

# PHOTO RESEARCH®

## PR®-640 SpectraCal

The PR-640 SpectraCal is a high precision spectroradiometer from Photo Research that offers a quick and affordable solution to intensity and color quality problems. It is a hand-held illuminance meter/colorimeter that performs NIST-traceable measurements in seconds. Since the PR-640 makes photometric and colorimetric measurements spectrally, it has extremely high accuracy unmatched by any filter colorimeter.



### Features and Benefits

- NIST Traceable calibration certified for 1 year
- Hand-held portability
- Fast charge NiCad batteries
- Spectral Measurement Capability
- RS-232 Interface for Data Transfer, Printing and Remote Host Control
- Back-lit LCD display for data viewing
- Storage and recall of 150 data files
- Optional, Windows based SpectraWin software for data analysis, display of CIE charts and Spectral Power Distributions
- Optional AC Adapter and Rapid Charger

**Portable with state-of-the-art Design.** The battery-powered PR-640 captures the entire visible spectrum (380-780 nm) simultaneously under CMOS microcomputer control in near real-time. It has a compact, fast-scanning spectrometer with a concave holographic diffraction grating and a 128 element diode-array detector. Automatic Adaptive Sensitivity selects the optimal dynamic range based on the available signal.

**What makes the PR-640 ideal for Projection System Testing?** - In order to meet ever tightening brightness and color specifications, Projection System manufacturers have to measure the intensity, contrast and color of their Displays and Screens. Typically, illuminance, chromaticity and CCT are measured at various spots to characterize the uniformity of products. The user-friendly PR-640 is the perfect instrument for this application because of its portability, high accuracy and rock-solid repeatability. Laser-based projectors and LCD projectors with metal-halide sources have spectra with narrow peaks and it is impossible to measure them accurately with a low cost filter colorimeter. The PR-640 offers the reliable performance of a spectroradiometer to make these measurements. A specially designed cosine receptor eliminates errors caused by other measurement methods and collects light perpendicular to the optical axis of the instrument. This makes it possible to use the PR-640 for applications where it is not practical to point it directly at the light source.

The NAPM IT7.288 (National Association of Photographic Manufacturers) standard adopted by ANSI and EIAJ (Electronic Industry Association of Japan) for Projection System Measurements recommend a spectroradiometer like the PR-640 to perform color measurements.

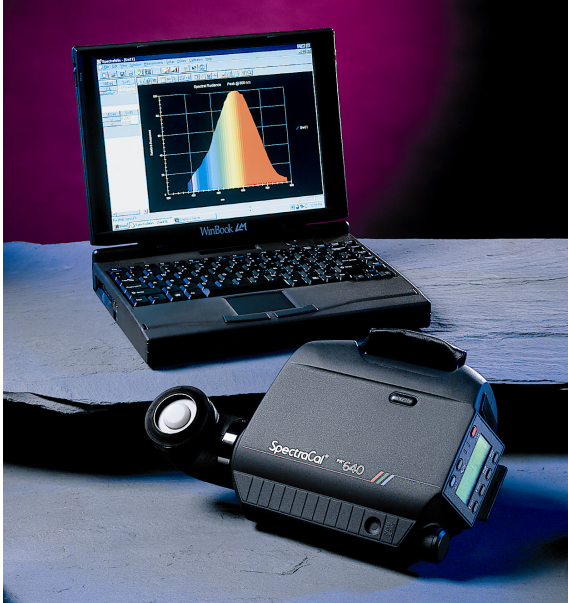
### Typical PR-640 Applications

- Projection Displays and Projection Screens
- Calibration of Light Booths
- Beam Pattern Measurements of Light Sources
- Architectural Lighting
- Daylight Illumination Testing
- Human Factors Testing



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The PR-640 can be used in the Stand-Alone and Remote modes or with SpectraWin software. Since the PR-640 can be controlled remotely from a host computer, it is possible to completely automate all the measurements.

**Spectroradiometric Performance for Color and Illuminance.** Most filter colorimeters perform accurate color measurements only when they measure broadband sources that are spectrally similar to the light source used to calibrate the colorimeter. Errors are introduced when the measured spectrum has a lot of energy in a region where the instrument's filters differ from the theoretical 1931 CIE color matching functions. This makes it difficult to specify the color accuracy of a filter colorimeter for different types of spectra. The filters also degrade over time and this further decreases the accuracy of measurements.

## Specifications

<b>Spectral Range</b>	380-780 nm
<b>Spectral Bandwidth</b>	8 nm (FWHM)
<b>Spectral Accuracy</b>	± 2 nm, Stray light < 0.25%
<b>Wavelength Resolution</b>	<3.4 nm/pixel
<b>Sensitivity for Illuminant A @ 1% precision</b>	≥ 0.6324 - ≤ 3162 footcandles ≤ ≥ 6.80 - ≤ 34,023 lux
<b>Illuminance Accuracy</b>	± 2% to NIST traceable standard for a 2856K source at 23° C. Range from 2-12,000 fc (21.5-130,000 lux)
<b>Illuminance Repeatability</b>	0.1% over 15 minutes at constant temperature
<b>Color Chromaticity Accuracy</b>	± 25K from 2000K to 3000K ± 50K from 3000K to 10,000K
<b>Color Repeatability</b>	± 0.0015 CIE 1931 x,y at 2856K
<b>Power</b>	NiCad rechargeable battery (minimum 2 hours continuous operation). AC and DC adapters optional.
<b>Operating Temperature</b>	5° to 35° C (41° to 95° F)
<b>Storage Temperature</b>	-20° to 65° C (-4° to 149° F)
<b>Humidity</b>	< 90% non-condensing
<b>Weight(approx)</b>	4 lbs.
<b>NIST Traceable Certification</b>	Certified for 6 months

On the other hand, a spectroradiometer like the PR-640 measures the complete Spectral Power Distribution of a source and calculates tristimulus values X, Y, and Z by integrating the spectral data mathematically with the 1931 CIE color matching functions. The calculated tristimulus values are then used to compute Illuminance, CIE chromaticity coordinates and Correlated Color Temperature (CCT) which provide a complete description of the source. There are no errors due to filter inaccuracies and therefore, the PR-640 has high accuracy and rock-solid repeatability over a wide range of CCT's (200K – 7000K) for any kind of spectrum.

## Measurement Capabilities

- Illuminance (fc or lux) and Irradiance
- CIE x,y (1931) and u', v' (1976) chromaticity values
- Correlated Color Temperature (CCT) in Kelvin
- Spectral Power Distribution (SPD)
- Δ Illuminance, Δ xy, Δu'v' and ΔCCT