

Sound Analyzer Meter

ST-105
ST-105L
ST-105S
ST-105D

User's Manual



CLASS 1



SOUNDTEK

HB2ST1050003

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1. SAFETY PRECAUTIONS

When taking measurements:

- Avoid doing measurement in humid or wet places - make sure that humidity is within the limits indicated in section “environmental conditions”.
- Avoid doing measurement in presence of explosive gas, combustible gas, steam or excessive dust.

The following symbols are used:



Caution: refer to the instruction manual; an improper use may damage the analyzer or its components.



Meter compliance to CE mark standards.

1.1. Preliminary Description

The Sound Analyzer Meter is a hand held real-time analyzer that can perform integrated measurement and statistic analysis on the noise (refer to paragraph 4), or other electrical signal including their frequency spectrum and amplitude 1/1 OTC and 1/3 OTC (refer to paragraph 5) value through the digital signal processing technology. This analyzer can be widely used in the various fields such as environmental protection, labor hygiene, research and teaching, industrial enterprise, measuring and testing etc. It can perform the environmental noise measurement, machine’s noise analysis, sound power level measurement, building acoustics measurement.

1.2. Note

Read the recommendation which follow and the instruction in this manual:

CAUTION



Does not observe the warning and/or operation instruction, it’s possible to damage the instrument either its components or the operator

- Do not operate the instrument at hot temperature and humid environment. Please refer to conditions of chapter 12.4.1.
- Wind blowing across through the microphone would bring additional extraneous noise. Once using the analyzer in the presence of wind, it is necessary to mount the windscreen to prevent undesirable signals.
- Keep the microphone dry and avoid severe vibration.

2. PREPARATION FOR USE

2.1. Initial

The instrument has been checked mechanically and electrically prior to shipment.

Take care to ensure the instrument reaches you undamaged.

However, it is wise to carry out a rapid check in order to detect any possible damage that may cause during transport. If it's damage, claims to the dealer immediately.

Check the packaging content according to packing list reported in 12.5.1 chapter .In case of discrepancies, contact the dealer immediately.

In the event of re-shipment of the instrument please follow the instructions reported in chapter 12.5.1.

2.2. Supply voltage

The instrument is powered by batteries (refer to paragraph 12.3.2 for details on model, no. and battery life). When batteries are low, a low battery indication is displayed.

To replace/insert batteries follow the instructions appearing in paragraph 11.2.

The analyzer can also be powered by the external power supply. The external power supply is connected by USB interface. The external power supply's voltage is 5V and its maximum output current is 1000 mA. When the external power supply is used, there is no need to take the batteries out. The analyzer can automatically select the power supply (the batteries or the external power supply) by determining their voltage. If the external power supply fails accidentally during the measurement, the analyzer will automatically switch to the batteries without interruption.

CAUTION



If you don't use the instrument for a long period, please take the batteries out to prevent eventual acid leakage from damaging the instrument

Meter can also be supplied by external 5VDC adapter; On the USB output receptacle, pin 1 and pin 5 are also the terminals of external power supply input. When the analyzer is connected to the computer, it can be powered by the USB interface power supply through the computer. Pin 4 is the 5V power supply output pin of the analyzer. When it is connected to the Flash disk, the Flash disk is powered by this pin. This pin's maximum supply current is 150mA.

2.3. Calibration

The instrument complies with the technical specifications contained in this manual and such compliance is guaranteed for 1 year. The instrument is maybe need recalibration after one year.

2.4. Storage

After a period of storage in extremely environmental conditions exceeding the limits mentioned in paragraph 12.4.1. Please use the instrument in suitable measuring conditions.

3. INSTRUMENT INSTRUCTIONS

3.1. Instrument Description

3.1.1. Controls Description

1. Microphone

2. : Turn on the analyzer's power or reset the analyzer.

3. : Turn off the analyzer's power.

4. : Delete the information stored in the analyzer.

5. : Press the this button once to turn on the LCD backlight. The LCD backlight automatically turns off after 15 seconds.

6. Display.

7. : Enter the next menu or confirm the current input.

8. : Exit to the upper menu from the current interface.

9. : Transfer the content on the current screen to the mini-printer.

10. : Start or pause the integrated measurement.

11. : Increase the parameter where the cursor is located by 1. Press it to increase the parameter upwards incessantly.

12. : Decrease the parameter where the cursor is located by 1. Press it to decrease the parameter downwards incessantly.

13. : Move the cursor rightwards. Press it to move the cursor rightwards incessantly.

14. : Move the cursor leftwards. Press it to move the cursor leftwards incessantly.

15. : Enter the parameter setup interface quickly.

Fig. 1: Instrument description

3.2. Measurements



CAUTION

Wind blowing across through the microphone would bring additional extraneous noise. Once using the instrument in the presence of wind with speed faster than 10m/s, it is necessary to mount the windscreen not to pick up undesirable signals. Keep the microphone dry and avoid sever vibration.



3.2.1. Input Interface

The front is X9-6z signal input receptacle. The receptacle pins are arranged as shown in Fig. 2. The pins have the following functions:

- Pin 1 Power supply
- Pin 2 Null
- Pin 3 Signal input
- Pin 4 Null
- Pin 5 Signal ground
- Pin 6 Null

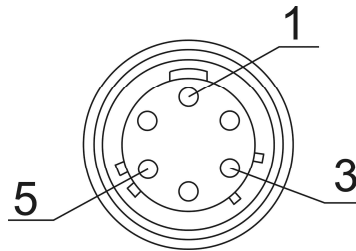


Fig. 2

1. On the input receptacle, “**pin1**” is the power supply pin that the analyzer transmits power to the sensor (36 V, 2 mA max.). Inside this power supply, a 2k Ω current limiting resistor is connected in series.
2. The signal input “**pin3**” can receive the input electrical signal, in which a DC isolated capacitor is connected.
 - Maximum input voltage: 10 V (RMS).
 - Input protection: : $\pm 18V$.
 - Input impedance: 150 k Ω , input capacitor: ≤ 100 pF.

3.2.2. Output interface

- On ST-105 Sound Analyzer Meter, the back is the three signal output receptacles (Fig. 3). The left one is AC output receptacle. This receptacle is a stereo output receptacle. When it is matched with the plug, the plug's pins are defined as (Fig. 4):



Fig. 3

Output Receptacle

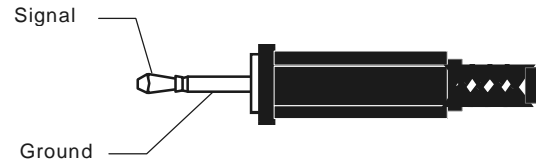


Fig. 4

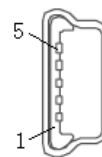
3.5mm Output Plug

- AC output is proportional to the input signal. The proportion between the output and the input is related to the analyzer's range controller. When the range controller is in -10 dB shift (namely the maximum measuring range shift), the AC output is 0.316 times of the input signal. The AC output signal's output impedance is 1 k Ω . It is recommended that the connected load resistor be higher than 100 k Ω and the connected load capacitor be lower than 200 pF.




Range Gain	Output /Input (Gain)	Range Display
-10dB	0.316	50~140
0dB	1	40~130
10dB	3.16	30~120
20dB	10	20~110
30dB	31.6	10~100
40dB	100	0~90





- RS 232 interface (Fig. 3), which can be connected to the mini-printer (OPTION) to print the measuring result, or connected to PC to transfer the measuring result and real-time analysis result.
- USB output receptacle (Fig. 3): Mini B type output receptacle is used, which complies with USB1.1 and USB2.0 standards. The data is transferred in a full speed manner. It supports USB-host and USB-Device/Slave devices. The analyzer can connect to computers or Flash disks.


1. +5V
2. D-
3. D+
4. 5VCC
5. GND




3.2.3. Start measurement



Press “” key on the front of the analyzer for 1 second or longer, the screen will display the list of the software which is installed in the analyzer. The cursor stays on the name of the software which was used last time. Press “” and “” keys to move the cursor.

Press “” and “” keys, you can change the screen’s contrast. Press “” key to enter the corresponding software. For this software’s operation, see the corresponding instructions (**refer to paragraph 4**) and (**refer to paragraph 5**). If you do not press any key for over 5 seconds, the system will automatically enter the software where the cursor is located. After you enter the software, you can enter any interface with “” key.

In starting status, when you press “” key, the analyzer immediately stops all measuring operations and enters the software to display and selection interface.


Press “” key to turn off the analyzer. After the power is turned off, the clock inside the analyzer still works by the backup battery. The backup battery is a rechargeable battery, which can be recharged when the analyzer is in working status. It can be fully recharged in 24 hours at least. The fully recharged batteries can make the analyzer’s clock running for at least 3 months. The measuring result is stored in the Flash. Even no external power supply is available; the data will not be lost.




3.2.4. Range Setup

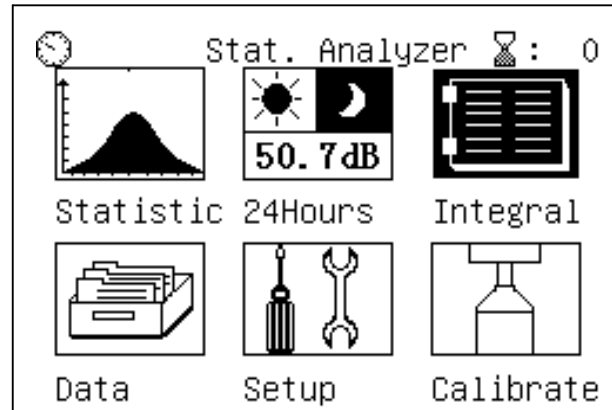
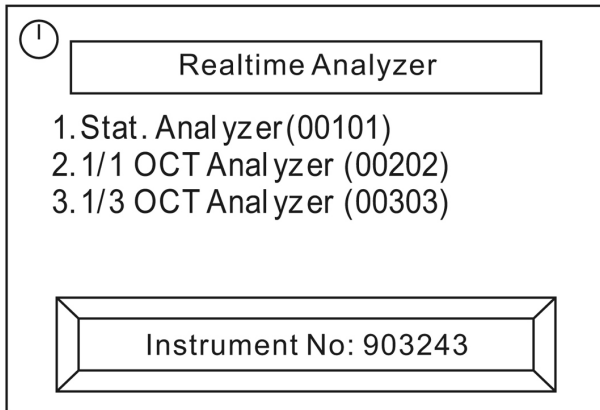
Model ST-105 Sound Analyzer Meter has the level linear range above 90 dB under the reference range. When measuring the noise in the common environment, the range may not be changed. However, you should reasonably select the range. The measuring upper limit and measuring lower limit of each shift range are related to the microphone’s sensitivity. When your microphone sensitivity level is -26 dB, the range displays “R: 40-130 dB”, which means the measuring upper limit is 130 dB and the measuring lower limit is 40 dB for 1 kHz sine wave signal. When the measured signal is not sine wave, the measuring upper limit becomes lower due to the peak factor influence. The overload indication is to judge the measuring signal’s peak. You should set the range at the location where the overload indicator is not lit in the measuring process. When adjusting the range, you only need to move the cursor to the range display location. Press “” and “” keys to change the range.




4. STATISTIC ANALYSIS MEASUREMENTS INSTRUCTIONS (ST-105/105D/105S)

4.1. Software Operation


Press “” key for 1 second, the LCD will display the list of all software which is installed in the analyzer.

Press “” and “” keys to move the cursor to “Stat. Analyzer”. The cursor will stay on the software which was used last time. As shown below, press “” key to go to the main menu.




The icon where the cursor is located becomes highlighted. Press “” and “” keys to move the cursor. Press “” key or do not press any key for over 5 seconds, you will go to the corresponding submenu automatically. The main menu has 6 icons (submenus), including:





- 1) **Statistic:** The integrated measurement of A sound level, the statistic analysis of F time weighting A sound level.
- 2) **24Hours:** 24H automatic measurement.
- 3) **Integral:** The simultaneous integrated measurement of sound pressure level of three frequency weighting modes and three time weighting modes.
- 4) **Data:** View the saved measuring result in the analyzer.
- 5) **Setup:** Set up the parameters like measuring name, measuring time etc.
- 6) **Calibrate:** Calibrate the microphone's sensitivity level with the sound level calibrator.



The number after the icon “ :XXX ” on the top right corner of the display means the group number of the data that can still be saved.

4.2. Operation Of Statistic Analysis Function







4.2.1. List interface


In the main menu, move the cursor to “Statistic” and press “” key to go to the screen shown as below:





ST-105/ST-105S	ST-105D
2008-09-20 09:21:20 R:50-140dB MEASURE_DATA LAFmax= 0.0dB LAFp = 80.3dB LAF5 = 0.0dB LAeq1s= 66.2dB LAF10= 0.0dB LAeq,T= 0.0dB LAF50= 0.0dB LAE = 0.0dB LAF90= 0.0dB LAFeqT= 0.0dB LAF95= 0.0dB SD = 0.0dB LAFmin= 0.0dB	2010-05-10 09:21:20 R:50-140dB MEASURE_DATA LAFmax= 0.0dB LAFp = 80.3dB LAF5 = 0.0dB LAeq1s= 66.2dB LAF10= 0.0dB LAeq,T= 0.0dB LAF50= 0.0dB LAE = 0.0dB LAF90= 0.0dB LAFeqT= 0.0dB LAF95= 0.0dB SD = 0.0dB LAFmin= 0.0dB
 Stat.  Ready	 Stat.  Press Start

On the screen, the first line shows the date, time and range. R: 50-140 dB means the range is from 50 to 140 dB (gain -10 dB). The bottom line of LCD display is the menu prompt. The left “” icon shows the battery level. The “**Stat.**” icon indicates that the software now is in statistic analysis software function. The “” icon indicates that the software now is in the list measuring interface. The middle of LCD displays the measuring results. The result is refreshed every second. The first 14 characters in the second line is

measuring name. You can change measuring name by selecting the “”.

On the screen, a black block flashes twice every second. Press “” and “” keys to move the cursor on the clock’s YY, MM, DD, HH, MM, SS, range and “List”. When the cursor is moved on the clock’s YY, MM, DD, MM, SS, you can adjust the date and time by pressing “” or “” keys. When the cursor is moved to the range zone, you can set the range by pressing “” or “” keys. After the range is changed, it takes about 3 s to become stable.

When you press “” key, the analyzer starts the integrated measurement and statistic analysis, as shown in the figure below:

ST-105/ST-105S	ST-105D
2008-09-20 09:22:28 Tm=00m05s MEASURE_DATA LAFmax= 56.8dB LAFp = 51.3dB LAF5 = 54.0dB LAeq1s= 48.4dB LAF10= 52.8dB LAeq,T= 49.7dB LAF50= 48.4dB LAE = 56.7dB LAF90= 46.6dB LAFeqT= 49.7dB LAF95= 45.9dB SD = 2.6dB LAFmin= 45.0dB	2010-05-10 09:22:28 Tm=00m05s MEASURE_DATA LAFmax= 56.8dB LAFp = 51.3dB LAF5 = 54.0dB LAeq1s= 48.4dB LAF10= 52.8dB LAeq,T= 49.7dB LAF50= 48.4dB LAE = 56.7dB LAF90= 46.6dB LAFeqT= 49.7dB LAF95= 45.9dB SD = 2.6dB LAFmin= 45.0dB
 Stat.  Run	 Stat.  Running

The range zone becomes the measuring time. The range cannot be changed in the integrated measuring process. When the cursor is moved to “Tm”, you can set the

measuring time's hours and minutes with “▲” and “▼” keys. When the measuring time reaches the set time, the integrated measurement will automatically stop and the integrated measuring result will be saved in the analyzer. In the measuring process, when you press “Start/Pause” key, the integrated measurement will be suspended. When you press “Output” key, the measurement will end and the measuring result will be saved. When the integrated measurement is suspended, you can delete the current measuring result by pressing “Cancel” key. When the integrated measurement is suspended, you can continue on the integrated measurement by pressing “Start/Pause” key again.

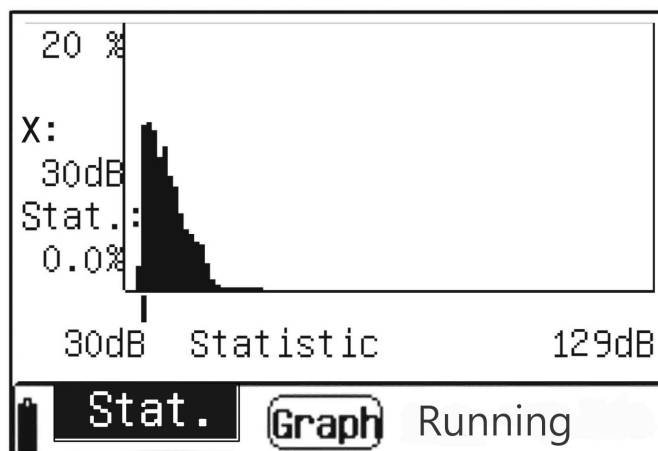


CAUTION

In the integrated measuring process, you cannot exit to the main menu. If necessary, you should stop or delete the measurement in advance.
Move the cursor to the “List” icon and press “▲” key to go to the graph interface. In the graph interface, the operations are described below:

4.2.2. Graph Interface

In the main menu, when you move the cursor to the “Graph” icon and press “←” key, the analyzer will change to the screen as shown below:



The screen shows the current statistic distribution diagram. It refreshes every second. On the left, you can see the location of reading cursor and the statistic percentage of corresponding sound pressure level range. As shown above, when the reading cursor points to dB, 1.9% of the sound level being measured is between 61 dB and 61.9 dB. The last line is the menu prompt. It is the same as the list interface.

