

Switch to TMTC N after PCDU 1553 bus failure
File: H_CRP_EPS_IF5R.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to switch from the redundant (RT 6) to the nominal PCDU TMTC module (RT 5) after an on-board PCDU switchover.

Summary of Constraints

Before switching OFF the redundant 1553 RT (TMTC R) it is necessary to disable the communication between PCDU and CDMU on the 1553 S/C bus.

Before switching ON the nominal 1553 RT (TMTC N) it is necessary to mark it as not failed in "Unit in Use" (UIU) table.

Re-enable of EAT entry ID 157 and communication on the bus are executed after the nominal 1553 RT (TMTC N) is switched ON.

Moreover:

- the EAT entry is enabled through TC(19,4) thus the status of the ASW function "Event/Action Management" has to be "running";
- the switching OFF/ON of the PCDU TMTC module is done using TC(2,1), thus not automatically updating the UIU table, therefore in addition to the health status (failed/not failed) in UIU table, one needs to change the UIU contents thus the status of the ASW function "FDIR Management" has to be "running".

Spacecraft Configuration

Start of Procedure

CDMU in default configuration.
Communication between CDMU and PCDU via redundant 1553 I/F, remote terminal address 6 (redundant TMTC module).
Nominal 1553 I/F, remote terminal address 5 (nominal TMTC module) marked OFF and failed in unit in use table.
EAT entry (Event ID 0x009D) disabled.

End of Procedure

CDMU in default configuration.
Communication between CDMU and PCDU via nominal 1553 I/F, remote terminal address 5 (nominal TMTC module).
Nominal 1553 I/F, remote terminal address 5 (nominal TMTC module) marked ON and not failed in unit in use table.
EAT entry (event ID 0x009D) re-enabled.

Reference File(s)

Input Command Sequences

Output Command Sequences

HRWIF5R

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Referenced Displays

ANDs **GRDs** **SLDs**
 ZAZ7H999
 ZAZ7L999
 ZAZ7K999

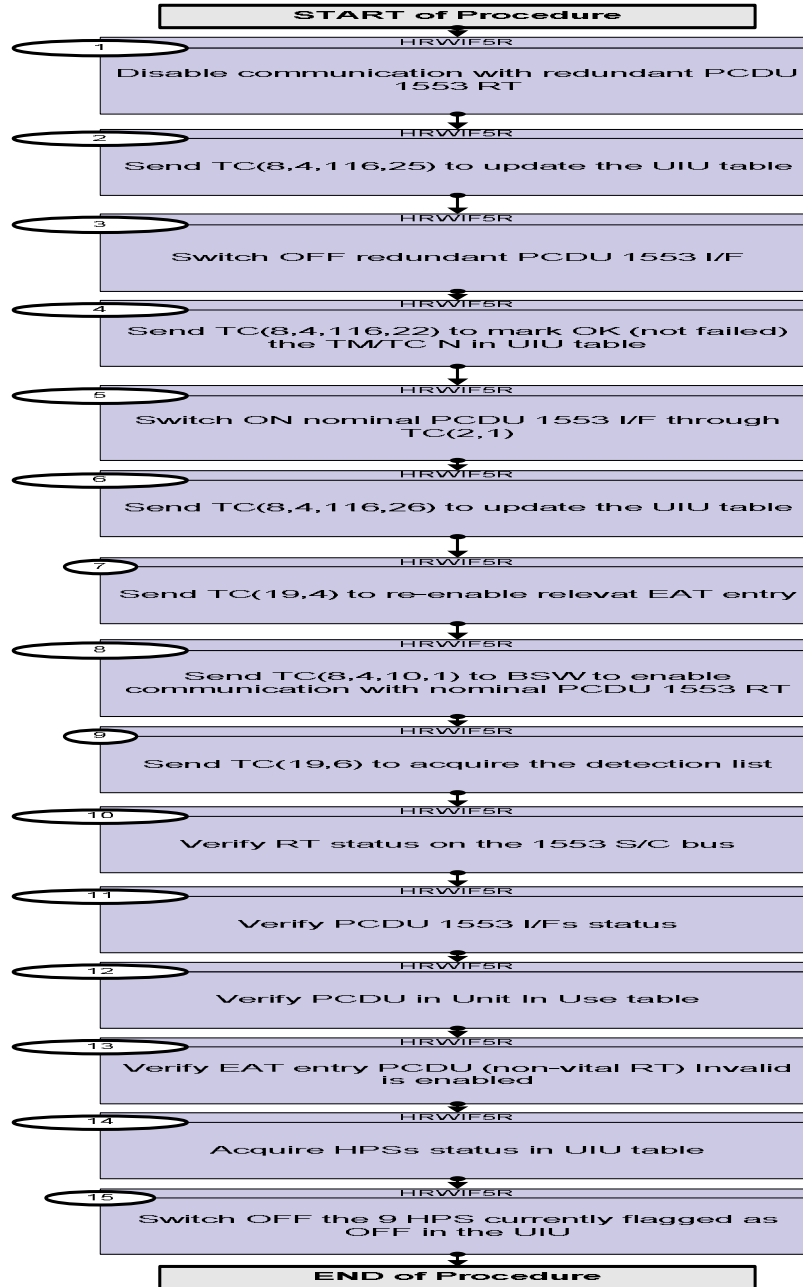
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
28/07/08	1	1	Created	E. Picallo	
19/09/08		2	TC DC005161 (Configure SDBFDIR) M12 / F12 flag setting update	E. Picallo	
09/01/09	2	3	CDMU ASW V3.8 and BSW V2.4 alignment	E. Picallo	
20/03/09	2.2	4	recommendation to execute the procedure using the MTL added	E. Picallo	
10/04/09	2.3	5	Set VC ID for Red High Priority Standard TC added	E. Picallo	
06/07/09	2.5	6	Re-enable EAT ID 157 before enable communication nominal 1553 RT (TMTC N) <input type="checkbox"/> Procedure using the MTL	E. Picallo	

