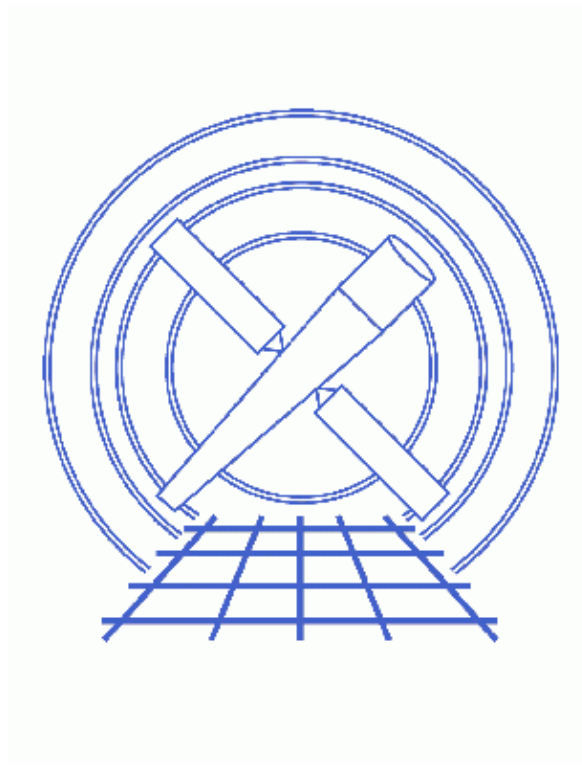


# New Observation-Specific HRC Bad Pixel File



## CIAO 4.1 Science Threads

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# New Observation-Specific HRC Bad Pixel File

## CIAO 4.1 Science Threads

### Overview

**Last Update:** 6 Feb 2009 - updated for CIAO 4.1: degap file path updated for CALDB 4

**Synopsis:**

The HRC-I and HRC-S bad pixel files are used both to define the valid coordinate regions in the detectors and to identify bad (hot) pixels. Observation-specific bad pixel files are generated from calibration data products by applying the appropriate degap corrections and selecting all time-dependent bad pixel regions in the calibration data that are appropriate to the time of the observation.

**Purpose:**

To generate a new observation-specific HRC bad pixel file.

**Read this thread if:**

you are working with an HRC dataset and you have either re-run `hrc_process_events` using degap corrections **different** from those used in standard processing, or you have identified new bad pixel regions that are not contained in the CALDB bad pixel list.

Proceed to the [HTML](#) or [hardcopy \(PDF: \[A4\]\(#\) | \[letter\]\(#\)\)](#) version of the thread.

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## Get Started

**Sample ObsID used:** 6476 (HRC-I, HZ 43)

**File types needed:** `evt1`; `bpix1`

or any FITS file for the observation whose header contains the keywords `TSTART`, `TSTOP`, & `DETNAM`.

In this thread, we assume that all relevant files are in the same working directory.

In order to run `hrc_build_badpix`, you need an `obs.par` file for the observation, which contains the `TSTART`, `TSTOP`, and `DETNAM` parameters. This is created by running `dmmakepar`:

```
unix% dmmakepar hrcf06476_000N002_evt1.fits hrcf06476_obs.par
unix% less hrcf06476_obs.par
```

```

title,s,h,"A07 Calibration Observations of HZ43",,,,"Proposal title"
observer,s,h,"Dr. CXC Calibration",,,,"Principal investigator"
object,s,h,"HZ43",,,,"Source name"
origin,s,h,"ASC",,,,"Source of FITS file"
...
detnam,s,h,"HRC-I",,,,"Detector"
...
tstart,r,h,270164100.35322,,,"Observation start time"
tstop,r,h,270167471.57838,,,"Observation end time"
...

```

---

## Updating the Bad Pixel File to the Current CALDB

The tool may be run to generate a new observation-specific bad pixel file from the newest available degap and bad pixel lists. To do so, set both `infile` and `degapfile` parameters to "CALDB" and the tool will automatically locate the newest appropriate file in the CALDB.

```

unix% punlearn hrc_build_badpix
unix% pset hrc_build_badpix infile=CALDB
unix% pset hrc_build_badpix degapfile=CALDB
unix% pset hrc_build_badpix outfile=hrcf06476_bpix1_caldb.fits
unix% pset hrc_build_badpix obsfile=hrcf06476_obs.par
unix% hrc_build_badpix
Input (ARD) bad pixel file (CALDB):
Output (Level 1) bad pixel file (hrcf06476_bpix1_caldb.fits):
Input observation parameter file (hrcf06476_obs.par):
Input degap file (NONE | none | COEFF | <filename>) (CALDB):
# hrc_build_badpix (CIAO 4.1): The following error occurred 3 times:
    dsHBBSETTLMINERR -- WARNING: chip coord. is outside of valid range. Set to TLMIN.
# hrc_build_badpix (CIAO 4.1): The following error occurred 3 times:
    dsHBBSETTLMAXERR -- WARNING: chip coord. is outside of valid range. Set to TLMAX.

```

The warnings may be ignored.

The contents of the parameter file may be checked using `plist hrc_build_badpix`.

This bad pixel file is suitable for use with a dataset that has also been reprocessed with the newest calibration, e. g. by following the [HRC Data Preparation Analysis Guide](#).

