

Configuration check after PCDU 1553 bus failure
File: H_CRP_EPS_IFR.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to check the PCDU configuration after the recovery (TMTC switchover) performed onboard by the ASW (through the Event-Action table) following a BSW TM (5,2,157)(PCDU 1553 Invalid RT, event ID Ox009D) triggered by the SDB DLL FDIR.

Summary of Constraints

The PCDU RT failure is detected by the BSW (that sets OFF and Invalid the RT in use in the RT A matrix); the address of the failed RT is communicated to the ASW via event ID Ox009D.

At the reception of the BSW event, the ASW:

- disables the relevant EAT entry;
- disables communication with RT in use;
- switches OFF the RT in use and changes to OFF and Failed its status in Unit In Use table;
- switches ON the other RT and changes to ON its status in UIU table.

Note that when the nominal/redundant TMTC module is turned ON, the state of all LCLs is maintained, while all HPSS are automatically turned ON by the PCDU initialisation, even if some where OFF; as part of the reconfiguration, the ASW itself switches OFF all HPSS that were OFF before the reconfiguration.

Thus in addition to the PCDU (TMTC modules) configuration, from BSW and ASW points of view, that is RT/ RT A matrices and UIU table, it is necessary to check also the HPSS configuration.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Communication between CDMU and PCDU via nominal/redundant 1553 I/F, RT address 5/6 (nominal/redundant TMTC module);
TMTC N/R marked failed in UIU table.

End of Procedure

CDMU in default configuration;
Communication between CDMU and PCDU via nominal/redundant 1553 I/F, RT address 5/6 (nominal/redundant TMTC module);
TMTC N/R marked failed in UIU table.

Reference File(s)

Input Command Sequences

Output Command Sequences

HRWIFRI

Referenced Displays

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ANDs **GRDs** **SLDs**
 ZAZ7H999
 ZAZ7L999
 ZAZ7N999
 WAHT1584
 WAHT2584
 WAHT3584
 ZAZ7K999

