

Severe CDMU Memory Patch  
 File: H\_CRP\_SYS\_PATCS.xls  
 Author: F. Keck



## Procedure Summary

### Objectives

Performing severe CDMU memory patches of all 4 images.  
 Draft System Procedure, based on the H-SVT-2 experience doing a severe patch on one image.

### Summary of Constraints

Activities must be coordinated with the SGS and mission planning. Instruments should be in standby/safemode and no MTL activities must be planned at the same time.  
 This procedure assumes that the current OBSW images are available on ground (dumped by H\_FCP\_OBS\_1242).

### Spacecraft Configuration

**Start of Procedure**

Mode = NOM/SCM  
 Instruments must be in standby/safemode

**End of Procedure**

Mode = NOM/SCM  
 Instruments in standby/safemode

### Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HCYPATCS

### Referenced Displays

<b>ANDs</b>	<b>GRDs</b>	<b>SLDs</b>
ZAZ24999		(None)
ZAZ25999		MIMIC:OVER_H
ZAZA1999		

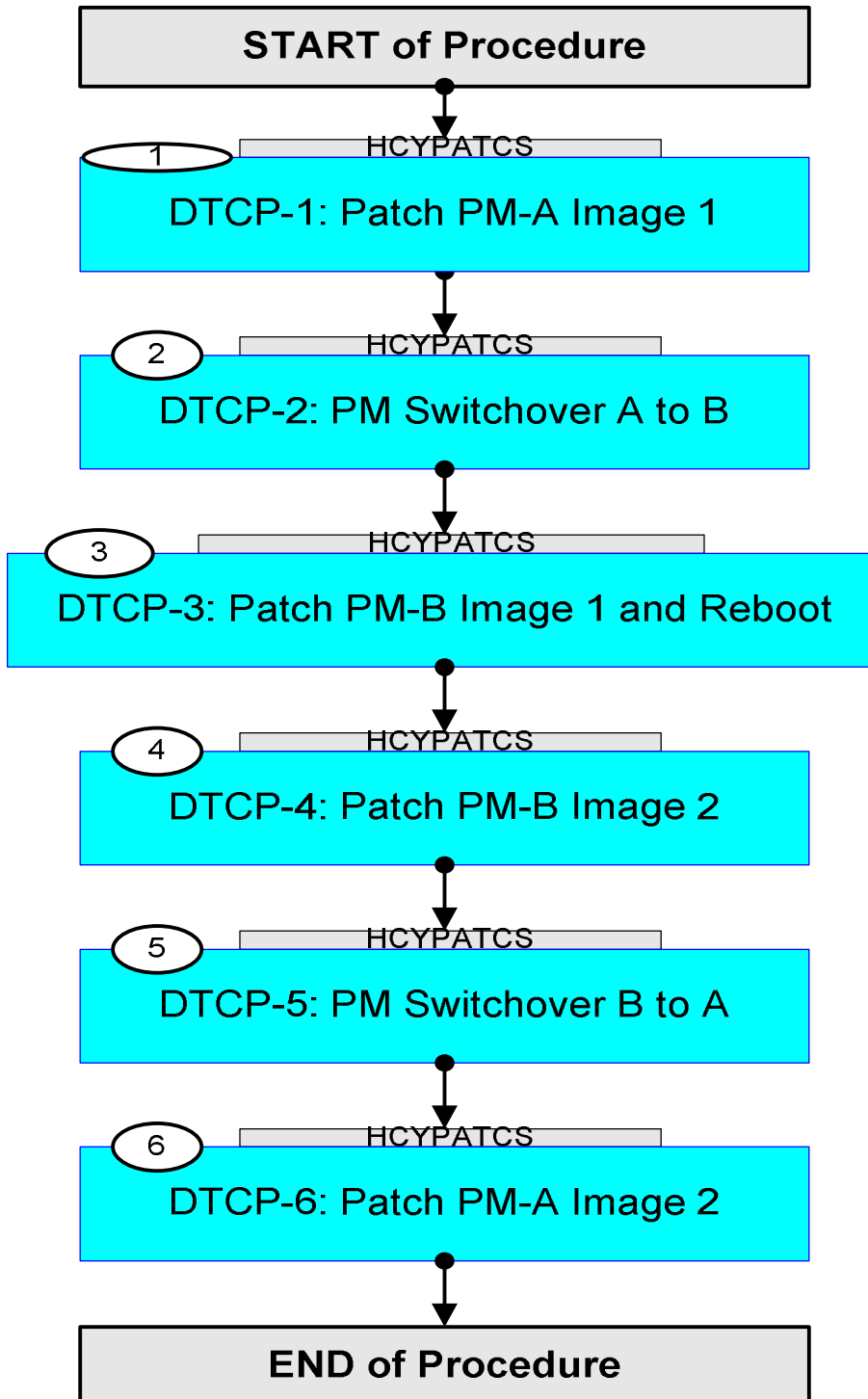
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
21/04/09	2.3	1	Created	F. Keck	
06/11/09	3	2	Included PM-A survival selection to cover level 3b FDIR with different software versions on PM A and B	F. Keck	

