2.12_V2.1 HRMA FLUX TRANSFER STANDARD SOURCES MEASUREMENTS

Last Revised: August 10,1999
Filename: hrma_fcm

BRIEF FUNCTIONAL DESCRIPTION:
The HRMA Flux Transfer Standard (FTS) sources were used during the XRCF phase of the mission to provide a baseline to compare against to identify any contaminants which may have built up on the HRMA since XRCF. The XRCF measurements produced a total of $\sim$ 8 hr of integration time, so we will plan to integrate twice as long on-orbit. The sources are on the inside of the Forward Contamination Cover (FCC), so the Aft Contamination Cover (ACC) must be open for ACIS to see the sources. The focal plane temperature at XRCF was -109.2 C, so this procedure will set that same temperature in order to facilitate the comparison. The procedure configures and executes science runs with ACIS-I and ACIS-S.

The sequence of actions will be:

1. warm boot and start DEA HKP if necessary
2. set the focal plane temperature to -109.2 C
3. configure the instrument to collect imaging array data
4. execute the science run including a dump of the complete configuration information
5. configure the instrument to collect spectroscopy array data
6. execute the science run including a dump of the complete configuration information
7. return to thermal standby state if necessary

ASSUMED INSTRUMENT STATE:
Assumes the ACIS door is open.
Assumes the instrument is in the canonical thermal standby state.
Assumes the standard patches are loaded.

SPECIAL INITIAL CONDITIONS:
Assumes the Aft Contamination Cover is open.

OPERATIONAL CONSTRAINTS/CAUTIONS:

REFERENCES:

CHANGE HISTORY:

V1.2

- changed filenames from "ccd_fcm" to "hrma_fcm"

V1.3

- changed step 1 to include an optional warm boot and start DEA HKP run
- added step 2 to set the focal plane temperature to -109.2 C

- edited step 3 to power up the FEPs and imaging video boards with the command "WSPOW0CF3F"
- edited step 4 to put the dumps after the start science run command
- added step 5 to power up the FEPs and spectroscopy video boards with the command "WSPOW3F03F"
- edited step 6 to put the dumps after the start science run command
- added step 7 to return to thermal standby state if necessary

V2.0

- ACIS Team signed-off version
- changed expected version number of flight SW to either 26 or 27 since either would be acceptable
- changed expected value of "1STAT7ST" in step 1.6
- changed time required for step 2.3 to 20 m
- changed comment in "Description" field of step 6.2 to "S0–S5" in step 6.2
- added step 7 to set the focal plane temperature to -120 C and step 8.4 to monitor the focal plane temperature

V2.1

- changed SW command mnemonic in step 4.1 to "WT00170014" from "WT000A6014"
- changed SW command mnemonic in step 6.1 to "WT00172014" from "WT000C2014"

Table 1: **HRMA Flux Transfer Standard Sources Measurement**

Step #	Title (Revision 2.12_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1	Warm Boot and Start DEA HKP if needed							
1.1	Set Boot modifier off	1	DPA FS Boot Mod	1BMODIBM(0)				
1.2	Set warm boot flag on	1	DPA Warm Boot	1WRMBTSB(1)				
1.3	Halt BEP	1	DPA Cmd Reset	1RSETIRT(1)				
1.4	Restart BEP	1		1RSETIRT(0)				
1.5	Check BEP A Boot	2.0						
1.6	Check HW LEDs	2.0			BEP Select	1STAT4ST	0	
					BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	0	
1.7	Check SW LEDs	2.0			BEP initialization	1STAT3ST	0	
					Watchdog boot	1STAT2ST	1	
					Science run status	1STAT1ST	1	
						1STAT0ST	0or1	
1.8	Load Board 11 DEA HK	1	loadDeaBlock	WD00001024				
1.9	Start DEA Hkp run	1	startDEA	XDZ0000005				
2	Set FP to -109 C							
2.1	set FP temp to -109 C	2	ChangeConfigSetting	WSFTNEG109				
2.2	dump system config.	0.1	dumpSysConfig	RS_0000001				
2.3	Monitor FP temp	20			FP Temp		-109.2	C
3	Configure for imaging							

