

LO functional test
 File: H_COP_HIF_NFL8.xls
 Author: R. Biggins



Procedure Summary

Objectives

The objective of this procedure is to execute the standard functional test of the Local Oscillator Unit. It consists of a switch of each of the LO-band at the default frequencies and safe voltages, as well as an IV Curve characterization of the multipliers.

Based on procedure:
 HIFI-COP-1.2-LO_FT (v1)

Summary of Constraints

Note that this procedure is made up of 2 sequences.
 The second sequence is executed via the following TPF file:
 HCHNFL8Y_LO_FT_4B_vvvv.IPF

Spacecraft Configuration

Start of Procedure
 n/a

End of Procedure
 n/a

Reference File(s)

Input Command Sequences

Output Command Sequences
 HCHNFL8X
 HCHNFL8Y

Referenced Displays

ANDs **GRDs** **SLDs**
 ZAZ9C999

Configuration Control Information

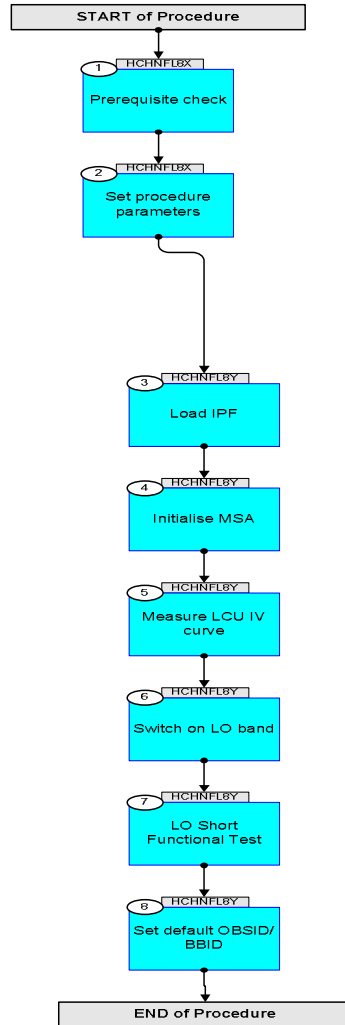
| DATE | FOP ISSUE | VERSION | MODIFICATION DESCRIPTION | AUTHOR | SPR REF |
|----------|-----------|---------|---|------------|---------|
| 31/10/08 | | 1 | Created | R. Biggins | |
| 20/11/08 | | 2 | Updates due to updates from D. Teyssier - Step 3 and 4 moved to the second sequence - Last 2 parameters of TC HIFI_P_Configure_FCU (step 5) changed to FP | R. Biggins | |
| 12/12/08 | | 3 | Changes due to IPF testing - ALL time tags updated (ET removed) - no change bars | R. Biggins | |
| 13/12/08 | 2 | 4 | Updates due to errors in the formal parameters | R. Biggins | |
| 08/04/09 | 2.3 | 5 | Changes due to updates from D. Teyssier - Step 3 removed - HIFI_non_periodic_hk_FCU TC removed from step 5 - TC flags updated | R. Biggins | |

Status : Version 5 - Unchanged
 Last Checkin: 08/04/09

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Procedure Flowchart Overview



