



AdvAPIX TPX3

Version 1.0

The next generation of
radiation imaging detectors

Recording:

- position
- energy/wavelength
- time-of-arrival

of every detected photon
or particle

www.advacam.com



Main Features

• Readout chip type	Timepix3
• Spatial resolution	256 x256 pixels, 55 µm pitch
• Time resolution	1.6 ns
• Interface	USB 3.0 (Super-Speed)
• Power	External or via second USB 3.0
• Max. readout speed	40 million pixels / s
• Dimensions	125 x 79 x 25.5 mm
• Weight	503g

The first truly spectral imaging detector in the world

- 1 Uncompromised spectral imaging
- 2 Event-driven readout
- 3 Recording a list of all events rather than just images
- 4 Position, energy and time-of-arrival is measured for every detected quantum

ADVAPIX^{TPX3} features

Timepix3 (TPX3) is the NEXT generation of X-ray and radiation imaging technology. It is a direct conversion detector, i.e. uses semiconductor or semi-insulator sensors. It has "clever" pixel electronics capable of processing every detected photon. Contrary to common X-ray imaging detectors, the Timepix3 is capable of measuring simultaneously:

• position • energy • time-of-arrival

of **every detected photon**. Rather than collecting data frame-by-frame the device generates a **continuous stream of event data**. The information about detected photon energy is used to create a full per-pixel spectra. It can be also used to analyse sharing of charge generated by radiation quanta between pixel to improve the spatial resolution: **the native resolution of 55 μm can be improved to 15 μm in CdTe sensor 1 mm thick**. This is absolutely the best resolution ever achieved with CdTe sensors in the world (common imaging detectors with CdTe sensors have typically pixels only 100 μm in size or larger). Moreover, the time information allows correlating and correcting XRF and Compton scattered events inside the sensor further improving the image quality.

ADVAPIX^{TPX3} is an ultimate tool for particle tracking. Detecting coincidences between particles is easy with time information coupled with every hit. The software bundled with AdvAPIX allows **identifying tracks of individual particles**.

Configuration Examples

Coming soon

Quad detector

(Single layer of 512 x 512 pixels, speed of 40 million pixels per second)

Quad detector with central hole

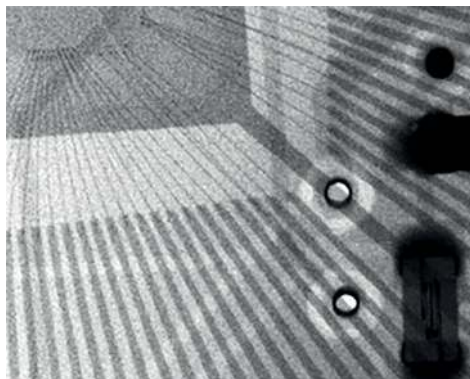
(Single layer of 512 x 512 pixels, speed of 40 million pixels per second with optional hole in the middle, up to 2mm square)

Sensor types:

Si (100, 300, 500 μm thick)

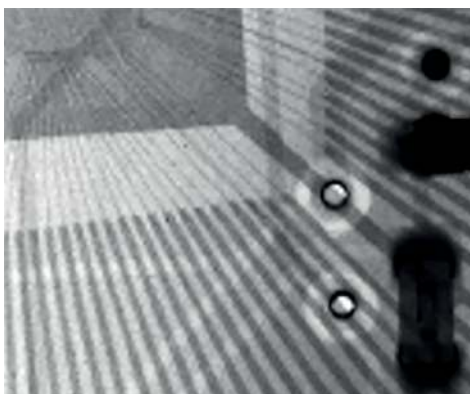
CdTe (1000 μm thick)

Image of high/low resolution from CdTe sensor



High resolution 15 μm

Records of deposited energy and time combined with Advacam's sophisticated data analysis allows achieving sub-pixel **resolution of 15 μm in X-ray images**. The timing information is used to **correct internal X-ray fluorescence in CdTe sensors**. The **resolution of 15 μm** combined with sensitivity of 1mm thick CdTe sensor makes **ADVAPIX^{TPX3} an unbeatable X-ray imaging detector**.



Standard resolution 55 μm



Imaging the Unseen

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