Monitoring table maintenance
File: H_FCP_DHS_3030.xls
Author: S. Manganelli

Procedure Summary

Objectives

This procedure describes the steps needed to perform one of the
following actions related to the Monitoring table:
- Modify the Monitoring List;
- Delete parameters from monitoring list;
- Report current monitoring list.

NOTE: A procedure containing the commands to upload the default
(EEPROM version) MOT entries, with editable parameters, is
available as H_FCP_DHS_DEFMO

Summary of Constraints

Default status of the ASW function "On board Monitoring":
"Started".

When the function is stopped, it does not accept any other
telecommands than the:
- Start Function TC(8,1,106);
- Report Function Status TC(8,5,106);
- Clear Monitoring List TC(12,4);
- Report Current Monitoring List TC(12,8).

Thus, if the function is stopped only the report can be acquired.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration, that is:
- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

End of Procedure

CDMU in default configuration, that is:
- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

Reference File(s)

Input Command Sequences

Output Command Sequences

HFD3030A
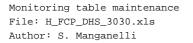HFD3030B
HFD3030C
HFD3030D

Referenced Displays

ANDs   GRDs   SLDs
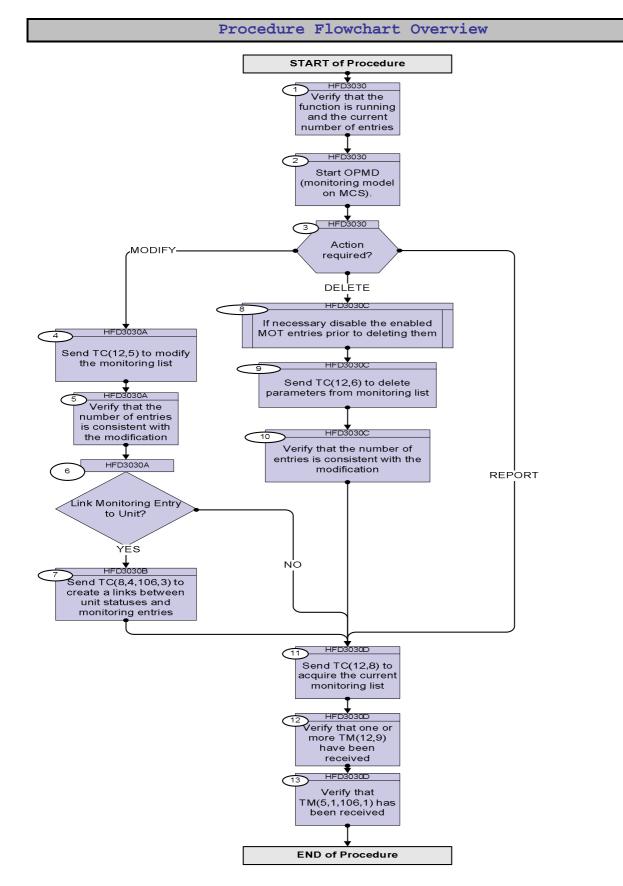
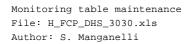Status   : Version 7 - Unchanged
Last Checkin: 19/04/09

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ZAZAI999   (None)

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
16/11/07		1	Created	cmevi-hp	
10/06/08	1	2	TC flags / Seq type modification	S. Manganelli	
23/11/08		3	Modified following industry inputs 16 oct 08	S. Manganelli	
11/12/08	2	4	Editorial	S. Manganelli	
02/03/09	2.1	5	Comment added at step 2	cmevi-hp	
22/03/09	2.2	6	Inserted comments about OPMD. Inserted check on count of monitored entries as per TAS-I input 3 march 09	S. Manganelli	
19/04/09	2.3	7	Added comment related to interpretation of mother-daughter parameter monitoring and their check mask	S. Manganelli	

