MEASURE
any light source

illumia®Plus2 Elevated Temperature Integrating Sphere Spectroradiometers

Allows testing over a broad range of temperatures

Measure with confidence

When a solid-state light engine is used in a luminaire or fixture, the thermal environment near the LEDs are altered by both the design and the application environment. By measuring the performance characteristics of a luminaire or fixture at various temperatures, one can model the expected light output by measuring the operating temperature. Labsphere's illumia®Plus2 Elevated Temperature Integrating Sphere Spectroradiometers are designed specifically to test photometric and colorimetric performance over a broad dynamic range of temperatures per IES LM-82 and LM-79 -19 recommended practices. Systems include a choice of integrating sphere sizes 1.65 m and 2 m with temperature controlled feedback loop, application-specific modules, accredited reference lamps and Integral® Software that drives it all.

Improve productivity

- Add-on electronic modules increase functionality and simplify compliance with IES LM-79-19, IES LM-78, LM-82 and equivalent measurement guidelines
- Automated calibration routines ensure ease-of-use and improved efficiency
- Automated IES LM-79-19 and S025 stabilization routines
- Generate reports using Excel templates: data where you want it, how you want it, formatted for language and style

Features

- Fast, low noise; TE cooled back – thinned CCD array detector
- Shutter for dark measurements in real time
- Hardware triggering capability
- Exceptional stability at long exposure time
- High dynamic range
- Ambient temperature control and monitoring
- Light source temperature monitors
- LIV and temperature stability

Labsphere
Advancing the Technology of Light: Measure. Create. Reflect.

sales@labsphere.com www.labsphere.com

PB-13061-000 Rev 04

Measure

- Indoor Lighting
- Outdoor Lighting
- Roadway Lighting
- Lamp and Luminaires
- LEDs
- Entertainment Lighting
- Automotive Lighting
- Troffers
- Luminaires
- CFLs
- Fluorescent Lamps
- OLEDs
- Low Power LEDs

Every illumia®Plus2 Elevated Temperature System features these standard products

Programmable DC Power Supplies

Designed to accurately provide DC current to reference lamp, auxiliary lamp, and DCV devices under test. The current output is selected, set and controlled using Integral Software included with the power supply.

- Programmable regulated DC current
- Programmable regulated DC voltage
- Controlled current ramp up
- Lamp operation timer
- Easy on/off operation
- Front panel or remote control
- Current, voltage readback

ICM-500 Control Module

The illumia®Plus2 Control Module is the routing module that ties Labsphere's powerful Integral Software to the illumia®Plus2 total spectral flux measurement hardware. When the ICM-500 is controlled by Integral, this user friendly, turn key system automatically routes power and metering.

- Main hub for power supplies and power meters
- Routes DC voltage to 2π and 4π reference locations
- Routes power to absorption correction lamp
- Routes DC or AC power to devices under test
- USB inputs

Calibrated Spectral and Luminous Flux Standards

Each standard has been carefully screened, seasoned, and calibrated at our manufacturing facility under the guidelines recommended by the NVLAP accredited ISO 17025 practices for the highest degree of confidence.

