Configuration of PM relay 0 and 1
File: H_CRP_DHS_3015.xls
Author: S. Manganelli

Procedure Summary

Objectives

Force the position of PM relay 0 and 1 on either PM

Summary of Constraints

See info sheet

Spacecraft Configuration

Start of Procedure

Any

End of Procedure

One or both PM relays changed (on PM A or PM B)

Reference File(s)

Input Command Sequences

Output Command Sequences

HRD3015E
HRD3015D
HRD3015G
HRD3015H
HRD3015M
HRD3015N
HRD3015P
HRD3015Q

Referenced Displays

ANDs	GRDs	SLDs
ZAD11999		
ZAD07999		

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
06/06/08		1	Created	cmevi-hp	
13/06/08	1	2	Added title and DB check	S. Manganelli	
02/12/08	2	3	Added text and info sheet	S. Manganelli	
18/03/10	3	4	Added comments and reformatted flowchart after "keep fit simulation 1"	S. Manganelli	

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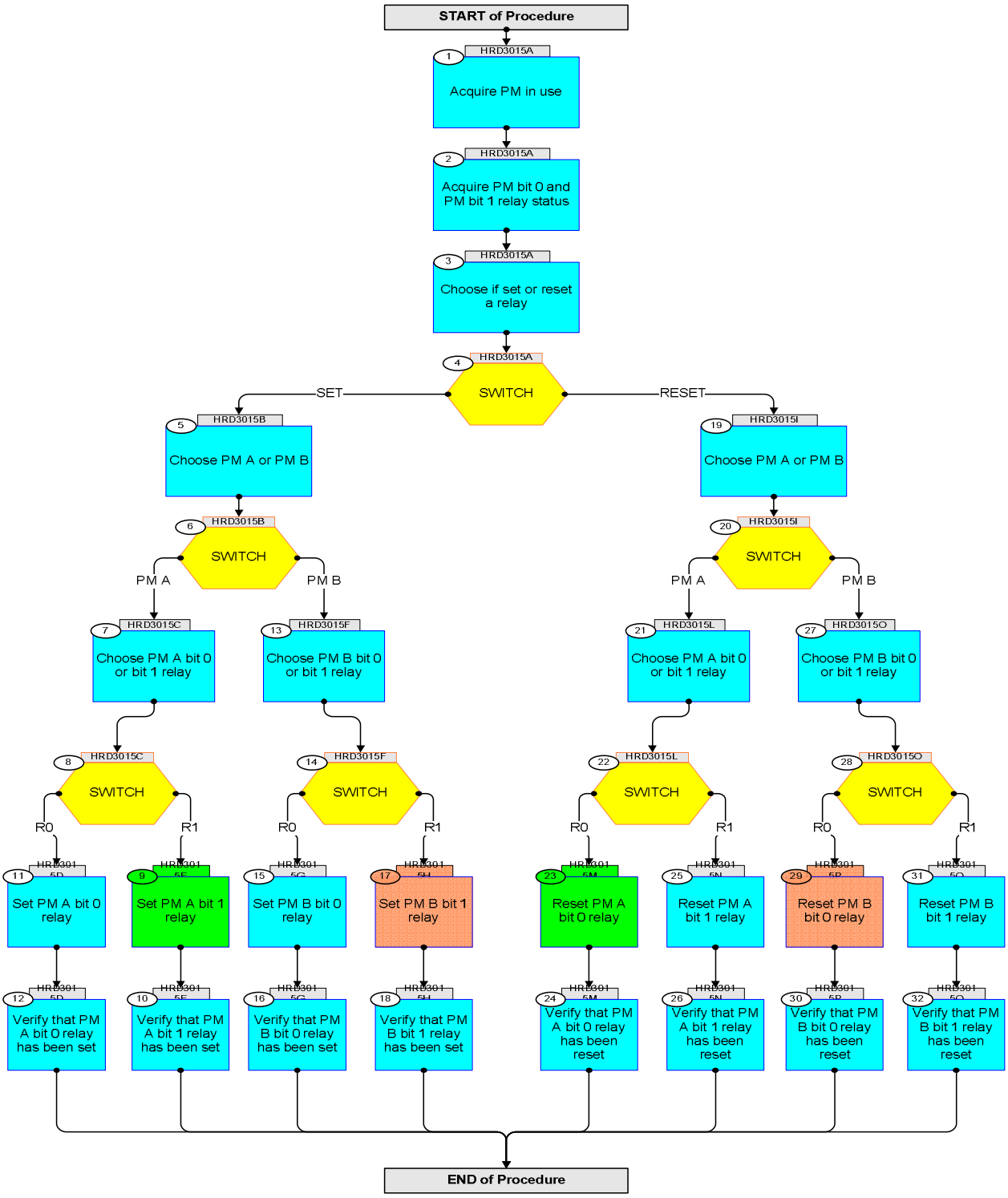
Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Beginning of Procedure			
	HRD3015A	*TC Seq. Name :* HRD3015A (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
1		Acquire PM in use		Next Step: 2	
		Verify Telemetry **Active_PM_Board** **DEDM1160**		AND=ZAD11999	
2		Acquire PM bit 0 and PM bit 1 relay status		Next Step: 3	
		Verify Telemetry **PMA_R0_TTR-RM_A** **DEEX1160**		AND=ZAD07999	
		Verify Telemetry **PMA_R1_TTR-RM_A** **DEEX2160**		AND=ZAD07999	
		Verify Telemetry **PMB_R0_TTR-RM_B** **DEEX3160**		AND=ZAD07999	
		Verify Telemetry **PMB_R1_TTR-RM_B** **DEEX4160**		AND=ZAD07999	
3		Choose if set or reset a relay		Next Step: 4	
		NOTE The NOMINAL CONFIGURATION is achieved by : **RESETTING PM Relay 0** **SETTING PM Relay 1** **on both PMs** (green and orange steps on the flowchart). This configuration : Allows NOMINAL boot mode and Selects SW IMAGE 1 on both sides.			
4		SWITCH type: [Switch]		Next Step: SET 5 RESET 19	
		End of Sequence			
	HRD3015B	*TC Seq. Name :* HRD3015B (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
5		Choose PM A or PM B		Next Step: 6	
6		SWITCH type: [Switch]		Next Step: PM A 7 PM B 13	
		End of Sequence			
	HRD3015C	*TC Seq. Name :* HRD3015C (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
7		Choose PM A bit 0 or bit 1 relay		Next Step: 8	
8		SWITCH type: [Switch]		Next Step: R1 9 R0 11	
		End of Sequence			
	HRD3015E	*TC Seq. Name :* HRD3015E (Set PM A bit 1 relay) *TimeTag Type:* *Sub Schedule ID:*			
9		Set PM A bit 1 relay		Next Step: 10	
		Execute Telecommand **PM_A_bit_1_SW_Image_1** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Set PM A bit 1 = Select SW Image 1 - High Priority Standard	**DCA58170**	**TC**	
10		Verify that PM A bit 1 relay has been set		Next Step: END	
		Verify Telemetry **PMA_R1_TTR-RM_A** **DEEX2160**	**= SET**	AND=ZAD07999	
		End of Sequence			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	HRD3015D	*TC Seq. Name :* HRD3015D (Set PM A bit 0 relay) *TimeTag Type:* *Sub Schedule ID:*			
11		Set PM A bit 0 relay		Next Step: 12	
		Execute Telecommand **Set_PM_A_bit_0** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Set PM A bit 0 - High Priority Standard	**DCA56170**	**TC**	
12		Verify that PM A bit 0 relay has been set		Next Step: END	
		Verify Telemetry **PMA_R0_TTR-RM_A** **DEEX1160**	**= SET**	AND=ZAD07999	
		End of Sequence			
	HRD3015F	*TC Seq. Name :* HRD3015F (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
13		Choose PM B bit 0 or bit 1 relay		Next Step: 14	
14		SWITCH type: [Switch]		Next Step: R0 15 R1 17	
		End of Sequence			
	HRD3015G	*TC Seq. Name :* HRD3015G (Set PMB bit 0 relay) *TimeTag Type:* *Sub Schedule ID:*			
