIs, 267  
CFE\_MSG\_GetHeaderVersion  
  cFE Message Primary Header APIs, 267  
CFE\_MSG\_GetMsgId  
  cFE Message Id APIs, 286  
CFE\_MSG\_GetMsgTime  
  cFE Message Secondary Header APIs, 282  
CFE\_MSG\_GetNextSequenceCount  
  cFE Message Primary Header APIs, 268  
CFE\_MSG\_GetPlaybackFlag  
  cFE Message Extended Header APIs, 276  
CFE\_MSG\_GetSegmentationFlag  
  cFE Message Primary Header APIs, 268  
CFE\_MSG\_GetSequenceCount  
  cFE Message Primary Header APIs, 269  
CFE\_MSG.GetSize  
  cFE Message Primary Header APIs, 269

**CFE\_MSG\_GetSubsystem**  
 cFE Message Extended Header APIs, [277](#)  
**CFE\_MSG\_GetSystem**  
 cFE Message Extended Header APIs, [277](#)  
**CFE\_MSG\_GetType**  
 cFE Message Primary Header APIs, [270](#)  
**CFE\_MSG\_GetTypeFromMsgId**  
 cFE Message Id APIs, [286](#)  
**CFE\_MSG\_HeaderVersion\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_Init**  
 cFE Generic Message APIs, [265](#)  
**CFE\_MSG\_Message\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_NOT\_IMPLEMENTED**  
`cfe_msg_api_typedefs.h`, [920](#)  
**CFE\_MSG\_OriginationAction**  
 cFE Message Integrity APIs, [288](#)  
**CFE\_MSG\_PlaybackFlag**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_PlaybackFlag\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_PlayFlag\_Invalid**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_PlayFlag\_Original**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_PlayFlag\_Playback**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_SegFlag\_Continue**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_SegFlag\_First**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_SegFlag\_Invalid**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_SegFlag\_Last**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_SegFlag\_Unsegmented**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_SegmentationFlag**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_SegmentationFlag\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_SequenceCount\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_SetApId**  
 cFE Message Primary Header APIs, [270](#)  
**CFE\_MSG\_SetEDSVersion**  
 cFE Message Extended Header APIs, [278](#)  
**CFE\_MSG\_SetEndian**  
 cFE Message Extended Header APIs, [278](#)  
**CFE\_MSG\_SetFcnCode**  
 cFE Message Secondary Header APIs, [283](#)  
**CFE\_MSG\_SetHasSecondaryHeader**  
 cFE Message Primary Header APIs, [271](#)  
**CFE\_MSG\_SetHeaderVersion**  
 cFE Message Primary Header APIs, [271](#)  
**CFE\_MSG\_SetMsgId**  
 cFE Message Id APIs, [287](#)  
**CFE\_MSG\_SetMsgTime**  
 cFE Message Secondary Header APIs, [283](#)  
**CFE\_MSG\_SetPlaybackFlag**  
 cFE Message Extended Header APIs, [279](#)  
**CFE\_MSG\_SetSegmentationFlag**  
 cFE Message Primary Header APIs, [272](#)  
**CFE\_MSG\_SetSequenceCount**  
 cFE Message Primary Header APIs, [272](#)  
**CFE\_MSG\_SetSize**  
 cFE Message Primary Header APIs, [273](#)  
**CFE\_MSG\_SetSubsystem**  
 cFE Message Extended Header APIs, [279](#)  
**CFE\_MSG\_SetSystem**  
 cFE Message Extended Header APIs, [280](#)  
**CFE\_MSG\_SetType**  
 cFE Message Primary Header APIs, [273](#)  
**CFE\_MSG\_Size\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_Subsystem\_t**  
`cfe_msg_api_typedefs.h`, [921](#)  
**CFE\_MSG\_System\_t**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_TelemetryHeader\_t**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_Type**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_Type\_Cmd**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_Type\_Invalid**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_Type\_t**  
`cfe_msg_api_typedefs.h`, [922](#)  
**CFE\_MSG\_Type\_Tlm**  
`cfe_msg_api_typedefs.h`, [923](#)  
**CFE\_MSG\_ValidateChecksum**  
 cFE Message Secondary Header APIs, [284](#)  
**CFE\_MSG\_VerificationAction**  
 cFE Message Integrity APIs, [289](#)  
**CFE\_MSG\_WRONG\_MSG\_TYPE**  
`cfe_msg_api_typedefs.h`, [920](#)  
**CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV**  
`default_cfe_core_api_base_msgids.h`, [884](#)  
**CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MSEC**  
`example_platform_cfg.h`, [840](#)  
**CFE\_PLATFORM\_ENDIAN**  
`example_platform_cfg.h`, [841](#)  
**CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT**  
`default_cfe_es_internal_cfg.h`, [979](#)  
`example_platform_cfg.h`, [841](#)  
**CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE**

default\_cfe\_es\_internal\_cfg.h, 979  
example\_platform\_cfg.h, 841  
**CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 842  
**CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 842  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 842  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 842  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04**  
  default\_cfe\_es\_internal\_cfg.h, 980  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 843  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14**  
  default\_cfe\_es\_internal\_cfg.h, 981  
  example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15**  
  default\_cfe\_es\_internal\_cfg.h, 982  
  example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16**

default\_cfe\_es\_internal\_cfg.h, 982  
example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_CDS\_SIZE**  
  default\_cfe\_es\_internal\_cfg.h, 982  
  example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE**  
  default\_cfe\_es\_internal\_cfg.h, 982  
  example\_platform\_cfg.h, 844  
**CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE**  
  default\_cfe\_es\_internal\_cfg.h, 982  
  example\_platform\_cfg.h, 845  
**CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE**  
  default\_cfe\_es\_internal\_cfg.h, 983  
  example\_platform\_cfg.h, 845  
**CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME**  
  default\_cfe\_es\_internal\_cfg.h, 983  
  example\_platform\_cfg.h, 845  
**CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE**  
  default\_cfe\_es\_internal\_cfg.h, 983  
  example\_platform\_cfg.h, 845  
**CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE**  
  default\_cfe\_es\_internal\_cfg.h, 984  
  example\_platform\_cfg.h, 846  
**CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE**  
  default\_cfe\_es\_internal\_cfg.h, 984  
  example\_platform\_cfg.h, 846  
**CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE**  
  default\_cfe\_es\_internal\_cfg.h, 984  
  example\_platform\_cfg.h, 846  
**CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE**  
  default\_cfe\_es\_internal\_cfg.h, 985  
  example\_platform\_cfg.h, 847  
**CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES**  
  default\_cfe\_es\_internal\_cfg.h, 985  
  example\_platform\_cfg.h, 847  
**CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE**  
  default\_cfe\_es\_internal\_cfg.h, 985  
  example\_platform\_cfg.h, 847  
**CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS**  
  default\_cfe\_es\_internal\_cfg.h, 986  
  example\_platform\_cfg.h, 848  
**CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE**  
  default\_cfe\_es\_internal\_cfg.h, 986  
  example\_platform\_cfg.h, 848  
**CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS**  
  default\_cfe\_es\_internal\_cfg.h, 986  
  example\_platform\_cfg.h, 848  
**CFE\_PLATFORM\_ES\_MAX\_LIBRARIES**  
  default\_cfe\_es\_internal\_cfg.h, 986  
  example\_platform\_cfg.h, 848  
**CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS**  
  default\_cfe\_es\_internal\_cfg.h, 987  
  example\_platform\_cfg.h, 849  
**CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS**

- default\_cfe\_es\_internal\_cfg.h, 987  
example\_platform\_cfg.h, 849
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01**  
default\_cfe\_es\_internal\_cfg.h, 987  
example\_platform\_cfg.h, 849
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10**  
default\_cfe\_es\_internal\_cfg.h, 988  
example\_platform\_cfg.h, 850
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN**  
default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING**
- default\_cfe\_es\_internal\_cfg.h, 989  
example\_platform\_cfg.h, 851
- CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE**  
default\_cfe\_es\_internal\_cfg.h, 990  
example\_platform\_cfg.h, 852
- CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE**  
default\_cfe\_es\_internal\_cfg.h, 990  
example\_platform\_cfg.h, 852
- CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY**  
default\_cfe\_es\_internal\_cfg.h, 990  
example\_platform\_cfg.h, 852
- CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY**  
default\_cfe\_es\_internal\_cfg.h, 990  
example\_platform\_cfg.h, 852
- CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE**  
default\_cfe\_es\_internal\_cfg.h, 991  
example\_platform\_cfg.h, 853
- CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE**  
default\_cfe\_es\_internal\_cfg.h, 991  
example\_platform\_cfg.h, 853
- CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS**  
default\_cfe\_es\_internal\_cfg.h, 991  
example\_platform\_cfg.h, 853
- CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL**  
default\_cfe\_es\_internal\_cfg.h, 992  
example\_platform\_cfg.h, 854
- CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT**  
default\_cfe\_es\_internal\_cfg.h, 992  
example\_platform\_cfg.h, 854
- CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE**  
default\_cfe\_es\_internal\_cfg.h, 992  
example\_platform\_cfg.h, 854
- CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL**  
default\_cfe\_es\_internal\_cfg.h, 992  
example\_platform\_cfg.h, 854
- CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT**  
default\_cfe\_es\_internal\_cfg.h, 993  
example\_platform\_cfg.h, 855
- CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE**  
default\_cfe\_es\_internal\_cfg.h, 993  
example\_platform\_cfg.h, 855
- CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS**  
default\_cfe\_es\_internal\_cfg.h, 993  
example\_platform\_cfg.h, 855
- CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING**  
default\_cfe\_es\_internal\_cfg.h, 993  
example\_platform\_cfg.h, 855
- CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS**  
default\_cfe\_es\_internal\_cfg.h, 994  
example\_platform\_cfg.h, 856
- CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED**  
default\_cfe\_es\_internal\_cfg.h, 994  
example\_platform\_cfg.h, 856
- CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE**

default\_cfe\_es\_internal\_cfg.h, 994  
example\_platform\_cfg.h, 856

CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY  
default\_cfe\_es\_internal\_cfg.h, 995  
example\_platform\_cfg.h, 857

CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE  
default\_cfe\_es\_internal\_cfg.h, 995  
example\_platform\_cfg.h, 857

CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC  
default\_cfe\_es\_internal\_cfg.h, 995  
example\_platform\_cfg.h, 857

CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC  
default\_cfe\_es\_internal\_cfg.h, 996  
example\_platform\_cfg.h, 858

CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE  
default\_cfe\_es\_internal\_cfg.h, 996  
example\_platform\_cfg.h, 858

CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE  
default\_cfe\_es\_internal\_cfg.h, 996  
example\_platform\_cfg.h, 858

CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE  
default\_cfe\_es\_internal\_cfg.h, 997  
example\_platform\_cfg.h, 859

CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC  
default\_cfe\_evs\_internal\_cfg.h, 1055  
example\_platform\_cfg.h, 859

CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATA\_FILE  
default\_cfe\_evs\_internal\_cfg.h, 1056  
example\_platform\_cfg.h, 859

CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE  
default\_cfe\_evs\_internal\_cfg.h, 1056  
example\_platform\_cfg.h, 860

CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE  
default\_cfe\_evs\_internal\_cfg.h, 1056  
example\_platform\_cfg.h, 860

CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE  
default\_cfe\_evs\_internal\_cfg.h, 1057  
example\_platform\_cfg.h, 860

CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG  
default\_cfe\_evs\_internal\_cfg.h, 1057  
example\_platform\_cfg.h, 861

CFE\_PLATFORM\_EVS\_LOG\_MAX  
default\_cfe\_evs\_internal\_cfg.h, 1057  
example\_platform\_cfg.h, 861

CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST  
default\_cfe\_evs\_internal\_cfg.h, 1058  
example\_platform\_cfg.h, 861

CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS  
default\_cfe\_evs\_internal\_cfg.h, 1058  
example\_platform\_cfg.h, 862

CFE\_PLATFORM\_EVS\_PORT\_DEFAULT  
default\_cfe\_evs\_internal\_cfg.h, 1058  
example\_platform\_cfg.h, 862

CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY  
default\_cfe\_evs\_internal\_cfg.h, 1058  
example\_platform\_cfg.h, 862

CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE  
default\_cfe\_evs\_internal\_cfg.h, 1059  
example\_platform\_cfg.h, 862

CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES  
default\_cfe\_sb\_internal\_cfg.h, 1099  
example\_platform\_cfg.h, 863

CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME  
default\_cfe\_sb\_internal\_cfg.h, 1099  
example\_platform\_cfg.h, 863

CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT  
default\_cfe\_sb\_internal\_cfg.h, 1100  
example\_platform\_cfg.h, 863

CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME  
default\_cfe\_sb\_internal\_cfg.h, 1100  
example\_platform\_cfg.h, 864

CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME  
default\_cfe\_sb\_internal\_cfg.h, 1100  
example\_platform\_cfg.h, 864

CFE\_PLATFORM\_SB\_FILTER\_MASK1  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 864

CFE\_PLATFORM\_SB\_FILTER\_MASK2  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 864

CFE\_PLATFORM\_SB\_FILTER\_MASK3  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTER\_MASK4  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTER\_MASK5  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTER\_MASK6  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTER\_MASK7  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTER\_MASK8  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTERED\_EVENT1  
default\_cfe\_sb\_internal\_cfg.h, 1101  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTERED\_EVENT2  
default\_cfe\_sb\_internal\_cfg.h, 1102  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTERED\_EVENT3  
default\_cfe\_sb\_internal\_cfg.h, 1102  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTERED\_EVENT4

default\_cfe\_sb\_internal\_cfg.h, 1102  
example\_platform\_cfg.h, 865

CFE\_PLATFORM\_SB\_FILTERED\_EVENT5  
  default\_cfe\_sb\_internal\_cfg.h, 1102  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_FILTERED\_EVENT6  
  default\_cfe\_sb\_internal\_cfg.h, 1102  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_FILTERED\_EVENT7  
  default\_cfe\_sb\_internal\_cfg.h, 1102  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_FILTERED\_EVENT8  
  default\_cfe\_sb\_internal\_cfg.h, 1102  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID  
  default\_cfe\_sb\_internal\_cfg.h, 1102  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE  
  default\_cfe\_sb\_internal\_cfg.h, 1103  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT  
  default\_cfe\_sb\_internal\_cfg.h, 1103  
  example\_platform\_cfg.h, 866

CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS  
  default\_cfe\_sb\_internal\_cfg.h, 1103  
  example\_platform\_cfg.h, 867

CFE\_PLATFORM\_SB\_MAX\_PIPES  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 867

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 867

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05  
  default\_cfe\_sb\_internal\_cfg.h, 1104  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16  
  default\_cfe\_sb\_internal\_cfg.h, 1105  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY  
  default\_cfe\_sb\_internal\_cfg.h, 1106  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE  
  default\_cfe\_sb\_internal\_cfg.h, 1106  
  example\_platform\_cfg.h, 869

CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES  
  default\_cfe\_tbl\_internal\_cfg.h, 1146  
  example\_platform\_cfg.h, 870

CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE  
  default\_cfe\_tbl\_internal\_cfg.h, 1146  
  example\_platform\_cfg.h, 870

CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES  
  default\_cfe\_tbl\_internal\_cfg.h, 1146  
  example\_platform\_cfg.h, 870

CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE  
  default\_cfe\_tbl\_internal\_cfg.h, 1147  
  example\_platform\_cfg.h, 871

CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES  
  default\_cfe\_tbl\_internal\_cfg.h, 1147  
  example\_platform\_cfg.h, 871

CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES  
  default\_cfe\_tbl\_internal\_cfg.h, 1147  
  example\_platform\_cfg.h, 871

CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIFICATIONS  
  default\_cfe\_tbl\_internal\_cfg.h, 1147  
  example\_platform\_cfg.h, 872

CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS  
  default\_cfe\_tbl\_internal\_cfg.h, 1148  
  example\_platform\_cfg.h, 872

CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE

default\_cfe\_tbl\_internal\_cfg.h, 1148  
example\_platform\_cfg.h, 872

CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY  
default\_cfe\_tbl\_internal\_cfg.h, 1148  
example\_platform\_cfg.h, 873

CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE  
default\_cfe\_tbl\_internal\_cfg.h, 1149  
example\_platform\_cfg.h, 873

CFE\_PLATFORM\_TBL\_U32FROM4CHARS  
default\_cfe\_tbl\_internal\_cfg.h, 1149  
example\_platform\_cfg.h, 873

CFE\_PLATFORM\_TBL\_VALID\_PRID\_1  
default\_cfe\_tbl\_internal\_cfg.h, 1149  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_PRID\_2  
default\_cfe\_tbl\_internal\_cfg.h, 1149  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_PRID\_3  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_PRID\_4  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_SCID\_1  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 874

CFE\_PLATFORM\_TBL\_VALID\_SCID\_2  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 875

CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT  
default\_cfe\_tbl\_internal\_cfg.h, 1150  
example\_platform\_cfg.h, 875

CFE\_PLATFORM\_TIME\_CFG\_CLIENT  
default\_cfe\_time\_internal\_cfg.h, 1204  
example\_platform\_cfg.h, 875

CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY  
default\_cfe\_time\_internal\_cfg.h, 1204  
example\_platform\_cfg.h, 875

CFE\_PLATFORM\_TIME\_CFG\_SERVER  
default\_cfe\_time\_internal\_cfg.h, 1204  
example\_platform\_cfg.h, 875

CFE\_PLATFORM\_TIME\_CFG\_SIGNAL  
default\_cfe\_time\_internal\_cfg.h, 1204  
example\_platform\_cfg.h, 876

CFE\_PLATFORM\_TIME\_CFG\_SOURCE  
default\_cfe\_time\_internal\_cfg.h, 1204  
example\_platform\_cfg.h, 876

CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS  
default\_cfe\_time\_internal\_cfg.h, 1205  
example\_platform\_cfg.h, 876

CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET

default\_cfe\_time\_internal\_cfg.h, 1205  
example\_platform\_cfg.h, 877

CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME  
default\_cfe\_time\_internal\_cfg.h, 1205  
example\_platform\_cfg.h, 877

CFE\_PLATFORM\_TIME\_CFG\_START\_FLY  
default\_cfe\_time\_internal\_cfg.h, 1205  
example\_platform\_cfg.h, 877

CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT  
default\_cfe\_time\_internal\_cfg.h, 1206  
example\_platform\_cfg.h, 877

CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL  
default\_cfe\_time\_internal\_cfg.h, 1206  
example\_platform\_cfg.h, 877

CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS  
default\_cfe\_time\_internal\_cfg.h, 1206  
example\_platform\_cfg.h, 878

CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 878

CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 878

CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 879

CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 879

CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 879

CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY  
default\_cfe\_time\_internal\_cfg.h, 1207  
example\_platform\_cfg.h, 879

CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE  
default\_cfe\_time\_internal\_cfg.h, 1208  
example\_platform\_cfg.h, 879

CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY  
default\_cfe\_time\_internal\_cfg.h, 1208  
example\_platform\_cfg.h, 880

CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE  
default\_cfe\_time\_internal\_cfg.h, 1208  
example\_platform\_cfg.h, 880

CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV  
default\_cfe\_core\_api\_base\_msgids.h, 884

cfe\_psp.h

- BUFF\_SIZE, 1272
- CFE\_PSP\_AttachExceptions, 1275
- CFE\_PSP\_Decompress, 1275
- CFE\_PSP\_EepromPowerDown, 1275
- CFE\_PSP\_EepromPowerUp, 1276
- CFE\_PSP\_EepromWrite16, 1276
- CFE\_PSP\_EepromWrite32, 1276

CFE\_PSP\_EepromWrite8, 1277  
CFE\_PSP\_EepromWriteDisable, 1277  
CFE\_PSP\_EepromWriteEnable, 1277  
CFE\_PSP\_Exception\_CopyContext, 1278  
CFE\_PSP\_Exception\_GetCount, 1278  
CFE\_PSP\_Exception\_GetSummary, 1278  
CFE\_PSP\_FlushCaches, 1279  
CFE\_PSP\_Get\_Dec, 1279  
CFE\_PSP\_Get\_Timebase, 1279  
CFE\_PSP\_Get\_Timer\_Tick, 1280  
CFE\_PSP\_GetBuildNumber, 1280  
CFE\_PSP\_GetCDSSize, 1280  
CFE\_PSP\_GetCFETextSegmentInfo, 1281  
CFE\_PSP\_GetKernelTextSegmentInfo, 1281  
CFE\_PSP\_GetProcessord, 1281  
CFE\_PSP\_GetProcessorName, 1281  
CFE\_PSP\_GetResetArea, 1282  
CFE\_PSP\_GetRestartType, 1282  
CFE\_PSP\_GetSpacecraftId, 1282  
CFE\_PSP\_GetTime, 1282  
CFE\_PSP\_GetTimerLow32Rollover, 1283  
CFE\_PSP\_GetTimerTicksPerSecond, 1283  
CFE\_PSP.GetUserReservedArea, 1283  
CFE\_PSP\_GetVersionCodeName, 1283  
CFE\_PSP\_GetVersionNumber, 1284  
CFE\_PSP\_GetVersionString, 1284  
CFE\_PSP\_GetVolatileDiskMem, 1284  
CFE\_PSP\_InitSSR, 1284  
CFE\_PSP\_Main, 1285  
CFE\_PSP\_MEM\_ANY, 1272  
CFE\_PSP\_MEM\_ATTR\_READ, 1272  
CFE\_PSP\_MEM\_ATTR\_READWRITE, 1272  
CFE\_PSP\_MEM\_ATTR\_WRITE, 1272  
CFE\_PSP\_MEM\_EEPROM, 1272  
CFE\_PSP\_MEM\_INVALID, 1272  
CFE\_PSP\_MEM\_RAM, 1272  
CFE\_PSP\_MEM\_SIZE\_BYTE, 1272  
CFE\_PSP\_MEM\_SIZE\_DWORD, 1272  
CFE\_PSP\_MEM\_SIZE\_WORD, 1273  
CFE\_PSP\_MemCpy, 1285  
CFE\_PSP\_MemRangeGet, 1286  
CFE\_PSP\_MemRanges, 1286  
CFE\_PSP\_MemRangeSet, 1286  
CFE\_PSP\_MemRead16, 1287  
CFE\_PSP\_MemRead32, 1288  
CFE\_PSP\_MemRead8, 1288  
CFE\_PSP\_MemSet, 1288  
CFE\_PSP\_MemValidateRange, 1289  
CFE\_PSP\_MemWrite16, 1289  
CFE\_PSP\_MemWrite32, 1290  
CFE\_PSP\_MemWrite8, 1290  
CFE\_PSP\_Panic, 1291  
CFE\_PSP\_PANIC\_CORE\_APP, 1273  
CFE\_PSP\_PANIC\_GENERAL\_FAILURE, 1273  
CFE\_PSP\_PANIC\_MEMORY\_ALLOC, 1273  
CFE\_PSP\_PANIC\_NONVOL\_DISK, 1273  
CFE\_PSP\_PANIC\_STARTUP, 1273  
CFE\_PSP\_PANIC\_STARTUP\_SEM, 1273  
CFE\_PSP\_PANIC\_VOLATILE\_DISK, 1273  
CFE\_PSP\_PortRead16, 1291  
CFE\_PSP\_PortRead32, 1291  
CFE\_PSP\_PortRead8, 1292  
CFE\_PSP\_PortWrite16, 1292  
CFE\_PSP\_PortWrite32, 1292  
CFE\_PSP\_PortWrite8, 1293  
CFE\_PSP\_ReadFromCDS, 1293  
CFE\_PSP\_Restart, 1293  
CFE\_PSP\_RST\_SUBTYPE\_BANKSWITCH\_RESET, 1273  
CFE\_PSP\_RST\_SUBTYPE\_EXCEPTION, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HW\_SPECIAL\_COMMAND, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HW\_WATCHDOG, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HWDEBUG\_RESET, 1274  
CFE\_PSP\_RST\_SUBTYPE\_MAX, 1274  
CFE\_PSP\_RST\_SUBTYPE\_POWER\_CYCLE, 1274  
CFE\_PSP\_RST\_SUBTYPE\_PUSH\_BUTTON, 1274  
CFE\_PSP\_RST\_SUBTYPE\_RESET\_COMMAND, 1274  
CFE\_PSP\_RST\_SUBTYPE\_UNDEFINED\_RESET, 1274  
CFE\_PSP\_RST\_TYPE\_MAX, 1274  
CFE\_PSP\_RST\_TYPE\_POWERON, 1274  
CFE\_PSP\_RST\_TYPE\_PROCESSOR, 1274  
CFE\_PSP\_SetDefaultExceptionEnvironment, 1294  
CFE\_PSP\_SOFT\_TIMEBASE\_NAME, 1274  
CFE\_PSP\_WatchdogDisable, 1294  
CFE\_PSP\_WatchdogEnable, 1294  
CFE\_PSP\_WatchdogGet, 1294  
CFE\_PSP\_WatchdogInit, 1294  
CFE\_PSP\_WatchdogService, 1294  
CFE\_PSP\_WatchdogSet, 1295  
CFE\_PSP\_WriteToCDS, 1295  
SIZE\_BYTE, 1275  
SIZE\_HALF, 1275  
SIZE\_WORD, 1275  
CFE\_PSP\_AttachExceptions  
    cfe\_psp.h, 1275  
CFE\_PSP\_Decompress  
    cfe\_psp.h, 1275  
CFE\_PSP\_EepromPowerDown  
    cfe\_psp.h, 1275  
CFE\_PSP\_EepromPowerUp  
    cfe\_psp.h, 1276  
CFE\_PSP\_EepromWrite16  
    cfe\_psp.h, 1276

CFE\_PSP\_EepromWrite32  
  cfe\_psp.h, 1276  
CFE\_PSP\_EepromWrite8  
  cfe\_psp.h, 1277  
CFE\_PSP\_EepromWriteDisable  
  cfe\_psp.h, 1277  
CFE\_PSP\_EepromWriteEnable  
  cfe\_psp.h, 1277  
CFE\_PSP\_ERROR  
  cfe\_psp\_error.h, 1296  
cfe\_psp\_error.h  
  CFE\_PSP\_ERROR, 1296  
  CFE\_PSP\_ERROR\_ADDRESS\_MISALIGNED,  
    1296  
  CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED, 1296  
  CFE\_PSP\_ERROR\_TIMEOUT, 1296  
  CFE\_PSP\_INVALID\_INT\_NUM, 1296  
  CFE\_PSP\_INVALID\_MEM\_ADDR, 1296  
  CFE\_PSP\_INVALID\_MEM\_ATTR, 1296  
  CFE\_PSP\_INVALID\_MEM\_RANGE, 1297  
  CFE\_PSP\_INVALID\_MEM\_SIZE, 1297  
  CFE\_PSP\_INVALID\_MEM\_TYPE, 1297  
  CFE\_PSP\_INVALID\_MEM\_WORDSIZE, 1297  
  CFE\_PSP\_INVALID\_MODULE\_ID, 1297  
  CFE\_PSP\_INVALID\_MODULE\_NAME, 1297  
  CFE\_PSP\_INVALID\_POINTER, 1297  
  CFE\_PSP\_NO\_EXCEPTION\_DATA, 1297  
  CFE\_PSP\_STATUS\_C, 1297  
  CFE\_PSP\_STATUS\_STRING\_LENGTH, 1297  
  CFE\_PSP\_Status\_t, 1298  
  CFE\_PSP\_StatusString\_t, 1298  
  CFE\_PSP\_StatusToString, 1298  
  CFE\_PSP\_SUCCESS, 1297  
CFE\_PSP\_ERROR\_ADDRESS\_MISALIGNED  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_ERROR\_NOT\_IMPLEMENTED  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_ERROR\_TIMEOUT  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_Exception\_CopyContext  
  cfe\_psp.h, 1278  
CFE\_PSP\_Exception\_GetCount  
  cfe\_psp.h, 1278  
CFE\_PSP\_Exception\_GetSummary  
  cfe\_psp.h, 1278  
CFE\_PSP\_FlushCaches  
  cfe\_psp.h, 1279  
CFE\_PSP\_Get\_Dec  
  cfe\_psp.h, 1279  
CFE\_PSP\_Get\_Timebase  
  cfe\_psp.h, 1279  
CFE\_PSP\_Get\_Timer\_Tick  
  cfe\_psp.h, 1280  
CFE\_PSP\_GetBuildNumber  
  cfe\_psp.h, 1280  
CFE\_PSP\_GetCDSSize  
  cfe\_psp.h, 1280  
CFE\_PSP\_GetCFETextSegmentInfo  
  cfe\_psp.h, 1281  
CFE\_PSP\_GetKernelTextSegmentInfo  
  cfe\_psp.h, 1281  
CFE\_PSP\_GetProcessorId  
  cfe\_psp.h, 1281  
CFE\_PSP\_GetProcessorName  
  cfe\_psp.h, 1281  
CFE\_PSP\_GetResetArea  
  cfe\_psp.h, 1282  
CFE\_PSP\_GetRestartType  
  cfe\_psp.h, 1282  
CFE\_PSP\_GetSpacecraftId  
  cfe\_psp.h, 1282  
CFE\_PSP\_GetTime  
  cfe\_psp.h, 1282  
CFE\_PSP\_GetTimerLow32Rollover  
  cfe\_psp.h, 1283  
CFE\_PSP\_GetTimerTicksPerSecond  
  cfe\_psp.h, 1283  
CFE\_PSP GetUserReservedArea  
  cfe\_psp.h, 1283  
CFE\_PSP\_GetVersionCodeName  
  cfe\_psp.h, 1283  
CFE\_PSP\_GetVersionNumber  
  cfe\_psp.h, 1284  
CFE\_PSP\_GetVersionString  
  cfe\_psp.h, 1284  
CFE\_PSP\_GetVolatileDiskMem  
  cfe\_psp.h, 1284  
CFE\_PSP\_InitSSR  
  cfe\_psp.h, 1284  
CFE\_PSP\_INVALID\_INT\_NUM  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_INVALID\_MEM\_ADDR  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_INVALID\_MEM\_ATTR  
  cfe\_psp\_error.h, 1296  
CFE\_PSP\_INVALID\_MEM\_RANGE  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_MEM\_SIZE  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_MEM\_TYPE  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_MEM\_WORDSIZE  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_MODULE\_ID  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_MODULE\_NAME  
  cfe\_psp\_error.h, 1297  
CFE\_PSP\_INVALID\_POINTER

cfe\_psp\_error.h, 1297  
CFE\_PSP\_Main  
    cfe\_psp.h, 1285  
CFE\_PSP\_MEM\_ANY  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_ATTR\_READ  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_ATTR\_READWRITE  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_ATTR\_WRITE  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_EEPROM  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_INVALID  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_RAM  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_SIZE\_BYTE  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_SIZE\_DWORD  
    cfe\_psp.h, 1272  
CFE\_PSP\_MEM\_SIZE\_WORD  
    cfe\_psp.h, 1273  
CFE\_PSP\_MemCopy  
    cfe\_psp.h, 1285  
CFE\_PSP\_MemRangeGet  
    cfe\_psp.h, 1286  
CFE\_PSP\_MemRanges  
    cfe\_psp.h, 1286  
CFE\_PSP\_MemRangeSet  
    cfe\_psp.h, 1286  
CFE\_PSP\_MemRead16  
    cfe\_psp.h, 1287  
CFE\_PSP\_MemRead32  
    cfe\_psp.h, 1288  
CFE\_PSP\_MemRead8  
    cfe\_psp.h, 1288  
CFE\_PSP\_MemSet  
    cfe\_psp.h, 1288  
CFE\_PSP\_MemValidateRange  
    cfe\_psp.h, 1289  
CFE\_PSP\_MemWrite16  
    cfe\_psp.h, 1289  
CFE\_PSP\_MemWrite32  
    cfe\_psp.h, 1290  
CFE\_PSP\_MemWrite8  
    cfe\_psp.h, 1290  
CFE\_PSP\_NO\_EXCEPTION\_DATA  
    cfe\_psp\_error.h, 1297  
CFE\_PSP\_Panic  
    cfe\_psp.h, 1291  
CFE\_PSP\_PANIC\_CORE\_APP  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_GENERAL\_FAILURE  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_MEMORY\_ALLOC  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_NONVOL\_DISK  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_STARTUP  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_STARTUP\_SEM  
    cfe\_psp.h, 1273  
CFE\_PSP\_PANIC\_VOLATILE\_DISK  
    cfe\_psp.h, 1273  
CFE\_PSP\_PortRead16  
    cfe\_psp.h, 1291  
CFE\_PSP\_PortRead32  
    cfe\_psp.h, 1291  
CFE\_PSP\_PortRead8  
    cfe\_psp.h, 1292  
CFE\_PSP\_PortWrite16  
    cfe\_psp.h, 1292  
CFE\_PSP\_PortWrite32  
    cfe\_psp.h, 1292  
CFE\_PSP\_PortWrite8  
    cfe\_psp.h, 1293  
CFE\_PSP\_ReadFromCDS  
    cfe\_psp.h, 1293  
CFE\_PSP\_Restart  
    cfe\_psp.h, 1293  
CFE\_PSP\_RST\_SUBTYPE\_BANKSWITCH\_RESET  
    cfe\_psp.h, 1273  
CFE\_PSP\_RST\_SUBTYPE\_EXCEPTION  
    cfe\_psp.h, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HW\_SPECIAL\_COMMAND  
    cfe\_psp.h, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HW\_WATCHDOG  
    cfe\_psp.h, 1273  
CFE\_PSP\_RST\_SUBTYPE\_HWDEBUG\_RESET  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_SUBTYPE\_MAX  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_SUBTYPE\_POWER\_CYCLE  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_SUBTYPE\_PUSH\_BUTTON  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_SUBTYPE\_RESET\_COMMAND  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_SUBTYPE\_UNDEFINED\_RESET  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_TYPE\_MAX  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_TYPE\_POWERON  
    cfe\_psp.h, 1274  
CFE\_PSP\_RST\_TYPE\_PROCESSOR  
    cfe\_psp.h, 1274  
CFE\_PSP\_SetDefaultExceptionEnvironment

cfe\_psp.h, 1294  
CFE\_PSP\_SOFT\_TIMEBASE\_NAME  
    cfe\_psp.h, 1274  
CFE\_PSP\_STATUS\_C  
    cfe\_psp\_error.h, 1297  
CFE\_PSP\_STATUS\_STRING\_LENGTH  
    cfe\_psp\_error.h, 1297  
CFE\_PSP\_Status\_t  
    cfe\_psp\_error.h, 1298  
CFE\_PSP\_StatusString\_t  
    cfe\_psp\_error.h, 1298  
CFE\_PSP\_StatusToString  
    cfe\_psp\_error.h, 1298  
CFE\_PSP\_SUCCESS  
    cfe\_psp\_error.h, 1297  
CFE\_PSP\_WatchdogDisable  
    cfe\_psp.h, 1294  
CFE\_PSP\_WatchdogEnable  
    cfe\_psp.h, 1294  
CFE\_PSP\_WatchdogGet  
    cfe\_psp.h, 1294  
CFE\_PSP\_WatchdogInit  
    cfe\_psp.h, 1294  
CFE\_PSP\_WatchdogService  
    cfe\_psp.h, 1294  
CFE\_PSP\_WatchdogSet  
    cfe\_psp.h, 1295  
CFE\_PSP\_WriteToCDS  
    cfe\_psp.h, 1295  
cfe\_resourceid.h  
    CFE\_Resourceld\_Equal, 925  
    CFE\_Resourceld\_FindNext, 925  
    CFE\_Resourceld\_FromInteger, 926  
    CFE\_Resourceld\_GetBase, 926  
    CFE\_Resourceld\_GetSerial, 926  
    CFE\_Resourceld\_IsDefined, 927  
    CFE\_RESOURCEID\_TEST\_DEFINED, 924  
    CFE\_RESOURCEID\_TEST\_EQUAL, 924  
    CFE\_RESOURCEID\_TO ULONG, 924  
    CFE\_Resourceld\_TolIndex, 927  
    CFE\_Resourceld\_ToInteger, 928  
cfe\_resourceid\_api\_typedefs.h  
    CFE\_RESOURCEID\_RESERVED, 929  
    CFE\_RESOURCEID\_UNDEFINED, 929  
cfe\_resourceid\_basevalue.h  
    CFE\_RESOURCEID\_MAKE\_BASE, 1085  
    CFE\_RESOURCEID\_MAX, 1085  
    CFE\_RESOURCEID\_SHIFT, 1086  
CFE\_RESOURCEID\_CONFIGID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_Resourceld\_Equal  
    cfe\_resourceid.h, 925  
CFE\_RESOURCEID\_ES\_APPID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_ES\_CDSBLOCKID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_ES\_COUNTID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_ES\_LIBID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_ES\_POOLID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_ES\_TASKID\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_Resourceld\_FindNext  
    cfe\_resourceld.h, 925  
CFE\_Resourceld\_FromInteger  
    cfe\_resourceld.h, 926  
CFE\_Resourceld\_GetBase  
    cfe\_resourceld.h, 926  
CFE\_Resourceld\_GetSerial  
    cfe\_resourceld.h, 926  
CFE\_Resourceld\_IsDefined  
    cfe\_resourceld.h, 927  
CFE\_RESOURCEID\_MAKE\_BASE  
    cfe\_resourceld\_basevalue.h, 1085  
CFE\_RESOURCEID\_MAX  
    cfe\_resourceld\_basevalue.h, 1085  
CFE\_RESOURCEID\_RESERVED  
    cfe\_resourceld\_api\_typedefs.h, 929  
CFE\_RESOURCEID\_SB\_PIPEID\_RESOURCE\_BASE\_OFFSET  
    cFE Resource ID base values, 357  
CFE\_RESOURCEID\_SHIFT  
    cfe\_resourceld\_basevalue.h, 1086  
CFE\_RESOURCEID\_TEST\_DEFINED  
    cfe\_resourceld.h, 924  
CFE\_RESOURCEID\_TEST\_EQUAL  
    cfe\_resourceld.h, 924  
CFE\_RESOURCEID\_TO ULONG  
    cfe\_resourceld.h, 924  
CFE\_Resourceld\_TolIndex  
    cfe\_resourceld.h, 927  
CFE\_Resourceld\_ToInteger  
    cfe\_resourceld.h, 928  
CFE\_RESOURCEID\_UNDEFINED  
    cfe\_resourceld\_api\_typedefs.h, 929  
CFE\_REVISION  
    cfe\_version.h, 945  
cfe\_sb.h  
    CFE\_BIT, 931  
    CFE\_CLR, 931  
    CFE\_SET, 931  
    CFE\_TST, 931  
CFE\_SB\_AllocateMessageBuffer  
    cFE Zero Copy APIs, 303  
CFE\_SB\_ALLSUBS\_TLM\_MID  
    default\_cfe\_sb\_msgids.h, 1110  
CFE\_SB\_AllSubscriptionsTlm, 559

Payload, 560  
 TelemetryHeader, 560  
**CFE\_SB\_AllSubscriptionsTlm\_Payload**, 560  
 Entries, 560  
 Entry, 560  
 PktSegment, 561  
 TotalSegments, 561  
**CFE\_SB\_AllSubscriptionsTlm\_Payload\_t**  
 default\_cfe\_sb\_msgdefs.h, 1108  
**CFE\_SB\_AllSubscriptionsTlm\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**cfe\_sb\_api\_typedefs.h**  
 CFE\_SB\_Buffer\_t, 935  
 CFE\_SB\_DEFAULT\_QOS, 933  
 CFE\_SB\_INVALID\_MSG\_ID, 933  
 CFE\_SB\_INVALID\_PIPE, 933  
 CFE\_SB\_MSGID\_C, 933  
 CFE\_SB\_MSGID\_RESERVED, 933  
 CFE\_SB\_MSGID\_UNWRAP\_VALUE, 934  
 CFE\_SB\_MSGID\_WRAP\_VALUE, 934  
 CFE\_SB\_PEND\_FOREVER, 934  
 CFE\_SB PIPEID\_C, 934  
 CFE\_SB\_POLL, 934  
 CFE\_SB\_SUBSCRIPTION, 934  
 CFE\_SB\_UNSUBSCRIPTION, 935  
**CFE\_SB\_BAD\_ARGUMENT**  
 cFE Return Code Defines, 187  
**CFE\_SB\_BAD\_CMD\_CODE\_EID**  
 cfe\_sb\_eventids.h, 1117  
**CFE\_SB\_BAD\_MSGID\_EID**  
 cfe\_sb\_eventids.h, 1117  
**CFE\_SB\_BAD\_PIPEID\_EID**  
 cfe\_sb\_eventids.h, 1117  
**CFE\_SB\_BUF\_ALOC\_ERR**  
 cFE Return Code Defines, 187  
**CFE\_SB\_BUFFER\_INVALID**  
 cFE Return Code Defines, 188  
**CFE\_SB\_Buffer\_t**  
 cfe\_sb\_api\_typedefs.h, 935  
**CFE\_SB\_CMD0\_RCVD\_EID**  
 cfe\_sb\_eventids.h, 1117  
**CFE\_SB\_CMD1\_RCVD\_EID**  
 cfe\_sb\_eventids.h, 1118  
**CFE\_SB\_CMD\_MID**  
 default\_cfe\_sb\_msgids.h, 1110  
**CFE\_SB\_CmdTopicIdToMsgId**  
 cFE Message ID APIs, 311  
**CFE\_SB\_CR\_PIPE\_BAD\_ARG\_EID**  
 cfe\_sb\_eventids.h, 1118  
**CFE\_SB\_CR\_PIPE\_ERR\_EID**  
 cfe\_sb\_eventids.h, 1118  
**CFE\_SB\_CR\_PIPE\_NAME\_TAKEN\_EID**  
 cfe\_sb\_eventids.h, 1118  
**CFE\_SB\_CR\_PIPE\_NO\_FREE\_EID**  
 cfe\_sb\_eventids.h, 1119  
**CFE\_SB\_CreatePipe**  
 cFE Pipe Management APIs, 290  
**CFE\_SB\_DEFAULT\_QOS**  
 cfe\_sb\_api\_typedefs.h, 933  
**CFE\_SB\_DEL\_PIPE\_ERR1\_EID**  
 cfe\_sb\_eventids.h, 1119  
**CFE\_SB\_DEL\_PIPE\_ERR2\_EID**  
 cfe\_sb\_eventids.h, 1119  
**CFE\_SB\_DeletePipe**  
 cFE Pipe Management APIs, 291  
**CFE\_SB\_DEST\_BLK\_ERR\_EID**  
 cfe\_sb\_eventids.h, 1119  
**CFE\_SB\_DISABLE\_ROUTE\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1088  
**CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1089  
**CFE\_SB\_DisableRouteCmd**, 561  
 CommandHeader, 561  
 Payload, 561  
**CFE\_SB\_DisableRouteCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_DisableSubReportingCmd**, 561  
 CommandHeader, 562  
**CFE\_SB\_DisableSubReportingCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_DSBL\_RTE1\_EID**  
 cfe\_sb\_eventids.h, 1120  
**CFE\_SB\_DSBL\_RTE2\_EID**  
 cfe\_sb\_eventids.h, 1120  
**CFE\_SB\_DSBL\_RTE3\_EID**  
 cfe\_sb\_eventids.h, 1120  
**CFE\_SB\_DUP\_SUBSCRIPT\_EID**  
 cfe\_sb\_eventids.h, 1120  
**CFE\_SB\_ENABLE\_ROUTE\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1090  
**CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1090  
**CFE\_SB\_EnableRouteCmd**, 562  
 CommandHeader, 562  
 Payload, 562  
**CFE\_SB\_EnableRouteCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_EnableSubReportingCmd**, 562  
 CommandHeader, 563  
**CFE\_SB\_EnableSubReportingCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_ENBL\_RTE1\_EID**  
 cfe\_sb\_eventids.h, 1121  
**CFE\_SB\_ENBL\_RTE2\_EID**  
 cfe\_sb\_eventids.h, 1121  
**CFE\_SB\_ENBL\_RTE3\_EID**  
 cfe\_sb\_eventids.h, 1121  
 cfe\_sb\_eventids.h

