

# rayonix mx series

◀HS▶

## High speed, high resolution, large format X-ray detector

Exclusive frame-transfer technology for high speed X-ray data collection without compromising resolution or data quality



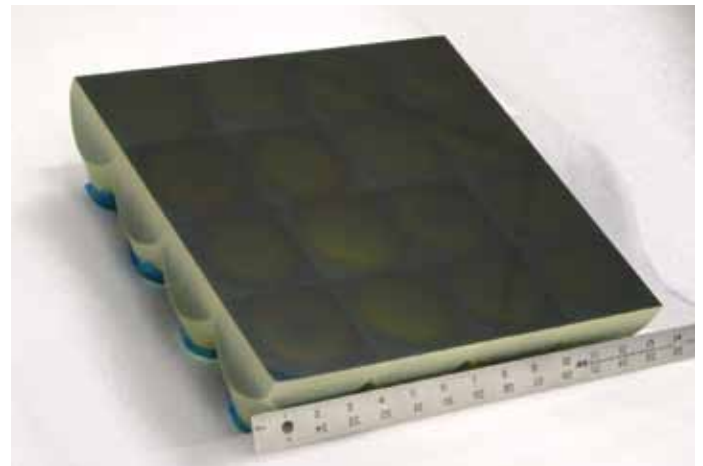
- One millisecond dead time
- Configurable imaging options
- Excellent quantum efficiency
- No gaps between elements
- Superb quality control

## Large, high resolution X-ray detectors using exclusive Rayonix high speed frame-transfer technology with only 1 millisecond dead time and up to 140 frames per second

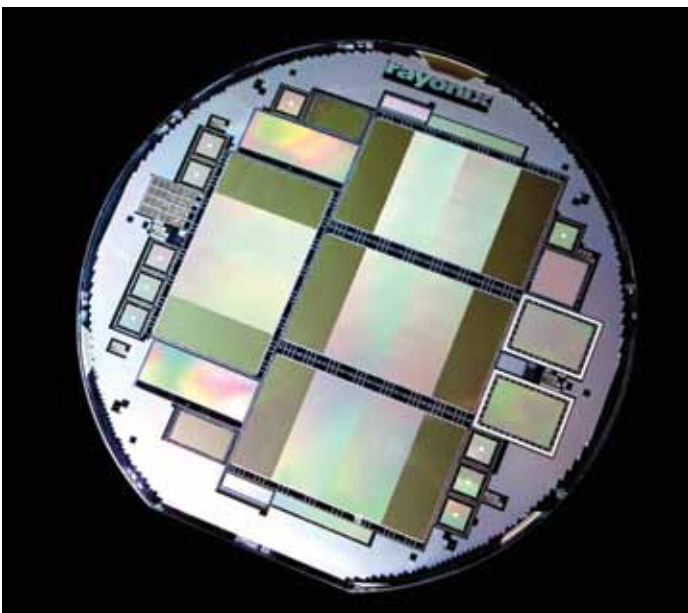
The MX-HS series from Rayonix incorporates the new, exclusive frame-transfer technology for high speed X-ray data collection without compromising resolution or data quality. The result is a new type of high speed and ultra-low noise area detector that delivers the highest performance available for X-ray diffraction applications.

The Rayonix MX-HS detectors are ideal for taking advantage of high brilliance synchrotron sources, or for any other high frame rate application. Examples include: high throughput protein crystallography, Laue diffraction, time-resolved or static small-angle X-ray scattering (SAXS), wide-angle X-ray scattering (WAXS), powder diffraction, X-ray computed tomography (CT), X-ray imaging, and coherent diffraction imaging (CDI). With no count rate limitation, these detectors are also ideal for XFEL applications.

Available are various configurations of FOT (fiber-optic taper) coupled modules. The detectors in the MX-HS series use  $2 \times 2$ ,  $3 \times 3$ ,  $4 \times 4$ , or  $5 \times 5$  arrays of fused fiber-optic taper elements to make a very large active area. Unlike other multi-element detectors, the images produced have no gaps between the modules. The Rayonix factory calibration is permanent and suitable for all X-ray sources.



