1.12_V2.0 Flight Software Event Histogram and CC 3x3 Patch

Last Revised: June 27, 1999
Filename: sw_evhcc3x3

BRIEF FUNCTIONAL DESCRIPTION:
This patch loads two new science modes to the ACIS Flight Software. The first, the Event Histogram Mode patch, allows the ACIS software to produce histograms of detected X-ray events. The second, the Continuous Clocking 3x3 patch, allows the software to use 3x3 pixel islands for event detection and telemetry while performing Continuous Clocking mode. The ACIS Flight SW team recommends that the optional patches be loaded together with the standard patches; therefore this procedure first removes any patches which may have been installed and then proceeds to load the standard patches followed by the optional patches.

NOTE on MIT version identifiers: Numeric revision identifiers are preliminary, and, although logged and controlled, have not been subjected to peer review and sign-off. Letter revision identifiers reflect items which have undergone peer review and sign-off. This procedure loads "standard Rev. A" and optional patches from "optional Rev. A". Refer to the release notes for standard patches, optional patches, and patch combination certification (see references below).

The FOT should implement the loading of the patches (steps 2.1 and 2.2) as a realtime command load in order to maximize the uplink efficiency. The command system should be configured with a blocking factor of 90 and a minimum time delay of 3 s.

The following procedure loads the Standard and Event Histogram/CC3x3 option set of patches into the ACIS instrument, and dumps the load to the ground for verification.

This procedure implements the following basic operations:

1. Reset the contents of the patch list to remove any existing patches, dump the contents of the patch list to verify that the list is empty
2. Load the "standard Rev. A" patch load
3. Load the Event Histogram patch (part of "optional Rev. A")
4. Load the CC3x3 patch (part of "optional Rev. A")
5. Load the patch load version number
6. Dump the contents of the patch list to verify the load
7. Warm boot the DPA to activate the new load and verify proper BEP boot

Refer to the Option Patch Release Notes, for MIT 36-58020 Rev. A for a detailed description of the effects of this patch load.

The verifiers for the procedure will be:

1. A command echo for the reset patch list command
2. A command echo for the 1st dumpPatchlist command

3. A single bepReadReply packet for the 1st empty dump
4. A series of command echoes for the addPatch commands
5. A command echo for the dumpPatchlist command
6. A series of bepReadReply packets for the dump command
7. A bepStartupMessage packet with a modified "version == 27" field

ACIS flight software personnel will review the contents of the various dumps after the procedure has been run.

ASSUMED INSTRUMENT STATE:
This assumes that at least one side of the DPA is on and the flight SW is running on one BEP.

SPECIAL INITIAL CONDITIONS:
The OCC command system must be configured with "Minimum Time Delay of 3 s" and a "Blocking Factor" of 90.
Spacecraft telemetry must be in Format 2 when the optional patches are dumped to save time.

OPERATIONAL CONSTRAINTS/CAUTIONS:
In order to avoid truncating a dump, each dumpPatchlist command must be followed by at least a 10 second delay.

REFERENCES:

1. MIT 36-58010, Standard Patch Release, Rev. A
2. MIT 36-58010, Optional Patch Release, Rev. A
3. MIT 36-58021.01, certification of patch combination cc3x3+eventhist, Rev. A

CHANGE HISTORY:

V1.2

- changed filenames from "sw_optevhcc3x3" to "sw_evhcc3x3"

V1.3

- added a new step 1 to remove the existing patches
- added a new step 2 to load the "standard-release-A" patches
- added commandEcho values for all SW command packets
- updated the "addPatch" commands in step 3.1 and a new step 4.1 to contain the "optional-release-A-A" patches.
- updated the "addPatch" commands in step 5.1 to update the version number
- added steps 7.5, 7.6, 7.7 to verify the BEP boot

V2.0

- ACIS Team signed-off version
- changed “standard-release-A” to “standard Rev. A” and “optional-release-A-A” to “optional Rev. A”

Table 1: **ACIS Event Histogram and CC 3x3 Flight Software Patch**

Step #	Title (Revision 1.12_V2.0)	Time Req	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1	Reset the Patchlist							
1.1	Empty the Patchlist	1	removePatches	AUALLPATCH				
1.2	Read the empty Patchlist	1	dumpPatchlist	RU_0000001				
2	Load Standard Patches							
2.1	Load "standard Rev. A" patches	1	addPatch	WUSTANDA01 WUSTANDA02 WUSTANDA03 WUSTANDA04 WUSTANDA05 WUSTANDA06 WUSTANDA07 WUSTANDA08 WUSTANDA09 WUSTANDA10 WUSTANDA11 WUSTANDA12 WUSTANDA13 WUSTANDA14 WUSTANDA15 WUSTANDA16 WUSTANDA17				
3	Load the Event Histogram Patch							
3.1	Load opt_eventhist patches part of "optional Rev. A"	5	addPatch	WUEVHSTA01 WUEVHSTA02 WUEVHSTA03 WUEVHSTA04 WUEVHSTA05 WUEVHSTA06 WUEVHSTA07 WUEVHSTA08				