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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>				
<p><i>TC Seq. Name : H_CYPATCS (CDMU Sev Mem Patch)</i></p> <p><i>TimeTag Type: N</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;"><input type="checkbox"/></p>				
1		<i>DTCP-1: Patch PM-A Image 1</i>		Next Step: 2
		This step has no impact on the nominal DTCP activities.		
		Activities: - Select image A2 - Patch image A1 - Leave image A2 selected - Do not reboot		
1.1		<i>Select Image A2</i>		<input type="checkbox"/>
		While patching image 1, image 2 must be selected to handle properly an unexpected reboot.		
		Execute Telecommand <div style="text-align: right;"><b>PM_A_bit_1_SW_Image_2</b></div> <i>TC Control Flags :</i> <div style="text-align: right;"><b>GBM IL DSE</b></div> <div style="text-align: right;"><b>--Y -- ---</b></div> <i>Subsch. ID : 10</i> <i>Det. descr. : Reset PM A bit 1 = Select SW Image 2 - High Priority Standard</i>	<b>DCA59170</b>	
		Verify Telemetry <div style="text-align: center;"><b>PMA_R1_TTR-RM_A</b></div> <div style="text-align: center;"><b>DEEX2160</b></div>	<b>= 1 &lt;dec&gt;</b>	(None)
1.2		<i>Patch Image A1</i>		<input type="checkbox"/>
		Execute Procedure: <b>H_FCP_OBS_1210</b> Load CDMU OBS in EEPROM		
2		<i>DTCP-2: PM Switchover A to B</i>		Next Step: 3
		Expected impact on the nominal DTCP activities: - Complete dump of packet store 2 unlikely - Dump of packet store 3 unlikely		
		Activities: - PM Switchover A to B		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: H_CRP_SYS_PMSC CDMU PM Switchover		
3		DTCP-3: Patch PM-B Image 1 and Reboot		Next Step: 4
		Expected impact on the nominal DTCP activities: - Complete dump of packet store 2 unlikely - Dump of packet store 3 unlikely		
		Activities: - Stop MTL - Mode Transition to EAM - Set PM-A to survival - Select image B2 - Patch image B1 - Select image B1 - Reboot to WARM_PATCH on PM-B - S/C Checkout - Recovery to rejoin Operations		
3.1		Stop MTL		<input type="checkbox"/>
		Execute Procedure: H_FCP_DHS_3025 Starting or stopping the MTL function		
		<b>Note:</b> The Transition to EAM will not stop the MTL.		
3.2		Manual Mode Transition NOM to EAM		<input type="checkbox"/>
		Transition to EAM will automatically trigger the Payload OBCPs (all instruments to standby/safemode).  ACMS mode remains SCM. CIR is not triggered, so the attitude remains DTCP pointing.  TTR Management Function and MTL remain enabled after this transition to EAM.		
		Execute Procedure: H_FCP_DHS_4005 S/C Mode transition from Nominal to Earth Acquisition		
3.3		Set PM-A to survival		<input type="checkbox"/>