CFE\_SB\_BAD\_CMD\_CODE\_EID, 1117  
CFE\_SB\_BAD\_MSGID\_EID, 1117  
CFE\_SB\_BAD\_PIPEID\_EID, 1117  
CFE\_SB\_CMD0\_RCVD\_EID, 1117  
CFE\_SB\_CMD1\_RCVD\_EID, 1118  
CFE\_SB\_CR\_PIPE\_BAD\_ARG\_EID, 1118  
CFE\_SB\_CR\_PIPE\_ERR\_EID, 1118  
CFE\_SB\_CR\_PIPE\_NAME\_TAKEN\_EID, 1118  
CFE\_SB\_CR\_PIPE\_NO\_FREE\_EID, 1119  
CFE\_SB\_DEL\_PIPE\_ERR1\_EID, 1119  
CFE\_SB\_DEL\_PIPE\_ERR2\_EID, 1119  
CFE\_SB\_DEST\_BLK\_ERR\_EID, 1119  
CFE\_SB\_DSBLS\_RTE1\_EID, 1120  
CFE\_SB\_DSBLS\_RTE2\_EID, 1120  
CFE\_SB\_DSBLS\_RTE3\_EID, 1120  
CFE\_SB\_DUP\_SUBSCRIP\_EID, 1120  
CFE\_SB\_ENBL\_RTE1\_EID, 1121  
CFE\_SB\_ENBL\_RTE2\_EID, 1121  
CFE\_SB\_ENBL\_RTE3\_EID, 1121  
CFE\_SB\_FILEWRITE\_ERR\_EID, 1121  
CFE\_SB\_FULL\_SUB\_PKT\_EID, 1122  
CFE\_SB\_GET\_BUF\_ERR\_EID, 1122  
CFE\_SB\_GETPIPEIDBYNAME\_EID, 1122  
CFE\_SB\_GETPIPEIDBYNAME\_NAME\_ERR\_EID,  
    1122  
CFE\_SB\_GETPIPEIDBYNAME\_NULL\_ERR\_EID,  
    1123  
CFE\_SB\_GETPIPNNAME\_EID, 1123  
CFE\_SB\_GETPIPNNAME\_ID\_ERR\_EID, 1123  
CFE\_SB\_GETPIPNNAME\_NULL\_PTR\_EID, 1123  
CFE\_SB\_GETPIPEOPTS\_EID, 1124  
CFE\_SB\_GETPIPEOPTS\_ID\_ERR\_EID, 1124  
CFE\_SB\_GETPIPEOPTS\_PTR\_ERR\_EID, 1124  
CFE\_SB\_HASHCOLLISION\_EID, 1124  
CFE\_SB\_INIT\_EID, 1125  
CFE\_SB\_LEN\_ERR\_EID, 1125  
CFE\_SB\_MAX\_DESTS\_MET\_EID, 1125  
CFE\_SB\_MAX\_MSGS\_MET\_EID, 1125  
CFE\_SB\_MAX\_PIPES\_MET\_EID, 1126  
CFE\_SB\_MSG\_TOO\_BIG\_EID, 1126  
CFE\_SB\_MSGID\_LIM\_ERR\_EID, 1126  
CFE\_SB\_PART\_SUB\_PKT\_EID, 1126  
CFE\_SB\_PIPE\_ADDED\_EID, 1127  
CFE\_SB\_PIPE\_DELETED\_EID, 1127  
CFE\_SB\_Q\_FULL\_ERR\_EID, 1127  
CFE\_SB\_Q\_RD\_ERR\_EID, 1127  
CFE\_SB\_Q\_WR\_ERR\_EID, 1128  
CFE\_SB\_RCV\_BAD\_ARG\_EID, 1128  
CFE\_SB\_RCV\_MESSAGE\_INTEGRITY\_FAIL\_EID,  
    1128  
CFE\_SB\_SEND\_BAD\_ARG\_EID, 1128  
CFE\_SB\_SEND\_INV\_MSGID\_EID, 1129  
CFE\_SB\_SEND\_MESSAGE\_INTEGRITY\_FAIL\_EID,  
    1129  
CFE\_SB\_SEND\_NO\_SUBS\_EID, 1129  
CFE\_SB\_SETPPIPEOPTS\_EID, 1129  
CFE\_SB\_SETPPIPEOPTS\_ID\_ERR\_EID, 1130  
CFE\_SB\_SETPPIPEOPTS\_OWNER\_ERR\_EID, 1130  
CFE\_SB SND RTG\_EID, 1130  
CFE\_SB SND RTG\_ERR1\_EID, 1130  
CFE\_SB SND STATS\_EID, 1131  
CFE\_SB SUB ARG\_ERR\_EID, 1131  
CFE\_SB SUB INV CALLER\_EID, 1131  
CFE\_SB SUB INV PIPE\_EID, 1131  
CFE\_SB SUBSCRIPTION RCVD\_EID, 1132  
CFE\_SB SUBSCRIPTION REMOVED\_EID, 1132  
CFE\_SB SUBSCRIPTION RPT\_EID, 1132  
CFE\_SB UNSUB ARG\_ERR\_EID, 1132  
CFE\_SB UNSUB INV CALLER\_EID, 1133  
CFE\_SB UNSUB INV PIPE\_EID, 1133  
CFE\_SB UNSUB NO SUBS\_EID, 1133  
CFE\_SB FILEWRITE\_ERR\_EID  
    cfe\_sb\_eventids.h, 1121  
CFE\_SB FULL SUB PKT\_EID  
    cfe\_sb\_eventids.h, 1122  
CFE\_SB GET\_BUF\_ERR\_EID  
    cfe\_sb\_eventids.h, 1122  
CFE\_SB GetPipeIdByName  
    cFE Pipe Management APIs, 291  
CFE\_SB GETPIPEIDBYNAME\_EID  
    cfe\_sb\_eventids.h, 1122  
CFE\_SB GETPIPEIDBYNAME\_NAME\_ERR\_EID  
    cfe\_sb\_eventids.h, 1122  
CFE\_SB GETPIPEIDBYNAME\_NULL\_ERR\_EID  
    cfe\_sb\_eventids.h, 1123  
CFE\_SB GetPipeName  
    cFE Pipe Management APIs, 292  
CFE\_SB GETPIPNNAME\_EID  
    cfe\_sb\_eventids.h, 1123  
CFE\_SB GETPIPNNAME\_ID\_ERR\_EID  
    cfe\_sb\_eventids.h, 1123  
CFE\_SB GETPIPNNAME\_NULL\_PTR\_EID  
    cfe\_sb\_eventids.h, 1123  
CFE\_SB GetPipeOpts  
    cFE Pipe Management APIs, 293  
CFE\_SB GETPIPEOPTS\_EID  
    cfe\_sb\_eventids.h, 1124  
CFE\_SB GETPIPEOPTS\_ID\_ERR\_EID  
    cfe\_sb\_eventids.h, 1124  
CFE\_SB GETPIPEOPTS\_PTR\_ERR\_EID  
    cfe\_sb\_eventids.h, 1124  
CFE\_SB GetUserData  
    cFE Message Characteristics APIs, 306  
CFE\_SB GetUserLength  
    cFE Message Characteristics APIs, 306  
CFE\_SB\_GlobalCmdTopicIdToMsgId  
    cFE Message ID APIs, 311  
CFE\_SB\_GlobalTlmTopicIdToMsgId

cFE Message ID APIs, 312  
**CFE\_SB\_HASHCOLLISION\_EID**  
  cfe\_sb\_eventids.h, 1124  
**CFE\_SB\_HK\_TLM\_MID**  
  default\_cfe\_sb\_msgids.h, 1110  
**CFE\_SB\_HousekeepingTlm**, 563  
  Payload, 563  
  TelemetryHeader, 563  
**CFE\_SB\_HousekeepingTlm\_Payload**, 563  
  CommandCounter, 564  
  CommandErrorCounter, 564  
  CreatePipeErrorCounter, 565  
  DuplicateSubscriptionsCounter, 565  
  GetPipeIdByNameErrorCounter, 565  
  InternalErrorCounter, 565  
  MemInUse, 565  
  MemPoolHandle, 565  
  MsgLimitErrorCounter, 565  
  MsgReceiveErrorCounter, 566  
  MsgSendErrorCounter, 566  
  NoSubscribersCounter, 566  
  PipeOptsErrorCounter, 566  
  PipeOverflowErrorCounter, 566  
  Spare2Align, 566  
  SubscribeErrorCounter, 566  
  UnmarkedMem, 567  
**CFE\_SB\_HousekeepingTlm\_Payload\_t**  
  default\_cfe\_sb\_msgdefs.h, 1108  
**CFE\_SB\_HousekeepingTlm\_t**  
  default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_INIT\_EID**  
  cfe\_sb\_eventids.h, 1125  
**CFE\_SB\_INTERNAL\_ERR**  
  cFE Return Code Defines, 188  
**CFE\_SB\_INVALID\_MSG\_ID**  
  cfe\_sb\_api\_typedefs.h, 933  
**CFE\_SB\_INVALID\_PIPE**  
  cfe\_sb\_api\_typedefs.h, 933  
**CFE\_SB\_IsValidMsgId**  
  cFE Message ID APIs, 312  
**CFE\_SB\_LEN\_ERR\_EID**  
  cfe\_sb\_eventids.h, 1125  
**CFE\_SB\_LocalCmdTopicIdToMsgId**  
  cFE Message ID APIs, 313  
**CFE\_SB\_LocalTlmTopicIdToMsgId**  
  cFE Message ID APIs, 313  
**CFE\_SB\_MAX\_DESTS\_MET**  
  cFE Return Code Defines, 188  
**CFE\_SB\_MAX\_DESTS\_MET\_EID**  
  cfe\_sb\_eventids.h, 1125  
**CFE\_SB\_MAX\_MSGS\_MET**  
  cFE Return Code Defines, 188  
**CFE\_SB\_MAX\_MSGS\_MET\_EID**  
  cfe\_sb\_eventids.h, 1125  
**CFE\_SB\_MAX\_PIPES\_MET**  
  cFE Return Code Defines, 188  
**CFE\_SB\_MAX\_PIPES\_MET\_EID**  
  cfe\_sb\_eventids.h, 1126  
**CFE\_SB\_MessageStringGet**  
  cFE Message Characteristics APIs, 307  
**CFE\_SB\_MessageStringSet**  
  cFE Message Characteristics APIs, 308  
**CFE\_SB\_Msg**, 567  
  LongDouble, 567  
  LongInt, 567  
  Msg, 567  
**CFE\_SB\_MSG\_TOO\_BIG**  
  cFE Return Code Defines, 188  
**CFE\_SB\_MSG\_TOO\_BIG\_EID**  
  cfe\_sb\_eventids.h, 1126  
**CFE\_SB\_MsgId\_Atom\_t**  
  default\_cfe\_sb\_extern\_typedefs.h, 1087  
**CFE\_SB\_MSGID\_C**  
  cfe\_sb\_api\_typedefs.h, 933  
**CFE\_SB\_MsgId\_Equal**  
  cFE Message ID APIs, 313  
**CFE\_SB\_MSGID\_LIM\_ERR\_EID**  
  cfe\_sb\_eventids.h, 1126  
**CFE\_SB\_MSGID\_RESERVED**  
  cfe\_sb\_api\_typedefs.h, 933  
**CFE\_SB\_MsgId\_t**, 568  
  Value, 568  
**CFE\_SB\_MSGID\_UNWRAP\_VALUE**  
  cfe\_sb\_api\_typedefs.h, 934  
**CFE\_SB\_MSGID\_WRAP\_VALUE**  
  cfe\_sb\_api\_typedefs.h, 934  
**CFE\_SB\_MsgIdToValue**  
  cFE Message ID APIs, 314  
**CFE\_SB\_MsgMapFileEntry**, 568  
  Index, 569  
  MsgId, 569  
**CFE\_SB\_MsgMapFileEntry\_t**  
  default\_cfe\_sb\_msgdefs.h, 1108  
**CFE\_SB\_NO\_MESSAGE**  
  cFE Return Code Defines, 188  
**CFE\_SB\_NOOP\_CC**  
  default\_cfe\_sb\_fcncodes.h, 1091  
**CFE\_SB\_NoopCmd**, 569  
  CommandHeader, 569  
**CFE\_SB\_NoopCmd\_t**  
  default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_NOT\_IMPLEMENTED**  
  cFE Return Code Defines, 189  
**CFE\_SB\_ONESUB\_TLM\_MID**  
  default\_cfe\_sb\_msgids.h, 1110  
**CFE\_SB\_PART\_SUB\_PKT\_EID**  
  cfe\_sb\_eventids.h, 1126  
**CFE\_SB\_PEND\_FOREVER**

cfe\_sb\_api\_typedefs.h, 934  
CFE\_SB\_PIPE\_ADDED\_EID  
    cfe\_sb\_eventids.h, 1127  
CFE\_SB\_PIPE\_CR\_ERR  
    cFE Return Code Defines, 189  
CFE\_SB\_PIPE\_DELETED\_EID  
    cfe\_sb\_eventids.h, 1127  
CFE\_SB\_PIPE\_RD\_ERR  
    cFE Return Code Defines, 189  
CFE\_SB\_PipeDepthStats, 569  
    CurrentQueueDepth, 570  
    MaxQueueDepth, 570  
    PeakQueueDepth, 570  
    Pipeld, 570  
    Spare, 570  
CFE\_SB\_PipeDepthStats\_t  
    default\_cfe\_sb\_msgdefs.h, 1108  
CFE\_SB\_PIPEID\_BASE  
    cFE Resource ID base values, 358  
CFE\_SB\_PIPEID\_C  
    cfe\_sb\_api\_typedefs.h, 934  
CFE\_SB\_Pipeld\_t  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_Pipeld\_ToIndex  
    cFE Pipe Management APIs, 293  
CFE\_SB\_PipeInfoEntry, 571  
    AppId, 571  
    AppName, 571  
    CurrentQueueDepth, 571  
    MaxQueueDepth, 571  
    Opts, 571  
    PeakQueueDepth, 572  
    Pipeld, 572  
    PipeName, 572  
    SendErrors, 572  
    Spare, 572  
CFE\_SB\_PipeInfoEntry\_t  
    default\_cfe\_sb\_msgdefs.h, 1108  
CFE\_SB\_PIPEOPTS\_IGNOREMINE  
    cFE SB Pipe options, 316  
CFE\_SB\_POLL  
    cfe\_sb\_api\_typedefs.h, 934  
CFE\_SB\_Q\_FULL\_ERR\_EID  
    cfe\_sb\_eventids.h, 1127  
CFE\_SB\_Q\_RD\_ERR\_EID  
    cfe\_sb\_eventids.h, 1127  
CFE\_SB\_Q\_WR\_ERR\_EID  
    cfe\_sb\_eventids.h, 1128  
CFE\_SB\_Qos\_t, 572  
    Priority, 572  
    Reliability, 573  
CFE\_SB\_QosPriority  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_QosPriority\_Enum\_t  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_QosPriority\_HIGH  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_QosPriority\_LOW  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_QosReliability  
    default\_cfe\_sb\_extern\_typedefs.h, 1088  
CFE\_SB\_QosReliability\_Enum\_t  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_QosReliability\_HIGH  
    default\_cfe\_sb\_extern\_typedefs.h, 1088  
CFE\_SB\_QosReliability\_LOW  
    default\_cfe\_sb\_extern\_typedefs.h, 1088  
CFE\_SB\_RCV\_BAD\_ARG\_EID  
    cfe\_sb\_eventids.h, 1128  
CFE\_SB\_RCV\_MESSAGE\_INTEGRITY\_FAIL\_EID  
    cfe\_sb\_eventids.h, 1128  
CFE\_SB\_ReceiveBuffer  
    cFE Send/Receive Message APIs, 300  
CFE\_SB\_ReleaseMessageBuffer  
    cFE Zero Copy APIs, 303  
CFE\_SB\_RESET\_COUNTERS\_CC  
    default\_cfe\_sb\_fcncodes.h, 1092  
CFE\_SB\_ResetCountersCmd, 573  
    CommandHeader, 573  
CFE\_SB\_ResetCountersCmd\_t  
    default\_cfe\_sb\_msgstruct.h, 1112  
CFE\_SB\_RouteCmd\_Payload, 573  
    MsgId, 574  
    Pipe, 574  
    Spare, 574  
CFE\_SB\_RouteCmd\_Payload\_t  
    default\_cfe\_sb\_msgdefs.h, 1109  
CFE\_SB\_Routeld\_Atom\_t  
    default\_cfe\_sb\_extern\_typedefs.h, 1087  
CFE\_SB\_RoutingFileEntry, 574  
    AppName, 574  
    MsgCnt, 575  
    MsgId, 575  
    Pipeld, 575  
    PipeName, 575  
    State, 575  
CFE\_SB\_RoutingFileEntry\_t  
    default\_cfe\_sb\_msgdefs.h, 1109  
CFE\_SB\_SEND\_BAD\_ARG\_EID  
    cfe\_sb\_eventids.h, 1128  
CFE\_SB\_SEND\_HK\_MID  
    default\_cfe\_sb\_msgids.h, 1110  
CFE\_SB\_SEND\_INV\_MSGID\_EID  
    cfe\_sb\_eventids.h, 1129  
CFE\_SB\_SEND\_MESSAGE\_INTEGRITY\_FAIL\_EID  
    cfe\_sb\_eventids.h, 1129  
CFE\_SB\_SEND\_NO\_SUBS\_EID  
    cfe\_sb\_eventids.h, 1129

**CFE\_SB\_SEND\_PREV\_SUBS\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1093  
**CFE\_SB\_SEND\_SB\_STATS\_CC**  
 default\_cfe\_sb\_fcncodes.h, 1093  
**CFE\_SB\_SendHkCmd**, 575  
 CommandHeader, 575  
**CFE\_SB\_SendHkCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_SendPrevSubsCmd**, 576  
 CommandHeader, 576  
**CFE\_SB\_SendPrevSubsCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_SendSbStatsCmd**, 576  
 CommandHeader, 576  
**CFE\_SB\_SendSbStatsCmd\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_SetPipeOpts**  
 cFE Pipe Management APIs, 294  
**CFE\_SB\_SETPPIPEOPTS\_EID**  
 cfe\_sb\_eventids.h, 1129  
**CFE\_SB\_SETPPIPEOPTS\_ID\_ERR\_EID**  
 cfe\_sb\_eventids.h, 1130  
**CFE\_SB\_SETPPIPEOPTS\_OWNER\_ERR\_EID**  
 cfe\_sb\_eventids.h, 1130  
**CFE\_SB\_SetUserDataLength**  
 cFE Message Characteristics APIs, 309  
**CFE\_SB\_SingleSubscriptionTlm**, 576  
 Payload, 577  
 TelemetryHeader, 577  
**CFE\_SB\_SingleSubscriptionTlm\_Payload**, 577  
 MsgId, 577  
 Pipe, 578  
 Qos, 578  
 SubType, 578  
**CFE\_SB\_SingleSubscriptionTlm\_Payload\_t**  
 default\_cfe\_sb\_msgdefs.h, 1109  
**CFE\_SB\_SingleSubscriptionTlm\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB SND RTG EID**  
 cfe\_sb\_eventids.h, 1130  
**CFE\_SB SND RTG\_ERR1 EID**  
 cfe\_sb\_eventids.h, 1130  
**CFE\_SB SND STATS EID**  
 cfe\_sb\_eventids.h, 1131  
**CFE\_SB STATS TLM MID**  
 default\_cfe\_sb\_msgids.h, 1110  
**CFE\_SB\_StatsTlm**, 578  
 Payload, 578  
 TelemetryHeader, 578  
**CFE\_SB\_StatsTlm\_Payload**, 579  
 MaxMemAllowed, 579  
 MaxMsgIdsAllowed, 580  
 MaxPipeDepthAllowed, 580  
 MaxPipesAllowed, 580  
 MaxSubscriptionsAllowed, 580  
 MemInUse, 580  
 MsgIdsInUse, 580  
 PeakMemInUse, 580  
 PeakMsgIdsInUse, 581  
 PeakPipesInUse, 581  
 PeakSBBuffersInUse, 581  
 PeakSubscriptionsInUse, 581  
 PipeDepthStats, 581  
 PipesInUse, 581  
 SBBuffersInUse, 581  
 SubscriptionsInUse, 582  
**CFE\_SB\_StatsTlm\_Payload\_t**  
 default\_cfe\_sb\_msgdefs.h, 1109  
**CFE\_SB\_StatsTlm\_t**  
 default\_cfe\_sb\_msgstruct.h, 1112  
**CFE\_SB\_SUB\_ARG\_ERR\_EID**  
 cfe\_sb\_eventids.h, 1131  
**CFE\_SB\_SUB\_ENTRIES\_PER\_PKT**  
 default\_cfe\_sb\_extern\_typedefs.h, 1086  
**CFE\_SB\_SUB\_INV\_CALLER\_EID**  
 cfe\_sb\_eventids.h, 1131  
**CFE\_SB\_SUB\_INV\_PIPE\_EID**  
 cfe\_sb\_eventids.h, 1131  
**CFE\_SB\_SUB\_RPT\_CTRL\_MID**  
 default\_cfe\_sb\_msgids.h, 1110  
**CFE\_SB\_SubEntries**, 582  
 MsgId, 582  
 Pipe, 582  
 Qos, 582  
**CFE\_SB\_SubEntries\_t**  
 default\_cfe\_sb\_msgdefs.h, 1109  
**CFE\_SB\_Subscribe**  
 cFE Message Subscription Control APIs, 295  
**CFE\_SB\_SubscribeEx**  
 cFE Message Subscription Control APIs, 296  
**CFE\_SB\_SubscribeLocal**  
 cFE Message Subscription Control APIs, 297  
**CFE\_SB\_SUBSCRIPTION**  
 cfe\_sb\_api\_typedefs.h, 934  
**CFE\_SB\_SUBSCRIPTION\_RCVD\_EID**  
 cfe\_sb\_eventids.h, 1132  
**CFE\_SB\_SUBSCRIPTION\_REMOVED\_EID**  
 cfe\_sb\_eventids.h, 1132  
**CFE\_SB\_SUBSCRIPTION\_RPT\_EID**  
 cfe\_sb\_eventids.h, 1132  
**CFE\_SB\_TIME\_OUT**  
 cFE Return Code Defines, 189  
**CFE\_SB\_TimeStampMsg**  
 cFE Message Characteristics APIs, 309  
**CFE\_SB\_TlmTopicIdToMsgId**  
 cFE Message ID APIs, 314  
**CFE\_SB\_TransmitBuffer**  
 cFE Zero Copy APIs, 304

CFE\_SB\_TransmitMsg  
cFE Send/Receive Message APIs, 301

CFE\_SB\_UNSUB\_ARG\_ERR\_EID  
cfe\_sb\_eventids.h, 1132

CFE\_SB\_UNSUB\_INV\_CALLER\_EID  
cfe\_sb\_eventids.h, 1133

CFE\_SB\_UNSUB\_INV\_PIPE\_EID  
cfe\_sb\_eventids.h, 1133

CFE\_SB\_UNSUB\_NO\_SUBS\_EID  
cfe\_sb\_eventids.h, 1133

CFE\_SB\_Unsubscribe  
cFE Message Subscription Control APIs, 297

CFE\_SB\_UnsubscribeLocal  
cFE Message Subscription Control APIs, 298

CFE\_SB\_UNSUBSCRIPTION  
cfe\_sb\_api\_typedefs.h, 935

CFE\_SB\_ValueToMsgId  
cFE Message ID APIs, 315

CFE\_SB\_WRITE\_MAP\_INFO\_CC  
default\_cfe\_sb\_fcncodes.h, 1094

CFE\_SB\_WRITE\_PIPE\_INFO\_CC  
default\_cfe\_sb\_fcncodes.h, 1095

CFE\_SB\_WRITE\_ROUTING\_INFO\_CC  
default\_cfe\_sb\_fcncodes.h, 1096

CFE\_SB\_WriteFileInfoCmd\_Payload, 583  
Filename, 583

CFE\_SB\_WriteFileInfoCmd\_Payload\_t  
default\_cfe\_sb\_msgdefs.h, 1109

CFE\_SB\_WriteMapInfoCmd, 583  
CommandHeader, 583  
Payload, 584

CFE\_SB\_WriteMapInfoCmd\_t  
default\_cfe\_sb\_msgstruct.h, 1112

CFE\_SB\_WritePipeInfoCmd, 584  
CommandHeader, 584  
Payload, 584

CFE\_SB\_WritePipeInfoCmd\_t  
default\_cfe\_sb\_msgstruct.h, 1112

CFE\_SB\_WriteRoutingInfoCmd, 584  
CommandHeader, 585  
Payload, 585

CFE\_SB\_WriteRoutingInfoCmd\_t  
default\_cfe\_sb\_msgstruct.h, 1112

CFE\_SB\_WRONG\_MSG\_TYPE  
cFE Return Code Defines, 189

CFE\_SERVICE\_BITMASK  
cfe\_error.h, 899

CFE\_SET  
cfe\_sb.h, 931

CFE\_SEVERITY\_BITMASK  
cfe\_error.h, 899

CFE\_SEVERITY\_ERROR  
cfe\_error.h, 899

CFE\_SEVERITY\_INFO  
cfe\_error.h, 899

CFE\_SEVERITY\_SUCCESS  
cfe\_error.h, 900

CFE\_SOFTWARE\_BUS\_SERVICE  
cfe\_error.h, 900

CFE\_SRC\_VERSION  
cfe\_version.h, 945

CFE\_STATUS\_BAD\_COMMAND\_CODE  
cFE Return Code Defines, 189

CFE\_STATUS\_C  
cfe\_error.h, 900

CFE\_STATUS\_EXTERNAL\_RESOURCE\_FAIL  
cFE Return Code Defines, 189

CFE\_STATUS\_INCORRECT\_STATE  
cFE Return Code Defines, 190

CFE\_STATUS\_NO\_COUNTER\_INCREMENT  
cFE Return Code Defines, 190

CFE\_STATUS\_NOT\_IMPLEMENTED  
cFE Return Code Defines, 190

CFE\_STATUS\_RANGE\_ERROR  
cFE Return Code Defines, 190

CFE\_STATUS\_REQUEST\_ALREADY\_PENDING  
cFE Return Code Defines, 190

CFE\_STATUS\_STRING\_LENGTH  
cfe\_error.h, 900

CFE\_Status\_t  
cfe\_error.h, 900

CFE\_STATUS\_UNKNOWN\_MSG\_ID  
cFE Return Code Defines, 190

CFE\_STATUS\_VALIDATION\_FAILURE  
cFE Return Code Defines, 190

CFE\_STATUS\_WRONG\_MSG\_LENGTH  
cFE Return Code Defines, 191

CFE\_StatusString\_t  
cfe\_error.h, 900

CFE\_STR  
cfe\_version.h, 945

CFE\_STR\_HELPER  
cfe\_version.h, 945

CFE\_SUCCESS  
cFE Return Code Defines, 191

CFE\_TABLE\_SERVICE  
cfe\_error.h, 900

CFE\_TBL\_ABORT\_LOAD\_CC  
default\_cfe\_tbl\_fcncodes.h, 1135

CFE\_TBL\_AbortLoadCmd, 585  
CommandHeader, 585  
Payload, 585

CFE\_TBL\_AbortLoadCmd\_Payload, 586  
TableName, 586

CFE\_TBL\_AbortLoadCmd\_Payload\_t  
default\_cfe\_tbl\_msgdefs.h, 1153

CFE\_TBL\_AbortLoadCmd\_t  
default\_cfe\_tbl\_msgstruct.h, 1156

CFE\_TBL\_ACTIVATE\_CC  
     default\_cfe\_tbl\_fcncodes.h, 1136

CFE\_TBL\_ACTIVATE\_DUMP\_ONLY\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1161

CFE\_TBL\_ACTIVATE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1161

CFE\_TBL\_ActivateCmd, 586  
     CommandHeader, 586  
     Payload, 586

CFE\_TBL\_ActivateCmd\_Payload, 587  
     TableName, 587

CFE\_TBL\_ActivateCmd\_Payload\_t  
     default\_cfe\_tbl\_msgdefs.h, 1153

CFE\_TBL\_ActivateCmd\_t  
     default\_cfe\_tbl\_msgstruct.h, 1156

cfe\_tbl\_api\_typedefs.h  
     CFE\_TBL\_BAD\_TABLE\_HANDLE, 937  
     CFE\_TBL\_CallbackFuncPtr\_t, 938  
     CFE\_TBL\_Handle\_t, 938  
     CFE\_TBL\_Info\_t, 938  
     CFE\_TBL\_MAX\_FULL\_NAME\_LEN, 937  
     CFE\_TBL\_SRC\_ADDRESS, 938  
     CFE\_TBL\_SRC\_FILE, 938  
     CFE\_TBL\_SrcEnum, 938  
     CFE\_TBL\_SrcEnum\_t, 938

CFE\_TBL\_ASSUMED\_VALID\_INF\_EID  
     cfe\_tbl\_eventids.h, 1161

CFE\_TBL\_BAD\_ARGUMENT  
     cFE Return Code Defines, 191

CFE\_TBL\_BAD\_TABLE\_HANDLE  
     cfe\_tbl\_api\_typedefs.h, 937

CFE\_TBL\_BufferSelect  
     default\_cfe\_tbl\_extern\_typedefs.h, 1134

CFE\_TBL\_BufferSelect\_ACTIVE  
     default\_cfe\_tbl\_extern\_typedefs.h, 1135

CFE\_TBL\_BufferSelect\_Enum\_t  
     default\_cfe\_tbl\_extern\_typedefs.h, 1134

CFE\_TBL\_BufferSelect\_INACTIVE  
     default\_cfe\_tbl\_extern\_typedefs.h, 1135

CFE\_TBL\_CallbackFuncPtr\_t  
     cfe\_tbl\_api\_typedefs.h, 938

CFE\_TBL\_CC1\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1162

CFE\_TBL\_CDS\_DELETE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1162

CFE\_TBL\_CDS\_DELETED\_INFO\_EID  
     cfe\_tbl\_eventids.h, 1162

CFE\_TBL\_CDS\_NOT\_FOUND\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1162

CFE\_TBL\_CDS\_OWNER\_ACTIVE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1163

CFE\_TBL\_CMD\_MID  
     default\_cfe\_tbl\_msgids.h, 1154

CFE\_TBL\_CREATING\_DUMP\_FILE\_ERR\_EID

          cfe\_tbl\_eventids.h, 1163

CFE\_TBL\_DeleteCDSCmd\_Payload, 587  
     TableName, 587

CFE\_TBL\_DeleteCDSCmd\_Payload\_t  
     default\_cfe\_tbl\_msgdefs.h, 1153

CFE\_TBL\_DELETE\_CDS\_CC  
     default\_cfe\_tbl\_fcncodes.h, 1137

CFE\_TBL\_DeleteCDSCmd, 588  
     CommandHeader, 588  
     Payload, 588

CFE\_TBL\_DeleteCDSCmd\_t  
     default\_cfe\_tbl\_msgstruct.h, 1156

CFE\_TBL\_DUMP\_CC  
     default\_cfe\_tbl\_fcncodes.h, 1138

CFE\_TBL\_DUMP\_PENDING\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1163

CFE\_TBL\_DUMP\_REGISTRY\_CC  
     default\_cfe\_tbl\_fcncodes.h, 1138

CFE\_TBL\_DumpCmd, 588  
     CommandHeader, 589  
     Payload, 589

CFE\_TBL\_DumpCmd\_Payload, 589  
     ActiveTableFlag, 589  
     DumpFilename, 589  
     TableName, 590

CFE\_TBL\_DumpCmd\_Payload\_t  
     default\_cfe\_tbl\_msgdefs.h, 1153

CFE\_TBL\_DumpCmd\_t  
     default\_cfe\_tbl\_msgstruct.h, 1156

CFE\_TBL\_DumpRegistryCmd, 590  
     CommandHeader, 590  
     Payload, 590

CFE\_TBL\_DumpRegistryCmd\_Payload, 590  
     DumpFilename, 591

CFE\_TBL\_DumpRegistryCmd\_Payload\_t  
     default\_cfe\_tbl\_msgdefs.h, 1153

CFE\_TBL\_DumpRegistryCmd\_t  
     default\_cfe\_tbl\_msgstruct.h, 1156

CFE\_TBL\_DumpToBuffer  
     cFE Manage Table Content APIs, 322

CFE\_TBL\_ERR\_ACCESS  
     cFE Return Code Defines, 191

CFE\_TBL\_ERR\_BAD\_CONTENT\_ID  
     cFE Return Code Defines, 191

CFE\_TBL\_ERR\_BAD\_PROCESSOR\_ID  
     cFE Return Code Defines, 191

CFE\_TBL\_ERR\_BAD\_SPACECRAFT\_ID  
     cFE Return Code Defines, 191

CFE\_TBL\_ERR\_BAD\_SUBTYPE\_ID  
     cFE Return Code Defines, 191

CFE\_TBL\_ERR\_DUMP\_ONLY  
     cFE Return Code Defines, 192

CFE\_TBL\_ERR\_DUPLICATE\_DIFF\_SIZE  
     cFE Return Code Defines, 192

CFE\_TBL\_ERR\_DUPLICATE\_NOT\_OWNED  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_FILE\_FOR\_WRONG\_TABLE  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_FILE\_SIZE\_INCONSISTENT  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_FILE\_TOO\_LARGE  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_FILENAME\_TOO\_LONG  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_HANDLES\_FULL  
  cFE Return Code Defines, [192](#)

CFE\_TBL\_ERR\_ILLEGAL\_SRC\_TYPE  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_INVALID\_HANDLE  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_INVALID\_NAME  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_INVALID\_OPTIONS  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_INVALID\_SIZE  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_LOAD\_IN\_PROGRESS  
  cFE Return Code Defines, [193](#)

CFE\_TBL\_ERR\_LOAD\_INCOMPLETE  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_NEVER\_LOADED  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_NO\_ACCESS  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_NO\_BUFFER\_AVAIL  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_NO\_STD\_HEADER  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_NO\_TBL\_HEADER  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_PARTIAL\_LOAD  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_REGISTRY\_FULL  
  cFE Return Code Defines, [194](#)

CFE\_TBL\_ERR\_SHORT\_FILE  
  cFE Return Code Defines, [195](#)

CFE\_TBL\_ERR\_UNREGISTERED  
  cFE Return Code Defines, [195](#)

cfe\_tbl\_eventids.h

  CFE\_TBL\_ACTIVATE\_DUMP\_ONLY\_ERR\_EID, [1161](#)

  CFE\_TBL\_ACTIVATE\_ERR\_EID, [1161](#)

  CFE\_TBL\_ASSUMED\_VALID\_INF\_EID, [1161](#)

  CFE\_TBL\_CC1\_ERR\_EID, [1162](#)

  CFE\_TBL\_CDS\_DELETE\_ERR\_EID, [1162](#)

  CFE\_TBL\_CDS\_DELETED\_INFO\_EID, [1162](#)

  CFE\_TBL\_CDS\_NOT\_FOUND\_ERR\_EID, [1162](#)

  CFE\_TBL\_CDS\_OWNER\_ACTIVE\_ERR\_EID, [1163](#)

CFE\_TBL\_CREATING\_DUMP\_FILE\_ERR\_EID, [1163](#)

CFE\_TBL\_DUMP\_PENDING\_ERR\_EID, [1163](#)

CFE\_TBL\_FAIL\_HK\_SEND\_ERR\_EID, [1163](#)

CFE\_TBL\_FAIL\_NOTIFY\_SEND\_ERR\_EID, [1164](#)

CFE\_TBL\_FILE\_ACCESS\_ERR\_EID, [1164](#)

CFE\_TBL\_FILE\_INCOMPLETE\_ERR\_EID, [1164](#)

CFE\_TBL\_FILE\_LOADED\_INF\_EID, [1164](#)

CFE\_TBL\_FILE\_STD\_HDR\_ERR\_EID, [1165](#)

CFE\_TBL\_FILE\_SUBTYPE\_ERR\_EID, [1165](#)

CFE\_TBL\_FILE\_TBL\_HDR\_ERR\_EID, [1165](#)

CFE\_TBL\_FILE\_TOO\_BIG\_ERR\_EID, [1165](#)

CFE\_TBL\_FILE\_TYPE\_ERR\_EID, [1166](#)

CFE\_TBL\_HANDLE\_ACCESS\_ERR\_EID, [1166](#)

CFE\_TBL\_ILLEGAL\_BUFF\_PARAM\_ERR\_EID, [1166](#)

CFE\_TBL\_IN\_REGISTRY\_ERR\_EID, [1166](#)

CFE\_TBL\_INIT\_INF\_EID, [1167](#)

CFE\_TBL\_LEN\_ERR\_EID, [1167](#)

CFE\_TBL\_LOAD\_ABORT\_ERR\_EID, [1167](#)

CFE\_TBL\_LOAD\_ABORT\_INF\_EID, [1167](#)

CFE\_TBL\_LOAD\_EXCEEDS\_SIZE\_ERR\_EID, [1168](#)

CFE\_TBL\_LOAD\_FILENAME\_LONG\_ERR\_EID, [1168](#)

CFE\_TBL\_LOAD\_IN\_PROGRESS\_ERR\_EID, [1168](#)

CFE\_TBL\_LOAD\_PEND\_REQ\_INF\_EID, [1168](#)

CFE\_TBL\_LOAD\_SUCCESS\_INF\_EID, [1169](#)

CFE\_TBL\_LOAD\_TBLNAME\_MISMATCH\_ERR\_EID, [1169](#)

CFE\_TBL\_LOAD\_TYPE\_ERR\_EID, [1169](#)

CFE\_TBL\_LOAD\_VAL\_ERR\_EID, [1169](#)

CFE\_TBL\_LOADING\_A\_DUMP\_ONLY\_ERR\_EID, [1170](#)

CFE\_TBL\_LOADING\_PENDING\_ERR\_EID, [1170](#)

CFE\_TBL\_MID\_ERR\_EID, [1170](#)

CFE\_TBL\_NO\_INACTIVE\_BUFFER\_ERR\_EID, [1170](#)

CFE\_TBL\_NO\_SUCH\_TABLE\_ERR\_EID, [1171](#)

CFE\_TBL\_NO\_WORK\_BUFFERS\_ERR\_EID, [1171](#)

CFE\_TBL\_NOOP\_INF\_EID, [1171](#)

CFE\_TBL\_NOT\_CRITICAL\_TBL\_ERR\_EID, [1171](#)

CFE\_TBL\_NOT\_IN\_CRIT\_REG\_ERR\_EID, [1172](#)

CFE\_TBL\_OVERWRITE\_DUMP\_INF\_EID, [1172](#)

CFE\_TBL\_OVERWRITE\_REG\_DUMP\_INF\_EID, [1172](#)

CFE\_TBL\_PARTIAL\_LOAD\_ERR\_EID, [1172](#)

CFE\_TBL\_PROCESSOR\_ID\_ERR\_EID, [1173](#)

CFE\_TBL\_REGISTER\_ERR\_EID, [1173](#)

CFE\_TBL\_RESET\_INF\_EID, [1173](#)

CFE\_TBL\_SHARE\_ERR\_EID, [1173](#)

CFE\_TBL\_SPACECRAFT\_ID\_ERR\_EID, [1174](#)

CFE\_TBL\_TLM\_REG\_CMD\_INF\_EID, [1174](#)

CFE\_TBL\_TOO\_MANY\_DUMPS\_ERR\_EID, [1174](#)

CFE\_TBL\_TOO\_MANY\_VALIDATIONS\_ERR\_EID, 1174  
 CFE\_TBL\_UNREGISTER\_ERR\_EID, 1175  
 CFE\_TBL\_UNVALIDATED\_ERR\_EID, 1175  
 CFE\_TBL\_UPDATE\_ERR\_EID, 1175  
 CFE\_TBL\_UPDATE\_SUCCESS\_INF\_EID, 1175  
 CFE\_TBL\_VAL\_REQ\_MADE\_INF\_EID, 1176  
 CFE\_TBL\_VALIDATION\_ERR\_EID, 1176  
 CFE\_TBL\_VALIDATION\_INF\_EID, 1176  
 CFE\_TBL\_WRITE\_CFE\_HDR\_ERR\_EID, 1176  
 CFE\_TBL\_WRITE\_DUMP\_INF\_EID, 1177  
 CFE\_TBL\_WRITE\_REG\_DUMP\_INF\_EID, 1177  
 CFE\_TBL\_WRITE\_TBL\_HDR\_ERR\_EID, 1177  
 CFE\_TBL\_WRITE\_TBL\_IMG\_ERR\_EID, 1177  
 CFE\_TBL\_WRITE\_TBL\_REG\_ERR\_EID, 1178  
 CFE\_TBL\_ZERO\_LENGTH\_LOAD\_ERR\_EID, 1178  
 CFE\_TBL\_FAIL\_HK\_SEND\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1163  
 CFE\_TBL\_FAIL\_NOTIFY\_SEND\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1164  
 CFE\_TBL\_FILE\_ACCESS\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1164  
 CFE\_TBL\_File\_Hdr, 591  
     NumBytes, 591  
     Offset, 591  
     Reserved, 592  
     TableName, 592  
 CFE\_TBL\_File\_Hdr\_t  
     default\_cfe\_tbl\_extern\_typedefs.h, 1134  
 CFE\_TBL\_FILE\_INCOMPLETE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1164  
 CFE\_TBL\_FILE\_LOADED\_INF\_EID  
     cfe\_tbl\_eventids.h, 1164  
 CFE\_TBL\_FILE\_STD\_HDR\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1165  
 CFE\_TBL\_FILE\_SUBTYPE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1165  
 CFE\_TBL\_FILE\_TBL\_HDR\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1165  
 CFE\_TBL\_FILE\_TOO\_BIG\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1165  
 CFE\_TBL\_FILE\_TYPE\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1166  
 CFE\_TBL\_FILEDEF  
     cfe\_tbl\_filedef.h, 939  
 CFE\_TBL\_FileDef, 592  
     Description, 592  
     lc\_def\_adt.c, 818  
     lc\_def\_wdt.c, 819  
     ObjectName, 592  
     ObjectSize, 593  
     TableName, 593  
     TgtFilename, 593  
 cfe\_tbl\_filedef.h  
 CFE\_TBL\_FILEDEF, 939  
 CFE\_TBL\_FileDef\_t, 940  
 CFE\_TBL\_FileDef\_t  
     cfe\_tbl\_filedef.h, 940  
 CFE\_TBL\_GetAddress  
     cFE Access Table Content APIs, 328  
 CFE\_TBL\_GetAddresses  
     cFE Access Table Content APIs, 329  
 CFE\_TBL\_GetInfo  
     cFE Get Table Information APIs, 333  
 CFE\_TBL\_GetStatus  
     cFE Get Table Information APIs, 334  
 CFE\_TBL\_HANDLE\_ACCESS\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1166  
 CFE\_TBL\_Handle\_t  
     cfe\_tbl\_api\_typedefs.h, 938  
 CFE\_TBL\_HK\_TLM\_MID  
     default\_cfe\_tbl\_msgids.h, 1154  
 CFE\_TBL\_HousekeepingTlm, 593  
     Payload, 594  
     TelemetryHeader, 594  
 CFE\_TBL\_HousekeepingTlm\_Payload, 594  
     ActiveBuffer, 595  
     ByteAlignPad1, 595  
     CommandCounter, 595  
     CommandErrorCounter, 595  
     FailedValCounter, 595  
     LastFileDumped, 596  
     LastFileLoaded, 596  
     LastTableLoaded, 596  
     LastUpdatedTable, 596  
     LastUpdateTime, 596  
     LastValCrc, 596  
     LastValStatus, 596  
     LastValTableName, 597  
     MemPoolHandle, 597  
     NumFreeSharedBufs, 597  
     NumLoadPending, 597  
     NumTables, 597  
     NumValRequests, 597  
     SuccessValCounter, 597  
     ValidationCounter, 598  
 CFE\_TBL\_HousekeepingTlm\_Payload\_t  
     default\_cfe\_tbl\_msgdefs.h, 1153  
 CFE\_TBL\_HousekeepingTlm\_t  
     default\_cfe\_tbl\_msgstruct.h, 1156  
 CFE\_TBL\_ILLEGAL\_BUFF\_PARAM\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1166  
 CFE\_TBL\_IN\_REGISTRY\_ERR\_EID  
     cfe\_tbl\_eventids.h, 1166  
 CFE\_TBL\_Info, 598  
     Crc, 599  
     Critical, 599  
     DoubleBuffered, 599

