

**OPTOMISTIC PRODUCTS**  
**UNIVERSAL LIGHTPROBE™**  
**PRODUCT**  
**CATALOG**

 **2023**

Phone (207) 865-9181  
[www.optomisticproducts.com](http://www.optomisticproducts.com)  
[info@optomisticproducts.com](mailto:info@optomisticproducts.com)



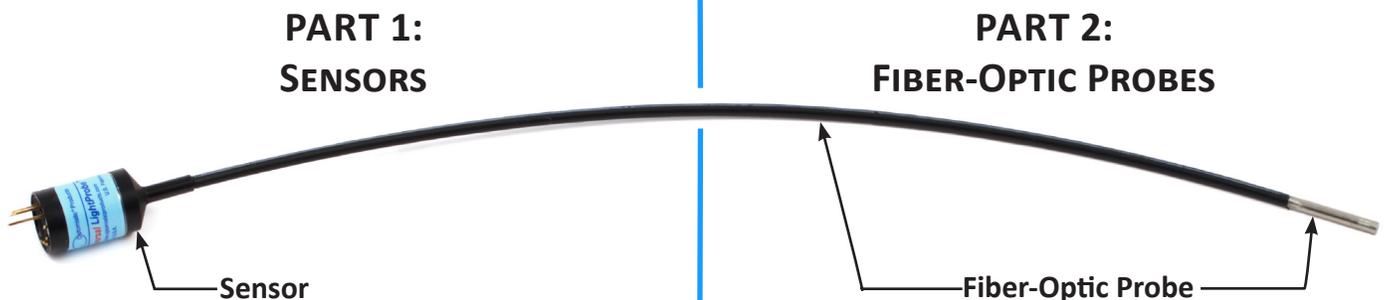
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# UNIVERSAL LIGHTPROBE™

## A TWO-PART SOLUTION FOR LED TESTING

The combination of various pre-programmed Sensors with a wide choice of **Fiber-Optic Probes**, produces a **Universal LightProbe™** that suits any LED test application. Start by choosing a pre-programmed Sensor for the type of test and output you require (Part 1), then, combine it with an interchangeable Fiber-optic Probe (Part 2) to further customize the test for mechanical requirements and constraints.



**Universal LightProbe Sensors** are pre-programmed for various types of tests, and are available with a choice of outputs.

### ANALOG OUTPUT:

**Penta Sensor** - our best selling sensor. Features color-binning and intensity test.

**Spectra Sensor** - features user-defined color-boundaries and intensity test.

**Unicolor Sensor** - is pre-programmed to sense intensity for any single color, or white, or IR or UV.

### SERIAL DIGITAL OUTPUT/USB INTERFACE:

**Spectra USB Sensors** - to test any color in the visual spectrum, and intensity. Popular for Functional Test.

### DIGITAL OUTPUT:

**Unicolor Digital Sensors** - to test a single color with a one-bit PASS/FAIL test output.

**Blinx Digital Sensors** - for blinking LEDs.

**Ultra-High Sensivity Sensors** - for extremely dim LEDs.

## PART 2: FIBER-OPTIC PROBES

**Universal LightProbe Fiber-Optic Probes** are combined with the Universal LightProbe Sensor to further refine your test. Choose from several models of Fiber-Optic Probes to meet your precise requirements for testing LEDs. There are three primary ways to tailor the probe, as shown below.

### APERTURE TYPES:

There are four choices of Fiber-optic Probe apertures (**Small- Aperture, Wide Aperture, Contacting-Tip** and **Very-Wide-Aperture**) to allow for specific requirements in spacing, alignment, and working distance from the LED, as well as LEDs that are difficult to access.

### CABLE TYPE:

Choose from four cable types ("**Regular**", "**Superflex**", "**Rugged**" and Stainless Steel encased "**Rigid**" models). This allows for specific requirements of LED access, spacing and harsh working conditions.

### TIP LENGTH AND TIP SHAPE:

The stainless-steel encased tip that interfaces with the LED comes in a variety of lengths (**Short, Long, and Extra-Long**), and **Right-Angle** to account for variations in working distance, LED orientation and accessibility.

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 SENSOR SELECTION GUIDE AND SPECIFICATIONS:

All Universal LightProbe S2 Sensors are pre-programmed to suit specific LED test requirements. The small size and non-conductive housing is specifically designed to accommodate today's high-density test fixtures.

#### UNIVERSAL LIGHTPROBE™ SENSOR SELECTION

WHAT ARE YOU TESTING?	SENSOR TYPE										Output	
	Penta	Penta High Sensitivity	Spectra	Spectra USB	Unicolor	Unicolor Digital	Blinx Digital	Ultra High Sensitivity	Low Sensitivity - available for most	Very Low Sensitivity - available for most		
♦5 Main LED Colors (B,G,Y,O,R) & White ♦Intensity	♦	♦										Analog
♦Any Color in Visual Spectrum - (400 - 700nm) & White ♦Intensity			♦									Analog
♦Any color in visual spectrum (400-700nm) & white ♦Intensity				♦								Serial Digital
♦Any single color or white, & IR or UV					♦							Analog
♦ON/OFF of any single color						♦						Digital
♦ON/OFF only. Insentitive to color							♦	♦				Digital
♦Very Bright LEDs (see Sensor Sensitivity Chart for details)									♦	♦		Varies
♦Very Dim LEDs (see Sensor Sensitivity Chart for details)		♦						♦	♦			Varies
♦Blinking LEDs							♦					Digital

#### UNIVERSAL LIGHTPROBE™ S2 SENSOR SPECIFICATIONS:

**Sensor size:** 0.560 inches dia. x 1.38 in. long

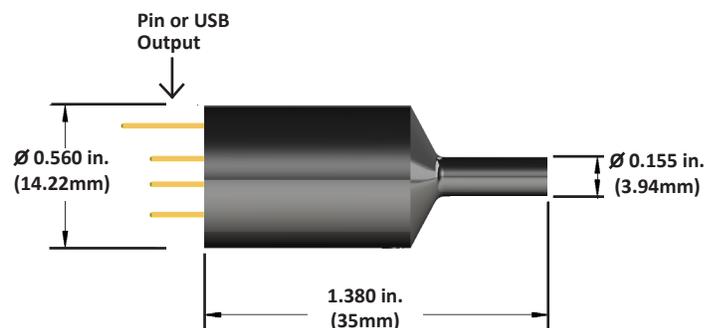
**Operating temperature range:** 0°C to 70°C

**Power consumption:** Operates between +5 and 28 volts D.C., at 6mA max; less than 4.75 volts is not recommended.

**Voltage protection:** Withstands up to +40 volts, & reverse polarity to -18 volts

**Output Pins:** 3 or 4 gold-plated (depending on Sensor type) standard wire-wrap pins (0.025 in. sq.) or **Built-in USB Port.**

For pin-out and USB location and dimensions on each sensor see pages 11 and 12; for installation accessories, see page 23.



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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 PENTA SENSORS:

Optomistic Products' best-selling Sensor, the Universal LightProbe Penta Sensor, provides analog voltage outputs for both color and intensity, and features built-in color binning, eliminating the need to convert LED wavelength to visual color in the ATE software, saving valuable processing time.



**Part Number: ULP-S2 PCI/V**

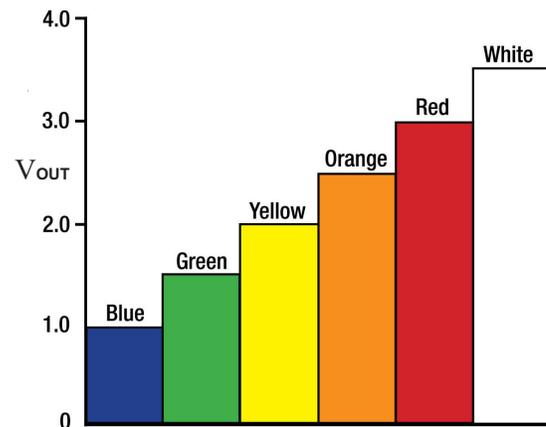
#### CHARACTERISTICS

- Typical response time: <10mS capture time; <100mS overall response time for color and intensity simultaneously
- Output Loads: 'Int.' & 'Color' - 2Kohms min., 100pF, max.
- Further details on Page 11

