

# STS Microspectrometer

Amazing Full-Spectrum Performance in a  
Tiny Footprint



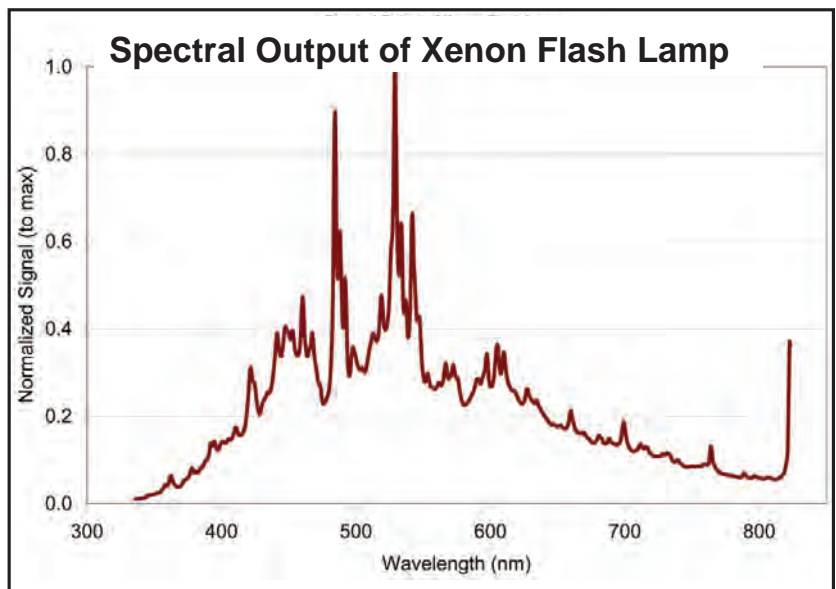
The STS introduces a family of compact, low-cost spectrometers that's ideal for embedding into OEM devices. At just 40 mm x 42 mm x 24 mm (1.6" x 1.7" x 0.9"), the STS provides full spectral analysis with low stray light, high signal to noise ratio and optical resolution of ~1.5 nm (FWHM) – remarkable performance for a spectrometer that size. The STS is an especially attractive option for high-intensity applications such as LED characterization and absorbance/transmission measurements, yet versatile enough for an extensive range of spectral sensing requirements.

## Robust Optical Bench Design

At the heart of the STS is a CMOS detector in a crossed Czerny Turner optical bench. The bench is distinguished by custom-molded collimating and focusing mirrors and a 600 lines/mm groove density grating that projects spectra onto the detector.

The unit achieves significantly better optical resolution and produces less stray light than most filter-based and other spectrometers of its size. For example, STS has 14-bit resolution and has low power consumption of just 0.75 W. Also, STS has triggering functions for instances where precise timing is necessary – for example, synchronizing measurements with an external event such as the pulsing of an excitation lamp for fluorescence.

STS takes advantage of recent advances in CMOS detectors that elevate optoelectronic performance and improve system reproducibility. It uses a 1024-element ELIS-1024 linear image sensor that's responsive from 200-1100 nm and has great sensitivity (6.74V/lux-second typical). This new generation of CMOS detectors offers excellent performance with great value.



## STS Options

We offer STS models for 200-600 nm (STS-UV), 350-800 nm (STS-VIS) and 650-1100 nm (STS-NIR) applications. Each unit has a fixed optical bench configuration, although you can select from standard slit sizes of 10, 25, 100 and 200  $\mu\text{m}$ . Custom slits are also available. To optimize signal collection efficiency and improve reproducibility, STS utilizes a fixed-fiber design. The fiber has a 400  $\mu\text{m}$  core and is 2 cm in length (including SMA connector). Custom configurations – including versions with different fiber lengths and with a cosine corrector – are available for high-volume applications.

## Markets and Applications

The STS was conceived as a low-cost, high-performance spectrometer for OEM and high-volume applications where one or more wavelengths are being monitored and customers seek a highly reproducible result. Life sciences, medical diagnostics, solid state lighting and environmental analysis are among the industries where STS is an attractive alternative to filter-based optical sensing systems and other microspectrometers.

## Key Features

- Full Spectral Analysis in a Small Footprint  
CMOS-based unit is less than 50 mm (2") square, weighs just 68 g (2.4 oz.)
- Ideal for OEM Devices  
Compact unit available at low cost and reproducible in large production quantities
- Remarkable Performance  
Meets or exceeds optical resolution, stability, sensitivity and other performance criteria associated with larger, more expensive spectrometers
- Multiple Interface Options  
Connectivity with spectrometer via USB or RS-232 interface and wireless data communication via Bluetooth or WiFi adapters

Physical	
Dimensions:	40 mm x 42 mm x 24 mm
Weight:	68 g (2.4 oz. ), incl. fixed fiber
Operating temperature:	0-50 °C, 10 °C change/hour ramp
Storage temperature:	-20 to +75 °C
Detector	
Detector type:	ELIS-1024, 1024 pixel linear CMOS
Detector range:	200-1100 nm (uncoated)
Pixels/size:	1024, 7.8 x 125 $\mu\text{m}$
Pixel well depth:	800,000 e-
Optical Bench	
Design:	Crossed Czerny Turner, focal length 28 mm
Entrance aperture:	Shaped aperture; 10 $\mu\text{m}$ , 25 $\mu\text{m}$ , 100 $\mu\text{m}$ and 200 $\mu\text{m}$ slits
Gratings:	600 l/mm
Fiber optic connector:	~2 cm x 400 $\mu\text{m}$ fixed fiber (not detachable)
Quantum efficiency:	60% (@ 675 nm)
Spectroscopic	
Wavelength range:	UV (200-600 nm), VIS (350-800 nm), NIR (650-1100 nm)
Optical resolution:	FWHM 1.0 nm (10 $\mu\text{m}$ slit), 1.5 nm (25 $\mu\text{m}$ slit), 6.0 nm (100 $\mu\text{m}$ slit), 12.0 nm (200 $\mu\text{m}$ slit)
Signal-to-noise ratio:	$\geq 1500:1$ (maximum signal)
A/D resolution:	14 bits
Dark noise:	$\leq 3$ counts RMS
Dynamic range:	$5 \times 10^9$ (system, 10 s max integration), 4600:1 single acq.
Integration time:	10 $\mu\text{s}$ -10 s
Stray light:	$\leq 0.25\%$ @ 450 nm; $\leq 0.1\%$ @ 750 nm
Corrected linearity:	$< \pm 0.5\%$ from 15-95% full scale
Max. dark current:	~150 counts/second at 60 °C
Electronics	
Power options:	USB or GPIO port
Data transfer speed:	USB full speed
Connector:	Micro-USB
Inputs/Outputs:	GPIO
Trigger modes:	3 modes
Strobe functions:	Single/Continuous
Gated delay feature:	Yes
Computer Requirements	
Computer interface:	USB 2.0, RS-232
Operating systems:	Any supported by OmniDriver/SeaBreeze or RS-232
Compliance	
CE mark:	Yes
RoHS:	Yes

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