1.13_V2.1 Diagnostic Mode

Last Revised: June 27,1999
Filename: diag_scs

BRIEF FUNCTIONAL DESCRIPTION:
The electronic system performance of ACIS video boards and DPA is evaluated.

The sequence of actions will be:

1. start a DEA HKP run if necessary
2. run TE diagnostic mode of image array
3. run TE diagnostic mode of spectroscopy array
4. power-down video boards and FEPs

ASSUMED INSTRUMENT STATE:
Assumes the instrument is in the canonical thermal standby state except that the focal plane may be at an elevated temperature.
Assumes the standard set of patches are loaded.

SPECIAL INITIAL CONDITIONS:

OPERATIONAL CONSTRAINTS/CAUTIONS:

REFERENCES:
ACIS Long Form Functional Test Procedure (36-01301.01)
ACIS Short Form Functional Test Procedure (36-01301.02)
ACIS Science Instrument SW User's Guide (36-54003)

CHANGE HISTORY:

V1.2

- changed filenames from "ccd_diag_posttv" to "diag_scs"
- changed warm boot in the first step to a cold boot

V1.3

- deleted cold boot in first step
- added dumps after the start science in step 2
- added dumps after the start science in step 3
- added a "dumpSysConfig" command in step 4.3
- added DPA and DEA power check in step 4.4

V1.4

- modified expected values of HW TLM verifiers in steps 2.1 and 2.2
- added "commandEcho" values for all SW command packets

- modified criticality column in steps 2.1, 2.3, 2.4, 2.16, 2.17, 3.15, 3.16, 4.1, & 4.2
- added filename identification at top of procedure

V1.5

- changed expected value of bus voltage to "28.0–34.0 V" and DEA and DPA input currents in steps 2.1, 2.2, and 4.4
- changed HW TLM verifier in step 4.4 to 1DE28AV0 from 1DEP3AVO and expected value to 27.0–35.0 V and expected value for DEA A Input current to 1.2–1.6 A

V2.0

- ACIS Team signed-off version, identical to previous version 1.5

V2.1

- changed expected value of "1DE28AVO" to 28.0–34.0 V in step 2.1 and input current accordingly.
- deleted extra comment on DPA power in "Description" column in step 2.2
- changed "Description" column in steps 2.10 and 3.9 to indicate the FEPs and video boards should be on
- added comment in step 4.3 that the FEPs and video boards should be off

Table 1: **Diagnostic Mode**

Step #	Title (Revision 1.13_V2.1)	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	TE Imaging Diagnostic							
2.1	Power up imaging video boards	1	changeConfigSetting	WSVIDSTD_I				
					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	1.5	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
2.3	Load parameter block	1	loadTeBlock	WT0001A024				
2.4	Start science	1	startScience	XTZ0000005				
2.5	dump default TE PBs	0.1	dumpParameterSlots	RT_0000001				
2.6	dump default CC PBs	0.1	dumpParameterSlots	RC_0000001				
2.7	dump default 2D PBs	0.1	dumpParameterSlots	R2_0000001				
2.8	dump default 1D PBs	0.1	dumpParameterSlots	R1_0000001				

Table 2: (CONT) **Diagnostic Mode**

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			1or2		
	commandEcho 225			parameter block into slot 4					
1.2	deaHousekeepingData		B	get FP temp, should be stable			1or2		
	commandEcho 18			and ± 2 C of desired value					
2.0									
2.1	Check cmdResult == OK		A		SF 4.4.3	Y	2	60k	
	commandEcho 90		2	Expect DEA side A = 42 ± 3 W.					
			2	Current is noisy, so an average is needed.					
2.2	Check cmdResult == OK		A		SF 4.4.4	Y	2	60k	
	commandEcho 89		2	Expect DPA Side A = 38 ± 2 W					
			2						
			2	Expect DPA Side B = 33 ± 2 W					
			2						
2.3	Check cmdResult == OK		A	loads into slot 4	SF 4.5.1	Y	2	60k	
	commandEcho 308								
2.4	Check cmdResult == OK		A	power rises to 49 ± 4 W on DEA	SF 4.5.1	Y	2	60k	
	commandEcho 58			side A, 40 ± 3 W on DPA side A,					
				35 ± 3 W on DPA side B,					
				Faint bias event records;					
				Compare DEA telemetry to SFF,					
				Start science from slot 4;					
				bias computed but not trickled					
				Check DEA telemetry;should have					
				data for cards I0-I3, S2, S3					
2.5	Check cmdResult == OK		B		*psci* should not indicate	Y	2	60k	
	commandEcho 78				any errors regarding				
2.6	Check cmdResult == OK		B		"truncated blocks" for	Y	2	60k	
	commandEcho 75				any of these dumps.				
2.7	Check cmdResult == OK		B			Y	2	60k	
	commandEcho 72								
2.8	Check cmdResult == OK		B			Y	2	60k	

