MEASURE
any light source

illumia®Plus2 Integrating Hemisphere Spectroradiometers

Efficient forward flux measurement method in half the footprint

Practical

This intuitively designed system allows for the same accurate, repeatable results as a traditional integrating sphere system in half the footprint. Designed to measure forward emitting lamps, LEDs, board mounted and heat-sinked LED Light Engines for Solid State Lighting (SSL), the hemisphere system features a Spectraflect® coated hemisphere capped with an interior mirrored surface which creates a virtual integrating sphere within the interior. A centrally placed port in the mirrored surface allows for the Device Under Test (DUT) to be internally mounted in the center of the virtual sphere while keeping the electrical and thermal controls of the DUT outside, reducing absorption errors that can occur in a traditional sphere based system.

Simple

The central mounting of the hemisphere allows for users to easily mount the lamp in the center of the sphere with the lamp driving device remaining on the outside of the sphere, reducing absorption errors. The center mounting combined with the internal mirrored surface allows for symmetrical light distribution by the specular image minimizing integrating error within the sphere. The hemispherical design allows for a smaller footprint being only half the size of a traditional integrating sphere system. The integrating hemisphere is recommended by IES as an alternative method to the integrating sphere for measuring total luminous flux.

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Find the illumia®Plus2 Hemisphere System that best fits your application

Hemisphere System 600/610

Measure

Packaged LEDs
Clustered LEDs
Miniature Lamps
Entertainment Lighting
Automotive Lighting
LED Troffers
LED Luminaires

Features

Wide spectral range
Fast CCD array detector
Compact size
Ideal for QC and manufacturing applications
High sensitivity

Hemisphere System 2600

Measure

Indoor Lighting
Outdoor Lighting
Roadway Lighting
Lamp and Luminaires
LEDs
Entertainment Lighting
Automotive Lighting
Troffers
Luminaires
CFLs
Fluorescent Lamps
OLEDs
Low Power LEDs
UV LEDs (CDS 1100 model only)

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

Hemisphere System 3020/3030

Measure

Packaged LEDs
Clustered LEDs
Miniature Lamps
Entertainment Lighting
Automotive Lighting
LED Troffers
LED Luminaires
CFLs
Fluorescent Lamps
OLEDs
Low Power LEDs
HID Lamps
LED Devices in High Speed Production Environment

Features

Exceptional measurement sensitivity
Inbuilt filter wheel with ND filters provides excellent dynamic range
Low stray light
High speed
Easily synchronized with other devices

Every illumia®Plus2 Hemisphere 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

