

Pacs_LoadDpuObsw_Nominal
 File: H_FCP_PAC_NLDM.xls
 Author: R. Biggins



Procedure Summary

Objectives

The objective of this procedure is to load a new version of the on board software for the nominal DPU

- Switch to PACS bus profile
- Disable SDB FDIR for PACS RTA
- Enable RT interrogations for PACS RTA
- Power on nominal DPU
- Enable SDB FDIR for PACS RTA
- Load new OBSW using H_FCP_OBS_4110
- Update ASW with new OBSW
- Write new OBSW to EEPROM
- Disable RT interrogations for PACS RTA
- Power off nominal DPU

Based on procedure:
 Pacs_LoadDpuObsw_Nominal_28_09_2007

Summary of Constraints

PACS has been switched off for at least 4 minutes.
 This procedure is valid for the DPU OBSW version 9.04

Spacecraft Configuration

Start of Procedure

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

End of Procedure

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

Reference File(s)

Input Command Sequences

Output Command Sequences

HFPNLDM

Referenced Displays

ANDs GRDs SLDs
 ZAZ9B999

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
21/09/07		1	Created	R. Biggins	

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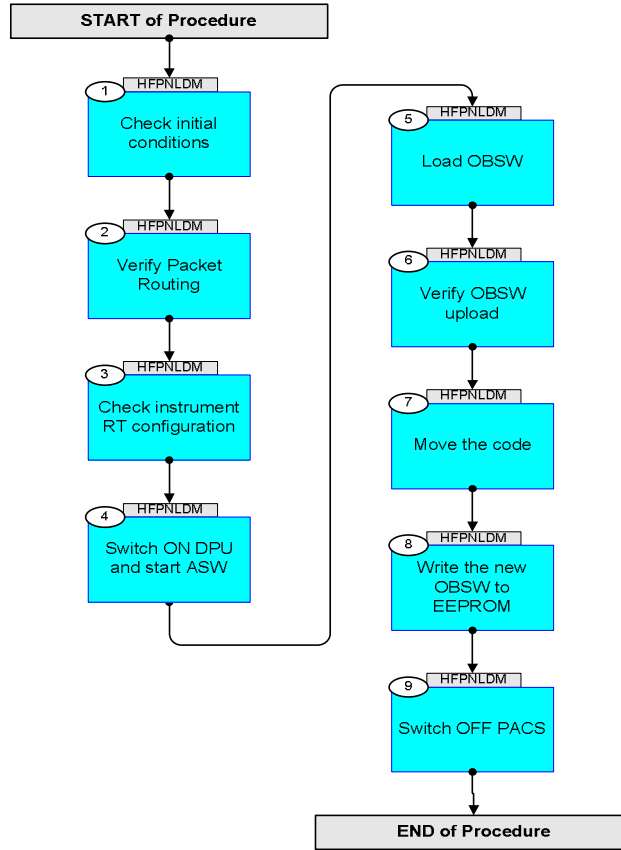


22/11/07		1.01	Validation : - Time tags added to SVM commands - Editorial updates	R. Biggins	
04/12/07		2	TC and TM updated for DPU UM v2.8	R. Biggins	
18/01/08		3	Update due to initial testing against the simulator: - TCs updated due to new DB - Execution times removed - Editorial updates	R. Biggins	
27/05/08	1	4	Updates due to SVT-1 testing: - TC to start RT interrogations updated (step 4.3) - TC to enable FDIR moved from step 9.3 to step 4.5 - Expected LCL currents updated - TM added to verify writing of EEPROM (step 8) - Comments added/updated - Flags updated - AND updated for all TM parameters	R. Biggins	
23/10/08	2	5	Updates due to new procedures from industry - Step 4.2 and 4.3 combined - TC DC005161 database definition updated	R. Biggins	
20/03/09	2.2	6	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	6.01	Validation : Editorial updates due to comments from project/industry	R. Biggins	
24/07/09		7	Updates due to new DPU software version: - DPU updated to version 9.04	R. Biggins	
24/07/09	2.5	7.01	Validation : Procedure cover updated	R. Biggins	

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Procedure Flowchart Overview



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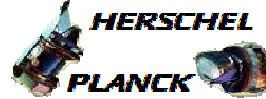
Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name :HFPNLDM (Load DPU OBSW (Nom)) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Check initial conditions		Next Step: 2
		Verify: PACS has been switched off for at least 4 minutes		
1.1		PACS input		<input type="checkbox"/>
		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		
		Verify that the PACS ICC has indicated whether the software should be written to the primary or secondary partition of the EEPROM (step 4.8) WRITE_PN = 1 or 2		
		Verify that the correct information has been supplied by the ICC: Software Image (verify with OBSM engineer) Software Version/Subversion number (step 7)		
		The FP NR_WORDS and NR_WORD2 should be set as follows (see step 7 and 8): DPU OBSW v9.04 = 10CB4		
1.2		Spacecraft mode		<input type="checkbox"/>
		Verify Telemetry CurrentMode DEL34170 = Nominal		AND=ZAZ9B999
		Verify Telemetry ACC_A_MODE AEE8G050 = Nominal		AND=ZAZ9B999
1.3		Bus status		<input type="checkbox"/>
		Verify Bus configuration		
		Verify: Active 1553 bus Active_Bus_A_B DEFJ1160 = BUS_A		AND=ZAZ9B999