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		Should the reboot of PM-B with the new software fail, a level 3b FDIR could switch over to PM-A.  Image A2 is pre-selected, which still contains the old software. Survival mode is required to force the old software to ignore the SGM (which may contain the structure of the new software).		
		Execute Telecommand  Set_PM_A_bit_0  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Set PM A bit 0 - High Priority Standard	DCA56170	
		Verify Telemetry  PMA_R0_TTR-RM_A DEEX1160	= SET	(None)
3.4		Patch Image B1		<input type="checkbox"/>
		While patching image 1, image 2 must be selected to handle properly an unexpected reboot.		
		Execute Telecommand  PM_B_bit_1_SW_Image_2  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Reset PM B bit 1 = Select SW Image 2 - High Priority Standard	DCA63170	
		Verify Telemetry  PMB_R1_TTR-RM_B DEEX4160	= 1 <dec>	(None)
		Execute Procedure: H_FCP_OBS_1210 Load CDMU OBS in EEPROM		
		Execute Telecommand  PM_B_bit_1_SW_Image_1  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Set PM B bit 1 = Select SW Image 1 - High Priority Standard	DCA62170	
		Verify Telemetry  PMB_R1_TTR-RM_B DEEX4160	= 0 <dec>	(None)

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
3.5		Reboot to WARM_PATCH on PM-B		<input type="checkbox"/>
		Activities: - Check PM Configuration - Disable RMs - Clean RM Logs - Update SR: Active S/C Bus = A - Change TM rate to Low-1 - Reset PM (reboot to WARM_PATCH) - Command EAM to EAM Transition - Update default tables - Start TTR Management Function - Update SR: Active S/C Bus = B - Enable RMs		
3.5.1		Check PM Configuration		<input type="checkbox"/>
		Verify Telemetry Active_PM_Board                   DEDM1160           = B		AND=ZAZ24999
		Verify Telemetry PMB_R0_TTR-RM_B               DEEX3160           = RESET		AND=ZAZ25999
3.5.2		Disable both RMs		<input type="checkbox"/>
		Execute Procedure: H_CRP_DHS_3011 Enable or disable Reconfiguration Module		
3.5.3		Clean RM Logs		<input type="checkbox"/>
		Execute Procedure: H_FCP_OBS_1423 Clean up the CDMU RM Logs		
3.5.4		Update Survival Registers (Select Bus A)		<input type="checkbox"/>
3.5.4.1		Update Survival Register A		<input type="checkbox"/>
		Read current SR		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  ReadSurvContxt  Command Parameter(s) :  RmId DH093170  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170  RM_A (Def)	
		Verify Packet Reception TM 8-6-109-6 TTR Management - Survival Context Report Packet Details:  APID: 16 Type: 8 Subtype: 6 PI1: 27910 PI2: 0	SurvCntxRpt	
		Verify Packet Telemetry Function_ID DE008170	= TTR_Manag	(None)
		Verify Packet Telemetry TtrManRptActId DE368170	= SurvCntxRpt	(None)
		Verify Packet Telemetry SID DE010170	= 0 <dec>	(None)
		Verify Packet Telemetry RmId DE283170	= RM_A	(None)
		Verify Packet Telemetry SurvBits1 DE343170	= 000303F7 <hex>	(None)
		Verify Packet Telemetry SurvBits2 DE344170	= F70101 <hex>	(None)
		Pre-select Bus A in SR		
		Execute Telecommand  WriteSurvContxt  Command Parameter(s) :  RmId DH093170 SurvBits1 DH100170 SurvBits2 DH101170  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Write Survival Context TC(8,4,109,7)	DCT61170  RM_A (Def) 000303F7 <hex> F70000 <hex>	
		Read updated SR		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  ReadSurvContxt  Command Parameter(s) : RmId DH093170  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170  RM_A (Def)	
		Verify Packet Reception TM 8-6-109-6 TTR Management - Survival Context Report Packet Details:  APID: 16 Type: 8 Subtype: 6 PI1: 27910 PI2: 0	SurvCntxRpt	
		Verify Packet Telemetry Function_ID DE008170	= TTR_Manag	(None)
		Verify Packet Telemetry TtrManRptActId DE368170	= SurvCntxRpt	(None)
		Verify Packet Telemetry SID DE010170	= 0 <dec>	(None)
		Verify Packet Telemetry RmId DE283170	= RM_A	(None)
		Verify Packet Telemetry SurvBits1 DE343170	= 000303F7 <hex>	(None)
		Verify Packet Telemetry SurvBits2 DE344170	= F70000 <hex>	(None)
3.5.4.2		Update Survival Register B		□
		Read current SR		
		Execute Telecommand  ReadSurvContxt  Command Parameter(s) : RmId DH093170  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170  RM_B	