Table 1: **Diagnostic Mode(Page 2)**

Step #	Title (Revision 1.13_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
2.9	dump default DeaHk PBs	0.1	dumpParameterSlots	RD_0000001				
2.10	dump system config.	0.1	dumpSysConfig	RS_0000001				
2.11	dump bad pixel list	0.5	dumpBadPixels	RP_0000001				
2.12	dump bad TE columns	0.1	dumpBadTeColumn	R4_0000001				
2.13	dump bad CC columns	0.1	dumpBadCcColumn	R3_0000001				
2.14	dump Huffman tables	0.5	dumpHuffman	RH_0000001				
2.15	dump patches	2	dumpPatchlist	RU_0000001				
2.16	Verify nominal operation	5						
2.17	Stop Science	1	stopScience	AA00000000				
3.0	TE Spectro Diagnostic							
3.1	Power up spectro video	1	changeConfigSetting	WSVIDSTD_S				
3.2	Load parameter block	1	loadTeBlock	WT0001C024				
3.3	Start science	1	startScience	XTZ0000005				

Table 2: (CONT) **Diagnostic Mode(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 71								
2.9	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
2.10	Check cmdResult == OK commandEcho 66		B	verify video boards & FEPs on		Y	2	60k	
2.11	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
2.12	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
2.13	Check cmdResult == OK commandEcho 77		B			Y	2	60k	
2.14	Check cmdResult == OK commandEcho 68		B			Y	2	60k	
2.15	Check cmdResult == OK commandEcho 65		B			Y	2	60k	
2.16			A	Run monitor_noise on ACIS GSE (see SF App. B for good values)	SF 4.5.2	Y	2	60k	
2.17	Check cmdResult == OK commandEcho 1539		A		SF 4.5.3	Y	2	60k	
3.0									
3.1	Check cmdResult == OK commandEcho 92		A		SF 4.6.1	Y	2	60k	
3.2	Check cmdResult == OK commandEcho 312		A	loads into slot 4	SF 4.6.1	Y	2	60k	
3.3	Check cmdResult == OK commandEcho 58		A	power rises to 49 ± 4 W on DEA side A, 40 ± 3 W on DPA side A, 35 ± 3 W on DPA side B, Faint bias event records; Compare DEA telemetry to SFF, Start science from slot 4; bias computed but not trickled Check DEA telemetry;should have	SF 4.5.1	Y	2	60k	

Table 1: **Diagnostic Mode(Page 3)**

Step #	Title (Revision 1.13_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
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	Verify nominal operation	5						
3.16	Stop Science	1	stopScience	AA00000000				
4.0	Power-down VDs & FEPS							
4.1	Power off video boards	1	changeConfigSetting	WSVIDALLDN				
4.2	Power off FEPs	1	changeConfigSetting	WSFEPALLDN				

Table 2: (CONT) **Diagnostic Mode(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
				data for cards S0 to S5					
3.4	Check cmdResult == OK commandEcho 78		B		*psci* should not indicate any errors regarding	Y	2	60k	
3.5	Check cmdResult == OK commandEcho 75		B		“truncated blocks” for	Y	2	60k	
3.6	Check cmdResult == OK commandEcho 72		B		any of these dumps.	Y	2	60k	
3.7	Check cmdResult == OK commandEcho 71		B			Y	2	60k	
3.8	Check cmdResult == OK commandEcho 63		B			Y	2	60k	
3.9	Check cmdResult == OK commandEcho 66		B	verify video boards & FEPs on		Y	2	60k	
3.10	Check cmdResult == OK commandEcho 83		B			Y	2	60k	
3.11	Check cmdResult == OK commandEcho 80		B			Y	2	60k	
3.12	Check cmdResult == OK commandEcho 77		B			Y	2	60k	
3.13	Check cmdResult == OK commandEcho 68		B			Y	2	60k	
3.14	Check cmdResult == OK commandEcho 65		B			Y	2	60k	
3.15			A	Run monitor_noise on ACIS GSE (see SF App. B for good values)	SF 4.5.2	Y	2	60k	
3.16	Check cmdResult == OK commandEcho 1539		A		SF 4.7	Y	2	60k	
4.0									
4.1	Check cmdResult == OK commandEcho 1541		A			Y	1or2	60k	
4.2	Check cmdResult == OK commandEcho 1542		A			Y	1or2		

Table 1: **Diagnostic Mode(Page 4)**

Step #	Title (Revision 1.13_V2.1)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
4.3	dump system config.	0.1	dumpSysConfig	RS_0000001				
4.4	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	31.2						

Table 2: (CONT) **Diagnostic Mode(Page 4)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
4.3	Check cmdResult == OK commandEcho 66		B	verify video boards & FEPs off		Y	1or2		
4.4			2 2 2 2 2	Expect 12 W for side A, power consumption should be more stable than I or V. Expect 9 W for side B, power consumption should be more stable than I or V. DEA A Power should be 21 $\pm$ 3 W, current is noisy, so an average is needed		Y	1or2		