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		Verify: 1553 bus FDIR status SDB_FDIR DEFJ4160	= ENABLED	AND=ZAZ9B999
		Verify: SDB handling status BSW_SDB_ENAB DEF60160	= ENABLED	AND=ZAZ9B999
		<i>Verify bus health status</i>		
		Verify: Bus (side A) health status BusA_HealthySts DEFJ2160	= Healthy	AND=ZAZ9B999
		Verify: Bus (side B) health status BusB_HealthySts DEFJ3160	= Healthy	AND=ZAZ9B999
1.4		<i>Nominal instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= OFF	AND=ZAZ9B999
		Verify: SPU LCL status PacsS_N_L35_S WM52A565	= OFF	AND=ZAZ9B999
		Verify: BOLC LCL status PacsB_N_L27_1S WM82D565	= OFF	AND=ZAZ9B999
		Verify: Dec/Mec1 LCL status PacsMec1_L65_1S WM52E565	= OFF	AND=ZAZ9B999
1.5		<i>Redundant instrument LCLs</i>		☐
		Verify: DPU LCL status PacsD_R_L42_S WM42B565	= OFF	AND=ZAZ9B999
		Verify: SPU LCL status PacsS_R_L36_S WM62A565	= OFF	AND=ZAZ9B999
		Verify: BOLC LCL status PacsB_R_L28_1S WM32D565	= OFF	AND=ZAZ9B999
		Verify: Dec/Mec2 LCL status PacsMec2_L69_1S WM62E565	= OFF	AND=ZAZ9B999
2		<i>Verify Packet Routing</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	DC141160 GBM IL DSE --Y -- ---	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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		
		Verify Packet Reception Telemetry Packets DownLinking-Storage Status Report (14,7)-1400 <i>Packet Details:</i> APID: 16 Type: 14 Subtype: 7 PI1: PI2:		
3		Check instrument RT configuration		Next Step: 4
3.1		Remote Terminal configuration		<input type="checkbox"/>
		Verify Telemetry PACS_VitalNonV DED5G161 = NonVital		AND=ZAZ9B999
		Verify Telemetry PACS_TmRetry DED5Z161 = ON		AND=ZAZ9B999
3.2		Remote Terminal Status		<input type="checkbox"/>
		Nominal units		
		Verify Telemetry PACSA_OnOff DED2G161 = OFF		AND=ZAZ9B999
		Verify Telemetry PACSA_DeadAliv DED2H161 = Alive		AND=ZAZ9B999
		Verify Telemetry PACSA_WellsiTC DED2Z161 = Well		AND=ZAZ9B999
		Verify Telemetry PACSA_WellsiTM DED2J161 = Well		AND=ZAZ9B999
		Verify Telemetry PACSA_ValidInv DED2K161 = Invalid		AND=ZAZ9B999
		Redundant units		
		Verify Telemetry PACSB_OnOff DED31161 = OFF		AND=ZAZ9B999
		Verify Telemetry PACSB_DeadAliv DED32161 = Alive		AND=ZAZ9B999
		Verify Telemetry PACSB_WellsiTC DED33161 = Well		AND=ZAZ9B999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		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 GBM IL DSE --Y -- ---	Healthy Healthy DISABLED	
		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	= DISABLED	AND=ZAZ9B999
		Verify Telemetry PACS_NomRed DED5H161	= NOMINAL	AND=ZAZ9B999
		Verify Telemetry PACSA_OnOff DED2G161	= ON	AND=ZAZ9B999
		Verify Telemetry PACSA_ValidInv DED2K161	= Valid	AND=ZAZ9B999
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_N_L41 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,5) PACS DPU Nom - switch LCL_41 on GBM IL DSE --Y -- ---	DC41D170	
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= ON	AND=ZAZ9B999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: DPU LCL current (+/- 0.1A) PacsD_N_L41_I WM707565	= 0.49 A	AND=ZAZ9B999
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.		
	ET=+ UT=+00.00.15	DPU_LLSW_FORCE_BOOT DPU_LLSW_FORCE_BOOT Command Parameter(s) : DPU_STRUCTURE_ID PP002380 DPU_PARTITION PP267380 SSID : 90	PC032380 1 <dec> (Def) DPU_PRTN	
		Verify: The following TM(3,25) packets should be generated: PACS_essential_HK (APID 1152) PACS_NO_PRIME_HK (APID 1154)		
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 OFF 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 Invalid Non-vital NOMINAL ON Ignore Flag Ignore CNT Ignore Flag Ignore Flag Ignore Flag Update status ENABLED LoopCnt1 Bus A	

