

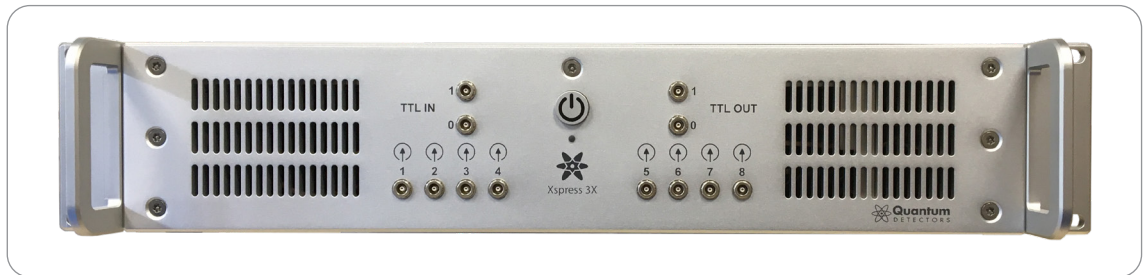


Xspress 3X

# Xspress 3X

Gold standard digital readout for SDD and HPGe detectors

## Technical Datasheet



### Introducing our new x-ray detector readout: Xspress 3X.

With over 100 installations worldwide, the Xspress 3 family of readouts has revolutionised the analysis of fluorescence detector data. Orders of magnitude improvement in throughput, combined with resolution optimisation, helps scientists to conduct faster experiments with better results. The new Xspress 3X combines the channel capacity of Xspress 3 with the flexibility of Xspress 3 Mini, to give you an easily calibrated, multi-channel system. Whether your detector is old or new, get the most out of it with the superlative performance of Xspress 3X.

#### Optimal Performance

Xspress 3X automatically adjusts to optimally analyse data at all count rates. No need to repeat a scan because the flux was too high. Its digital architecture allows advanced analysis techniques to extract the optimal amount of information.

#### Future-proof

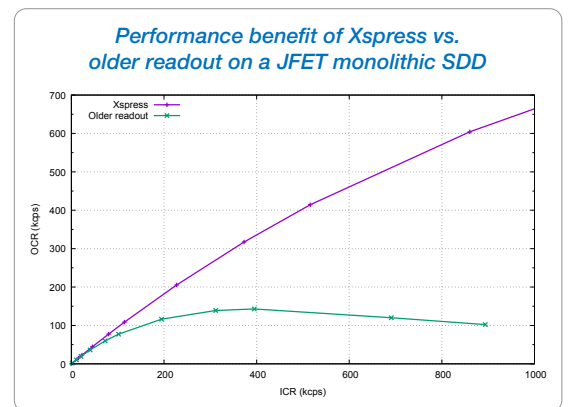
With its modular design Xspress 3X is easily expandable should your requirements change in future. Each X3X unit is expandable to a maximum of 8-channels. Units can be daisy-chained to service larger systems all the way up to 32-channels, and beyond.

#### Seamless integration

Designed by scientists, for scientists, the Xspress 3X runs on EPICS and TANGO, and supports integration with lab-based software such as LabView.

#### Power to old and new

As well as optimising data rates from newer detectors, Xspress 3X can greatly improve the performance of older detectors. See below for a comparison between an Xspress system and an older generation readout on a JFET equipped monolithic detector.



#### Supporting you all the way

We'll support you for the full lifetime of your system. Access to our support channel is free, we're here to get you started, to assist with getting the most out of your system, and if you'd like to expand your horizons, helping you to create novel installations.

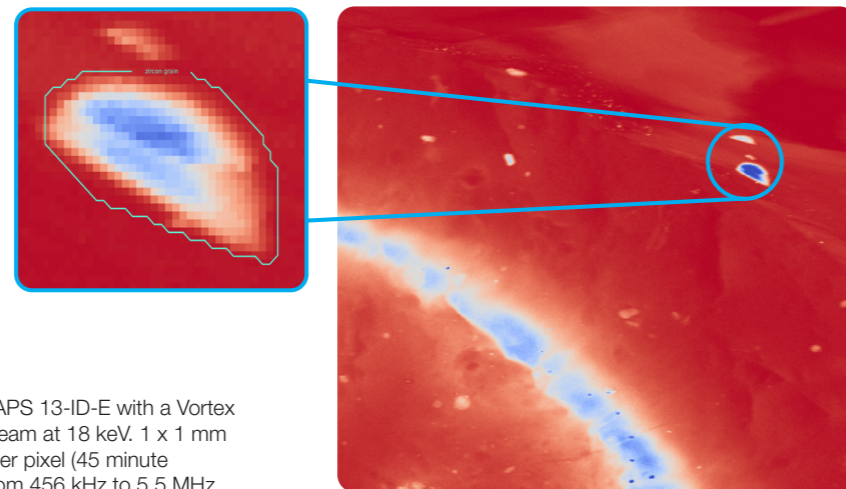
#### Key features

- Greater than 4 Mcps output rate
- ~80 ns deadtime per event
- 32+ channels supported
- Out of the box EPICS and TANGO integration
- Ideal resolution and rate at all levels of flux with no user intervention required



