

# **Advanced Datalogging Sound Meter**

850013

SPER  
SCIENTIFIC

*Environmental Measurement Instruments*

**Advanced Datalogging Sound Meter 850013**

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## INTRODUCTION

The Sper Scientific Advanced Datalogging Sound Meter (Model 850013) uses a single range of 30 ~ 130 dB. This dynamic range eliminates the need to manually select and change ranges, alleviating the problem of lost data associated with range changes in auto-ranging models. All test parameters are simultaneously displayed on a large, bright backlit display that features 0.1 dB resolution and a bar graph. Data can be stored in the meter or directly saved on a computer through the PC interface.

This meter measures sound in decibels (dB). Although it is used for a wide variety of other measurements in science and engineering, the decibel is most commonly recognized as a measure of the intensity of a sound wave. The decibel is a unit of power ratio with the number of units equal to a constant times the logarithm to the base 10 of two sources of intensity.

## **FEATURES**

- ANSI S1.4 Type 2 and IEC-61672-1 Class 2 standard compliant
- Large, backlit LCD with bar graph
- Datalogger capacity of 31,000 records
- Manual reading recording memory (99 data points)
- LCD recording readout ( 99 memories capacity)
- PC connection
- A/C frequency rating scale
- Fast/slow time weighting scale
- Minimum/maximum
- Over/under alarms
- AC/DC recorder output
- Auto power off

## **MATERIALS SUPPLIED**

- Meter
- USB cable
- Software
- Windscreen
- Calibration tool
- Recorder output plug
- 4 AA batteries
- Instruction manual
- Hard carrying case

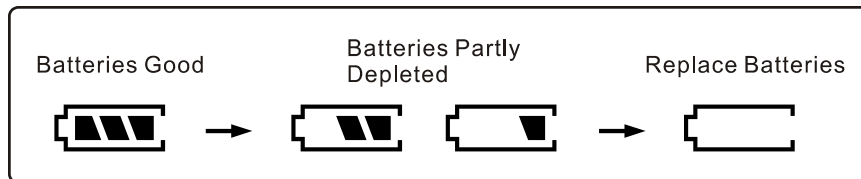
## POWER SUPPLY


The meter is powered by 4 AA 1.5V batteries or an AC adapter. When using the AC adapter, insert the adapter plug into the DC9V connector on the bottom of the meter.

### Note...

When the AC adapter is connected, the meter will supply power from the adapter rather than the batteries.

When using batteries as the power source, periodically check the following indicator to determine the battery capacity.

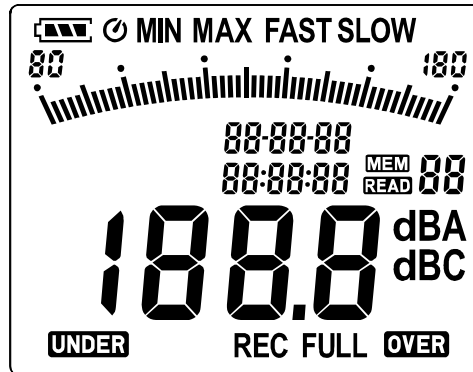


When the battery power is almost empty, the  symbol will disappear from the LCD. Press **MEM** or **REC**. "Lo Bat" appears on the LCD. If the meter is in recording mode, it will stop recording.



For battery replacement, see page 18.