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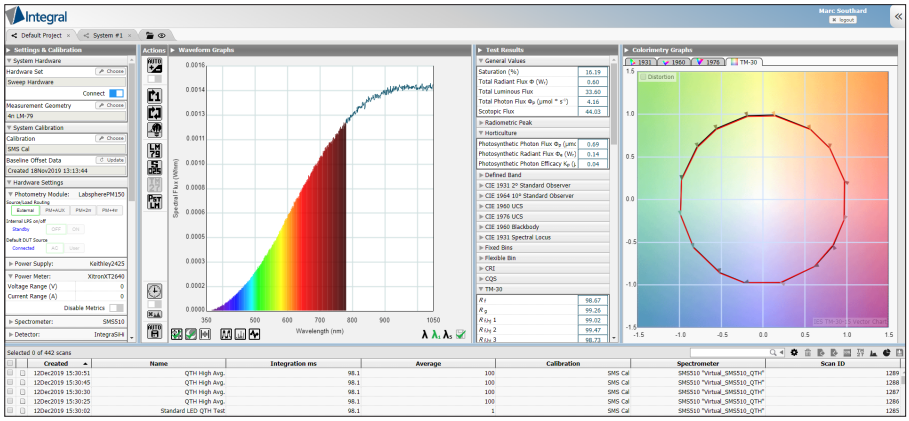
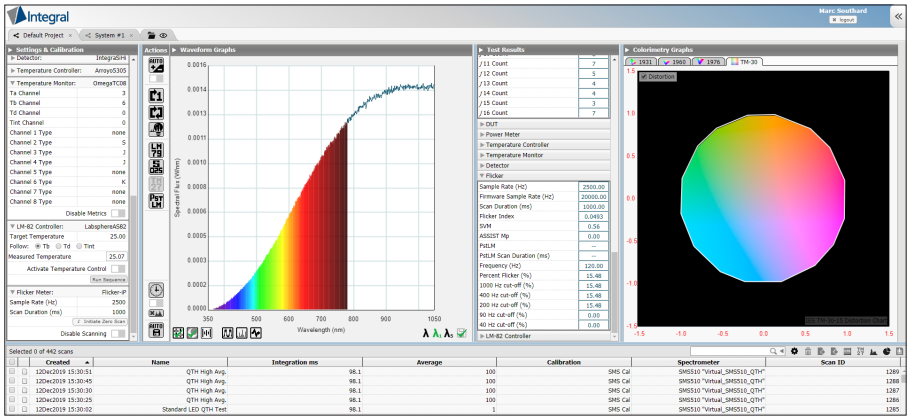
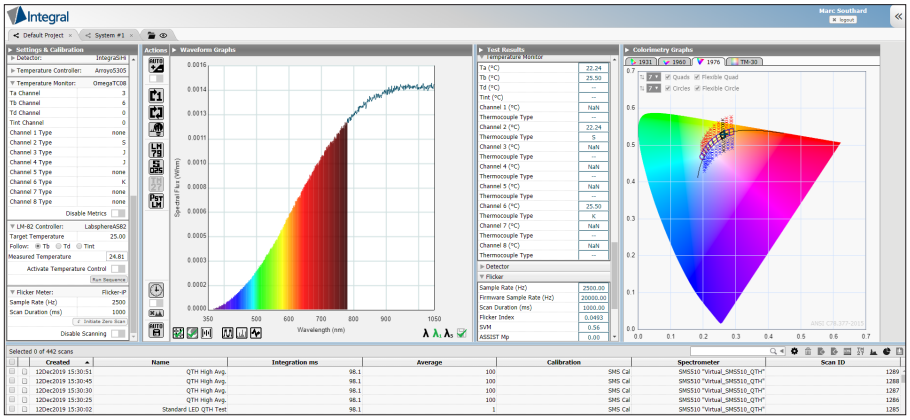
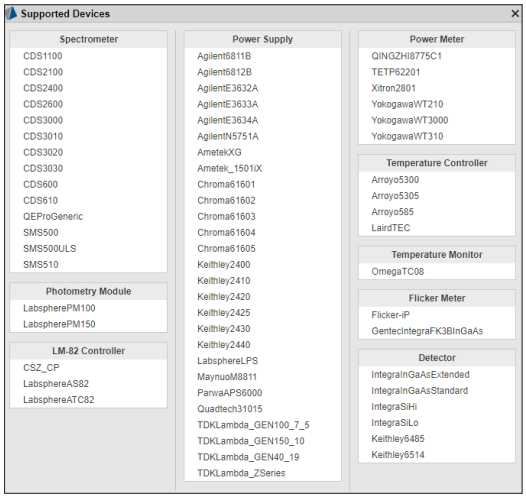
Integral® Light Measurement Software







- 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

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illumia®Plus2 Hemisphere System Specifications