#### COLOR RESPONSE:

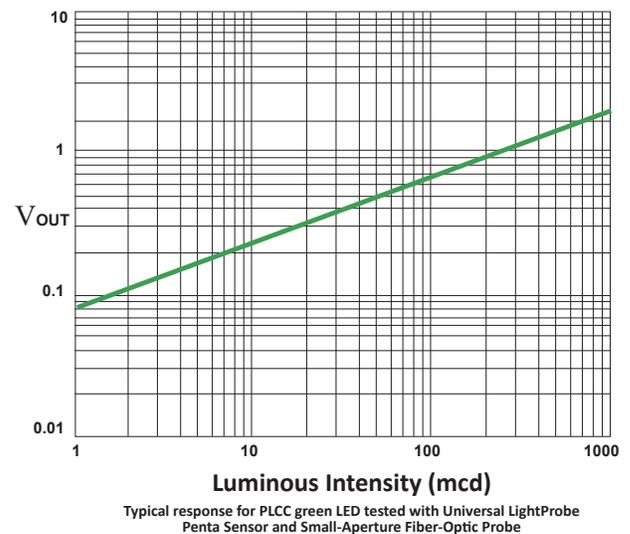
- Test for the five main LED colors, plus white
- Unambiguous and stable analog voltage output
- Color output is independent of LED intensity

<b>Blue:</b>	1.0 volts
<b>Green:</b>	1.5 volts
<b>Yellow/Amber:</b>	2.0 volts
<b>Orange:</b>	2.5 volts
<b>Red:</b>	3.0 volts
<b>White:</b>	3.5 volts



#### INTENSITY RESPONSE:

- Analog output ranging from 0 to 4 volts
- Corresponds to LED's luminous intensity in millicandelas
- C.I.E. photopic-curve-corrected
- Tests LEDs from 1 mcd to 20,000 mcd
- Available in Low and Very-Low Sensitivity models for extremely bright LEDs as well as High-Sensitivity models for very dim LEDs. Refer to page 10 for more information.
- Read-out < 50mV indicates under-ranging - the LED is too dim; Penta High-Sensitivity Sensors are available
- Read-out > 4 volts indicates over-ranging - the LED is too bright; Penta Low-Sensitivity Sensors are available
- Intensity response depends on size of LED, the aperture of the fiber-optic probe and the distance between the probe tip and the LED emitter; for more information on Sensor Sensitivity Responses please see AN 35



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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 SPECTRA SENSORS:

Universal LightProbe Spectra Sensors test a wide range of LED intensity, and any color in the visual spectrum, plus white. Universal LightProbe Spectra Sensors are well-suited for the test of “boundary” color LEDs, as they allow the user to set their own PASS/FAIL limits for color.

#### CHARACTERISTICS

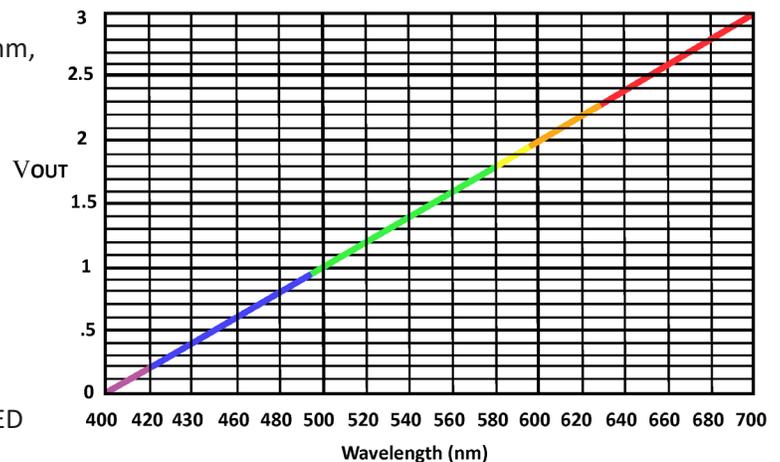
- Typical response time: <10mS capture time; <100mS overall response time for color and intensity simultaneously
- Output Loads: ‘Int.’ & ‘Color’ - 2Kohms min., 100pF, max.
- Further details on Page 11



Part Number: ULP-S2 WBI/V

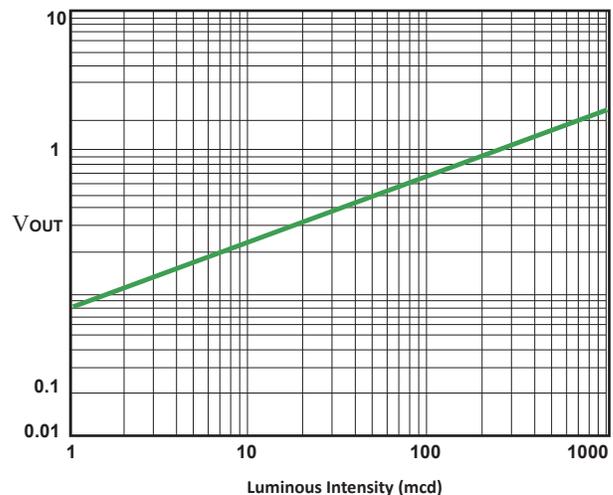
#### COLOR RESPONSE

- Test any LED color wavelength from 400 to 700nm, plus white
- Unambiguous and stable analog voltage output proportional to LED wavelength
- LED Wavelength =  $[100(V_{out} + 4)nm]$
- For white, the voltage output is 3.5volts
- Enables user to set their own PASS/FAIL limits
- Color output is independent of LED intensity
- Eliminates need to convert LED wavelength as a pulse rate
- Improves the overall response time to test an LED



#### INTENSITY RESPONSE :

- Analog output ranging from 0 to 4 volts
- Corresponds to LED's luminous intensity in millicandelas
- C.I.E. photopic-curve-corrected
- Tests LEDs from 1 mcd to 20,000 mcd
- Available in Low and Very-Low Sensitivity models for extremely bright LEDs as well as High-Sensitivity models for very dim LEDs. Refer to page 10 for more information.
- Read-out < 50mV indicates under-ranging - LED is too dim
- Read-out > 4V indicates over-ranging - the LED is too bright
- Intensity response depends on size of LED, the aperture of the fiber-optic probe and the distance between the probe tip and the LED emitter; for more information on Sensor Sensitivity Responses please see Application Note 35



Typical response for PLCC green LED tested with Universal LightProbe Spectra Sensor and Small-Aperture Fiber-Optic Probe

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 SPECTRA USB SENSORS:

Universal LightProbe S2 Spectra USB Sensors test a wide range of LED intensities and any color in the visual spectrum, plus white, providing a linear response with a serial digital output via a PC.



Part Number: ULP SPECTRA USB

#### CHARACTERISTICS

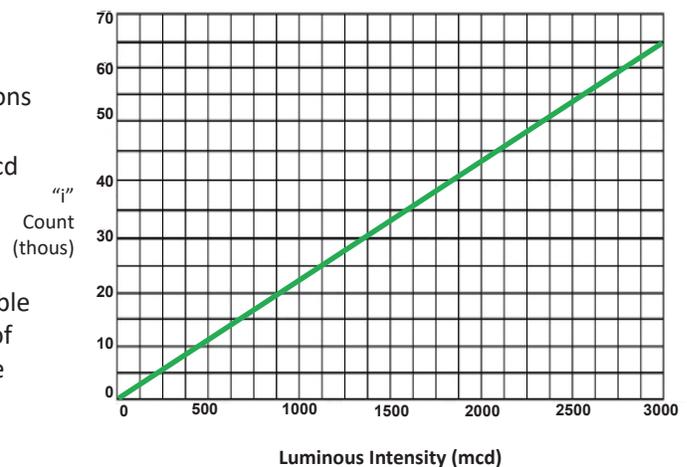
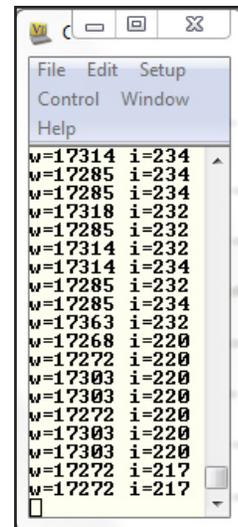
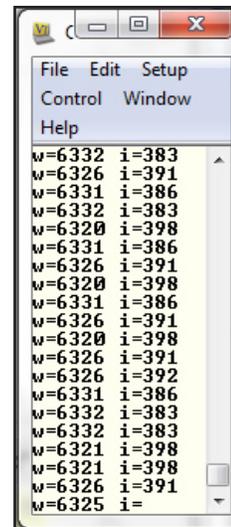
- A standard mini-type B five-pin USB connector is integrated into the S2 Spectra USB Sensor, and a standard USB Cable is provided
- Typical response time: < 10mS for color and intensity as a serial bit-stream (19200 baud rate)