Press “←” and “→” keys, you can move the cursor from the “dB” to “Graph”. When the cursor is moved on the “dB”, you can change the location of reading cursor with “▲” and “▼” keys. When the cursor is moved on the “Graph”, you can go to the list interface with “▲” and “▼” keys. When you press “←” key, the statistic chart can be changed to accumulative chart. In the accumulative chart, through changing the location of reading


cursor, you can get any statistic sound level. In the graph display interface, you also can start, suspend and delete measurement.




CAUTION


In the integrated measuring process, you cannot exit to the main menu. If necessary, you need to stop or delete the measurement in advance.


4.2.3. 24 H Measurement






24H measuring function means that the analyzer starts measurement automatically at every integrated point of time. And after it has measured data of 24 intervals (one day), it will stop automatically and calculate L_d , L_n , L_{dn} . You can set the measuring time of every interval in the range of 1 min. to 59 min. When the measuring time set is not in this range, the analyzer will automatically change the time to 20 min. The start up time of every interval can be integrated point or equal to the time when you press the “” key.

4.2.4. List Interface

In the main menu, when you move the cursor to the “24Hours” icon and press “” key, the analyzer will change to the screen as shown below:

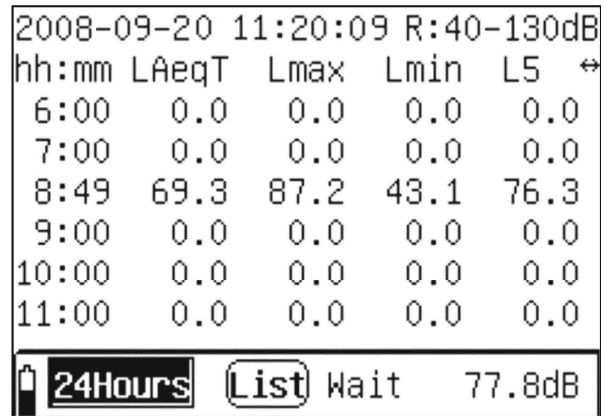
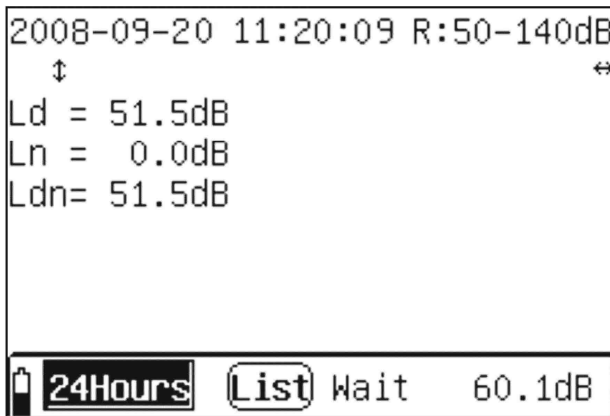
2008-09-20 11:20:09 R:50-140dB				
hh:mm	LAeqT	Lmax	Lmin	L5 ↔
6:00	0.0	0.0	0.0	0.0
7:00	0.0	0.0	0.0	0.0
8:00	0.0	0.0	0.0	0.0
9:00	0.0	0.0	0.0	0.0
10:00	0.0	0.0	0.0	0.0
11:00	0.0	0.0	0.0	0.0
	24Hours	List	Ready	49.0dB

On the screen, the first line shows the date, time and range. The middle shows the measuring results of 6 different intervals. The bottom line is the menu prompt. The left “” icon means the battery level. The “**24Hours**” icon indicates that the analyzer now is in 24 h measuring function. The “**List**” icon indicates that the software now is in the list display interface. The “Ready” icon indicates that the 24 h automatic measuring now is not started, and is waiting for “Start” or reaching the integrated point time. The “49.0 dB” is the current instant sound pressure level being measured.

When the menu prompt displays “Ready”, you can enter “” by pressing “” key and set parameters such as measuring time and measuring name etc. When you start to measure, you cannot enter “” by pressing “” key. When the clock reaches “00”, the analyzer will start measuring automatically. Also you can press “” key to start the first interval’s measurement. Then, the analyzer will start other interval’s measurement

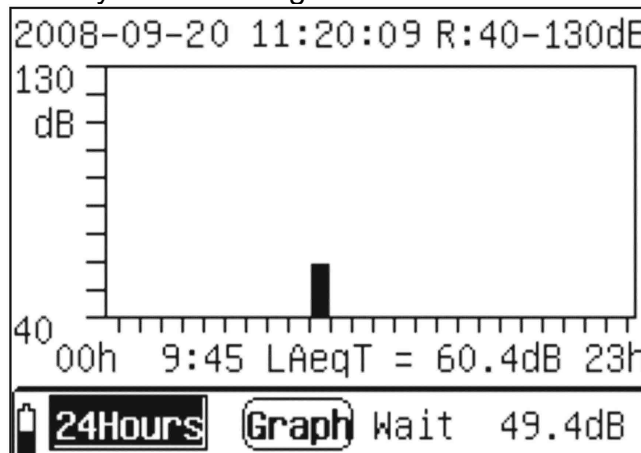
when MM of the clock reaches the time of first interval's measurement. The range zone becomes the measuring time. The range cannot be changed in the measuring process. When the cursor is moved to "Tm", you can display the measuring time's hours and minutes with "▲" and "▼" keys. When the measuring time reaches the preset time, the current interval' measuring will automatically stop and the measuring result will be saved in the analyzer. The menu prompt displays "Wait", which indicates that analyzer is waiting for the arrival of next interval's startup time.

On the screen, the cursor is the the black block that flashes twice every second. Press "←" and "→" keys to move the cursor on the clock's YY, MM, DD, HH, MM, SS, range, "hh:mm", "↓" and "List". When the cursor is moved on the clock's YY, MM, DD, MM, SS, you can adjust the date and time with "▲" and "▼" keys. When the cursor is moved to the range zone, you can set the range with "▲" and "▼" keys. After the range is changed, it will take about 3 s to become stable. When the cursor stays on the "hh:mm", you can look over the measuring values of other intervals as well as Ld, Ln, Ldn with "▲" and "▼" keys. When the cursor stays on the "↓", you can display other measuring values with "▲" and "▼" keys.



4.2.5. Graph Interface

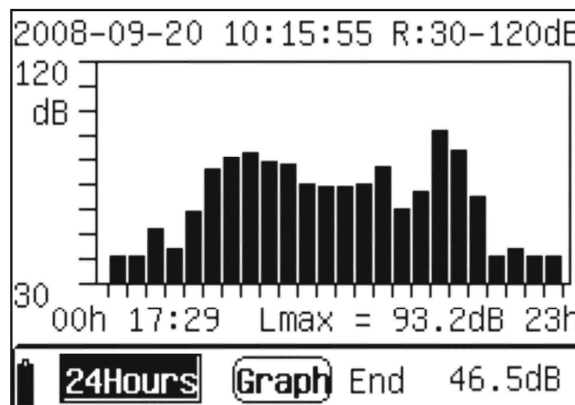
When the cursor stays on the "List", you can switch to graph display interface with "▲" and "▼" keys. The analyzer will change to the screen as shown below:



On the screen, the first line shows the date, time and range. The middle shows the 24 h distribution diagram. The last line is the menu prompt. The displayed contents and meanings are the same as those in the list display interface. On top of the menu prompt, it displays interval name and its measuring results.

In the graph display interface, you can move the cursor on clock's YY, MM, DD, HH, MM, SS, range, interval name, measuring values and "Graph". The change of clock and range is the same as those in the list display interface. When the cursor is moved to "18:29", you can go to last or next interval with "▲" and "▼" keys. The measuring value display zone will be changed accordingly. When the cursor is moved to "LAeqT", you can look over other measuring values with "▲" and "▼" keys. When the measuring values change, the display graph will change accordingly.

If you want to exit from 24h measuring function, press "Cancel" key and the display will show "Press Enter Key To Exit!" as a note, and then press the "←" key to exit to the main menu. If you do not want to exit from 24h measuring mode, you should press "Cancel" key and return to measuring status. When the analyzer give a prompt, the noise measuring is not affected.



After all 24h measurement finished, you can press "Exit" key to back to the main menu. If another group of 24 h measuring is needed, you can re-enter the 24h measuring status.

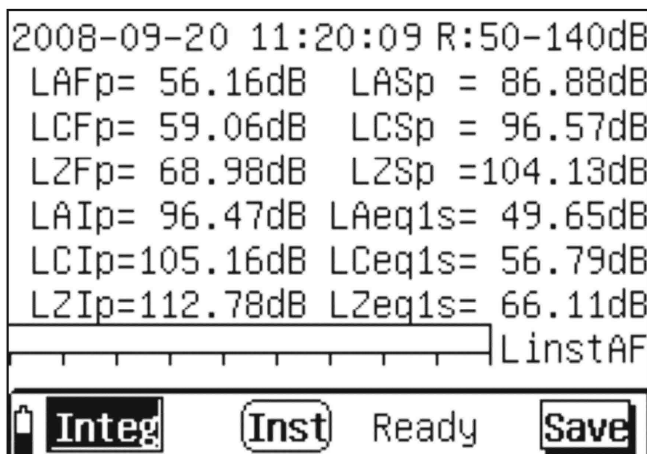






CAUTION



In the 24h measuring processing, the "Start/Pause" key does not work. 24h measurement has 24 groups of measuring results. They use the same measuring name.



4.3. Integrated Measurement




In the main menu, when you move the cursor to the “Integral” menu and press “←” key, you can enter integrated measurement function. The analyzer will change to the screen as shown below. The integrated measuring function is to measure the instant values, integrated values and peak C sound levels of three different time weighting modes and frequency weighting modes. The dynamic bar chart can show the instant value change of various frequency weighting modes and time weighting modes.

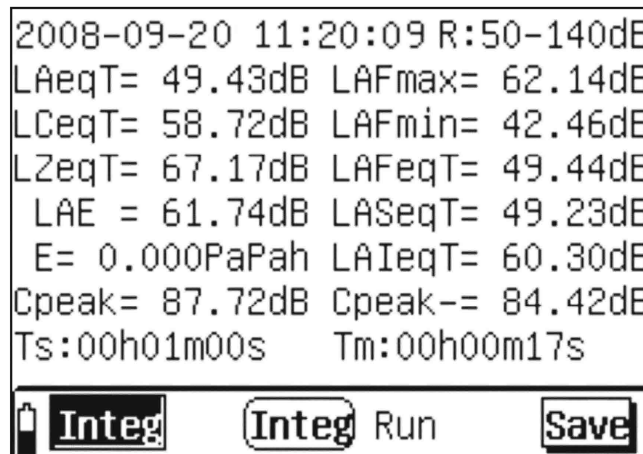





On the screen, the first line shows the date, time and the current range. The middle shows the instant values of various frequency modes and time modes. The next is the instant value bar chart. The last line is the menu prompt. The left “ ” icon indicates the battery level. The “ ” icon indicates the analyzer is now in integrated measuring function. The “ ” icon indicates the values displayed now are instant values. The “ ” icon means the current screen can be saved.

Press “←” and “→” keys, you can move the cursor on the clock’s YY, MM, DD, HH, MM, SS, range, “LinstAF”, “Inst”, and “Save”. When the cursor is moved on the clock’s YY, MM, DD, MM, SS, you can adjust the date and time with “↑” and “↓” keys. When the cursor is moved to the range zone, you can set the range with “↑” and “↓” keys. After the range is changed, it takes about 3 s to become stable. When the cursor stays on “LinstAF”, you can change its status to “LinstAS, LinstAI, LinstCF, LinstCS, LinstCI, LinstZF, LinstZS, LinstZI with “↑” and “↓” keys. The display contents of bar chart will be changed accordingly. When the cursor stays on the “ ” icon, you can save the data into the analyzer by pressing “←” key. When “ ” icon becomes highlighted and then returns to normal status, that indicates that the data has been saved completely. If you are making integrated measurement, you should pause the integrated measurement first in order to

save the data. After saving the data, you can press “ ” key to continue on the integrated measurement. When the cursor stays on the “ ” icon, change it to “Lock” or “Max” with “↑” and “↓” keys. When the screen key shows “Lock”, you can move the cursor to this key and press “←” key. When the lock button is selected, the analyzer is in the lock status and the values will not change. Press “←” key again to exit from the lock status. When the screen key shows “Max”, you can move the cursor to this key and press “←” key. The “Max” key is highlighted. The data to be displayed will be compared with the data shown in

previous time. If it is larger than the previous data, the new data will be displayed. Otherwise, the display will not change. When the cursor stays on “Inst” icon, you can change it to “Integ” with “” and “” keys. When you press “” key to start integrated measurement, it will also change to “Integ” automatically. The display interface will change to as below:



When the measuring time reaches the set time, the integrated measurement will automatically stop and the integrated measuring result will be saved in the analyzer. In the measuring process, when you press “” key again, the integrated measurement will be suspended. When you press “” key, the measurement will end and the measuring result will be saved. When the integrated measurement is suspended, you can delete the current measuring result by pressing “Cancel” key. When the integrated measurement is suspended, you can continue on the integrated measurement by pressing “” key again. In the “Integ” interface, you cannot move the cursor to “Save”. In the measuring process, you cannot change the range.









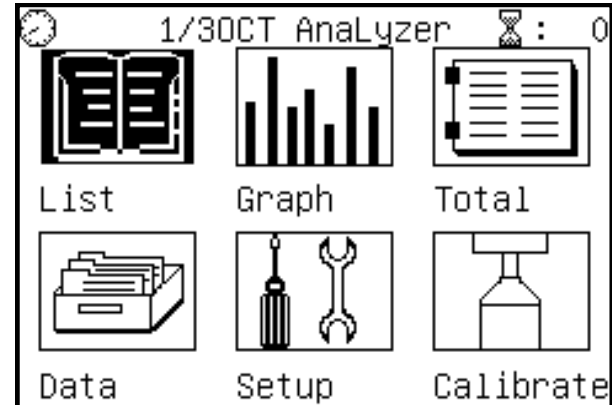
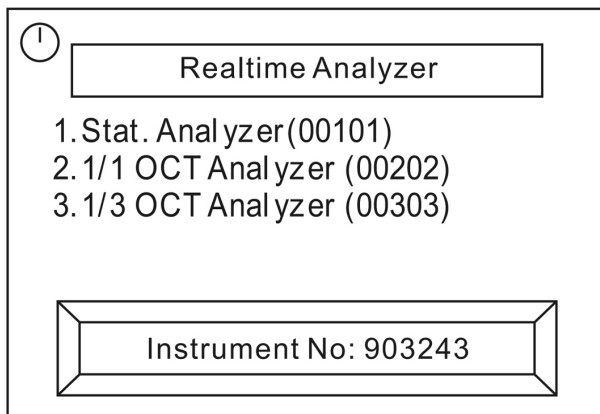
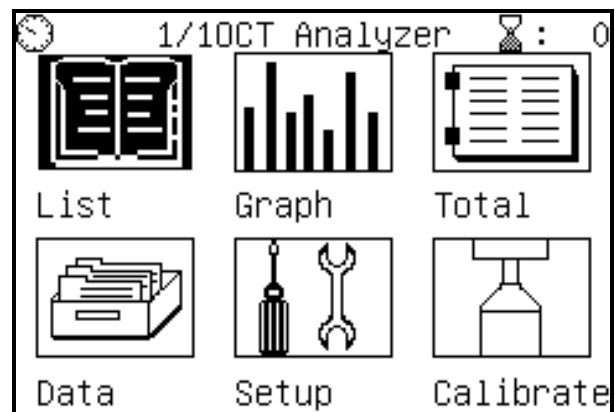
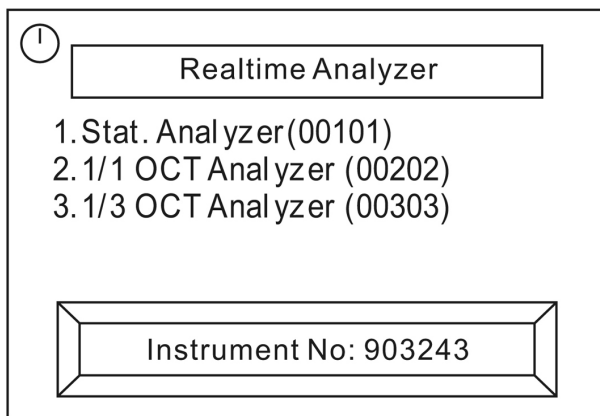
CAUTION

In the integrated measurement process, you cannot exit to the main menu. If necessary, you should stop or delete the measurement in advance.


5. 1/1 OCT and 1/3 OCT OPERATING INSTRUCTIONS (ST-105 / ST-105D) (ST-105L only has 1/3 OCT)

5.1. Operation


Press “” key on the top in the front of instrument for 1 s, the LCD will display the list of all software which is installed in the analyzer. If the contrast is not proper, adjust it with “” and “” keys. Press “” and “” keys can move the cursor to “OCT Analyzer” or “1/3 OCT Analyzer”. As shown below, press “” key to go to 1/3 OCT Analyzer software’s main menu.




