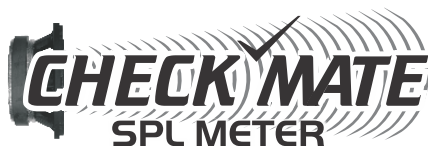


GALAXY AUDIO

Instruction Manual



CM-150/CM-160

CM-150



CM-160



GCBC CM150/160-102006

SOUND LEVEL METER

CM-150/160 Operation Manual

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I. 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.

Environmental operating conditions

- Altitude up to 2000 meters
- Relative humidity 90% max.
- Ambient Operating Temperature 0 ~ 40°C

Maintenance & Cleaning

- Repairs or servicing not covered in this manual should only be performed by qualified personnel.
- Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instrument.

Safety symbols



Complies with EMC

When servicing, use only specified replacement parts.

II. GENERAL DESCRIPTION

Thank you for using the Galaxy Audio Checkmate SPL meters. To ensure that you can get the most from them, we recommend that you read and follow the manual carefully before use.

These units conform to the IEC651 type2 and ANSI S1.4 Type2 for Sound Level Meters. The CM 160 Data Logger Sound Level Meter's internal memory can store up to 32000 records.(Note 1.)

It uses a USB interface to perform bi-directional communication with a PC.

Note1:

Every time you press the "REC" button to start recording data and press the "REC" button again to stop recording, there will be a data set placed in memory You can store as many data sets as you want until the memory is full.



III. SPECIFICATIONS

Standard applied: IEC651 Type2, ANSI S1.4 Type2.

Frequency range: 31.5Hz ~ 8KHz

Measuring level range: 30 ~ 130dB

Frequency weighting: A / C

Microphone: 1/2 inch electret condenser microphone

Display: LCD

Digital display: 4 digits

Resolution: 0.1dB

Display Update: 0.5 sec.

Analog display: 50 segment bar graph

Resolution: 1dB

Display Update: CM-150 100 mS

CM-160 50 mS

Time weighting: FAST (125mS), SLOW (1 sec.)

Level ranges: Lo: 30 – 80 dB

Med: 50 – 100 dB

Hi: 80 – 130 dB

Auto: 30 – 130 dB

Accuracy: ± 1.5 dB (under reference conditions @ 94dB, 1KHz)

Dynamic range: 100 dB

Alarm function: "OVER" is when the input is more than upper limit of range.

"UNDER" is when the input is less than lower limit of range.

MAX/MIN hold: Hold readings of the Maximum and Minimum Values.

AC output: 1 Vrms at FS (full scale).

Output impedance: Approx. 100 Ω

FS: means the upper limit of each level range.

DC output: 10mV / dB, output impedance approx. 1K Ω

Power supply: One 9V battery, 006P or IEC 6F22 or NEDA 1604.

Power life: About 50hrs (alkaline battery)

AC adapter: Voltage 9 VDC (8-15VDC Max)

Supply current : > 30mADC Socket : pin \rightarrow Ground

Casing \rightarrow Positive

External Diameter \rightarrow 3.5mm

Internal Diameter \rightarrow 1.35mm



Electromagnetic Compatibility:

RF field = 3V/m

Total accuracy = specified accuracy + 0.5dB

Operation temperature: 0 to 40°C (32 to 104°F)

Operation humidity: 10 to 90%RH

Storage temperature: -10 to 60°C (14 to 140°F)