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception <b>TM 8-6-109-6 TTR Management - Survival Context Report</b> Packet Details:	SurvCntxRpt	
		APID: 16 Type: 8 Subtype: 6 P11: 27910 P12: 0		
		Verify Packet Telemetry <b>Function_ID DE008170</b>	= TTR_Manag	(None)
		Verify Packet Telemetry <b>TtrManRptActId DE368170</b>	= SurvCntxRpt	(None)
		Verify Packet Telemetry <b>SID DE010170</b>	= 0 <dec>	(None)
		Verify Packet Telemetry <b>RmId DE283170</b>	= RM_B	(None)
		Verify Packet Telemetry <b>SurvBits1 DE343170</b>	= 000303F7 <hex>	(None)
		Verify Packet Telemetry <b>SurvBits2 DE344170</b>	= F70101 <hex>	(None)
		Pre-select Bus A in SR		
		Execute Telecommand <b>WriteSurvContxt DCT61170</b>  Command Parameter(s) : <b>RmId DH093170 RM_B</b> <b>SurvBits1 DH100170 000303F7 &lt;hex&gt;</b> <b>SurvBits2 DH101170 F70000 &lt;hex&gt;</b>  TC Control Flags : <b>GBM IL DSE</b> <b>--Y -- ---</b>  Subsch. ID : 10 Det. descr. : TEMPLATE Write Survival Context TC(8,4,109,7)		
		Read updated SR		
		Execute Telecommand <b>ReadSurvContxt DCT60170</b>  Command Parameter(s) : <b>RmId DH093170 RM_B</b>  TC Control Flags : <b>GBM IL DSE</b> <b>--Y -- ---</b>  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception <b>TM 8-6-109-6 TTR Management - Survival Context Report</b> Packet Details:	SurvCntxRpt	
		APID: 16 Type: 8 Subtype: 6 PI1: 27910 PI2: 0		
		Verify Packet Telemetry <b>Function_ID DE008170</b>	= TTR_Manag	(None)
		Verify Packet Telemetry <b>TtrManRptActId DE368170</b>	= SurvCntxRpt	(None)
		Verify Packet Telemetry <b>SID DE010170</b>	= 0 <dec>	(None)
		Verify Packet Telemetry <b>RmId DE283170</b>	= RM_B	(None)
		Verify Packet Telemetry <b>SurvBits1 DE343170</b>	= 000303F7 <hex>	(None)
		Verify Packet Telemetry <b>SurvBits2 DE344170</b>	= F70000 <hex>	(None)
3.5.5		Change TM rate to Low-1		<input type="checkbox"/>
		Coordinate with Ground Station.		
		Because the MTL is stopped, choose the "blocked" option in following procedure.		
		Execute Procedure: <b>H_CRP_TTC_TUL1</b> <b>Tx and TM encoder in use configuration for LR1</b>		
		<b>Note:</b> H-SVT-2 experience: The TM rate must be commanded to Low-1 before doing the PM reset; this ensures consistency between the TM Encoder and the TX after the PM reset.		
3.5.6		Reset PM-B		<input type="checkbox"/>
		Execute Telecommand <b>PM_B_Reset DCA68170</b>  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : PM B Reset - High Priority Standard		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Wait 20s for boot completion.		
		Verify Telemetry  CurrentMode DEL34170	= EarthAcquistn	MIMIC:OVER_H
		Continue immediately		
3.5.7		Mode Transition EAM to EAM		<input type="checkbox"/>
		To come quickly back to a better EAM configuration, another mode transition to EAM must be commanded after the PM reset. This includes an increase of TM rate to medium.		
		Coordinate expected TM rate change with Ground Station.		
		Execute Telecommand  ModeManArmTrans_EaAcq  TC Control Flags :  Subsch. ID : 10 Det. descr. : Mode Manag. Arm Trans. to Earth Acquisition Mode TC(8,4,110,1)	DC04G170	
		Execute Telecommand  ModeManFireTrans_EaAcq  TC Control Flags :  Subsch. ID : 10 Det. descr. : Mode Manag. Fire Trans. to Earth Acquisition Mode TC(8,4,110,2)	DC09G170	
		Set default TM configuration		
		Execute Procedure: H_CRP_SYS_TMTC Configure TM/TC after Mode Drop		
3.5.8		Update Tables		<input type="checkbox"/>
		The reboot from EEPROM resulted in the default tables to be in use, i.e. UIU assumes that all instruments are off, but they are on.  <b>ATTENTION:</b> Any operational deviations from the default tables must be applied asap. To avoid waste of time, the required sequences must be prepared on the stack and inserted here.		

