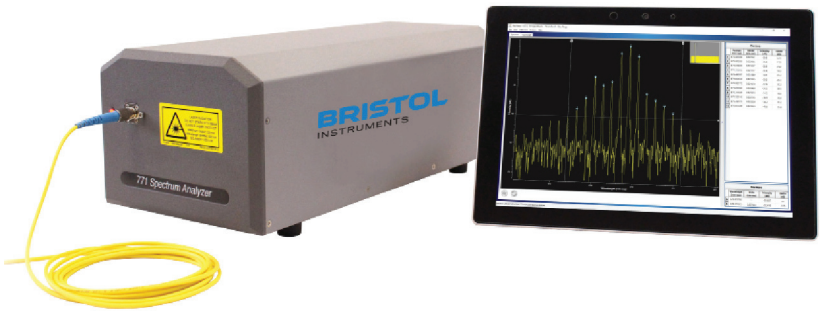
BRISTOL INSTRUMENTS

Accuracy. Reliability. Confidence.

LASER SPECTRUM ANALYZER

771 Series



The most complete laser spectral characterization from the visible to the mid-infrared.

The 771 Series Laser Spectrum Analyzer from Bristol Instruments combines proven Michelson interferometer technology with fast Fourier transform analysis resulting in a unique instrument that operates as both a high-resolution spectrum analyzer and a high-accuracy wavelength meter. With spectral resolution up to 2 GHz, wavelength accuracy as high as ± 0.0001 nm, and an optical rejection ratio of more than 40 dB, the model 771 provides the most detailed information about a laser's spectral properties.

Two versions of the 771 Laser Spectrum Analyzer are available. The model 771A is the most precise, measuring wavelength to an accuracy of ± 0.2 parts per million. For experiments that are less exacting, the model 771B is a lower-priced alternative with an accuracy of ± 0.75 parts per million.

Operation of the 771 Laser Spectrum Analyzer is straightforward using a PC connected directly via USB or through a local area network using Ethernet. Software is provided to control measurement parameters, display spectra, and to report wavelength data.

Key Features:

- Spectral analysis and wavelength measurement with one instrument.
- Spectral resolution as high as 2 GHz.
- Wavelength accuracy up to ± 0.0001 nm.
- Continuous calibration with a built-in wavelength standard.
- Optical rejection ratio greater than 40 dB.
- Operation available from 375 nm to 12 µm.
- Operates with CW and high-repetition rate pulsed lasers.
- Convenient pre-aligned fiber-optic input for wavelengths up to 2.6 µm.
- Free-space aperture input with visible alignment aid for IR/mid-IR wavelengths.
- Straightforward operation with a PC using USB or Ethernet.
- Display software provided to control measurement parameters, display spectra, and report wavelength data.
- Five-year warranty covers all parts and labor.

