

PM switchover from B to A  
 File: H\_CRP\_DHS\_3028.xls  
 Author: S. Manganelli



## Procedure Summary

### Objectives

This procedure describe the steps to perform the switchover from PM B to PM A. It can be used to perform a roll back to PM A after a PM switchover performed on board by RM and OBSW. The procedure will always be called by a higher level system procedure.

### Summary of Constraints

The switchover/roll back is performed with the S/C in EAM or SAM, by triggering the PAP 3 of programming set 2.  
 Note that this procedure assumes that programming set 2 (for PM B nominal) has already been selected in a former procedure. If not, use H\_CRP\_DHS\_PAP\_B to do it.

### Spacecraft Configuration

**Start of Procedure**

PM B active

**End of Procedure**

PM A active

### Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HRD3028A

### Referenced Displays

<b>ANDs</b>	<b>GRDs</b>	<b>SLDs</b>
ZAZAI999		(None)
ZAZAA999		
ZAZ4Z999		

### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
14/11/08		1	Created	S. Manganelli	
02/02/09	2	2	DB check	S. Manganelli	
13/04/09		3	Modified front page and step 1 so that procedure is called by system procedure and starting mode can be either SAM or EAM Included all substeps needed to verify PAP set status at step 3 Calls to instantiated ESOC check procedures at step 5 Calls to instantiated procedures at steps 8 and 9	S. Manganelli	

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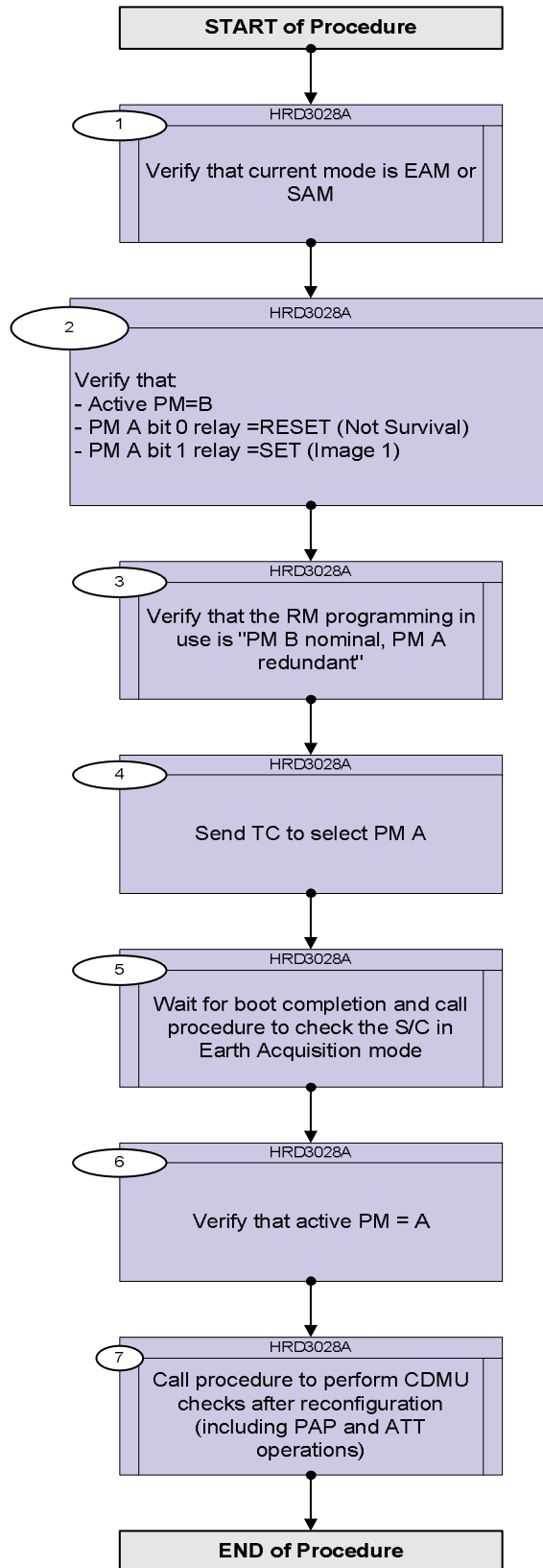