System	Hemisphere 600/610	Hemisphere 2600	Hemisphere 3020/3030
Spectral Flux Measurements:	350 nm - 850 nm (600 systems) 350 nm - 1000 nm (610 systems)	350 nm - 1050 nm	350 nm - 830 nm (3020 systems) 350 nm - 1050 nm (3030 systems)
Minimum Measurable Lumens: (typical)	0.04 lumens (Cool white LED source with 50 cm sphere)	0.012 lumens (Cool white LED source with 50 cm sphere)	0.007 lumens (Cool white LED source with 50 cm sphere)
Maximum Measurable Lumens: (typical)	~46K lumens (Cool white LED source with 195 cm sphere)	~159K lumens (Cool white LED source with 195 cm sphere)	~317K lumens (Cool white LED source with 195 cm sphere)
Exposure Time Range: (Actual exposure time depends on sphere size and source type)	1 ms - 5 sec	8 ms – 900 sec	5 ms - 20 sec
Software:	Integral	Integral	Integral

Spectrometer	CDS 600	CDS 610	CDS 2600	CDS 3020	CDS 3030
Detector: Linear CCD	2048 element Linear CCD	2048 element (back thinned)	1044 x 64 CCD (back thinned)	1044 x 128 CCD (back thinned)	1044 x 128 CCD
Spectral Range: (spectrograph)	200 - 850 nm	350 - 1100 nm	325 - 1050 nm	350 - 830 nm	350 - 1100 nm
Shutter:	No	No	Yes	Yes	Yes

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Hemisphere 600/610 Ordering Information

System	with 30 cm hemisphere	with 50 cm hemisphere	with 100 cm hemisphere
600 Order Number:	AA-30460-030	AA-30460-050	AA-30460-100
610 Order Number:	AA-30470-030	AA-30470-050	AA-30470-100
Above Systems Include:			
Hemisphere:	HM-030-SF	HM-050-SF	HM-100-SF
Spectrally-Calibrated Lamp:	2PI-1-INT-600	2PI-1-INT-600	2PI-1-INT-600
Lamp Socket Assembly			
Control Module:	ICM-500	ICM-500	ICM-500
Aux Lamp:	AUX-600	AUX-600	AUX-600
Software:	Integral	Integral	Integral

Performance Specifications (lumens)

	min	max	min	max	min	max
Tungsten Filament:	0.009	1360	0.03	3750	0.10	8150
Cool White LED:	0.007	1270	0.02	3550	0.08	7250
Warm White LED:	0.006	790	0.02	2250	0.07	6900
Blue LED:	0.009	55	0.03	150	0.10	600
Red LED:	0.006	140	0.02	400	0.06	550
Upper Range:	Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C	

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Hemisphere 2600 Ordering Information

System	with 30 cm hemisphere	with 50 cm hemisphere	with 100 cm hemisphere
2600 Order Number:	AA-30450-030	AA-30450-050	AA-30450-100
Above Systems Include:			
Hemisphere:	HM-030-SF	HM-050-SF	HM-100-SF
Spectrally-Calibrated Lamp:	2PI-1-INT-600	2PI-1-INT-600	2PI-1-INT-600
Lamp Socket Assembly			
Control Module:	ICM-500	ICM-500	ICM-500
Aux Lamp:	AUX-600	AUX-600	AUX-600
Software:	Integral	Integral	Integral

Performance Specifications (lumens)

	min	max	min	max	min	max
Tungsten Filament:	0.005	2450	0.02	6900	0.06	27200
Cool White LED:	0.002	1360	0.01	3800	0.02	15000
Warm White LED:	0.001	950	0.005	2650	0.02	12500
Blue LED:	0.001	100	0.001	300	0.01	900
Red LED:	0.001	238	0.004	650	0.02	950
Upper Range:	Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C	

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Hemisphere 3020/3030 Ordering Information

System	with 30 cm hemisphere	with 50 cm hemisphere	with 100 cm hemisphere
3020 Order Number:	AA-30480-030	AA-30480-050	AA-30480-100
3030 Order Number:	AA-30490-030	AA-30490-050	AA-30490-100
Above Systems Include:			
Hemisphere:	HM-030-SF	HM-050-SF	HM-100-SF
Spectrally-Calibrated Lamp:	2PI-1-INT-050	2PI-1-INT-050	2PI-1-INT-050
Lamp Socket Assembly			
Control Module:	ICM-500	ICM-500	ICM-500
Aux Lamp:	AUX-050	AUX-050	AUX-050
Software:	Integral	Integral	Integral

