

SpireEngPatchPM
 File: H_CRP_SPI_SEU.xls
 Author: L.Lucas-hp



Procedure Summary

Objectives

This procedure dumps the DPU memory for investigation after a bit flip has been detected by the checksums; and then patches the DPU PM (RAM) in the specific area affected.

DTCP 1: Dump

- Dump SPIRE PM, slowly.

DTCP 2: Recovery

- Stop the SPIRE on-board monitoring
- Check the checksums of the PM
- Dump the PM word to be patched (to verify contents)
- Patch the PM word
- Dump the PM words after patching (to verify contents)
- Check the checksums of the PM again
- Start the on-board monitoring

Based on procedure: SpireEngPatchPM Version number:1
 Generated by SPIRE ICC:26/04/2010

Summary of Constraints

This procedure can be executed in any bus profile.

Spacecraft Configuration

Start of Procedure

Mode = REDY

End of Procedure

Mode = REDY

Reference File(s)

Input Command Sequences

Output Command Sequences

HRSSEU

Referenced Displays

ANDs	GRDs	SLDs
ZAZD4999		(None)
ZAZ90999		
SA_1_559		
SAM4_500		

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
29/07/2010		1	Created	R. Biggins	
30/07/2010		2	Update to add the re-enabling of the SPIRE MTL SSIDs	R. Biggins	

Status : Version 4 - Updated
 Last Checkin: 16/08/2010

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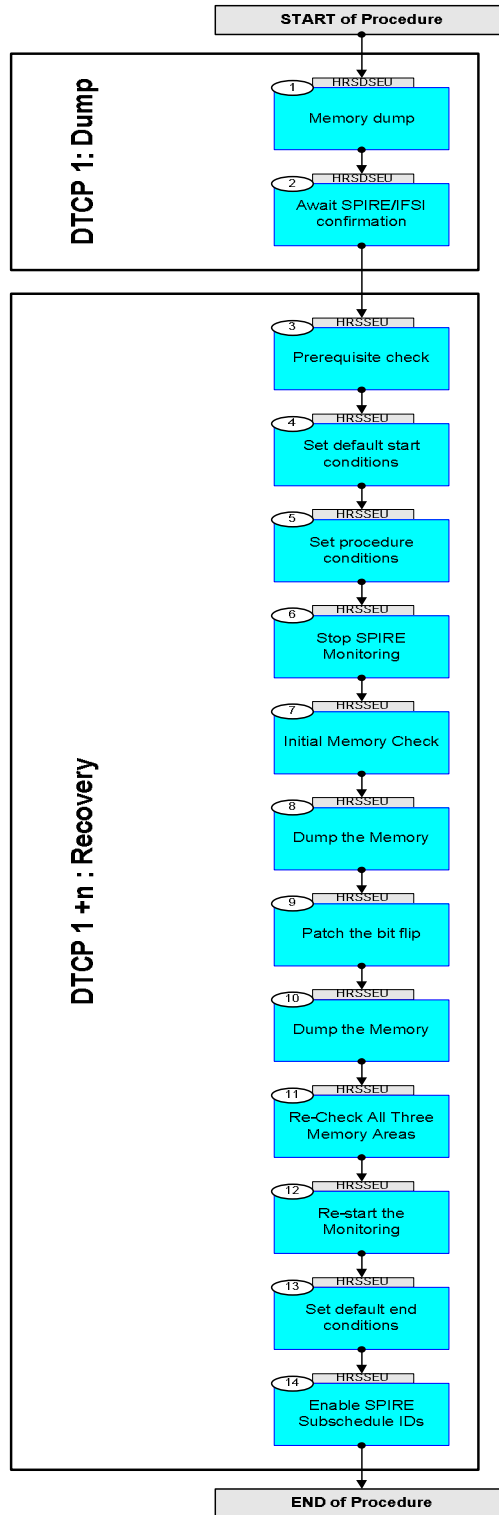