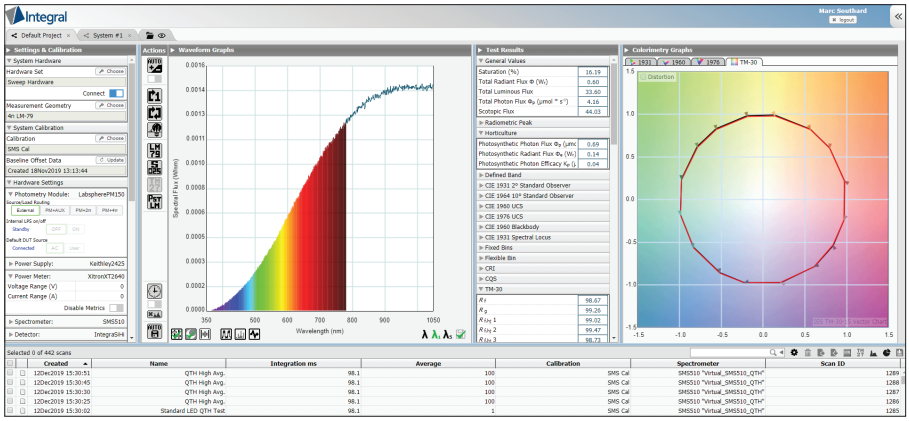
NVLAP® CALIBRATION

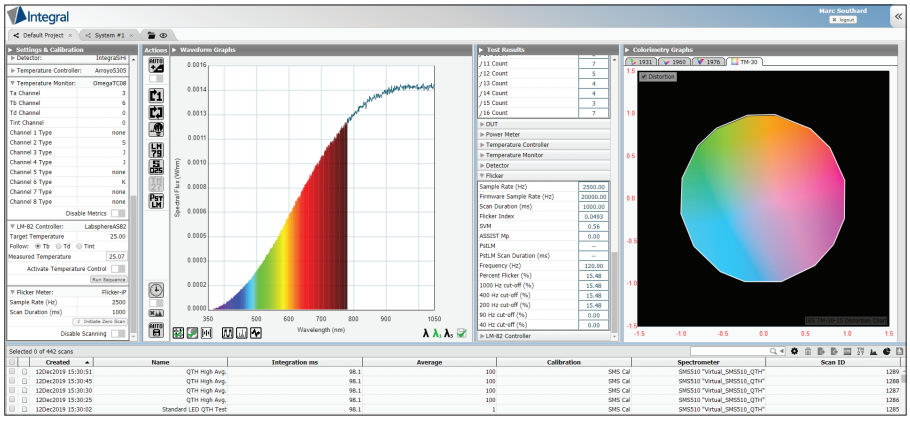
Labsphere
Advancing the Technology of Light: Measure. Create. Reflect.

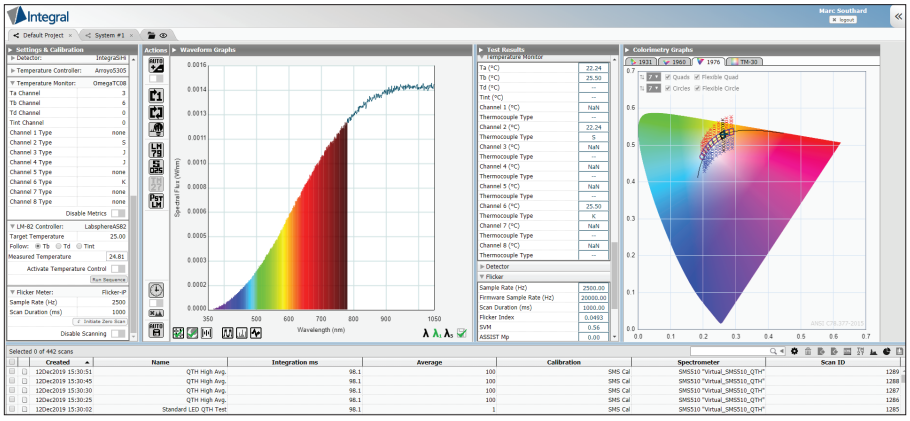
sales@labsphere.com www.labsphere.com

PB-13061-000 Rev 04

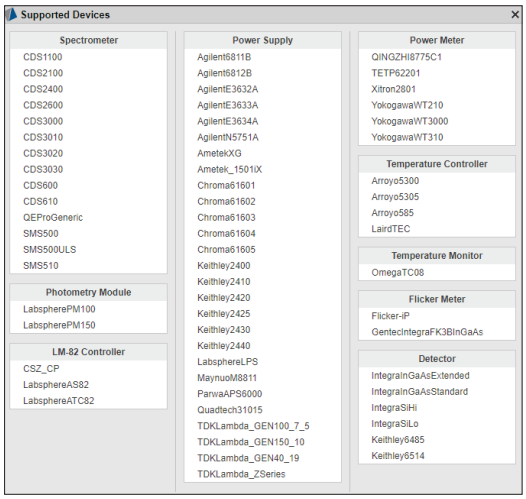
Integral® Light Measurement Software







- HTML5-enabled web browser based light measurement software
- Operation from any device, any platform, any location and in any language
- Instantly switch between English, Mandarin Chinese, Japanese, Korean, and French
- Large assortment of test hardware configurations are supported (spectrometer, AC and DC power supplies, temperature controls and monitors)
- Powerful, easy-to-use Application Programming Interface (API) supports LabVIEW, .NET, C, and VBA
- One user can control many test stations and multiple users can access the same test station from anywhere
- Meets LM-79-19 and LM-78 integrating sphere spectrometer recommended measurement methods
- Automated calibration routines
- Built-in report generator with the ability to create custom reports
- All Industry standard color calculations including:
  - x, y, u, v, u', v', CCT, CRI (1-15 and general), CQS, luminous flux (lumens), scotopic lumens, Duv, dominant wavelength, peak wavelength, FWHM, Centroid, Purity, ANSI SSL 2015 binning, TM-30-18 fidelity and gamut data, distortion and vector graphics, and horticulture



List of Integral Supported Devices

Labsphere

Advancing the Technology of Light: Measure. Create. Reflect.

sales@labsphere.com www.labsphere.com

PB-13061-000 Rev 04

illumia®Plus2 Elevated Temperature System Specifications

System:	**illumia®Plus2 2600**
Spectral Flux Measurements:	325 nm - 1050 nm
Exposure Time Range:	8 ms – 900 sec

(Actual exposure time depends on sphere size and source type)

Performance Specifications (lumens)

System:	**illumia®Plus2 2600-165**		**illumia®Plus2 2600-195**	
	min	max	min	max
Tungsten Filament:	0.33	89000	0.47	124000
Cool White LED:	0.13	114000	0.18	160000
Warm White LED:	0.09	98500	0.14	138000
Blue LED:	0.02	6000	0.04	8300
Red LED:	0.07	7600	0.11	11000
Upper Range:	Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C	

