

FSI-OEM | FBG Sensor Interrogator for OEM



FSI-OEM

The Optilab FSI-OEM Fiber Bragg Grating (FBG) Sensor Interrogator is a compact, rugged, dynamic interrogator module designed for demanding aerospace applications. The FSI-OEM is a fully-integrated, high-resolution measurement system, features a high power, high speed swept wavelength laser, state-of-art embedded system for signal processing. The FSI-OEM interrogator core employs advanced hardware peak detection, optimized for rapid data processing of many simultaneous FBG sensors. The FSI-OEM is focused on providing measurements with higher acquisition rates, large dynamic range and continuous lifetime on-board referencing. The combination of high speed and excellent repeatability enables a single FSI-OEM to simultaneously monitor dynamic sensors. The FSI-OEM responds directly to the user commands and output sensor wavelength data via Ethernet port and our standard protocol.

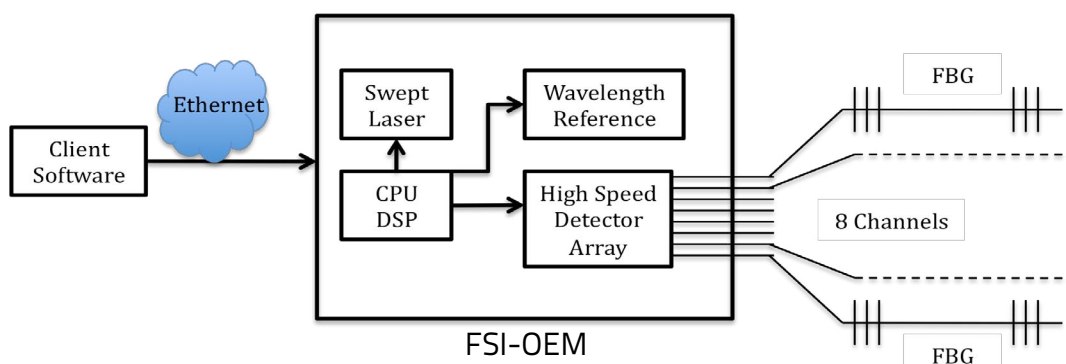
Features

- Compact, low profile, lightweight chassis
- Embedded system design for continuous, uninterrupted operation, no PC required
- Ruggedized power, data, and optical connectors
- Ethernet output, allow cloud operation
- Fast sweep rate up to of 1 kHz
- 8 channels sensor detection standard
- High wavelength resolution of ± 0.5 pm
- High power swept laser
- Precision machined aluminum housing

Applications

- Aerospace vehicles (airframes, composite structures, wind tunnels, dynamic tests)
- Marine vessels (hull, mast, rudder, deck, cargo containers)
- Transportation (railways, trains, roadways, specialty vehicles, cranes)
- Homeland security (perimeter intrusion, heat detection, security gate monitoring)
- Space craft structure analysis

Functional Diagram



Specifications | FSI-OEM

Technical Specifications	
Sweep Frequency	1 Hz to 1 kHz (2 kHz optional)
Number of Optical Channels	4 - 8 (Standard; Can be customized)
Wavelength Range	Up to 70 nm
Wavelength Accuracy	± 2.5 pm
Wavelength Repeatability	± 1 pm
Dynamic Range ¹	> 30 dB
Laser Output Power	10 mW - 40 mW
Minimum FBG Wavelength Separation	0.3 nm
FBG Detection	Proprietary DSP
Optical Connectors	FC/APC
FBG Requirements	Standard FBG ²

¹ Defined as external optical insertion loss (from FSI to FBG sensors)

² FBG 3 dB bandwidth >0.15 nm, sidelobe <-10 dB from peak

Data Processing Capabilities	
Interface	Ethernet
Protocol	TCP/IP
Client Server Software	Included, can be customized
Synchronization	One pulse per second (Optional)
Data Format	Standard format included; Can be customized

Mechanical, Environment, Electrical Properties	
Dimension	318 mm x 268 mm x 50 mm
Weight	3.6 kg (7.8 lbs)
Operating Temperature; Humidity	0°C to 50°C; 0 to 80%, non-condensing
Storage Temperature; Humidity	-30°C to 85°C; 0 to 95%, non-condensing
Input Voltage	24 V to 32 V; 2A
Power Consumption	50 W peak; < 20 W operational
Housing Construction	Machined aluminum alloy, anodized

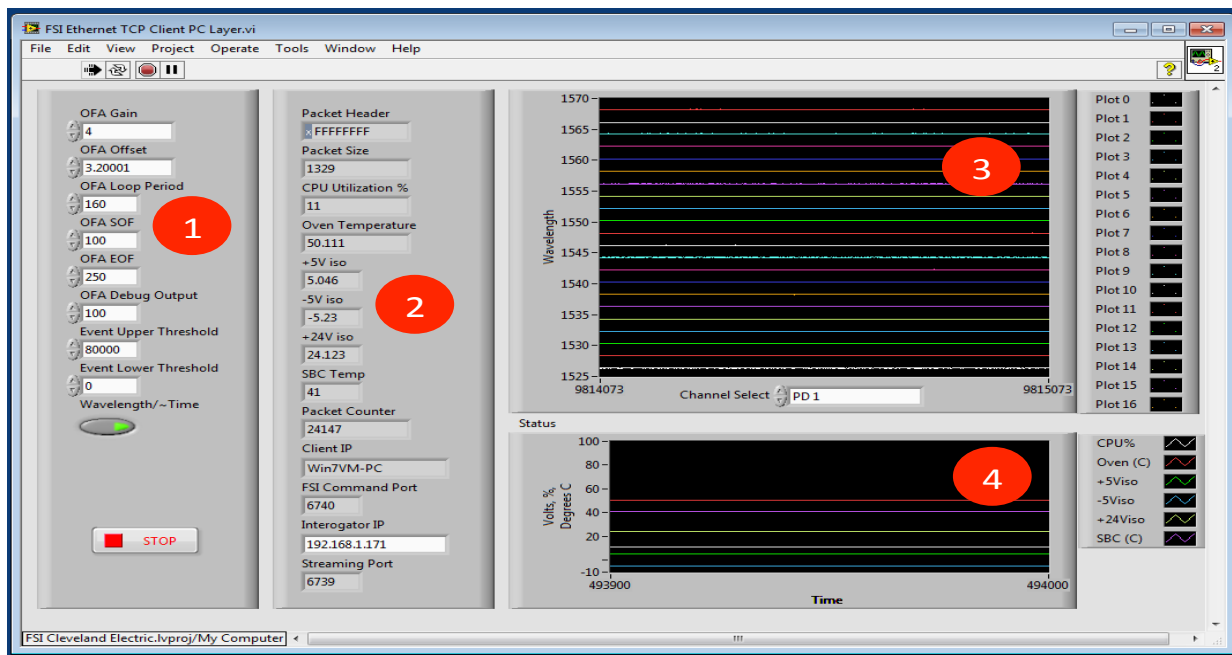
Other Options	
Optical Channels	4-8 channels (up to 16 channels)
Laser Power	Up to 100 mW
Sweeping Speed	2 kHz available upon request

Features and Information of FSI-OEM

ENVIRONMENTAL TESTING & QUALIFICATION

- High Temperature / Low Temperature
- Temperature Cycle Aging Qualification 2,000 hours (on going)
- Damp Heat (Humidity)
- Shock resistant
- Vibration test on horizontal and vertical axis

CLIENT SERVER SOFTWARE



1. Control parameters
2. System status parameters
3. FBG wavelength real time display window
4. System status parameters real time display window

MECHANICAL DRAWING

