Set RM Activation and Toggle Delays
File: H_CRP_AOC_D2AD.xls
Author: dsalt-hp

Procedure Summary

Objectives

USAGE:

The procedure may be applied for restoring the value of one of the activation delay or toggle delay registers after a bit flip.

NOTES:

All RM registers are 32 bits wide. The storage of temporisation values requires only 16 bits. The most significant 16 bits of all temporisation registers are always set to 0.

Summary of Constraints

N/A

Spacecraft Configuration

Start of Procedure

N/A

End of Procedure

N/A

Reference File(s)

Input Command Sequences

Output Command Sequences

HRAD2AD1
HRAD2AD2
HRAD2AD3
HRAD2AD4
HRAD2ADA
HRAD2ADB
HRAD2ADC
HRAD2ADD

Referenced Displays

ANDs	GRDs	SLDs
ZAAM3999		
ZAA07999		

Configuration Control Information

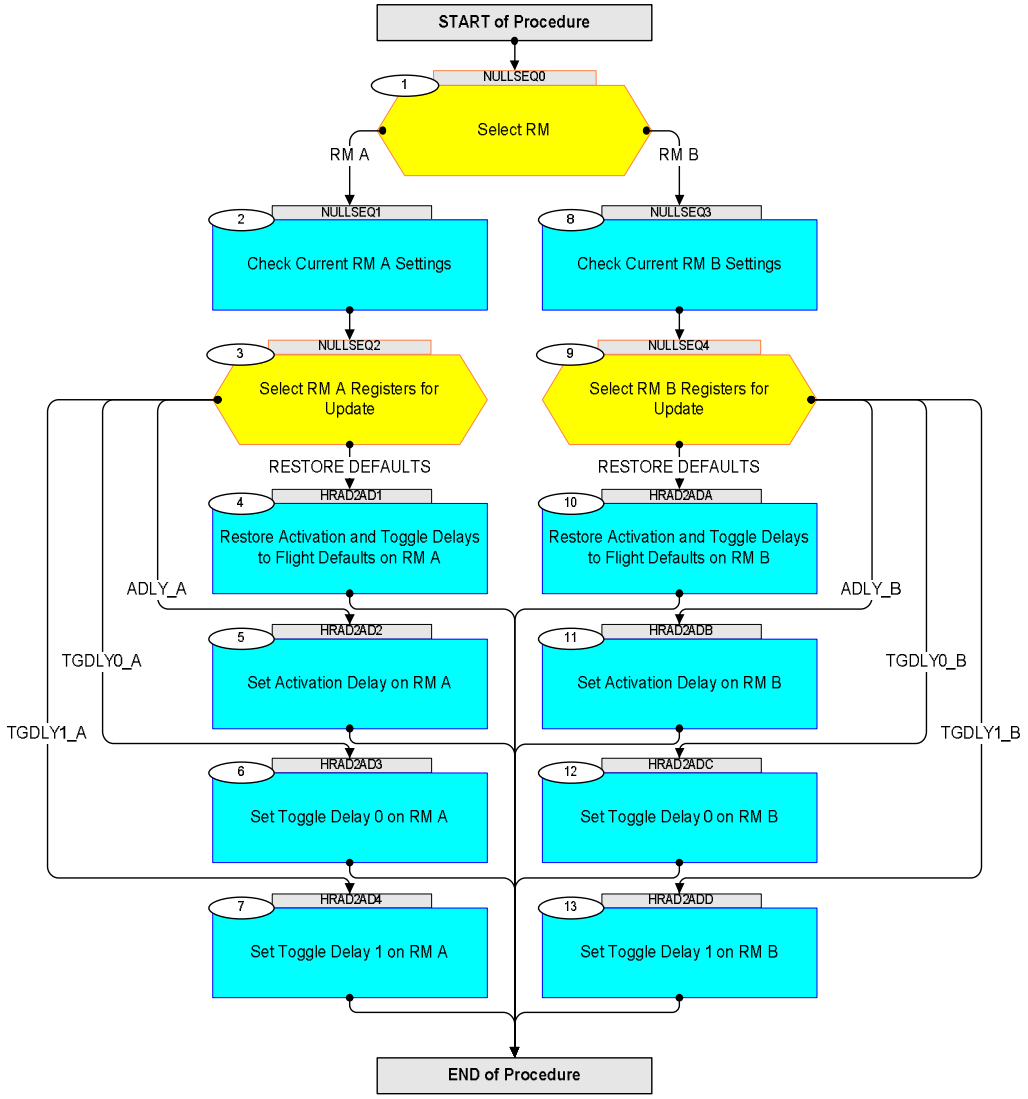
DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF

