2.14_V2.0 UNFILTERED CCD ORBITAL BACKGROUND MEASUREMENT

Last Revised: August 8, 1999
Filename: bkg_unfiltered

BRIEF FUNCTIONAL DESCRIPTION:
This procedure is executed after the ACIS door has been opened, but while the HRMA sunshade and aft contamination cover are still closed. It is designed to acquire the necessary data to characterize the ACIS particle-induced background as a function of orbital position. Consequently, *Chandra* must be in nearly its final orbit (apogee $> 120,000$ km) before this procedure is run. This procedure uses windows to reject all events in CCDs I0-I3 and the leftmost 2.5 quadrants of S2. It telemeters all events in S3 and the rightmost 1.5 quadrants of S2.

The sequence of actions will be:

1. warm boot and start DEA HKP if necessary
2. configure the instrument to collect imaging array data
3. execute the science run with the ACIS-I array, including a dump of the complete configuration information
4. return to thermal standby mode

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

SPECIAL INITIAL CONDITIONS:
Assumes the HRMA sunshade and aft contamination cover are closed.
Assumes *Chandra* is in nearly its final orbit (apogee $> 120,000$ km).

OPERATIONAL CONSTRAINTS/CAUTIONS:

REFERENCES:

CHANGE HISTORY:

V1.0

- Initial version, copied from procedure 2.11_v2.0, "CCD ORBITAL BACKGROUND MEASUREMENT WITH THE ACIS DOOR OPEN".
- Changed filenames from "bkg_doorop" to "bkg_unfiltered"
- Changed command mnemonic from "WT000BE014" to "????" and command Id from "729" to "????" in step 3.1.
- Inserted new step 3.2 to load window block "????" with command Id "????" to filter all events from I0-I3 and the leftmost 1.5 quadrants of S2.

- Changed time required field in step 3.15 to 180 min.
- Changed telemetry format field to format 2 in step 3.15.
- Deleted steps 4, 5, and 6.
- Renumbered old step 7 to step 4.

V2.0

- added command mnemonics and IDs in steps 3.1 and 3.2

Table 1: **CCD Orbital Background Measurement Unfiltered**

Step #	Title (Revision 2.14_V2.0)	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 Modifier	1BMODIBM(0)				
1.2	Set warm boot flag on	1	DPA Warm Boot	1WRMBTSB(1)				
1.3	Halt BEP	1	DPA Command 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	1	loadDeaBlock	WD00001024				
1.9	Start DEA HKP run	1	startDEA	XDZ0000005				
2	Configure for Imaging							
2.1	Power up imaging vid	1	changeConfigSetting	WSPOW0CF3F				
	boards & FEPs				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

Table 2: (CONT) **CCD Orbital Background Measurement Unfiltered**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1									
1.1				disables boot from uplink			1or2		
1.2				enable Warm boot			1or2		
1.3				Hold active BEP reset line			1or2		
1.4				Release BEP reset line			1or2		
1.5	Check bepStartupMessage:		B				1or2		
	bepTickCounter $<$ 10; version=26or27;		B	Either version contains the standard patches.					
	warmBootFlag = 1, patchValidFlag =1		B						
	Check swHousekeeping messages:								
	startingBepTickCounter $<$ 10;		B						
	endingBepTickCounter=		B						
	=startingBepTickCounter+640								
	version=26or27		B	Either version contains the standard patches.					
1.6			2	0 indicates BEP A is selected			1or2		
			2	1 means FIFO not full					
			2	1 means FIFO not empty					
1.7			2	0 means BEP SW is running			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			1or2		
	commandEcho 225			parameter block into slot 4					
1.9	deaHousekeepingData		B	get FP temp, should be stable and			1or2		
	commandEcho 18			$\pm$2 C of desired value					
2									
2.1	Check cmdResult == OK		B				2	60k	
	commandEcho 359		2	Expect DEA side A					
			2	power = 42 ± 3 W					
			2	Expect DPA Side A					
			2	= 38 ± 2 W					
			2	Expect DPA Side B					

Table 1: **CCD Orbital Background Measurement Unfiltered(Page 2)**

Step #	Title (Revision 2.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
					DPA Input I B	1DPICBCU	1.0–1.2	A
3	Collect ACIS-I events							
3.1	Load parameter block	0.1	loadTeBlock	WT0016E014				
3.2	Load window block	0.1	load2dBlock	W20002B014				
3.3	Start science	0.1	startScience	XTZ0000005				
3.4	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
3.5	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
3.6	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
3.7	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				
3.8	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
3.9	dump system config.	0.1	dumpSysConfig	RS_0000001				
3.10	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
3.11	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
3.12	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				
3.13	dump Huffman tables	0.5	dumpHuffman	RH_0000001				
3.14	dump patches	2	dumpPatchlist	RU_0000001				
3.15	Wait for data acquisition	180						
3.16	Stop Science	8	stopScience	AA00000000				

Table 2: (CONT) **CCD Orbital Background Measurement Unfiltered(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
			2	$= 33 \pm 2$ W					
3									
3.1	Check cmdResult == OK commandEcho 1360		B	collect events with ACIS-I			2	60k	
3.2	Check cmdResult == OK commandEcho 1365		B	Filter events from I0-3, and 5/8 of S2			2	60k	
3.3	Check cmdResult == OK commandEcho 58		B	run I0–I3,S2,S3			2	60k	
3.4	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding		2	60k	
3.5	Check cmdResult == OK commandEcho 75		B		“truncated blocks” for any of these dumps.		2	60k	
3.6	Check cmdResult == OK commandEcho 72		B				2	60k	
3.7	Check cmdResult == OK commandEcho 71		B				2	60k	
3.8	Check cmdResult == OK commandEcho 63		B				2	60k	
3.9	Check cmdResult == OK commandEcho 66		B				2	60k	
3.10	Check cmdResult == OK commandEcho 83		B				2	60k	
3.11	Check cmdResult == OK commandEcho 80		B				2	60k	
3.12	Check cmdResult == OK commandEcho 77		B				2	60k	
3.13	Check cmdResult == OK commandEcho 68		B				2	60k	
3.14	Check cmdResult == OK commandEcho 65		B				2	60k	
3.15			B				2	60k	
3.16	Check cmdResult == OK		B	scienceReport	Wait until in Tlm Fmt 2		2	60k	

Table 1: **CCD Orbital Background Measurement Unfiltered(Page 3)**

Step #	Title (Revision 2.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
4.0	Return to Thermal Standby **Only if necessary**							
4.1	Power down video boards and FEPs	1	changeConfigSetting	WSPOW00000				
4.2	dump system config.	0.1	dumpSysConfig	RS_0000001				
4.3	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
	Total Time	206.2						

Table 2: (CONT) **CCD Orbital Background Measurement Unfiltered(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 1539								
4.0									
4.1	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 773			return to thermal standby state					
4.2	Check cmdResult == OK		B				1or2		
	commandEcho 66								
4.3			2	Expect 12 W for side A, power consumption			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 ± 3 W,					
				current is noisy, so an average is needed					