Table 2: (CONT) **HRMA Flux Transfer Standard Sources Measurement**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1									
1.1				disables boot from uplink		Y	1or2		
1.2				enable Warm boot		Y	1or2		
1.3				Hold active BEP reset line		Y	1or2		
1.4				Release BEP reset line		Y	1or2		
1.5	Check bepStartupMessage:		A			Y	1or2		
	bepTickCounter < 10; version=26or27;		A	Either version contains the standard patches.					
	warmBootFlag = 1, patchValidFlag =1		A						
	Check swHousekeeping messages:								
	startingBepTickCounter < 10;		B						
	endingBepTickCounter=		B						
	=startingBepTickCounter+640								
	version=26or27		A	Either version contains the standard patches.					
1.6			2	0 indicates BEP A is selected		Y	1or2		
			2	1 means FIFO not full					
			2	1 means FIFO not empty					
1.7			1	0 means BEP SW is running		Y	1or2		
			2	1 means no watchdog boot					
			2	1 means science idle					
			2	this bit toggles to indicate BEP is running					
1.8	Check cmdResult == OK		B	Load Fullhouse DEA housekeeping		Y	1or2		
	commandEcho 225			parameter block into slot 4					
1.9	deaHousekeepingData		B	get FP temp, should be stable and		Y	1or2		
	commandEcho 18			± 2 C of desired value					
2									
2.1	Check cmdResult == OK		A	This matches the temperature at XRCF.		Y	1or2		
	commandEcho 771								
2.2	Check cmdResult == OK		B			Y	1or2		
	commandEcho 66								
2.3	deaHousekeepingData		A	time depends on starting temp		Y	1or2		
3									

Table 1: **HRMA Flux Transfer Standard Sources Measurement(Page 2)**

Step #	Title (Revision 2.12_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
3.1	Power up imaging video boards & FEPs	1	changeConfigSetting	WSPOW0CF3F				
					DEA Input V A	1DE28AVO	28.0–34.0	V
					DEA Input I A	1DEICACU	1.2–1.5	A
					DPA Input V A	1DP28AVO	28.0-34.0	V
					DPA Input I A	1DPICACU	1.1–1.4	A
					DPA Input V B	1DP28BVO	28.0–34.0	V
					DPA Input I B	1DPICBCU	1.0–1.2	A
4	Collect ACIS-I data							
4.1	Load parameter block	1	loadTeBlock	WT00170014				
4.2	Start science	1	startScience	XTZ0000005				
4.3	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
4.4	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
4.5	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
4.6	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				
4.7	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
4.8	dump system config.	0.1	dumpSysConfig	RS_0000001				
4.9	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
4.10	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
4.11	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				
4.12	dump Huffman tables	0.5	dumpHuffman	RH_0000001				

Table 2: (CONT) **HRMA Flux Transfer Standard Sources Measurement(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
3.1	Check cmdResult == OK commandEcho 359		A 2 2 2 2 2 2	 Expect DEA side A power = 42 ± 3 W Expect DPA Side A = 38 ± 2 W Expect DPA Side B = 33 ± 2 W		Y	2	60k	
4									
4.1	Check cmdResult == OK commandEcho 1370		B	collect data with ACIS-I		Y	2	60k	
4.2	Check cmdResult == OK commandEcho 58		B	run I0–I3,S2,S3		Y	2	60k	
4.3	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding "truncated blocks" for any of these dumps.	Y	2	60k	
4.4	Check cmdResult == OK commandEcho 75		B			Y	2	60k	
4.5	Check cmdResult == OK commandEcho 72		B			Y	2	60k	
4.6	Check cmdResult == OK commandEcho 71		B			Y	2	60k	
4.7	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
4.8	Check cmdResult == OK commandEcho 66		B			Y	2	60k	
4.9	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
4.10	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
4.11	Check cmdResult == OK commandEcho 77		B			Y	2	60k	
4.12	Check cmdResult == OK commandEcho 68		B			Y	2	60k	

