Spectra-FT Fine Tunable
VIS-NIR Spectral Calibration Sources

Trusted test data
Labsphere is a recognized leader in image sensor calibration sources. Our Spectra-FT sources are engineered for the high performance requirements in image sensor research, development and production testing and calibration.

Save money, save space
One instrument produces unlimited spectrums. Large area uniform radiance field in a compact and robust instrument. The sources are designed to easily mount in a production test station with active spectral feedback and user recalibration features.

Repeateable, reproducible results
With Labsphere’s diffuse reflectance material, Spectralon®️, and thermal-controlled LED module, long term repeatability and reproducibility are ensured.
Features and Applications

Measurement Applications
- Cross Talk
- Color Balance
- Distortion
- Dynamic Range
- Flat Fielding
- ISO Speed
- Linearity
- Pixel Defects
- Pixel Shading
- PRNU
- Quantum Efficiency
- Saturation Exposure
- Sensitivity
- Signal-to-Noise
- Spatial and Angular Non-Uniformity
- Vignetting Correction
- White Balance, White Noise

Industry Applications
- Ambient Light Sensor Calibration
- Automotive Camera Calibration
- CMOS Image Sensor Test
- Lens Testing
- Mobile Camera Calibration
- Photodiode Responsivity
- RGB Sensor Test
- Spectrum/Illuminant Simulation
- Technical and Industrial Photography

Features
- Resolution and Accuracy – 15, and 32 channels (18, 42, 84 LEDs)
  in the Visible and NIR
- User Spectral Optimization – Quickly simulate any spectrum
- Create and match the combination of multiple spectrums
- Performance Metrics – Built-in spectral fidelity metric A’ and color performance
  matching metrics of any simulated spectra
- Built-in spectrometer monitor and feedback loop to ensure accurate spectral output
  and correction for every wavelength channel
- Built-in user spectral radiance reference for user recalibration
- Convert between radiance and irradiance values and geometries
- Extended use life with built in user recharacterization and calibration features
- No down time returning unit for recalibration
- DC constant current drivers and thermal control for continuous stable performance
- Viewing Area – Large area 75 mm uniform radiance port
- Exceptional uniformity from narrow to 180° field of view (FOV)
- Quick Integration – Compact and robust for tester and production line integration

Calibration*
The spectral radiance of the source is monitored with an embedded spectroradiometer. The systems include a stable quartz tungsten halogen reference source used to recalibrated the spectral radiance responsivity of the spectroradiometer at the discretion of the user. This ensures NIST traceable continuous accurate spectral monitoring of the performance of the systems.

Active Feedback Control*
Achieve reproducible results with the active feedback control feature enabled. The calibrated embedded spectroradiometer can be used to measure and correct for any spectral radiance changes due to ambient conditions, inter reflections during test or long term drift, ensuring stability and optimal performance over time. Unlike broadband monitors the spectral feedback measures the total spectral distribution and corrects for individual LED input to the total spectral output.

System LED Characterization*
Limit down time by not having to return your source to the supplier for recharacterization with this embedded analytical feature! Characterization data are used to create the underlying predictive output model of the tunable calibration source system used for optimizing the spectral radiance to desired target spectra. The characterization feature is performed with the internal spectroradiometer of the tunable calibration source. The user can use this feature after long term use to recalibrate the spectral radiance of the source.

*applies to Labsphere’s tunable calibration sources with the embedded spectroradiometer
**Specifications**

