

Tx2 and TM encoder in use configuration for LR2
File: H_CRP_TTC_T2L2.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to change the TM bit rate to 5 kbps when the downlink and the uplink are already established.

This procedure does not use the logical addressing, thus must be executed under Ground control (the commands used cannot be inserted in the MTL).

Summary of Constraints

XPND2 and the TM encoder are configured using TC(8,4,115,9), TC(8,4,115,18) and TC(8,4,115,20), thus the status of the ASW function "TTC Management" has to be "running".

Note that:

- the value of the TM modulation index is always 1.2;
- the value of the RNG modulation index, when CM and RNG are ON, is always 0.6;
- the value of the Output power level is always - 4dBm;
- the External reference and Internal bit pattern generator are always OFF.

If the ASW function "On board Scheduling" is stopped the TCs can not be added into the MTL.
If the function is running, up to four time-tagged TCs are released per second.

It is recommended to command ON the coherent and ranging mode parameters by Ground only after confirmation of onboard lock.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
Downlink active via TX2 and TWTA2;
TM bit rate set to any value;
XPND configuration: CM OFF or CM ON and RNG OFF or CM ON and RNG ON.

End of Procedure

CDMU in default configuration;
Downlink active via TX2 and TWTA2;
TM bit rate equal to 5 kbps;
XPND configuration: CM and RNG unchanged.

Reference File(s)

Input Command Sequences

Output Command Sequences

HRRT2L21
HRRT2L22

Referenced Displays

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ANDs GRDs SLDs
 ZAZ7I999
 ZAZ7J999

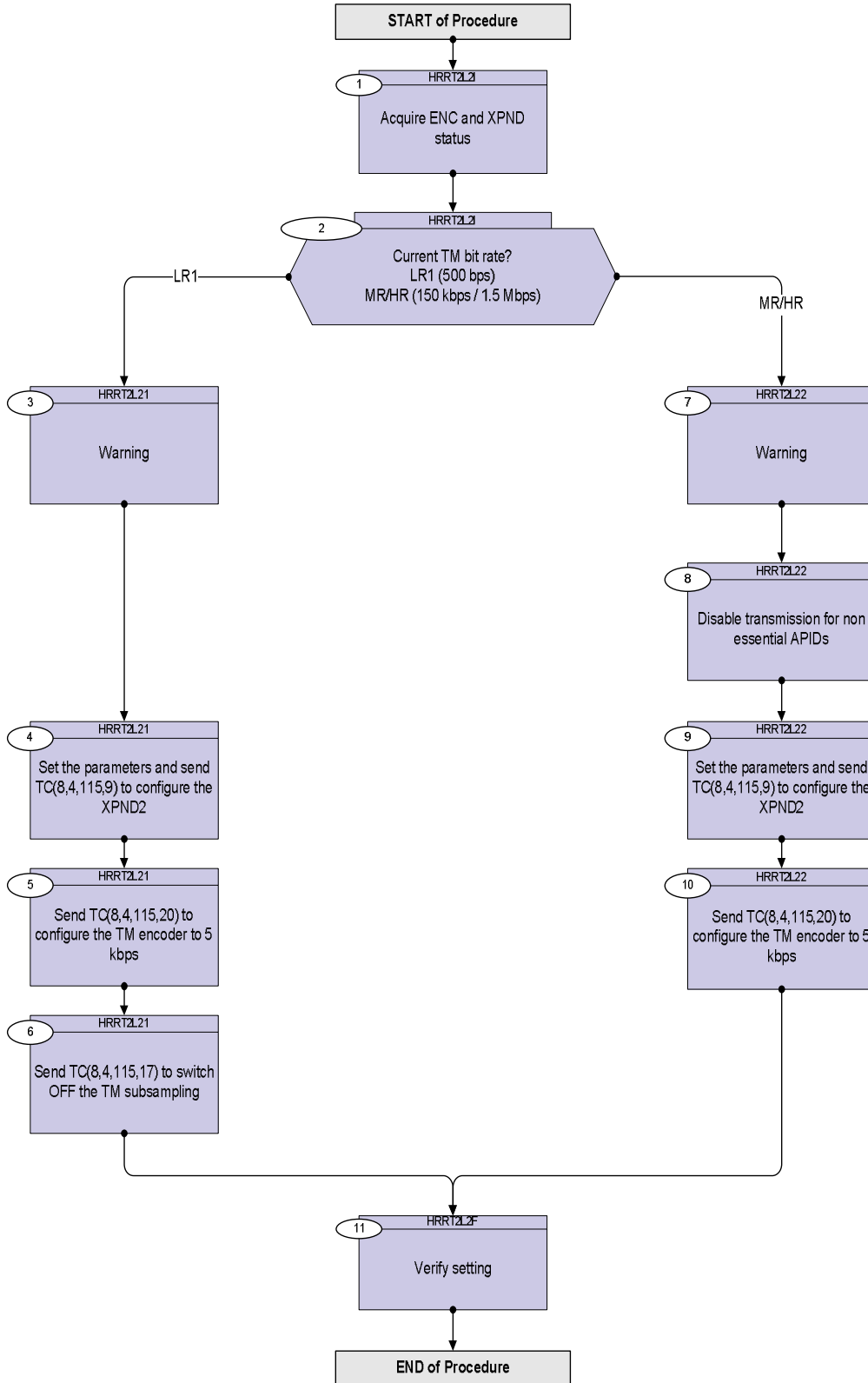
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
29/07/08	1	1	Created	E. Picallo	
16/12/08		2	TC DCT18170 Configure Xpnd mask update TCs XPND Config & TM ENC Config blocked TC XPND Config do not update CM and RM	E. Picallo	
08/01/09	2	3	CDMU ASW V3.8 and BSW V2.4 alignment	E. Picallo	
07/04/09	2.3	4	Step 6: wrong command description, the TC DC03F170 is a TC(8,4,115,17) corrected	E. Picallo	

