No TC Recovery
File: H_CRP_SYS_NOTC.xls
Author: F. Keck

Procedure Summary

Objectives

Run this procedure if a transmitted TC is not confirmed onboard.
The procedure will handle all stages of TC onboard acceptance:
1) RX (RF and Bit Lock)
2) Decoder (FARM-B Counter and FAR)
3) PM acceptance (Software TCs)
4) CPDU acceptance (if failed TC was a HP TC)

Summary of Constraints

Start this procedure only if a TC was released by the MCS,
accepted and successfully radiated by the ground station.
This procedure does not cover
- Ground Segment problems to transmit a TC
- PTV and database problems
- AD specific (configuration) problems

Spacecraft Configuration

Start of Procedure

Transmitted TC is not confirmed on board

End of Procedure

Transmitted TC is confirmed on board

Reference File(s)

Input Command Sequences

Output Command Sequences

HRYNOTC

Referenced Displays

ANDs **GRDs** **SLDs**

MIMIC: Overview

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
11/02/2009	2.1	1	Created	F. Keck	
25/03/2009	2.2	1.01	Validation : Added optional procedure call to handle RX-1 problem	F. Keck	
31/03/2009		2	Adding more comments and annex for FAR interpretation	F. Keck	
03/04/2009	2.3	3	Adding Crome Register dump for CPDU analysis Adding comment with TTR FDIR events	F. Keck	
22/09/2009	2.5	4	Increased re-sweep range. Different lock ranges of RX-1 and RX-2.	F. Keck	
12/11/2010	3.1	5	Clarification about sweep ranges	F. Keck	