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>FT-1100-W</th>
<th>FT-2200-W</th>
<th>FT-2300-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Number:</td>
<td>AA-01367-300</td>
<td>AA-01577-000</td>
<td>AA-01577-001</td>
</tr>
<tr>
<td>Source Geometry:</td>
<td>75 mm diameter uniform output with 180° FOV Lambertian source. Mid Range</td>
<td>75 mm diameter uniform output with 180° FOV Lambertian source. High Range</td>
<td>75 mm diameter uniform output with 180° FOV Lambertian source. Extreme Range</td>
</tr>
<tr>
<td>Spectral Resolution A':</td>
<td>12%</td>
<td>6 to 10%</td>
<td>6 to 10%</td>
</tr>
<tr>
<td>Initial Warm-Up Time:</td>
<td>2 minutes</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>Operating Temp:</td>
<td>20 - 40°C, 0 - 70% RH</td>
<td>20 - 40°C, 0 - 70% RH</td>
<td>20 - 40°C, 0 - 70% RH</td>
</tr>
<tr>
<td>Spatial Uniformity:</td>
<td>≥99% over 180°</td>
<td>≥99% over 180°</td>
<td>≥99% over 180°</td>
</tr>
<tr>
<td>Optical Geometry:</td>
<td>Labsphere Integrating Sphere Technology</td>
<td>Labsphere Integrating Sphere Technology</td>
<td>Labsphere Integrating Sphere Technology</td>
</tr>
<tr>
<td>Typical Radiance Range:</td>
<td>VIS maximum of 25 W/m²·sr·μm</td>
<td>VIS-NIR maximum of 250 W/m²·sr·μm</td>
<td>VIS-NIR maximum of 325 W/m²·sr·μm</td>
</tr>
<tr>
<td>Typical Luminance Range:</td>
<td>Typical range of 10 to 800 cd/m²</td>
<td>Typical range of 200 to 10,000 cd/m²</td>
<td>Typical range of 260 to 13,000 cd/m²</td>
</tr>
<tr>
<td>Spectral Output:</td>
<td>15 channels, 405 nm, 420 nm, 435 nm, 451 nm, 475 nm, 505 nm, 525 nm - 530 nm, 565 nm, 594.5 nm - 594.5 nm, 610 nm - 620 nm, 645 nm, 660 nm, 680 nm, 700 nm, 850 nm, 940 nm, and Calibration Lamp</td>
<td>32 channels, 42 LEDs</td>
<td>32 channels, 48 LEDs</td>
</tr>
<tr>
<td>Spectral Range:</td>
<td>400 nm to 700 nm, 850 nm</td>
<td>380 nm to 1000 nm</td>
<td>380 nm to 1000 nm</td>
</tr>
<tr>
<td>Color Accuracy: (x,y)</td>
<td>0.0001, 0.003</td>
<td>0.0001, 0.002</td>
<td>0.0001, 0.002</td>
</tr>
<tr>
<td>Spectral Bandwidth:</td>
<td>Typical: Visible 20 nm FWHM, NIR 50 nm FWHM 1900K to 40000K</td>
<td>Typical: Visible 20 nm FWHM, NIR 50 nm FWHM 1900K to 40000K</td>
<td>Typical: Visible 20 nm FWHM, NIR 50 nm FWHM 1900K to 40000K</td>
</tr>
<tr>
<td>Preset Spectra:</td>
<td>Custom preset spectra upon request</td>
<td>Custom preset spectra upon request</td>
<td>Custom preset spectra upon request</td>
</tr>
<tr>
<td>Electrical Resolution:</td>
<td>Visible resolution ~ 15 nm, NIR resolution ~ 50 nm (typical channel spacing)</td>
<td>Visible resolution ~ 15 nm, NIR resolution ~ 50 nm (typical channel spacing)</td>
<td>Visible resolution ~ 15 nm, NIR resolution ~ 50 nm (typical channel spacing)</td>
</tr>
<tr>
<td>LED Control:</td>
<td>12 bit DAC for channel current drivers</td>
<td>16 bit DAC for channel current drivers</td>
<td>16 bit DAC for channel current drivers</td>
</tr>
<tr>
<td>Software:</td>
<td>Includes full spectral calibration with spectral fitting, preset storage, real-time optical feedback, radiometric and photometric units supported, user optimization, and recalibration programs</td>
<td>Includes full spectral calibration with spectral fitting, preset storage, real-time optical feedback, radiometric and photometric units supported, user optimization, and recalibration programs</td>
<td>Includes full spectral calibration with spectral fitting, preset storage, real-time optical feedback, radiometric and photometric units supported, user optimization, and recalibration programs</td>
</tr>
<tr>
<td>Interface Connectors:</td>
<td>USB 2.0 type B</td>
<td>TPC Command Sets</td>
<td>USB 2.0 type B</td>
</tr>
<tr>
<td>Interface Protocol:</td>
<td>TPC Command Sets</td>
<td>TPC Command Sets</td>
<td>TPC Command Sets</td>
</tr>
<tr>
<td>Input Voltage and Power:</td>
<td>110 to 240 VAC at 50 - 60 Hz</td>
<td>110 to 240 VAC at 50 - 60 Hz</td>
<td>110 to 240 VAC at 50 - 60 Hz</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Source: H 25 cm, W 18 cm, D 18 cm Power Module: H 14 cm, W 23 cm, D 37 cm</td>
<td>Source: H 23 cm, W 30.2 cm, D 29.5 cm Power Module: H 5.5 cm, W 16.7 cm, D 31 cm</td>
<td>Source: H 23 cm, W 30.2 cm, D 29.5 cm Power Module: H 5.5 cm, W 16.7 cm, D 31 cm</td>
</tr>
<tr>
<td>Weight:</td>
<td>Source: 8 kg Power Module: 6 kg</td>
<td>Source: 6 kg</td>
<td>Source: 6 kg</td>
</tr>
<tr>
<td>Supported Operating System:</td>
<td>Windows 10</td>
<td>Windows 10</td>
<td>Windows 10</td>
</tr>
</tbody>
</table>