Set RM Activation and Toggle Delays
File: H_CRP_AOC_D2AD.xls
Author: dsalt-hp

09/01/09		1	Created	dsalt-hp	
09/01/09	2	2	Redundant sequence references removed from end of procedure	dsalt-hp	

Set RM Activation and Toggle Delays
File: H_CRP_AOC_D2AD.xls
Author: dsalt-hp

Procedure Flowchart Overview



Set RM Activation and Toggle Delays
File: H_CRP_AOC_D2AD.xls
Author: dsalt-hp

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :NULLSEQ0 ( ) *TimeTag Type: N* *Sub Schedule ID:*		
1		*Select RM*		Next Step: RM A 2 RM B 8
		Select the reconfiguration module that needs change of alarm temporisation delay settings: *RM A -> GO TO STEP 2* *RM B -> GO TO STEP 13*		
		TC Seq. Name :NULLSEQ1 ( ) *TimeTag Type:* *Sub Schedule ID:*		
2		*Check Current RM A Settings*		Next Step: 3
		This step verifies if the current activation and toggle delay settings are as expected. The temporisation delay settings can be read as part of the telemetry packet returned by the TC_GET_RM_STATUS command.		
2.1		*Uplink Sequence HFADRMR1*		
		Execute Sequence **HFADRMR1 GetRmAstatusReport**		
2.2		*Check Toggle Delay and Activation Delay Settings*		
		Verify Telemetry **RMH_TGDLY0_MSB AEXU0109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0_LSB AEXU1109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0 AD001109**	**<to be read>**	AND=ZAAM3999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **RMH_TGDLY1_MSB** **AEXU2109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB** **AEXU3109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1** **AD002109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_MSB** **AEXU4109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB** **AEXU5109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY** **AD003109**	**<to be read>**	AND=ZAAM3999
		TC Seq. Name :NULLSEQ2 ( ) *TimeTag Type:* *Sub Schedule ID:* □		
3		*Select RM A Registers for Update*		Next Step: RESTORE DEFAULTS 4 ADLY_A 5 TGDLY0_A 6 TGDLY1_A 7
		Options are to restore the default temporisation delay settings for flight or to set a user-defined temporisation delay for the individual alarms: *Restore flight defaults -> GO TO STEP 4* *Activation Delay -> GO TO STEP 5* *Toggle Delay 0 -> GO TO STEP 6* *Toggle Delay 1 -> GO TO STEP 7*		
		TC Seq. Name :HRAD2AD1 (SetRmAadlyTgdlyDef) *TimeTag Type: N* *Sub Schedule ID:* □		
4		*Restore Activation and Toggle Delays to Flight Defaults on RM A*		Next Step: END

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		This step restores the default activation delay and toggle delay settings for flight. Default configuration is as highlighted in the table attached at the back of this procedure.		
4.1		*Uplink Sequence HRAD2AD1*		□
4.1.1		*Disable RM A*		□
		Execute Telecommand **Ext_ACC_RM_A_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Disable - Mission Specific	**DCM22170**	
		Verify Telemetry **RMA_fromTTR-RMA** **AEE91050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB** **AEE92050**	**= DISABLED**	AND=ZAA07999
4.1.2		*Load Activation Delay and Toggle Delay Flight Defaults*		□
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5888 <hex>** **4 <dec>** (Def) **00009C07 <hex>** **A9A1 <hex>**	

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5880 <hex>** **4 <dec>** (Def) **0000FA01 <hex>** **68EB <hex>**	
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5884 <hex>** **4 <dec>** (Def) **00009602 <hex>** **16CF <hex>**	
4.1.3		*Verify Update via RM A Status Report*		
		Execute Telecommand **Get RM-A status** *Command Parameter(s) :* **RMStat DF86Cmd** **AH841001** **RMStat DD86Cmd** **AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-A status	**ACZZ4109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** **A86_RMStatus** *Packet Details:* **APID:** **512** **Type:** **8** **Subtype:** **6** **PI1:** **41600** **PI2:** **1**		
		Verify Telemetry **RMH_TGDLY0_MSB** **AEXU0109**	**= 250 <dec>**	AND=ZAAM3999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **RMH_TGDLY0_LSB** **AEXU1109**	**= 1 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TDLY0** **AD004109**	**50.1 ms**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_MSB** **AEXU2109**	**= 150 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB** **AEXU3109**	**= 2 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1** **AD002109**	**60.1 ms**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_MSB** **AEXU4109**	**= 156 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB** **AEXU5109**	**= 7 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY** **AD003109**	**1996.9 ms**	AND=ZAAM3999
4.1.4		*Enable RM A*		
		Execute Telecommand **Ext_ACC_RM_A_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Enable - Mission Specific	**DCM21170**	
		Verify Telemetry **RMA_fromTTR-RMA** **AEE91050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB** **AEE92050**	**= ENABLED**	AND=ZAA07999
		TC Seq. Name :HRAD2AD2 (SetRmAactivDelay) *TimeTag Type: N* *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= <dec> Memory Checksum MemCrc= <dec>		
5		*Set Activation Delay on RM A*		Next Step: END

