

ONO SOKKI

High-Sensitivity Precision Sound Level Meter LA-5120

Wide-Range Precision Sound Level Meter LA-5111

Multi-Functional Sound Level Meter LA-2111

Integrating Sound Level Meter

**Instruction Manual
RS-232C**

ONO SOKKI CO., LTD.

Warranty

1. This product is covered by a warranty for a period of one year from the date of purchase.
 2. This warranty covers free-of-charge repair for defects judged to be the responsibility of the manufacturer, i.e., defects occurred while the product is used under normal operating conditions according to descriptions in this manual and notices on the unit label.
 3. For free-of-charge repair, contact either your sales representative or our sales office nearby.
 4. The following failures will be handled on a fee basis even during the warranty period.
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 - (b) Failures occurring through mishandling (dropping) or transportation
 - (c) Failures occurring through natural calamities (fires, earthquakes, flooding, and lightning), environmental disruption, or abnormal voltage.
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PREFACE

The LA2111/5111/5120 can transmit and receive data and commands to and from a personal computer via the RS-232C interface.

This manual describes the function and operation of the RS-232C interface for the sound level meter.

For details on the handling and operation of the sound level meter main unit, refer to Basic Operations in the LA2111/5111/5120 Operation Manual.

Trademarks

- IBM is a registered trademark of IBM Corporation, U.S.A.
- MS-DOS is a registered trademark of Microsoft Corporation, U.S.A.

CAUTION! Use only the AX-502 or AX-5022 RS-232C connection cable (commercially available) specified by Ono Sokki. Otherwise, normal operation cannot be guaranteed.
AX-5021: For the details of non-IBM machines, contact the sales dealer or Ono Sokki sales representative.
(25-pin D-sub connector)
AX-5022: For IBM machines (9-pin D-sub connector)

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Section 1

GENERAL

1.1 Specifications

1.2 Connector Specifications

1.3 RS-232C Setting

1.4 RS-232C Function ON/OFF Setting

1.5 RS-232C ON/OFF Setting for Printer Connection

1.6 Commands

1.7 Command Transmission

1.8 Consecutive Command Transmission

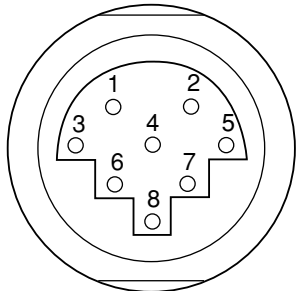
1.1 Specifications

Note: • Flow control is performed only when transferring data from the sound level meter to a personal computer.

Communication method	Asynchronous full-duplex mode
Baud rate	2400, 4800, 9600, 19200
Character length	8 bits
Parity check	None
Stop bit	1 bit
X parameter control	Receive: Invalid (OFF) Transmit: Vaid (ON)
Terminator	CR+LF/CR

1.2 Connector Specifications

Pin No.	Signal Name	Function	Input/Output
1	FG(AA)	No Connection	–
2	R x D(BB)	Receive data	Input
3	T x D(BA)	Transmit data	Output
4	CTS(CB)	Transmit Enabled	Input
5	RTS(CA)	Transmit Request	Output
6	NC(CC)	No Connection	–
7	COM(AB)	Clear to Send	
8	DTR(CD)	Data Terminal Ready	Input



1.3 RS-232C Setting

To make the RS-232C interface effective, specify the transfer rate and terminator, using bit switches SW1, SW2, and SW6 integrated in the battery compartment of the sound level meter main unit.

Note: • After bit switch setting is changed, be sure to turn off the power and then turn it back on to validate the setting.

■ Transfer Rate

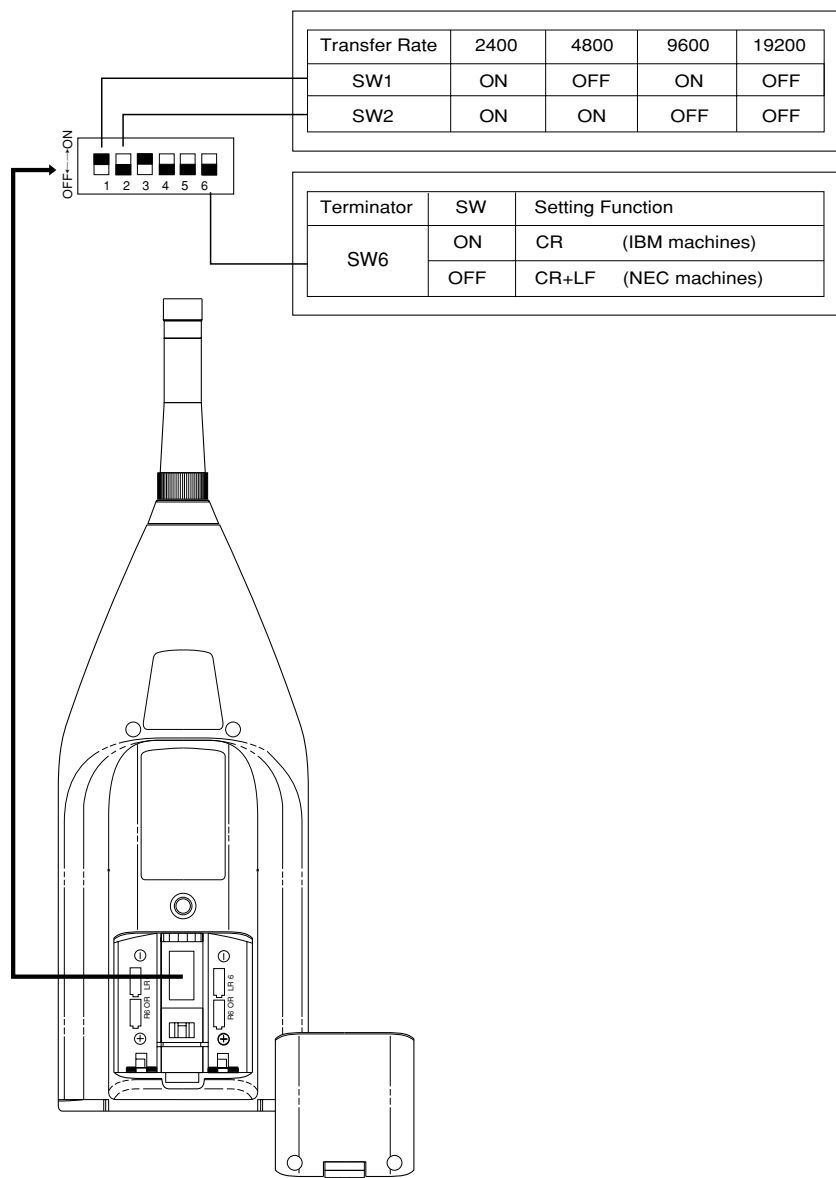
Select 2400, 4800, 9600 or 19200 bps using bit switches SW1 and SW2.

■ Terminator

Set bit switch SW6 to CR (carriage return) or CR+LF (carriage return + line feed).

The personal computer usually specifies to automatically append the terminator control code at the end of transmission data.

In general, CR is specified as a terminator for IBM machines. However, some machines specify the terminator by means of software. Refer to the Instruction Manuals for your personal computer and software before specifying the terminator.



- Note:
- Use the AX-502/5022 cable to connect the sound level meter and a personal computer.
 - AX-502 : For non-IBM machines
 - AX-5022 : For IBM machines

1.4 RS-232C Function ON/OFF Setting

It is not necessary to make ON/OFF setting of the RS-232C interface from the sound level meter. The RS-232C is automatically changed from OFF to ON when the RS-232C port on the personal computer is activated while the sound level meter and personal computer are connected by the AX-502/5022 cable.

