2.6_V2.0 DEA/FEP MUX Verification

Last Revised: June 27, 1999
Filename: deafep_mux

BRIEF FUNCTIONAL DESCRIPTION:

This activity performs the DEA/FEP MUX verification portion of the ACIS Long Form Functional Procedure (see MIT Document 36-01301.01 Rev. E).

Within ACIS, each Front End Processor (FEP) is capable of being configured to process data from any of the 10 Detector Electronics Assembly (DEA) Video Boards. This activity verifies this capability.

This activity consists of setting up and briefly running a series of science runs, where the runs vary which FEPs are assigned to which Video Boards. In order to verify that the FEPs are processing the correct Video Boards, each run configures the video offset parameters to force the overclock levels from certain quadrants on a board to zero. The ACIS EGSE is then used to verify that each FEP is processing data from the proper video board.

The overall procedure consists of 4 main steps:

1. Power on the 6 FEPs and the 6 DEA video boards used for imaging
2. Run a suite of science runs, varying the expected overclock levels in each run
3. Power off the imaging video boards and power on those used for spectroscopy
4. Run a new suite of science runs, varying the expected overclock levels for each

Each run within this activity consists of the following overall steps:

1. Load a test parameter block
2. Start the science run
3. Wait for exposure records for each FEP and verify the quadrant pattern
4. Stop the science run

The verifiers for the setup and these runs will consist of the measured power levels for the DEA and DPA; command echoes; exposure records from the runs; and science reports from the runs. The easiest method of verifying the quadrant levels is to use the ACIS EGSE's "Monitor Noise" program to display the overclock levels from the exposure records as they arrive in the telemetry stream.

At the end of the procedure the video boards and FEPs are powered down to return the instrument to its thermal standby state.

ASSUMED INSTRUMENT STATE:

Assumes the instrument is in the canonical thermal standby state with BEP A selected.

SPECIAL INITIAL CONDITIONS:

Spacecraft telemetry must be in Format 2 during steps 3–5 (the science runs).

OPERATIONAL CONSTRAINTS/CAUTIONS:

This procedure powers on the FEPs, and powers on and off video boards. This will vary the power draw of ACIS. This may or may not be an issue depending on other activities happening with the spacecraft.

REFERENCES:
ACIS Long Form Functional Procedure - MIT Document 36-01301.01 Rev. E
CHANGE HISTORY:

V1.2

- added a "cold boot" at the beginning of the procedure in step 1
- added commands to power down the video boards and FEPs at the end of the procedure in step 6

V1.3

- added steps 1.6, 1.7, 1.8 to verify BEP A cold boot
- changed command in step 2.1 to power-up FEPs and imaging video boards to "WSPOW0CF3F"
- added commandEcho values for all SW command packets
- changed command in step 4.1 to power-up FEPs and imaging video boards to "WSPOW3F03F"
- changed step 6 to return to the canonical thermal standny state

V2.0

- ACIS Team signed-off version
- changed expected value of "1STAT7ST" in step 1.6

Table 1: **ACIS DEA Video Board/FEP Mux Test**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1.0	Cold Boot							
1.1	Set boot modifier off	1	DPA FS Boot Modifier	1BMODIBM(0)				
1.2	Set warm boot off	1	DPA Cold Boot	1WRMBTSB(0)				
1.3	Halt BEP	1	DPA 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	
2.0	Setup Imaging Array							
2.1	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
3	Check Imaging Array							
3.1	Load parameter block - imageA	1	loadTeBlock	WT0001E014				

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1.0									
1.1				disable uplink boot	LF 4.4.1	Y	1or2		
1.2				Cold boot active BEP	LF 4.4.1	Y	1or2		
1.3				Hold active BEP reset line	LF 4.4.1	Y	1or2		
1.4				Release BEP reset line	LF 4.4.1	Y	1or2		
1.5	Check bepStartupMessage:		A			Y	1or2		
	bepTickCounter < 10; version =11;		A						
	watchdogFlag = 0, patchValidFlag =1		A						
	warmbootFlag = 0		A						
	Check swHousekeeping messages:								
	startingBepTickCounter < 10;		B						
	endingBepTickCounter=		B						
	=startingBepTickCounter+640								
	version =11		A						
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			2	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					
2.0									
2.1	Check cmdResult == 1		A			Y	1or2	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					
			2	= 33 ± 2 W					
3									
3.1	Check cmdResult == 1		A		LF 4.5.1	Y	2	60k	
	commandEcho 180								