Xpress 3X

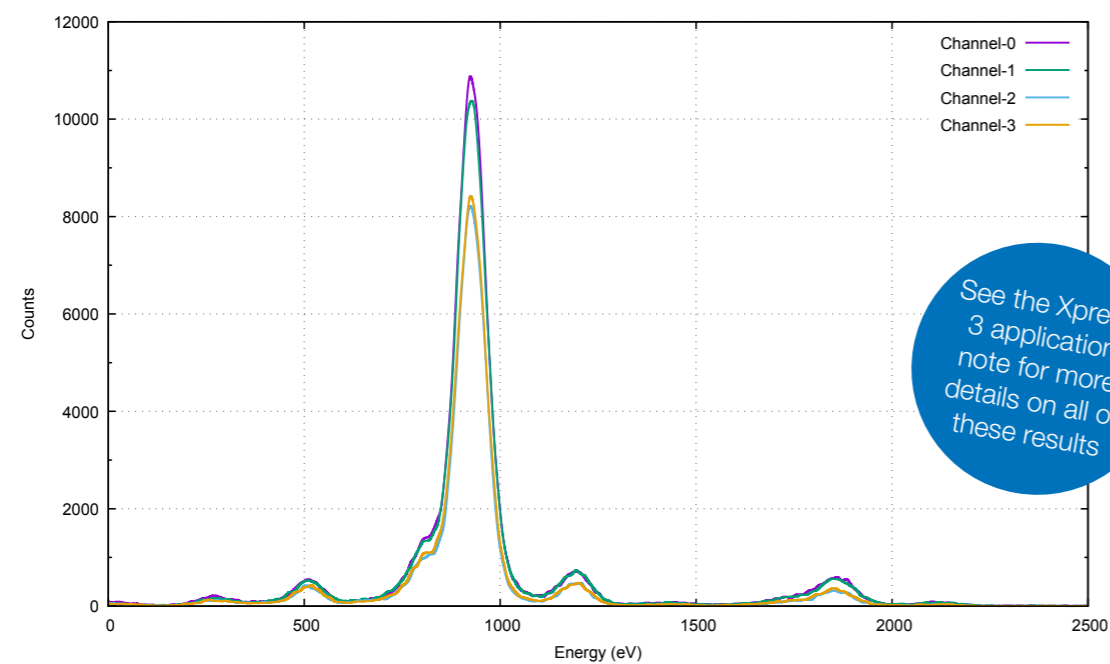
### X-ray Fluorescence Mapping ( $\mu$ XRF)



Data collected at GSECARS, APS 13-ID-E with a Vortex ME4 and 2 x 2 micron X-ray beam at 18 keV. 1 x 1 mm area, 2 x 2  $\mu$ m pixels, 10 ms per pixel (45 minute acquisition). OCR increased from 456 kHz to 5.5 MHz

### Low Energy Performance

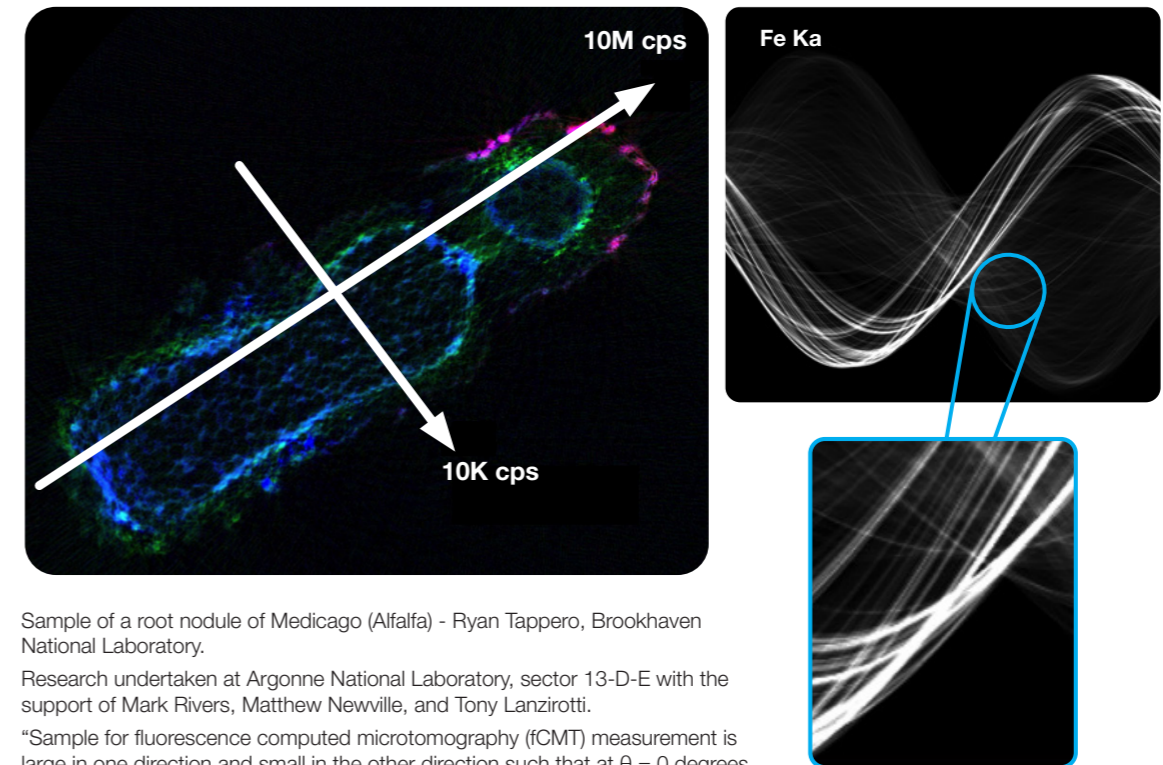
- Xpress 3 pre calibration at SPring-8-BL25SU showed data in the range 900 eV upwards.
- After recalibration Xpress 3 allowed us to see all the fluorescence peaks in the copper oxide on carbon tape sample.
- This included previously undetectable peaks for carbon (277 eV) and oxygen (524 eV).