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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 :HFD3030 (Dummy sequence) *TimeTag Type:* *Sub Schedule ID:*		
1		*Verify that the function is running and the current number of entries*		Next Step: 2
		Verify Telemetry **MonitSts** **DEH23170**	**= Running**	AND=ZAZAI999
		Verify Telemetry **AswNumMot** **DE871170**	**Note the value**	(None)
2		*Start OPMD (monitoring model on MCS).*		Next Step: 3
		All operations in this procedure can be easily followed observing their effect on the monitoring model display. The model is updated both by TC activity and by received TM.		
3		*Action required?*		Next Step: MODIFY 4 REPORT 11 DELETE 8
		TC Seq. Name :HFD3030A (Add Modif MOT entry) *TimeTag Type:* *Sub Schedule ID:*		
4		*Send TC(12,5) to modify the monitoring list*		Next Step: 5

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		This telecommand is used for adding parameters into the monitoring list and for modifying entries already present in the monitoring list. **When the CDMU ASW receives this request, it will add the parameter monitoring information to the Monitoring List, and set the parameter monitoring status according to the value provided in the Monitoring Status field. In case a parameter has already an entry in the Monitoring list with an identical Monitoring Identifier, the values provided with the new Telecommand shall replace the previous values, in order to facilitate a modification.** **If an error is detected during the processing of the monitoring information for a given parameter, this parameter is not added to the Monitoring List. This does not affect the processing of the remaining parameters**		
		WARNING: the following TC is of variable length and therefore does not allow the definition of a generic procedure.		
		In the TC(12,5) it is necessary to set the following parameters: **- N: number of parameters to be added to the Monitoring List, or to be modified. The allowed range is between 1 and 13.** **- Parameter-ID: unique identification of a datapool parameter;** **- Monitoring ID: unique identifier of a MOT entry, it associates a certain parameter with a specific Check Definition and with specific Event Packets. If applicable, the action which will be initiated in case of monitoring event is defined on-board by the Event/ Action Service.**		
		- Parameter-Monitoring-Status: indicates whether the monitoring of the corresponding parameter is enabled or disabled immediately after modifying the Monitoring List. **- Monitoring-Interval: monitoring interval for this parameter; allowed values are 1, 2, 4 and any multiple of 8 (16, 24, etc.), thus resulting in intervals of 1/8s, 1/4s, 1/2s, 1s, 2s, 3s ... For MOT entries that monitor the results of FCCT checks (updated at 1 Hz frequency) intervals less than 1s are not sensible.**		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		- <u>REP-Number</u> : number of successive samples of the parameter, which must fail (or succeed) the check in order to establish a new checking status. **- <u>Check-Value</u>: provides a value against which the specified Parameter will be compared. The Check Value can be a Low Limit, High Limit, or Expected Value. The parameter to be monitored will be submitted to right alignment and to «bitwise-AND» masking before to be compared against the 16-bit specified Check-Value.** **- <u>Check-Mask</u>: provides the bit-masking to be applied (after right alignment) to the parameter to be monitored. The «bit-masking» operation consist in «bitwise-AND» between Check-Mask and the value of the right aligned parameter to be monitored.**		
		- <u>Check-Type-ID</u>: determines the type monitoring test to be performed on the pair {Masked Parameter Value; Check Value}. The expected result in all cases is FALSE. **If Check-Type-ID = 1 the monitoring-test 'Masked Parameter Value equal to Check Value' shall be performed. The expected result is that the parameter value should not equal to Check Value.** **If Check-Type-ID = 2 the monitoring-test 'Masked Parameter Value larger than Check Value' shall be performed. The expected result is that the parameter value should be smaller or equal to Check Value.** **If Check-Type-ID = 4 the monitoring-test 'Masked Parameter Value smaller than Check Value' shall be performed. The expected result is that the parameter value should be larger or equal to Check Value.**		
