WAVECAPTURE FBG INTERROGATOR

Instrument with an integrated light source (IRS) that provides interrogation for 1, 4, or 16 FBG sensors.

The WaveCapture™ Fiber Bragg Grating Interrogator is an instrument with an integrated light source that monitors multiple wavelengths from multiple channels. Precise fiber bragg grating (FBG) sensor system measurements are achieved with high wavelength accuracy at ultra-fast response times.

PRODUCT HIGHLIGHTS

- High reliabilty with no moving parts
- Ultra-fast response time (up to 5 kHz)
- Excellent wavelength repeatability and resolution
- Low power consumption enabling battery-operated operation
- Integrated broadband light source
- USB 2.0 or RS-232 interface

APPLICATIONS

- Smart structures
- Strain measurements
- Perimeter sensing
- Aerospace
- Construction
- Oil and gas down-hole drilling
- Electrical grid reliability
- Mining
- Medical devices
- Transportation
- Energy (solar, nuclear, wind)

AT A GLANCE

Number of Channels

1, 4, or 16

Wavelength Range

40 nm Model: 1525 to 1565 nm
80 nm Model: 1510 to 1590 nm
Others available on request

Wavelength Repeatability

±2 pm (with IRS)
±5 pm (without IRS)

Wavelength Readout Resolution

1 pm

Frequency Response Time (Typ.)

Standard: 1 to 5 Hz (RS232/USB 1.1)
Fast: Up to 5 kHz (USB 2.0)

Compliance

- Telcordia GR-63/1209/1221-CORE qualified
- MIL STD 810F

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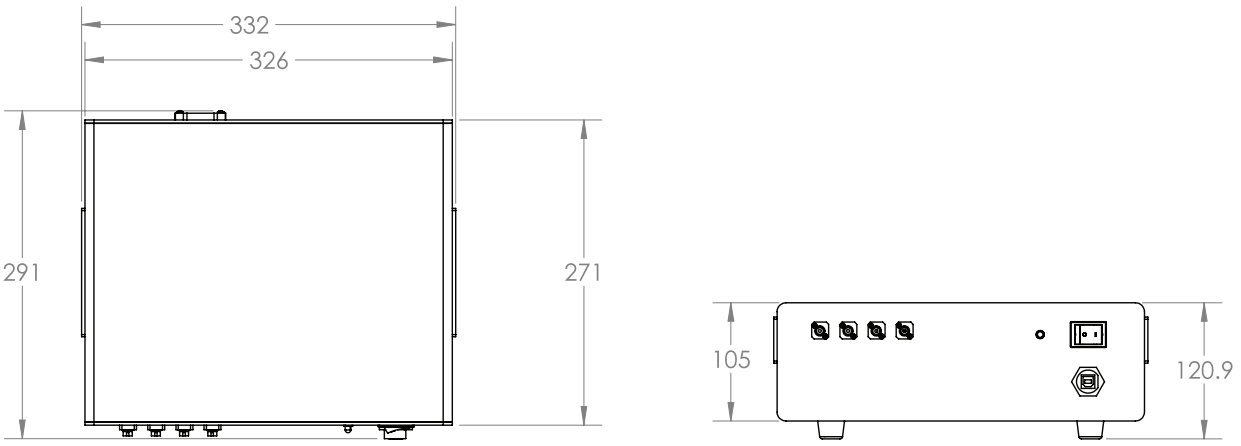
TECHNICAL DATA

