M400

Custom Integrable Detector Module

Features

- ✓ Fast and highly portable spectrometer
- ✓ Option for ≤0.8% FWHM energy resolution at 662 keV and interaction-by-interaction resolution of ≤0.65% FWHM
- ✓ Ready to use in less than 60 s
- ✓ Rapidly identifies gamma-ray sources
- ✓ Industry-leading efficiency with up to >29 cm^3 pixelated CZT
- ✓ Real-time spectroscopy and ID
- ✓ Discrimination between background and sources of interest in less than 20 s
- ✓ Factory-configurable USB-C and DB9 connections for power and control
- ✓ Wireless, Ethernet, or USB communication
- ✓ Cleanable for decontamination
- ✓ Option for gamma-ray imaging from 250 keV to 3 MeV
- ✓ Option to synchronize data collection with other radiation detectors for coincidence detection
- ✓ Option for extreme efficiency stability

Integrate H3D's detector module into your product. This box contains everything you need for high-resolution spectroscopy.

Perfect for integration with:

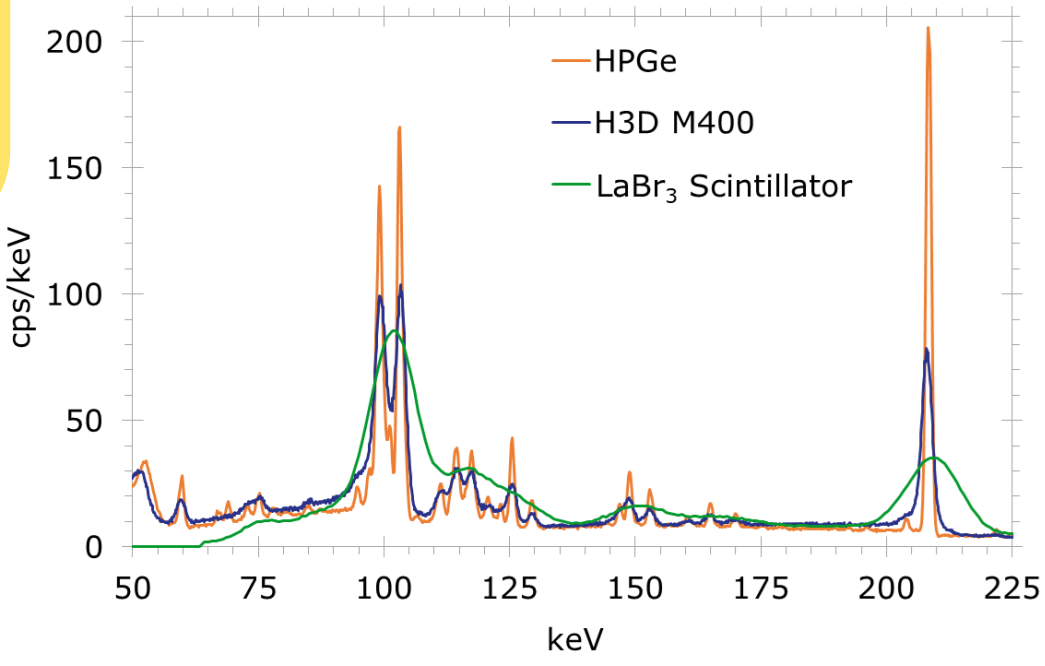
- ❑ Drones
- ❑ Robots
- ❑ Laboratory experiments
- ❑ Medical-imaging arrays
- ❑ Other sensor suites

Containing the most advanced room-temperature semiconductor technology to achieve spectroscopic performance competitive with cryogenically cooled detectors, the detector module has:

- ❑ Compact and light-weight size
- ❑ Fast startup
- ❑ Excellent energy resolution
- ❑ Low power

Contact H3D to create a custom solution for your application.

The M400 system mounted on a drone.



Any options can be combined, except as noted.

Custom designs also available, including spectroscopy >3 MeV.

Extra-High-Efficiency Option (M400-15)

Increase crystal volume to >29 cm^3. Also available as a higher-resolution M400⁺-15 with no resolution guarantee.

Lower-Efficiency Options

M200

Crystal Volume:	>9.5 cm^3
Anode Pixelation:	2 x 11 x 11
Sensitivity:	Detect in <44 s

M100

Crystal Volume:	>4.5 cm^3
Anode Pixelation:	1 x 11 x 11
Sensitivity:	Detect in <88 s

Sync-Pulse Option (M400J)

Accept sync-pulse input to FPGA for coincidence flags and improved timing relative to external clock. Capable of synchronizing an array of M400 units.

Quantification Option (M400Q)

Photopeak efficiency variation <1% across temperature range.

M400 Base Specifications

Dimensions:	4.0 in x 2.25 in x 2.25 in (10.2 cm x 5.7 cm x 5.7 cm)
Weight:	1.3 lbs (0.6 kg)
Ingress Protection:	IP67
Power Input:	5 V, <7 W, through USB-C or DB9 port
Startup & Operating Temp.:	-20° C to 50° C (-4° F to 122° F) with fan enabled -10° C to 35° C (14° F to 95° F) with fan disabled
Startup Time:	<60 s
Energy Resolution at 25° C (77° F):	≤1.1% FWHM at 662 keV (coincident interactions combined) ≤0.9% FWHM at 662 keV (coincident interactions separated)
Sensitivity:	Detects 10-µCi ^{137}Cs at 1 m (~3 µR/hr) in < 22 s (in natural background)
Spectroscopy Range:	50 keV to 3 MeV
Crystal Volume:	>19 cm^3 CZT (CdZnTe)
Anode Pixelation:	4 x 11 x 11
Spatial Resolution:	<0.5 mm (≥140 keV)
Count-Rate Limit:	1 rem/hr (10 mSv/hr) bare-^{137}Cs equivalent
Maximum Event Rate:	75 kcps at <0.5-mm spatial resolution 150 kcps at <2-mm spatial resolution
Communication Options:	USB to computer USB to Ethernet Wireless communication interfaces available
Data API Options:	Real-time spectrum Event total energy, each interaction energy, and time stamp

High-Resolution Option (M400⁺)

Improve energy resolution to ≤0.8% FWHM at 662 keV (coincident interactions combined) and ≤0.65% FWHM at 662 keV (coincident interactions separated)

Provide power and communicate through USB-C and/or DB9 ports on the back of the M400.

Compton-Imaging Option (M400i)

Image Energy Range:	250 keV to 3 MeV
Field of View:	4π (360°) omnidirectional
Angular Precision:	±1° source localization for all 4π (real time)
Angular Resolution:	~30° FWHM for all 4π (real time; >250 keV) ~20° FWHM for all 4π (post processing; >250 keV)
Sensitivity:	Localize point source of ^{137}Cs producing ~3 µR/hr in <90 s
Data API Options:	Each interaction 3D position (x, y, z)

Optical-Camera and Imaging Option (M400iC)

All specifications of M400i, and…

Optical Field of View:	>162° horizontal, >122° vertical; full color
Optical Registration:	±2° to radiation image in front 90° × 90°

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