2.3_V2.0 ACIS Load from Uplink Test

Last Revised: June 27, 1999
Filename: uplink_boot

BRIEF FUNCTIONAL DESCRIPTION:
This activity checks the "Load from Uplink" feature of the ACIS DPA, and checks the ACIS bi-level telemetry. This activity is heavily based on the DPA Bilevel Telemetry Test test from the the ACIS Long Form Functional Procedure (see MIT Document 36-01301.01 Rev. E).

The ACIS instrument boot software is capable of loading code from either EEPROM or from uplinked software command packets. The "code" used for this activity has the following behaviors:

1. It does not touch the watchdog timer, allowing a test of the timer
2. It does not read the command FIFO, allowing a test of filling the FIFO
3. It cycles through the BEP "LED" bi-level telemetry

This activity consists of the following overall steps:

1. Perform a "Load from Uplink" on the Side A DPA and check the Watchdog Timer
2. Verify the DPA Side-A uplink FIFO bi-level telemetry
3. Perform a "Load from EEPROM" and check the Watchdog indicator
4. Repeat the above steps for DPA Side B

The "Load from Uplink" step consists of the following substeps:

1. Select the appropriate BEP and verify the bi-level telemetry indicator
2. Place the BEP into a "Load from Uplink" state
3. Perform the load and verify the bi-level telemetry indicators
4. Verify that the watchdog timer resets the BEP
5. Re-load and verify that the watchdog timer is disabled and the code runs

The verifiers for the setup and these runs will consist of the software and hardware bi-level telemetry items and a BEP Startup Message telemetry packet.

ASSUMED INSTRUMENT STATE:
This assumes that both DPA Side A and B and DEA A are on, with the Side A BEP selected. If not consult other procedures.

SPECIAL INITIAL CONDITIONS:
Spacecraft telemetry must be in either Format 1 or 2 throughout the operation.

OPERATIONAL CONSTRAINTS/CAUTIONS:
Patches in either BEP will be removed by this procedure.

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

V1.2

- adjusted descriptive text to fit entire table on a page

V1.3

- edited step 1 to include only the cold boot of BEP A
- changed step 2 to include the boot from uplink test for BEP A
- added step 2.4 to set the boot modifier off
- added new steps 2.7-2.11, deleted old steps 1.10-1.13
- removed first cold boot in step 3 so that there is now only one cold boot
- edited step 4 to include only the selecton and cold boot of BEP B
- changed step 5 to include the boot from uplink test for BEP B
- added step 5.4 to set the boot modifier off
- added new steps 5.7-5.11, deleted old steps 4.10-4.13
- added step 7 to switch back to BEP A
- updated criticality and realtime contact column throughout the procedure

V1.4

- edited "Assumed Instrument State" to delete comment that the BEP should be running an unpatched version of the SW
- changed "Command Description" in 2.3 and 5.3 to "executeUpload"
- deleted old steps 2.8 and 5.8 which check the SW LEDs to verify the BEP had reset

