Chroma Light Meter

850011
Instruction Manual

Chroma Light Meter - 850011

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TABLE OF CONTENTS

PRODUCT INTRODUCTION

- Illuminance in Lux or FC

- Color temperature and correlated color temperature

- Custom reference value of color difference

Enables precise measurement of illuminance, color temperature, correlated color temperature or color difference simultaneously shown on a backlit display. Excellent for art galleries and museums, film and TV studios, lighting manufacturers, stores and designers. Meets CIE photopic spectral response and color temperature. Lux and foot candle selectable with general or LED light modes and a hold function. Comes in a protective foam lined carrying case complete with a tripod screw, magnetic mount, 9V battery and instructions. N.I.S.T. traceable certificate of compliance available (for lux and foot candles only).

Weight: 16 oz (453g)
Dimensions: 5 ½" x 2" x 1" (140 x 49 x 29 mm)

SAFETY INFORMATION

Read the following safety information carefully before attempting to operate or service the meter. Only qualified personnel should perform repairs.

Safety Symbols

$C\epsilon$ CE Certification.

This instrument conforms to the following standards:

EN61326: Electrical equipment for measurement, control and laboratory use.

IEC61000-4-2: Electrostatic discharge immunity test.

IEC61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test.

IEC61000-4-8: Power frequency magnetic field immunity test.

Tests were conducted using a frequency range of 80-1000MHz with the instrument in three orientations. The average error for the three orientations is ±3% at 3V/m throughout the spectrum.

However, between 180-500MHz at 3V/m, the instrument permissive loss of performance is specified by the specifications.

RoHS Restrict to use of six substances within electrical and electronic equipment (EEE), thereby contributing to the protection of human health and the environment.

Precautions

Be sure to adhere to the following points to avoid injury.

- Please read the manual carefully to ensure safe and correct use of this meter before using. Please reread if necessary.

- Do not immerse the meter in water.

- Do not disassemble or modify the meter.

- Do not attempt to repair it yourself if the meter malfunctions.

- Only qualified personnel may do it.

- Do not press, push or strike the LCD and sensor head.

- Do not use the meter in places where flammable or near fire.

- Do not use this meter in environments outside the range of: 32ºF (0°C) to 122ºF (50°C) at Relative Humidity no higher than 80%.

- When not in use, close the receptor cover.

- Be aware the accumulation of irradiations would cause the sensor continue to age. Please keep away the light source and cover with the cap when the unit is not in use.

- If the meter will not be used for a long time, remove the battery and close the receptor cover.

- Never use organic solvents to clean the meter. (such as thinner, benzene, etc.)

LCD AND CONTROL PANEL
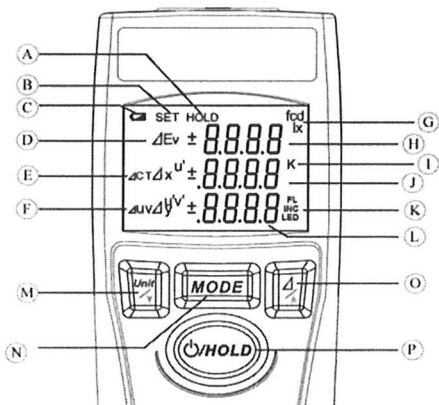
A. Data Hold Symbol
B. SET Function Symbol
C. Low Battery Symbol
D. Measuring Symbols of
   Primary Reading
E. Measuring Symbols of
   Secondary Reading
F. Measuring Symbols of
   Tertiary Reading
G. Illuminance Unit
   (lx or fcd) Symbol
H. Primary Reading
I. Color Temperature
   Unit (K) Symbol

J. Secondary Reading
K. Light Source Symbol
   (FL, INC or LED) (522)
L. Tertiary Reading
M. Unit / Down Button
N. Mode Button
O. ⊿(Color Difference) /
   Up Button
P. Power and Hold Button

REAR
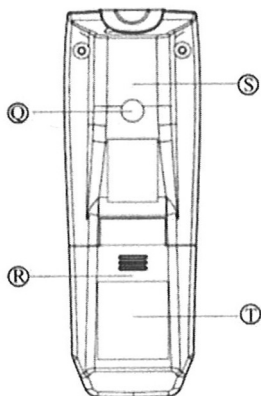
Q. Tripod Socket
R. Battery Cover
S. Magnet Position
T. Anti-slippery Pad