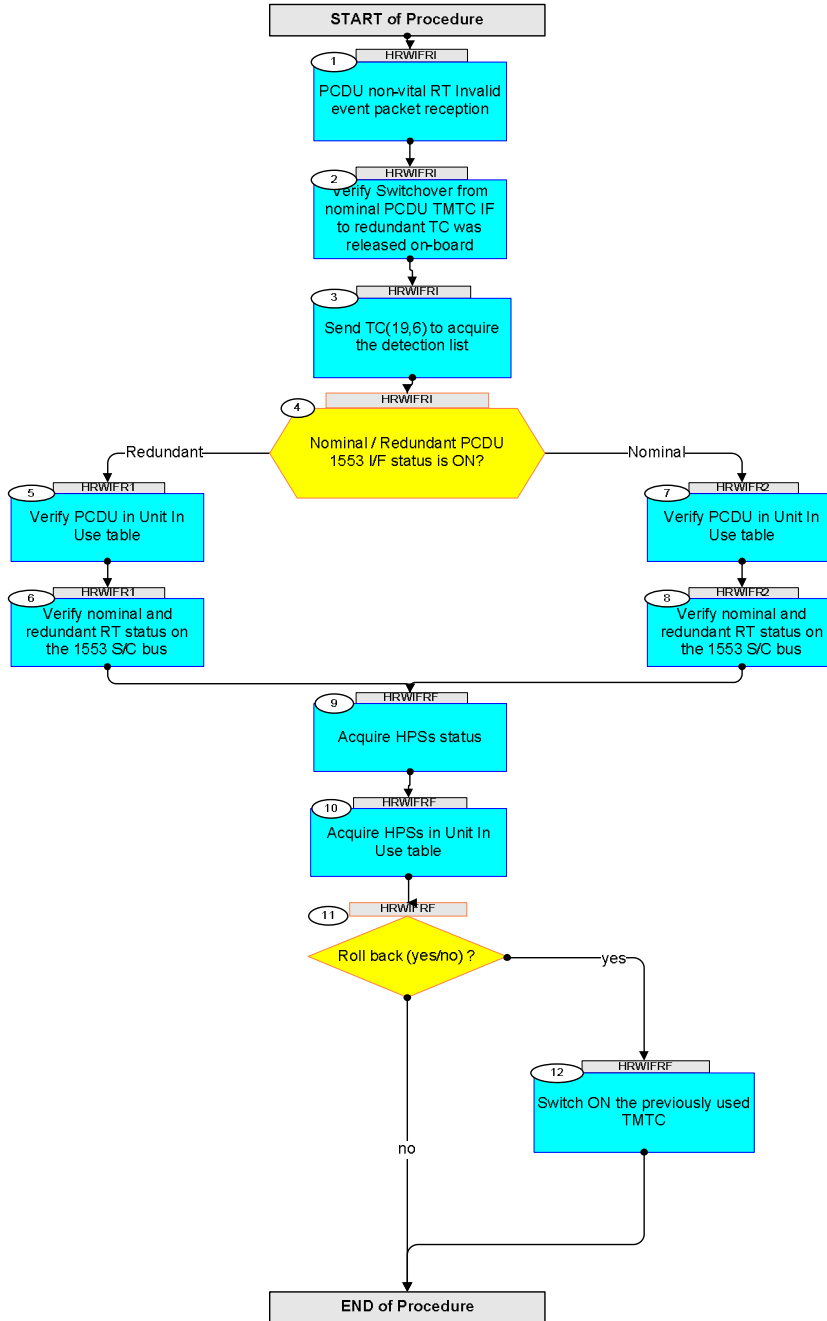
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
28/07/08	1	1	Created	E. Picallo	
15/12/08	2	2	Database alignment	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				
<p><i>TC Seq. Name :HRWIFRI (PCDU553FailCheckInit)</i> Configuration check after PCDU 1553 bus failure Initial</p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		<i>PCDU non-vital RT Invalid event packet reception</i>		Next Step: 2
		<p>Identifies a TMTC switchover Recovery performed onboard by the ASW through the EAT.</p> <p>The BSW event (5,2,157) PCDU 1553 Invalid RT (event ID Ox009D) provides the information relevant to the failing PCDU RT address.</p>		
		Verify Packet Reception CdmuBsw Event 5-2 PCDU non-vital RT Invalid <i>Packet Details:</i>	(5,2)-0557	
		APID: 16 Type: 5 Subtype: 2 PI1: 157 PI2: 157		
		Verify Packet Telemetry (Pkt = (5,2)-0557)		
		EVENT_ID DEZA0161	= 157 <dec>	(None)
		Verify Packet Telemetry (Pkt = (5,2)-0557)		
		BSW_EvIDCnt157 DES4Z161		
		Verify Packet Telemetry (Pkt = (5,2)-0557)		
		FAIL_RT_ADDR DEZ50161	Failing PCDU RT address	(None)
		Verify Packet Telemetry (Pkt = (5,2)-0557)		
		RT_ADDR_CL DEZ54161	RT address classification (Nom./Red.)	(None)
2		<i>Verify Switchover from nominal PCDU TMTC IF to redundant TC was released on-board</i>		Next Step: 3
		<p>Verify TM(1,9) Telecommand Contents Report reception.</p> <p>The Source Data of this TC is the same as the Telecommand to be reported. That is , PCDU 1553 Bus Communication failure TC(8,4,116,33), with parameters as passed from the related TM(5,x,157) event.</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception Telecommand Contents Report Packet Details: APID: 16 Type: 1 Subtype: 9 PI1: PI2:	TcContentRep	
3		Send TC(19,6) to acquire the detection list		Next Step: 4
		Execute Telecommand ReptEvtActTable TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6)	DCT86170	
3.1		Verify that TM(19,7) have been received and the status of action related to PCDU (non-vital RT) Invalid		☐
		Verify Packet Reception TM 19-7 Event-Action Table Content Report Packet Details: APID: 16 Type: 19 Subtype: 7 PI1: PI2:	EvtActTblRpt	
		Verify Packet Telemetry (Pkt = EvtActTblRpt) RankInRpt DE316170		
		Verify Packet Telemetry (Pkt = EvtActTblRpt) Apid DE053170 = CDMS		(None)
		Verify Packet Telemetry (Pkt = EvtActTblRpt) EventId DE068170 = 157 <dec>		(None)
		Verify Packet Telemetry (Pkt = EvtActTblRpt) ParamPassSts DE317170 = 1 <dec>		(None)
		Verify Packet Telemetry (Pkt = EvtActTblRpt) AfoStatus DE318170 = 1 <dec>		(None)
		Verify Packet Telemetry (Pkt = EvtActTblRpt) AfsStatus DE319170 = 1 <dec>		(None)