1.5 RS-232C ON/OFF Setting for Printer (DP-414)

Connection

When the PRINT or All Print panel switch of the sound level meter is set to ON while the sound level meter and the DP-414 digital printer are connected with the dedicated cable (AX-5042) supplied to the printer, the RS-232C setting is automatically changed from OFF to ON.

1.6 Commands

The RS-232C function provided in the LA2111/5111/5120 Sound Level Meter has the following three types of commands:

- Type 1: Only a three-character command is transmitted to the sound level meter.
- Type 2: A three-character command is transmitted with required parameters appended.
- Type 3: After a character command (with parameters appended if necessary) is transmitted to the sound level meter, ASCII data from the sound level meter is read.

1.7 Command Transmission

Type 1 and Type 2 commands can be transmitted in a batch as a string of commands as shown below. Up to 28 characters (including control codes) can be transmitted at one time.

Example "FREA" (Type 2: Specifies frequency correction characteristic A)
"TREF" (Type 2: Specifies dynamic characteristic FAST)
"STT" (Type 1: Specifies measurement start)

To transmit the above commands consecutively, the format is:

"FREATREFSTT" + Control code.

It is also possible to insert a space () between commands as shown below.

"FREA_TREF_STT" + Control Code.

When two or more commands are transmitted consecutively, a Type 3 command can be placed at the end of the command string. When an incorrect or invalid command is detected, command execution is terminated at that point, and the system returns to the command wait state.

1.8 Consecutive Command Transmission

When Type 1 and Type 2 commands are transmitted consecutively, their processing may be delayed in the sound level meter. To avoid this, a 64-character buffer is used to receive the command string. However, it may overflow if consecutive commands are transmitted continuously.

To transmit a command string consisting of 64 characters or more, provide a delay of approximately 100 ms between commands.

Section 2

COMMAND LIST

- 2.1 Type 1 Command List
- 2.2 Type 2 Command List
- 2.3 Type 3 Command List

2.1 Type 1 Command List

A Type 1 command is terminated when a three-character command is transmitted to the sound level meter.

Command	Format/Function
STT	Starts measurement. (panel switch [START])
	Caution: • Not available when memory recall is in progress.
EST	Starts consecutive measurement. (panel switch [ENDLESS])
	Caution: • Not available when memory recall is in progress.
PAS	Temporarily stops/resumes measurement. (panel switch [PAUSE])
RCL	Recalls memory data. (panel switch [RECALL])
	Caution: • Data recall is disabled while memory mode is OFF. To cancel data recall, send this command again.
STR	Stores measurement data. (panel switch [STORE])
	Caution: • Data store is disabled while memory data recall is in progress. To force storing measurement data end, send this command again. • Before issuing STR, set the memory mode and address. When FSCN and common memory (AUTO, ATLx, Lp) are selected, preset necessary measurement conditions.
INI	Releases panel conditions. Caution: • All the data calculated before issuance of this command is cleared.

2.2 Type 2 Command List

A Type 2 command is transmitted by adding required parameters to the end of a three-character command. Parameters consist of ASCII characters including alphanumeric. Always add the specified number of characters. A leading parameter character of space (20H) cannot be omitted. A space is indicated by "_" in the table.

Command	Format/Function
FRE	Specifies the input filter frequency correction characteristic. (Read command provided)
	FRE@ @ = A: A-weighting = C: C-weighting = F: Flat = D: D-weighting Caution: • D-weighting can be specified only when bit switch SW3 is OFF.
TRE	Specifies the input filter time constant. (Read command provided)
	TRE@ @ = F: FAST = S: SLOW = I: IMPULSE = 1: 10ms
MAX	Specifies LP/TACT MAX and changes the display. (Read command provided)
	MAX@ @ = I: INST = M: TACT MAX 1 sec. = 3: TACT MAX 3 sec. = 5: TACT MAX 5 sec. Caution: • TACT MAX 3 sec. and 5 sec. can be specified only when bit switch SW4 is ON. Not available when real-time function is activated.

Command	Format/Function																											
LVL	<p>Specifies the level range. (Read command provided) LVL@</p> <table border="1"> <thead> <tr> <th>@</th> <th>LA-5111/2111</th> <th>LA-5120</th> </tr> </thead> <tbody> <tr><td>1</td><td>20 to 80dB</td><td>10 to 70dB</td></tr> <tr><td>2</td><td>30 to 90dB</td><td>20 to 80dB</td></tr> <tr><td>3</td><td>40 to 100dB</td><td>30 to 90dB</td></tr> <tr><td>4</td><td>50 to 110dB</td><td>40 to 100dB</td></tr> <tr><td>5</td><td>60 to 120dB</td><td>50 to 110dB</td></tr> <tr><td>6</td><td>70 to 130dB</td><td>60 to 120dB</td></tr> <tr><td>7</td><td>30 to 120dB</td><td>20 to 110dB</td></tr> <tr><td>8</td><td>40 to 130dB</td><td>30 to 120dB</td></tr> </tbody> </table> <p>Caution:</p> <ul style="list-style-type: none"> • When dual mode, octave filter, or realtime function is activated, @ cannot be set to 7 or 8. • When an octave filter is activated, the upper and lower limit values for the level range displayed are less than the values in the above table by 10dB. • When the realtime function is activated, the lower limit value for the level range displayed is less than the values in the above table by 20dB. However, LVL1 is set with the LA-5120, the internal gain setting range is -10 to 70 dB and the display range is 0 to 80 dB. 	@	LA-5111/2111	LA-5120	1	20 to 80dB	10 to 70dB	2	30 to 90dB	20 to 80dB	3	40 to 100dB	30 to 90dB	4	50 to 110dB	40 to 100dB	5	60 to 120dB	50 to 110dB	6	70 to 130dB	60 to 120dB	7	30 to 120dB	20 to 110dB	8	40 to 130dB	30 to 120dB
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4	50 to 110dB	40 to 100dB																										
5	60 to 120dB	50 to 110dB																										
6	70 to 130dB	60 to 120dB																										
7	30 to 120dB	20 to 110dB																										
8	40 to 130dB	30 to 120dB																										
CAL	<p>Sets the internal reference signal to ON or OFF. (Read command provided) CAL@ @ = N: ON = F: OFF</p>																											
DUL	<p>Selects dual or single mode. (Read command provided) DUL@ @ = S: SINGLE = D: DUAL</p> <p>Caution:</p> <ul style="list-style-type: none"> • Not available when the wide range, octave filter, or real-time function is activated. 																											
DMS	<p>Selects MAIN or SUB in dual mode. (Read command provided) DMS@ @ = M: MAIN = S: SUB</p> <p>Caution:</p> <ul style="list-style-type: none"> • Available only in the dual mode. 																											