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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 :HRRT2L2I (Tx2 for LR2 initial) Tx2 and TM encoder in use configuration for LR2 TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Acquire ENC and XPND status		Next Step: 2
		Verify RX2 AGC Level Telemetry X2 AGC TMUpInk RMB41442	>= -141.0 dbmW	AND=ZAZ7I999
		Verify RX2 Lock statusTelemetry X2 Rx Lock - RL RMB45442	= Locked	AND=ZAZ7I999
		Verify Low Rate-1 status Telemetry X2 LowRate-1 MD RMB51442		AND=ZAZ7I999
		Verify Low Rate-2 status Telemetry X2 LowRate-2 MD RMB52442	= OFF	AND=ZAZ7I999
		Verify Medium Rate Modulator status Telemetry X2 MedRate-MRM RMB50442		AND=ZAZ7I999
		Verify High Rate Modulator status Telemetry X2 HIRateMD-HRM RMB49442		AND=ZAZ7I999
		Verify Coherent Mode status Telemetry X2 Coher MOD-CM RMB47442		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry X2 Rang MD - RM RMB48442		AND=ZAZ7I999
		Verify Telemetry TME_BITRATE DEMRF160		AND=ZAZ7J999
2		Current TM bit rate? LR1 (500 bps) MR/HR (150 kbps / 1.5 Mbps)		Next Step: LR1 3 MR/HR 7
TC Seq. Name :HRRT2L21 (Tx2 from LR1 to LR2) Tx2 and TM encoder configuration from LR1 to LR2 TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
3		Warning		Next Step: 4

