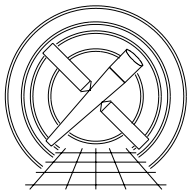

MIT Kavli Institute **Chandra X-Ray Center**

MEMORANDUM
June 3, 2011

To:	Jonathan McDowell, SDS Group Leader
From:	Glenn E. Allen, SDS
Subject:	Deltoclk spec
Revision:	1.0
URL:	http://space.mit.edu/CXC/docs/docs.html#deltoclk
File:	/nfs/cxc/h2/gea/sds/docs/memos/deltoclk_spec_1.0.tex

1 Description

Occasionally the values of `DELTOCLK` in exposure-records files are anomalously high or anomalously low. Since the values of `DELTOCLK` are used to compute the pulse heights of event data, events that are processed using anomalous values have a `STATUS` bit set to one and are discarded from Level 2 event-data files.

2 Input

1. One or more Level 0 event-data file (acis*evt0.fits)
2. One or more Level 0 exposure-records file (acis*exr0.fits)

3 Output

1. An event-data file
2. A Level 1 exposure statistics file (acis*stat1.fits)

4 Parameters

1. `infile,f,a,"",,,"Name of input event-data file(s)"`
2. `outfile,f,a"",,,"Name of output event-data file"`
3. `exrfile,f,a,"",,,"Name of input exposure-records file"`
4. `expstatsfile,f,a,"",,,"Name of output exposure-statistics file"`
5. `expnowidth,i,h,5,3,1001,"Number of frames in the sliding time window"`
6. `deltoclkthresh,i,h,6,1,4096,"Minimum offset for anomalous DELTOCLKs"`

5 Processing

The tool `acis_format_events` includes the following processing steps.

1. Verify that the `infile` and `exrfile` exist. If `clobber=no`, then verify that the `outfile` and `expstatsfile` do not exist. Verify that the values of the parameters `expnowidth` and `deltoclkthresh` are in the valid ranges for these parameters. Note that `expnowidth` must be an odd number.

2. For each node of each CCD of each frame i of data, compute the median value M_i of the `DELTOCLK`s from frames $i - w$ to $i + w$ of the same node. Here, $w = (\texttt{expnowidth} - 1)/2$ (i.e. there are `expnowidth` frames in the full range). Note that the width of the time window is smaller at the beginning and the end of the data. For example, the appropriate range for the first and second frames of data are i to $i + w$ and $i - 1$ to $i + w$, respectively.

3. If $\texttt{DELTOCLK}_i \geq M_i + \texttt{deltoclkthresh}$ or $\texttt{DELTOCLK}_i \leq M_i - \texttt{deltoclkthresh}$ for a particular node, then set `STATUS` bit 10 (of 0-31) to one for all of the events in frame i on that node and include the `EXPNO`, `CCD_ID`, and `NODE_ID` information in the "BADOCLK" HDU of the `expstatsfile`.