

Load DMC software (Redundant)
File: H_FCP_PAC_RLMM.xls
Author: R. Biggins



Procedure Summary

Objectives

The objective of this procedure is to load a new version of the redundant DMC software

- Switch to PACS bus profile
- Disable SDB FDIR for PACS RTA
- Enable RT interrogations for PACS RTA
- Power on redundant DPU
- Enable SDB FDIR for PACS RTA
- Switch on and connect DMC
- Load new DMC OBSW using H_FCP_OBS_4310
- Write new OBSW to EEPROM
- Disable RT interrogations for PACS RTA
- Power off DMC
- Power off nominal DPU

Based on procedures:

Pacs_Switch_On_DPU_DMCLLSW_Redundant_31_07_2007
Pacs_Dmc_MemCheck_PRAM_30_07_2007
Pacs_Dmc_Start_OBSW_31_07_2007
Pacs_Dmc_Copy_OBSW_to_EEPROM_31_07_2007
PACS_Switch_Off_Redundant_28_07_2007

Summary of Constraints

PACS has been switched off for at least 4 minutes.

This procedure is valid for the DMC software version 6.028

Spacecraft Configuration

Start of Procedure

- PACS is OFF
- All PACS units powered off
 - UIU table shows PACSS units OFF

End of Procedure

- PACS is OFF
- All PACS units powered off
 - UIU table shows PACSS units OFF

Reference File(s)

Input Command Sequences

Output Command Sequences

HFPRLMM

Referenced Displays

ANDs GRDs SLDs
ZAZ99999

Configuration Control Information

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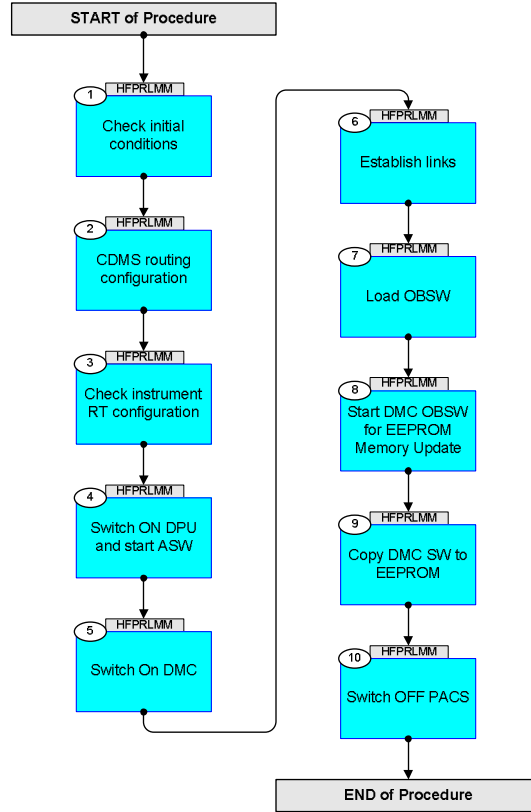


DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
21/09/07		1	Created	R. Biggins	
22/11/07		2	- Time tags added to SVM commands - FDIR updated to be disabled throughout procedure - Editorial updates	R. Biggins	
04/12/07		2.01	Validation : Editorial updates	R. Biggins	
21/01/08		3	Update due to initial testing against the simulator: - TCs updated due to new DB - Bus profile selection TC added - Execution times removed	R. Biggins	
03/03/08		4	Update due to testing against MOC Simulator and comments by S. Pezzuto: - Telecommand flags updated - Telemetry check added to step 6.2	R. Biggins	
27/05/08	1	5	Updates due to SVT-1 testing: - TC to start RT interrogations updated (step 4.3) - TCs to disable/enable FDIR deleted from step 12 - TC to disable RT interrogations moved to before LCL switch off (step 12) - Expected LCL currents updated - Comments added/updated - Flags updated - AND updated for all TM parameters	R. Biggins	
23/10/08	2	6	Updates due to new procedures from industry - New step added at beginning to verify FP - Step 4.2 and 4.3 combined - TC DC005161 database definition updated	R. Biggins	
23/03/09	2.2	7	Final updates before flight - Summary updated - TC flags updated - Procedure description/title updated - Memory checks updated to reflect current software versions	R. Biggins	
17/04/09	2.3	7.01	Validation : Editorial updates due to comments from project/industry	R. Biggins	