Storage humidity: 10 to 75%RH

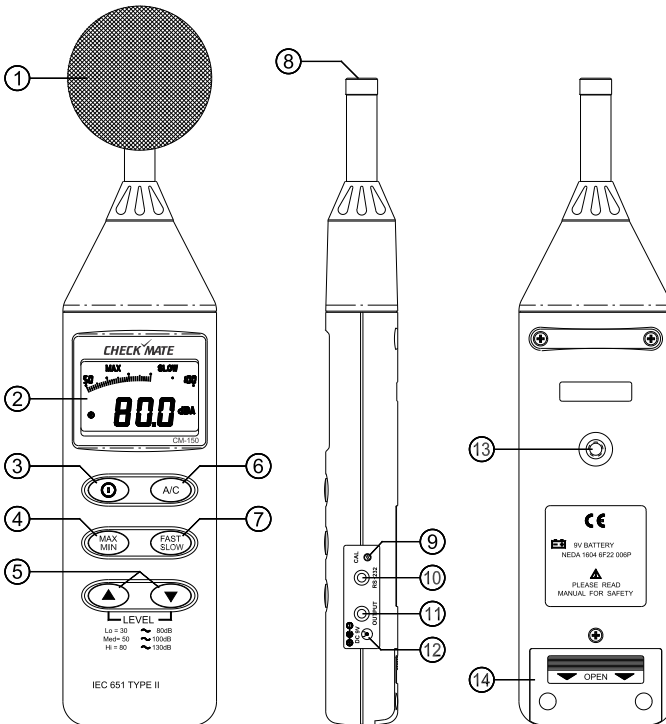
Dimensions : 275 (L) x 64 (W) x 30 (H)mm

10.8 (L) x 2.5 (W) x 1.2 (H)inch

Weight: 285g (including battery)

Included Accessories: 9V battery, carrying case, screwdriver, instruction manual, windscreen, 3.5 mm plug, software, and USB cable. (Software, USB cable not included with CM-150).

IV. NAME AND FUNCTIONS CM-150

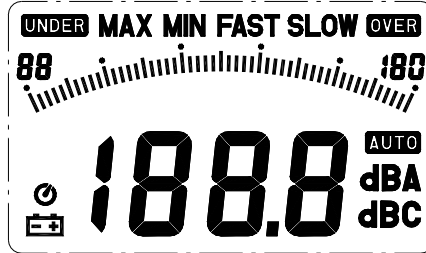




① **Windscreen**

When making outdoor measurements, wind noise at the microphone can cause measurements errors. Such effects can be reduced by using the windscreen.

② **Display**




SYMBOL

FUNCTION

MAX	Maximum value displayed
MIN	Minimum value displayed
OVER	Over range
UNDER	Under range
FAST	Fast response
SLOW	Slow response
dBA	A-Weighting
dBC	C-Weighting
88 - 180	Range Indicator
[-+]	Low-Battery
-LQ-	Under range 20dB
AUTO	Auto level range selected

③ **Power & Backlight button**



The  key turns the CM-150 ON or OFF and the backlight ON & OFF. Press it once to turn on the CM-150.

Press it again for a moment to turn the backlight ON or OFF. .

Press and hold this button for 3 seconds to turn OFF the power.



④ **MAX / MIN hold button**

Select the proper level range before using MAX/MIN to ensure that the reading value will not exceed the measurement range. Press  button to enter the maximum and minimum recording mode. Press once to select MAX value. Press again to select MIN value, and press again to select current value with “ MAX/MIN “ annunciator blinking. Press  and hold down button for 2 seconds to exit the MAX/MIN mode.

Note: If the sound level range or A-C weighting is changed , the MAX/ MIN mode will clear.

⑤ **Level range control switch**

Each time the UP button ▲ is pressed, the range level is increased from “ Lo ” Level to “ Hi “ Level to “Auto” Level.
Each time the DOWN button ▼ is pressed. The range level is decreased from “Auto” Level to “ Hi ” Level to “ Lo “ Level.

⑥ **Frequency Weighting select button**

A: A - Weighting filters out low frequencies to approximate the response of the human ear at lower SPL's.

C: C - Weighting filters less low frequencies to approximate the response of the human ear at higher SPL's. (a flatter response.)

⑦ **Time weighting select button**

FAST: for normal measurements

SLOW: for checking average level of fluctuating noise.

⑧ **Microphone**

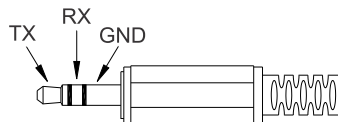
1/2 inch Electret Condenser microphone

⑨ **CAL potentiometer**

Calibration control for level calibration adjustment.

⑩ **RS-232 Interface:**

The USB signal output is a 9600 bps USB interface.





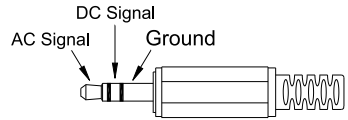
⑪ Signal output terminal

AC: 1 Vrms Corresponding to each range step.

