MIT Kavli Institute

Chandra X-Ray Center

MEMORANDUM
June 12, 2007

To:	Jonathan McDowell, SDS Group Leader
From:	Glenn E. Allen, SDS
Subject:	Mean biases
Revision:	1.2
URL:	http://space.mit.edu/CXC/docs/docs.html#mean_bias
File:	/nfs/cxc/h2/gea/sds/docs/memos/memo_mean_bias_1.2.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 (PHAS, PHA, ENERGY and PI) and grades (FLTGRADE and GRADE). To address this issue, the ACIS instrument team created one mean bias image for each CCD at each epoch with 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. Read the value of initial overclock $\bar{O}_{nc}$ of the 256 columns and 1024 rows of the mean bias $\bar{B}_{nc}$ from the header of the bias file[1].
2. Read the value of the initial overclock O_{nc} of the observation-specific bias B_{nc}[1].
3. Set the estimated bias value
$$B'_{nc} = \bar{B}_{nc} - \bar{O}_{nc} + O_{nc}. \tag{1}$$
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.
6. Write the four values of O_{nc} to the keywords INITOCLA, INITOCLB, INITOCLC and INITOCLD in the header of the output bias file for B'.

[1] The names of the overclock keywords are INITOCLA, INITOCLB, INITOCLC and INITOCLD for NODE_IDs 0, 1, 2 and 3, respectively.