		Verify Packet Telemetry (Pkt = EvtActTblRpt) ActionStatus DE320170		(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verified that the PCDU 1553 RT Failure Recovery Sequence is disabled i.e. will not be re-enabled again after the recovery since PCDUs are only single failure tolerant. This will prevent to raise again the same failure event with continuous switching of the selected PCDU.		
4		Nominal / Redundant PCDU 1553 I/F status is ON?		Next Step: Redundant 5 Nominal 7
4.1		Verify if Redundant PCDU 1553 I/F is ON		<input type="checkbox"/>
		Verify PCDU 1553 I/F Module #2 Status N Telemetry PCDU_1553_M2_N WMB03565	= ON	AND=ZAZ7H999
		Verify PCDU 1553 I/F Module #2 Status R Telemetry PCDU_1553_M2_R WMB05565	= ON	AND=ZAZ7H999
4.2		OR Verify if 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
<p>TC Seq. Name :HRWIFR1 (PCDU1553Fail TMTCRON) Configuration check after PCDU 1553 bus fail & Red PCDU 1553 ON</p> <p>TimeTag Type: Sub Schedule ID:</p> <p><input type="checkbox"/></p>				
5		Verify PCDU in Unit In Use table		Next Step: 6
		Verify unit status Telemetry PcdulFuncSts DEG03170	= Off	AND=ZAZ7L999
		Verify Telemetry PcdulUse DEN00170	= Not_In_Use	AND=ZAZ7L999
		Verify default status Telemetry PcdulLogSts DEN01170	= Nominal	AND=ZAZ7L999
		Verify FDIR status Telemetry PcdulFailSts DEN02170	= Failed	AND=ZAZ7L999
		Verify unit status Telemetry Pcdul2FuncSts DEG02170	= On	AND=ZAZ7L999
		Verify Telemetry Pcdul2Use DEN03170	= In_Use	AND=ZAZ7L999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify default status Telemetry Pcd2LogSts DEN04170	= Redundant	AND=ZAZ7L999
		Verify FDIR status Telemetry Pcd2FailSts DEN05170	= Not_Failed	AND=ZAZ7L999
6		Verify nominal and redundant RT status on the 1553 S/C bus		Next Step: 9
		Verify Telemetry PCDUA_On_Off DEFAG160	= OFF	AND=ZAZ7N999
		Verify Telemetry PCDUA_Val_Inval DEFAG160	= Invalid	AND=ZAZ7N999
		Verify Telemetry PCDUADeal_Alive DEFAH160	= Alive	AND=ZAZ7N999
		Verify Telemetry PCDUAWellsickTC DEFAZ160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUAWellsickTM DEFAJ160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUB_On_Off DEFB1160	= ON	AND=ZAZ7N999
		Verify Telemetry PCDUB_Val_Inval DEFB5160	= Valid	AND=ZAZ7N999
		Verify Telemetry PCDUBDead_Alive DEFB2160	= Alive	AND=ZAZ7N999
		Verify Telemetry PCDUBWellsickTC DEFB3160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUBWellsickTM DEFB4160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDU_No_Re_RTA DEFDM160	= REDUNDANT	AND=ZAZ7N999
		<p>Notice that the parameter DEFDM160 is for the overall PCDU it indicates the I/F "Active", that is the RT used to communicate where:</p> <ul style="list-style-type: none"> - RT 5 (I/F A) is always the nominal one. - RT 6 (I/F B) is always the redundant one. 		

