

Features

- ✓ Fast and highly portable spectrometer
- ✓ Option for $\leq 0.8\%$ FWHM energy resolution at 662 keV and interaction-by-interaction resolution of $\leq 0.65\%$ FWHM
- ✓ Ready to use in less than 60 s
- ✓ Rapidly identifies gamma-ray sources
- ✓ Industry-leading efficiency with up to $>29 \text{ cm}^3$ 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



The M400 system mounted on a drone.

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

Perfect for integration with:

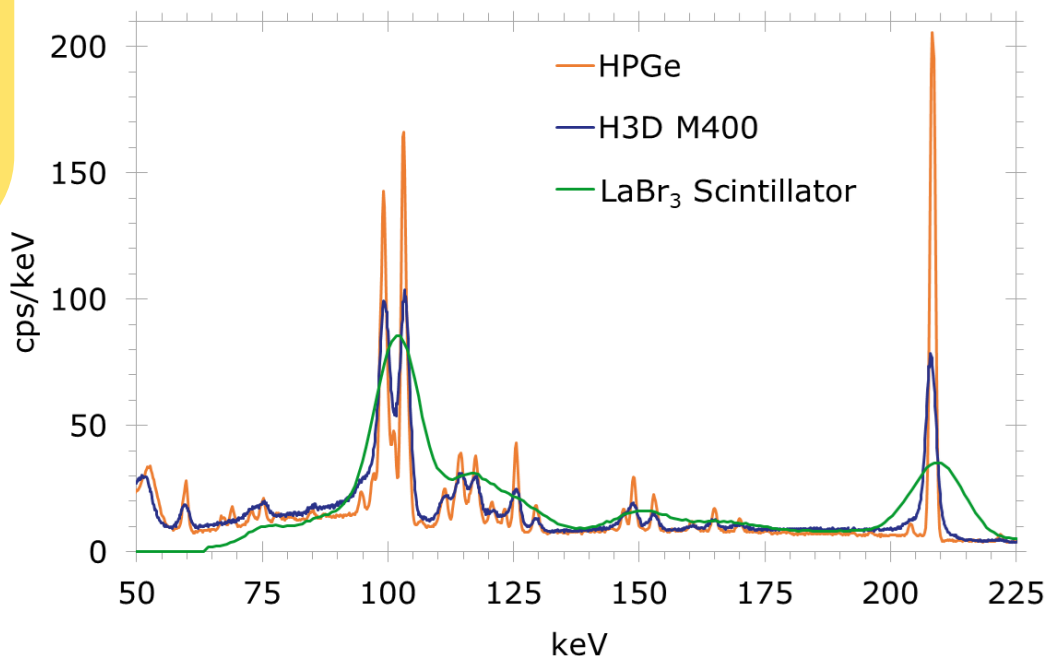
- Drones
- Robots
- Laboratory experiments
- Medical-imaging arrays
- Other sensor suites



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.



Any options can be combined, except as noted.

Custom designs also available.

Extra-High-Efficiency Option (M400-15)

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

Lower-Efficiency Options

M200

Crystal Volume: $>9.5 \text{ cm}^3$
Anode Pixelation: $2 \times 11 \times 11$
Sensitivity: Detect in $<44 \text{ s}$

M100

Crystal Volume: $>4.5 \text{ cm}^3$
Anode Pixelation: $1 \times 11 \times 11$
Sensitivity: Detect in $<88 \text{ s}$

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.

Compton-Imaging Option (M400i)

Image Energy Range: 250 keV to 3 MeV
Field of View: 4π (360°) omnidirectional
Angular Precision: $\pm 1^\circ$ source localization for all 4π (real time)
Angular Resolution: $\sim 30^\circ$ FWHM for all 4π (real time; $>250 \text{ keV}$)
 $\sim 20^\circ$ FWHM for all 4π (post processing; $>250 \text{ keV}$)
Sensitivity: Localize point source of ^{137}Cs producing $\sim 3 \mu\text{R/hr}$ in $<90 \text{ s}$
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: $>162^\circ$ horizontal, $>122^\circ$ vertical; full color
Optical Registration: $\pm 2^\circ$ to radiation image in front $90^\circ \times 90^\circ$

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, $<7 \text{ W}$, 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:	$<60 \text{ s}$
Energy Resolution at 25° C (77° F):	$\leq 1.1\%$ FWHM at 662 keV (coincident interactions combined) $\leq 0.9\%$ FWHM at 662 keV (coincident interactions separated)
Sensitivity:	Detects $10\text{-}\mu\text{Ci } ^{137}\text{Cs}$ at 1 m ($\sim 3 \mu\text{R/hr}$) in $< 22 \text{ s}$ (in natural background)
Spectroscopy Range:	50 keV to 3 MeV
Crystal Volume:	$>19 \text{ cm}^3$ CZT (CdZnTe)
Anode Pixelation:	$4 \times 11 \times 11$
Spatial Resolution:	$<0.5 \text{ mm}$ ($\geq 140 \text{ keV}$)
Count-Rate Limit:	1 rem/hr (10 mSv/hr) bare- ^{137}Cs equivalent
Maximum Event Rate:	75 kcps at $<0.5\text{-mm}$ spatial resolution 150 kcps at $<2\text{-mm}$ 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 $\leq 0.8\%$ FWHM at 662 keV (coincident interactions combined) and $\leq 0.65\%$ FWHM at 662 keV (coincident interactions separated)



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



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