Command	Format/Function																																																																																																																
LXP	<p>Specifies Lx sampling interval. (Read command provided) LXP@.@@ @.@@ = 0.01 to 5.00 Time (sec.)</p> <p>Caution:</p> <ul style="list-style-type: none"> • 10 ms is specified if key operation is made after value setting with this command. 																																																																																																																
OCT	<p>Specifies the octave filter. (Read command provided) OCT@ @ = F: OFF (THROUGH) = 1: 1/1 octave filter = 3: 1/3 octave filter = R: 1/1 octave real-time = T: 1/3 octave real-time</p> <p>Caution:</p> <ul style="list-style-type: none"> • Not available when no option is attached. 																																																																																																																
OFB	<p>Specifies the octave filter band. (Read command provided) OFB@@ @@ = 01 to 11: 1/1 octave band No. = 01 to 31: 1/3 octave band No.</p> <table border="1"> <thead> <tr> <th colspan="2">1/1 Octave</th> <th colspan="6">1/3 Octave</th> </tr> <tr> <th>No.</th> <th>Center Frequency</th> <th>No.</th> <th>Center Frequency</th> <th>No.</th> <th>Center Frequency</th> <th>No.</th> <th>Center Frequency</th> </tr> </thead> <tbody> <tr><td>01</td><td>31.5Hz</td><td>02</td><td>25.0Hz</td><td>03</td><td>31.5Hz</td><td>04</td><td>20.0Hz</td></tr> <tr><td>02</td><td>63.0Hz</td><td>05</td><td>50.0Hz</td><td>06</td><td>63.0Hz</td><td>07</td><td>40.0Hz</td></tr> <tr><td>03</td><td>125.0Hz</td><td>08</td><td>100.0Hz</td><td>09</td><td>125.0Hz</td><td>10</td><td>80.0Hz</td></tr> <tr><td>04</td><td>250.0Hz</td><td>11</td><td>200.0Hz</td><td>12</td><td>250.0Hz</td><td>13</td><td>160.0Hz</td></tr> <tr><td>05</td><td>500.0Hz</td><td>14</td><td>400.0Hz</td><td>15</td><td>500.0Hz</td><td>16</td><td>315.0Hz</td></tr> <tr><td>06</td><td>1kHz</td><td>17</td><td>800.0Hz</td><td>18</td><td>1.0kHz</td><td>19</td><td>630.0Hz</td></tr> <tr><td>07</td><td>2kHz</td><td>20</td><td>1.6kHz</td><td>21</td><td>2.0kHz</td><td>22</td><td>1.25kHz</td></tr> <tr><td>08</td><td>4kHz</td><td>23</td><td>3.15kHz</td><td>24</td><td>4.0kHz</td><td>25</td><td>2.5kHz</td></tr> <tr><td>09</td><td>8kHz</td><td>26</td><td>6.3kHz</td><td>27</td><td>8.0kHz</td><td>28</td><td>5.0kHz</td></tr> <tr><td></td><td></td><td>29</td><td>12.5kHz</td><td>30</td><td>ALL PASS 1</td><td>31</td><td>10.0kHz</td></tr> <tr><td>10</td><td>ALL PASS 1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td>ALL PASS 2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>Caution:</p> <ul style="list-style-type: none"> • For band No., refer to the octave band No. list shown above. • ALLPASS setting is invalidated when the octave filter function is activated. 	1/1 Octave		1/3 Octave						No.	Center Frequency	No.	Center Frequency	No.	Center Frequency	No.	Center Frequency	01	31.5Hz	02	25.0Hz	03	31.5Hz	04	20.0Hz	02	63.0Hz	05	50.0Hz	06	63.0Hz	07	40.0Hz	03	125.0Hz	08	100.0Hz	09	125.0Hz	10	80.0Hz	04	250.0Hz	11	200.0Hz	12	250.0Hz	13	160.0Hz	05	500.0Hz	14	400.0Hz	15	500.0Hz	16	315.0Hz	06	1kHz	17	800.0Hz	18	1.0kHz	19	630.0Hz	07	2kHz	20	1.6kHz	21	2.0kHz	22	1.25kHz	08	4kHz	23	3.15kHz	24	4.0kHz	25	2.5kHz	09	8kHz	26	6.3kHz	27	8.0kHz	28	5.0kHz			29	12.5kHz	30	ALL PASS 1	31	10.0kHz	10	ALL PASS 1							11	ALL PASS 2						
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2. Command List

2

Command	Format/Function
DAT	<p>Specifies the calendar. (Read command provided)</p> <p>DAT@@/@@/@@/@@/@@:@@ year/month/day/hour:min.</p> <p>@@ = 00 to 99 (year) = 01 to 12 (month) = 01 to 31 (day) = 00 to 23 (hour) = 00 to 59 (min.)</p> <p>Caution: • Not available during calculation. Do not specify a non-existing calendar.</p>
MAS	<p>Specifies the memory address. (Read command provided)</p> <p>MAS@@@@</p> <p>@@@@ = 00001 to 00080: MAN = 00001 to 00040: FSCAN = 00001 to 20000: AUTO SINGLE = 00001 to 10000: AUTO DUAL = 00001 to 06600: AUTO Lx SINGLE = 00001 to 05000: AUTO Lx DUAL = 00001 to 99999: AUTO Lp SINGLE = 00001 to 50000: AUTO Lp DUAL</p> <p>MAS@ @ = +: Increases the memory address by 1. = -: Decreases the memory address by 1.</p> <p>Caution: • Memory address cannot be changed during recall or when the specified address has no data. • When “+” or “-” is specified, memory address is automatically changed to a next address in which data exists.</p>
MMD	<p>Specifies the memory mode. (Read command provided)</p> <p>MMD@ @ = F: OFF = M: MAN = S: FSCAN = A: AUTO = X: AUTO Lx = P: AUTO Lp</p> <p>Caution: • When real-time mode is activated, only F and S are available.</p>

Command	Format/Function
DDT	<p>Specifies the display mode. (Read command provided)</p> <p>DDT@ @ = 1: Lp = 2: Leq = 3: LE = 4: LMX = 5: LMN = 6: LPK</p> <p>Caution: • 6 is invalid in real-time activation mode. • DDT is effective for the list screen.</p>
LGT	<p>Sets the backlight to ON or OFF. (Read command provided)</p> <p>LGT@ @ = F: OFF = N: ON</p>
MTM	<p>Specifies the measurement time duration. (Read command provided)</p> <p>Format "MTM@@hour:@@min.:@@sec."</p> <p>@@ = 00 to 99: (hour) = 00 to 59: (minute) = 00 to 59: (second)</p> <p>Caution: • FREE (00:00:00) is specified if keyboard operation is made after value setting.</p>
LPP	<p>Sets memory store interval. (Read command provided)</p> <p>LPP@.@@</p> <p>@.@@ = 0.00 to 5.00 Number of sec.</p> <p>Caution: • 5 ms is selected if 0.00 is specified. 5 ms is also specified if key operation is made after value setting with this command.</p>

Command	Format/Function																																					
LST	<p>Specifies the list display. (Read command provided)</p> <p>Caution: • The list screen for filters is disabled except for filter scan memory recall.</p> <p>LST@</p> <table border="1"> <thead> <tr> <th>@</th> <th>Content of List Screen</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>List OFF screen</td> <td>• Bar indicator display (standard)</td> </tr> <tr> <td>1</td> <td>Leq related list screen</td> <td>• List for the modes set with “DDT” command. • Except for real-time octave filters</td> </tr> <tr> <td>2</td> <td>Lx list screen</td> <td>• Except for real-time octave filters</td> </tr> <tr> <td rowspan="2">3</td> <td>31.5 Hz to 8 kHz</td> <td>• 1/1 OCT filter memory recall • 1/1 real-time octave filter</td> </tr> <tr> <td>20 Hz to 160 Hz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="3">4</td> <td>THRU A to THRU F</td> <td>• 1/1 octave filter memory recall</td> </tr> <tr> <td>200 Hz to 1.6 kHz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td>ALLPASS1 & PEAK ALLPASS2 & PEAK</td> <td>• 1/1 real-time octave filter</td> </tr> <tr> <td>5</td> <td>2 kHz to 12.5 kHz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="2">6</td> <td>THRU A to THRU F</td> <td>• 1/3 OCT filter memory recall</td> </tr> <tr> <td>ALLPASS1 & PEAK ALLPASS2 & PEAK</td> <td>• 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="2">7</td> <td>NGF, NGD</td> <td>• Loudness</td> </tr> <tr> <td>LNGF, LNGD</td> <td>• Loudness level</td> </tr> </tbody> </table> <p>Caution: • Filter list screen is available only during filter scan memory recall.</p>	@	Content of List Screen	Remarks	F	List OFF screen	• Bar indicator display (standard)	1	Leq related list screen	• List for the modes set with “DDT” command. • Except for real-time octave filters	2	Lx list screen	• Except for real-time octave filters	3	31.5 Hz to 8 kHz	• 1/1 OCT filter memory recall • 1/1 real-time octave filter	20 Hz to 160 Hz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	4	THRU A to THRU F	• 1/1 octave filter memory recall	200 Hz to 1.6 kHz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	ALLPASS1 & PEAK ALLPASS2 & PEAK	• 1/1 real-time octave filter	5	2 kHz to 12.5 kHz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	6	THRU A to THRU F	• 1/3 OCT filter memory recall	ALLPASS1 & PEAK ALLPASS2 & PEAK	• 1/3 real-time octave filter	7	NGF, NGD	• Loudness	LNGF, LNGD	• Loudness level
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	LNGF, LNGD	• Loudness level																																				

