

Dexela

Flat Panel CMOS X-ray Detectors



dexela.com

KEY FEATURES

- Fast: 26-86 fps
- High resolution: 75µm pixel pitch
- Superior image quality: high DQE at low dose
- Virtually no image lag
- Ready-to-run software and drivers
- Flexible, reliable, stable and robust

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, cardiology, small animal imaging and non-destructive testing (real-time, CT and static).

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.

A NEW CMOS DETECTOR DESIGN

The main components of the Dexela detectors are: CMOS sensor, scintillator (structured CsI or Gadox), readout electronics and communications interface.

The Dexela CMOS sensor consists of a photodiode array with a pixel size of 75 µm. The sensor has very low read noise, with high linearity and consistency of response. The detector is capable of multi-resolution readout and pixels can be binned 1x2, 2x2, 1x4, 2x4 and 4x4. The frame rate of the largest model over the whole active area ranges from 26 frames per second at full resolution to 86 binned 4x4. The small 1207 model is even faster.

The detectors have a high DQE of 0.7 at low spatial frequency and their DQE remains high even at low dose levels. This results in lower patient dose and superior image quality in demanding applications including fluoroscopy and imaging of dense breasts.



DETECTOR MODELS

The Dexela detectors are built from a highly modular technology platform that allows Dexela to produce detectors of different dimensions using the same basic building blocks. Sizes currently offered are: 12x7, 15x12, 23x15, 23x21 and 29x23 cm.

Model	Active area size, mm	Clinical applications
1207	115 x 65	Small field mammography, CBCT, NDT
1512	115 x 145	CBCT, fluoroscopy, NDT
2315	230 x 145	CBCT, fluoroscopy, bone densitometry, NDT
2315MAM	230 x 145	Mammography
2321	230 x 210	CBCT, fluoroscopy
2923	290 x 230	CBCT, fluoroscopy, NDT
2923MAM	290 x 230	Mammography and breast tomosynthesis
2923HE	290 x 230	High energy NDT

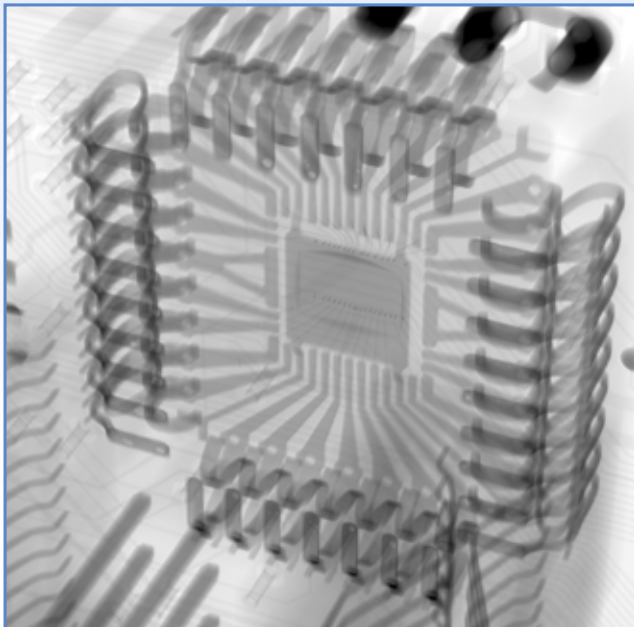
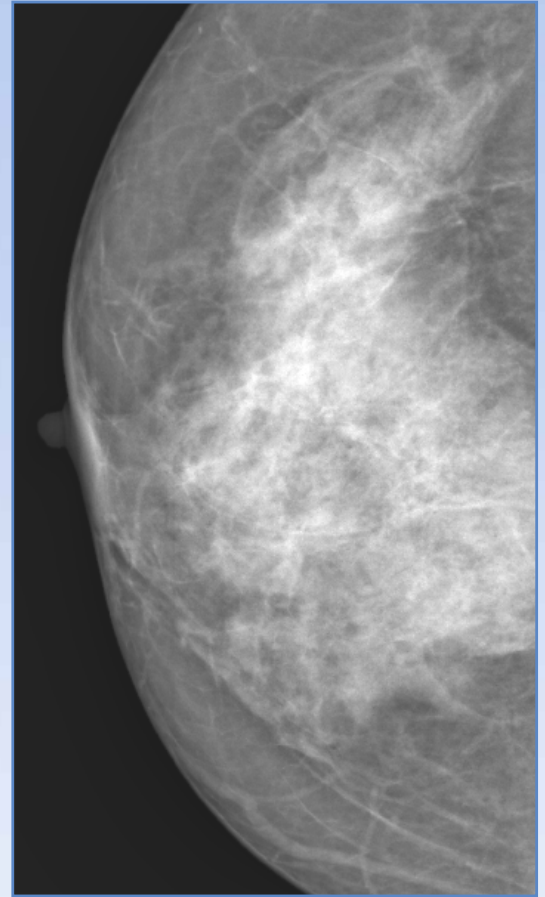
BREAST IMAGING: FFDM AND BREAST TOMOSYNTHESIS