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Procedure Flowchart Overview

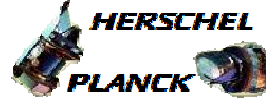


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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HFPRLMM (Load DMC s/w (Red))				
TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Check initial conditions		Next Step: 2
		Verify: PACS has been switched off for at least 4 minutes		
1.1		Verify HSC/ICC input		<input type="checkbox"/>
		Verify that the correct information has been supplied by the ICC: Software Image for DMC OBSW (verify with OBSM engineer)		
		Verify that the PACS ICC has indicated whether the DPU is to be booted from the primary or secondary partition (step 4.6) DPU_PRTN = 1 or 2		
1.2		Spacecraft mode		<input type="checkbox"/>
		Verify Telemetry CurrentMode DEL34170 = Nominal		AND=ZAZ99999
		Verify Telemetry ACC_A_MODE AEE8G050 = Nominal		AND=ZAZ99999
1.3		Bus status		<input type="checkbox"/>
		Verify Bus configuration		
		Verify: Active 1553 bus Active_Bus_A_B DEFJ1160 = BUS_A		AND=ZAZ99999
		Verify: 1553 bus FDIR status SDB_FDIR DEFJ4160 = ENABLED		AND=ZAZ99999
		Verify: SDB handling status BSW_SDB_ENAB DEF60160 = ENABLED		AND=ZAZ99999
		Verify bus health status		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: Bus (side A) health status BusA_HealthySts DEFJ2160	= Healthy	AND=ZAZ99999
		Verify: Bus (side B) health status BusB_HealthySts DEFJ3160	= Healthy	AND=ZAZ99999
1.4		<i>Redundant instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_R_L42_S WM42B565	= OFF	AND=ZAZ99999
		Verify: SPU LCL status PacsS_R_L36_S WM62A565	= OFF	AND=ZAZ99999
		Verify: BOLC LCL status PacsB_R_L28_1S WM32D565	= OFF	AND=ZAZ99999
		Verify: Dec/Mec2 LCL status PacsMec2_L69_1S WM62E565	= OFF	AND=ZAZ99999
1.5		<i>Nominal instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= OFF	AND=ZAZ99999
		Verify: SPU LCL status PacsS_N_L35_S WM52A565	= OFF	AND=ZAZ99999
		Verify: BOLC LCL status PacsB_N_L27_1S WM82D565	= OFF	AND=ZAZ99999
		Verify: Dec/Mec1 LCL status PacsMec1_L65_1S WM52E565	= OFF	AND=ZAZ99999
2		<i>CDMS routing configuration</i>		Next Step: 3
	ET=+ UT=+00.00.00	Execute Telecommand RepDownlinkTMStorage TC Control Flags : Subsch. ID : 10 Det. descr. : Report Telemetry Packets Down-linking/ Storage Status GBM IL DSE --Y -- ---	DC141160	
		It should be verified that telemetry packets for ALL PACS APIDs should be transmitted to ground (Transmit_Flag = ENABLED) EXCEPT for TM(21,x) which should be stored in the SSMM (Storage_Flag = ENABLED, Transmit_Flag = DISABLED). This should be verified on the VPD		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception Telemetry Packets DownLinking-Storage Status Report Packet Details: APID: 16 Type: 14 Subtype: 7 PI1: PI2:	(14,7)-1400	
3		Check instrument RT configuration		Next Step: 4
3.1		Remote Terminal configuration		<input type="checkbox"/>
		Verify Telemetry PACS_VitalNonV DED5G161	= NonVital	AND=ZAZ99999
		Verify Telemetry PACS_TmRetry DED5Z161	= ON	AND=ZAZ99999
3.2		Remote Terminal Status		<input type="checkbox"/>
		Redundant units		
		Verify Telemetry PACSB_OnOff DED31161	= OFF	AND=ZAZ99999
		Verify Telemetry PACSB_DeadAliv DED32161	= Alive	AND=ZAZ99999
		Verify Telemetry PACSB_WellsiTC DED33161	= Well	AND=ZAZ99999
		Verify Telemetry PACSB_WellsiTM DED34161	= Well	AND=ZAZ99999
		Verify Telemetry PACSB_ValidInv DED35161	= Invalid	AND=ZAZ99999
		Nominal units		
		Verify Telemetry PACSA_OnOff DED2G161	= OFF	AND=ZAZ99999
		Verify Telemetry PACSA_DeadAliv DED2H161	= Alive	AND=ZAZ99999
		Verify Telemetry PACSA_WellsiTC DED2Z161	= Well	AND=ZAZ99999
		Verify Telemetry PACSA_WellsiTM DED2J161	= Well	AND=ZAZ99999
		Verify Telemetry PACSA_ValidInv DED2K161	= Invalid	AND=ZAZ99999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		F9 DH027161 F10 DH028161 F11 DH029161 TC Control Flags : Subsch. ID : 10 Det. descr. : Configure SDB FDIR GBM IL DSE --Y -- ---	Healthy Healthy DISABLED	
		Wait up to 1 minute for the generation of the D_Hk_P64 packet from the CDMU (APID = 18)		
		Verify: 1553 bus FDIR status SDB_FDIR DEFJ4160	= DISABLED	AND=ZAZ99999
		Verify Telemetry PACS_NomRed DED5H161	= REDUNDANT	AND=ZAZ99999
		Verify Telemetry PACSB_OnOff DED31161	= ON	AND=ZAZ99999
