

### 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
- ✓ Single USB connection for power and control
- ✓ Wireless, Ethernet, or USB communication
- ✓ Option for gamma-ray imaging from 250 keV to 3 MeV
- ✓ Option to synchronize data collection with other radiation detectors for coincidence detection



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:

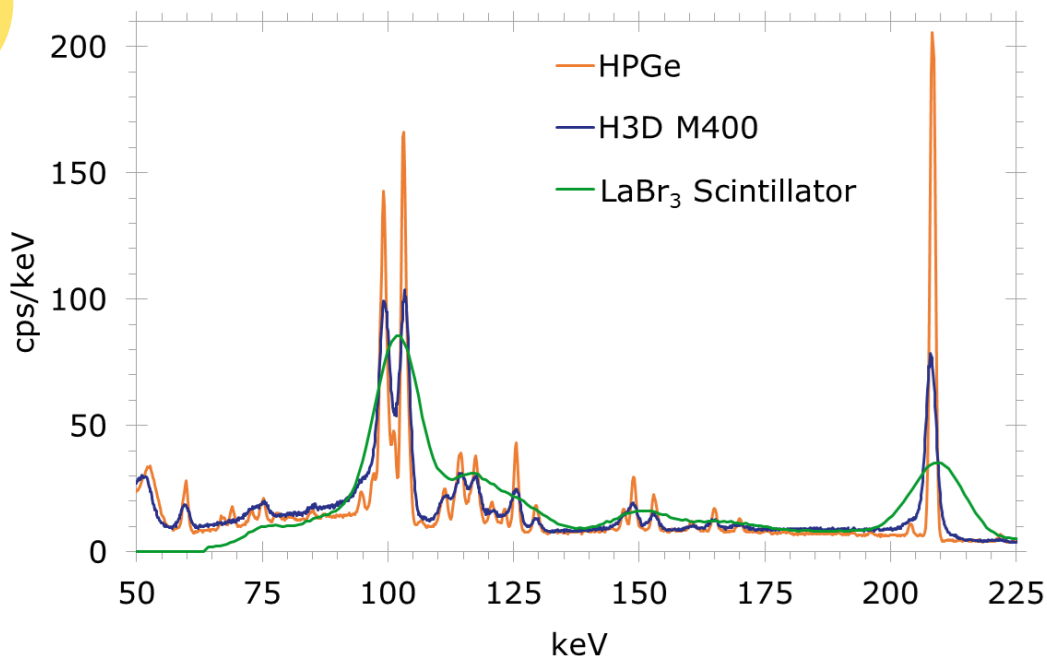
- Drones
- Robots
- Laboratory experiments
- Medical-imaging arrays
- Other sensor suites



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.**

### 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)

### 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  $<88 \text{ s}$

### 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.

## M400 Base Specifications

### Note: Custom designs also available

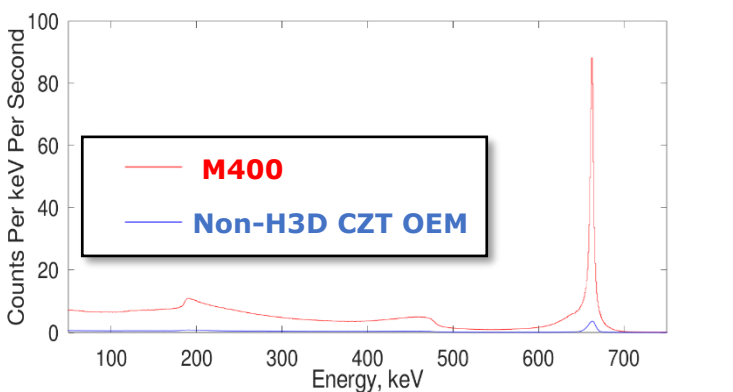
Dimensions:	4.0 in x 2.25 in x 2.25 in (10.2 cm x 5.7 cm x 5.7 cm)
Weight:	1.3 lbs (0.6 kg)
Battery:	Optional add-on box
Power Input:	5 V, $<6 \text{ W}$ , USB-C (option for other connectors)
Startup & Operating Temp.:	$-20^\circ \text{ C}$ to $50^\circ \text{ C}$ ( $-4^\circ \text{ F}$ to $122^\circ \text{ F}$ ) with fan enabled $-10^\circ \text{ C}$ to $35^\circ \text{ C}$ ( $14^\circ \text{ F}$ to $95^\circ \text{ F}$ ) with fan disabled
Startup Time:	$<60 \text{ s}$
Energy Resolution:	$\leq 1.1\%$ 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- $^{137}\text{Cs}$ equivalent
Maximum Event Rate:	75 kcps at $<0.5\text{-mm}$ spatial resolution 150 kcps at $<2\text{-mm}$ spatial resolution
Coincidence:	FPGA-level architecture
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

### Compton Imaging Option (M400i)

Image Energy Range: 250 keV to 3 MeV  
Field of View:  $4\pi$  ( $360^\circ$ ) omnidirectional  
Angular Precision:  $\pm 1^\circ$  source localization for all  $4\pi$  (real time)  
Angular Resolution:  $\sim 30^\circ$  FWHM for all  $4\pi$  (real time;  $>250 \text{ keV}$ )  
 $\sim 20^\circ$  FWHM for all  $4\pi$  (post processing;  $>250 \text{ keV}$ )  
Sensitivity: Localize point source of  $^{137}\text{Cs}$  producing  $\sim 3 \mu\text{R/hr}$  in  $<90 \text{ s}$

### 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  $90^\circ \times 90^\circ$



Spectral comparison between **H3D M400** and **non-H3D CZT OEM**. ( $10 \mu\text{Ci } ^{137}\text{Cs}$ , 5 cm)



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