#### COLOR AND WHITE RESPONSE

- Test any color wavelength, from 400-700nm & white
- Provides serial-digital output of LED color
- For color "w" = color wavelength in tenths of nanometers
- For white, "w" = a value that assists in "binning" the CCT into "warm," "neutral," or "cool" shades of white (see ULP-AN 39 for detail).
- Display/print-out the linear response with Tera Term software (included with purchase) See AN46 for details on LabView VISA
- Color output is independent of LED intensity
- Unique streaming technology enables LED color wavelength (and intensity) to be rapidly and simultaneously accessed by a PC and displayed/printed-out
- Reduces test time and provides continuous automatic data logging for statistical process control (SPC).
- Multipoint display is available

#### INTENSITY RESPONSE

- Provides serial digital output for LED intensity
- "i" = intensity, from 0 to 65,0000
- Output corresponds to LED luminous intensity in millicandelas, as seen in most LED manufacturers' specifications
- C.I.E. photopic-curve-corrected
- Tests LEDs from 0.03mcd to 18,300mcd; up to 293,000mcd with the S2 Spectra USB Very-Low Sensitivity Sensor
- Read-out of 4 indicates under-ranging - LED is too dim
- Read-out > over 65,000 indicates over-ranging - LED too bright; S2 Spectra USB Low-Sensitivity Sensors available
- Intensity response depends on size of LED, the aperture of the fiber-optic probe and the distance between the probe tip and the LED emitter; for more information on Sensor Sensitivity Responses in millicandelas, please see AN 35
- Available in Low and Very-Low Sensitivity models for the test of extremely bright LEDs



Typical response for PLCC green LED tested with Universal LightProbe Spectra USB Sensor and Small-Aperture Fiber-Optic Probe

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 UNICOLOR SENSORS:

Universal LightProbe Unicolor Sensors are designed for the intensity test of any single one of the five main LED colors (blue, green, yellow, orange, and red) plus white, Infrared and UV.

#### CHARACTERISTICS

- Typical response time: <10mS capture time ; 65mS overall response time; intensity output of correct color only.
- Easy install with one-hole fixing clamps available
- Output Loads: 'Int.'- 2Kohms min.,100pF, max.
- Further detail on Page 11



**Part Number: ULP-S2 SCI/V**

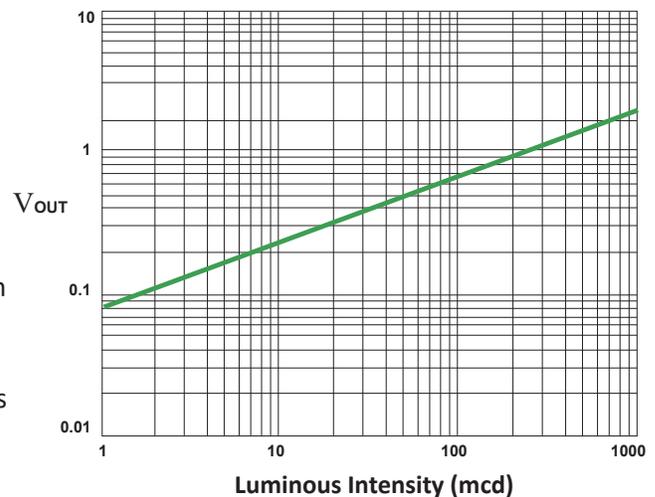
#### COLOR RESPONSE

- Analog output ranging from 0 to 4 volts
- Output is proportional to LED intensity *only* if the LED is the color specified and it is "ON"
- Tests five main LED colors - blue, green, yellow/amber, orange, or red, plus white
- Tests Infrared LEDs/emitters 700nm to 1,000nm
- Tests UV LEDs/emitters 365nm to 400nm
- Sensor is insensitive to the "wrong" color
- Note: IR LightSources, emitting specific IR wavelengths, are also available

Specific Color Sensor	Output Voltage (V <sub>OUT</sub> )							
	B	G	Y	O	R	W	IR	UV
Blue	I <sub>V</sub>	0	0	0	0	0	0	0
Green	0	I <sub>V</sub>	0	0	0	0	0	0
Yellow	0	0	I <sub>V</sub>	0	0	0	0	0
Orange	0	0	0	I <sub>V</sub>	0	0	0	0
Red	0	0	0	0	I <sub>V</sub>	0	0	0
White	0	0	0	0	0	I <sub>V</sub>	0	0
IR	0	0	0	0	0	0	I <sub>e</sub>	0
UV	0	0	0	0	0	0	0	I <sub>e</sub>

#### INTENSITY RESPONSE

- Analog output ranging from 0 to 4 volts
  - Corresponds to LED's luminous intensity in millicandelas (as provided in most LED manufacturers' specifications)
  - C.I.E. photopic-curve-corrected for visual colors
  - Tests LEDs from 1 mcd to 20,000 mcd, and up to 315,000 md with the Very-Low Sensitivity version of the Sensor
  - Read-out < 50mV indicates under-ranging - LED is too dim
  - Read-out > 4V indicates over-ranging - the LED is too bright (for IR LEDs, <5mV indicates over-ranging).
- Unicolor Low-Sensitivity and Very-Low-Sensitivity Sensors are available



Typical response for PLCC green LED tested with Universal LightProbe Unicolor Sensor and Small-Aperture Fiber-Optic Probe

Note: For more information on Sensor Sensitivity Responses please see Page 12.

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### Universal LightProbe™ S2 Unicolor Digital Sensors:

Universal LightProbe Unicolor Digital Sensors are designed for the simple ON / OFF test and color check of a single color LED, with a one-bit digital output, quickly determining PASS/FAIL status without further processing by the ATE.



**Part Number: ULP-S2 SCC**

#### CHARACTERISTICS

- Typical response time: <10mS capture time; <65mS overall response time
- Signal Output Loads: 20 mA max. Non-inductive.
- Further details on page 12

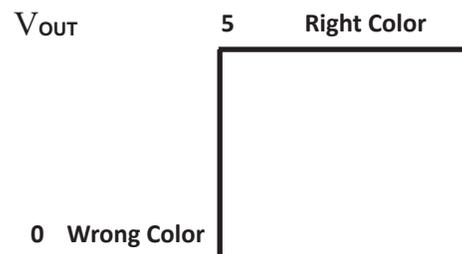
#### COLOR RESPONSE

- Tests a target LED's color by providing a Logic "1" voltage output (5 volts) only if the LED is the color specified and it is "ON"
- Tests five main LED colors: blue, green, yellow/amber, orange, or red, plus white
- Sensor is insensitive to the "wrong" color
- Provides optimum ATE/ICT Pin Board/memory interface for fast digital burst mode LED test

Specific Color Sensor	Output Voltage (V <sub>out</sub> )					
	B	G	Y	O	R	W
Blue	5	0	0	0	0	0
Green	0	5	0	0	0	0
Yellow	0	0	5	0	0	0
Orange	0	0	0	5	0	0
Red	0	0	0	0	5	0
White	0	0	0	0	0	5

#### INTENSITY RESPONSE

- Unicolor Digital Sensors do not provide an intensity output
- When detecting the correct color, Unicolor Digital Sensors respond to a wide dynamic range of LED intensity
- No adjustments for intensity are necessary



# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ S2 BLINX DIGITAL SENSORS:

Universal LightProbes Blinx Digital Sensors are fast-response-time Sensors, designed for the simple ON/OFF test of any color blinking/pulsed or stable LED, for fast results with a digital output.

#### CHARACTERISTICS

- Response time: <1ms response time; <20mS overall response time
- Signal Output Load: 20mA max. (Source/Sink). Non-inductive
- Wide-aperture Fiber-optic Probe recommended
- Further details on Pag 12

#### ON/OFF RESPONSE

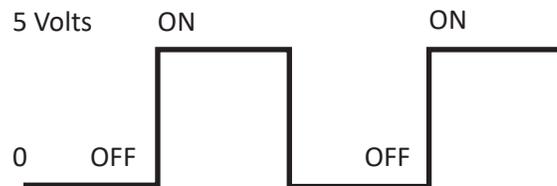
- Tests the ON/OFF status of any color LED, from dim to very bright
- Tests stable or blinking/pulsed LEDs, up to a rate of 15 Hz, typically, and higher rates for brighter LEDs
- Provides a Logic "1" output of 5 volts only if the LED is ON and a Logic "0" if the LED is OFF
- "Color-blind" sensor will check the ON/OFF status of any color LED
- Provides the simplest and fastest 1-bit digital interface to automatic test equipment

#### INTENSITY

- Blinx Digital Sensors do not provide an intensity output
- Blinx Digital Sensors respond to a wide dynamic range of LED intensity without adjustment
- Will test surface-mount LEDs of 0.125 mcd minimum, at a blinking rate of 15Hz
- Will test finished product LED displays, e.g. RJ45 T-1 / 3mm LEDs of 0.5 mcd min. at a blinking rate of 15Hz, or higher for brighter LEDs



Part Number: ULP S2 BLINX



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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

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### UNIVERSAL LIGHTPROBE™ S2 ULTRA-HIGH SENSITIVITY SENSORS:

Designed for the test of very dim LEDs, as low as 0.01 mcd minimum, and including very low light-level LED-illuminated action-indicator switches, controls and status indicators for night/dark viewing in automobile interiors. Recommend the use of wide-aperture stainless-steel encased Fiber-optic Probes with contacting tips.



