

Visible Light SD Card Datalogger

850007
Instruction Manual

Visible Light SD Card Datalogger - 850007

Copyright ©2015 by Sper Scientific

ALL RIGHTS RESERVED

Printed in the USA

The contents of this manual may not be reproduced or transmitted in any form or by any means electronic, mechanical, or other means that do not yet exist or may be developed, including photocopying, recording, or any information storage and retrieval system without the express permission from Sper Scientific.

TABLE OF CONTENTS

INTRODUCTION	3
FEATURES	3
MATERIALS SUPPLIED	3
POWER SUPPLY	4
METER COMPONENTS & KEYPAD	4
SETUP	5
MEASUREMENT PROCEDURES	6
DATALOGGER	10
BATTERY REPLACEMENT	12
TROUBLESHOOTING	12
SPECIFICATIONS	13
WARRANTY	16

INTRODUCTION

The Sper Scientific Visible Light SD Card Datalogger (Model 850007) is an intelligent meter that reads light in Lux or Foot Candles and functions as a Type K/J thermocouple thermometer.

This meter features a real time SD memory card datalogger. Standard, portable SD memory cards provide unlimited data storage and upload pre-formatted data directly to Excel, eliminating the need for cables or software. Each data set includes light measurement, time and date.

FEATURES

- Functions as a light meter and Type K/J thermometer
- Three ranges for light measurement
- Auto range for light measurement
- Lux or Foot Candles unit selection
- SD memory card datalogger
- Manual datalogger option
- Photo sensor spectrum meets CIE
- Zero adjustment
- Highly accurate microcomputer circuit
- Direct upload of data to Excel
- Detachable probe for measuring flexibility
- Internal clock and calendar
- Touch-tone
- Tripod mounting screw
- Built-in tabletop stand
- Maximum and minimum
- Hold function
- Auto-power-off
- Low battery indicator
- Backlight

MATERIALS SUPPLIED

- Meter
- Sensor
- SD Card
- 6 AA Batteries
- Instruction Manual
- Soft Carrying Case

POWER SUPPLY

This meter can be powered by six AA (1.5 V, UM3) batteries or an optional 9 Volt DC adapter. See battery replacement instructions.

Plug the adaptor into the power port labelled “DC 9V,” located on the side of the meter.

Note...

When using the adapter, the meter will remain permanently **ON** and the **POWER** button will be disabled.

METER COMPONENTS & KEYPAD



SETUP MODE

The advanced Setup Mode allows you to customize the following meter preferences and defaults:

- Real Time Clock
- Decimal Type
- Auto Power Off
- Touch-Tone
- Thermometer Type K/J
- Temperature Units
- Sampling Time
- SD Memory Card Format

Note...

The setup functions can be performed under any parameter but not while utilizing the datalogger function. Once selections are saved, the meter will default to the selected preferences. Once a selection is saved, the meter automatically advances to the next setup function (i.e., after setting the real time clock, the meter will automatically enter the decimal type setup function).

1. Press **POWER** to turn the meter on.
2. Press **SET** for 2 seconds or longer to enter Setup Mode.
3. Press **NEXT** to cycle through the setup functions.

Note...

Press **ESC** to exit Setup Mode. The meter will return to Normal Mode.

Real Time Clock

1. Enter the clock function from Setup Mode (as described above). “dAtE” appears on the LCD.
2. Press **ENTER**. The year will appear on the LCD.
3. Press **▲** or **▼** to adjust the value. Press **ENTER** to save the value.
4. Repeat Step 3 to adjust the month, date, hour, minute and second.

Note...

This procedure adjusts the meter’s internal clock. The internal clock will function when the meter is turned off but only when the batteries have adequate power (not with low battery power.)

Decimal Type

Although the decimal is commonly expressed as the “.” symbol (i.e., 20.6 or 1000.53), some (European) countries use a “,” symbol to represent the decimal (i.e., 20,6 or 1000,53). The meter defaults to the period symbol.

To adjust:

1. Enter the decimal type function from Setup Mode (see page 5). “dEC” appears on the LCD.
2. Press ▲ or ▼ to select Basic (.) or Euro (,). Press **ENTER** to save the selection.

