



ASTRO-H

INSTRUMENT CALIBRATION REPORT SXI PATTERN GRADE DEFINITION ASTH-SXI-CALDB-PATTERN

Version 0.1

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ISAS/ GSFC

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Table of Contents

1	Introduction.....	4
1.1	Purpose.....	4
1.2	Scientific Impact	4
2	Release CALDB 20160310.....	4
2.1	Data Description & Results.....	4
2.2	Final remarks.....	7

CHANGE RECORD PAGE (1 of 1)

DOCUMENT TITLE : SXI Pattern Grade Definition			
ISSUE	DATE	PAGES AFFECTED	DESCRIPTION
Version 0.1	March 2016	All	First Release

1 Introduction

1.1 Purpose

This document describes how the grade hit pattern CALDB file for the Soft X-ray Imager (SXI) is prepared. The CALDB file structure is defined in the ASTH-SCT-04 and available from the CALDB web page at <http://hitomi.gsfc.nasa.gov>.

1.2 Scientific Impact

The grade hit pattern CALDB file converts a 3x3 PHAS pattern to an ASCA grade, which is used as the first step in the SXI grade assigned by *sxipi*. Further grading uses the *Suzaku* scheme, which changes some of the ASCA grades to other values depending on the exact pixel PHAS pulse heights and the pulse heights in the outer 5x5 (16 pixel) ring, as encoded in the P_OUTER_MOST column.

2 Release CALDB 20160310

Filename	Valid date	Release date	CALDB Vrs	Comments
ah_sxi_pattern_20140101v001.fits	2014-01-01	20160310	001	

2.1 Data Description & Results

The ASCA grade defines which of the 3x3 pixels in an event island have pulse height above the split threshold. This definition was obtained from the ASCA ABC guide (<http://heasarc.gsfc.nasa.gov/docs/asca/abc>), including Figure 4.1 from that guide, which is reproduced as Figure 1 here. Based on this definition, a full list of all 256 possible combinations of 3x3 hit patterns was constructed and assigned by hand the appropriate ASCA grade. These patterns and grades are shown in Figure 2. The hit pattern/grade conversion was tested with flight *Suzaku* data by converting the event list to ASTRO-H format, running *sxipi* on the data, and comparing to the *Suzaku xispi* grade assignment, which should be the same.

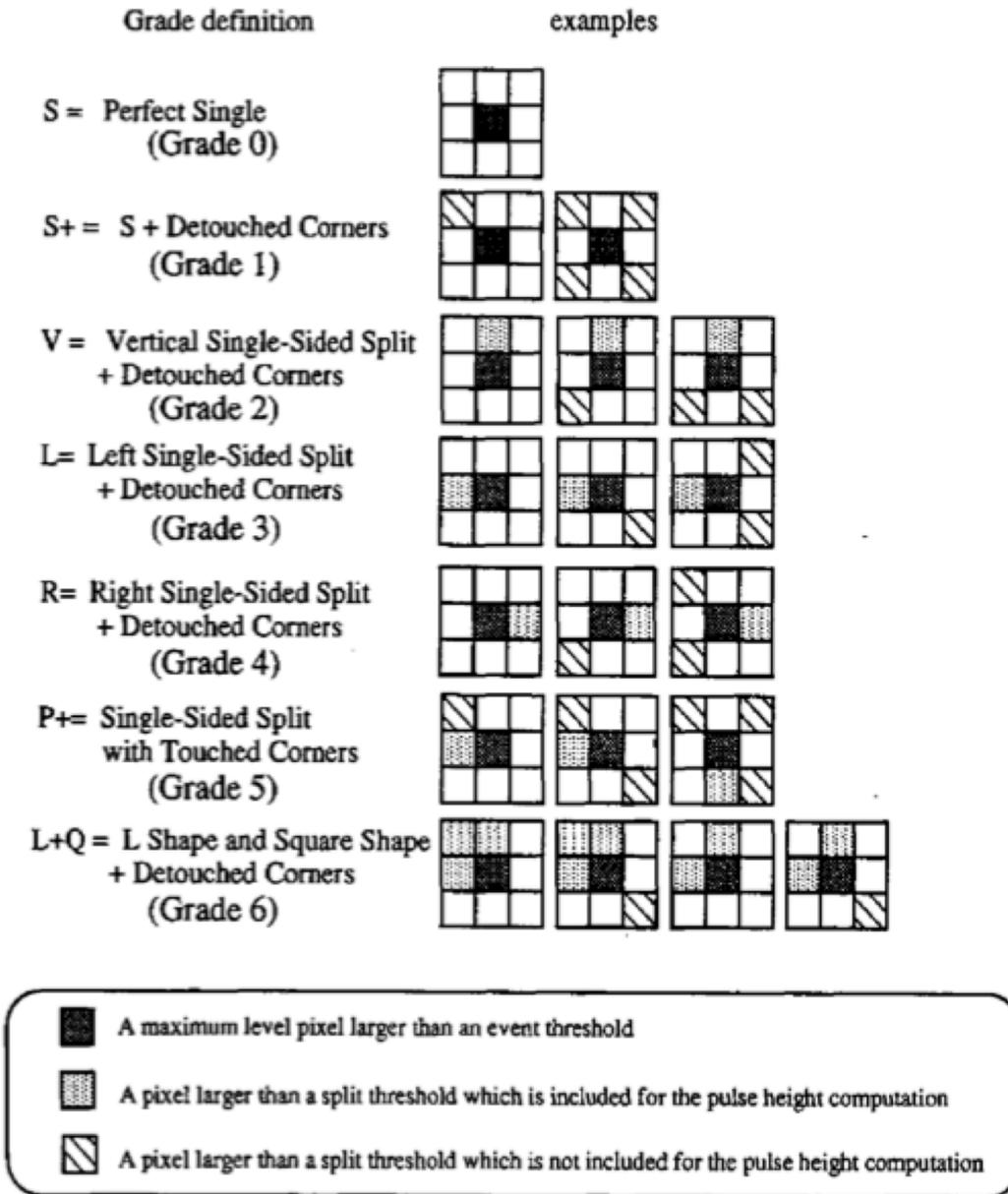


Figure 1. ASCA grades from the ASCA ABC guide.



Figure 2. Schematic of all possible 256 hit patterns with corresponding ASCA grades. Each grid shows a 3x3 pixel event island, with the readout node toward the lower left. Green pixels indicate a pulse-height greater than or equal to the split threshold, with the central pixel (with a dot) above the event threshold. The corresponding ASCA grade number (0–7) is shown below the 3x3 grid.

2.2 Final remarks

This is the first release of this CALDB file. Due to the static nature of ASCA grades, this file is not expected to be updated.