SD card real time datalogger, RS232/USB
Frequency weighting and Time weighting
meet IEC 61672 class 2 ,
Personal sound exposure meet IEC 61252

Noise Dosimeter

Model : DS-2013SD

Your purchase of this Personal sound exposure Noise Dosimeter with SD CARD DATALOGGER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

TABLE OF CONTENTS

1. FEATURES

* Personal sound exposure meet IEC 61252
* Frequency and Time weighting are designed to meet IEC 61672 class 2.
* A & C weighting networks comply with standards.
* LCD is dot-matrix with backlight and easy reading.
* Combination Dose meter, Data-logger and Sound level meter.
* 0.5" standard microphone head.
* Time weighting (Fast & Slow) dynamic characteristic modes.
* Build External calibration VR.
* User-defined measurement configurations. Selectable Criterion Level,
* Exchange Rate, Threshold, Frequency Weighting, and Response Time setting.
* Condenser microphone for high accuracy & long-term stability.
* Memory function to store the Max. & Min. value.
* Hold functions.
* Real time Datalogger
  Records device of internal memory device (EEPROM) and an external
  memory device (SD memory card) ,Real time Datalogger, it Built-in
  Clock and Calendar, real time data recorder, sampling time set
  from 1 second to 3600 seconds.
* Manual datalogger is available (set the sampling
  time to 0 second).
* Innovation and easy operation, computer is not need to
  setup extra software, after execute datalogger, just take
  away the SD card from the meter and plug in the SD card
  into the computer, it can download the all the measured
  value with the time information (year/month/date/
  hour/minute/second) to the Excel directly, then user can
  make the further data or graphic analysis by themselves.
* SD card capacity : 1 GB to 16 GB.
* Can default auto power off or manual power off.
* Noise Dose % ，SPL measurements.
* Microcomputer circuit, high accuracy.
* Power by UM4/AAA (1.5 V) x 6 batteries or DC 9V adapter.
* RS232/USB PC COMPUTER interface.
* Heavy duty & compact housing case.

2. SPECIFICATIONS

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	LCD size : 50 mm x 30 mm LCD with green backlight (ON/OFF).
Measurement Type	**SPL** : Sound pressure level **Dose**：test noise exprosure
Measurement Range	SPL：Auto 30 - 130 dB. Dose：70～130dB
Resolution	0.1 dB.
Function	dB (A & C frequency weighting), Time weighting (Fast, Slow), Data hold Record (Max., Min.).
Accuracy (23 ±5 ℃)	Characteristics of " A " frequency weighting network meet IEC 61672 class 2. Under 94 dB input signal, the accuracy are : _(see table below)_ _Remark :_ _The above spec. are tested under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only._

31.5	Hz	±3.0 dB
63	Hz	±2.0 dB
125	Hz	±1.5 dB
250	Hz	±1.5 dB
500	Hz	±1.5 dB
1 K	Hz	±1.0 dB
2 K	Hz	±2.0 dB
4 K	Hz	±3.0 dB
8 K	Hz	±5.0 dB

Frequency Weighting Network	Characteristics of A & C. A weighting : The characteristic is simulated as "Human Ear Listing" response. Typical, if making the environmental sound level measurement, always select to A weighting. C weighting The characteristic is near the "FLAT" response. Typical, it is suitable for checking the noise of machinery (Q.C. check) & knowing the sound pressure level of the tested equipment.
Time weighting (Fast & Slow)	Fast - t = 125 ms * "Fast" range is simulated the human ear response time weighting. Slow - t = 1 s * "Slow" range is easy to get the average values of vibration sound level.
Data hold	To freeze the measurement value.
Function selector 　　SPL 　　DOSE	Auto range：30～130dB. Threshold Level(Thr)：70～90dB in 1dB steps. Criterion Level(Crit)：80、84、85、90dB. Exchange Rate　：3, 4, 5 or 6 dB
Frequency	31.5 to 8,000 Hz.
Microphone type	Electric condenser microphone.
Microphone size	Out size, 12.7 mm DIA. (1/2 inch).