Auto Power Off

The meter automatically turns off after 10 minutes of inactivity, however this function can be disabled.

1. Enter the auto power off function from Setup Mode (see page 5). “PoFF” appears on the LCD.
2. Press ▲ or ▼ to select yes (auto power off enabled) or no (auto power off disabled). Press **ENTER** to save the selection.

Touch-Tone

1. Enter the touch-tone function from Setup Mode (see page 5). “bEEP” appears on the LCD.
2. Press ▲ or ▼ to select yes (touch-tone enabled) or no (touch-tone disabled). Press **ENTER** to save the selection.

Thermometer Type K/J

1. Enter the thermometer type function from Setup Mode (see page 5). “tYPE” appears on the LCD.
2. Press ▲ or ▼ to select K or J. Press **ENTER** to save the selection.

Temperature Units

1. Enter the temperature units function from Setup Mode (see page 5). “t-CF” appears on the LCD.
2. Press ▲ or ▼ to select C (degrees Celsius) or F (degrees Fahrenheit). Press **ENTER** to save the selection.

Sampling Time

The sampling time is the time allotted between successive measurements. To adjust the sampling time (in seconds):

1. Enter the sampling time function from Setup Mode (see page 5). “SP-t” appears on the LCD.
2. Press ▲ or ▼ to adjust the value (0, 1, 2, 5, 10, 30, 60, 120, 300, 600, 800, 1800, 3600 seconds). Press **ENTER** to save the value.

SD Memory Card Format

Enabling this function will format the SD memory card to work specifically with your meter. Formatting the SD card will erase any previous memory on the card. New SD cards should be formatted to work with your meter.

1. Enter the SD memory card format function from Setup Mode (see page 5). “Sd F” appears on the LCD.
2. Press ▲ or ▼ to select yes (format the SD memory card) or no (do not format the SD memory card). Press **ENTER** to confirm your selection. If selecting yes, “yES Enter” will appear on the LCD, press **ENTER** again and the meter will format the SD card.

MEASUREMENT PROCEDURES

Turning the Unit On/Off

Press **POWER** to turn the meter on.

Press and hold **POWER** for 2 seconds to turn the meter off.

Selecting the Function

1. Press and hold **FUNC** to cycle through the options listed below. Release **FUNC** when you reach the desired function.

Light Meter: “LlGht” appears on the LCD.

Type K/J thermometer: “tP” appears on the LCD.

Note...

The meter will default to the last function setting used when it is turned off and on again.

Light Meter

1. Press **POWER** to turn the meter on.
2. Plug the probe plug into the probe input socket.
3. Remove the sensor cover from the light sensor.

4. Press and hold **FUNC** to cycle through the options until "Llght" appears on the LCD. Release the **FUNC** button.
5. While holding the sensor handle, point the light sensor directly toward (facing) the light source. The light measurement will appear on the LCD.

Note...

This meter measures light in Lux or Foot Candles (Ft-cd). To change the light unit, press and hold **REC ENTER**. Release **REC ENTER** when the desired unit appears on the LCD.

Zero Adjustment

During light measurement, if the display does not show a value of 0 when the sensor cover is placed on the light sensor, zero adjustment is needed:

1. With the sensor cover on, press **ZERO** for longer than 3 seconds. A value of 0 will appear on the LCD.
2. Remove the sensor cover to resume normal measurement.

Type K/J Thermometer

1. Press **POWER** to turn the meter on.
2. Press and hold **FUNC** to cycle through the options until "tP" appears on the LCD. Release the **FUNC** button.
3. Plug a thermocouple temperature probe (type K or J) into the thermometer socket. The temperature measurement will appear on the LCD along with "K" or "J" to indicate the thermocouple type.

Note...

When using the meter for the first time, the meter will default to K type thermocouple. See page 6 for instructions on changing the thermocouple type.

Hold Function

1. When measuring any parameter, press **HOLD** to freeze the reading on the display. "HOLD" will appear on the LCD.
2. Press **HOLD** again to release the hold function. "HOLD" will disappear from the LCD.