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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|----------|----------------------|--|--|-----------------|
| | ET=+ UT=+00.00.01 | HIFI_Configure_FCU_Power HIFI_Configure_FCU_Power Command Parameter(s) : HIFI_BB_ID HP001197 HF_CPR_Mixer_H_S HP203191 HF_CPR_Mixer_V_S HP204191 HF_CPR_Chopper_S HP205191 HF_CPR_UCH_S HP206191 HF_CPR_UCV_S HP207191 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Switch ON or OFF the five FCU-boards (mixer H/V, chopper, IF HV) | HC027289 C800001 <hex> ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) | |
| | ET=+ UT=+00.00.00 | HIFI_P_Configure_FCU HIFI_P_Configure_FCU Command Parameter(s) : HIFI_BB_ID HP001197 HF_CPR_MX BAND HP202191 HF_CH1_DPFP1 HP176191 HF_CH2_FIF1_Drain_V HP177191 HF_CH2_FIF1_Drain_C HP178191 HF_CH2_FIF2_Drain_V HP179191 HF_CH2_FIF2_Drain_C HP180191 HF_CH2_SIF1_Drain_V HP181191 HF_CH2_SIF1_Drain_C HP182191 HF_CH2_SIF2_Drain_V HP183191 HF_CH2_SIF2_Drain_C HP184191 | HC182289 C800001 <hex> 4 <dec> 227 <dec> (Def) 0.75 V 4.0 mA 0.65 V 3.0 mA 0.85 V 2.5 mA 0.75 V 2.1 mA | |
| | | HF_CH2_SIF3_Drain_V HP185191 HF_CH2_SIF3_Drain_C HP186191 HF_CV1_DPFP1 HP191191 HF_CV2_FIF1_Drain_V HP192191 HF_CV2_FIF1_Drain_C HP193191 HF_CV2_FIF2_Drain_V HP194191 HF_CV2_FIF2_Drain_C HP195191 HF_CV2_SIF1_Drain_V HP196191 HF_CV2_SIF1_Drain_C HP197191 HF_CV2_SIF2_Drain_V HP198191 HF_CV2_SIF2_Drain_C HP199191 HF_CV2_SIF3_Drain_V HP200191 HF_CV2_SIF3_Drain_C HP201191 HF_CPR_CH_SINE_S HP211191 HF_CPR_CH_LOOP_S HP210191 | 0.7 V 2.5 mA 227 <dec> (Def) 0.75 V 4.0 mA 0.65 V 3.0 mA 0.9 V 2.5 mA 0.75 V 1.9 mA 0.75 V 2.5 mA ON (Def) CLOSE (Def) | |

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|----------|----------------------|--|--|-----------------|
| | | HF_CPR_CHFPG1 HP212191 HF_CPR_CHFPG2 HP213191 HF_CPR_CHFPG1 HP214191 HF_CPR_CHFPG2 HP215191 HF_CPR_CHFPG2 HP216191 HF_CPR_Cal_Heater_C HP217191 HF_CH1_MXBIAS_V HP172191 HF_CH1_MX_MG_C HP173191 HF_CV1_MXBIAS_V HP187191 HF_CV1_MX_MG_C HP188191 HF_P_Chopper_Rot HP454191 HF_CH1_DPACT_C HP174191 HF_CV1_DPACT_C HP189191 Subsch. ID : 70 | 17 <dec> 201 <dec> 1010 <dec> 885 <dec> 149 <dec> 1.1 mA 1.922 mV 15.0 mA 1.922 mV 15.0 mA -1.07 V A B | |
| | | Det. descr. : Configure the FCU-subsystem (prime) | | |
| | ET=+ UT=+00.00.03 | HIFI_CH1_MX_MG_C HIFI_CH1_MX_MG_C Command Parameter(s) : HIFI_BB_ID HP001197 HF_CH1_MX_MG_C HP173191 Subsch. ID : 70 Det. descr. : Send single command to set H mixer magnet current | HC096289 C800001 <hex> 5.25 mA | |
| | ET=+ UT=+00.00.00 | HIFI_CV1_MX_MG_C HIFI_CV1_MX_MG_C Command Parameter(s) : HIFI_BB_ID HP001197 HF_CV1_MX_MG_C HP188191 Subsch. ID : 70 Det. descr. : Send single command to set V mixer magnet current | HC099289 C800001 <hex> 5.3 mA | |
| | ET=+ UT=+00.00.01 | HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode | HC082289 E2F0001 <hex> | |
| | ET=+ UT=+00.00.00 | HIFI_Conf_nom_LCU_ch0 HIFI_Conf_nom_LCU_ch0 Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Create macro-command to switch off the bands | HC049289 E2F0001 <hex> | |