15/04/09		4	Following sim validation : <input type="checkbox"/> updated step 2 (relay values were inverted) <input type="checkbox"/> updated step 4 (the two TCs are now released together)	S. Manganelli	
20/04/09	2.3	5	Added note related to the utilization of TC Use_PM_A_R	S. Manganelli	
13/07/09		6	Last IF for PAP / ATT operations removed, substituted by call to H_CRP_DHS_3046	S. Manganelli	
13/07/09	2.5	7	Comment at step 5 about delay in TM reacquisition	S. Manganelli	
18/03/10	3	8	Front page and comments updated after "keep fit simulation 1"	S. Manganelli	

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### Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<b>Beginning of Procedure</b>				
TC Seq. Name :HRD3028A (Switch to PM A)				
TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
1		Verify that current mode is EAM or SAM		Next Step: 2
		Verify Telemetry  <b>CurrentMode</b> <b>DEL34170</b>		AND=ZAZAI999
2		Verify that: - Active PM=B - PM A bit 0 relay =RESET (Not Survival) - PM A bit 1 relay =SET (Image 1)		Next Step: 3
		Verify Telemetry <b>Active_PM_Board</b> <b>DEDM1160</b> = B		AND=ZAZAA999
		Verify Telemetry <b>PMA_R0_TTR-RM_A</b> <b>DEEX1160</b> = RESET		AND=ZAZAA999
		Verify Telemetry <b>PMA_R1_TTR-RM_A</b> <b>DEEX2160</b> = SET		AND=ZAZAA999
		If PM A relays are not as expected, and the reason is understood, modify the configuration using H_CRP_DHS_3015 and only then continue with this procedure.		
3		Verify that the RM programming in use is "PM B nominal, PM A redundant"		Next Step: 4
3.1		Start TTR management		<input type="checkbox"/>
		Verify Telemetry  <b>TtrSts</b> <b>DEL17170</b> = Stopped		AND=ZAZAI999
		If the TTR Management function is already running go to next step.		
		Execute Telecommand  <b>StartTtrManag</b>  TC Control Flags :  <b>GBM IL DSE</b> <b>--Y -- ---</b>  Subsch. ID : 10 Det. descr. : Start Ttr Management TC(8,1,109)	<b>DCN06170</b>	
		Verify Telemetry  <b>TtrSts</b> <b>DEL17170</b> = Running		AND=ZAZAI999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
3.2		Read PAP in use on RMA		<input type="checkbox"/>
		Execute Telecommand CRMA_RMH_PAPpointerReg TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : CROME A: Read RMH PAP Pointer Register	DCW0Z159	
		Verify Packet Reception TM 8-6-109-17 TTR Management - Crome Register Report Packet Details: APID: 16 Type: 8 Subtype: 6 PI1: 27921 PI2: 0	CromeRegRpt	
		Verify Packet Telemetry CromeId DE285170	= Crome_A	AND=ZAZ4Z999
		Verify Packet Telemetry CromeAddr DE329170	= 07005830 <hex>	(None)
		Verify Packet Telemetry CromeData DE367170	note down	(None)
		Possible values in RM PAP Pointer: Set 1 PMA Nom --> 0x02000030 Set 2 PMB Nom--> 0x020000A8 Set 3 PMA only--> 0x02000104 Set 4 PMB only--> 0x0200012C		