Table 1: **ACIS DEA Video Board/FEP Mux Test(Page 2)**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
3.2	Start science - imageA	8	startScience	XTZ0000005				
3.3	Stop Science - imageA	1	stopScience	AA00000000				
3.4	Load parameter block - imageB	1	loadTeBlock	WT00020014				
3.5	Start science - imageB	8	startScience	XTZ0000005				
3.6	Stop Science - imageB	1	stopScience	AA00000000				
3.7	Load parameter block - imageC	1	loadTeBlock	WT00022014				
3.8	Start science - imageC	8	startScience	XTZ0000005				
3.9	Stop Science - imageC	1	stopScience	AA00000000				
3.10	Load parameter block - imageD	1	loadTeBlock	WT00024014				

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
3.2	Check cmdResult == 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageA Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: xxxx FEP 1: xxx0 FEP 2: xx0x FEP 3: xx00 FEP 4: 0x0x FEP 5: 0x00	Y	2	60k	
3.3	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
3.4	Check cmdResult = 1 commandEcho 183	A			LF 4.5.1	Y	2	60k	
3.5	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageB Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: xxx0 FEP 1: xx0x FEP 2: xx00 FEP 3: 0x0x FEP 4: 0x00 FEP 5: xxxx	Y	2	60k	
3.6	Check cmdResult = 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
3.7	Check cmdResult = 1 commandEcho 184		A		LF 4.5.1	Y	2	60k	
3.8	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageC Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: xx0x FEP 1: xx00 FEP 2: 0x0x FEP 3: 0x00 FEP 4: xxxx FEP 5: xxx0	Y	2	60k	
3.9	Check cmdResult = 1 commandEcho 1539		A	scienceReport		Y	2	60k	
3.10	Verify cmdResult = 1		A		LF 4.5.1	Y	2	60k	

Table 1: **ACIS DEA Video Board/FEP Mux Test(Page 3)**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
3.11	Start science - imageD	8	startScience	XTZ0000005				
3.12	Stop Science -imageD	1	stopScience	AA00000000				
3.13	Load parameter block -imageE	1	loadTeBlock	WT00026024				
3.14	Start science - imageE	8	startScience	XTZ0000005				
3.15	Stop Science - imageE	1	stopScience	AA00000000				
3.16	Load parameter block - imageF	1	loadTeBlock	WT00028014				
3.17	Start science - imageF	8	startScience	XTZ0000005				
3.18	Stop Science - imageF	1	stopScience	AA00000000				

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 187								
3.11	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageD Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: xx00 FEP 1: 0x0x FEP 2: 0x00 FEP 3: xxxx FEP 4: xxx0 FEP 5: xx0x	Y	2	60k	
3.12	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
3.13	Check cmdResult == 1 commandEcho 317		A		LF 4.5.1	Y	2	60k	
3.14	Check cmdResult == 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageE Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0x0x FEP 1: 0x00 FEP 2: xxxx FEP 3: xxx0 FEP 4: xx0x FEP 5: xx00	Y	2	60k	
3.15	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
3.16	Check cmdResult = 1 commandEcho 190		A		LF 4.5.1	Y	2	60k	
3.17	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for imageF Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0x00 FEP 1: xxxx FEP 2: xxx0 FEP 3: xx0x FEP 4: xx00 FEP 5: 0x0x	Y	2	60k	
3.18	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	

Table 1: **ACIS DEA Video Board/FEP Mux Test(Page 4)**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
4.0	Setup Spectroscopy Array							
4.1	Power up spectro video	1	changeConfigSetting	WSPOW3F03F				
5.0	Check Spectroscopy Array							
5.1	Load parameter block - spectroA	1	loadTeBlock	WT0002A014				
5.2	Start science - spectroA	8	startScience	XTZ0000005				
5.3	Stop Science - spectroA	1	stopScience	AA00000000				
5.4	Load parameter block - spectroB	1	loadTeBlock	WT0002C014				
5.5	Start science - spectroB	8	startScience	XTZ0000005				
5.6	Stop Science - spectroB	1	stopScience	AA00000000				
5.7	Load parameter block - spectroC	1	loadTeBlock	WT0002E014				
5.8	Start science - spectroC	8	startScience	XTZ0000005				

