Applications

- Measurements of fiber bragg grating (FBG) strain gages, temperature probes, accelerometers, pressure sensors and other FBG sensors.
- Simultaneous dynamic and static measurements of hundreds of sensors.
- Permanent installations for tracking the condition and performance in smart structures like bridges, dams, buildings and tunnels.
- Continuous, decades-long, structural health monitoring of ships, aircraft, trains and other complex structures.

Description

The sm230 Optical Sensing Interrogator provides simultaneous, static and dynamic interrogation of hundreds of fiber optic sensors. The combination of high speed and repeatability allows a single module to interrogate dynamic sensors and measure ultra-static sensors with ultra-high resolution.

In its standard 16 channel configuration, the module seamlessly integrates:

- Wide-scanning, high power, high speed, swept laser technology
- Advanced parallel PC control-analysis-communications architecture
- ENLIGHT™ Sensing Analysis Software

Like all Micron Optics interrogators, the sm230 uses patented state-of-the-art sub-picometer optical referencing technology so that the module never requires recalibration. Balancing world-leading measurement capabilities with a sensible price, the commercial grade sm230 is available in three configurations to serve a range of users - from those monitoring a handful of sensors to heavy users whose applications demand parallel monitoring of hundreds of sensors.

Features

- More sensors - Wider range swept laser scanning means more sensors per channel (4x the competition).
- More channels – Up to 16 channels can be built into the compact sm230 package.
- Fast dynamic measurements.
- Spectral Diagnostic View – Observe sensor optical characteristics during setup.
- Synchronized Measurement – Sync multiple sm230s to acquire simultaneous data for 1000s of sensors.

ENLIGHT™ Sensing Analysis Software is included with Micron Optics sensing interrogator systems and provides a single suite of tools for data acquisition, computation, and analysis of optical sensor networks. ENLIGHT™ combines the useful features of traditional sensor software with the specific needs of the optical sensor system, making it easy to optimize optical properties during the design and implementation phase of an optical sensor system. Intuitive data display and additional graphing and data visualization features make ENLIGHT™ easy to use. Learn more about ENLIGHT™at: http://www.micronoptics.com/sensing_software.php.
## Optical Sensing Interrogator | sm230

### Specifications

<table>
<thead>
<tr>
<th>Optical Properties</th>
<th>sm230-200</th>
<th>sm230-500</th>
<th>sm230-800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Optical Channels</td>
<td>1</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Scan Frequency</td>
<td>100 Hz</td>
<td>500 Hz</td>
<td>250 Hz</td>
</tr>
<tr>
<td>Wavelength Range</td>
<td>1510-1590 nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavelength Stability</td>
<td>2 pm typ, 5 pm max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavelength Repeatability</td>
<td>1 pm, 0.05 pm with 1,000 averages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>25 dB with user-selectable gain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max FBGs per Channel</td>
<td>80 (up to 160 with expanded λ range)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Peak Detection</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Spectral Diagnostic View</td>
<td>Optional</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Optical Connectors</td>
<td>FC/APC (E2000 available)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBG Requirements</td>
<td>0.25 +/- 0.05nm, FWHM (-3dB point); &gt;15dB isolation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Data Processing Capabilities

- Interfaces: Ethernet - other interfaces available via an sp1xx Sensing Processor Module
- Protocols: Custom Micron Optics protocol via Ethernet (others available)
- Remote Software: Peak detection, data logger, peak tracking, and instrument control
- LabVIEW™ Source Code: Allows for customization of remote software
- Enhanced Data Management: ENLIGHT™ Sensing Analysis Software

### Mechanical, Environmental, Electrical Properties

- Dimensions; Weight: 435 mm x 442 mm x 45 mm; 4.1 kg (9 lbs max)
- Rack Mount Hardware: Included
- Operating Temperature; Humidity: 0° to 50° C; 0 to 80%, non-condensing
- Storage Temperature; Humidity: -20° to 70° C; 0 to 95%, non-condensing
- Input Voltage: 7 - 36 VDC (100~240 VAC, 47~63Hz), AC/DC converter included
- Power Consumption at 12V: 25 W typ, 50 max

### Options

- FBG Distance Measurement: Optional
- 1kHz Scan Rate: Optional
- 2 kHz Scan Rate: Available with 40nm λ range, (1525-1565nm) n/a
- Expanded FBG Capacity: λ range of 1460 - 1620nm doubles max FBGs to 160 per channel, 2pm λ Repeatability at full acquisition speed n/a
- 1310nm λ Range: Available custom λ range of 1280-1360nm n/a
- Internal Sensing Processor Module: Windows XP Professional or Linux OS, See sp1xx datasheet

### Notes:

2. Captures effects of long term use over full operating temperature range of the instrument. (Assumes an FBG bandwidth of 0.25nm).
4. Defined as laser launch power minus detection noise floor. Adjustable 13 dB window within total range.
5. Use for performance qualification. (See Notes 2 and 3). Bandwidths of 0.1 to 1.0nm may reduce performance.
6. Minimum FBG λ spacing is 1.5nm; FBGs must be in ascending λ order along the fiber; distance measurement accuracy is ~2m, 1kHz/80nm max.
7. Maximum scan frequency of 500Hz, 125Hz for 16 channel model. Not compatible with FBG distance measurement.