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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 : HRWIF5R (Switch TMTCN busfail) Switch to TMTC N after PCDU 1553 bus failure TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>																																																																																																																								
1		Disable communication with redundant PCDU 1553 RT		Next Step: 2																																																																																																																				
		In the TC(8,4,10,1) it is necessary to set, in this case, the following parameters: - Remote terminal address = 6 (redundant PCDU 1553 I/F) - Status of the RT= off (M0=1,F0=0) - Status of the RT = invalid (M4=1,F4=0) The remaining parameters of the TC have been set but they are not important because are masked.																																																																																																																						
	ET=+00.00.00 UT=+	Execute Telecommand Command Parameter(s) : <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%; text-align: center;">RTA</td> <td style="width: 15%; text-align: center;">DH011161</td> <td style="width: 15%; text-align: center;">PCDU B</td> </tr> <tr> <td></td> <td style="text-align: center;">M0</td> <td style="text-align: center;">DH030161</td> <td style="text-align: center;">Update status</td> </tr> <tr> <td></td> <td style="text-align: center;">M1</td> <td style="text-align: center;">DH031161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M2</td> <td style="text-align: center;">DH032161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M3</td> <td style="text-align: center;">DH033161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M4</td> <td style="text-align: center;">DH034161</td> <td style="text-align: center;">Update status</td> </tr> <tr> <td></td> <td style="text-align: center;">M5</td> <td style="text-align: center;">DH035161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M6</td> <td style="text-align: center;">DH036161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M7</td> <td style="text-align: center;">DH037161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">F0</td> <td style="text-align: center;">DH018161</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td></td> <td style="text-align: center;">F1</td> <td style="text-align: center;">DH019161</td> <td style="text-align: center;">Dead</td> </tr> <tr> <td></td> <td style="text-align: center;">F2</td> <td style="text-align: center;">DH020161</td> <td style="text-align: center;">Sick TC</td> </tr> <tr> <td></td> <td style="text-align: center;">F3</td> <td style="text-align: center;">DH021161</td> <td style="text-align: center;">Sick TM</td> </tr> <tr> <td></td> <td style="text-align: center;">F4</td> <td style="text-align: center;">DH022161</td> <td style="text-align: center;">Invalid</td> </tr> <tr> <td></td> <td style="text-align: center;">F5</td> <td style="text-align: center;">DH023161</td> <td style="text-align: center;">Non-vital</td> </tr> <tr> <td></td> <td style="text-align: center;">F6</td> <td style="text-align: center;">DH024161</td> <td style="text-align: center;">NOMINAL</td> </tr> <tr> <td></td> <td style="text-align: center;">F7</td> <td style="text-align: center;">DH025161</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td></td> <td style="text-align: center;">M12</td> <td style="text-align: center;">DH051161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M_C</td> <td style="text-align: center;">DH043161</td> <td style="text-align: center;">Ignore CNT</td> </tr> <tr> <td></td> <td style="text-align: center;">M8</td> <td style="text-align: center;">DH038161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M9</td> <td style="text-align: center;">DH039161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M10</td> <td style="text-align: center;">DH040161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">M11</td> <td style="text-align: center;">DH041161</td> <td style="text-align: center;">Ignore Flag</td> </tr> <tr> <td></td> <td style="text-align: center;">F12</td> <td style="text-align: center;">DH050161</td> <td style="text-align: center;">DISABLED</td> </tr> <tr> <td></td> <td style="text-align: center;">CNT</td> <td style="text-align: center;">DH042161</td> <td style="text-align: center;">LoopCnt1</td> </tr> <tr> <td></td> <td style="text-align: center;">F8</td> <td style="text-align: center;">DH026161</td> <td style="text-align: center;">Bus A</td> </tr> <tr> <td></td> <td style="text-align: center;">F9</td> <td style="text-align: center;">DH027161</td> <td style="text-align: center;">Unhealthy</td> </tr> <tr> <td></td> <td style="text-align: center;">F10</td> <td style="text-align: center;">DH028161</td> <td style="text-align: center;">Unhealthy</td> </tr> <tr> <td></td> <td style="text-align: center;">F11</td> <td style="text-align: center;">DH029161</td> <td style="text-align: center;">DISABLED</td> </tr> </table> TC Control Flags : Subsch. ID : 10 Det. descr. : Configure SDB FDIR <div style="text-align: right;"> GBM IL DSE --Y -- -- </div>		RTA	DH011161	PCDU B		M0	DH030161	Update status		M1	DH031161	Ignore Flag		M2	DH032161	Ignore Flag		M3	DH033161	Ignore Flag		M4	DH034161	Update status		M5	DH035161	Ignore Flag		M6	DH036161	Ignore Flag		M7	DH037161	Ignore Flag		F0	DH018161	OFF		F1	DH019161	Dead		F2	DH020161	Sick TC		F3	DH021161	Sick TM		F4	DH022161	Invalid		F5	DH023161	Non-vital		F6	DH024161	NOMINAL		F7	DH025161	OFF		M12	DH051161	Ignore Flag		M_C	DH043161	Ignore CNT		M8	DH038161	Ignore Flag		M9	DH039161	Ignore Flag		M10	DH040161	Ignore Flag		M11	DH041161	Ignore Flag		F12	DH050161	DISABLED		CNT	DH042161	LoopCnt1		F8	DH026161	Bus A		F9	DH027161	Unhealthy		F10	DH028161	Unhealthy		F11	DH029161	DISABLED	DC005161	
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2		Send TC(8,4,116,25) to update the UIU table		Next Step: 3
	ET=+00.00.05 UT=+	Execute Telecommand H_FdirMarkUnitOff_Templ Command Parameter(s) : H_ConfStsUnitId DHZ00170 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : TEMPLATE FDIR: Mark Unit OFF, TC(8,4,116,25), Herschel Version	DC91H159 PcdutmtcB	
3		Switch OFF redundant PCDU 1553 I/F		Next Step: 4
		Note that when the TM/TC R is turned OFF the state of all LCLs and HPSS is maintained		
	ET=+00.00.05 UT=+	Execute Telecommand PCDU_1553_IF_B_OFF_Nom TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : PCDU 1553 I/F B OFF Nominal - High Level	DCH42170	
	ET=+00.00.05 UT=+	Execute Telecommand PCDU_1553_IF_B_OFF_Red TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : PCDU 1553 I/F B OFF Redundant - High Level	DCH58170	
4		Send TC(8,4,116,22) to mark OK (not failed) the TM/TC N in UIU table		Next Step: 5
		Mark Unit OK telecommand is used to modify the health status of a unit as OK.		
	ET=+00.00.05 UT=+	Execute Telecommand MarkOKUnitA_Pcdutmtc TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Fdir Mark OK Unit A PCDU TM TC, TC(8,4,116,22)	DCB6H170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.05 UT=+	Execute Telecommand EnableActions <i>Command Parameter(s) :</i> N_Repetition DH041170 APID_for_EAT_TC DH236170 EventId DH146170 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- <i>Subsch. ID : 10</i> Det. descr. : TEMPLATE Enable Actions TC(19,4)	DCT84170 1 <dec> (Def) CDMS (Def) 157 <dec>	
8		Send TC(8,4,10,1) to BSW to enable communication with nominal PCDU 1553 RT		Next Step: 9
		In the TC(8,4,10,1) it is necessary to set, in this case, the following parameters: - Remote terminal address = 5 (nominal PCDU 1553 I/F) - Status of the RT= on (M0=1,F0=1) - Status of the RT = valid (M4=1,F4=1) - RT Nominal/Redundant = Nominal (M6=1,F6=1) The remaining parameters of the TC have been set but they are not important because are masked.		
	ET=+00.00.05 UT=+	Execute Telecommand ConfigureSDBFDIR <i>Command Parameter(s) :</i> RTA DH011161 M0 DH030161 M1 DH031161 M2 DH032161 M3 DH033161 M4 DH034161 M5 DH035161 M6 DH036161 M7 DH037161 F0 DH018161 F1 DH019161 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	DC005161 PCDU A Update status Ignore Flag Ignore Flag Ignore Flag Update status Ignore Flag Update status Ignore Flag ON Dead Sick TC Sick TM Valid Non-vital NOMINAL OFF Ignore Flag Ignore CNT Ignore Flag Ignore Flag Ignore Flag Ignore Flag DISABLED 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 -- ---	Unhealthy Unhealthy DISABLED	
9		Send TC(19,6) to acquire the detection list		Next Step: 10
	ET=+00.00.05 UT=+	Execute Telecommand ReptEvtActTable TC Control Flags : Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6) GBM IL DSE --Y -- ---	DCT86170	
10		Verify RT status on the 1553 S/C bus		Next Step: 11
10.1		Verify redundant RT status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry PCDUB_On_Off DEF B1160 = OFF		AND=ZAZ7H999
		Verify Telemetry PCDUB_Val_Inval DEF B5160 = Invalid		AND=ZAZ7H999
10.2		Verify nominal RT status on the 1553 S/C bus		<input type="checkbox"/>
		Verify Telemetry PCDUA_On_Off DEF A G160 = ON		AND=ZAZ7H999
		Verify Telemetry PCDUA_Val_Inval DEF A K160 = Valid		AND=ZAZ7H999
		Verify Telemetry PCDU_No_Re_RTA DEF D M160 = NOMINAL		AND=ZAZ7H999
		Notice that the parameter DEFDM160 is for the overall PCDU it indicates the I/F "Active", that is the RT used to communicate where: - RT 5 (I/F A) is always the nominal one. - RT 6 (I/F B) is always the redundant one.		
11		Verify PCDU 1553 I/Fs status		Next Step: 12