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		This step allows the user to set a user-defined activation delay.		
5.1		*Uplink Sequence HRAD2AD2*		□
5.1.1		*Disable RM A*		□
		Execute Telecommand **Ext_ACC_RM_A_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Disable - Mission Specific	**DCM22170**	
		Verify Telemetry **RMA_fromTTR-RMA** **AEE91050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB** **AEE92050**	**= DISABLED**	AND=ZAA07999
5.1.2		*Load Activation Delay Settings*		□
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5888 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
5.1.3		*Verify Update via RM A Status Report*		□
		Execute Telecommand **Get RM-A status** *Command Parameter(s) :* **RMStat DF86Cmd** **AH841001** **RMStat DD86Cmd** **AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-A status	**ACZZ4109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**A86_RMStatus** **512** **8** **6** **41600** **1**	
		Verify Telemetry **RMH_ADLY_MSB** **AEXU4109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB** **AEXU5109**	**<user defined setting>**	AND=ZAAM3999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **RMH_ADLY AD003109**	**<user defined setting>**	AND=ZAAM3999
5.1.4		*Enable RM A*		
		Execute Telecommand **Ext_ACC_RM_A_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Enable - Mission Specific	**DCM21170**	
		Verify Telemetry **RMA_fromTTR-RMA AEE91050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB AEE92050**	**= ENABLED**	AND=ZAA07999
		TC Seq. Name :HRAD2AD3 (SetRmAtoggleDelay0) *TimeTag Type: N* *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= Memory Checksum MemCrc=	 <dec> <dec>	
6		*Set Toggle Delay 0 on RM A*		Next Step: END
		This step allows the user to set a user-defined toggle delay 0.		
6.1		*Uplink Sequence HRAD2AD3*		
6.1.1		*Disable RM A*		
		Execute Telecommand **Ext_ACC_RM_A_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Disable - Mission Specific	**DCM22170**	

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **RMA_fromTTR-RMA** **AEE91050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB** **AEE92050**	**= DISABLED**	AND=ZAA07999
6.1.2		*Load Toggle Delay 0 Settings*		
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5880 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
6.1.3		*Verify Update via RM A Status Report*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Get RM-A status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-A status	**ACZZ4109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**A86_RMStatus** **512** **8** **6** **41600** **1**	
		Verify Telemetry **RMH_TGDLY0_MSB AEXU0109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0_LSB AEXU1109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0 AD001109**	**<user defined setting>**	AND=ZAAM3999
6.1.4		*Enable RM A*		
		Execute Telecommand **Ext_ACC_RM_A_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Enable - Mission Specific	**DCM21170**	
		Verify Telemetry **RMA_fromTTR-RMA AEE91050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB AEE92050**	**= ENABLED**	AND=ZAA07999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		TC Seq. Name :HRAD2AD4 (SetRmAtoggleDelay1) *TimeTag Type:* N *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= Memory Checksum MemCrc=	 <dec> <dec>	
7		*Set Toggle Delay 1 on RM A*		Next Step: END
		This step allows the user to set a user-defined toggle delay 1.		
7.1		*Uplink Sequence HRAD2AD4*		□
7.1.1		*Disable RM A*		□
		Execute Telecommand **Ext_ACC_RM_A_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Disable - Mission Specific	**DCM22170**	
		Verify Telemetry **RMA_fromTTR-RMA** **AEE91050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB** **AEE92050**	**= DISABLED**	AND=ZAA07999
7.1.2		*Load Toggle Delay 1 Settings*		□