- 1) List: Display the sound pressure level and weighting sound pressure level of all center frequency points in one screen.
- 2) Graph: Display 1/3 OCT's analysis result in the form of histogram.
- 3) Total: Measure the frequency weighting sound pressure level in a parallel manner.
- 4) Data: View the saved measuring result in the analyzer.
- 5) Setup: Set up the parameters like measuring name, measuring time etc.
- 6) Calibrate: Calibrate the microphone's sensitivity level with the sound level calibrator.

The number after the icon “” on the top right corner of the display means the group number of the data that can still be saved.


5.2. Low Frequency Noise Measurement

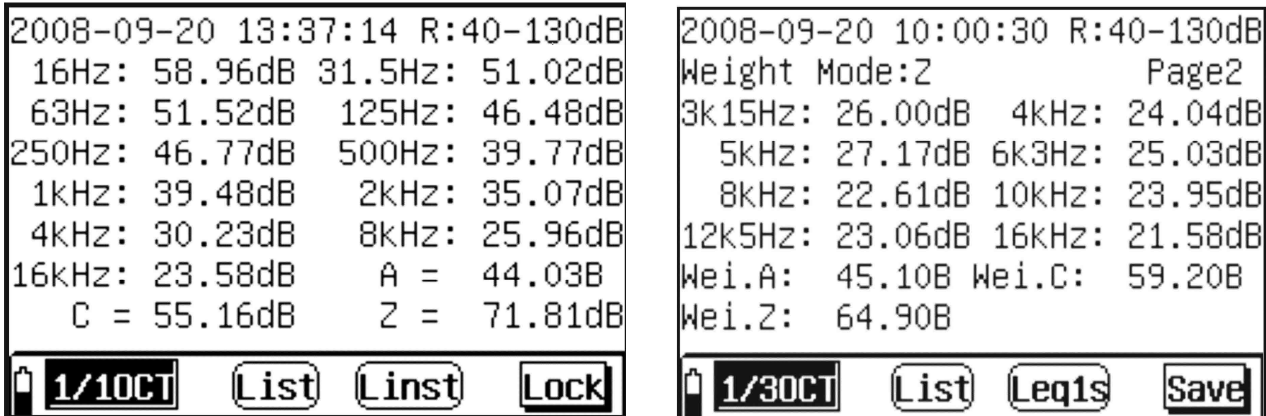
In the main menu, move the cursor to "List" and press "" key to go to the screen shown as below:






Low Frequency Noise Measurement Total Figure









	<p>2008-09-20 11:20:09 Tm=00m04s Weight Mode:Z Page2 3k15Hz: 34.54dB 4kHz: 32.56dB 5kHz: 30.94dB 6k3Hz: 29.16dB 8kHz: 26.02dB 10kHz: 23.10dB 12k5Hz: 23.68dB 16kHz: 21.94dB Wei.A: 48.60B Wei.C: 57.50B Wei.L: 62.30B</p>		<ol style="list-style-type: none">1. A weight total.2. C weight total.3. low frequency total.
①	Wei.A: 48.60B Wei.C: 57.50B	②	
③	Wei.L: 62.30B		
	 1/30CT	List	Leq,T
			Save


5.3. List Interface:


In the main menu, move the cursor to "List" and press  key to go to the screen shown as below:









On the screen, the first line shows the date, time and range. R: 40-130 dB means the range is from 40 dB to 130dB. The second line means that frequency weighting method is to make the spectral analysis (typically Z weighting). When the cursor stays on weight mode, you can change it to A or C with  and  keys. When the cursor stays on page and refreshes every second, press  and  keys to read different Hertz from 12.5 Hz to 16K Hz. The result of spectral analysis is weighted on the basis of the selected weighting mode. When A weighting is selected, the low frequency attenuation is high. As 1/3 OCT spectral analysis has much data, the data is shown in three pages. When you just enter the list interface, it is page 2 that the screen displays. The last line is the menu prompt. The left  icon means the battery level. The "**1/10CT**" or "**1/30CT**" icon indicates that the software now is in 1/3 OCT analysis software function. The "**List**" icon means the software now is in the list measuring interface. The "**Leq1s**" icon means the values displayed now are 1 s equivalent values. The "**Save**" icon means the current screen button has saving function. The screen center is the measuring result display.


The cursor is the black block that flashes twice every second on the screen. It is the cursor. Press  and  keys, to move the cursor on the clock's YY, MM, DD, HH, MM, SS, range, "Weight Mode:", "Page", "List", "Leq1s" and "Save". When the cursor is moved on the clock's YY, MM, DD, MM, SS, you can adjust the date and time with  and  keys. When the cursor is moved to the range zone, you can set the range with  and  keys. After the range is changed, it takes about 3 s to become stable. When the cursor stays on the "Leq1s" icon, you can change its status to "Leq,T" with  and  keys. Leq1s means that the value displayed now is 1 s' equivalent value. Leq,T means

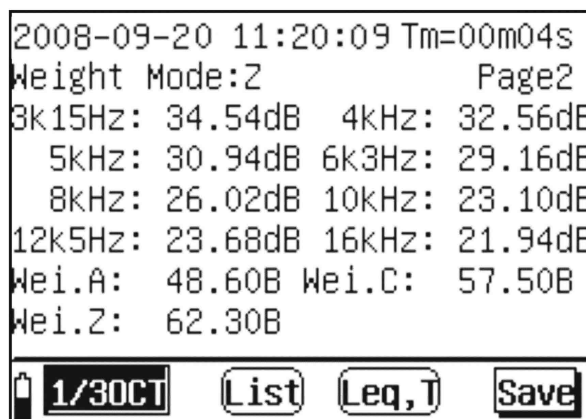
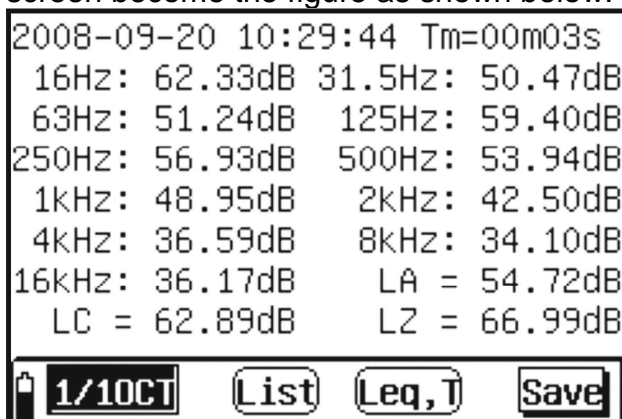
that the value displayed now is the equivalent value in an interval. When you press  key, it becomes Leq,T automatically and the range zone displays the measuring time.



When the cursor stays on the "Save" icon, you can save the current data by pressing  key. When "Save" becomes highlighted and then it returns to normal status that means the data is saved completely. When you are making integrated measurement, you should pause the integrated measurement first in order to save the data. After saving the data,






you can press  key to continue on the integrated measurement. When the cursor stays on the "Save" icon, change it to "Lock" or "Max" with  and  keys. They




respectively mean that the screen key becomes lock function and maximum value hold function. When the screen key shows “Lock”, you can move the cursor to this key and press “” key. The “Lock” key is highlighted. When the lock button is selected, the analyzer is in the lock status and the values displayed do not change. However, the ongoing measurement and integrated measurement continue. Press “” key again to exit from the lock status. When the screen key shows “Max”, you can move the cursor to this key and press “” key, and then the “Max” key will be highlighted. The data to be displayed will be compared with the data shown in previous time. If it is larger than the previous data, the new data will be displayed. Otherwise, the display will not change.
Note: In the integrated measurement process, the lock and maximum value hold functions do not work to the “Leq,T” value.

When you press “” key, when the analyzer starts the integrated measurement, its screen becomes the figure as shown below:



The display zone automatically changes to the integrated values. The range zone becomes the measuring time. In the integrated measuring process, you cannot change the range. When the cursor is moved to “Tm”, you can display the measuring time’s hours and minutes with “” and “” keys. When the measuring time reaches the set time, the integrated measurement will automatically stop and the integrated measuring result will be

saved in the analyzer. In the measuring process, when you press “” key again, the integrated measurement will be suspended. When you press “” key, the measurement will end in advance and the measuring result will be saved. When the integrated measurement is suspended, you can delete the current measuring result and exit from the integrated measurement status by pressing “” key. When the integrated measurement is suspended, you can continue on the integrated measurement by pressing “” key again. When the measurement is not started, you can exit to the main menu from the list display interface by pressing “” key.


When the measuring is not started, you can exit to the main menu from the list display interface by pressing “” key. When you press “” key, you can directly go to the “Setup” submenu. If you set the “Screen Print” as “On” status in the “Setup” submenu, you can print the content shown in the screen with the mini-printer by pressing “” key.

CAUTION




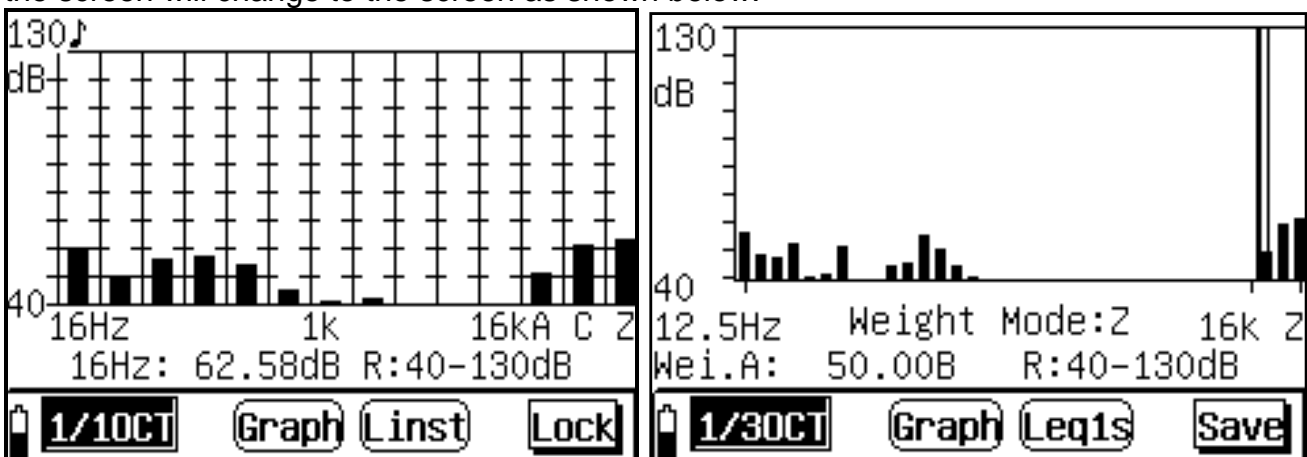
In the integrated measuring process, you cannot exit to the main menu. If necessary, you should stop or delete the measurement in advance.




In the integrated measuring process, change of weighting mode and display page does not affect the integrated measuring result.





Move the cursor to the “List” icon and press “” key to go to the graph interface. In the graph interface, the operations are described below:

5.4. Graph Interface

In the main menu, when you move the cursor to the “Graph” icon and press “” key, the screen will change to the screen as shown below:

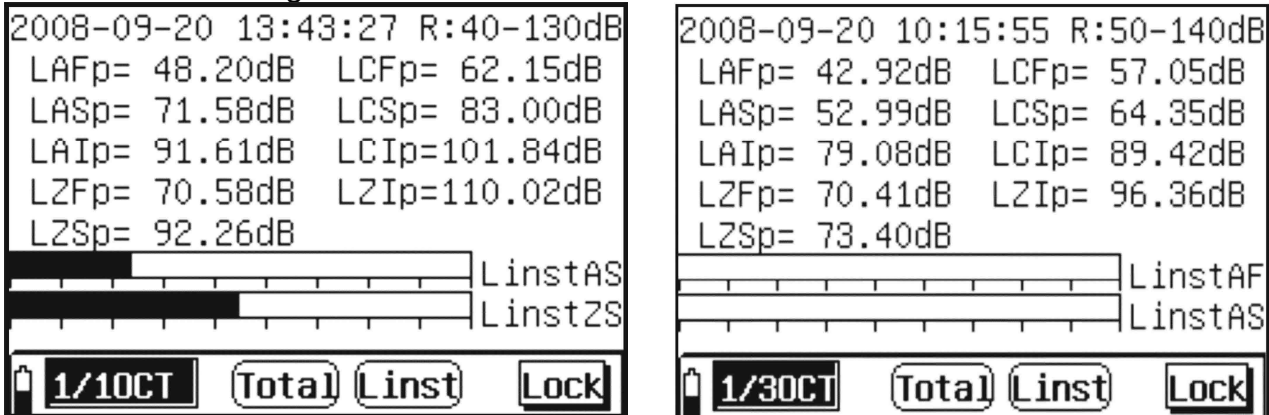


In the frequency spectrum graph, the ordinate is the sound pressure level and the abscissa is the center frequency. The location of the center frequency is indicated by a straight line. The middle is the graph display zone, which can display all center frequencies and A, C, Z weighting sound pressure level in the resolution of 1 dB. The maximum and minimum values of the ordinate are respectively determined by the upper and lower limits of the range. The last second line is the center frequency or the sound pressure level under A, C, Z weighting. “R:40-130” means the current range. The last line is the menu prompt. The “” icon means that the software now is in the graph measuring interface. The “” icon indicates that the values displayed now are 1 s' equivalent values. The “” icon indicates the current screen button has saving function.

Press “” and “” keys to move the cursor on “Weight Mode”, it will display sound pressure level, range, “Graph”, “Leq1s” and “Save”. When you move the cursor on “Wei.A” as shown above, you can display other center frequencies and the sound pressure level under compound C and compound Z by pressing “” and “” keys. When you move the cursor on other locations, the relevant operations are the same as those in the list interface. You can refer to 5.2”.

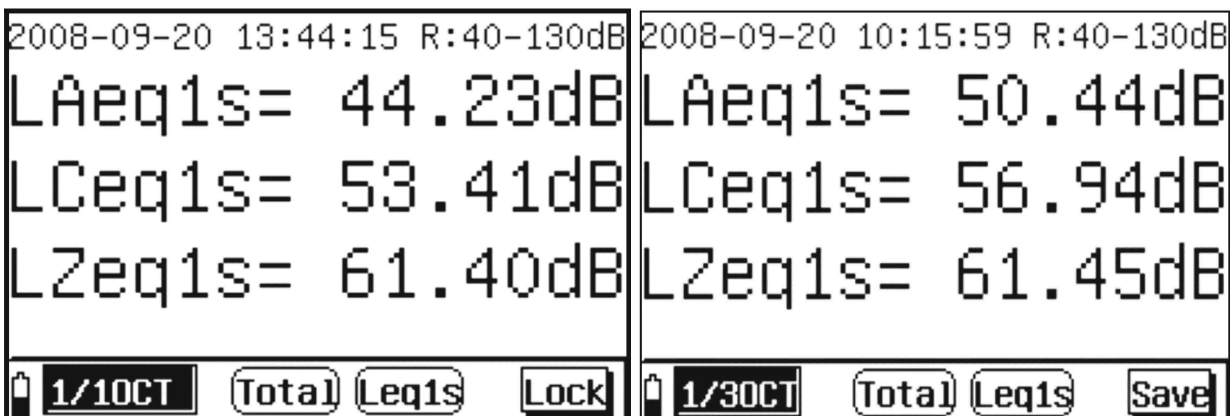
5.5. Total Interface

In the main menu, when you move the cursor to the “Total” icon and press “←” key, the screen will change to the screen as shown below:

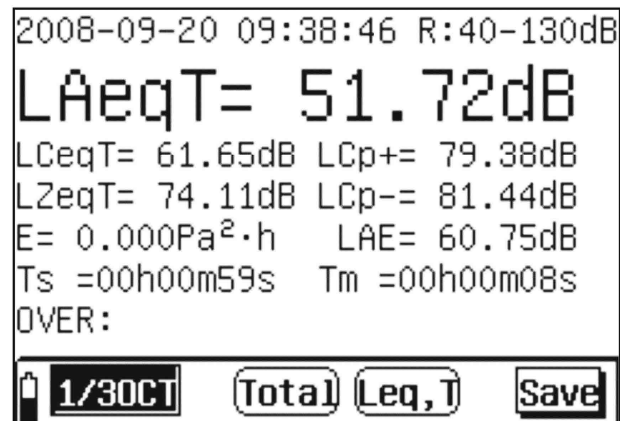
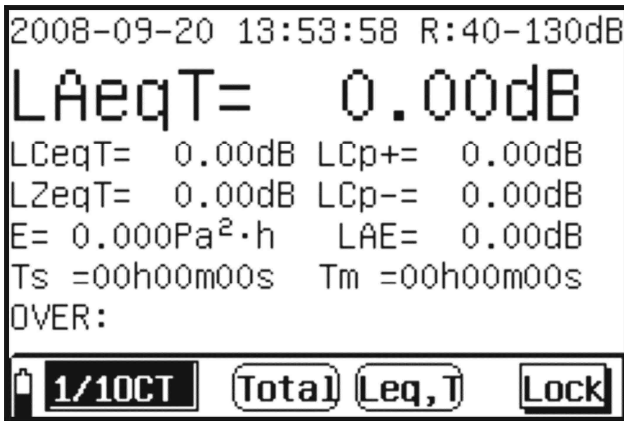







On the screen, the first line shows the date, time and range. The middle five lines are the maximum instant 1 s values in the three frequency weighting modes and three time weighting modes. The following are two bar charts, which can be defined by as the instant values of the three frequency weighting modes and three time weighting modes. The bottom line is the menu prompt. The left “” icon indicates the battery level. The “” icon indicates that the analyzer now is in 1/3 OCT analysis software function. The “” icon indicates that the software now is in the total measuring interface. The “” icon indicates that the values displayed now are instant values. The “” icon indicates that the current screen button has lock function.

