TENMA® RS-232 Sound Level Meter

72-860A
INSTRUCTION MANUAL

www.tenma.com

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1. SAFETY INFORMATION

❑ Read the following safety information carefully before attempting to operate or service the meter.

❑ Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.

Environment conditions

① Altitude up to 2000 meters

② Relatively humidity 90% max.

③ Operation Ambient 0 ～40℃

Maintenance & Clearing

① Repairs or servicing not covered in this manual should only be performed by qualified personnel.

② Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instruments.

Do not use abrasives or solvents on this instruments.

Safety symbols

Meter is protected throughout by double insulation or reinforced insulation.
When servicing, use only specified replacement parts.

CE Comply with EMC

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2. GENERAL DESCRIPTION AND FEATURES

Thanks you for selecting our Sound Level Meter. To ensure that you can get the most from it, we recommend that you read and follow the manual carefully before use.

This unit was designed according to the IEC651 , ANSI S1.4 for Sound Level Meters.

The Sound Level Meter has been designed to meet the measurement requirements for Industrial safety offices and sound quality control in various environments.

❑ Ranges from 35dB to 130dB at frequencies between 31.5Hz and 8KHz.

❑ Display with 0.1dB steps on a 4-digits LCD.

❑ With two weighting , A and C.

3. SPECIFICATIONS

Standard applied	: According to IEC651, ANSI S1. 4
Frequency range	: 31.5Hz ～ 8KHz
Measuring level range	: 35～130dB
Frequency weighting	: A/C

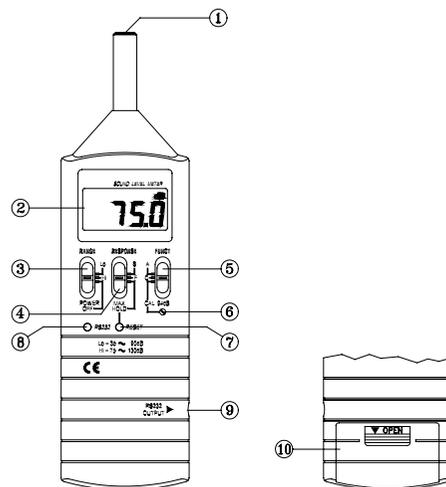|	
Microphone	: 1/2 inch Electret condenser microphone
Display	: LCD
Digital display	: 4 digits
	Resolution ⇨0.1dB
	Display period ⇨ 0.5 sec.
Time weighting	: FAST (125mS), SLOW (1 sec.)
Level ranges	: Lo: 35～100dB and Hi: 65～130dB
Accuracy	: ±2.0dB (under reference conditions)
Dynamic range	: 65dB
Alarm function	: " OVER " is show when input is out of range.
Maximum hold	: Hold readings, with decay < 1dB／3minutes.
Calibration	: Electrical calibration with the internal oscillator (1KHz sine wave)
RS232 output	: Baud rate 19200, Parity none, Data bits 8, Stop bits 1.
Power supply	: One 9V battery 006P or IEC 6F22 or NEDA 1604
Power life	: About 50hrs (alkaline cell)
Operating temperature	: 0 to 40℃ (32 to 104℉)
Operating humidity	: 10 to 90%RH
Storage temperature	: -10 to 60℃ (14 to 140℉)
Storage humidity	: 10 to 75%RH
Dimensions	: 240 (L)×68 (W)×25 (H)mm

Weight	: 210g (including battery)
Accessories	: 9V battery, carrying case. Screwdriver, Instruction manual, 3.5 φ plug, windscreen, Software for Windows, RS-232 cable.

4. DESCRIPTION OF CONTROLS

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① Microphone
  1/2 inch Electric Condenser microphone

② Display
  Serves to display the sound pressure level (dB), over or under range "OVER" , maximum hold data "MAX HOLD" and Low battery indicator "BT".

  dB : Sound pressure level with 0.1dB resolution.

  OVER: Shown when the range setting is too high (or Low) .

③ Power and Range switch
  ● Turn power ON and select measurement range.
    (Hi range = 65～130dB, Lo range = 35～100dB)
  ● When "OVER" is indicated, Slide range switch to another range for measurement.

④ Response and Max hold switch
  Setting the meter dynamic characteristics (Fast/slow) and maximum value hold.

  S (slow response) : for comparatively stable noise measurement.

  F (fast response) : for fast varying noise.

  MAX HOLD : The max hold position is used to measure the maximum level of sounds. The maximum measured level is up dated continuously.

  To re-fresh please set switch to "F" or "S" position to cancel existing value, then, set switch to "MAX HOLD" position.

⑤ Function switch　(A/C weighting & calibration selector)

　A　　　: A-weighting

　C　　　: C-weighting

　CAL 94dB　: Calibration

⑥ Calibration control can be adjusted clockwise or counterclockwise to standard 94.0dB.

⑦ Reset button :
　Serves to reset the maximum level indication.

⑧ RS-232 button.

⑨ RS-232 output jack
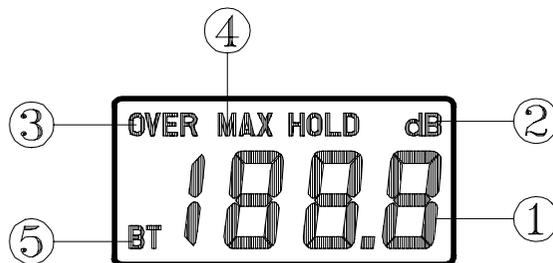
⑩ Battery cover (on bottom)

LCD Description

① Sound Pressure Level measuring value, resolution 0.1dB.

② Measuring unit

③ When readout is out of range.

④ MAX HOLD: Maximum hold.

⑤ BT: Low battery indicator.

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5. CALIBRATION PROCEDURES

(1). Using a acoustic calibrator

　a). Make the following switch settings.