Calibration VR	Build in external calibration VR, easy to calibrate on 94 dB level by screw driver. * Calibrated via external SOUND CALIBRATOR (SC-942, optional).	
Calibrator	B & K (Bruel & kjaer), MULTIFUNCTION ACOUSTIC CALIBRATOR Type 4226.	
Datalogger Sampling Time Setting range	Auto	1 second to 3600 seconds @ *Sampling time can set to 1 second, but memory data may loss.*
	Manual	Push the data logger button once will save data one time. @ *Set the sampling time to 0 second.*
Memory device	internal memory device : EEPROM can be record 16,000 items.	
	external memory device (AC Adapter only) : SD memory card. 1 GB to 16 GB.	
Data error no.	$\leqq$ 0.1% no. of total saved data typically.	
Advanced setting	* Set clock time (Year/Month/Date,Hour/Minute/ Second) * Set sampling time * Auto power OFF management * Set beep Sound ON/OFF * Decimal point of SD card setting * SD memory card Format * Frequency weighting to A or C setting	
Over Indication	Show " - - - - ".	
Data Hold	Freeze the display reading.	
Memory Recall	Maximum & Minimum value.	
Sampling Time of Display	Approx. 1 second.	
Data Output	RS 232/USB PC computer interface. * *Connect the optional RS232 cable UPCB-02 will get the RS232 plug.* * *Connect the optional USB cable USB-01 will get the USB plug.*	

Power off	Auto shut off saves battery life or manual off by push button.
Operating Temperature	0 to 50 ℃.
Operating Humidity	Less than 85% R.H.
Power Supply	* Alkaline or heavy duty DC 1.5 V battery (UM4, AAA) x 6 PCs, or equivalent. * DC 9V adapter input. (AC/DC power adapter).
Power Current	Normal operation (w/o SD card save data and LCD Backlight is OFF) : *Approx. DC 16 mA.* When " SD " save the data but and LCD Backlight is OFF) : *Approx. DC 35 mA.* * *If LCD backlight on, the power consumption will increase approx. DC 8 mA.*
Weight	250 g/ 0.55 LB. (without battery)
Dimension	132 x 80 x 32 mm. (5.2 x 3.1 x 1.3 inch).
Accessories Included	* Instruction manual...1 PC * Soft carrying case, CA-05A………………… 1 PC * Micophone with clip…………………………… 1 PC * Hanging unit (with sticker)...........................1 PC * AC to DC 9V adapter............................. 1 PC
Optional Accessories	* Sound calibrator (94 dB), SC-941. * Sound calibrator (94/114 dB), SC-942. * Sound wind shield ball, SB-01 * SD Card (4 GB) * USB cable, USB-01. * RS232 cable, UPCB-02.

3. FRONT PANEL DESCRIPTION

Fig. 1

3-1 Display.

3-2 Power Button(Backlight Button)

3-3 ▲ Button（Hold only for SPL）

3-4 RUN Button （REC only for SPL)

3-5 TIME Button (Set)

3-6 ▼ Button

3-7 ENTER Button (Fast / Slow)

3-8 Microphone

3-9 Microphone plug

3-10 DC 9V adapter socket.
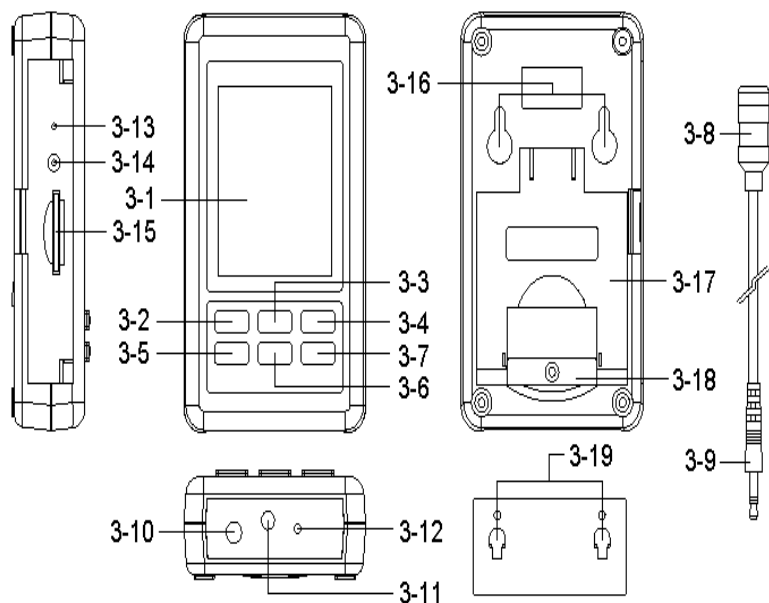
3-11 Microphone input jack