In the total interface, change of the clock and range is the same as that in the “List” interface. The function and operation of the screen button at the bottom right corner of the display are also the same as those in the “List” interface. The maximum value hold function and lock function do not work to the dynamic bar charts. In the total interface, it also can display 1 s’ equivalent value and integrated value. You can move the cursor to the “Linst” icon and go to the 1 s’ equivalent value or integrated value display by pressing “” and “” keys. The 1 s’ (Leq1s) equivalent value is displayed as below:




The integrated value is displayed as below:




In the total measuring interface, no matter in “Linst” display status, or in “Leq,1s” display status, when you press “” key, the system will automatically go to the integrated value display interface. When the measuring time reaches the set time, the integrated measurement will stop automatically and save the integrated measuring result in the analyzer. In the measuring process, when you press “” key again, the integrated measurement will be suspended. When you press “” key, the measurement will end in advance and the measuring result will be saved. When the integrated measurement is suspended, you can delete the current measuring result and exit from the integrated measuring status by pressing “” key. When the integrated measurement is suspended, you can continue on the integrated measurement by pressing “” key again.

CAUTION

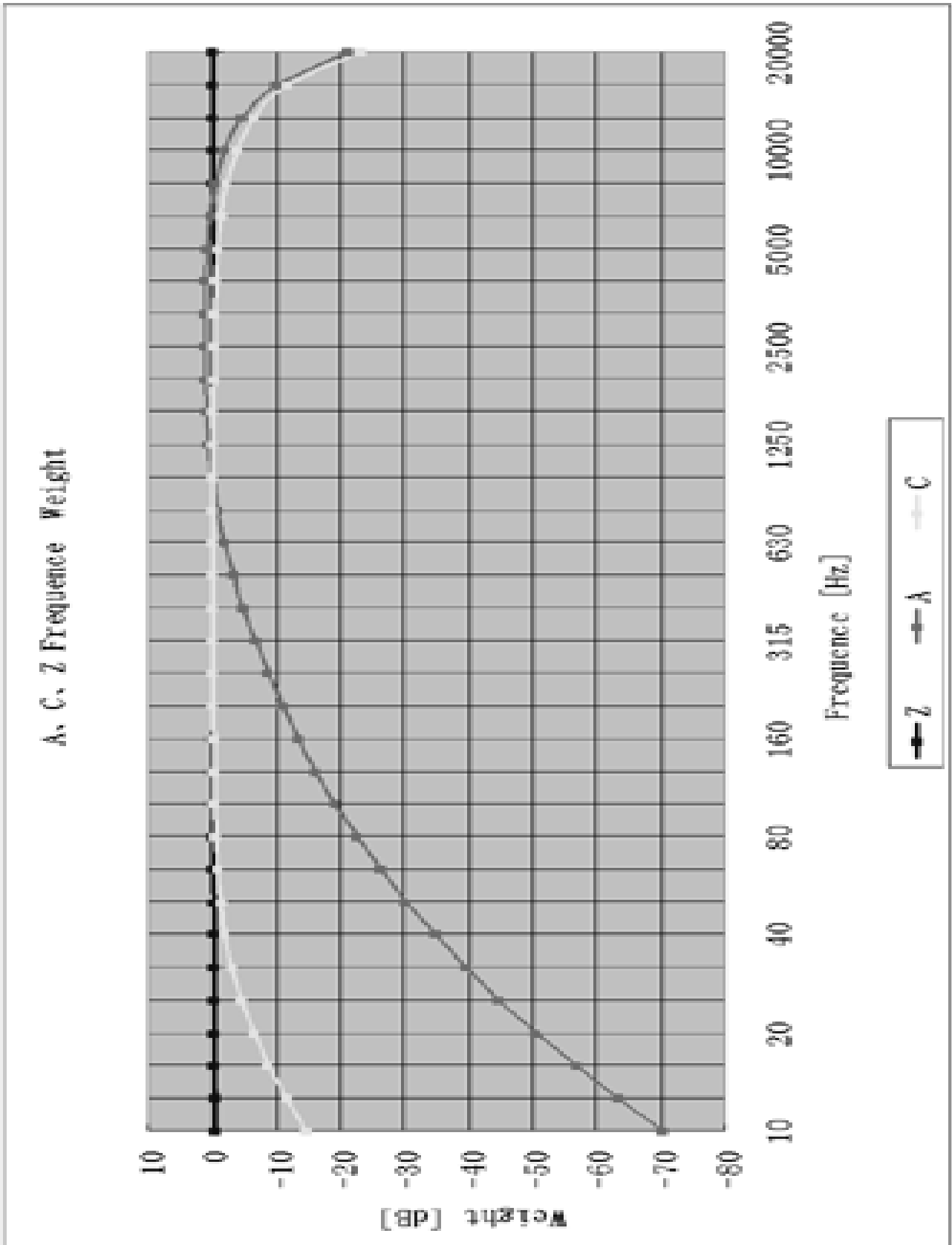


In the integrated measuring process, you cannot exit to the main menu. If necessary, you should stop or delete the measurement in advance. The display lock and the maximum value hold functions do not affect the integrated measuring result. In the integrated measuring process, you cannot select or cancel the display lock and the maximum value hold functions.

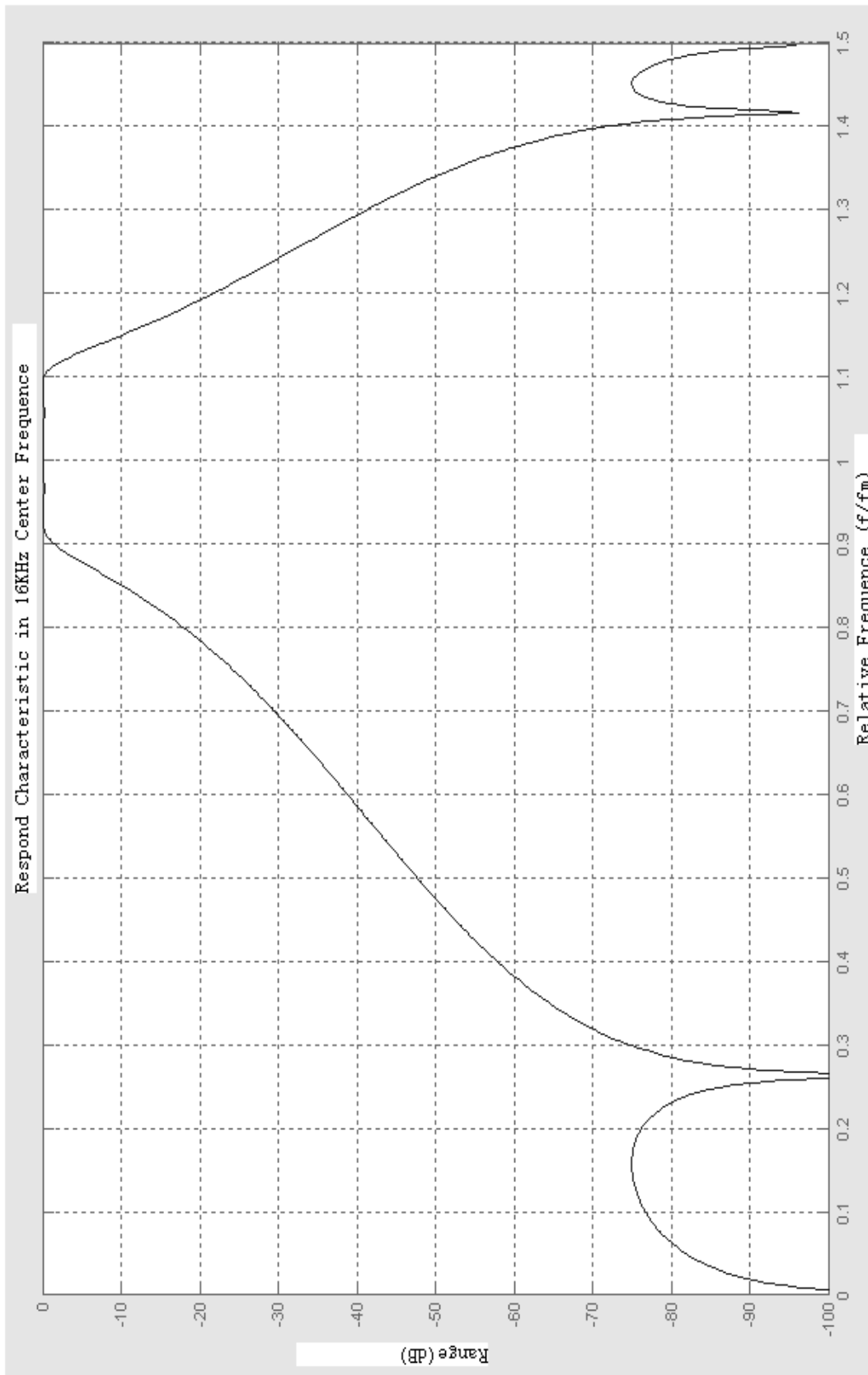
5.6. Record the user parameters

After you press “” key, the analyzer can automatically save the relevant parameters that were used this time. When you start the analyzer next time, the system will automatically import these parameters. The saved content includes the cursor location in the main menu, display index, center frequency, screen button’s functions, set integral measuring time, selected measuring name, start delay time, prompt status before starting, LCD’s contrast, screen copy printing status, range, measuring name selection method, and selected software module.

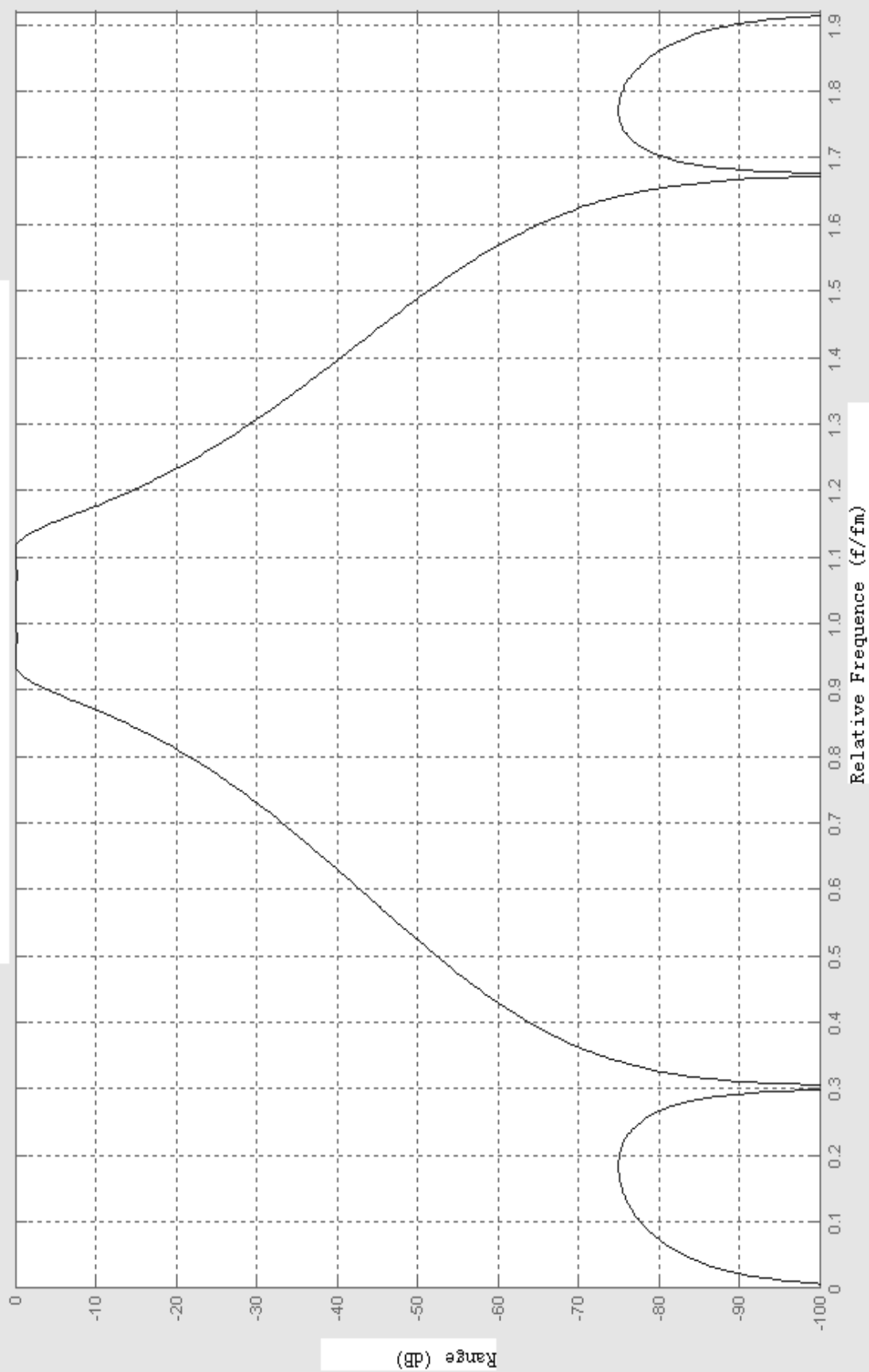
Appendix 1: Frequency weighting characteristics