Output impedance = 100Ω

Output signal by standard 3.5mm mini stereo jack with signal on tip.

Note: At “Auto” level range, output signal is Auto select on “Lo” or “Med” or “Hi” level range.



DC: Output: 10mV/dB

Output impedance = $1K\Omega$

Output signal by standard 3.5mm mini stereo jack with signal on ring

⑫ External DC 9V power supply terminal

For connection with AC adapter.

⑬ Tripod mounting screw.

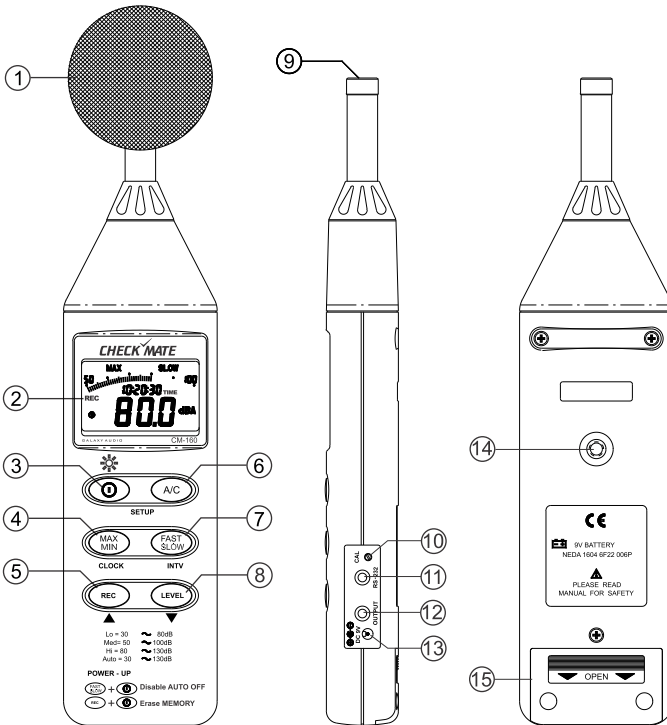
⑭ Battery Cover

V. AUTO POWER OFF

By default, when the meter is powered on, it is under auto power off mode. The meter will shut itself off after 30 minutes if there is no key operation, no USB communication, or no recording combination selected at power up.

By pressing and holding the “FAST/SLOW” button and then turning on the meter the  will not show up, indicating that auto power off is disabled.

VI. NAMES AND FUNCTIONS CM-160





① Windscreen

When making outdoor measurements, wind noise at the microphone can cause measurements errors. Such effects can be reduced by using the windscreen.

② Display



SYMBOL

FUNCTION

-	Maximum value displayed
MIN	Minimum value displayed
OVER	Over range
UNDER	Under range
FAST	Fast response
SLOW	Slow response
dBA	A-Weighting
dBC	C-Weighting
88 - 180	Range Indicator
[-+]	Low-Battery
-LQ-	Under range 20dB
AUTO	Auto level range selected
REC	Recording Data Logger
FULL	Memory Full
	Auto Power OFF active

③ Power & Backlight button



The key turns the CM-160 ON or OFF and the backlight ON or OFF. Press it once to turn on the CM-160. The backlight will stay on until the meter is powered off.

Press and hold this button for 3 seconds to turn OFF the meter.

Note: When the CM-160 is turned ON, the LCD will show how much memory space is available to use.




④ **MAX / MIN hold button**

Select the proper level range before using MAX/MIN to ensure that the reading value will not exceed the measurement range. Press  button to enter the maximum and minimum recording mode. Press once to select MAX value. Press again to select MIN value, and press again to select current value with "MAX/MIN" annunciator blinking. Press  and hold it down for 2 seconds to exit the MAX/MIN mode.

Note: If the sound level range or A-C weighting is changed, the MAX/MIN mode will clear.

⑤ **Record Data logger button**

When the  button is pressed, the meter will start recording and the "REC" annunciator is displayed. Press again to stop recording.

⑥ **Frequency Weighting select button**

A: A - Weighting filters out low frequencies to approximate the response of the human ear at lower SPL's.