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
11.1		Verify redundant PCDU 1553 I/F is OFF		<input type="checkbox"/>
		Verify PCDU 1553 I/F Module #2 Status N Telemetry PCDU_1553_M2_N WMB03565	= OFF	AND=ZAZ7H999
		Verify PCDU 1553 I/F Module #2 Status R Telemetry PCDU_1553_M2_R WMB05565	= OFF	AND=ZAZ7H999
11.2		Verify nominal PCDU 1553 I/F is ON		<input type="checkbox"/>
		Verify PCDU 1553 I/F Module #1 Status N Telemetry PCDU_1553_M1_N WMB02565	= ON	AND=ZAZ7H999
		Verify PCDU 1553 I/F Module #1 Status R Telemetry PCDU_1553_M1_R WMB04565	= ON	AND=ZAZ7H999
12		Verify PCDU in Unit In Use table		Next Step: 13
		Verify unit status Telemetry PcdulFuncSts DEG03170	= On	AND=ZAZ7L999
		Verify Telemetry PcdulUse DEN00170	= In_Use	AND=ZAZ7L999
		Verify default status Telemetry PcdulLogSts DEN01170	= Nominal	AND=ZAZ7L999
		Verify FDIR status Telemetry PcdulFailSts DEN02170	= Not_Failed	AND=ZAZ7L999
		Verify unit status Telemetry Pcdul2FuncSts DEG02170	= Off	AND=ZAZ7L999
		Verify Telemetry Pcdul2Use DEN03170	= Not_In_Use	AND=ZAZ7L999
		Verify default status Telemetry Pcdul2LogSts DEN04170	= Redundant	AND=ZAZ7L999
		Verify FDIR status Telemetry Pcdul2FailSts DEN05170	= Not_Failed	AND=ZAZ7L999
13		Verify EAT entry PCDU (non-vital RT) Invalid is enabled		Next Step: 14
		Verify Packet Reception TM 19-7 Event-Action Table Content Report Packet Details: APID: 16 Type: 19 Subtype: 7 PI1: PI2:	EvtActTblRpt	

