# Module --

# High-Level Description

This module handles the EPS system state transitions and is used to determine the operating system state based on knowledge of customer and internal inputs. The System State is used in turn by the Scheduler to determine the task list to be executed in a particular state.

# Figures

## Component Diagram

None, files are generated by Configurator.

# Variable Data Dictionary

|  |  |
| --- | --- |
| Module Inputs | Module Outputs |
| CTerm\_Cnt\_lgc | CloseCheck\_Cnt\_u32 |
| ATerm\_Cnt\_lgc | TypeHData\_Cnt\_u08[D\_TYPEHDATASIZE\_CNT\_U16] |
| FTerm\_Cnt\_lgc |  |
| RampStatusComplete\_Cnt\_lgc |  |
| ControlledDampStatusComplete\_Cnt\_lgc |  |
| TMFTestComplete\_Cnt\_lgc |  |

## Module Internal Variables

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable Name | DataType | Resolution | Legal Range  (min) | Legal Range  (max) | Multiplicity | Software Segment |
| StTrnsVctr\_Cnt\_D\_b08 | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_8 |
| WarmInitMilestoneRqst\_Cnt\_M\_u32 | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_32 |
| WarmInitMilestoneRqst#\_Cnt\_M\_u32 | Refer \* | Refer \* | Refer \* | Refer \* | 0:n | STAMD#\_START\_SEC\_VAR\_CLEARED\_32 |
| EcuResetActive\_Cnt\_M\_lgc | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| FinalNvMWriteInProgress\_Cnt\_M\_lgc | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| StopTODPerOperation\_Cnt\_M\_lgc | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| TODState\_Cnt\_M\_lgc | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| TransitionComplete\_Cnt\_M\_lgc | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| SystemState\_Cnt\_M\_enum | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_INIT\_UNSPECIFIED |
| SystemState#\_Cnt\_M\_enum | Refer \* | Refer \* | Refer \* | Refer \* | 0:n | STAMD#\_START\_SEC\_VAR\_INIT\_UNSPECIFIED |
| SysCSystemState\_Cnt\_M\_enum | Refer \* | Refer \* | Refer \* | Refer \* | 1:1 | STAMD#\_START\_SEC\_VAR\_INIT\_UNSPECIFIED |
| Lnk\_TypeH#\_Start | Refer \* | Refer \* | Refer \* | Refer \* | 0:n | AP\_STAMD\_CONST |
| Lnk\_TypeH#\_Size | Refer \* | Refer \* | Refer \* | Refer \* | 0:n | AP\_STAMD\_CONST |

Note: “ Refer \*” - Refer to States\_And\_Modes\_GeneratedCfg\_MDD

Note “#” denotes application number(1 to n) which varies across projects. Check project configuration files Under UTP/ Contract folder for number of applications

### User defined typedef definition/declaration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typedef Name | Element Name | User Defined Type | Legal Range  (min) | Legal Range  (max) |
|  |  |  |  |  |
| TypeHInfoType\_Str | Start | Const uint8 pointer | 0 | Full |
|  | Size | Uint32 | 0 | Full |
| Rte\_ModeType\_StaMd\_Mode | RTE\_MODE\_StaMd\_Mode\_DISABLE  RTE\_MODE\_StaMd\_Mode\_OFF  RTE\_MODE\_StaMd\_Mode\_OPERATE  RTE\_MODE\_StaMd\_Mode\_WARMINIT  RTE\_TRANSITION\_StaMd\_Mode | N/A | N/A | N/A |

# Constant Data Dictionary

## Calibration Constants

|  |
| --- |
| Constant Name |
| k\_StaMdsSysCDiag\_Cnt\_str |

## Program(fixed) Constants

### Embedded Constants

#### Local

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Units | Value |
| D\_STATELKPVCTRS\_CNT\_U16 | 1 | Counts | 16 |
| D\_STATELKPSTATES\_CNT\_U16 | 1 | Counts | 4 |
| D\_TVBITF\_CNT\_U16 | 1 | Counts | 0x01 |
| D\_TVBITC\_CNT\_U16 | 1 | Counts | 0x02 |
| D\_TVBITM\_CNT\_U16 | 1 | Counts | 0x04 |
| D\_TVBITA\_CNT\_U16 | 1 | Counts | 0x08 |
| D\_CLOSECHECKVALUE\_CNT\_U32 | 1 | Counts | 0 x00FF00FF |
| D\_CLOSECHECKGARBAGE\_CNT\_U32 | 1 | Counts | 0x5555AAAA |

