X-Panel 1412i

CMOS X-ray flat panel detector

- **Provides the fastest scanning speed in its class yet razor sharp images at low radiation doses**
- **Optimized for static and real-time industrial imaging**
- **Supports a wide energy range**
- **Enables high X-ray penetration**
- **Characterized by enhanced radiation hardness**
- **Built on a proven and reliable CMOS platform**
- **Equipped with durable and compact mechanics with multiple installation options**
- **Comes with application-optimized read-out electronics and a developer aid kit**

full resolution. In certain application-specific ROI (region of interest) modes, it is also capable of acquiring images at 300 fps. As an example of its key imaging quality parameters, the X-Panel 1412i provides a dynamic range of up to 76 dB.

The X-Panel 1412i has an active area of 140.1-by-120 mm, and robust screen scintillators, which are optimized for fast and high-resolution industrial imaging. It has two gain modes – high gain and high dynamic range modes, and supports both continuous and synchronous triggering modes. It has a pixel size of 100 µm, and is designed for an X-ray energy range of 20-225 kVp.

The X-Panel 1412i is characterized by high X-ray penetration for the inspection of dense objects, and an extended sensor lifetime under X-ray. It is equipped with durable and compact mechanics with multiple installation options for reliability and ease of X-ray imaging system design. The X-Panel 1412i can be easily integrated into small X-ray system form factors, like NDT (non-destructive testing) X-ray cabinets.

The X-Panel 1412i comes with optimized read-out electronics and a reliable Gigabit Ethernet interface. For speeding up design and system integration, a complete developer aid kit is available. The kit includes an application programming interface (API), a panel demonstration application software, necessary cabling, and developer guides.

The X-Panel 1412i is a CMOS (complementary metal oxide semiconductor) X-ray flat panel detector (FPD) that provides the fastest scanning speed in its class yet razor sharp images, and covers a wide energy range. It is an ideal solution for boosting the imaging performance of industrial CT (computed tomography) and DR (digital radiography) X-ray imaging applications. This use-case-driven detector is built on a proven and robust digital platform to accelerate detector integration to X-ray systems and time-to-market, to extend system lifespan, and to bring greater total cost savings for X-ray OEMs (original equipment manufacturers) and system integrators.

The speedy yet sharp 1412i utilizes a reliable CMOS imaging sensor (CIS) design for high scanning speeds and image quality, even at low-dose operation modes. The X-Panel 1412i features a frame rate of up to 30 fps in full size and

Key features

- Active CMOS pixel sensor (APS)
- Active area 140.1-by-120 mm
  - Dual gain (LFW/HFW) 100 µm pixel
  - 14-bit ADC, full frame rate up to 30 fps, ROI frame rate up to 300 fps
- Optimized for X-ray energies up to 225 kVp
- Industrial screen scintillator options
- Programmable ROI mode
- Dynamic range up to 76 dB
- GigE data interface

Applications

- Industrial CT (e.g., cone beam CT at additive manufacturing and casting inspection)
- Industrial DR (e.g., weld and pipeline inspection)
- Other high-resolution quality inspection and process control applications, for example in the electronics, food, and battery industries
- Metrology

Key characteristics

FEATURE	Specification
X-ray energy range	20–225 kVp
Active area	140.1-by-120 mm
Pixel pitch	100 µm
Pixel matrix	1401-by-1200
Frame rate	
Full size, 14 bit, GigE	30 fps
ROI mode/100 pixel rows,14 bit, GigE	300 fps
ADC	14-bit
Gain modes	2 (LFW/HFW)
ROI mode	Programmable size and location
Binning	1x1, 2x2
Trigger modes	Continuous/synchronous with input/output
Scintillator type	GOS screen options, optimized for industrial imaging
Data interface	1000 Base-T Gigabit Ethernet
Power supply	12 V / 24 V
Power consumption	<7W (typical)
Weight	3.3 kg
Saturation dose	LFW 2 uGy, HFW 10 uGy
Dynamic range	LFW 72 dB, HFW 76 dB
Image quality characteristics	ASTM E2597-14 (refer to user manual for details)
Performance and stability	ASTM E2737-10 (refer to user manual for details)
Ingress protection class	IP40
Regulatory compliance	CE, RoHS, China RoHS, WEEE Safety, general: IEC 62368-1, IEC 61010-1 Safety, X-ray systems: IEC 61010-2-091 EMC: IEC 61000

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Detection
Technology