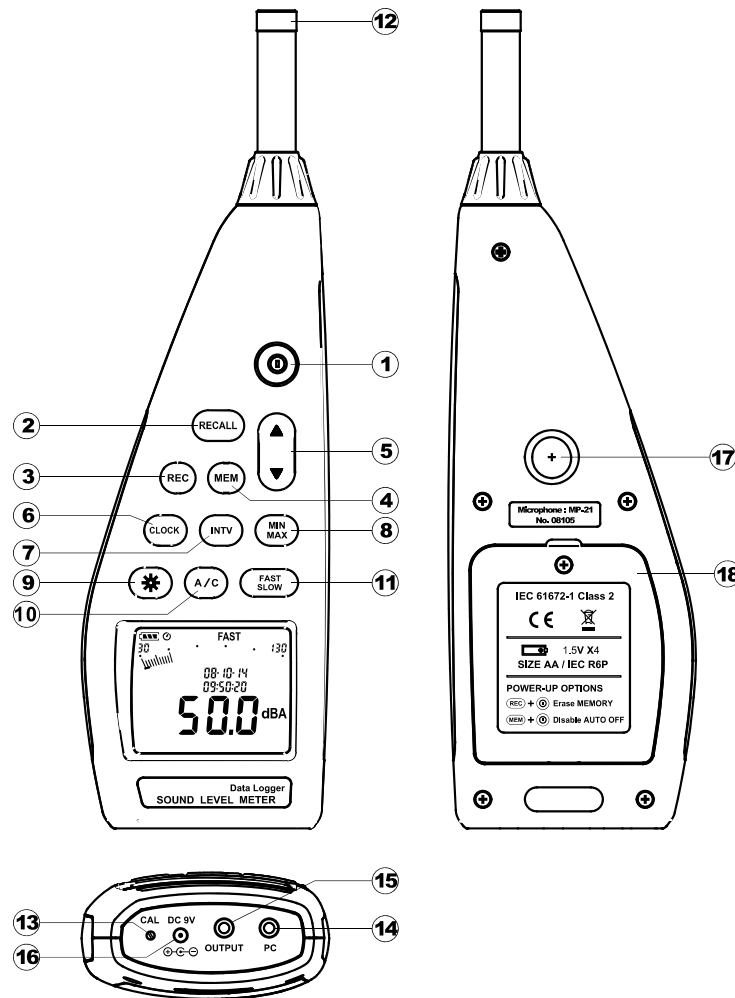
## LCD DISPLAY



	Battery capacity indicator
	Auto power off indicator
<b>MIN MAX</b>	Minimum/maximum indicator
<b>FAST SLOW</b>	Time weighting indicator
<b>30-130</b>	Level range indicator
	Bar graph
<b>MEM</b>	Manual store indicator
<b>88-88-88</b>	Time
<b>88</b>	Memory address
<b>READ</b>	Recall indicator
<b>dBA/dBC</b>	Frequency weighting indicator
<b>188.8</b>	Level reading
<b>88-88-88</b>	Date
<b>OVER</b>	Over-range signal indicator
<b>FULL</b>	Memory full
<b>REC</b>	Recording datalogger indicator
<b>UNDER</b>	Under-range signal indicator



## KEYPAD




### 1. Ⓞ POWER

Press to turn the unit **on**. To turn the unit **off**, press and hold **POWER** until “P-OFF” appears on the LCD.










Auto Power Off - To save battery life, the unit defaults to the auto power off mode when turned **on**. The unit will turn **off** after 30 minutes of inactivity. The auto power off function is disabled when connected to a PC or when the recording function is in process.

## KEYPAD




To disable auto power off: With the meter turned **off**, press and hold **MEM**, and then press **POWER** to turn the unit **on**. Continue holding **MEM** until the meter starts to function. The  symbol will disappear from the LCD when the auto power off function is disabled.

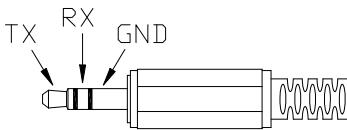
### Note...

When the meter is turned **on**, the LCD shows how much internal memory space is available for use.

2.  **RECALL**  
Recalls data from the manual store.
  3.  **REC**  
Press to start recording. “REC” appears on the display.  
Press again to stop recording.
  4.  **MEM**  
Press to store measurement data using manual store.
  5.   
Press  or  to increase or decrease the value.
  6.  **CLOCK**  
Press to turn the date and time display on or off.  
Press and hold for at least 2 seconds to set the date and time.
  7.  **INTV**  
Adjusts auto store interval time.
-  **MIN/MAX**  
Press to enter the maximum and minimum recording mode. See page 15 for detailed instructions on using the minimum and maximum functions.

