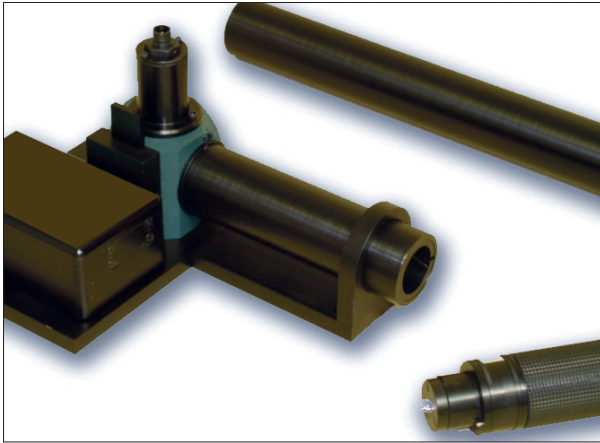


# LED CHARACTERIZATION SYSTEM LCS-100

## Complete and Flexible LED Characterization System, Software and Components



### LCS-100 LED CHARACTERIZATION SYSTEM

The LCS LED Characterization System is designed with measurement accuracy, flexibility, and ease-of-use in mind. These systems provide high performance to-price ratio along with exceptional quality to meet the measurement challenges of today's LED users and manufacturers.

The LCS-100 is the foundation of the LED measurement solutions product line. At the heart of the test station is a fast scanning 16 bit, 2048 element CCD spectrometer configured to cover the 360 to 1000 nm or 300 to 800 nm wavelength range. Simply by adding any of the LCS series integrating spheres, ILEDA or ILEDB adapters or power supplies users can achieve any geometry required for measuring the optical, spectral, color, and purity characteristics of LEDs, lamps, and large light sources.

### POWERFUL EASY TO USE SOFTWARE

The system's Windows® XP compatible software is intuitive and guides the user through all measurement procedures. The software includes automatic routines to simplify measurements and ensure accuracy for each measurement. Results can be downloaded to database programs including MS Excel, Word or Access.

### SOFTWARE FEATURES

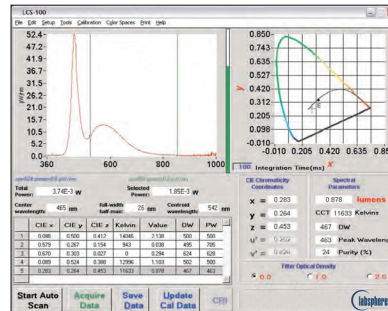
- Convenient, Menu Driven Operation
- Displays Measured Data in Real-Time
- Displays Current and Voltage Settings on Screen
- Calculates and Displays Center Wavelength, FWHM, Centroid and Purity
- Displays LED, Lamp Standard and Auxiliary Lamp Parameters
- Easily Enter LED and Lamp Information for Test Identification
- Print Function Automatically Generates Data and Test Reports
- Export Data Easily for QC and Statistical Analysis
- Tracks Calibration Lamp Hours

### FEATURES

- CCD-Spectrometer Based Test Stations
- Intensity Heads for ILEDA and ILEDB
- Constant Current Power Source Optimized for LEDs
- A Variety of Test Sockets and Holders Available
- Application Software and DLL's
- High Sensitivity Spectrometer Spectral Range Covering 360 to 1000 nm or 300 to 800 nm
- 1.5 nm Spectral Resolution
- 0.5 nm Wavelength Accuracy
- Interchangeable Neutral Density Filters to Regulate Dynamic Range
- NIST Traceable Calibrated Lamp
- Built-in Self Calibration Function
- USB 2.0 Computer Connection
- Optional Integrating Spheres in Sizes from 6 to 76 in
- Exchangeable Measurement Heads and Integrating Spheres Expand Measurement Capabilities
- Meets Design Requirements of CIE 127 for LED Measurement

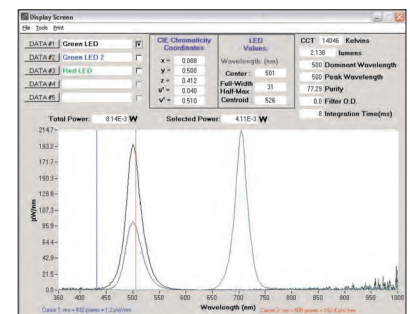
### MEASURE

- Total Luminous Flux (lumens and lumens/nm)
- Total Spectral Flux (integrated Watts and Watts/nm)
- Averaged Luminous Intensity (lumens/sr and lumens/sr-nm)
- Averaged Spectral Radiant Intensity (Watts/sr and Watts/sr-nm)
- Dominant Wavelength
- Peak Wavelength
- Center Wavelength
- Centroid Wavelength
- FWHM Full Width /Half Max
- Spectral Purity
- Correlated Color Temperature
- Color Rendering Index (CRI)
- Chromaticity Coordinates (x, y, u', v')
- LED Output vs Time
- L-I-V Characterization Curves
- Soak Time

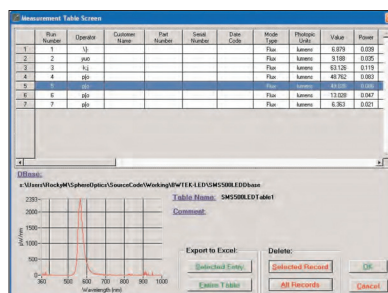


Main data acquisition screen shows real time updates of LED spectrum along with calculated spectral quantities.