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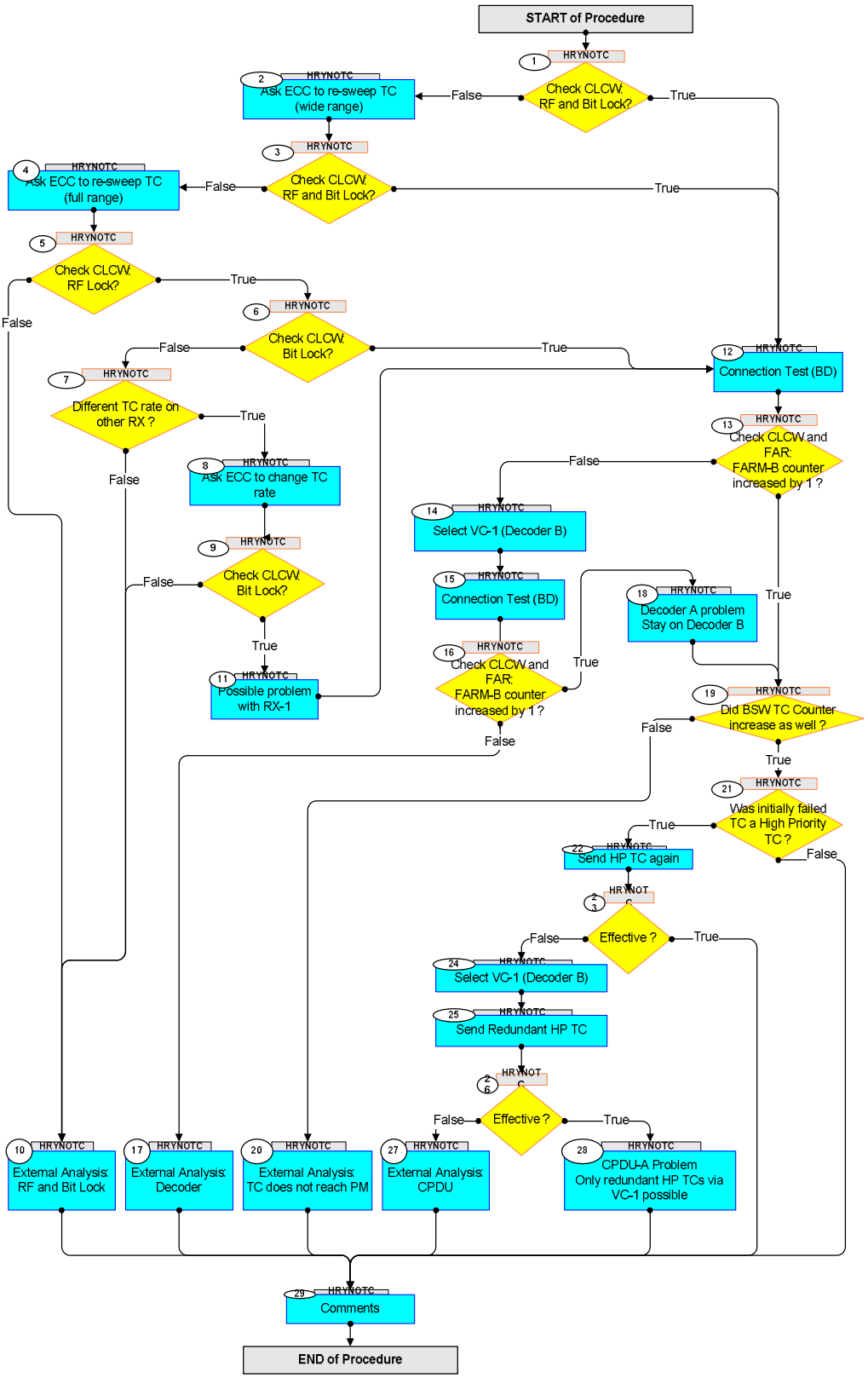
Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRYNOTC () *TimeTag Type: N* *Sub Schedule ID:*		
1		*Check CLCW:* *RF and Bit Lock?*		Next Step: False 2 True 12
		Check on the Overview MIMIC the CLCW status of the RF and Bit Lock.		
2		*Ask ECC to re-sweep TC* *(wide range)*		Next Step: 3
		Use the wide sweep range (+/- 30kHz). Infos: - Normal sweep range is only +/- 20kHz - Normal and wide sweep range lock only on RX-1 (RX-1 and RX-2 have different lock ranges)		
3		*Check CLCW:* *RF and Bit Lock?*		Next Step: True 12 False 4
		Check on the Overview MIMIC the CLCW status of the RF and Bit Lock.		
4		*Ask ECC to re-sweep TC* *(full range)*		Next Step: 5
		Use the full sweep range (+/- 100kHz). Info: The full sweep range should lock on both RX.		
5		*Check CLCW:* *RF Lock?*		Next Step: False 10 True 6
		Check on the Overview MIMIC the CLCW status of the RF Lock.		
6		*Check CLCW:* *Bit Lock?*		Next Step: False 7 True 12
		Check on the Overview MIMIC the CLCW status of the Bit Lock.		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
7		*Different TC rate on other RX ?*		Next Step: False 10 True 8
		At this stage none of both RX is in Bit Lock. If RX-2 is configured for another bitrate (default), the ground station cannot get a Bit Lock via RX-2 yet.		
8		*Ask ECC to change TC rate*		Next Step: 9
		If RX-2 is configured for another bitrate (default is low TC rate), the ground station could try to get a Bit Lock via RX-2 by configuring to the other bitrate.		
9		*Check CLCW:* *Bit Lock?*		Next Step: False 10 True 11
		Check on the Overview MIMIC the CLCW status of the Bit Lock. Info: This time RX-2 should show the Bit Lock.		
10		*External Analysis:* *RF and Bit Lock*		Next Step: 29
		E.g. Ground Station problem. RX-1 broken, but RX-2 connected to antenna, which does not allow a lock (e.g. not Earth poiting). RFDN got stuck and FDIR failed: E.g. ground station could try with max. uplink power to get a lock by brute RF force. In a worst case: Wait for the 60h LOS FDIR, which reconfigures the XPND and RFDN chains.		
11		*Possible problem with RX-1*		Next Step: 12
		No lock was achieved via RX-1, but via RX-2. This could indicate a problem with RX-1. An antenna/RFDN (connected to XPND-1) problem is unlikely if TM is transmitted via TX-1.		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Comment: Should the Connection Test in the next step be successful and the assumed RX-1 problem be confirmed, the following procedure could be run to switchover the XPND chain. The switchover is not required to continue this procedure and should be considered after the current TC chain is confirmed to work properly.		
		Execute Procedure: **H_CRP_TTC_FDIR** **Trigger TTC FDIR Level 1 Recovery**		
12		*Connection Test (BD)*		Next Step: 13
		Send Connection Test TC in BD and check if FARM-B counter increases by 1.		
		Execute Telecommand **ConnectionTest** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : Perform Connection Test	**DC810180**	
13		*Check CLCW and FAR:* *FARM-B counter increased by 1 ?*		Next Step: False 14 True 19
		Check BD Counter increasing (on MIMIC:Overview). Check FAR as well (on Decoder AND:ZAZ2C999). See annex for failure interpretation. NOTE: If in low TM rate, wait long enough to allow the TM to update.		
14		*Select VC-1 (Decoder B)*		Next Step: 15
		TC SPACON: Select VC-1 for commanding.		