　　RANGE　　　: Hi
　　RESPONSE　: F
　　FUNCT　　　: A

　b). Insert the microphone carefully into the insertion hole of the calibrator.

　c). Turn on the switch of calibrator and adjust the CAL screw of the instrument, until the level display indicates the desired level.

　　Note: Our products are well calibrated before shipment. Recommended calibrator cycle is one year.

(2). Calibration using the internal oscillator

　a). Make the following switch settings.

　　RANGE　　　:　Hi
　　RESPONSE　:　F
　　FUNCT　　　:　CAL 94dB

　b). Display will show $94.0 \pm 1.5dB$

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6. MEASUREMENT PREPARATION

(1). Battery Loading:
Remove the battery cover on the back of the unit replace 9V battery and refit battery cover.
Note : make sure the battery polarity is correct.

(2). Battery Replacement:
When the battery voltage drops below the operating voltage, " BT " mark will appear in the display and, battery should be replaced with new one.

7. OPERATING PRECAUTIONS

(1). Wind blowing across the microphone would cause additional extraneous noises. When using the instrument in the presence of wind, you must use the windscreen to avoid any undesirable signals.

(2). Calibrate the instrument before operation if the unit has been left used for any length of time is being operated in poor conditions.

(3). Do not store or operate this instrument at high temperature and in a high humidity environment for any length of time.

(4). Keep microphone dry and avoid severe vibration.

(5). Please take out the battery and keep the instrument in low humidity environment when not in use.

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8. MEASUREMENT

(1). Open battery cover and install a 9-volt battery in the battery compartment.

(2). Turn on power and select the desired response and weighting. If the sound source consists of short bursts or only catching sound peak, set RESPONSE to FAST. To measure average sound level, use the slow setting.

　Select A- weighting for general noise sound level and C-weighting for measuring sound level of acoustic material.

(3). Hold the instrument comfortably in hand or fix on tripod and point the microphone at the suspected noise source, the sound pressure level will be displayed.

(4). When MAX HOLD mode is chosen. The instrument captures and holds the maximum noise level for a long period.
Press " RESET" button to reset the maximum level indication.

(5). Turn OFF the instrument when not in use.

(6). For RS-232 measurements please refer to the instruction manual enclosed on the CD-ROM.

9. RS-232 INTERFACE, SOFTWARE INSTALLATION and OPERATION

❑ For the detailed instruction, please refer to the content of attached CD-ROM, which has the complete instruction of RS-232 interface, software operation and relevant information.

❑ RS-232 protocol : are enclosed within the content of CD-ROM, please open the CD-ROM for details.

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10. SERVICE, REPAIR AND CALIBRATION

For service, repair and calibration please contact your local Tenma distributor or go to http://www.tenma.com

TENMA®

**TEST EQUIPMENT
405 Pioneer Blvd.
Springboro, Ohio, 45066
http://www.tenma.com**

Mar-2007-1

Datalogger and RS232 Interface

RS232 Wiring Hardware
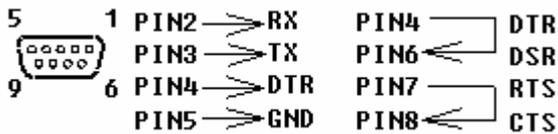
PC Interface Cable

Meter side of PC Interface Cable

The RS-232 "phono" plug side of the PC Interface Cable connects to the meter's RS-232 phono jack. Refer to the diagram below for wiring information.

```
        RX   GND
         ↓    ↓
TX ———→ ▷═╪═╪═══════▌▌▌▌▌▌▌▌▌▌══
```
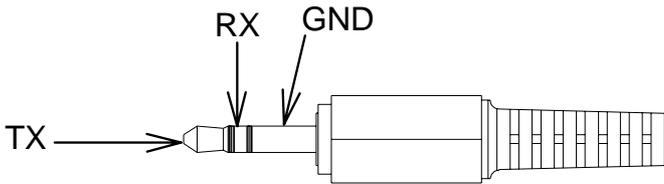
Computer's Serial Port side of Interface Cable

The RS-232 "DB-9" side of the PC Interface Cable connects to the PC's COM port. Refer to the diagram below for wiring information. Note that a SERIAL to USB Adapter may be used.

```
 5      1   PIN2 ——>RX      PIN4 ———┐ DTR
(°°°°°)     PIN3 ——>TX      PIN6 <——┘ DSR
 9      6   PIN4 ——>DTR     PIN7 ———┐ RTS
            PIN5 ——>GND     PIN8 <——┘ CTS
```

RS232 Settings

19200, N, 8, 1

RS232 Protocol

1. RS232 Settings :

① Baud rate : 19200bps　　② Parity check : None　　③ Data bits : 8　　④ Stop bit : 1

2. Transfer Format :

Command : "SPACE" Key

Protocol :

Byte 1	Byte 2		Byte 3		Byte 4		Byte 5		Byte 6789	Byte 10		Byte 11	
	bit4~6	bit0~3	bit4~6	bit0~3	bit4~6	bit0~3	bit4~6	bit0~3		bit4~6	bit0~3	bit4~6	bit0~3
		100		10		1		0.1			1101		1010

Byte 1 : Don't Care

Byte 2,3,4,5 : LCD Bytes

Byte 6,7,8,9 : Don't Care

Byte 10,11 : Checking Code

Hardware Requirements and Setup

PC HardWare Requirements :

HDD, CD Rom, 486 PC or above, with available COM port

EGA or higher monitor

4M bytes or more memory size

PC HardWare Setup :

1) Switch off all power related to the PC

2) Connect the DB9 (female) end of the supplied RS-232 cable to available COM port