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00C0 <hex>** **5884 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
7.1.3		*Verify Update via RM A Status Report*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Get RM-A status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-A status	**ACZZ4109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**A86_RMStatus** **512** **8** **6** **41600** **1**	
		Verify Telemetry **RMH_TGDLY1_MSB AEXU2109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB AEXU3109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1 AD002109**	**<user defined setting>**	AND=ZAAM3999
7.1.4		*Enable RM A*		
		Execute Telecommand **Ext_ACC_RM_A_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM A Enable - Mission Specific	**DCM21170**	
		Verify Telemetry **RMA_fromTTR-RMA AEE91050**	**=**	AND=ZAA07999
		Verify Telemetry **RMA_fromTTR-RMB AEE92050**	**= ENABLED**	AND=ZAA07999
		TC Seq. Name :NULLSEQ3 ( ) *TimeTag Type:* *Sub Schedule ID:*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
8		*Check Current RM B Settings*		Next Step: 9
		This step verifies if the current activation and toggle delay settings are as expected. The temporisation delay settings can be read as part of the telemetry packet returned by the TC_GET_RM_STATUS command.		
8.1		*Uplink Sequence HFADRMR2*		□
		Execute Sequence **HFADRMR2 GetRmBstatusReport**		
8.2		*Check Toggle Delay and Activation Delay Settings*		□
		Verify Telemetry **RMH_TGDLY0_MSB AEXU0109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0_LSB AEXU1109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0 AD001109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_MSB AEXU2109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB AEXU3109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1 AD002109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_MSB AEXU4109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB AEXU5109**	**<to be read>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY AD003109**	**<to be read>**	AND=ZAAM3999
		TC Seq. Name :NULLSEQ4 ( ) *TimeTag Type:* *Sub Schedule ID:* □		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
9		*Select RM B Registers for Update*		Next Step: TGDLY1_B 13 RESTORE DEFAULTS 10 ADLY_B 11 TGDLY0_B 12
		Options are to restore the default temporisation delay settings for flight or to set a user-defined temporisation delay for the individual alarms: *Restore flight defaults -> GO TO STEP 10* *Activation Delay -> GO TO STEP 11* *Toggle Delay 0 -> GO TO STEP 12* *Toggle Delay 1 -> GO TO STEP 13*		
		TC Seq. Name :HRAD2ADA (SetRmBadlyTgdlyDef) *TimeTag Type: N* *Sub Schedule ID:* □		
10		*Restore Activation and Toggle Delays to Flight Defaults on RM B*		Next Step: END
		This step restores the default activation delay and toggle delay settings for flight. Default configuration is as highlighted in the table attached at the back of this procedure.		
10.1		*Uplink Sequence HRAD2AD5*		□
10.1.1		*Disable RM B*		□
		Execute Telecommand **Ext_ACC_RM_B_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Disable - Mission Specific	**DCM25170**	

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry **RMB_fromTTR-RMA AEE93050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB AEE94050**	**= DISABLED**	AND=ZAA07999
10.1.2		*Load Activation Delay and Toggle Delay Flight Defaults*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID AH6M0109** **Start Address AH6M1109** **Length SAU AH6M2109** **Memory Data 32 AH6M6109** **Memory Checksum AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5888 <hex>** **4 <dec>** (Def) **00009C07 <hex>** **A9A1 <hex>**	
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID AH6M0109** **Start Address AH6M1109** **Length SAU AH6M2109** **Memory Data 32 AH6M6109** **Memory Checksum AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5880 <hex>** **4 <dec>** (Def) **00008902 <hex>** **0582 <hex>**	
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID AH6M0109** **Start Address AH6M1109** **Length SAU AH6M2109** **Memory Data 32 AH6M6109** **Memory Checksum AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5884 <hex>** **4 <dec>** (Def) **00008902 <hex>** **0582 <hex>**	

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
10.1.3		*Verify Update via RM B Status Report*		
		Execute Telecommand **Get RM-B status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-B status	**ACZZ5109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**A86_RMStatus** **512** **8** **6** **41600** **1**	
		Verify Telemetry **RMH_TGDLY0_MSB AEXU0109**	**= 137 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0_LSB AEXU1109**	**= 2 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TDLY0 AD004109**	**54.9 ms**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_MSB AEXU2109**	**= 137 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB AEXU3109**	**= 2 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1 AD002109**	**54.9 ms**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_MSB AEXU4109**	**= 156 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB AEXU5109**	**= 7 <dec>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY AD003109**	**1996.9 ms**	AND=ZAAM3999
10.1.4		*Enable RM B*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Ext_ACC_RM_B_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Enable - Mission Specific	**DCM24170**	
		Verify Telemetry **RMB_fromTTR-RMA** **AEE93050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB** **AEE94050**	**= ENABLED**	AND=ZAA07999
		TC Seq. Name :HRAD2ADB (SetRmBactivDelay) *TimeTag Type: N* *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= Memory Checksum MemCrc=	 <dec> <dec>	
11		*Set Activation Delay on RM B*		Next Step: END
		This step allows the user to set a user-defined activation delay.		
11.1		*Uplink Sequence HRAD2AD6*		□
11.1.1		*Disable RM B*		□
		Execute Telecommand **Ext_ACC_RM_B_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Disable - Mission Specific	**DCM25170**	
		Verify Telemetry **RMB_fromTTR-RMA** **AEE93050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB** **AEE94050**	**= DISABLED**	AND=ZAA07999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
11.1.2		*Load Activation Delay Settings*		
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5888 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
11.1.3		*Verify Update via RM B Status Report*		