PROBE
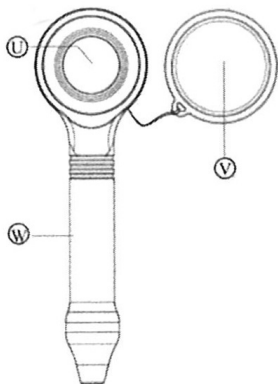
U. Receptor Head
V. Receptor Cover
W. Grip

OPERATION INSTRUCTION

Main Function

Power On/Off

Press and hold the Power button for 2 seconds to turn the meter on and all of symbols will appear for 2 seconds on the LCD. After power-on, the meter will measure and show the readings on the LCD continuously. Press and hold the Power button for 2 seconds again to turn the meter off.

Measuring Units

Press the *Unit*/γ button to select the illuminance (Ev) unit: Lux (lx) or foot-candle (fcd).

Measuring light source selection(522)

After power-on, select the type of light sources to be measured.

In the CT or $\varDelta$CT display mode, press *Unit*/γ button for 3 seconds to select different light source three different light sources can be selected: FL(Fluorescent), INC(Incandescent) and LED.

The CT value will be more accurate when the selected light source corresponds to the light source is being measured. "----", indicates that the measured CT value exceeds the light source's defined value. Please select a different light source mode.

Example: Switch FL light source to INC light source.

FL Light source

Unit/∨ Hold for 3 Secs.

INC Light source
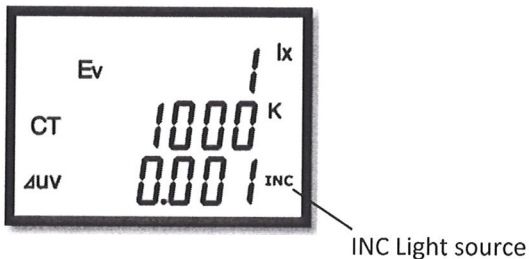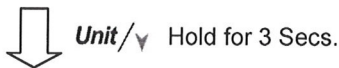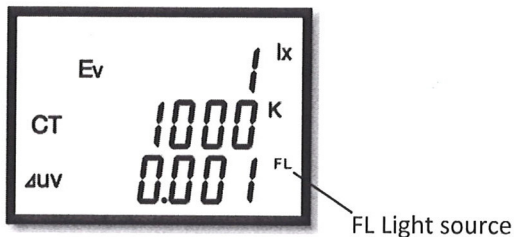
Data Hold

While measuring, press the HOLD button once to freeze the display. HOLD will appear on the LCD. Press HOLD button again to resume measuring.

Measuring Modes

Press MODE and $\triangle/_\wedge$ buttons simultaneously to switch between color measurement and color difference.

Each has 3 modes:

• **Color Measurement:**

1. Ev, x, y (Illuminance, Color coordinate)

2. Ev, u', v' (Illuminance, Color coordinate, CIE1960)

3. Ev, CT, $\triangle$uv (Illuminance, Color temperature)

Press the MODE button to select your color management mode.

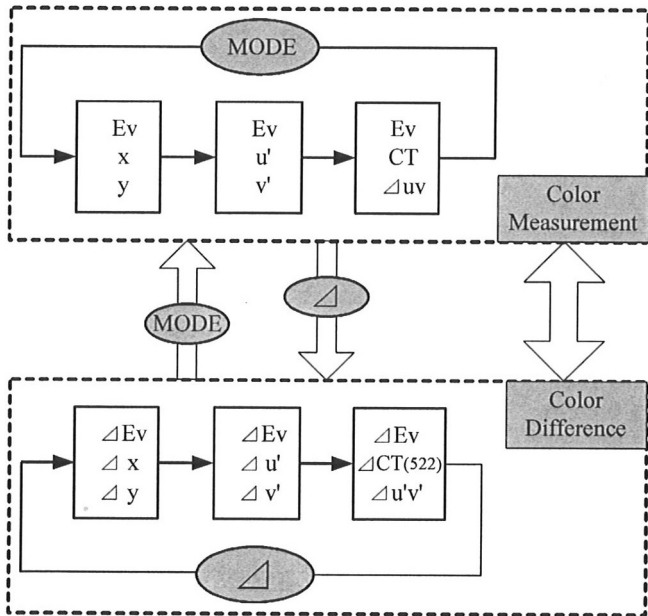• **Color Difference:**

1. $\triangle$Ev, $\triangle$x, $\triangle$y (Color difference of Illuminance and Color coordinate)

