

XSPRESS II

The X-ray Signal Processing Electronics for Solid State detectors system, XSPRESS, has been developed at STFC & Diamond through the close collaboration of electronic engineers and experimental scientists.

This system replaces the complete traditional cryogenic semiconductor analogue processing chain for detecting, with a full digital, adaptive shaping time system.

The strength of XSPRESS is its flexibility which offers the user the capability both to count very fast and tailor the energy resolution to the experimental requirements.

Benefits

High speed data acquisition

Variable resolution filter

Full line (MCA) profile storage at each data point

Retrieve data from a full experiment for later analysis

Easily scale the system for higher channel count numbers



Features

Count rate ¹	5x10 ⁶ counts/ channel/ second.
Scaler capability per channel	On board 256 point scalers
Histogram capability per channel	4k point MCA per point
On board memory	System has space for 250 frames (250 x 4k MCA) / channel Equivalent to 250 points on a raster scan or 250 monochromator positions.
Deadtime correction	System deadtime is scaled internally enabling simple count rate relineralisation
Shaping time	Trapezoidal adaptive filter ranging from 12.5ns to 1.6µs increases throughput. Adaptive or fixed mode.
System noise ²	1.5 bits RMS
System sample rate	80 MS/s (Samples / second)
Input dynamic range	14 Bit 80 MHz convertors behind each channel with adjustable input gain range (Fully selectable.)
Energy resolution	Typ 220eV with Fe ⁵⁵ detector and rate dependent

¹ In practice this is entirely detector dependent. The system has been tested up to 1x10⁶ counts/ channel/ second

² The ADC noise will contribute to the overall system FWHM. This dependence is function of system gain and shaping time.

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Form factor

Basic system components	8 channel ADC card in single width NIM 8 channel Digital pulse processor in VME (2 x 4 channel PMC on VME carrier)
Software interface	server for TCP/IP aware command protocol (via Linux OS running on MVME 7500). All features software selectable.
Histogram capability	Complete MCA and histogram facility

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