DumpOnly, 599  
FileCreateTimeSecs, 599  
FileCreateTimeSubSecs, 599  
LastFileLoaded, 599  
NumUsers, 599  
Size, 599  
TableLoadedOnce, 599  
TimeOfLastUpdate, 600  
UserDefAddr, 600  
**CFE\_TBL\_INFO\_DUMP\_PENDING**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_INFO\_NO\_UPDATE\_PENDING**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_INFO\_NO\_VALIDATION\_PENDING**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_INFO\_RECOVERED\_TBL**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_Info\_t**  
  cfe\_tbl\_api\_typedefs.h, 938  
**CFE\_TBL\_INFO\_TABLE\_LOCKED**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_INFO\_UPDATE\_PENDING**  
  cFE Return Code Defines, 195  
**CFE\_TBL\_INFO\_UPDATED**  
  cFE Return Code Defines, 196  
**CFE\_TBL\_INFO\_VALIDATION\_PENDING**  
  cFE Return Code Defines, 196  
**CFE\_TBL\_INIT\_INF\_EID**  
  cfe\_tbl\_eventids.h, 1167  
**CFE\_TBL\_LEN\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1167  
**CFE\_TBL\_Load**  
  cFE Manage Table Content APIs, 323  
**CFE\_TBL\_LOAD\_ABORT\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1167  
**CFE\_TBL\_LOAD\_ABORT\_INF\_EID**  
  cfe\_tbl\_eventids.h, 1167  
**CFE\_TBL\_LOAD\_CC**  
  default\_cfe\_tbl\_fcncodes.h, 1139  
**CFE\_TBL\_LOAD\_EXCEEDS\_SIZE\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1168  
**CFE\_TBL\_LOAD\_FILENAME\_LONG\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1168  
**CFE\_TBL\_LOAD\_IN\_PROGRESS\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1168  
**CFE\_TBL\_LOAD\_PEND\_REQ\_INF\_EID**  
  cfe\_tbl\_eventids.h, 1168  
**CFE\_TBL\_LOAD\_SUCCESS\_INF\_EID**  
  cfe\_tbl\_eventids.h, 1169  
**CFE\_TBL\_LOAD\_TBLNAME\_MISMATCH\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1169  
**CFE\_TBL\_LOAD\_TYPE\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1169  
**CFE\_TBL\_LOAD\_VAL\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1169  
**cfe\_tbl\_eventids.h, 1169**  
**CFE\_TBL\_LoadCmd, 600**  
  CommandHeader, 600  
  Payload, 600  
**CFE\_TBL\_LoadCmd\_Payload, 600**  
  LoadFilename, 601  
**CFE\_TBL\_LoadCmd\_Payload\_t**  
  default\_cfe\_tbl\_msgdefs.h, 1153  
**CFE\_TBL\_LoadCmd\_t**  
  default\_cfe\_tbl\_msgstruct.h, 1156  
**CFE\_TBL\_LOADING\_A\_DUMP\_ONLY\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1170  
**CFE\_TBL\_LOADING\_PENDING\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1170  
**CFE\_TBL\_Manage**  
  cFE Manage Table Content APIs, 324  
**CFE\_TBL\_MAX\_FULL\_NAME\_LEN**  
  cfe\_tbl\_api\_typedefs.h, 937  
**CFE\_TBL\_MESSAGE\_ERROR**  
  cFE Return Code Defines, 196  
**CFE\_TBL\_MID\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1170  
**CFE\_TBL\_Modified**  
  cFE Manage Table Content APIs, 325  
**CFE\_TBL\_NO\_INACTIVE\_BUFFER\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1170  
**CFE\_TBL\_NO\_SUCH\_TABLE\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1171  
**CFE\_TBL\_NO\_WORK\_BUFFERS\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1171  
**CFE\_TBL\_NOOP\_CC**  
  default\_cfe\_tbl\_fcncodes.h, 1140  
**CFE\_TBL\_NOOP\_INF\_EID**  
  cfe\_tbl\_eventids.h, 1171  
**CFE\_TBL\_NoopCmd, 601**  
  CommandHeader, 601  
**CFE\_TBL\_NoopCmd\_t**  
  default\_cfe\_tbl\_msgstruct.h, 1156  
**CFE\_TBL\_NOT\_CRITICAL\_TBL\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1171  
**CFE\_TBL\_NOT\_IMPLEMENTED**  
  cFE Return Code Defines, 196  
**CFE\_TBL\_NOT\_IN\_CRIT\_REG\_ERR\_EID**  
  cfe\_tbl\_eventids.h, 1172  
**CFE\_TBL\_NotifyByMessage**  
  cFE Get Table Information APIs, 334  
**CFE\_TBL\_NotifyCmd, 601**  
  CommandHeader, 602  
  Payload, 602  
**CFE\_TBL\_NotifyCmd\_Payload, 602**  
  Parameter, 602  
**CFE\_TBL\_NotifyCmd\_Payload\_t**  
  default\_cfe\_tbl\_msgdefs.h, 1153  
**CFE\_TBL\_NotifyCmd\_t**

default\_cfe\_tbl\_msgstruct.h, 1156  
**CFE\_TBL\_OPT\_BUFFER\_MSK**  
 cFE Table Type Defines, 336  
**CFE\_TBL\_OPT\_CRITICAL**  
 cFE Table Type Defines, 336  
**CFE\_TBL\_OPT\_CRITICAL\_MSK**  
 cFE Table Type Defines, 336  
**CFE\_TBL\_OPT\_DBL\_BUFFER**  
 cFE Table Type Defines, 336  
**CFE\_TBL\_OPT\_DEFAULT**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_DUMP\_ONLY**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_LD\_DMP\_MSK**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_LOAD\_DUMP**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_NOT\_CRITICAL**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_NOT\_USR\_DEF**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_SNGL\_BUFFER**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_USR\_DEF\_ADDR**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OPT\_USR\_DEF\_MSK**  
 cFE Table Type Defines, 337  
**CFE\_TBL\_OVERWRITE\_DUMP\_INF\_EID**  
 cfe\_tbl\_eventids.h, 1172  
**CFE\_TBL\_OVERWRITE\_REG\_DUMP\_INF\_EID**  
 cfe\_tbl\_eventids.h, 1172  
**CFE\_TBL\_PARTIAL\_LOAD\_ERR\_EID**  
 cfe\_tbl\_eventids.h, 1172  
**CFE\_TBL\_PROCESSOR\_ID\_ERR\_EID**  
 cfe\_tbl\_eventids.h, 1173  
**CFE\_TBL\_REG\_TLM\_MID**  
 default\_cfe\_tbl\_msgids.h, 1154  
**CFE\_TBL\_Register**  
 cFE Registration APIs, 317  
**CFE\_TBL\_REGISTER\_ERR\_EID**  
 cfe\_tbl\_eventids.h, 1173  
**CFE\_TBL\_ReleaseAddress**  
 cFE Access Table Content APIs, 330  
**CFE\_TBL\_ReleaseAddresses**  
 cFE Access Table Content APIs, 331  
**CFE\_TBL\_RESET\_COUNTERS\_CC**  
 default\_cfe\_tbl\_fcncodes.h, 1141  
**CFE\_TBL\_RESET\_INF\_EID**  
 cfe\_tbl\_eventids.h, 1173  
**CFE\_TBL\_ResetCountersCmd**, 602  
 CommandHeader, 603  
**CFE\_TBL\_ResetCountersCmd\_t**  
 default\_cfe\_tbl\_msgstruct.h, 1156  
**CFE\_TBL\_SEND\_HK\_MID**  
 default\_cfe\_tbl\_msgids.h, 1154  
**CFE\_TBL\_SEND\_REGISTRY\_CC**  
 default\_cfe\_tbl\_fcncodes.h, 1142  
**CFE\_TBL\_SendHkCmd**, 603  
 CommandHeader, 603  
**CFE\_TBL\_SendHkCmd\_t**  
 default\_cfe\_tbl\_msgstruct.h, 1157  
**CFE\_TBL\_SendRegistryCmd**, 603  
 CommandHeader, 604  
 Payload, 604  
**CFE\_TBL\_SendRegistryCmd\_Payload**, 604  
 TableName, 604  
**CFE\_TBL\_SendRegistryCmd\_Payload\_t**  
 default\_cfe\_tbl\_msgdefs.h, 1153  
**CFE\_TBL\_SendRegistryCmd\_t**  
 default\_cfe\_tbl\_msgstruct.h, 1157  
**CFE\_TBL\_Share**  
 cFE Registration APIs, 319  
**CFE\_TBL\_SHARE\_ERR\_EID**  
 cfe\_tbl\_eventids.h, 1173  
**CFE\_TBL\_SPACECRAFT\_ID\_ERR\_EID**  
 cfe\_tbl\_eventids.h, 1174  
**CFE\_TBL\_SRC\_ADDRESS**  
 cfe\_tbl\_api\_typedefs.h, 938  
**CFE\_TBL\_SRC\_FILE**  
 cfe\_tbl\_api\_typedefs.h, 938  
**CFE\_TBL\_SrcEnum**  
 cfe\_tbl\_api\_typedefs.h, 938  
**CFE\_TBL\_SrcEnum\_t**  
 cfe\_tbl\_api\_typedefs.h, 938  
**CFE\_TBL\_TableRegistryTlm**, 604  
 Payload, 605  
 TelemetryHeader, 605  
**CFE\_TBL\_TableRegistryTlm\_t**  
 default\_cfe\_tbl\_msgstruct.h, 1157  
**CFE\_TBL\_TblRegPacket\_Payload**, 605  
 ActiveBufferAddr, 606  
 ByteAlign4, 606  
 Crc, 606  
 Critical, 606  
 DoubleBuffered, 607  
 DumpOnly, 607  
 FileCreateTimeSecs, 607  
 FileCreateTimeSubSecs, 607  
 InactiveBufferAddr, 607  
 LastFileLoaded, 607  
 LoadPending, 607  
 Name, 608  
 OwnerAppName, 608  
 Size, 608  
 TableLoadedOnce, 608  
 TimeOfLastUpdate, 608  
 ValidationFuncPtr, 608  
**CFE\_TBL\_TblRegPacket\_Payload\_t**

default\_cfe\_tbl\_msgdefs.h, 1154  
CFE\_TBL\_TLM\_REG\_CMD\_INF\_EID  
  cfe\_tbl\_eventids.h, 1174  
CFE\_TBL\_TOO\_MANY\_DUMPS\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1174  
CFE\_TBL\_TOO\_MANY\_VALIDATIONS\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1174  
CFE\_TBL\_Unregister  
  cFE Registration APIs, 320  
CFE\_TBL\_UNREGISTER\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1175  
CFE\_TBL\_UNVALIDATED\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1175  
CFE\_TBL\_Update  
  cFE Manage Table Content APIs, 326  
CFE\_TBL\_UPDATE\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1175  
CFE\_TBL\_UPDATE\_SUCCESS\_INF\_EID  
  cfe\_tbl\_eventids.h, 1175  
CFE\_TBL\_VAL\_REQ\_MADE\_INF\_EID  
  cfe\_tbl\_eventids.h, 1176  
CFE\_TBL\_Validate  
  cFE Manage Table Content APIs, 326  
CFE\_TBL\_VALIDATE\_CC  
  default\_cfe\_tbl\_fcncodes.h, 1143  
CFE\_TBL\_ValidateCmd, 609  
  CommandHeader, 609  
  Payload, 609  
CFE\_TBL\_ValidateCmd\_Payload, 609  
  ActiveTableFlag, 609  
  TableName, 610  
CFE\_TBL\_ValidateCmd\_Payload\_t  
  default\_cfe\_tbl\_msgdefs.h, 1154  
CFE\_TBL\_ValidateCmd\_t  
  default\_cfe\_tbl\_msgstruct.h, 1157  
CFE\_TBL\_VALIDATION\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1176  
CFE\_TBL\_VALIDATION\_INF\_EID  
  cfe\_tbl\_eventids.h, 1176  
CFE\_TBL\_WARN\_DUPLICATE  
  cFE Return Code Defines, 196  
CFE\_TBL\_WARN\_NOT\_CRITICAL  
  cFE Return Code Defines, 196  
CFE\_TBL\_WARN\_PARTIAL\_LOAD  
  cFE Return Code Defines, 196  
CFE\_TBL\_WARN\_SHORT\_FILE  
  cFE Return Code Defines, 197  
CFE\_TBL\_WRITE\_CFE\_HDR\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1176  
CFE\_TBL\_WRITE\_DUMP\_INF\_EID  
  cfe\_tbl\_eventids.h, 1177  
CFE\_TBL\_WRITE\_REG\_DUMP\_INF\_EID  
  cfe\_tbl\_eventids.h, 1177  
CFE\_TBL\_WRITE\_TBL\_HDR\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1177  
CFE\_TBL\_WRITE\_TBL\_IMG\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1177  
CFE\_TBL\_WRITE\_TBL\_REG\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1178  
CFE\_TBL\_ZERO\_LENGTH\_LOAD\_ERR\_EID  
  cfe\_tbl\_eventids.h, 1178  
cfe\_time.h  
  CFE\_TIME\_Copy, 941  
CFE\_TIME\_1HZ\_CMD\_MID  
  default\_cfe\_time\_msgids.h, 1212  
CFE\_TIME\_A\_GT\_B  
  cfe\_time\_api\_typedefs.h, 943  
CFE\_TIME\_A\_LT\_B  
  cfe\_time\_api\_typedefs.h, 943  
CFE\_TIME\_Add  
  cFE Time Arithmetic APIs, 344  
CFE\_TIME\_ADD\_ADJUST\_CC  
  default\_cfe\_time\_fcncodes.h, 1184  
CFE\_TIME\_ADD\_DELAY\_CC  
  default\_cfe\_time\_fcncodes.h, 1184  
CFE\_TIME\_ADD\_ONE\_HZ\_ADJUSTMENT\_CC  
  default\_cfe\_time\_fcncodes.h, 1185  
CFE\_TIME\_AddAdjustCmd, 610  
  CommandHeader, 610  
  Payload, 610  
CFE\_TIME\_AddAdjustCmd\_t  
  default\_cfe\_time\_msgstruct.h, 1214  
CFE\_TIME\_AddDelayCmd, 610  
  CommandHeader, 611  
  Payload, 611  
CFE\_TIME\_AddDelayCmd\_t  
  default\_cfe\_time\_msgstruct.h, 1214  
CFE\_TIME\_AddOneHzAdjustmentCmd, 611  
  CommandHeader, 611  
  Payload, 611  
CFE\_TIME\_AddOneHzAdjustmentCmd\_t  
  default\_cfe\_time\_msgstruct.h, 1214  
CFE\_TIME\_AdjustDirection  
  default\_cfe\_time\_extern\_typedefs.h, 1181  
CFE\_TIME\_AdjustDirection\_ADD  
  default\_cfe\_time\_extern\_typedefs.h, 1181  
CFE\_TIME\_AdjustDirection\_Enum\_t  
  default\_cfe\_time\_extern\_typedefs.h, 1180  
CFE\_TIME\_AdjustDirection\_SUBTRACT  
  default\_cfe\_time\_extern\_typedefs.h, 1181  
cfe\_time\_api\_typedefs.h  
  CFE\_TIME\_A\_GT\_B, 943  
  CFE\_TIME\_A\_LT\_B, 943  
  CFE\_TIME\_Compare, 943  
  CFE\_TIME\_Compare\_t, 942  
  CFE\_TIME\_EQUAL, 943  
  CFE\_TIME\_PRINTED\_STRING\_SIZE, 942  
  CFE\_TIME\_SynchCallbackPtr\_t, 942

**CFE\_TIME\_BAD\_ARGUMENT**  
 cFE Return Code Defines, [197](#)  
**CFE\_TIME\_CALLBACK\_NOT\_REGISTERED**  
 cFE Return Code Defines, [197](#)  
**CFE\_TIME\_CC\_ERR\_EID**  
*cfe\_time\_eventids.h*, [1219](#)  
**CFE\_TIME\_ClockState**  
*default\_cfe\_time\_extern\_typedefs.h*, [1181](#)  
**CFE\_TIME\_ClockState\_Enum\_t**  
*default\_cfe\_time\_extern\_typedefs.h*, [1180](#)  
**CFE\_TIME\_ClockState\_FLYWHEEL**  
*default\_cfe\_time\_extern\_typedefs.h*, [1182](#)  
**CFE\_TIME\_ClockState\_INVALID**  
*default\_cfe\_time\_extern\_typedefs.h*, [1182](#)  
**CFE\_TIME\_ClockState\_VALID**  
*default\_cfe\_time\_extern\_typedefs.h*, [1182](#)  
**CFE\_TIME\_CMD\_MID**  
*default\_cfe\_time\_msgids.h*, [1212](#)  
**CFE\_TIME\_Compare**  
 cFE Time Arithmetic APIs, [344](#)  
*cfe\_time\_api\_typedefs.h*, [943](#)  
**CFE\_TIME\_Compare\_t**  
*cfe\_time\_api\_typedefs.h*, [942](#)  
**CFE\_TIME\_Copy**  
*cfe\_time.h*, [941](#)  
**CFE\_TIME\_DATA\_CMD\_MID**  
*default\_cfe\_time\_msgids.h*, [1212](#)  
**CFE\_TIME\_DELAY\_CFG\_EID**  
*cfe\_time\_eventids.h*, [1219](#)  
**CFE\_TIME\_DELAY\_EID**  
*cfe\_time\_eventids.h*, [1220](#)  
**CFE\_TIME\_DELAY\_ERR\_EID**  
*cfe\_time\_eventids.h*, [1220](#)  
**CFE\_TIME\_DELTA\_CFG\_EID**  
*cfe\_time\_eventids.h*, [1220](#)  
**CFE\_TIME\_DELTA\_EID**  
*cfe\_time\_eventids.h*, [1220](#)  
**CFE\_TIME\_DELTA\_ERR\_EID**  
*cfe\_time\_eventids.h*, [1221](#)  
**CFE\_TIME\_DIAG\_EID**  
*cfe\_time\_eventids.h*, [1221](#)  
**CFE\_TIME\_DIAG\_TLM\_MID**  
*default\_cfe\_time\_msgids.h*, [1212](#)  
**CFE\_TIME\_DiagnosticTlm**, [612](#)  
 Payload, [612](#)  
 TelemetryHeader, [612](#)  
**CFE\_TIME\_DiagnosticTlm\_Payload**, [612](#)  
 AtToneDelay, [614](#)  
 AtToneLatch, [614](#)  
 AtToneLeapSeconds, [615](#)  
 AtToneMET, [615](#)  
 AtToneSTCF, [615](#)  
 ClockFlyState, [615](#)  
 ClockSetState, [615](#)  
 ClockSignal, [615](#)  
 ClockSource, [615](#)  
 ClockStateAPI, [616](#)  
 ClockStateFlags, [616](#)  
 CurrentLatch, [616](#)  
 CurrentMET, [616](#)  
 CurrentTAI, [616](#)  
 CurrentUTC, [616](#)  
 DataStoreStatus, [616](#)  
 DelayDirection, [617](#)  
 Forced2Fly, [617](#)  
 LocalIntCounter, [617](#)  
 LocalTaskCounter, [617](#)  
 MaxElapsed, [617](#)  
 MaxLocalClock, [617](#)  
 MinElapsed, [617](#)  
 OneHzAdjust, [618](#)  
 OneHzDirection, [618](#)  
 OneTimeAdjust, [618](#)  
 OneTimeDirection, [618](#)  
 ServerFlyState, [618](#)  
 TimeSinceTone, [618](#)  
 ToneDataCounter, [618](#)  
 ToneDataLatch, [619](#)  
 ToneIntCounter, [619](#)  
 ToneIntErrorCounter, [619](#)  
 ToneMatchCounter, [619](#)  
 ToneMatchErrorCounter, [619](#)  
 ToneOverLimit, [619](#)  
 ToneSignalCounter, [619](#)  
 ToneSignalLatch, [620](#)  
 ToneTaskCounter, [620](#)  
 ToneUnderLimit, [620](#)  
 VersionCounter, [620](#)  
 VirtualMET, [620](#)  
**CFE\_TIME\_DiagnosticTlm\_Payload\_t**  
*default\_cfe\_time\_msgdefs.h*, [1211](#)  
**CFE\_TIME\_DiagnosticTlm\_t**  
*default\_cfe\_time\_msgstruct.h*, [1215](#)  
**CFE\_TIME\_EQUAL**  
*cfe\_time\_api\_typedefs.h*, [943](#)  
*cfe\_time\_eventids.h*  
 CFE\_TIME\_CC\_ERR\_EID, [1219](#)  
 CFE\_TIME\_DELAY\_CFG\_EID, [1219](#)  
 CFE\_TIME\_DELAY\_EID, [1220](#)  
 CFE\_TIME\_DELAY\_ERR\_EID, [1220](#)  
 CFE\_TIME\_DELTA\_CFG\_EID, [1220](#)  
 CFE\_TIME\_DELTA\_EID, [1220](#)  
 CFE\_TIME\_DELTA\_ERR\_EID, [1221](#)  
 CFE\_TIME\_DIAG\_EID, [1221](#)  
 CFE\_TIME\_FLY\_OFF\_EID, [1221](#)  
 CFE\_TIME\_FLY\_ON\_EID, [1221](#)  
 CFE\_TIME\_ID\_ERR\_EID, [1222](#)  
 CFE\_TIME\_INIT\_EID, [1222](#)

CFE\_TIME\_LEAPS\_CFG\_EID, 1222  
CFE\_TIME\_LEAPS\_EID, 1222  
CFE\_TIME\_LEN\_ERR\_EID, 1223  
CFE\_TIME\_MET\_CFG\_EID, 1223  
CFE\_TIME\_MET\_EID, 1223  
CFE\_TIME\_MET\_ERR\_EID, 1223  
CFE\_TIME\_NOOP\_EID, 1224  
CFE\_TIME\_ONEHZ\_CFG\_EID, 1224  
CFE\_TIME\_ONEHZ\_EID, 1224  
CFE\_TIME\_RESET\_EID, 1224  
CFE\_TIME\_SIGNAL\_CFG\_EID, 1225  
CFE\_TIME\_SIGNAL\_EID, 1225  
CFE\_TIME\_SIGNAL\_ERR\_EID, 1225  
CFE\_TIME\_SOURCE\_CFG\_EID, 1225  
CFE\_TIME\_SOURCE\_EID, 1226  
CFE\_TIME\_SOURCE\_ERR\_EID, 1226  
CFE\_TIME\_STATE\_EID, 1226  
CFE\_TIME\_STATE\_ERR\_EID, 1226  
CFE\_TIME\_STCF\_CFG\_EID, 1227  
CFE\_TIME\_STCF\_EID, 1227  
CFE\_TIME\_STCF\_ERR\_EID, 1227  
CFE\_TIME\_TIME\_CFG\_EID, 1227  
CFE\_TIME\_TIME\_EID, 1228  
CFE\_TIME\_TIME\_ERR\_EID, 1228  
CFE\_TIME\_ExternalGPS  
    cFE External Time Source APIs, 349  
CFE\_TIME\_ExternalMET  
    cFE External Time Source APIs, 350  
CFE\_TIME\_ExternalTime  
    cFE External Time Source APIs, 350  
CFE\_TIME\_ExternalTone  
    cFE External Time Source APIs, 351  
CFE\_TIME\_FakeToneCmd, 620  
    CommandHeader, 621  
CFE\_TIME\_FakeToneCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215  
CFE\_TIME\_FLAG\_ADD1HZ  
    cFE Clock State Flag Defines, 359  
CFE\_TIME\_FLAG\_ADDADJ  
    cFE Clock State Flag Defines, 359  
CFE\_TIME\_FLAG\_ADDTCL  
    cFE Clock State Flag Defines, 359  
CFE\_TIME\_FLAG\_CLKSET  
    cFE Clock State Flag Defines, 359  
CFE\_TIME\_FLAG\_CMDFLY  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_FLYING  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_GDTONE  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_REFERR  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_SERVER  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_SIGPRI  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_SRCINT  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_SRVFLY  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FLAG\_UNUSED  
    cFE Clock State Flag Defines, 360  
CFE\_TIME\_FlagBit  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_ADD1HZ  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_ADDADJ  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_ADDTCL  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_CLKSET  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_CMDFLY  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_Enum\_t  
    default\_cfe\_time\_extern\_typedefs.h, 1180  
CFE\_TIME\_FlagBit\_FLYING  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_GDTONE  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_SERVER  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_SIGPRI  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_SRCINT  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlagBit\_SRVFLY  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FLY\_OFF\_EID  
    cfe\_time\_eventids.h, 1221  
CFE\_TIME\_FLY\_ON\_EID  
    cfe\_time\_eventids.h, 1221  
CFE\_TIME\_FlywheelState  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlywheelState\_Enum\_t  
    default\_cfe\_time\_extern\_typedefs.h, 1180  
CFE\_TIME\_FlywheelState\_IS\_FLY  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_FlywheelState\_NO\_FLY  
    default\_cfe\_time\_extern\_typedefs.h, 1182  
CFE\_TIME\_GetClockInfo  
    cFE Get Time Information APIs, 341  
CFE\_TIME\_GetClockState  
    cFE Get Time Information APIs, 341  
CFE\_TIME\_GetLeapSeconds  
    cFE Get Time Information APIs, 342  
CFE\_TIME\_GetMET  
    cFE Get Current Time APIs, 338

**CFE\_TIME\_GetMETseconds**  
 cFE Get Current Time APIs, 338  
**CFE\_TIME\_GetMETsubsecs**  
 cFE Get Current Time APIs, 339  
**CFE\_TIME\_GetSTCF**  
 cFE Get Time Information APIs, 342  
**CFE\_TIME\_GetTAI**  
 cFE Get Current Time APIs, 339  
**CFE\_TIME\_GetTime**  
 cFE Get Current Time APIs, 340  
**CFE\_TIME\_GetUTC**  
 cFE Get Current Time APIs, 340  
**CFE\_TIME\_HK\_TLM\_MID**  
 default\_cfe\_time\_msgids.h, 1212  
**CFE\_TIME\_HousekeepingTlm**, 621  
 Payload, 621  
 TelemetryHeader, 621  
**CFE\_TIME\_HousekeepingTlm\_Payload**, 621  
 ClockStateAPI, 622  
 ClockStateFlags, 622  
 CommandCounter, 623  
 CommandErrorCounter, 623  
 LeapSeconds, 623  
 Seconds1HzAdj, 623  
 SecondsDelay, 623  
 SecondsMET, 623  
 SecondsSTCF, 623  
 Subsecs1HzAdj, 624  
 SubsecsDelay, 624  
 SubsecsMET, 624  
 SubsecsSTCF, 624  
**CFE\_TIME\_HousekeepingTlm\_Payload\_t**  
 default\_cfe\_time\_msgdefs.h, 1211  
**CFE\_TIME\_HousekeepingTlm\_t**  
 default\_cfe\_time\_msgstruct.h, 1215  
**CFE\_TIME\_ID\_ERR\_EID**  
 cfe\_time\_eventids.h, 1222  
**CFE\_TIME\_INIT\_EID**  
 cfe\_time\_eventids.h, 1222  
**CFE\_TIME\_INTERNAL\_ONLY**  
 cFE Return Code Defines, 197  
**CFE\_TIME\_LEAPS\_CFG\_EID**  
 cfe\_time\_eventids.h, 1222  
**CFE\_TIME\_LEAPS\_EID**  
 cfe\_time\_eventids.h, 1222  
**CFE\_TIME\_LeapsCmd\_Payload**, 624  
 LeapSeconds, 625  
**CFE\_TIME\_LeapsCmd\_Payload\_t**  
 default\_cfe\_time\_msgdefs.h, 1211  
**CFE\_TIME\_LEN\_ERR\_EID**  
 cfe\_time\_eventids.h, 1223  
**CFE\_TIME\_Local1HzISR**  
 cFE Miscellaneous Time APIs, 354  
**CFE\_TIME\_MET2SCTime**  
 cFE Time Conversion APIs, 347  
**CFE\_TIME\_MET\_CFG\_EID**  
 cfe\_time\_eventids.h, 1223  
**CFE\_TIME\_MET\_EID**  
 cfe\_time\_eventids.h, 1223  
**CFE\_TIME\_MET\_ERR\_EID**  
 cfe\_time\_eventids.h, 1223  
**CFE\_TIME\_Micro2SubSecs**  
 cFE Time Conversion APIs, 347  
**CFE\_TIME\_NOOP\_CC**  
 default\_cfe\_time\_fnccodes.h, 1186  
**CFE\_TIME\_NOOP\_EID**  
 cfe\_time\_eventids.h, 1224  
**CFE\_TIME\_NoopCmd**, 625  
 CommandHeader, 625  
**CFE\_TIME\_NoopCmd\_t**  
 default\_cfe\_time\_msgstruct.h, 1215  
**CFE\_TIME\_NOT\_IMPLEMENTED**  
 cFE Return Code Defines, 197  
**CFE\_TIME\_ONEHZ\_CFG\_EID**  
 cfe\_time\_eventids.h, 1224  
**CFE\_TIME\_ONEHZ\_CMD\_MID**  
 default\_cfe\_time\_msgids.h, 1212  
**CFE\_TIME\_ONEHZ\_EID**  
 cfe\_time\_eventids.h, 1224  
**CFE\_TIME\_OneHzAdjustmentCmd\_Payload**, 625  
 Seconds, 625  
 Subseconds, 625  
**CFE\_TIME\_OneHzAdjustmentCmd\_Payload\_t**  
 default\_cfe\_time\_msgdefs.h, 1211  
**CFE\_TIME\_OneHzCmd**, 626  
 CommandHeader, 626  
**CFE\_TIME\_OneHzCmd\_t**  
 default\_cfe\_time\_msgstruct.h, 1215  
**CFE\_TIME\_OUT\_OF\_RANGE**  
 cFE Return Code Defines, 197  
**CFE\_TIME\_Print**  
 cFE Miscellaneous Time APIs, 354  
**CFE\_TIME\_PRINTED\_STRING\_SIZE**  
 cfe\_time\_api\_typedefs.h, 942  
**CFE\_TIME\_RegisterSynchCallback**  
 cFE External Time Source APIs, 351  
**CFE\_TIME\_RESET\_COUNTERS\_CC**  
 default\_cfe\_time\_fnccodes.h, 1187  
**CFE\_TIME\_RESET\_EID**  
 cfe\_time\_eventids.h, 1224  
**CFE\_TIME\_ResetCountersCmd**, 626  
 CommandHeader, 626  
**CFE\_TIME\_ResetCountersCmd\_t**  
 default\_cfe\_time\_msgstruct.h, 1215  
**CFE\_TIME\_SEND\_CMD\_MID**  
 default\_cfe\_time\_msgids.h, 1213  
**CFE\_TIME\_SEND\_DIAGNOSTIC\_CC**  
 default\_cfe\_time\_fnccodes.h, 1188

CFE\_TIME\_SEND\_HK\_MID  
    default\_cfe\_time\_msgids.h, 1213

CFE\_TIME\_SendDiagnosticCmd, 627  
    CommandHeader, 627

CFE\_TIME\_SendDiagnosticCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SendHkCmd, 627  
    CommandHeader, 627

CFE\_TIME\_SendHkCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SERVICE  
    cfe\_error.h, 900

CFE\_TIME\_SET\_LEAP\_SECONDS\_CC  
    default\_cfe\_time\_fncodes.h, 1189

CFE\_TIME\_SET\_MET\_CC  
    default\_cfe\_time\_fncodes.h, 1190

CFE\_TIME\_SET\_SIGNAL\_CC  
    default\_cfe\_time\_fncodes.h, 1191

CFE\_TIME\_SET\_SOURCE\_CC  
    default\_cfe\_time\_fncodes.h, 1191

CFE\_TIME\_SET\_STATE\_CC  
    default\_cfe\_time\_fncodes.h, 1192

CFE\_TIME\_SET\_STCF\_CC  
    default\_cfe\_time\_fncodes.h, 1194

CFE\_TIME\_SET\_TIME\_CC  
    default\_cfe\_time\_fncodes.h, 1194

CFE\_TIME\_SetLeapSecondsCmd, 627  
    CommandHeader, 628  
    Payload, 628

CFE\_TIME\_SetLeapSecondsCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetMETCmd, 628  
    CommandHeader, 628  
    Payload, 628

CFE\_TIME\_SetMETCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetSignalCmd, 629  
    CommandHeader, 629  
    Payload, 629

CFE\_TIME\_SetSignalCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetSourceCmd, 629  
    CommandHeader, 630  
    Payload, 630

CFE\_TIME\_SetSourceCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetState  
    default\_cfe\_time\_extern\_typedefs.h, 1182

CFE\_TIME\_SetState\_Enum\_t  
    default\_cfe\_time\_extern\_typedefs.h, 1180

CFE\_TIME\_SetState\_NOT\_SET  
    default\_cfe\_time\_extern\_typedefs.h, 1183

CFE\_TIME\_SetState\_WAS\_SET  
    default\_cfe\_time\_extern\_typedefs.h, 1183

CFE\_TIME\_SetStateCmd, 630  
    CommandHeader, 630  
    Payload, 630

CFE\_TIME\_SetStateCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetSTCFCmd, 631  
    CommandHeader, 631  
    Payload, 631

CFE\_TIME\_SetSTCFCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SetTimeCmd, 631  
    CommandHeader, 631  
    Payload, 631

CFE\_TIME\_SetTimeCmd\_t  
    default\_cfe\_time\_msgstruct.h, 1215

CFE\_TIME\_SIGNAL\_CFG\_EID  
    cfe\_time\_eventids.h, 1225

CFE\_TIME\_SIGNAL\_EID  
    cfe\_time\_eventids.h, 1225

CFE\_TIME\_SIGNAL\_ERR\_EID  
    cfe\_time\_eventids.h, 1225

CFE\_TIME\_SignalCmd\_Payload, 632  
    ToneSource, 632

CFE\_TIME\_SignalCmd\_Payload\_t  
    default\_cfe\_time\_msgdefs.h, 1211

CFE\_TIME\_SOURCE\_CFG\_EID  
    cfe\_time\_eventids.h, 1225

CFE\_TIME\_SOURCE\_EID  
    cfe\_time\_eventids.h, 1226

CFE\_TIME\_SOURCE\_ERR\_EID  
    cfe\_time\_eventids.h, 1226

CFE\_TIME\_SourceCmd\_Payload, 632  
    TimeSource, 633

CFE\_TIME\_SourceCmd\_Payload\_t  
    default\_cfe\_time\_msgdefs.h, 1211

CFE\_TIME\_SourceSelect  
    default\_cfe\_time\_extern\_typedefs.h, 1183

CFE\_TIME\_SourceSelect\_Enum\_t  
    default\_cfe\_time\_extern\_typedefs.h, 1181

CFE\_TIME\_SourceSelect\_EXTERNAL  
    default\_cfe\_time\_extern\_typedefs.h, 1183

CFE\_TIME\_SourceSelect\_INTERNAL  
    default\_cfe\_time\_extern\_typedefs.h, 1183

CFE\_TIME\_STATE\_EID  
    cfe\_time\_eventids.h, 1226

CFE\_TIME\_STATE\_ERR\_EID  
    cfe\_time\_eventids.h, 1226

CFE\_TIME\_StateCmd\_Payload, 633  
    ClockState, 633

CFE\_TIME\_StateCmd\_Payload\_t  
    default\_cfe\_time\_msgdefs.h, 1211

CFE\_TIME\_STCF\_CFG\_EID  
    cfe\_time\_eventids.h, 1227

CFE\_TIME\_STCF\_EID

cfe\_time\_eventids.h, 1227  
 CFE\_TIME\_STCF\_ERR\_EID  
     cfe\_time\_eventids.h, 1227  
 CFE\_TIME\_Sub2MicroSecs  
     cFE Time Conversion APIs, 348  
 CFE\_TIME\_SUB\_ADJUST\_CC  
     default\_cfe\_time\_fncodes.h, 1195  
 CFE\_TIME\_SUB\_DELAY\_CC  
     default\_cfe\_time\_fncodes.h, 1196  
 CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC  
     default\_cfe\_time\_fncodes.h, 1197  
 CFE\_TIME\_SubAdjustCmd, 633  
     CommandHeader, 634  
     Payload, 634  
 CFE\_TIME\_SubAdjustCmd\_t  
     default\_cfe\_time\_msgstruct.h, 1216  
 CFE\_TIME\_SubDelayCmd, 634  
     CommandHeader, 634  
     Payload, 634  
 CFE\_TIME\_SubDelayCmd\_t  
     default\_cfe\_time\_msgstruct.h, 1216  
 CFE\_TIME\_SubOneHzAdjustmentCmd, 634  
     CommandHeader, 635  
     Payload, 635  
 CFE\_TIME\_SubOneHzAdjustmentCmd\_t  
     default\_cfe\_time\_msgstruct.h, 1216  
 CFE\_TIME\_Subtract  
     cFE Time Arithmetic APIs, 345  
 CFE\_TIME\_SynchCallbackPtr\_t  
     cfe\_time\_api\_typedefs.h, 942  
 CFE\_TIME\_SysTime, 635  
     Seconds, 635  
     Subseconds, 636  
 CFE\_TIME\_SysTime\_t  
     default\_cfe\_time\_extern\_typedefs.h, 1181  
 CFE\_TIME\_TIME\_CFG\_EID  
     cfe\_time\_eventids.h, 1227  
 CFE\_TIME\_TIME\_EID  
     cfe\_time\_eventids.h, 1228  
 CFE\_TIME\_TIME\_ERR\_EID  
     cfe\_time\_eventids.h, 1228  
 CFE\_TIME\_TimeCmd\_Payload, 636  
     MicroSeconds, 636  
     Seconds, 636  
 CFE\_TIME\_TimeCmd\_Payload\_t  
     default\_cfe\_time\_msgdefs.h, 1211  
 CFE\_TIME\_TONE\_CMD\_MID  
     default\_cfe\_time\_msqid.h, 1213  
 CFE\_TIME\_ToneDataCmd, 636  
     CommandHeader, 637  
     Payload, 637  
 CFE\_TIME\_ToneDataCmd\_Payload, 637  
     AtToneLeapSeconds, 637  
     AtToneMET, 637  
     AtToneState, 638  
     AtToneSTCF, 638  
 CFE\_TIME\_ToneDataCmd\_Payload\_t  
     default\_cfe\_time\_msgdefs.h, 1211  
 CFE\_TIME\_ToneDataCmd\_t  
     default\_cfe\_time\_msgstruct.h, 1216  
 CFE\_TIME\_ToneSignalCmd, 638  
     CommandHeader, 638  
 CFE\_TIME\_ToneSignalCmd\_t  
     default\_cfe\_time\_msgstruct.h, 1216  
 CFE\_TIME\_ToneSignalSelect  
     default\_cfe\_time\_extern\_typedefs.h, 1183  
 CFE\_TIME\_ToneSignalSelect\_Enum\_t  
     default\_cfe\_time\_extern\_typedefs.h, 1181  
 CFE\_TIME\_ToneSignalSelect\_PRIMARY  
     default\_cfe\_time\_extern\_typedefs.h, 1183  
 CFE\_TIME\_ToneSignalSelect\_REDUNDANT  
     default\_cfe\_time\_extern\_typedefs.h, 1183  
 CFE\_TIME\_TOO\_MANY\_SYNCH\_CALLBACKS  
     cFE Return Code Defines, 197  
 CFE\_TIME\_UnregisterSynchCallback  
     cFE External Time Source APIs, 352  
 CFE\_TST  
     cfe\_sb.h, 931  
 cfe\_version.h  
     CFE\_BUILD\_BASELINE, 944  
     CFE\_BUILD\_CODENAME, 944  
     CFE\_BUILD\_DEV\_CYCLE, 944  
     CFE\_BUILD\_NUMBER, 944  
     CFE\_CFG\_MAX\_VERSION\_STR\_LEN, 944  
     CFE\_LAST\_OFFICIAL, 944  
     CFE\_MAJOR\_VERSION, 944  
     CFE\_MINOR\_VERSION, 945  
     CFE\_MISSION\_REV, 945  
     CFE\_REVISION, 945  
     CFE\_SRC\_VERSION, 945  
     CFE\_STR, 945  
     CFE\_STR\_HELPER, 945  
 CFECOREChecksum  
     CFE\_ES\_HousekeepingTlm\_Payload, 500  
 CFEMajorVersion  
     CFE\_ES\_HousekeepingTlm\_Payload, 500  
 CFEMinorVersion  
     CFE\_ES\_HousekeepingTlm\_Payload, 500  
 CFEMissionRevision  
     CFE\_ES\_HousekeepingTlm\_Payload, 500  
 CFRRevision  
     CFE\_ES\_HousekeepingTlm\_Payload, 501  
 CFS Limit Checker Command Codes, 159  
     LC\_NOOP\_CC, 159  
     LC\_RESET\_AP\_STATS\_CC, 160  
     LC\_RESET\_CC, 160  
     LC\_RESET\_WP\_STATS\_CC, 161  
     LC\_SET\_AP\_PERM\_OFF\_CC, 162

