

Enable/Disable Low-Rate Mode Telemetry
File: H_FCP_AOC_D3LW.xls
Author: dsalt-hp



Procedure Summary

Objectives

This procedure describes how to enable/disable low-rate mode telemetry. Ground will enable these packets every time the spacecraft downlink rate drops to or is commanded to low rate (= 5 kbps).

BACKGROUND:

Nominal mode telemetry is considered non-essential and uses APID 514. Packets using APID 514 are blocked from the downlink (but can still be stored onboard) as soon the spacecraft downlink rate drops to or is commanded to low rate (= 5 kbps). As there is approx. 1 kbps of margin when in low-rate Ground will use that margin to enable low-rate mode telemetry packets as essential telemetry. These packets are on APID 512 and are therefore considered essential.

NOTE: Low rate TM packets are predefined on-board within the BSW and so only need to be enabled/disabled and each has a unique Packet ID, as follows:

- 1 = SBM_SBSM
- 2 = SAM
- 3 = SASM
- 4 = OCM
- 5 = SCM

Summary of Constraints

1. Spacecraft configured for 5 kbps downlink rate.
2. In low rate (= 5 kbps) there is approx. 1 kbps of margin, besides the default essential telemetry.

Spacecraft Configuration

Start of Procedure

End of Procedure

Reference File(s)

Input Command Sequences

Output Command Sequences

HFAD3LW1
HFAD3LW2
HFAD3LW3
HFAD3LW4
HFAD3LW5
HFAD3LW6
HFAD3LW7
HFAD3LW8
HFAD3LWB
HFAD3LWC

Referenced Displays

Status : Version 1 - Unchanged
Last Checkin: 13/01/09

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ANDs **GRDs** **SLDs**
ZAD07999

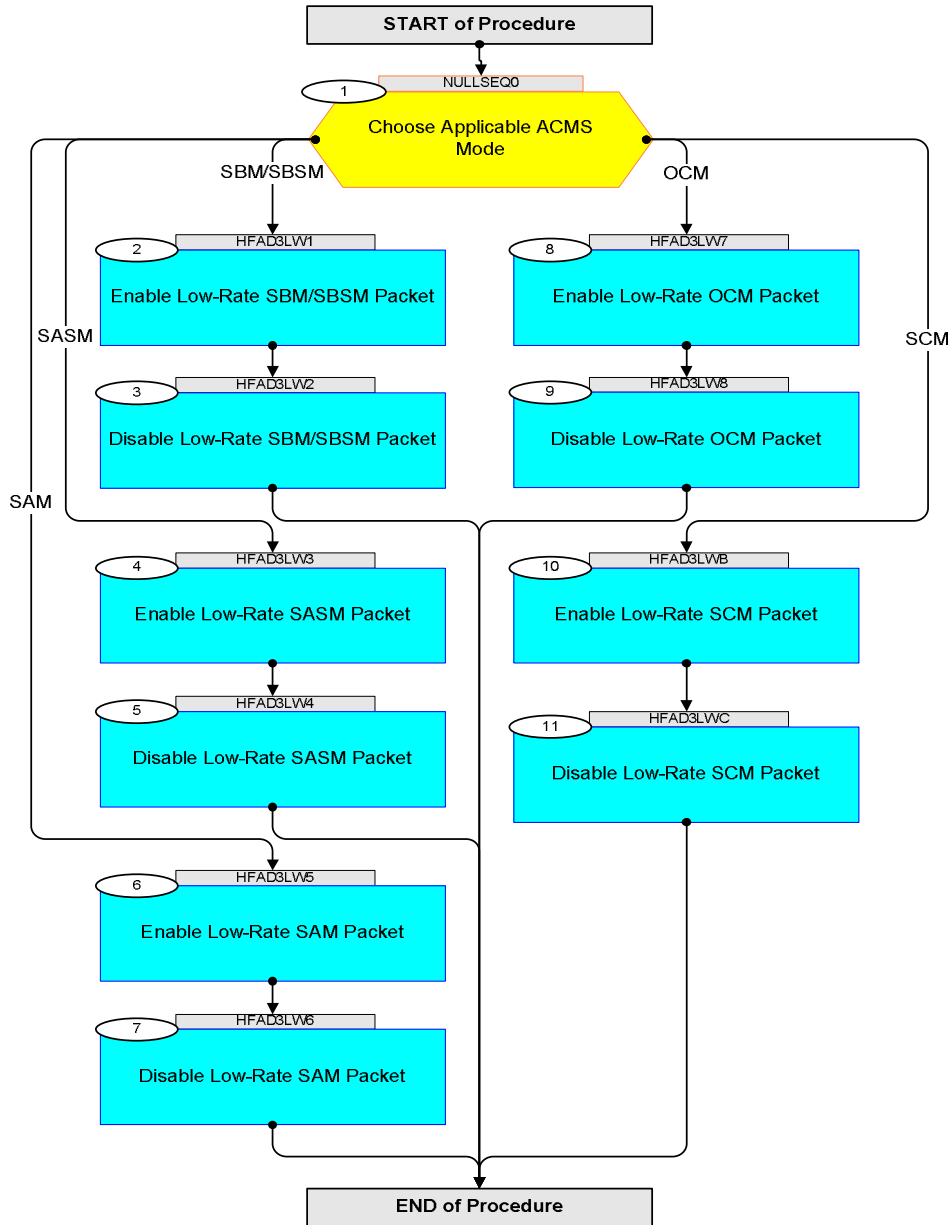
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
13/01/09	2	1	Created	dsalt-hp	

