DIRA® DFP

CMOS-BASED DYNAMIC FLAT PANEL DETECTORS

- UNIQUE TECHNICAL CHARACTERISTICS
- WIDE RANGE OF APPLICATIONS
- COMPLETE SOLUTION FOR OEMs

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Advantages of detectors based on CMOS technology

DIRA® DFP flat panel dynamic detector is a new design in the DIRA line of detectors, based on CMOS technology.

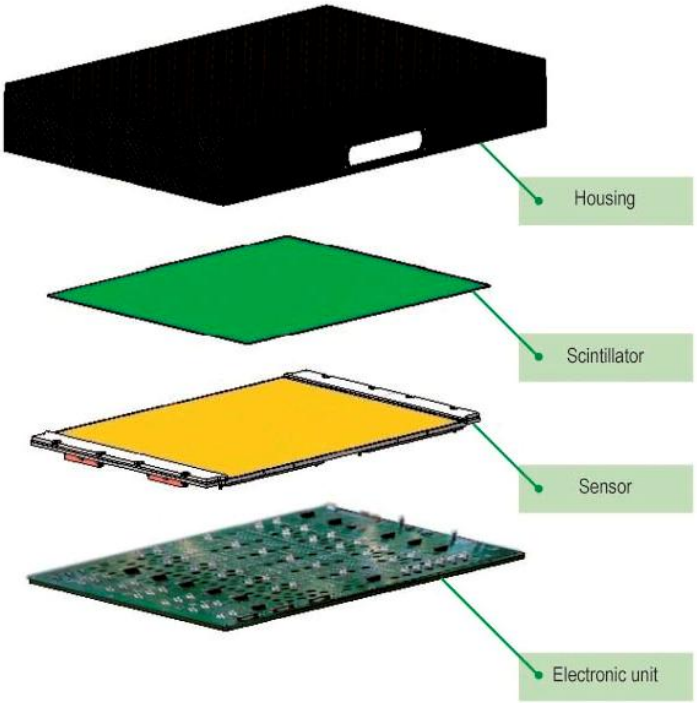
DIRA® DFP main components are: scintillator, sensor and controlling electronic unit, data readout and transmission to the work station.

DIRA® DFP design allows to develop detectors of different dimensions, depending on the application area.

The biggest advantage is a robust design with control and readout circuits embedded directly into the image sensor die.

DIRA® DFP based on CMOS technology consists of diode sensor array with **pixel size of 50 µm**. This enables very low dark current and readout noise values, with high diode parameter consistency.

High rate of fluoroscopic examinations **up to 100 frames per second** over the whole active area can be achieved.



Schematic of detector assembly.
Pixel size may vary within 50–400 µm range depending on the area of application.

Application areas

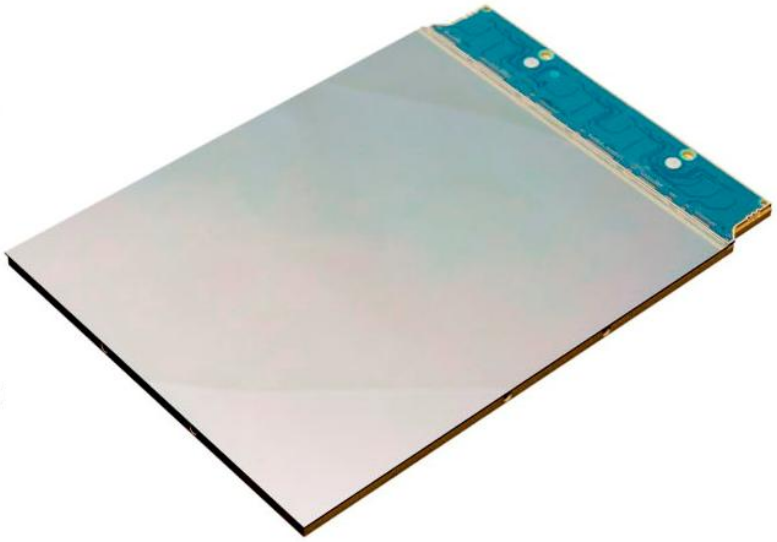
Different applications were considered when developing the detector. Flexible design of detector types allows their adaptation to various application areas. Appropriate set of parameters may be specified, e.g. energy range and resolution, quantum efficiency and contrast sensitivity requirements.

Resolution (pixel size):

- 50 µm (minimal pixel size) — **mammography and dental applications**
- 100–200 µm — general radiology **(radiography mode)**
- 200–400 µm — general radiology **(fluoroscopy mode)**

X-ray tube voltage ranges:

- 18–45 kV — mammography
- 40–150 kV — general radiology, surgical X-ray systems, cardiovascular procedures
- 40–250 kV — non-destructive control (industrial applications)



Active area size depending on the application:

Active area size, mm	Medical application	Industrial application
120 x 145	-	Non-destructive control
145 x 235	Interventional radiology, microsurgery, dental systems	
235 x 290	Interventional radiology and mammography, veterinary	
290 x 350		
350 x 430	General radiology	
290 x 700	Computed tomography	

Technical data sheet *

Active pixels, depending on a detector size:	
120 x 145 mm	2.3K x 2.8K
145 x 235 mm	2.8K x 4.6K
235 x 290 mm	4.6K x 5.6K
290 x 350 mm	5.6K x 6.9K
350 x 430 mm	6.9K x 8.4K
290 x 700 mm	5.6K x 13.8K
Spatial frequency	10.0 lp/mm
Detective Quantum Efficiency (DQE) at 70 kV and 2.3 μGy	67%
CMOS pixel design	three p-i-n photodiodes
Maximum frame rate	100 frames/sec
Pixel size	50 μm
Readout frequency, no less than	30MHz
Dynamic range	74dB
Grey scale	16 bit (65536)
Image acquisition time for maximum resolution	0.2 sec
Automatic exposure control (AEC) provided by dose-sensing via non-destructive sub-sampled image readout	Yes

* Information contained in this document is subject to change without notice.

Serial production of flat panel dynamic detectors is planned for 2010

DIRA® DFP is presented in two option packages

Option package 1:

- Detector
- Power supply unit
- Work station with DIRA® USER software installed

Option package 2:

- Detector
- Power supply unit
- Fiber interface PCIe card and DIRA® OEM software package (DLL programming modules for Windows XP and Windows Vista, driver for PCIe card, detector calibration and adjustment software)

This option package allows the customer to use own software.

DIRA® USER software supports Windows XP and Windows Vista, any language, customer GUI localization and performs the following functions

- Anatomically programmed radiography including parameters of X-ray generator, collimator, positioner, detector, processing and post-processing
- Image acquisition from DIRA® detectors
- Image pre-processing and processing
- Local database support

DIRA® USER software supports the following X-ray devices of different types

- DIRA® detectors
- X-ray generators
- Collimators supported CANOpen protocols
- Positioners
- Dosimeters

DIRA® USER software supports DICOM

- DX, RF, XA, MG modalities
- Verification as SCU
- Storage as SCU
- Storage commitment as SCU
- Basic Worklist as SCU
- MPPS
- Print as SCU
- Patient CD

We are looking forward to establishing cooperation with partners worldwide