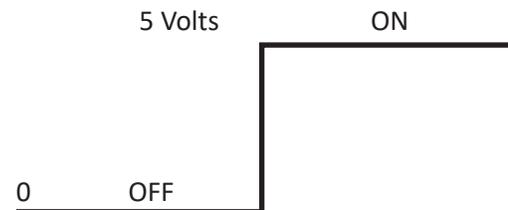
**Part Number: ULP-S2 UHS**

#### CHARACTERISTICS

- Typical response time: < 10mS capture time; <100mS overall response time
- Signal Output Load: 20mA max. (Source/Sink). Non-inductive
- Further details on Page 12

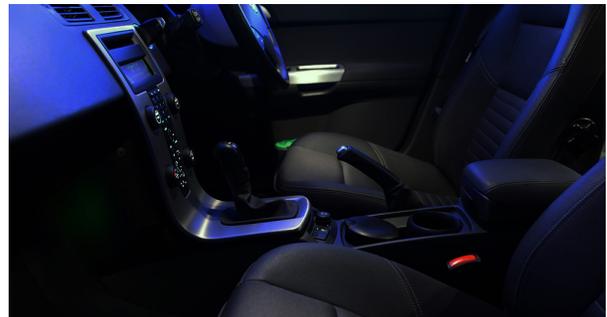
#### ON/OFF RESPONSE

- Tests the ON/OFF status of any color LED
- Provides a Logic "1" output of 5 volts only if the LED is ON and a Logic "0" if the LED is OFF
- "Color-blind" sensor will check the ON/OFF status of any color LED
- Provides the simplest and fastest 1-bit digital interface to automatic test equipment, requiring no further PASS/FAIL processing by the ATE software



#### INTENSITY RESPONSE

- Ultra-High Sensitivity Sensors do not provide an intensity output
- Ultra-High Sensitivity Sensors respond to a wide dynamic range of LED intensity without adjustment
- Will test surface-mount LEDs of 0.01 mcd minimum
- Will test finished product LED displays, e.g. RJ45 T-1 / 3mm LEDs of 0.15 mcd minimum



# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### UNIVERSAL LIGHTPROBE™ SENSOR SENSITIVITY SELECTION GUIDE:

Optomistic Products offers a selection of Universal LightProbes for testing various intensity LEDs. Sensor selection depends on several factors, including:

- The size of LED under test
- The brightness of the LED under test (check the manufacturers data sheet for intensity in mcd)
- The type of Universal LightProbe Fiber-optic Probe being used for the test
- The air-gap between the fiber-optic probe tip and the LED under test
- Whether the LED is being tested through translucent material of unknown transmission characteristics.

The chart below serves as a guide to determine which sensor and fiber-optic probe is best for your specific LED test application.

UNIVERSAL LIGHTPROBE SENSOR TYPE (ULP AND ULP-S2)	UNIVERSAL LIGHTPROBE FIBER-OPTIC PROBE TYPE	CIRCUIT-BOARD TEST		FINISHED-PRODUCT TEST
		SURFACE-MOUNT CHIP LEDs	SURFACE-MOUNT PLCC LEDs	THROUGH-HOLE T-1 3/4 (5MM)
Penta, Spectra or Unicolor Sensor PCI/V, WBI/V, SCI/V	Small-aperture probe (3mm air-gap)	1 mcd to 3000 mcd	1 mcd to 3000 mcd	10 mcd to 20,000 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.1 mcd to 200 mcd	0.1 mcd to 200 mcd	3 mcd to 6,000 mcd
Penta, Spectra or Unicolor Low-Sensitivity Sensor (LS) PCI/V-LS, WBI/V,-LS SCI/VLS	Small-aperture probe (3mm air-gap)	5 mcd to 10,000 mcd	5 mcd to 10,000 mcd	40 mcd to 80,000 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.3 mcd to 800 mcd	0.5 mcd to 1,000 mcd	10 mcd to 25,000 mcd
Penta, Spectra or Unicolor Very-Low-Sensitivity Sensor (VLS) PCI/V-VLS, WBI/V-VLS, SCI/V-VLS	Small-aperture probe (3mm air-gap)	20 mcd to 45,000mcd	20 mcd to 45,000 mcd	125 mcd to 315,000 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	2 mcd to 3,200 mcd	2 mcd to 4,000 mcd	40 mcd to 95,000 mcd
Penta & Spectra High-Sensitivity Sensor (HS) PCI/V-HS,WBI/V-HS	Wide-aperture probe (Contacting tip or 1mm air-gap)	N/A	N/A	1 mcd to 15 mcd (1.0 to 4 volts)
Spectra USB or ASCII Sensor Spectra USB	Small-aperture probe (3mm air-gap)	0.5 mcd to 3,400 mcd	0.5 mcd to 3,000 mcd	3 mcd to 18,300 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.03 mcd to 200 mcd	0.04 mcd to 260 mcd	0.5 mcd to 3,000 mcd
Spectra USB Low -Sensitivity Sensor (LS) Spectra USB-LS	Small-aperture probe (3mm air-gap)	2 mcd to 13,600 mcd	2 mcd to 12,000 mcd	12 mcd to 73,200 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.12 mcd to 800 mcd	0.2 mcd to 1,000 mcd	2 mcd to 12,000 mcd
Spectra USB Very-Low-Sensitivity Sensor (VLS) Spectra USB-VLS	Small-aperture probe (3mm air-gap)	8 mcd to 54,400 mcd	8 mcd to 48,000 mcd	48 mcd to 293,000 mcd
	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.5 mcd to 3,200 mcd	1 mcd to 4,000 mcd	8 mcd to 48,000 mcd
Blinx Digital Sensor (BLINX) (?? Hz. Max. LED blink rate)	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.125 mcd min.	0.130 mcd min.	1.5 mcd min. (0.5 mcd min. RJ45 T1 LEDs)
Blinx Digital High-Sensitivity Sensor BLINX-HS (Does not detect color)	Wide-aperture probe (Contacting tip or 1mm air-gap)	0.03 mcd min.	0.03 mcd min.	0.46 mcd min. (0.15 mcd min. RJ45 T1)
Ultra-High Sensitivity Sensor (UHS) ULP-UHS (Does not detect color)	Wide-aperture probe (Contacting tip)	0.01 mcd min.	0.01 mcd min.	0.25mcd min. (0.15 mcd min. RJ45 T1)

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### PIN CONNECTIONS, DIMENSIONS AND OUTPUT SIGNAL CHARACTERISTICS:

All Universal LightProbe Sensors share the same form, and are then pre-programmed to suit specific LED test requirements.