3) Switch on all related power

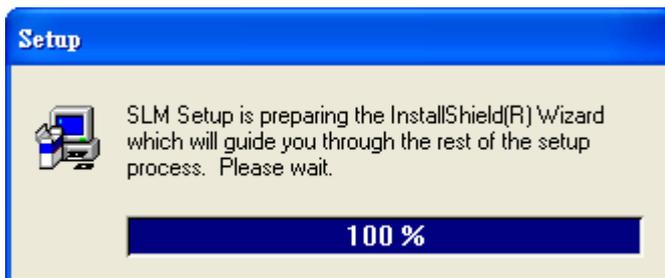4) Connect the phono plug end of the RS232 cable to the meter

Software Requirements and Setup

1) Start up windows   98 / XP   operating system
2) Close all other applications
3) Insert disk in CD drive

   Wait for "Autorun" to start and follow on-screen instructions

   (If "autorun" does not start, click on "Start" then "Run". Type the drive letter and
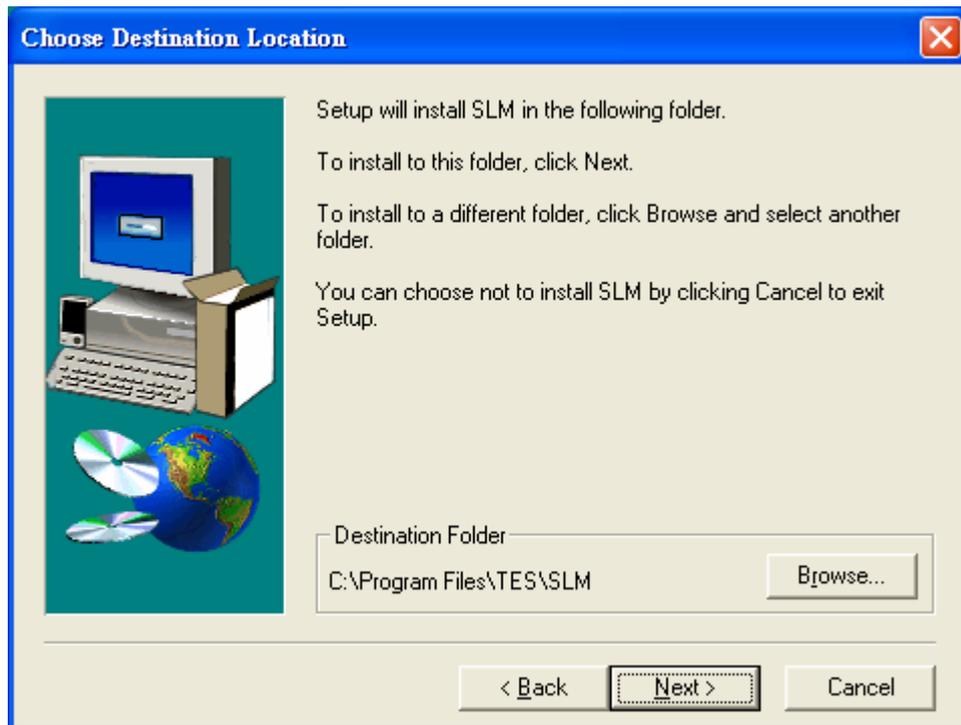
   ": \Disk1\Setup.exe" and click "OK" .)

   1).

   Setup program will run automatically.

   2).

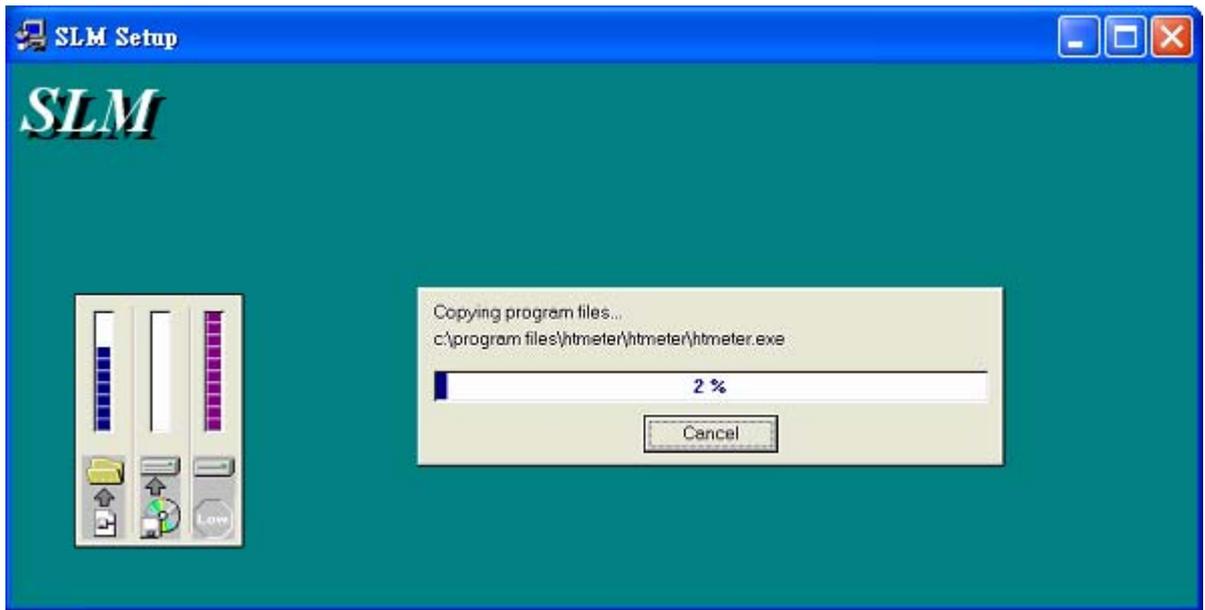   Click Next> button

3).