V2.0

- ACIS Team signed-off version, identical to previous version 1.4

Table 1: **ACIS Load from Uplink Test**

Step #	Title (Revision 2.3_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1	Restart BEP A							
1.1	Select BEP A	1		1BSELICL(0)	BEP Select Bi-level	1STAT4ST	0	
1.2	Halt BEP	1	DPA Command Reset	1RSETIRT(1)	BEP Running Bi-Level	1STAT5ST	0	
1.3	Set Boot modifier on	1	DPA FS Boot Modifier	1BMODIBM(1)				
1.4	Set warm boot flag off	1	DPA Warm Boot	1WRMBTSB(0)				
1.5	Restart BEP	1		1RSETIRT(0)	BEP Running Bi-level	1STAT5ST	1	
					BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	0	
1.6	Check for “Waiting” State	1			BEP “LED” Bi-levels	1STAT0ST	0	
						1STAT1ST	0	
						1STAT2ST	1	
						1STAT3ST	1	
2	Test BEP A							
2.1	Establish load address	1	startUpload	XL_LEDTST1	BEP “LED” BI-levels	1STAT0ST	1	
						1STAT1ST	1	
						1STAT2ST	0	
						1STAT3ST	1	
2.2	Load “short” code image.	1	continueUpload	WL_LEDTST2	BEP “LED” Bi-levels	1STAT0ST	1	
						1STAT1ST	1	
						1STAT2ST	0	
						1STAT3ST	1	
2.3	Execute loaded code	1	executeUpload	XL_LEDTST3	BEP “LED” BI-levels	1STAT0ST	0or1	
						1STAT1ST	0or1	
						1STAT2ST	0or1	
						1STAT3ST	0or1	
2.4	Set Boot modifier off	1	DPA FS Boot Modifier	1BMODIBM(0)				
2.5	Load small packet	1	startUpload	XL_LEDTST1	BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	1	
2.6	Fill the FIFO	1	writeBep	WBHSREAD01	BEP FIFO Not Full	1STAT6ST	0	
				WBHSREAD02	BEP FIFO Not Empty	1STAT7ST	1	
				WUHSREAD03				
				WUFSV00015				

Table 2: (CONT) **ACIS Load from Uplink Test**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1									
1.1			2	1BSELICL=0 selects BEP A		Y	1or2		
1.2			2	Hold active BEP reset line	LF 4.4.1	Y	1or2		
1.3				enables boot from uplink	LF 4.4.1	Y	1or2		
1.4				disable Warm boot	LF 4.4.1	Y	1or2		
1.5			2	Release BEP reset line, BEP [AB]: FIFO Empty Waiting for first uplink packet, No bepStartupMessage	LF 4.4.1	Y	1or2		
1.6			2	LED_BOOT_UPLINK_WAIT		Y	1or2		
2									
2.1			2	1st packet only contains load address and length + 1 LED_BOOT_UPLINK_COPY indicates load needs a "Continue" packet		Y	1or2		
2.2			2	2nd packet contains code length of code is 1 word short allowing next startUpload to act as an "execute"		Y	1or2		
2.3			2	Last packet acts as an "execute". LEDs start cycling. Watchdog timer is running, expect a reset in 8 minutes. This leaves watchdog timer disabled.		Y	1or2		
2.4				disables boot from uplink		Y	1or2		
2.5			2	The small packet remains in FIFO causing a FIFO Not Empty indication		Y	1or2		
2.6			2	The big series of packets fill the FIFO causing "full" indication		Y	1or2		

Table 1: **ACIS Load from Uplink Test(Page 2)**

Step #	Title (Revision 2.3_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
	load twice to fill FIFO			WBHSREAD01				
				WBHSREAD02				
				WUHSREAD03				
				WUFSV00015				
2.7	Verify LEDs toggle	5						
						1STAT3ST	0or1	
						1STAT2ST	0or1	
						1STAT1ST	0or1	
						1STAT0ST	0or1	
2.8	Verify BEP reboots	2						
						1STAT3ST	1	
						1STAT2ST	0	
						1STAT1ST	0	
						1STAT0ST	0	
2.9	Check SW messages	2						
2.10	Verify SW in science idle state	2						
						1STAT3ST	0	
						1STAT2ST	0	
						1STAT1ST	1	
						1STAT0ST	0or1	
3	Reset BEP A Watchdog							
3.1	Set warm boot flag off	1	DPA Warm Boot	1WRMBTSB(0)				
3.2	Halt BEP	1	DPA Command Reset	1RSETIRT(1)	BEP Running Bi-Level	1STAT5ST	0	
3.3	Restart BEP	2		1RSETIRT(0)	BEP Running Bi-Level	1STAT5ST	1	