Thermal Performance with Cincinnati Sub-Zero ZPRCS-1816-6-SC/AC Z Plus Remote Conditioner

Temperature Range:	15°C to 80°C
Typical Temperature Rate of Change:	From 20°C to 80°C 52 minutes From 80°C to 20°C 45 minutes

illumia®Plus2 Elevated Temperature System Ordering Information

System:	**illumia®Plus2-2600-165-4pi-LM82**	**illumia®Plus2-2600-195-4pi-LM82**
Order Number:	AA-40059-165	AA-40059-195
Above Systems Include:		
Insulated Light Measurement Sphere:	165 cm	195 cm
Spectrally-Calibrated 4π Lamp:	SCL-1400	SCL-1400
Lamp Socket Assembly:	4π	4π
Control Module:	ICM-500	ICM-500
Aux Lamp:	AUX-1400	AUX-1400
Software:	Integral	Integral

Labsphere
Advancing the Technology of Light: Measure. Create. Reflect.

sales@labsphere.com www.labsphere.com

PB-13061-000 Rev 04

System Spectrometer Specifications

Spectrometer	CDS 2600
Detector:	1044 x 64 CCD (back thinned)
Spectral Range: (spectrograph)	325 - 1050 nm
Resolution: (FWHM)	2.4 nm
Integration Time:	8 ms - 900 sec
Cooling:	-10 ± 0.05°C
Linearity:	± 0.1%
Wavelength Accuracy:	< ± 0.3 nm
Average % Noise on 100% Line:	0.07%
Stray Light: (Y-50 filter)	1.87%
Stray Light LED/Laser:	1.8E-5 from 450-550 nm w/633 nm laser
Optical Input:	600 um, permanently mounted
Measurement Dynamic Range:	475K
x, y Chromaticity Accuracy:	<0.001 for x, y
Mechanical Shutter:	Yes
AD Converter:	18 bit
PC Interface:	USB 2.0
Trigger: hardware	Yes
Trigger: software	Yes
OD Filters:	No
Shutter:	Yes

NOTES:
1. Values above are the noise equivalent power in W/nm or lumens for the different wavelength ranges sited. They were all taken with a 5W lamp, 10" sphere and 10 ms integration time.

PB-13061-000 Rev 04

Integrating Sphere Specifications

Interior Sphere Diameter:	165 cm	195 cm
Sphere Open Style:	Clam Shell	Clam Shell
Sphere Assembly:	Spun Aluminum	Spun Aluminum
Frame Style:	Extruded Aluminum	Extruded Aluminum
Sphere Coating:	Spectraflect®	Spectraflect®
Spectraflect Coating Reflectance:	> 97% (nominal)	> 97% (nominal)
SMA Adapter:	Included	Included
Cosine Corrector:	Included	Included
Detector Port Dimension:	1.25 cm	1.25 cm
Detector Port Quantity:	2	2
Temperature Probe Port:	2.5 cm	2.5 cm
Max Recommended Lamp Size: (LM-79) 4π geometry	<23 cm dia, 110 cm long	<27 cm dia, 130 cm long
Max Recommended Linear DUT Dimension: (2/3 sphere diameter)	110 cm	130 cm
Max Recommended Internal Surface Size: (2% Rule)(cm^2)	545 cm^2	760 cm^2
Maximum Sphere Coating Temp:	100°C	100°C

Labsphere
Advancing the Technology of Light: Measure. Create. Reflect.

sales@labsphere.com www.labsphere.com

PB-13061-000 Rev 04

Upgrade Modules Ordering Information

IL-AC1
Order Number: AA-40000-002
Includes:
- Chroma 61603 Programmable Instrument Grade AC Power Source
- Cabling for ICM-500 connections

IL-PM1
Order Number: AA-40000-001
Includes:
- XITRON 2640 Precision Multi-Channel Power Analyzer
- Cabling for ICM-500 and AC power source connections

Optional Accessories Ordering Information

Ambient Temperature Probe and Monitor

Model Number:	TPM-400TC-08
Order Number:	AS-03003-400

illumia®Plus to illumia®Plus2 Upgrade Kit Ordering Information

Model Number:	**ICM-500-175**	**ICM-500-350**	**ICM-500-525**
Order Number:	AS-40000-175	AS-40000-350	AS-40000-525
	includes: ICM-500, LPS-175 27 DC Power Supply, jumper cable and documentation for systems using 2PI-INT-050, 2PI-INT-650, SCL-050, SCL-650, AUX-050, AUX-650 and FFS-100-400 lamps	*includes: ICM-500, LPS-350 28 DC Power Supply, jumper cable and documentation for systems using AUX-75, FFS-100-1000, and AUX-100 lamps*	*includes: ICM-500, LPS-525 42 DC Power Supply, jumper cable and documentation for systems using 2PI-INT-1400, AUX-1400, ISC-1400, and SCL-1400 lamps*

Model Number:	**Integral LM-User ASM**
Order Number:	AS-81021-000
	Integral Major Module Software Upgrade to existing illumia and/or Integral installation. Single user, single Integral License and 1 year support and maintenance

PB-13061-000 Rev 04