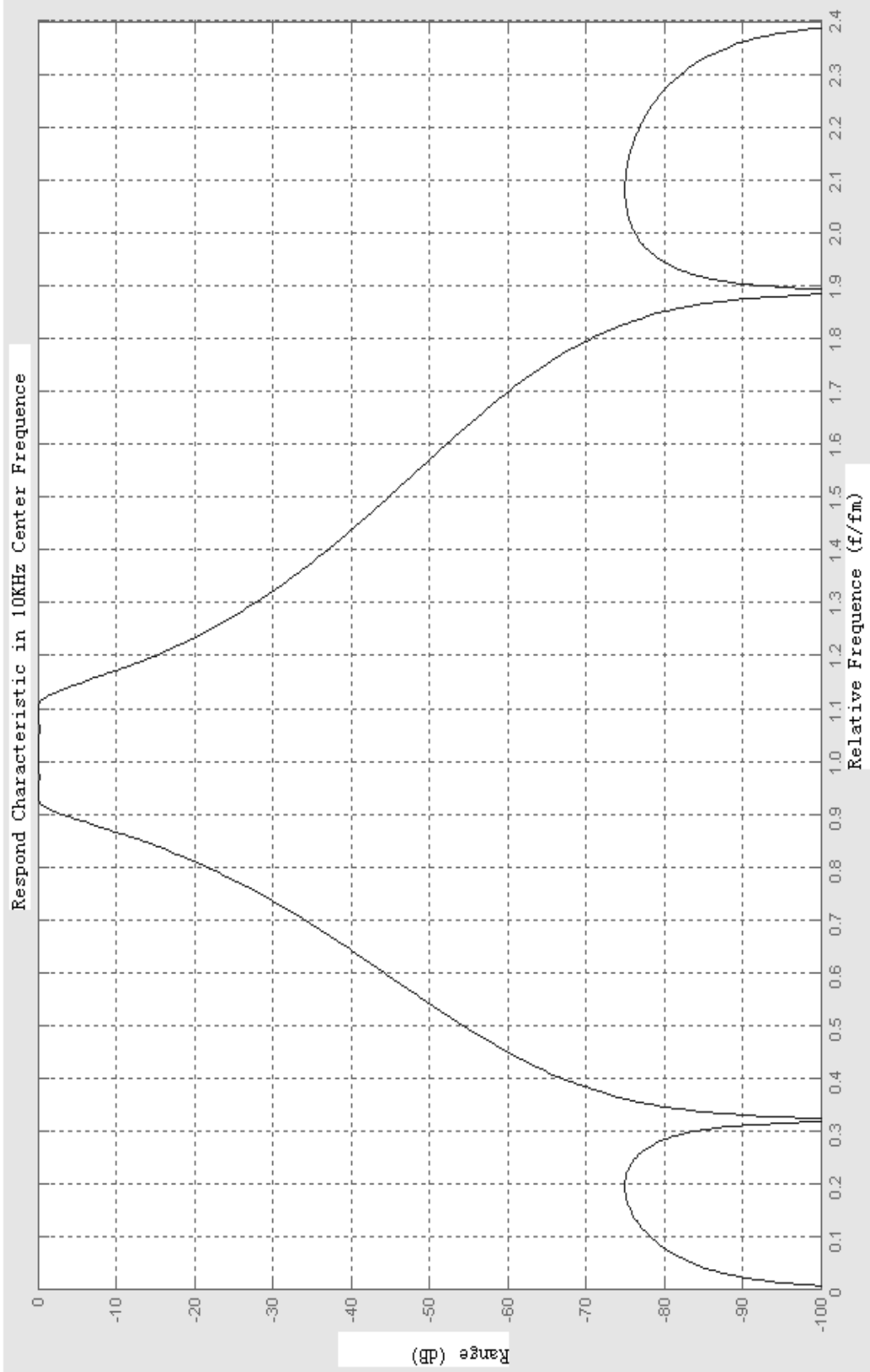


Appendix 2: 1/3 OCT filter characteristics



Respond Characteristic in 12.5KHz Center Frequency

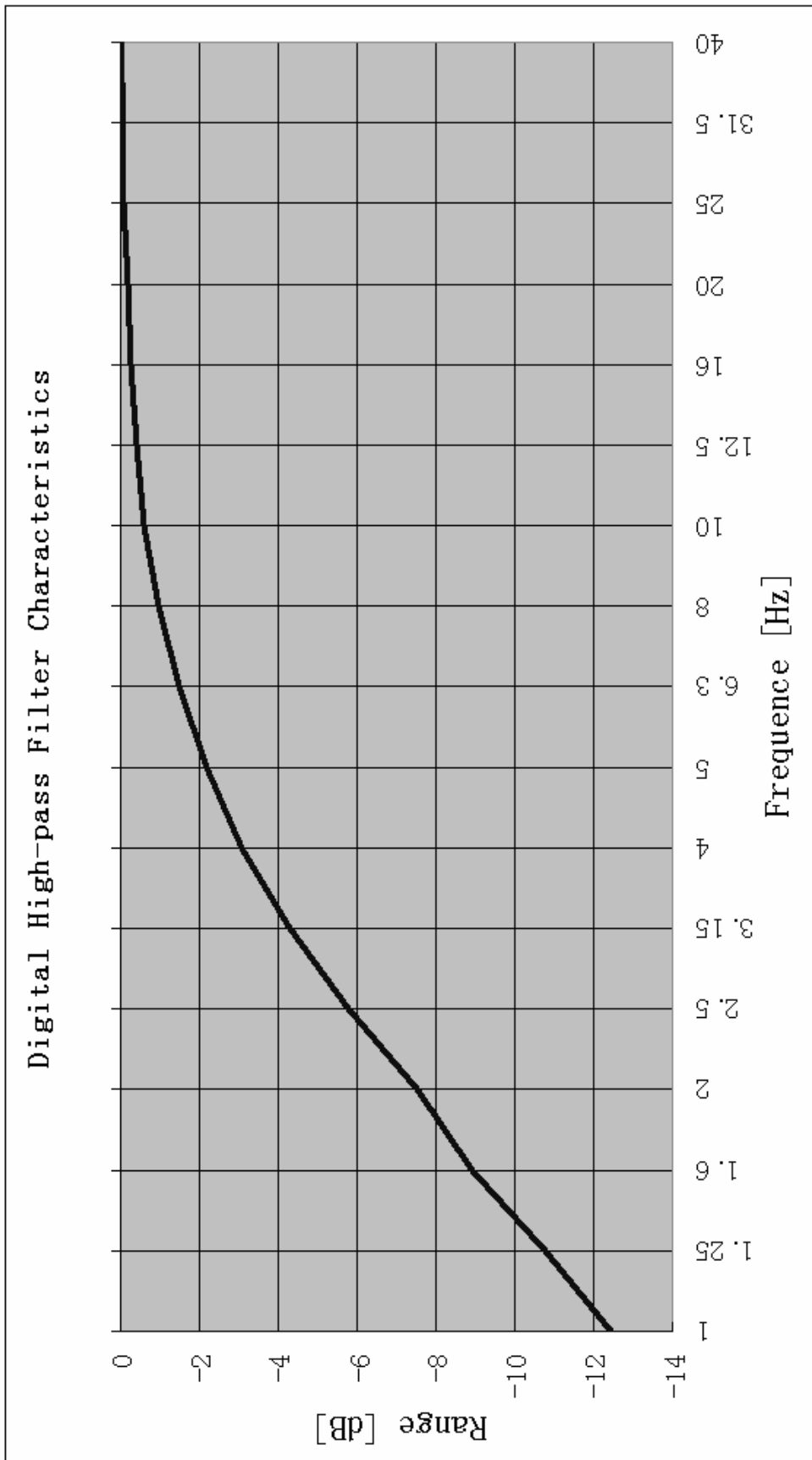




Appendix 3: A, C frequency weighting

Frequency (Hz)	A (dB)	C (dB)	Frequency (Hz)	A (dB)	C (dB)
10	-70.4	-14.3	500	-3.2	0
12.5	-63.4	-11.2	630	-1.9	0
16	-56.7	-8.5	800	-0.8	0
20	-50.5	-6.2	1000	0	0
25	-44.7	-4.4	1250	0.6	0
31.5	-39.4	-3.0	1600	1.0	-0.1
40	-34.6	-2.0	2000	1.2	-0.2
50	-30.2	-1.3	2500	1.3	-0.3
63	-26.2	-0.8	3150	1.2	-0.5
80	-22.5	-0.5	4000	1.0	-0.8
100	-19.1	-0.3	5000	0.5	-1.3
125	-16.1	-0.2	6300	-0.1	-2.0
160	-13.4	-0.1	8000	-1.1	-3.0
200	-10.9	0	10000	-2.5	-4.4
250	-8.6	0	12500	-4.3	-6.2
315	-6.6	0	16000	-6.6	-8.5
400	-4.8	0	20000	-9.3	-11.2

Appendix 4: 4 Hz digital high-pass filter characteristics




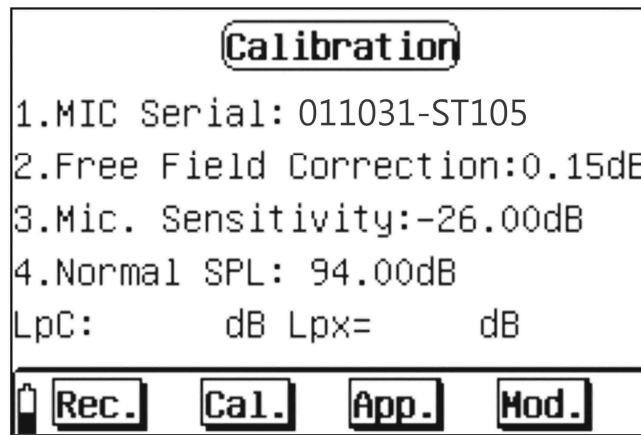
6. ACOUSTIC CALIBRATION INSTRUCTIONS

6.1. Overview

Model ST-105 Sound Analyzer Meter has been calibrated on ex-factory. Acoustical calibration is necessary under measurement standard or after a period time. Acoustical calibration will be done by Model ST-110 Sound Level Calibrator or similar class 1 calibrators. The operating frequency of sound level calibrator should be 1000 Hz \pm 1%, the harmonic distortion of less than 1 %.

6.2. Operation Interface

Move the cursor to “Calibrate” icon and press “” key, it will display:



The first line below acoustical calibration interface is the microphone’s serial number, which is set at ex-factory and can not be modified by user.

The second line is the microphone’s free field correction, which is set according to the microphone’s type. When ST-105 Sound Analyzer Meter uses 1/2” free field microphone, its correction between sound pressure field and free field is 0.15 dB at the frequency of 1 kHz.

The third line is microphone’s sensitivity level, which is the sensitivity output level of preamplifier when preamplifier is set on the microphone. The microphone should be calibrated to get a new sensitivity level when the preamplifier is replaced, as the amplifier has a certain input capacitance and gain.

The fourth line is calibrator’s sound pressure level, which is the actual sound pressure level after sound level calibrator is checked.

The fifth line shows the calibration result. When the analyzer is calibrated by C weight, “Lpx=” indicates the microphone’s current sensitivity level.

The last line is menu, the left of it is battery level, “Rec” button is used to view the calibration records, “Cal” button is used to start the sound calibrating, “App” button is used to store the calibration result and use the new sensitivity level for the measurement later, “Mod” button allows user to adjust the free field correction, the microphone sensitivity level and the calibration sound pressure level.

6.3. Acoustical Calibration with ST-110

For the first acoustical calibration, set “calibrator sound pressure level” according to the verification certification of ST-110 Sound Level Calibrator. In general, the sound level calibrator’s sound pressure level is 94.0 dB, when the measured sound pressure level is not 94.0 dB, calibrate by the actual result, for example, if 94.2 dB, move cursor to “Mod” button, press “←” key, then press “←” and “→” keys to ‘4.’, and press “▲” or “▼” key to adjust the value to 94.2. Press “▲” or “▼” key once, the value will increase/decrease by 0.01 dB, when press “▲” or “▼” key continuously, the value will increase/decrease by 1 dB continuously until release the key. Then move the cursor to “Mod” button, and press “←” button.

CAUTION



The above step is carried only when the indicated calibrator’s sound Pressure is different from that of the working sound level calibrator.

Set the ST-110 Sound Level Calibrator on the microphone, turn on the power, and wait a few seconds until the system runs steady. Move the instrument’s cursor to “calibrate” button, press “←” key, then instrument will calibrate automatically. “Lp C” indicates the sound pressure level, which is around the result that subtracts free field correction from sound pressure level of calibrator. “Lpx” indicates the sensitivity level. The value showed on the display’s top left corner starts from 0 and stops at 9. Move cursor to “App” button, press “←” key, then microphone’s new sensitivity level is stored. If the difference is more than 3 dB between the new and stored sensitivity-values, the instrument will indicate “The difference between These two sensitivity is too large!(refer to Fig. 5),Please affirm the calibration is correct!” user should check if the microphone is damaged. If user does not press “←” key on “App” button, the analyzer still uses the original sensitivity level.

Warning

Old Sensitivity: -35.62 dB
New Sensitivity: -70.36 dB
The Difference Between These
Two Sensitivity is Too Large!
Please Affirm The Calibration
is Correct!

Fig. 5

6.4. Direct Input Sensitivity

When there is no calibrator, microphone’s sensitivity level can be input directly. Move cursor to “Mod” button, press “←” key, then move cursor to “3.”, and adjust to the required value by pressing “▲” or “▼” button. Press “▲” or “▼” key once, the value will

increase/decrease by 0.01 dB, when depress "▲" or "▼" key continuously, the value will increase/decrease by 1 dB continuously until release the key. Move cursor to "App" button, press "↔" key, then microphone's new sensitivity level is stored.

6.5. View Calibration Record

Model ST-105 Sound Analyzer Meter can store every calibration record with a maximum of 256 times. If exceeding 256 records, it automatically removes the 250 records and stores the latest one. Move cursor to "Rec" button, press "↔" key, it indicates as below:


When the data cannot be showed on one screen, press "▲" or "▼" to page-up or page-down, the most left number of the first line on the screen is page number. If you want to print the calibration records out, you have to go to "Setup" in the main menu and turn "Screen Print" to "On" in order to print the records out. After "Screen Print" in the menu

"Setup" is set at "On", go back to Calibration records and then press "Output" button to print the calibration records.

Correction	Date	Sensitivity
2008-09-20	10:22:39	-26.00dB
2008-09-20	10:23:40	-27.31dB

7. PARAMETER SETTING OPERATING INSTRUCTIONS OF (ST-105/ST-105L/ST-105S)

7.1. Overview

Before start your test, set up the parameters like measuring name and measuring time etc. You can enter the parameter setup interface from the main menu or by press “” key in the measuring interface. The analyzer will save the setting parameters automatically when it is turned off, and import them automatically when it is turned on next time.









CAUTION






When the measurement is running, you cannot enter the parameter setup.

7.2. Operation Interface


After enter the “Parameter Setup” sub-menu, you will find a screen as shown below:

Vcc=4.77V Setup Vbat=2.87V	← Line 1
1.Name:Measure_Data00 @ 1	← Line 2
2.Name Choice:Manual To 1:256	← Line 3
3.Setup Before Start:No	← Line 4
4.Delay(s): 0	← Line 5
5.Screen Print:Off	← Line 6
6.Integral Time:Ts=00h00m59s	← Line 7
Release Date:Sep 20 2008	← Line 8



Line 1	In the line 1 both sides show the battery voltage and back-up battery voltage separately. The value is calculated in V with two decimal digits. In case that the voltage is over 10 V, the screen will display “Over
Line 2	The line 2 is the measuring name. The measuring result will save the used measuring name in the next measurement. “@ 1” behind the measuring name means that the position of this measuring name in the prestored measuring name is 1. You can move the cursor to “1”, and press “  ” and “  ” keys to select the previous or next prestored measuring name separately.
Line 3	In the line 3 it is possible to define “Auto” or “manual” measure name,by using the “  ” and “  ” keys,two modes are available: <ul style="list-style-type: none"> ● Auto → the measute name is automatically changed by the instrument each time a new measurement is started. ● Manual→ the measure name is not changed automatically by the instrument and only the user can make the change.
Line 4	In the line 4, the end is “No”, which means you can start integrated measurement by pressing start-up key. When you use “  ” and “  ” keys


	<p>to change “No” to “Yes”, first of all, enter parameter setup by pressing “” key, and set the measuring name and integrated measuring time etc. Then, press “” key to start measuring. In this way, you can clearly know the measuring name and integrated measuring time of each measurement.</p> <p>Note: This function does not work in the 24H measurement mode</p>
Line 5	<p>In the line 5, means that the integrated measurement will begin after you press the start-up key for a while. The delay time is determined by the value behind. You can move the cursor to “4”, and use “” and “” keys to adjust the delay time within the range of 0 to 10. “0” means no delay time.</p> <p>Note: This function does not work in the 24H measurement mode.</p>
Line 6	<p>In the line 6 decides whether to print the contents shown on the LCD display with micro printer when you press the “” key. You can press “On” to print, or press “Off” to shut down this function.</p>
Line 7	<p>In the line 7 shows the setting measuring time. You can set the measuring time at your will from 1 s to 24 h.</p> <p>The analyzer will save the above settings automatically when it is turned off, and import them automatically when it is turned on next time without the need to reset.</p>
Line 8	<p>The last line shows the release date of the software.</p>

7.3. Presorted Measuring Name Examination


As shown below, in the “Setup” interface, when the cursor is on “2”, you can press “” key to enter the display interface of the prestored measuring name list:

Num	Name
1	MEA1
2	MEA2
3	MEA3
4	MEA4
5	MEA5
6	MEA6
7	MEA7
8	MEA8
9	MEA9






The first row is location number; the second row is measuring name. The measuring name can be English letters or numbers, no more than 14 characters. If there are still some prestored file names upwards and downwards, you can use “” and “” keys to

turn the page up or down. After you finish examination, press “” key to return to “Setup” interface.





7.4. Presorted Measuring Name Input

As shown below, in the “Setup” interface, when the cursor is on “1”, you can press “” key to enter the measuring name input interface:

```
Input Name:
-----
Press Enter Key Into The Edit
Status.Then,Press Left Or Right
Key To Move Cursor.Press Enter
Key To Choose The Character
.Press Del Key To Deletet The
Last Character Which Has Chose
n.Press Setup Key To Write The
Name.
```

When the cursor is on the characters for your selection, you can press “” and “” to move the cursor. When the cursor is moved to the desired character, press “” key, and this character is copied to the measuring name input interface. If there is no desired character in the current characters zone, you can press “” and “” keys to turn the page up or down to look for other characters.





```
Input Name:
-----
ABCDEFGHIJKLMNO
PQRSTUVWXYZ0123
456789
```

Move the cursor in the same method as above. Press “” key to copy the desired character to the measuring name input interface. If the input is incorrect, you can press “” key to delete the character. The measuring name should not exceed 14 characters. One Chinese character occupies two characters’ position. When the characters reach 14, no more characters can be inputted. After input the characters, you can press “” key to save the inputted measuring name. The last line of the display shows the saved location number. Press “” key to return to the “Setup” interface.

Note: The analyzer can prestore 256 measuring names at most. When exceeds 256, the analyzer will delete the previous 256 measuring names automatically, and only save the latest one.

As the efficiency of inputting the measuring name to the analyzer is low, it is recommended to enter all prestored measuring name to the computer, then transfer them to the analyzer with RS232 interface. Delete the previous prestored measuring name before transmission. Refer the relevant operation to the instruction of the bound software.


7.5. Integrated Measuring Time Setting

For Model Sound Analyzer Meter, you can set the integrated measuring time in given levels or in h/m/s. There are 13 given levels: manual setting, 10 s, 1 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h, 4 h, 8 h and 24 h. In the "Parameter Setup" interface, you can move the cursor to "6", and press "" and "" keys to switch the integrated measuring time within these 13 levels in sequence. If you cannot find the desired integrated measuring time within these 13 levels, you can move the cursor to the h, m, s of the "Ts=00 h00 m00 s", and press "" and "" keys to set the h, m, s of the integrated measuring time separately.

The analyzer will save the setting parameters automatically when it is turned off. It will import them automatically when it is turned on next time.

8. PARAMETER SETTING OPERATING INSTRUCTIONS OF (ST-105D)

8.1. Overview

Before start your test, set up the parameters like measuring name and measuring time etc. You can enter the parameter setup interface from the main menu or by press "" key in the measuring interface. The analyzer will save the setting parameters automatically when it is turned off, and import them automatically when it is turned on next time.



CAUTION



When the measurement is running, you cannot enter the parameter setup.

