1.14_V2.0 RAW DATA FROM EACH CCD

Last Revised: June 27,1999
Filename: raw_data

BRIEF FUNCTIONAL DESCRIPTION:
ACIS allows raw pixel data (without bias subtraction or event recognition) to be telemetered from the instrument. These data are a highly useful diagnostic. Unfortunately, these data consume a large amount of telemetry. For example, one full frame of raw data takes $\sim$ 8 minutes to telemeter with no compresion at 24 kbs and $\sim$ 3 minutes to telemeter with a compression factor of 2.5 at 24 kbs. Therefore, these data will be collected infrequently. We plan to collect two raw frames from each CCD early in the OAC phase. These data will immediately alert us to any serious problems with the instrument performance and will be used as the baseline to which future data will be compared. This procedure also includes two short science runs with all 10 video boards powered-up so that accurate values of the clock bias voltages may be obtained.

The sequence of actions will be:

1. start a DEA HKP run if necessary
2. configure the instrument to collect imaging array data with all video boards up to check the clock biases
3. execute a short science run to get the clock biases
4. configure the instrument to collect imaging array data with 6 video boards up
5. execute the science run, collect 2 raw frames per CCD, including a dump of all the configuration information
6. configure the instrument to collect spectroscopy array data with all video boards up
7. execute a short science run to get the clock biases
8. configure the instrument to collect spectroscopy array data with 6 video boards up
9. execute the science run, collect 2 raw frames per CCD, including a dump of all the configuration information
10. reconfigure back to the thermal standy state if necessary

ASSUMED INSTRUMENT STATE:
Assumes the focal plane temperature is -90 C (or thereabouts).
Assumes that the instrument is in the canonical thermal standby state except for an elevated focal plane temperature.
Assumes the standard patches are loaded.

SPECIAL INITIAL CONDITIONS:

OPERATIONAL CONSTRAINTS/CAUTIONS:

REFERENCES:

CHANGE HISTORY:

V1.2

- changed filenames from “ccd_raw” to “raw_data”

V1.3

- changed step 1 to load a DEA HKP PB and start a DEA HKP run if necessary
- added a new step 2 which powers up all 10 video boards so that calibrated DEA HKP data may be collected with the imaging array
- added the HW TLM verifiers for the expected DEA and DPA power consumption in step 2
- added a short science run in step 3 to measure the video offsets
- added a command to power-up only imaging array video boards in step 4
- put the dump of the configuration information after the start science run command in step 5
- added a new step 6 which powers up all 10 video boards so that calibrated DEA HKP data may be collected with the spectroscopy array
- added a short science run in step 7 to measure the video offsets
- added a command to power-up only spectroscopy array video boards in step 8
- put the dump of the configuration information after the start science run command in step 9
- added a step 10 to reconfigure the instrument into a thermal standby state if necesary
- added commandEcho values for all SW command packets
- added filename identification at top of procedure

V1.4

- changed expected values of the DPA A & B and DEA A input voltages to 28.0–34.0 V in steps 2.1, 2.2, 10.4 and the DPA A & B and DEA A input currents in the same steps
- added command echo value in step 2.1
- added comment in steps 3.2 and 7.2 to wait for at least one exposure record before terminating the science run
- changed duration of science run in step 7.2 to 10 minutes
- changed comments in steps 2, 3, 3.4, 6, 7, 7.4 to say "clock biases" instead of video offsets
- edited Brief Functional Description to be consistent with the table of commands
- changed PB mnemonics in steps 3.2,5.2,7.2,9.2
- added new steps 5.3 and 9.3 to load a 2D window PB

V2.0

- ACIS Team signed-off version
- added comment in step 10.3 to verify that FEPs and video boards are off