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3.5.9		Start TTR Management Function		<input type="checkbox"/>
		<b>Note:</b> The TTR Management function was stopped by the PM reset.		
		Verify Telemetry  TtrSts DEL17170	= Stopped	AND=ZAZAI999
		Execute Telecommand  StartTtrManag  TC Control Flags :  Subsch. ID : 10 Det. descr. : Start Ttr Management TC(8,1,109)  GBM IL DSE --Y -- ---	DCN06170	
		Verify Telemetry  TtrSts DEL17170	= Running	AND=ZAZAI999
3.5.10		Update Survival Registers (Select Bus B)		<input type="checkbox"/>
3.5.10.1		Update Survival Register A		<input type="checkbox"/>
		Pre-select Bus B in SR		
		Execute Telecommand  WriteSurvContxt  Command Parameter(s) : RmId DH093170 SurvBits1 DH100170 SurvBits2 DH101170  TC Control Flags :  Subsch. ID : 10 Det. descr. : TEMPLATE Write Survival Context TC(8,4,109,7)  GBM IL DSE --Y -- ---	DCT61170  RM_A (Def) 000303F7 <hex> F70101 <hex>	
		Read updated SR		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  ReadSurvContxt  Command Parameter(s) : RmId                    DH093170  TC Control Flags : GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170  RM_A (Def)	
		Verify Packet Reception <b>TM 8-6-109-6 TTR Management - Survival Context Report</b> Packet Details: APID: 16 Type: 8 Subtype: 6 PI1: 27910 PI2: 0	SurvCntxRpt	
		Verify Packet Telemetry Function_ID                    DE008170	= TTR_Manag	(None)
		Verify Packet Telemetry TtrManRptActId                DE368170	= SurvCntxRpt	(None)
		Verify Packet Telemetry SID                            DE010170	= 0 <dec>	(None)
		Verify Packet Telemetry RmId                          DE283170	= RM_A	(None)
		Verify Packet Telemetry SurvBits1                    DE343170	= 000303F7 <hex>	(None)
		Verify Packet Telemetry SurvBits2                    DE344170	= F70101 <hex>	(None)
3.5.10. 2		Update Survival Register B		□
		Pre-select Bus B in SR		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  WriteSurvContxt  Command Parameter(s) : RmId              DH093170 SurvBits1      DH100170 SurvBits2      DH101170  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Write Survival Context TC(8,4,109,7)	DCT61170  RM_B 000303F7 <hex> F70101 <hex>	
		Read updated SR		
		Execute Telecommand  ReadSurvContxt  Command Parameter(s) : RmId              DH093170  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : TEMPLATE Read Survival Context TC(8,4,109,6)	DCT60170  RM_B	
		Verify Packet Reception <b>TM 8-6-109-6 TTR Management - Survival Context Report</b> Packet Details:  APID:      16 Type:      8 Subtype:   6 PI1:      27910 PI2:      0	SurvCntxRpt	
		Verify Packet Telemetry Function_ID          DE008170	= TTR_Manag	(None)
		Verify Packet Telemetry TtrManRptActId      DE368170	= SurvCntxRpt	(None)
		Verify Packet Telemetry SID                  DE010170	= 0 <dec>	(None)
		Verify Packet Telemetry RmId                  DE283170	= RM_B	(None)
		Verify Packet Telemetry SurvBits1          DE343170	= 000303F7 <hex>	(None)
		Verify Packet Telemetry SurvBits2          DE344170	= F70101 <hex>	(None)
3.5.11		Enable both RMs		☐