**Operating temperature range:** 0°C to 70°C

**Power consumption:** Operates between +5 and 28 volts D.C. at 6mA max; less than 4.75 volts not recommended.

**Voltage protection:** Withstands up to +40 volts, & reverse polarity to -18 volts

**Output Pins:** 3 or 4 gold-plated (depending on sensor type) standard wire-wrap pins (0.025 in. sq.) **OR** USB

#### PENTA (ULP-S2 PCI/V) and SPECTRA (ULP-S2 WBI/V) SENSORS: Four standard wire-wrap pins

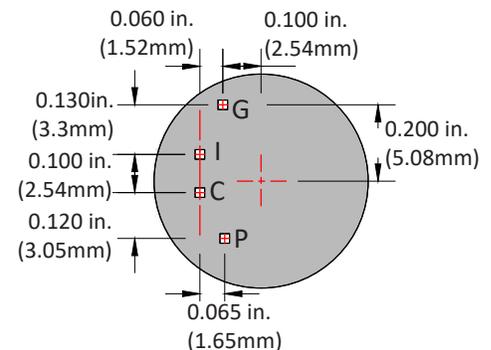
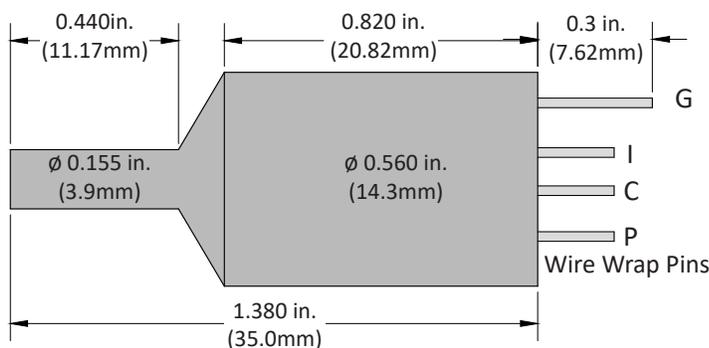
**G - Ground** - common for analog output and power input

**I - Intensity** of LED under test (relative)

**C - Color** of LED under test

**P - DC Power Input:** Between +5 and 28 volts D.C. at 6 mA max; less than 4.75 volts not recommended.

**Typical response times:** Penta and Spectra <10mS capture time; <100mS overall response time



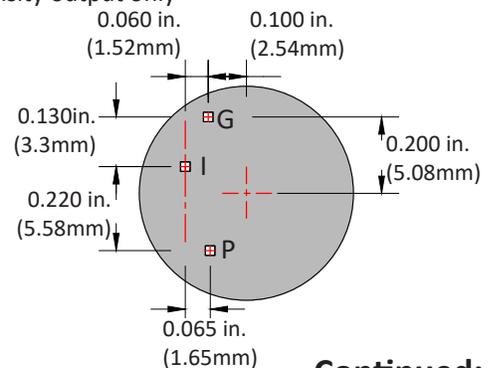
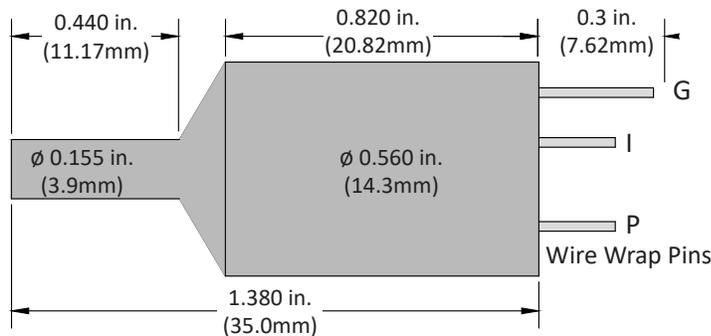
#### UNICOLOR (ULP-S2 SCI/V) SENSOR: Three standard wire-wrap pins

**G - Ground:** common for analog output and power input

**I - Intensity** of correct color LED under test (relative)

**P - DC Power Input:** Between +5 and 28 volts D.C. at 6 mA max; less than 4.75 volts not recommended.

**Typical response time:** <10mS capture time ; 65mS overall response time; intensity output only



**Continued:**

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# UNIVERSAL LIGHTPROBE™

## PART 1 - SENSORS

### PIN CONNECTIONS, DIMENSIONS AND OUTPUT SIGNAL CHARACTERISTICS - Continued:

**UNICOLOR DIGITAL (ULP-S2 SCC), BLINX DIGITAL (ULP-S2 BLINX) and ULTRA HIGH-SENSITIVITY (ULP-S2 UHS) SENSORS:**

**Three standard wire-wrap pins**

**G - Ground:** common for digital output and power input

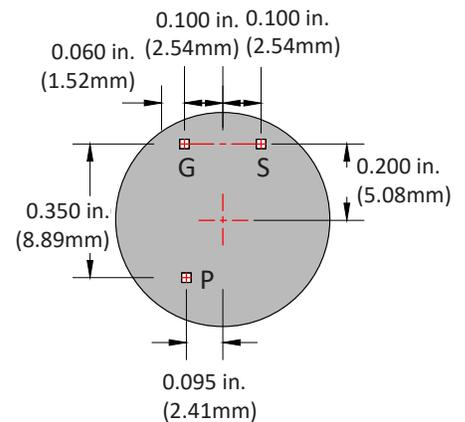
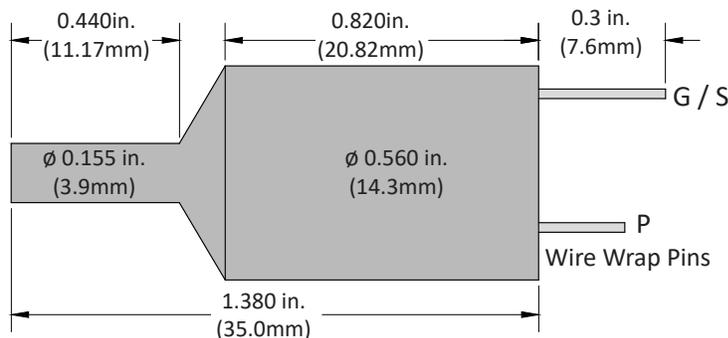
**S - Status of LED:** **Unicolor Digital** - correct color = Logic '1' (5v); incorrect color = Logic 0 (0v)  
**Blinx & UHS** - ON = Logic '1' (5v); OFF = Logic 0 (0v)

**P - DC Power Input:** Between +5 and 28 volts D.C. at 6mA max; less than 4.75 volts not recommended.

**Typical response times:** **Unicolor Digital** : <10mS capture time; <65mS overall response time

**Blinx Digital** <1ms response time; <20mS overall response time

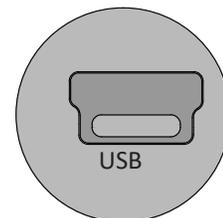
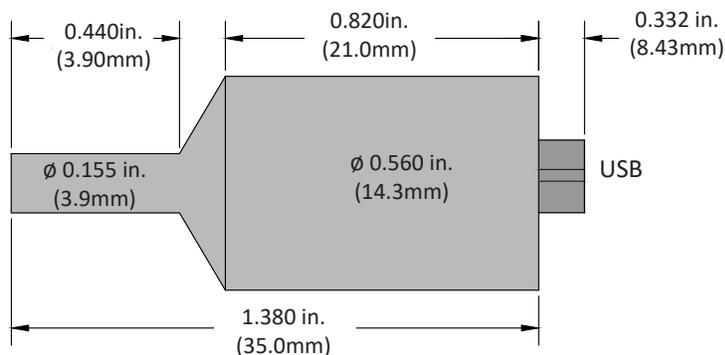
**Ultra-High Sensitivity** <10mS capture time; <100mS overall response time



**S2 SPECTRA USB SENSOR:**

**Connection is a USB port:** sensor includes compatible standard mini-B type USB cable

**Typical response time:** <10mS color & intensity output as a serial bit-stream (19200 baud rate)



# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

### UNIVERSAL LIGHTPROBE™ FIBER-OPTIC PROBE SELECTION GUIDE

After choosing a pre-programmed **Sensor** for the type of test and output you require, then choose a **Fiber-optic Probe** to further customize the test for mechanical requirements and constraints. Fiber-optic Probes come in a variety of **aperture styles (wide-aperture, small-aperture, contacting tip)**, **Fiber-optic cable type**, and **stainless-steel tip** lengths to meet your exact requirements for testing LEDs. These options are outlined below.

#### SMALL-APERTURE (SA) FIBER-OPTIC PROBES: Our most popular and cost-efficient option.

Appropriate for most testing applications. The best choice for testing closely-spaced LEDs. Small-Aperture Fiber-Optic Probes come in **Single** models for testing single LEDs, **“Duplex” (250D)** for testing two LEDs sequentially, and the **“Trident” (250-12x12)** and **“Skinny Trident” (250T)** models for testing three LEDs sequentially.

**SINGLE (250-12):** For testing single LEDs.



#### Characteristics:

- Flexible cable: 1 x 9.84 in./250mm long.
- Probe tip dia.: 0.050 in. /1.27mm
- LED spacing: Not less than 0.050 in. / 1.27mm
- Probe tip type: Stainless-steel
- Air-gap: 1mm min. recommended
- See probe tip lengths below

#### FIBER-OPTIC CABLE TYPE:

Universal LightProbe™ Small-aperture Fiber-Optic Probes have a flexible cable with a 1 in./25.4 mm min. bend radius.

#### PART NUMBERS:

There are 5 tip styles in the **Small-Aperture Single** model available to account for variations in working distance, LED orientation and accessibility, **Short (SL)**, **Long (LL)**, and **Extra-Long (XLL)**, as well as three **Right-Angle** options, **12P, Short (RSL)** and **Long (RLL)**, for side-emitting LEDs. For further explanation of part numbers, please see page 20.