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test(Page 4)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
4.0					LF 4.5				
4.1	Check cmdResult == OK commandEcho 360		A			Y	2	60k	
5.0									
5.1	Check cmdResult = 1 commandEcho 192		A		LF 4.5.2	Y	2	60k	
5.2	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroA Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0xxx FEP 1: 0xx0 FEP 2: 0x0x FEP 3: 0x00 FEP 4: 00xx FEP 5: 00x0	Y	2	60k	
5.3	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
5.4	Check cmdResult = 1 commandEcho 195		A		LF 4.5.2	Y	2	60k	
5.5	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroB Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0xx0 FEP 1: 0x0x FEP 2: 0x00 FEP 3: 00xx FEP 4: 00x0 FEP 5: 0xxx	Y	2	60k	
5.6	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
5.7	Check cmdResult = 1 commandEcho 197		A		LF 4.5.2	Y	2	60k	
5.8	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroC Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0x0x FEP 1: 0x00 FEP 2: 00xx	Y	2	60k	

Table 1: **ACIS DEA Video Board/FEP Mux Test(Page 5)**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
5.9	Stop Science - spectroC	1	stopScience	AA00000000				
5.10	Load parameter block - spectroD	1	loadTeBlock	WT00030014				
5.11	Start science - spectroD	8	startScience	XTZ0000005				
5.12	Stop Science - spectroD	1	stopScience	AA00000000				
5.13	Load parameter block -spectroE	1	loadTeBlock	WT00032014				
5.14	Start science - spectroE	8	startScience	XTZ0000005				
5.15	Stop Science - spectroE	1	stopScience	AA00000000				
5.16	Load parameter block - spectroF	1	loadTeBlock	WT00034014				
5.17	Start science - spectroF	8	startScience	XTZ0000005				

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test(Page 5)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
					FEP 3: 00x0 FEP 4: 0xxx FEP 5: 0xx0				
5.9	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
5.10	Check cmdResult = 1 commandEcho 198		A		LF 4.5.2	Y	2	60k	
5.11	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroD Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 0x00 FEP 1: 00xx FEP 2: 00x0 FEP 3: 0xxx FEP 4: 0xx0 FEP 5: 0x0x	Y	2	60k	
5.12	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
5.13	Check cmdResult = 1 commandEcho 201		A		LF 4.5.2	Y	2	60k	
5.14	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroE Run monitor_noise on ACIS GSE	Quadrants ABCD FEP 0: 00xx FEP 1: 00x0 FEP 2: 0xxx FEP 3: 0xx0 FEP 4: 0x0x FEP 5: 0x00	Y	2	60k	
5.15	Check cmdResult == 1 commandEcho 1539		A	scienceReport Verify no FEP or CCD error flags		Y	2	60k	
5.16	Check cmdResult = 1 commandEcho 202		A		LF 4.5.2	Y	2	60k	
5.17	Check cmdResult = 1 commandEcho 58 exposureTeFaintBias		A	ACIS EGSE verify overclock values for spectroF	Quadrants ABCD FEP 0: 00x0 FEP 1: 0xxx	Y	2	60k	

Table 1: **ACIS DEA Video Board/FEP Mux Test(Page 6)**

Step #	Title (Revision 2.6_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
5.18	Stop Science - spectroF	1	stopScience	AA00000000				
6	Return to Thermal Standby Only if necessary.							
6.1	Power down video boards and FEPs	1	changeConfigSetting	WSPOW00000				
6.2	dump system config.	0.1	dumpSysConfig	RS_0000001				
6.3	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	133.1						

Table 2: (CONT) **ACIS DEA Video Board/FEP Mux Test(Page 6)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
				Run monitor_noise on ACIS GSE	FEP 2: 0xx0				
					FEP 3: 0x0x				
					FEP 4: 0x00				
					FEP 5: 00xx				
5.18	Check cmdResult == 1		A	scienceReport		Y	2	60k	
	commandEcho 1539			Verify no FEP or CCD error flags					
6									
6.1	Check cmdResult == OK		A			Y	1or2	60k	
	commandEcho 773			return to thermal standby state					
6.2	Check cmdResult == OK		B			Y	1or2		
	commandEcho 66								
6.3			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 ± 3 W,					
				current is noisy so an avg. is needed					