# 1.25_V2.1 Continuous Clocking 3x3

*Last Revised: August 3, 1999*

## BRIEF FUNCTIONAL DESCRIPTION:

The ACIS instrument is capable of taking continuous clocking data and telemetering down 3x3 event islands. However, this mode has not been well used. This test will allow us to gain experience with this mode.

The sequence of actions will be:

1. warm boot and start DEA housekeeping if necessary
2. configure the instrument to collect imaging array data
3. execute the continuous clocking 3x3 mode science run
4. configure the instrument to collect spectroscopy array data
5. execute the continuous clocking 3x3 mode science run
6. return to thermal standby mode if necessary

## ASSUMED INSTRUMENT STATE:

Assumes that the instrument is in the cannonical thermal standby mode.
Assumes that the standard patches have been loaded.

## SPECIAL INITIAL CONDITIONS:

The continuous clocking 3x3 optional patch must have been loaded before this procedure begins.

## OPERATIONAL CONSTRAINTS/CAUTIONS:

## REFERENCES:

## CHANGE HISTORY:

**V1.0**

- Original version.

**V2.0**

- ACIS team signed-off version.
- Bev makes changes which Bob suggested.

**V2.1**

- step 3.1, changed the SW command mnemonic from "WC0001A014" to "WC0001E014" and the command identifier
- step 3.2, changed the SW command mnemonic from "W100018014" to "W100019014" and the command identifier

- step 5.1, changed the SW command mnemonic from “WC0001C014” to “WC00020014” and the command identifier
- step 5.2, changed the SW command mnemonic from “W100018014” to “W100019014” and the command identifier

Table 1: **Continuous Clocking 3x3**

| Step # | Title (Revision 1.25_V2.1) | Time Req (m) | Command Description | Command Mnemonic | Telemetry Description | Telemetry Mnemonic | Expected Value | Units |
|---|---|---|---|---|---|---|---|---|
| 1 | Warm Boot and Start DEA HKP if needed | | | | | | | |
| 1.1 | Set Boot modifier off | 0.1 | DPA FS Boot Mod | 1BMODIBM(0) | | | | |
| 1.2 | Set warm boot flag on | 0.1 | DPA Warm Boot | 1WRMBTSB(1) | | | | |
| 1.3 | Halt BEP | 0.1 | DPA Com Reset | 1RSETIRT(1) | | | | |
| 1.4 | Restart BEP | 0.1 | | 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 | 1 | |
| 1.7 | Check SW LEDs | 2.0 | | | BEP initialization | 1STAT3ST | 0 | |
| | | | | | Watchdog boot | 1STAT2ST | 1 | |
| | | | | | Science run status | 1STAT1ST | 1 | |
| | | | | | | 1STAT0ST | 0or1 | |
| 1.8 | Load Board 11 DEA HK | 1 | loadDeaBlock | WD00001024 | | | | |
| 1.9 | Start DEA Hkp run | 1 | startDEA | XDZ0000005 | | | | |
| 2 | Configure for imaging | | | | | | | |
| 2.1 | Power up imaging video boards & FEPs | 1 | changeConfigSetting | WSPOW0CF3F | | | | |
| | | | | | DEA Input V A | 1DE28AVO | 28.0–32.0 | V |
| | | | | | DEA Input I A | 1DEICACU | 1.3–1.5 | A |
| | | | | | DPA Input V A | 1DP28AVO | 28.0-32.0 | V |
| | | | | | DPA Input I A | 1DPICACU | 1.2–1.4 | A |
| | | | | | DPA Input V B | 1DP28BVO | 28.0–32.0 | V |

Table 2: (CONT) **Continuous Clocking 3x3**

| Step # | Telemetry EGSE | Other Verifier | Crit | Description | Notes | RT Con | Tlm Fmt | Min Alt | SIM Pos |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 1.1 | | | | disables boot from uplink | | Y | 1or2 | | |
| 1.2 | | | | enable Warm boot | | Y | 1or2 | | |
| 1.3 | | | | Hold active BEP reset line | | Y | 1or2 | | |
| 1.4 | | | | Release BEP reset line | | Y | 1or2 | | |
| 1.5 | Check bepStartupMessage: | | A | | | Y | 1or2 | | |
| | bepTickCounter < 10; version =27; | | A | | | | | | |
| | warmBootFlag = 1, patchValidFlag =1 | | A | | | | | | |
| | Check swHousekeeping messages: | | | | | | | | |
| | startingBepTickCounter < 10; | | B | | | | | | |
| | endingBepTickCounter= | | B | | | | | | |
| | =startingBepTickCounter+640 | | | | | | | | |
| | version =27 | | A | | | | | | |
| 1.6 | | | 2 | 0 indicates BEP A is selected | | Y | 1or2 | | |
| | | | 2 | 1 mean FIFO not full | | | | | |
| | | | 2 | 1 mean FIFO not empty | | | | | |
| 1.7 | | | 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 | | | | | |
| 1.8 | Check cmdResult == OK | | B | Load Fullhouse DEA housekeeping | | Y | 1or2 | | |
| | commandEcho 225 | | | parameter block into slot 4 | | | | | |
| 1.9 | deaHousekeepingData | | B | get FP temp, should be stable and | | Y | 1or2 | | |
| | commandEcho 18 | | | $\pm 2$ C of desired value | | | | | |
| 2 | | | | | | | | | |
| 2.1 | Check cmdResult == OK | | A | | | Y | 2 | 60k | |
| | commandEcho 359 | | 2 | Expect DEA side A | | | | | |
| | | | 2 | power = $42 \pm 3$ W | | | | | |
| | | | 2 | Expect DPA Side A | | | | | |
| | | | 2 | = $38 \pm 2$ W | | | | | |
| | | | 2 | Expect DPA Side B | | | | | |