      a. Click Next> to use the default folder
               or
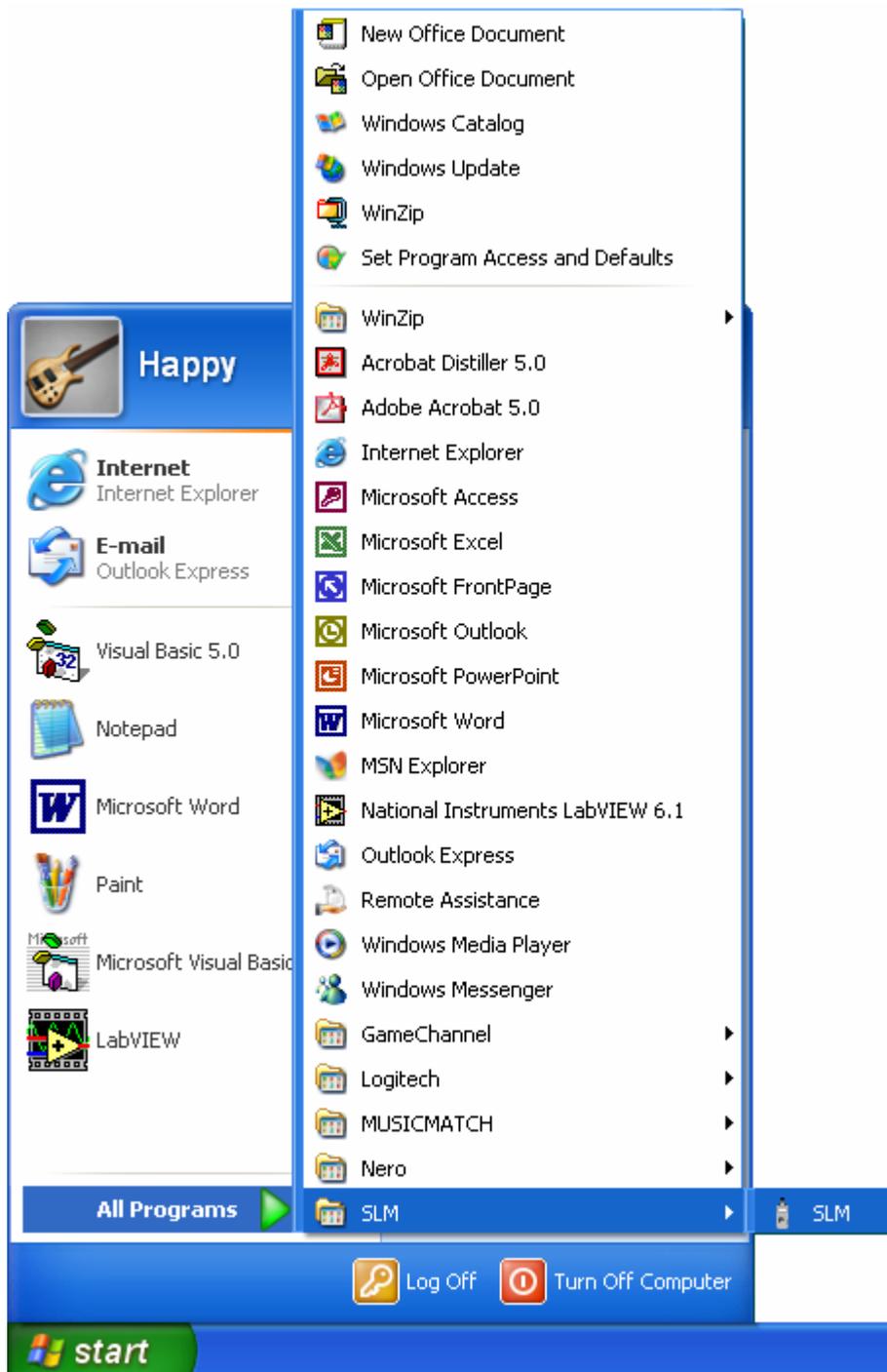   b. Click Browse… to select a different folder

4).

Click Next> button

Setup is complete.