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		Execute Procedure: H_CRP_DHS_3011 Enable or disable Reconfiguration Module		
3.6		S/C Checkout		<input type="checkbox"/>
		Execute Procedure: H_CRP_SYS_CHECK FDIR 3&4 Anomaly Checkout		
3.7		Recovery to rejoin Operations		<input type="checkbox"/>
		Execute Procedure: H_CRP_SYS_ANOM System Anomalies		
4		DTCP-4: Patch PM-B Image 2		Next Step: 5
		This step has no impact on the nominal DTCP activities.		
		Activities: - Patch image B2		
4.1		Patch Image B2		<input type="checkbox"/>
		Execute Procedure: H_FCP_OBS_1210 Load CDMU OBS in EEPROM		
5		DTCP-5: PM Switchover B to A		Next Step: 6
		Expected impact on the nominal DTCP activities: - Complete dump of packet store 2 unlikely - Dump of packet store 3 unlikely		
		Activities: - Set PM-A to nominal - Select image A1 - PM Switchover B to A		
5.1		Set PM-A to nominal		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		The new software works, so a level 3b FDIR may run as normal.		
		Execute Telecommand  Reset_PM_A_bit_0  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Reset PM A bit 0 - High Priority Standard	DCA57170	
		Verify Telemetry  PMA_R0_TTR-RM_A                      DEEX1160	= RESET	(None)
5.2		Select Image A1		<input type="checkbox"/>
		Execute Telecommand  PM_A_bit_1_SW_Image_1  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : Set PM A bit 1 = Select SW Image 1 - High Priority Standard	DCA58170	
		Verify Telemetry  PMA_R1_TTR-RM_A                      DEEX2160	= 0 <dec>	(None)
5.3		PM B to A		<input type="checkbox"/>
		Execute Procedure: H_CRP_SYS_PMSC CDMU PM Switchover		
6		DTCP-6: Patch PM-A Image 2		Next Step: END
		This step has no impact on the nominal DTCP activities.		
		Activities: - Patch image A2		
6.1		Patch Image A2		<input type="checkbox"/>



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		Execute Procedure: H_FCP_OBS_1210 Load CDMU OBS in EEPROM		
<b>End of Procedure</b>				