Table 1: **Collect Raw Mode Data Procedure**

Step #	Title (Revision 1.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1.0	Start DEA HK if necessary							
1.1	Load Board 11 DEA HK	1	loadDeaBlock	WD00001024				
1.2	Start DEA Hkp run	1	startDEA	XDZ0000005				
2.0	Config to check clock biases							
2.1	Power up all video boards	1	changeConfigSetting	WSVIDALLUP				
					DEA Input V A	1DE28AVO	28.0–34.0	V
					DEA Input I A	1DEICACU	1.2–1.5	A
2.2	Power up FEPs	2	changeConfigSetting	WSFEPALLUP				
					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
3	Science run to get clock biases							
3.1	Load parameter block	1	loadTeBlock	WT000D0014				
3.2	Start science	10	startScience	XTZ0000005				
3.3	Stop Science	1	stopScience	AA00000000				
3.4	Check clock biases	1						
4.0	Configure for imaging							
4.1	Power up imaging video	1	changeConfigSetting	WSVIDSTD_I				
5	Imaging Science run							
5.1	Load parameter block	1	loadTeBlock	WT000D5014				
5.2	Load 2D window block	1	load2dBlock	W20000B014				
5.3	Start science	1	startScience	XTZ0000005				

Table 2: (CONT) **Collect Raw Mode Data Procedure**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1.0									
1.1	Check cmdResult == OK		B	Load Fullhouse DEA housekeeping		Y	2		
	commandEcho 225			parameter block into slot 4					
1.2	Check cmdResult == OK		B	get FP temp, should be stable		Y	2		
	commandEcho 18			and ± 2 C of desired value					
2.0									
2.1	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 768		2	Expect DEA side A $= 42 \pm 3$ W.					
			2	Current is noisy, so an average is needed.					
2.2	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 89		2	Expect DPA Side A $= 38 \pm 2$ W					
			2						
			2	Expect DPA Side B $= 33 \pm 2$ W					
			2						
3									
3.1	Check cmdResult == OK		A	clock ACIS-I CCDs		Y	2	60k	
	commandEcho 797								
3.2	Check cmdResult == OK		A	wait for at least one exposure record		Y	2	60k	
	commandEcho 58								
3.3	Check cmdResult == OK		A	scienceReport		Y	2	60k	
	commandEcho 1539								
3.4	deaHousekeepingData		B	ACIS EGSE checks clock biases		Y	2	60k	
4.0									
4.1	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 90								
5									
5.1	Check cmdResult == OK		A	clock ACIS-I CCDs		Y	2	60k	
	commandEcho 807								
5.2	Check cmdResult == OK		A	accept data from I0-I3 and S2,		Y	2	60k	
	commandEcho 813			exclude S3					
5.3	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 58								

Table 1: **Collect Raw Mode Data Procedure(Page 2)**

Step #	Title (Revision 1.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
5.4	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
5.5	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
5.6	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
5.7	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				
5.8	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
5.9	dump system config.	0.1	dumpSysConfig	RS_0000001				
5.10	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
5.11	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
5.12	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				
5.13	dump Huffman tables	0.5	dumpHuffman	RH_0000001				
5.14	dump patches	2	dumpPatchlist	RU_0000001				
5.15	Wait for data acquisition	60						
5.16	Stop Science	1	stopScience	AA00000000				
5.17	Wait for telemetry	30						
6.0	Config to check vid. offsets							
6.1	Power up all video boards	1	changeConfigSetting	WSVIDALLUP				
7	Science run to get clock biases							
7.1	Load parameter block	1	loadTeBlock	WT000D2014				

Table 2: (CONT) **Collect Raw Mode Data Procedure(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
5.4	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding “truncated blocks” for any of these dumps.	Y	2	60k	
5.5	Check cmdResult == OK commandEcho 75		B			Y	2	60k	
5.6	Check cmdResult == OK commandEcho 72		B			Y	2	60k	
5.7	Check cmdResult == OK commandEcho 71		B			Y	2	60k	
5.8	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
5.9	Check cmdResult == OK commandEcho 66		B			Y	2	60k	
5.10	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
5.11	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
5.12	Check cmdResult == OK commandEcho 77		B			Y	2	60k	
5.13	Check cmdResult == OK commandEcho 68		B			Y	2	60k	
5.14	Check cmdResult == OK commandEcho 65		B			Y	2	60k	
5.15			A	wait for 1st packet with exp # > than 2		Y	2	60k	
5.16	Check cmdResult == OK commandEcho 1539		A	scienceReport		Y	2	60k	
5.17			A			Y	2	60k	
6.0									
6.1	Check cmdResult == OK commandEcho 768		A			Y	2	60k	
7									
7.1	Check cmdResult == OK commandEcho 801		A	clock ACIS-S CCDs		Y	2	60k	