		If Check-Type-ID = 8 the monitoring-test 'Masked Parameter Value not equal to Check Value' shall be performed. The expected result is that the parameter value should be equal to Check Value. **If Check-Type-ID = 16 the monitoring-test 'Masked Parameter Value larger or equal to Check Value' shall be performed. The expected result is that the parameter value should be smaller than Check Value.** **If Check-Type-ID = 32 the monitoring-test 'Masked Parameter Value smaller or equal to Check Value' shall be performed. The expected result is that the parameter value should be larger than Check Value.**		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		- Event-ID-1 and Event-ID-2: identifier of the specific Event Report (5,x) that will be generated, when a transition of the checking status is detected. **For a given Monitoring-ID, the checking status will be set to IN_RANGE when Parameter-Monitoring-Status is enabled. A checking status transition will be detected when the monitoring-test gives REP Number successive results opposite to the current value of checking status.** **If a transition of checking status from IN_RANGE to OUT_OF_RANGE is detected (this correspond to REP Number successive TRUE results of the specified monitoring-test while checking status = IN_RANGE), the Event-Packet identified by Event-ID-1 will be generated.** **If a transition of checking status from OUT_OF_RANGE to IN_RANGE is detected (this correspond to REP Number successive FALSE results of the specified monitoring-test while checking status OUT_OF_RANGE), the Event-Packet identified by Event-ID-2 will be generated.**		
		With this convention, the issuing of Event-Packet identified by Event-ID-1 will in all cases indicate a transition to non expected result of monitoring-test (i.e. : in a general case, the monitoring-test define an abnormal condition). **The value of Event-ID-1 and Event-ID-2 specified in a TC(12,5) request shall be higher than 32767 (from 8000h to FFFFh), i.e. the first bit of Event-ID for monitoring Event shall be 1b.**		
		For what concerns parameters we have three possibilities: 1) normal parameter (without daugthers) 2) mother parameter (normal parameter having daugthers) 3) daughter parameter The parameter ID read in the OPMD display is respectevely (see cases above): 1) normal parameter (without daugthers) 2) mother parameter (normal parameter having daugthers) 3) daughter parameter When sending the command below however the following has to be used respectively (see cases above) in filling the Parameter_ID: 1) normal parameter (without daugthers)		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		2) mother parameter (normal parameter having daugthers) if monitoring on all daugthers has to be enabled/disabled 3) mother parameter This means that it must be checked in the Access DB (Table "MOTHER_DAUGTHER") what case the entry corresponds to. The following guidelines can also be helpful: - in case 2) only the mask should be modified if the enable/disable action does not have to affect all daugther parameters of that mother parameters. - the raw value for the Parameter ID can be found in the db table pcf.dat (PCF_PID) - the Parameter ID of the entry associated with the specific Monitoring_ID can be read also in vpd for the monitoring list report TM(12,9)		
		The mask parameter is always expressed as a 16 bits string, and it is used to choose which parts (daughters) of the mother parameter are actually monitored. **The mapping with a daugther parameter is as shown in the example below:** **a 16 bit mother parameter contains three daughters A, B and C : they that use the bits in the PLF of the mother as** **AAAA AAAA BBBB CCCC** **The mask** **0000 0000 0000 1111** **on that mother parameter means that the only daughter parameter monitored by this mask is C, i.e. the one occupying location CCCC.** **In other words, the bits of the mother parameter corresponding to zeros of the check mask are NOT monitored.**		
		WARNING: the following TC is intended to be just an example.		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch

		Execute Telecommand
		
		                    AddModifMonParam
		
		Command Parameter(s) :
		                  N_Repetition DH041170
		                  ParameterId DH042170
		                  MonitorId DH043170
		                ParamMonStatus DH044170
		                MonitInterval DH045170
		                  RepNumber DH046170
		                  CheckValue DH047170
		                 CheckMask DH048170
		                CheckTypeId DH049170
		                  Event1Id DH050170
		                  Event2Id DH051170
			DC49F170
			
			1 <dec> (Def)
			Parameter_ID
			Monitoring_ID
			Enabled or
			Disabled
			Monitoring
			interval
			Repetition number
			Check value
			Check mask
			Check type
			Event_ID_1
			Event_ID_2	

		TC Control Flags :
		                    GBM IL DSE
		                    --Y -- ---
		
		Subsch. ID : 10
		Det. descr. : TEMPLATE Add or Modify Param of the Monit List, TC(12,5)
		This Telecommand will not be included in the export		

5		*Verify that the number of entries is consistent with the modification*		Next Step: 6
		Verify Telemetry **AswNumMot** DE871170	**Compare this value with step 1**	(None)
		If new entries have been defined the new number shall have increased accordingly, otherwise the number of entries is unchanged.		
6		*Link Monitoring Entry to Unit?*		Next Step: NO 11 YES 7
		TC Seq. Name :HFD3030B (Set MOT UNIT link) *TimeTag Type:* *Sub Schedule ID:*		
7		*Send TC(8,4,106,3) to create a links between unit statuses and monitoring entries*		Next Step: 11

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		These links are used when the unit status is changed by a TTC or PCDU management TC, so that in the beginning of the commanding sequence all monitorings linked to the original unit status are disabled, and in the end of the sequence all the monitorings connected to the new unit status are enabled.		
		In the TC(8,4,106,3) it is necessary to set the following parameters: - **Unit ID** (0xFFFF for no unit); - **Unit Status** ON or OFF; - **N** number of reptition; 0 if the unit status is linked into all monitorings. **Parameters repeated N times:** - **Parameter ID** uniquely identifying the datapool parameter; - **Monitoring ID** uniquely identifying the MOT entry.		
7.1		*Link all MOT entries to a UnitID and the expected status*		
		In this particular case all entries would be linked to NoUnit, ie the monitorings will never be disabled as a result of a TTC or PCDU management command. In this case the expected status is irrelevant.		

		Execute Telecommand
		                        LinkStatusUnitMon
		
		Command Parameter(s) :
		            LinkedUnitId DH183170
		            LinkUnitStatus DH180170
		            N_Repetition DH041170
		
		TC Control Flags :
		                        GBM IL DSE
		                        --Y -- ---
		Subsch. ID : 10
		Det. descr. : TC(8,4,106,3) Link Monitoring Entry To Status Unit
		This Telecommand will not be included in the export
			DCP08170
			
			NoUnit
			On
			0 <dec>	

7.2		*Link a subset of MOT entries to a UnitID and the expected status*		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch

		Execute Telecommand
		
		                        LinkStatusUnitMon
		
		Command Parameter(s) :
		          LinkedUnitId **DH183170**
		        LinkUnitStatus **DH180170**
		         N_Repetition **DH041170**
		           ParameterId **DH042170**
		             MonitorId **DH043170**
		
		TC Control Flags :
		                       GBM IL DSE
		                       --Y -- ---
		Subsch. ID : 10
		Det. descr. : TC(8,4,106,3) Link Monitoring Entry To Status Unit
			DCP08170
			
			Unit_ID
			On or Off
			1 <dec> (Def)
			Parameter_ID
			Monitoring_ID	

		This Telecommand will not be included in the export		
		TC Seq. Name :HFD3030C (Delete MOT entry) *TimeTag Type:* *Sub Schedule ID:*		
8		*If necessary disable the enabled MOT entries prior to deleting them*		Next Step: 9
		WARNING: entries containing parameters to be deleted must first be disabled or the TC(12,6) will be rejected.		
		Execute procedure H_FCP_DHS_3028.		
9		*Send TC(12,6) to delete parameters from monitoring list*		Next Step: 10
		When the CDMU ASW receives this request, it processes each parameter in turn and removes its corresponding monitoring information, if any, from the Monitoring List (the entry becomes free). **If a certain parameter is not in the Monitoring List there shall be no effect on the deletion of the parameters which have an entry in the Monitoring List.**		
		WARNING: the following TC is of variable lenght therefore does not allow the definition of a generic procedure.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		In the TC(12,6) it is necessary to set the following parameters: **- N: number of parameters to be removed from Monitoring List.** **- Parameter-ID: unique identification of the datapool parameter.** **- Monitoring-ID: associates a certain parameter with a specific Check Definition and with specific Event Packets. If applicable, the action which will be initiated in case of monitoring event is defined on-board by the Event/ Action Service.**		
		WARNING: the following TC is intended to be just an example.		