Table 2: (CONT) **ACIS Load from Uplink Test(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
2.7			2	Code sets LEDs one by one. Use this 5m interval to watch LEDs toggle.		Y	1or2		
2.8			2	SW LEDs indicate multi-tasking excutive has started.		Y	1or2		
2.9	Check bepStartupMessage: bepTickCounter $<$ 10; version =11; watchdogFlag = 1, patchValidFlag =1 warmBootFlag = 0 Check swHousekeeping messages: startingBepTickCounter $<$ 10; endingBepTickCounter= =startingBepTickCounter+640 version =11		A A A A B B A			Y	1or2		
2.10			2	SW LEDs indicate no science run is in progress. bit toggles to indicate BEP is alive.		Y	1or2		
3									
3.1				disable Warm boot	LF 4.4.1	Y	1or2		
3.2			2	Hold active BEP reset line	LF 4.4.1	Y	1or2		
3.3	bepStartupMessage		A	Release BEP reset line, see	LF 4.4.1	Y	1or2		

Table 1: **ACIS Load from Uplink Test(Page 3)**

Step #	Title (Revision 2.3_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
4	Select & restart BEP B							
4.1	Select BEP B	1		1BSELICL(1)	BEP Select Bi-level	1STAT4ST	1	
4.2	Halt BEP	1	DPA Command Reset	1RSETIRT(1)	BEP Running Bi-Level	1STAT5ST	0	
4.3	Set Boot modifier on	1	DPA FS Boot Modifier	1BMODIBM(1)				
4.4	Set warm boot flag off	1	DPA Warm Boot	1WRMBTSB(0)				
4.5	Restart BEP	1		1RSETIRT(0)	BEP Running Bi-level	1STAT5ST	1	
					BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	0	
4.6	Check for "Waiting" state.	1			BEP "LED" Bi-levels	1STAT0ST	0	
						1STAT1ST	0	
						1STAT2ST	1	
						1STAT3ST	1	
5	Test BEP B							
5.1	Establish load address	1	startUpload	XL_LEDTST1	BEP "LED" BI-levels	1STAT0ST	1	
						1STAT1ST	1	
						1STAT2ST	0	
						1STAT3ST	1	
5.2	Load "short" code image.	1	continueUpload	WL_LEDTST2	BEP "LED" Bi-levels	1STAT0ST	1	
						1STAT1ST	1	
						1STAT2ST	0	
						1STAT3ST	1	
5.3	Execute loaded code	1	executeUpload	XL_LEDTST3	BEP "LED" BI-levels	1STAT0ST	0or1	
						1STAT1ST	0or1	
						1STAT2ST	0or1	
						1STAT3ST	0or1	
5.4	Set Boot modifier off	1	DPA FS Boot Modifier	1BMODIBM(0)				
5.5	Load small packet	1	startUpload	XL_LEDTST1	BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	1	
5.6	Fill the FIFO	1	writeBep	WBHSREAD01	BEP FIFO Not Full	1STAT6ST	0	
				WBHSREAD02	BEP FIFO Not Empty	1STAT7ST	1	
				WUHSREAD03				

Table 2: (CONT) **ACIS Load from Uplink Test(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
				watchdogFlag=0 in bepStartupMessage	LF 4.4.1		1or2		
4									
4.1			2	1BSELICL=1 selects BEP B		Y	1or2		
4.2			2	Hold active BEP reset line	LF 4.4.1	Y	1or2		
4.3				enables boot from uplink	LF 4.4.1	Y	1or2		
4.4				disable Warm boot	LF 4.4.1	Y	1or2		
4.5			2	Release BEP reset line, BEP [AB]: FIFO Empty Waiting for first uplink packet, No bepStartupMessage	LF 4.4.1	Y	1or2		
4.6			2	LED_BOOT_UPLINK_WAIT		Y	1or2		
5									
5.1			2	1st packet only contains load address and length + 1 LED_BOOT_UPLINK_COPY indicates load needs a "Continue" packet		Y	1or2		
5.2			2	2nd packet contains code length of code is 1 word short allowing next startUpload to act as an "execute"		Y	1or2		
5.3			2	Last packet acts as an "execute". LEDs start cycling. Watchdog timer is running, expect a reset in 8 minutes. This leaves watchdog timer disabled.		Y	1or2		
5.4				disables boot from uplink		Y	1or2		
5.5			2	The small packet remains in FIFO causing a FIFO Not Empty indication		Y	1or2		
5.6			2	The big series of packets fill the FIFO causing "full" indication		Y	1or2		