3.3		Read Attempt pointer in use on RMA		<input type="checkbox"/>
		Execute Telecommand CRMA_RMH_AT_pointerReg TC Control Flags : GBM IL DSE --Y -- -- Subsch. ID : 10 Det. descr. : CROME A: Read RMH AT Pointer Register	DCW0Y159	
		Verify Packet Reception TM 8-6-109-17 TTR Management - Crome Register Report Packet Details: APID: 16 Type: 8 Subtype: 6 PI1: 27921 PI2: 0	CromeRegRpt	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry CromeId DE285170	= Crome_A	AND=ZAZ4Z999
		Verify Packet Telemetry CromeAddr DE329170	= 07005828 <hex>	(None)
		Verify Packet Telemetry CromeData DE367170	note down	(None)
		Possible values in RM Attempt Pointer: Set 1 PMA Nom--> 0x02000000 Set 2 PMB Nom--> 0x02000078 Set 3 PMA only--> 0x020000F0 Set 4 PMB only--> 0x02000118		
3.4		Read PAP in use on RMB		<input type="checkbox"/>
		Execute Telecommand CRMB_RMH_PAPpointerReg  TC Control Flags :  Subsch. ID : 10 Det. descr. : CROME B: Read RMH PAP Pointer Register	DCW2X159  GBM IL DSE --Y -- --	
		Verify Packet Reception TM 8-6-109-17 TTR Management - Crome Register Report Packet Details:	CromeRegRpt  APID: 16 Type: 8 Subtype: 6 PI1: 27921 PI2: 0	
		Verify Packet Telemetry CromeId DE285170	= Crome_B	AND=ZAZ4Z999
		Verify Packet Telemetry CromeAddr DE329170	= 07005830 <hex>	(None)
		Verify Packet Telemetry CromeData DE367170	note down	(None)
		Possible values in RM PAP Pointer: Set 1 PMA Nom --> 0x02000030 Set 2 PMB Nom--> 0x020000A8 Set 3 PMA only--> 0x02000104 Set 4 PMB only--> 0x0200012C		
3.5		Read Attempt pointer in use on RMB		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  <b>CRMB_RMh_AT_pointerReg</b>  <i>TC Control Flags :</i>  GBM IL DSE --Y -- --  <i>Subsch. ID : 10</i> Det. descr. : CROME B: Read RMH AT Pointer Register	DCW2W159	
		Verify Packet Reception <b>TM 8-6-109-17 TTR Management - Crome Register Report</b> <i>Packet Details:</i>  APID: 16 Type: 8 Subtype: 6 PI1: 27921 PI2: 0	CromeRegRpt	
		Verify Packet Telemetry <b>CromeId</b> DE285170	= Crome_B	AND=ZAZ4Z999
		Verify Packet Telemetry <b>CromeAddr</b> DE329170	= 07005828 <hex>	(None)
		Verify Packet Telemetry <b>CromeData</b> DE367170	note down	(None)
		<b>Possible values in RM Attempt Pointer:</b> Set 1 PMA Nom--> 0x02000000 Set 2 PMB Nom--> 0x02000078 Set 3 PMA only--> 0x020000F0 Set 4 PMB only--> 0x02000118		
3.6		<i>Stop TTR management</i>		□
		Verify Telemetry <b>TtrSts</b> DEL17170	= Running	AND=ZAZAI999
		If the TTR Management function is already stopped go to next step.		
		Execute Telecommand  <b>StopTtrManag</b>  <i>TC Control Flags :</i>  GBM IL DSE --Y -- --  <i>Subsch. ID : 10</i> Det. descr. : Stop Ttr Management TC(8,2,109)	DCN07170	
		Verify Telemetry <b>TtrSts</b> DEL17170	= Stopped	AND=ZAZAI999
4		<i>Send TC to select PM A</i>		Next Step: 5