C: C - Weighting filters less low frequencies to approximate the response of the human ear at higher SPL's. (a flatter response.)

⑦ **Time weighting select button**

FAST: for normal measurements

SLOW: for checking the average level of fluctuating noise.

⑧ **Level range control button**

Each time you press  button, the level range will rotate between "Lo" level, "Med" level, "Hi" level and "Auto" level.

⑨ **Microphone**

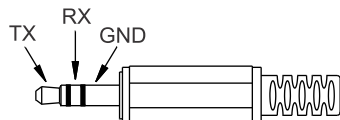
1/2 inch Electret Condenser microphone

⑩ **CAL potentiometer**

Calibration control for level calibration adjustment.

⑪ **USB Interface:**

The USB signal output is a 9600 bps USB interface.





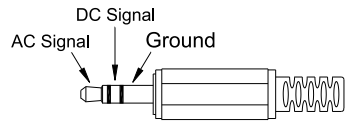
⑫ Signal output terminal

AC: 1 Vrms Corresponding to each range step.

Output impedance = 100Ω

Output signal by standard 3.5mm mini stereo jack with signal on tip.

Note: On "Auto" level range, output signal is Auto select on "Lo" or "Med" or "Hi" level range.



DC: Output: 10mV/dB

Output impedance = 1KΩ

Output signal by standard 3.5mm mini stereo jack with signal on ring.

⑬ External DC 9V power supply terminal

For connection with AC adapter.

⑭ Tripod mounting screw.

⑮ Battery Cover

VII. DATA LOGGER CLOCK & INTERVAL SETUP

• DataLogger:

When the "REC" button is pressed, the meter will start recording. Pressing the "REC" button again will stop recording. If you want to clear the memory, power off the meter. Press and hold the "REC" button and press the power button and hold it for at least 5 seconds. The LCD will show "CLR" and "SURE 5" to clear the memory.



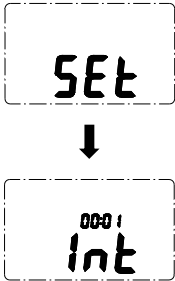
Clock Setup :



- 1: press and hold the "A/C" button and then power up the meter:
- 2: press the "MAX/MIN" (clock) button:
- 3: Press "REC" ▲ or "LEVEL" ▼ to increase or decrease the number. Press the "MAX/MIN" (clock) button to adjust the next item. The adjusting order is year → month → day → hour → minute. Press the "MAX/MIN" (clock) button to finish adjusting. If you want to abort during a setup process, press the power button to cancel.




• **Recording Interval Setup :**



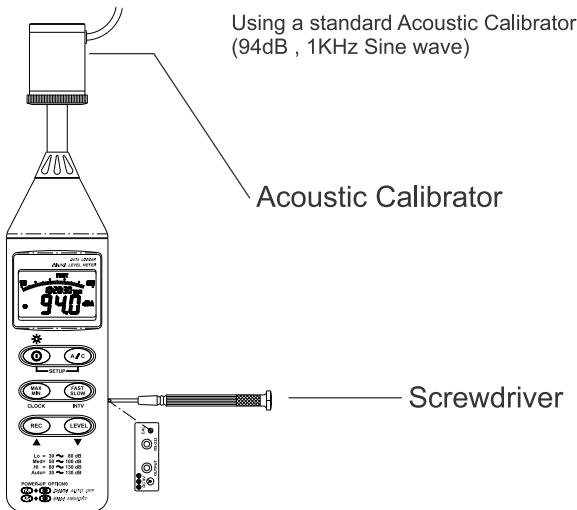
- 1: press and hold the "A/C" button and then power up the meter:
- 2: press the "FAST/SLOW"(INTV) button:
- 3: press "REC" ▲ or "LEVEL" ▼ to increase or decrease the number. Press the "FAST/SLOW " (INTV) button to adjust next item. Press "FAST/SLOW" (INTV) to finish. If you want to abort during a setup process, press the power button to cancel.

• **Auto Power Off:**

By default, when the meter is powered on, it is in the auto power off mode. The meter will shut itself off after 30 minutes if there is no key operation, no USB communication, or no recording combination selected at power up.