		Verify Telemetry PACSB_ValidInv DED35161	= Valid	AND=ZAZ99999
4.3		Switch ON DPU LCL		<input type="checkbox"/>
		Switching ON the DPU LCL will initialise BSW. This will initially execute memory checks (failures will generate TM(5,4) packets) and then generate TM(5,1) [EVENT_REPORT_3_32776] packets every 10 seconds.		
	ET=+ UT=+00.00.00	Execute Telecommand SwOn_PacsD_R_L42 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS DPU Red - switch LCL_42 on	DC42D170	
		Verify: DPU LCL status PacsD_R_L42_S WM42B565	= ON	AND=ZAZ99999
		Verify: DPU LCL current (+/- 0.1A) PacsD_R_L42_I WM407565	= 0.49 A	AND=ZAZ99999
4.4		DPU Force Boot		<input type="checkbox"/>
		Sending the FORCE_BOOT TC will generate a TM(5,1) [EVENT_REPORT_3_33041] packet from the BSW.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.15	DPU_LLSW_FORCE_BOOT DPU_LLSW_FORCE_BOOT Command Parameter(s) : DPU_STRUCTURE_ID PP002380 DPU_PARTITION PP267380 Subsch. ID : 90 Det. descr. : FORCE THE BOOT OF THE DPU LLSW FROM EEPROM	PC032380 1 <dec> (Def) DPU_PRTN	
		Verify: The following TM(3,25) packets should be generated: PACS_essential_HK (APID 1153) PACS_NO_PRIME_HK (APID 1155)		
4.5		Re-enable SDB FDIR		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand ConfigureSDBFDIR Command Parameter(s) : RTA DH011161 M0 DH030161 M1 DH031161 M2 DH032161 M3 DH033161 M4 DH034161 M5 DH035161 M6 DH036161 M7 DH037161 F0 DH018161 F1 DH019161	DC005161 PACS B Ignore Flag Ignore Flag Ignore Flag Ignore Flag Ignore Flag Ignore Flag Ignore Flag Ignore Flag ON Alive	
		F2 DH020161 F3 DH021161 F4 DH022161 F5 DH023161 F6 DH024161 F7 DH025161 M12 DH051161 M_C DH043161 M8 DH038161 M9 DH039161 M10 DH040161 M11 DH041161 F12 DH050161 CNT DH042161 F8 DH026161	Well TC Well TM Valid Non-vital NOMINAL ON Ignore Flag Ignore CNT Ignore Flag Ignore Flag Ignore Flag Update status ENABLED LoopCnt1 Bus A	
		F9 DH027161 F10 DH028161 F11 DH029161 TC Control Flags : Subsch. ID : 10 Det. descr. : Configure SDB FDIR	Healthy Healthy ENABLED GBM IL DSE --Y -- ---	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Wait up to 1 minute for the generation of the D_H_Hk_P64 packet from the CDMU (APID = 18)		
		Verify: 1553 bus FDIR status SDB_FDIR DEFJ4160	= ENABLED	AND=ZAZ99999
5		Switch On DMC		Next Step: 6
	ET=+ UT=+00.00.00	Execute Telecommand SwOn_PacsDecMec2_L69 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS DEC/MEC2 - switch LCL_69 on	DC69D170	
		Verify: DMC LCL status PacsMec2_L69_1S WM62E565	= ON	AND=ZAZ99999
		Verify: DMC LCL current (+/- 0.1A) PacsMec2_L69_I WM610565	= 0.6 A	AND=ZAZ99999
6		Establish links		Next Step: 7
6.1		DPU reset of 1355		<input type="checkbox"/>
	ET=+ UT=+00.00.28	DPU_RESET_1355 Subsch. ID : 90 Det. descr. : DPU RESET THE 1355 CHIP	DPU_RESET_1355 PC025380	
6.2		Establish DPU -> DMC connection		<input type="checkbox"/>
	ET=+ UT=+00.00.03	DPU_START_OBCP_RAW Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 TC Control Flags : Subsch. ID : 90	DPU_START_OBCP PC012380 START_1355_LINK 2 <dec> (Def) 1 <dec> 0 <dec> 2 <dec> 1 <dec>	
		Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry DP_DMC_LINK PM022380	= ON	AND=ZAZ99999
6.3		Execute Memory self test check		☐
	ET=+ UT=+00.00.04	DPU_MEMORY_DUMP DPU_MEMORY_DUMP Command Parameter(s) : DPU_MEMORY_BLOCK_ID PP009380 DPU_MEMORY_ADDR PP003380 DPU_DATA_LENGTH PP008380 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : DUMP OF A DPU MEMORY AREA	PC028380 3100 <hex> 0 <hex> 17 <dec>	
		Verify: The following TM(6,6) packet should be generated: PACS_MEMORY_DUMP (APID 1152)		
		For PACS DMC OBSW v6.028 : 0x 0000 0001 0x 0007 FFFF 0x 0000 55D0 0x 0000 55D0 Although the rest of the dump should be 0x0000 0000, it is not unexpected if it is not. This should be analysed by PACS offline.		
7		Load OBSW		Next Step: 8
		OBSM engineer to run the procedure H_FCP_OBS_4310 to generate the saved stack files for upload.		
		The OBSM procedure will generate a saved stack file and uplink the load commands to PACS. It will also verify that the load is successful by checksum verification of the on-board image.		
8		Start DMC OBSW for EEPROM Memory Update		Next Step: 9
		WARNING: the following TCs must be sent with the exact time delay as defined		