Maximum and Minimum

To record maximum and minimum readings:


1. When measuring any parameter, press **REC** to begin recording the maximum and minimum values. "REC" appears on the LCD.
2. Press **REC**. The maximum value and "REC MAX" will appear on the LCD.
3. Press **REC**. The minimum value and "REC MIN" will appear on the LCD.
4. To delete the maximum or minimum value, press **HOLD**. "REC" appears on the LCD and the meter will begin recording the maximum and minimum values again.
5. To exit the min/max function, press and hold **REC** for 2 seconds. The meter will return to Normal Mode.


Note...

The meter cannot be turned off from the memory record function. Exit the function, then press and hold **POWER** to turn the meter off.

Backlight

The backlight turns on automatically when the meter is turned on.

Press  to turn the backlight off.

Press  to turn the backlight on.

View Real Time Clock

To view the time function during normal measurement (not during datalogging):

1. Press **TIME CHECK**. The time information (Year, Month/Date, Hour/Minute) will appear on the lower display of the LCD.

View Sampling Time

To view the sampling time function during normal measurement (not during datalogging):

1. Press **SAMPLING CHECK**. The sampling time (in seconds) will appear on the lower display of the LCD.

DATALOGGER

Preparing the Datalogger

1. Insert the SD card into the SD card socket on the bottom of the meter, ensuring that the front of the SD card faces the back of the meter.
2. Format the SD card as needed (see page 7).
3. Set the clock if using the meter for the first time (see page 7).
4. Set the decimal type if using the meter for the first time (see page 6).

Auto Datalogging

1. Set the sampling time to ≥ 1 second. Refer to page 7.
2. Press **REC**. "REC" will appear on the LCD.
3. Press **LOGGER**. "REC" will flash on the LCD and the alarm will sound while the measurement data and time information are saved to memory.
4. To pause datalogging, press **LOGGER**. The meter will temporarily stop recording and "REC" will stop flashing on the LCD. Press **LOGGER** again to resume datalogging. "REC" will flash on the LCD.
5. To finish datalogging, pause the datalogger. Press **REC** for 2 secs. or longer. "REC" will disappear from the LCD to indicate that datalogging has ended.

Note...

To enable/disable the touch-tone feature, see page 6.

Manual Datalogging

1. Set the sampling time to 0 seconds. Refer to page 7.
2. Press **REC**. "REC" will appear on the LCD.
3. Press **LOGGER**. "REC" will flash on the LCD and the alarm will sound while the measurement data and time information are saved to memory. The position (location) number will appear on the bottom of the LCD and will also be recorded on the SD card.

Note...

To enable/disable the touch-tone feature, see page 15. To change the position number, press **▼**. The position number will flash on the LCD. Press **▲** or **▼** to set the position number (from 1 to 99). To indicate the position location, P x (x = 1 to 99) will appear on the lower display. After selecting the position number, press **ENTER** to confirm.

4. To finish datalogging, press **REC** for longer than 2 seconds. "REC" will disappear from the LCD to indicate that datalogging has ended.

SD Card Data Structure

1. The first time a SD card is used in this meter, a folder LXA01 will be generated.
2. If the datalogger is being used for the first time, a new file LXA01001.XLS will be generated under the route LXA01\ . After exiting the datalogger and executing the function again, the data is saved to the LXA01001.XLS file until the data reach 30,000 data columns. A new file will then be generated (i.e., LXA01002.XLS).
3. The folder LXA01\ will hold 99 files. A new route (i.e., LXA02\) will be generated when exceeding 99 files.
4. The file's route structure:

```
LXA01\  
    LXA01001.XLS  
    LXA01002.XLS  
    .....  
    LXA01099.XLS  
LXA02\  
    LXA02001.XLS  
    LXA02002.XLS  
    .....  
    LXA02099.XLS  
LXAXX\  
    .....  
    .....
```

Note...

XX: Maximum value is 10.

BATTERY REPLACEMENT

This meter uses six AA (1.5 V, UM3) batteries. When the low battery indicator appears on the LCD, battery replacement is needed. After the icon appears on the LCD, in-spec measurement can still be made for several hours before becoming inaccurate.

