NASA GSFC FLIGHT SOFTWARE SYSTEMS BRANCH

FSW VERSION DESCRIPTION DOCUMENT

CFS MEMORY DWELL (MD) APPLICATION

BUILD: MD 2.3.3

RELEASE DATE: 10/7/2020

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 various bug fixes and enhancements, but does not include any new functionality. The primary purpose of this release is to ensure compatibility between the MD application and cFS Bootes.

This document serves as the notification of the Build 2.3.3 release of the cFS MD application.

Memory Dwell (MD) version 2.3.3 is compatible with cFE builds 6.8.0 and above.

1.2 NEW/CHANGED FUNCTIONALITY IN THIS VERSION

Table 1.2-1 identifies the DCRs that have been implemented in this FSW version. For each DCR the "Key" column shows the corresponding DCR in the GSFC cFS tracking system.

Table 1.2-1 – DCRs Implemented in this Version

Key	Summary	Description
GSFCCFS-1047	Code could be streamlined with a switch/case statement	In md_dwell_pkt.c function MD_GetDwellData, the if-else chain could be streamlined with a switch statement. Finding from JSC code review
GSFCCFS-1126	Update MD Doxygen User Guide	Suggest updating the doxygen user guide file and adding a doxygen configuration file to allow users to successfully generate the doxygen guide themselves.
GSFCCFS-1177	MD has static code analysis findings	In analysis on 7/10/2020, CodeSonar flagged the attached findings for MD.
GSFCCFS-1207	MD should use event messages for initialization errors	MD should use event messages instead of syslog messages for errors encountered in initialization function MD_InitSoftwareBusServices.
GSFCCFS-1152	MD should build with -Werror and OMIT_DEPRECATED enabled	MD should build against the latest cFE with -Werror and OMIT_DEPRECATED enabled.
GSFCCFS-1226	MD has compilation errors on test machine	MD has alignment errors on VxWorks test machine.
GSFCCFS-1229	MD Command Structure implicitly pads to 32-bit boundary	The MD_CmdStartStop_t structure contains a single uint16 variable. When compiled, this adds an implicit 2-byte pad to that structure. A second uint16 variable will explicitly define this padding.

1.3 MISSING PLANNED FEATURES AND KNOWN PROBLEMS

Table 1.3-1 identifies currently open DCRs that are not addressed in this build. Any workarounds that may apply are identified.

Information on currently open DCRs is available at:

https://etdjira.gsfc.nasa.gov/projects/GSFCCFS/issues

Note that this is a restricted website that requires a server account. Additional DCRs may have been submitted after preparation of this VDD. A cFS MD DCR report containing a listing of open DCRs is available upon request for customers who do not have access to the restricted server. Please contact Elizabeth Timmons, elizabeth.timmons@nasa.gov.

Table 1.3-1 – Currently open DCRs

Key	Summary	Description
GSFCCFS-1036	Use sizeof(<SYMBOL_NAME>) instead of sizeof(<TYPE>)	In several places, sizeof references a type instead of an actual symbol. This is a potential maintenance issue if the size of the field is changed. md_dwell_tbl.c lines 327, 331, 335
GSFCCFS-1048	Consider using an enum for MD error codes	In file md_dwell_pkt.c function MD_GetDwellData, all the "-1" status values could be replaced with an enum.
GSFCCFS-1037	Return statements not needed in void functions	
GSFCCFS-764	MD - Table Configuration is Not Consistent with Other Applications	MD currently gets the dwell tables from the CDS or zeros them out. The MD table design is not consistent with other cFS applications: The MD task should allow the option to save or not save tables in the CDS (and therefore behave like the other applications). The MD task should allow the option to have default tables in EEPROM (and therefore behave like the other applications). The default address to be used, should a table not be found, should be user defined. 0 may not be a valid address. The MD task doesn't use the CFE_TBL_Manage feature.

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
Source Code of this FSW Build	Yes	2.3.3	https://github.com/nasa/md
Doxygen Documentation	Yes	N/A	https://github.com/nasa/md
Unit Test Data	Yes	2.3.3	https://github.com/nasa/md
FSW Make Files	Yes	2.3.3	https://github.com/nasa/md

3.0 INSTALLATION PROCEDURES

In order to build and install the MD application, it must be added to the cFE CMake build system. This is done by modifying the TGTX_APPLIST in the cFE targets.cmake file. This is shown in the trivial example below.

```
SET(TGT1_NAME cpu1)
SET(TGT1_APPLIST md)
SET(TGT1_FILELIST cfe_es_startup.scr)
```

After MD is added to the targets.cmake file, it is built and installed using the standard cFE CMake build instructions. These instructions are available in cFE CMake documentation:

https://github.com/nasa/cFE/blob/main/cmake/README.md

4.0 CONFIGURATION SUMMARY AND VERSION IDENTIFICATION

This software can be found in the MD GitHub repository (https://github.com/nasa/MD) under the tag "2.3.3".

Verification of the version can be done by sending an 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.

ACRONYMS

ACS ..... Attitude Control System
C&DH ..... Command and Data Handling
cFS ..... Core Flight System
CM ..... Configuration Management
COTS ..... Commercial Off-The-Shelf
CPU ..... Central Processing Unit
DCR ..... Discrepancy/Change Request
ETU ..... Engineering Test Unit
FSB ..... Flight Software Branch
FSW ..... Flight Software
GSFC ..... Goddard Space Flight Center
I&T ..... Integration & Test
JSC ..... Johnson Space Center
MD ..... Memory Dwell
POSIX ..... Portable Operating System Interface
RTOS ..... Real-Time Operating System
SMP ..... Symmetric Multiprocessing
T&C ..... Telemetry and Command
TBD ..... To Be Determined
URL ..... Universal Resource Locator
VDD ..... Version Description Document