See the Xpress 3 application note for more details on all of these results

Copper oxide on carbon tape with 10s exposure at 300 kcps. The plot is shown on linear scale. Clearly visible are carbon (277eV), oxygen (524 eV), and copper La (927 eV).

### Fluorescence Computed Microtomography (fCMT)

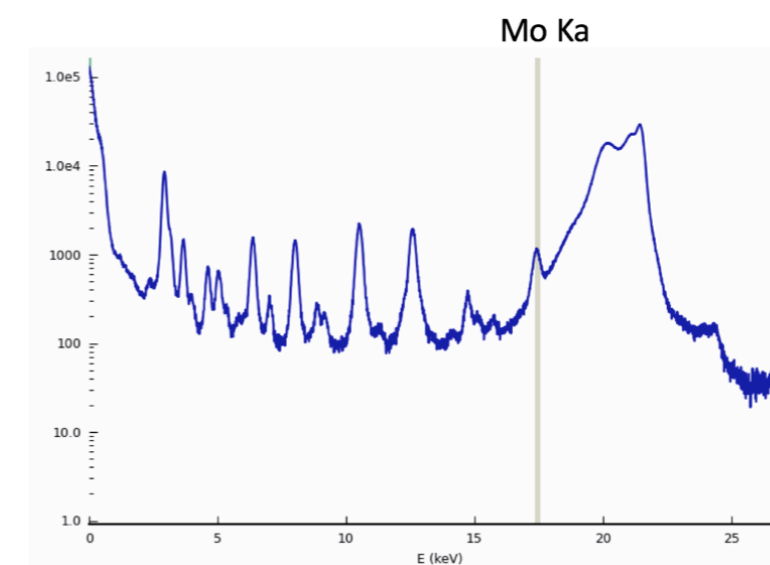


Sample of a root nodule of Medicago (Alfalfa) - Ryan Tappero, Brookhaven National Laboratory.

Research undertaken at Argonne National Laboratory, sector 13-D-E with the support of Mark Rivers, Matthew Newville, and Tony Lanzirotti.

"Sample for fluorescence computed microtomography (fCMT) measurement is large in one direction and small in the other direction such that at  $\theta = 0$  degrees we measure, say, 10 kcps and at  $\theta = 90$  degrees we measure, say, 10 Mcps. This heroic fCMT measurement was possible with the dynamic range of Xpress 3"

### EXAFS



See the Xpress 3 application note for more details on all of these results

EXAFS scan with 13 femtograms of Mo with large adjacent scatter peak.



Xspress 3X

## Performance

Max. output rate	> 4 Mcps (dependent on detector)
Deadtime per event	<80ns (dependent on detector)
Max. number of time frames	Unlimited (via circular buffer), 12,000 (standard mode)
Max. frame rate	> 24 kHz
ADC bit depth	16
Sample rate	80 MHz (12.5 ns)
TTL channels	2 in, 2 out
Time between frames	< 1 $\mu$ s
Peaking time (equivalent)	Adaptive ( $\geq$ 12.5 ns)

## Compatibility

Channel count	Up to 8 per unit (multiple units can be integrated to create higher channel systems)
Max channel count	> 32
Detector input range	-5 V to +5 V, max. 8 Vpp, auto adjusting
Software infrastructure	EPICS and TANGO (full support), LabView

## Data Format

Points per MCA	4096
File format	HDF5

## I/O

Detector input	LEMO.00.250 *
Hardware trigger	TTL (x4), LEMO.00.250 *
Data transfer	10GBASE-T ethernet

\* SMA option available as an optional extra

## Configuration

Input range	User customisable, autoset using software
Calibration	Via user-friendly browser based GUI

## Dimensions

	Without rack mount handles	With rack mount handles
W	423	480
D	594	630
H	89	89
Rackmount	2U Standard 19"	

## Server specs

Model	Dell R340 PowerEdge. High channel systems may ship with an alternative server.
Configuration	3.5 inch chassis
Weight	13.6 kg (max.)
Power	110-240 VAC, 50-60 Hz, 350 W