2.3 Type 3 Command List

A Type 3 command reads ASCII data from the sound level meter after transmitting a three-character command (with parameters if necessary) to the meter.

The number of data items transmitted from the sound level meter is fixed. Be sure to receive the correct number of characters. Care must be taken that the sound level meter is set to automatically terminate data transmission if the CTS line on the receive side is not active for a specified period of time. At the end of the data, a control code specified by bit switch SW6 is appended as a terminator. The number of characters transmitted shown in the table does not include the control code characters.

Command	Format/Function
CAL?	<p>Reads internal reference signal ON/OFF. (With setting command)</p> <p>Data format @ @ = N: ON = F: OFF</p>
MTM?	<p>Reads the measurement time duration specified. (Setting command provided)</p> <p>Data format @@(hour):@(min.):@(sec.) @@ = 00 to 99: (hour) @@ = 00 to 59: (minute) @@ = 00 to 59: (second)</p>
LXP?	<p>Reads the Lx sampling interval. (Setting command provided)</p> <p>Data format @.@@ @.@@ = 0.01 to 5.00 (second)</p> <p>Caution: • The sampling interval of data stored in memory is used during memory data recall.</p>
LPP?	<p>Reads memory store interval. (Setting command provided)</p> <p>Data format @.@@@ @.@@@ = 0.01 to 5.00 (second)</p> <p>Caution: • 0.00 is transmitted if 5 ms is specified. • The sampling interval of data stored in memory is used during memory recall.</p>

2. Command List

2

Command	Format/Function
OCT?	<p>Reads the octave filter. (Setting command provided)</p> <p>Data format @ @ = F: OFF</p> <ul style="list-style-type: none"> = 1: 1/1 octave filter = 3: 1/3 octave filter = R: 1/1 octave real-time = T: 1/3 octave real-time <p>Caution: • Not available if no option is attached.</p>
OFR?	<p>Reads the octave filter band. (Setting command provided)</p> <p>Data format @@</p> <ul style="list-style-type: none"> @@ = 01 to 11: 1/1 octave band No. = 01 to 31: 1/3 octave band No. <p>Caution: • If the filter is OFF (THROUGH), one character "F" is returned.</p> <ul style="list-style-type: none"> • For band No., refer to the band No. list.
DAT?	<p>Reads the calendar. (Setting command provided)</p> <p>Data format @@/@@/@@/@@:@@ year/month/day/hour:min.</p> <ul style="list-style-type: none"> @@ = 00 to 99 (year) = 01 to 12 (month) = 01 to 31 (day) = 00 to 23 (hour) = 00 to 59 (min.)
MAS?	<p>Reads the memory address. (Setting command provided)</p> <p>MAS?</p> <p>Data format @@@@</p> <ul style="list-style-type: none"> @@@@ = 00001 to 00080: MAN = 00001 to 00200: FSCAN = 00001 to 20000: AUTO SINGLE = 00001 to 10000: AUTO DUAL = 00001 to 06600: AT Lx SINGLE = 00001 to 05000: AT Lx DUAL = 00001 to 99999: Lp SINGLE = 00001 to 50000: Lp DUAL <p>Caution: • In the case of memory OFF, one character "F" is returned. If it is not stored in the AUTO memory, "0000" is returned.</p>

Command	Format/Function
MMD?	<p>Reads the memory mode. (Setting command provided)</p> <p>MMD?</p> <p>Data format @ @ = F: OFF</p> <ul style="list-style-type: none"> = M: MAN = S: FSCAN = A: AUTO = X: AT Lx = P: Lp
DDT?	<p>Reads the display mode. (Setting command provided)</p> <p>DDT?</p> <p>Data format @ @ = 1: Lp</p> <ul style="list-style-type: none"> = 2: Lep = 3: LE = 4: LMX = 5: LMN = 6: LPK = L: List screen

Command	Format/Function																																					
LST?	<p>Reads the list display. (Setting command provided) LST?</p> <table border="1"> <thead> <tr> <th>@</th> <th>Content of List Screen</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>List OFF screen</td> <td>• Bar indicator display (standard)</td> </tr> <tr> <td>1</td> <td>Leq related list screen</td> <td>• List for the modes set with "DDT" command. • Except for real-time octave filters</td> </tr> <tr> <td>2</td> <td>Lx list screen</td> <td>• Except for real-time octave filters</td> </tr> <tr> <td rowspan="2">3</td> <td>31.5 Hz to 8 kHz</td> <td>• 1/1 OCT filter memory recall • 1/1 real-time octave filter</td> </tr> <tr> <td>20 Hz to 160 Hz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="3">4</td> <td>THRU A to THRU F</td> <td>• 1/1 OCT filter memory recall</td> </tr> <tr> <td>200 Hz to 1.6 kHz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td>ALLPASS1 & PEAK ALLPASS2 & PEAK</td> <td>• 1/1 real-time octave filter</td> </tr> <tr> <td>5</td> <td>2 kHz to 12.5 kHz</td> <td>• 1/3 OCT filter memory recall • 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="2">6</td> <td>THRU A to THRU F</td> <td>• 1/3 OCT filter memory recall</td> </tr> <tr> <td>ALLPASS1 & PEAK ALLPASS2 & PEAK</td> <td>• 1/3 real-time octave filter</td> </tr> <tr> <td rowspan="2">7</td> <td>NGF, NGD</td> <td>• Loudness</td> </tr> <tr> <td>LNGF, LNGD</td> <td>• Loudness level</td> </tr> </tbody> </table>	@	Content of List Screen	Remarks	F	List OFF screen	• Bar indicator display (standard)	1	Leq related list screen	• List for the modes set with "DDT" command. • Except for real-time octave filters	2	Lx list screen	• Except for real-time octave filters	3	31.5 Hz to 8 kHz	• 1/1 OCT filter memory recall • 1/1 real-time octave filter	20 Hz to 160 Hz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	4	THRU A to THRU F	• 1/1 OCT filter memory recall	200 Hz to 1.6 kHz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	ALLPASS1 & PEAK ALLPASS2 & PEAK	• 1/1 real-time octave filter	5	2 kHz to 12.5 kHz	• 1/3 OCT filter memory recall • 1/3 real-time octave filter	6	THRU A to THRU F	• 1/3 OCT filter memory recall	ALLPASS1 & PEAK ALLPASS2 & PEAK	• 1/3 real-time octave filter	7	NGF, NGD	• Loudness	LNGF, LNGD	• Loudness level
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	LNGF, LNGD	• Loudness level																																				
LGT?	<p>Reads the backlight ON/OFF state. (Setting command provided) LGT? Data format @ @ = F: OFF / N: ON</p>																																					
DUL?	<p>Reads whether the dual or single mode is specified. (Setting command provided) DUL? Data format @ @ = S: SINGLE = D: DUAL</p>																																					
DMS?	<p>Reads dual mode settings. (Setting command provided) DMS? Data format @ @ = M: MAIN = S: SUB</p>																																					