The 2315MAM and 2923MAM are specially designed for full-field breast imaging applications: FFDM and breast tomosynthesis. These detectors have enclosures optimised for these applications:

- the detector is wedge shaped at the chest wall to aid patient positioning for Craniocaudal views
- the distance from active area to edge of enclosure is <3 mm

Breast CT and tomosynthesis both benefit enormously from the high speed, high spatial resolution, high DQE at low dose, virtual absence of image lag and low read noise of the 2923MAM. These technical features combine to provide these clinical benefits:

- minimising the incidence of re-takes and blurring in tomosynthesis caused by patient motion
- reducing the radiation dose to the patient in breast imaging procedures
- enabling small structures such as spiculations and micro-calcifications to be better visualised
- allowing a large number of low dose projection images to be acquired rapidly thus enhancing tomosynthesis image quality



NON-DESTRUCTIVE TESTING

Special versions of the 1207, 1512 and 2923 detectors are available for demanding high energy NDT applications. The high speed and high sensitivity of the Dexela detectors allows them to be used for real-time applications as well as CT and static imaging.

DENTAL AND CRANIAL CT

The 1207 and 1512 detectors are ideal for small field dental CT systems aimed at implantology. These detectors allow dramatic reductions in patient dose combined with enhanced image quality when compared with popular amorphous silicon flat panel detectors. The 2321 and 2923 detectors are well suited to systems used in Cranio-Maxillofacial imaging where a large field of view is

required. Clinical applications include orthodontics, implantology and surgical planning. All these detectors have higher spatial resolution than competing products and yet also have higher read-out speed and excellent low-dose DQE.

FLUOROSCOPY

The 1512 and 2321 detectors can be used in mobile C-arm systems, where they offer superior ergonomics when compared with image intensifiers and their imaging performance is superior to amorphous silicon flat panel detectors. All Dexela detectors can be read out at 26 frames per second without binning and up to 86 frames per second when binned. The excellent low-dose DQE of the Dexela detectors makes them ideally suited for fluoroscopy and allows lower patient dose in comparison with amorphous silicon flat panel detectors.

SCINTILLATOR OPTIONS

The Dexela flat panel CMOS X-ray detectors can be used in a range of applications employing different X-ray energy ranges. This is achieved by offering a choice of scintillators: 150 µm structured CsI or fine Gadox screen for mammography, 600 µm structured CsI for dental CBCT and fluoroscopy as well as DRZ Gadox screens. The scintillator can be customised for specific OEM applications.

SOFTWARE

Dexela provides software drivers and companion software with its detectors. The software includes a basic application for image acquisition and viewing on a workstation or laptop running Microsoft Windows XP, Vista (x32 or x64) or Windows 7 (x32 or x64). The development kit includes the Dexela SCAP software application that performs detector calibration, sensor set-up, image acquisition and image corrections. SCAP includes file translators for smv, raw and tif formats.

Dexela also offers DexView image processing software for mammography and other forms of radiography. DexView enhances the visibility of structures, removes noise and compensates for variations in exposure within an image.

- **Noise reduction whilst preserving tiny structures**
- **Image enhancement (contrast, edge)**
- **Peripheral equalization**

DexView image processing software can be customised for specific OEM products.

INTERFACE OPTIONS

Interface options include high speed Camera Link (full configuration for the 2923, medium configuration for the 2315 and base configuration for the 1512) and USB 2.0. Gigabit Ethernet is offered on the 1512 and 1207 and will be offered on other detectors in 2011. Images are displayed instantaneously on a user-supplied workstation fitted with the appropriate interface card or a standard USB port. The aluminium housing is shock and vibration resistant. The detector is highly robust with a storage temperature range of -5 to +50 °C and an operating temperature range +10 to +40 °C.

OPTIONAL ACCESSORIES

Dexela can supply these optional accessories with its detectors:

- **Detector power supply unit (PSU)**
- **Power and data cables**
- **Camera Link interface cards**



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