



Technical Specifications

Rayonix MX 225

225 mm High Speed CCD Detector System for X-ray Diffraction

(Specifications subject to change)

- Imaging X-ray detector with 225 mm x 225 mm, square active area
- Multi-CCD system consisting of nine (9) CCD sensors coupled to fiber optic taper array
- Monolithic fiber optic taper array for seamless imaging
- High gain design using modest 2.7:1 fiber optic taper demagnification ratio
- 1 second readout time at the full resolution (3072 x 3072) accomplished by simultaneous 18-channel readout (two channels per CCD, each at ~500 kHz)
- Low noise 2kx2k CCD chips – 10 e⁻ at 500 kHz , 6 e⁻ at 250 kHz
- Lowest dark current available (< 0.005 e⁻/sec/pix) due to operating temperature of -75°C
- Complete system including computer workstation data-acquisition software

1. MX CCD225 X-ray Detector System

1.1. 225 MM CCD DETECTOR

- Nine 2k x 2k (2048 x 2048 pixels) Front Illuminated CCDs; two on-chip readout channels per CCD for simultaneous 18-channel readout
- Each CCD is coupled to phosphor by 2.7:1 fiber-optic taper
- Produces fully corrected, seamless images. Maximum physical gap between adjacent fiber optic taper elements of less than 1 pixel (~ 50 μm)
- Active imaging surface : 225 mm x 225 mm square (50,625 mm²)
- Software-selectable on-chip binning yields the following supported resolutions:

On-Chip Binning	Resolution	Pixel Size (at phosphor)
2 x 2	3072 x 3072	73 μm
3 x 3	2046 x 2046	110 μm
4 x 4	1536 x 1536	146 μm

- **Gain** (electrons/X-ray photon) 6 e⁻/12keV
- **Read noise** at 1 sec readout < 10 e⁻ (1.67 12keV photon equivalent), or read noise at 2 sec readout = 6e⁻ (1.0 12keV photon equivalent)

Readout Time vs. Resolution and Noise

		Resolution (pixel size)		
		3072*3072 73 μm	2046*2046 110 μm	1536*1536 146 μm
Readout speed	500 kHz x 18 (10 e ⁻ RMS)	1 sec	0.5 sec	0.3 sec

1.2. CONTROL AND DATA ACQUISITION SOFTWARE PACKAGE

- Menu-driven control program for autonomous data collection
- Graphical user interface (GUI) based on X11 /Motif
- Graphical data display and inspection software
- ``Zinger" removal routines (combining two images)
- Combined dark current, flatfield and spatial distortion correction routines
- Optional "Slave" mode API for control by external program

1.3. CONTROL AND DATA ACQUISITION HARDWARE AND COMPUTER WORKSTATION

- Proprietary PCI busmaster DMA Controller with kernel level driver
- Direct transfer of data, in real time, to workstation memory with no involvement of workstation CPU
- Optically isolated digital input for external trigger of shutter and/or readout
- Optically isolated digital output as trigger for external shutter controller
- The supplied workstation for control of the CCD is an integral part of the CCD-Camera:
 - Pentium IV Extreme Edition PC with Linux OS
 - Flat-panel Monitor
 - 750 GB Hard disk, 2 GB RAM
 - 10/100/1000 Ethernet Interface
- Networkable (TCP/IP, NFS) to other laboratory computers by Fast Ethernet (1000 Mbit/sec).
- Complete Documentation.