

## Quality Control

The AutoVidi Screen Photometer can be used in the laboratory or factory. It saves you time and money and ensures your lighting products are consistently produced with a high level of quality. It reduces the reject rate of your products by quickly discovering any out-of-specification units. Photometry is performed to any desired industry specifications. Special user-defined tests can be performed, including the measurement of isocandela data.

## How It Works

A Charge Coupled Device (CCD) video camera has been integrated into the system to provide the capability of capturing the calibrated photometric readings. Unlike a film camera, the CCD camera incorporates a sensor which, in

effect, consists of many thousands of individual photocells. The LSI AutoVidi camera incorporates a 768 x 512 array of pixels for a total of roughly 400,000 measurement points in a single frame. Optimum stability and high signal-to-noise ratio are provided by an internal scientific grade Peltier solid state cooling system.

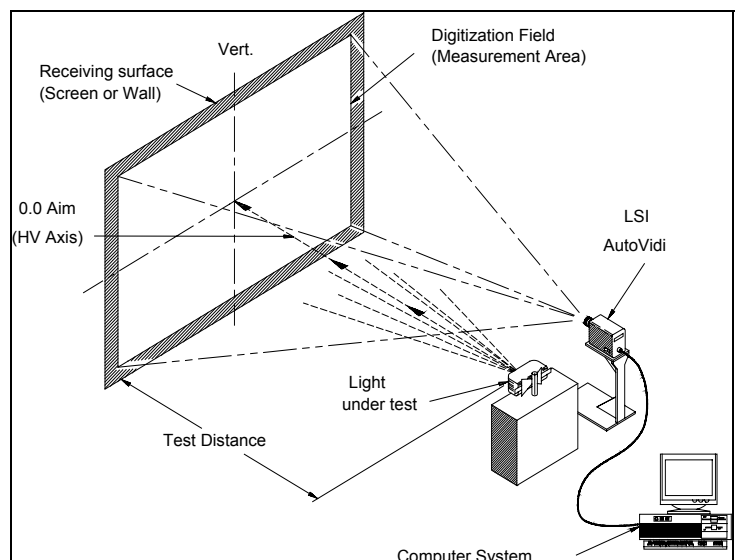
Lighting Sciences Inc. offers a unique CCD (Charge Coupled Device) camera-based AutoVidi™ Screen Photometer system specifically designed for near-instantaneous measurement of lighting devices. This form of digital camera is the same type as used by astronomers for incredibly accurate and detailed light measurement in deep-space applications.

AutoVidi combines powerful hardware and software to form a high speed comprehensive measurement and analysis capability for laboratory and quality control applications.

Lighting Sciences' AutoVidi Screen Photometers rapidly measure light distribution patterns and verify product performance versus specifications. Controlled by Windows™ - based software, the AutoVidi Screen Photometer is easy to use and requires no special training.

## Near-Instantaneous Testing

With this new form of photometer, the lamp to be tested is placed on its test stand, which aims it towards a screen. The adjacent AutoVidi digitizes the light pattern on the screen to provide many thousands of spot readings to an on-line computer. Using unique software and calibration routines, the digitized image allows automatic determination of the intensity distribution in candelas of the test lamp. The light pattern is captured virtually instantaneously, without any movement of the lamp.



## NIST Traceable Accuracy

Each pixel is individually calibrated traceable to NIST. This is achieved using a goniometer calibrated standard light source (provided with the instrument) which illuminates the screen. The calibration software captures the image and computes calibration data for every pixel. These are stored and then applied in subsequent tests. In this way, any variations in screen reflectance are canceled and direct NIST traceability is provided. Recalibrations can be made at any time in a few minutes. Typical accuracy is better than  $\pm 5\%$ .

## Instant Pass/Fail

A computer interface board captures the digitized readings from the camera. System software can automatically set the test voltage (optional) and all electronic parameters. Complete isocandelas then can be displayed and output files can be built. Alternatively the photometric results can be analyzed and compared to stored specifications. A pass/fail determination may be displayed on the system's monitor with an identification of failure points.

## HARDWARE SPECIFICATIONS

**CCD Camera and Stand** — Height of stand specified by user. Lighting Sciences will advise on complete system geometry to meet user's needs.

**Lens for AutoVidi™ Photometer** — A wide range of lenses is available to suit requirements. Lighting Sciences' personnel will advise in lens selection.

**CCD Sensor Type** — Scientific grade blemish free imager, with scientific grade electronic Peltier cooling.

**System Resolution** — Resolution (angle between measurement points) is dictated by the lens and camera type. A resolution of better than 0.1 degrees is standard.

**Spectral Correction Filter** — high accuracy fit to the CIE  $V(\lambda)$  luminosity curve.

**Depth of Field = 3 ft. to infinity** — (Focusing to a distance of less than 3 ft. is available as special option.)

**Viewfinder** — image is displayed on computer monitor.

**Power Requirement** — 120 VAC. Other voltages available.

**Interface Electronics** — 12 bit system for wide dynamic range is standard. Systems up to 16 bits are available.

LSI provides a Windows-based computer system, supplied as an integral part of the AutoVidi Screen Photometer System. The system is configured to provide high speed and large capacity. Specifications change rapidly: Please contact Lighting Sciences for information on presently supplied computers.

**Intensity Calibration Reference Standard** included, to provide NIST traceability.

## SOFTWARE SPECIFICATIONS

Windows software for IBM based systems is included. Features of software are:

- ◆ **Complete Automation**, operable by unskilled personnel.
- ◆ **Automatic Exposure** selection of required settings. No user knowledge of the technology is needed.
- ◆ **Electronic Link** to camera automatically reads in digitized image from camera.
- ◆ **Low Light Levels**. With the cooled CCD system, extremely low levels can be measured with high signal-to-noise ratio. Eliminates major errors associated with lower quality systems.
- ◆ **NIST Traceable** calibration software routine for use with the intensity standard (included) allows field calibration. Software automatically calculates the calibration factor for the pixels and places array of calibration factors in memory.
- ◆ **Automatic Calibration Factor** application. The AutoVidi incorporates a comprehensive calibration system which does not simply determine the *luminance* of the light pattern on the screen. Mathematical factors are automatically applied during test processing to convert pixel signals to candelas generated by the light under test
- ◆ **Lamp Book™ Test Specifications**. A comprehensive library of test specifications is provided with the AutoVidi software. The desired specification for the light under test is selected using Windows menus. LampBook then specifies the angular range or locations of intensities to be collected, and applies the required form of data analysis. For automotive lights, LampBook contains over 500 US DOT FMVSS108, SAE, ECE, and JIS specifications. For aviation lights, LampBook includes the full range of ICAO and FAA specifications. Additional specifications are provided.
- ◆ **New user-defined** test procedures can be added at any time using the Windows software. A test specification file is built and stored for every form of test desired.
- ◆ **Data Analysis**. The test specification files also contain instructions of the data analysis methods to be applied. These include analysis by beam center candlepower, beam spread and uniformity, or discrete points, isocandelas or other desired characteristics.
- ◆ **Pass/Fail Specifications** are stored in the test specification files, and a pass/fail indication is given upon completion of the test.
- ◆ **Output Files** may be generated by the AutoVidi of the measured intensity data in standard format. Thus the data are usable by numerous other software packages.

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*"Excellence in Photometrics"*