8.2. Operation Interface

1. After enter the “Parameter Setup” sub-menu, you will find a screen as shown below:








VCC=4.72V	Setup 1	Vbat=2.61V	← line 1
1. Name: MEASURE_DATA00	@ 1		← line 2
2. Name Choice : Hand	Total : 0		← line 3
3. Show setup before	start : No		← line 4
4. Delay times(s):	0		← line 5
5. Screen Print :	off		← line 6
6. RTC :2010-05-25	09: 16:4	Tue	← line 7
7. Integral Time :Ts	=00h00m00s		← line 8
8. Run mode:▲T= 5m	9. Log :off		← line 9

Line 1	In the line 1 both sides show the battery voltage and back-up battery voltage separately. The value is calculated in V with two decimal digits. In case that the voltage is over 10 V, the screen will display “Over”
Line 2	The line 2 is the measuring name. The measuring result will save the used measuring name in the next measurement. “@ 1” behind the measuring name means that the position of this measuring name in the prestored measuring name is 1. You can move the cursor to “1”, and press “▲” and “▼” keys to select the previous or next prestored measuring name separately.
Line 3	In the line 3 it is possible to define “Auto” or “manual” measure name, by using the “▲” and “▼” keys, two modes are available: <ul style="list-style-type: none"> ● Auto → the measure name is automatically changed by the instrument each time a new measurement is started. ● Manual → the measure name is not changed automatically by the instrument and only the user can make the change.
Line 4	In the line 4, the end is “No”, which means you can start integrated measurement by pressing start-up key. When you use “▲” and “▼” keys to change “No” to “Yes”, first of all, enter parameter setup by pressing “Start/Pause” key, and set the measuring name and integrated measuring time etc. Then, press “Exit” key to start measuring. In this way, you can clearly know the measuring name and integrated measuring time of each measurement. <p>Note: This function does not work in the 24H measurement mode</p>
Line 5	In the line 5, means that the integrated measurement will begin after you press the start-up key for a while. The delay time is determined by the value behind. You can move the cursor to “4”, and use “▲” and “▼” keys to adjust the delay time within the range of 0 to 10. “0” means no delay time. <p>Note: This function does not work in the 24H measurement mode</p>
Line 6	In the line 6 decides whether to print the contents shown on the LCD display with micro printer when you press the “Output” key. You can press “On” to print, or press “Off” to shut down this function.
Line 7	The line 7 shows the calendar clock, cursor in it, you can modify the clock
Line 8	In the line 8 shows the setting measuring time. You can set the measuring time at your will from 1 s to 24 h. The analyzer will save the above settings automatically when it is turned


	off, and import them automatically when it is turned on next time without the need to reset.
Line 9	<p>The Line 9 shows start measuring and recording mode, startup available in "(Button)", ">XXdB", "$\Delta T = XXm$". Select "(Button)" means the user according to the Panel on the  button to begin integrating measurement; select ">XXdB," said the instantaneous values over A weighted 0dB to start automatically.</p> <p>Select the "integral; $\Delta T = XXm$" ; When set the measurement mode, the integral measurement will be automatically started.</p> <p>The start time is related to the integral:</p> <p>Example 1. If set integral 5 seconds, $\Delta t=10s$, log: off, then record a sum of 10 seconds , total recorded 10 data.</p> <p>Example 2. If set integral 15 seconds, $\Delta t=10s$, log: off, then record a sum of 20 seconds , total recorded 20 data.</p> <p>Example 3. If set integral 5 seconds, button, log:1.0s , then 1 seconds record a data , total recorded 5 data.</p> <p>Example 4. If set integral 5 seconds, button, log:0.5s , then 0.5 seconds record a data , total recorded 10 data.</p> <p>Example 5. If set integral 5 seconds, Button, log:0.1s , then 0.1 seconds record a data , total recorded 50 data.</p> <p>Example 6. If set integral 5 seconds, when button, log:31ms , Per second to record 31 data , total recorded 155 data.</p> <p>PS:</p> <ol style="list-style-type: none"> 1. Statistical analysis (Srat. Analyzer 00101) Without log function, please set "Run mode" as Button, "Log" sets as Off. 2. Record counted because time counts the question, will reduce slightly sometimes. 3. Stop the auto integral: When Tm stops counting, press  exit.

2. Set 2 (Setup2): "Setup1" and press the "" key, instrument set 2 "interface, shown below:




VCC=4.75V	Setup 2	Vbat = 2.67V	← line 1
1. Contrast : 24			← line 2
2. Auto enter : No			← line 3
3. Auto ON : 00d00h00m Sun [N]			← line 4
4. Auto OFF : **d**h**m **** [N]			← line 5

Line 1	In the line 1 both sides show the battery voltage and back-up battery voltage separately. The value is calculated in V with two decimal digits. In case that the voltage is over 10 V, the screen will display "Over"
Line 2	LCD contrast value adjustment , by using the "  " and "  " keys.
Line 3	When you select Yes, the instrument can automatically enter after powering on the cursor location in the main menu and the submenu, , by using the "  " and "  " keys.
Line 4	The line 4 shows Real Time Clock, then there are four can be set up, namely the "day", "time", "minutes", "week", the line's last "[N]" indicates that this feature is valid, when "N", this function is not valid, selected "Y", this feature effectively, user system, instrument automatically determine whether the current time and target content to match, matches will automatically turn on the power. In the "day", "time", "minutes", "week" location if you appear as "****" indicates that this item is not involved in the comparison. Move the cursor to "day", "time", "minutes", "week" location, press the "  " and "  " keys can be individually adjusted post of the "day", "time", "minutes", "week", press the "  " key, the corresponding Office display becomes "****", indicates that this item is not involved in the comparison. For example, regular boot after showing: "***d08h00m **** [Y]" Daily 8 point automatically power on "***d08h00m MON [Y]" Every Monday 8 point automatically power on
Line 5	The Line 5 to display the scheduled shutdown time, set the mode: same as above


8.3. Presorted Measuring Name Examination

As shown below, in the "Setup" interface, when the cursor is on "2", you can press "" key to enter the display interface of the prestored measuring name list:

Num	Name
1	MEA1
2	MEA2
3	MEA3
4	MEA4
5	MEA5
6	MEA6
7	MEA7
8	MEA8
9	MEA9

The first row is location number; the second row is measuring name. The measuring name can be English letters or numbers, no more than 14 characters. If there are still some prestored file names upwards and downwards, you can use “” and “” keys to turn the page up or down. After you finish examination, press “” key to return to “Setup” interface.






8.4. Presorted Measuring Name Input

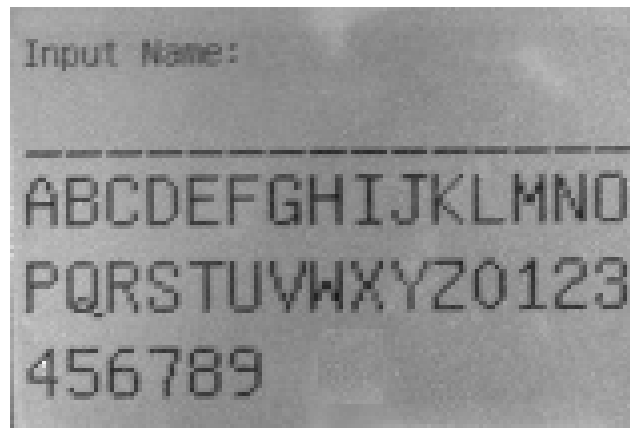
As shown below, in the “Setup” interface, when the cursor is on “1”, you can press “” key to enter the measuring name input interface:





```

Input Name:
-----
Press Enter Key Into The Edit
Status.Then,Press Left Or Right
t Key To Move Cursor.Press Ent
er Key To Choose The Character
.Press Del Key To Deletet The
Last Character Which Has Chose
n.Press Setup Key To Write The
Name.

```

When the cursor is on the characters for your selection, you can press “” and “” to move the cursor. When the cursor is moved to the desired character, press “” key, and this character is copied to the measuring name input interface. If there is no desired character in the current characters zone, you can press “” and “” keys to turn the page up or down to look for other characters.







Move the cursor in the same method as above. Press “” key to copy the desired character to the measuring name input interface. If the input is incorrect, you can press “” key to delete the character. The measuring name should not exceed 14 characters. One Chinese character occupies two characters’ position. When the characters reach 14, no more characters can be inputted. After input the characters, you can press “” key to save the inputted measuring name. The last line of the display shows the saved location number. Press “” key to return to the “Setup” interface.

Note: The analyzer can prestore 256 measuring names at most. When exceeds 256, the analyzer will delete the previous 256 measuring names automatically, and only save the latest one.



As the efficiency of inputting the measuring name to the analyzer is low, it is recommended to enter all prestored measuring name to the computer, then transfer them to the analyzer with RS232 interface. Delete the previous prestored measuring name before transmission. Refer the relevant operation to the instruction of the bound software.

8.5. Integrated Measuring Time Setting

For Model Sound Analyzer Meter, you can set the integrated measuring time in given levels or in h/m/s. There are 13 given levels: manual setting, 10 s, 1 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h, 4 h, 8 h and 24 h. In the “Parameter Setup” interface, you can move the cursor to “6”, and press “” and “” keys to switch the integrated measuring time within these 13 levels in sequence. If you cannot find the desired integrated measuring time within these 13 levels, you can move the cursor to the h, m, s of the “Ts=00 h00 m00 s”, and press “” and “” keys to set the h, m, s of the integrated measuring time separately.



The analyzer will save the setting parameters automatically when it is turned off. It will import them automatically when it is turned on next time.

8.6. Start-up setting



Move the cursor to “8”, use “” and “” to choose from “press”, “>xxdB” and “ $\Delta T=xx$ ”. Choose “” press “ok” then xx value plus 1, this value is the exceeded limit to start. When the measured A weighting and F time weighting in excess of this value, the instrument will start integral measuring automatically. Choose “ $\Delta T=xx$ ” press “ok” then choose from “5min”, “10min”, “20min”, “30min” and “1h”, which means the instrument will do the according interval measuring automatically. When auto-start measuring time can be divided by the selected interval, the set parameters will automatically saved when it’s swift off, and also auto fold the pre-set outcome.

Note: when select overrun or interval start, press the start key to start the measuring.

8.7. Calendar clock adjustment

Move the cursor to “year”, “month”, “day”, “hour”, “minute”, and “second” of clock “6 clock”, use “” and “” to modify correspondingly as required.

8.8. Auto-start, auto-measuring and auto-end settings


Move the cursor to “Line9” **Run mode** to choose over limit set up or interval set up as required. Press “” to enter into “setup 2”, the cursor moves to the “Line4”, set the startup time, and then select this feature ,and move the cursor to “Line5” :Auto OFF” to set up the end time, then select the function again. Exit from the set up interface, enter into the measuring interface, press “”, The instrument will auto-start at the set start-time, seconds later enter the measuring interface and start measuring automatically. Suggest users set up under measuring interface, and then can swift off directly. By using this method users can select any start and end time.



9. DATA MANAGEMENT OPERATING INSTRUCTIONS

9.1. Overview

Model ST-105/ST-105S/ST-105L has 64k Flash Ram for storing the measured results. Each measured result takes up 512 bytes, Model ST-105D has 64M Flash Ram for storing the measured results. Each measured result takes up 512 bytes, therefore the analyzer can store 12288 groups of data. The data stored in the analyzer can be transferred to the Flash disk through the USB interface, or transferred to the computer through the RS-232 or USB interface. The measured result stored in the analyzer can be recalled in the data management menu, or printed out through the mini-printer.

9.2. Data Recall

In the main menu, when you move the cursor to "Data" menu and press  key, you can start the data management function. The display shows the list of the measured results.

On the display, the first column displays the location number of the measured result stored in the analyzer. The second column is the measuring name used by the measured result. The third column is the measuring date. You can display the starting time and measuring method of the measured result by pressing  and  keys.

In the measuring modes, the common measuring mode codes include:

Num	Name	Date	Num	Time	Mode
0	MEA1	2008-09-10	0	15:45:19	STA Tm=00h01m00s
1	MEA2	2008-09-12	1	15:47:41	INT
2	MEA3	2008-09-13	2	15:49:07	24H 1 Tm=00h01m0
3	MEA4	2008-09-14	3	15:52:36	OCT
4	MEA5	2008-09-20	4	15:52:49	ALL
5	MEA6	2008-09-20	5	15:53:21	1/3OCT
6	MEA7	2008-09-20	6	15:53:56	ALL
7	MEA8	2008-09-20			
8	MEA9	2008-09-20			

24Hxx: 24H measured result in the statistic analysis software. The latter two characters means the interval number.





ALL: Total analysis result.



OCT: OCT analysis result in the 1/1 OCT analysis software. (ST-105 / ST-105D)

STA: Statistic analysis result in the statistic analysis software.

INT: Integral measured result in the statistic analysis software.

1/3 OCT: 1/3 OCT analysis result in the 1/3 OCT analysis software. (ST-105 / ST-105D)

You can move the cursor downwards with  key. When it is moved to the last line, the content in the next page will be displayed if you continue to press  key. After all measured results stored in the analyzer are listed, the cursor cannot be moved downwards. Similarly, you can move the cursor upwards with  key. When the cursor is moved to the location number 0, you cannot move it upwards again. When you move the cursor on the number of the measured result, you can view the details by pressing  key. If you


press  key, you can exit to the main menu. If you press  key, you can print out the stored result pointed by the cursor through the mini-printer.


CAUTION



Data Transfer to flash disk only works for the Flash disk that came with the sound analyzer. Please, bring the Flash disk that came with the analyzer every time when you want to save the previous measuring results from the analyzer.




9.3. Data Transferred to Flash Disk

After you enter the “Data” menu and press “” key, the screen asks you to insert a Flash disk. After you insert the formatted Flash disk into the analyzer through the Flash disk line, the analyzer starts initializing the Flash disk and displays the Flash disk’s total section number and free section number. The system will check whether there is enough space in the Flash disk. If not enough, the system will prompt you. Afterwards, the system will in the Flash disk’s root directory create a new folder in the name of the current date and transfer the measured results stored in the analyzer to this new folder. Each group of measured results is stored in one text file. The name of the text file is the first six characters of the measuring name plus two location numbers. Its extension is “.TXT”. After transferring the data, the analyzer will notify the number of transferred files. Turn off the analyzer’s power supply and take the Flash disk out. Insert the Flash disk into the computer and you can see the measured results on the computer.

When the system ask you to insert the Flash disk and you do not want to transfer the data, you can press “” key to exit to the main menu.



9.4. OCT Analysis Result Recall (ST-105 / ST-105D)

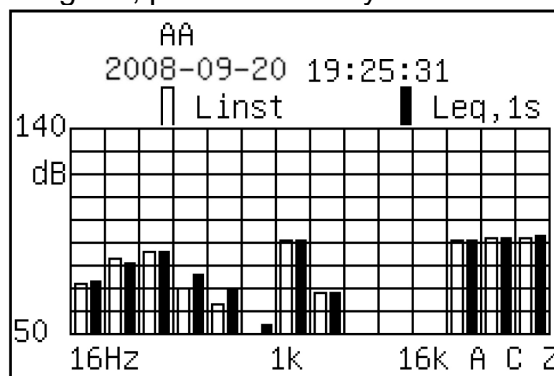
After entering the “Data” menu, when you select the measured result which was obtained by OCT analyzer and press “” key, it will displays the content of the measured result in details. If they cannot be displayed in one page, press “” key to display the next page, or press “” key to return the previous page.

AA	500Hz: 50.93dB	54.89dB
2008-09-20 19:25:31	1000Hz: 91.56dB	91.56dB
OCT	2000Hz: 68.00dB	68.00dB
R:50dB-140dB	4000Hz: 49.52dB	49.54dB
Freq Linst Leq,1s	8000Hz: 31.95dB	31.98dB
16Hz: 72.84dB	16kHz: 36.22dB	37.27dB
31.5Hz: 83.52dB	LA : 91.47dB	91.48dB
63Hz: 86.44dB	LC : 92.40dB	92.73dB
125Hz: 70.49dB	LZ : 92.75dB	93.16dB
250Hz: 63.26dB		

When the OCT analysis result is saved, the first line is the measuring name. The second line is the date and time when the measuring is started. The third line is the measuring mode. If the saved result is integrated value, the integrated time is also displayed. The fourth line is the measuring range. The fifth line is the measuring index (MaxLeq1s, Leq.T or Linst, Leq.1s). From the sixth line, it displays each center frequency and the sound pressure level under three frequency weighting modes.

After connecting the analyzer and the mini-printer with printing cable and turning on the printer's power, press "Output" key on the analyzer panel to print the OCT analysis result and spectrogram through the mini-printer. Press "←" key to display the spectrogram.

After viewing the spectrogram, press "Exit" key to return the list display interface.