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		Verify that TM(19,7) have been received and that action related to PCDU (non-vital RT) Invalid is enabled (Event ID 157)		
14		Acquire HPSS status in UIU table		Next Step: 15
		Since when the TM/TC N is turned ON all HPSSs are automatically turned ON by the PCDU (even if some were OFF), it is necessary to check the UIU table to know what HPSSs were OFF before the switchover.		
14.1		Verify Nominal HPSSs status in UIU table		□
		Verify Telemetry Hps1FuncSts DEG77170		AND=ZAZ7K999
		Verify Telemetry Hps2FuncSts DEG81170		AND=ZAZ7K999
		Verify Telemetry Hps3FuncSts DEG85170		AND=ZAZ7K999
		Verify Telemetry Hps4FuncSts DEG89170		AND=ZAZ7K999
		Verify Telemetry Hps5FuncSts DEG93170		AND=ZAZ7K999
		Verify Telemetry Hps6FuncSts DEG97170		AND=ZAZ7K999
		Verify Telemetry Hps7FuncSts DEH01170		AND=ZAZ7K999
		Verify Telemetry Hps8FuncSts DEH05170		AND=ZAZ7K999
		Verify Telemetry Hps9FuncSts DEH09170		AND=ZAZ7L999
14.2		Verify Redundant HPSSs status in UIU table		□
		Verify Telemetry Hps10FuncSts DEG41170		AND=ZAZ7L999
		Verify Telemetry Hps11FuncSts DEG45170		AND=ZAZ7K999
		Verify Telemetry Hps12FuncSts DEG49170		AND=ZAZ7K999
		Verify Telemetry Hps13FuncSts DEG53170		AND=ZAZ7K999

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		Verify Telemetry Hps14FuncSts DEG57170		AND=ZAZ7K999
		Verify Telemetry Hps15FuncSts DEG61170		AND=ZAZ7K999
		Verify Telemetry Hps16FuncSts DEG65170		AND=ZAZ7K999
		Verify Telemetry Hps17FuncSts DEG69170		AND=ZAZ7K999
		Verify Telemetry Hps18FuncSts DEG73170		AND=ZAZ7K999
15		Switch OFF the 9 HPS currently flagged as OFF in the UIU		Next Step: END
		In order to restore the original HPS configuration, ie only 9 HPS ON, the Ground shall switch OFF the 9 HPS currently flagged as OFF in the UIU.		
15.1		Switch OFF redundant HPS?		<input type="checkbox"/>
		WARNING: If it is necessary to switch OFF more than one redundant HPS the procedure must be called more times.		
		Execute Procedure: H_CRP_TCS_HPR0 Redundant HPS switch OFF		
15.2		Switch OFF nominal HPS?		<input type="checkbox"/>
		WARNING: If it is necessary to switch OFF more than one redundant HPS the procedure must be called more times.		
		Execute Procedure: H_CRP_TCS_HPNO Nominal HPS switch OFF		
End of Procedure				