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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 : NULLSEQ0 () TimeTag Type: Sub Schedule ID: <input type="checkbox"/>				
1		Choose Applicable ACMS Mode		Next Step: SBM/SBSM 2 SASM 4 SAM 6 OCM 8 SCM 10
		Verify Telemetry <div style="display: flex; justify-content: space-around;"> TME_BITRATE DEMRF160 </div>	= 5 Kbps	AND=ZAD07999
		SBM/SBSM -> GO TO STEP 2 SASM -> GO TO STEP 4 SAM -> GO TO STEP 6 OCM -> GO TO STEP 8 SCM -> GO TO STEP 10		
TC Seq. Name : HFAD3LW1 (EnableLowRateSbmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
2		Enable Low-Rate SBM/SBSM Packet		Next Step: 3
		A3H_LR_MSBM {Herschel LowRate MTM SBM} size and default settings: Packet size = 3552 bits Interval = 4 s (= 16 sampling periods) Packet rate = 3552 [bits] / 4 [s] = 888 [bps]		
2.1		Uplink Sequence HFAD3LW2		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <div style="text-align: right;">EnableTmGen</div> Command Parameter(s) : <div style="text-align: right;"> N AH017070 Sub-Type AH019070 Packet-ID AH020070 </div> TC Control Flags : <div style="text-align: right;"> GBM IL DSE --Y -- --- </div> Subsch. ID : 20 Det. descr. : Enable Generation of Telemetry Packets	AC900070 1 <dec> (Def) HK Report 1 <dec>	
2.2		Verify Diagnostic Packet Enable		<input type="checkbox"/>
		Verify Packet Reception <div style="text-align: right;">Herschel LowRate MTM SBM-SBSM</div> Packet Details: <div style="text-align: right;"> APID: 512 Type: 3 Subtype: 25 PI1: 500 PI2: </div>	A3H_LR_MSBM	
TC Seq. Name : HFAD3LW2 (DisableLowRateSbmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
3		Disable Low-Rate SBM/SBSM Packet		Next Step: END
3.1		Uplink Sequence HFAD3LW3		<input type="checkbox"/>
		Execute Telecommand <div style="text-align: right;">DisableTmGen</div> Command Parameter(s) : <div style="text-align: right;"> N AH017070 Sub-Type AH019070 Packet-ID AH020070 </div> TC Control Flags : <div style="text-align: right;"> GBM IL DSE --Y -- --- </div> Subsch. ID : 20 Det. descr. : Disable Generation of Telemetry Packets	AC902070 1 <dec> (Def) HK Report 1 <dec>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch											
<p><i>TC Seq. Name : HFAD3LW3 (EnableLowRateSasmPkt)</i></p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p>□</p>															
4		Enable Low-Rate SASM Packet		Next Step: 5											
		<p>A3H_LR_MSASM {Herschel LowRate MTM SASM} size and default settings:</p> <p>Packet size = 3552 bits Interval = 4 s (= 16 sampling periods) Packet rate = 3552 [bits] / 4 [s] = 888 [bps]</p>													
4.1		Uplink Sequence HFAD3LW5		□											
		<p>Execute Telecommand</p> <p style="text-align: right;">EnableTmGen</p> <p>AC900070</p> <p>Command Parameter(s) :</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">N</td> <td>AH017070</td> <td>1 <dec> (Def)</td> </tr> <tr> <td style="text-align: right;">Sub-Type</td> <td>AH019070</td> <td>HK Report</td> </tr> <tr> <td style="text-align: right;">Packet-ID</td> <td>AH020070</td> <td>3 <dec></td> </tr> </table> <p>TC Control Flags :</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">GBM IL DSE</td> </tr> <tr> <td style="text-align: right;">--Y -- ---</td> </tr> </table> <p>Subsch. ID : 20 Det. descr. : Enable Generation of Telemetry Packets</p>	N	AH017070	1 <dec> (Def)	Sub-Type	AH019070	HK Report	Packet-ID	AH020070	3 <dec>	GBM IL DSE	--Y -- ---		
N	AH017070	1 <dec> (Def)													
Sub-Type	AH019070	HK Report													
Packet-ID	AH020070	3 <dec>													
GBM IL DSE															
--Y -- ---															
4.2		Verify Diagnostic Packet Enable		□											
		<p>Verify Packet Reception</p> <p style="text-align: right;">Herschel LowRate MTM SASM</p> <p>A3H_LR_MSASM</p> <p>Packet Details:</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">APID:</td> <td>512</td> </tr> <tr> <td style="text-align: right;">Type:</td> <td>3</td> </tr> <tr> <td style="text-align: right;">Subtype:</td> <td>25</td> </tr> <tr> <td style="text-align: right;">PI1:</td> <td>1500</td> </tr> <tr> <td style="text-align: right;">PI2:</td> <td></td> </tr> </table>	APID:	512	Type:	3	Subtype:	25	PI1:	1500	PI2:				
APID:	512														
Type:	3														
Subtype:	25														
PI1:	1500														
PI2:															
<p><i>TC Seq. Name : HFAD3LW4 (DisableLowRateSasmPkt)</i></p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p>□</p>															
5		Disable Low-Rate SASM Packet		Next Step: END											