1. Press and hold **POWER** for 2 seconds to turn the meter off.
2. Unscrew the battery cover and remove from the meter.
3. Remove the old batteries and replace with six new AA batteries, ensuring correct polarity.
4. Replace the battery cover. Tighten the screws on the battery cover to secure to the meter.

TROUBLESHOOTING

System Reset

If the meter is not functioning properly (i.e., the system is frozen and the keypad is non-operational), reset the meter:

1. Press **POWER** to turn the meter on.
2. Use a small tool (such as a disassembled paperclip or a pin) to press the **RESET** button (located on the right side of the meter under the protective black cover). Wait a few seconds for the meter to restart.

SPECIFICATIONS

Circuit	Custom one-chip of microprocessor LSI circuit
Display	LCD size: 52 mm x 38 mm. Backlight function.
Measurement Unit	Light: Lux or Foot Candle Type K/J Thermometer: °C or °F
Light Sensor Structure	Photo diode and color correction filter, spectrum designed to meet CIE
Temperature Compensation	Automatic temperature compensation for the humidity function and the type K/J thermometer.
Sampling Time of Display	Approximately 1 second
Memory Card	SD card 1 GB to 16 GB
Operating Temperature	0 to 50°C
Operating Humidity	< 85%RH
Power Supply	Alkaline or heavy duty DC 1.5 V battery (UM3, AA) x 6 pieces
	DC 9V adapter input (AC/DC power adapter is optional)
Power Current	Normal Operation (without use of the datalogger or backlight): Approximately DC 6.5 mA
	Datalogger Operation (backlight is off): Approximately DC 30 mA
	If the backlight is on, the power consumption will increase by approximately 16 mA.
Dimensions	7" x 2¾" x 1¾" (178 x 70 x 44 mm)
Weight	1 lb. (0.45 kg)

SPECIFICATIONS

The following specification tests were performed in an ambient temperature of $23 \pm 5^\circ\text{C}$:

Light

Unit	Range	Maximum In-Range Display
Lux (Auto Range)	2,000 Lux	0 to 1,999 Lux
	20,000 Lux	1,800 to 19,990 Lux
	100,000 Lux	18,000 to 99,900 Lux
Foot Candles (Auto Range)	200 Ft-cd	0 to 186 Ft-cd
	2,000 Ft-cd	167 to 1,860 Ft-cd
	10,000 Ft-cd	1,670 to 9,290.7 Ft-cd

Range	Resolution	Accuracy
2,000 Lux	1 Lux	$\pm (4\% \text{ reading} + 2 \text{ dgt})$
20,000 Lux	10 Lux	
100,000 Lux	100 Lux	
200 Ft-cd	0.1 Ft-cd	$\pm (4\% \text{ reading} + 2 \text{ Ft-cd})$
2,000 Ft-cd	1 Ft-cd	
10,000 Ft-cd	10 Ft-cd	

Note...

The accuracy for the specifications shown above was tested with a standard parallel light tungsten lamp of 2856 K temperature.

Type K/J Thermometer

Sensor Type	Range	Resolution	Accuracy
Type K	-50.0 to 1300°C -50.1 to -100°C	0.1°C	$\pm (0.4\% \text{ reading} + 0.5^\circ\text{C})$ $\pm (0.4\% \text{ reading} + 1^\circ\text{C})$
	-58.0 to 2372°F -58.1 to -148°F	0.1°F	$\pm (0.4\% \text{ reading} + 1^\circ\text{F})$ $\pm (0.4\% \text{ reading} + 1.8^\circ\text{F})$
Type J	-50.0 to 1200°C -50.1 to -100°C	0.1°C	$\pm (0.4\% \text{ reading} + 0.5^\circ\text{C})$ $\pm (0.4\% \text{ reading} + 1^\circ\text{C})$
	-58.0 to 2192°F -58.1 to -148°F	0.1°F	$\pm (0.4\% \text{ reading} + 1^\circ\text{F})$ $\pm (0.4\% \text{ reading} + 1.8^\circ\text{F})$

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 break the waterproof seal and void the warranty.

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

SPER SCIENTIFIC LTD.
8281 East Evans Road, 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.