3-12 External 94dB CAL. VR

3-13 Reset Switch.

3-14 RS232 Output

3-15 SD card socket

3-16 Hanging holes

3-17 Stand

3-18 Battery compartment and
Screw of the battery cover

3-19 Hanging unit (with sticker)

4. MEASURING PROCEDURE

4-1 Sound Pressure Measurements (SPL)

In SPL mode the display shows readings of
the sound pressure level.

1) Power ON the meter by pressing and holding the " Power
Button " (3-2, Fig. 1)for at least 1.5 seconds,
the meter's default function is " A"(frequency weighting) ,
" Fast"(time weighting) " Auto range ". The
LCD display will show the Symbol " A, FAST , xx.x dB , 0 ".

2) Frequency weighting select
How to select the frequency weighting (A or C), the
procedures please refer to chapter 7-7   page 20   .
Note :
a. The characteristic table of A,C weighting, please
    ref. page 24.
b. The characteristic of A weighting is simulated as the
    " Human Ear Listening " response.
    Typically always select the A weighting when makes
    environmental sound level measurement.
c. The C weighting characteristic is near the " FLAT "
    response. Typically it is suitable for checking the
    noise of machinery (Q.C. check) & knowing the
    real sound level of the tested equipment.

3) According to various measuring sound source, select the
Time Weighting (Fast or Slow) by pressing " ENTER
Button " (3-7 , Fig. 1).
Note :
a. If select the function of " Fast " time weighting, the
    display will show the unit of " FAST".
b. If select the function of " Slow " time weighting, the
    display will show the unit of " SLOW ".

4-2 Running the Dose Meter Noise Survey

1) In " SPL" mode to select the " **Dose** " mode by
pressing and holding the" RUN button" (3-4 Fig 1)
 into the DOSE mode .

2) In "DOSE" mode, display will show DUR(duration) ,
0.00(cumulative dose) , 00 : 00 :00(current time) ,
0(record sampling time counter) , %DOSE(Dose mode) ,
FAST(Time weighting).

3) In Dose mode , Pressing and holding the " Time Button "
into setting , SET" DATE→SP-T→POFF→BEEP→DEC
→SD-F→A→Crit→Thr→ER→CLRM→DATE".
Note :
a:Crit(Criterion Level) : 80、84、85、90dB.
b:Thr(Threshold Level) : 70 to 90dB in 1 dB steps.
c:ER(Exchange Rate) : 3, 4, 5, or 6 db.
d:pressing the " Power Button" to leave the set mode.
e:Factory default settings : Crit→90 , Thr→70 , ER→3.

4) According to various measuring sound source, select the
Time Weighting (Fast or Slow) by pressing the "ENTER
Button " (3-7, Fig. 1).

5) In DOSE mode , pressing and holding the ▼ button ,
display is shown and DUR , xx : xx : xx(h : m : s) ,
pressing the ▲ or ▼ button adjustment measurement
time, pressing Enter button to save the satting and leave setting .