Communicating Operation

■ **Run the software**

1. Click "Start" form Start menu then move to "All Programs" (or "Programs") then "SLM" and then click the "SLM" icon.
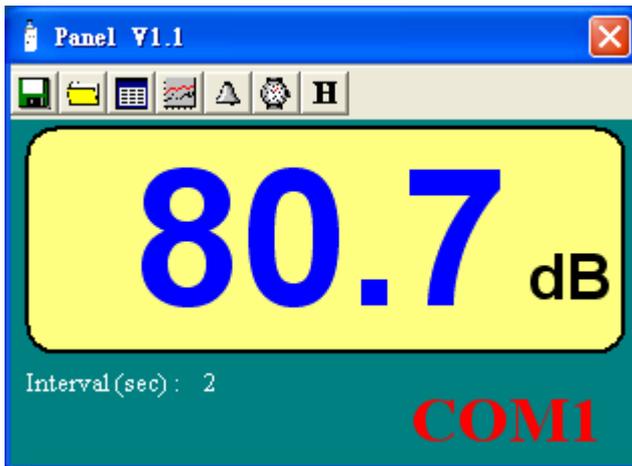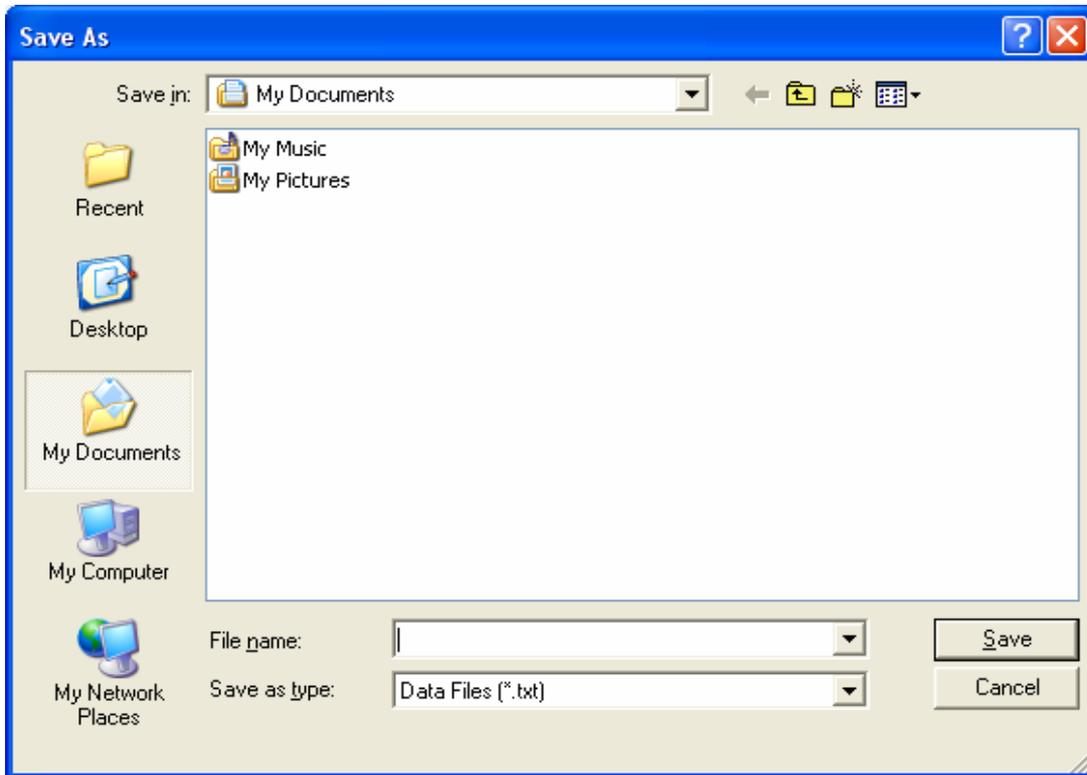
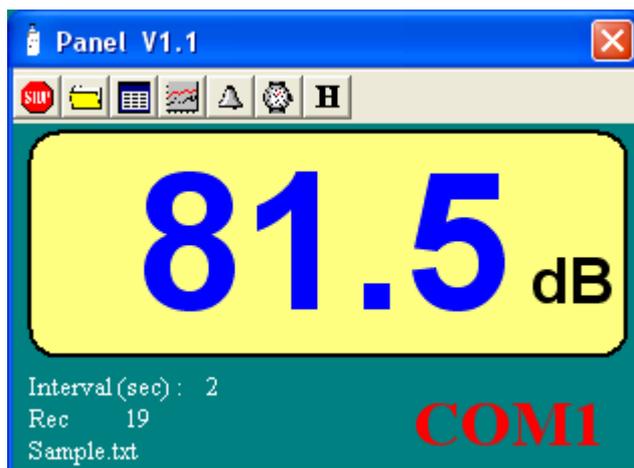2.

Click an available COM port

3. Main software screen

■ Record

Save to Hard Disk (PC)

Click ![save] button. The dialog box shown below will appear.

Input a file name and then click "Save" to begin saving data to the file just named.
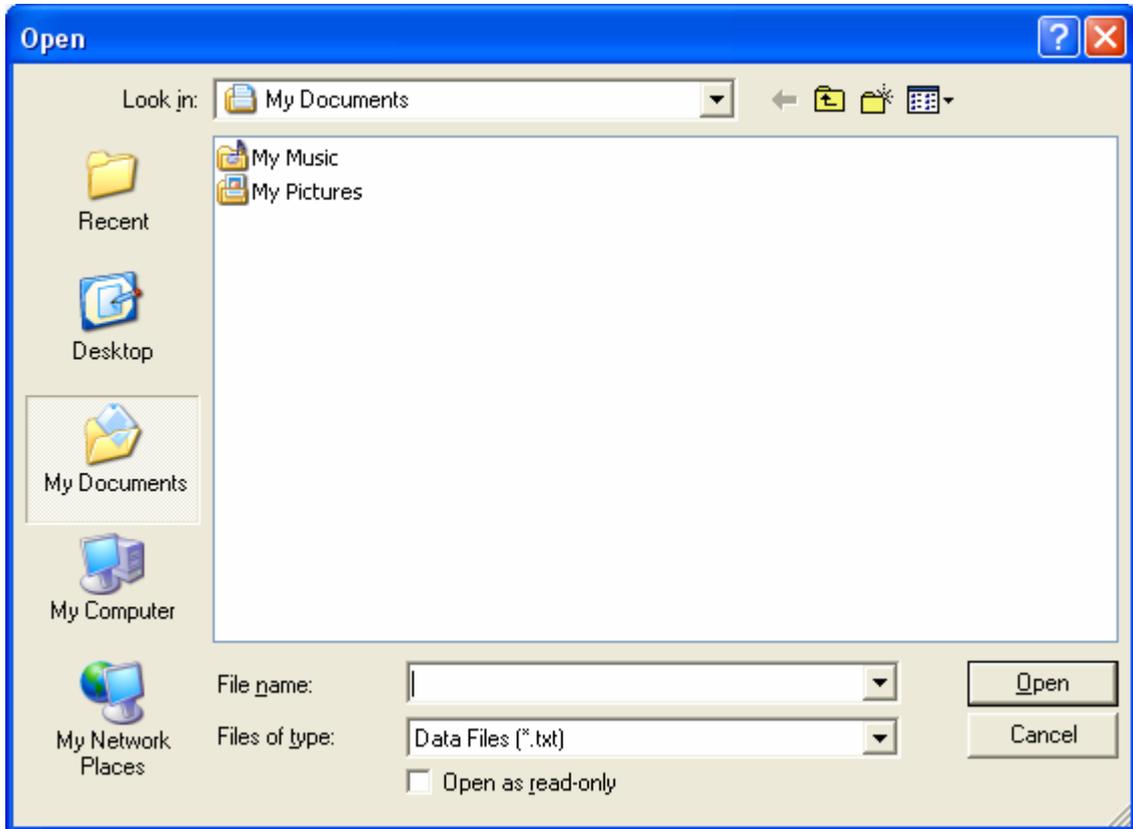

Click ![stop] button to stop recording.