15		*Connection Test (BD)*		Next Step: 16
		Send Connection Test TC in BD and check if FARM-B counter increases by 1.		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **ConnectionTest** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : Perform Connection Test	**DC810180**	
16		*Check CLCW and FAR:* *FARM-B counter increased by 1 ?*		Next Step: False 17 True 18
		Check BD Counter increasing (on MIMIC:Overview). Check FAR as well (on Decoder AND:ZAZ2C999). See annex for failure interpretation. NOTE: If in low TM rate, wait long enough to allow the TM to update.		
17		*External Analysis:* *Decoder*		Next Step: 29
		Options: None of both Decoders received the BD command: Perhaps only the connection between the RX in lock and both Decoders is broken. Try to get the other RX in lock. In a worst case: Wait for the 60h LOS FDIR, which reconfigures the XPND and RFDN chains.		
18		*Decoder A problem* *Stay on Decoder B*		Next Step: 19
		Stay on VC-1 Use only redundant CPDU TCs		
19		*Did BSW TC Counter increase as well ?*		Next Step: False 20 True 21
		Check the BSW TC Counter to confirm that the Connection Test TC reached the PM. NOTE: If in low TM rate, wait long enough to allow the TM to update.		
		Verify Telemetry **BSW_TC_Complete DELAF160**	**N+1**	MIMIC: Overview
		INFO: If service 1 is enabled, the (1,1) and (1,7) packets are expected as well.		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
20		*External Analysis:* *TC does not reach PM*		Next Step: 29
		Connection problem between Decoder and PM: - Try the other Decoder (if not already failed) - Try HP TCs to check both Decoders (e.g. disable/enable RM) - PM switchover as last chance (via HP TCs)		
21		*Was initially failed TC a High Priority TC ?*		Next Step: False 29 True 22
		If true: Perhaps the CPDU is the problem.		
22		*Send HP TC again*		Next Step: 23
		No Test TCs exist for HP TCs; so send the failed HP TC again. If Decoder B is selected (VC-1), use the redundant HP TC.		
		Check if the HP TC was effective. Option: Check CPDU report by sending following TC.		
		Option 1) Check nominal HP TC (VC-0, CPDU-A):		
		Execute Telecommand **CRMA_CPDM_StsReportReg** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : CROME A: Read CPDM Status Report Register	**DCW0R159**	
		Get the dumped register from AND:ZAZ7R999 DE285170 CromeId DE329170 CromeAddr DE367170 CromeData and insert CromeData into the excel sheet: CROME_reg_data_decommutation.xls		
		Option 2) Check redundant HP TC (VC-1, CPDU-B):		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand **CRMB_CPDM_StsReportReg** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : CROME B: Read CPDM Status Report Register	**DCW2N159**	
		Get the dumped register from AND:ZAZ7R999 DE285170 CromeId DE329170 CromeAddr DE367170 CromeData and insert CromeData into the excel sheet: CROME_reg_data_decommutation.xls		
23		*Effective ?*		Next Step: False 24 True 29
24		*Select VC-1 (Decoder B)*		Next Step: 25
		TC SPACON: Select VC-1 for commanding.		
25		*Send Redundant HP TC*		Next Step: 26
		To Decoder B (CPDU-B) the redundant HP TCs must be send.		
		Check if the HP TC was effective. Option: Check CPDU report by sending following TC.		
		Check redundant HP TC (VC-1, CPDU-B):		
		Execute Telecommand **CRMB_CPDM_StsReportReg** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 10* Det. descr. : CROME B: Read CPDM Status Report Register	**DCW2N159**	

