

# ACIS Verification Summary Report

36-01510.008

**Specification:** ACIS Contract End Item Specification

**Requirement Number/Title:** 3.1.3.1b Continuous Readout Mode (VRSD 3.1.3.1b-1)

**Requirement Statement:** During continuous exposure mode, ACIS shall be capable of reading a data stream from the CCDs with a full-line readout time (including parallel transfer) of no more than 6.2 msec.

**Verification Method:** Measurement Analysis

**Procedure Number:**

**Configuration:**

XRCF HRMA test, Science Run #57, start time 1997:113:26186 stop time 1997:113:31213, 6CCDs, Imaging focus cclx3 mode

**Cycle Time:**

## Verification Discussion/Results:

ACIS telemetry was processed through 'get\_packets' and 'psci', 'XRCF 57 time 1x1'. File was examined and compared with FEP time stamps against UTC derived from IREG-B timing. A full line readout of 1024 values was read in 2.845 Msecs.

ACIS Cognizant Engineer

6/5/97

Date

Element:  
ACIS

Requirement Number:  
3.1.3.1

Verification Item:  
3.1.3.1b-1

Requirement Title:  
Continuous Readout Modes

### AXAF-I Verification Requirement Compliance Data Submittal

Evaluators:  
CHE, IN&C, DMS, SAO

Type of Review:  
 Verification Item Closure  
 Requirement Closure

Compliance Data/Location:  
MA-234/38-01510.008/Rm 522 Bldg 4200 (Closure Report)

Verification Method:  
Test

Comments:  
DMS - N/A  
SAO/COJ-DISAPPROVED-824-97  
No evidence supporting statement.  
IN&C - Disapprove: Concur with SAO  
  
*Test was redone by Dorothy Gordon and Peter Ford. See attached results.  
Full-line readout time is 2.990 msec (well under the specification of 6.2 msec.*  
*William Mayer*  
*7/25/97*

Status:  
Open 6/12/97

Recommendation:  Approve  
 Disapprove  
 Other (Explain)  
Action Required for Closure:  
Provide supporting data instead of simply a statement of compliance.

MSFC Evaluator: Ken Reed      Date: 7/9/97      Organization: EJ32      Phone Number: 4-8560

Disposition:  Approve  
 Disapprove  
 Other (Explain)  
Action Required for Closure:  
A few things....First, I believe there is a typo in the time duration that needs to be corrected (Msec instead of msec). Second, it wasn't clear that the timestamp being compared should be the FEP. I believe the FEP timestamp was used, and the relationship to UTC or IRIG-B should be better explained. Finally, simply a copy of the timestamped data from one full line of data should be provided.

Chief Engineer: Anthony R. Lavole      Date: 7/14/97

## ACIS Continuous Readout Mode

The engineering DEA and DPA was configured via the flight software to execute a continuous clocking mode. (A copy of the flight software parameter block is attached.) A breakdown of a row of pixel readout operations and the timing of each element follows:

	Parallel Transfer	Dummy Pixels	Valid Pixel Readout	Dummy Pixels	Overclocks	Horizontal Synch
SRAM cycles	4	4	256	4	30	1
Pixel Cycles	16	16	1024 valid pixels per line	16	120	4
Elapsed Time	40 $\mu$ sec	40 $\mu$ sec	2560 $\mu$ sec	40 $\mu$ sec	300 $\mu$ sec	10 $\mu$ sec

Note that each SRAM cycle feeds all four video chains simultaneously, so for each 10  $\mu$ sec SRAM cycle, four pixel, overclock or control streams are transferred from the DEA to the DPA.

The total calculated elapsed time, 2.990 msec, is the sum of all the elapsed time contributions. The row readout time was verified in the lab with a logic analyzer. Time between horizontal synchs (HS) was consistently measured at 2.990 msec (see attached waveform printout). (To further verify timing consistency, the logic analyzer was configured to trigger on two rising edges of HS occurring at greater than 2.990 msec; it did not trigger.) The attached waveform diagram also displays pixel code (PCODE), a control word transferred from the DEA to the DPA. A PCODE value of 3 indicates valid pixel. The smaller block appearing to the right of the valid pixel section represents the overclock transfer.

```
paramBlockName      = ccBlock
parameterBlockId    = 0x90000000
fepCcdSelect        = 0 10 10 10 10 10
fepMode              = 1
bepPackingMode      = 0
ignoreBadColumnMap  = 0
recomputeBias       = 0
trickleBias         = 0
rowSum               = 0
columnSum            = 0
overclockPairsPerNode = 15
outputRegisterMode  = 0
ccdVideoResponse    = 0 0 0 0 0 0
fep0EventThreshold  = 50 50 50 50
fep1EventThreshold  = 50 50 50 50
fep2EventThreshold  = 50 50 50 50
fep3EventThreshold  = 50 50 50 50
fep4EventThreshold  = 50 50 50 50
fep5EventThreshold  = 50 50 50 50
fep0SplitThreshold  = 20 20 20 20
fep1SplitThreshold  = 20 20 20 20
fep2SplitThreshold  = 20 20 20 20
fep3SplitThreshold  = 20 20 20 20
fep4SplitThreshold  = 20 20 20 20
fep5SplitThreshold  = 20 20 20 20
lowerEventAmplitude = 0
eventAmplitudeRange = 24570
gradeSelections     = 1 1 1 1
windowSlotIndex     = 0xffff
rawCompressionSlotIndex = 0
ignoreInitialFrames = 2
biasAlgorithmId     = 0 0 0 0 0 0
biasRejection       = 5 5 5 5 5 5
fep0VideoOffset     = 32 32 32 32
fep1VideoOffset     = 32 32 32 32
fep2VideoOffset     = 32 32 32 32
fep3VideoOffset     = 32 32 32 32
fep4VideoOffset     = 32 32 32 32
fep5VideoOffset     = 32 32 32 32
deaLoadOverride     = 0
fepLoadOverride     = 0
```

Analyzer    Waveform MACHINE 1    Acq. Control    Cancel    Run  
 Accumulate    PCODE    X → 4    Center  
   Off        Hex    0 → 4    Screen  
 sec/Div    Delay    Markers    X to 0    Trig to X    Trig to 0  
 500 us    -1.400 ms    Time    -2.990 ms    -55.86 ns    -2.990 ms

PCODE all	3		3		3
HS					
VS					