## KEYPAD

9.  BACKLIGHT  
Press to turn the backlight on. Press again to turn the backlight off. The backlight will turn off automatically after 30 seconds.
10.  A/C  
Sets frequency rating to A or C scale.
11.  FAST/SLOW  
Sets time weighting to Fast or Slow.
12. Microphone  
½ inch Electret Condenser microphone
13. CAL potentiometer  
Calibration control for level calibration adjustment.
14. PC connection  
The PC jack signal output is a 9600 bps N 8 1 serial interface. Use the accessory RS232/USB interface cable to connect to the PC.



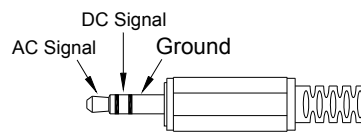
## KEYPAD

### 15. AC/DC signal output jack

Connect the AC/DC output (located on the bottom of the unit) to the level recorder.

AC: 1 V<sub>rms</sub> corresponding to 130 dB (with frequency weighting)

DC: Output: 10 mV/dB



### 16. External DC 9V power supply jack

Connect the AC adapter.

### 17. Tripod mounting thread



For long-term measurements, the unit can be mounted on a camera tripod. Be careful to avoid dropping the unit.

### 18. Battery compartment

## SETUP MODE

### Setting the Clock

This meter includes a clock that records the date and time along with measured data.

1. Press and hold **CLOCK** for longer than 2 seconds.
2. Press  or  to adjust the number, press **CLOCK** to adjust the next item.
3. The setting adjustment order is year→ month→ day→ hour→ minute→ second. Press **CLOCK** to complete adjustment. To cancel a setup process, press **POWER**.

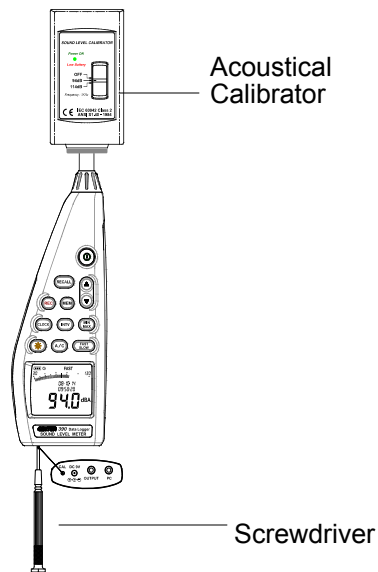
### Note...

An internal (rechargeable) backup battery runs the clock when the meter is turned **off**. The backup battery is recharged by the main batteries. The clock will run for 30 minutes on the backup battery alone. If the meter will not be in use for an extended period (one month or longer), remove the main batteries to prevent possible damage due to battery fluid leakage. After reinstalling the batteries, set the date and time.

## CALIBRATION

The meter has been factory calibrated. Annual calibration is recommended for best results. Calibrate the instrument before use if the meter was not used for one month or longer or was operated in an undesirable environment (high temperature and/or humidity, heavy dust).

1. Prepare for calibration by setting up the meter as follows:
  - Frequency scale: A
  - Time weighting: FAST
  - Measurement mode: Disable Min/Max function.
  - Level range: 30 ~ 130 dB
2. Insert the microphone housing carefully into the insertion hole of the acoustical calibrator.
3. Switch the calibrator to emit 94.0 dB. Turn the calibrator on. Using the calibration tool, adjust the CAL potentiometer on the meter until the LCD displays 94.0 dB.



## MEASUREMENT PROCEDURES

1. Press **POWER** to turn the meter **on**.
2. Select the desired response time and frequency weighting.

### **Note...**

If the sound source consists of short bursts or sudden changes in sound level, set the response time to FAST. To measure typical sound level, use the SLOW setting.

3. Hold the meter in a comfortable position or attach to a tripod and point the microphone towards the noise source. The sound pressure level reading will appear on the LCD.