2. $\triangle$Ev, $\triangle$u', $\triangle$v' (Color difference of Illuminance and Color coordinate, CIE1960)

3. $\triangle$Ev, $\triangle$CT(522), $\triangle$u'v' (Color difference of Illuminance and Color temperature)

This function allows you to measure or check the difference of illuminance, color coordinate color and color temperature between two or more light sources.
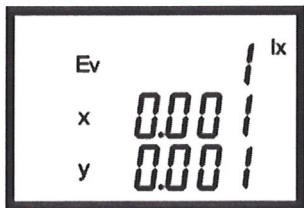
Press the $\triangle/_\wedge$ button to select your color difference mode.
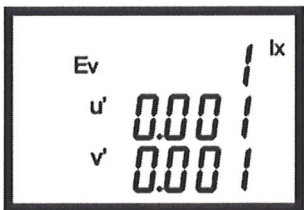
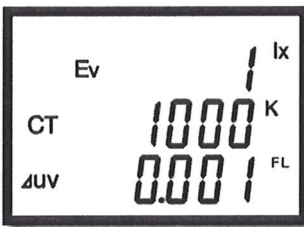**Measuring Modes Diagram**

LCD Display in Color Measurement Mode

1. Ev, x, y (Illuminance, Color Coordinate)

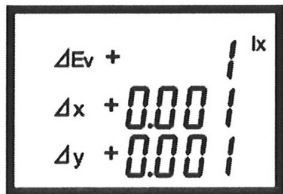2. Ev, u', v' (Illuminance, Color Coordinate, CIE1960)
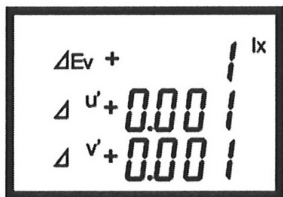

3. Ev, CT, ⊿uv (Illuminance, Color Temperature)
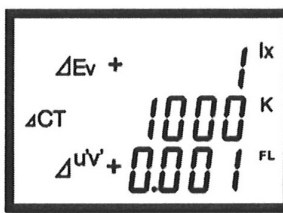
LCD Display in Color Diffference Mode

1. ⊿Ev, ⊿x, ⊿y (Color Difference of Illuminance and Color Coordinate)

```
          ⊿Ev +              l  lx
          ⊿x + 0.001
          ⊿y + 0.001
```

2. ⊿Ev, ⊿u', ⊿v' (Color Difference of Illuminance and Color Coordinate, CIE1960)

```
          ⊿Ev +              l  lx
          ⊿ u'+ 0.001
          ⊿ v'+ 0.001
```

3. ⊿Ev, ⊿CT(522), ⊿u'v' ((Color Difference of Illuminance and Color Temperature)

```
          ⊿Ev +              l  lx
          ⊿CT    1000      K
          ⊿u'v'+ 0.001    FL
```
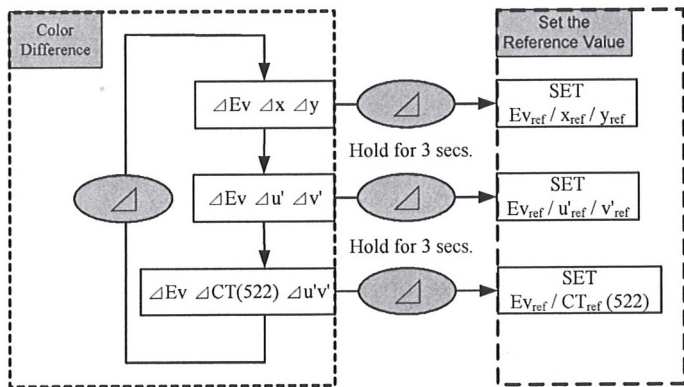
14

SET Function

Color Difference: This function allows you to set certain reference values (Ev_{ref}, x_{ref}, y_{ref}, u'_{ref}, v'_{ref}, $CT_{ref}(522)$) to compare with the target color.