Command	Format/Function
CON	<p>Reads the processing status. CON Data format @ @ = S: Calculation terminated = P: Pause in progress = M: Calculation in progress = R: Memory recall in progress</p>
BAT	<p>Reads the power voltage. BAT Data format @ @ = 0: 3.8 V or less = 1: 3.8 to 4.0 V = 2: 4.0 to 4.25 V = 3: 4.25 to 4.5 V = 4: 4.5 to 4.75 V = 5: 4.75 to 5.0 V = 6: 5.0 to 5.25 V = 7: 5.25 to 5.5 V = 8: 5.5 V or higher</p>
MTR	<p>Reads the actual measurement time. Data format @:@:@@:@@ hour:min.:sec. @@ = 00 to 99: (hour) @@ = 00 to 59: (minute) @@ = 00 to 59: (second)</p>
FRE?	<p>Reads the input filter frequency correction characteristic. (Setting command provided) FRE? Data format @ @ = A: A-weighting = C: C-weighting = F: Flat = D: D-weighting</p>
TRE?	<p>Reads the input filter time constant. (Setting command provided) TRE? Data format @ @ = F: FAST = S: SLOW = I: IMPULSE = 1: 10ms</p>

2. Command List

2

Command	Format/Function	Command	Format/Function
MDR	<p>Reads the measurement start time.</p> <p>MDR</p> <p>Data format @@@/@@/@@/@@/@@:@@ year/month/day/hour:min.</p> <p>@@ = 00 to 99 (year)</p> <p>= 01 to 12 (month)</p> <p>= 01 to 31 (day)</p> <p>= 00 to 23 (hour)</p> <p>= 00 to 59 (min.)</p>		<p>@@: Data transmission interval time</p> <p>05 to 50: 1/1 oct 2400bps</p> <p>04 to 50: 1/1 oct 4800bps</p> <p>03 to 50: 1/1 oct 9600bps</p> <p>02 to 50: 1/1 oct 19200bps</p> <p>16 to 50: 1/3 oct 2400bps</p> <p>08 to 50: 1/3 oct 4800bps</p> <p>04 to 50: 1/3 oct 9600bps</p> <p>02 to 50: 1/3 oct 19200bps</p> <p>@@@@: Total number of output data (00001 to 65000)</p> <p>Caution: • The setting range depends on the octave and baud rate.</p>
LPO	<p>Consecutively outputs Lp data at specified intervals.</p> <p>LPO@@,@@@@</p> <p>@@ = 01 to 50</p> <p>@@@@ = 00001 to 65000</p> <p>Data format ±@@@@,@@,@@</p> <p>±@@@@, @@ = Lp value (dB)</p> <p>@@ = OK/OV/UD/UO</p> <p>..... Normal/Excessive/Under/Under+Excessive</p> <p>Caution: • @@ indicates the Lp data transmission interval time in units of 100 msec.</p> <ul style="list-style-type: none"> • @@=01 shows the minimum interval 100 ms. Up to 50 (5 sec.) can be specified in units of 1. • @@@@ indicates the total number of output data items, which can be specified up to 65000. • When real-time function is selected, the band data indicated by the marker is output in succession. 		<p>Data format</p> <p>At bar graph display (Continuously outputs instantaneous data for the band indicated by the cursor.)</p> <p>+@@@@.@@,@@</p> <p>+@@@@.@@ = Lp value(dB)</p> <p>@@ = OK/OV/UD/UO</p> <p>..... Normal/Excessive/Under/Under+Excessive</p> <p>At list display (Continuously outputs instantaneous data for all bands, all paths, and peak.)</p> <p>+@@@@.@@, +@@@@.@@,@@</p> <p>+@@@@.@@, +@@@@.@@=Lp value for each band (dB)</p> <p>@@ = OK/OV/UD/UO</p> <p>..... Normal/Excessive/Under/Under+Excessive</p> <p>Caution: • During data transmission at list display, the screen is not updated.</p>
DOI	<p>Continuously outputs Lp data in realtime mode.</p> <p>DOI@@,@@@@@ 01 to 50, 00001 to 65000</p> <p>Caution: • @@ indicates data transmission interval time in units of 100msec.</p> <ul style="list-style-type: none"> • @@=01 indicates the minimum interval of 100msec. Up to 50 (5s) can be set. • @@@@@ indicates the total number of output data. Up to 65000 can be set. <p>At bar graph display (Continuously outputs instantaneous data for the band indicated by the maker.)</p> <p>@@: Data transmission interval time (01 to 50)</p> <p>@@@@@: Total number of output data (00001 to 65000)</p> <p>At list display (Continuously outputs instantaneous data for all bands, all paths, and peak.)</p>		<p>DDR</p> <p>Reads display data.</p> <p>DDR</p> <p>Data format ±@@@@, @@</p> <p>, ±@@@@, @@</p> <p>⋮</p> <p>, ±@@@@, @@</p> <p>, @@</p> <p>±@@@@, @@ = Data value (dB)</p> <p>@@ = OK/OV/UD/UO</p> <p>..... Normal/Excessive/Under/Under+Excessive</p> <p>Caution: • Number of data items varies depending on the display screen as shown below.</p>

Command	Format/Function																											
	<table border="1"> <tr><td>Standard screen</td><td>1</td></tr> <tr><td>Single Leq-related list screen</td><td>5</td></tr> <tr><td>Dual Leq-related list screen</td><td>10</td></tr> <tr><td>Lx-related list screen</td><td>10</td></tr> <tr><td>1/1 octave filter scan list screen</td><td>15</td></tr> <tr><td>1/3 octave filter scan list screen</td><td>35</td></tr> <tr><td>1/1 real-time filter scan list screen</td><td>13</td></tr> <tr><td>1/3 real-time filter scan list screen</td><td>33</td></tr> <tr><td>Loudness screen</td><td>4</td></tr> </table>	Standard screen	1	Single Leq-related list screen	5	Dual Leq-related list screen	10	Lx-related list screen	10	1/1 octave filter scan list screen	15	1/3 octave filter scan list screen	35	1/1 real-time filter scan list screen	13	1/3 real-time filter scan list screen	33	Loudness screen	4									
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MAX?	<p>Reads the Lp/TACT MAX value. (Setting command provided)</p> <p>MAX?</p> <p>Data format @ @ = 1: INST = M: TACT MAX 1 sec. = 3: TACT MAX 3 sec. = 5: TACT MAX 5 sec.</p>																											
LVL?	<p>Reads the level range. (Setting command provided)</p> <p>LVL?</p> <p>Data format @</p> <table border="1"> <thead> <tr> <th>@</th> <th>LA-5111/2111</th> <th>LA-5120</th> </tr> </thead> <tbody> <tr><td>1</td><td>20 to 80dB</td><td>10 to 70dB</td></tr> <tr><td>2</td><td>30 to 90dB</td><td>20 to 80dB</td></tr> <tr><td>3</td><td>40 to 100dB</td><td>30 to 90dB</td></tr> <tr><td>4</td><td>50 to 110dB</td><td>40 to 100dB</td></tr> <tr><td>5</td><td>60 to 120dB</td><td>50 to 110dB</td></tr> <tr><td>6</td><td>70 to 130dB</td><td>60 to 120dB</td></tr> <tr><td>7</td><td>30 to 120dB</td><td>20 to 110dB</td></tr> <tr><td>8</td><td>40 to 130dB</td><td>30 to 120dB</td></tr> </tbody> </table>	@	LA-5111/2111	LA-5120	1	20 to 80dB	10 to 70dB	2	30 to 90dB	20 to 80dB	3	40 to 100dB	30 to 90dB	4	50 to 110dB	40 to 100dB	5	60 to 120dB	50 to 110dB	6	70 to 130dB	60 to 120dB	7	30 to 120dB	20 to 110dB	8	40 to 130dB	30 to 120dB
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7	30 to 120dB	20 to 110dB																										
8	40 to 130dB	30 to 120dB																										
MCN	<p>Reads whether the specified addresses have memory data or not.</p> <p>Data format @ = 1: Data is stored. = 2: No data is stored. = 3: Data is stored (real-time mode).</p> <p>Caution: • For filter scan memory, “3” is returned when real-time data is stored in the memory; otherwise, “1” is returned.</p>																											
LAD	<p>Reads the auto memory last address.</p> <p>LAD</p> <p>Data format @@@@ = Last address</p> <p>Caution: • “0000” is used if no data is stored in the specified auto memory.</p>																											