		Execute Telecommand
		                          DeleteMonitParam_Templ
		
		 Command Parameter(s) :
		                N_Repetition DH041170
		                ParameterId DH042170
		                MonitorId DH043170
		
		 TC Control Flags :
		                                  GBM IL DSE
		                                  --Y -- ---
		 Subsch. ID : 10
		 Det. descr. : TEMPLATE Delete Parameters from the monitoring list, TC(12,6)
		 This Telecommand will not be included in the export
			DCT28170
			
			 1 \<dec\> (Def)
			 Parameter_ID
			 Monitoring_ID	

10		*Verify that the number of entries is consistent with the modification*		Next Step: 11
		Verify Telemetry AswNumMot DE871170	**Compare this value with step 1**	(None)
		TC Seq. Name :HFD3030D (Report MOT) TimeTag Type: Sub Schedule ID:		
11		*Send TC(12,8) to acquire the current monitoring list*		Next Step: 12

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		This check should be done using the MCS OPMD task. When the CDMU ASW receives this TC, it issues one or several reports with the current static contents of the Monitoring List (TM packet type (12,9)). When the dump of TM(12,9) has ended, an Event Report TM(5,1,106,1) indicating the number of reported TM(12,9) is issued.		
		Execute Telecommand ReportMonitList *TC Control Flags :* GBM IL DSE --Y -- --- *Subsch. ID : 10* Det. descr. : Report current monitoring list, TC(12,8), no appl. data	DC20L170	
12		*Verify that one or more TM(12,9) have been received*		Next Step: 13
		Verify Packet Reception **TM 12-9 Current Monitoring List Report** CurMonLstRpt *Packet Details:* APID: 16 Type: 12 Subtype: 9 PI1: PI2:		
		Verify Telemetry **N_Repetition** DE014170		(None)
		The following 12 parameters are repeated N times		
		Verify Telemetry Unique identifier for the datapool parameter **ParameterId** DE054170		(None)
		Verify Telemetry Unique Identifier of the MOT entry **MonitorId** DE055170		(None)
		Verify Telemetry **ParamMonStatus** DE056170	**Enabled or Disabled**	(None)
		Verify Telemetry The allowed monitoring intervals are values 1 (= 1/8 sec), 2 (= 1/4 sec), 4(= 1/2 sec), and any multiple of 8 (8=1 sec, 16=2 sec, 24=3 sec, etc.) **MonitInterval** DE057170	**multiples of 1/8 sec**	(None)
		Verify Telemetry The number of successive samples of the parameter, which must fail (or succeed) the check in order to establish a new checking status. **RepNumber** DE058170		(None)
		Verify Telemetry The value against which the specified Parameter shall be compared. Please note that this is the OUT OF RANGE value! **CheckValue** DE059170		(None)

Status   : Version 7 - Unchanged
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry The «bit-masking» operation consist in «bitwise-AND» between Check-Mask and the value of the parameter to be monitored. **CheckMask** **DE060170**	**bit-masking to be applied to the parameter to be monitored**	(None)
		Verify Telemetry One of =, >, <, <>, >= , <= Please note that the expeted result of the expression is FALSE! **CheckTypeId** **DE061170**		(None)
		Verify Telemetry Event ID-1 is reporting the transition between an "In Range" to" Out of Range status, its type is 2 and if declared and enabled in the EAT an onbard action will take place. **Event1Id**		(None)
		Verify Telemetry Event ID-2 is reporting a transition between an "Out of Range" to "In Range" status, its type is 1, ie for information only. **Event2Id** **DE063170**		(None)
		Verify Telemetry The identifier of the unit that is linked to the MOT entry **LinkedUnitId** **DEZSH170**		(None)
		Verify Telemetry The MOT entry is foreseen to be enabled when the Unit specified into the "Unit ID" field is according to the status specified into "Unit Status" field, otherwise the MOT entry is disabled. **MonUnitStatus** **DEZU5170**	**ON or OFF**	(None)
13		*Verify that TM(5,1,106,1) has been received*		Next Step: END

		Verify Packet Reception
		      CdmuAsw Event 5-1-106-1 TM 12-9 Dump Ended **D_EvRp_033**
		Packet Details:
		      APID: 16
		      Type: 5
		      Subtype: 1
		      PI1: 27137
		      PI2: 0		

		Verify Packet Telemetry **TM5xEventID** **DEZSJ170**	**= TM_12_9DmpEnd**	(None)
		Verify Packet Telemetry **NrOfTmPktIssued** **DE072170**		(None)
		End of Procedure		