



ASTRO-H

**Instrument Calibration report
HXI Channel Remapping
ASTH-HXI-CALDB-REMAP**

Version 0.1

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JAXA / GSFC

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CHANGE RECORD PAGE

DOCUMENT TITLE : HXI Channel Remapping			
ISSUE	DATE	PAGES AFFECTED	DESCRIPTION
Version 0.1	November 2015	All	First Release

Introduction

1.1 Purpose

This document describes how the Channel Remapping CALDB of the Hard X-ray Imager (HXI) is prepared. The CALDB file structure is define in the ASTH-SCT-04 and available from the CALDB web page at <http://hitomi.gsfc.nasa.gov>.

1.2 Readout ID and Remapped Readout ID

The HXI Camera part consists of a vertical stack of four double-sided Si detectors (DSSDs) and one double-sided CdTe detector (CdTe DSD) each of which has 128 separated readout channels on both sides of the sensor chips. Figure 1 shows a schematic view of one of the sensor layer print-circuit board together with signal amplifier ASIC (application specific integrated circuit) chips. The readout channel number (READOUT_ID) within an ASIC runs from 0 to 31, and ASIC number runs from 0 to 7 within a sensor layer. These numbers are remapped to serial numbers running over the entire sensor (i.e. the HXI Camera part) so that better visibility of the readout channel location in the software implementation. The remapped readout channel ID (READOUT_ID_RMAP) running from 1 to 1280, and the remapped ASIC ID running from 1 to 40.

Remapping table is contained in the Channel Remapping CALDB file. The CALDB also carries positional information of each readout channel (RAWX/RAWY) to be used in the event reconstruction stage (hxievtd).

ASIC layout and channel mapping.
<Single sensor layer>

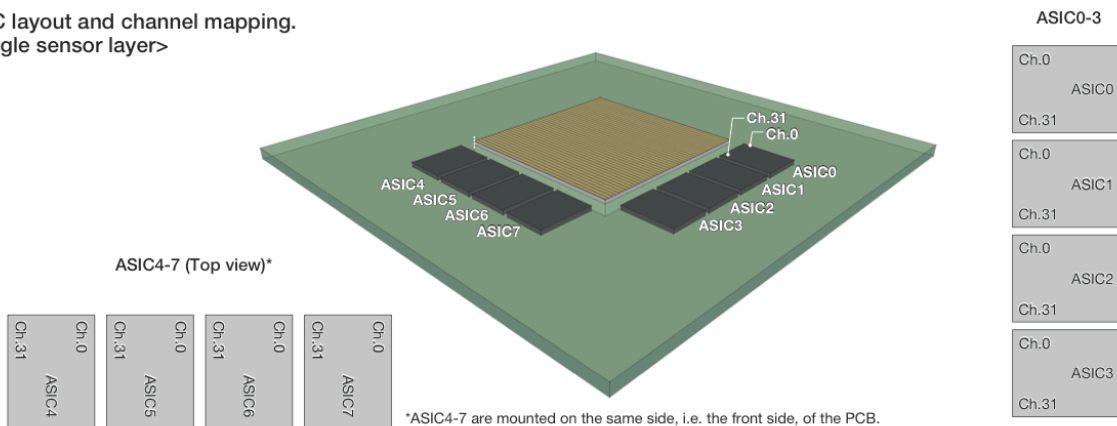


Figure 1. Physical structure of a sensor layer and the numbering of readout channels of ASICs.

1.3 Scientific Impact

Readout channel number remapping does not have direct impact to science analyses. The position information of each readout channel is rather important in the event reconstruction and the following analyses (e.g. event extraction with region selection or image extraction). The channel mapping relation and consequential positional information of each readout channel are determined and fixed by design, and will not change in orbit over time.

Release CALDB 20160310

Filename	Valid date	Release date	CALDB Versions	Comments
ah_hxi_remap_20140101v001.fits	2014-01-01	20160310	001	

2.1 Data Description

As noted above, the remapping relation is determined by design. The following table summarizes the relation.

ASIC_ID		READOUT_ID	LAYER	ASIC_INDEX	ASIC_ID_RMAP	READOUT_ID_RMAP	RAW_X	RAW_Y
hex	decimal	0-31 for given ASIC	0-3 DSSD, 4 CdTe	0-7 for given Layer	1-40 for whole Camera	1-1280 for whole Camera	1-128 for given Layer	1-128 for given Layer
00	0	0-31	0	0	1	128-97		128-97
10	16	0-31	0	1	2	96-65		96-65
20	32	0-31	0	2	3	64-33		64-33
30	48	0-31	0	3	4	32-1		32-1
40	64	0-31	0	4	5	160-129	32-1	
50	80	0-31	0	5	6	192-161	64-33	
60	96	0-31	0	6	7	224-193	96-65	
70	112	0-31	0	7	8	256-225	128-97	
01	1	0-31	1	0	9	384-353		128-97
11	17	0-31	1	1	10	352-321		96-65
21	33	0-31	1	2	11	320-289		64-33
31	49	0-31	1	3	12	288-257		32-1
41	65	0-31	1	4	13	416-385	32-1	
51	81	0-31	1	5	14	448-417	64-33	
61	97	0-31	1	6	15	480-449	96-65	
71	113	0-31	1	7	16	512-481	128-97	
02	2	0-31	2	0	17	640-609		128-97
12	18	0-31	2	1	18	608-577		96-65
22	34	0-31	2	2	19	576-545		64-33
32	50	0-31	2	3	20	544-513		32-1
42	66	0-31	2	4	21	672-641	32-1	
52	82	0-31	2	5	22	704-673	64-33	
62	98	0-31	2	6	23	736-705	96-65	
72	114	0-31	2	7	24	768-737	128-97	
03	3	0-31	3	0	25	896-865		128-97
13	19	0-31	3	1	26	864-833		96-65
23	35	0-31	3	2	27	832-801		64-33

33	51	0-31	3	3	28	800-769		32-1
43	67	0-31	3	4	29	928-897	32-1	
53	83	0-31	3	5	30	960-929	64-33	
63	99	0-31	3	6	31	992-961	96-65	
73	115	0-31	3	7	32	1024-993	128-97	
04	4	0-31	4	0	33	1152-1121		128-97
14	20	0-31	4	1	34	1120-1089		96-65
24	36	0-31	4	2	35	1088-1057		64-33
34	52	0-31	4	3	36	1056-1025		32-1
44	68	0-31	4	4	37	1184-1153	32-1	
54	84	0-31	4	5	38	1216-1185	64-33	
64	100	0-31	4	6	39	1248-1217	96-65	
74	116	0-31	4	7	40	1280-1249	128-97	

2.2 Data Analysis

Not applicable.

2.3 Results

Not applicable.

2.4 Comparison with previous releases

Not applicable.

2.5 Final remarks

Not applicable.