Table 1: **Continuous Clocking 3x3 (Page 2)**

| Step # | Title (Revision 1.25_V2.1) | Time Req (m) | Command Description | Command Mnemonic | Telemetry Description | Telemetry Mnemonic | Expected Value | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | DPA Input I B | 1DPICBCU | 1.0–1.2 | A |
| 3 | Collect ACIS-I data | | | | | | | |
| 3.1 | Load parameter block | 1 | loadCcBlock | WC0001E014 | | | | |
| 3.2 | Load window block | 1 | load1dBlock | W100019014 | | | | |
| 3.3 | Start science | 1 | startScience | XCZ0000005 | | | | |
| 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 | Wait for data acquisition | 60 | | | | | | |
| 3.16 | Stop Science | 5 | stopScience | AA00000000 | | | | |

Table 2: (CONT) **Continuous Clocking 3x3 (Page 2)**

| Step # | Telemetry EGSE | Other Verifier | Crit | Description | Notes | RT Con | Tlm Fmt | Min Alt | SIM Pos |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2 | $= 33 \pm 2$ W | | | | | |
| 3 | | | | | | | | | |
| 3.1 | Check cmdResult == OK commandEcho 1244 | | B | | | Y | 2 | 60k | |
| 3.2 | Check cmdResult == OK commandEcho 1232 | | B | Filter events from I0-I3 | | Y | 2 | 60k | |
| 3.3 | Check cmdResult == OK commandEcho 39 | | B | run I0–I3,S2,S3 | | Y | 2 | 60k | |
| 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 any of these dumps. | Y | 2 | 60k | |
| 3.6 | Check cmdResult == OK commandEcho 72 | | B | | | 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 | | | 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 | | | | | | N | 2 | 60k | |
| 3.16 | Check cmdResult == OK | scienceReport | A | | | Y | 2 | 60k | |

Table 1: **Continuous Clocking 3x3 (Page 3)**

| Step # | Title (Revision 1.25_V2.1) | Time Req (m) | Command Description | Command Mnemonic | Telemetry Description | Telemetry Mnemonic | Expected Value | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 4 | Configure for spectro | | | | | | | |
| 4.1 | Power up spectro video | 1 | changeConfigSetting | WSPOW3F03F | | | | |
| 5 | Collect ACIS-S data | | | | | | | |
| 5.1 | Load parameter block | 0.1 | loadCcBlock | WC00020014 | | | | |
| 5.2 | Load window block | 0.1 | load1dBlock | W100019014 | | | | |
| 5.3 | Start science | 0.1 | startScience | XCZ0000005 | | | | |
| 5.4 | dump default TE PBs | 0.1 | dumpParameterSlots | RT_0000001 | | | | |
| 5.5 | dump default CC PBs | 0.1 | dumpParameterSlots | RC_0000001 | | | | |
| 5.6 | dump default 2D PBs | 0.1 | dumpParameterSlots | R2_0000001 | | | | |
| 5.7 | dump default 1D PBs | 0.1 | dumpParameterSlots | R1_0000001 | | | | |
| 5.8 | dump default DeaHk PBs | 0.1 | dumpParameterSlots | RD_0000001 | | | | |
| 5.9 | dump system config. | 0.1 | dumpSysConfig | RS_0000001 | | | | |
| 5.10 | dump bad pixel list | 0.5 | dumpBadPixels | RP_0000001 | | | | |
| 5.11 | dump bad TE columns | 0.1 | dumpBadTeColumn | R4_0000001 | | | | |
| 5.12 | dump bad CC columns | 0.1 | dumpBadCcColumn | R3_0000001 | | | | |
| 5.13 | dump Huffman tables | 0.5 | dumpHuffman | RH_0000001 | | | | |
| 5.14 | dump patches | 2 | dumpPatchlist | RU_0000001 | | | | |

