

# HR2000+ Spectrometer

## User-Configured for Flexibility



### HR2000+

One of our most popular items, the HR2000+ Spectrometer features a high-resolution optical bench, a powerful 2-MHz analog-to-digital (A/D) converter, programmable electronics, a 2048-element CCD-array detector and a high-speed USB 2.0 port.

This innovative combination produces an extremely fast spectrometer and provides resolution to 0.035 nm (FWHM).

The HR2000+ allows you to capture and store a full spectrum into memory nearly every millisecond (that's up to 1,000 full spectra every second) when the spectrometer is interfaced to a computer via a USB 2.0 port. The HR2000+ is perfect for chemical, biochemical and other applications where fast reactions need to be monitored and fine spectral features need to be resolved.

The HR2000+ interfaces to a computer via USB 2.0 or RS-232 serial port. When using the serial port, the HR2000+ requires a single 5-volt power supply (not included).

Data unique to each spectrometer are programmed into a memory chip on the HR2000+; SpectraSuite software reads these values for easy setup.

### Features

- Up to 1,000 full spectra per second
- Programmable microcontroller
- High-resolution performance
- Multiple bench and interface options

Physical	
Dimensions:	148.6 mm x 104.8 mm x 45.1 mm
Weight:	570 g
Detector	
Detector:	Sony ILX511B linear silicon CCD-array
Detector range:	200-1100 nm
Pixels:	2048 pixels
Pixel size:	14 $\mu\text{m}$ x 200 $\mu\text{m}$
Pixel well depth:	~62,500 electrons
Sensitivity:	75 photons/count at 400 nm; 41 photons/count at 600 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 gratings, UV through Shortwave NIR
HC-1 grating option:	Provides 200-1050 nm range
Detector collection lens option:	Yes, L2
OFLV filter options:	OFLV 200-1100 nm
Other bench filter options:	Longpass OF-1 filters
Collimating and focusing mirrors:	Standard or SAG+UPG-HR
UV enhanced window:	Yes, UV2 quartz window
Fiber optic connector:	SMA 905 to 0.22 numerical aperture single-strand optical fiber
Spectroscopic	
Wavelength range:	Grating dependent
Optical resolution:	~0.035-6.8 nm FWHM
Signal-to-noise ratio:	250:1 (at full signal)
A/D resolution:	14 bit
Dark noise:	12 RMS counts
Dynamic range:	$8.5 \times 10^7$ (system); 1300:1 for a single acquisition
Integration time:	1 ms-65 seconds (20 s typical)
Stray light:	<0.05% at 600 nm; <0.10% at 435 nm
Corrected linearity:	>99%
Electronics	
Power consumption:	220 mA @ 5 VDC
Data transfer speed:	Full scans to memory every 2 ms with USB 2.0 port, 15 ms with USB 1.1 port
Inputs/Outputs:	Yes, 10 onboard digital user-programmable GPIOs
Analog channels:	One 13-bit analog input; one 9-bit analog output
Auto nulling:	No
Breakout box compatibility:	Yes, HR4-BREAKOUT
Trigger modes:	4 modes
Strobe functions:	Yes
Gated delay feature:	No
Connector:	30-pin connector