p: (585) 924-2620 **w:** bristol-inst.com **e:** info@bristol-inst.com

SPECIFICATIONS — 771 Series

MODEL	771A	771B
LASER TYPE [1]	CW, quasi-CW (repetition rate > 10 MHz), and pulsed (repetition rate > 50 kHz, pulse length > 50 ns)	
WAVELENGTH		
Range [2]	VIS: 375 - 1100 nm NIR: 520 - 1700 nm NIR2: 1 - 2.6 µm IR: 1 - 5 µm MIR: 1 - 12 µm	
Accuracy [3, 4, 5, 6]	± 0.2 ppm (± 1 ppm for λ > 5 µm) ± 0.0002 nm @ 1000 nm ± 0.002 cm^{-1} @ 10,000 cm^{-1} ± 60 MHz @ 300,000 GHz	± 0.75 ppm (± 1 ppm for λ > 5 µm) ± 0.0008 nm @ 1000 nm ± 0.008 cm^{-1} @ 10,000 cm^{-1} ± 225 MHz @ 300,000 GHz
Spectral Resolution [4, 7, 8]	4 GHz (for VIS, NIR, NIR2, MIR) 8 GHz (for IR)	
Calibration	Continuous - built-in stabilized single-frequency HeNe laser	Continuous - built-in standard HeNe laser
Display Resolution	9 digits	8 digits
Units [9]	nm, µm, cm^{-1}, GHz, THz	
OPTICAL REJECTION RATIO [4, 10, 11, 12]	> 40 dB (> 30 dB for MIR)	
MINIMUM INPUT POWER [12, 13, 14]	VIS: 0.025 - 1.1 µW NIR: 0.01 - 0.5 µW NIR2: 0.07 - 0.27 µW IR: 0.01 - 2.25 µW MIR: 0.01 - 13 µW	
MAXIMUM INPUT POWER	10 mW	
MEASUREMENT TIME [15]	< 2 s (1 s with smaller measurement ranges)	
INPUTS/OUTPUTS		
Optical Input [16]	VIS / NIR: Pre-aligned FC/UPC or FC/APC connector (9 µm core diameter) - optional free beam-to-fiber coupler NIR2: Pre-aligned FC/UPC or FC/APC connector (7 µm core diameter) - optional free beam-to-fiber coupler IR / MIR: Collimated beam, 2-3 mm diameter aperture, visible tracer beam to facilitate alignment	
Instrument Interface	USB and Ethernet with Windows-based display program Library of commands (SCPI) for custom and LabVIEW programming using any PC operating system	
COMPUTER REQUIREMENTS [17]	PC running Windows 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
ENVIRONMENTAL [12]		
Warm-Up Time	< 15 minutes	None
Temperature | Pressure | Humidity	+15°C to +30°C (-10°C to +70°C storage) | 500 – 900 mm Hg | ≤ 90% R.H. at + 40°C (no condensation)	
DIMENSIONS AND WEIGHT		
Dimensions (H x W x D) [18]	VIS / NIR / NIR2: 5.6" x 6.5" x 15.0" (142 mm x 165 mm x 381 mm)	IR / MIR: 7.5" x 6.5" x 15.0" (191 mm x 165 mm x 381 mm)
Weight	14 lbs (6.3 kg)	
POWER REQUIREMENTS	90 - 264 VAC, 47 - 63 Hz, 50 VA max	
WARRANTY	5 Years (parts and labor)	

(1) Operation with pulsed lasers may result in modulation artifacts in the form of false spectral features. These modulation artifacts are reduced with averaging.
(2) MIR capable of operation to 14 µm. However, operation and specifications are not guaranteed beyond 12 µm.
(3) Defined as measurement uncertainty, or maximum wavelength error, with a confidence level of ≥ 99.7%.
(4) Using Approximate Blackman window function for FFT analysis.
(5) Wavelength Meter Mode: 771A - for laser spectral bandwidth less than 1 GHz (FWHM). 771B - for laser spectral bandwidth less than 10 GHz (FWHM).
(6) Spectrum Analyzer Mode: wavelength axis is calibrated to system's accuracy specification.
(7) Defined as the measured full width at half maximum intensity (FWHM) of an infinitely narrow optical signal.
(8) Spectral resolution as high as 2 GHz (4 GHZ for IR) can be achieved using other window functions. However, wavelength accuracy and optical rejection ratio may be reduced.
(9) Data in units of nm, µm, and cm^{-1} are given as vacuum values.
(10) For single measurement with CW lasers, FWHM < 10 GHz, and 10,000 times (1,000 times for MIR) minimum input power.
(11) A co-addition averaging feature can be used to reduce the noise level and therefore improve the optical rejection ratio.
(12) Characteristic performance, but non-warranted.
(13) Optical power required to achieve a signal-to-noise ratio of approximately 1 dB.
(14) Sensitivity at specific wavelengths can be determined from a graph provided in the 771 Series Product Details brochure.
(15) Time to generate a spectrum over the entire operational wavelength range. Smaller ranges are available to reduce measurement time to 1 s.
(16) IR and MIR required beam height is 5.4 ± 0.25".
(17) For use with Windows-based display program. Interface with SCPI can be done using any PC operating system.
(18) IR and MIR instrument height is adjustable (7.25 ± 0.25") for alignment purposes.

Bristol Instruments reserves the right to change the specifications as may be required to permit improvements in the design of its products.
Specifications are subject to change without notice.

BRISTOL INSTRUMENTS, INC. **p:** (585) 924-2620 **w:** bristol-inst.com **e:** info@bristol-inst.com