Set RM Activation and Toggle Delays
File: H_CRP_AOC_D2AD.xls
Author: dsalt-hp

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Get RM-B status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-B status	**ACZZ5109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID: 512** **Type: 8** **Subtype: 6** **PI1: 41600** **PI2: 1**	**A86_RMStatus**	
		Verify Telemetry **RMH_ADLY_MSB AEXU4109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY_LSB AEXU5109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_ADLY AD003109**	**<user defined setting>**	AND=ZAAM3999
11.1.4		*Enable RM B*		
		Execute Telecommand **Ext_ACC_RM_B_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Enable - Mission Specific	**DCM24170**	
		Verify Telemetry **RMB_fromTTR-RMA AEE93050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB AEE94050**	**= ENABLED**	AND=ZAA07999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		TC Seq. Name :HRAD2ADC (SetRmBtoggleDelay0) *TimeTag Type:* N *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= Memory Checksum MemCrc=	 <dec> <dec>	
12		*Set Toggle Delay 0 on RM B*		Next Step: END
		This step allows the user to set a user-defined toggle delay 0.		
12.1		*Uplink Sequence HRAD2AD7*		□
12.1.1		*Disable RM B*		□
		Execute Telecommand **Ext_ACC_RM_B_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Disable - Mission Specific	**DCM25170**	
		Verify Telemetry **RMB_fromTTR-RMA** **AEE93050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB** **AEE94050**	**= DISABLED**	AND=ZAA07999
12.1.2		*Load Toggle Delay 0 Settings*		□

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5880 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
12.1.3		*Verify Update via RM B Status Report*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Get RM-B status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-B status	**ACZZ5109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**A86_RMStatus** **512** **8** **6** **41600** **1**	
		Verify Telemetry **RMH_TGDLY0_MSB AEXU0109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0_LSB AEXU1109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY0 AD001109**	**<user defined setting>**	AND=ZAAM3999
12.1.4		*Enable RM B*		
		Execute Telecommand **Ext_ACC_RM_B_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Enable - Mission Specific	**DCM24170**	
		Verify Telemetry **RMB_fromTTR-RMA AEE93050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB AEE94050**	**= ENABLED**	AND=ZAA07999

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		TC Seq. Name :HRAD2ADD (SetRmBtoggleDelay1) *TimeTag Type:* N *Sub Schedule ID:* *Formal Parameter List :* Memory Data 32 MemData= Memory Checksum MemCrc=	 <dec> <dec>	
13		*Set Toggle Delay 1 on RM B*		Next Step: END
		This step allows the user to set a user-defined toggle delay 1.		
13.1		*Uplink Sequence HRAD2AD8*		□
13.1.1		*Disable RM B*		□
		Execute Telecommand **Ext_ACC_RM_B_Disable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Disable - Mission Specific	**DCM25170**	
		Verify Telemetry **RMB_fromTTR-RMA** **AEE93050**	**= DISABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB** **AEE94050**	**= DISABLED**	AND=ZAA07999
13.1.2		*Load Toggle Delay 1 Settings*		□