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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|----------|----------------------|--|--|-----------------|
| | ET=+ UT=+00.00.10 | HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater | HC086289 E2F0001 <hex> 6.0 V | |
| | | Verify Telemetry HL_Channel_S HM003194 | = OFF | AND=ZAZ9C999 |
| | | Verify Telemetry HL_MODE_S HM258194 | = normal | AND=ZAZ9C999 |
| 5 | | Measure LCU IV curve | | Next Step: 6 |
| | ET=+ UT=+00.00.00 | HIFI_measure_LCU_IV HIFI_measure_LCU_IV Command Parameter(s) : HIFI_BB_ID HP001197 HIF_LCU_diode HP072197 HIF_LCU_IV_delay HP073197 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Perform IV-measurement on an LOU-diode | HC108289 E4F0001 <hex> M1_4b 90 <dec> | |
| | ET=+ UT=+00.01.32 | HIFI_measure_LCU_IV HIFI_measure_LCU_IV Command Parameter(s) : HIFI_BB_ID HP001197 HIF_LCU_diode HP072197 HIF_LCU_IV_delay HP073197 Subsch. ID : 70 Det. descr. : Perform IV-measurement on an LOU-diode | HC108289 E4F0002 <hex> M2_4b 90 <dec> | |
| 6 | | Switch on LO band | | Next Step: 7 |
| | ET=+ UT=+00.01.32 | HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode | HC082289 E2A0001 <hex> | |

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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|----------|----------------------|---|----------|-----------------|
| | ET=+ UT=+00.00.01 | HIFI_Conf_safe_LCU_ch4b HIFI_Conf_safe_LCU_ch4b Command Parameter(s) : HIFI_BB_ID HP001197 1 HL_freq_nx HP436194 2 HL_LSU_main HP438194 3 HL_LSU_offset HP439194 4 HL_D2_step HP437194 5 HL_Drain2_4B_V HP352194 6 HL_Curlim2 HP291194 7 HL_macro_checksum HP440194 8 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 4b to safe setting | HC057289 | |
| | ET=+ UT=+00.00.20 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM1 (Def) Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM2 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM3 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |

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|----------|----------------------|---|---|-----------------|
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_G | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_Single HIFI_LCU_Single Command Parameter(s) : HIFI_BB_ID HP001197 LCU_cmd HP234194 Subsch. ID : 70 Det. descr. : Send a single command to LCU | HC101289 237043713 <dec> HL_CLR_ERR | |
| | ET=+ UT=+00.00.01 | HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater | HC086289 9 10 | |
| | | Verify Telemetry HL_Channel_S HM003194 | = 4b | AND=ZAZ9C999 |
| | | Verify Telemetry HL_MODE_S HM258194 | = normal | AND=ZAZ9C999 |
| 7 | | LO Short Functional Test | | Next Step: 8 |
| | | The following TCs should be sent automatically with the defined time separation. | | |
| | | Verify: Monitor the following parameter and ensure that any occurrences of a 'FAULT' condition are communicated immediately to the HIFI representative (use AND HA004289). HM259194 HL_error_word_S | | |

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| | ET=+ UT=+00.00.00 | HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode | HC082289 E2A0002 <hex> | |
| | ET=+ UT=+00.00.01 | HIFI_Conf_safe_LCU_ch4b HIFI_Conf_safe_LCU_ch4b Command Parameter(s) : HIFI_BB_ID HP001197 HL_freq_nx HP436194 HL_LSU_main HP438194 HL_LSU_offset HP439194 HL_D2_step HP437194 HL_Drain2_4B_V HP352194 HL_Curlim2 HP291194 HL_macro_checksum HP440194 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 4b to safe setting | HC057289 11 12 13 14 15 16 17 18 | |
| | ET=+ UT=+00.00.20 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_TM1 (Def) | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_TM2 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_TM3 | |