TC Seq. Name :HRWIFR2 (PCDU1553Fail TMTCON)
 Configuration check after PCDU 1553 bus fail & Nom.
 PCDU 1553 ON

TimeTag Type:
 Sub Schedule ID:

□

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
7		Verify PCDU in Unit In Use table		Next Step: 8
		Verify unit status Telemetry PcdulFuncSts DEG03170	= On	AND=ZAZ7L999
		Verify Telemetry PcdulUse DEN00170	= In_Use	AND=ZAZ7L999
		Verify default status Telemetry PcdulLogSts DEN01170	= Redundant	AND=ZAZ7L999
		Verify FDIR status Telemetry PcdulFailSts DEN02170	= Not_Failed	AND=ZAZ7L999
		Verify unit status Telemetry Pcdu2FuncSts DEG02170	= Off	AND=ZAZ7L999
		Verify Telemetry Pcdu2Use DEN03170	= Not_In_Use	AND=ZAZ7L999
		Verify default status Telemetry Pcdu2LogSts DEN04170	= Nominal	AND=ZAZ7L999
		Verify FDIR status Telemetry Pcdu2FailSts DEN05170	= Failed	AND=ZAZ7L999
8		Verify nominal and redundant RT status on the 1553 S/C bus		Next Step: 9
		Verify Telemetry PCDUA_On_Off DEFAG160	= ON	AND=ZAZ7N999
		Verify Telemetry PCDUA_Val_Inval DEFAG160	= Valid	AND=ZAZ7N999
		Verify Telemetry PCDUADeal_Alive DEFAH160	= Alive	AND=ZAZ7N999
		Verify Telemetry PCDUAWellsickTC DEFAZ160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUAWellsickTM DEFAJ160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUB_On_Off DEFB1160	= OFF	AND=ZAZ7N999
		Verify Telemetry PCDUB_Val_Inval DEFB5160	= Invalid	AND=ZAZ7N999
		Verify Telemetry PCDUBDead_Alive DEFB2160	= Alive	AND=ZAZ7N999
		Verify Telemetry PCDUBWellsickTC DEFB3160	= Well	AND=ZAZ7N999
		Verify Telemetry PCDUBWellsickTM DEFB4160	= Well	AND=ZAZ7N999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry PCDU_No_Re_RT DEFDM160	= NOMINAL	AND=ZAZ7N999
		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.		
<p>TC Seq. Name : HRWIFRF (PCDU553FailCheckFina)</p> <p>TimeTag Type: Sub Schedule ID: □</p>				
9		Acquire HPSs status		Next Step: 10
		As part of the reconfiguration the ASW : - Reinforce the HPS currently in use on commands through 1553 bus - Switch off redundant HPS (default configuration foresees to have HPS 10 to 18 as redundant)		
		Verify Telemetry GRP1_HPS_STS WM12G565		AND=WAHT1584
		Verify Telemetry GRP2_HPS_STS WM22G565		AND=WAHT1584
		Verify Telemetry GRP3_HPS_STS WM22H565		AND=WAHT1584
		Verify Telemetry GRP4_HPS_STS WM32G565		AND=WAHT1584
		Verify Telemetry GRP5_HPS_STS WM32H565		AND=WAHT1584
		Verify Telemetry GRP6_HPS_STS WM42G565		AND=WAHT1584
		Verify Telemetry GRP7_HPS_STS WM42H565		AND=WAHT2584
		Verify Telemetry GRP8_HPS_STS WM52G565		AND=WAHT2584
		Verify Telemetry GRP9_HPS_STS WM52H565		AND=WAHT2584
		Verify Telemetry GRP10_HPS_STS WM62G565		AND=WAHT2584
		Verify Telemetry GRP11_HPS_STS WM62H565		AND=WAHT2584

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry GRP12_HPS_STS WM72G565		AND=WAHT2584
		Verify Telemetry GRP13_HPS_STS WM72H565		AND=WAHT3584
		Verify Telemetry GRP14_HPS_STS WM82G565		AND=WAHT3584
		Verify Telemetry GRP15_HPS_STS WM82H565		AND=WAHT3584
		Verify Telemetry GRP16_HPS_STS WM92G565		AND=WAHT3584
		Verify Telemetry GRP17_HPS_STS WM92H565		AND=WAHT3584
		Verify Telemetry GRP18_HPS_STS WMA2G565		AND=WAHT3584
10		Acquire HPSs in Unit In Use table		Next Step: 11
		Only 9 HPS should be flagged as ON in the UIU, and the paired HPS should be flagged as OFF. (default configuration foresees to have HPS 1 to 9 as nominal switch ON)		
		Refer to Checkform ZAZ7K999 at the back of this document		ANDCK
		Refer to Checkform ZAZ7L999 at the back of this document		ANDCK
11		Roll back (yes/no) ?		Next Step: yes 12 no END
12		Switch ON the previously used TMTC		Next Step: END
12.1		using PCDU R (yes/no)?		<input type="checkbox"/>
		Verify PCDU 1553 I/F Module #2 Status N Telemetry PCDU_1553_M2_N WMB03565	= ON	AND=ZAZ7H999
		Verify PCDU 1553 I/F Module #2 Status R Telemetry PCDU_1553_M2_R WMB05565	= ON	AND=ZAZ7H999
12.2		Switch back to TMTC N		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: H_CRP_EPS_IF5R Switch to TMTC N after PCDU 1553 bus failure		
12.3		using TMTC N (yes/no)?		<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
12.4		Switch back to TMTC R		<input type="checkbox"/>
		Execute Procedure: H_CRP_EPS_IF6R Switch to TMTC R after PCDU 1553 bus failure		
End of Procedure				