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		<p>The current TM bit rate is not LR2. Therefore a TM bit rate switch will be performed.</p> <p>A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.</p> <p>In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC. Therefore send those TCs blocked (encoded in a single CLTU) or send TCs TT.</p>																																																																																																																						
4		<p>Set the parameters and send TC(8,4,115,9) to configure the XPND2</p>		Next Step: 5																																																																																																																				
		<p>Execute Telecommand</p> <p style="text-align: center;">XpndConfigure_Templ</p> <p>Command Parameter(s) :</p> <table border="0"> <tr> <td>XpndId</td> <td>DH018170</td> <td>XpndB</td> <td></td> </tr> <tr> <td>XpndConfMask1Unus</td> <td>DH220170</td> <td>11 <bin></td> <td></td> </tr> <tr> <td>XpndConfMask1_ER</td> <td>DH221170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask1_CM</td> <td>DH222170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfMask1_RM</td> <td>DH223170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfMask1_HRM</td> <td>DH224170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask1_MRM</td> <td>DH225170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask1LRM1</td> <td>DH226170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask1LRM2</td> <td>DH227170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask1_RMI</td> <td>DH228170</td> <td>Update</td> <td></td> </tr> <tr> <td>XpndConfMask1_TMI</td> <td>DH229170</td> <td>Update</td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td>XpndConfMask2_PG</td> <td>DH230170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfMask2Unus</td> <td>DH231170</td> <td>1111111111 <bin></td> <td></td> </tr> <tr> <td>XpndConfMask2OPLS</td> <td>DH232170</td> <td>Update</td> <td></td> </tr> <tr> <td>XpndConfDW1Unus</td> <td>DH020170</td> <td>0 <dec> (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1_ER</td> <td>DH021170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1_CM</td> <td>DH022170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1_RM</td> <td>DH023170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1_HRM</td> <td>DH024170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1_MRM</td> <td>DH025170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1LRM1</td> <td>DH026170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW1LRM2</td> <td>DH027170</td> <td>ON</td> <td></td> </tr> <tr> <td>XpndConfDW1_RMI</td> <td>DH028170</td> <td>0.6</td> <td></td> </tr> <tr> <td>XpndConfDW1_TMI</td> <td>DH029170</td> <td>1.2</td> <td></td> </tr> <tr> <td>XpndConfDW2_PG</td> <td>DH030170</td> <td>OFF (Def)</td> <td></td> </tr> <tr> <td>XpndConfDW2Unus</td> <td>DH031170</td> <td>0 <dec> (Def)</td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td>XpndConfDW2OPLS</td> <td>DH032170</td> <td>-4</td> <td></td> </tr> </table> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE -SY -- ---</p> <p>Subsch. ID : 10 Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)</p>	XpndId	DH018170	XpndB		XpndConfMask1Unus	DH220170	11 <bin>		XpndConfMask1_ER	DH221170	ON		XpndConfMask1_CM	DH222170	OFF (Def)		XpndConfMask1_RM	DH223170	OFF (Def)		XpndConfMask1_HRM	DH224170	ON		XpndConfMask1_MRM	DH225170	ON		XpndConfMask1LRM1	DH226170	ON		XpndConfMask1LRM2	DH227170	ON		XpndConfMask1_RMI	DH228170	Update		XpndConfMask1_TMI	DH229170	Update						XpndConfMask2_PG	DH230170	ON		XpndConfMask2Unus	DH231170	1111111111 <bin>		XpndConfMask2OPLS	DH232170	Update		XpndConfDW1Unus	DH020170	0 <dec> (Def)		XpndConfDW1_ER	DH021170	OFF (Def)		XpndConfDW1_CM	DH022170	OFF (Def)		XpndConfDW1_RM	DH023170	OFF (Def)		XpndConfDW1_HRM	DH024170	OFF (Def)		XpndConfDW1_MRM	DH025170	OFF (Def)		XpndConfDW1LRM1	DH026170	OFF (Def)		XpndConfDW1LRM2	DH027170	ON		XpndConfDW1_RMI	DH028170	0.6		XpndConfDW1_TMI	DH029170	1.2		XpndConfDW2_PG	DH030170	OFF (Def)		XpndConfDW2Unus	DH031170	0 <dec> (Def)						XpndConfDW2OPLS	DH032170	-4			
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		Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.		
5		Send TC(8,4,115,20) to configure the TM encoder to 5 kbps		Next Step: 6
		Execute Telecommand <p style="text-align: center;">TtcConfigTmEncInUseLow2</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE -E- -- ---</p> Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 2 - 5kbps, TC(8,4,115,20)	DC17F170	
6		Send TC(8,4,115,17) to switch OFF the TM subsampling		Next Step: 11
		Execute Telecommand <p style="text-align: center;">TtcSwitchTmSubsamploff</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- ---</p> Subsch. ID : 10 Det. descr. : TTC: Switch TM Subsampling Off TC(8,4,115,17)	DC03F170	
TC Seq. Name :HRRT2L22 (Tx2 from MR to LR2) Tx2 and TM encoder in use configuration from MR to LR2 TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
7		Warning		Next Step: 8
		<p>The current TM bit rate is not LR2. Therefore a TM bit rate switch will be performed.</p> <p>A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.</p> <p>In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC. Therefore send those TCs blocked (encoded in a single CLTU) or send TCs TT.</p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
8		Disable transmission for non essential APIDs		Next Step: 9
		Execute Procedure: H_CRP_DHS_1001 Disabling transmission for non essential APIDs.		
9		Set the parameters and send TC(8,4,115,9) to configure the XPND2		Next Step: 10
		Execute Telecommand XpndConfigure_Templ	DCT18170	
		Command Parameter(s) :		
		XpndId DH018170	XpndB	
		XpndConfMask1Unus DH220170	11 <bin>	
		XpndConfMask1_ER DH221170	ON	
		XpndConfMask1_CM DH222170	OFF (Def)	
		XpndConfMask1_RM DH223170	OFF (Def)	
		XpndConfMask1_HRM DH224170	ON	
		XpndConfMask1_MRM DH225170	ON	
		XpndConfMask1LRM1 DH226170	ON	
		XpndConfMask1LRM2 DH227170	ON	
		XpndConfMask1_RMI DH228170	Update	
		XpndConfMask1_TMI DH229170	Update	
		XpndConfMask2_PG DH230170	ON	
		XpndConfMask2Unus DH231170	1111111111 <bin>	
		XpndConfMask2OPLS DH232170	Update	
		XpndConfDW1Unus DH020170	0 <dec> (Def)	
		XpndConfDW1_ER DH021170	OFF (Def)	
		XpndConfDW1_CM DH022170	OFF (Def)	
		XpndConfDW1_RM DH023170	OFF (Def)	
		XpndConfDW1_HRM DH024170	OFF (Def)	
		XpndConfDW1_MRM DH025170	OFF (Def)	
		XpndConfDW1LRM1 DH026170	OFF (Def)	
		XpndConfDW1LRM2 DH027170	ON	
		XpndConfDW1_RMI DH028170	0.6	
		XpndConfDW1_TMI DH029170	1.2	
		XpndConfDW2_PG DH030170	OFF (Def)	
		XpndConfDW2Unus DH031170	0 <dec> (Def)	
		XpndConfDW2OPLS DH032170	-4	
		TC Control Flags :		
		GBM IL DSE		
		-SY -- ---		
		Subsch. ID : 10		
		Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9)		
		Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.		