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	ET=+ UT=+00.00.00	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 TC Control Flags : GBM IL DSE --Y -- --	PC012380 21 <dec> 3 <dec> 1 <dec> 0 <dec> 2 <dec> 1 <dec> 3 <dec> 32818 <dec>	
		Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS		
	ET=+ UT=+00.00.10	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 19 <dec> 2 <dec> (Def) 1 <dec> 0 <dec> 2 <dec> 2 <dec>	
8.1		Verify DMC OBSW started		<input type="checkbox"/>
		Verify that the following parameter is incrementing DM_IRS_CNT PM046420	incrementing	AND=ZAZ99999
		Verify Telemetry DM_SW_GLOBAL_ST PM000420	= 10000 <hex>	AND=ZAZ99999
		Verify Telemetry DM_VID PM047420	Version	AND=ZAZ99999
9		Copy DMC SW to EEPROM		Next Step: 10
	ET=+ UT=+00.00.00	DMC_COPY_OBS_TO_EEPROM DMC_COPY_OBS_TO_EEPROM TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 90 Det. descr. : COPY THE DMC HLSW TO EEPROM	PC201420	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify that the following parameter is incrementing DM_IRS_CNT PM046420	incrementing	AND=ZAZ99999
		Verify Telemetry DM_SW_GLOBAL_ST PM000420	= 10000 <hex>	AND=ZAZ99999
10		Switch OFF PACS		Next Step: END
10.1		Go to SAFE MODE		<input type="checkbox"/>
		Sending this TC will generate a TM(5,1) [EVENT_REPORT_5_28 - Unexp 1355 ACK] packet.		
	ET=+ UT=+00.00.00	DPU_START_OBCP_RAW DPU_START_OBCP Command Parameter(s) : PROCEDURE_ID PP012380 NUMBER_OF_TIMES PP010380 TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	PC012380 24 <dec> 0 <dec>	
		Verify Telemetry DP_TM_RATE PM049380	= SAFE	AND=ZAZ99999
10.2		Stop the instrument RT interrogation		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand ConfiguresDBFDIR Command Parameter(s) : RTA DH011161 M0 DH030161 M1 DH031161 M2 DH032161 M3 DH033161 M4 DH034161 M5 DH035161 M6 DH036161 M7 DH037161 F0 DH018161 F1 DH019161	DC005161 PACS B Update status Ignore Flag Ignore Flag Ignore Flag Update status Ignore Flag Ignore Flag Ignore Flag OFF Alive	