Set the Reference Value

You can select one of these color difference modes to set:

1. $\varDelta Ev$, $\varDelta x$, $\varDelta y$

2. $\varDelta Ev$, $\varDelta u'$, $\varDelta v'$

3. $\varDelta Ev$, $\varDelta CT(522)$, $\varDelta u'v'$

In the Color Difference mode, press the $\varDelta/\wedge$ button and hold for 3 seconds into set mode.

Set the reference values in either of two methods:

    5-2-1. Use the measured values and adjust it manually
           as the reference values.

    5-2-2. Use previous values stored in memory and adjust
           manually as the reference values.

The difference between method 5-2-1 and 5-2-2 is whether
the Data Hold was enabled before entering the set mode.

Note:

Color difference = (Measured value) – (Reference value)
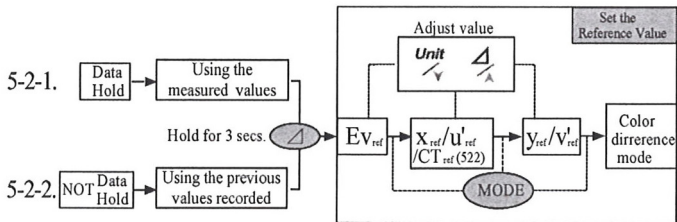
Example:

$$\varDelta Ev = Ev_{meas} - Ev_{ref}$$
$$\varDelta x = x_{meas} - x_{ref}$$
$$\varDelta y = y_{meas} - y_{ref}$$
$$\varDelta u' = u'_{meas} - u'_{ref}$$
$$\varDelta v' = v'_{meas} - v'_{ref}$$
$$\varDelta CT = CT_{meas} - CT_{ref} \ (522)$$

Using the Measured Values

Select the (Ev, x, y) mode first and measure a light source.

1. Press the **HOLD** button to hold these values that you want to use as your reference values.

2. Press the $\varDelta/\wedge$ button once to toggle the color difference mode.

3. Press the $\varDelta/\wedge$ button again and hold for 3 seconds to toggle the set reference values mode. The SET symbol will appear and the Ev symbol will flash on the LCD. In the set mode, the default of Ev reference will show the measured value that you held previously.

4. Press the *Unit*/$\vee$ or $\varDelta/\wedge$ button to adjust the Ev reference value (Ev_{ref}) if necessary.

5. Next press the MODE button to toggle to the next reference value (x_{ref}).

6. Repeat the step 4 and step 5 to adjust the rest of the reference values (x_{ref} and y_{ref}).

7. Press MODE button again to return to color difference mode.

$EV_{ref} \rightarrow \boxed{MODE} \rightarrow x_{ref} \rightarrow \boxed{MODE} \rightarrow y_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

b. Select the (Ev, u', v') mode and repeat step 1~7 to set the u' and v' reference values.

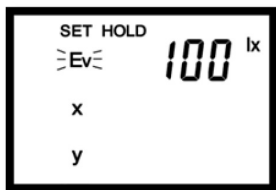$EV_{ref} \rightarrow \boxed{MODE} \rightarrow u'_{ref} \rightarrow \boxed{MODE} \rightarrow v'_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

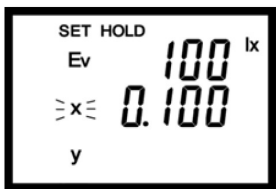c. Select the (Ev, CT, $\varDelta$uv) mode and repeat step 1~7 to set the CT reference values. (522)

$EV_{ref} \rightarrow \boxed{MODE} \rightarrow CT_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

Please note that the Ev reference value in the three modes (Ev, x, y ,Ev, u', v' and Ev, CT, $\varDelta$uv) remains the same.
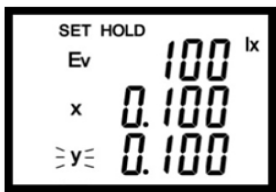
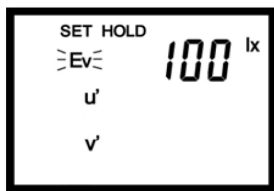a. Using the measured values to set the reference values of (⊿Ev, ⊿x, ⊿y) mode.