9.5. Total Analysis Result Recall (ST-105 / ST-105D/ST-105L)



In the OCT and 1/3 OCT analysis software, the total analysis result's saving format is shown as below:

```
MEASURE_DATA
2008-09-20 09:21:20
STA Tm=00h01m00s
R:50dB-140dB
LAeq,T= 49.8dB LAFmax= 65.7dB
LAE = 67.5dB LAF5 = 54.5dB
LAFeqT= 49.7dB LAF10= 53.0dB
SD = 3.6dB LAF50= 47.1dB
Ts=00h01m00s LAF90= 43.6dB
LAFmin= 42.4dB LAF95= 43.3dB
```






```
LCEq,1s= 63.07dB
LZeq,1s= 68.19dB
```

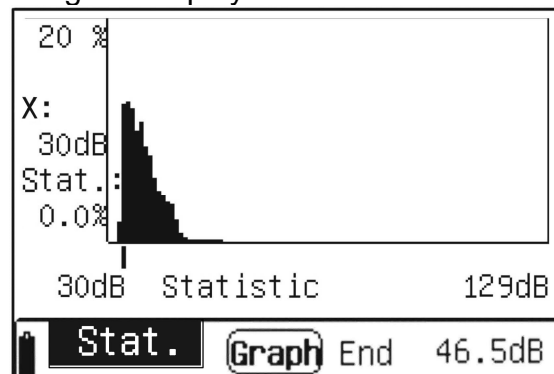
The first line is the measuring name. The second line is the date and time when the instant value is stored. The third line is the measuring mode. The fourth line is the measuring range. From the fifth line, it displays the instant value. If there is integrated measured result, it also displays the date and time when the integral is started as well as the integrated measured result.

9.6. Statistic Analysis Result Recall (ST-105 / ST-105D/ST-105S)

The first line is the measuring name. The second line is the date and time when the measuring is started. In the third line, “**STA**” means it is statistic analysis result. The latter is the integrated measuring time. The fourth line is the measuring range. From the fifth line, it displays the analysis result. In this list display interface, press “” key to print the stored content through the mini-printer. Press “” key to display the statistic distribution diagram.

```
MEASURE_DATA
2008-09-20 09:21:20
STA Tm=00h01m00s
R:50dB-140dB
LAeq,T= 49.8dB LAFmax= 65.7dB
LAE = 67.5dB LAF5 = 54.5dB
LAFeqT= 49.7dB LAF10= 53.0dB
SD = 3.6dB LAF50= 47.1dB
Ts=00h01m00s LAF90= 43.6dB
LAFmin= 42.4dB LAF95= 43.3dB
```

Press “” key again to display the accumulated distribution diagram. In the distribution diagram display, you can view the statistic percentage and accumulation percentage under different sound pressure levels by pressing “” and “” keys. The sound pressure level is increased or decreased by each time you press the two keys. In the distribution diagram display, press “” key to return the list display. Press “” key to print out the distribution diagram displayed on the screen through the mini-printer.



9.7. 24H Measured Result Recall (ST-105 / ST-105D/ST-105S)

24H measured result’s saving format is the same as the statistic analysis’ saving format. After entering the “Data” menu, when you select any group of measured result which was

obtained by 24H measuring and press “←” key, you will go to the measured result list display interface of the current interval.

```

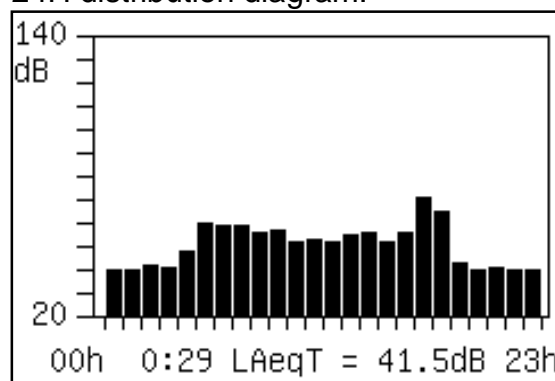
MEASURE_DATA
2008-09-20 12:29:52
24H19 Tm=00h01m01s
R:30dB-120dB
LAeq,T= 53.2dB LAFmax= 70.1dB
LAE = 71.1dB LAF5 = 58.2dB
LAFeqT= 53.2dB LAF10= 54.6dB
SD = 0.5dB LAF50= 43.4dB
Ts=00h01m01s LAF90= 41.4dB
LAFmin= 42.4dB LAF95= 41.3dB
    
```

Press “←” key to go to 24H result list display interface.

hh:mm	LAeqT	Lmax	Lmin	L5	↓
0:29	41.5	42.3	40.6	42.5	
1:29	41.7	42.6	40.8	42.5	
2:29	43.4	53.7	41.0	43.5	
3:29	42.6	45.8	40.9	43.7	
4:29	49.9	60.5	42.5	46.3	
5:29	61.3	77.2	42.9	54.4	
6:29	60.2	82.5	42.6	56.7	
7:29	60.2	84.1	43.8	57.2	

In this interface, it displays eight intervals' four different measuring index. By pressing “←” and “→” keys, you can change the display index. Pressing “▲” and “▼” keys, you can view the measured results and Ld, Ln, Ldn in other intervals. Press “Output” key to print the 24H measured result and 24H distribution diagram through the mini-printer.

Press “←” key to display 24H distribution diagram.




In the 24H distribution diagram display interface, press “←” and “→” keys to change the display index. You can view the measuring data in other intervals with “▲” and “▼” keys. Press “Exit” key to return to the measuring result list display interface of the current interval.

9.8. Integrated Measuring Result Recall (ST-105 / ST-105D/ST-105S)

In the statistic analysis software, the integrated measuring result's saving format is shown as below:

```
MEASURE_DATA
2008-09-20 11:45:01
INT
R:50dB-140dB
LAFp= 50.21dB  LAsp = 49.73dB
LCFp= 60.43dB  LCSp = 59.16dB
LZFP= 66.57dB  LZSp = 64.33dB
LAIp= 52.48dB  LAeq1s= 49.05dB
LCIp= 61.93dB  LCeq1s= 58.93dB
LZIp= 68.72dB  LZeq1s= 64.11dB
```

The first line is the measuring name. The second line is the date and time when the instant value is saved. The third line is the measuring mode. The fourth line is the measuring range. From the fifth line, it displays the instant values. If there is integrated measuring result, you can press “” key to view the next page.

The first line is the date and time when the integral is started. The second line is the preset measuring time and actual measuring time. The following lines are the integrated measured results.

```
LCeq,1s= 63.07dB
LZeq,1s= 68.19dB
2008-09-20 22:22:58
Ts=00h01m01s    Tm=00h01m01s
LAeqT= 62.14dB  LCeqT= 65.26dB
LZeqT= 70.28dB  LAE = 79.99dB
Cp+ =105.08dB  Cp- = 97.88dB
E= 0.000PaPah
OVER:
```

9.9. 1/3 OCT Analysis Result Recall (ST-105 / ST-105D/ST-105L)

When entering the “Data Management” menu, you can move the cursor to the measured result obtained by 1/3 OCT analysis by pressing “” and “” keys. Press “” key to display the content of the measured result in details. If it cannot be displayed in one page, press “” key to display the next page and press “” key to return the previous page.

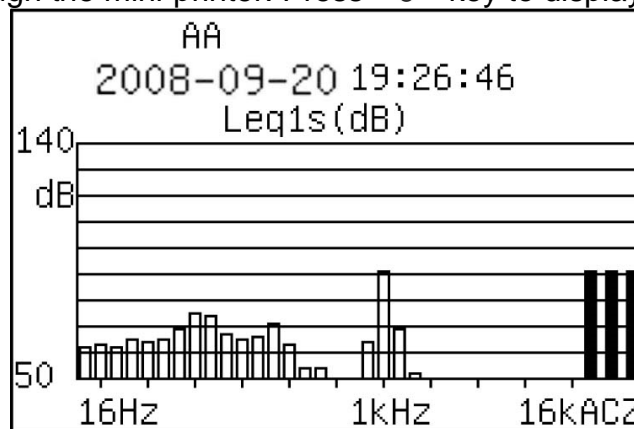
AA					
2008-09-20 19:26:46					
1/3OCT					
R:50dB-140dB					
f0(Hz) Leq1s(dB)					
12.5		62.4	16		63.0
20		62.4			
25		65.5	31.5		64.8
40		65.0			
50		69.1	63		75.8
80		74.6			
100		67.4	125		65.9
160		66.0			
200		71.1	250		63.3
315		54.1			

400		54.2	500		50.0
630		44.5			
800		64.5	1k		91.4
1k25		69.5			
1k6		52.1	2k		44.4
2k5		34.8			
3k15		49.1	4k		28.3
5k		28.7			
6k3		26.6	8k		27.3
10k		28.2			
12k		28.7	16k		29.5
WA		91.4			
WC		91.7	WZ		91.8

When the 1/3 OCT analysis result is saved, the first line is the measuring name. The second line is the date and time when the measuring is started. The third line is the measuring mode. If integrated value is saved, the integrated time is also displayed. The fourth line is the measuring range. The fifth line is the measuring index (Leq.T or Leq1s). From the sixth line, it displays each center frequency and the sound pressure level under three frequency weighting modes. The value before the “|” icon is the normal center frequency and the value behind it is the corresponding sound pressure level.

Note: No matter which weighting mode is selected in the measuring process, the saved result is also the spectral analysis result under Z weighting mode (zero weighting).

After connecting the analyzer and the mini-printer with printing cable and turning on the printer’s power, press “” key on the analyzer panel to print the 1/3 OCT analysis result and spectrogram through the mini-printer. Press “” key to display the spectrogram.



After viewing the spectrogram, press “” key to return the list display interface.

10. COMPUTER DATA RECEIVING SOFTWARE OPERATING INSTRUCTIONS

● Overview

The SOUND ANALYZER METER driver is computer-based system provided either the RS-232 or the USB interface to output the saved measuring result; read, write or delete the PRESTORED measuring point name; and examine the calibration record from the "SOUND ANALYZER METER". The saved data can be uploaded to computer then Displayed from the Excel file and chart. It's real-time signal analysis (one second/transient real-time analysis).

● Functions

- 1) Data transmission method: RS-232 and USB.
- 2) Read the saved measuring result from the analyzer and save them in a new folder. The folder's name is created by the user. All read data is saved in such folder. Each group of data makes up one file. The file name consists of the measuring point name (14 bits) and the location ID of internal FLASH where the data is stored. Its file extension is ".txt".
- 3) Read the prestored measuring point name, delete the prestored file name zone inside the analyzer and enter the prestored point name. It can be saved in the computer for the user's recall. Its file extension is ".nam".
- 4) Read the calibration records, and save them in the file of "calrecord.xls".
- 5) Open the saved data with WordPad and open the calibration record with EXCEL.

● Minimum hardware requirements

CPU Pentium III 500MHZ
128M memory
100M hard disk
Windows 2000/XP OS
Windows 10 OS (Application software only for English)

10.1. Software Installation

To describe the software installation, we take Windows XP OS for example.

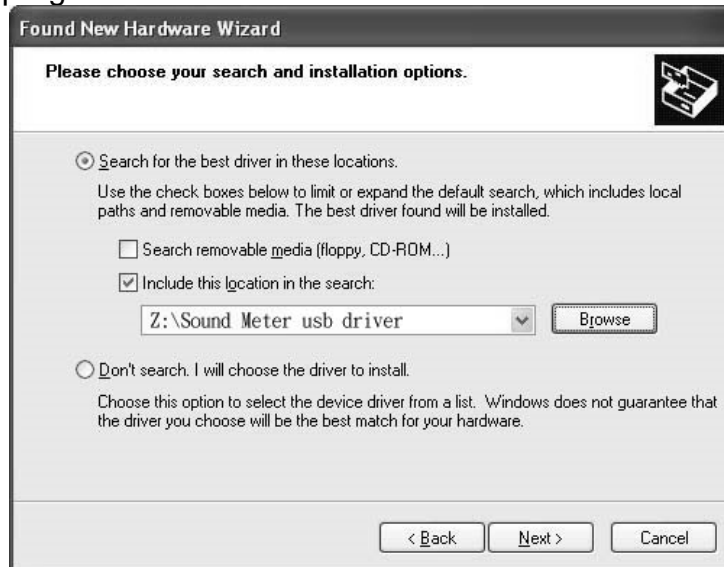
10.1.1. USB device driver installation

When you make data transmission on the computer via USB interface for the first time, install the USB device's driver first. Connect the analyzer and the computer's USB port with a USB cable. As shown below, when you turn on the analyzer's power, the computer will pop up a note that a new hardware is found and will install the driver automatically:



After selecting the “Install from list or specific location” and clicking “Next” button, the following prompt will appear:

1. Click “Browse” button to found the Sound Meter usb driver folder and then click on “Next”, the program will choose to install the ch375wdm.inf archives.



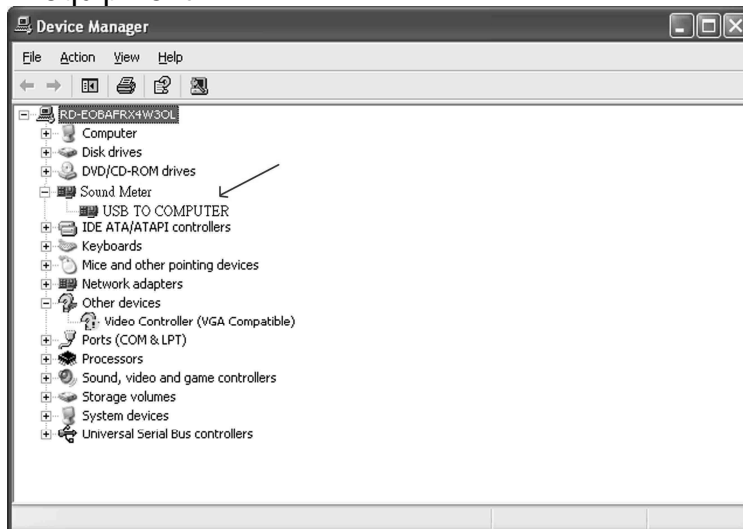
2. Installing.



3. After you click “Finish” button, the new hardware is installed successfully and can be used.

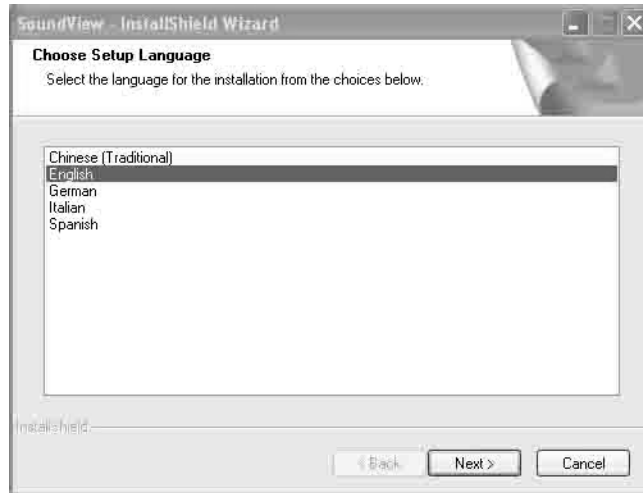


4. After installation, Device Manager will increase the Sound Meter\USB TO COMPUTER equipment.



10.2. Data receiving software installation

You can find the Z:\Application software of SoundView_20100422\ setup.exe in SOUND ANALYZER METER folder in the flash disk. When you double-click it, the following note will appear:



Click “next”



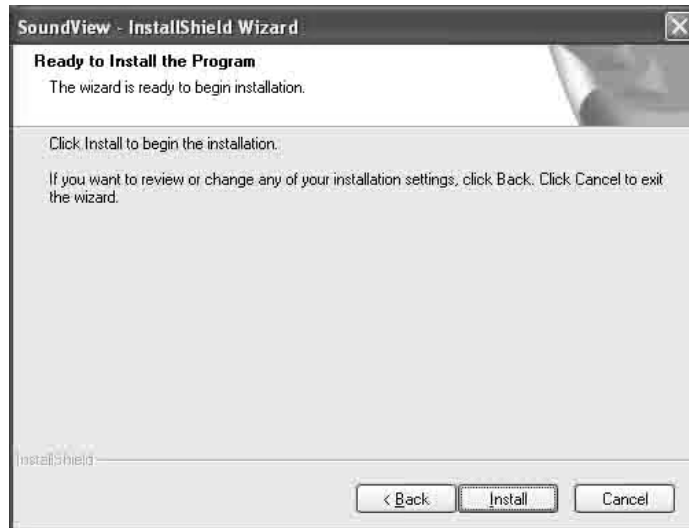
login User Name and Company Name and click “Next” button:



Select Complete and click the “Next” button.



Click “Install”

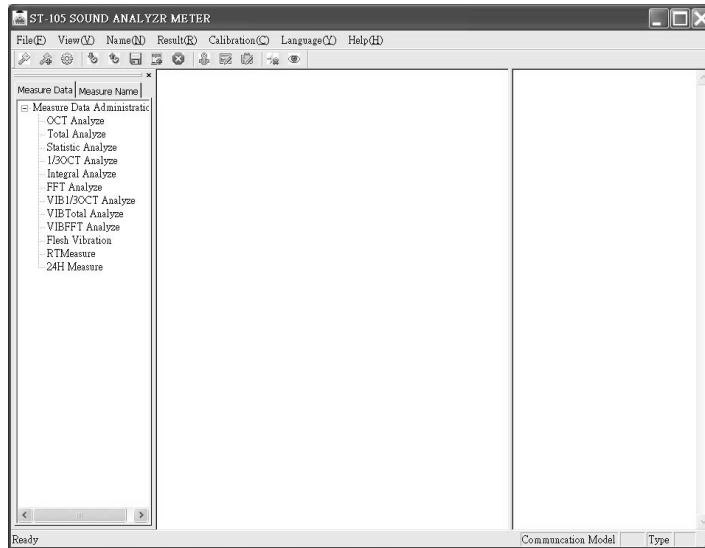


Click “Finish”. Now, you can use the data receiving software.