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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 Unhealthy ENABLED	
		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=ZAZ9B999
5		Load OBSW		Next Step: 6
		OBSM engineer to run the procedure H_FCP_OBS_4110 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.		
6		Verify OBSW upload		Next Step: 7
		The following checks will verify the contents of the DPU Data Memory (RAM)		
		For PACS DPU OBSW v9.04: CHECKSUM1 = 44D3 CHECKSUM2 = 876F		
	ET=+ UT=+00.00.03	DPU_MEMORY_CHECK Command Parameter(s) : DPU_MEMORY_BLOCK_ID PP009380 DPU_MEMORY_ADDR PP003380 DPU_DATA_LENGTH PP008380 TC Control Flags : Subsch. ID : 90 Det. descr. : REQUEST FOR A CHECKSUM OF A SPECIFIED MEMORY AREA GBM IL DSE --Y -- ---	PC029380 103 <hex> 4000 <hex> 154F <hex>	
		Verify: DPU memory checksum CHECKSUM PM132380	CHECKSUM1	AND=ZAZ9B999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	DPU_MEMORY_CHECK DPU_MEMORY_CHECK 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. : REQUEST FOR A CHECKSUM OF A SPECIFIED MEMORY AREA	PC029380 103 <hex> 5551 <hex> B764 <hex>	
		Verify: DPU memory checksum CHECKSUM PM132380	CHECKSUM2	AND=ZAZ9B999
7		Move the code		Next Step: 8
		The NR_WORDS parameter should be set as follows: DPU OBSW v9.04 = 10CB4		
	ET=+ UT=+00.00.01	DPU_PATCH_EXECUTE_RAW DPU_PATCH_EXECUTE Command Parameter(s) : DPU_DIRECTION PP263380 DPU_START_ADDRESS PP266380 DPU_NUMBER_OF_WORDS PP264380 SSID : 90	PC370380 BACKWARD 30000 <hex> NR_WORDS	
		Verify: The following TM(3,25) packet should be generated: PACS_NO_PRIME_HK (APID 1154)		
		Verify Telemetry DP_SW_VERS_ID PM050380	Version	AND=ZAZ9B999
		Verify Telemetry DP_SW_SUBVERS_ID PM051380	Subversion	AND=ZAZ9B999
8		Write the new OBSW to EEPROM		Next Step: 9
		WARNING: The relevant authority (TBD) should be informed that the DPU EEPROM is being written to in order to monitor the total number of write cycles as the EEPROM has only a limited number of cycles.		
		The NR_WORD2 parameter value should be set as follows: DPU OBSW v9.04 = 10CB4		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	Execute Telecommand 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 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380 PAR_VALUE PP017380 PAR_ID PP011380	PC012380 WRITE_IN_EEPROM 5 <dec> 1 <dec> 4000 <hex> 2 <dec> NR_WORD2 3 <dec> WRITE_PN 4 <dec> 426116354 <dec> 5 <dec>	
		PAR_VALUE PP017380 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 90 Det. descr. : START AN OBCP WITH THE COMMANDED PARAMETERS	0 <dec>	
		Verify: During the write to EEPROM DP_EEPROM_PROT PM063380	= NO WRT PROTECT	AND=ZAZ9B999
		Verify: After completion of the action DP_EEPROM_PROT PM063380	= WRT PROT ENABL	AND=ZAZ9B999
9		Switch OFF PACS		Next Step: END
9.1		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 A Update status Ignore Flag Ignore Flag Ignore Flag Update status Ignore Flag Ignore Flag Ignore Flag OFF Alive	

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		F9 DH027161 F10 DH028161 F11 DH029161 TC Control Flags : Subsch. ID : 10 Det. descr. : Configure SDB FDIR GBM IL DSE --Y -- ---	Healthy Healthy ENABLED	
		Wait up to 1 minute		
		Verify Telemetry PACSA_OnOff DED2G161	= OFF	AND=ZAZ9B999
		Verify Telemetry PACSA_ValidInv DED2K161	= Invalid	AND=ZAZ9B999
9.2		Switch off DPU LCL		<input type="checkbox"/>
	ET=+ UT=+00.00.00	Switch off DPU LCL SwOff_PacsD_N_L41 TC Control Flags : Subsch. ID : 10 Det. descr. : PCDU: TC(8,4,112,3) PACS DPU Nom - switch LCL_41 off GBM IL DSE --Y -- ---	DC41B170	
		Verify: DPU LCL status PacsD_N_L41_S WM72B565	= OFF	AND=ZAZ9B999
End of Procedure				