- LC\_SET\_AP\_STATE\_CC, 162  
LC\_SET\_LC\_STATE\_CC, 163  
CFS Limit Checker Command Message IDs, 172  
    LC\_CMD\_MID, 172  
    LC\_SAMPLE\_AP\_MID, 172  
    LC\_SEND\_HK\_MID, 172  
CFS Limit Checker Command Structures, 174  
CFS Limit Checker Event IDs, 135  
    LC\_ACTION\_ERROR\_ERR\_EID, 138  
    LC\_ADT\_GETADDR\_ERR\_EID, 138  
    LC\_ADT\_LOAD\_ERR\_EID, 139  
    LC\_ADT\_REGISTER\_CRIT\_ERR\_EID, 139  
    LC\_ADT\_REGISTER\_ERR\_EID, 139  
    LC\_ADTVVAL\_ERR\_EID, 139  
    LC\_ADTVVAL\_INF\_EID, 140  
    LC\_ADTVVAL\_RPNERR\_EID, 140  
    LC\_AP\_FAILTOMPASS\_INF\_EID, 140  
    LC\_AP\_PASSIVE\_FAIL\_INF\_EID, 140  
    LC\_AP\_PASSTOFAIL\_INF\_EID, 141  
    LC\_APOFF\_APNUM\_ERR\_EID, 141  
    LC\_APOFF\_CURR\_ERR\_EID, 141  
    LC\_APOFF\_INF\_EID, 141  
    LC\_APP\_CDS\_REGISTER\_ERR\_EID, 142  
    LC\_APP\_NO\_SAVE\_START\_ERR\_EID, 142  
    LC\_APSSAMPLE\_APNUM\_ERR\_EID, 142  
    LC\_APSSAMPLE\_CURR\_ERR\_EID, 142  
    LC\_APSSAMPLE\_LEN\_ERR\_EID, 143  
    LC\_APSTATE\_APNUM\_ERR\_EID, 143  
    LC\_APSTATE\_CURR\_ERR\_EID, 143  
    LC\_APSTATE\_INF\_EID, 143  
    LC\_APSTATE\_NEW\_ERR\_EID, 144  
    LC\_APSTATS\_APNUM\_ERR\_EID, 144  
    LC\_APSTATS\_INF\_EID, 144  
    LC\_ART\_CDS\_REGISTER\_ERR\_EID, 144  
    LC\_ART\_GETADDR\_ERR\_EID, 145  
    LC\_ART\_NO\_SAVE\_ERR\_EID, 145  
    LC\_ART\_REGISTER\_ERR\_EID, 145  
    LC\_BASE\_AP\_EID, 145  
    LC\_CC\_ERR\_EID, 146  
    LC\_CDS\_DISABLED\_INF\_EID, 146  
    LC\_CDS\_RESTORED\_INF\_EID, 146  
    LC\_CDS\_UPDATED\_INF\_EID, 147  
    LC\_CFCALL\_ERR\_EID, 147  
    LC\_CR\_PIPE\_ERR\_EID, 148  
    LC\_HKREQ\_LEN\_ERR\_EID, 148  
    LC\_INIT\_INF\_EID, 148  
    LC\_INVALID\_RPN\_ERR\_EID, 148  
    LC\_LCSTATE\_ERR\_EID, 149  
    LC\_LCSTATE\_INF\_EID, 149  
    LC\_LEN\_ERR\_EID, 149  
    LC\_MID\_INF\_EID, 149  
    LC\_NOOP\_INF\_EID, 150  
    LC\_PASSIVE\_FAIL\_DBG\_EID, 150  
    LC\_RESERVED\_EID, 150  
    LC\_RESET\_DBG\_EID, 150  
    LC\_SUB\_GND\_CMD\_ERR\_EID, 151  
    LC\_SUB\_HK\_REQ\_ERR\_EID, 151  
    LC\_SUB\_SAMPLE\_CMD\_ERR\_EID, 151  
    LC\_SUB\_WP\_ERR\_EID, 151  
    LC\_TASK\_EXIT\_EID, 152  
    LC\_UNSUB\_WP\_ERR\_EID, 152  
    LC\_WDT\_GETADDR\_ERR\_EID, 152  
    LC\_WDT\_LOAD\_ERR\_EID, 152  
    LC\_WDT\_REGISTER\_CRIT\_ERR\_EID, 153  
    LC\_WDT\_REGISTER\_ERR\_EID, 153  
    LC\_WDT\_REREREGISTER\_ERR\_EID, 153  
    LC\_WDTVVAL\_ERR\_EID, 153  
    LC\_WDTVVAL\_FPERR\_EID, 154  
    LC\_WDTVVAL\_INF\_EID, 154  
    LC\_WP\_DATATYPE\_ERR\_EID, 154  
    LC\_WP\_NAN\_ERR\_EID, 154  
    LC\_WP\_OFFSET\_ERR\_EID, 155  
    LC\_WP\_OPERID\_ERR\_EID, 155  
    LC\_WPSTATS\_INF\_EID, 155  
    LC\_WPSTATS\_WPNUM\_ERR\_EID, 155  
    LC\_WRT\_CDS\_REGISTER\_ERR\_EID, 156  
    LC\_WRT\_GETADDR\_ERR\_EID, 156  
    LC\_WRT\_NO\_SAVE\_ERR\_EID, 156  
    LC\_WRT\_REGISTER\_ERR\_EID, 156  
CFS Limit Checker Mission Configuration, 165  
    LC\_APPMAIN\_PERF\_ID, 165  
    LC\_MAX\_ACTION\_TEXT, 165  
    LC\_MAX\_ACTIONPOINTS, 165  
    LC\_MAX\_RPN\_EQU\_SIZE, 166  
    LC\_MAX\_WATCHPOINTS, 166  
    LC\_RTS\_REQ\_CC, 166  
    LC\_RTS\_REQ\_MID, 167  
    LC\_WDT\_SEARCH\_PERF\_ID, 167  
CFS Limit Checker Platform Configuration, 168  
    LC\_ADT\_FILENAME, 168  
    LC\_ADT\_TABLENAME, 168  
    LC\_APP\_NAME, 168  
    LC\_ART\_TABLENAME, 169  
    LC\_FLOAT\_TOLERANCE, 169  
    LC\_MAX\_VALID\_ADT\_RTSID, 169  
    LC\_MISSION\_REV, 169  
    LC\_PIPE\_DEPTH, 170  
    LC\_STATE\_POWER\_ON\_RESET, 170  
    LC\_STATE\_WHEN\_CDS\_RESTORED, 170  
    LC\_WDT\_FILENAME, 171  
    LC\_WDT\_TABLENAME, 171  
    LC\_WRT\_TABLENAME, 171  
CFS Limit Checker Telemetry, 175  
CFS Limit Checker Telemetry Message IDs, 173  
    LC\_HK\_TLM\_MID, 173  
CFS Limit Checker Version, 158  
    LC\_MAJOR\_VERSION, 158  
    LC\_MINOR\_VERSION, 158

LC\_REVISION, [158](#)  
 CheckErrCtr  
     CFE\_ES\_MemPoolStats, [507](#)  
 ClockFlyState  
     CFE\_TIME\_DiagnosticTlm\_Payload, [615](#)  
 ClockSetState  
     CFE\_TIME\_DiagnosticTlm\_Payload, [615](#)  
 ClockSignal  
     CFE\_TIME\_DiagnosticTlm\_Payload, [615](#)  
 ClockSource  
     CFE\_TIME\_DiagnosticTlm\_Payload, [615](#)  
 ClockState  
     CFE\_TIME\_StateCmd\_Payload, [633](#)  
 ClockStateAPI  
     CFE\_TIME\_DiagnosticTlm\_Payload, [616](#)  
     CFE\_TIME\_HousekeepingTlm\_Payload, [622](#)  
 ClockStateFlags  
     CFE\_TIME\_DiagnosticTlm\_Payload, [616](#)  
     CFE\_TIME\_HousekeepingTlm\_Payload, [622](#)  
 CmdCount  
     LC\_AppData\_t, [642](#)  
     LC\_HkTlm\_Payload\_t, [647](#)  
 CmdErrCount  
     LC\_AppData\_t, [642](#)  
     LC\_HkTlm\_Payload\_t, [647](#)  
 CmdPipe  
     LC\_OperData\_t, [653](#)  
 code\_address  
     OS\_module\_address\_t, [677](#)  
 code\_size  
     OS\_module\_address\_t, [677](#)  
 CodeAddress  
     CFE\_ES\_AppInfo, [487](#)  
 CodeSize  
     CFE\_ES\_AppInfo, [488](#)  
 CommandCounter  
     CFE\_ES\_HousekeepingTlm\_Payload, [501](#)  
     CFE\_EVS\_HousekeepingTlm\_Payload, [543](#)  
     CFE\_SB\_HousekeepingTlm\_Payload, [564](#)  
     CFE\_TBL\_HousekeepingTlm\_Payload, [595](#)  
     CFE\_TIME\_HousekeepingTlm\_Payload, [623](#)  
 CommandErrorCounter  
     CFE\_ES\_HousekeepingTlm\_Payload, [501](#)  
     CFE\_EVS\_HousekeepingTlm\_Payload, [543](#)  
     CFE\_SB\_HousekeepingTlm\_Payload, [564](#)  
     CFE\_TBL\_HousekeepingTlm\_Payload, [595](#)  
     CFE\_TIME\_HousekeepingTlm\_Payload, [623](#)  
 CommandHeader  
     CFE\_ES\_ClearERLogCmd, [493](#)  
     CFE\_ES\_ClearSysLogCmd, [494](#)  
     CFE\_ES\_DeleteCDSCmd, [494](#)  
     CFE\_ES\_DumpCDSRegistryCmd, [495](#)  
     CFE\_ES\_FileNameCmd, [496](#)  
     CFE\_ES\_NoopCmd, [508](#)  
     CFE\_ES\_OverWriteSysLogCmd, [510](#)  
     CFE\_ES\_QueryAllCmd, [512](#)  
     CFE\_ES\_QueryAllTasksCmd, [513](#)  
     CFE\_ES\_QueryOneCmd, [513](#)  
     CFE\_ES\_ReloadAppCmd, [514](#)  
     CFE\_ES\_ResetCountersCmd, [515](#)  
     CFE\_ES\_ResetPRCountCmd, [515](#)  
     CFE\_ES\_RestartAppCmd, [515](#)  
     CFE\_ES\_RestartCmd, [516](#)  
     CFE\_ES\_SendHkCmd, [517](#)  
     CFE\_ES\_SendMemPoolStatsCmd, [518](#)  
     CFE\_ES\_SetMaxPRCountCmd, [519](#)  
     CFE\_ES\_SetPerfFilterMaskCmd, [520](#)  
     CFE\_ES\_SetPerfTriggerMaskCmd, [521](#)  
     CFE\_ES\_StartApp, [522](#)  
     CFE\_ES\_StartPerfDataCmd, [525](#)  
     CFE\_ES\_StopAppCmd, [525](#)  
     CFE\_ES\_StopPerfDataCmd, [526](#)  
     CFE\_ES\_WriteERLogCmd, [529](#)  
     CFE\_ES\_WriteSysLogCmd, [529](#)  
     CFE\_EVS\_AddEventFilterCmd, [530](#)  
     CFE\_EVS\_ClearLogCmd, [536](#)  
     CFE\_EVS\_DeleteEventFilterCmd, [536](#)  
     CFE\_EVS\_DisableAppEventsCmd, [537](#)  
     CFE\_EVS\_DisableAppEventTypeCmd, [537](#)  
     CFE\_EVS\_DisableEventTypeCmd, [538](#)  
     CFE\_EVS\_DisablePortsCmd, [539](#)  
     CFE\_EVS\_EnableAppEventsCmd, [539](#)  
     CFE\_EVS\_EnableAppEventTypeCmd, [540](#)  
     CFE\_EVS\_EnableEventTypeCmd, [540](#)  
     CFE\_EVS\_EnablePortsCmd, [541](#)  
     CFE\_EVS\_NoopCmd, [547](#)  
     CFE\_EVS\_ResetAllFiltersCmd, [549](#)  
     CFE\_EVS\_ResetAppCounterCmd, [550](#)  
     CFE\_EVS\_ResetCountersCmd, [550](#)  
     CFE\_EVS\_ResetFilterCmd, [551](#)  
     CFE\_EVS\_SendHkCmd, [551](#)  
     CFE\_EVS\_SetEventFormatModeCmd, [552](#)  
     CFE\_EVS\_SetFilterCmd, [553](#)  
     CFE\_EVS\_SetLogModeCmd, [554](#)  
     CFE\_EVS\_WriteAppDataFileCmd, [556](#)  
     CFE\_EVS\_WriteLogDataFileCmd, [556](#)  
     CFE\_SB\_DisableRouteCmd, [561](#)  
     CFE\_SB\_DisableSubReportingCmd, [562](#)  
     CFE\_SB\_EnableRouteCmd, [562](#)  
     CFE\_SB\_EnableSubReportingCmd, [563](#)  
     CFE\_SB\_NoopCmd, [569](#)  
     CFE\_SB\_ResetCountersCmd, [573](#)  
     CFE\_SB\_SendHkCmd, [575](#)  
     CFE\_SB\_SendPrevSubsCmd, [576](#)  
     CFE\_SB\_SendSbStatsCmd, [576](#)  
     CFE\_SB\_WriteMapInfoCmd, [583](#)  
     CFE\_SB\_WritePipeInfoCmd, [584](#)  
     CFE\_SB\_WriteRoutingInfoCmd, [585](#)

CFE\_TBL\_AbortLoadCmd, 585  
CFE\_TBL\_ActivateCmd, 586  
CFE\_TBL\_DeleteCDSCmd, 588  
CFE\_TBL\_DumpCmd, 589  
CFE\_TBL\_DumpRegistryCmd, 590  
CFE\_TBL\_LoadCmd, 600  
CFE\_TBL\_NoopCmd, 601  
CFE\_TBL\_NotifyCmd, 602  
CFE\_TBL\_ResetCountersCmd, 603  
CFE\_TBL\_SendHkCmd, 603  
CFE\_TBL\_SendRegistryCmd, 604  
CFE\_TBL\_ValidateCmd, 609  
CFE\_TIME\_AddAdjustCmd, 610  
CFE\_TIME\_AddDelayCmd, 611  
CFE\_TIME\_AddOneHzAdjustmentCmd, 611  
CFE\_TIME\_FakeToneCmd, 621  
CFE\_TIME\_NoopCmd, 625  
CFE\_TIME\_OneHzCmd, 626  
CFE\_TIME\_ResetCountersCmd, 626  
CFE\_TIME\_SendDiagnosticCmd, 627  
CFE\_TIME\_SendHkCmd, 627  
CFE\_TIME\_SetLeapSecondsCmd, 628  
CFE\_TIME\_SetMETCmd, 628  
CFE\_TIME\_SetSignalCmd, 629  
CFE\_TIME\_SetSourceCmd, 630  
CFE\_TIME\_SetStateCmd, 630  
CFE\_TIME\_SetSTCFCmd, 631  
CFE\_TIME\_SetTimeCmd, 631  
CFE\_TIME\_SubAdjustCmd, 634  
CFE\_TIME\_SubDelayCmd, 634  
CFE\_TIME\_SubOneHzAdjustmentCmd, 635  
CFE\_TIME\_ToneDataCmd, 637  
CFE\_TIME\_ToneSignalCmd, 638  
LC\_NoopCmd\_t, 651  
LC\_ResetAPStatsCmd\_t, 656  
LC\_ResetCountersCmd\_t, 656  
LC\_ResetWPStatsCmd\_t, 658  
LC\_RTSSRequestCmd\_t, 659  
LC\_SampleAPCmd\_t, 661  
LC\_SendHkCmd\_t, 661  
LC\_SetAPPPermOffCmd\_t, 662  
LC\_SetAPStateCmd\_t, 664  
LC\_SetLCStateCmd\_t, 665  
common\_types.h  
  \_EXTENSION\_, 1230  
  CompileTimeAssert, 1230, 1232, 1233  
  cpuaddr, 1230  
  cpudiff, 1231  
  cpusize, 1231  
  int16, 1231  
  int32, 1231  
  int64, 1231  
  int8, 1231  
  intptr, 1231  
OS\_ArgCallback\_t, 1231  
OS\_PRINTF, 1230  
OS\_USED, 1230  
OSAL\_BLOCKCOUNT\_C, 1230  
osal\_blockcount\_t, 1231  
osal\_id\_t, 1231  
OSAL\_INDEX\_C, 1230  
osal\_index\_t, 1231  
OSAL\_OBJTYPE\_C, 1230  
osal\_objtype\_t, 1232  
OSAL\_SIZE\_C, 1230  
OSAL\_STATUS\_C, 1230  
osal\_status\_t, 1232  
uint16, 1232  
uint32, 1232  
uint64, 1232  
uint8, 1232  
ComparisonValue  
  LC\_WDTEEntry\_t, 666  
CompileTimeAssert  
  common\_types.h, 1230, 1232, 1233  
ConsecutiveFailCount  
  LC\_ARTEntry\_t, 644  
ConsecutiveTrueCount  
  LC\_WRTEEntry\_t, 669  
ContentType  
  CFE\_FS\_Header, 558  
CountdownToStale  
  LC\_WRTEEntry\_t, 669  
cpuaddr  
  common\_types.h, 1230  
cpudiff  
  common\_types.h, 1231  
cpusize  
  common\_types.h, 1231  
Crc  
  CFE\_TBL\_Info, 599  
  CFE\_TBL\_TblRegPacket\_Payload, 606  
CreatePipeErrorCounter  
  CFE\_SB\_HousekeepingTlm\_Payload, 565  
creator  
  OS\_bin\_sem\_prop\_t, 671  
  OS\_condvar\_prop\_t, 672  
  OS\_count\_sem\_prop\_t, 673  
  OS\_mut\_sem\_prop\_t, 679  
  OS\_queue\_prop\_t, 680  
  OS\_socket\_prop\_t, 682  
  OS\_task\_prop\_t, 684  
  OS\_timebase\_prop\_t, 685  
  OS\_timer\_prop\_t, 686  
Critical  
  CFE\_TBL\_Info, 599  
  CFE\_TBL\_TblRegPacket\_Payload, 606  
CumulativeEventMsgsSent

LC\_ARTEEntry\_t, 644  
 CumulativeFailCount  
   LC\_ARTEEntry\_t, 644  
 CumulativeRTSExecCount  
   LC\_ARTEEntry\_t, 644  
 CumulativeTrueCount  
   LC\_WRTEntry\_t, 669  
 CurrentLatch  
   CFE\_TIME\_DiagnosticTlm\_Payload, 616  
 CurrentLCState  
   LC\_AppData\_t, 642  
   LC\_HkTlm\_Payload\_t, 647  
 CurrentMET  
   CFE\_TIME\_DiagnosticTlm\_Payload, 616  
 CurrentQueueDepth  
   CFE\_SB\_PipeDepthStats, 570  
   CFE\_SB\_PipeInfoEntry, 571  
 CurrentState  
   LC\_ARTEEntry\_t, 644  
 CurrentTAI  
   CFE\_TIME\_DiagnosticTlm\_Payload, 616  
 CurrentUTC  
   CFE\_TIME\_DiagnosticTlm\_Payload, 616  
 CustomFuncArgument  
   LC\_WDTEEntry\_t, 666  
  
 data\_address  
   OS\_module\_address\_t, 678  
 data\_size  
   OS\_module\_address\_t, 678  
 DataAddress  
   CFE\_ES\_AppInfo, 488  
 DataFileName  
   CFE\_ES\_StopPerfCmd\_Payload, 526  
 DataSize  
   CFE\_ES\_AppInfo, 488  
 DataStoreStatus  
   CFE\_TIME\_DiagnosticTlm\_Payload, 616  
 DataType  
   LC\_WDTEEntry\_t, 666  
   LC\_WRTTransition\_t, 670  
 default\_cfe\_core\_api\_base\_msgids.h  
   CFE\_CPU1\_CMD\_MID\_BASE, 883  
   CFE\_CPU1\_TLM\_MID\_BASE, 883  
   CFE\_GLOBAL\_CMD\_MID\_BASE, 883  
   CFE\_GLOBAL\_CMD\_TOPICID\_TO\_MIDV, 883  
   CFE\_GLOBAL\_TLM\_MID\_BASE, 884  
   CFE\_GLOBAL\_TLM\_TOPICID\_TO\_MIDV, 884  
   CFE\_PLATFORM\_CMD\_TOPICID\_TO\_MIDV, 884  
   CFE\_PLATFORM\_TLM\_TOPICID\_TO\_MIDV, 884  
 default\_cfe\_core\_api\_interface\_cfg.h  
   CFE\_MISSION\_MAX\_API\_LEN, 885  
   CFE\_MISSION\_MAX\_FILE\_LEN, 885  
   CFE\_MISSION\_MAX\_NUM\_FILES, 886  
  
 CFE\_MISSION\_MAX\_PATH\_LEN, 886  
 default\_cfe\_es\_extern\_typedefs.h  
   CFE\_ES\_AppId\_t, 948  
   CFE\_ES\_AppInfo\_t, 948  
   CFE\_ES\_AppState, 952  
   CFE\_ES\_AppState\_EARLY\_INIT, 952  
   CFE\_ES\_AppState\_Enum\_t, 948  
   CFE\_ES\_AppState\_LATE\_INIT, 952  
   CFE\_ES\_AppState\_MAX, 952  
   CFE\_ES\_AppState\_RUNNING, 952  
   CFE\_ES\_AppState\_STOPPED, 952  
   CFE\_ES\_AppState\_UNDEFINED, 952  
   CFE\_ES\_AppState\_WAITING, 952  
   CFE\_ES\_AppType, 952  
   CFE\_ES\_AppType\_CORE, 952  
   CFE\_ES\_AppType\_Enum\_t, 949  
   CFE\_ES\_AppType\_EXTERNAL, 952  
   CFE\_ES\_AppType\_LIBRARY, 952  
   CFE\_ES\_BlockStats\_t, 949  
   CFE\_ES\_CDSHandle\_t, 949  
   CFE\_ES\_CDSRegDumpRec\_t, 949  
   CFE\_ES\_CounterId\_t, 949  
   CFE\_ES\_ExceptionAction, 952  
   CFE\_ES\_ExceptionAction\_Enum\_t, 949  
   CFE\_ES\_ExceptionAction\_PROC\_RESTART, 952  
   CFE\_ES\_ExceptionAction\_RESTART\_APP, 952  
   CFE\_ES\_LibId\_t, 949  
   CFE\_ES\_LogEntryType, 952  
   CFE\_ES\_LogEntryType\_APPLICATION, 952  
   CFE\_ES\_LogEntryType\_CORE, 952  
   CFE\_ES\_LogEntryType\_Enum\_t, 950  
   CFE\_ES\_LogMode, 953  
   CFE\_ES\_LogMode\_DISCARD, 953  
   CFE\_ES\_LogMode\_Enum\_t, 950  
   CFE\_ES\_LogMode\_OVERWRITE, 953  
   CFE\_ES\_MEMADDRESS\_C, 948  
   CFE\_ES\_MemAddress\_t, 950  
   CFE\_ES\_MEMADDRESS\_TO\_PTR, 948  
   CFE\_ES\_MemHandle\_t, 950  
   CFE\_ES\_MemOffset\_t, 950  
   CFE\_ES\_MemOffset\_TO\_SIZE, 948  
   CFE\_ES\_MemPoolStats\_t, 950  
   CFE\_ES\_RunStatus, 953  
   CFE\_ES\_RunStatus\_APP\_ERROR, 953  
   CFE\_ES\_RunStatus\_APP\_EXIT, 953  
   CFE\_ES\_RunStatus\_APP\_RUN, 953  
   CFE\_ES\_RunStatus\_CORE\_APP\_INIT\_ERROR,  
     953  
   CFE\_ES\_RunStatus\_CORE\_APP\_RUNTIME\_ERROR,  
     953  
   CFE\_ES\_RunStatus\_Enum\_t, 951  
   CFE\_ES\_RunStatus\_MAX, 953  
   CFE\_ES\_RunStatus\_SYS\_DELETE, 953

CFE\_ES\_RunStatus\_SYS\_EXCEPTION, 953  
CFE\_ES\_RunStatus\_SYS\_RELOAD, 953  
CFE\_ES\_RunStatus\_SYS\_RESTART, 953  
CFE\_ES\_RunStatus\_UNDEFINED, 953  
CFE\_ES\_SystemState, 953  
CFE\_ES\_SystemState\_APPS\_INIT, 953  
CFE\_ES\_SystemState\_CORE\_READY, 953  
CFE\_ES\_SystemState\_CORE\_STARTUP, 953  
CFE\_ES\_SystemState\_EARLY\_INIT, 953  
CFE\_ES\_SystemState\_Enum\_t, 951  
CFE\_ES\_SystemState\_MAX, 953  
CFE\_ES\_SystemState\_OPERATIONAL, 953  
CFE\_ES\_SystemState\_SHUTDOWN, 953  
CFE\_ES\_SystemState\_UNDEFINED, 953  
CFE\_ES\_TaskId\_t, 951  
CFE\_ES\_TaskInfo\_t, 951  
CFE\_ES\_TaskPriority\_Atom\_t, 951  
default\_cfe\_es\_fcncodes.h  
CFE\_ES\_CLEAR\_ER\_LOG\_CC, 954  
CFE\_ES\_CLEAR\_SYS\_LOG\_CC, 955  
CFE\_ES\_DELETE\_CDS\_CC, 956  
CFE\_ES\_DUMP\_CDS\_REGISTRY\_CC, 956  
CFE\_ES\_NOOP\_CC, 957  
CFE\_ES\_OVER\_WRITE\_SYS\_LOG\_CC, 958  
CFE\_ES\_QUERY\_ALL\_CC, 959  
CFE\_ES\_QUERY\_ALL\_TASKS\_CC, 960  
CFE\_ES\_QUERY\_ONE\_CC, 960  
CFE\_ES\_RELOAD\_APP\_CC, 961  
CFE\_ES\_RESET\_COUNTERS\_CC, 962  
CFE\_ES\_RESET\_PR\_COUNT\_CC, 963  
CFE\_ES\_RESTART\_APP\_CC, 963  
CFE\_ES\_RESTART\_CC, 964  
CFE\_ES\_SEND\_MEM\_POOL\_STATS\_CC, 965  
CFE\_ES\_SET\_MAX\_PR\_COUNT\_CC, 966  
CFE\_ES\_SET\_PERF\_FILTER\_MASK\_CC, 967  
CFE\_ES\_SET\_PERF\_TRIGGER\_MASK\_CC, 968  
CFE\_ES\_START\_APP\_CC, 968  
CFE\_ES\_START\_PERF\_DATA\_CC, 969  
CFE\_ES\_STOP\_APP\_CC, 970  
CFE\_ES\_STOP\_PERF\_DATA\_CC, 971  
CFE\_ES\_WRITE\_ER\_LOG\_CC, 972  
CFE\_ES\_WRITE\_SYS\_LOG\_CC, 973  
default\_cfe\_es\_interface\_cfg.h  
CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN,  
    975  
CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH,  
    975  
CFE\_MISSION\_ES\_CRC\_16, 975  
CFE\_MISSION\_ES\_CRC\_32, 975  
CFE\_MISSION\_ES\_CRC\_8, 976  
CFE\_MISSION\_ES\_DEFAULT\_CRC, 976  
CFE\_MISSION\_ES\_MAX\_APPLICATIONS, 976  
CFE\_MISSION\_ES\_PERF\_MAX\_IDS, 976  
CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS, 976  
default\_cfe\_es\_internal\_cfg.h  
CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT, 979  
CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE, 979  
CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04,  
    980  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14,  
    981  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15,  
    982  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16,  
    982  
CFE\_PLATFORM\_ES\_CDS\_SIZE, 982  
CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE,  
    982  
CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE,  
    982  
CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE,  
    983  
CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME,  
    983  
CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE,  
    983  
CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE,  
    984  
CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE, 984  
CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE,

CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE, 984  
 CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES, 985  
 CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE, 985  
 CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS, 986  
 CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE, 986  
 CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS, 986  
 CFE\_PLATFORM\_ES\_MAX\_LIBRARIES, 986  
 CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS, 987  
 CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS, 987  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01, 987  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10, 988  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11, 989  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12, 989  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13, 989  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14, 989  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15, 989  
 CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16, 989  
 CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN, 989  
 CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING, 989  
 CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE, 990  
 CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE, 990  
 CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY, 990  
 CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY, 990  
 CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE, 991  
 CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE, 991  
 CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS, 991  
 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL, 992  
 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT, 992  
 CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE, 992  
 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL, 992  
 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT, 993  
 CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE, 993  
 CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS, 993  
 CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING, 993  
 CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS, 994  
 CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED, 994  
 CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE, 994  
 CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY, 995  
 CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE, 995  
 CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSEC, 995  
 CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC, 996  
 CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE, 996  
 CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE, 996  
 CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE, 997  
 default\_cfe\_es\_msgdefs.h  
 CFE\_ES\_AppNameCmd\_Payload\_t, 999  
 CFE\_ES\_AppReloadCmd\_Payload\_t, 1000  
 CFE\_ES\_DeleteCDSCmd\_Payload\_t, 1000  
 CFE\_ES\_DumpCDSRegistryCmd\_Payload\_t, 1000  
 CFE\_ES\_FileNameCmd\_Payload\_t, 1000  
 CFE\_ES\_HousekeepingTlm\_Payload\_t, 1000  
 CFE\_ES\_OneAppTlm\_Payload\_t, 1000  
 CFE\_ES\_OverWriteSysLogCmd\_Payload\_t, 1000  
 CFE\_ES\_PerfMode, 1001  
 CFE\_ES\_PerfMode\_Enum\_t, 1000  
 CFE\_ES\_PerfTrigger\_CENTER, 1001  
 CFE\_ES\_PerfTrigger\_END, 1001  
 CFE\_ES\_PerfTrigger\_START, 1001  
 CFE\_ES\_PoolStatsTlm\_Payload\_t, 1000  
 CFE\_ES\_RestartCmd\_Payload\_t, 1000  
 CFE\_ES\_SendMemPoolStatsCmd\_Payload\_t, 1000  
 CFE\_ES\_SetMaxPRCountCmd\_Payload\_t, 1001  
 CFE\_ES\_SetPerfFilterMaskCmd\_Payload\_t, 1001  
 CFE\_ES\_SetPerfTrigMaskCmd\_Payload\_t, 1001  
 CFE\_ES\_StartAppCmd\_Payload\_t, 1001  
 CFE\_ES\_StartPerfCmd\_Payload\_t, 1001  
 CFE\_ES\_StopPerfCmd\_Payload\_t, 1001  
 default\_cfe\_es\_msgids.h  
 CFE\_ES\_APP\_TLM\_MID, 1002  
 CFE\_ES\_CMD\_MID, 1002  
 CFE\_ES\_HK\_TLM\_MID, 1002  
 CFE\_ES\_MEMSTATS\_TLM\_MID, 1002  
 CFE\_ES\_SEND\_HK\_MID, 1002  
 default\_cfe\_es\_msgstruct.h

CFE\_ES\_ClearERLogCmd\_t, 1005  
CFE\_ES\_ClearSysLogCmd\_t, 1005  
CFE\_ES\_DeleteCDSCmd\_t, 1005  
CFE\_ES\_DumpCDSRegistryCmd\_t, 1005  
CFE\_ES\_FileNameCmd\_t, 1005  
CFE\_ES\_HousekeepingTlm\_t, 1005  
CFE\_ES\_MemStatsTlm\_t, 1005  
CFE\_ES\_NoopCmd\_t, 1005  
CFE\_ES\_OneAppTlm\_t, 1005  
CFE\_ES\_OverWriteSysLogCmd\_t, 1005  
CFE\_ES\_QueryAllCmd\_t, 1005  
CFE\_ES\_QueryAllTasksCmd\_t, 1005  
CFE\_ES\_QueryOneCmd\_t, 1005  
CFE\_ES\_ReloadAppCmd\_t, 1006  
CFE\_ES\_ResetCountersCmd\_t, 1006  
CFE\_ES\_ResetPRCountCmd\_t, 1006  
CFE\_ES\_RestartAppCmd\_t, 1006  
CFE\_ES\_RestartCmd\_t, 1006  
CFE\_ES\_SendHkCmd\_t, 1006  
CFE\_ES\_SendMemPoolStatsCmd\_t, 1006  
CFE\_ES\_SetMaxPRCountCmd\_t, 1006  
CFE\_ES\_SetPerfFilterMaskCmd\_t, 1006  
CFE\_ES\_SetPerfTriggerMaskCmd\_t, 1006  
CFE\_ES\_StartAppCmd\_t, 1006  
CFE\_ES\_StartPerfDataCmd\_t, 1006  
CFE\_ES\_StopAppCmd\_t, 1006  
CFE\_ES\_StopPerfDataCmd\_t, 1006  
CFE\_ES\_WriteERLogCmd\_t, 1007  
CFE\_ES\_WriteSysLogCmd\_t, 1007

default\_cfe\_es\_topicids.h  
CFE\_MISSION\_ES\_APP\_TLM\_TOPICID, 1007  
CFE\_MISSION\_ES\_CMD\_TOPICID, 1007  
CFE\_MISSION\_ES\_HK\_TLM\_TOPICID, 1008  
CFE\_MISSION\_ES\_MEMSTATS\_TLM\_TOPICID, 1008  
CFE\_MISSION\_ES\_SEND\_HK\_TOPICID, 1008

default\_cfe\_evs\_extern\_typedefs.h  
CFE\_EVS\_EventFilter, 1035  
CFE\_EVS\_EventFilter\_BINARY, 1035  
CFE\_EVS\_EventFilter\_Enum\_t, 1034  
CFE\_EVS\_EventOutput, 1035  
CFE\_EVS\_EventOutput\_Enum\_t, 1034  
CFE\_EVS\_EventOutput\_PORT1, 1035  
CFE\_EVS\_EventOutput\_PORT2, 1035  
CFE\_EVS\_EventOutput\_PORT3, 1035  
CFE\_EVS\_EventOutput\_PORT4, 1035  
CFE\_EVS\_EventType, 1035  
CFE\_EVS\_EventType\_CRITICAL, 1036  
CFE\_EVS\_EventType\_DEBUG, 1036  
CFE\_EVS\_EventType\_Enum\_t, 1034  
CFE\_EVS\_EventType\_ERROR, 1036  
CFE\_EVS\_EventType\_INFORMATION, 1036  
CFE\_EVS\_LogMode, 1036  
CFE\_EVS\_LogMode\_DISCARD, 1036

CFE\_EVS\_LogMode\_Enum\_t, 1035  
CFE\_EVS\_LogMode\_OVERWRITE, 1036  
CFE\_EVS\_MsgFormat, 1036  
CFE\_EVS\_MsgFormat\_Enum\_t, 1035  
CFE\_EVS\_MsgFormat\_LONG, 1036  
CFE\_EVS\_MsgFormat\_SHORT, 1036

default\_cfe\_evs\_fcncodes.h  
CFE\_EVS\_ADD\_EVENT\_FILTER\_CC, 1037  
CFE\_EVS\_CLEAR\_LOG\_CC, 1038  
CFE\_EVS\_DELETE\_EVENT\_FILTER\_CC, 1038  
CFE\_EVS\_DISABLE\_APP\_EVENT\_TYPE\_CC, 1039  
CFE\_EVS\_DISABLE\_APP\_EVENTS\_CC, 1040  
CFE\_EVS\_DISABLE\_EVENT\_TYPE\_CC, 1041  
CFE\_EVS\_DISABLE\_PORTS\_CC, 1042  
CFE\_EVS\_ENABLE\_APP\_EVENT\_TYPE\_CC, 1043  
CFE\_EVS\_ENABLE\_APP\_EVENTS\_CC, 1043  
CFE\_EVS\_ENABLE\_EVENT\_TYPE\_CC, 1044  
CFE\_EVS\_ENABLE\_PORTS\_CC, 1045  
CFE\_EVS\_NOOP\_CC, 1046  
CFE\_EVS\_RESET\_ALL\_FILTERS\_CC, 1047  
CFE\_EVS\_RESET\_APP\_COUNTER\_CC, 1047  
CFE\_EVS\_RESET\_COUNTERS\_CC, 1048  
CFE\_EVS\_RESET\_FILTER\_CC, 1049  
CFE\_EVS\_SET\_EVENT\_FORMAT\_MODE\_CC, 1050  
CFE\_EVS\_SET\_FILTER\_CC, 1051  
CFE\_EVS\_SET\_LOG\_MODE\_CC, 1052  
CFE\_EVS\_WRITE\_APP\_DATA\_FILE\_CC, 1052  
CFE\_EVS\_WRITE\_LOG\_DATA\_FILE\_CC, 1053

default\_cfe\_evs\_interface\_cfg.h  
CFE\_MISSION\_EVS\_MAX\_MESSAGE\_LENGTH, 1055

default\_cfe\_evs\_internal\_cfg.h  
CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC, 1055  
CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATA\_FILE, 1056  
CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE, 1056  
CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE, 1056  
CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE, 1057  
CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG, 1057  
CFE\_PLATFORM\_EVS\_LOG\_MAX, 1057  
CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST, 1058  
CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS, 1058  
CFE\_PLATFORM\_EVS\_PORT\_DEFAULT, 1058  
CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY, 1058  
CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE,

1059  
**default\_cfe\_evs\_msgdefs.h**  
 CFE\_EVS\_AppDataCmd\_Payload\_t, 1062  
 CFE\_EVS\_AppNameBitMaskCmd\_Payload\_t, 1062  
 CFE\_EVS\_AppNameCmd\_Payload\_t, 1062  
 CFE\_EVS\_AppNameEventIDCmd\_Payload\_t, 1062  
 CFE\_EVS\_AppNameEventIDMaskCmd\_Payload\_t, 1062  
 CFE\_EVS\_AppTlmData\_t, 1062  
 CFE\_EVS\_BitMaskCmd\_Payload\_t, 1062  
 CFE\_EVS\_CRITICAL\_BIT, 1061  
 CFE\_EVS\_DEBUG\_BIT, 1061  
 CFE\_EVS\_ERROR\_BIT, 1061  
 CFE\_EVS\_HousekeepingTlm\_Payload\_t, 1063  
 CFE\_EVS\_INFORMATION\_BIT, 1061  
 CFE\_EVS\_LogFileCmd\_Payload\_t, 1063  
 CFE\_EVS\_LongEventTlm\_Payload\_t, 1063  
 CFE\_EVS\_PacketID\_t, 1063  
 CFE\_EVS\_PORT1\_BIT, 1062  
 CFE\_EVS\_PORT2\_BIT, 1062  
 CFE\_EVS\_PORT3\_BIT, 1062  
 CFE\_EVS\_PORT4\_BIT, 1062  
 CFE\_EVS\_SetEventFormatMode\_Payload\_t, 1063  
 CFE\_EVS\_SetLogMode\_Payload\_t, 1063  
 CFE\_EVS\_ShortEventTlm\_Payload\_t, 1063  
**default\_cfe\_evs\_msgids.h**  
 CFE\_EVS\_CMD\_MID, 1064  
 CFE\_EVS\_HK\_TLM\_MID, 1064  
 CFE\_EVS\_LONG\_EVENT\_MSG\_MID, 1064  
 CFE\_EVS\_SEND\_HK\_MID, 1064  
 CFE\_EVS\_SHORT\_EVENT\_MSG\_MID, 1064  
**default\_cfe\_evs\_msgstruct.h**  
 CFE\_EVS\_AddEventFilterCmd\_t, 1066  
 CFE\_EVS\_ClearLogCmd\_t, 1066  
 CFE\_EVS\_DeleteEventFilterCmd\_t, 1066  
 CFE\_EVS\_DisableAppEventsCmd\_t, 1066  
 CFE\_EVS\_DisableAppEventTypeCmd\_t, 1066  
 CFE\_EVS\_DisableEventTypeCmd\_t, 1066  
 CFE\_EVS\_DisablePortsCmd\_t, 1066  
 CFE\_EVS\_EnableAppEventsCmd\_t, 1066  
 CFE\_EVS\_EnableAppEventTypeCmd\_t, 1066  
 CFE\_EVS\_EnableEventTypeCmd\_t, 1066  
 CFE\_EVS\_EnablePortsCmd\_t, 1066  
 CFE\_EVS\_HousekeepingTlm\_t, 1066  
 CFE\_EVS\_LongEventTlm\_t, 1066  
 CFE\_EVS\_NoopCmd\_t, 1066  
 CFE\_EVS\_ResetAllFiltersCmd\_t, 1066  
 CFE\_EVS\_ResetAppCounterCmd\_t, 1067  
 CFE\_EVS\_ResetCountersCmd\_t, 1067  
 CFE\_EVS\_ResetFilterCmd\_t, 1067  
 CFE\_EVS\_SendHkCmd\_t, 1067  
 CFE\_EVS\_SetEventFormatModeCmd\_t, 1067  
 CFE\_EVS\_SetFilterCmd\_t, 1067  
 CFE\_EVS\_SetLogModeCmd\_t, 1067  
**CFE\_EVS\_ShortEventTlm\_t, 1067**  
**CFE\_EVS\_WriteAppDataFileCmd\_t, 1067**  
**CFE\_EVS\_WriteLogDataFileCmd\_t, 1067**  
**default\_cfe\_evs\_topicids.h**  
 CFE\_MISSION\_EVS\_CMD\_TOPICID, 1068  
 CFE\_MISSION\_EVS\_HK\_TLM\_TOPICID, 1068  
 CFE\_MISSION\_EVS\_LONG\_EVENT\_MSG\_TOPICID, 1068  
 CFE\_MISSION\_EVS\_SEND\_HK\_TOPICID, 1068  
 CFE\_MISSION\_EVS\_SHORT\_EVENT\_MSG\_TOPICID, 1068  
**default\_cfe\_fs\_filedef.h**  
 CFE\_FS\_Header\_t, 1081  
 CFE\_FS\_SubType, 1082  
 CFE\_FS\_SubType\_Enum\_t, 1081  
 CFE\_FS\_SubType\_ES\_CDS\_REG, 1082  
 CFE\_FS\_SubType\_ES\_ERLOG, 1082  
 CFE\_FS\_SubType\_ES\_PERFDATA, 1082  
 CFE\_FS\_SubType\_ES\_QUERYALL, 1082  
 CFE\_FS\_SubType\_ES\_QUERYALLTASKS, 1083  
 CFE\_FS\_SubType\_ES\_SYSLOG, 1082  
 CFE\_FS\_SubType\_ES\_APPDATA, 1082  
 CFE\_FS\_SubType\_EVS\_EVENTLOG, 1082  
 CFE\_FS\_SubType\_SB\_MAPDATA, 1083  
 CFE\_FS\_SubType\_SB\_PIPEDATA, 1082  
 CFE\_FS\_SubType\_SB\_ROUTEDATA, 1082  
 CFE\_FS\_SubType\_TBL\_IMG, 1082  
 CFE\_FS\_SubType\_TBL\_REG, 1082  
**default\_cfe\_fs\_interface\_cfg.h**  
 CFE\_FS\_FILE\_CONTENT\_ID, 1083  
 CFE\_FS\_HDR\_DESC\_MAX\_LEN, 1083  
**default\_cfe\_sb\_extern\_typedefs.h**  
 CFE\_SB\_MsgId\_Atom\_t, 1087  
 CFE\_SB\_Pipeld\_t, 1087  
 CFE\_SB\_QosPriority, 1087  
 CFE\_SB\_QosPriority\_Enum\_t, 1087  
 CFE\_SB\_QosPriority\_HIGH, 1087  
 CFE\_SB\_QosPriority\_LOW, 1087  
 CFE\_SB\_QosReliability, 1088  
 CFE\_SB\_QosReliability\_Enum\_t, 1087  
 CFE\_SB\_QosReliability\_HIGH, 1088  
 CFE\_SB\_QosReliability\_LOW, 1088  
 CFE\_SB\_Routeld\_Atom\_t, 1087  
 CFE\_SB\_SUB\_ENTRIES\_PER\_PKT, 1086  
**default\_cfe\_sb\_fcncodes.h**  
 CFE\_SB\_DISABLE\_ROUTE\_CC, 1088  
 CFE\_SB\_DISABLE\_SUB\_REPORTING\_CC, 1089  
 CFE\_SB\_ENABLE\_ROUTE\_CC, 1090  
 CFE\_SB\_ENABLE\_SUB\_REPORTING\_CC, 1090  
 CFE\_SB\_NOOP\_CC, 1091  
 CFE\_SB\_RESET\_COUNTERS\_CC, 1092  
 CFE\_SB\_SEND\_PREV\_SUBS\_CC, 1093  
 CFE\_SB\_SEND\_SB\_STATS\_CC, 1093  
 CFE\_SB\_WRITE\_MAP\_INFO\_CC, 1094