Table 2: (CONT) **ACIS Event Histogram and CC 3x3 Flight Software Patch**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1									
1.1	Check cmdResult == 1		A			Y	1or2		
	commandEcho 326								
1.2	Check cmdResult == 1		B	bepReadReply, ACIS EGSE verifies		Y	1or2		
	commandEcho 65			single packet reply					
2									
2.1	commandEcho 898		A	Expect to send 17 packets. Total load size $\sim$ 456 bytes.		Y	1or2		
	commandEcho 900		A						
	commandEcho 903		A						
	commandEcho 904		A						
	commandEcho 907		A						
	commandEcho 909		A						
	commandEcho 910		A						
	commandEcho 912		A						
	commandEcho 915		A						
	commandEcho 917		A						
	commandEcho 918		A						
	commandEcho 921		A						
	commandEcho 922		A						
	commandEcho 924		A						
	commandEcho 927		A						
	commandEcho 928		A						
	commandEcho 931		A						
3									
3.1	commandEcho 934		A	Expect to send 15 packets.		Y	1or2		
	commandEcho 937		A	Total load size $\sim$ 6340 bytes.					
	commandEcho 938		A						
	commandEcho 940		A						
	commandEcho 943		A						
	commandEcho 945		A						
	commandEcho 946		A						
	commandEcho 948		A						

Table 1: **ACIS Event Histogram and CC 3x3 Flight Software Patch(Page 2)**

Step #	Title (Revision 1.12_V2.0)	Time Req	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
				WUEVHSTA09 WUEVHSTA10 WUEVHSTA11 WUEVHSTA12 WUEVHSTA13 WUEVHSTA14 WUEVHSTA15				
4 4.1	Load CC3x3 Mode Patch Load opt_cc3x3 patches part of "optional Rev. A"	 5	 addPatch	 WUCC3X3A01 WUCC3X3A02 WUCC3X3A03 WUCC3X3A04 WUCC3X3A05 WUCC3X3A06 WUCC3X3A07 WUCC3X3A08 WUCC3X3A09 WUCC3X3A10 WUCC3X3A11 WUCC3X3A12 WUCC3X3A13				
5 5.1	Patch the version number Load the version number patch	 1	 addPatch	 WUFSV0001B				
6 6.1	Dump Installed Patches Dump Patchlist	 1	 dumpPatchlist	 RU_0000001				
7 7.1 7.2 7.3 7.4	Activate Patches Set Boot Modifier off Set Warm Boot Flag on Halt BEP Restart BEP	 0.1 0.1 0.1 1	 DPA FS Boot Modifier DPA Warm Boot Halt BEP Restart BEP	 1BMODIBM(0) 1WRMBTSB(1) 1RSETIRT(1) 1RSETIRT(0)				

Table 2: (CONT) **ACIS Event Histogram and CC 3x3 Flight Software Patch(Page 2)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
	commandEcho 951		A						
	commandEcho 952		A						
	commandEcho 955		A						
	commandEcho 957		A						
	commandEcho 958		A						
	commandEcho 960		A						
	commandEcho 963		A						
4									
4.1	commandEcho 965		A	Expect to send 13 packets.		Y	1or2		
	commandEcho 966		A	Total load size ~ 4620 bytes.					
	commandEcho 969		A						
	commandEcho 970		A						
	commandEcho 972		A						
	commandEcho 975		A						
	commandEcho 977		A						
	commandEcho 978		A						
	commandEcho 980		A						
	commandEcho 983		A						
	commandEcho 984		A						
	commandEcho 987		A						
	commandEcho 989		A						
5									
5.1	commandEcho 990			Expect to send 1 packet. Total load size ~ 16 byte.s Sets the version number to 27.		Y	1or2		
6									
6.1	check cmdResult = 1 commandEcho 65			bepReadReply, ACIS EGSE verifies reply against file wujehc3a.dumpedPatches.txt.		Y	2		
7									
7.1				disables uplink boot		Y	1or2		
7.2						Y	1or2		
7.3						Y	1or2		
7.4	bepStartupMessage			ACIS EGSE verifies "version" field == 27 decimal		Y	1or2		

Table 1: **ACIS Event Histogram and CC 3x3 Flight Software Patch(Page 3)**

Step #	Title (Revision 1.12_V2.0)	Time Req	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
7.5	Check BEP Boot	2.0						
7.6	Check HW LEDs	2.0			BEP Select	1STAT4ST	0or1	
					BEP FIFO Not Full	1STAT6ST	1	
					BEP FIFO Not Empty	1STAT7ST	0	
7.7	Check SW LEDs	2.0			BEP initialization	1STAT3ST	0	
					Watchdog boot	1STAT2ST	1	
					Science run status	1STAT1ST	1	
						1STAT0ST	0or1	
	Total Time	22.3						

Table 2: (CONT) **ACIS Event Histogram and CC 3x3 Flight Software Patch(Page 3)**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
7.5	Check bepStartupMessage:		A			Y	1or2		
	bepTickCounter < 10; version =27;		A						
	watchdogFlag = 0, patchValidFlag =1		A						
	warmbootFlag = 1		A						
	Check swHousekeeping messages:								
	startingBepTickCounter < 10;		B						
	endingBepTickCounter=		B						
	=startingBepTickCounter+640								
	version =27		A						
7.6			2	0/1 indicates BEP A/B is selected		Y	1or2		
			2	1 means FIFO not full					
			2	1 means not FIFO empty					
7.7			1	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					