### **Maximum and Minimum**

1. With the meter turned **on**, press **MIN/MAX**. “MAX” and the maximum value appear on the LCD. The LCD will continuously update and display as new maximum values are reached.
2. Press **MIN/MAX** again. “MIN” and the minimum value appear on the LCD. The LCD will continuously update and display as new minimum values are reached.
3. Press **MIN/MAX** again. The maximum and minimum indicators will blink simultaneously to indicate that the meter is recording maximum and minimum values. The current value displays on the LCD. To view the maximum and minimum values obtained during recording (since Step 1 in the Maximum/Minimum instructions), press **MIN/MAX** to view the maximum and press **MIN/MAX** again to view the minimum.

## MEASUREMENT PROCEDURES

4. To exit this mode and clear all maximum and minimum values, press and hold **MIN/MAX** until “MAX MIN” disappears from the display.

### **Note...**



Maximum and minimum values cannot be saved when exiting the Maximum/Minimum Mode or when the meter is turned **off**.

### **Datalogging**

The data storage method can be set to auto or manual.

### **Auto Datalogging**

To set the interval time:

1. Press **INTV**. “Int” and a seconds display appear on the LCD.
2. Set the recording interval in minutes and seconds by pressing  or  to adjust the number. The maximum setting is 1 minute. The minimum setting is 1 second (“00:01”).
3. Press **INTV** to save and return to Normal Mode or press **POWER** to cancel.
4. Press **REC** to start recording the measurements. The values are stored in the meter’s memory. Press **REC** again to stop recording.

### **Note...**

While the meter is recording, most of the meter’s buttons (such as **RECALL**, **MEM**, **INTV**, **A/C**, **FAST/SLOW**) will not function. Setting adjustments should be made before recording. When the maximum of 31,000 records are



## MEASUREMENT PROCEDURES

stored in the memory, "FULL" appears on the LCD.



### Clearing Auto-Stored Data

1. Press and hold **POWER** to turn the meter **off**.
2. Press and hold **REC**. While still holding **REC**, press and release **POWER**. "CLr" appears on the LCD. The LCD displays "SURE 5, 4, 3, 2, 1, 0." (The meter allows 5 seconds to abort the operation by releasing **REC**.) Continue holding **REC** until the meter returns to Normal Mode. The memory is now cleared.

### Manually Storing Data

1. Press **MEM** to store up to 99 data point using manual storage.

### Reading Manually-Stored Data

1. Press **RECALL**. "READ" appears on the LCD.
2. Press  or  to select the data set. The data will display on the LCD. If there are no data in a data set, "MEM00" appears on the LCD. Press **RECALL** to exit Recall Mode.

### Clearing Manually-Stored Data

Press and hold **RECALL**. While still holding **RECALL**, press and release **POWER**. "CLr" appears on the LCD. The LCD displays "SURE 5, 4, 3, 2, 1, 0." (The meter allows 5 seconds to abort the operation by releasing **RECALL**.) Continue holding **RECALL** until the meter returns to Normal Mode. The memory is now cleared.

## **BATTERY REPLACEMENT**

1. Remove the screw at the top of the battery cover and lift the cover off the meter.
2. Insert 4 AA batteries, ensuring correct polarity.
3. Replace the battery cover and tighten the screw to secure.

### **Note...**

This meter can use AA rechargeable batteries. A separate charger must be provided for rechargeable batteries because the meter is not designed to recharge batteries.

## **MAINTENANCE**

The following actions will keep the meter in good working condition and ensure correct measurement technique:

- Wind blowing across the microphone may cause additional noise and affect the reading. When taking measurements in a windy environment, the windscreen must be used to prevent interference.
- Do not store or operate the meter in high temperature or high humidity environments. See Specifications (page 30) for recommended operating environment ranges.
- Keep the microphone dry and avoid severe vibration.
- Remove the batteries and store the meter in a low humidity environment when not in use for an extended period of time.
- Repairs or services not covered in this manual should be performed by qualified personnel only. Please contact Sper Scientific to speak with a technician.
- Periodically wipe the meter with a dry cloth. Do NOT use abrasives or solvents on this meter.

## TROUBLESHOOTING

### **1. Meter connected to PC serial port and turned on but still displays “NO CONNECTION”:**

All serial ports may be occupied by other applications. Close other applications. If the problem is still not resolved, restart the computer and run the software again.

