

EPIXHR

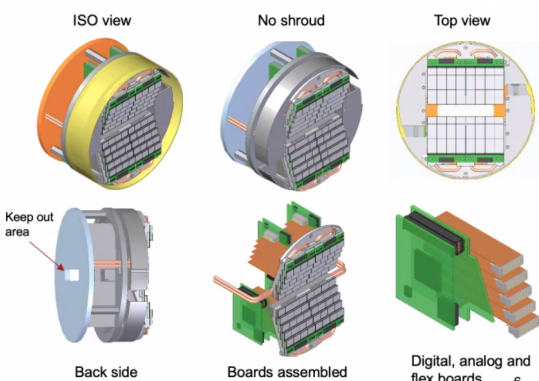
- [Slides from Dionisio Doering](#)
- [Info from Matt](#)
- [Sensor geometry](#)
- [Geometry file](#)
- [Gain factors](#)
- [References](#)

Slides from Dionisio Doering

Concept Overview: Full system

X-Ray Detector
R&D Program
SLAC

- Tile
- Stringer
- Crescent
- Jaw movement
- Cooling
- Electronic system
 - Boards distribution



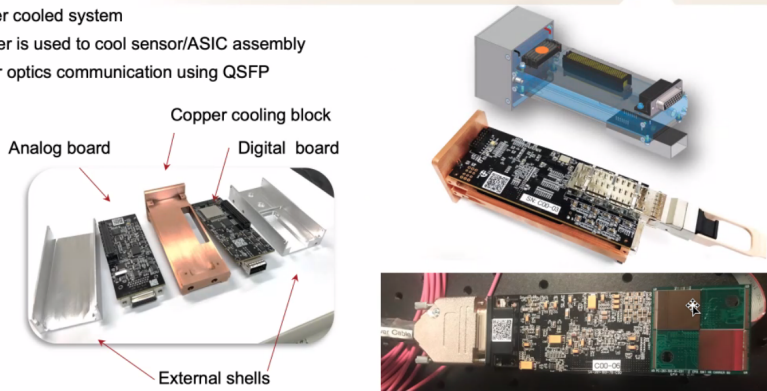
ISO view, No shroud, Top view, Back side, Boards assembled, Digital, analog and flex boards

The slide shows a concept overview of the full system. It includes a list of components: Tile, Stringer, Crescent, Jaw movement, Cooling, and Electronic system (with a sub-item Boards distribution). To the right, there are six 3D CAD models: 'ISO view' (a curved assembly), 'No shroud' (a similar assembly without an outer shell), 'Top view' (a circular layout of components), 'Back side' (a view of the underside with a 'Keep out area' marked), 'Boards assembled' (a stack of circuit boards), and 'Digital, analog and flex boards' (individual board components).

Epix HR - Mechanics

X-Ray Detector
R&D Program
SLAC

- Water cooled system
- Peltier is used to cool sensor/ASIC assembly
- Fiber optics communication using QSFP



Analog board, Copper cooling block, Digital board, External shells

The slide focuses on the mechanical aspects of the Epix HR system. It lists three key features: a water-cooled system, the use of Peltier coolers for the sensor/ASIC assembly, and fiber optic communication via QSFP. Below the text are three images: a 3D model of a cooling assembly with a 'Copper cooling block', a photograph of an 'Analog board' and 'Digital board' mounted on 'External shells', and a close-up photograph of a circuit board with a fiber optic connector.

Info from Matt

Weaver, Matt, Wed 9/22/2021 5:02 PM
To: Dubrovin, Mikhail, O'Grady, Paul Christopher

Hi Mikhail,

I just want to confirm what we talked about earlier today. The `asicPixelConfig` map which appears in the `epixhr2x2` config object will be an array of shape (4,144,192). The ASICs are positioned like so:

```
A1 | A3
----+----
A0 | A2
```

The map will be stored such that the orientation of all the ASICs appear the same.

-Matt

Sensor geometry

Pretty much similar to epix10ka, pixek sizes 100x100um, 100x225um, 225x225um.

Geometry file

/cds/group/psdm/detector/alignment/epixhr2x2/geo-epixhr2x2-1-segment.data

essential part of the geometry file														
#	HDR	PARENT	IND	OBJECT	IND	X0[um]	Y0[um]	Z0[um]	ROT-Z	ROT-Y	ROT-X	TILT-Z	TILT-Y	TILT-X
SEGMENT			0	EPIXHR2X2:V1	0	0	0	0	0	0	0	0.00000	0.00000	0.00000
IP			0	SEGMENT	0	0	0	10000	90	0	0	0.00000	0.00000	0.00000

Gain factors

Gain range	Design(*), ~ADU/eV	Measured (**), eV/ADU	Constants, ADU/keV	epix10ka default, ADU/keV
High	1	24.4eV/ADU	41.0	16.40
Medium	1/3		13.7	5.466
Low	1/80		0.512	0.164

*) Doering, Dionisio <didoering@slac.stanford.edu> Sun 10/3/2021 7:39 PM

To: Hart, Philip Adam; Dubrovin, Mikhail; Blaj, Gabriel; Dragone, Angelo

Cc: O'Grady, Paul Christopher; Kamath, Umanath Ramachandra; Markovic, Bojan

Hi Philip, I just checked this with Angelo, the number we should use are the ones from the 10kT, which means:

H M L
1 1/3 1/80

**) Dionisio: We will get the measured gain values with the upcoming tests. For now we can estimate them using the expected gain ratios between high to medium and high to low gains respectively x3.925 and x141.6.

**) Dionisio: Last time we measured we got for the Cd sealed source $\sim 22000/900\text{ADU} = 24.4\text{eV/ADU}$

Philip: I think 24 eV/ADU should be for high gain - 100 counts would be 2.4 keV, more or less the photon it's aimed at.

References

- 2021-08-20 Dionisio Doering presentation [ePixhr10kTV2_LCLSIntegration_V1p0.pptx](#)
- 2021-09-22 Dionisio Doering presentation [ePixhr10kTV2_LCLS-IIDataDescramble_V1p0.pptx](#)
- 2020 IEEE - Readout System for ePixHR X-ray Detectors
- [Poster at LCLS_userMeeting_2020_tamma \(pdf\)](#)