24 Hr	12 Hr	10 Hr	8 Hr	4 Hr
2 Hr	1 Hr	30 minutes	15 minutes	10 minutes
5 minutes	1 minutes			

6) In DOSE mode ,Setting current date or current time surely.
(please refer to chapter 7-1 page 17)

pressing and holding the ▲ button , display is shown
and the BEG , x.xx , xx - xx : xx(date - hr : min) and then
pressing and holding the ▼ button , display is shown
and the BEG , xx - xx : xx(dd - h : m) and END
xx - xx : xx(dd - h : m) , pressing ▲ or ▼ button to set
the BEG(begin time) , pressing TIME button to setting next vaule
, pressing ENTER button to save the setting and leave the
setting , pressing ▲ button once to check the set state.
If user wants to record %dose every day.Please use the ▼ button
to select R BEG , then press RUN button,
If user wants to rerun %dose Function .Please use the ▲ button
and ▼ button > 2 sec. to reset dose value and time.
If user wants to change RUN or Pause Function.Please press the
▼ button and Enter button to release KEY LOCK.

4-3 Data Hold

During the SPL measurement, press the " ▲ Button " (3-3,
Fig. 1) once will hold the measured value & the LCD will
display a " HOLD " symbol.
Press the " Hold Button " once again will leave the data
hold function.

4-4 Data Record (Max., Min. reading)

1) The data record function records the maximum and
   minimum readings. Press the " RUN Button " (3-4, Fig.1)
    once to start the Data Record function and display
   is shown the" REC " symbol .

2) With the " REC " symbol on the display :
   a) Press the " RUN Button " (3-4, Fig. 1) once, the
      " REC MAX " symbol along with the maximum value
      will appear on the display. Press the " RUN Button"
      again the " REC MIN " symbol along with the minimum
      value will appear on the display. Press the " RUN Button"
      again will show the " REC " symbol only & execute the
      memory function continuously.

   b) To exit the memory record function, just press the
      " RUN " button > 2 seconds at least. The display will
      revert to the current reading.

4-5 LCD Backlight ON/OFF

After power ON, the " LCD Backlight " will light
automatically. During the measurement, press the
" POWER Button " (3-2, Fig. 1) once will turn off the
" LCD Backlight ".
Press the " POWER Button " once again will turn ON the
" LCD Backlight " again.

5. DATALOGGER

5-1 Preparation before execute datalogger function

The dose meter measured data first be stored into the meter internal built EEPROM, can be stored total of 16,000 sets of data, when stored > 16000 sets , datalogger will be stop and display will show FULL.

Remark :

How to send the storage of information, you have two choices.

1) If select data send to SD card , please use AC adapter . refer to Chapter 5-2 d.--a,b,c. page 12,13.

2) If select the logger data send to RS232 , please press the power button > 2 sec. refer to Chapter 5-2 d.---c. page 13.

a. Time setting

If the meter is used at first time, it should to adjust the clock time exactly, please refer chapter 7-1 (page 17).

b. Decimal format setting
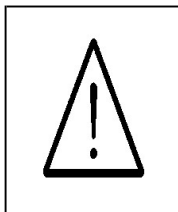
The numerical data structure of SD card is default used the " . " as the decimal, for example "20.6" "1000.53" . But in certain countries   (Europe ...) is used the " , " as the decimal point, for example " 20, 6 " "1000,53". Under such situation, it should change the Decimal character at first, details of setting the Decimal point, refer to Chapter 7-5, page 19.

5-2 Auto Datalogger (Set sampling time $\geqq$ 1 second)

a. Start the datalogger

Pressing and holding the " ENTER Button "(3-7, Fig. 1) once , display is shown   " LOGGER " , the " LOGGER " will flashing at the same time the measuring data along the time information will be saved into the memory circuit(EEPROM).
and the top right will record items.