Download Data

1. Download Data from Hard Disk

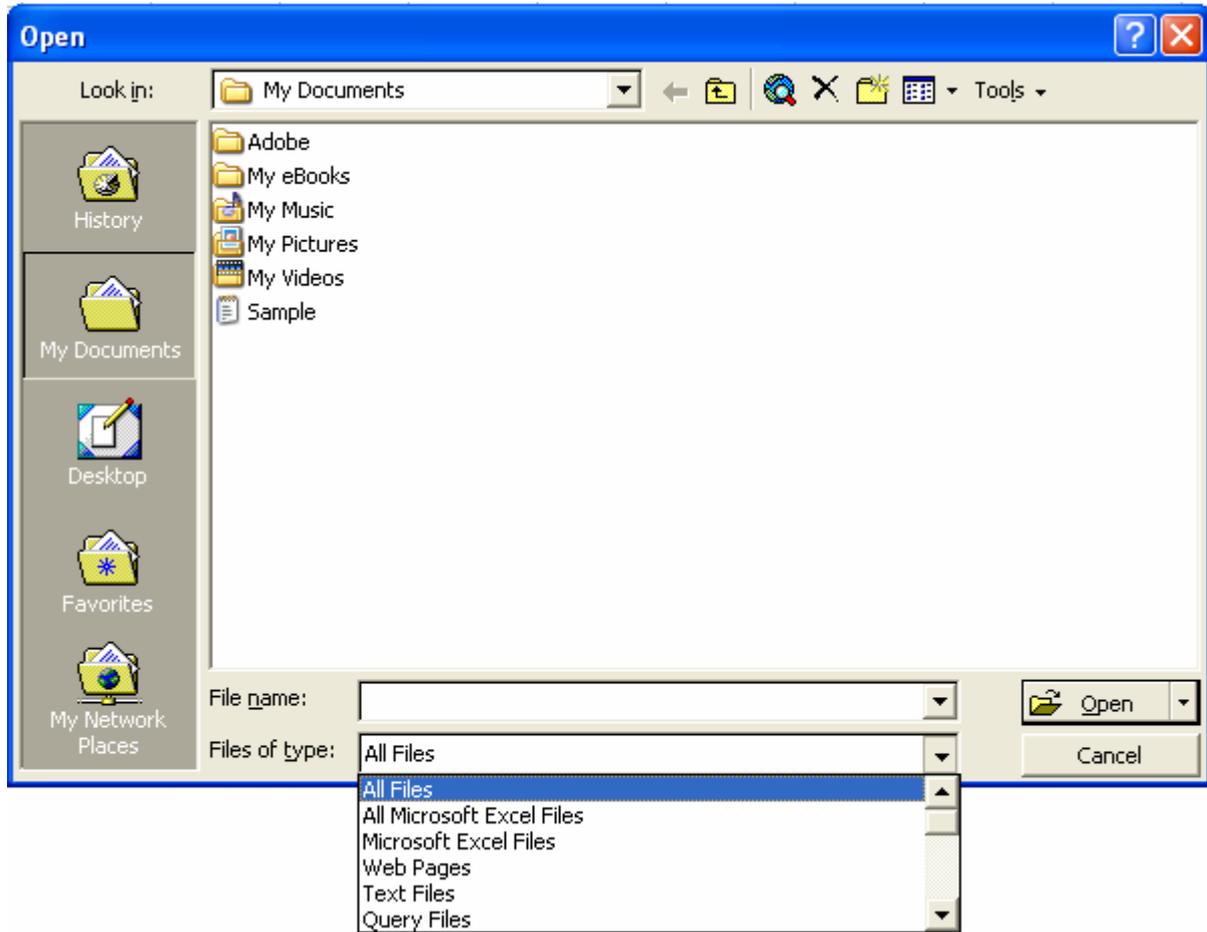Click button. The Open window, shown below, appears

Input the file that was selected earlier and then click the Open button.
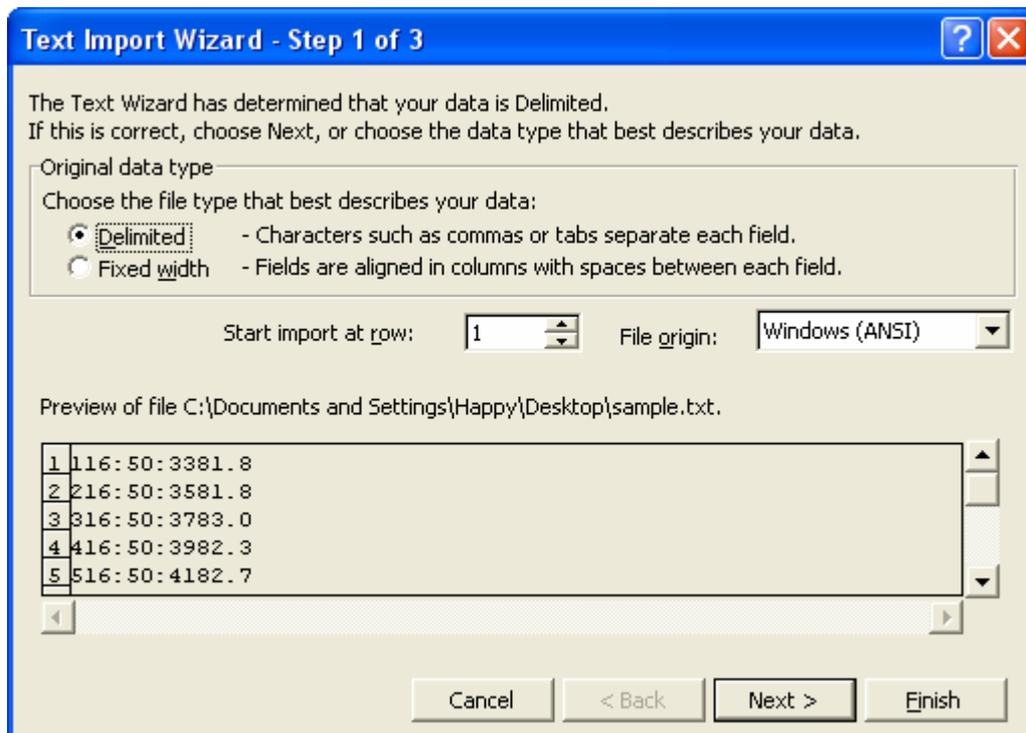
■ Data Convert