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<b>This step will trigger a reconfiguration by RM matching PAP-3.</b>  If TC Use_PM_A does <b>not</b> have effect: a) select TC VC 1 b) load and uplink TC Use_PM_B_R (not included in the MCS sequence)		
		Execute Telecommand  Use_PM_A  TC Control Flags :  GBM IL DSE --Y -- --  Subsch. ID : 10 Det. descr. : Use PM A - High Priority Standard	DCA49170	
		Execute Telecommand  Use_PM_A_R  TC Control Flags :  GBM IL DSE --Y -- --  Subsch. ID : 10 Det. descr. : Use PM A -R- High Priority Standard This Telecommand will not be included in the export	DCB49170	
5		Wait for boot completion and call procedure to check the S/C in Earth Acquisition mode		Next Step: 6
		<b>TM shall be unavailable until the end of the mode transition autonomous sequence completion. Due to operations on the TT&amp;C amplifier and RFDN switches this shall take about three minutes.</b>		
		Execute procedure H_FCP_DHS_EACK or H_FCP_DHS_SACK		
6		Verify that active PM = A		Next Step: 7
		Verify Telemetry  Active_PM_Board                      DEDM1160                      = A		AND=ZAZAA999
7		Call procedure to perform CDMU checks after reconfiguration (including PAP and ATT operations)		Next Step: END
		Execute Procedure: H_CRP_DHS_3046 Configuration check after level 3 or 4		
<b>End of Procedure</b>				



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**10.3.1 PMA nominal, PMB redundant (default configuration)**

Programmable Alarm Pattern							
	0	1	2	3	4	5	6
	DOD (PMA Nom)	Level 3 After Launch Phase (PMA Nom)	Level 3 During Launch Phase (PMA Nom)	PM relay After Launch Phase (PMA Nom)	PM relay During Launch Phase (PMA Nom)	Level 3 Internal Alarm with PMB	ACC RCS LCLs and TWTA ON (PMA Nom)
Alarm Name							
WD Toggle (temp.delay =2sec)	X	OR	OR	X	X	OR	X
DOD1	1	X	X	X	X	X	X
DOD2	1	X	X	X	X	X	X
Strap 1 (temp.delay = 21 sec)	1 (Separated since 21 sec)	1 (Separated since 21 sec)	0 (Not separated since 21 sec)	1 (Separated since 21 sec)	0 (Not separated since 21 sec)	X	X
Strap 2 (temp.delay = 19 sec)	X	X	X	X	X	X	1 (Separated since 19 sec)
Strap 3 (temp.delay = 19 sec)	X	X	X	X	X	X	1 (Separated since 19 sec)
Ext. Unused	X	X	X	X	X	X	X
Ext. Unused	X	X	X	X	X	X	X
Ext. Unused	X	X	X	X	X	X	X
PMA CPU	X	OR	OR	X	X	X	X
PMA COCOS	X	OR	OR	X	X	X	X
PMA Undervoltage	X	OR	OR	0	0	1	X
PMA Software	X	OR	OR	X	X	X	X
PMB CPU	X	X	X	X	X	OR	X
PMB COCOS	X	X	X	X	X	OR	X
PMB Undervoltage	X	X	X	1	1	OR	X
PMB Software	X	X	X	X	X	OR	X
Select PM (high=PMB)	X	0	0	1	1	1	X
WD Enable	X	X	X	X	X	X	X
Retry delay	2.5 sec	2 sec	0.5 sec	2.5 sec	2.5 sec	2.5 sec	0.1 msec
Command sequence							
1st Attempt	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2nd Attempt	No	Yes	No	No	No	No	No
Further Attempt	No	No	No	No	No	No	No

Table 10.3-1 RM Programming Set 1: PM A as Nominal

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10.3.2 PMB nominal, PMA redundant