MODE
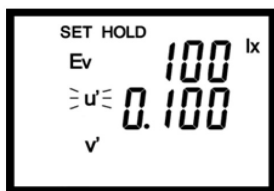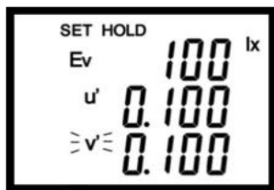

MODE

b. Using the measured values to set the reference values of (ΔEv, Δu', Δv') mode.

SET HOLD
≋Ev≋ **100** lx
u'
v'

MODE

SET HOLD
Ev **100** lx
≋u'≋ **0.100**
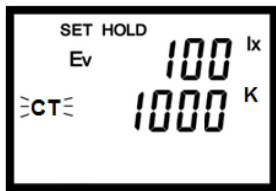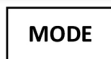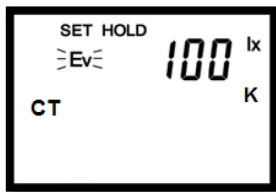v'

MODE

SET HOLD
Ev **100** lx
u' **0.100**
≋v'≋ **0.100**

c. Using the measured values to set the reference values of ($\varDelta$Ev, $\varDelta$CT, $\varDelta$u'v') mode.(522)

Using the previous values stored in memory

a. Select the color different ($\varDelta$Ev, $\varDelta$x, $\varDelta$y) mode directly.

1. Press the $\varDelta$/$\wedge$ button and hold for 3 seconds to toggle reference values mode wihout Data Hold.

2. The SET symbol will appear and the Ev symbol will flash on the LCD. In the set mode, the default of Ev reference will show the previous value stored in memory.

3. Press the *Unit*/$_\curlyvee$ or $\varDelta$/$_\wedge$ button to adjust the Ev reference value (Ev_{ref}).

4. Press the MODE button to toggle the next reference value (x_{ref}).

5. Repeat the step 3 and step 4 to adjust the reference value (x_{ref} and y_{ref}).

6. Press the mode button again to return to color difference mode.

$EV_{ref} \rightarrow \boxed{MODE} \rightarrow x_{ref} \rightarrow \boxed{MODE} \rightarrow y_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

b. Select the ($\varDelta$Ev, $\varDelta$u', $\varDelta$v') mode and repeat step 1~6 to set the u' and v' reference values.

$EV_{ref} \rightarrow \boxed{MODE} \rightarrow u'_{ref} \rightarrow \boxed{MODE} \rightarrow v'_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

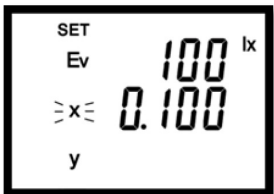c. Select the ($\varDelta$Ev, $\varDelta$CT, $\varDelta$u'v') mode and repeat step 1~6 to set the CT reference values. (522)

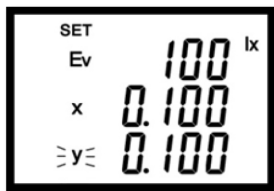$EV_{ref} \rightarrow \boxed{MODE} \rightarrow CT_{ref} \rightarrow \boxed{MODE} \rightarrow$ Color difference mode

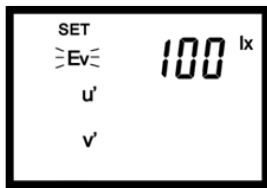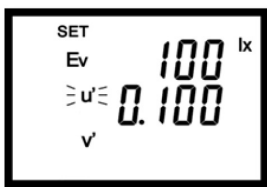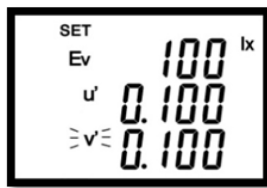a. Using the previous values to set the reference values of ($\varDelta$Ev, $\varDelta$x, $\varDelta$y) mode.

