Dexela Flat Panel CMOS X-ray Detectors

Advantages of detectors based on CMOS technology

The Dexela flat panel CMOS X-ray detector family employs an innovative CMOS sensor design to provide a new level of performance and reliability for OEMs operating in medical, dental and industrial X-ray markets.

The detectors are suitable for a range of applications including mammography, breast tomosynthesis, breast CT, dental cone beam CT, fluoroscopy, vascular imaging, bone densitometry and non-destructive testing.

The major advantages of the technology are: high frame-rate, low noise, high reliability, reduced image lag and high spatial resolution. The clinical benefits in medical applications are lower radiation dose to the patient combined with superior image quality when compared with flat panel detectors based on amorphous silicon technology.

Key Features:

- **High Speed: 26 – 86 fps**
- **High resolution: 75 - 300 µm pixel pitch**
- **Superior image quality: high DQE, high contrast, high dynamic range**
- **Reduced image lag**
- **Ready-to-run software and drivers**
- **Flexible, reliable, stable and robust**

A new CMOS detector design

The Dexela detectors' main components are: CMOS image sensor, scintillator (structured CsI or Gadox), control electronics, readout electronics and communications with the workstation.

The Dexela CMOS image sensor consists of a photodiode array with a pixel size of 75 µm. The sensor has very low dark current and read noise, with high linearity and consistency of response. The detector is capable of multi-resolution readout with pixels binned 1x2, 2x2, 1x4, 2x4 and 4x4. The frame rate of the largest model ranges from 26 frames per second at full resolution to 86 frames per second at 300x300 µm over the whole active area. Smaller models are even faster.

The versatility of CMOS allows advanced electronics to be integrated alongside the light-sensing function. Non-destructive readout of pixels for dose monitoring, and dynamically configurable on-chip binning, are standard features on all Dexela detectors. The pixel gain can also be varied dynamically.

The high fill factor, efficiency and low noise of the sensor combine to produce a high DQE of 0.7 at low spatial frequency. This results in lower patient dose and superior image quality.

The Dexela CMOS X-ray detectors are inherently stable, have a wide storage temperature range and are resilient to shock and vibration.

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