#### Global

|  |
| --- |
| Constant Name |
| \*D\_STAMD\_DIAGMGR\_CLIENTSERVER\_CALL |
|  |
| \*D\_TYPEHDATASIZE\_CNT\_U16 |
| \*D\_DIAGMGR\_SHUTDOWN\_TASK |
| \*BC\_STAMD\_TODSTEADYSTATE |
| \*BC\_STAMD\_TOD2MSTOGGLE |
| \*BC\_STAMD\_SYSCHKINCOREAPP |
|  |

Note: \* Values of these Global data constants tend to change based on project configuration. Check Project configuration files under UTP/Contract folder

### Module specific Lookup Tables Constants

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Value | Software Segment |
| Rte\_ModeType\_StaMd\_Mode t\_StateLkpTbl\_Cnt\_u8 [D\_STATELKPSTATES\_CNT\_U16] [D\_STATELKPVCTRS\_CNT\_U16] | N/A | { {RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_ DISABLE,  RTE\_MODE\_StaMd\_Mode\_ DISABLE,  RTE\_MODE\_StaMd\_Mode\_ WARMINIT,  RTE\_MODE\_StaMd\_Mode\_ DISABLE },  {RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_OFF,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_WARMINIT},  {RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE},  {RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_WARMINIT,  RTE\_MODE\_StaMd\_Mode\_DISABLE,  RTE\_MODE\_StaMd\_Mode\_OPERATE,  RTE\_MODE\_StaMd\_Mode\_DISABLE}  } | CONST\_UNSPECIFIED |
| T\_CurrentSystemState\_Ptr\_enum[ \*SIZE] | N/A | Refer \* | AP\_STAMD\_CONST |
| T\_TypeHInfo\_Cnt\_Str[ \*SIZE] | TypeHInfoType\_Str | Refer \* | AP\_STAMD\_CONST |
| T\_WarmInitMilestoneRqst\_Ptr\_enum[\*SIZE] | N/A | Refer \* | AP\_STAMD\_CONST |

**Note:** The entries in the state lookup table rely on the fact that generated values for the system state are maintained. If the generated values are changed then the entries have to re arranged.

Note: \* SIZE for above tables varies across projects.Check Project configuration files for size and elements of tables.**.**

Note: Refer \* **:** Refer to States\_And\_Modes\_GeneratedCfg\_MDD

# Functions/Macros used by the Sub-Modules

## Library Functions / Macros

The library functions / Macros that are called by the various sub modules are identified below,

## Data Hiding Functions

None

## Global Functions/Macros Defined by this Module

### Process WarmInit Milestone Complete

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | MilestoneRqst\_WarmInitMilestoneComplete | Type | Min | Max |
| **Arguments Passed** | user | StaMd\_Users | 0 | 31 |
| **Return Value** | None |  |  | |

#### Description



### Process WarmInit Milestone Not Complete

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | MilestoneRqst\_WarmInitMilestoneNotComplete | Type | Min | Max |
| **Arguments Passed** | user | StaMd\_Users | 0 | 31 |
| **Return Value** | None |  |  | |

#### Description



### States and Modes ECU Reset

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | StaMd\_SCom\_EcuReset | Type | Min | Max |
| **Arguments Passed** | none |  |  |  |
| **Return Value** | None |  |  | |

#### Description

EcuResetActive\_Cnt\_M\_lgc = TRUE

### States and Modes Transition Function

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | StaMd\_Trns1 | Type | Min | Max |
| **Arguments Passed** | none |  |  |  |
| **Return Value** | None |  |  | |

#### Description

WriteTypeH()

**#if**(D\_STAMD\_DIAGMGR\_CLIENTSERVER\_CALL == STD\_ON)

Rte\_Call\_DiagMgr\_StaCtrl\_Shutdown();

**#else**

ActivateTask(D\_DIAGMGR\_SHUTDOWN\_TASK);