12/08/2010		3	Amended sequences name to avoid conflict	L.Lucas-hp	
16/08/2010		4	Added some TM checks Updated procedure called	L.Lucas-hp	
26/08/2010		4.01	Validation : TM checks update	L.Lucas-hp	
14/09/2010	3.1	4.02	Validation : Added some text here and there	L.Lucas-hp	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
<p><i>TC Seq. Name : HRSSEU (Dump Memory)</i></p> <p><i>TimeTag Type:</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Memory dump		Next Step: 2
		<p><i>Before the SPIRE PM can be patched, the precise location of the bitflip(s) must be found. The following procedure should be executed to dump the PM for further investigation:</i></p>		
		<p>Execute Procedure</p> <p>This procedure may be executed regardless which instrument is Prime</p> <p>:</p> <p>H_CRP_SPI_DUMP SpireEngSlowPMDump Dump and Check Memory (CRP)</p> <p><i>Parameters:</i> OBS_ID OBSERVATION_ID 2999<hex></p>		
2		Await SPIRE/IFSI confirmation		Next Step: 3
		<p>The dump data will be analysed by SPIRE/IFSI to find the SEU location(s). The recovery in the next sequence will usually be executed in one of the following DTCPs.</p>		
<p><i>TC Seq. Name : HRSSEU (SEU Recovery)</i></p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
3		Prerequisite check		Next Step: 4
3.1		HSC/ICC input		□
		<p>Verify that SPIRE has supplied valid data for the patch:</p> <p>MEM_LOC = 0xnxxx DATA = 0xnxxx nxxx nxxx CRC = 0xnxxx</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
3.2		TM Checks		<input type="checkbox"/>
		Veriify: SPIRE mode <div style="text-align: right;"> MODE SM00M500 </div>	= REDY	AND=ZAZD4999
4		Set default start conditions		Next Step: 5
	ET=+ UT=+00.00.00	SET_OBSID Command Parameter(s) : <div style="text-align: right;"> OBSERVATION_ID SP00N500 </div> TC Control Flags : <div style="text-align: right;"> GBM IL DSE --Y -- --- </div> Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SC000500 2999 <hex>	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : <div style="text-align: right;"> BUILDING_BLOCK_ID SP01N500 </div> Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80020001 <hex>	
	ET=+ UT=+00.00.01	Execute Telecommand Command Parameter(s) : <div style="text-align: right;"> OBSERVATION_STEP SP03N500 </div> Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 1 <hex>	
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
		Verify Telemetry <div style="text-align: right;"> OBSID SM10N500 </div>	= 00000000 <hex>	AND=ZAZ90999
		Verify Telemetry <div style="text-align: right;"> BBFULLTYPE SM2LN500 </div>	= SpireBbStartOb	AND=ZAZ90999
5		Set procedure conditions		Next Step: 6

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	RESET_DRCU_COUNTERS RESET_DRCU_COUNTERS TC Control Flags : Subsch. ID : 370 Det. descr. : RESET DRCU COUNTERS GBM IL DSE --Y -- --	SCD00505	
		Verify that the TRESET parameter has the same value as the THSK parameter TRESET SM01T500	same as THSK	AND=SA_1_559
		THSK SM00T500	any	AND=SA_1_559
6		Stop SPIRE Monitoring		Next Step: 7
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP GBM IL DSE --Y -- --	SC003500 0 <hex>	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 8D530001 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= StopMonitoring	AND=ZAZ90999
	ET=+ UT=+00.00.00	STOP_MONITORING_RAW STOP_MONITORING TC Control Flags : Subsch. ID : 370 Det. descr. : STOP ONBOARD MONITORING GBM IL DSE --Y -- --	SC007500	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	
	ET=+ UT=+00.00.05	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500	SC001500 8D5E0001 <hex>	
		Verify Telemetry BBFULLTYPE	SM2LN500	= StopMonitoring	AND=ZAZ90999
		WAIT a few minutes and ensure monitoring has been stopped, await SPIRe confirmation before going ahead.			
		Verify Telemetry HK_MON_STATUS	SM80X500	= STOPPED	(None)
7		Initial Memory Check			Next Step: 8
		The following checks will verify the contents of the DPU Program Memory			
		WARNING: At least one of the following checksums will be incorrect. The purpose is to verify that no changes have occurred since the triggering checksum difference. It should be verified that the checksums are the same as was detected during the triggering checks.			
		For SPIRE OBSW v4.0: CHECKSUM1 = E9C4 <hex> CHECKSUM2 = 5DC1 <hex> CHECKSUM2 = 305F <hex>			
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW Command Parameter(s) : MEMORYID_CHECKMEM STARTADDR_CHECKMEM NSAU_CHECKMEM TC Control Flags : Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	CHECK_MEMORY SPM9N500 SPMAN500 SPMBN500	SCM02500 0 <hex> 4000 <hex> 174B <hex>	
		Verify Telemetry CHK_MCHK	SMMBN500	= CHECKSUM1	AND=SAM4_500

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW CHECK_MEMORY Command Parameter(s) : MEMORYID_CHECKMEM SPM9N500 STARTADDR_CHECKMEM SPMAN500 NSAU_CHECKMEM SPMBN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	SCM02500 0 <hex> 6000 <hex> FFFF <hex>	
		Verify Telemetry CHK_MCHK SMMBN500	= CHECKSUM2	AND=SAM4_500
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW CHECK_MEMORY Command Parameter(s) : MEMORYID_CHECKMEM SPM9N500 STARTADDR_CHECKMEM SPMAN500 NSAU_CHECKMEM SPMBN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	SCM02500 0 <hex> 15FFF <hex> 59 <hex>	
		Verify Telemetry CHK_MCHK SMMBN500	= CHECKSUM3	AND=SAM4_500
8		Dump the Memory		Next Step: 9
		Dump the memory area which has been corrupted, (just for confirmation).		
	ET=+ UT=+00.00.00	DUMP_MEMORY_RAW DUMP_MEMORY Command Parameter(s) : MEMORYID_DUMPMEM SPM6N500 STARTADDR_DUMPMEM SPM7N500 NSAU_DUMPMEM SPM8N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : DUMP MEMORY USING ABSOLUTE ADDRESSES	SCM01500 0 <hex> MEM_LOC 1 <hex>	
9		Patch the bit flip		Next Step: 10

