XRD 1640 AL / AG
Digital X-Ray Detector

Overview

The XRD 1640 AL and 1640 AG are digital x-ray detectors based on 16'' amorphous silicon sensors operating as two-dimensional photodiode arrays. The detectors are well suited to perform digital x-ray imaging and contain 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 400 μm, an image size of 1024 x 1024 pixels, and a frame rate of 3.5 Hz, the XRD 1640 AL and 1640 AG detectors are designed to fulfill the requirements of a variety of medical and industrial applications.

The XRD 1640 series detectors are connected to a PCI computer, with the data transferred via a customized parallel interface. Up to four detectors, each using its own frame grabber can be connected to one PC. The image integration time is variable between 285 ms and 5 sec in steps of 1 ms (internal timer). It can also be set between 285 ms and 9 sec in eight fixed steps (free running). The PKI 1640 series provides the advantage of synchronization between the detector and x-ray source or manipulator by using an external trigger signal.

Key Features

- ➤ Complete Digital X-Ray Detector
- ➤ Monolithic Flat Panel
- ➤ > 1 Million Pixels
- ➤ 400 μm Pixel Pitch
- ➤ 65,536 Shades of Gray
- ➤ Ultra High Sensitivity
- ➤ Live Images @ 3.5 fps
- ➤ Tolerates Wide Range of X-Ray Energies
- ➤ Windows Compatible (requires PCI Bus)

Applications

- ➤ Radiotherapy Simulation & Portal Imaging
- ➤ Non-Destructive Testing
- ➤ 3D CT Reconstruction
- ➤ Scientific & Medical Applications

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The XRD 1640 AL/AG, the XRD-LPX Power Supply Unit, and the PCI I/O board are optimized for the highest performance. The XRD 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 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:	1024 x 1024
Active pixel number:	1012 x 1012
Pitch:	400 µm
Total area:	409.6 x 409.6 mm^2
Saturation charge :	84 pC

Electronics Specifications

Charge amplifier:	16 x 128 channel ASIC
ADC:	16 x 16 bit A/D @ 250 kSps
Saturation charge of ASIC:	5 pC (PKI 1640 AL)
	25 pC (PKI 1640 AG)
Integration time (minimum):	285 ms
Non-linearity:	< 1% (10% to 90% of FSR)

Detector Specifications

Dynamic range:	> 80 dB
Response non-uniformity:	< ± 2% (10% to 90% FSR)
Image lag: (standard)	< 8% (1st frame)
(CsI-option)	< 10% (1st frame)
Frame rate (max):	3.5 Hz
Radiation energy:	40 keV – 15 MeV
Detector housing:	672 x 599 x 44 mm^3
For CsI option (75 kVp, 20 mm Al filtration, 7 mm Al HVL):	
MTF (0.25 lp/mm)	80% (typical >90%)
MTF (1.0 lp/mm)	33% (typical >50%)
DQE (0.25 lp/mm)	56% (typical 58%)
DQE (1.0 lp/mm)	28% (typical 37%)
Minimum detectable signal	30 uR (typical 10 uR)

Requirements

Power supply:	XRD-LPX (95510255)
Frame grabber:	XRD-FG (95510214)
	16 bit @16 MHz
PC-requirements:	CPU > 1.8 GHz
	RAM > 1 GB
	PCI Bus
	Windows®2000, XP, NT4.0

All values are nominal; specifications subject to change without notice.

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