

XRD 0820 N ES Series

by PerkinElmer

8-inch Digital X-ray Detectors



Overview

The XRD 0820 N ES (“enhanced speed”) series detectors are the newest additions to the PerkinElmer family of 8-inch amorphous silicon (a-Si) digital x-ray detectors. They produce a higher throughput by providing double the frame rate of previous models, while maintaining an industry-leading 16-bit resolution and the ability to perform real-time digital x-ray imaging. The detectors’ radiation-hardened design gives them the ability to perform in harsh environments, making them the ideal choice for 24/7 NDT applications.

The XRD 0820 N ES series of digital x-ray detectors are based on an 8-inch a-Si sensor operating as a two-dimensional photodiode array. X-rays are converted into light using a Kasei DRZ Standard, DRZ Plus, or a CsI scintillator. The information is digitized in 16 bits to achieve highest dynamic range and contrast. The detectors offer a pixel size of 200 μm , an image size

of 1024 x 1024 pixels, and a frame rate of 15 or 30 fps with a 2 x 2 binning.

The XRD 0820 N ES 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 XRD 0820 N ES series when combined with a XRD-EP Power Supply Unit and the PCI I/O board, are optimized for the highest performance. The image integration time is variable between 66.7 ms and 5 sec (33.25 ms @ 2 x 2 binning) in steps of 1 ms (internal timer) or can be set between 66.7 ms and 1 sec in eight fixed steps (free-running). The XRD 0820 N ES series provides the advantage of synchronization between the detector and x-ray source or manipulator by using an external trigger signal.

Features and Benefits

- ▶ Complete digital x-ray detector
- ▶ Monolithic flat panel
- ▶ Radiation-hardened for harsh environments
- ▶ Live Images @ 30 fps—twice as fast as prior models—while maintaining 16-bit resolution
- ▶ > 1 Million pixels
- ▶ 200 μm Pixel pitch
- ▶ 65,536 Gray levels
- ▶ Ultra-high sensitivity
- ▶ Suitable for X-ray energies from 20 keV – 450 keV
- ▶ Selectable gain setting
- ▶ RoHS-compliant

Applications

- ▶ Nondestructive testing (NDT)
- ▶ In-line manufacturing inspection
- ▶ Pipeline inspection
- ▶ 3D Cone beam CT
- ▶ Metrology
- ▶ Medical
- ▶ Scientific and veterinary

Three models of the XRD 0820 N ES Series detectors are available: the XRD 0820 AN ES, which provides radiation energy from 20 keV – 225 keV; the XRD 0820 CN ES, which provides radiation energy from 20 keV – 225 keV and comes with a carbon fiber cover for high quality images at low x-ray energies; the XRD 0820 MN ES, which provides radiation energy from 20 keV – 450 keV. All three models are ideal for demanding NDT applications including in-line manufacturing inspection, PCB inspection, and pipeline inspection.

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 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 online corrections for
 - offset correction
 - multiple gain correction
 - pixel correction.

XRD 0820 TECHNICAL SPECIFICATIONS

Panel	
Scintillator screen* (standard) (optional)	DRZ-STD / DRZ-PLUS CsI, needles directly deposited on the a-Si photodiodes
Pixel number	1024 x 1024
Active Pixel number	1000 x 1000
Pitch	200 µm
Total area	204.8 x 204.8 mm ²
Diode capacity	2.1 pF

Electronics	
Charge amplifier	16 x 128 channel ASIC
Feedback capacitance (gain)	0.25 pF, 0.5 pF, 1 pF, 2 pF, 4 pF, 8 pF
ADC	16 x 16 bit A/D @ 1 MSps
Integration time (minimum):	66.7 ms @ 200 µm 33.3 ms @ 400 µm (2 x 2 Binning)
Non-linearity ¹	< 1 % (10 % to 90 % FSR)

Detector	
Dynamic range ¹	> 80 dB
Response Non Uniformity ¹	± 2 % (10 % to 90 % FSR)
Image lag (standard) (CsI-option)	< 8 % (1st frame) < 10 % (1st frame)
Frame rate (max)	15 fps @ 200 µm 30 fps @ 400 µm (2 x 2 Binning)
Radiation energy	40 keV – 225 keV (XRD 0820 AN ES) 20 keV – 225 keV (XRD 0820 CN ES) 40 keV – 450 keV (XRD 0820 MN ES)
Detector housing	335 x 320 x 50 mm ³

Requirements	
Power supply	XRD-EP (95510254H)
Frame grabber	XRD-FG (95510214H)
PC-requirements**	CPU > 3 GHz RAM > 1 GB PCI Bus Windows™ 2000, XP

¹ At 1 pF Gain, 200 µm, 15 fps and all corrections applied

*DRZ is a trademark of Kasei Optonix

**Windows™ 2000 and Windows™ XP are registered trademarks of Microsoft Corporation

North American Customer Support Hub

22001 Durnberry Road
Vaudreuil-Dorion, Québec
Canada J7V 8P7
Telephone: (+1) 450-424-3300
(+1) 866-574-6786 (toll-free)
Fax: (+1) 450-424-3345
Email: opto@perkinelmer.com

Global Headquarters

PerkinElmer Optoelectronics
44370 Christy Street
Fremont, CA 94538-3180
Telephone: (+1) 510-979-6500
(+1) 800-775-6786 (toll-free)
Fax: (+1) 510-687-1140
Email: opto@perkinelmer.com

European Headquarters

PerkinElmer Optoelectronics
Wenzel-Jaksch-Str. 31
65199 Wiesbaden, Germany
Telephone: (+49) 611-492-430
Fax: (+49) 611-492-170
Email: opto.Europe@perkinelmer.com

Asia Headquarters

PerkinElmer Optoelectronics
47 Ayer Rajah Crescent #06-12
Singapore 139947
Telephone: (+65) 6775-2022
Fax: (+65) 6775-1008
Email: opto.Asia@perkinelmer.com



For a complete listing of our global offices, visit www.optoelectronics.perkinelmer.com

©2008 PerkinElmer, Inc. All rights reserved. The PerkinElmer logo and design are registered trademarks of PerkinElmer, Inc. All other trademarks not owned by PerkinElmer, Inc. or its subsidiaries that are depicted herein are the property of their respective owners. PerkinElmer reserves the right to change this document at any time without notice and disclaims liability for editorial, pictorial or typographical errors.

600272_01 DTS 0509P Printed in USA