Remark :
How to set the sampling time, refer to Chapter 7-2, page 18.
In Dose mode please start datalogger , then run Dose Function.

b. Pause the datalogger

During execute the Datalogger function , if press the
" ENTER Button " (3-7, Fig. 1) once will pause the
Datalogger function (stop to save the measuring data
into the memory circuit temporality). In the same time
the text of " LOGGER " will stop flashing.
Remark :
If press the " ENTER Button " (3-7, Fig. 1) once again
will execute the Datalogger again, the text of " LOGGER " will
flashing .

c. Finish the Datalogger

Press the " ENTER Button "(3-7, Fig. 1) continuously at
 least two seconds, the " LOGGER " indicator will be
 disappeared and finish the Datalogger.
Remark :
When the battery is under the low battery condition
(show the low battery indicator), the Datalogger
function is maybe disable.

d. EEPROM Datalogger data send to SD card or RS232.

a. Insert the SD card
Prepare a " SD memory card " (1 GB to 16 GB, optional),
insert the SD card into the " SD card socket " (3-15, Fig. 1).
The front panel of the SD card should face against the
 down case.
 * *It recommend use memory card $\leq$ 4 GB.*

b. SD card Format
If SD card just the first time use into the meter, it
recommend to make the " SD card Format " at first. ,

please refer chapter 7-6 (page 20).

  * *It recommend strongly, do not use memory cards that*
    have been formatted by other meter or by other installation (such
    as camera…) Reformat the memory card with your meter.
  * If the sd memory card exist the trouble during
    format by the meter , use the Computer to
    reformat again can fix the problem .

c. EEPROM data send to SD card or RS232 select
EEPROM data send to SD card or RS232 select , press "▲ + RUN "
Button continuously at least two seconds , the " SEND TO SD and
RS232 " text will be appeared , use "▲ or ▼ "Button to select SD or
RS232 , then press " ENTER " , then press " RUN " to send the data,
display will show the send data counts.

Remark :
If select data send to SD card , please use AC adapter .
If want to pause send the logger data , please press the run button
  ones, press the run button ones again will be resume the send
  logger data.
If stop send the logger data , please press the power button > 2 sec.

5-3 Manual Datalogger (Set sampling time = 0 second)

a. Set sampling time is to 0 second

Pressing and holding the " ENTER Button (3-7, Fig. 1) once ,
the LCD will show the text " LOGGER ", then press the
" ENTER Button "(3-7, Fig. 1) once, the " LOGGER " will flashing
at the same time the measuring data along the time information will
be saved into the memory circuit.

b. Finish the Datalogger

Press the " Enter Button " (3-7, Fig. 1) continuously at least two
seconds, the " LOGGER " indication will be
disappeared and finish the Datalogger.

5-4 Check time and sampling time information

During the measurement if press " TIME Button "
(3-5, Fig. 1) ones, the LCD display will
present the time and sampling time information of Year/Month/
Date , Hour/ Minute/Second, and sampling time informationin
in second unit.

5-5 SD Card Data structure

1) When the first time, the SD card is used into the meter,
   the SD card will generate a folder :

   ### SLD01

2) If the first time to execute the Datalogger,
   under the route SLD01\, will generate a new
   file name SLD01001.XLS.
   After exist the Datalogger, then execute again,
   the data will save to the SLD01001.XLS until
   Data column reach to 30,000 columns, then
   will generate a new file, for example SLD01002.XLS
3) Under the folder SLD01\, if the total files more
   than 99 files, will generate anew route, such as
   SLD02\ ....
4) The file's route structure :
   SLD01\
       SLD01001.XLS
       SLD01002.XLS

       ....
       SLD01099.XLS
   SLD02\
       SLD02001.XLS
       SLD02002.XLS

       ....
       SLD02099.XLS
   SLDXX\

       ....
       ....
       Remark : XX : Max. value is 10.

6. Saving data from the SD card to the computer (EXCEL software)

1) After execute the Data Logger function, take away the SD card out from the " SD card socket " (3-15, Fig. 1).
2) Plug in the SD card into the Computer's SD card slot (if your computer build in this installation) or insert the SD card into the " SD card adapter ". then connect the " SD card adapter " into the computer.
3) Power ON the computer and run the " EXCEL software ". Down load the saving data file (for example the file name : SLD01001.XLS, SLD01002.XLS) from the SD card to the computer. The saving data will present into the EXCEL software screen (for example as following EXCEL data screens) , then user can use those EXCEL data to make the further Data or Graphic analysis usefully.