Command	Format/Function
MBR	<p>Reads memory data block.</p> <p>Caution: • Filter scan memory cannot be read. To read filter scan memory data, change over to LIST mode after recalling and then use “DDR” command to read data.</p> <p>Command format: MBR @@@@ (Start address), @@@@ (End address) @@@@ = 00001 to 00080: MAN = 00001 to 20000: AUTO SINGLE = 00001 to 10000: AUTO DUAL = 00001 to 06600: AT Lx SINGLE = 00001 to 05000: AT Lx DUAL = 00001 to 99999: Lp SINGLE = 00001 to 50000: Lp DUAL</p> <p>Caution: • For MAN memory, only the data for one address can be read. Therefore, only the memory data at the address number which is set to a starting address is transferred.</p> <p>Data format:</p> <ul style="list-style-type: none"> MAN memory <ul style="list-style-type: none"> S (single) or D (dual): Mode of instantaneous data <S mode> Lp (Main instantaneous data), @@ <D mode> Lp (Main instantaneous data), @@, Lp (Sub-instantaneous data), @@ S (single) or D (dual): Mode of calculation data <Calculation in S mode> Leq,LE,LMX,LMN,LPK (main calculation data),L01,L05,L10,L50,L90,L95,L99,LLO,LHI,LAV,@@ <Calculation in D mode> Leq,LE,LMX,LMN,LPK (main calculation data),L01,L05,L10,L50,L90,L95,L99,LLO,LHI,LAV,@@,Leq,LE,LMX,LMN,LPK (sub-calculation data),@@ @@ = OK,O,UD,OU

2. Command List

2

Command	Format/Function
	<p><i>(Example)</i> When the instantaneous data at address 15 of MAN memory is in single mode while the calculated data is in dual mode, MBR00015,00015 S +110.02,OV D +080.86,+090.86,+091.43,+64.55,+98.45,+90.50,+87.10, +086.00,+074.90,+070.80,+069.40,+068.60,+068.50, +090.50,+080.91,OK,081.39,+091.39,+092.60,+049.86, +098.87,OK</p> <ul style="list-style-type: none"> • AUTO memory S (single) or D (dual): Mode of instantaneous data <Calculation in S mode> Leq,LE,LMX,LMN,LPK (main calculation data),@@ <Calculation in D mode> Leq,LE,LMX,LMN,LPK (main calculation data),@@,Leq,LE,LMX, LMN,LPK (sub-calculation data),@@ <p><i>(Example)</i> When "111" is read from address "108" of AUTO memory, using MBR command, where calculation data is in single mode. MBR00108,00111 S +080.52,+087.51,+087.12,+068.02,+093.06,OK +093.77,+100.76,+107.45,+069.48,+113.00,OV +072.83,+079.82,+076.68,+067.13,+085.51,OK +089.49,+096.48,+095.42,+068.39,+107.24,OK</p> <ul style="list-style-type: none"> • AT Lx memory S (single) or D (dual): Mode of calculation data <Calculation in S mode> Leq,LE,LMX,LMN,LPK (main calculation data),L01,L05,L10,L50,L90, L99,LLO,LHI,LAV,@@ <Calculation in D mode> Leq,LE,LMX,LMN,LPK (main calculation data),L01,L05,L10,L50,L90, L99,LLO,LHI,LAV,@@,Leq,LE,LMX,LMN,LPK (sub-calculation data),@@

Command	Format/Function
	<p><i>(Example)</i> When "246" is read from address "245" of AUTO Lx memory, using MBR command, where calculation data is in single mode. S +090.24,+100.24,+097.05,+068.29,+103.94,+096.90, +096.90,+096.20,+087.50,+071.50,+070.80,+070.60, +070.60,+096.90,+090.11,OK +081.04,+091.04,+089.07,+067.68,+096.34,+088.70, +088.70,+088.40,+074.10,+071.80,+071.20,+068.60, +068.60,+088.70,+081.12,OK</p> <ul style="list-style-type: none"> • Lp memory S (single) or D (dual): Mode of instantaneous data <S mode> Lp (main instantaneous data) <D mode> Lp (main instantaneous data), Lp (sub-instantaneous data) <p><i>(Example)</i> When "2460" is read from address "2456" of AUTO Lp memory, using MBR command, where calculation data is in dual mode. MBR02456,02460 D +073.03,+053.81 +091.01,+092.08 +074.57,+067.46 +087.78,+088.75 +081.72,+082.13</p>

Section 3
ALPHABETICAL COMMAND LIST

3. Alphabetical Command List

3

	Command	Type	Function
B	BAT	3	Reads the power voltage.
C	CAL	2	Specifies the internal reference signal ON/OFF. (Read command provided)
	CAL?	3	Reads the internal reference signal ON/OFF. (Setting command provided)
	CON	3	Reads the processing status.
D	DAT	2	Specifies the calendar. (Read command provided)
	DAT?	3	Reads the calendar. (Setting command provided)
	DDR	3	Reads the display data.
	DDT	2	Specifies the display mode. (Read command provided)
	DDT?	3	Reads the display mode. (Setting command provided)
	DMS	2	Selects MAIN or SUB in dual mode. (Read command provided)
	DMS?	3	Reads whether MAIN or SUB is specified in dual mode. (Setting command provided)
	DOI	3	Continuously outputs Lp data in certain interval in realtime mode.
	DUL	2	Selects dual or single mode. (Read command provided)
	DUL?	3	Reads whether the dual or single mode is specified. (Setting command provided)
E	EST	1	Starts consecutive measurement.
F	FRE	2	Specifies the input filter frequency correction characteristic. (Read command provided)
	FRE?	3	Reads the input filter frequency correction characteristic. (Setting command provided)
I	INI	3	Releases the panel condition.
L	LAD	3	Reads the last address of auto memory.
	LGT	2	Specifies backlight ON/OFF. (Read command provided)
	LGT?	3	Reads backlight ON/OFF. (Setting command provided)
	LPO	3	Consecutively outputs Lp data at the specified intervals.
	LPP	2	Sets memory store interval. (Read command provided)
	LPP?	3	Reads memory store interval. (Set command provided)
	LST	2	Specifies the list display. (Read command provided)
	LST?	3	Reads the list display. (Setting command provided)