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		When loading this command sequence on the Manual Stack, it will ask you to enter values for the formal parameters inside the sequence. The formal parameters are: - ***MemData*** *= Alarm temporisation delay in the timing format prescribed at the back of this procedure. Storage of timing data uses two integer numbers: V, in the range 0 .. 255 and exponent E, in the range 0 .. 15. Time is then equal to (V * 2^E + 1) * 0.1 msec. For timing data stored in registers, the datastring to be loaded into the 32-bit register can be obtained as follows: register content = '0000' & V [hex] & E [hex], with V and E expressed as 1 byte hex strings.*		
		- ***MemCrc*** *= CRC-CCITT (0xFFFF) checksum calculated over the entire datastring described above. Do not forget the leading four zeros (!). To verify your own checksum calculation you could use the following webpage: http://www.lammertbies.nl/comm/info/crc-calculation.html?crc=0000b70e&method=hex*		
		Execute Telecommand **Load Memory** *Command Parameter(s) :* **Memory ID** **AH6M0109** **Start Address** **AH6M1109** **Length SAU** **AH6M2109** **Memory Data 32** **AH6M6109** **Memory Checksum** **AH6M7109** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(6,2) Load Memory Using Absolute Addresses	**AC062109** **00F0 <hex>** **5884 <hex>** **4 <dec>** (Def) **MemData** **MemCrc**	
13.1.3		*Verify Update via RM B Status Report*		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **Get RM-B status** *Command Parameter(s) :* **RMStat DF86Cmd AH841001** **RMStat DD86Cmd AH842001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC(8,1) - Get RM-B status	**ACZZ5109** **Enable 86** **Enable 86**	
		Verify Packet Reception **TM 8-6 for RM Status parametrized** **A86_RMStatus** *Packet Details:* **APID: 512** **Type: 8** **Subtype: 6** **PI1: 41600** **PI2: 1**		
		Verify Telemetry **RMH_TGDLY1_MSB AEXU2109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1_LSB AEXU3109**	**<user defined setting>**	AND=ZAAM3999
		Verify Telemetry **RMH_TGDLY1 AD002109**	**<user defined setting>**	AND=ZAAM3999
13.1.4		*Enable RM B*		
		Execute Telecommand **Ext_ACC_RM_B_Enable** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : External ACC RM B Enable - Mission Specific	**DCM24170**	
		Verify Telemetry **RMB_fromTTR-RMA AEE93050**	**= ENABLED**	AND=ZAA07999
		Verify Telemetry **RMB_fromTTR-RMB AEE94050**	**= ENABLED**	AND=ZAA07999

End of Procedure

Tables & Figures

Register name	Register address RMA (hex)	Register address RMB (hex)	Usage	Default time (msec)	Binary representation (hex)
ADLY	00C05888	00F05888	Activation delay	1996.9	9C07
TGDLY0	00C05880	00F05880	Toggle delay #1	50.1 (RMA) 54.9 (RMB)	FA01 (RMA) 8902 (RMB)
TGDLY1	00C05884	00F05884	Toggle delay #2	60.1 (RMA) 54.9 (RMB)	9602 (RMA) 8902 (RMB)
TDLY0	00C05900	00F05900	Temporisation delay #1 (WD toggle)	998.5	9C06
TDLY1	00C05904	00F05904	Temporisation delay #2 (CRS1)	249.7	9C04
TDLY2	00C05908	00F05908	Temporisation delay #3 (CRS2)	249.7	9C04
TDLY3	00C0590C	00F0590C	Unused (CRS3 on Planck)	249.7	9C04
TDLY4	00C05910	00F05910	Temporisation delay #5 (AAD1)	249.7	9C04
TDLY5	00C05914	00F05914	Temporisation delay #6 (AAD2)	249.7	9C04
TDLY6	00C05918	00F05918	Temporisation delay #7 (Sep. strap 1)	29900.9	920B
TDLY7	00C0591C	00F0591C	Temporisation delay #8 (Sep. strap 2)	299827.3	B70E

Timing format

The storage of timing data always uses two integer numbers: a value, V, in the range 0 .. 255 and an exponent, E, i the range 0 .. 15. The actual timing is derived from these two numbers using the formula:

$$\text{Time} = (V * 2^E + 1) * 0.1 \text{ msec.}$$

This format allows the representation of timing values in the range from 0.1 msec to 836 seconds.
For timing data stored in registers, the integer number loaded into the register can be obtained as follows:

$$\text{Register} = (V << 8) + E,$$

where << represents a bit-wise left shift. The bit layout for retry delays is different to allow more efficient packing bits in PAP tables.

Conversion to RM format

For any value T, representing time in milliseconds, the value and exponent for the representation used by the RM ca be obtained as follows:

$$E = \max(\text{floor}(\log_2((T / 0.1 - 1) / 255), 0)$$

$$V = \text{floor}((T / 0.1 - 1) / 2^E)$$

A check must obviously be applied that the numbers remain in the ranges specified above. The choice of value and exponent is not unique, and the algorithm above is optimised to achieve the best resolution (lowest exponent).