15		Set PM B bit 0 relay		Next Step: 16	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand **Set_PM_B_bit_0** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Set PM B bit 0 - High Priority Standard	**DCA60170**	**TC**	
16		Verify that PM B bit 0 relay has been set		Next Step: END	
		Verify Telemetry **PMB_R0_TTR-RM_B** **DEEX3160**	**= SET**	AND=ZAD07999	
		End of Sequence			
	HRD3015H	*TC Seq. Name :* HRD3015H (Set PMB bit 1 relay) *TimeTag Type:* *Sub Schedule ID:*			
17		Set PM B bit 1 relay		Next Step: 18	
		Execute Telecommand **PM_B_bit_1_SW_Image_1** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Set PM B bit 1 = Select SW Image 1 - High Priority Standard	**DCA62170**	**TC**	
18		Verify that PM B bit 1 relay has been set		Next Step: END	
		Verify Telemetry **PMB_R1_TTR-RM_B** **DEEX4160**	**= SET**	AND=ZAD07999	
		End of Sequence			
	HRD3015I	*TC Seq. Name :* HRD3015I (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
19		Choose PM A or PM B		Next Step: 20	
20		SWITCH type: [Switch]		Next Step: PM A 21 PM B 27	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		End of Sequence			
	HRD3015L	*TC Seq. Name :* HRD3015L (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
21		Choose PM A bit 0 or bit 1 relay		Next Step: 22	
22		SWITCH type: [Switch]		Next Step: R0 23 R1 25	
		End of Sequence			
	HRD3015M	*TC Seq. Name :* HRD3015M (Reset PMA bit 0 rela) *TimeTag Type:* *Sub Schedule ID:*			
23		Reset PM A bit 0 relay		Next Step: 24	
		Execute Telecommand **Reset_PM_A_bit_0** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Reset PM A bit 0 - High Priority Standard	**DCA57170**	**TC**	
24		Verify that PM A bit 0 relay has been reset		Next Step: END	
		Verify Telemetry **PMA_R0_TTR-RM_A** **DEEX1160**	**= RESET**	AND=ZAD07999	
		End of Sequence			
	HRD3015N	*TC Seq. Name :* HRD3015N (Reset PMA bit 1 rela) *TimeTag Type:* *Sub Schedule ID:*			
25		Reset PM A bit 1 relay		Next Step: 26	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand **PM_A_bit_1_SW_Image_2** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Reset PM A bit 1 = Select SW Image 2 - High Priority Standard	**DCA59170**	**TC**	
26		Verify that PM A bit 1 relay has been reset		Next Step: END	
		Verify Telemetry **PMA_R1_TTR-RM_A** **DEEX2160**	**= RESET**	AND=ZAD07999	
		End of Sequence			
	HRD3015O	*TC Seq. Name :* HRD3015O (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*			
27		Choose PM B bit 0 or bit 1 relay		Next Step: 28	
28		SWITCH type: [Switch]		Next Step: R0 29 R1 31	
		End of Sequence			
	HRD3015P	*TC Seq. Name :* HRD3015P (Reset PMB bit 0 rela) *TimeTag Type:* *Sub Schedule ID:*			
29		Reset PM B bit 0 relay		Next Step: 30	
		Execute Telecommand **Reset_PM_B_bit_0** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Reset PM B bit 0 - High Priority Standard	**DCA61170**	**TC**	
30		Verify that PM B bit 0 relay has been reset		Next Step: END	
		Verify Telemetry **PMB_R0_TTR-RM_B** **DEEX3160**	**= RESET**	AND=ZAD07999	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		End of Sequence			
	HRD3015Q	*TC Seq. Name :* HRD3015Q (Reset PMB bit 1 rela) *TimeTag Type:* *Sub Schedule ID:*			
31		Reset PM B bit 1 relay		Next Step: 32	
		Execute Telecommand **PM_B_bit_1_SW_Image_2** *TC Control Flags :* **GBM IL DSE** **--Y -- YYY** *Subsch. ID : 10* Det. descr. : Reset PM B bit 1 = Select SW Image 2 - High Priority Standard	**DCA63170**	**TC**	
32		Verify that PM B bit 1 relay has been reset		Next Step: END	
		Verify Telemetry **PMB_R1_TTR-RM_B** **DEEX4160**	**= RESET**	AND=ZAD07999	
		End of Sequence			
		End of Procedure			

