

# QE65000 Spectrometer

## Scientific-Grade Spectroscopy in a Small Footprint



### QE65000

The QE65000 Spectrometer is the most sensitive spectrometer we've developed. Its Hamamatsu FFT-CCD detector provides 90% quantum efficiency as well as superior signal-to-noise ratio and signal processing speed.

QE65000's onboard programmable microcontroller puts you in command of the spectrometer and its accessories and provides 10 user-programmable digital inputs/outputs as well as a pulse generator for triggering other devices.

The QE65000's great quantum efficiency is not its only distinguishing feature. Its 2D area detector lets us bin (or sum) a vertical row of pixels. That offers significant improvement in the signal-to-noise ratio (>1000:1) performance and signal processing speed of the detector compared with a linear CCD, where signals are digitally added by an external circuit.

Because the QE65000's detector is back-thinned, it has outstanding native response in the UV. It's an excellent option for low light-level applications such as fluorescence, Raman spectroscopy, DNA sequencing, astronomy and thin-film reflectivity. Its TE-cooled detector features low noise and low dark signal, enabling low light-level detection and long integration times from 8 ms to 15 minutes.

### Features

- Onboard programming
- Multiple interface and bench options
- Quantum efficiency of 90%
- Ideal for low light level applications

Physical	
Dimensions:	182 mm x 110 mm x 47 mm
Weight:	1.18 kg (without power supply)
Detector	
Detector:	Hamamatsu S7031-1006
Detector range:	200-1100 nm
Pixels:	1024 x 58 (1044 x 64 total pixels)
Pixel size:	24 $\mu\text{m}^2$
Pixel well depth:	300,000 electrons/well, 1.5 m elec/column
Sensitivity:	22 electrons/count all $\lambda$ ; 26 photons/count @ 250 nm
Quantum efficiency:	90% peak; 65% at 250 nm
Optical Bench	
Design:	f/4, Symmetrical crossed Czerny-Turner
Focal length:	101.6 mm input and output
Entrance aperture:	5, 10, 25, 50, 100 or 200 $\mu\text{m}$ wide slits or fiber (no slit)
Grating options:	Multiple grating options, UV through Shortwave NIR
HC-1 grating:	Provides 200-1050 nm range (best efficiency)
OFLV filter options:	OFLV-QE (200-950 nm); OFLV-QE-250 (250-1000 nm); OFLV-QE-300 (300-1050 nm); OFLV-QE-350 (350-1100 nm); OFLV-QE-400 (400-1150 nm)
Other filter options:	Longpass OF-1 filters
Fiber optic connector:	SMA 905 to 0.22 NA single-strand optical fiber
Spectroscopic	
Wavelength range:	Grating dependent
Optical resolution:	~0.14-7.7 nm (FWHM) (slit dependent)
Signal-to-noise ratio:	1000:1 (at full signal)
A/D resolution:	16 bit
Dark noise:	3 RMS counts
Dynamic range:	$7.5 \times 10^8$ (system), 25000:1 for a single acquisition
Integration time:	8 ms-15 minutes
Stray light:	<0.08% at 600 nm; 0.4% at 435 nm
Corrected linearity:	>99%
Electronics	
Power consumption:	500 mA @ 5 VDC (no TE cooling); 3.5 A @ 5 VDC (with TE cooling)
Data transfer speed:	Full scans to memory every 8 ms with USB 2.0 port, 18 ms with USB1.1 port, 300 ms with serial port
Inputs/Outputs:	10 onboard digital user-programmable GPIOs (general purpose inputs/outputs)
Breakout box:	Yes, HR4-BREAKOUT
Trigger modes:	4 modes
Gated delay feature:	Yes
Connector:	30-pin connector
Power-up time:	<5 seconds
Dark current:	4000 e-/pixel/sec @ 25 $^{\circ}\text{C}$ ; 200 e-/pixel/sec @ 0 $^{\circ}\text{C}$
Temperature and Thermoelectric (TE) Cooling	
Temperature limits:	0 $^{\circ}\text{C}$ to 50.0 $^{\circ}\text{C}$ ; no condensation
Set point:	Lowest set point is 40 $^{\circ}\text{C}$ below ambient
Stability:	+/-0.1 $^{\circ}\text{C}$ of set temperature in <2 minutes