CFE\_SB\_WRITE\_PIPE\_INFO\_CC, 1095  
CFE\_SB\_WRITE\_ROUTING\_INFO\_CC, 1096  
default\_cfe\_sb\_interface\_cfg.h  
    CFE\_MISSION\_SB\_MAX\_PIPES, 1097  
    CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE, 1097  
default\_cfe\_sb\_internal\_cfg.h  
    CFE\_PLATFORM\_SB\_BUF\_MEMORY\_BYTES,  
        1099  
    CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME,  
        1099  
    CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT, 1100  
    CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME,  
        1100  
    CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME,  
        1100  
    CFE\_PLATFORM\_SB\_FILTER\_MASK1, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK2, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK3, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK4, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK5, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK6, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK7, 1101  
    CFE\_PLATFORM\_SB\_FILTER\_MASK8, 1101  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT1, 1101  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT2, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT3, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT4, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT5, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT6, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT7, 1102  
    CFE\_PLATFORM\_SB\_FILTERED\_EVENT8, 1102  
    CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID,  
        1102  
    CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE, 1103  
    CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT,  
        1103  
    CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS, 1103  
    CFE\_PLATFORM\_SB\_MAX\_PIPES, 1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01,  
        1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02,  
        1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03,  
        1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04,  
        1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05,  
        1104  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06,  
        1105  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07,  
        1105  
    CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08,  
        1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15,  
    1105  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16,  
    1105  
CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY,  
    1106  
CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE,  
    1106  
default\_cfe\_sb\_msgdefs.h  
    CFE\_SB\_AllSubscriptionsTlm\_Payload\_t, 1108  
    CFE\_SB\_HousekeepingTlm\_Payload\_t, 1108  
    CFE\_SB\_MsgMapFileEntry\_t, 1108  
    CFE\_SB\_PipeDepthStats\_t, 1108  
    CFE\_SB\_PipeInfoEntry\_t, 1108  
    CFE\_SB\_RouteCmd\_Payload\_t, 1109  
    CFE\_SB\_RoutingFileEntry\_t, 1109  
    CFE\_SB\_SingleSubscriptionTlm\_Payload\_t, 1109  
    CFE\_SB\_StatsTlm\_Payload\_t, 1109  
    CFE\_SB\_SubEntries\_t, 1109  
    CFE\_SB\_WriteFileInfoCmd\_Payload\_t, 1109  
default\_cfe\_sb\_msgids.h  
    CFE\_SB\_ALLSUBS\_TLM\_MID, 1110  
    CFE\_SB\_CMD\_MID, 1110  
    CFE\_SB\_HK\_TLM\_MID, 1110  
    CFE\_SB\_ONESUB\_TLM\_MID, 1110  
    CFE\_SB\_SEND\_HK\_MID, 1110  
    CFE\_SB\_STATS\_TLM\_MID, 1110  
    CFE\_SB\_SUB\_RPT\_CTRL\_MID, 1110  
default\_cfe\_sb\_msgstruct.h  
    CFE\_SB\_AllSubscriptionsTlm\_t, 1112  
    CFE\_SB\_DisableRouteCmd\_t, 1112  
    CFE\_SB\_DisableSubReportingCmd\_t, 1112  
    CFE\_SB\_EnableRouteCmd\_t, 1112  
    CFE\_SB\_EnableSubReportingCmd\_t, 1112  
    CFE\_SB\_HousekeepingTlm\_t, 1112  
    CFE\_SB\_NoopCmd\_t, 1112  
    CFE\_SB\_ResetCountersCmd\_t, 1112  
    CFE\_SB\_SendHkCmd\_t, 1112  
    CFE\_SB\_SendPrevSubsCmd\_t, 1112  
    CFE\_SB\_SendSbStatsCmd\_t, 1112  
    CFE\_SB\_SingleSubscriptionTlm\_t, 1112  
    CFE\_SB\_StatsTlm\_t, 1112

CFE\_SB\_WriteMapInfoCmd\_t, 1112  
 CFE\_SB\_WritePipeInfoCmd\_t, 1112  
 CFE\_SB\_WriteRoutingInfoCmd\_t, 1112  
 default\_cfe\_sb\_topicids.h  
     CFE\_MISSION\_SB\_ALLSUBS\_TLM\_TOPICID,  
         1113  
     CFE\_MISSION\_SB\_CMD\_TOPICID, 1113  
     CFE\_MISSION\_SB\_HK\_TLM\_TOPICID, 1113  
     CFE\_MISSION\_SB\_ONESUB\_TLM\_TOPICID, 1114  
     CFE\_MISSION\_SB\_SEND\_HK\_TOPICID, 1114  
     CFE\_MISSION\_SB\_STATS\_TLM\_TOPICID, 1114  
     CFE\_MISSION\_SB\_SUB\_RPT\_CTRL\_TOPICID,  
         1114  
 default\_cfe\_tbl\_extern\_typedefs.h  
     CFE\_TBL\_BufferSelect, 1134  
     CFE\_TBL\_BufferSelect\_ACTIVE, 1135  
     CFE\_TBL\_BufferSelect\_Enum\_t, 1134  
     CFE\_TBL\_BufferSelect\_INACTIVE, 1135  
     CFE\_TBL\_File\_Hdr\_t, 1134  
 default\_cfe\_tbl\_fcncodes.h  
     CFE\_TBL\_ABORT\_LOAD\_CC, 1135  
     CFE\_TBL\_ACTIVATE\_CC, 1136  
     CFE\_TBL\_DELETE\_CDS\_CC, 1137  
     CFE\_TBL\_DUMP\_CC, 1138  
     CFE\_TBL\_DUMP\_REGISTRY\_CC, 1138  
     CFE\_TBL\_LOAD\_CC, 1139  
     CFE\_TBL\_NOOP\_CC, 1140  
     CFE\_TBL\_RESET\_COUNTERS\_CC, 1141  
     CFE\_TBL\_SEND\_REGISTRY\_CC, 1142  
     CFE\_TBL\_VALIDATE\_CC, 1143  
 default\_cfe\_tbl\_interface\_cfg.h  
     CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN,  
         1144  
     CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH, 1145  
 default\_cfe\_tbl\_internal\_cfg.h  
     CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES,  
         1146  
     CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE,  
         1146  
     CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES,  
         1146  
     CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE,  
         1147  
     CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES,  
         1147  
     CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES, 1147  
     CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS,  
         1147  
     CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOAD  
         1148  
     CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE,  
         1148  
     CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY,  
         1148  
     CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE,  
         1149  
     CFE\_PLATFORM\_TBL\_U32FROM4CHARS, 1149  
     CFE\_PLATFORM\_TBL\_VALID\_PRID\_1, 1149  
     CFE\_PLATFORM\_TBL\_VALID\_PRID\_2, 1149  
     CFE\_PLATFORM\_TBL\_VALID\_PRID\_3, 1150  
     CFE\_PLATFORM\_TBL\_VALID\_PRID\_4, 1150  
     CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT, 1150  
     CFE\_PLATFORM\_TBL\_VALID\_SCID\_1, 1150  
     CFE\_PLATFORM\_TBL\_VALID\_SCID\_2, 1150  
     CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT, 1150  
 default\_cfe\_tbl\_msgdefs.h  
     CFE\_TBL\_AbortLoadCmd\_Payload\_t, 1153  
     CFE\_TBL\_ActivateCmd\_Payload\_t, 1153  
     CFE\_TBL\_DeleteCDSCmd\_Payload\_t, 1153  
     CFE\_TBL\_DumpCmd\_Payload\_t, 1153  
     CFE\_TBL\_DumpRegistryCmd\_Payload\_t, 1153  
     CFE\_TBL\_HousekeepingTlm\_Payload\_t, 1153  
     CFE\_TBL\_LoadCmd\_Payload\_t, 1153  
     CFE\_TBL\_NotifyCmd\_Payload\_t, 1153  
     CFE\_TBL\_SendRegistryCmd\_Payload\_t, 1153  
     CFE\_TBL\_TblRegPacket\_Payload\_t, 1154  
     CFE\_TBL\_ValidateCmd\_Payload\_t, 1154  
 default\_cfe\_tbl\_msgids.h  
     CFE\_TBL\_CMD\_MID, 1154  
     CFE\_TBL\_HK\_TLM\_MID, 1154  
     CFE\_TBL\_REG\_TLM\_MID, 1154  
     CFE\_TBL\_SEND\_HK\_MID, 1154  
 default\_cfe\_tbl\_msgstruct.h  
     CFE\_TBL\_AbortLoadCmd\_t, 1156  
     CFE\_TBL\_ActivateCmd\_t, 1156  
     CFE\_TBL\_DeleteCDSCmd\_t, 1156  
     CFE\_TBL\_DumpCmd\_t, 1156  
     CFE\_TBL\_DumpRegistryCmd\_t, 1156  
     CFE\_TBL\_HousekeepingTlm\_t, 1156  
     CFE\_TBL\_LoadCmd\_t, 1156  
     CFE\_TBL\_NoopCmd\_t, 1156  
     CFE\_TBL\_NotifyCmd\_t, 1156  
     CFE\_TBL\_ResetCountersCmd\_t, 1156  
     CFE\_TBL\_SendHkCmd\_t, 1157  
     CFE\_TBL\_SendRegistryCmd\_t, 1157  
     CFE\_TBL\_TableRegistryTlm\_t, 1157  
     CFE\_TBL\_ValidateCmd\_t, 1157  
 default\_cfe\_tbl\_topicids.h  
     CFE\_MISSION\_TBL\_CMD\_TOPICID, 1157  
     CFE\_MISSION\_TBL\_HK\_TLM\_TOPICID, 1158  
     CFE\_MISSION\_TBL\_REG\_TLM\_TOPICID, 1158  
     CFE\_MISSION\_TBL\_SEND\_HK\_TOPICID, 1158  
 default\_cfe\_time\_extern\_typedefs.h  
     CFE\_TIME\_AdjustDirection, 1181  
     CFE\_TIME\_AdjustDirection\_ADD, 1181  
     CFE\_TIME\_AdjustDirection\_Enum\_t, 1180  
     CFE\_TIME\_AdjustDirection\_SUBTRACT, 1181  
     CFE\_TIME\_ClockState, 1181

CFE\_TIME\_ClockState\_Enum\_t, 1180  
CFE\_TIME\_ClockState\_FLYWHEEL, 1182  
CFE\_TIME\_ClockState\_INVALID, 1182  
CFE\_TIME\_ClockState\_VALID, 1182  
CFE\_TIME\_FlagBit, 1182  
CFE\_TIME\_FlagBit\_ADD1HZ, 1182  
CFE\_TIME\_FlagBit\_ADDADJ, 1182  
CFE\_TIME\_FlagBit\_ADDTCL, 1182  
CFE\_TIME\_FlagBit\_CLKSET, 1182  
CFE\_TIME\_FlagBit\_CMDFLY, 1182  
CFE\_TIME\_FlagBit\_Enum\_t, 1180  
CFE\_TIME\_FlagBit\_FLYING, 1182  
CFE\_TIME\_FlagBit\_GDTONE, 1182  
CFE\_TIME\_FlagBit\_SERVER, 1182  
CFE\_TIME\_FlagBit\_SIGPRI, 1182  
CFE\_TIME\_FlagBit\_SRCINT, 1182  
CFE\_TIME\_FlagBit\_SRVFLY, 1182  
CFE\_TIME\_FlywheelState, 1182  
CFE\_TIME\_FlywheelState\_Enum\_t, 1180  
CFE\_TIME\_FlywheelState\_IS\_FLY, 1182  
CFE\_TIME\_FlywheelState\_NO\_FLY, 1182  
CFE\_TIME\_SetState, 1182  
CFE\_TIME\_SetState\_Enum\_t, 1180  
CFE\_TIME\_SetState\_NOT\_SET, 1183  
CFE\_TIME\_SetState\_WAS\_SET, 1183  
CFE\_TIME\_SourceSelect, 1183  
CFE\_TIME\_SourceSelect\_Enum\_t, 1181  
CFE\_TIME\_SourceSelect\_EXTERNAL, 1183  
CFE\_TIME\_SourceSelect\_INTERNAL, 1183  
CFE\_TIME\_SysTime\_t, 1181  
CFE\_TIME\_ToneSignalSelect, 1183  
CFE\_TIME\_ToneSignalSelect\_Enum\_t, 1181  
CFE\_TIME\_ToneSignalSelect\_PRIMARY, 1183  
CFE\_TIME\_ToneSignalSelect\_REDUNDANT, 1183  
default\_cfe\_time\_fcncodes.h  
CFE\_TIME\_ADD\_ADJUST\_CC, 1184  
CFE\_TIME\_ADD\_DELAY\_CC, 1184  
CFE\_TIME\_ADD\_ONE\_HZ\_ADJUSTMENT\_CC,  
    1185  
CFE\_TIME\_NOOP\_CC, 1186  
CFE\_TIME\_RESET\_COUNTERS\_CC, 1187  
CFE\_TIME\_SEND\_DIAGNOSTIC\_CC, 1188  
CFE\_TIME\_SET\_LEAP\_SECONDS\_CC, 1189  
CFE\_TIME\_SET\_MET\_CC, 1190  
CFE\_TIME\_SET\_SIGNAL\_CC, 1191  
CFE\_TIME\_SET\_SOURCE\_CC, 1191  
CFE\_TIME\_SET\_STATE\_CC, 1192  
CFE\_TIME\_SET\_STCF\_CC, 1194  
CFE\_TIME\_SET\_TIME\_CC, 1194  
CFE\_TIME\_SUB\_ADJUST\_CC, 1195  
CFE\_TIME\_SUB\_DELAY\_CC, 1196  
CFE\_TIME\_SUB\_ONE\_HZ\_ADJUSTMENT\_CC,  
    1197  
default\_cfe\_time\_interface\_cfg.h  
CFE\_MISSION\_TIME\_AT\_TONE\_WAS, 1199  
CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE, 1200  
CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI, 1200  
CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC, 1200  
CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE, 1200  
CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS, 1200  
CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS, 1200  
CFE\_MISSION\_TIME\_DEF\_LEAPS, 1201  
CFE\_MISSION\_TIME\_DEF\_MET\_SECS, 1201  
CFE\_MISSION\_TIME\_DEF\_MET\_SUBS, 1201  
CFE\_MISSION\_TIME\_DEF\_STCF\_SECS, 1201  
CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS, 1201  
CFE\_MISSION\_TIME\_EPOCH\_DAY, 1201  
CFE\_MISSION\_TIME\_EPOCH\_HOUR, 1201  
CFE\_MISSION\_TIME\_EPOCH\_MICROS, 1201  
CFE\_MISSION\_TIME\_EPOCH\_MINUTE, 1202  
CFE\_MISSION\_TIME\_EPOCH\_SECOND, 1202  
CFE\_MISSION\_TIME\_EPOCH\_YEAR, 1202  
CFE\_MISSION\_TIME\_FS\_FACTOR, 1202  
CFE\_MISSION\_TIME\_MAX\_ELAPSED, 1202  
CFE\_MISSION\_TIME\_MIN\_ELAPSED, 1202  
default\_cfe\_time\_internal\_cfg.h  
CFE\_PLATFORM\_TIME\_CFG\_CLIENT, 1204  
CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY, 1204  
CFE\_PLATFORM\_TIME\_CFG\_SERVER, 1204  
CFE\_PLATFORM\_TIME\_CFG\_SIGNAL, 1204  
CFE\_PLATFORM\_TIME\_CFG\_SOURCE, 1204  
CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS, 1205  
CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET, 1205  
CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME, 1205  
CFE\_PLATFORM\_TIME\_CFG\_START\_FLY, 1205  
CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT, 1206  
CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL, 1206  
CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS, 1206  
CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS, 1207  
CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS, 1207  
CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS, 1207  
CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY,  
    1207  
CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE,  
    1207  
CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY,  
    1207  
CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE,  
    1208  
CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY,  
    1208  
CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE,  
    1208  
default\_cfe\_time\_msgdefs.h  
CFE\_TIME\_DiagnosticTlm\_Payload\_t, 1211  
CFE\_TIME\_HousekeepingTlm\_Payload\_t, 1211  
CFE\_TIME\_LeapsCmd\_Payload\_t, 1211  
CFE\_TIME\_OneHzAdjustmentCmd\_Payload\_t, 1211

CFE\_TIME\_SignalCmd\_Payload\_t, 1211  
 CFE\_TIME\_SourceCmd\_Payload\_t, 1211  
 CFE\_TIME\_StateCmd\_Payload\_t, 1211  
 CFE\_TIME\_TimeCmd\_Payload\_t, 1211  
 CFE\_TIME\_ToneDataCmd\_Payload\_t, 1211  
**default\_cfe\_time\_msgids.h**  
   CFE\_TIME\_1HZ\_CMD\_MID, 1212  
   CFE\_TIME\_CMD\_MID, 1212  
   CFE\_TIME\_DATA\_CMD\_MID, 1212  
   CFE\_TIME\_DIAG\_TLM\_MID, 1212  
   CFE\_TIME\_HK\_TLM\_MID, 1212  
   CFE\_TIME\_ONEHZ\_CMD\_MID, 1212  
   CFE\_TIME\_SEND\_CMD\_MID, 1213  
   CFE\_TIME\_SEND\_HK\_MID, 1213  
   CFE\_TIME\_TONE\_CMD\_MID, 1213  
**default\_cfe\_time\_msgstruct.h**  
   CFE\_TIME\_AddAdjustCmd\_t, 1214  
   CFE\_TIME\_AddDelayCmd\_t, 1214  
   CFE\_TIME\_AddOneHzAdjustmentCmd\_t, 1214  
   CFE\_TIME\_DiagnosticTlm\_t, 1215  
   CFE\_TIME\_FakeToneCmd\_t, 1215  
   CFE\_TIME\_HousekeepingTlm\_t, 1215  
   CFE\_TIME\_NoopCmd\_t, 1215  
   CFE\_TIME\_OneHzCmd\_t, 1215  
   CFE\_TIME\_ResetCountersCmd\_t, 1215  
   CFE\_TIME\_SendDiagnosticCmd\_t, 1215  
   CFE\_TIME\_SendHkCmd\_t, 1215  
   CFE\_TIME\_SetLeapSecondsCmd\_t, 1215  
   CFE\_TIME\_SetMETCCmd\_t, 1215  
   CFE\_TIME\_SetSignalCmd\_t, 1215  
   CFE\_TIME\_SetSourceCmd\_t, 1215  
   CFE\_TIME\_SetStateCmd\_t, 1215  
   CFE\_TIME\_SetSTCFCmd\_t, 1215  
   CFE\_TIME\_SetTimeCmd\_t, 1215  
   CFE\_TIME\_SubAdjustCmd\_t, 1216  
   CFE\_TIME\_SubDelayCmd\_t, 1216  
   CFE\_TIME\_SubOneHzAdjustmentCmd\_t, 1216  
   CFE\_TIME\_ToneDataCmd\_t, 1216  
   CFE\_TIME\_ToneSignalCmd\_t, 1216  
**default\_cfe\_time\_topicids.h**  
   CFE\_MISSION\_TIME\_CMD\_TOPICID, 1217  
   CFE\_MISSION\_TIME\_DATA\_CMD\_TOPICID, 1217  
   CFE\_MISSION\_TIME\_DIAG\_TLM\_TOPICID, 1217  
   CFE\_MISSION\_TIME\_HK\_TLM\_TOPICID, 1217  
   CFE\_MISSION\_TIME\_ONEHZ\_CMD\_TOPICID,  
     1217  
   CFE\_MISSION\_TIME\_SEND\_CMD\_TOPICID, 1217  
   CFE\_MISSION\_TIME\_SEND\_HK\_TOPICID, 1218  
   CFE\_MISSION\_TIME\_TONE\_CMD\_TOPICID, 1218  
**default\_lc\_fcncodes.h**  
   LC\_SET\_AP\_PERMOFF\_CC, 687  
**default\_lc\_msghdefs.h**  
   LC\_ACTION\_NOT\_USED, 691  
   LC\_ALL\_ACTIONPOINTS, 691  
   LC\_ALL\_WATCHPOINTS, 691  
   LC\_APSTATE\_ACTIVE, 691  
   LC\_APSTATE\_DISABLED, 691  
   LC\_APSTATE\_NOT\_USED, 691  
   LC\_APSTATE\_PASSIVE, 691  
   LC\_APSTATE\_PERMOFF, 691  
   LC\_HKAR\_ERROR, 691  
   LC\_HKAR\_FAIL, 691  
   LC\_HKAR\_NUM\_BYTES, 692  
   LC\_HKAR\_PASS, 692  
   LC\_HKAR\_STALE, 692  
   LC\_HKAR\_STATE\_ACTIVE, 692  
   LC\_HKAR\_STATE\_DISABLED, 692  
   LC\_HKAR\_STATE\_NOT\_USED, 692  
   LC\_HKAR\_STATE\_PASSIVE, 692  
   LC\_HKWR\_ERROR, 692  
   LC\_HKWR\_FALSE, 692  
   LC\_HKWR\_NUM\_BYTES, 693  
   LC\_HKWR\_STALE, 693  
   LC\_HKWR\_TRUE, 693  
   LC\_STATE\_ACTIVE, 693  
   LC\_STATE\_DISABLED, 693  
   LC\_STATE\_FROM\_CDS, 693  
   LC\_STATE\_PASSIVE, 693  
**default\_lc\_tbldefs.h**  
   LC\_ACTION\_ERROR, 699  
   LC\_ACTION\_FAIL, 699  
   LC\_ACTION\_PASS, 699  
   LC\_ACTION\_STALE, 699  
   LC\_ADTVAL\_ERR\_DEFSTATE, 699  
   LC\_ADTVAL\_ERR\_EVTYPE, 699  
   LC\_ADTVAL\_ERR\_FAILCNT, 699  
   LC\_ADTVAL\_ERR\_NONE, 699  
   LC\_ADTVAL\_ERR\_RPN, 699  
   LC\_ADTVAL\_ERR\_RTSID, 699  
   LC\_ADTVAL\_NO\_ERR, 700  
   LC\_BITMASK\_NONE, 700  
   LC\_CDS\_NOT\_SAVED, 700  
   LC\_CDS\_SAVED, 700  
   LC\_DATA\_BYTE, 700  
   LC\_DATA\_DWORD\_BE, 700  
   LC\_DATA\_DWORD\_LE, 700  
   LC\_DATA\_FLOAT\_BE, 700  
   LC\_DATA\_FLOAT\_LE, 700  
   LC\_DATA\_NOT\_USED, 700  
   LC\_DATA\_UBYTE, 700  
   LC\_DATA\_UDWORD\_BE, 701  
   LC\_DATA\_UDWORD\_LE, 701  
   LC\_DATA\_UWORD\_BE, 701  
   LC\_DATA\_UWORD\_LE, 701  
   LC\_DATA\_WATCH\_BYTE, 701  
   LC\_DATA\_WATCH\_DWORD\_BE, 701  
   LC\_DATA\_WATCH\_DWORD\_LE, 701  
   LC\_DATA\_WATCH\_FLOAT\_BE, 701

LC\_DATA\_WATCH\_FLOAT\_LE, 701  
LC\_DATA\_WATCH\_NOT\_USED, 701  
LC\_DATA\_WATCH\_UBYTE, 701  
LC\_DATA\_WATCH\_UDWORD\_BE, 702  
LC\_DATA\_WATCH\_UDWORD\_LE, 702  
LC\_DATA\_WATCH\_UWORD\_BE, 702  
LC\_DATA\_WATCH\_UWORD\_LE, 702  
LC\_DATA\_WATCH\_WORD\_BE, 702  
LC\_DATA\_WATCH\_WORD\_LE, 702  
LC\_DATA\_WORD\_BE, 702  
LC\_DATA\_WORD\_LE, 702  
LC\_NO\_BITMASK, 702  
LC\_NO\_OPER, 702  
LC\_OPER\_CUSTOM, 702  
LC\_OPER\_EQ, 703  
LC\_OPER\_GE, 703  
LC\_OPER\_GT, 703  
LC\_OPER\_LE, 703  
LC\_OPER\_LT, 703  
LC\_OPER\_NE, 703  
LC\_OPER\_NONE, 703  
LC\_RPN\_AND, 703  
LC\_RPN\_EQUAL, 703  
LC\_RPN\_NOT, 704  
LC\_RPN\_OR, 704  
LC\_RPN\_XOR, 704  
LC\_WATCH\_ERROR, 704  
LC\_WATCH\_FALSE, 704  
LC\_WATCH\_STALE, 704  
LC\_WATCH\_TRUE, 704  
LC\_WDTVAL\_ERR\_DATATYPE, 704  
LC\_WDTVAL\_ERR\_FPINF, 704  
LC\_WDTVAL\_ERR\_FPNAN, 704  
LC\_WDTVAL\_ERR\_MID, 705  
LC\_WDTVAL\_ERR\_NONE, 705  
LC\_WDTVAL\_ERR\_OPER, 705  
LC\_WDTVAL\_NO\_ERR, 705  
DefaultState  
    LC\_ADTEEntry\_t, 639  
DelayDirection  
    CFE\_TIME\_DiagnosticTlm\_Payload, 617  
Description  
    CFE\_FS\_FileWriteMetaData, 557  
    CFE\_FS\_Header, 559  
    CFE\_TBL\_FileDef, 592  
DoubleBuffered  
    CFE\_TBL\_Info, 599  
    CFE\_TBL\_TblRegPacket\_Payload, 607  
DumpFilename  
    CFE\_ES\_DumpCDSRegistryCmd\_Payload, 496  
    CFE\_TBL\_DumpCmd\_Payload, 589  
    CFE\_TBL\_DumpRegistryCmd\_Payload, 591  
DumpOnly  
    CFE\_TBL\_Info, 599  
    CFE\_TBL\_TblRegPacket\_Payload, 607  
DuplicateSubscriptionsCounter  
    CFE\_SB\_HousekeepingTlm\_Payload, 565  
EndIndex  
    LC\_SampleAP\_Payload\_t, 660  
Entries  
    CFE\_SB\_AllSubscriptionsTlm\_Payload, 560  
Entry  
    CFE\_SB\_AllSubscriptionsTlm\_Payload, 560  
entry\_point  
    OS\_module\_prop\_t, 678  
EntryPoint  
    CFE\_ES\_AppInfo, 488  
ERLogEntries  
    CFE\_ES\_HousekeepingTlm\_Payload, 501  
ERLogIndex  
    CFE\_ES\_HousekeepingTlm\_Payload, 501  
EvaluationCount  
    LC\_WRTEntry\_t, 669  
EventID  
    CFE\_EVS\_AppNameEventIDCmd\_Payload, 532  
    CFE\_EVS\_AppNameEventIDMaskCmd\_Payload, 533  
    CFE\_EVS\_BinFilter, 535  
    CFE\_EVS\_PacketID, 548  
    LC\_ADTEEntry\_t, 639  
EventText  
    LC\_ADTEEntry\_t, 639  
EventType  
    CFE\_EVS\_PacketID, 548  
    LC\_ADTEEntry\_t, 639  
example\_mission\_cfg.h  
    CFE\_FS\_FILE\_CONTENT\_ID, 827  
    CFE\_FS\_HDR\_DESC\_MAX\_LEN, 827  
    CFE\_MISSION\_ES\_CDS\_MAX\_FULL\_NAME\_LEN, 827  
    CFE\_MISSION\_ES\_CDS\_MAX\_NAME\_LENGTH, 827  
    CFE\_MISSION\_ES\_CRC\_16, 828  
    CFE\_MISSION\_ES\_CRC\_32, 828  
    CFE\_MISSION\_ES\_CRC\_8, 828  
    CFE\_MISSION\_ES\_DEFAULT\_CRC, 828  
    CFE\_MISSION\_ES\_MAX\_APPLICATIONS, 828  
    CFE\_MISSION\_ES\_PERF\_MAX\_IDS, 828  
    CFE\_MISSION\_ES\_POOL\_MAX\_BUCKETS, 829  
    CFE\_MISSION\_ES\_MAX\_MESSAGE\_LENGTH, 829  
    CFE\_MISSION\_MAX\_API\_LEN, 829  
    CFE\_MISSION\_MAX\_FILE\_LEN, 830  
    CFE\_MISSION\_MAX\_NUM\_FILES, 830  
    CFE\_MISSION\_MAX\_PATH\_LEN, 831  
    CFE\_MISSION\_SB\_MAX\_PIPES, 831  
    CFE\_MISSION\_SB\_MAX\_SB\_MSG\_SIZE, 831

CFE\_MISSION\_TBL\_MAX\_FULL\_NAME\_LEN, [832](#)  
CFE\_MISSION\_TBL\_MAX\_NAME\_LENGTH, [832](#)  
CFE\_MISSION\_TIME\_AT\_TONE\_WAS, [832](#)  
CFE\_MISSION\_TIME\_AT\_TONE\_WILL\_BE, [833](#)  
CFE\_MISSION\_TIME\_CFG\_DEFAULT\_TAI, [833](#)  
CFE\_MISSION\_TIME\_CFG\_DEFAULT\_UTC, [833](#)  
CFE\_MISSION\_TIME\_CFG\_FAKE\_TONE, [833](#)  
CFE\_MISSION\_TIME\_DEF\_DELAY\_SECS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_DELAY\_SUBS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_LEAPS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_MET\_SECS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_MET\_SUBS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_STCF\_SECS, [834](#)  
CFE\_MISSION\_TIME\_DEF\_STCF\_SUBS, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_DAY, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_HOUR, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_MICROS, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_MINUTE, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_SECOND, [835](#)  
CFE\_MISSION\_TIME\_EPOCH\_YEAR, [835](#)  
CFE\_MISSION\_TIME\_FS\_FACTOR, [835](#)  
CFE\_MISSION\_TIME\_MAX\_ELAPSED, [836](#)  
CFE\_MISSION\_TIME\_MIN\_ELAPSED, [836](#)  
example\_platform\_cfg.h  
    CFE\_PLATFORM\_CORE\_MAX\_STARTUP\_MSEC,  
        [840](#)  
    CFE\_PLATFORM\_ENDIAN, [841](#)  
    CFE\_PLATFORM\_ES\_APP\_KILL\_TIMEOUT, [841](#)  
    CFE\_PLATFORM\_ES\_APP\_SCAN\_RATE, [841](#)  
    CFE\_PLATFORM\_ES\_CDS\_MAX\_BLOCK\_SIZE,  
        [842](#)  
    CFE\_PLATFORM\_ES\_CDS\_MAX\_NUM\_ENTRIES,  
        [842](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_01,  
        [842](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_02,  
        [842](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_03,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_04,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_05,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_06,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_07,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_08,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_09,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_10,  
        [843](#)  
    CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_11,  
        [843](#)  
        843  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_12,  
    [843](#)  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_13,  
    [844](#)  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_14,  
    [844](#)  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_15,  
    [844](#)  
CFE\_PLATFORM\_ES\_CDS\_MEM\_BLOCK\_SIZE\_16,  
    [844](#)  
CFE\_PLATFORM\_ES\_CDS\_SIZE, [844](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_APP\_LOG\_FILE,  
    [844](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_CDS\_REG\_DUMP\_FILE,  
    [845](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_ER\_LOG\_FILE,  
    [845](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_PERF\_DUMP\_FILENAME,  
    [845](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_POR\_SYSLOG\_MODE,  
    [845](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_PR\_SYSLOG\_MODE,  
    [846](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_STACK\_SIZE, [846](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_SYSLOG\_FILE,  
    [846](#)  
CFE\_PLATFORM\_ES\_DEFAULT\_TASK\_LOG\_FILE,  
    [847](#)  
CFE\_PLATFORM\_ES\_ER\_LOG\_ENTRIES, [847](#)  
CFE\_PLATFORM\_ES\_ER\_LOG\_MAX\_CONTEXT\_SIZE,  
    [847](#)  
CFE\_PLATFORM\_ES\_MAX\_APPLICATIONS, [848](#)  
CFE\_PLATFORM\_ES\_MAX\_BLOCK\_SIZE, [848](#)  
CFE\_PLATFORM\_ES\_MAX\_GEN\_COUNTERS,  
    [848](#)  
CFE\_PLATFORM\_ES\_MAX\_LIBRARIES, [848](#)  
CFE\_PLATFORM\_ES\_MAX\_MEMORY\_POOLS,  
    [849](#)  
CFE\_PLATFORM\_ES\_MAX\_PROCESSOR\_RESETS,  
    [849](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_01, [849](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_02, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_03, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_04, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_05, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_06, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_07, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_08, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_09, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_10, [850](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_11, [851](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_12, [851](#)  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_13, [851](#)

CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_14, 851  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_15, 851  
CFE\_PLATFORM\_ES\_MEM\_BLOCK\_SIZE\_16, 851  
CFE\_PLATFORM\_ES\_MEMPOOL\_ALIGN\_SIZE\_MIN, 851  
CFE\_PLATFORM\_ES\_NONVOL\_DISK\_MOUNT\_STRING, CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE, 860  
CFE\_PLATFORM\_ES\_NONVOL\_STARTUP\_FILE, CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE, 860  
CFE\_PLATFORM\_ES\_OBJECT\_TABLE\_SIZE, 852  
CFE\_PLATFORM\_ES\_PERF\_CHILD\_MS\_DELAY, 852  
CFE\_PLATFORM\_ES\_PERF\_CHILD\_PRIORITY, 852  
CFE\_PLATFORM\_ES\_PERF\_CHILD\_STACK\_SIZE, 853  
CFE\_PLATFORM\_ES\_PERF\_DATA\_BUFFER\_SIZE, 853  
CFE\_PLATFORM\_ES\_PERF\_ENTRIES\_BTWN\_DLYS, 853  
CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_ALL, 854  
CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_INIT, 854  
CFE\_PLATFORM\_ES\_PERF\_FILTMASK\_NONE, 854  
CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_ALL, 854  
CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_INIT, 855  
CFE\_PLATFORM\_ES\_PERF\_TRIGMASK\_NONE, 855  
CFE\_PLATFORM\_ES\_POOL\_MAX\_BUCKETS, 855  
CFE\_PLATFORM\_ES\_RAM\_DISK\_MOUNT\_STRING, 855  
CFE\_PLATFORM\_ES\_RAM\_DISK\_NUM\_SECTORS, 856  
CFE\_PLATFORM\_ES\_RAM\_DISK\_PERCENT\_RESERVED, CFE\_PLATFORM\_SB\_BUFS\_MEMORY\_BYTES, 863  
CFE\_PLATFORM\_ES\_RAM\_DISK\_SECTOR\_SIZE, 856  
CFE\_PLATFORM\_ES\_START\_TASK\_PRIORITY, 857  
CFE\_PLATFORM\_ES\_START\_TASK\_STACK\_SIZE, 857  
CFE\_PLATFORM\_ES\_STARTUP\_SCRIPT\_TIMEOUT\_MSE, CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME, 863  
CFE\_PLATFORM\_ES\_STARTUP\_SYNC\_POLL\_MSEC, CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT, 863  
CFE\_PLATFORM\_ES\_SYSTEM\_LOG\_SIZE, 858  
CFE\_PLATFORM\_ES\_USER\_RESERVED\_SIZE, 858  
CFE\_PLATFORM\_ES\_VOLATILE\_STARTUP\_FILE, 859  
CFE\_PLATFORM\_EVS\_APP\_EVENTS\_PER\_SEC, 859  
CFE\_PLATFORM\_EVS\_DEFAULT\_APP\_DATA\_FILE, 859  
CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_FILE, 860  
CFE\_PLATFORM\_EVS\_DEFAULT\_LOG\_MODE, 860  
CFE\_PLATFORM\_EVS\_DEFAULT\_MSG\_FORMAT\_MODE, 860  
CFE\_PLATFORM\_EVS\_DEFAULT\_TYPE\_FLAG, 861  
CFE\_PLATFORM\_EVS\_LOG\_MAX, 861  
CFE\_PLATFORM\_EVS\_MAX\_APP\_EVENT\_BURST, 861  
CFE\_PLATFORM\_EVS\_MAX\_EVENT\_FILTERS, 862  
CFE\_PLATFORM\_EVS\_PORT\_DEFAULT, 862  
CFE\_PLATFORM\_EVS\_START\_TASK\_PRIORITY, 862  
CFE\_PLATFORM\_EVS\_START\_TASK\_STACK\_SIZE, 862  
CFE\_PLATFORM\_SB\_BUFS\_MEMORY\_BYTES, 863  
CFE\_PLATFORM\_SB\_DEFAULT\_MAP\_FILENAME, 863  
CFE\_PLATFORM\_SB\_DEFAULT\_MSG\_LIMIT, 863  
CFE\_PLATFORM\_SB\_DEFAULT\_PIPE\_FILENAME, 864  
CFE\_PLATFORM\_SB\_DEFAULT\_ROUTING\_FILENAME, 864  
CFE\_PLATFORM\_SB\_FILTER\_MASK1, 864  
CFE\_PLATFORM\_SB\_FILTER\_MASK2, 864  
CFE\_PLATFORM\_SB\_FILTER\_MASK3, 865  
CFE\_PLATFORM\_SB\_FILTER\_MASK4, 865  
CFE\_PLATFORM\_SB\_FILTER\_MASK5, 865  
CFE\_PLATFORM\_SB\_FILTER\_MASK6, 865  
CFE\_PLATFORM\_SB\_FILTER\_MASK7, 865  
CFE\_PLATFORM\_SB\_FILTER\_MASK8, 865  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT1, 865  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT2, 865  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT3, 865  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT4, 865  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT5, 866  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT6, 866  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT7, 866  
CFE\_PLATFORM\_SB\_FILTERED\_EVENT8, 866  
CFE\_PLATFORM\_SB\_HIGHEST\_VALID\_MSGID, 866  
CFE\_PLATFORM\_SB\_MAX\_BLOCK\_SIZE, 866  
CFE\_PLATFORM\_SB\_MAX\_DEST\_PER\_PKT, 866  
CFE\_PLATFORM\_SB\_MAX\_MSG\_IDS, 867  
CFE\_PLATFORM\_SB\_MAX\_PIPES, 867  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_01, 867  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_02, 868  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_03, 868  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_04, 868  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_05, 868  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_06, 868  
CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_07, 868

CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_08, [868](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_09, [868](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_10, [868](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_11, [869](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_12, [869](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_13, [869](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_14, [869](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_15, [869](#)  
 CFE\_PLATFORM\_SB\_MEM\_BLOCK\_SIZE\_16, [869](#)  
 CFE\_PLATFORM\_SB\_START\_TASK\_PRIORITY, [869](#)  
 CFE\_PLATFORM\_SB\_START\_TASK\_STACK\_SIZE, [869](#)  
 CFE\_PLATFORM\_TBL\_BUF\_MEMORY\_BYTES, [870](#)  
 CFE\_PLATFORM\_TBL\_DEFAULT\_REG\_DUMP\_FILE, [ExceptionAction](#)  
     [CFE\\_ES\\_AppInfo](#), [488](#)  
 CFE\_PLATFORM\_TBL\_MAX\_CRITICAL\_TABLES, [870](#)  
 CFE\_PLATFORM\_TBL\_MAX\_DBL\_TABLE\_SIZE, [871](#)  
 CFE\_PLATFORM\_TBL\_MAX\_NUM\_HANDLES, [871](#)  
 CFE\_PLATFORM\_TBL\_MAX\_NUM\_TABLES, [871](#)  
 CFE\_PLATFORM\_TBL\_MAX\_NUM\_VALIDATIONS, [872](#)  
 CFE\_PLATFORM\_TBL\_MAX\_SIMULTANEOUS\_LOADS, [LC\\_ARTEEntry\\_t](#), [644](#)  
     [872](#)  
 CFE\_PLATFORM\_TBL\_MAX\_SNGL\_TABLE\_SIZE, [872](#)  
 CFE\_PLATFORM\_TBL\_START\_TASK\_PRIORITY, [873](#)  
 CFE\_PLATFORM\_TBL\_START\_TASK\_STACK\_SIZE, [873](#)  
 CFE\_PLATFORM\_TBL\_U32FROM4CHARS, [873](#)  
 CFE\_PLATFORM\_TBL\_VALID\_PRID\_1, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_PRID\_2, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_PRID\_3, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_PRID\_4, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_PRID\_COUNT, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_SCID\_1, [874](#)  
 CFE\_PLATFORM\_TBL\_VALID\_SCID\_2, [875](#)  
 CFE\_PLATFORM\_TBL\_VALID\_SCID\_COUNT, [875](#)  
 CFE\_PLATFORM\_TIME\_CFG\_CLIENT, [875](#)  
 CFE\_PLATFORM\_TIME\_CFG\_LATCH\_FLY, [875](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SERVER, [875](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SIGNAL, [876](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SOURCE, [876](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SRC\_GPS, [876](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SRC\_MET, [877](#)  
 CFE\_PLATFORM\_TIME\_CFG\_SRC\_TIME, [877](#)  
 CFE\_PLATFORM\_TIME\_CFG\_START\_FLY, [877](#)  
 CFE\_PLATFORM\_TIME\_CFG\_TONE\_LIMIT, [877](#)  
 CFE\_PLATFORM\_TIME\_CFG\_VIRTUAL, [877](#)  
 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SECS, [878](#)  
 CFE\_PLATFORM\_TIME\_MAX\_DELTA\_SUBS, [878](#)  
 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SECS, [878](#)  
 CFE\_PLATFORM\_TIME\_MAX\_LOCAL\_SUBS, [879](#)  
 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_PRIORITY, [879](#)  
 CFE\_PLATFORM\_TIME\_ONEHZ\_TASK\_STACK\_SIZE, [879](#)  
 CFE\_PLATFORM\_TIME\_START\_TASK\_PRIORITY, [879](#)  
 CFE\_PLATFORM\_TIME\_START\_TASK\_STACK\_SIZE, [879](#)  
 CFE\_PLATFORM\_TIME\_TONE\_TASK\_PRIORITY, [880](#)  
 CFE\_PLATFORM\_TIME\_TONE\_TASK\_STACK\_SIZE, [880](#)  
 CFE\_ES\_AppInfo, [488](#)  
 CFE\_ES\_StartAppCmd\_Payload, [524](#)  
 ExecutionCounter  
     [CFE\\_ES\\_AppInfo](#), [488](#)  
     [CFE\\_ES\\_TaskInfo](#), [528](#)  
 FailedValCounter  
     [CFE\\_TBL\\_HousekeepingTlm\\_Payload](#), [595](#)  
 FailToPassCount  
 FileCreateTimeSecs  
     [CFE\\_TBL\\_Info](#), [599](#)  
     [CFE\\_TBL\\_TblRegPacket\\_Payload](#), [607](#)  
 FileCreateTimeSubSecs  
     [CFE\\_TBL\\_Info](#), [599](#)  
     [CFE\\_TBL\\_TblRegPacket\\_Payload](#), [607](#)  
 FileModeBits  
     [os\\_fstat\\_t](#), [676](#)  
 FileName  
     [CFE\\_ES\\_AppInfo](#), [488](#)  
     [CFE\\_ES\\_FileNameCmd\\_Payload](#), [497](#)  
     [CFE\\_FS\\_FileWriteMetaData](#), [557](#)  
     [os\\_dirent\\_t](#), [673](#)  
 Filename  
     [CFE\\_SB\\_WriteFileInfoCmd\\_Payload](#), [583](#)  
 filename  
     [OS\\_module\\_prop\\_t](#), [678](#)  
 FileSize  
     [os\\_fstat\\_t](#), [676](#)  
 FileSubType  
     [CFE\\_FS\\_FileWriteMetaData](#), [557](#)  
 FileTime  
     [os\\_fstat\\_t](#), [676](#)  
 FilterMask  
     [CFE\\_ES\\_SetPerfFilterMaskCmd\\_Payload](#), [521](#)  
 FilterMaskNum