Apply for Excel

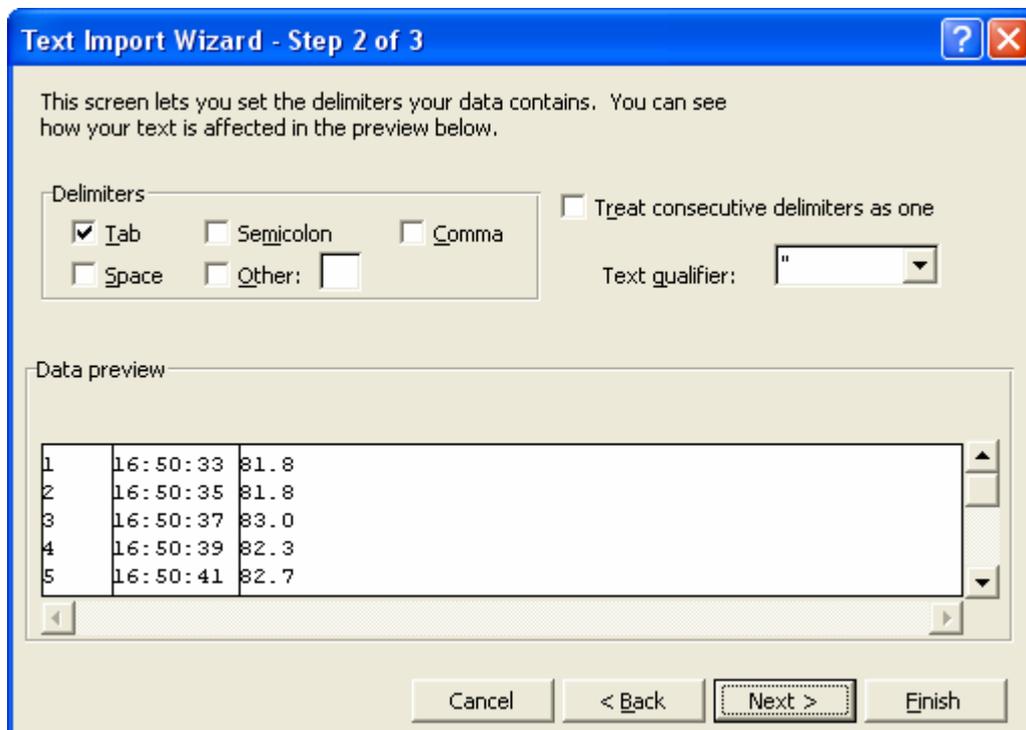Open Microsoft Excel, find the file saved in Excel type, for example, test.xls.

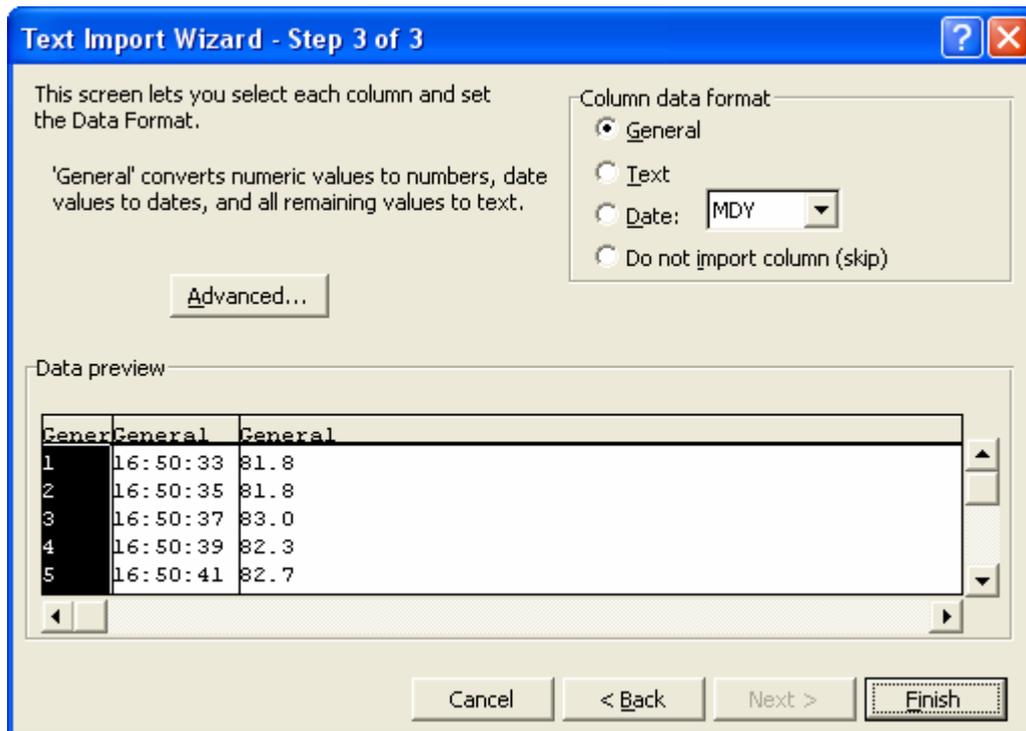or find any file already saved in HDD, for example, sample.dat.