	Command	Type	Function
L	LVL	2	Specifies the level range. (Read command provided)
	LVL?	3	Reads the level range. (Setting command provided)
	LXP	2	Specifies the Lx sampling interval. (Read command provided)
	LXP?	3	Reads the Lx sampling interval. (Setting command provided)
M	MAS	2	Specifies the memory address. (Read command provided)
	MAS?	3	Reads the memory address. (Setting command provided)
	MAX	2	Specifies the Lp/MAX-HOLD mode and display change. (Read command provided)
	MAX?	3	Reads the Lp/MAX-HOLD mode and display change. (Setting command provided)
	MBR	3	Reads the memory data block.
	MCN	3	Reads whether the specified addresses have memory data or not.
	MDR	3	Reads the measurement start time.
	MMD	2	Specifies the memory mode. (Read command provided)
	MMD?	3	Reads the memory mode. (Setting command provided)
	MTM	2	Specifies the measurement time duration. (Read command provided)
	MTM?	3	Reads the measurement time duration. (Setting command provided)
	MTR	3	Reads the actual measurement time duration.
O	OCT	2	Specifies the octave filter. (Read command provided)
	OCT?	3	Reads the octave filter. (Setting command provided)
	OFR	2	Specifies the octave filter band. (Read command provided)
	OFR?	3	Reads the octave filter band. (Setting command provided)
P	PAS	1	Temporarily stops (PAUSE) or resumes (CONTINUE) the measurement.
R	RCL	1	Reads memory data.
S	STR	1	Stores measurement data.
	STT	1	Starts measurement.
T	TRE	2	Specifies the input filter time constant. (Read command provided)
	TRE?	3	Reads the input filter time constant. (Setting command provided)

Section 4

SAMPLE PROGRAMS

- 4.1 Display Data Read (For IBM PC/AT)
- 4.2 Basic Condition Setting (For IBM PC/AT)
- 4.3 Basic Condition Read (For IBM PC/AT)
- 4.4 Measurement Execution (For IBM PC/AT)

4. *Sample Programs*

This section describes a sample program created with Quick-BASIC on the IBM PC/AT. Use it as a reference for programming the RS-232C interface commands.

- Notes:
- If you have found errors or problems, please contact your Ono Sokki representative.
 - Please notice that Ono Sokki is not liable for the results from use of the sample program.
It is prohibited to transfer a part of or the entire program without prior permission.
 - IBM is a registered trademark of IBM Corporation, U.S.A.
 - MS-DOS and Quick-Basic are registered trademarks of Microsoft Corporation, U.S.A.

4.1 Display Data Read (For IBM PC/AT)

This sample program is used to set basic conditions.

■ Sample Program

```
#####
# Read out of Display Data      File name: LARD_CDT      #
#                               #
# CPU System: IBM PC-AT QuickBASIC Ver4.5 (MS-DOS)      #
# LA-5100/2100 Series: 9600 Baud, Terminator=CR          #
#                               #
# Copyright (c) 1995 - ONO SOKKI CO., Ltd.              #
#####
*** Definition of Parameters
OPTION BASE 1
DIM FREI$(4), TREI$(4), LVLI$(8), DDTI$(6), LSTI$(2)
FREI$(1) = "A": FREI$(2) = "C": FREI$(3) = "F": FREI$(4) = "D" ' Freq Weighting
TREI$(1) = "F": TREI$(2) = "S": TREI$(3) = "I": TREI$(4) = "1" ' Time Weighting
LVLI$(1) = "1": LVLI$(2) = "2": LVLI$(3) = "3": LVLI$(4) = "4" ' Level Range
LVLI$(5) = "5": LVLI$(6) = "6": LVLI$(7) = "7": LVLI$(8) = "8"
DDTI$(1) = "1": DDTI$(2) = "2": DDTI$(3) = "3": DDTI$(4) = "4" ' Display Kind
DDTI$(5) = "5": DDTI$(6) = "6"
LSTI$(1) = "1": LSTI$(2) = "2" ' List Kind
DIM LSTDT$(10)
DIM TTLEQ$(5), TTLX$(10)
TTLEQ$(1) = "Leq=": TTLEQ$(2) = "LE=": TTLEQ$(3) = "Lpk=" ' Leq
TTLEQ$(4) = "Lmx=": TTLEQ$(5) = "Lmn="
TTLX$(1) = "L01=": TTLX$(2) = "L05=": TTLX$(3) = "L10=" ' Lx
TTLX$(4) = "L50=": TTLX$(5) = "L90=": TTLX$(6) = "L95="
TTLX$(7) = "L99=": TTLX$(8) = "Llo=": TTLX$(9) = "Lhi="
TTLX$(10) = "Lav="
*** Initial set of RS-232C Interfave
OPEN "COM1:9600 ,N,8,1 ,DS0" FOR RANDOM AS #1
*** Input Conditions
INPUT "Select Frequency Weighting (1:A/2:C/3:F/4:): ", FREI
INPUT "Select Time Weighting (1:FAST/2:SLOW/3:IMP/4:10m) ", TREI
INPUT "Select Level Range (1--8) ", LVLI
INPUT "Select Display Kind (1:Lp/2:Leq/3:LE/4:LMX/5:LMN/6:LPK) ", DDTI
INPUT "Select List Kind (0:OFF/1:Leq/2:Lx) ", LSTI
```

```
*** Set Condition to LA-5100
SET$ = "FRE" + FREI$(FREI) ' Freq Weighting
SET$ = SET$ + " TRE" + TREI$(TREI) ' Time Weighting
SET$ = SET$ + " LVL" + LVLI$(LVLI) ' Level Range
SET$ = SET$ + " DDT" + DDTI$(DDTI) ' Display Kind
IF LSTI <> 0 THEN
  SET$ = SET$ + " LST" + LSTI$(LSTI) ' List
END IF
PRINT #1, SET$
INPUT "Push RETURN key, if Data ready ", A$
*** Read out of Data and Display
CLS
PRINT #1, "LST?": INPUT #1, LSTR$ ' List Kind ?
SELECT CASE LSTR$
  CASE "F" ' Standard
    PRINT #1, "DDR": INPUT #1, NRMDT$
    PRINT "Data : ", NRMDT$
  CASE "1" ' Leq List
    PRINT #1, "DDR"
    FOR I = 1 TO 5
      INPUT #1, LSTDT$(I)
    NEXT I
    PRINT "Data : (Leq List)"
    FOR I = 1 TO 5
      PRINT TTLEQ$(I), LSTDT$(I)
    NEXT I
  CASE "2" ' Lx List
    PRINT #1, "DDR"
    FOR I = 1 TO 10
      INPUT #1, LSTDT$(I)
    NEXT I
    PRINT "Data : (Lx List)"
    FOR I = 1 TO 10
      PRINT TTLX$(I), LSTDT$(I)
    NEXT I
  CASE ELSE ' others
    PRINT "Different Mode"
END SELECT
*** End Operation
CLOSE #1
END
```

4. Sample Programs

4.2 Basic Condition Setting (For IBM PC/AT)

This sample program is used to read the displayed data on the sound level meter.