EXCEL data screen (for example)

	A	B	C	D	E	F	G
1	Place	Date	Time	Value	Unit	Value	Unit
2	1	2014/12/20	12:04:11	52.6	SPL dBA		
3	2	2014/12/20	12:04:12	53.3	SPL dBA		
4	3	2014/12/20	12:04:14	53.8	SPL dBA		
5	4	2014/12/20	12:04:16	78.2	SPL dBA		
6	5	2014/12/20	12:04:18	67.4	SPL dBA		
7	6	2014/12/20	12:04:20	63.7	SPL dBA		
8	7	2014/12/20	12:04:22	55.7	SPL dBA		
9	8	2014/12/20	12:04:24	57.8	SPL dBA		
10	9	2014/12/20	12:04:26	52.2	SPL dBA		
11	10	2014/12/20	12:04:28	68.1	SPL dBA		
12	11	2014/12/20	12:04:30	57.9	SPL dBA		
13	12	2014/12/20	12:04:32	59.3	SPL dBA		
14	13	2014/12/20	12:04:34	52.3	SPL dBA		
15	14	2014/12/20	12:04:36	51.1	SPL dBA		
16	15	2014/12/20	12:04:38	52.5	SPL dBA		
17	16	2014/12/20	12:04:40	69.2	SPL dBA		
18	17	2014/12/20	12:04:42	70.3	SPL dBA		
19	18	2014/12/20	12:04:44	53.2	SPL dBA		
20	19	2014/12/20	12:04:46	58.4	SPL dBA		

EXCEL graphic screen（for example）

7. ADVANCED SETTING

Under do not execute the Datalogger function,
press the " TIME Button " (3-5, Fig. 1) continuously at
least 1.5 seconds will enter the " Advanced Setting " mode.
then press the "TIME Button " (3-5, Fig. 1) once a while
in sequence to select the eleven main function, the lower
display will show :

DATE…… Set clock time (Year/Month/Date, Hour/Minute/
Second)

SP-T......... Set sampling time (0-3600 Seconds)

POFF....... Auto power OFF management

BEEP....... Set beeper sound ON/OFF

DEC......... Set SD card Decimal character

SD- F....... SD memory card Format

A ……… Select the Frequency weighting to A or C

Crit …….. Set Criterion level in dB

Thr ……... Set Threshold in dB

ER ………. Set Exchange rate in dB

CLRM …….. Set Clear Memory

During execute the " Advanced Setting " function,
if press " Enter Button " (3-7, Fig. 1) will into main function.
if press " POWER Button " (3-2, Fig. 1) once will exit
the " Advanced Setting " function, the LCD will
return to normal screen.
7-1 Set clock time (Year/Month/Date,
Hour/Minute/ Second)

When the lower display show " DATE "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button "
(3-6, Fig. 1) to adjust the value (Setting start from
Year value). After the desired value is set, press the
 " Enter Button " (3-7, Fig. 1) once will going to
next value adjustment (for example, first setting
value is Year then next to adjust Month, Date, Hour,
Minute, Second value).

2) After set all the time value (Year, Month, Date, Hour, Minute, Second),
the screen will jump to " Set sampling time character " setting screen (Chapter 7-2).
Remark :
After the time value is setting, the internal clock will run precisely even Power is off (The battery is under normal condition, no low battery condition).

7-2 Set sampling time (seconds)

When the lower display show " SP-T "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to adjust the value (0 ~ 3600 sec.)
if press " RUN button " the adjust value will be x 10 increase.
Remark :
If select the sampling time to " 0 second ", it is ready for manual Datalogger.

2) After the Sampling value is selected, press the " ENTER Button " (3-7, Fig. 1) will save the setting function with default.

7-3 Auto power OFF management

When the lower display show " POFF "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the upper text to " YES " or " NO ".

   YES - Auto Power Off management will enable.
   NO - Auto Power Off management will disable.