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		F2 DH020161 F3 DH021161 F4 DH022161 F5 DH023161 F6 DH024161 F7 DH025161 M12 DH051161 M_C DH043161 M8 DH038161 M9 DH039161 M10 DH040161 M11 DH041161 F12 DH050161 CNT DH042161 F8 DH026161	Well TC Well TM Invalid Non-vital NOMINAL OFF Ignore Flag Ignore CNT Ignore Flag Ignore Flag Ignore Flag Ignore Flag Ignore Flag ENABLED LoopCnt1 Bus A	
		F9 DH027161 F10 DH028161 F11 DH029161 Subsch. ID : 10 Det. descr. : Configure SDB FDIR	Healthy Healthy ENABLED	
		Wait up to 1 minute for the generation of the D_H_Hk_P64 packet from the CDMU (APID = 18)		
		Verify Telemetry PACSB_OnOff DED31161	= OFF	AND=ZAZ99999
		Verify Telemetry PACSB_ValidInv DED35161	= Invalid	AND=ZAZ99999
10.3		Switch OFF LCLs		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Execute Telecommand SwOff_PacsDecMec2_L69 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,3) PACS DEC/MEC2 - switch LCL_69 off GBM IL DSE --Y -- ---	DC69B170	
	ET=+ UT=+00.00.01	Execute Telecommand SwOff_PacsD_R_L42 Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,3) PACS DPU Red - switch LCL_42 off	DC42B170	
		Verify Telemetry PacsMec2_L69_1S WM62E565	= OFF	AND=ZAZ99999
		Verify Telemetry PacsD_R_L42_S WM42B565	= OFF	AND=ZAZ99999
End of Procedure				