CFE\_ES\_SetPerfFilterMaskCmd\_Payload, 521  
flags  
    OS\_module\_address\_t, 678  
Float32  
    LC\_MultiType\_t, 649  
Forced2Fly  
    CFE\_TIME\_DiagnosticTlm\_Payload, 617  
free\_blocks  
    OS\_heap\_prop\_t, 677  
free\_bytes  
    OS\_heap\_prop\_t, 677  
FreeFds  
    os\_fsinfo\_t, 675  
freerun\_time  
    OS\_timebase\_prop\_t, 685  
FreeVolumes  
    os\_fsinfo\_t, 675  
  
GetData  
    CFE\_FS\_FileWriteMetaData, 557  
GetPipeIdByNameErrorCounter  
    CFE\_SB\_HousekeepingTlm\_Payload, 565  
  
Handle  
    CFE\_ES\_CDSRegDumpRec, 493  
HashTable  
    LC\_OperData\_t, 653  
HaveActiveCDS  
    LC\_OperData\_t, 653  
HeapBlocksFree  
    CFE\_ES\_HousekeepingTlm\_Payload, 501  
HeapBytesFree  
    CFE\_ES\_HousekeepingTlm\_Payload, 501  
HeapMaxBlockSize  
    CFE\_ES\_HousekeepingTlm\_Payload, 502  
HkPacket  
    LC\_OperData\_t, 653  
host\_module\_id  
    OS\_module\_prop\_t, 679  
  
InactiveBufferAddr  
    CFE\_TBL\_TblRegPacket\_Payload, 607  
Index  
    CFE\_SB\_MsgMapFileEntry, 569  
int16  
    common\_types.h, 1231  
int32  
    common\_types.h, 1231  
int64  
    common\_types.h, 1231  
int8  
    common\_types.h, 1231  
InternalErrorCounter  
    CFE\_SB\_HousekeepingTlm\_Payload, 565  
interval\_time  
    OS\_timer\_prop\_t, 686  
intptr  
    common\_types.h, 1231  
isfinite  
    lc\_watch.c, 790  
isnan  
    lc\_watch.c, 790  
IsPending  
    CFE\_FS\_FileWriteMetaData, 557  
IsValid  
    OS\_file\_prop\_t, 674  
  
largest\_free\_block  
    OS\_heap\_prop\_t, 677  
LastFalseToTrue  
    LC\_WRTEntry\_t, 669  
LastFileDumped  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastFileLoaded  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
    CFE\_TBL\_Info, 599  
    CFE\_TBL\_TblRegPacket\_Payload, 607  
LastTableLoaded  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastTrueToFalse  
    LC\_WRTEntry\_t, 669  
LastUpdatedTable  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastUpdateTime  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastValCrc  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastValStatus  
    CFE\_TBL\_HousekeepingTlm\_Payload, 596  
LastValTableName  
    CFE\_TBL\_HousekeepingTlm\_Payload, 597  
LC\_16BIT\_BE\_VAL  
    lc\_watch.h, 804  
LC\_16BIT\_LE\_VAL  
    lc\_watch.h, 804  
LC\_32BIT\_BE\_VAL  
    lc\_watch.h, 804  
LC\_32BIT\_LE\_VAL  
    lc\_watch.h, 804  
lc\_action.c  
    LC\_EvaluateRPN, 710  
    LC\_SampleAPs, 711  
    LC\_SampleSingleAP, 712  
    LC\_ValidateADT, 713  
    LC\_ValidateRPN, 714  
    POP\_RPN\_DATA, 710  
lc\_action.h  
    LC\_AP\_EVENT\_TAIL\_LEN, 716  
    LC\_AP\_EVENT\_TAIL\_STR, 716

LC\_EvaluateRPN, [716](#)  
 LC\_SampleAPs, [717](#)  
 LC\_SampleSingleAP, [718](#)  
 LC\_ValidateADT, [719](#)  
 LC\_ValidateRPN, [720](#)  
**LC\_ACTION\_ERROR**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ACTION\_ERROR\_ERR\_EID**  
 CFS Limit Checker Event IDs, [138](#)  
**LC\_ACTION\_FAIL**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ACTION\_NOT\_USED**  
 default\_lc\_msgdefs.h, [691](#)  
**LC\_ACTION\_PASS**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ACTION\_STALE**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_AddWatchpoint**  
 lc\_watch.c, [790](#)  
 lc\_watch.h, [805](#)  
**LC\_ADT**  
 lc\_def\_adt.c, [819](#)  
**LC\_ADT\_CRITICAL\_TBL**  
 lc\_app.h, [735](#)  
**LC\_ADT\_DEFAULT\_TBL**  
 lc\_app.h, [735](#)  
**LC\_ADT\_FILENAME**  
 CFS Limit Checker Platform Configuration, [168](#)  
**LC\_ADT\_GETADDR\_ERR\_EID**  
 CFS Limit Checker Event IDs, [138](#)  
**LC\_ADT\_LOAD\_ERR\_EID**  
 CFS Limit Checker Event IDs, [139](#)  
**LC\_ADT\_NOT\_CRITICAL**  
 lc\_app.h, [735](#)  
**LC\_ADT\_REGISTER\_CRIT\_ERR\_EID**  
 CFS Limit Checker Event IDs, [139](#)  
**LC\_ADT\_REGISTER\_ERR\_EID**  
 CFS Limit Checker Event IDs, [139](#)  
**LC\_ADT\_TABLENAME**  
 CFS Limit Checker Platform Configuration, [168](#)  
**LC\_ADT\_TBL\_RESTORED**  
 lc\_app.h, [735](#)  
**LC\_ADTEEntry\_t, 638**  
 DefaultState, [639](#)  
 EventID, [639](#)  
 EventText, [639](#)  
 EventType, [639](#)  
 MaxFailPassEvents, [640](#)  
 MaxFailsBeforeRTS, [640](#)  
 MaxPassFailEvents, [640](#)  
 MaxPassiveEvents, [640](#)  
 RPNEquation, [640](#)  
 RTSId, [640](#)  
**LC\_ADTVAL\_ERR\_DEFSTATE**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_ERR\_EID**  
 CFS Limit Checker Event IDs, [139](#)  
**LC\_ADTVAL\_ERR\_EVTTYPE**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_ERR\_FAILCNT**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_ERR\_NONE**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_ERR\_RPN**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_ERR\_RTSID**  
 default\_lc\_tbldefs.h, [699](#)  
**LC\_ADTVAL\_INF\_EID**  
 CFS Limit Checker Event IDs, [140](#)  
**LC\_ADTVAL\_NO\_ERR**  
 default\_lc\_tbldefs.h, [700](#)  
**LC\_ADTVAL\_RPNERR\_EID**  
 CFS Limit Checker Event IDs, [140](#)  
**LC\_ALL\_ACTIONPOINTS**  
 default\_lc\_msgdefs.h, [691](#)  
**LC\_ALL\_WATCHPOINTS**  
 default\_lc\_msgdefs.h, [691](#)  
**LC\_AP\_EVENT\_TAIL\_LEN**  
 lc\_action.h, [716](#)  
**LC\_AP\_EVENT\_TAIL\_STR**  
 lc\_action.h, [716](#)  
**LC\_AP\_FAILTOPASS\_INF\_EID**  
 CFS Limit Checker Event IDs, [140](#)  
**LC\_AP\_PASSIVE\_FAIL\_INF\_EID**  
 CFS Limit Checker Event IDs, [140](#)  
**LC\_AP\_PASSTOFAIL\_INF\_EID**  
 CFS Limit Checker Event IDs, [141](#)  
**LC\_APOFF\_APNUM\_ERR\_EID**  
 CFS Limit Checker Event IDs, [141](#)  
**LC\_APOFF\_CURR\_ERR\_EID**  
 CFS Limit Checker Event IDs, [141](#)  
**LC\_APOFF\_INF\_EID**  
 CFS Limit Checker Event IDs, [141](#)  
**lc\_app.c**  
 LC\_AppData, [732](#)  
 LC\_AppInit, [722](#)  
 LC\_AppMain, [723](#)  
 LC\_CreateDefinitionTables, [725](#)  
 LC\_CreateResultTables, [726](#)  
 LC\_CreateTaskCDS, [726](#)  
 LC\_EvsInit, [727](#)  
 LC\_LoadDefaultTables, [728](#)  
 LC\_OperData, [732](#)  
 LC\_SblInit, [729](#)  
 LC\_TableInit, [730](#)  
**lc\_app.h**  
 LC\_ADT\_CRITICAL\_TBL, [735](#)  
 LC\_ADT\_DEFAULT\_TBL, [735](#)

LC\_ADT\_NOT\_CRITICAL, 735  
LC\_ADT\_TBL\_RESTORED, 735  
LC\_APP\_CDS\_CREATED, 735  
LC\_APP\_CDS\_RESTORED, 735  
LC\_APP\_DEFAULT\_DATA, 735  
LC\_AppData, 748  
LC\_APPDATA\_CDSNAME, 735  
LC\_ApInit, 737  
LC\_AppMain, 739  
LC\_ART\_CDS\_CREATED, 735  
LC\_ART\_CDS\_RESTORED, 735  
LC\_ART\_CDSNAME, 735  
LC\_ART\_DEFAULT\_DATA, 735  
LC\_ART\_TBL\_CREATED, 736  
LC\_CDS\_CREATED, 736  
LC\_CDS\_ENABLED, 736  
LC\_CDS\_RESTORED, 736  
LC\_CDS\_UPDATED, 736  
LC\_CreateDefinitionTables, 740  
LC\_CreateResultTables, 741  
LC\_CreateTaskCDS, 742  
LC\_EvSInit, 743  
LC\_HASH\_TABLE\_ENTRIES, 736  
LC\_HASH\_TABLE\_MASK, 736  
LC\_LoadDefaultTables, 744  
LC\_MessageList\_t, 737  
LC\_OperData, 748  
LC\_PIPE\_NAME, 736  
LC\_SB\_TIMEOUT, 736  
LC\_SbInit, 745  
LC\_TableInit, 746  
LC\_WatchPtList\_t, 737  
LC\_WDT\_CRITICAL\_TBL, 736  
LC\_WDT\_DEFAULT\_TBL, 736  
LC\_WDT\_NOT\_CRITICAL, 737  
LC\_WDT\_TBL\_RESTORED, 737  
LC\_WRT\_CDS\_CREATED, 737  
LC\_WRT\_CDS\_RESTORED, 737  
LC\_WRT\_CDSNAME, 737  
LC\_WRT\_DEFAULT\_DATA, 737  
LC\_WRT\_TBL\_CREATED, 737  
LC\_APP\_CDS\_CREATED  
  lc\_app.h, 735  
LC\_APP\_CDS\_REGISTER\_ERR\_EID  
  CFS Limit Checker Event IDs, 142  
LC\_APP\_CDS\_RESTORED  
  lc\_app.h, 735  
LC\_APP\_DEFAULT\_DATA  
  lc\_app.h, 735  
LC\_APP\_NAME  
  CFS Limit Checker Platform Configuration, 168  
LC\_APP\_NO\_SAVE\_START\_ERR\_EID  
  CFS Limit Checker Event IDs, 142  
LC\_AppData  
  lc\_app.c, 732  
  lc\_app.h, 748  
LC\_APPDATA\_CDSNAME  
  lc\_app.h, 735  
LC\_AppData\_t, 641  
  APSSampleCount, 641  
  CDSSavedOnExit, 642  
  CmdCount, 642  
  CmdErrCount, 642  
  CurrentLCState, 642  
  MonitoredMsgCount, 642  
  PassiveRTSExecCount, 642  
  RTSExecCount, 642  
LC\_ApInit  
  lc\_app.c, 722  
  lc\_app.h, 737  
LC\_AppMain  
  lc\_app.c, 723  
  lc\_app.h, 739  
LC\_APPMAIN\_PERF\_ID  
  CFS Limit Checker Mission Configuration, 165  
LC\_AppPipe  
  lc\_dispatch.c, 774  
  lc\_dispatch.h, 781  
LC\_APSSAMPLE\_APNUM\_ERR\_EID  
  CFS Limit Checker Event IDs, 142  
LC\_APSSAMPLE\_CURR\_ERR\_EID  
  CFS Limit Checker Event IDs, 142  
LC\_APSSAMPLE\_LLEN\_ERR\_EID  
  CFS Limit Checker Event IDs, 143  
LC\_APSTATE\_ACTIVE  
  default\_lc\_msgdefs.h, 691  
LC\_APSTATE\_APNUM\_ERR\_EID  
  CFS Limit Checker Event IDs, 143  
LC\_APSTATE\_CURR\_ERR\_EID  
  CFS Limit Checker Event IDs, 143  
LC\_APSTATE\_DISABLED  
  default\_lc\_msgdefs.h, 691  
LC\_APSTATE\_INF\_EID  
  CFS Limit Checker Event IDs, 143  
LC\_APSTATE\_NEW\_ERR\_EID  
  CFS Limit Checker Event IDs, 144  
LC\_APSTATE\_NOT\_USED  
  default\_lc\_msgdefs.h, 691  
LC\_APSTATE\_PASSIVE  
  default\_lc\_msgdefs.h, 691  
LC\_APSTATE\_PERMOFF  
  default\_lc\_msgdefs.h, 691  
LC\_APSTATS\_APNUM\_ERR\_EID  
  CFS Limit Checker Event IDs, 144  
LC\_APSTATS\_INF\_EID  
  CFS Limit Checker Event IDs, 144  
LC\_ART\_CDS\_CREATED  
  lc\_app.h, 735

LC\_ART\_CDS\_REGISTER\_ERR\_EID  
   CFS Limit Checker Event IDs, 144

LC\_ART\_CDS\_RESTORED  
   lc\_app.h, 735

LC\_ART\_CDSENAMEx  
   lc\_app.h, 735

LC\_ART\_DEFAULT\_DATA  
   lc\_app.h, 735

LC\_ART\_GETADDR\_ERR\_EID  
   CFS Limit Checker Event IDs, 145

LC\_ART\_NO\_SAVE\_ERR\_EID  
   CFS Limit Checker Event IDs, 145

LC\_ART\_REGISTER\_ERR\_EID  
   CFS Limit Checker Event IDs, 145

LC\_ART\_TABLENAME  
   CFS Limit Checker Platform Configuration, 169

LC\_ART\_TBL\_CREATED  
   lc\_app.h, 736

LC\_ARTEEntry\_t, 643  
   ActionResult, 643  
   ConsecutiveFailCount, 644  
   CumulativeEventMsgsSent, 644  
   CumulativeFailCount, 644  
   CumulativeRTSExecCount, 644  
   CurrentState, 644  
   FailToPassCount, 644  
   Padding, 644  
   PassiveAPCount, 645  
   PassToFailCount, 645

LC\_BASE\_AP\_EID  
   CFS Limit Checker Event IDs, 145

LC\_BITMASK\_NONE  
   default\_lc\_tbldefs.h, 700

LC\_CC\_ERR\_EID  
   CFS Limit Checker Event IDs, 146

LC\_CDS\_CREATED  
   lc\_app.h, 736

LC\_CDS\_DISABLED\_INF\_EID  
   CFS Limit Checker Event IDs, 146

LC\_CDS\_ENABLED  
   lc\_app.h, 736

LC\_CDS\_NOT\_SAVED  
   default\_lc\_tbldefs.h, 700

LC\_CDS\_RESTORED  
   lc\_app.h, 736

LC\_CDS\_RESTORED\_INF\_EID  
   CFS Limit Checker Event IDs, 146

LC\_CDS\_SAVED  
   default\_lc\_tbldefs.h, 700

LC\_CDS\_UPDATED  
   lc\_app.h, 736

LC\_CDS\_UPDATED\_INF\_EID  
   CFS Limit Checker Event IDs, 147

LC\_CFCALL\_ERR\_EID

  CFS Limit Checker Event IDs, 147

LC\_CheckMsgForWPs  
   lc\_watch.c, 791  
   lc\_watch.h, 806

LC\_CMD\_MID  
   CFS Limit Checker Command Message IDs, 172

lc\_cmds.c  
   LC\_GET\_CMD\_PAYLOAD, 750  
   LC\_NoopCmd, 750  
   LC\_ResetAPStatsCmd, 750  
   LC\_ResetCounters, 751  
   LC\_ResetCountersCmd, 752  
   LC\_ResetResultsAP, 753  
   LC\_ResetResultsWP, 753  
   LC\_ResetWPStatsCmd, 754  
   LC\_SampleAPReq, 754  
   LC\_SendHkCmd, 755  
   LC\_SetAPPermOffCmd, 756  
   LC\_SetAPStateCmd, 757  
   LC\_SetLCStateCmd, 758

lc\_cmds.h  
   LC\_NoopCmd, 759  
   LC\_ResetAPStatsCmd, 760  
   LC\_ResetCounters, 761  
   LC\_ResetCountersCmd, 761  
   LC\_ResetResultsAP, 762  
   LC\_ResetResultsWP, 763  
   LC\_ResetWPStatsCmd, 763  
   LC\_SampleAPReq, 764  
   LC\_SendHkCmd, 765  
   LC\_SetAPPermOffCmd, 766  
   LC\_SetAPStateCmd, 767  
   LC\_SetLCStateCmd, 768

LC\_CopyBytesWithSwap  
   lc\_watch.c, 792

LC\_CR\_PIPE\_ERR\_EID  
   CFS Limit Checker Event IDs, 148

LC\_CreateDefinitionTables  
   lc\_app.c, 725  
   lc\_app.h, 740

LC\_CreateHashTable  
   lc\_watch.c, 792  
   lc\_watch.h, 807

LC\_CreateResultTables  
   lc\_app.c, 726  
   lc\_app.h, 741

LC\_CreateTaskCDS  
   lc\_app.c, 726  
   lc\_app.h, 742

lc\_custom.c  
   LC\_CustomFunction, 769  
   LC\_ExecuterTS, 770

lc\_custom.h  
   LC\_CustomFunction, 771

LC\_ExecuteRTS, 773  
LC\_CustomFunction  
  lc\_custom.c, 769  
  lc\_custom.h, 771  
LC\_DATA\_BYTEx  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_DWORD\_BE  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_DWORD\_LE  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_FLOAT\_BE  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_FLOAT\_LE  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_NOT\_USED  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_UBYTE  
  default\_lc\_tbldefs.h, 700  
LC\_DATA\_UDWORD\_BE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_UDWORD\_LE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_UWORD\_BE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_UWORD\_LE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_BYTEx  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_DWORD\_BE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_DWORD\_LE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_FLOAT\_BE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_FLOAT\_LE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_NOT\_USED  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_UBYTE  
  default\_lc\_tbldefs.h, 701  
LC\_DATA\_WATCH\_UDWORD\_BE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WATCH\_UDWORD\_LE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WATCH\_UWORD\_BE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WATCH\_UWORD\_LE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WATCH\_WORD\_BE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WATCH\_WORD\_LE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WORD\_BE  
  default\_lc\_tbldefs.h, 702  
LC\_DATA\_WORD\_LE  
  default\_lc\_tbldefs.h, 702  
  CFE\_TBL\_FileDef, 818  
  LC\_ADT, 819  
lc\_def\_wdt.c  
  CFE\_TBL\_FileDef, 819  
  LC\_WDT, 819  
lc\_dispatch.c  
  LC\_AppPipe, 774  
  LC\_NoopVerifyDispatch, 775  
  LC\_ResetAPStatsVerifyDispatch, 776  
  LC\_ResetCountersVerifyDispatch, 776  
  LC\_ResetWPStatsVerifyDispatch, 777  
  LC\_SampleAPVerifyDispatch, 777  
  LC\_SendHkVerifyDispatch, 778  
  LC\_SetAPPermOffVerifyDispatch, 778  
  LC\_SetAPStateVerifyDispatch, 779  
  LC\_SetLCStateVerifyDispatch, 779  
  LC\_VerifyMsgLength, 780  
lc\_dispatch.h  
  LC\_AppPipe, 781  
LC\_EvaluateRPN  
  lc\_action.c, 710  
  lc\_action.h, 716  
LC\_EvsInit  
  lc\_app.c, 727  
  lc\_app.h, 743  
LC\_ExecuteRTS  
  lc\_custom.c, 770  
  lc\_custom.h, 773  
LC\_FLOAT\_TOLERANCE  
  CFS Limit Checker Platform Configuration, 169  
LC\_FloatCompare  
  lc\_watch.c, 793  
  lc\_watch.h, 808  
LC\_GET\_CMD\_PAYLOAD  
  lc\_cmnds.c, 750  
LC\_GetHashTableIndex  
  lc\_watch.c, 794  
  lc\_watch.h, 809  
LC\_GetSizedWPData  
  lc\_watch.c, 795  
  lc\_watch.h, 810  
LC\_HASH\_TABLE\_ENTRIES  
  lc\_app.h, 736  
LC\_HASH\_TABLE\_MASK  
  lc\_app.h, 736  
LC\_HK\_TLM\_MID  
  CFS Limit Checker Telemetry Message IDs, 173  
LC\_HKAR\_ERROR  
  default\_lc\_msgdefs.h, 691  
LC\_HKAR\_FAIL  
  default\_lc\_msgdefs.h, 691

LC\_HKAR\_NUM\_BYTES  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_PASS  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_STALE  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_STATE\_ACTIVE  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_STATE\_DISABLED  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_STATE\_NOT\_USED  
     default\_lc\_msgdefs.h, 692

LC\_HKAR\_STATE\_PASSIVE  
     default\_lc\_msgdefs.h, 692

LC\_HkPacket\_t, 645  
     Payload, 645  
     TelemetryHeader, 645

LC\_HKREQ\_LEN\_ERR\_EID  
     CFS Limit Checker Event IDs, 148

LC\_HkTlm\_Payload\_t, 646  
     ActiveAPs, 646  
     APResults, 646  
     APSampleCount, 647  
     CmdCount, 647  
     CmdErrCount, 647  
     CurrentLCState, 647  
     MonitoredMsgCount, 647  
     Pad16, 647  
     Pad8, 647  
     PassiveRTSExecCount, 647  
     RTSExecCount, 647  
     WPResults, 648  
     WPsInUse, 648

LC\_HKWR\_ERROR  
     default\_lc\_msgdefs.h, 692

LC\_HKWR\_FALSE  
     default\_lc\_msgdefs.h, 692

LC\_HKWR\_NUM\_BYTES  
     default\_lc\_msgdefs.h, 693

LC\_HKWR\_STALE  
     default\_lc\_msgdefs.h, 693

LC\_HKWR\_TRUE  
     default\_lc\_msgdefs.h, 693

LC\_IEEE\_EXPONENT\_MASK  
     lc\_watch.h, 804

LC\_IEEE\_FRACTION\_MASK  
     lc\_watch.h, 805

LC\_INIT\_INF\_EID  
     CFS Limit Checker Event IDs, 148

LC\_INVALID\_RPN\_ERR\_EID  
     CFS Limit Checker Event IDs, 148

LC\_LCSTATE\_ERR\_EID  
     CFS Limit Checker Event IDs, 149

LC\_LCSTATE\_INF\_EID  
     CFS Limit Checker Event IDs, 149

LC\_LEN\_ERR\_EID  
     CFS Limit Checker Event IDs, 149

LC\_LoadDefaultTables  
     lc\_app.c, 728  
     lc\_app.h, 744

LC\_MAJOR\_VERSION  
     CFS Limit Checker Version, 158

LC\_ManageTables  
     lc\_utils.c, 783  
     lc\_utils.h, 786

LC\_MAX\_ACTION\_TEXT  
     CFS Limit Checker Mission Configuration, 165

LC\_MAX\_ACTIONPOINTS  
     CFS Limit Checker Mission Configuration, 165

LC\_MAX\_RPN\_EQU\_SIZE  
     CFS Limit Checker Mission Configuration, 166

LC\_MAX\_VALID\_ADT\_RTSID  
     CFS Limit Checker Platform Configuration, 169

LC\_MAX\_WATCHPOINTS  
     CFS Limit Checker Mission Configuration, 166

LC\_MessageList\_t  
     lc\_app.h, 737

LC\_MID\_INF\_EID  
     CFS Limit Checker Event IDs, 149

LC\_MINOR\_VERSION  
     CFS Limit Checker Version, 158

LC\_MISSION\_REV  
     CFS Limit Checker Platform Configuration, 169

LC\_MListTag, 648  
     MessageID, 648  
     Next, 648  
     Spare, 649  
     WatchPtList, 649

LC\_MultiType\_t, 649  
     Float32, 649  
     RawByte, 649  
     Signed16, 650  
     Signed32, 650  
     Signed8, 650  
     Unsigned16, 650  
     Unsigned32, 650  
     Unsigned8, 650

LC\_NO\_BITMASK  
     default\_lc\_tbldefs.h, 702

LC\_NO\_OPER  
     default\_lc\_tbldefs.h, 702

LC\_NOOP\_CC  
     CFS Limit Checker Command Codes, 159

LC\_NOOP\_INF\_EID  
     CFS Limit Checker Event IDs, 150

LC\_NoopCmd  
     lc\_cmds.c, 750  
     lc\_cmds.h, 759

LC\_NoopCmd\_t, 650  
    CommandHeader, 651

LC\_NoopVerifyDispatch  
    lc\_dispatch.c, 775

LC\_OPER\_CUSTOM  
    default\_lc\_tbldefs.h, 702

LC\_OPER\_EQ  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_GE  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_GT  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_LE  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_LT  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_NE  
    default\_lc\_tbldefs.h, 703

LC\_OPER\_NONE  
    default\_lc\_tbldefs.h, 703

LC\_OperatorCompare  
    lc\_watch.c, 796  
    lc\_watch.h, 811

LC\_OperData  
    lc\_app.c, 732  
    lc\_app.h, 748

LC\_OperData\_t, 651  
    ADTHandle, 652  
    ADTPtr, 652  
    AppDataCDSHandle, 652  
    ARTDataCDSHandle, 652  
    ARTHandle, 653  
    ARTPtr, 653  
    CmdPipe, 653  
    HashTable, 653  
    HaveActiveCDS, 653  
    HkPacket, 653  
    MessageIDsCount, 653  
    MessageLinks, 654  
    TableResults, 654  
    WatchpointCount, 654  
    WatchPtLinks, 654  
    WDTHandle, 654  
    WDTPtr, 654  
    WRDataCDSHandle, 654  
    WRTHandle, 654  
    WRTPtr, 655

LC\_PASSIVE\_FAIL\_DBG\_EID  
    CFS Limit Checker Event IDs, 150

LC\_PerformMaintenance  
    lc\_utils.c, 784  
    lc\_utils.h, 787

LC\_PIPE\_DEPTH  
    CFS Limit Checker Platform Configuration, 170

LC\_PIPE\_NAME  
    lc\_app.h, 736

LC\_ProcessWP  
    lc\_watch.c, 797  
    lc\_watch.h, 812

LC\_RESERVED\_EID  
    CFS Limit Checker Event IDs, 150

LC\_RESET\_AP\_STATS\_CC  
    CFS Limit Checker Command Codes, 160

LC\_RESET\_CC  
    CFS Limit Checker Command Codes, 160

LC\_RESET\_DBG\_EID  
    CFS Limit Checker Event IDs, 150

LC\_RESET\_WP\_STATS\_CC  
    CFS Limit Checker Command Codes, 161

LC\_ResetAPStats\_Payload\_t, 655  
    APNumber, 655  
    Padding, 655

LC\_ResetAPStatsCmd  
    lc\_cmds.c, 750  
    lc\_cmds.h, 760

LC\_ResetAPStatsCmd\_t, 656  
    CommandHeader, 656  
    Payload, 656

LC\_ResetAPStatsVerifyDispatch  
    lc\_dispatch.c, 776

LC\_ResetCounters  
    lc\_cmds.c, 751  
    lc\_cmds.h, 761

LC\_ResetCountersCmd  
    lc\_cmds.c, 752  
    lc\_cmds.h, 761

LC\_ResetCountersCmd\_t, 656  
    CommandHeader, 656

LC\_ResetCountersVerifyDispatch  
    lc\_dispatch.c, 776

LC\_ResetResultsAP  
    lc\_cmds.c, 753  
    lc\_cmds.h, 762

LC\_ResetResultsWP  
    lc\_cmds.c, 753  
    lc\_cmds.h, 763

LC\_ResetWPStats\_Payload\_t, 657  
    Padding, 657  
    WPNumber, 657

LC\_ResetWPStatsCmd  
    lc\_cmds.c, 754  
    lc\_cmds.h, 763

LC\_ResetWPStatsCmd\_t, 657  
    CommandHeader, 658  
    Payload, 658

LC\_ResetWPStatsVerifyDispatch  
    lc\_dispatch.c, 777

LC\_REVISION

CFS Limit Checker Version, [158](#)

**LC\_RPN\_AND**  
default\_lc\_tbldefs.h, [703](#)

**LC\_RPN\_EQUAL**  
default\_lc\_tbldefs.h, [703](#)

**LC\_RPN\_NOT**  
default\_lc\_tbldefs.h, [704](#)

**LC\_RPN\_OR**  
default\_lc\_tbldefs.h, [704](#)

**LC\_RPN\_XOR**  
default\_lc\_tbldefs.h, [704](#)

**LC\_RTS\_REQ\_CC**  
CFS Limit Checker Mission Configuration, [166](#)

**LC\_RTS\_REQ\_MID**  
CFS Limit Checker Mission Configuration, [167](#)

**LC\_RTSRequest\_Payload\_t**, [658](#)  
Padding, [658](#)  
RTSId, [658](#)

**LC\_RTSRequestCmd\_t**, [659](#)  
CommandHeader, [659](#)  
Payload, [659](#)

**LC\_SAMPLE\_AP\_MID**  
CFS Limit Checker Command Message IDs, [172](#)

**LC\_SampleAP\_Payload\_t**, [659](#)  
EndIndex, [660](#)  
Padding, [660](#)  
StartIndex, [660](#)  
UpdateAge, [660](#)

**LC\_SampleAPCmd\_t**, [660](#)  
CommandHeader, [661](#)  
Payload, [661](#)

**LC\_SampleAPReq**  
lc\_cmds.c, [754](#)  
lc\_cmds.h, [764](#)

**LC\_SampleAPs**  
lc\_action.c, [711](#)  
lc\_action.h, [717](#)

**LC\_SampleAPVerifyDispatch**  
lc\_dispatch.c, [777](#)

**LC\_SampleSingleAP**  
lc\_action.c, [712](#)  
lc\_action.h, [718](#)

**LC\_SB\_TIMEOUT**  
lc\_app.h, [736](#)

**LC\_SbInit**  
lc\_app.c, [729](#)  
lc\_app.h, [745](#)

**LC\_SEND\_HK\_MID**  
CFS Limit Checker Command Message IDs, [172](#)

**LC\_SendHkCmd**  
lc\_cmds.c, [755](#)  
lc\_cmds.h, [765](#)

**LC\_SendHkCmd\_t**, [661](#)  
CommandHeader, [661](#)

**LC\_SendHkVerifyDispatch**  
lc\_dispatch.c, [778](#)

**LC\_SET\_AP\_PERM\_OFF\_CC**  
CFS Limit Checker Command Codes, [162](#)

**LC\_SET\_AP\_PERMOFF\_CC**  
default\_lc\_fcncodes.h, [687](#)

**LC\_SET\_AP\_STATE\_CC**  
CFS Limit Checker Command Codes, [162](#)

**LC\_SET\_LC\_STATE\_CC**  
CFS Limit Checker Command Codes, [163](#)

**LC\_SetAPPPermOff\_Payload\_t**, [661](#)  
APNumber, [662](#)  
Padding, [662](#)

**LC\_SetAPPPermOffCmd**  
lc\_cmds.c, [756](#)  
lc\_cmds.h, [766](#)

**LC\_SetAPPPermOffCmd\_t**, [662](#)  
CommandHeader, [662](#)  
Payload, [662](#)

**LC\_SetAPPPermOffVerifyDispatch**  
lc\_dispatch.c, [778](#)

**LC\_SetAPState\_Payload\_t**, [663](#)  
APNumber, [663](#)  
NewAPState, [663](#)

**LC\_SetAPStateCmd**  
lc\_cmds.c, [757](#)  
lc\_cmds.h, [767](#)

**LC\_SetAPStateCmd\_t**, [663](#)  
CommandHeader, [664](#)  
Payload, [664](#)

**LC\_SetAPStateVerifyDispatch**  
lc\_dispatch.c, [779](#)

**LC\_SetLCState\_Payload\_t**, [664](#)  
NewLCState, [664](#)  
Padding, [664](#)

**LC\_SetLCStateCmd**  
lc\_cmds.c, [758](#)  
lc\_cmds.h, [768](#)

**LC\_SetLCStateCmd\_t**, [665](#)  
CommandHeader, [665](#)  
Payload, [665](#)

**LC\_SetLCStateVerifyDispatch**  
lc\_dispatch.c, [779](#)

**LC\_SignedCompare**  
lc\_watch.c, [798](#)  
lc\_watch.h, [813](#)

**LC\_STATE\_ACTIVE**  
default\_lc\_msgdefs.h, [693](#)

**LC\_STATE\_DISABLED**  
default\_lc\_msgdefs.h, [693](#)

**LC\_STATE\_FROM\_CDS**  
default\_lc\_msgdefs.h, [693](#)

**LC\_STATE\_PASSIVE**  
default\_lc\_msgdefs.h, [693](#)

LC\_STATE\_POWER\_ON\_RESET  
    CFS Limit Checker Platform Configuration, 170

LC\_STATE\_WHEN\_CDS\_RESTORED  
    CFS Limit Checker Platform Configuration, 170

LC\_SUB\_GND\_CMD\_ERR\_EID  
    CFS Limit Checker Event IDs, 151

LC\_SUB\_HK\_REQ\_ERR\_EID  
    CFS Limit Checker Event IDs, 151

LC\_SUB\_SAMPLE\_CMD\_ERR\_EID  
    CFS Limit Checker Event IDs, 151

LC\_SUB\_WP\_ERR\_EID  
    CFS Limit Checker Event IDs, 151

LC\_TableInit  
    lc\_app.c, 730  
    lc\_app.h, 746

LC\_TASK\_EXIT\_EID  
    CFS Limit Checker Event IDs, 152

LC\_UnsignedCompare  
    lc\_watch.c, 799  
    lc\_watch.h, 814

LC\_UNSUB\_WP\_ERR\_EID  
    CFS Limit Checker Event IDs, 152

LC\_UpdateTaskCDS  
    lc\_utils.c, 784  
    lc\_utils.h, 787

lc\_utils.c  
    LC\_ManageTables, 783  
    LC\_PerformMaintenance, 784  
    LC\_UpdateTaskCDS, 784

lc\_utils.h  
    LC\_ManageTables, 786  
    LC\_PerformMaintenance, 787  
    LC\_UpdateTaskCDS, 787

LC\_ValidateADT  
    lc\_action.c, 713  
    lc\_action.h, 719

LC\_ValidateRPN  
    lc\_action.c, 714  
    lc\_action.h, 720

LC\_ValidateWDT  
    lc\_watch.c, 800  
    lc\_watch.h, 815

LC\_VerifyMsgLength  
    lc\_dispatch.c, 780

lc\_watch.c  
    isfinite, 790  
    isnan, 790  
    LC\_AddWatchpoint, 790  
    LC\_CheckMsgForWPs, 791  
    LC\_CopyBytesWithSwap, 792  
    LC\_CreateHashTable, 792  
    LC\_FloatCompare, 793  
    LC\_GetHashTableIndex, 794  
    LC\_GetSizedWPData, 795

LC\_OperatorCompare, 796

LC\_ProcessWP, 797

LC\_SignedCompare, 798

LC\_UnsignedCompare, 799

LC\_ValidateWDT, 800

LC\_WPOffsetValid, 801

lc\_watch.h  
    LC\_16BIT\_BE\_VAL, 804  
    LC\_16BIT\_LE\_VAL, 804  
    LC\_32BIT\_BE\_VAL, 804  
    LC\_32BIT\_LE\_VAL, 804  
    LC\_AddWatchpoint, 805  
    LC\_CheckMsgForWPs, 806  
    LC\_CreateHashTable, 807  
    LC\_FloatCompare, 808  
    LC\_GetHashTableIndex, 809  
    LC\_GetSizedWPData, 810  
    LC\_IEEE\_EXPONENT\_MASK, 804  
    LC\_IEEE\_FRACTION\_MASK, 805  
    LC\_OperatorCompare, 811  
    LC\_ProcessWP, 812  
    LC\_SignedCompare, 813  
    LC\_UnsignedCompare, 814  
    LC\_ValidateWDT, 815  
    LC\_WPOffsetValid, 816

LC\_WATCH\_ERROR  
    default\_lc\_tbldefs.h, 704

LC\_WATCH\_FALSE  
    default\_lc\_tbldefs.h, 704

LC\_WATCH\_STALE  
    default\_lc\_tbldefs.h, 704

LC\_WATCH\_TRUE  
    default\_lc\_tbldefs.h, 704

LC\_WatchPtList\_t  
    lc\_app.h, 737

LC\_WDT  
    lc\_def\_wdt.c, 819

LC\_WDT\_CRITICAL\_TBL  
    lc\_app.h, 736

LC\_WDT\_DEFAULT\_TBL  
    lc\_app.h, 736

LC\_WDT\_FILENAME  
    CFS Limit Checker Platform Configuration, 171

LC\_WDT\_GETADDR\_ERR\_EID  
    CFS Limit Checker Event IDs, 152

LC\_WDT\_LOAD\_ERR\_EID  
    CFS Limit Checker Event IDs, 152

LC\_WDT\_NOT\_CRITICAL  
    lc\_app.h, 737

LC\_WDT\_REGISTER\_CRIT\_ERR\_EID  
    CFS Limit Checker Event IDs, 153

LC\_WDT\_REGISTER\_ERR\_EID  
    CFS Limit Checker Event IDs, 153

LC\_WDT\_REREGISTER\_ERR\_EID

CFS Limit Checker Event IDs, 153  
**LC\_WDT\_SEARCH\_PERF\_ID**  
     CFS Limit Checker Mission Configuration, 167  
**LC\_WDT\_TABLENAME**  
     CFS Limit Checker Platform Configuration, 171  
**LC\_WDT\_TBL\_RESTORED**  
     lc\_app.h, 737  
**LC\_WDTEEntry\_t**, 665  
     BitMask, 666  
     ComparisonValue, 666  
     CustomFuncArgument, 666  
     DataType, 666  
     MessageID, 666  
     OperatorID, 667  
     ResultAgeWhenStale, 667  
     WatchpointOffset, 667  
**LC\_WDTVAL\_ERR\_DATATYPE**  
     default\_lc\_tbldefs.h, 704  
**LC\_WDTVAL\_ERR\_EID**  
     CFS Limit Checker Event IDs, 153  
**LC\_WDTVAL\_ERR\_FPINF**  
     default\_lc\_tbldefs.h, 704  
**LC\_WDTVAL\_ERR\_FPNAN**  
     default\_lc\_tbldefs.h, 704  
**LC\_WDTVAL\_ERR\_MID**  
     default\_lc\_tbldefs.h, 705  
**LC\_WDTVAL\_ERR\_NONE**  
     default\_lc\_tbldefs.h, 705  
**LC\_WDTVAL\_ERR\_OPER**  
     default\_lc\_tbldefs.h, 705  
**LC\_WDTVAL\_FPERR\_EID**  
     CFS Limit Checker Event IDs, 154  
**LC\_WDTVAL\_INF\_EID**  
     CFS Limit Checker Event IDs, 154  
**LC\_WDTVAL\_NO\_ERR**  
     default\_lc\_tbldefs.h, 705  
**LC\_WListTag**, 667  
     Next, 667  
     Spare, 668  
     WatchIndex, 668  
**LC\_WP\_DATATYPE\_ERR\_EID**  
     CFS Limit Checker Event IDs, 154  
**LC\_WP\_NAN\_ERR\_EID**  
     CFS Limit Checker Event IDs, 154  
**LC\_WP\_OFFSET\_ERR\_EID**  
     CFS Limit Checker Event IDs, 155  
**LC\_WP\_OPERID\_ERR\_EID**  
     CFS Limit Checker Event IDs, 155  
**LC\_WPOffsetValid**  
     lc\_watch.c, 801  
     lc\_watch.h, 816  
**LC\_WPSTATS\_INF\_EID**  
     CFS Limit Checker Event IDs, 155  
**LC\_WPSTATS\_WPNUM\_ERR\_EID**

CFS Limit Checker Event IDs, 155  
**LC\_WRT\_CDS\_CREATED**  
     lc\_app.h, 737  
**LC\_WRT\_CDS\_REGISTER\_ERR\_EID**  
     CFS Limit Checker Event IDs, 156  
**LC\_WRT\_CDS\_RESTORED**  
     lc\_app.h, 737  
**LC\_WRT\_CDSNAME**  
     lc\_app.h, 737  
**LC\_WRT\_DEFAULT\_DATA**  
     lc\_app.h, 737  
**LC\_WRT\_GETADDR\_ERR\_EID**  
     CFS Limit Checker Event IDs, 156  
**LC\_WRT\_NO\_SAVE\_ERR\_EID**  
     CFS Limit Checker Event IDs, 156  
**LC\_WRT\_REGISTER\_ERR\_EID**  
     CFS Limit Checker Event IDs, 156  
**LC\_WRT\_TABLENAME**  
     CFS Limit Checker Platform Configuration, 171  
**LC\_WRT\_TBL\_CREATED**  
     lc\_app.h, 737  
**LC\_WRTEEntry\_t**, 668  
     ConsecutiveTrueCount, 669  
     CountdownToStale, 669  
     CumulativeTrueCount, 669  
     EvaluationCount, 669  
     FalseToTrueCount, 669  
     LastFalseToTrue, 669  
     LastTrueToFalse, 669  
     Padding, 670  
     WatchResult, 670  
**LC\_WRTTransition\_t**, 670  
     DataType, 670  
     Padding, 671  
     Timestamp, 671  
     Value, 671  
**LeapSeconds**  
     CFE\_TIME\_HousekeepingTlm\_Payload, 623  
     CFE\_TIME\_LeapsCmd\_Payload, 625  
**Length**  
     CCSDS\_PrimaryHeader, 486  
     CFE\_FS\_Header, 559  
**LENGTHCHECK**  
     osapi-macros.h, 1252  
**LoadFilename**  
     CFE\_TBL\_LoadCmd\_Payload, 601  
**LoadPending**  
     CFE\_TBL\_TblRegPacket\_Payload, 607  
**LocalIntCounter**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 617  
**LocalTaskCounter**  
     CFE\_TIME\_DiagnosticTlm\_Payload, 617  
**LogEnabled**  
     CFE\_EVS\_HousekeepingTlm\_Payload, 543