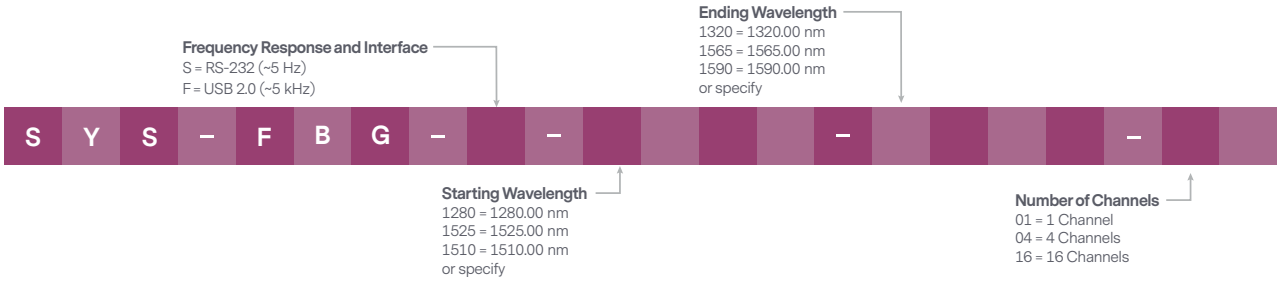
Specifications	
Number of Channels	1, 4, 8, or 16
Wavelength Ranges	40 nm Model: 1525 to 1565 nm
	80 nm Model: 1510 to 1590 nm
	Other wavelength ranges on request
Wavelength Repeatability	±2 pm (with IRS); ±5 pm (without IRS)
Min Detectable Wavelength Change	±1 pm
Optical Interface	FC/APC connector (or specified)
Frequency Response Time (typ)	Standard: 1 to 5 Hz (RS-2320
	Fast: up to 5 kHz (USB 2.0)
SLED Light Source	> 15 mW Output Power
	> 40 nm FWHM for Standard
	> 80 nm FWHM for Extended
Optical Circulator	Included
Operating Temperature	-5 to 75°C, 0 to 80%, non-condensing
Storage Temperature	-20 to 70°C, 0 to 95%, non-condensing
Software	WaveCapture Sense 20/20 software,
	WaveCapture Sense 20/20 SDK for development (optional)
Power Supply	110 to 220 VAC
Power Consumption	< 10 W

SCHEMATIC



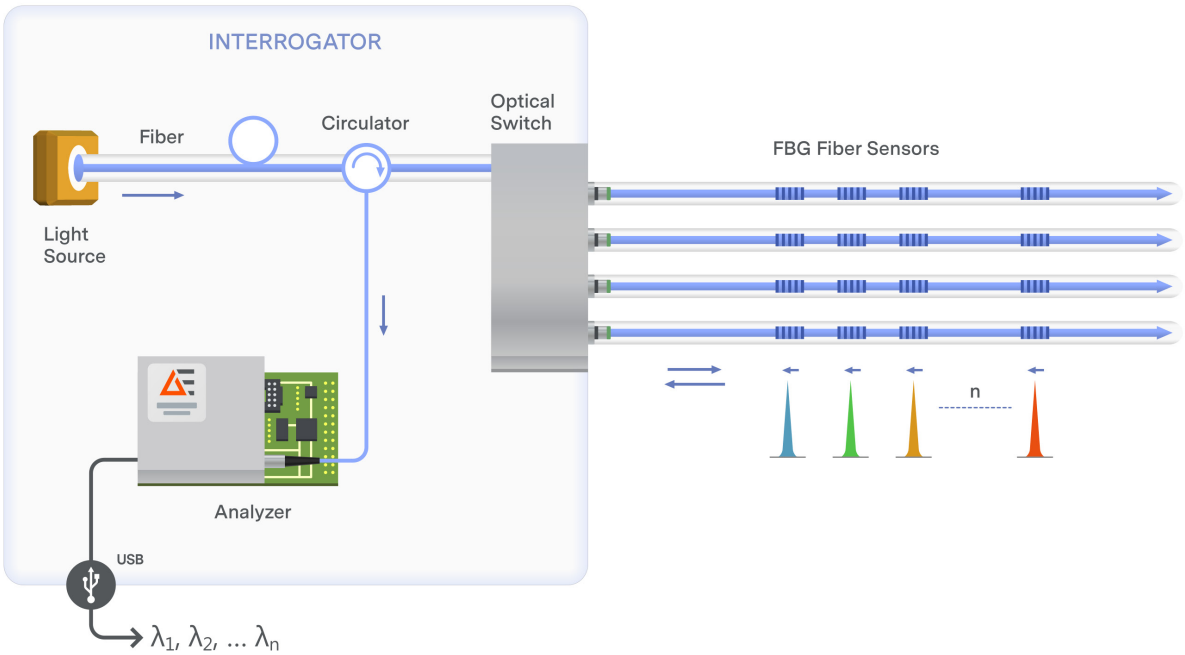
Dimensions in mm
Drawing depicts the 4 channel version