Table 1: **ACIS Load from Uplink Test(Page 4)**

Step #	Title (Revision 2.3_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
				WUFSV00015				
	load twice to fill FIFO			WBHSREAD01				
				WBHSREAD02				
				WUHSREAD03				
				WUFSV00015				
5.7	Verify LEDs toggle	5						
						1STAT3ST	0or1	
						1STAT2ST	0or1	
						1STAT1ST	0or1	
						1STAT0ST	0or1	
5.8	Verify BEP reboots	2						
						1STAT3ST	1	
						1STAT2ST	0	
						1STAT1ST	0	
						1STAT0ST	0	
5.9	Check SW messages	2						
5.10	Verify SW in science idle state.	2						
						1STAT3ST	0	
						1STAT2ST	0	
						1STAT1ST	1	
						1STAT0ST	0or1	
6	Reset BEP B Watchdog							
6.1	Set warm boot flag off	1	DPA Warm Boot	1WRMBTSB(0)				
6.2	Halt BEP	1	DPA Command Reset	1RSETIRT(1)	BEP Running Bi-Level	1STAT5ST	0	

Table 2: (CONT) **ACIS Load from Uplink Test(Page 4)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
5.7			2	Code sets LEDs one by one.		Y	1or2		
				Use this 5m interval to					
				watch LEDs toggle.					
5.8			2			Y	1or2		
				SW LEDs indicate multi-tasking					
				excutive has started.					
5.9	Check bepStartupMessage:		A			Y	1or2		
	bepTickCounter < 10; version =11;		A						
	watchdogFlag = 1, patchValidFlag =1		A						
	warmBootFlag = 0		A						
	Check swHousekeeping messages:								
	startingBepTickCounter < 10;		B						
	endingBepTickCounter=		B						
	=startingBepTickCounter+640								
	version =11		A						
5.10			2			Y	1or2		
				SW LEDs indicate no science					
				run is in progress.					
				bit toggles to indicate BEP is alive.					
6									
6.1				disable Warm boot	LF 4.4.1	Y	1or2		
6.2				Hold active BEP reset line	LF 4.4.1	Y	1or2		

Table 1: **ACIS Load from Uplink Test(Page 5)**

Step #	Title (Revision 2.3_V2.0)	Time Req (m)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
6.3	Restart BEP	2		1RSETIRT(0)	BEP Running Bi-Level	1STAT5ST	1	
7	Go Back to BEP A							
7.1	Select BEP A	1		1BSELICL(0)	BEP Select Bi-level	1STAT4ST	0	
7.2	Set warm boot flag off	1	DPA Cold Boot	1WRMBTSB(0)				
7.3	Halt BEP A	1	DPA Command Reset	1RSETIRT(1)				
7.4	Restart BEP A	1		1RSETIRT(0)				
	Total Time	58						

Table 2: (CONT) **ACIS Load from Uplink Test(Page 5)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
6.3	bepStartupMessage		A	Release BEP reset line, see	LF 4.4.1	Y	1or2		
				watchdogFlag=0 in bepStartupMessage	LF 4.4.1		1or2		
7									
7.1			2	1BSELICL=0 selects BEP A		Y	1or2		
7.2				disable Warm boot	LF 4.4.1	Y	1or2		
7.3				Hold active BEP reset line	LF 4.4.1	Y	1or2		
7.4	bepStartupMessage		A	Release BEP reset line	LF 4.4.1	Y	1or2		
				Check startup messages					
				bepTickCounter < 10; version =11					
				watchdogFlag = 0					
				warmBootFlag = 0					
				Check swHousekeeping messages					
				startingBepTickCounter < 10;					
				endingBepTickCounter =					
				(startingBepTickCounter +640)					