LogFilename  
    CFE\_EVS\_LogFileCmd\_Payload, 545

LogFullFlag  
    CFE\_EVS\_HousekeepingTlm\_Payload, 543

LogMode  
    CFE\_EVS\_HousekeepingTlm\_Payload, 543  
    CFE\_EVS\_SetLogMode\_Payload, 553

LogOverflowCounter  
    CFE\_EVS\_HousekeepingTlm\_Payload, 543

LongDouble  
    CFE\_ES\_PoolAlign, 511  
    CFE\_SB\_Msg, 567

LongInt  
    CFE\_ES\_PoolAlign, 511  
    CFE\_SB\_Msg, 567

MainTaskId  
    CFE\_ES\_AppInfo, 489

MainTaskName  
    CFE\_ES\_AppInfo, 489

Mask  
    CFE\_EVS\_AppNameEventIDMaskCmd\_Payload,  
        533  
    CFE\_EVS\_BinFilter, 535

MaxElapsed  
    CFE\_TIME\_DiagnosticTlm\_Payload, 617

MaxFailPassEvents  
    LC\_ADTEEntry\_t, 640

MaxFailsBeforeRTS  
    LC\_ADTEEntry\_t, 640

MaxFdS  
    os\_fsinfo\_t, 675

MaxLocalClock  
    CFE\_TIME\_DiagnosticTlm\_Payload, 617

MaxMemAllowed  
    CFE\_SB\_StatsTlm\_Payload, 579

MaxMsgIdsAllowed  
    CFE\_SB\_StatsTlm\_Payload, 580

MaxPassFailEvents  
    LC\_ADTEEntry\_t, 640

MaxPassiveEvents  
    LC\_ADTEEntry\_t, 640

MaxPipeDepthAllowed  
    CFE\_SB\_StatsTlm\_Payload, 580

MaxPipesAllowed  
    CFE\_SB\_StatsTlm\_Payload, 580

MaxPRCount  
    CFE\_ES\_SetMaxPRCountCmd\_Payload, 519

MaxProcessorResets  
    CFE\_ES\_HousekeepingTlm\_Payload, 502

MaxQueueDepth  
    CFE\_SB\_PipeDepthStats, 570  
    CFE\_SB\_PipeInfoEntry, 571

MaxSubscriptionsAllowed

CFE\_SB\_StatsTlm\_Payload, 580

MaxVolumes  
    os\_fsinfo\_t, 675

MemInUse  
    CFE\_SB\_HousekeepingTlm\_Payload, 565  
    CFE\_SB\_StatsTlm\_Payload, 580

MemPoolHandle  
    CFE\_SB\_HousekeepingTlm\_Payload, 565  
    CFE\_TBL\_HousekeepingTlm\_Payload, 597

Message  
    CFE\_EVS\_LongEventTlm\_Payload, 546

MessageFormatMode  
    CFE\_EVS\_HousekeepingTlm\_Payload, 544

MessageID  
    LC\_MListTag, 648  
    LC\_WDTEEntry\_t, 666

MessageIDsCount  
    LC\_OperData\_t, 653

MessageLinks  
    LC\_OperData\_t, 654

MessageSendCounter  
    CFE\_EVS\_HousekeepingTlm\_Payload, 544

MessageTruncCounter  
    CFE\_EVS\_HousekeepingTlm\_Payload, 544

MicroSeconds  
    CFE\_TIME\_TimeCmd\_Payload, 636

MinElapsed  
    CFE\_TIME\_DiagnosticTlm\_Payload, 617

Mode  
    CFE\_ES\_OverWriteSysLogCmd\_Payload, 510

Module  
    OS\_static\_symbol\_record\_t, 682

MonitoredMsgCount  
    LC\_AppData\_t, 642  
    LC\_HkTlm\_Payload\_t, 647

Msg  
    CFE\_SB\_Msg, 567

MsgCnt  
    CFE\_SB\_RoutingFileEntry, 575

MsgFormat  
    CFE\_EVS\_SetEventFormatCode\_Payload, 552

MsgId  
    CFE\_SB\_MsgMapFileEntry, 569  
    CFE\_SB\_RouteCmd\_Payload, 574  
    CFE\_SB\_RoutingFileEntry, 575  
    CFE\_SB\_SingleSubscriptionTlm\_Payload, 577  
    CFE\_SB\_SubEntries, 582

MsgIdsInUse  
    CFE\_SB\_StatsTlm\_Payload, 580

MsgLimitErrorCounter  
    CFE\_SB\_HousekeepingTlm\_Payload, 565

MsgReceiveErrorCounter  
    CFE\_SB\_HousekeepingTlm\_Payload, 566

MsgSendErrorCounter

CFE\_SB\_HousekeepingTlm\_Payload, [566](#)

Name  
 CFE\_ES\_AppInfo, [489](#)  
 CFE\_ES\_CDSRegDumpRec, [493](#)  
 CFE\_TBL\_TblRegPacket\_Payload, [608](#)  
 OS\_static\_symbol\_record\_t, [682](#)

name  
 OS\_bin\_sem\_prop\_t, [671](#)  
 OS\_condvar\_prop\_t, [672](#)  
 OS\_count\_sem\_prop\_t, [673](#)  
 OS\_module\_prop\_t, [679](#)  
 OS\_mut\_sem\_prop\_t, [679](#)  
 OS\_queue\_prop\_t, [680](#)  
 OS\_socket\_prop\_t, [682](#)  
 OS\_task\_prop\_t, [684](#)  
 OS\_timebase\_prop\_t, [685](#)  
 OS\_timer\_prop\_t, [686](#)

NewAPState  
 LC\_SetAPState\_Payload\_t, [663](#)

NewLCState  
 LC\_SetLCState\_Payload\_t, [664](#)

Next  
 LC\_MListTag, [648](#)  
 LC\_WListTag, [667](#)

nominal\_interval\_time  
 OS\_timebase\_prop\_t, [685](#)

NoSubscribersCounter  
 CFE\_SB\_HousekeepingTlm\_Payload, [566](#)

NumBlocksRequested  
 CFE\_ES\_MemPoolStats, [507](#)

NumBytes  
 CFE\_TBL\_File\_Hdr, [591](#)

NumCreated  
 CFE\_ES\_BlockStats, [492](#)

NumFree  
 CFE\_ES\_BlockStats, [492](#)

NumFreeBytes  
 CFE\_ES\_MemPoolStats, [507](#)

NumFreeSharedBufs  
 CFE\_TBL\_HousekeepingTlm\_Payload, [597](#)

NumLoadPending  
 CFE\_TBL\_HousekeepingTlm\_Payload, [597](#)

NumOfChildTasks  
 CFE\_ES\_AppInfo, [489](#)

NumTables  
 CFE\_TBL\_HousekeepingTlm\_Payload, [597](#)

NumUsers  
 CFE\_TBL\_Info, [599](#)

NumValRequests  
 CFE\_TBL\_HousekeepingTlm\_Payload, [597](#)

object\_ids  
 OS\_FdSet, [674](#)

ObjectName

CFE\_TBL\_FileDef, [592](#)

ObjectSize  
 CFE\_TBL\_FileDef, [593](#)

Offset  
 CFE\_TBL\_File\_Hdr, [591](#)

OneHzAdjust  
 CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)

OneHzDirection  
 CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)

OneTimeAdjust  
 CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)

OneTimeDirection  
 CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)

OnEvent  
 CFE\_FS\_FileWriteMetaData, [558](#)

OperatorID  
 LC\_WDTEEntry\_t, [667](#)

Opts  
 CFE\_SB\_PipeInfoEntry, [571](#)

OS\_ADD\_TASK\_FLAGS  
 osconfig.h, [821](#)

OS\_API\_Init  
 OSAL Core Operation APIs, [379](#)

OS\_API\_Teardown  
 OSAL Core Operation APIs, [380](#)

OS\_Application\_Run  
 OSAL Core Operation APIs, [380](#)

OS\_Application\_Startup  
 OSAL Core Operation APIs, [380](#)

OS\_ApplicationExit  
 OSAL Core Operation APIs, [380](#)

OS\_ApplicationShutdown  
 OSAL Core Operation APIs, [380](#)

OS\_ArgCallback\_t  
 common\_types.h, [1231](#)

OS\_bin\_sem\_prop\_t, [671](#)  
 creator, [671](#)  
 name, [671](#)  
 value, [672](#)

OS\_BinSemCreate  
 OSAL Binary Semaphore APIs, [362](#)

OS\_BinSemDelete  
 OSAL Binary Semaphore APIs, [363](#)

OS\_BinSemFlush  
 OSAL Binary Semaphore APIs, [363](#)

OS\_BinSemGetIdByName  
 OSAL Binary Semaphore APIs, [364](#)

OS\_BinSemGetInfo  
 OSAL Binary Semaphore APIs, [364](#)

OS\_BinSemGive  
 OSAL Binary Semaphore APIs, [365](#)

OS\_BinSemTake  
 OSAL Binary Semaphore APIs, [365](#)

OS\_BinSemTimedWait

OSAL Binary Semaphore APIs, 366  
OS\_BSP\_GetArgC  
    OSAL BSP low level access APIs, 367  
OS\_BSP\_GetArgV  
    OSAL BSP low level access APIs, 367  
OS\_BSP\_GetResourceTypeConfig  
    OSAL BSP low level access APIs, 367  
OS\_BSP\_SetExitCode  
    OSAL BSP low level access APIs, 367  
OS\_BSP\_SetResourceTypeConfig  
    OSAL BSP low level access APIs, 367  
OS\_BUFFER\_MSG\_DEPTH  
    osconfig.h, 821  
OS\_BUFFER\_SIZE  
    osconfig.h, 821  
OS\_BUILD\_BASELINE  
    osapi-version.h, 1265  
OS\_BUILD\_CODENAME  
    osapi-version.h, 1265  
OS\_BUILD\_DEV\_CYCLE  
    osapi-version.h, 1265  
OS\_BUILD\_NUMBER  
    osapi-version.h, 1265  
OS\_CFG\_MAX\_VERSION\_STR\_LEN  
    osapi-version.h, 1265  
OS\_CHECK  
    osapi-constants.h, 1239  
OS\_CHK\_ONLY  
    osapi-fs.h, 1248  
OS\_chkfs  
    OSAL File System Level APIs, 419  
OS\_chmod  
    OSAL Standard File APIs, 408  
OS\_close  
    OSAL Standard File APIs, 409  
OS\_CloseAllFiles  
    OSAL Standard File APIs, 409  
OS\_CloseFileByName  
    OSAL Standard File APIs, 410  
OS\_condvar\_prop\_t, 672  
    creator, 672  
    name, 672  
OS\_CondVarBroadcast  
    OSAL Condition Variable APIs, 382  
OS\_CondVarCreate  
    OSAL Condition Variable APIs, 383  
OS\_CondVarDelete  
    OSAL Condition Variable APIs, 384  
OS\_CondVarGetIdByName  
    OSAL Condition Variable APIs, 384  
OS\_CondVarGetInfo  
    OSAL Condition Variable APIs, 385  
OS\_CondVarLock  
    OSAL Condition Variable APIs, 385  
OS\_CondVarSignal  
    OSAL Condition Variable APIs, 385  
OS\_CondVarTimedWait  
    OSAL Condition Variable APIs, 386  
OS\_CondVarUnlock  
    OSAL Condition Variable APIs, 386  
OS\_CondVarWait  
    OSAL Condition Variable APIs, 387  
OS\_ConvertToArrayIndex  
    OSAL Object ID Utility APIs, 431  
OS\_count\_sem\_prop\_t, 672  
    creator, 673  
    name, 673  
    value, 673  
OS\_CountSemCreate  
    OSAL Counting Semaphore APIs, 388  
OS\_CountSemDelete  
    OSAL Counting Semaphore APIs, 389  
OS\_CountSemGetIdByName  
    OSAL Counting Semaphore APIs, 389  
OS\_CountSemGetInfo  
    OSAL Counting Semaphore APIs, 390  
OS\_CountSemGive  
    OSAL Counting Semaphore APIs, 390  
OS\_CountSemTake  
    OSAL Counting Semaphore APIs, 391  
OS\_CountSemTimedWait  
    OSAL Counting Semaphore APIs, 391  
OS\_cp  
    OSAL Standard File APIs, 410  
OS\_DeleteAllObjects  
    OSAL Core Operation APIs, 381  
OS\_DirectoryClose  
    OSAL Directory APIs, 393  
OS\_DirectoryOpen  
    OSAL Directory APIs, 393  
OS\_DirectoryRead  
    OSAL Directory APIs, 394  
OS\_DirectoryRewind  
    OSAL Directory APIs, 394  
os\_dirent\_t, 673  
    FileName, 673  
OS\_DIRENTRY\_NAME  
    osapi-dir.h, 1241  
OS\_ERR\_BAD\_ADDRESS  
    OSAL Return Code Defines, 399  
OS\_ERR\_FILE  
    OSAL Return Code Defines, 399  
OS\_ERR\_INCORRECT\_OBJ\_STATE  
    OSAL Return Code Defines, 399  
OS\_ERR\_INCORRECT\_OBJ\_TYPE  
    OSAL Return Code Defines, 399  
OS\_ERR\_INVALID\_ARGUMENT  
    OSAL Return Code Defines, 399

OS\_ERR\_INVALID\_ID  
    OSAL Return Code Defines, 399

OS\_ERR\_INVALID\_PRIORITY  
    OSAL Return Code Defines, 400

OS\_ERR\_INVALID\_SIZE  
    OSAL Return Code Defines, 400

OS\_ERR\_NAME\_NOT\_FOUND  
    OSAL Return Code Defines, 400

os\_err\_name\_t  
    osapi-error.h, 1244

OS\_ERR\_NAME\_TAKEN  
    OSAL Return Code Defines, 400

OS\_ERR\_NAME\_TOO\_LONG  
    OSAL Return Code Defines, 400

OS\_ERR\_NO\_FREE\_IDS  
    OSAL Return Code Defines, 400

OS\_ERR\_NOT\_IMPLEMENTED  
    OSAL Return Code Defines, 400

OS\_ERR\_OBJECT\_IN\_USE  
    OSAL Return Code Defines, 400

OS\_ERR\_OPERATION\_NOT\_SUPPORTED  
    OSAL Return Code Defines, 400

OS\_ERR\_OUTPUT\_TOO\_LARGE  
    OSAL Return Code Defines, 400

OS\_ERR\_SEM\_NOT\_FULL  
    OSAL Return Code Defines, 401

OS\_ERR\_STREAM\_DISCONNECTED  
    OSAL Return Code Defines, 401

OS\_ERROR  
    OSAL Return Code Defines, 401

OS\_ERROR\_ADDRESS\_MISALIGNED  
    OSAL Return Code Defines, 401

OS\_ERROR\_NAME\_LENGTH  
    osapi-error.h, 1244

OS\_ERROR\_TIMEOUT  
    OSAL Return Code Defines, 401

OS\_EVENT\_MAX  
    osapi-common.h, 1238

OS\_EVENT\_RESERVED  
    osapi-common.h, 1237

OS\_EVENT\_RESOURCE\_ALLOCATED  
    osapi-common.h, 1237

OS\_EVENT\_RESOURCE\_CREATED  
    osapi-common.h, 1238

OS\_EVENT\_RESOURCE\_DELETED  
    osapi-common.h, 1238

OS\_Event\_t  
    osapi-common.h, 1237

OS\_EVENT\_TASK\_STARTUP  
    osapi-common.h, 1238

OS\_EventHandler\_t  
    osapi-common.h, 1237

OS\_FDGetInfo  
    OSAL Standard File APIs, 411

OS\_FdSet, 673  
    object\_ids, 674

OS\_FILE\_FLAG\_CREATE  
    osapi-file.h, 1247

OS\_FILE\_FLAG\_NONE  
    osapi-file.h, 1247

OS\_file\_flag\_t  
    osapi-file.h, 1247

OS\_FILE\_FLAG\_TRUNCATE  
    osapi-file.h, 1247

OS\_file\_prop\_t, 674  
    IsValid, 674  
    Path, 674  
    User, 674

OS\_FileOpenCheck  
    OSAL Standard File APIs, 411

OS\_FILESTAT\_EXEC  
    osapi-file.h, 1246

OS\_FILESTAT\_ISDIR  
    osapi-file.h, 1246

OS\_FILESTAT\_MODE  
    osapi-file.h, 1246

OS\_FILESTAT\_MODE\_DIR  
    osapi-file.h, 1247

OS\_FILESTAT\_MODE\_EXEC  
    osapi-file.h, 1247

OS\_FILESTAT\_MODE\_READ  
    osapi-file.h, 1247

OS\_FILESTAT\_MODE\_WRITE  
    osapi-file.h, 1247

OS\_FILESTAT\_READ  
    osapi-file.h, 1246

OS\_FILESTAT\_SIZE  
    osapi-file.h, 1246

OS\_FILESTAT\_TIME  
    osapi-file.h, 1246

OS\_FILESTAT\_WRITE  
    osapi-file.h, 1247

OS\_FileSysAddFixedMap  
    OSAL File System Level APIs, 420

OS\_FileSysStatVolume  
    OSAL File System Level APIs, 420

OS\_ForEachObject  
    OSAL Object ID Utility APIs, 432

OS\_ForEachObjectOfType  
    OSAL Object ID Utility APIs, 432

OS\_FP\_ENABLED  
    osapi-task.h, 1261

OS\_FS\_DEV\_NAME\_LEN  
    osconfig.h, 821

OS\_FS\_ERR\_DEVICE\_NOT\_FREE  
    OSAL Return Code Defines, 401

OS\_FS\_ERR\_DRIVE\_NOT\_CREATED  
    OSAL Return Code Defines, 401

OS\_FS\_ERR\_NAME\_TOO\_LONG  
    OSAL Return Code Defines, 401

OS\_FS\_ERR\_PATH\_INVALID  
    OSAL Return Code Defines, 401

OS\_FS\_ERR\_PATH\_TOO\_LONG  
    OSAL Return Code Defines, 401

OS\_FS\_GetPhysDriveName  
    OSAL File System Level APIs, 421

OS\_FS\_PHYS\_NAME\_LEN  
    osconfig.h, 821

OS\_FS\_VOL\_NAME\_LEN  
    osconfig.h, 821

os\_fsinfo\_t, 675

- FreeFds, 675
- FreeVolumes, 675
- MaxFds, 675
- MaxVolumes, 675

os\_fstat\_t, 675

- FileModeBits, 676
- FileSize, 676
- FileTime, 676

OS\_GetBuildNumber  
    osapi-version.h, 1266

OS\_GetErrorName  
    OSAL Error Info APIs, 404

OS\_GetFsInfo  
    OSAL File System Level APIs, 422

OS\_GetLocalTime  
    OSAL Real Time Clock APIs, 369

OS\_GetResourceName  
    OSAL Object ID Utility APIs, 432

OS\_GetVersionCodeName  
    osapi-version.h, 1266

OS\_GetVersionNumber  
    osapi-version.h, 1267

OS\_GetVersionString  
    osapi-version.h, 1267

OS\_heap\_prop\_t, 676

- free\_blocks, 677
- free\_bytes, 677
- largest\_free\_block, 677

OS\_HeapGetInfo  
    OSAL Heap APIs, 427

OS\_IdentifyObject  
    OSAL Object ID Utility APIs, 433

OS\_IdleLoop  
    OSAL Core Operation APIs, 381

OS\_initfs  
    OSAL File System Level APIs, 422

OS\_INVALID\_INT\_NUM  
    OSAL Return Code Defines, 402

OS\_INVALID\_POINTER  
    OSAL Return Code Defines, 402

OS\_INVALID\_SEM\_VALUE

OSAL Return Code Defines, 402

OS\_LAST\_OFFICIAL  
    osapi-version.h, 1265

OS\_lseek  
    OSAL Standard File APIs, 412

OS\_MAJOR\_VERSION  
    osapi-version.h, 1265

OS\_MAX\_API\_NAME  
    osconfig.h, 821

OS\_MAX\_BIN\_SEMAPHORES  
    osconfig.h, 822

OS\_MAX\_CMD\_LEN  
    osconfig.h, 822

OS\_MAX\_CONDVARS  
    osconfig.h, 822

OS\_MAX\_CONSOLES  
    osconfig.h, 822

OS\_MAX\_COUNT\_SEMAPHORES  
    osconfig.h, 822

OS\_MAX\_FILE\_NAME  
    osconfig.h, 822

OS\_MAX\_FILE\_SYSTEMS  
    osconfig.h, 822

OS\_MAX\_LOCAL\_PATH\_LEN  
    osapi-constants.h, 1239

OS\_MAX\_MODULES  
    osconfig.h, 823

OS\_MAX\_MUTEXES  
    osconfig.h, 823

OS\_MAX\_NUM\_OPEN\_DIRS  
    osconfig.h, 823

OS\_MAX\_NUM\_OPEN\_FILES  
    osconfig.h, 823

OS\_MAX\_PATH\_LEN  
    osconfig.h, 823

OS\_MAX\_QUEUES  
    osconfig.h, 823

OS\_MAX\_SYM\_LEN  
    osconfig.h, 823

OS\_MAX\_TASK\_PRIORITY  
    osapi-task.h, 1261

OS\_MAX\_TASKS  
    osconfig.h, 824

OS\_MAX\_TIMEBASES  
    osconfig.h, 824

OS\_MAX\_TIMERS  
    osconfig.h, 824

OS\_MINOR\_VERSION  
    osapi-version.h, 1265

OS\_MISSION\_REV  
    osapi-version.h, 1265

OS\_mkdir  
    OSAL Directory APIs, 395

OS\_mkfs

OSAL File System Level APIs, 423  
**OS\_module\_address\_t**, 677  
  bss\_address, 677  
  bss\_size, 677  
  code\_address, 677  
  code\_size, 677  
  data\_address, 678  
  data\_size, 678  
  flags, 678  
  valid, 678  
**OS\_MODULE\_FILE\_EXTENSION**  
  osconfig.h, 824  
**OS\_MODULE\_FLAG\_GLOBAL\_SYMBOLS**  
  osapi-module.h, 1253  
**OS\_MODULE\_FLAG\_LOCAL\_SYMBOLS**  
  osapi-module.h, 1253  
**OS\_module\_prop\_t**, 678  
  addr, 678  
  entry\_point, 678  
  filename, 678  
  host\_module\_id, 679  
  name, 679  
**OS\_ModuleInfo**  
  OSAL Dynamic Loader and Symbol APIs, 436  
**OS\_ModuleLoad**  
  OSAL Dynamic Loader and Symbol APIs, 436  
**OS\_ModuleSymbolLookup**  
  OSAL Dynamic Loader and Symbol APIs, 437  
**OS\_ModuleUnload**  
  OSAL Dynamic Loader and Symbol APIs, 438  
**OS\_mount**  
  OSAL File System Level APIs, 423  
**OS\_mut\_sem\_prop\_t**, 679  
  creator, 679  
  name, 679  
**OS\_MutSemCreate**  
  OSAL Mutex APIs, 440  
**OS\_MutSemDelete**  
  OSAL Mutex APIs, 440  
**OS\_MutSemGetIdByName**  
  OSAL Mutex APIs, 441  
**OS\_MutSemGetInfo**  
  OSAL Mutex APIs, 441  
**OS\_MutSemGive**  
  OSAL Mutex APIs, 442  
**OS\_MutSemTake**  
  OSAL Mutex APIs, 442  
**OS\_mv**  
  OSAL Standard File APIs, 412  
**OS\_NetworkGetHostName**  
  OSAL Network ID APIs, 444  
**OS\_NetworkGetID**  
  OSAL Network ID APIs, 444  
**OS\_OBJECT\_CREATOR\_ANY**  
  osapi-constants.h, 1239  
**OS\_OBJECT\_ID\_UNDEFINED**  
  osapi-constants.h, 1239  
**OS\_OBJECT\_INDEX\_MASK**  
  osapi-idmap.h, 1250  
**OS\_OBJECT\_TYPE\_OS\_BINSEM**  
  OSAL Object Type Defines, 428  
**OS\_OBJECT\_TYPE\_OS\_CONDVAR**  
  OSAL Object Type Defines, 428  
**OS\_OBJECT\_TYPE\_OS\_CONSOLE**  
  OSAL Object Type Defines, 428  
**OS\_OBJECT\_TYPE\_OS\_COUNTSEM**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_DIR**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_FILESYS**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_MODULE**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_MUTEX**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_QUEUE**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_STREAM**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_TASK**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_TIMEBASE**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_OS\_TIMECB**  
  OSAL Object Type Defines, 429  
**OS\_OBJECT\_TYPE\_SHIFT**  
  osapi-idmap.h, 1250  
**OS\_OBJECT\_TYPE\_UNDEFINED**  
  OSAL Object Type Defines, 430  
**OS\_OBJECT\_TYPE\_USER**  
  OSAL Object Type Defines, 430  
**OS\_ObjectIdDefined**  
  OSAL Object ID Utility APIs, 433  
**OS\_ObjectIdEqual**  
  OSAL Object ID Utility APIs, 434  
**OS\_ObjectIdFromInteger**  
  OSAL Object ID Utility APIs, 434  
**OS\_ObjectIdToArrayIndex**  
  OSAL Object ID Utility APIs, 434  
**OS\_ObjectIdToInteger**  
  OSAL Object ID Utility APIs, 435  
**OS\_OpenCreate**  
  OSAL Standard File APIs, 413  
**OS\_PEND**  
  osapi-constants.h, 1240  
**OS\_PRINTF**  
  cfe\_es.h, 904  
  common\_types.h, 1230

OS\_printf  
    OSAL Printf APIs, 446

OS\_PRINTF\_CONSOLE\_NAME  
    osconfig.h, 824

OS\_printf\_disable  
    OSAL Printf APIs, 446

OS\_printf\_enable  
    OSAL Printf APIs, 446

OS\_QUEUE\_EMPTY  
    OSAL Return Code Defines, 402

OS\_QUEUE\_FULL  
    OSAL Return Code Defines, 402

OS\_QUEUE\_ID\_ERROR  
    OSAL Return Code Defines, 402

OS\_QUEUE\_INVALID\_SIZE  
    OSAL Return Code Defines, 402

OS\_QUEUE\_MAX\_DEPTH  
    osconfig.h, 824

OS\_queue\_prop\_t, 679  
    creator, 680  
    name, 680

OS\_QUEUE\_TIMEOUT  
    OSAL Return Code Defines, 402

OS\_QueueCreate  
    OSAL Message Queue APIs, 447

OS\_QueueDelete  
    OSAL Message Queue APIs, 448

OS\_QueueGet  
    OSAL Message Queue APIs, 448

OS\_QueueGetByName  
    OSAL Message Queue APIs, 449

OS\_QueueGetInfo  
    OSAL Message Queue APIs, 449

OS\_QueuePut  
    OSAL Message Queue APIs, 450

OS\_read  
    OSAL Standard File APIs, 414

OS\_READ\_ONLY  
    OSAL File Access Option Defines, 406

OS\_READ\_WRITE  
    OSAL File Access Option Defines, 406

OS\_RegisterEventHandler  
    OSAL Core Operation APIs, 381

OS\_remove  
    OSAL Standard File APIs, 414

OS\_rename  
    OSAL Standard File APIs, 415

OS\_REPAIR  
    osapi-filesystems.h, 1248

OS\_REVISION  
    osapi-version.h, 1265

OS\_rmdir  
    OSAL Directory APIs, 395

OS\_rmfs

OSAL File System Level APIs, 424

OS\_SEEK\_CUR  
    OSAL Reference Point For Seek Offset Defines, 407

OS\_SEEK\_END  
    OSAL Reference Point For Seek Offset Defines, 407

OS\_SEEK\_SET  
    OSAL Reference Point For Seek Offset Defines, 407

OS\_SelectFdAdd  
    OSAL Select APIs, 451

OS\_SelectFdClear  
    OSAL Select APIs, 451

OS\_SelectFdIsSet  
    OSAL Select APIs, 452

OS\_SelectFdZero  
    OSAL Select APIs, 452

OS\_SelectMultiple  
    OSAL Select APIs, 453

OS\_SelectSingle  
    OSAL Select APIs, 454

OS\_SEM\_EMPTY  
    OSAL Semaphore State Defines, 361

OS\_SEM\_FAILURE  
    OSAL Return Code Defines, 402

OS\_SEM\_FULL  
    OSAL Semaphore State Defines, 361

OS\_SEM\_TIMEOUT  
    OSAL Return Code Defines, 402

OS\_SetLocalTime  
    OSAL Real Time Clock APIs, 369

OS\_SHELL\_CMD\_INPUT\_FILE\_NAME  
    osconfig.h, 824

OS\_ShellOutputToFile  
    OSAL Shell APIs, 455

OS SOCKADDR\_MAX\_LEN  
    osapi-sockets.h, 1259  
    osconfig.h, 824

OS\_SockAddr\_t, 680  
    ActualLength, 680  
    AddrData, 680

OS\_SockAddrData\_t, 681  
    AlignPtr, 681  
    AlignU32, 681  
    Buffer, 681

OS\_socket\_prop\_t, 681  
    creator, 682  
    name, 682

OS\_SocketAccept  
    OSAL Socket Management APIs, 460

OS\_SocketAddrFromString  
    OSAL Socket Address APIs, 456

OS\_SocketAddrGetPort  
    OSAL Socket Address APIs, 457

OS\_SocketAddrInit  
    OSAL Socket Address APIs, 457

OS\_SocketAddrSetPort  
    OSAL Socket Address APIs, 458

OS\_SocketAddrToString  
    OSAL Socket Address APIs, 458

OS\_SocketBind  
    OSAL Socket Management APIs, 461

OS\_SocketBindAddress  
    OSAL Socket Management APIs, 462

OS\_SocketConnect  
    OSAL Socket Management APIs, 462

OS\_SocketDomain\_INET  
    osapi-sockets.h, 1259

OS\_SocketDomain\_INET6  
    osapi-sockets.h, 1259

OS\_SocketDomain\_INVALID  
    osapi-sockets.h, 1259

OS\_SocketDomain\_MAX  
    osapi-sockets.h, 1259

OS\_SocketDomain\_t  
    osapi-sockets.h, 1259

OS\_SocketGetIdByName  
    OSAL Socket Management APIs, 463

OS\_SocketGetInfo  
    OSAL Socket Management APIs, 463

OS\_SocketListen  
    OSAL Socket Management APIs, 464

OS\_SocketOpen  
    OSAL Socket Management APIs, 464

OS\_SocketRecvFrom  
    OSAL Socket Management APIs, 465

OS\_SocketSendTo  
    OSAL Socket Management APIs, 465

OS\_SocketShutdown  
    OSAL Socket Management APIs, 466

OS\_SocketShutdownMode\_NONE  
    osapi-sockets.h, 1259

OS\_SocketShutdownMode\_SHUT\_READ  
    osapi-sockets.h, 1259

OS\_SocketShutdownMode\_SHUT\_READWRITE  
    osapi-sockets.h, 1259

OS\_SocketShutdownMode\_SHUT\_WRITE  
    osapi-sockets.h, 1259

OS\_SocketShutdownMode\_t  
    osapi-sockets.h, 1259

OS\_SocketType\_DATAGRAM  
    osapi-sockets.h, 1259

OS\_SocketType\_INVALID  
    osapi-sockets.h, 1259

OS\_SocketType\_MAX  
    osapi-sockets.h, 1259

OS\_SocketType\_STREAM  
    osapi-sockets.h, 1259

OS\_SocketType\_t  
    osapi-sockets.h, 1259

OS\_stat  
    OSAL Standard File APIs, 415

OS\_static\_symbol\_record\_t, 682  
    Address, 682  
    Module, 682  
    Name, 682

OS\_STATUS\_STRING\_LENGTH  
    osapi-error.h, 1244

os\_status\_string\_t  
    osapi-error.h, 1244

OS\_StatusToInteger  
    OSAL Error Info APIs, 404

OS\_StatusToString  
    OSAL Error Info APIs, 405

OS\_statvfs\_t, 683  
    block\_size, 683  
    blocks\_free, 683  
    total\_blocks, 683

OS\_STR  
    osapi-version.h, 1266

OS\_STR\_HELPER  
    osapi-version.h, 1266

OS\_STREAM\_STATE\_BOUND  
    osapi-select.h, 1257

OS\_STREAM\_STATE\_CONNECTED  
    osapi-select.h, 1257

OS\_STREAM\_STATE\_LISTENING  
    osapi-select.h, 1257

OS\_STREAM\_STATE\_READABLE  
    osapi-select.h, 1257

OS\_STREAM\_STATE\_WRITABLE  
    osapi-select.h, 1257

OS\_StreamState\_t  
    osapi-select.h, 1256

OS\_SUCCESS  
    OSAL Return Code Defines, 403

OS\_SymbolLookup  
    OSAL Dynamic Loader and Symbol APIs, 438

OS\_SymbolTableDump  
    OSAL Dynamic Loader and Symbol APIs, 439

OS\_task\_prop\_t, 683  
    creator, 684  
    name, 684  
    priority, 684  
    stack\_size, 684

OS\_TaskCreate  
    OSAL Task APIs, 468

OS\_TaskDelay  
    OSAL Task APIs, 469

OS\_TaskDelete  
    OSAL Task APIs, 469

OS\_TaskExit  
    OSAL Task APIs, 470

OS\_TaskFindIdBySystemData

OSAL Task APIs, 470  
OS\_TaskGetId  
    OSAL Task APIs, 471  
OS\_TaskGetIdByName  
    OSAL Task APIs, 471  
OS\_TaskGetInfo  
    OSAL Task APIs, 471  
OS\_TaskInstallDeleteHandler  
    OSAL Task APIs, 472  
OS\_TaskSetPriority  
    OSAL Task APIs, 472  
OS\_time\_t, 684  
    ticks, 684  
OS\_TIME\_TICK\_RESOLUTION\_NS  
    osapi-clock.h, 1236  
OS\_TIME\_TICKS\_PER\_MSEC  
    osapi-clock.h, 1236  
OS\_TIME\_TICKS\_PER\_SECOND  
    osapi-clock.h, 1236  
OS\_TIME\_TICKS\_PER\_USEC  
    osapi-clock.h, 1236  
OS\_TimeAdd  
    OSAL Real Time Clock APIs, 370  
OS\_TimeAssembleFromMicroseconds  
    OSAL Real Time Clock APIs, 370  
OS\_TimeAssembleFromMilliseconds  
    OSAL Real Time Clock APIs, 370  
OS\_TimeAssembleFromNanoseconds  
    OSAL Real Time Clock APIs, 371  
OS\_TimeAssembleFromSubseconds  
    OSAL Real Time Clock APIs, 371  
OS\_timebase\_prop\_t, 685  
    accuracy, 685  
    creator, 685  
    freerun\_time, 685  
    name, 685  
    nominal\_interval\_time, 685  
OS\_TimeBaseCreate  
    OSAL Time Base APIs, 474  
OS\_TimeBaseDelete  
    OSAL Time Base APIs, 475  
OS\_TimeBaseGetFreeRun  
    OSAL Time Base APIs, 475  
OS\_TimeBaseGetIdByName  
    OSAL Time Base APIs, 476  
OS\_TimeBaseGetInfo  
    OSAL Time Base APIs, 477  
OS\_TimeBaseSet  
    OSAL Time Base APIs, 477  
OS\_TimedRead  
    OSAL Standard File APIs, 416  
OS\_TimedWrite  
    OSAL Standard File APIs, 417  
OS\_TimeFromTotalMicroseconds  
    OSAL Real Time Clock APIs, 372  
OS\_TimeFromTotalMilliseconds  
    OSAL Real Time Clock APIs, 372  
OS\_TimeFromTotalNanoseconds  
    OSAL Real Time Clock APIs, 373  
OS\_TimeFromTotalSeconds  
    OSAL Real Time Clock APIs, 373  
OS\_TimeGetFractionalPart  
    OSAL Real Time Clock APIs, 373  
OS\_TimeGetMicrosecondsPart  
    OSAL Real Time Clock APIs, 374  
OS\_TimeGetMillisecondsPart  
    OSAL Real Time Clock APIs, 374  
OS\_TimeGetNanosecondsPart  
    OSAL Real Time Clock APIs, 375  
OS\_TimeGetSubsecondsPart  
    OSAL Real Time Clock APIs, 376  
OS\_TimeGetTotalMicroseconds  
    OSAL Real Time Clock APIs, 376  
OS\_TimeGetTotalMilliseconds  
    OSAL Real Time Clock APIs, 377  
OS\_TimeGetTotalNanoseconds  
    OSAL Real Time Clock APIs, 377  
OS\_TimeGetTotalSeconds  
    OSAL Real Time Clock APIs, 378  
OS\_TIMER\_ERR\_INTERNAL  
    OSAL Return Code Defines, 403  
OS\_TIMER\_ERR\_INVALID\_ARGS  
    OSAL Return Code Defines, 403  
OS\_TIMER\_ERR\_TIMER\_ID  
    OSAL Return Code Defines, 403  
OS\_TIMER\_ERR\_UNAVAILABLE  
    OSAL Return Code Defines, 403  
OS\_timer\_prop\_t, 686  
    accuracy, 686  
    creator, 686  
    interval\_time, 686  
    name, 686  
    start\_time, 686  
OS\_TimerAdd  
    OSAL Timer APIs, 479  
OS\_TimerCallback\_t  
    osapi-timer.h, 1263  
OS\_TimerCreate  
    OSAL Timer APIs, 480  
OS\_TimerDelete  
    OSAL Timer APIs, 481  
OS\_TimerGetIdByName  
    OSAL Timer APIs, 482  
OS\_TimerGetInfo  
    OSAL Timer APIs, 482  
OS\_TimerSet  
    OSAL Timer APIs, 483  
OS\_TimerSync\_t

osapi-timebase.h, 1263  
**OS\_TimeSubtract**  
 OSAL Real Time Clock APIs, 378  
**OS\_TranslatePath**  
 OSAL File System Level APIs, 424  
**OS\_unmount**  
 OSAL File System Level APIs, 425  
**OS\_USED**  
 common\_types.h, 1230  
**OS\_UTILITYTASK\_PRIORITY**  
 osconfig.h, 825  
**OS\_UTILITYTASK\_STACK\_SIZE**  
 osconfig.h, 825  
**OS\_VERSION**  
 osapi-version.h, 1266  
**OS\_write**  
 OSAL Standard File APIs, 417  
**OS\_WRITE\_ONLY**  
 OSAL File Access Option Defines, 406  
**OSAL Binary Semaphore APIs, 362**  
 OS\_BinSemCreate, 362  
 OS\_BinSemDelete, 363  
 OS\_BinSemFlush, 363  
 OS\_BinSemGetIdByName, 364  
 OS\_BinSemGetInfo, 364  
 OS\_BinSemGive, 365  
 OS\_BinSemTake, 365  
 OS\_BinSemTimedWait, 366  
**OSAL BSP low level access APIs, 367**  
 OS\_BSP\_GetArgC, 367  
 OS\_BSP\_GetArgV, 367  
 OS\_BSP\_GetResourceTypeConfig, 367  
 OS\_BSP\_SetExitCode, 367  
 OS\_BSP\_SetResourceTypeConfig, 367  
**OSAL Condition Variable APIs, 382**  
 OS\_CondVarBroadcast, 382  
 OS\_CondVarCreate, 383  
 OS\_CondVarDelete, 384  
 OS\_CondVarGetIdByName, 384  
 OS\_CondVarGetInfo, 385  
 OS\_CondVarLock, 385  
 OS\_CondVarSignal, 385  
 OS\_CondVarTimedWait, 386  
 OS\_CondVarUnlock, 386  
 OS\_CondVarWait, 387  
**OSAL Core Operation APIs, 379**  
 OS\_API\_Init, 379  
 OS\_API\_Teardown, 380  
 OS\_Application\_Run, 380  
 OS\_Application\_Startup, 380  
 OS\_ApplicationExit, 380  
 OS\_ApplicationShutdown, 380  
 OS\_DeleteAllObjects, 381  
 OS\_IdleLoop, 381  
 OS\_RegisterEventHandler, 381  
**OSAL Counting Semaphore APIs, 388**  
 OS\_CountSemCreate, 388  
 OS\_CountSemDelete, 389  
 OS\_CountSemGetIdByName, 389  
 OS\_CountSemGetInfo, 390  
 OS\_CountSemGive, 390  
 OS\_CountSemTake, 391  
 OS\_CountSemTimedWait, 391  
**OSAL Directory APIs, 393**  
 OS\_DirectoryClose, 393  
 OS\_DirectoryOpen, 393  
 OS\_DirectoryRead, 394  
 OS\_DirectoryRewind, 394  
 OS\_mkdir, 395  
 OS\_rmdir, 395  
**OSAL Dynamic Loader and Symbol APIs, 436**  
 OS\_ModuleInfo, 436  
 OS\_ModuleLoad, 436  
 OS\_ModuleSymbolLookup, 437  
 OS\_ModuleUnload, 438  
 OS\_SymbolLookup, 438  
 OS\_SymbolTableDump, 439  
**OSAL Error Info APIs, 404**  
 OS\_GetErrorName, 404  
 OS\_StatusToInteger, 404  
 OS\_StatusToString, 405  
**OSAL File Access Option Defines, 406**  
 OS\_READ\_ONLY, 406  
 OS\_READ\_WRITE, 406  
 OS\_WRITE\_ONLY, 406  
**OSAL File System Level APIs, 419**  
 OS\_chkfs, 419  
 OS\_FileSysAddFixedMap, 420  
 OS\_FileSysStatVolume, 420  
 OS\_FS\_GetPhysDriveName, 421  
 OS\_GetFsInfo, 422  
 OS\_initfs, 422  
 OS\_mkfs, 423  
 OS\_mount, 423  
 OS\_rmfs, 424  
 OS\_TranslatePath, 424  
 OS\_unmount, 425  
**OSAL Heap APIs, 427**  
 OS\_HeapGetInfo, 427  
**OSAL Message Queue APIs, 447**  
 OS\_QueueCreate, 447  
 OS\_QueueDelete, 448  
 OS\_QueueGet, 448  
 OS\_QueueGetIdByName, 449  
 OS\_QueueGetInfo, 449  
 OS\_QueuePut, 450  
**OSAL Mutex APIs, 440**  
 OS\_MutSemCreate, 440