#### 250-12-SL-SA

1.125 in. /  
28.57mm tip



#### 250-12-LL-SA

1.75 in./  
44.45mm tip



#### 250-12-XLL-SA

2.25 in./  
57.15mm tip



#### 250-12-RSSL-SA

0.175 in. /4.44mm right-angle length  
1.75 in./  
44.45mm tip



#### 250-12-RSLL-SA

0.75 in./20.32mm right-angle length  
1.125 in./  
28.57mm tip



#### 250-12P-SL-SA

1.125 in./28.57mm tip



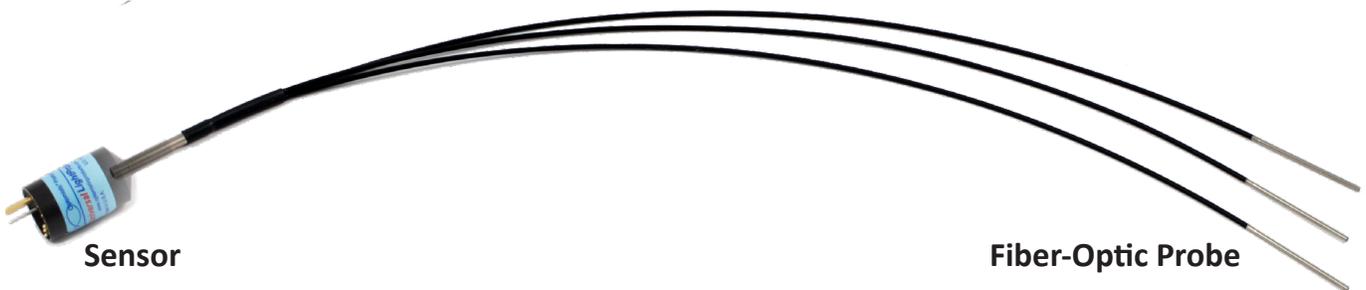
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# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

### SMALL-APERTURE (SA) FIBER-OPTIC PROBES - continued:

**TRIDENT (250T-12x12) AND SKINNY TRIDENT (250T/13):** For the testing of three LEDs sequentially with one sensor. Our most popular and cost-efficient option. The “Trident” and “Skinny Trident” models are bundled together in groups of three per sensor for sequential testing of LEDs and additional cost savings. A two probe “Duplex” (D) model is also available, 250D-12x12.



#### Characteristics:

- Flexible cable: 3 x 9.84 in. / 250mm long
- Air-gap: 1mm min. recommended
- LED spacing: Not less than 0.050 in. / 1.27mm
- Probe tip type: Stainless-steel
- Probe tip dia.: 0.050 in. / 1.27mm
- LEDs must be turned on and tested one at a time
- Individual probes on the “Trident” are replaceable
- Individual probes ARE NOT replaceable on the “Skinny Trident”

#### PART NUMBERS:

There are 6 tip styles in both the “Trident” (250T-12x12) and “Skinny Trident” (250T/13) models available to account for variations in working distance, LED orientation and accessibility: **Short (SL)**, **Long (LL)**, and **Extra-Long (XLL)**, as well as three **Right-Angle** options - **12P**, **(RSSL)** and **(RSLL)** for testing side-emitting LEDs. For further explanation of part numbers, please see page 20.

#### 250T-12x12-SL-SA

#### 250T/13-12-SL-SA

1.125 in./  
28.57mm tips



#### 250T-12x12-RSSL-SA

0.175 in./4.44mm right-angle length  
1.75 in./44.45mm tips



#### 250T-12x12-LL-SA

#### 250T/13-12-LL-SA

1.75 in./  
44.45mm tips



#### 250T-12x12-RSLL-SA

0.75 in./20.32mm right-angle length  
1.125 in./28.57mm tips



#### 250T-12x12-XLL-SA

#### 250T/13-12-XLL-SA

2.25 in./  
57.15mm tips



#### 250T-12x12P-SL-SA

1.125 in./28.57mm tips



# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

### WIDE-APERTURE (WA) FIBER-OPTIC PROBES : for Dim or Misaligned LEDs

The wide-aperture probes allow four times the amount of light input as small-aperture probes, compensating for dim LEDs and potential misalignment errors in ATE test fixtures. The best choice for finished-product displays such as illuminated switch alpha-numeric icons. Wide-Aperture probes come in a variety of models, the flexible **250-27's**, which come with a choice of cable housing, the rigid stainless-steel encased **XXX-27's**.

**FLEXIBLE (250-27):** For testing of single LEDs.



#### Characteristics:

- Flexible cable: 9.84 in. / 250mm long
- Probe tip diameter: 0.109 in./2.77mm stainless-steel tip
- Probe tip type: non-contacting stainless steel
- LED spacing: not less than 0.109 in./2.77mm
- Air-gap: 1mm recommended- up to 3mm to increase field of view when testing misaligned LEDs

#### FIBER-OPTIC CABLE TYPES:

Universal LightProbe™ Wide-aperture Fiber-Optic Probes come in two cable types (“Regular” and “Superflex”). This allows for specific requirements for LED access, spacing and working conditions.

**Regular (250)** - 2 in./50.8 mm minimum bend radius

**Superflex (250SF)** - 1/4 in. /6.35mm minimum bend radius. Increased flexibility allows for easier access to difficult to reach LEDs.

#### PART NUMBERS:

There are 5 tip styles of the **Wide-Aperture Single** model available to account for variations in working distance, LED orientation and accessibility, **Short (SL)**, **Long (LL)**, and **Extra-Long (XLL)**, as well as two **Right-Angle** options for testing side-emitting LEDs, **27P**, and the **250SF-27-RSLL** (available only with the “Superflex” cable type. For further explanation of part numbers, please see page 20.

**250-27-SL-WA**  
**250SF-27-SL-WA**  
 0.325 in./  
 8.25mm tip



**250-27-LL-WA**  
**250SF-27-LL-WA**  
 1.375 in./  
 34.92mm tip



**250-27P-LL-WA**  
 1.375 in. /34.92mm tip



**250SF-27-RSLL-WA**  
 Available in the “Superflex” model only  
 0.220 in./5.59mm right angle length

**250-27-XLL-WA**  
**250SF-27-XLL-WA**  
 2.25 in./  
 57.15mm tip



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# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

**WIDE-APERTURE (WA) FIBER-OPTIC PROBES continued:** for Dim or Misaligned LEDs.  
Stainless-steel encased probe. Eliminates the need for sensor mounting clamps.

**RIGID (XXX-27):** For testing of single LEDs.



### Characteristics:

- Stainless-steel encased probe
- Probe tip diameter: 0.109in./2.77mm stainless-steel tip
- Probe tip type: stainless steel
- LED spacing: Straight - not less than 0.56 in./14.22mm, the width of the sensor; Right Angle - not less than 0.134 in./3.4mm, by rotating the sensors outward
- Air-gap: 1mm recommended- up to 3mm to increase field of view when testing misaligned LEDs

### PART NUMBERS:

There are 5 styles of the **Wide-Aperture Rigid** model available to account for variations in working distance, LED orientation and accessibility, **Very Short (SSL)**, **Short (SL)**, **Long (LL)**, as well as two **Right-Angle** options, **(RSL)** and **(RLL)**. Right-angle probes can be rotated for closer spacing of sensors. For further explanation of part numbers, please see page 20.

#### XXX-27-SSL-WA

0.75 in./19.05mm long  
Fully inserted into sensor



#### XXX-27-SL-WA

1.125 in. / 28.57mm long  
Extends 0.375 in. past sensor

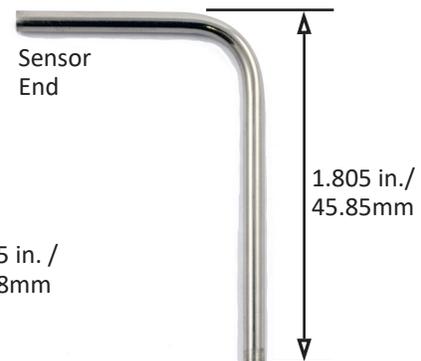


#### XXX-27-LL-WA

2.20 in. / 55.88mm long  
Extends 1.45 in./ 36.83mm past sensor



#### XXX-27-RLL-WA



#### XXX-27-RSL-WA



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## UNIVERSAL LIGHTPROBE™ PART 2 - FIBER-OPTIC PROBES

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**CONTACTING-TIP (WA-CT) FIBER-OPTIC PROBES** : for more refined intensity testing. Eliminates variations in intensity measurement due to inconsistent working distance between LED and fiber-optic probe tip. Also comes in **Right-Angle** and **Rigid** models.

