1.10_V2.2 ACIS Flight Software Dump

Last Revised: Aug 9, 2012

BRIEF FUNCTIONAL DESCRIPTION:
ACIS Flight Software has been burned into the EEPROMs on both Back End Processors of the Digital Processor Assembly. Whenever the DPA is powered on, or performs a reboot without the boot from uplink hardware flag being set, the active BEP will load the contents of the EEPROM into protected instruction memory ("I-cache") and begin executing the code.

During orbital activation checkout, and perhaps on later occasions in order to check for radiation damage or other anomalies in connection with EEPROM memory, the ACIS instrument will conduct this activity, which dumps the entire as-launched flight software into the science telemetry stream. (This activity is not intended to produce a ground image of ACIS flight software in its patched state; one examines patches separately using the dumpPatch command.)

Memory dumps such as this can be conducted in parallel with other instrument activity, such as science observations. Only one BEP memory operation (read, write, or execute) can be active at a time, however. If a new memory operation is commanded while an old one is still in progress, it will not be queued; the flight software will either truncate the execution of the earlier command, or reply to the new one with a non-acknowledge.

In the absence of science telemetry, the 1 megabyte of EEPROM memory can be dumped in under 6 minutes. In the presence of saturated science telemetry, the same operation can take as long as 4 hours. Accordingly, it is expected that the dump will be a stand-alone procedure, with the instrument performing no simultaneous tasks other than DEA and software housekeeping.

The activity is implemented with a single software serial command, a readBep command which begins at virtual memory location 0xbfc0 0000, and which asks for a 32-bit word count of 0x08000.

The only verifiers will be (1) a command echo for the readBep command, and (2) a series of bepReadReply packets in the science telemetry. There should be a total of 259 of these; when all 259 have been seen, the activity is complete. ACIS flight software personnel will review the contents of the dump later on.

ASSUMED INSTRUMENT STATE:
Assumes that at least one side of the DPA is on and the flight SW is running; if not consult other procedures.

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

OPERATIONAL CONSTRAINTS/CAUTIONS:
When the command is issued, and until it has had time to complete (400 seconds in the absence of a simultaneous science run, up to four hours otherwise), there shall be no concurrent ACIS memory operation (read, write, execute) issued to the BEP or the FEPs.

REFERENCES:

CHANGE HISTORY:

V2.0

- ACIS Team signed-off version

- added commandEcho value for the one SW command packet

V2.1

- changed dump command in step 1.1 to "RBROMDUMP1" from "RBDUMP_ROM" in order to dump the entire EEPROM, as we did in thermal vac testing

V2.2

- Altered text and tsv verifiers to reflect the change from 128K of telemetry to 4 megabytes.

Table 1: **ACIS Flight Software Dump**

Step #	Title (Revision 1.10_V2.2)	Time Req	Command Description	Command Mnemonic	Cmd EGSE	Seq Key	Telemetry Description	Telemetry Mnemonic
1.0	Dump ACIS flight SW							
1.1	Read EEPROM	2	Initiate memory read from the BEP	RBROMDUMP1				
	Total Time	2						

Table 2: (CONT) **ACIS Flight Software Dump**

Step #	Expected Value	Units	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1.0 1.1			check cmdResult == 1 commandEcho 306		B	bepReadReply, expect 259 packets, Proceed when full bepReadReply packet count is seen			2		