

IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



## Procedure Summary

### Objectives

The objective of this procedure is to check the functionality of the IF chain up to the spectrometers.

- Set TM rate to 1 packet/s
- Initialise FPU
- Turn on shot noise for mixers
- Tune WBS
- Set TM rate to 4 packet/s

Based on procedure:  
 HIFI-COP-1.2-IF\_FT (v3)

### Summary of Constraints

Real-time science packets should be enabled for downlink for HIFI analysis

### Spacecraft Configuration

**Start of Procedure**

HIFI in STANDBY II or PRIMARY mode

**End of Procedure**

### Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HCHRIF6

### Referenced Displays

ANDs	GRDs	SLDs
ZAZ9C999		
HA038289		
HA039289		
ZAZ9D999		

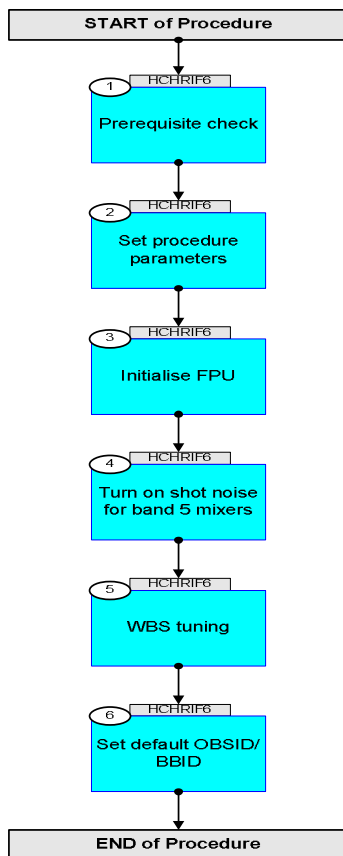
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
27/08/09	2.5	1	Created	R. Biggins	

IF Chain Functional Test  
File: H\_COP\_HIF\_RIF6.xls  
Author: R. Biggins



## Procedure Flowchart Overview



IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<b>Beginning of Procedure</b>				
TC Seq. Name : HCHRIF6 (IF Chain Test)				
TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>				
1		Prerequisite check		Next Step: 2
1.1		HSC/ICC input		<input type="checkbox"/>
		Verify that the HSC has supplied a valid OBSID value:  OBS_ID = 0xnnnn nnnn		
		Verify with the HIFI ICC that the correct lasers are turned ON:  Laser 1 ON: HWH_LZR1 = ON HWH_LZR2 = OFF HWV_LZR1 = ON HWV_LZR2 = OFF  Laser 2 ON (default): HWH_LZR1 = OFF HWH_LZR2 = ON HWV_LZR1 = OFF HWV_LZR2 = ON		
1.2		Verify initial conditions		<input type="checkbox"/>
		Verify Telemetry  HI_Prime_red                      HM009190                      = HIFI_redundant		AND=ZAZ9C999
2		Set procedure parameters		Next Step: 3
	ET=+00.00.01 UT=+00.00.01	HIFI_Set_OBS_ID  Command Parameter(s) : HIFI_BB_ID                      HP001197 HIFI_OBS_ID                      HP000197  Subsch. ID : 70 Det. descr. : Set Observation-ID and Building-Block-ID	HIFI_Set_OBS_ID  HC014289	17700001 <hex> OBS_ID
		Verify Telemetry  BB_ID_per_hk                      HM004190                      = 17700001 <hex>		AND=ZAZ9C999



IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		HF_CH2_SIF3_Drain_V HP185191 HF_CH2_SIF3_Drain_C HP186191 HF_CV1_DPFPF1 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  HF_CPR_CHFPG1 HP212191 HF_CPR_CHFPG2 HP213191 HF_CPR_CHFPZ1 HP214191 HF_CPR_CHFPZ2 HP215191 HF_CPR_CHFPF2 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_R_Chopper_Rot HP455191 HF_CH1_DFACT_C HP174191 HF_CV1_DFACT_C HP189191	0.57 V 3.5 mA 227 <dec> (Def) 0.75 V 4.0 mA 0.65 V 3.0 mA 0.57 V 3.5 mA 0.57 V 3.5 mA 0.57 V 3.5 mA 0.57 V 3.5 mA ON (Def) CLOSE (Def)  17 <dec> 201 <dec> (Def) 1010 <dec> 885 <dec> (Def) 149 <dec> (Def) 1.1 mA 6.0 mV 0.0 mA (Def) 6.0 mV 0.0 mA (Def) -2.33 V -1.057 mA 0.033 mA	
		Subsch. ID : 70  Det. descr. : Configure the FCU-subsystem (redundant)		
	ET=+00.00.03 UT=+00.00.03	HIFI_CH1_MXBIAS_V  Command Parameter(s) : HIFI_BB_ID HP001197 HF_CH1_MXBIAS_V HP172191  Subsch. ID : 70 Det. descr. : Send single command to set H mixer bias voltage	HIFI_CH1_MXBIAS_V  HC095289  1C200001 <hex> 0.6 mV	
	ET=+00.00.00 UT=+00.00.00	HIFI_CV1_MXBIAS_V  Command Parameter(s) : HIFI_BB_ID HP001197 HF_CV1_MXBIAS_V HP187191  Subsch. ID : 70 Det. descr. : Send single command to set V mixer bias voltage	HIFI_CV1_MXBIAS_V  HC098289  1C200001 <hex> 0.6 mV	

IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify: Verify the content of the following ANDs with the HIFI representative:  HA038289 FCU_H_device HA039289 FCU_V_device HA042289 FCU_PR_power HA044289 FPU_common		
4		Turn on shot noise for band 5 mixers		Next Step: 5
	ET=+00.00.01 UT=+00.00.01	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	HIFI_CH1_MX_MG_C  HC096289  E3C0001 <hex> 0.0 mA (Def)	
	ET=+00.00.00 UT=+00.00.00	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	HIFI_CV1_MX_MG_C  HC099289  E3C0001 <hex> 0.0 mA (Def)	
		Verify Telemetry HF_AH1_MXMG_C                  HM040191	= 0.0 mA	AND=HA038289
		Verify Telemetry HF_AV1_MXMG_C                  HM131191	= 0.0 mA	AND=HA039289
	ET=+00.00.01 UT=+00.00.01	HIFI_CH1_MXBIAIS_V  Command Parameter(s) : HIFI_BB_ID                  HP001197 HF_CH1_MXBIAIS_V          HP172191  Subsch. ID : 70 Det. descr. : Send single command to set H mixer bias voltage	HIFI_CH1_MXBIAIS_V  HC095289  0 <hex> (Def) 5.0 mV	
	ET=+00.00.00 UT=+00.00.00	HIFI_CV1_MXBIAIS_V  Command Parameter(s) : HIFI_BB_ID                  HP001197 HF_CV1_MXBIAIS_V          HP187191  Subsch. ID : 70 Det. descr. : Send single command to set V mixer bias voltage	HIFI_CV1_MXBIAIS_V  HC098289  0 <hex> (Def) 5.0 mV	

IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry HF_AH1_MXBIAS_V HM029191	= 5.0 mV	AND=HA038289
		Verify Telemetry HF_AV1_MXBIAS_V HM120191	= 5.0 mV	AND=HA039289
5		WBS tuning		Next Step: 6
	ET=+00.00.01 UT=+00.00.01	HIFI_Configure_WBS_H HIFI_Configure_WBS_H Command Parameter(s) : HIFI_BB_ID HP001197 HWH_LASER1_S HP158193 HWH_LASER2_S HP159193 HWH_Heater HP160193 HWH_Latchup_S HP161193 HWH_ATT_Band_4 HP157193 HWH_ATT_Band_3 HP156193 HWH_ATT_Band_2 HP155193 HWH_ATT_Band_1 HP154193 HWH_ATT_IN HP153193  Subsch. ID : 70 Det. descr. : Configure WBS-H	HC032289  E350001 <hex> HWH_LZR1 HWH_LZR2 0 <dec> (Def) Level1 7 dB 7 dB 7 dB 7 dB 15 dB	
	ET=+00.00.00 UT=+00.00.00	HIFI_Configure_WBS_V HIFI_Configure_WBS_V Command Parameter(s) : HIFI_BB_ID HP001197 HWV_LASER1_S HP168193 HWV_LASER2_S HP169193 HWV_Heater HP170193 HWV_Latchup_S HP171193 HWV_ATT_Band_4 HP167193 HWV_ATT_Band_3 HP166193 HWV_ATT_Band_2 HP165193 HWV_ATT_Band_1 HP164193 HWV_ATT_IN HP163193  Subsch. ID : 70 Det. descr. : Configure WBS-H	HC033289  E350001 <hex> HWV_LZR1 HWV_LZR2 0 <dec> (Def) Level1 7 dB 7 dB 7 dB 7 dB 15 dB	
		Verify Telemetry HWH_Laser1_S HM017193	HWH_LZR1	AND=ZAZ9D999
		Verify Telemetry HWH_Laser2_S HM016193	HWH_LZR2	AND=ZAZ9D999
		Verify Telemetry HWV_Laser1_S HM056193	HWV_LZR1	AND=ZAZ9D999
		Verify Telemetry HWV_Laser2_S HM055193	HWV_LZR2	AND=ZAZ9D999

IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.01 UT=+00.00.01	HIFI_Tune_WBS  HIFI_Tune_WBS  Command Parameter(s) : HIFI_BB_ID                  HP001197 HIF_WBS_tune_target          HP074197  Subsch. ID : 70 Det. descr. : Find optimal setting for WBS attenuators	HC144289   E130001 <hex> 80 <dec>	
	ET=+00.00.10 UT=+00.00.10	Execute Telecommand  HIFI_Tune_HRS  Command Parameter(s) : HIFI_BB_ID                  HP001197  Subsch. ID : 70 Det. descr. : Find optimal setting for HRS attenuators	HC143289   E110001 <hex>	
	ET=+00.00.05 UT=+00.00.05	HIFI_config_spectroscopy  HIFI_config_spectroscopy  Command Parameter(s) : HIFI_BB_ID                  HP001197 HIF_N_WBS_START              HP021197 HIF_R_HRS                   HP022197 HIF_N_WBS_INTEGR             HP023197 HIF_N_HRS_INTEGR             HP024197 HIF_DEL_HRS                  HP025197 HIF_DEL_WBS                  HP026197 HIF_T_ACC_WBS                HP027197 HIF_T_ACC_HRS                HP028197 HIF_WBSH_OFFSET1             HP029197 HIF_WBSH_WIDTH1              HP030197  HIF_WBSH_OFFSET2             HP031197 HIF_WBSH_WIDTH2              HP032197 HIF_WBSH_OFFSET3             HP033197 HIF_WBSH_WIDTH3              HP034197 HIF_WBSH_OFFSET4             HP035197 HIF_WBSH_WIDTH4              HP036197 HIF_WBSV_OFFSET1             HP037197 HIF_WBSV_WIDTH1              HP038197 HIF_WBSV_OFFSET2             HP039197 HIF_WBSV_WIDTH2              HP040197 HIF_WBSV_OFFSET3             HP041197 HIF_WBSV_WIDTH3              HP042197 HIF_WBSV_OFFSET4             HP043197 HIF_WBSV_WIDTH4              HP044197 HIF_HRS_RSHIFT               HP045197  HIF_WBS_RSHIFT               HP046197 HIF_HRSH_SEL                  HP047197 HIF_HRSV_SEL                  HP048197 HIF_WBS_packing               HP049197  Subsch. ID : 70 Det. descr. : Specify parameters for next spectroscopy measurement	HC150289   0 <hex> (Def) 4 <dec> 1 <dec> (Def) 4 <dec> 4 <dec> 2 <dec> 4 <dec> 945 <dec> 929 <dec> 0 <dec> (Def) 0 <dec>  3072 <dec> 988 <dec> 4132 <dec> 1976 <dec> 6180 <dec> 1976 <dec> 0 <dec> (Def) 0 <dec> 3072 <dec> 988 <dec> 4132 <dec> 1976 <dec> 6180 <dec> 1976 <dec> 0 <dec> (Def) 3 <dec> 255 <dec> (Def) 255 <dec> (Def) 16_bits_format	



IF Chain Functional Test  
 File: H\_COP\_HIF\_RIF6.xls  
 Author: R. Biggins



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+00.00.00 UT=+00.00.00	HIFI_Spectr_total_power  HIFI_Spectr_total_power  Command Parameter(s) : HIFI_BB_ID                  HP001197  Subsch. ID : 70 Det. descr. : Start total-power spectroscopy measurement	HC151289  E160001 <hex>	
	ET=+00.00.07 UT=+00.00.07	HIFI_Housekeeping_on  HIFI_Housekeeping_on  Command Parameter(s) : 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  Subsch. ID : 70 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 <b>TM(3,25)</b> packets should be produced once every 4 seconds:  HIFI_R_essential_HK (APID 1025) HIFI_R_HK_rev_7 (APID 1027)		
6		Set default OBSID/BBID		Next Step: END
	ET=+00.00.01 UT=+00.00.01	HIFI_Set_OBS_ID  HIFI_Set_OBS_ID  Command Parameter(s) : HIFI_BB_ID                  HP001197 HIFI_OBS_ID                  HP000197  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
<b>End of Procedure</b>				