Programmable Alarm Pattern							
	0	1	2	3	4	5	6
	DOD (PMB Nom)	Level 3 After Launch Phase (PMB Nom)	Level 3 During Launch Phase (PMB Nom)	PM relay After Launch Phase (PMB Nom)	PM relay During Launch Phase (PMB Nom)	Level 3 Internal Alarm with PMA	ACC RCS LCLs and TWTA ON (PMB Nom)
Alarm Name							
WD Toggle (temp.delay = 2sec)	X	OR	OR	X	X	OR	X
DOD1	1	X	X	X	X	X	X
DOD2	1	X	X	X	X	X	X
Strap 1 (temp.delay = 21 sec)	1 (Separated since 21 sec)	1 (Separated since 21 sec)	0 (Not separated since 21 sec)	1 (Separated since 21 sec)	0 (Not separated since 21 sec)	X	X
Strap 2 (temp.delay = 19 sec)	X	X	X	X	X	X	1 (Separated since 19 sec)
Strap 3 (temp.delay = 19 sec)	X	X	X	X	X	X	1 (Separated since 19 sec)
Ext. Unused	X	X	X	X	X	X	X
Ext. Unused	X	X	X	X	X	X	X
Ext. Unused	X	X	X	X	X	X	X
PMA CPU	X	X	X	X	X	OR	X
PMA COCOS	X	X	X	X	X	OR	X
PMA Undervoltage	X	X	X	1	1	OR	X
PMA Software	X	X	X	X	X	OR	X
PMB CPU	X	OR	OR	X	X	X	X
PMB COCOS	X	OR	OR	X	X	X	X
PMB Undervoltage	X	OR	OR	0	0	1	X
PMB Software	X	OR	OR	X	X	X	X
Select PM (high=PMB)	X	1	1	0	0	0	X
WD Enable	X	X	X	X	X	X	X
Retry delay	2.5 sec	2 sec	0.5 sec	2.5 sec	2.5 sec	2.5 sec	0.1 msec
Command sequence							
1st Attempt	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2nd Attempt	No	Yes	No	No	No	No	No
Further Attempt	No	No	No	No	No	No	No

Table 10.3-2 RM Programming Set 2: PM B as Nominal

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**10.3.3 PMA only (PMB Excluded after failure)**

	Programmable Alarm Pattern	
	0	1
	DOD (PMA only)	Level 3 (PMA only)
<b>Alarm Name</b>		
WD Toggle (temp.delay =2sec)	X	OR
DOD1	1	X
DOD2	1	X
Strap 1 (temp.delay =21 sec)	1 (Separated since 21 sec)	X
Strap 2 (temp.delay =19 sec)	X	X
Strap 3 (temp.delay =19 sec)	X	X
Ext. Unused	X	X
Ext. Unused	X	X
Ext. Unused	X	X
PMA CPU	X	OR
PMA COCOS	X	OR
PMA Undervoltage	X	OR
PMA Software	X	OR
PMB CPU	X	X
PMB COCOS	X	X
PMB Undervoltage	X	X
PMB Software	X	X
Select PM (high=PMB)	X	X
WD Enable	X	X
Retry delay	2,5 sec	2 sec
Command sequence		
1st Attempt	Yes	Yes
2nd Attempt	No	Yes
Further Attempt	No	No

Table 10.3-3 RM Programming Set 3: PM A only

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**10.3.4 PMB only (PMA excluded after failure)**

	Programmable Alarm Pattern	
	0	1
	DOD (PMB only)	Level 3 (PMB only)
<b>Alarm Name</b>		
WD Toggle (temp.delay =2sec)	X	OR
DOD1	1	X
DOD2	1	X
Strap 1 (temp.delay =21 sec)	1 (Separated since 21 sec)	X
Strap 2 (temp.delay =19 sec)	X	X
Strap 3 (temp.delay =19 sec)	X	X
Ext. Unused	X	X
Ext. Unused	X	X
Ext. Unused	X	X
PMA CPU	X	X
PMA COCOS	X	X
PMA Undervoltage	X	X
PMA Software	X	X
PMB CPU	X	OR
PMB COCOS	X	OR
PMB Undervoltage	X	OR
PMB Software	X	OR
Select PM (high=PMB)	X	X
WD Enable	X	X
Retry delay	2,5 sec	2 sec
Command sequence		
1st Attempt	Yes	Yes
2nd Attempt	No	Yes
Further Attempt	No	No

Table 10.3-4 RM Programming Set 4: PM B only