2) After select the upper text to " YES " or " NO ", press the " ENTER Button " (3-7, Fig. 1) will save the setting function with default.

7-4 Set beeper sound ON/OFF

When the lower display show " BEEP "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button "
   (3-6, Fig. 1) to select the upper text to " YES " or
   " NO ".

   YES - Meter's beep sound will be ON with default.
   NO - Meter's beep sound will be OFF with default.

2) After select the upper text to " YES " or " NO ", press the
   " ENTER Button " (3-7, Fig. 1) will save the setting
   function with default.

   Remark :
   After execute the datalogger function, the buzzer sound
   will off automatically to prevent any interference of
   the measurement.

7-5 Decimal point of SD card setting

The numerical data structure of SD card is default used
the " . " as the decimal, for example "20.6" "1000.53" .
But in certain countries   (Europe ...) is used the " , " as
the decimal point, for example " 20,6 " "1000,53".
Under such situation, it should change the Decimal
character at first.

When the lower display show " DEC "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button "
   (3-6, Fig. 1) to select the upper text to " USA " or
   " EURO ".
   USA - Use " . " as the Decimal point with default.
   EURO - Use " , " as the Decimal point with default.

2) After select the upper text to " USA " or " EURO ",
   press the " ENTER Button " (3-7, Fig. 1) will save the
   setting function with default.

7-6 SD memory card Format

When the lower display show " SD-F "

1) Use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (
   3-6, Fig. 1) to select the upper text to "YES " or
   " NO ".

   YES - Intend to format the SD memory card
   NO - Not execute the SD memory card format

2) If select the upper to " YES ", press the " ENTER Button
   " (3-7, Fig. 1) once again, the Display will show text
   " YES ENTER " to confirm again, if make sure to do the
   SD memory card format, then press " Enter Button "
   once will format the SD memory clear all the existing
   data that already saving into the SD card.

7-7 Frequency weighting to A or C setting

When the display show " A "

1) Pressing and hold the " TIME Button " (3-5, Fig. 1) ,
   into Advanced setting , to set A or C weighting,
   push ▲ or ▼ select the "A " or " C ".And then push
   " ENTER Button " set completely. Pushing the " POWER
   Button " to relieve the Advanced setting.

   A - A Frequency weighting selection.
   C - C Frequency weighting selection.

Note :
a. The characteristic table of A, C weighting, please ref. page 24.
b. The characteristic of A weighting is simulated as the " Human Ear Listening " response.
Typically always select the A weighting when makes environmental sound level measurement.
c. The C weighting characteristic is near the " FLAT " response. Typically it is suitable for checking the noise of machinery (Q.C. check) & knowing the real sound level of the tested equipment.

8. POWER SUPPLY from DC ADAPTER

The meter also can supply the power supply from the DC 9V Power Adapter . Insert the plug of Power Adapter into " DC 9V Power Adapter Input Socket " (3-10, Fig. 1). The meter will permanent power ON when use the DC ADAPTER power supply (The power Button function is disable).

9. SYSTEM RESET

If the meter happen the troubles such as :

CPU system is hold (for example, the key button can not be operated...).

Then make the system RESET will fix the problem.
The system RESET procedures will be either following method :

During the power on, use a pin to press the " Reset Button " (3-13, Fig. 1) once a while will reset the circuit system.

10. BATTERY REPLACEMENT

1) When the left corner of LCD display show " ⊠ ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Loose the " Battery Cover Screws " (3-18, Fig. 1) and take away the " Battery Cover " (3-18, Fig. 1) from the instrument and remove the battery.
3) Replace with DC 1.5 V battery (UM4, AAA, Alkaline/heavy duty) x 6 PCs, and reinstate the cover.
4) Make sure the battery cover is secured after changing the battery.