b. Using the previous values to set the reference values of ($\varDelta$Ev, $\varDelta$u', $\varDelta$v') mode.
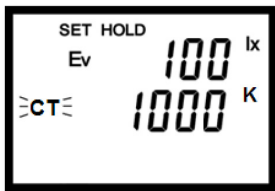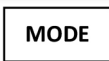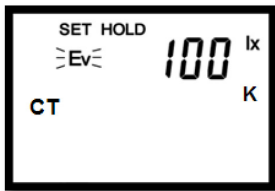
c. Using the previous values to set the reference values of ($\varDelta$Ev, $\varDelta$CT, $\varDelta$u'v') mode.(522)

Zero the Reference Values of Color Difference

Close the sensor cover and the (Ev, x, y ,Ev, u', v' or EV, CT) measured values will show zero. Then repeat the section 5-2-1: using the measured values to zero the reference value.

MAINTENANCE

Clean the Receptor Head:

Blow off loose particles using clean compressed air. Gently brush remaining debris sway with a camel's hair brush. Carefully wipe the surface with a cotton swab. The swab may be moistened with some water.

Clean the Housing:

When you clean the meter, wipe it with soap and water on a damp sponge or soft cloth.

Note:

Never use organic solvents to clean the meter or receptor head. (such as thinner, benzene, etc.) If the meter will not be used for a long time, remove the battery and close the receptor cover.

BATTERY REPLACEMENT

The meter is powered by a 9V battery. When ▮◪
appears, battery voltage has dropped below the level for
reliable operation, and the battery should be replaced.
Turn the meter off, open the battery cover on the back and
replace the battery.

Step1

Step2

SPECIFICATIONS

Model	850011
Sensor Element	SPC（Silicon Photocell）
Measuring Light Sources Selection	FL (Fluorescent light source) INC (Incandescent light source) LED (LED light source)
Measuring Function	Illuminance：Ev（lx or fcd） Color Coordinate：(x, y)，(u', v')（CIE 1960） Correlated Color Temperature：CT, △uv Color Difference：(△Ev, △x, △y)，(△Ev, △u', △v'), (△Ev, △u'v')（One set of reference color）
Measuring Range	Ev：0~80000 lx（0~7432 fcd）CT：99990 K Max.
Accuracy(at 25°C, 60% RH)	Ev：±（3%+2 Digital）（3000 lx, standard illuminant A measured） x, y：± 0.02　（100 lx, RGB LED Light）
Resolution	Ev：1（0~9999），10（Over 10000）　, lx； 　　　0.1（0.0~999.9），1（Over 1000），fcd； CT：1（0~9999），10（Over 10000），K； x, y：0.001；u', v'：0.001
Response Time	Approx. 1 sec.
Repeatability	x, y：±0.003　（100 lx, RGB LED Light）
Temperature Drift	Ev：±（5%+2 Digital）（3000 lx, standard illuminant A measured） x, y：± 0.008（100 lx, RGB LED Light）
Humidity Drift	Ev：±（3%+2 Digital）（3000 lx, standard illuminant A measured） x, y：± 0.005（100 lx, RGB LED Light）
Operation Temperature	32°F to 122°F (0°C to 50°C)，Less than 80% RH
Store Temperature	14°F to 140°F (-10°C to 60°C)，Less than 85% RH
Battery life	70 hours or longer continuous use
Multi-Display	Triple readings
Over range indication	Yes　（"—H I—"）
Data Hold	Yes
Low battery indication	Yes
Auto Power Off	30 Minutes of idle
Weight	6.3 oz.（179g）without battery
Dimensions	Main Instrument：5.5 x 1.9 x 1.1 inch（140 x 49 x 29 mm） Sensor Probe：6.5 x 2.0 x 1.4 inch（165 x 50 x 36 mm）
Accessories	9V Battery x1 , Instruction manual x1 , Carrying case x1

NOTES:

WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) years** from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will void the warranty.

To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
8281 E. Evans Rd., Suite 103
Scottsdale, AZ 85260

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperwarranty.com within 10 days of purchase.

Please note: The most current version of the manual can always be found at www.sperdirect.com

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