By pressing the "FAST/SLOW" button and then turning on the meter the  will not show up , indicating that auto power off is disabled.

VIII. CALIBRATION PROCEDURES






- (1) Make the following switch settings.
Display: dBA
Time weighting : FAST
Measurement mode : MAX/MIN Mode function disabled.
Level range: 50 to 100dB
- (2) Insert the microphone housing carefully into the insertion hole of the calibrator.
- (3) Turn on the calibrator and adjust the CAL potentiometer of the SPL meter, until the value displayed matches the value supplied by the calibrator. All products are well calibrated before shipment.
Recommended Recalibration cycle: 1 year.

IX. MEASUREMENT PREPARATION

(1) Battery Loading

Remove the battery cover on the back and put in one 9V Battery.

(2) Battery Replacement

When the battery voltage drops below the operating voltage, this symbol will appear . Replace 9 Volt battery.

(1) AC Adapter Connection

When the AC adapter is used, insert the plug of the adapter into the DC9V connector on the side panel.

X. OPERATING PRECAUTIONS

- (1) Wind blowing across the microphone can cause extraneous noise. When using the instrument in the presence of wind, mount the windscreen to the mic to avoid picking up undesirable signals.
- (2) Calibrate the instrument before operation if the instrument was not in use for a long time or has been operated in an unfavorable environment.
- (3) Do not store or operate the instrument in high temperature or high humidity environments.
- (4) Keep the microphone dry and avoid severe vibration.
- (5) Take out the battery and keep the instrument in a low humidity environment when not in use.



XI. MEASUREMENT

- (1) Open battery cover and install a 9V battery in the battery compartment.
- (2) Turn the power on and select the desired response Time and Weighting. If the sound source consists of short bursts or only intermittent sound peaks, set the response to FAST. To measure an average sound level, use the SLOW setting. Select A-weighting which filters out low frequencies to approximate the response of the human ear at lower SPL's. C - Weighting filters less low frequencies to approximate the response of the human ear at higher SPL's. (a flatter response.)
- (3) Select desired Level Range.
- (4) Hold the instrument comfortably in your hand or mount to a tripod and point the microphone at the suspected noise source. The sound pressure level will be displayed.
- (5) When MAX/ MIN (maximum, minimum hold) mode is chosen. The instrument captures and holds the maximum and minimum noise level for a long period using any of the time weightings and ranges. Press the MAX /MIN button for 2 seconds to clear the MAX/MIN reading. MAX/MIN " symbol disappears.
- (6) Turn OFF the instrument. Remove the battery if the meter is not to be used for an extended period.

XII. CM-150 / CM-160 Setup Test Link SE-322 USB interface software:

- **The Test Link package contains:**

1. 80mm Test Link CD.
2. Custom designed USB cable for Test Link.
3. 80mm USB driver CD

- **System Required:**

Windows 95, Windows 98, or Windows NT 4.0 and higher..

- **Minimum Hardware Required:**

PC or Notebook with Pentium 90MHz or higher, 32 MB RAM.

At least 5 Mb hard disk space available to install Test Link.

Recommended resolution 800X600.

- **Install TestLink:**

- 1 It is recommended that all other applications be closed before installing Test Link.
2. Insert setup CD disk into CD disk drive.
3. From the Start button on the Taskbar select Run.

4. Type E:\SETUP (where E is the letter of the CD drive) and choose OK. The SE322.exe(executable file) and help file will be copied to the hard drive (default is c:\program files\TestLink\SE322). For detailed operation instructions, refer to online help while executing SE322.

- **Main Menu**

File | Open- Retrieve files from the disk.

Save - Save the active window(when the caption bar is highlighted) data to the disk.

Print - Print the data of the active window(graph or list).

Printer Setup - Select printer.

File | Exit: Terminates Test Link program.

View | Control Panel: By opening the Panel Window, the user can control the meter via the button in this window.

View | ReaL-Time Graph: Open Real-Time Graph display to graph the present data.

