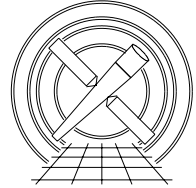




MIT Kavli Institute



Chandra X-Ray Center

MEMORANDUM

May 30, 2007

To: Jonathan McDowell, SDS Group Leader
From: Glenn E. Allen, SDS
Subject: Mean biases
Revision: 1.0
URL: http://space.mit.edu/CXC/docs/docs.html#mean_bias
File: /nfs/cxc/h2/gea/sds/docs/memos/memo_mean_bias_1.0.tex

Anomalous features have been identified in many ACIS bias images. Events that occur on pixels adversely affected by an anomaly can have inaccurate pulse-height amplitudes and grades. To address this issue, the ACIS instrument team created mean bias images for each CCD at a focal-plane temperature of -120°C .

1 Processing

To construct a bias B' from a mean bias \bar{B} and an observation-specific bias B , perform the following steps for each node n of each CCD c :

1. Compute the median value \bar{O}_{nc} of the 256 columns and 1024 rows of the mean bias \bar{B}_{nc} . Exclude pixels that have a bias value of 4094 and 4095 from this calculation.
2. Compute the median value O_{nc} of the observation-specific bias B_{nc} . Again, exclude pixels that have a bias value of 4094 and 4095 from this calculation.
3. Set the estimated bias value

$$B'_{nc} = \bar{B}_{nc} - \bar{O}_{nc} + O_{nc}. \quad (1)$$

4. Round B'_{nc} to the nearest integer to avoid introducing a systematic offset of -0.5 adu when the real-valued bias B' is converted to an integer image by truncating the decimal portions of the numbers.
5. Write the bias B' to a file as an array of two-byte integers. Also write the four values of O_{nc} to the keywords INITOCLA ($n = 0$), INITOCLB (1), INITOCLC (2) and INITOCLD ($n = 3$).