Database detail screen allows user to view and print reports of saved spectrum.



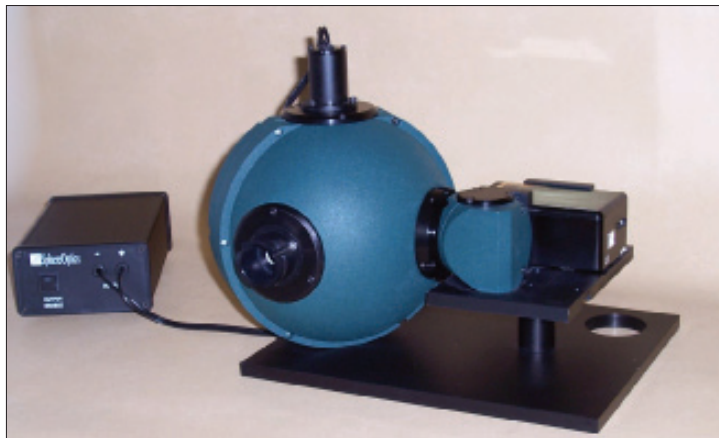
Database overview screen allows user to page through saved data and find data files.



# LED CHARACTERIZATION SYSTEM LCS-100

## Complete and Flexible LED Characterization System Components

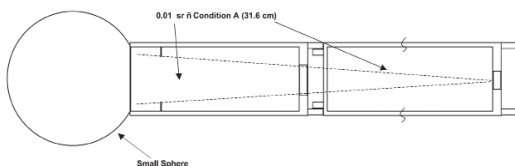
### LCS-100-S6 6 INCH INTEGRATING SPHERE OPTION



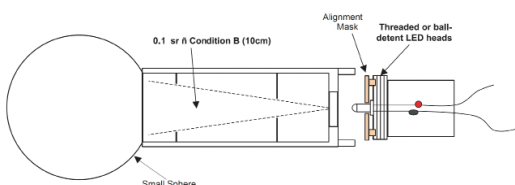
### FLEXIBLE DESIGN

The LCS-100 base station consists of a CCD spectrometer, a two-inch integrating sphere assembly, installed calibration lamp with power source, filter holder with a calibrated neutral density filter set, and powerful operating software. A Dynamic Link Library (DLL) utility adds to the functionality of the software by allowing user-based programming interface. The system easily connects to either desktop or laptop computers via a USB connector. The 2 inch diameter model integrating sphere is coated with Spectrafect® diffuse white reflectance coating which provides a 98% reflectance surface over the wavelength region from 400 to 1000 nm. The sphere interior provides high reflectance and near perfect Lambertian properties.

The integrating sphere is outfitted with an internal calibration lamp, calibrated for spectral flux. This provides a means for simple in-house calibration and re-calibration of the system. Replacement calibration lamps are available and easily installed by the user. The filter holder assembly is designed for easy interchange of neutral density filters to increase the dynamic range of the system, thus allowing for measurement of very bright or high power LEDs. The sphere geometry is designed according to CIE recommendations for LED measurement.



### ILED A CONDITION A MEASUREMENT HEAD



### ILED B CONDITION B MEASUREMENT HEAD

### MEASUREMENT FLEXIBILITY WITH INTEGRATING SPHERE OPTIONS

The LCS base station readily adapts to integrating spheres ranging in size from 6 inches to 76 inches with a specially designed mounting hardware kit. The mounting kit includes the adapters necessary to securely mount the test station to one of our lamp measurement series spheres. This allows for measurement of a wide variety of types and sizes of LED sources and assemblies.

### ILED A AND ILED B MEASUREMENT HEADS

Measure luminous intensity, spectral intensity and colorimetric information. The LCS-100 conveniently accepts both our ILED A and ILED B measurement heads with a built-in slide support fixture that securely holds the adapters.

The LCS-100-A adapter provides the 31.6 cm (0.01 sr) CIE compliant measurements and the LCS-100-B provides the 10 cm (0.1 sr) CIE compliant measurement of luminous intensity, spectral intensity, and all derived colorimetric information.

### LED TEST SOCKETS

A large selection of test sockets are available to ensure precise LED alignment allowing for easy, accurate, repeatable measurements. The selection includes standard and TE cooled designs for T1 or T1 3/4 type LEDs, Lumileds Luxeon emitters, Piranha style emitters, TopLED, SnapLED, Cree Xlamp XR series and Osram Dragon series emitters. A TE Controller Unit is provided with all TE cooled test sockets. Custom socket design is available.