Table 1: **HRMA Flux Transfer Standard Sources Measurement(Page 3)**

Step #	Title (Revision 2.12_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
4.13	dump patches	2	dumpPatchlist	RU_0000001				
4.14	Wait for data acquisition	530						
4.15	Stop Science	5	stopScience	AA00000000				
5	Configure for spectro							
5.1	Power up spectro video	1	changeConfigSetting	WSPOW3F03F				
6	Collect ACIS-S data							
6.1	Load parameter block	1	loadTeBlock	WT00172014				
6.2	Start science	1	startScience	XTZ0000005				
6.3	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
6.4	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
6.5	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
6.6	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				
6.7	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
6.8	dump system config.	0.1	dumpSysConfig	RS_0000001				
6.9	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
6.10	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
6.11	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				
6.12	dump Huffman tables	0.5	dumpHuffman	RH_0000001				

Table 2: (CONT) **HRMA Flux Transfer Standard Sources Measurement(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
4.13	Check cmdResult == OK commandEcho 65		B			Y	2	60k	
4.14						N	2	60k	
4.15	Check cmdResult == OK commandEcho 1539	scienceReport	B			Y	2	60k	
5									
5.1	Check cmdResult == OK commandEcho 360		A			Y	2	60k	
6									
6.1	Check cmdResult == OK commandEcho 1375		B	collect data with ACIS-S		Y	2	60k	
6.2	Check cmdResult == OK commandEcho 58		B	run S0–S5 CCDs		Y	2	60k	
6.3	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding “truncated blocks” for any of these dumps.	Y	2	60k	
6.4	Check cmdResult == OK commandEcho 75		B			Y	2	60k	
6.5	Check cmdResult == OK commandEcho 72		B			Y	2	60k	
6.6	Check cmdResult == OK commandEcho 71		B			Y	2	60k	
6.7	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
6.8	Check cmdResult == OK commandEcho 66		B			Y	2	60k	
6.9	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
6.10	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
6.11	Check cmdResult == OK commandEcho 77		B			Y	2	60k	
6.12	Check cmdResult == OK		B			Y	2	60k	

Table 1: **HRMA Flux Transfer Standard Sources Measurement(Page 4)**

Step #	Title (Revision 2.12_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
6.13	dump patches	2	dumpPatchlist	RU_0000001				
6.14	Wait for data acquisition	530						
6.15	Stop Science	5	stopScience	AA00000000				
7	Set FP to -120 C							
7.1	set FP temp to -120 C	2	ChangeConfigSetting	WSFTNEG120				
8	Return to Thermal Standby Only if necessary.							
8.1	Power down video boards and FEPs	1	changeConfigSetting	WSPOW00000				
8.2	dump system config.	0.1	dumpSysConfig	RS_0000001				
8.3	Check DPA and DEA pwr				DPA Input V A	1DP28AVO	28.0–34.0	V
					DPA Input I A	1DPICACU	0.35–0.43	A
					DPA Input V B	1DP28BVO	28.0–34.0	V
					DPA Input I B	1DPICBCU	0.26–0.32	A
					DEA Input I A	1DEICACU	0.62–0.75	A
					DEA Input V A	1DEP3AVO	28.0-34.0	V
8.4	Monitor FP temp	30						
	Total Time	1150.8						

Table 2: (CONT) **HRMA Flux Transfer Standard Sources Measurement(Page 4)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 68								
6.13	Check cmdResult == OK		B			Y	2	60k	
	commandEcho 65								
6.14						N	2	60k	
6.15	Check cmdResult == OK	scienceReport	B			Y	2	60k	
	commandEcho 1539								
7									
7.1	Check cmdResult == OK		1			Y	1or2		
	commandEcho 105								
8									
8.1	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 773			return to thermal standby state					
8.2	Check cmdResult == OK		B			Y	1or2		
	commandEcho 66								
8.3			2	Expect 12 W for side A, power consumption		Y	1or2		
			2	should be more stable than I or V.					
			2	Expect 9 W for side B, power consumption					
			2	should be more stable than I or V.					
			2	DEA A Power should be 21 $\pm$ 3 W,					
				current is noisy so an avg. is needed					
8.4	deaHousekeepingData		A	verify temperature stabilizes at -120 C		P	1or2		