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Info

PM Bits 0 and 1 can be commanded at any time, they are used by the OBSW only during the next boot.

PM bit 0 = SET = “Survival” will trigger the switch to Survival mode.
Basically this relay can assume two values (RESET = Nominal and SET = Survival) and it is used by both BSW and ASW to retrieve data from SGM (PM Bit 0 = RESET) or EEPROM (PM Bit 0 = SET).
Default configuration for PM Relay 0 is RESET for both PM-A and PM-B. It is autonomously modified to SET by the RM following an S/C Level 4 FDIR, leading to an S/C Survival Mode transition.
On board autonomous commanding never resets PM bit 0 and it should be RESET to “Nominal” by the Ground when recovering from Survival mode, otherwise a subsequent level 3 failure would lead to another switch to Survival mode.

PM bit 1 = RESET = “Select SW Image 2” will cause the second image in EEPROM to be loaded in RAM as part of the bootstrap logic. The EEPROM stores two SW images, one in each half of the EEPROM. SW Image 1 (in the lower half of the EEPROM) is used when PM Relay 1 is set and SW Image 2 (in the upper part of the EEPROM) is used when PM Relay 1 is reset (cleared).
On board autonomous commanding never sets it back to “Select SW Image 1” and thus it is up to the Ground to set the PM bit 1 when correcting the SW images stored on board.

The PM bits relay values (part of the Configuration relays variable) reflect the value at initialisation and are not updated in response to subsequent Ground TC, even though the actual value is affected by commanding and the value will be taken into account at the next reboot.

The commanded position of the relay can be observed by Ground via the data pool variables in charge of storing the status of the relay, as read from the TTR boards.

So:

DEEX1160 PMA_R0_TTR-RM_A - PM A Relay 0 as read from TTR/RM board A
DEEX3160 PMB_R0_TTR-RM_B - PM B Relay 0 as read from TTR/RM board B

are the current values, while

DEK8K160 PM_relay_0

is the status used by OBSW at last boot.

PM relay 1 current value parameters :

DEEX2160 PMA_R1_TTR-RM_A - PM A Relay 1 as read from TTR/RM board A
DEEX4160 PMB_R1_TTR-RM_B - PM B Relay 1 as read from TTR/RM board B