### GONIOMETRIC SPECTRORADIOMETER LCS-100-G

SphereOptics LCS-100-G Goniometric Spectroradiometer enables complete far-field angular characterization of a single LED (standard and high power). Users can perform accurate, repeatable angular characterizations for intensity, spectrum, and derived color values. A front panel rotational dial allows for manual axial rotation of the LED in 15° increments. A small cosine-corrected detector placed at 100 mm sweeps up to 180° at a user selectable resolution as small as 1.8 degrees. Typical scan time for measurements can vary from one minute for low resolution, very bright LED's up to 10 minutes to complete a full angular scan, including LED brightness, scan averaging and angular range. The system includes a NIST traceable calibration source and dedicated power supply for spectral intensity calibrations.



GONIOMETRIC SPECTRORADIOMETER LCS-100-G

## SPECIFICATIONS

Model Name	Part Number	Description
LCS-100	LCS-100	LCS base station includes: Spectrograph 360 to 1000 nm with 2 inch Spectrafect sphere, 5 W calibration lamp and power source, set of three calibrated neutral density filters and operating software
LCS-100-UV	LCS-100-UV	LCS base station includes: Spectrograph 300 to 800 nm with 2 inch Spectrafect sphere, 5 W calibration lamp and power source, set of three calibrated neutral density filters and operating software

## SYSTEM PROPERTIES AND PERFORMANCE

### System Performance Specifications

System Model	LCS-100	w/ condition B	w/ condition A	LCS-100-6
Sphere Size:	2 inch	n/a	n/a	6 inch
Sphere Interior Coating:	Spectrafect	n/a	n/a	Spectrafect
Max Incandescent Wattage:	12.5 W	n/a	n/a	75 W
Long-Term Stability:				
Max number of data points:	3000			
Max length of test:	8000 hrs.			
Photometric Range: (Illuminant A)	0.001 - 150 lm	0.1 - 15000 cd	1 - 150,000 cd	0.05 - 1,400 lm
Red LED Range: (626 nm)	0.001 - 120 lm	0.1 - 12000 cd	1 - 120,000 cd	0.01 - 4,500 lm
Green LED Range: (530 nm)	0.001 - 200 lm	0.1 - 20000 cd	1 - 200,000 cd	0.01 - 7,000 lm
Blue LED Range: (530 nm)	0.001 - 50 lm	0.1 - 5000 cd	1 - 50,000 cd	0.01 - 1,400 lm
White LED Range: (6500 K)	0.001 - 400 lm	0.1 - 40000 cd	1 - 100,000 cd	0.01 - 18,000 lm
UV LED Range: (360 to 400 nm)	0.01 - 2,000 mW	0.001 - 200 W/sr	0.01 - 2000 W/sr	0.1 - 40,000 mW

### CCD Spectrograph Specifications

Detector:	2048 element CCD array
Spectral Range Sensitivity:	360 - 1000 nm or 300 - 800 nm
Calibration Range:	360 - 1000 nm or 300 - 800 nm
Spectral Resolution:	1.5 nm
Wavelength Accuracy:	0.5 nm
Sample Spectral Interval:	1.0 nm
F/# Length:	3
Stray Light:	0.05% @ 600 nm
A/D Resolution:	16 bits
Exposure Time:	1 ms to 2000 ms
Fiber Connector:	SMA
Computer Interface:	USB 2.0

### Calibration Lamp Specifications

<b>Model</b>	<b>LCS-100-5W</b>
Calibration:	360 - 1000 nm or 300 - 800 nm
Power:	5 watt
Luminous Flux:	~ 60 lumens
Calibration Life:	50 hours (1000 calibrations)

Optional Component	Part Number	Description
LCS-100-A	LCS-100-A	LCS Intensity Adapter for CIE Condition A geometry, with holder bracket attachment
LCS-100-B	LCS-100-B	LCS Intensity Adapter for CIE Condition B geometry, with holder bracket attachment
LCS-100-S6	LCS-100-S6	LCS 6 inch Spectrafect coated sphere for connection to LCS - 100 base station
LCS-100-S6Z	Contact for details	LCS 6 inch Spectralon sphere and base adaptor for LCS-100
LCS-PL-STAR	Contact for details	Socket for Philips Lumileds Luxeon Star LED
LCS-T1	LCS-T1	Socket for T1 or T 1 3/4 bi-pin LEDs

Optional Accessories	Part Number	Description
LCS-100-CASE	Contact for details	Storage case - airtight, dustproof case with carrying handle

Replacement Parts	Part Number	Description
LCS-100-NDFS	Contact for details	Neutral Density Filters, Calibrated Set of 3 includes: ND0 Filter; ND1 (10x reduction); ND2 (100x reduction)
LCS-100-5W	LCS-100-5W	Spectral Flux Calibration Lamp - 360 to 1000 nm or 300 to 800 nm

As part of our continuous product improvement program, Labsphere reserves the right to change specifications without notice. All tradenames are the property of their respective owner.