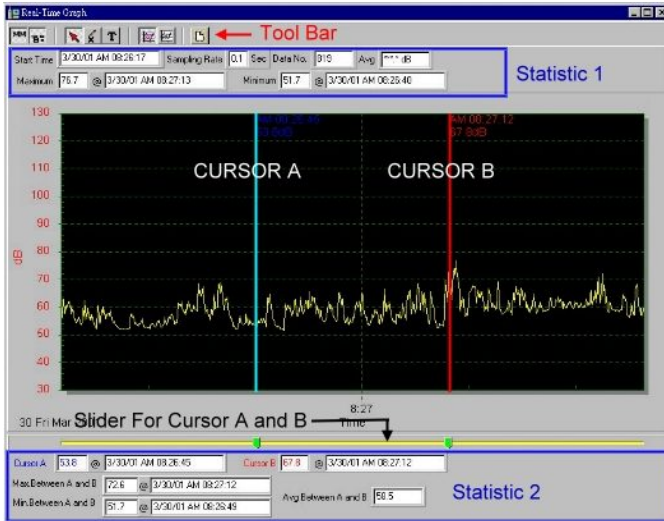
Real Time Data | Run - Start collecting real time data .

Stop - Stop collecting real time data .

Data Logger: By opening the **Data Logger** Window, the user can load recorded data from the meter to the PC in this window.

Output To Graph - Graph tabular data.

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 on the graph. Click on the graph to mark a cross sign on the graph.



- When selected, the mouse cursor will become a "T" sign when moving on the graph. Click on the graph to add text annotations.



- Color graph.



- Monochrome graph.

You can choose a rectangular area on the graph to zoom into for detail.

There are two vertical lines (CURSOR A and CURSOR B) in the graph. There are time and value displays on the top and the right side of each cursor. You can move the mouse cursor over cursor A or B and click to drag the cursor to the left or right. Right below cursor A and B is a slider. You can also click and drag the slider to move cursor A or B. Below the slider are the statistics that display start time, sampling rate, data number, and maximum and minimum levels shown on the graph. The statistics also display the maximum, minimum, and average between cursor A and B. This data updates automatically when cursor A or B is moving.

You can double click the graph to call up the option dialog. In the option dialog, the graph style can be customized.

You can right click on the graph (not available for real time graphs) to call up the popup menu.

You can Zoom the graph by using the mouse:

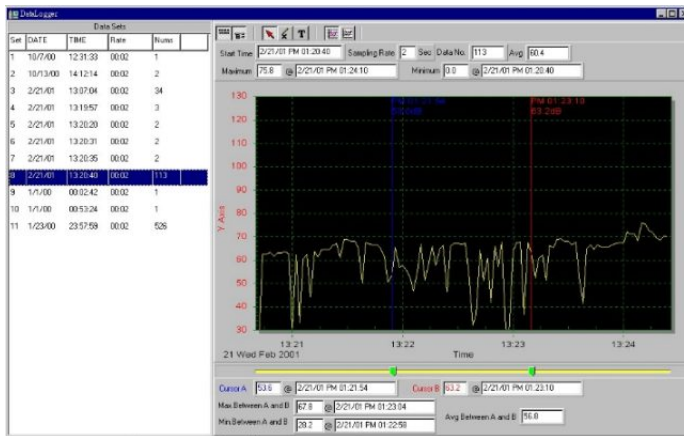
To Zoom:

1. Press the left mouse button and drag the cursor to select the area on which you want to zoom in.
2. Release the mouse button.


To Undo the Zoom - Right click on the graph to bring up the pop-up menu. Select Undo Zoom .

DataLogger

Applies to CM-160 only





When you have a Sound Level DATA LOGGER meter connected to a PC and select "Data Logger" from main menu or click  from the tool bar recorded data will be downloaded from the meter and there will be a progress indicator to show the loading progress. If an error occurs, click "Data Logger" again.

After the data is loaded, the left hand side will show how many data sets were loaded and detailed information for each data set (start date, start time, recording rate, and record numbers).

examples:

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

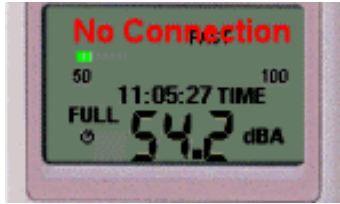
The first data set will be transferred to the graph and the tabular on the right hand side every time after recorded data has been downloaded from the Sound Level Meter. Click any data set to select that set for the graph. On the right hand side is the waveform graph and statistics for the data set that is chosen.