The "Text Import Wizard" then appears. Follow the steps 1 to 3 to complete.

Text Import Wizard - Step 1 of 3

The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type
Choose the file type that best describes your data:
- ⦿ Delimited   - Characters such as commas or tabs separate each field.
- ○ Fixed width   - Fields are aligned in columns with spaces between each field.

Start import at row: 1   File origin: Windows (ANSI)

Preview of file C:\Documents and Settings\Happy\Desktop\sample.txt.

```
1 116:50:3381.8
2 216:50:3581.8
3 316:50:3783.0
4 416:50:3982.3
5 516:50:4182.7
```

Cancel   < Back   Next >   Finish

Click Next> button

Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see
how your text is affected in the preview below.

Delimiters
- ☑ Tab   ☐ Semicolon   ☐ Comma
- ☐ Space   ☐ Other:

☐ Treat consecutive delimiters as one

Text qualifier: "

Data preview

```
1    16:50:33    81.8
2    16:50:35    81.8
3    16:50:37    83.0
4    16:50:39    82.3
5    16:50:41    82.7
```

Cancel   < Back   Next >   Finish

Click Next> button

Click **Finish** button

Apply for Graph

Open a saved data file in the software program and then click ![icon] .
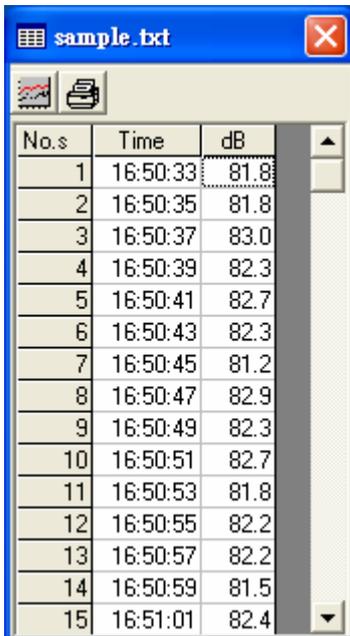
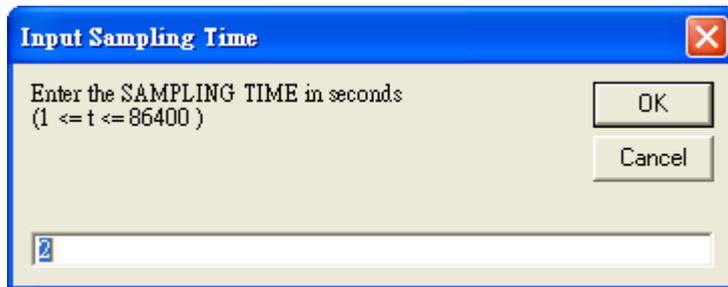| No.s	Time	dB
1	16:50:33	81.8
2	16:50:35	81.8
3	16:50:37	83.0
4	16:50:39	82.3
5	16:50:41	82.7
6	16:50:43	82.3
7	16:50:45	81.2
8	16:50:47	82.9
9	16:50:49	82.3
10	16:50:51	82.7
11	16:50:53	81.8
12	16:50:55	82.2
13	16:50:57	82.2
14	16:50:59	81.5
15	16:51:01	82.4

sample.txt

Plot Data/File
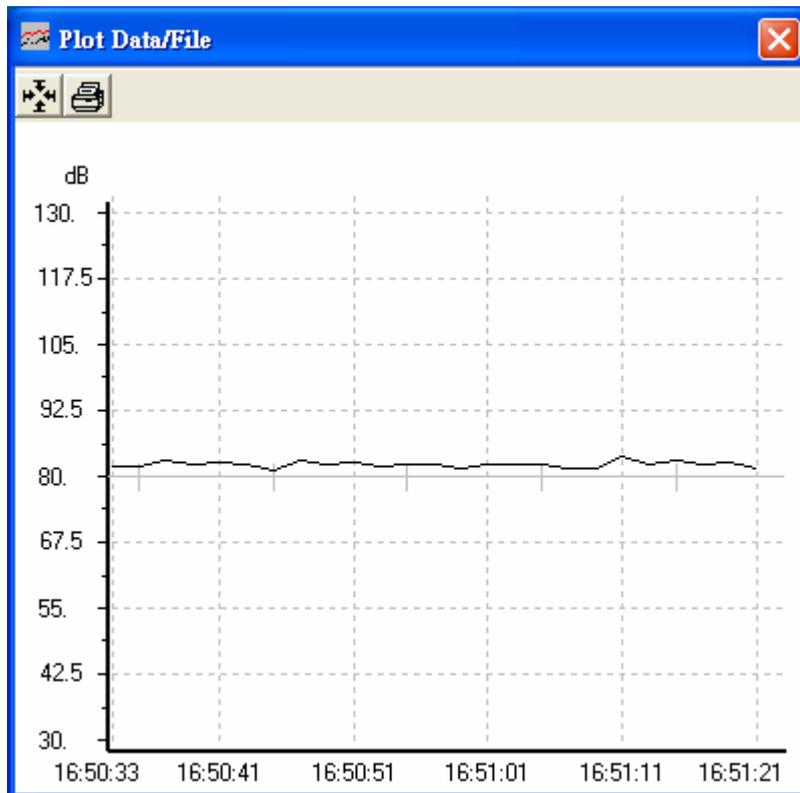
■ Sampling Time

PC Sampling Rate:

(rate at which the PC collects readings while connected to the meter)

Click on the **Menu Bar.**

In the **Input Sampling Time** dialog box, input a sampling time and then click "**OK**" button to confirm.