

Core Flight Software System (cFS)

Memory Dwell (MD) Application

Build: 2.3.1.0

FSW Version Description Document

Release Date: 7/14/2017

Signatures

Approved by:



1.0 FSW Version Description

1.1 purpose and summary

The purpose of this build is to continue to refine the cFS Memory Dwell (MD) application product. This build provides the following revisions:

* Minor clean up to remove old history logs
* Minor clean up to remove unused Event ID
* Fixed Doxygen user’s guide makefile
* Fixes use of an unsigned integer to store/reference a memory address
* Updated table verify to produce events consistent with other applications
* Changed table load to use table files vs. memory address
* Fixes CFE\_EVS\_SendEvent format warnings
* Adds new assert based unit tests.

This document serves as the notification of the Build 2.3.1.0 release of the cFS MD application.

Memory Dwell (MD) version 2.3.1.0 is compatible with cFE builds 6.5.0 and above and OSAL builds 4.2.0 and above.

1.2 new functionality in this VERSION

Table 1.2-1 identifies new FSW functionality that has been implemented and is integrated into this FSW version. Requirement references are included.

**Table 1.2-1 – New Functionality in this Version**

| No. | FSB DCR # (or N/A ) | Requirements | Functionality or Change Description |
| --- | --- | --- | --- |
| - | - | N/A | None |

Table 1.2-2 identifies changes to FSW functionality from a previously delivered FSW version and the DCRs and Trac Ticket numbers associated with these changes. See attachment 1 for a full listing of the DCRs and Trac Tickets included in this release.

**Table 1.2-2 – Changes to Previously Delivered Functionality**

| No. | FSB DCR # (or N/A ) | Requirements | High Level Description of Functionality |
| --- | --- | --- | --- |
| 1 | 3716 | N/A | MD table verification event messages and default table location need to be updated to be consistent with other applications.  Table verification event messages should be handled as follows:   * Per table, generate and error event for the first error found * After verification is complete, generate an info event with the totals (ie "table\_name verify results:  good = x, bad = y, unused = z")  (note:  this event is generate at the end of every table verify, not just if there are errors).   Added information event MD\_DWELL\_TBL\_INF\_EID 52 with message text:  'MD Dwell Tbl verify results: good = \%d, bad = \%d, unused = \%d'  The default table location should be:   /cf/apps/  Changed table load from memory address to use the table files.  Table files have been renamed to have a base filename of 'md\_dw' followed by 2 digits in sequential order starting from 1 and will read these from the /cf/apps directory  e.g. "md\_dw01.tbl" "md\_dw02.tbl" |
| 2 | 146175 | MD3000  MD4000 | Fix use of uint32 to Store/Reference a Memory Address. MD used uint32 to define variables that store/access a memory address. This will not work on 64-bit architectures.  The OSAL version 4.2.0 "common\_types.h" introduced a "cpuaddr" type to address this -- it is defined as an integer type large enough to store a memory address on the local processor.  All uses of uint32 to store/access a memory address has been replaced with the cpuaddr type for better portability. This is a requirement for a native 64-bit build to work. The following have been changed to cpuaddr type:   * MD\_DwellControlEntry\_t.ResolvedAddress * MD\_GetDwellData: local var DwellAddress * MD\_ValidTableEntry : local var ResolvedAddr * MD\_CopyUpdatedTbl : local var ResolvedAddr * MD\_ProcessJamCmd : local var ResolvedAddr * MD\_ValidAddrRange : Argument 1 : Addr |

1.3 MISSING Planned FEATURES AND KNOWN PROBLEMS

Table 1.3-1 identifies the functions and known discrepancies that are absent from MD Build 2.3.1.0. Any workarounds that may apply are identified.

Information on currently open DCRs is available at:

<http://gs580v-fsbmks10.ndc.nasa.gov:7001/index.html>.

Information on currently open Trac tickets is available at:

<https://babelfish.arc.nasa.gov/trac/cfs_apps/report/1>.

Note that these are restricted websites that requires a server account. Additional DCRs and/or Trac Tickets may have been submitted after preparation of this VDD. A cFS MD DCR report containing a listing of open DCRs and Trac tickets is available on request for customers who do not have access to the restricted servers. Please contact Susanne Strege, [susie.strege@nasa.gov](mailto:susie.strege@nasa.gov).

**Table 1.3-1 – Functions absent from this Release**

Trac ticket references are proceeded with a ‘#’ character.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **FSB DCR or Trac #** | **Description** | **Reason for Absence** | **Affected Requirement or Component** | **Workaround** | **Planned Delivery** |
| 1 | #89 | MD Table Configuration is Not Consistent with Other Applications:  MD does not allow the option to save/not save tables in the CDS  MD does not allow default address to be configurable  MD does not use the CFE\_TBL\_Manage feature | Implementation is dependent on resource/staff availability | MD Tables | N/A | Not Determined |
| 2 | 4118 | MD - Add Trick Simulation Support (JSC Request) | Implementation is dependent on customer needs. Community input is needed. | Trick | None | Not Determined |

1.4 Development Tool Versions Associated with this FSW Version

Table 1.4-1 identifies the versions of development tools used to generate this FSW version:

**Table 1.4-1 – Development Tool Versions Associated with this FSW Version**

| Tool Type. | Tool Name | Version Used |
| --- | --- | --- |
| RTOS | BVTed with VxWorks 6.9, however, OSAL provides ability to use multiple OSes | 6.9 |
| Compiler | GNU | 3.3.2 |
| cFE | Core Flight Executive | 6.5.0.0 |
| OSAL | Operating System Abstraction Layer | 4.2.0.0 |

2.0 Delivered products

Table 2-1 identifies the locations of FSW products relevant to this FSW Build. The version or date of the Build and where the product can be located are provided. Changes from a previous VDD are identified.