OS\_MutSemDelete, 440  
OS\_MutSemGetIdByName, 441  
OS\_MutSemGetInfo, 441  
OS\_MutSemGive, 442  
OS\_MutSemTake, 442  
OSAL Network ID APIs, 444  
    OS\_NetworkGetHostName, 444  
    OS\_NetworkGetID, 444  
OSAL Object ID Utility APIs, 431  
    OS\_ConvertToArrayIndex, 431  
    OS\_ForEachObject, 432  
    OS\_ForEachObjectType, 432  
    OS\_GetResourceName, 432  
    OS\_IdentifyObject, 433  
    OS\_ObjectIdDefined, 433  
    OS\_ObjectIdEqual, 434  
    OS\_ObjectIdFromInteger, 434  
    OS\_ObjectIdToArrayIndex, 434  
    OS\_ObjectIdToInteger, 435  
OSAL Object Type Defines, 428  
    OS\_OBJECT\_TYPE\_OS\_BINSEM, 428  
    OS\_OBJECT\_TYPE\_OS\_CONDVAR, 428  
    OS\_OBJECT\_TYPE\_OS\_CONSOLE, 428  
    OS\_OBJECT\_TYPE\_OS\_COUNTSEM, 429  
    OS\_OBJECT\_TYPE\_OS\_DIR, 429  
    OS\_OBJECT\_TYPE\_OS\_FILESYS, 429  
    OS\_OBJECT\_TYPE\_OS\_MODULE, 429  
    OS\_OBJECT\_TYPE\_OS\_MUTEX, 429  
    OS\_OBJECT\_TYPE\_OS\_QUEUE, 429  
    OS\_OBJECT\_TYPE\_OS\_STREAM, 429  
    OS\_OBJECT\_TYPE\_OS\_TASK, 429  
    OS\_OBJECT\_TYPE\_OS\_TIMEBASE, 429  
    OS\_OBJECT\_TYPE\_OS\_TIMECB, 429  
    OS\_OBJECT\_TYPE\_UNDEFINED, 430  
    OS\_OBJECT\_TYPE\_USER, 430  
OSAL Printf APIs, 446  
    OS\_printf, 446  
    OS\_printf\_disable, 446  
    OS\_printf\_enable, 446  
OSAL Real Time Clock APIs, 368  
    OS\_GetLocalTime, 369  
    OS\_SetLocalTime, 369  
    OS\_TimeAdd, 370  
    OS\_TimeAssembleFromMicroseconds, 370  
    OS\_TimeAssembleFromMilliseconds, 370  
    OS\_TimeAssembleFromNanoseconds, 371  
    OS\_TimeAssembleFromSubseconds, 371  
    OS\_TimeFromTotalMicroseconds, 372  
    OS\_TimeFromTotalMilliseconds, 372  
    OS\_TimeFromTotalNanoseconds, 373  
    OS\_TimeFromTotalSeconds, 373  
    OS\_TimeGetFractionalPart, 373  
    OS\_TimeGetMicrosecondsPart, 374  
    OS\_TimeGetMillisecondsPart, 374  
    OS\_TimeGetNanosecondsPart, 375  
    OS\_TimeGetSubsecondsPart, 376  
    OS\_TimeGetTotalMicroseconds, 376  
    OS\_TimeGetTotalMilliseconds, 377  
    OS\_TimeGetTotalNanoseconds, 377  
    OS\_TimeGetTotalSeconds, 378  
    OS\_TimeSubtract, 378  
OSAL Reference Point For Seek Offset Defines, 407  
    OS\_SEEK\_CUR, 407  
    OS\_SEEK\_END, 407  
    OS\_SEEK\_SET, 407  
OSAL Return Code Defines, 397  
    OS\_ERR\_BAD\_ADDRESS, 399  
    OS\_ERR\_FILE, 399  
    OS\_ERR\_INCORRECT\_OBJ\_STATE, 399  
    OS\_ERR\_INCORRECT\_OBJ\_TYPE, 399  
    OS\_ERR\_INVALID\_ARGUMENT, 399  
    OS\_ERR\_INVALID\_ID, 399  
    OS\_ERR\_INVALID\_PRIORITY, 400  
    OS\_ERR\_INVALID\_SIZE, 400  
    OS\_ERR\_NAME\_NOT\_FOUND, 400  
    OS\_ERR\_NAME\_TAKEN, 400  
    OS\_ERR\_NAME\_TOO\_LONG, 400  
    OS\_ERR\_NO\_FREE\_IDS, 400  
    OS\_ERR\_NOT\_IMPLEMENTED, 400  
    OS\_ERR\_OBJECT\_IN\_USE, 400  
    OS\_ERR\_OPERATION\_NOT\_SUPPORTED, 400  
    OS\_ERR\_OUTPUT\_TOO\_LARGE, 400  
    OS\_ERR\_SEM\_NOT\_FULL, 401  
    OS\_ERR\_STREAM\_DISCONNECTED, 401  
    OS\_ERROR, 401  
    OS\_ERROR\_ADDRESS\_MISALIGNED, 401  
    OS\_ERROR\_TIMEOUT, 401  
    OS\_FS\_ERR\_DEVICE\_NOT\_FREE, 401  
    OS\_FS\_ERR\_DRIVE\_NOT\_CREATED, 401  
    OS\_FS\_ERR\_NAME\_TOO\_LONG, 401  
    OS\_FS\_ERR\_PATH\_INVALID, 401  
    OS\_FS\_ERR\_PATH\_TOO\_LONG, 401  
    OS\_INVALID\_INT\_NUM, 402  
    OS\_INVALID\_POINTER, 402  
    OS\_INVALID\_SEM\_VALUE, 402  
    OS\_QUEUE\_EMPTY, 402  
    OS\_QUEUE\_FULL, 402  
    OS\_QUEUE\_ID\_ERROR, 402  
    OS\_QUEUE\_INVALID\_SIZE, 402  
    OS\_QUEUE\_TIMEOUT, 402  
    OS\_SEM\_FAILURE, 402  
    OS\_SEM\_TIMEOUT, 402  
    OS\_SUCCESS, 403  
    OS\_TIMER\_ERR\_INTERNAL, 403  
    OS\_TIMER\_ERR\_INVALID\_ARGS, 403  
    OS\_TIMER\_ERR\_TIMER\_ID, 403  
    OS\_TIMER\_ERR\_UNAVAILABLE, 403  
OSAL Select APIs, 451

OS\_SelectFdAdd, 451  
 OS\_SelectFdClear, 451  
 OS\_SelectFdIsSet, 452  
 OS\_SelectFdZero, 452  
 OS\_SelectMultiple, 453  
 OS\_SelectSingle, 454  
 OSAL Semaphore State Defines, 361  
 OS\_SEM\_EMPTY, 361  
 OS\_SEM\_FULL, 361  
 OSAL Shell APIs, 455  
 OS\_ShellOutputToFile, 455  
 OSAL Socket Address APIs, 456  
 OS\_SocketAddrFromString, 456  
 OS\_SocketAddrGetPort, 457  
 OS\_SocketAddrInit, 457  
 OS\_SocketAddrSetPort, 458  
 OS\_SocketAddrToString, 458  
 OSAL Socket Management APIs, 460  
 OS\_SocketAccept, 460  
 OS\_SocketBind, 461  
 OS\_SocketBindAddress, 462  
 OS\_SocketConnect, 462  
 OS\_SocketGetIdByName, 463  
 OS\_SocketGetInfo, 463  
 OS\_SocketListen, 464  
 OS\_SocketOpen, 464  
 OS\_SocketRecvFrom, 465  
 OS\_SocketSendTo, 465  
 OS\_SocketShutdown, 466  
 OSAL Standard File APIs, 408  
 OS\_chmod, 408  
 OS\_close, 409  
 OS\_CloseAllFiles, 409  
 OS\_CloseFileByName, 410  
 OS\_cp, 410  
 OS\_FDGetInfo, 411  
 OS\_FileOpenCheck, 411  
 OS\_lseek, 412  
 OS\_mv, 412  
 OS\_OpenCreate, 413  
 OS\_read, 414  
 OS\_remove, 414  
 OS\_rename, 415  
 OS\_stat, 415  
 OS\_TimedRead, 416  
 OS\_TimedWrite, 417  
 OS\_write, 417  
 OSAL Task APIs, 468  
 OS\_TaskCreate, 468  
 OS\_TaskDelay, 469  
 OS\_TaskDelete, 469  
 OS\_TaskExit, 470  
 OS\_TaskFindIdBySystemData, 470  
 OS\_TaskGetId, 471  
 OS\_TaskGetIdByName, 471  
 OS\_TaskGetInfo, 471  
 OS\_TaskInstallDeleteHandler, 472  
 OS\_TaskSetPriority, 472  
 OSAL Time Base APIs, 474  
 OS\_TimeBaseCreate, 474  
 OS\_TimeBaseDelete, 475  
 OS\_TimeBaseGetFreeRun, 475  
 OS\_TimeBaseGetIdByName, 476  
 OS\_TimeBaseGetInfo, 477  
 OS\_TimeBaseSet, 477  
 OSAL Timer APIs, 479  
 OS\_TimerAdd, 479  
 OS\_TimerCreate, 480  
 OS\_TimerDelete, 481  
 OS\_TimerGetIdByName, 482  
 OS\_TimerGetInfo, 482  
 OS\_TimerSet, 483  
 osal/docs/src/osal\_frontpage.dox, 1228  
 osal/docs/src/osal\_fs.dox, 1228  
 osal/docs/src/osal\_timer.dox, 1228  
 osal/src/os/inc/common\_types.h, 1228  
 osal/src/os/inc/osapi-binsem.h, 1233  
 osal/src/os/inc/osapi-bsp.h, 1234  
 osal/src/os/inc/osapi-clock.h, 1234  
 osal/src/os/inc/osapi-common.h, 1236  
 osal/src/os/inc/osapi-condvar.h, 1238  
 osal/src/os/inc/osapi-constants.h, 1239  
 osal/src/os/inc/osapi-countsem.h, 1240  
 osal/src/os/inc/osapi-dir.h, 1240  
 osal/src/os/inc/osapi-error.h, 1241  
 osal/src/os/inc/osapi-file.h, 1244  
 osal/src/os/inc/osapi-filesystems.h, 1247  
 osal/src/os/inc/osapi-heap.h, 1249  
 osal/src/os/inc/osapi-idmap.h, 1249  
 osal/src/os/inc/osapi-macros.h, 1251  
 osal/src/os/inc/osapi-module.h, 1252  
 osal/src/os/inc/osapi-mutex.h, 1254  
 osal/src/os/inc/osapi-network.h, 1254  
 osal/src/os/inc/osapi-printf.h, 1255  
 osal/src/os/inc/osapi-queue.h, 1255  
 osal/src/os/inc/osapi-select.h, 1256  
 osal/src/os/inc/osapi-shell.h, 1257  
 osal/src/os/inc/osapi-sockets.h, 1257  
 osal/src/os/inc/osapi-task.h, 1260  
 osal/src/os/inc/osapi-timebase.h, 1262  
 osal/src/os/inc/osapi-timer.h, 1263  
 osal/src/os/inc/osapi-version.h, 1264  
 osal/src/os/inc/osapi.h, 1267  
 OSAL\_API\_VERSION  
 osapi-version.h, 1266  
 OSAL\_BLOCKCOUNT\_C  
 common\_types.h, 1230  
 osal\_blockcount\_t

common\_types.h, 1231  
OSAL\_CONFIG\_CONSOLE\_ASYNC  
osconfig.h, 825  
OSAL\_CONFIG\_INCLUDE\_DYNAMIC\_LOADER  
osconfig.h, 825  
OSAL\_CONFIG\_INCLUDE\_NETWORK  
osconfig.h, 825  
OSAL\_CONFIG\_INCLUDE\_STATIC\_LOADER  
osconfig.h, 825  
osal\_id\_t  
    common\_types.h, 1231  
OSAL\_INDEX\_C  
    common\_types.h, 1230  
osal\_index\_t  
    common\_types.h, 1231  
OSAL\_OBJTYPE\_C  
    common\_types.h, 1230  
osal\_objtype\_t  
    common\_types.h, 1232  
OSAL\_PRIORITY\_C  
    osapi-task.h, 1261  
osal\_priority\_t  
    osapi-task.h, 1261  
OSAL\_SIZE\_C  
    common\_types.h, 1230  
OSAL\_STACKPTR\_C  
    osapi-task.h, 1261  
osal\_stackptr\_t  
    osapi-task.h, 1261  
OSAL\_STATUS\_C  
    common\_types.h, 1230  
osal\_status\_t  
    common\_types.h, 1232  
osal\_task  
    osapi-task.h, 1262  
OSAL\_TASK\_STACK\_ALLOCATE  
    osapi-task.h, 1261  
OSALMajorVersion  
    CFE\_ES\_HousekeepingTlm\_Payload, 502  
OSALMinorVersion  
    CFE\_ES\_HousekeepingTlm\_Payload, 502  
OSALMissionRevision  
    CFE\_ES\_HousekeepingTlm\_Payload, 502  
OSALRevision  
    CFE\_ES\_HousekeepingTlm\_Payload, 502  
osapi-clock.h  
    OS\_TIME\_TICK\_RESOLUTION\_NS, 1236  
    OS\_TIME TICKS\_PER\_MSEC, 1236  
    OS\_TIME TICKS\_PER\_SECOND, 1236  
    OS\_TIME TICKS\_PER\_USEC, 1236  
osapi-common.h  
    OS\_EVENT\_MAX, 1238  
    OS\_EVENT\_RESERVED, 1237  
    OS\_EVENT\_RESOURCE\_ALLOCATED, 1237  
osapi-constants.h  
    OS\_CHECK, 1239  
    OS\_MAX\_LOCAL\_PATH\_LEN, 1239  
    OS\_OBJECT\_CREATOR\_ANY, 1239  
    OS\_OBJECT\_ID\_UNDEFINED, 1239  
    OS\_PEND, 1240  
osapi-dir.h  
    OS\_DIRENTRY\_NAME, 1241  
osapi-error.h  
    os\_err\_name\_t, 1244  
    OS\_ERROR\_NAME\_LENGTH, 1244  
    OS\_STATUS\_STRING\_LENGTH, 1244  
    os\_status\_string\_t, 1244  
osapi-file.h  
    OS\_FILE\_FLAG\_CREATE, 1247  
    OS\_FILE\_FLAG\_NONE, 1247  
    OS\_file\_flag\_t, 1247  
    OS\_FILE\_FLAG\_TRUNCATE, 1247  
    OS\_FILESTAT\_EXEC, 1246  
    OS\_FILESTAT\_ISDIR, 1246  
    OS\_FILESTAT\_MODE, 1246  
    OS\_FILESTAT\_MODE\_DIR, 1247  
    OS\_FILESTAT\_MODE\_EXEC, 1247  
    OS\_FILESTAT\_MODE\_READ, 1247  
    OS\_FILESTAT\_MODE\_WRITE, 1247  
    OS\_FILESTAT\_READ, 1246  
    OS\_FILESTAT\_SIZE, 1246  
    OS\_FILESTAT\_TIME, 1246  
    OS\_FILESTAT\_WRITE, 1247  
osapi-filesystems.h  
    OS\_CHK\_ONLY, 1248  
    OS\_REPAIR, 1248  
osapi-idmap.h  
    OS\_OBJECT\_INDEX\_MASK, 1250  
    OS\_OBJECT\_TYPE\_SHIFT, 1250  
osapi-macros.h  
    ARGCHECK, 1251  
    BUGCHECK, 1251  
    BUGCHECK\_VOID, 1252  
    BUGREPORT, 1252  
    LENGTHCHECK, 1252  
osapi-module.h  
    OS\_MODULE\_FLAG\_GLOBAL\_SYMBOLS, 1253  
    OS\_MODULE\_FLAG\_LOCAL\_SYMBOLS, 1253  
osapi-select.h  
    OS\_STREAM\_STATE\_BOUND, 1257  
    OS\_STREAM\_STATE\_CONNECTED, 1257  
    OS\_STREAM\_STATE\_LISTENING, 1257  
    OS\_STREAM\_STATE\_READABLE, 1257

OS\_STREAM\_STATE\_WRITABLE, 1257  
 OS\_StreamState\_t, 1256  
 osapi-sockets.h  
   OS SOCKADDR\_MAX\_LEN, 1259  
   OS\_SocketDomain\_INET, 1259  
   OS\_SocketDomain\_INET6, 1259  
   OS\_SocketDomain\_INVALID, 1259  
   OS\_SocketDomain\_MAX, 1259  
   OS\_SocketDomain\_t, 1259  
   OS\_SocketShutdownMode\_NONE, 1259  
   OS\_SocketShutdownMode\_SHUT\_READ, 1259  
   OS\_SocketShutdownMode\_SHUT\_READWRITE,  
     1259  
   OS\_SocketShutdownMode\_SHUT\_WRITE, 1259  
   OS\_SocketShutdownMode\_t, 1259  
   OS\_SocketType\_DATAGRAM, 1259  
   OS\_SocketType\_INVALID, 1259  
   OS\_SocketType\_MAX, 1259  
   OS\_SocketType\_STREAM, 1259  
   OS\_SocketType\_t, 1259  
 osapi-task.h  
   OS\_FP\_ENABLED, 1261  
   OS\_MAX\_TASK\_PRIORITY, 1261  
   OSAL\_PRIORITY\_C, 1261  
   osal\_priority\_t, 1261  
   OSAL\_STACKPTR\_C, 1261  
   osal\_stackptr\_t, 1261  
   osal\_task, 1262  
   OSAL\_TASK\_STACK\_ALLOCATE, 1261  
 osapi-timebase.h  
   OS\_TimerSync\_t, 1263  
 osapi-timer.h  
   OS\_TimerCallback\_t, 1263  
 osapi-version.h  
   OS\_BUILD\_BASELINE, 1265  
   OS\_BUILD\_CODENAME, 1265  
   OS\_BUILD\_DEV\_CYCLE, 1265  
   OS\_BUILD\_NUMBER, 1265  
   OS\_CFG\_MAX\_VERSION\_STR\_LEN, 1265  
   OS\_GetBuildNumber, 1266  
   OS\_GetVersionCodeName, 1266  
   OS\_GetVersionNumber, 1267  
   OS\_GetVersionString, 1267  
   OS\_LAST\_OFFICIAL, 1265  
   OS\_MAJOR\_VERSION, 1265  
   OS\_MINOR\_VERSION, 1265  
   OS\_MISSION\_REV, 1265  
   OS\_REVISION, 1265  
   OS\_STR, 1266  
   OS\_STR\_HELPER, 1266  
   OS\_VERSION, 1266  
   OSAL\_API\_VERSION, 1266  
 osconfig.h  
   OS\_ADD\_TASK\_FLAGS, 821  
 OS\_BUFFER\_MSG\_DEPTH, 821  
 OS\_BUFFER\_SIZE, 821  
 OS\_FS\_DEV\_NAME\_LEN, 821  
 OS\_FS\_PHYS\_NAME\_LEN, 821  
 OS\_FS\_VOL\_NAME\_LEN, 821  
 OS\_MAX\_API\_NAME, 821  
 OS\_MAX\_BIN\_SEMAPHORES, 822  
 OS\_MAX\_CMD\_LEN, 822  
 OS\_MAX\_CONDVARS, 822  
 OS\_MAX\_CONSOLES, 822  
 OS\_MAX\_COUNT\_SEMAPHORES, 822  
 OS\_MAX\_FILE\_NAME, 822  
 OS\_MAX\_FILE\_SYSTEMS, 822  
 OS\_MAX\_MODULES, 823  
 OS\_MAX\_MUTEXES, 823  
 OS\_MAX\_NUM\_OPEN\_DIRS, 823  
 OS\_MAX\_NUM\_OPEN\_FILES, 823  
 OS\_MAX\_PATH\_LEN, 823  
 OS\_MAX\_QUEUES, 823  
 OS\_MAX\_SYM\_LEN, 823  
 OS\_MAX\_TASKS, 824  
 OS\_MAX\_TIMEBASES, 824  
 OS\_MAX\_TIMERS, 824  
 OS\_MODULE\_FILE\_EXTENSION, 824  
 OS\_PRINTF\_CONSOLE\_NAME, 824  
 OS\_QUEUE\_MAX\_DEPTH, 824  
 OS\_SHELL\_CMD\_INPUT\_FILE\_NAME, 824  
 OS SOCKADDR\_MAX\_LEN, 824  
 OS\_UTILITYTASK\_PRIORITY, 825  
 OS\_UTILITYTASK\_STACK\_SIZE, 825  
 OSAL\_CONFIG\_CONSOLE\_ASYNC, 825  
 OSAL\_CONFIG\_INCLUDE\_DYNAMIC\_LOADER,  
   825  
 OSAL\_CONFIG\_INCLUDE\_NETWORK, 825  
 OSAL\_CONFIG\_INCLUDE\_STATIC\_LOADER, 825  
 OutputPort  
   CFE\_EVS\_HousekeepingTlm\_Payload, 544  
 OwnerAppName  
   CFE\_TBL\_TblRegPacket\_Payload, 608  
 PacketID  
   CFE\_EVS\_LongEventTlm\_Payload, 546  
   CFE\_EVS\_ShortEventTlm\_Payload, 555  
 Pad16  
   LC\_HkTlm\_Payload\_t, 647  
 Pad8  
   LC\_HkTlm\_Payload\_t, 647  
 Padding  
   LC\_ARTEEntry\_t, 644  
   LC\_ResetAPStats\_Payload\_t, 655  
   LC\_ResetWPStats\_Payload\_t, 657  
   LC\_RTSRequest\_Payload\_t, 658  
   LC\_SampleAP\_Payload\_t, 660  
   LC\_SetAPPPermOff\_Payload\_t, 662

LC\_SetLCState\_Payload\_t, [664](#)  
LC\_WRTEntry\_t, [670](#)  
LC\_WRTTransition\_t, [671](#)

Parameter  
  CFE\_TBL\_NotifyCmd\_Payload, [602](#)

PassiveAPCount  
  LC\_ARTEEntry\_t, [645](#)

PassiveRTSExecCount  
  LC\_AppData\_t, [642](#)  
  LC\_HkTlm\_Payload\_t, [647](#)

PassToFailCount  
  LC\_ARTEEntry\_t, [645](#)

Path  
  OS\_file\_prop\_t, [674](#)

Payload  
  CFE\_ES\_DeleteCDSCmd, [494](#)  
  CFE\_ES\_DumpCDSRegistryCmd, [495](#)  
  CFE\_ES\_FileNameCmd, [497](#)  
  CFE\_ES\_HousekeepingTlm, [498](#)  
  CFE\_ES\_MemStatsTlm, [508](#)  
  CFE\_ES\_OneAppTlm, [509](#)  
  CFE\_ES\_OverWriteSysLogCmd, [510](#)  
  CFE\_ES\_QueryAllCmd, [512](#)  
  CFE\_ES\_QueryAllTasksCmd, [513](#)  
  CFE\_ES\_QueryOneCmd, [513](#)  
  CFE\_ES\_ReloadAppCmd, [514](#)  
  CFE\_ES\_RestartAppCmd, [516](#)  
  CFE\_ES\_RestartCmd, [516](#)  
  CFE\_ES\_SendMemPoolStatsCmd, [518](#)  
  CFE\_ES\_SetMaxPRCountCmd, [519](#)  
  CFE\_ES\_SetPerfFilterMaskCmd, [520](#)  
  CFE\_ES\_SetPerfTriggerMaskCmd, [521](#)  
  CFE\_ES\_StartApp, [523](#)  
  CFE\_ES\_StartPerfDataCmd, [525](#)  
  CFE\_ES\_StopAppCmd, [525](#)  
  CFE\_ES\_StopPerfDataCmd, [527](#)  
  CFE\_ES\_WriteERLogCmd, [529](#)  
  CFE\_ES\_WriteSysLogCmd, [529](#)

CFE\_EVS\_AddEventFilterCmd, [530](#)  
CFE\_EVS\_DeleteEventFilterCmd, [536](#)  
CFE\_EVS\_DisableAppEventsCmd, [537](#)  
CFE\_EVS\_DisableAppEventTypeCmd, [537](#)  
CFE\_EVS\_DisableEventTypeCmd, [538](#)  
CFE\_EVS\_DisablePortsCmd, [539](#)  
CFE\_EVS\_EnableAppEventsCmd, [539](#)  
CFE\_EVS\_EnableAppEventTypeCmd, [540](#)  
CFE\_EVS\_EnableEventTypeCmd, [540](#)  
CFE\_EVS\_EnablePortsCmd, [541](#)  
CFE\_EVS\_HousekeepingTlm, [542](#)  
CFE\_EVS\_LongEventTlm, [546](#)  
CFE\_EVS\_ResetAllFiltersCmd, [549](#)  
CFE\_EVS\_ResetAppCounterCmd, [550](#)  
CFE\_EVS\_ResetFilterCmd, [551](#)  
CFE\_EVS\_SetEventFormatModeCmd, [552](#)

CFE\_EVS\_SetFilterCmd, [553](#)  
CFE\_EVS\_SetLogModeCmd, [554](#)  
CFE\_EVS\_ShortEventTlm, [555](#)  
CFE\_EVS\_WriteAppDataFileCmd, [556](#)  
CFE\_EVS\_WriteLogDataFileCmd, [556](#)  
CFE\_SB\_AllSubscriptionsTlm, [560](#)  
CFE\_SB\_DisableRouteCmd, [561](#)  
CFE\_SB\_EnableRouteCmd, [562](#)  
CFE\_SB\_HousekeepingTlm, [563](#)  
CFE\_SB\_SingleSubscriptionTlm, [577](#)  
CFE\_SB\_StatsTlm, [578](#)  
CFE\_SB\_WriteMapInfoCmd, [584](#)  
CFE\_SB\_WritePipeInfoCmd, [584](#)  
CFE\_SB\_WriteRoutingInfoCmd, [585](#)  
CFE\_TBL\_AbortLoadCmd, [585](#)  
CFE\_TBL\_ActivateCmd, [586](#)  
CFE\_TBL\_DeleteCDSCmd, [588](#)  
CFE\_TBL\_DumpCmd, [589](#)  
CFE\_TBL\_DumpRegistryCmd, [590](#)  
CFE\_TBL\_HousekeepingTlm, [594](#)  
CFE\_TBL\_LoadCmd, [600](#)  
CFE\_TBL\_NotifyCmd, [602](#)  
CFE\_TBL\_SendRegistryCmd, [604](#)  
CFE\_TBL\_TableRegistryTlm, [605](#)  
CFE\_TBL\_ValidateCmd, [609](#)  
CFE\_TIME\_AddAdjustCmd, [610](#)  
CFE\_TIME\_AddDelayCmd, [611](#)  
CFE\_TIME\_AddOneHzAdjustmentCmd, [611](#)  
CFE\_TIME\_DiagnosticTlm, [612](#)  
CFE\_TIME\_HousekeepingTlm, [621](#)  
CFE\_TIME\_SetLeapSecondsCmd, [628](#)  
CFE\_TIME\_SetMETCCmd, [628](#)  
CFE\_TIME\_SetSignalCmd, [629](#)  
CFE\_TIME\_SetSourceCmd, [630](#)  
CFE\_TIME\_SetStateCmd, [630](#)  
CFE\_TIME\_SetSTCFCmd, [631](#)  
CFE\_TIME\_SetTimeCmd, [631](#)  
CFE\_TIME\_SubAdjustCmd, [634](#)  
CFE\_TIME\_SubDelayCmd, [634](#)  
CFE\_TIME\_SubOneHzAdjustmentCmd, [635](#)  
CFE\_TIME\_ToneDataCmd, [637](#)  
LC\_HkPacket\_t, [645](#)  
LC\_ResetAPStatsCmd\_t, [656](#)  
LC\_ResetWPStatsCmd\_t, [658](#)  
LC\_RTSRequestCmd\_t, [659](#)  
LC\_SampleAPCmd\_t, [661](#)  
LC\_SetAPPPermOffCmd\_t, [662](#)  
LC\_SetAPStateCmd\_t, [664](#)  
LC\_SetLCStateCmd\_t, [665](#)

PeakMemInUse  
  CFE\_SB\_StatsTlm\_Payload, [580](#)

PeakMsgIdsInUse  
  CFE\_SB\_StatsTlm\_Payload, [581](#)

PeakPipesInUse

CFE\_SB\_StatsTlm\_Payload, 581  
 PeakQueueDepth  
   CFE\_SB\_PipeDepthStats, 570  
   CFE\_SB\_PipeInfoEntry, 572  
 PeakSBBuffersInUse  
   CFE\_SB\_StatsTlm\_Payload, 581  
 PeakSubscriptionsInUse  
   CFE\_SB\_StatsTlm\_Payload, 581  
 PerfDataCount  
   CFE\_ES\_HousekeepingTlm\_Payload, 502  
 PerfDataEnd  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfDataStart  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfDataToWrite  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfFilterMask  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfMode  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfState  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfTriggerCount  
   CFE\_ES\_HousekeepingTlm\_Payload, 503  
 PerfTriggerMask  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 Pipe  
   CFE\_SB\_RouteCmd\_Payload, 574  
   CFE\_SB\_SingleSubscriptionTlm\_Payload, 578  
   CFE\_SB\_SubEntries, 582  
 PipeDepthStats  
   CFE\_SB\_StatsTlm\_Payload, 581  
 PipeId  
   CFE\_SB\_PipeDepthStats, 570  
   CFE\_SB\_PipeInfoEntry, 572  
   CFE\_SB\_RoutingFileEntry, 575  
 PipeName  
   CFE\_SB\_PipeInfoEntry, 572  
   CFE\_SB\_RoutingFileEntry, 575  
 PipeOptsErrorCounter  
   CFE\_ES\_HousekeepingTlm\_Payload, 566  
 PipeOverflowErrorCounter  
   CFE\_SB\_HousekeepingTlm\_Payload, 566  
 PipesInUse  
   CFE\_SB\_StatsTlm\_Payload, 581  
 PktSegment  
   CFE\_SB\_AllSubscriptionsTlm\_Payload, 561  
 PoolHandle  
   CFE\_ES\_PoolStatsTlm\_Payload, 512  
   CFE\_ES\_SendMemPoolStatsCmd\_Payload, 518  
 PoolSize  
   CFE\_ES\_MemPoolStats, 507  
 PoolStats  
   CFE\_ES\_PoolStatsTlm\_Payload, 512  
   POP\_RPN\_DATA  
     lc\_action.c, 710  
 Priority  
   CFE\_ES\_AppInfo, 489  
   CFE\_ES\_StartAppCmd\_Payload, 524  
   CFE\_ES\_TaskInfo, 528  
   CFE\_SB\_Qos\_t, 572  
 priority  
   OS\_task\_prop\_t, 684  
 ProcessorID  
   CFE\_EVS\_PacketID, 548  
   CFE\_FS\_Header, 559  
 ProcessorResets  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 psp/fsw/inc/cfe\_psp.h, 1268  
 psp/fsw/inc/cfe\_psp\_error.h, 1295  
 PSPMajorVersion  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 PSPMinorVersion  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 PSPMissionRevision  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 PSPRevision  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 Ptr  
   CFE\_ES\_PoolAlign, 511  
 Qos  
   CFE\_SB\_SingleSubscriptionTlm\_Payload, 578  
   CFE\_SB\_SubEntries, 582  
 RawByte  
   LC\_MultiType\_t, 649  
 RegisteredCoreApps  
   CFE\_ES\_HousekeepingTlm\_Payload, 504  
 RegisteredExternalApps  
   CFE\_ES\_HousekeepingTlm\_Payload, 505  
 RegisteredLibs  
   CFE\_ES\_HousekeepingTlm\_Payload, 505  
 RegisteredTasks  
   CFE\_ES\_HousekeepingTlm\_Payload, 505  
 Reliability  
   CFE\_SB\_Qos\_t, 573  
 Reserved  
   CFE\_TBL\_File\_Hdr, 592  
 ResetSubtype  
   CFE\_ES\_HousekeepingTlm\_Payload, 505  
 ResetType  
   CFE\_ES\_HousekeepingTlm\_Payload, 505  
 ResourceId  
   CFE\_ES\_AppInfo, 489  
 RestartType  
   CFE\_ES\_RestartCmd\_Payload, 517  
 ResultAgeWhenStale  
   LC\_WDTEntry\_t, 667

RPNEquation  
  LC\_AdTEntry\_t, 640

RTSExecCount  
  LC\_AppData\_t, 642  
  LC\_HkTlm\_Payload\_t, 647

RTSId  
  LC\_AdTEntry\_t, 640  
  LC\_RTSRequest\_Payload\_t, 658

sample\_perfids.h  
  CFE\_MISSION\_ES\_MAIN\_PERF\_ID, 881  
  CFE\_MISSION\_ES\_PERF\_EXIT\_BIT, 881  
  CFE\_MISSION\_EVS\_MAIN\_PERF\_ID, 881  
  CFE\_MISSION\_SB\_MAIN\_PERF\_ID, 881  
  CFE\_MISSION\_SB\_MSG\_LIM\_PERF\_ID, 881  
  CFE\_MISSION\_SB\_PIPE\_OFLOW\_PERF\_ID, 881  
  CFE\_MISSION\_TBL\_MAIN\_PERF\_ID, 881  
  CFE\_MISSION\_TIME\_LOCAL1HZISR\_PERF\_ID, 881  
  CFE\_MISSION\_TIME\_LOCAL1HZTASK\_PERF\_ID, 881  
  CFE\_MISSION\_TIME\_MAIN\_PERF\_ID, 882  
  CFE\_MISSION\_TIME\_SENDMET\_PERF\_ID, 882  
  CFE\_MISSION\_TIME\_TONE1HZISR\_PERF\_ID, 882  
  CFE\_MISSION\_TIME\_TONE1HZTASK\_PERF\_ID, 882

SBBuffersInUse  
  CFE\_SB\_StatsTlm\_Payload, 581

Seconds  
  CFE\_TIME\_OneHzAdjustmentCmd\_Payload, 625  
  CFE\_TIME\_SysTime, 635  
  CFE\_TIME\_TimeCmd\_Payload, 636

Seconds1HzAdj  
  CFE\_TIME\_HousekeepingTlm\_Payload, 623

SecondsDelay  
  CFE\_TIME\_HousekeepingTlm\_Payload, 623

SecondsMET  
  CFE\_TIME\_HousekeepingTlm\_Payload, 623

SecondsSTCF  
  CFE\_TIME\_HousekeepingTlm\_Payload, 623

SendErrors  
  CFE\_SB\_PipeInfoEntry, 572

Sequence  
  CCSDS\_PrimaryHeader, 486

ServerFlyState  
  CFE\_TIME\_DiagnosticTlm\_Payload, 618

Signed16  
  LC\_MultiType\_t, 650

Signed32  
  LC\_MultiType\_t, 650

Signed8  
  LC\_MultiType\_t, 650

Size  
  CFE\_ES\_CDSRegDumpRec, 493  
  CFE\_TBL\_Info, 599  
  CFE\_TBL\_TblRegPacket\_Payload, 608

SIZE\_BYTE  
  cfe\_psp.h, 1275

SIZE\_HALF  
  cfe\_psp.h, 1275

SIZE\_WORD  
  cfe\_psp.h, 1275

SpacecraftID  
  CFE\_EVS\_PacketID, 548  
  CFE\_FS\_Header, 559

Spare  
  CFE\_ES\_TaskInfo, 528  
  CFE\_EVS\_AppNameBitMaskCmd\_Payload, 531  
  CFE\_EVS\_BitMaskCmd\_Payload, 535  
  CFE\_EVS\_SetEventFormatCode\_Payload, 552  
  CFE\_EVS\_SetLogMode\_Payload, 554  
  CFE\_SB\_PipeDepthStats, 570  
  CFE\_SB\_PipeInfoEntry, 572  
  CFE\_SB\_RouteCmd\_Payload, 574  
  LC\_MListTag, 649  
  LC\_WListTag, 668

Spare1  
  CFE\_EVS\_HousekeepingTlm\_Payload, 544  
  CFE\_EVS\_LongEventTlm\_Payload, 547

Spare2  
  CFE\_EVS\_HousekeepingTlm\_Payload, 544  
  CFE\_EVS\_LongEventTlm\_Payload, 547

Spare2Align  
  CFE\_SB\_HousekeepingTlm\_Payload, 566

Spare3  
  CFE\_EVS\_HousekeepingTlm\_Payload, 544

stack\_size  
  OS\_task\_prop\_t, 684

StackSize  
  CFE\_ES\_AppInfo, 489  
  CFE\_ES\_StartAppCmd\_Payload, 524  
  CFE\_ES\_TaskInfo, 528

start\_time  
  OS\_timer\_prop\_t, 686

StartAddress  
  CFE\_ES\_AppInfo, 490

StartIndex  
  LC\_SampleAP\_Payload\_t, 660

State  
  CFE\_SB\_RoutingFileEntry, 575

StreamId  
  CCSDS\_PrimaryHeader, 486

SubscribeErrorCounter  
  CFE\_SB\_HousekeepingTlm\_Payload, 566

SubscriptionsInUse  
  CFE\_SB\_StatsTlm\_Payload, 582

Subseconds

CFE\_TIME\_OneHzAdjustmentCmd\_Payload, [625](#)  
 CFE\_TIME\_SysTime, [636](#)  
 Subsecs1HzAdj  
   CFE\_TIME\_HousekeepingTlm\_Payload, [624](#)  
 SubsecsDelay  
   CFE\_TIME\_HousekeepingTlm\_Payload, [624](#)  
 SubsecsMET  
   CFE\_TIME\_HousekeepingTlm\_Payload, [624](#)  
 SubsecsSTCF  
   CFE\_TIME\_HousekeepingTlm\_Payload, [624](#)  
 Subsystem  
   CCSDS\_ExtendedHeader, [485](#)  
 SubType  
   CFE\_FS\_Header, [559](#)  
   CFE\_SB\_SingleSubscriptionTlm\_Payload, [578](#)  
 SuccessValCounter  
   CFE\_TBL\_HousekeepingTlm\_Payload, [597](#)  
 SysLogBytesUsed  
   CFE\_ES\_HousekeepingTlm\_Payload, [505](#)  
 SysLogEntries  
   CFE\_ES\_HousekeepingTlm\_Payload, [505](#)  
 SysLogMode  
   CFE\_ES\_HousekeepingTlm\_Payload, [506](#)  
 SysLogSize  
   CFE\_ES\_HousekeepingTlm\_Payload, [506](#)  
 SystemId  
   CCSDS\_ExtendedHeader, [485](#)  
  
 Table  
   CFE\_ES\_CDSRegDumpRec, [493](#)  
 TableLoadedOnce  
   CFE\_TBL\_Info, [599](#)  
   CFE\_TBL\_TblRegPacket\_Payload, [608](#)  
 TableName  
   CFE\_TBL\_AbortLoadCmd\_Payload, [586](#)  
   CFE\_TBL\_ActivateCmd\_Payload, [587](#)  
   CFE\_TBL\_DelCDSCmd\_Payload, [587](#)  
   CFE\_TBL\_DumpCmd\_Payload, [590](#)  
   CFE\_TBL\_File\_Hdr, [592](#)  
   CFE\_TBL\_FileDef, [593](#)  
   CFE\_TBL\_SendRegistryCmd\_Payload, [604](#)  
   CFE\_TBL\_ValidateCmd\_Payload, [610](#)  
 TableResults  
   LC\_OperData\_t, [654](#)  
 TaskId  
   CFE\_ES\_TaskInfo, [528](#)  
 TaskName  
   CFE\_ES\_TaskInfo, [528](#)  
 TelemetryHeader  
   CFE\_ES\_HousekeepingTlm, [498](#)  
   CFE\_ES\_MemStatsTlm, [508](#)  
   CFE\_ES\_OneAppTlm, [509](#)  
   CFE\_EVS\_HousekeepingTlm, [542](#)  
   CFE\_EVS\_LongEventTlm, [546](#)  
 CFE\_EVS\_ShortEventTlm, [555](#)  
 CFE\_SB\_AllSubscriptionsTlm, [560](#)  
 CFE\_SB\_HousekeepingTlm, [563](#)  
 CFE\_SB\_SingleSubscriptionTlm, [577](#)  
 CFE\_SB\_StatsTlm, [578](#)  
 CFE\_TBL\_HousekeepingTlm, [594](#)  
 CFE\_TBL\_TableRegistryTlm, [605](#)  
 CFE\_TIME\_DiagnosticTlm, [612](#)  
 CFE\_TIME\_HousekeepingTlm, [621](#)  
 LC\_HkPacket\_t, [645](#)  
 TgtFilename  
   CFE\_TBL\_FileDef, [593](#)  
 ticks  
   OS\_time\_t, [684](#)  
 TimeOfLastUpdate  
   CFE\_TBL\_Info, [600](#)  
   CFE\_TBL\_TblRegPacket\_Payload, [608](#)  
 TimeSeconds  
   CFE\_FS\_Header, [559](#)  
 TimeSinceTone  
   CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)  
 TimeSource  
   CFE\_TIME\_SourceCmd\_Payload, [633](#)  
 Timestamp  
   LC\_WRTTransition\_t, [671](#)  
 TimeSubSeconds  
   CFE\_FS\_Header, [559](#)  
 ToneDataCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [618](#)  
 ToneDataLatch  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneIntCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneIntErrorCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneMatchCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneMatchErrorCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneOverLimit  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneSignalCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [619](#)  
 ToneSignalLatch  
   CFE\_TIME\_DiagnosticTlm\_Payload, [620](#)  
 ToneSource  
   CFE\_TIME\_SignalCmd\_Payload, [632](#)  
 ToneTaskCounter  
   CFE\_TIME\_DiagnosticTlm\_Payload, [620](#)  
 ToneUnderLimit  
   CFE\_TIME\_DiagnosticTlm\_Payload, [620](#)  
 total\_blocks  
   OS\_statvfs\_t, [683](#)  
 TotalSegments

CFE\_SB\_AllSubscriptionsTlm\_Payload, 561  
TriggerMask  
  CFE\_ES\_SetPerfTrigMaskCmd\_Payload, 522  
TriggerMaskNum  
  CFE\_ES\_SetPerfTrigMaskCmd\_Payload, 522  
TriggerMode  
  CFE\_ES\_StartPerfCmd\_Payload, 524  
Type  
  CFE\_ES\_AppInfo, 490

uint16  
  common\_types.h, 1232  
uint32  
  common\_types.h, 1232  
uint64  
  common\_types.h, 1232  
uint8  
  common\_types.h, 1232  
UnmarkedMem  
  CFE\_SB\_HousekeepingTlm\_Payload, 567  
UnregisteredAppCounter  
  CFE\_EVS\_HousekeepingTlm\_Payload, 545  
Unsigned16  
  LC\_MultiType\_t, 650  
Unsigned32  
  LC\_MultiType\_t, 650  
Unsigned8  
  LC\_MultiType\_t, 650  
UpdateAge  
  LC\_SampleAP\_Payload\_t, 660  
User  
  OS\_file\_prop\_t, 674  
UserDefAddr  
  CFE\_TBL\_Info, 600

valid  
  OS\_module\_address\_t, 678  
ValidationCounter  
  CFE\_TBL\_HousekeepingTlm\_Payload, 598  
ValidationFuncPtr  
  CFE\_TBL\_TblRegPacket\_Payload, 608  
Value  
  CFE\_SB\_MsgId\_t, 568  
  LC\_WRTTransition\_t, 671  
value  
  OS\_bin\_sem\_prop\_t, 672  
  OS\_count\_sem\_prop\_t, 673  
VersionCounter  
  CFE\_TIME\_DiagnosticTlm\_Payload, 620  
VirtualMET  
  CFE\_TIME\_DiagnosticTlm\_Payload, 620

WatchIndex  
  LC\_WListTag, 668  
WatchpointCount

LC\_OperData\_t, 654  
WatchpointOffset  
  LC\_WDTEEntry\_t, 667  
WatchPtLinks  
  LC\_OperData\_t, 654  
WatchPtList  
  LC\_MListTag, 649  
WatchResult  
  LC\_WRTEEntry\_t, 670  
WDTHandle  
  LC\_OperData\_t, 654  
WDTPtr  
  LC\_OperData\_t, 654  
WPNumber  
  LC\_ResetWPStats\_Payload\_t, 657  
WPResults  
  LC\_HkTlm\_Payload\_t, 648  
WPsInUse  
  LC\_HkTlm\_Payload\_t, 648  
WRDataCDSHandle  
  LC\_OperData\_t, 654  
WRTHandle  
  LC\_OperData\_t, 654  
WRTPtr  
  LC\_OperData\_t, 655