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10		Send TC(8,4,115,20) to configure the TM encoder to 5 kbps		Next Step: 11
		Execute Telecommand TtcConfigTmEncInUseLow2 TC Control Flags : <div style="text-align: right;">GBM IL DSE -E- - - - -</div> Subsch. ID : 10 Det. descr. : TTC: Config TM Enc In Use Mode Low 2 - 5kbps, TC(8,4,115,20)	DC17F170	
TC Seq. Name : HRRT2L2F (Tx2 for LR2 final)				
TimeTag Type: Sub Schedule ID: □				
11		Verify setting		Next Step: END
		Verify Telemetry <div style="text-align: center;">TME_BITRATE DEMRF160</div> = 5 Kbps		AND=ZAZ7J999
		Verify Telemetry <div style="text-align: center;">BSW_TM_MODE DEMF0160</div> = AllVc		AND=ZAZ7J999
		Verify Low Rate-2 status Telemetry <div style="text-align: center;">X2 LowRate-2 MD RMB52442</div> = ON		AND=ZAZ7I999
		Verify Coherent Mode status Telemetry <div style="text-align: center;">X2 Coher MOD-CM RMB47442</div>		AND=ZAZ7I999
		Verify Ranging Modulator status Telemetry <div style="text-align: center;">X2 Rang MD - RM RMB48442</div>		AND=ZAZ7I999
		Verify RNG Modulation Index Telemetry <div style="text-align: center;">X2 RNGMD ID-RMI RMB53442</div> = 0.6 rad		AND=ZAZ7I999
End of Procedure				