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## Generating a Bad Pixel File to Match Event Data Calibration

When creating a bad pixel file for use with a specific observation, it is important to make sure that the degap solution used is the same one that was applied to the event data. The degap solution is applied during analysis when converting from raw to chip coordinates.

### Determine the degap solutions

The degap filename is stored in the DEGAP header keyword of the event and bad pixel files:

```

unix% dmkeypar hrc_6476_new_evt1.fits DEGAP echo+
hrciD1999-07-22gaplookupN0003.fits

unix% dmkeypar hrcf06476_000N002_bpix1.fits DEGAP echo+
/data/CALDB/sdp/data/chandra/hrc/bcf/gaplookup/hrciD1999-07-22gaplookupN0003.fits

```

## HRC Bad Pixel File - CIAO 4.1

The event data and bad pixel file have been reprocessed with the same version of the degap file. In this case, it is not necessary to create a new bad pixel file.

This data will still be used to show how the bad pixel file would be remade to use the same calibration as the event data.

---

### Run `hrc_build_badpix`, specifying the degap file

Now we run `hrc_build_badpix`, specifying which degap file should be used when creating the new bad pixel file. Since the `infile` parameter is set to `CALDB`, the newest bad pixel file from the `CALDB` will be used for that input.

```
unix% punlearn hrc_build_badpix
unix% pset hrc_build_badpix infile=CALDB
unix% pset hrc_build_badpix degapfile=$CALDB/data/chandra/hrc/gaplookup/hrciD1999-07-22gaplookup
unix% pset hrc_build_badpix outfile=hrcf06476_bpix1_match.fits
unix% pset hrc_build_badpix obsfile=hrcf06476_obs.par
unix% hrc_build_badpix
Input (ARD) bad pixel file (CALDB):
Output (Level 1) bad pixel file (hrcf06476_bpix1_match.fits):
Input observation parameter file (hrcf06476_obs.par):
Input degap file (NONE | none | COEFF | <filename>) (/soft/ciao/CALDB/data/chandra/hrc/gaplookup

# hrc_build_badpix (CIAO 4.1): The following error occurred 3 times:
    dsHBBSETTLMINERR -- WARNING: chip coord. is outside of valid range. Set to TLMIN.
# hrc_build_badpix (CIAO 4.1): The following error occurred 3 times:
    dsHBBSETTLMAXERR -- WARNING: chip coord. is outside of valid range. Set to TLMAX.
```

The warnings may be ignored.

The contents of the parameter file may be checked using `plist hrc_build_badpix`.

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## Applying the File

Now that we have a new bad pixel file, it needs to be applied to the event file. To do so, run `hrc_process_events` as shown in the [Create a New Level=2 Event File thread](#). The bad pixel file is used in the `badpixfile` parameter:

```
unix% pset hrc_process_events badpixfile=hrcf06476_bpix1_match.fits
```

Also, set this as the the observation-specific bad pixel file for any subsequent analysis tasks; see the [Setting the Observation-specific Bad Pixel Files thread](#) for instructions.

---

Parameters for `/home/username/cxcds_param/hrc_build_badpix.par`

```
infile = CALDB           Input (ARD) bad pixel file
outfile = hrcf06476_bpix1_caldb.fits Output (Level 1) bad pixel file
obsfile = hrcf06476_obs.par Input observation parameter file
degapfile = CALDB       Input degap file (NONE | none | COEFF | <filename>)
    (cfu1 = 1.0)         u axis 1st order cor. factor
    (cfu2 = 0.0)         u axis 2nd order cor. factor
    (cfv1 = 1.0)         v axis 1st order cor. factor
    (cfv2 = 0.0)         v axis 2nd order cor. factor
```

## HRC Bad Pixel File - CIAO 4.1

```
(logfile = STDOUT)      Output debug log file (<filename>, NONE, STDOUT)
(clobber = no)          Overwrite output file(s) if already exists?
(verbose = 0)           Debug level (0-5)
(mode = ql)
```

---

Parameters for /home/username/cxcds\_param/hrc\_build\_badpix.par

```
infile = CALDB           Input (ARD) bad pixel file
outfile = hrcf06476_bpix1_match.fits Output (Level 1) bad pixel file
obsfile = hrcf06476_obs.par Input observation parameter file
degapfile = /soft/ciao/CALDB/data/chandra/hrc/gaplookup/hrcid1999-07-22gaplookupN0003.fits Input d
(cfu1 = 1.0)            u axis 1st order cor. factor
(cfu2 = 0.0)            u axis 2nd order cor. factor
(cfv1 = 1.0)            v axis 1st order cor. factor
(cfv2 = 0.0)            v axis 2nd order cor. factor
(logfile = STDOUT)      Output debug log file (<filename>, NONE, STDOUT)
(clobber = no)          Overwrite output file(s) if already exists?
(verbose = 0)           Debug level (0-5)
(mode = ql)
```

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## History

01 Dec 2006 new for CIAO 3.4

25 Jan 2008 reviewed for CIAO 4.0: no changes

06 Feb 2009 updated for CIAO 4.1: degap file path updated for CALDB 4

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URL: [http://cxc.harvard.edu/ciao/threads/hrc\\_badpix/](http://cxc.harvard.edu/ciao/threads/hrc_badpix/)

Last modified: 6 Feb 2009