**#endif**

NVMWRITEALLFUNC()

FinalNvMWriteInProgress\_Cnt\_M\_lgc = TRUE

*Note: D\_STAMD\_DIAGMGR\_CLIENTSERVER\_CALL is generated as STD\_ON or STD\_OFF based on the configuration of the program.*

### States and Modes Initialization

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | StaMd\_Init1 | Type | Min | Max |
| **Arguments Passed** | none |  |  |  |
| **Return Value** | None |  |  | |

#### Description



### States and Modes Periodic

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | StaMd\_Per1 | Type | Min | Max |
| **Arguments Passed** | none |  |  |  |
| **Return Value** | None |  |  | |

#### Description



### System State Check

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | SystemStateCheck | Type | Min | Max |
| **Arguments Passed** | FTermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | CTermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | ATermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | RampStatusCmp\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | CtrldDmpStsCmp\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | TMFTestComplete\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | SysCFltCntr\_Ptr\_T\_u16 | uint16 \* | 0 | 255 |
| **Return Value** | FaultStatus\_Cnt\_T\_enum | NxtrDiagMgrStatus | NTC\_STATUS\_PASSED  NTC\_STATUS\_FAILED  NTC\_STATUS\_PREPASSED  NTC\_STATUS\_PREFAILED | |

#### Description

#### 



## Local Functions/Macros Used by this MDD only

### Macro Function #1

SetBits\_m(var, mask) : var = var | mask

### Macro Function #2

ClrBits\_m(var, mask) : var = var & mask

### Local Function #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | BldTranVctr | Type | Min | Max |
| **Arguments Passed** | SysState\_Cnt\_T\_Enum | Rte\_ModeType\_StaMd\_Mode | RTE\_MODE\_StaMd\_Mode\_DISABLE  RTE\_MODE\_StaMd\_Mode\_OFF  RTE\_MODE\_StaMd\_Mode\_OPERATE  RTE\_MODE\_StaMd\_Mode\_WARMINIT  RTE\_TRANSITION\_StaMd\_Mode | |
|  | FTermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | CTermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | ATermActive\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | RampStatusCmp\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | CtrldDmpStsCmp\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
| **Return Value** | TransVec\_Cnt\_T\_u8 | uint8 | FULL | FULL |

#### Design Rationale

NvM\_GetErrorStatus has been used instead of an RTE\_Call\_GetErrorStatus in order to specify the blockID and also to prevent the integrator map it to a wrong port interface.

#### Description

### Local Function #2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | ReadTypeH | Type | Min | Max |
| **Arguments Passed** | None |  |  | |
| **Return Value** | none |  |  |  |

#### Design Rationale

ReadTypeH functions call has been added to this module although the FDD doesn’t call them out as this module performs the system NvH memory read after system power up.

#### Description



### Local Function #3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | WriteTypeH | Type | Min | Max |
| **Arguments Passed** | none |  |  | |
| **Return Value** | none |  |  |  |

#### Design Rationale

WriteTypeH functions call has been added to this module although the FDD doesn’t call them out as this module performs the system NvH memory write before system shutdown.

#### Description



### Local Function #4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | CheckWarmInitComplete | Type | Min | Max |
| **Arguments Passed** | None |  |  | |
| **Return Value** | WarmInitMilestoneComp\_Cnt\_T\_lgc | Boolean | FALSE | TRUE |

#### Description

# Software Module Implementation

## Initial Data Values

|  |  |
| --- | --- |
| Data | Value |
| CTerm\_Cnt\_lgc | D\_FALSE\_CNT\_LGC |
| ATerm\_Cnt\_lgc | D\_TRUE\_CNT\_LGC |
| FTerm\_Cnt\_lgc | D\_FALSE\_CNT\_LGC |

## Initialization Functions

### Init:

## Periodic Functions

## Fault Recovery Functions

None

## Shutdown Functions

None

## Interrupt Functions

None

## Serial Communication Functions

## Execution Requirements

## Execution Sequence of the Module

## \_Init1 needs to RUN prior to any function that requires the use of TypeH data.Execution Rates for sub-modules called by the Scheduler

|  |  |  |
| --- | --- | --- |
| Function Name | Calling Frequency | System State(s) in which the function is called |
|  |  |  |
|  |  |  |
|  |  |  |