Performance Specifications (lumens)

	min	max	min	max	min	max
Tungsten Filament:	0.005	3400	0.01	9500	0.05	38000
Cool White LED:	0.001	3700	0.01	10400	0.07	41500
Warm White LED:	0.001	3600	0.002	10000	0.01	39500
Blue LED:	0.002	200	0.05	550	0.01	2300
Red LED:	0.001	300	0.004	800	0.01	3200
Upper Range:	Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C		Ambient temp cannot exceed 100°C	

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System Spectrometer Specifications

Spectrometer	CDS 600	CDS 610	CDS 2600	CDS 3020	CDS 3030
Detector:	2048 element Linear CCD	2048 element Linear CCD	1044 x 64 CCD (back thinned)	1044 x 128 CCD (back thinned)	1044 x 128 CCD (back thinned)
Spectral Range: (spectrograph)	200 - 850 nm	350 - 1100 nm	325 - 1050 nm	350 - 830 nm	350 - 1050 nm
Resolution: (FWHM)	1.5 nm	1.5 nm	2.4 nm	3.0 nm	3.7 nm
Integration Time:	1 ms - 5 sec	1 ms - 5 sec	8 ms - 900 sec	5 ms - 20 sec	5 ms - 20 sec
Cooling:	n/a	n/a	-10 ± 0.05°C	-10 ± 0.05°C	-10 ± 0.05°C
Linearity:	± 0.13%	± 0.13%	± 0.1%	± 0.5%	± 0.5%
Wavelength Accuracy:	< ± 0.3 nm	< ± 0.3 nm	< ± 0.3 nm	< ± 0.3 nm	< ± 0.3 nm
Average % Noise on 100% Line:	0.20%	0.20%	0.07%	0.18%	0.18%
Stray Light: (Y-50 filter)	1.66%	1.66%	1.87%	0.97%	0.97%
Stray Light LED/Laser:	2.6E-5 from 450-550 nm w/633 nm laser	1.8E-5 from 450-550 nm w/633 nm laser	1.8E-5 from 450-550 nm w/633 nm laser	1.8E-5 from 450-550 nm w/633 nm laser	
Optical Input:	600 um, 3 m long SMA Connection	600 um, 3 m long SMA Connection	600 um, permanently mounted	1000um, 2 m long Ferrule Connection	1000um, 2 m long Ferrule Connection
Measurement Dynamic Range:	15K	15K	475K	1.6M	1.6M
x, y Chromaticity Accuracy:	<0.001 for x, y	<0.001 for x, y	<0.001 for x, y	<0.001 for x, y	<0.001 for x, y
Mechanical Shutter:	No	No	Yes	Yes	Yes
AD Converter:	16 bit	16 bit	18 bit	16 bit	16 bit
PC Interface:	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Trigger: hardware	No	No	Yes	Yes	Yes
Trigger: software	Yes	Yes	Yes	Yes	Yes
OD Filters:	No	No	No	Yes: ND1 & ND2	Yes: ND1 & ND2
Shutter:	No	No	Yes	Yes	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.

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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

Hemisphere Size:	**30 cm**	**50 cm**	**100**
Ambient Temperature Probe and Monitor			
Model Number:	TPM-100TC-08	TPM-100TC-08	TPM-400TC-08
Order Number:	AS-03003-100	AS-03003-100	AS-03003-400
Forward Flux Standard			
Model Number:	FFS-100-400	FFS-100-400	FFS-100-400
Order Number:	AS-02768-100	AS-02768-100	AS-02768-100

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-600, SCL-050, SCL-600, AUX-050, AUX-600 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