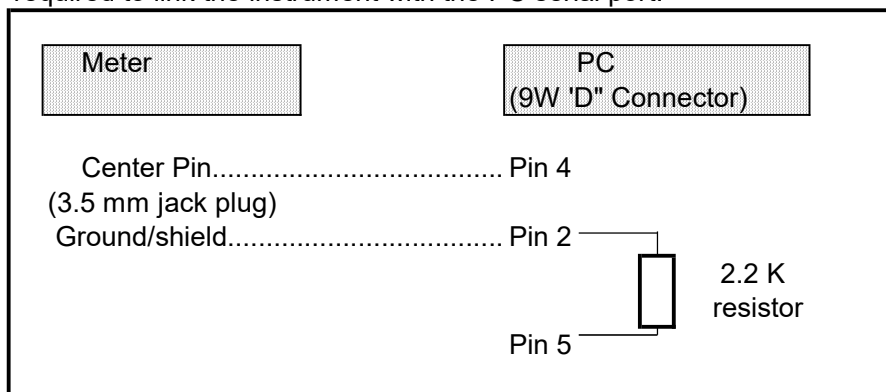# 11. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-14, Fig. 1).
The data output is a 16 digit stream which can be utilized for user's specific application.
Remark:
* When power use AC to DC adapter, the RS-232 signal will output

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.

Meter	PC (9W 'D" Connector)

Center Pin..................................... Pin 4
(3.5 mm jack plug)
 Ground/shield................................... Pin 2 ┐
                                                          2.2 K resistor
Pin 5 ┘

The 16 digits data stream will be displayed in the following format :

| D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

Each digit indicates the following status :

D15	Start Word
D14	4
D13	When send the SPL display data = 1
	When send the DOSE display data = 2
D12, D11	Annunciator for Display
	dB = 17 % = 03
D10	Polarity
	0 = Positive 1 = Negative
D9	Decimal Point(DP), position from right to the left
	0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D8 to D1	Display reading, D1 = LSD, D8 = MSD
	For example :
	If the display reading is 1234, then D8 to
	D1 is : 00001234
D0	End Word

RS232 FORMAT : 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

12. CALIBRATION

1) Prepare the optional " SOUND CALIBRATOR ", such as
" SC-941 " or " SC-942 " (set range to 94.0 dB). Power
on the Sound Calibrator & plug calibrator output socket
into the " Microphone " head (3-8, Fig. 1) of the
Sound Level meter.
2) Select " Time Weighting " at " Fast " position.
3) Select " A " weighting.
4) Adjust the " Calibration VR " (3-12, Fig. 1) carefully
with a " - " screw driver until the display reading value
within " 94 +/- 0.2 " dB.

13. FREQUENCY WEIGHTING CHARACTERISTICS OF A & C NETWORKS

Frequency	A Weighting Charac.	C Weighting Charac.	Tolerance (IEC 61672 Class 2)
31.5 Hz	-39.4 dB	-3 dB	±3.0 dB
63 Hz	-26.2 dB	-0.8 dB	±2.0 dB
125 Hz	-16.1 dB	-0.2 dB	±1.5 dB
250 Hz	-8.6 dB	0 dB	±1.5 dB
500 Hz	-3.2 dB	0 dB	±1.5 dB
1 KHz	0 dB	0 dB	±1.0 dB
2 KHz	+1.2 dB	-0.2 dB	±2.0 dB
4 KHz	+1 dB	-0.8 dB	±3.0 dB
8 KHz	-1.1 dB	-3 dB	±5.0 dB

14. TIME WEIGHTING (F/S) CHARACTERISTICS

Charac.	Max. response ref. continuous signal	Tolerance (IEC 61672 Class 2)
F (Fast)	- 1.0 dB	+ 1.0 dB , - 2.0 dB
S (Slow)	- 4.1 dB	±2.0 dB

Test under signal on 1,000 Hz/94 dB.

15. PATENT

The meter (SD card structure) already get patent or patent pending in following countries :

Germany	Nr. 20 2008 016 337.4
JAPAN	3151214
TAIWAN	M 358970
	M 359043
CHINA	ZL 2008 2 0189918.5
	ZL 2008 2 0189917.0
USA	Patent pending

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