### **2. Saving the graph to a file that can be used in Excel:**

When saving the graph to a file, the default file format is “\*ghf.” Select the file type as “\*csv” (Excel file format) and save. The file is ready to open in Excel.

### **3. Uninstalling the SE390 software:**

Open the control panel on your PC and launch the Add/Remove programs application. Highlight SE390 and click the Add/Remove button. The SE390 folder and files will be removed from the PC.

### **4. Loading data failure:**

Utilizing a notebook PC may cause a slow response.

### **5. Zooming in on the graph:**

Press the left mouse button and drag the cursor to select the new graph boundaries. Release the mouse button.

### **6. Meter setup with real time sampling with FAST rate (i.e., 0.1 second), some sampling data may be lost:**

This may be caused by slow response time of the PC.

## **PC CONNECTION**

### **System Requirements**

Windows NT 4.0/ NT2000/ XP/ VISTA

### **Minimum Hardware Requirements**

PC or Notebook with Pentium 90 MHz or higher, 32 MB RAM; At least 50 MB hard disk space available to install the software. Recommended resolution of 800 x 600.

### **Installing the Software**

1. Close all other applications before installing the software.
2. Insert the setup CD into the CD drive of the PC.
3. Select the Start button on the Taskbar and select Run.
4. Type E:\SETUP and choose OK to copy SE390.exe (executive file) and the help file to your hard drive (default is c:\program files\SE390).
5. For detailed software operating instructions, refer to the online help feature while executing SE390.

### **Main Menu**

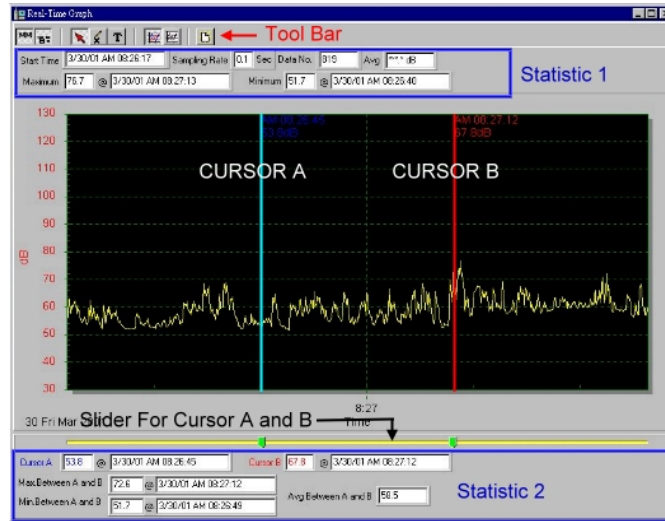
1. File\_Open  
Retrieves files from the disk
2. File\_Save  
Saves the active window (the caption bar is highlighted) data to the disk
3. File\_Print  
Prints the data in the active window (graph or list)

## **PC CONNECTION**








4. File\_Printer setup  
Selects printer
5. File\_Exit  
Terminates the software program
6. View\_Control Panel  
Opens the Panel Window to allow control of the meter via the button in Panel Window
7. View\_Real Time Graph  
Opens display to graph the current data
8. Real Time Data\_Run  
Starts collecting real time data
9. Real Time Data\_Stop  
Stops collecting real time data
10. Datalogger  
Opens the Datalogger Window to allow loading of recorded data from the meter to the PC
11. Output to Graph  
Graphing tabular data

# PC CONNECTION

## Graph



## Tool Bar

-  - Display or hide Statistic1
-  - Display or hide Statistic2
-  - Normal cursor
-  - When selected, the mouse cursor will become a cross sign when moving through the graph. Click on the graph to mark a cross sign on the graph.
-  - When selected, the mouse cursor will become a "I" sign (text tool) when moving through the graph. Click on the graph to annotate.
-  - Color graph
-  - Monochrome graph

## PC CONNECTION

### Graph Functions

- To select a rectangular area on the graph to zoom in for detail:

There are two vertical lines on the graph (CURSOR A and CURSOR B). Time and value display at the top and right side of each cursor. Move the mouse cursor over cursor A or B and click to drag the cursor to the left or right. Directly below cursors A and B is a slider. Alternatively, click and drag the slider to move cursor A or B. The statistic is located under the slider. The statistic displays start time, sampling rate, data number, and maximum and minimum in the graph. The statistic also displays the maximum, minimum, and average between cursors A and B; these data will update automatically as cursor A or B is moved.