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Get the dumped register from AND:ZAZ7R999 DE285170 CromeId DE329170 CromeAddr DE367170 CromeData and insert CromeData into the excel sheet: CROME_reg_data_decommutation.xls		
26		*Effective ?*		Next Step: False 27 True 28
27		*External Analysis:* *CPDU*		Next Step: 29
		None of both CPDUs executed the received HP TC. Options: Try another HP TC, to see if it's a generic Decoder problem or related to a specific HP TC.		
28		*CPDU-A Problem* *Only redundant HP TCs via VC-1 possible*		Next Step: 29
29		*Comments*		Next Step: END
		Additional hints for PDEC problems could be found in TTR failure event packets. See following examples:		
		Search for **CdmuBsw Event 5-2 TTR-RM A CROME Access Failure** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**D_EvRp_520** **16** **5** **2** **120** **120**	
		Search for **CdmuBsw Event 5-2 TTR-RM B CROME Access Failure** *Packet Details:* **APID:** **Type:** **Subtype:** **PI1:** **PI2:**	**D_EvRp_521** **16** **5** **2** **121** **121**	

End of Procedure

Frame Analysis Report

Bit/field	Value	Description
AuAna		Authentication process analysis:
	000	No authentication report
	001	Authorised TC Segment with data
	010	Authorised and executable AU Control Command
	011	Authorised "Dummy Segment"
	100	TC Segment rejected because of error in the Signature
	101	TC Segment rejected because of error in the LAC
	110	Non-executable authorised AU Control Command
	111	Incorrect length of the TC Segment, i.e. length less than 10 octets
LastMap	Any	Number of last MAP Identifier
Channel	Any	Selected TC channel input
Type	00	AD Frame
	01	No Legal Frame
	10	BD Frame
	11	BC Frame
ErrCnt	Any	Number of single-error TC Code Block corrections, saturates at 111
CbCnt	Any	Number of accepted TC Code Blocks modulo 64
IReason		Reason for frame declared Illegal (in case of multiple reasons, the reason of lowest value will be presented):
	000	No Illegal report
	001	Error in Version Number and Reserved A and B fields
	010	Illegal combination (AC) of Bypass and Control Command flags
	011	Spacecraft Identifier did not match
	100	VC Identifier bits 0 (MSB) to 4 did not match
	101	VC Identifier bit 5 (LSB) did not match
	110	N(S) of BC or BD Frame not set to all zeroes
	111	Incorrect BC Control Command format
FrameAna		Frame analysis (in case of multiple possibilities, the report of lowest value will be presented):
	000	Abandoned CLTU
	001	Frame declared Dirty
	010	Frame declared Illegal for one reason
	011	Frame declared Illegal for multiple reasons
	100	AD Frame discarded because of Lockout
	101	AD Frame discarded because of Wait
	110	AD Frame discarded because of N(S) or V(R)
	111	Frame accepted by FARM-1
Stat	0	New analysis data
	1	Old analysis data