Table 2: (CONT) **Continuous Clocking 3x3 (Page 3)**

| Step # | Telemetry EGSE | Other Verifier | Crit | Description | Notes | RT Con | Tlm Fmt | Min Alt | SIM Pos |
|---|---|---|---|---|---|---|---|---|---|
| | commandEcho 1539 | | | | | | | | |
| 4 | | | | | | | | | |
| 4.1 | Check cmdResult == OK<br>commandEcho 360 | | A | | | Y | 2 | 60k | |
| 5 | | | | | | | | | |
| 5.1 | Check cmdResult == OK<br>commandEcho 1247 | | B | | | Y | 2 | 60k | |
| 5.2 | CheckcmdResult == OK<br>commandEcho 1232 | | B | filter events from s0,1,4,5 | | Y | 2 | 60k | |
| 5.3 | Check cmdResult == OK<br>commandEcho 39 | | B | run S0–S6 CCDs | | Y | 2 | 60k | |
| 5.4 | Check cmdResult == OK<br>commandEcho 78 | | B | | *psci* should not indicate any errors regarding | Y | 2 | 60k | |
| 5.5 | Check cmdResult == OK<br>commandEcho 75 | | B | | "truncated blocks" for any of these dumps. | Y | 2 | 60k | |
| 5.6 | Check cmdResult == OK<br>commandEcho 72 | | B | | | Y | 2 | 60k | |
| 5.7 | Check cmdResult == OK<br>commandEcho 71 | | B | | | Y | 2 | 60k | |
| 5.8 | Check cmdResult == OK<br>commandEcho 63 | | B | | | Y | 2 | 60k | |
| 5.9 | Check cmdResult == OK<br>commandEcho 66 | | B | | | Y | 2 | 60k | |
| 5.10 | Check cmdResult == OK<br>commandEcho 83 | | B | | | Y | 2 | 60k | |
| 5.11 | Check cmdResult == OK<br>commandEcho 80 | | B | | | Y | 2 | 60k | |
| 5.12 | Check cmdResult == OK<br>commandEcho 77 | | B | | | Y | 2 | 60k | |
| 5.13 | Check cmdResult == OK<br>commandEcho 68 | | B | | | Y | 2 | 60k | |
| 5.14 | Check cmdResult == OK | | B | | | Y | 2 | 60k | |

Table 1: **Continuous Clocking 3x3 (Page 4)**

| Step # | Title (Revision 1.25_V2.1) | Time Req (m) | Command Description | Command Mnemonic | Telemetry Description | Telemetry Mnemonic | Expected Value | Units |
|---|---|---|---|---|---|---|---|---|
| 5.15 | Wait for data acquisition | 60 | | | | | | |
| 5.16 | Stop Science | 1 | stopScience | AA00000000 | | | | |
| 6 | Return to Thermal Standby Only if necessary. | | | | | | | |
| 6.1 | Power down FEPS, vid bds | 0.1 | changeConfigSetting | WSPOW00000 | | | | |
| 6.2 | dump system config. | 0.1 | dumpSysConfig | RS_0000001 | | | | |
| 6.3 | Check DPA and DEA pwr | | | | DPA Input V A | 1DP28AVO | 28.0–32.0 | V |
| | | | | | DPA Input I A | 1DPICACU | 0.38–0.43 | A |
| | | | | | DPA Input V B | 1DP28BVO | 28.0–32.0 | V |
| | | | | | DPA Input I B | 1DPICBCU | 0.28–0.32 | A |
| | | | | | DEA Input I A | 1DEICACU | 0.66–0.75 | A |
| | | | | | DEA Input V A | 1DEP3AVO | 28.0-32.0 | V |
| | Total Time | 147.5 | | | | | | |

Table 2: (CONT) **Continuous Clocking 3x3 (Page 4)**

| Step # | Telemetry EGSE | Other Verifier | Crit | Description | Notes | RT Con | Tlm Fmt | Min Alt | SIM Pos |
|---|---|---|---|---|---|---|---|---|---|
| | commandEcho 65 | | | | | | | | |
| 5.15 | | | | | | N | 2 | 60k | |
| 5.16 | Check cmdResult == OK<br>commandEcho 1539 | scienceReport | A | | | N | 2 | 60k | |
| 6 | | | | | | | | | |
| 6.1 | Check cmdResult == OK<br>commandEcho 773 | | A | return to thermal standby state | | Y | 2 | 60k | |
| 6.2 | Check cmdResult == OK<br>commandEcho 66 | | B | | | Y | 1or2 | | |
| 6.3 | | | 2<br>2<br>2<br>2<br>2 | Expect 12 W for side A, power consumption<br>should be more stable than I or V.<br>Expect 9 W for side B, power consumption<br>should be more stable than I or V.<br>DEA A Power should be $21 \pm 3$ W,<br>current is noisy so an avg. is needed | | Y | 1or2 | | |
| | | | | | | | | | |