- To customize the graph style:

Double click on the graph to open the option dialog. Right click the graph (real time graph is not allowed) to open the popup menu.

- To zoom in on the graph using the mouse:


Click the left mouse button and drag the cursor to select the new graph boundaries. Release the mouse button. To undo the zoom, right click on the graph. Select Undo Zoom from the popup menu.



# PC CONNECTION

## Datalogger



Connect the meter to a PC. Select datalogger from the main menu of the software or click  from the tool bar to load the recorded data from the meter. A progress indicator will display the loading progress. If an error occurs, click datalogger again. After the data loads, the left side of the screen will show the number of data sets with detailed information for each data set, including start data, start time, recording rate and record numbers.

Data Sets				
Set	DATE	TIME	Rate	Nums
1	1999/7/25	PM 01:24:52	00:02	10
2	1999/7/25	PM 01:25:38	00:02	5142
3	1999/7/25	PM 09:29:08	00:02	21
4	1999/7/25	PM 09:32:04	00:02	3
5	1999/7/25	PM 09:32:09	00:02	1
6	1999/7/25	PM 09:32:14	00:02	9
7	1999/7/25	PM 10:03:43	00:02	1896
8	1999/7/25	PM 11:06:57	00:02	3
9	1999/7/25	PM 11:49:47	00:02	9086

After loading the recorded data from the meter, the first data set will transfer to the graph and tabulate on the right



## PC CONNECTION

side. Click any data set to graph that set. The right side of the screen displays the waveform graph and statistical information of the selected data set.

### Recording Real Time Data in Waveform

1. Press **POWER** to turn the meter **on**.
2. Connect the meter to the PC's RS232/USB serial port with the USB cable.
3. Start the software program.
4. If the connection is successful, the same value will appear on the Panel Window and the meter. If the meter fails to connect with the PC, "No Connection" appears on the Panel Window.



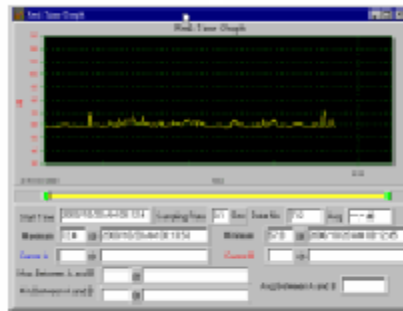
5. When successfully connected to the PC, click  to start recording real time data. A waveform appears on the Real Time Graph Window.
6. Click  to stop recording.

### Saving Real Time Data to a File

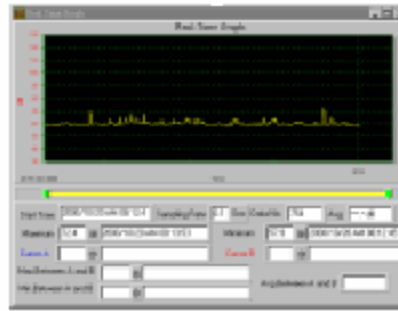
1. Select the graph window to save to the PC and click on the graph window to make it active.


## PC CONNECTION

Active Window



Non-Active Window



2. Select File\_Save from the main menu or click  from the tool bar.
3. The save dialog window appears on the screen. Select the file name and file type to save.