10.2.1. Software Operation Instruction

After finding the “ SOUND ANALYZR METER” in the program list and clicking “Data Receiving”, you will find a screenshot as shown below:



On the top, it is a menu bar, including the menus like “File”, “View”, “Name” , “Result”, “Calibration”, “Help” . “File” has four submenus: “Input Name(N)”, “Input Data(D)”, “Setup”, “Exit”.

1. File:

- Input Name(N): Can open and display the measure name of files, stored in PC.
- “Setup”: It has “Communicate Mode”, “Serial Port or USB”, “Browse”, “Save” and “Exit” .



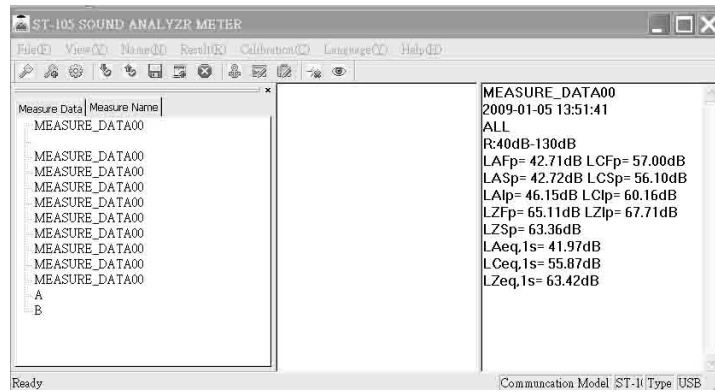
- Exit : exit program.

2. Name:

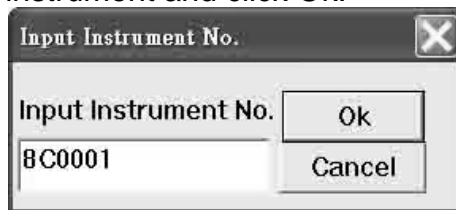
- Read Out(C): Read out the measure name, it can read out the instrument pre-save name , and display the measures under the roll-call management label in the host interface.
- Add: add measure name, click “Add” then appear a screenshot shown below: Type the name, for example “B”.



The “B” measure name is added.



- Write In: Write measure name in the instrument, when click “Write” ,then keyin 6 serial number to be saved in the instrument and click Ok.



- Save: Save measure name, click “Save” then keyin file name, the extension name of “man”.
- Clear: Click “Clear” to delete measure name , same as the above screenshot ,keyin 6 serial number in the instrument and click Ok.

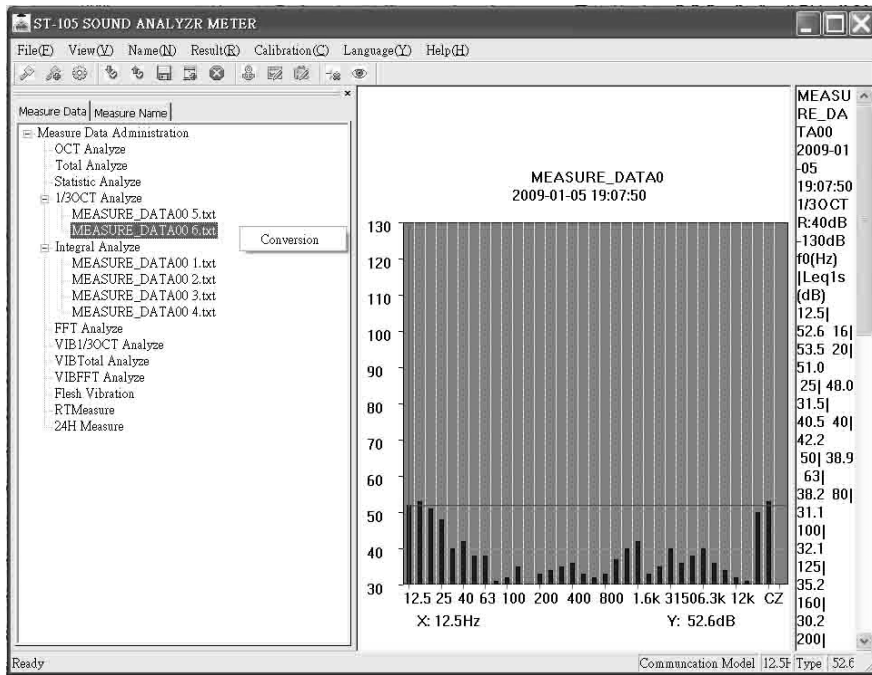
3. Result:

- Read Result: Down load instrument measure result ,click “Result” to down load the instrument’s measurement result and save in the computer. The save path is in the “Setup”,double click the measure name to display data or figure.
- Realtime Analyze→Analyze per Second: OCT analysis per second. (Only in RS-232 mode)
- Realtime Analyze→Instant Analyze: OCT real-time analysis (analysis of 47 times per second) (only in RS-232 mode).
- Clear Result: Click “Clear Result” then keyin the instrument serial number,it will clear all the instrument result.

4. Calibration:

- Read Cal:click “Read Cal” to read out completely the instrument Calibration result and save in the computer,the extension name of ”Cal”.
- View Cal:open the Cal file.
- Clear Cal: Click “Clear Cal” then keyin instrument serial number to delete all the instrument calibration result.

5. Conversion: File conversion, move the cursor on the “Measure Data” block, click the mouse right key“ then click “conversion to it and save in Excel file.



CAUTION



When emptying the point name, you should enter the machine number as per that shown on the built-in software authorization certificate of this analyzer. If it is incorrect, you can't remove the original point name or write the new point name.

● Q & A

- 1) *Write control command error: Turn off the analyzer's power and exit from the program. Re-launch the program and turn on the analyzer. Make another transmission.*
- 2) *Communication overtime: The computer runs too slow. Change another computer or shut down other programs. You can also make data transmission through the USB interface.*

11. MAINTENANCE

11.1. General Information

This is a precision instrument. To guarantee its performances be sure to use it or keep it stored on suitable environmental conditions. Do not expose it to high temperatures or humidity or direct sunlight. Be sure to turn it off after use. If you expect not to use the instrument for a long period remove batteries to avoid leakages of battery liquid which could damage the its inner components.

11.2. Battery Replacement

The low battery indication (refer to paragraph 12.3.2) is displayed the batteries are to be replaced.

CAUTION



If the symbol "⚡" or "BATTERY LOW" appears on the LCD, please replace the battery immediately

1. Turn off the instrument.
2. Remove the battery cover.
3. Remove all the batteries from the battery holder.
4. Insert four new batteries of the same type (refer to paragraph 12.3.2) respecting the polarity signs.
5. Install the battery cover.

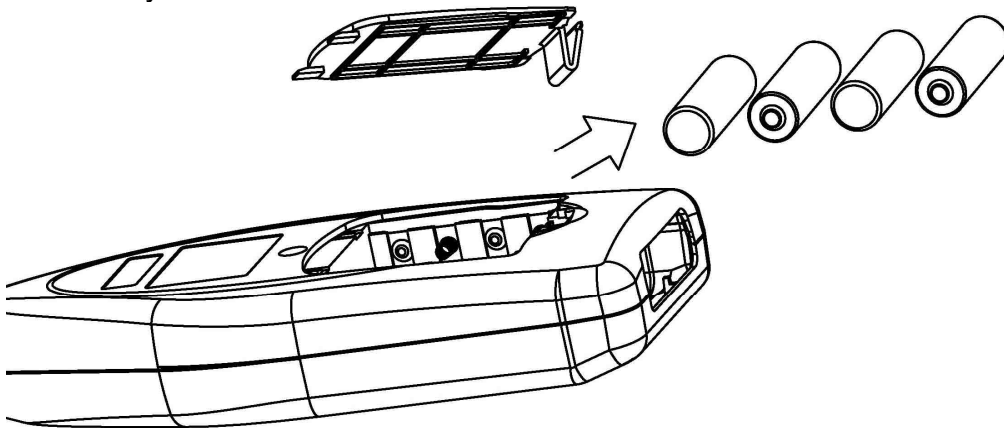


Fig. 6: Opening and closing of battery cover

11.3. Cleaning

To clean the instrument, use a soft dry cloth. Never use a wet cloth, solvents or water.

11.4. End of Life



Caution: this symbol indicates that instrument and its accessories should be subject to a separate collection and correct disposal

12. TECHNICAL SPECIFICATIONS

12.1. Technical Features

Environmental conditions: temperature $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, relative humidity $< 80\%$.

- Display refresh: 1 Hz for value; 10 Hz for graph.
- Resolution: Statistic is 0.1dB, OCT and 1/3 OCT is 0.01 dB.
- Frequency range: 10 Hz~20 kHz ± 0.2 dB, 1 Hz~23 kHz(± 1.0 dB)
- Range gain: -10 dB, 0 dB, 10 dB, 20 dB, 30 dB, 40 dB.
- Range control error: ≤ 0.1 dB.
- Self-generated noise voltage : $< 4 \mu\text{V}$ (1 Hz~23 kHz linear)
(Short circuit with 50 Ω resistor).
- Measuring voltage range: 15 μV ~10 V (RMS)
- Level linear range: > 90 dB.
- Time weighting: Parallel (simultaneous) F, S, I, PeakC+, PeakC-.
- Frequency weighting: Parallel (simultaneous) A, C, Z. Realized by digital filtering.
- A/D bits: 24 bits.
- Anti-aliasing filter: Cut off frequency is 23.5 kHz and stopband attenuation is 100 dB.
- Contrast adjustment: 64-class adjustable.
- Integrated time: 1.s-24.h, set in a given range or randomly
- Data storage: It can store the statistic analysis result, 24h.measuring result and integrated measuring result (maximum 128 groups. The measuring result can be stored only in Flash disk that came with the analyzer.
- Internal clock: Error less than 1 min/month.
- The analyzer can store 256 calibration records.
- Starting time: < 10 s.
- Background noise: < 13 dB(A), 15 dB(C), 25 dB(Z).
Note: Take 20 μPa as reference 0 dB. The below are the same. Input 15 pF capacitor is short circuit to the END.
- Total noise: < 18 dB(A), 23 dB(C), 28 dB(Z).
- Measuring range: 25~140 dB(A), 30~140 dB(C), 35~140 dB(Z).
Note: Microphones with different sensitivities have different measuring ranges.
- Peak C sound level measuring range: 50~143 dB.

- Range display: 0~90, 10~100, 20~110, 30~120, 40~130, 50~140 dB, reference range 30~120 dB. In different range displays, the measuring ranges are shown as below:

Range	0~90	10~100	20~110	30~120	40~130	50~140
A weighting	25~90	25~100	25~110	30~120	40~130	50~140
C weighting	30~90	30~100	30~110	30~120	40~130	50~140
Z weighting	35~90	35~100	35~110	35~120	40~130	50~140
Peak C	50~93	50~103	50~113	50~123	60~133	70~143

CAUTION



When the microphone sensitivity is not 50 mV/Pa(-26 dB), the analyzer's measuring range and range will change automatically based on the microphone sensitivity. When the microphone sensitivity is less than 50 mV/Pa, the measuring range moves upwards. For example: when the microphone with 40 mV/Pa(-28 dB) sensitivity is equipped, the range moves upwards by 2 dB and the reference range display changes to 42~132dB .

- Recommended measuring microphone: For 1/2" pre-polarized, sensitivity: 50 mV/Pa, frequency range: 10 Hz~20 kHz, heat noise: <16 dB(A).

12.2. Parameters And Performance of Statistic Analysis (ST-105/ST-105D/ST-105S)

- Function: **Noise's statistic analysis** and **integral** measuring.
- Menu: Statistic, 24 Hours, Integral, Setup, Data, Calibrate.
- **Measuring parameter:**

Statistic analysis menu:

LAFp, LAFmax, LAF5, LAF10, LAF50, LAF90, LAF95, LAFmin, SD, LAeq1s, LAeq,T, LAE, LAfeqT.

24H measuring menu:

Ld, Ln, Ldn, besides all measuring parameters in the statistic analysis menu.

Integrated measuring menu:

Lxyp, Lxyi, Lxeq,1s, Lxeq,T, LAE, E, Cpeak+, Cpeak-, LAFmax, LAFmin, LAfeqT, LASeqT, LAleqT.

Note: X is frequency weighting A, C, Z and Y is time weighting F, S, I.

12.3. Parameters and Performance of OCT and 1/3 OCT (ST-105 / ST-105D)(ST-105L only has 1/3 OCT)

- Function: Noise's real-time OCT or 1/3 OCT(octave) spectral analysis and integral measuring.
- Frequency weighting: Parallel (simultaneous) A, C, Z. The spectral analysis interface is composed by the frequency spectrum. The total analysis interface is realized by digital filtering. For the characteristics, see Appendix 1.
Z weighting is added with one digital high-pass filter (cutoff frequency: 4 Hz). For the characteristics, see Appendix 4.
- Filter type: Parallel (real-time) Octave and 1/3 Octave band filter, G=2, digital filter.
- OCT Filter center frequency: 16 Hz, 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1k Hz, 2 k, 4 kHz, 8 kHz (For the characteristics, see Appendix 3), 16 kHz(For the characteristics, see Appendix 2).
- 1/3 OCT Filter center frequency: **10Hz(ST-105D)**,12.5Hz, 16Hz, 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz,**20kHz(ST-105D)** (For the characteristics, see Appendix 2).
- OCT Main menus: OCT, Total, Setup, Data, Calibrate.
- 1/3 OCT Main menus: 1/3 OCT, Total, Setup, Data, Calibrate.
- Display interface: List interface, graph interface.
- Measuring parameters: $L_{f_{meq},1s}$, $L_{f_{meq},T}$, L_{xyp} , L_{xyi} , $L_{xeq,1s}$, $L_{xeq,T}$, L_{AE} , E , C_{peak} , T_m .
Note: f_m is center frequency; X is frequency weighting A, C, Z. Y is time weighting F, S, I.
- The noise exposure (E)'s measuring range is 0-65.535 Pa²h.

12.3.1. Standard

The instrument complies with IEC 61672-1 2013 class 1 and CNS 7129 and IEC 61260(1995) Class 1. IEC60651:1979 TYPE 1, IEC60804:1985 TYPE 1, ANSI S1.4:1983 Type1.

12.3.2. General Data


Mechanical characteristics

Dimensions 285(L) x 90(W) x 39(H) mm

Weight (including batteries) approximately 500g

Power supply

Battery type 4 batteries 1.5 V – LR6 – AA – AM3 – MN 1500
AC to DC Adapter. (5V/1A).

Indication of low batteries when batteries voltage is too low LCD display “” icon and LOW BATTERY (*Note: If you don't use the analyzer for a long time, please take the batteries out*).

Battery life: Approximate 8 hours

Display

1) Type 240x160 matrix LCD, with LED backlight, can display number, English character and graph.

12.4. Environment

12.4.1. Environmental Conditions

For inside use, max height 2000m

Reference temperature 23° ± 5°C

Working temperature 5 ~ 40 °C

Relative humidity <80% for temperatures up to 31°C decreasing linearly to <50% relative humidity at 40°C

Storage temperature -10 ~ 60 °C

Storage humidity <70%

12.4.2. EMC

This tester was designed in accordance with EMC Standards in force and its compatibility has been tested in accordance with EN61326-1 (2006).

12.5. Accessories

12.5.1. Standard Accessories

The accessories contained inside the packaging are the following:

- User's manual
- MINI USB cable.
- SWITCHING ADAPTOR: 100V ~ 240V AC to DC 5V/1A.
- 3.5 ϕ plug to MINI USB connector.
- Carrying case.
- 4 batteries 1.5 V – LR6 – AA – AM3 – MN 1500.
- 60mm diameter windscreen.
- Flash disk (Transcend Brand).

12.5.2. Option Accessories

- Mini printer and printer cable.
- RS-232 cable.
- 5M microphone cable.
- 10M long microphone cable.
- 20M long microphone cable.
- ST-110 sound level calibrator.

13. SERVICE

13.1. Warranty Conditions

This instrument is guaranteed for one year against material or production defects, in accordance with our general sales conditions. During the warranty period the manufacturer reserves the right to decide either to repair or replace the product.

Should you need for any reason to return back the instrument for repair or replacement take prior agreements with the local distributor from whom you bought it. Do not forget to enclose a report describing the reasons for returning (detected fault). Use only original packaging. Any damage occurred in transit due to non-original packaging will be charged anyhow to the customer.

The warranty does **not** apply to:

- Accessories and batteries (not covered by warranty).
- Repairs made necessary by improper use (including adaptation to particular applications not foreseen in the instructions manual) or improper combination with incompatible accessories or equipment.
- Repairs made necessary by improper shipping material causing damages in transit.
- Repairs made necessary by previous attempts for repair carried out by non-skilled or unauthorized personnel.
- Instruments for whatever reason modified by the customer himself without explicit authorization of our Technical Dept.

The contents of this manual may not be reproduced in any form whatsoever without the manufacturer's authorization.

Our products and our logotypes are registered. We reserve the right to modify specifications and prices in view of technological improvements or developments, which might be necessary.

13.2. Service

Shouldn't the instrument work properly, before contacting your distributor make sure that batteries are correctly installed and work.

TENMARS ELECTRONICS CO., LTD
6F, 586, RUI GUANG ROAD, NEIHU,
TAIPEI 114, TAIWAN.
E-mail: service@tenmars.com
<http://www.tenmars.com>