## Execution Requirements for Serial Communication Functions

|  |  |
| --- | --- |
| Function Name | Sub-Module called by (Serial Comm Function Name) |
|  |  |

# Memory Map Definition Requirements

## Sub Modules (Functions)

This table identifies the software segments for functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
|  |  |
|  |  |
|  |  |
|  |  |

## Global and Local Functions

This table identifies the software segments for global and local functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
| BldTranVctr | RTE\_AP\_STAMD\_APPL\_CODE |
| MilestoneRqst\_WarmInitMilestoneComplete | RTE\_AP\_STAMD\_APPL\_CODE |
| MilestoneRqst\_WarmInitMilestoneNotComplete | RTE\_AP\_STAMD\_APPL\_CODE |
| ReadTypeH | RTE\_AP\_STAMD\_APPL\_CODE |
| WriteTypeH | RTE\_AP\_STAMD\_APPL\_CODE |
| CheckWarmInitComplete | RTE\_AP\_STAMD\_APPL\_CODE |
| SystemStateCheck | RTE\_AP\_STAMD\_APPL\_CODE |
| StaMd\_SCom\_EcuReset | RTE\_AP\_STAMD\_APPL\_CODE |
| StaMd\_Trns1 | RTE\_AP\_STAMD\_APPL\_CODE |
| StaMd\_Per1 | RTE\_AP\_STAMD\_APPL\_CODE |
| StaMd\_Init1 | RTE\_AP\_STAMD\_APPL\_CODE |

# Known Issues / Limitations With Design

1. .FDD does not currently support “Transition” state required for RTE runnables triggered on state transitions. Current design simply does nothing if in “Transition” state.
2. FDD requirement state that an off state milestone is considered as complete when all the NVM writes are complete. This milestone is currently performed internally by querying the NVM write status in this module.
3. FDD calls out for the F Term input to this module as a Boolean type diagnostic flag that is used to indicate a fault requesting removal of assist and currently there is no requirement for a component to send out this flag(according to FDD data dictionary version 86 dated 16th Mar 2012). However, it has been implemented in Diagnostic manager version FDD37B\_001.6

# Revision Control Log

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item #** | **Rev #** | **Change Description** | **Date** | **Author Initials** |
| 1 | 1 | Initial EA3.0 version. | 11-Apr-11 | LWW |
| 2 | 2 | Updated range errors found during UTP | 13-Apr-11 | LWW |
| 3 | 3 | Added RampStatusCmp\_Cnt\_T\_lgc | 05-Jan-12 | M. Story |
| 4 | 4 | Updated for issues found at Unit Test | 30-Jan-12 | M. Story |
| 5 | 5 | Updates to meet FDD 10C v006 | 20-Mar-12 | VK |
| 6 | 6 | Updates to fix anomaly 3143 | 09-Apr-12 | VK |
| 7 | 7 | Added SCom function and logic to perform ECU Reset | 26-Apr-12 | LWW |
| 8 | 8 | Updated to fix Anom 3158 for LookUpTable | 7-May-12 | NRAR |
| 9 | 9 | Added EEPROM Failed to Close check | 27-Jul-12 | OT |
| 10 | 10 | Changed write complete check on Close Check diagnostic | 03-Aug-12 | LWW |
| 11 | 11 | Added checkpoints, removed call to end operation cycle, added a MemMap section for const table | 21-Sep-12 | LWW |
| 12 | 12 | Updated to the latest src(v16) | 15-Feb-13 | VK |
| 13 | 13 | Moved state transition complete logic ahead of the switch case statement to always be performed | 05-Jun-13 | KJS |
| 14 | 14 | Applied final changes to A5108 correction in Per1 | 05-Jun-13 | KJS |
| 15 | 15 | Changes made to MDD to be more generic for all projects | 18-June-13 | NRAR |
| 16 | 16 | MDD version updated to match synergy version | 27-June-13 | NRAR |
| 17 | 17 | Fixed anomaly 5205, added logic to force TOD low in toggle mode during powerdown. | 27-June-13 | LWW |