**Table 2-1 – Delivered Products and their Locations**

| Software Element | Changed with this Version? | New Version or Date | Location |
| --- | --- | --- | --- |
| Executable for this build | Yes | 2.3.1.0 | Not applicable. Executables must be created for the specific mission/platform |
| Installation Procedures & Special Instructions **(See Section 3.0)** | No | 3.1 | See cFS Deployment Guide    babelfish.arc.nasa.gov (in git system TOOLS master branch)  and  <http://sourceforge.net/projects/coreflightexec> |
| Source Code of this FSW Build | Yes | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| FSW Build Plan | N/A | N/A | None |
| Annotated S/W Detailed Design Docs | No | N/A | fsb.gsfc.nasa.gov/cFS |
| Ground System T&C Database | No | N/A | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Ground System Scripts developed by FSB | Yes | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Simulator and Test Data Generator Software | No | N/A | None |
| Executable - Ground Tools associated with FSW (tools to build stored command loads, etc.) | No | N/A | None |
| Source Code - Ground Tools associated with FSW (tools to build stored command loads, etc.) | No | N/A | Perl scripts to generate ground database and build verification procedures from templates (see cFS Deployment Guide) |
| Unit Test Procedures | Yes | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Unit Test Data | Yes | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Unit Test Results | Yes | 2017/06/21 | gs580v-fsbmks10.ndc.nasa.gov. MKS label CS-ALL-Build2.2.1.0\_MAY3-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| FSW Make Files | No | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Linker & Compiler Configuration Files | No | 2.3.1.0 | gs580v-fsbmks10.ndc.nasa.gov. MKS label MD-ALL-Build2.3.1.0\_JUL14-2017  babelfish.arc.nasa.gov (in git system md\_app\_master branch)  and  <http://sourceforge.net/projects/cfs-md> |
| Requirements version (from MKS) | No | 1.3 | MKS label – version 1.3 |

3.0 INSTALLATION PROCEDURES

Table 3-1 identifies the nominal FSW Installation Procedure(s) for this FSW Build onto the intended target system (including the commercial applications used and the configuration settings). The procedure version identifier, the date of the procedure and where it can be located are also provided.

**Table 3-1 FSW Installation Procedure(s)**

| Destination  (Target System) | Filename | Version and Date | Location |
| --- | --- | --- | --- |
| N/A | See cFS Deployment Guide | Version 3.1 | Available with cFE open source release:  <http://sourceforge.net/projects/coreflightexec/>  babelfish.arc.nasa.gov (in git system TOOLS master branch)  and on gs580v-fsbmks10.ndc.nasa.gov |

4.0 Configuration summary and version identification

MD Build 2.3.1.0 can be found on gs580v-fsbmks10.ndc.nasa.gov, sourceforge: [http://sourceforge.net/projects/cfs-md](http://sourceforge.net/projects/cfs-sch), and babelfish.arc.nasa.gov (in git system md\_app\_master branch). Verification of the version can be done by sending a MD NOOP command which produces an event message containing the version information. In addition, the initialization event message generated during the application startup provides the version information.

5.0 Software CopyRight Notice

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Acronyms

ACS Attitude Control System

C&DH Command and Data Handling

cFE…………………………………………………………………………………………..……core Flight Executive

cFS………………………………………………………………………………………core Flight Software System

CM Configuration Management

COTS Commercial Off-The-Shelf

DCR Discrepancy/Change Request

ETU Engineering Test Unit

FSB Flight Software Branch

FSW Flight Software

I&T Integration & Test

MD……………………………………………………………………………………………Memory Dwell Application

OSAL……………………………………………………………………………Operating System Abstraction Layer

RTOS Real-Time Operating System

T&C Telemetry and Command

URL Universal Resource Locator

VDD Version Description Document

ATTACHMENT 1 – CFS memory dwell build 2.3.1.0 DCRs/Trac Tickets

Trac ticket references are proceeded with a ‘#’ character.

|  | | | |
| --- | --- | --- | --- |
| **No.** | **DCR/Trac Ticket #** | **Description** | **Type** | | **Priority** | **State** | **Date Reported** | **Build Target** |
| 1 | 3699 | The MD User's Guide does not contain information in the Commands Section. The line in the user\_doxy file for including \_msgdefs.h was commented out. Uncommented this to include the Commands in the User Guide. | defect | | minor | Test Complete | 02/17/2010 | 2.3.1.0 |
| 2 | 3716 | MD table verification event messages and default table location need to be updated to be consistent with other applications. | enhancement | | minor | Test Complete | 03/25/2010 | 2.3.1.0 |
| 3 | 4099 | MD Event ID 48 Is Defined and Not Used | cosmetic | | minor | Test Complete | 12/29/2012 | 2.3.1.0 |
| 4 | 145924 | MD - CFE\_EVS\_SendEvent Format Warnings | defect | | minor | Test Complete | 10/24/2016 | 2.3.1.0 |
| 5 | 146037 | Implement UT-Assert Unit Tests for the MD Application | enhancement | | major | Test Complete | 01/27/2017 | 2.3.1.0 |
| 6 | 146038 | MD: Move function prototypes from .c files to .h files. Unit tests need access to function definitions. | defect | | minor | Test Complete | 01/27/2017 | 2.3.1.0 |
| 7 | 146175 | Fix use of uint32 to Store/Reference a Memory Address. MD used uint32 to define variables that store/access a memory address. This will not work on 64-bit architectures. | defect | | moderate | Test Complete | 05/11/2017 | 2.3.1.0 |
| 8 | 146178 | MD - Remove MKS Logs and change copyright symbol to ASCII | cosmetic | | minor | Test Complete | 05/18/2017 | 2.3.1.0 |