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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|----------|----------------------|---|---|-----------------|
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_TM | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_G | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_Single HIFI_LCU_Single Command Parameter(s) : HIFI_BB_ID HP001197 LCU_cmd HP234194 Subsch. ID : 70 Det. descr. : Send a single command to LCU | HC101289 E210002 <hex> HL_CLR_ERR | |
| | ET=+ UT=+00.00.01 | HIFI_HL_heater HIFI_HL_heater Command Parameter(s) : HIFI_BB_ID HP001197 HL_heater HP397194 Subsch. ID : 70 Det. descr. : Send single command to control the LCU heater | HC086289 19 20 | |
| | ET=+ UT=+00.00.20 | HIFI_HL_Normal HIFI_HL_Normal Command Parameter(s) : HIFI_BB_ID HP001197 Subsch. ID : 70 Det. descr. : Send single command to switch LCU to normal mode | HC082289 E2A0003 <hex> | |

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| | ET=+ UT=+00.00.01 | HIFI_Conf_safe_LCU_ch4b HIFI_Conf_safe_LCU_ch4b Command Parameter(s) : HIFI_BB_ID HP001197 21 HL_freq_nx HP436194 22 HL_LSU_main HP438194 23 HL_LSU_offset HP439194 24 HL_D2_step HP437194 25 HL_Drain2_4B_V HP352194 26 HL_Curlim2 HP291194 27 HL_macro_checksum HP440194 28 Subsch. ID : 70 Det. descr. : Create macro-command to configure LCU band 4b to safe setting | HC057289 | |
| | ET=+ UT=+00.00.06 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM1 (Def) Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM2 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM3 Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk HIFI_LCU_macro_tuning_hk Command Parameter(s) : HIF_LCU_memmacro HP068197 HSK_TM Subsch. ID : 70 Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 | |

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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|----------|----------------------|---|---|-------------------|
| | ET=+ UT=+00.00.02 | HIFI_LCU_macro_tuning_hk <p style="text-align: center;">HIFI_LCU_macro_tuning_hk</p> <i>Command Parameter(s) :</i> HIF_LCU_memmacro HP068197 <i>Subsch. ID : 70</i> Det. descr. : Requests one of the eight LCU intermediate housekeeping-sets | HC019289 HSK_G | |
| | ET=+ UT=+00.00.02 | HIFI_LCU_Single <p style="text-align: center;">HIFI_LCU_Single</p> <i>Command Parameter(s) :</i> HIFI_BB_ID HP001197 LCU_cmd HP234194 <i>Subsch. ID : 70</i> Det. descr. : Send a single command to LCU | HC101289 E210003 <hex> HL_CLR_ERR | |
| | | Verify: Verify the content of the following ANDs with the HIFI representative: HA004289 LCU_status2 HA013289 LCU_4b | | |
| | ET=+ UT=+00.00.01 | HIFI_Housekeeping_on <p style="text-align: center;">HIFI_Housekeeping_on</p> <i>Command Parameter(s) :</i> HIF_HK_rate HP012197 HIF_FCU_S HP006197 HIF_LCU_S HP007197 HIF_WBSV_S HP009197 HIF_WBSH_S HP008197 HIF_HRSV_S HP011197 HIF_HRSH_S HP010197 <i>TC Control Flags :</i> GBM IL DSE --Y -- -- <i>Subsch. ID : 70</i> Det. descr. : Sets periodic housekeeping packet generation period | HC016289 1_pkt_per_4_s ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) ON (Def) | |
| | | Verify: The following TM(3,25) packets should be produced once every 4 seconds: HIFI_essential_HK (APID 1024) HIFI_HK_rev_7 (APID 1026) | | |
| 8 | | Set default OBSID/BBID | | Next Step: END |

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| | ET=+ UT=+00.00.01 | HIFI_Set_OBS_ID HIFI_Set_OBS_ID <i>Command Parameter(s) :</i> HIFI_BB_ID HP001197 HIFI_OBS_ID HP000197 <i>TC Control Flags :</i> GBM IL DSE --Y -- --- Subsch. ID : 70 Det. descr. : Set Observation-ID and Building-Block-ID | HC014289 0 <hex> (Def) 0 <hex> (Def) | |
| | | Verify Telemetry BB_ID_per_hk HM004190 | = 0 <hex> | AND=ZAZ9C999 |
| | | Verify Telemetry OBS_ID_per_hk HM003190 | = 0 <hex> | AND=ZAZ9C999 |
| End of Procedure | | | | |