### Note...

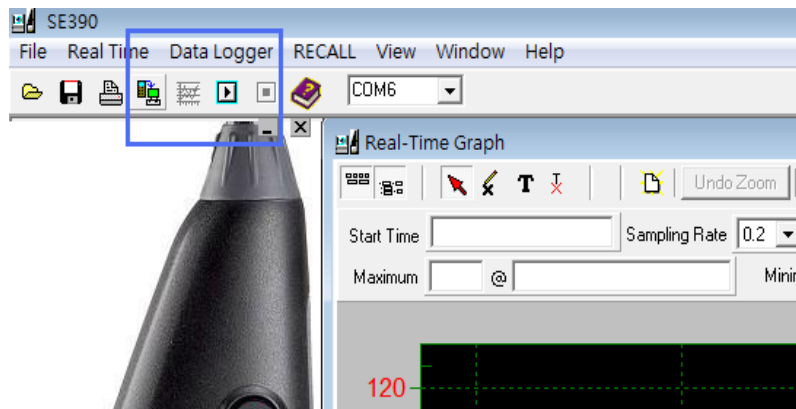
There are three file type options: binary (\*.ghf), text (\*.txt) and Excel format (\*.csv). Of the three file types, \*.ghf files use much less disk space to save the data but the format can only be used with the SE390 software. Text files can be opened by SE390 and any other word processing program such as Word, Notepad, etc. Excel files can be opened by SE390 and Microsoft Excel.



## PC CONNECTION

### Loading Recorded Data from the Meter's Memory and Saving to a File

1. Press **POWER** to turn the meter **on**.
2. Press **REC** to start recording data.
3. When finished recording, press **REC** to stop recording data.
4. Connect the meter to the PC's RS232/USB serial port with the USB cable.
5. Start the software program.
6. Select datalogger from the main menu or click  from the tool bar.



7. Refer to the datalogger section of this manual (page 25) for more information.

## **OPTIONAL ACCESSORIES**

- 800003 AC Adapter
- 840091 Windscreen Replacement
- 840092 Bench-Top Tripod
- 840093 Field Tripod
- 840095 16' Microphone Extension Cable
- 850016 2 Pt. Acoustical Calibrator

## SPECIFICATIONS

<b>Accuracy:</b>	± 1.4 dB (under reference conditions at 94 dB, 1 KHz)
<b>Measurement range:</b>	30 ~ 130 dB
<b>Frequency range:</b>	20 Hz ~ 8 KHz
<b>Dynamic range:</b>	100 dB
<b>Digital display:</b>	4 digits Resolution: 0.1 dB Display update: 0.5 seconds
<b>Analog display:</b>	50 segment bar graph Resolution: 2 dB Display update: 50 mS
<b>Frequency weighting:</b>	A/C
<b>Time weighting:</b>	FAST (124 mS) SLOW (1 second)
<b>Microphone:</b>	½" electret condenser
<b>Alarm function:</b>	"OVER" indicates that the input is over the upper range limit "UNDER" indicates that the input is less than the lower range limit
<b>Datalogging capacity:</b>	31,000 records
<b>Operating temperature:</b>	0 ~ 40°C (32 ~ 104°F)

## SPECIFICATIONS

<b>Operating RH%:</b>	10 ~ 90% RH
<b>Operating Altitude:</b>	Up to 2,000 meters
<b>Storage Temperature:</b>	-10 ~ 60°C (14 ~ 140°F)
<b>Storage RH%:</b>	10 ~ 75% RH
<b>AC adapter:</b>	Voltage 9 VDC (8-10 VDC Max)
<b>AC output:</b>	1 Vrms at FS (full scale)
<b>DC output:</b>	10 mV/dB
<b>Power supply:</b>	4 x IEC LR6P (AA) batteries
<b>Battery life:</b>	Approximately 30 hours (alkaline battery)
<b>Power consumption:</b>	Approximately 0.3 W
<b>Weight:</b>	15 oz (420 g)
<b>Dimensions:</b>	10 <sup>3</sup> / <sub>4</sub> " x 3 <sup>1</sup> / <sub>2</sub> " x 1 <sup>1</sup> / <sub>2</sub> " (272 x 83 x 42 mm)

## 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  
7720 E Redfield Rd, Suite 7  
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.sperscientific.com](http://www.sperscientific.com), or return your warranty card within 10 days of purchase.



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