

VORTEX[®]

Multi-Cathode X-Ray Detector



Vortex[®] multi-cathode x-ray detectors (MCD) feature the largest single active area (50 mm²) available of its kind. Vortex detectors are produced from high purity silicon using state of the art CMOS production technology. They feature excellent resolution (<136 eV FWHM is typical) and a high count rate capability (input rate >1 Mcps). At a very short peaking time of 0.25 μ s, an output count rate of 600 kcps is achieved. A unique feature of these detectors is their ability to process high count rates with virtually zero loss in resolution and no peak shift with count rate.

Typical Applications:

- ◆ X-ray fluorescence (XRF) spectroscopy – both bulk and micro-fluorescence.
- ◆ X-ray diffraction (XRD).
- ◆ Microanalysis and x-ray imaging.
- ◆ Process control.

The Vortex is operated at near room temperature and cooled by a thermoelectric cooler (TEC) device and can be cycled as frequently as needed without any degradation in detector performance. Cool down times are typically less than 3 minutes.

The Vortex x-ray spectroscopy system includes a detector unit and control box which includes power supplies for the detector and TEC, a digital pulse processor (DPP), and our PI-SPEC software.

The complete detector also contains a charge-sensitive preamplifier and temperature stabilization system, which eliminates concerns of varying ambient temperature.

Features:

Large single area multi-cathode detector (50 mm²).

Superb energy resolution.

Detector temperature stabilization.

Advanced vacuum system ensures limitless temperature cycles.

Additional sizes are available under special contracts.

Digital pulse processor (DPP)

Radiant Detector Technologies, LLC

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(818) 280-0745 Fax (818) 709-2463
www.RadiantDetectors.com

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Multi-Cathode X-Ray Detector

Detector

Crystal material	Silicon
Crystal active area	50 mm ² (nominal)
Crystal thickness	350 μ m (nominal)

Window

Material	Beryllium
Thickness	25 μ m (alternatives available)

Energy Resolution(FWHM) @ 5.9 keV

	Typical	Maximum
@ 12 μ s peaking time	<136 eV	140 eV
@ 4 μ s peaking time	<145 eV	150 eV
@ 1 μ s peaking time	<165 eV	178 eV
@ 0.25 μ s peaking time	<230 eV	250 eV

Preamplifier

Type	Charge sensitive, 2 mV/keV
Signal polarity	Positive
Reset	Electrical, <1 μ s duration

Cooling

Type	Thermoelectrical
Max voltage	8 V
Max current	1.1 A

Power Consumption

Preamplifier	+/- 12 V, 0.25 W
Power supply	110 V
Thermoelectric cooler	3.5 W (max)
Cooling fan	0.6 W

Physical Specifications

Detector package weight	680 g
Length	181 mm (probe is 33 mm)
Height x width	62 x 62 mm
Cable standard length	2 m

US Patent Number 6,455,858

Digital Pulse Processor* (DPP)

Digital Controls

Gain	16-bit DAC
Peaking time	0.25 - 64 μ s
Preset time	Up to 1717 s

Data Outputs

Spectrum size	1024, 2048, 4096 or 8192 channels
Channel size	10, 20 or 40 eV

Integral Non-linearity

Deadtime Correction	0.1% of full-scale output better than \pm 0.5% accuracy from 0 to 120,000 cps at 4 μ s peaking time
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PCB occupies same card rack as Vortex power supply and is powered internally.

Power Consumption (Additional)

DPP	3.2 W
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All specifications subject to change without notice in accordance with our drive for continuous improvement.

Software

PI-SPEC software*

Allows user to acquire, manipulate and test spectra. Pentium III or later with 64 MB memory and 30 MB available disk space.

VTXDLL package*

Dynamic-Link Library to facilitate host software communication with the DPP.

Pentium III or later with 64 MB memory and 30 MB available disk space.

*Requires parallel port running in EPP mode.

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