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
5.1		Uplink Sequence HFAD3LW6		<input type="checkbox"/>
		Execute Telecommand DisableTmGen Command Parameter(s) : N AH017070 Sub-Type AH019070 Packet-ID AH020070 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : Disable Generation of Telemetry Packets	AC902070 1 <dec> (Def) HK Report 3 <dec>	
TC Seq. Name : HFAD3LW5 (EnableLowRateSamPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
6		Enable Low-Rate SAM Packet		Next Step: 7
		A3H_LR_MSAM {Herschel LowRate MTM SAM} size and default settings: Packet size = 3552 bits Interval = 4 s (= 16 sampling periods) Packet rate = 3552 [bits] / 4 [s] = 888 [bps]		
6.1		Uplink Sequence HFAD3LW8		<input type="checkbox"/>
		Execute Telecommand EnableTmGen Command Parameter(s) : N AH017070 Sub-Type AH019070 Packet-ID AH020070 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 20 Det. descr. : Enable Generation of Telemetry Packets	AC900070 1 <dec> (Def) HK Report 2 <dec>	
6.2		Verify Diagnostic Packet Enable		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Reception Herschel LowRate MTM SAM Packet Details: <div style="float: right;"> APID: 512 Type: 3 Subtype: 25 PI1: 1000 PI2: </div>	A3H_LR_MSAM	
TC Seq. Name : HFAD3LW6 (DisableLowRateSamPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
7		Disable Low-Rate SAM Packet		Next Step: END
7.1		Uplink Sequence HFAD3LW9		<input type="checkbox"/>
		Execute Telecommand <div style="float: right;">DisableTmGen</div> Command Parameter(s) : <div style="float: right;"> N AH017070 Sub-Type AH019070 Packet-ID AH020070 </div> TC Control Flags : <div style="float: right;"> GBM IL DSE --Y -- --- </div> Subsch. ID : 20 Det. descr. : Disable Generation of Telemetry Packets	AC902070	1 <dec> (Def) HK Report 2 <dec>
TC Seq. Name : HFAD3LW7 (EnableLowRateOcmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
8		Enable Low-Rate OCM Packet		Next Step: 9
		A3H_LR_MOCM {Herschel LowRate MTM OCM} size and default settings: Packet size = 4048 bits Interval = 4 s (= 16 sampling periods) Packet rate = 4048 [bits] / 4 [s] = 1012 [bps]		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch																														
8.1		Uplink Sequence HFAD3LWB		<input type="checkbox"/>																														
		Execute Telecommand <p style="text-align: right;">EnableTmGen</p> Command Parameter(s) : <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">N</td> <td style="width: 30%; text-align: center;">AH017070</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">Sub-Type</td> <td style="text-align: center;">AH019070</td> <td></td> <td>1 <dec> (Def)</td> </tr> <tr> <td></td> <td style="text-align: center;">Packet-ID</td> <td style="text-align: center;">AH020070</td> <td></td> <td>HK Report</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>4 <dec></td> </tr> </table> TC Control Flags : <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">GBM IL DSE</td> <td style="width: 30%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">--Y -- ---</td> <td></td> <td></td> <td></td> </tr> </table> Subsch. ID : 20 Det. descr. : Enable Generation of Telemetry Packets		N	AH017070				Sub-Type	AH019070		1 <dec> (Def)		Packet-ID	AH020070		HK Report					4 <dec>		GBM IL DSE					--Y -- ---				AC900070	
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	--Y -- ---																																	
8.2		Verify Diagnostic Packet Enable		<input type="checkbox"/>																														
		Verify Packet Reception <p style="text-align: center;">Herschel LowRate MTM OCM</p> Packet Details: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%; text-align: center;">APID:</td> <td style="width: 50%; text-align: center;">512</td> </tr> <tr> <td></td> <td style="text-align: center;">Type:</td> <td style="text-align: center;">3</td> </tr> <tr> <td></td> <td style="text-align: center;">Subtype:</td> <td style="text-align: center;">25</td> </tr> <tr> <td></td> <td style="text-align: center;">PI1:</td> <td style="text-align: center;">2000</td> </tr> <tr> <td></td> <td style="text-align: center;">PI2:</td> <td></td> </tr> </table>		APID:	512		Type:	3		Subtype:	25		PI1:	2000		PI2:		A3H_LR_MOCM																