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	LOAD_PM_RAW LOAD_PM Command Parameter(s) : STARTADDR_LOADPM SPMGN500 SPARE_LOADPM SPMMN500 NSAU_LOADPM SPMHN500 DATA_LOADPM SPMJN500 CRC_LOADPM SPMKN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : LOAD PROGRAM MEMORY USING ABSOLUTE ADDRESSES	SCM05500 MEM_LOC 0 <hex> 1 <hex> (Def) DATA CRC	
10		Dump the Memory Dump the memory area which has been patched, (just for confirmation).		Next Step: 11
	ET=+ UT=+00.00.00	DUMP_MEMORY_RAW DUMP_MEMORY Command Parameter(s) : MEMORYID_DUMPMEM SPM6N500 STARTADDR_DUMPMEM SPM7N500 NSAU_DUMPMEM SPM8N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : DUMP MEMORY USING ABSOLUTE ADDRESSES	SCM01500 0 <hex> MEM_LOC 1 <hex>	
11		Re-Check All Three Memory Areas The following checks will verify the contents of the DPU Program Memory		Next Step: 12
		For SPIRE OBSW v4.0: CHECKSUM1 = E9C4 <hex> CHECKSUM2 = 5DC1 <hex> CHECKSUM2 = 305F <hex>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW CHECK_MEMORY Command Parameter(s) : MEMORYID_CHECKMEM SPM9N500 STARTADDR_CHECKMEM SPMAN500 NSAU_CHECKMEM SPMBN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	SCM02500 0 <hex> 4000 <hex> 174B <hex>	
		Verify Telemetry CHK_MCHK SMMBN500	= CHECKSUM1	AND=SAM4_500
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW CHECK_MEMORY Command Parameter(s) : MEMORYID_CHECKMEM SPM9N500 STARTADDR_CHECKMEM SPMAN500 NSAU_CHECKMEM SPMBN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	SCM02500 0 <hex> 6000 <hex> FFFF <hex>	
		Verify Telemetry CHK_MCHK SMMBN500	= CHECKSUM2	AND=SAM4_500
	ET=+ UT=+00.00.00	CHECK_MEMORY_RAW CHECK_MEMORY Command Parameter(s) : MEMORYID_CHECKMEM SPM9N500 STARTADDR_CHECKMEM SPMAN500 NSAU_CHECKMEM SPMBN500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : CHECK MEMORY USING ABSOLUTE ADDRESSES	SCM02500 0 <hex> 15FFF <hex> 59 <hex>	
		Verify Telemetry CHK_MCHK SMMBN500	= CHECKSUM3	AND=SAM4_500
12		Re-start the Monitoring		Next Step: 13

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID TC Control Flags : Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500 GBM IL DSE --Y -- --- SC001500 8D520001 <hex>	
	ET=+ UT=+00.00.04	START_MONITORING_RAW Command Parameter(s) : TABLEID_STARTMONITORING Subsch. ID : 370 Det. descr. : START ONBOARD MONITORING	START_MONITORING SPB9N500 5 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= StartMonitorin	AND=ZAZ90999
		Wait a few minutes to ensure monitoring has re-started		
		Verify Telemetry HK_MON_STATUS SM80X500	= RUNNING	(None)
13		Set default end conditions		Next Step: 14
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
	ET=+ UT=+00.00.00	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID TC Control Flags : Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500 GBM IL DSE --Y -- --- SC001500 80030001 <hex>	
	ET=+ UT=+00.00.01	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500 1 <hex>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.01	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= EndObs	AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80000000 <hex>	
	ET=+ UT=+00.00.01	SET_OBSID_RAW SET_OBSID Command Parameter(s) : OBSERVATION_ID SP00N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SC000500 50000000 <hex>	
		Verify Telemetry OBSID SM10N500	= 50000000 <hex>	AND=ZAZ90999
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999
14		Enable SPIRE Subschedule IDs		Next Step: END
	ET=+ UT=+00.00.00	Execute Telecommand EnableRelOfTcs_Templ Command Parameter(s) : N_Repetition DH041170 SubscheduleId DH053170 SubscheduleId DH053170 M_nrOfApids DH054170 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TEMPLATE EnableReleaseOfTcs, TC(11,1)	DCT22170 2 <dec> 100 <dec> 370 <dec> 0 <dec>	
		WARNING: Do not send the following TC until all MTL operations have been completed by the SPACON		

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	ET=+ UT=+00.00.00	Execute Telecommand RetStatusOfCmdSchedule <i>TC Control Flags :</i> Subsch. ID : 10 Det. descr. : TEMPLATE ReportStatusOfCmdSchedule, TC(11,18), no appl. data GBM IL DSE --Y -- --	DCT25170	
		Verify: Check on the OBQD (ask the Spacon as there should only be 1 OBQD open at a time) that the SSIDs 100 and 370 are no longer disabled		
End of Procedure				