A  $4 \times 4$  array of fused fiber-optic tapers used in our MX300 and MX340 cameras. Taper elements are bonded together without gaps in the final X-ray images.



A wafer with new Rayonix HS frame-transfer CCD chips showing the imaging and buffering areas.

### MX Model-specific Technical Specifications

#### FT-CCDs Bonded to Fiber-optic Tapers

#### Active Imaging Surface

**Readout Electronics** 16 channels per FT-CCD



#### Physical Dimensions

Detector Head	Height x Width x Depth
	Approximate Weight
Electronics/ Cooling Assembly	Height x Width x Depth
	Approximate Weight






## MX-HS Technical Specifications

<b>Sensors</b>	Proprietary Rayonix frame-transfer CCD
<b>Dead Time</b>	1 millisecond
<b>Full Well Capacity, at 2 x 2 Binning</b>	400ke <sup>-</sup> /pixel
<b>Noise</b>	High Speed mode: 8 e <sup>-</sup> /pixel    Low Noise mode: 4 e <sup>-</sup> /pixel
<b>Dynamic Range</b>	High Speed mode: 16 bit    Low Noise mode: 18 bit
<b>Dark Current</b>	0.003 e <sup>-</sup> /pixel/second or 0.0004 photons/pixel/second (12keV)
<b>Phosphor</b>	40μm standard, 20–80μm by special order
<b>PSF, FWHM</b>	100μm with 40μm thick phosphor, 65μm with 25μm phosphor
<b>Sensor Operating Temperature</b>	–80° C
<b>Cooling</b>	Closed-cycle refrigeration

## User-configurable Imaging Parameters

			 	 
On-chip Binning	Frame Rate (Hz)	Pixel Size (μm)	Pixel Size (μm)	Pixel Size (μm)
1 x 1	2.5	44	39	44
2 x 2 (standard)	10	89	78	89
3 x 3	20	133	117	133
4 x 4	40	177	156	177
5 x 5	55	221	195	221
6 x 6	75	266	234	266
8 x 8	100	354	312	354
10 x 10	140	440	390	440
<b>Other Specifications</b>				
Fiber-optic Taper Demagnification Ratio		2.92:1	2.6:1	2.92:1
Electro-optical Gain		7e <sup>-</sup> /12keV photon	9e <sup>-</sup> /12keV photon	7e <sup>-</sup> /12keV photon

## ations

				
<b>4 Modules</b> <b>15 Megapixels</b>	<b>9 Modules</b> <b>33 Megapixels</b>	<b>16 Modules</b> <b>59 Megapixels</b>	<b>16 Modules</b> <b>59 Megapixels</b>	<b>25 Modules</b> <b>92 Megapixels</b>
170 mm x 170 mm, 28,900 mm <sup>2</sup>	225 mm x 225 mm, 50,625 mm <sup>2</sup>	300 mm x 300 mm, 90,000 mm <sup>2</sup>	340 mm x 340 mm, 115,600 mm <sup>2</sup>	425 mm x 425 mm, 180,625 mm <sup>2</sup>
64 channels	144 channels	256 channels	256 channels	400 channels
34 cm x 30 cm x 40 cm	46 cm x 37 cm x 40 cm	58 cm x 47 cm x 43 cm	58 cm x 47 cm x 43 cm	68 cm x 57 cm x 43 cm
30 kg	57 kg	120 kg	130 kg	200 kg
175 cm x 64 cm x 64 cm	175 cm x 64 cm x 64 cm	175 cm x 64 cm x 64 cm (x2)	175 cm x 64 cm x 64 cm (x2)	175 cm x 64 cm x 64 cm (x3)
215 kg	215 kg	215 kg (x2)	215 kg (x2)	215 kg (x3)



**rayonix**

High-performance X-ray technology

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