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TC Seq. Name : HFAD3LW8 (DisableLowRateOcmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>																																		
9		Disable Low-Rate OCM Packet		Next Step: END																														
9.1		Uplink Sequence HFAD3LWC		<input type="checkbox"/>																														
		Execute Telecommand <p style="text-align: right;">DisableTmGen</p> Command Parameter(s) : <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">N</td> <td style="width: 30%; text-align: center;">AH017070</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">Sub-Type</td> <td style="text-align: center;">AH019070</td> <td></td> <td>1 <dec> (Def)</td> </tr> <tr> <td></td> <td style="text-align: center;">Packet-ID</td> <td style="text-align: center;">AH020070</td> <td></td> <td>HK Report</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>4 <dec></td> </tr> </table> TC Control Flags : <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">GBM IL DSE</td> <td style="width: 30%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">--Y -- ---</td> <td></td> <td></td> <td></td> </tr> </table> Subsch. ID : 20 Det. descr. : Disable Generation of Telemetry Packets		N	AH017070				Sub-Type	AH019070		1 <dec> (Def)		Packet-ID	AH020070		HK Report					4 <dec>		GBM IL DSE					--Y -- ---				AC902070	
	N	AH017070																																
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TC Seq. Name : HFAD3LWB (EnableLowRateScmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
10		Enable Low-Rate SCM Packet		Next Step: 11
		A3H_LR_MSCM {Herschel LowRate MTM SCM} size and default settings: Packet size = 4144 bits Interval = 4 s (= 16 sampling periods) Packet rate = 4144 [bits] / 4 [s] = 1036 [bps]		
10.1		Uplink Sequence HFAD3LWH		<input type="checkbox"/>
		Execute Telecommand <div style="text-align: right; margin-right: 100px;">EnableTmGen</div> Command Parameter(s) : <div style="display: flex; justify-content: space-between; margin-left: 100px;"> N AH017070 1 <dec> (Def) </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Sub-Type AH019070 HK Report </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Packet-ID AH020070 5 <dec> </div> TC Control Flags : <div style="display: flex; justify-content: space-between; margin-left: 100px;"> GBM IL DSE </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> --Y -- --- </div> Subsch. ID : 20 Det. descr. : Enable Generation of Telemetry Packets	AC900070	
10.2		Verify Diagnostic Packet Enable		<input type="checkbox"/>
		Verify Packet Reception <div style="text-align: right; margin-right: 100px;">Herschel LowRate MTM SCM</div> Packet Details: <div style="display: flex; justify-content: space-between; margin-left: 100px;"> APID: 512 </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Type: 3 </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Subtype: 25 </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> PI1: 2500 </div> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> PI2: </div>	A3H_LR_MSCM	
TC Seq. Name : HFAD3LWC (DisableLowRateScmPkt) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
11		Disable Low-Rate SCM Packet		Next Step: END

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
11.1		<i>Uplink Sequence HFAD3LWI</i>		<input type="checkbox"/>
		Execute Telecommand <p style="text-align: right;">DisableTmGen</p> Command Parameter(s) : N AH017070 1 <dec> (Def) Sub-Type AH019070 HK Report Packet-ID AH020070 5 <dec> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 20 Det. descr. : Disable Generation of Telemetry Packets	AC902070	
End of Procedure				