**FLEXIBLE (250-34)**: For testing of single LEDs.



### Characteristics:

- Flexible cable: 9.84in./250mm long
- Probe tip diameter: 0.134in./3.4mm stainless-steel tip. See specific probe tip lengths below.
- Probe tip type: stainless steel with contacting insulated spring tip
- LED spacing: not less than 0.134in./3.4mm

### FIBER-OPTIC CABLE TYPES:

Universal LightProbe™ Flexible Contacting-Tip Fiber-Optic Probes (CT) come in two cable types - “Regular” and “Superflex.” This allows for specific requirements for LED access and working conditions.

**Regular (250)** - 2 in./50.8mm minimum bend radius.

**Superflex (250SF)** - 1/4 in./6.35mm minimum bend radius. Increased flexibility allows for easier access to difficult to reach LEDs.

### PART NUMBERS:

There are 2 styles of the **Flexible Contacting-Tip** model available to account for variations in working distance, **Short (SL)** and **Long (LL)**. For further explanation of part numbers, please see page 20.

**250-34-SL-WA-CT**  
**250SF-34-SL-WA-CT**  
1.29 in./32.76mm long tip



**250-34-LL-WA-CT**  
**250SF-34-LL-WA-CT**  
2.34 in./59.43 long tip



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# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

### CONTACTING-TIP (WA-CT) FIBER-OPTIC PROBES - continued:

**RIGID (XXX-34):** For more refined intensity testing. Eliminates variations in intensity measurement due to inconsistent working distance between LED and fiber-optic probe tip. Stainless-steel encased probes eliminate the need for sensor mounting clamps. Comes in **Rigid** and **Rigid Right-Angle** models.



#### Characteristics:

- Stainless-steel encased probe
- Probe tip diameter: 0.134in./3.4mm stainless-steel tip
- Probe tip type: stainless steel with contacting insulated spring tip
- LED spacing: Straight - not less than 0.56 in./14.22mm, the width of the sensor; Right Angle - not less than, 0.134 in./3.4mm, by rotating the sensors outward

#### PART NUMBERS:

There are 4 styles of the **Rigid Wide-Aperture Contacting-Tip** model available to account for variations in working distance, LED orientation and accessibility, **Short (SL)** and **Long (LL)**, as well as two **Right-Angle** options, **Short-Length (RSL)** and **Long-Length (RLL)**. Right-angle probes can be rotated for closer spacing of sensors. For further explanation of part numbers, please see page 20.

#### XXX-34-SL-WA-CT

2.12 in. /53.85mm long  
Extends 1.37 in./34.8mm past sensor

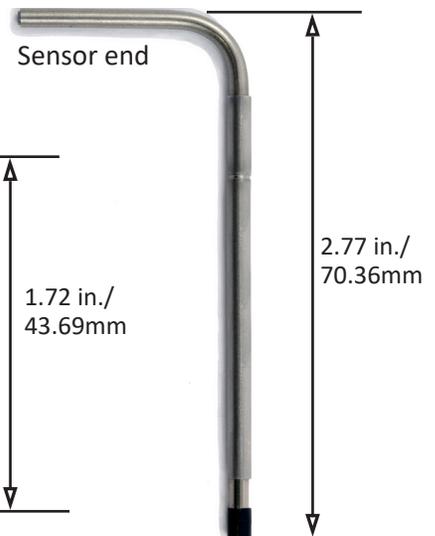


#### XXX-34-LL-WA-CT

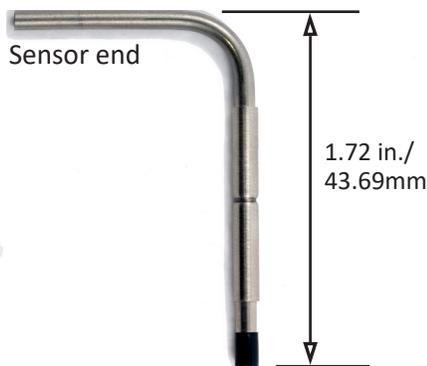
3.17 in./80.52 long  
Extends 2.42 in./61.47mm past sensor



#### XXX-34-RLL-WA-CT



#### XXX-34-RSL-WA-CT



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## UNIVERSAL LIGHTPROBE™ PART 2 - FIBER-OPTIC PROBES

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### **VERY-WIDE-APERTURE (VWA) FIBER-OPTIC PROBES:** for Very Dim or Misaligned LEDs.

Allows over 2x the light of a WA probe.

### **VERY-WIDE-APERTURE (152-VWA):** For testing very dim LEDs.



#### **Characteristics:**

- Semi-flexible cable: 6 in./152mm long, minimum 4 in. bend radius without significant light loss
- Probe tip diameter: 0.145in./3.7mm stainless-steel tip
- Probe tip type: stainless steel
- LED spacing: not less than 0.145in./3.7mm
- Air-gap: 1mm recommended - up to 3mm to increase field of view when testing misaligned LEDs

#### **PART NUMBERS:**

There are 2 styles of the **Very-Wide-Aperture** fiber-optic probes available to account for variations in working distance, **Short (SL)**, **Long (LL)**. For further explanation of part numbers, please see page 20.

#### **152-37-SL-VWA**

0.325 in./8.25mm tip



#### **152-37-LL-VWA**

1.375 in./34.92mm tip



### **SPECIAL ORDERS:**

Optomistic Products can provide Special Order fiber-optic probes that are customized to address specific LED test constraints or requirements.

Examples:

- Custom length fiber-optic cables- from 6 in./152mm to 12 ft/3.657m in length
- Custom length stainless-steel tips
- Small-aperture contacting-tip probes
- Small-aperture Rigid (stainless-steel encased) right-angle probes

# UNIVERSAL LIGHTPROBE™

## PART 2 - FIBER-OPTIC PROBES

### UNIVERSAL LIGHTPROBE™ FIBER-OPTIC PROBE SELECTION GUIDE:

Fiber-optic Probes come in a variety of aperture sizes (wide-aperture, small-aperture), lengths, and fiber-optic cable type to meet your exact needs for testing LEDs. After choosing a pre-programmed **Sensor** for the type of test and output you require, then choose a **Fiber-optic Probe** to further customize the test for mechanical requirements and constraints.

WHAT ARE YOU TESTING?	P R O B E T Y P E							
	Small Aperture Probes	Duplex & Trident Small-Aperture Probes	Wide-Aperture Probes	Wide-Aperture Probes Contacting Tips	Very-Wide Aperture Probes	Super-Flexible Wide-Aperture Probes	"Periscope" Wide-Aperture Probe	Stainless Steel Encased Wide-Aperture Probes
Closely spaced LEDs 0.050 inch on center	◆	◆						
Two or Three LEDs with a Single Sensor		◆						
Compensate for Mis-alignment of Probe Tip to LED			◆					
Dim LEDs			◆	◆	◆			
Requiring Refined Intensity Test				◆				
Difficult to Access LEDs					◆	◆		
Side-Facing LEDs							◆	
Install Sensor without Clamps								◆

### PROBE PART NUMBERS

Below are sample part numbers and what they indicate.