Table 1: **Collect Raw Mode Data Procedure(Page 3)**

Step #	Title (Revision 1.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
7.2	Start science	10	startScience	XTZ0000005				
7.3	Stop Science	1	stopScience	AA00000000				
7.4	Check clock biases	1						
8	Configure for spectro							
8.1	Power up spectro video	1	changeConfigSetting	WSVIDSTD_S				
9	Spectro Science run							
9.1	Load parameter block	1	loadTeBlock	WT000D7014				
9.2	Load 2D window block	1	load2dBlock	W20000A014				
9.3	Start science	1	startScience	XTZ0000005				
9.4	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
9.5	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
9.6	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
9.7	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				
9.8	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
9.9	dump system config.	0.1	dumpSysConfig	RS_0000001				
9.10	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
9.11	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
9.12	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				

Table 2: (CONT) **Collect Raw Mode Data Procedure(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
7.2	Check cmdResult == OK commandEcho 58		A	wait for at least one exposure record		Y	2	60k	
7.3	Check cmdResult == OK commandEcho 1539		A	scienceReport		Y	2	60k	
7.4	deaHousekeepingData		B	ACIS EGSE checks clock biases		Y	2	60k	
8									
8.1	Check cmdResult == OK commandEcho 92		A			Y	2	60k	
9									
9.1	Check cmdResult == OK commandEcho 808		A	clock ACIS-S CCDs		Y	2	60k	
9.2	Check cmdResult == OK commandEcho 811		A	accept data from S0, S1, S3–5, exclude S2		Y	2	60k	
9.3	Check cmdResult == OK commandEcho 58		A			Y	2	60k	
9.4	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding “truncated blocks” for any of these dumps.	Y	2	60k	
9.5	Check cmdResult == OK commandEcho 75		B			Y	2	60k	
9.6	Check cmdResult == OK commandEcho 72		B			Y	2	60k	
9.7	Check cmdResult == OK commandEcho 71		B			Y	2	60k	
9.8	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
9.9	Check cmdResult == OK commandEcho 66		B			Y	2	60k	
9.10	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
9.11	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
9.12	Check cmdResult == OK		B			Y	2	60k	

Table 1: **Collect Raw Mode Data Procedure(Page 4)**

Step #	Title (Revision 1.14_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
9.13	dump Huffman tables	0.5	dumpHuffman	RH_0000001				
9.14	dump patches	2	dumpPatchlist	RU_0000001				
9.15	Wait for data acquisition	60						
9.16	Stop Science	1	stopScience	AA00000000				
9.17	Wait for telemetry	30						
10.0	Power down VDs and FEPs							
10.1	Power down vid bds	1	changeConfigSetting	WSVIDALLDN				
10.2	Power down FEPs	2	changeConfigSetting	WSFEPALLDN				
10.3	dump system config.	0.1	dumpSysConfig	RS_0000001				
10.4	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	1DE28AVO	28.0-34.0	V
	Total Time	232.7						

Table 2: (CONT) **Collect Raw Mode Data Procedure(Page 4)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 77								
9.13	Check cmdResult == OK		B			Y	2	60k	
	commandEcho 68								
9.14	Check cmdResult == OK		B			Y	2	60k	
	commandEcho 65								
9.15			A	wait for first packet with exp # greater than 2		Y	2	60k	
9.16	Check cmdResult == OK		A	scienceReport		Y	2	60k	
	commandEcho 1539								
9.17			A			Y	2	60k	
10.0									
10.1	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 1541			return to thermal standby state					
10.2	Check cmdResult == OK		A			Y	2	60k	
	commandEcho 1542								
10.3	Check cmdResult == OK		B	verify FEPs and video boards off		Y	1or2		
	commandEcho 66								
10.4			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 average is needed.					