• Tutorial - Quick Start to Use SE322 Test Link

(1.) Recording real time data in waveform.


1. Power on the Sound Level Meter and connect it to a USB port with the USB cable.
2. Start the SE322 program.

- If the connection is successful the panel will display the same value as the Sound Level Meter. If there is a failure to connect the meter with the PC, the display will read "No Connection" in the Test Link Se322 panel window.



- When the connection is successful,  click to start recording real time data, There will be a waveform displayed in the Real Time Graph Window.
- Click  to start recording.

(2.) How to save the recorded real time data to a file.


- Click the graph window you want to save and the graph window will become active. Choose File | Save the from main menu or click  from the tool bar .

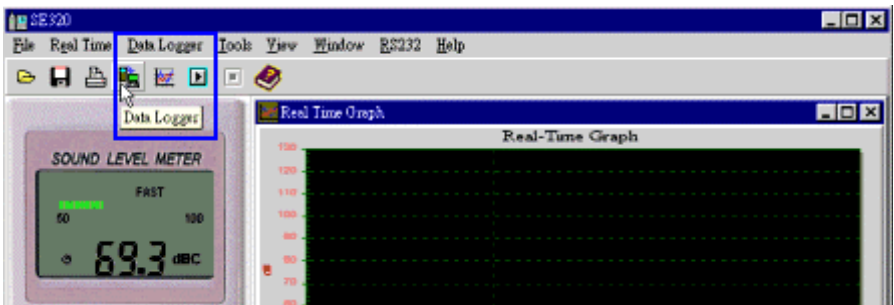


- There will be a save dialog window where the file name and type can be specified. There are three types of files that can be chosen: binary file (*.ghf), text file (*.txt) and EXCEL format file (*.csv). The *.ghf file uses much less disk space to save the data than the other two file formats, but it can only be used in Test Link SE322. The text file can be opened by Test Link SE322 and any other word processor program like Word, Notepad, etc. EXCEL format file can be opened by Test Link SE322 and Microsoft EXCEL.



(3.) How to load the recorded data from the memory of a Sound Level Meter and save it to a file (Only for models with Data Logger)

1. Power on the Sound Level Meter.
2. Press the REC button of the meter to start recording data.
3. When finished, press the REC button again to stop recording data.
4. Connect the Sound Level Meter to a PC
5. Start SE322 program.
6. Choose Data Logger from the main menu or click  from the tool bar.
7. Proceed with download as described on page 17.





• Frequently Asked Questions

1. I have connected a Sound Level Meter to a PC USB port and turned meter power on, but the PC still shows "NO CONNECTION".

Answer: It could be that all USB ports are occupied by other applications. Close all other applications . If there is still "NO CONNECTION", restart your computer and run Test Link SE322 again.

2. How can I save the graph to a file which can be used in EXCEL ?

Answer: When you save a graph to a file , the default file format is "*.ghf" but you can select *.csv to save files. CSV is an EXCEL file format. You can open it in EXCEL.

3. How do I uninstall Test Link SE322 ?

Answer: Uninstall Test Link SE322 by launching the Add/Remove Programs applet out of the Control Panel, highlighting the SE322, and clicking on the Add/Remove... push button. The SE322 folder and files will be removed from your computer.

4. Why did data downloading fail?

Answer: This might be caused by the slow response of some PC systems.

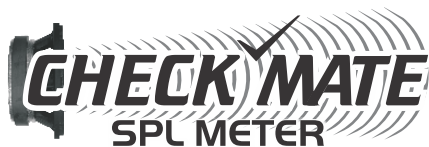
5. How do I zoom in on the graph?

Answer: Press the left mouse button and drag the cursor to select the area on which you want to zoom in. Release the mouse button.

6. When I setup the real time sampling with a fast rate(eg. 0.1 sec), some of the sampling data gets lost.

Answer: This might be caused by slow response time of some PC systems.





CM-150/CM-160

Instruction Manual



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*Specifications subject to change with