#### 250-27P-SL-WA

- 250** Length of the Fiber-optic cable in mm
- 27** Diameter of the Probe tip, in this case, 2.7mm
- P** **Periscope** - Side-looking tip
- SL** Length of the Probe tip, in this case Short Length
- WA** Aperture size, in this case "Wide aperture" (2mm)

#### 250T-12x12-LL-SA

- 250** Length of the Fiber-optic cable in mm
- T** **Trident** - 3 Fiber-optic Probes inserted into one Sensor.
- 12x12**- Exterior diameter of the stainless-steel Probe tip on both ends of the Fiber-optic cable (1.27mm)
- LL** Length of the Probe tip, in this case Long Length
- SA** Aperture size, in this case "Small Aperture" (1mm)

#### 250SF-34-LL-WA-CT

- 250** Length of the cable in mm
- SF** Type of special cable, in this case, SuperFlex
- 34** Diameter of the Probe tip, in this case, 3.4mm
- LL** Length of the Probe tip, in this case Long Length
- WA** Aperture size, in this case "Wide aperture" (2mm)
- CT** Indicates a "contacting" Probe tip

#### XXX-27-LL-WA

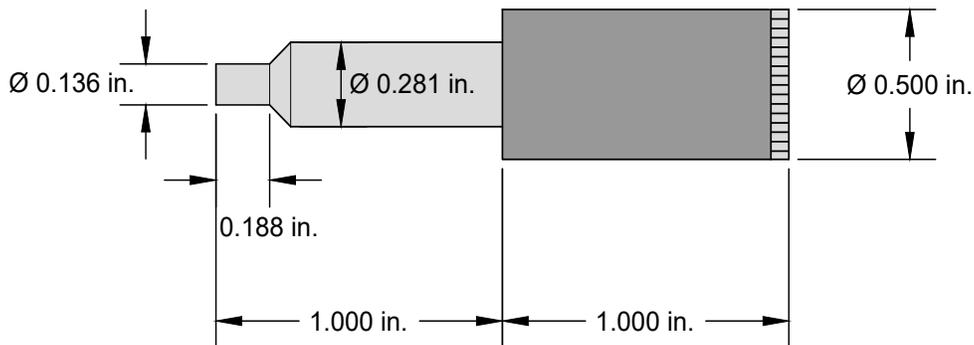
- XXX** Stainless-steel encased rigid Probe (no cable)
- 27** Diameter of the Probe tip, in this case 2.7mm
- LL** Length of the Probe tip, in this case Long Length
- WA** Aperture size, in this case "Wide aperture" (2mm)

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## UNIVERSAL LIGHTSOURCE™ INFRA-RED (IR) EMITTER

Universal LightSources™ emit Infra-red (IR) radiant energy and are designed for the testing of IR (infra-red) sensors used in remotely-controlled products. The emitters are available in eight different IR wavelengths: 830nm, 850nm, 870nm, 875nm, 880nm, 890nm, 940nm and 950nm, with radiant intensities commonly used for such IR emitters. The Universal LightSources use a standard 5-volt regulated DC power supply connected via a connecting cable with mating coaxial power plug supplied with each LightSource. Alternatively, the Universal LightSource can be connected to a serial-digital pulse-code-modulated signal source.

**Part Number ULS-SL-IR-XXX - (XXX indicates peak wavelength in nanometers)**



A **Universal LightSource** can be mounted with a single-hole mounting clip (also supplied). For fixture mounting, choose from a wide variety of **Universal LightProbe** fiber-optic probes, which can be coupled to the IR LightSources to probe an IR sensor under test.

Clamp and Connector Cable included. Add Universal LightProbe Fiber-Optic Probe if required

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# UNIVERSAL LIGHTPROBE™ INSTALLATION ACCESSORIES

## UNIVERSAL LIGHTPROBE™ SENSOR SIX-PACK:

The Universal LightProbe Sensor Six-Pack provides a compact and efficient way to install six Universal LightProbe Sensors in a single space-saving unit. Two standard circuit-board header connectors enable the use of standard ribbon cable connectors. A single power and a single ground wire is all that is needed to connect as many as six Sensors.

The Sensor Six-Pack will accommodate any combination of the pre-programmed Universal LightProbe Sensor models, which can then be paired with a wide variety of Fiber-optic Probes. This includes the popular Penta Sensor combined with the “Trident” Fiber-optic Probes to test a total of 18 LEDs per Sensor Six-Pack.

**PART NUMBER: S6P** (Sensors and Fiber-optic Probes sold separately)

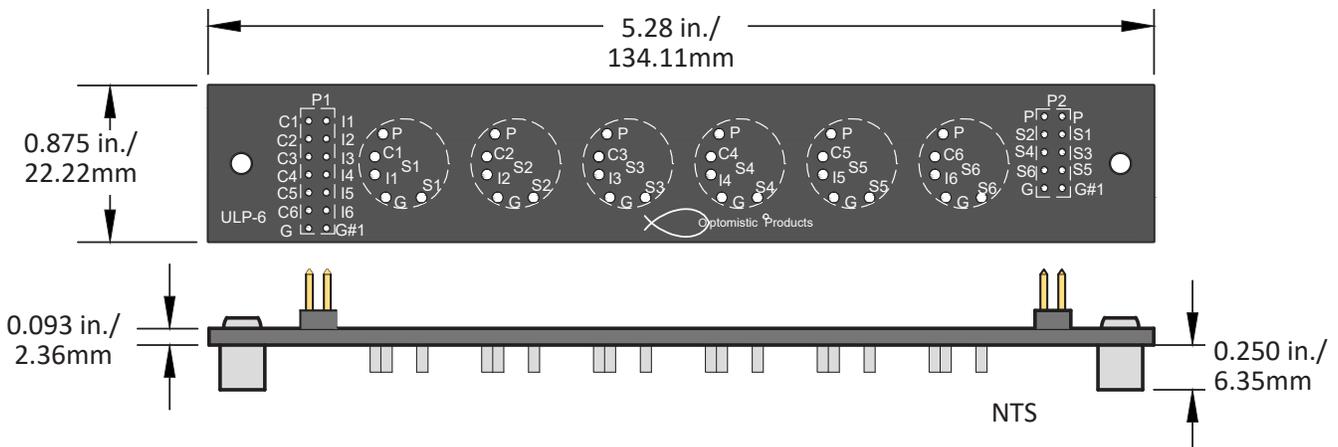


**Easy Installation:** Two tapped (4-40) mounting holes are used for installation with ¼ in./ 6.35mm stand-offs. Both 10-pin and 14-pin standard circuit-board header connectors accommodate either analog or digital Sensor outputs.

See Application Note **AN47** for details on installation

**Note: Ribbon cable / wire-wrap / stand-offs to be supplied by customer**

UNIVERSAL LIGHTPROBE SENSOR SIX-PACK SHOWN WITH SENSORS AND COMBINATION OF VARIOUS FIBER-OPTIC PROBES



**SENSOR SIX-PACK RETAINING CLAMP:** The Sensor Six-Pack Retaining Clamp is used to keep the Sensors in place when the Sensor Six-Pack is mounted in a horizontal position, or, if there is a lot of movement of the test fixture.

**Part Number: S6P-RC**

[www.optomisticproducts.com](http://www.optomisticproducts.com)  
[info@optomisticproducts.com](mailto:info@optomisticproducts.com)

# UNIVERSAL LIGHTPROBE™

## INSTALLATION ACCESSORIES

Universal LightProbe™ Sensors and Fiber-Optic Probes are easy and fast to install. The Sensor Six-Pack - see Page 24 - can accommodate Six Universal LightProbe Sensors in a single space-saving unit. Use one-hole fixing clamps for the sensors and flexible cable fiber-optic probes. Stainless-steel encased Fiber-Optic Probes support both the sensor and the Fiber-Optic Probe without sensor clamps. The Universal LightProbe™ Connector Cable is also available for quick and easy sensor wiring to ATE interface.

### MOUNTING CLAMPS:

#### Sensor Clamp: Part Number ULP-CP

Use a single clamp for the sensor with a single #10-ANSI screw for one-hole fixing



#### Probe Clamp: Part Number LCP-XXX

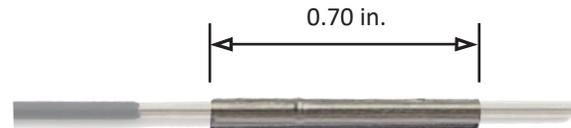
("XX = Fiber-Optic Probe model number - 12P, 27P, or 34P)

Individual clamps secured to the probe plate, allows the height of the probe tips above the LEDs to be adjusted



#### Socket Clamp: Part Number LCP-S12

Secures the stainless-steel tips in the probe plate. For small-aperture fiber-optic-probes, including the popular "Trident" fiber-optic probe. See AN 22 for more information.



### Universal LightProbe™ Connector Cable: Part Number ULP-CC

#### - Fool-proof Sensor Wiring

Color-coded and labeled wires, corresponding to sensor pin labelling, with separate sheathing of individual sensor wires for easy identification at the ATE interface

#### - Time-Saving

Provides a quick-change of sensors, saving time over wire-wrap connections

#### - Reduces Overall Fixture Assembly Cost

Eliminates costly wiring errors and de-bug time and provides automatic dressing of specific sensor wires.

#### - Protects Sensor from Heat Damage

Eliminates the possibility of sensor damage caused by excessive heat.  
(Soldering connections NOT recommended)

#### - Long, Durable, Flexible and Tested

Long-length (36 inches/914.4 mm) allows for trimming to suit most fixtures and 26 AWG stranded conductors for flexibility and durability. End-to-end continuity tested and pull tested



PO Box 751 • South Freeport, ME 04078 USA | Phone (207) 865-9181 • Fax (207) 510-8039

www.optomisticproducts.com  
info@optomisticproducts.com