MIT Kavli Institute

Chandra X-Ray Center

MEMORANDUM
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To:	Jonathan McDowell, SDS Group Leader
From:	Glenn Allen, SDS ACIS Scientist
Subject:	The use of bad-pixel files by acis_process_events
Revision:	1.0
URL:	http://space.mit.edu/CXC/docs/docs.html#apebadpix
File:	/nfs/cxc/h2/gea/sds/docs/memos/memo_ape_badpix_1.0.tex

1 acis_process_events

1.1 Bad-pixel files

The tool acis_process_events identifies events that occur on (or adjacent to) bad pixels by setting one or both of STATUS bits 4 and 5 to one for these events. This spec describes how these STATUS bits are set.

1.1.1 Input

1. A (preferably observation-specific) bad-pixel file

1.1.2 Parameters

1. **badpixfile**,f,h,"none",,,"ACIS bad-pixel file name (NONE — none — ⟨filename⟩)"
2. **badpixaction**,s,h,"set",,,"Copy, set or unset bad-pixel STATUS bits?"
   The valid choices for this parameter include "copy", "set" and "unset".

1.1.3 Algorithm

When the tool acis_process_events is first executed, verify that the bad-pixel–related parameters are valid.

- If badpixfile = "", "none" or "NONE", then set badpixaction = "copy". If badpixfile is not "", "none" or "NONE" and the specified input file does not exist, then exit with an error message.
- If badpixaction is not "copy", "set" or "unset", then exit with an error message.

The three possible actions for STATUS bits 4 and 5 include (1) copying the bits, (2) setting (or resetting) the bits and (3) unsetting the bits. Each of these actions is described below.

- **Copy**:
  In this case, if the input event-data file or stack of files includes a STATUS column with bits 4 and 5, then the values of the bits are copied from the input file to the output file. If the input file or stack does not have this STATUS information, then STATUS bits 4 and 5 are set to zero for every event in the output file.

- **Set**:
  In this case, the following actions are performed in order.

  1. STATUS bits 4 and 5 are set to zero independent of the STATUS information (if any) in the input event-data file or stack of files.
  2. STATUS bit 4 is set to one for an event in the output file if the following conditions are satisfied.
     - The CCD coordinates (CCD_ID, CHIPX and CHIPY) of the event are the same as the coordinates of a pixel in the bad-pixel file for which one or more of the bad-pixel STATUS bits 0–4, 7, and 11–16 are set to one.
     - The event time is greater than or equal to the start time of the bad pixel.
     - The event time is less than the stop time of the bad pixel.
  3. STATUS bit 5 is set to one for an event in the output file if the following conditions are satisfied.
     - The CCD coordinates of the event are the same as the coordinates of a pixel in the bad-pixel file for which bad-pixel STATUS bit 8 is set to one.
     - The event time is greater than or equal to the start time of the bad pixel.
     - The event time is less than the stop time of the bad pixel.

- **Unset**:
  In this case, STATUS bits 4 and 5 are set to zero for every event in the output file.