ORDERING INFORMATION



WAVECAPTURE FBGA OVERVIEW

Advanced Energy's WaveCapture Fiber Bragg Grating Analyzer (FBGA) is an integrated spectral engine that serves as the heart of precise, fast, and reliable FBG interrogator systems. The FBG Analyzer employs a proprietary optical design that features high-efficiency dispersive optics, an ultrasensitive detector array, and innovative numerical algorithms to provide high speed, high-resolution spectral measurements in challenging environments. The figure below shows an FBG analyzer integrated into an FBG sensing system. A broadband light source illuminates an optical fiber which features an array of "N" fiber bragg grating sensors. The FBG array reflects "N" spectral bands of light back down the fiber, where an optical circulator directs the light to the FBG Analyzer. Inside the analyzer, the light is dispersed and the diffracted spectrum is measured by a detector array. Numerical algorithms are used to extract each "Bragg wavelengths" from the raw data, which are sent to the host and converted to temperature, strain, acceleration, or other measured parameter. Both raw and processed data are available to the host.

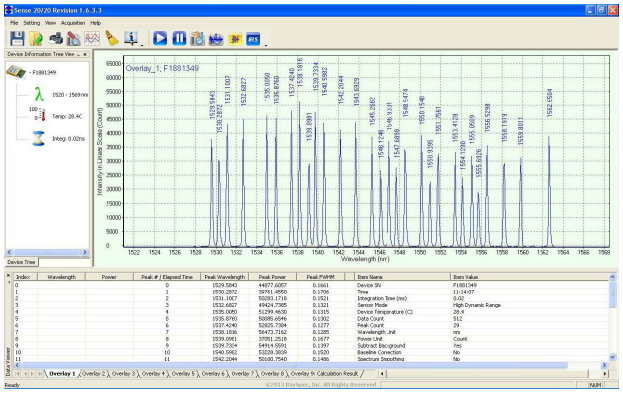


SOFTWARE

WaveCapture Sense 20/20

The WaveCapture™ Sense 20/20 software is a Windows-based program for interfacing with WaveCapture FBG analyzers and systems via USB, RS232, or Ethernet. The software is designed to run on Windows 7 and 10 operating systems. The software provides the following features:

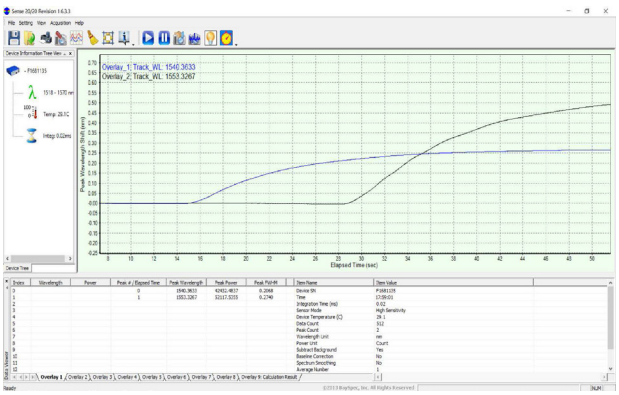
- Setup acquisition mode and parameters
- Acquire spectrum and display into multiple overlays
- Post-process spectrum data such as peak search, background subtraction, spectrum smooth and baseline correction, save and load spectrum data
- Record and replay spectrum data in the fast acquisition mode
- Track the wavelength shift of the selected peaks
- Control SLED light source
- Control optical switch and GPIO output



WaveCapture™ Sense 20/20 software

WaveCapture Sense 20/20 SDK

WaveCapture Sense 20/20 software development kit (SDK) provides the interface for software developers to access the WaveCapture FBG Analyzer spectrometers. The Dynamic Link Library (DLL) in the SDK can be used under different programming environments, including C, C++, Visual Basic, and LabVIEW. The SDK provides a set of fuctions that allow users to configure and control the FBG Anayzer spectrometer as well as acquire and post-process the spectrum data.



WaveCapture™ SDK

Advanced Energy

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PRECISION | POWER | PERFORMANCE

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