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ZAZ7K999 / EPS_UIU1							
ID	DESCRIPTION	VALUE	UNIT	ID	DESCRIPTION	VALUE	UNIT
DEG77170	Hps1FuncSts			DEG73170	Hps18FuncSts		
DEG79170	Hps1Use			DEG75170	Hps18Use		
DEG78170	Hps1LogSts			DEG74170	Hps18LogSts		
DEG76170	Hps1FailSts			DEG72170	Hps18FailSts		
DEG81170	Hps2FuncSts			DEG69170	Hps17FuncSts		
DEG83170	Hps2Use			DEG71170	Hps17Use		
DEG82170	Hps2LogSts			DEG70170	Hps17LogSts		
DEG80170	Hps2FailSts			DEG68170	Hps17FailSts		
DEG85170	Hps3FuncSts			DEG65170	Hps16FuncSts		
DEG87170	Hps3Use			DEG67170	Hps16Use		
DEG86170	Hps3LogSts			DEG66170	Hps16LogSts		
DEG84170	Hps3FailSts			DEG64170	Hps16FailSts		
DEG89170	Hps4FuncSts			DEG61170	Hps15FuncSts		
DEG91170	Hps4Use			DEG63170	Hps15Use		
DEG90170	Hps4LogSts			DEG62170	Hps15LogSts		
DEG88170	Hps4FailSts			DEG60170	Hps15FailSts		
DEG93170	Hps5FuncSts			DEG57170	Hps14FuncSts		
DEG95170	Hps5Use			DEG59170	Hps14Use		
DEG94170	Hps5LogSts			DEG58170	Hps14LogSts		
DEG92170	Hps5FailSts			DEG56170	Hps14FailSts		
DEG97170	Hps6FuncSts			DEG53170	Hps13FuncSts		
DEG99170	Hps6Use			DEG55170	Hps13Use		
DEG98170	Hps6LogSts			DEG54170	Hps13LogSts		
DEG96170	Hps6FailSts			DEG52170	Hps13FailSts		
DEH01170	Hps7FuncSts			DEG49170	Hps12FuncSts		
DEH03170	Hps7Use			DEG51170	Hps12Use		
DEH02170	Hps7LogSts			DEG50170	Hps12LogSts		
DEH00170	Hps7FailSts			DEG48170	Hps12FailSts		
DEH05170	Hps8FuncSts			DEG45170	Hps11FuncSts		
DEH07170	Hps8Use			DEG47170	Hps11Use		
DEH06170	Hps8LogSts			DEG46170	Hps11LogSts		
DEH04170	Hps8FailSts			DEG44170	Hps11FailSts		

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ZAZ7L999 / EPS_UIU2

ID	DESCRIPTION	VALUE	UNIT	ID	DESCRIPTION	VALUE	UNIT
DEH09170	Hps9FuncSts			DEG41170	Hps10FuncSts		
DEH11170	Hps9Use			DEG43170	Hps10Use		
DEH10170	Hps9LogSts			DEG42170	Hps10LogSts		
DEH08170	Hps9FailSts			DEG40170	Hps10FailSts		
DEG03170	Pcd1FuncSts			DEG02170	Pcd2FuncSts		
DEN00170	Pcd1Use			DEN03170	Pcd2Use		
DEN01170	Pcd1LogSts			DEN04170	Pcd2LogSts		
DEN02170	Pcd1FailSts			DEN05170	Pcd2FailSts		