

# XRD 1620 AN

## Digital X-Ray Detector



### Overview

The XRD 1620 AN is a digital x-ray detector based on a 16" amorphous silicon sensor operating as a two-dimensional photodiode array. The XRD 1620 AN is well suited to perform digital x-ray imaging and contains all drive and read-out electronics including an x-ray interlock. X-rays are converted into light using a Kodak® Lanex® Fast, Lanex® Fine, or a CsI scintillator.

The information is digitized in 16 bits to achieve the highest dynamic range and contrast. With a pixel size of 200 µm, an image size of 2048 x 2048 pixels, and a frame rate of 3.50 Hz, the detector is designed to fulfill the requirements of a variety of industrial and medical applications.

The XRD 1620 AN series detectors are connected to a PCI computer, transferring data via a customized parallel interface. Up to four detectors, each using its own frame grabber, can be connected to a single PC. The image integration time is variable—between 285.6 ms and 5 sec in steps of 1 ms (internal timer) or set between 285.6 ms and 4 sec in eight fixed steps (free running). The XRD 1620 AN series provides the advantage of synchronization between the detector and x-ray source, or manipulator, by using an external trigger signal.

The XRD 1620 AN, the XRD-EP Power Supply Unit and the PCI I/O board are optimized for the highest performance. The XRD

### Key Features

- ▶ Complete digital x-ray detector
- ▶ Monolithic flat panel
- ▶ > 4 million pixels
- ▶ 200 µm pixel pitch
- ▶ 65.536 gray levels
- ▶ Ultra-high sensitivity
- ▶ Live images @ 3.50 fps
- ▶ Suitable for a wide range of x-ray energies
- ▶ Selectable gain setting

### Applications

- ▶ Radiotherapy simulation and portal imaging
- ▶ Non-destructive testing
- ▶ 3D CT reconstruction
- ▶ Scientific and medical applications

image acquisition and demonstration software and the XRD image acquisition software library are included. The software library can be used to integrate the specific detector functions into various types of image processing software. The library supports functions for:

- acquisition of a single frame or a sequence
- selection of integration times
- selection of gain setting
- selection of trigger modes
  - free running
  - external trigger source
  - internal timer
  - software trigger
- calibration procedures to acquire offset and gain correction files
- perform offset, gain and pixel correction on acquired frames (online correction)

## Technical Specifications

### Sensor Specifications

Scintillator screen (standard):	Lanex®Fine/Lanex®Fast
(optional):	CsI
Pixel number:	2048 x 2048
Active pixel number:	2024 x 2024
Pitch:	200 µm
Total area:	409.6 x 409.6 mm <sup>2</sup>
Diode capacity:	2.1 pF

### Electronics Specifications

Charge amplifier:	32 x 128 channel ASIC
Feedback capacitance (gain):	0.5 pF, 1 pF, 2 pF, 4 pF, 8 pF
ADC:	32 x 16 bit A/D @ 1 MSps
Integration time (minimum):	285.6 ms
Non-linearity <sup>1</sup> :	< 1% (10% to 90% FSR)

### Detector Specifications

Dynamic range <sup>1</sup> :	> 75 dB
Response non-uniformity <sup>1</sup> :	< ±2% (10% to 90% FSR)
Image lag: (standard)	< 8% (1 <sup>st</sup> frame)
(CsI-option)	< 10% (1 <sup>st</sup> frame)
Frame rate (max):	3.5 Hz
Radiation energy:	40 keV – 15 MeV
Detector housing:	672 x 599 x 44 mm <sup>3</sup>
For CsI option (75 kVp, 20 mm Al filtration, 7 mm Al HVL):	
MTF (0.5 lp/mm)	80% (typical 90%)
MTF (2.0 lp/mm)	30% (typical 38%)
DQE (0.5 lp/mm)	56% (typical 58%)
DQE (2.0 lp/mm)	28% (typical 37%)

### Requirements

Power supply:	XRD-EP (95510254)
Frame grabber:	XRD-FG (95510214)
	16 bit @ 16 MHz
PC requirements:	CPU > 3 GHz
	RAM > 1 GB
	PCI bus
	Windows®2000, XP, NT4.0

<sup>1</sup> At 1pF Gain and 3.5 frames per second

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