■ Sample Program

```
#####  
# Set Basic Conditions File name: LASETCON #  
# #  
# CPU System: IBM PC-AT QuickBASIC Ver4.5 (MS-DOS) #  
# LA-5100/2100 Series: 9600 Baud, Terminator=CR #  
# #  
# Copyright (c) 1995 - ONO SOKKI CO., Ltd. #  
#####  
,  
*** Definition of Parameters  
OPTION BASE 1  
DIM FREI$(4), TREI$(4), LVLI$(8), DDTI$(6), LSTI$(2), LGTI$(2)  
FREI$(1) = "A": FREI$(2) = "C": FREI$(3) = "F": FREI$(4) = "D" ' Freq Weighting  
TREI$(1) = "F": TREI$(2) = "S": TREI$(3) = "I": TREI$(4) = "1" ' Time Weighting  
LVLI$(1) = "1": LVLI$(2) = "2": LVLI$(3) = "3": LVLI$(4) = "4" ' Level Range  
LVLI$(5) = "5": LVLI$(6) = "6": LVLI$(7) = "7": LVLI$(8) = "8"  
DDTI$(1) = "1": DDTI$(2) = "2": DDTI$(3) = "3": DDTI$(4) = "4" ' Display Kind  
DDTI$(5) = "5": DDTI$(6) = "6"  
LSTI$(1) = "1": LSTI$(2) = "2" ' List Kind  
LGTI$(1) = "F": LGTI$(2) = "N" ' Backlight  
,  
*** Initial Set of RS-232C Interface  
OPEN "COM1:9600 ,N,8,1 ,DS0" FOR RANDOM AS #1  
,  
*** Input Conditions  
INPUT "Enter Date and Time (ex. 99/12/31/23:59) ", DATI$  
INPUT "Select Frequency Weighting (1:A/2:C/3:F/4: ) ", FREI$  
INPUT "Select Time Weighting (1:FAST/2:SLOW/3:IMP/4:10m) ", TREI$  
INPUT "Select Level Range (1--8) ", LVLI$  
INPUT "Select Display Kind (1:Lp/2:Leq/3:LE/4:LMX/5:LMN/6:LPK) ", DDTI$  
INPUT "Select List Kind (0:OFF/1:Leq/2:Lx) ", LSTI$  
INPUT "Select Backlight (1:OFF/2:ON) ", LGTI$  
,  
*** Set Condition to LA-5100  
SET1$ = "DAT" + DATI$ ' Date/Time  
PRINT #1, SET1$  
SET2$ = SET2$ + " FRE" + FREI$(FREI) ' Freq Weighting  
SET2$ = SET2$ + " TRE" + TREI$(TREI) ' Time Weighting
```

```
' SET2$ = SET2$ + " LVL" + LVLI$(LVLI) ' Level Range  
SET2$ = SET2$ + " DDT" + DDTI$(DDTI) ' Display Kind  
IF LSTI <> 0 THEN  
SET2$ = SET2$ + " LST" + LSTI$(LSTI) ' List Kind  
END IF  
SET2$ = SET2$ + " LGT" + LGTI$(LGTI) ' Backlight  
PRINT #1, SET2$  
,  
*** End Operation  
CLOSE #1  
,  
END
```


4.3 Basic Condition Read (For IBM PC/AT)

This sample program is used to read the conditions currently set in the sound level meter.

■ Sample Program

```
#####
# Read out of Basic Conditions File name: LAGETCON #
# #
# CPU System: IBM PC-AT QuickBASIC Ver4.5 (MS-DOS) #
# LA-5100/2100 Series: 9600 Baud, Terminator=CR #
# #
# Copyright (c) 1995 - ONO SOKKI CO., Ltd. #
#####
,
*** Definition of Character Array
OPTION BASE 1
DIM LVLD$(8), DDTD$(6), LSTD$(6), BATD$(9)
LVLD$(1) = "20 -- 80dB": LVLD$(2) = "30 -- 90dB" ' Level Range
LVLD$(3) = "40 -- 100dB": LVLD$(4) = "50 -- 110dB"
LVLD$(5) = "60 -- 120dB": LVLD$(6) = "70 -- 130dB"
LVLD$(7) = "30 -- 120dB": LVLD$(8) = "40 -- 130dB"
DDTD$(1) = "Lp ": DDTD$(2) = "Leq": DDTD$(3) = "LE " ' Display Kind
DDTD$(4) = "LMX": DDTD$(5) = "LMN": DDTD$(6) = "LPK"
LSTD$(1) = "Leq ": LSTD$(2) = "Lx ": LSTD$(3) = "Filt1" ' Display Mode
LSTD$(4) = "Filt2": LSTD$(5) = "Filt3": LSTD$(6) = "Filt4"
BATD$(1) = "under 3.8V ": BATD$(2) = " 3.8 -- 4.0V" ' Battery Voltage
BATD$(3) = "4.0 -- 4.25V": BATD$(4) = "4.25 -- 4.5V"
BATD$(5) = "4.5 -- 4.75V": BATD$(6) = "4.75 -- 5.0V"
BATD$(7) = "5.0 -- 5.25V": BATD$(8) = "5.25 -- 5.5V"
BATD$(9) = "5.0V over "
,
*** Initial Set of rs-232C Interface
OPEN "COM1:9600 ,N,8,1 ,DS0" FOR RANDOM AS #1
,
*** Read out from LA-5100
PRINT #1, "DAT?": INPUT #1, DATI$ ' Date/Time
PRINT DATI$
PRINT #1, "FRE?": INPUT #1, FREI$ ' Freq Weighting
PRINT FREI$
PRINT #1, "TRE?": INPUT #1, TREI$ ' Time Weighting
PRINT TREI$
PRINT #1, "LVL?": INPUT #1, LVLI$ ' Level Range
PRINT LVLI$
```

```
PRINT #1, "DDT?": INPUT #1, DDTI$ ' Display Kind
PRINT DDTI$
PRINT #1, "LST?": INPUT #1, LSTI$ ' List Kind
PRINT LSTI$
PRINT #1, "LGT?": INPUT #1, LGTI$ ' Backlight
PRINT LGTI$
PRINT #1, "BAT": INPUT #1, BATI$ ' Battery Voltage
PRINT BATI$
,
*** Display Conditions
CLS
PRINT "Date/Time : " + DATI$ ' Date/Time
PRINT "Condition : ";
SELECT CASE FREI$ ' Freq Weighting
CASE "A"
PRINT "A-Weight, ";
CASE "C"
PRINT "C-Weight, ";
CASE "F"
PRINT "Flat, ";
CASE "D"
PRINT "D-Weight, ";
END SELECT
SELECT CASE TREI$ ' Time Weighting
CASE "F"
PRINT "FAST"
CASE "S"
PRINT "SLOW"
CASE "I"
PRINT "IMPULSE"
CASE "1"
PRINT "10ms"
END SELECT
PRINT "Level Range :"; ' Level Range
PRINT LVLD$(VAL(LVLI$))
PRINT "Display Kind : "; ' Display Kind
IF DDTI$ = "L" THEN
PRINT "List"
ELSE
PRINT DDTD$(VAL(DDTI$))
END IF
PRINT "List Kind : "; ' List Kind
IF LSTI$ = "F" THEN
PRINT "OFF"
ELSE
PRINT LSTD$(VAL(LSTI$))
END IF
```

4. Sample Programs

```
PRINT "Backlight  :";      ' Backlight
IF LGTI$ = "N" THEN
  PRINT "ON"
ELSE
  PRINT "OFF"
END IF
PRINT "Batt Voltage :";    ' Battery Voltage
PRINT BATD$(VAL(BATI$) + 1)
,
*** End Operation
CLOSE #1
,
END
```

4.4 Measurement Execution (For IBM PC/AT)

This sample program is used to control measurement condition setting and measurement execution from a PC.

■ Sample Program

```
#####
# Execution of Measurement      File name: LAEXEMES      #
#                               #
# CPU System: IBM PC-AT QuickBASIC Ver4.5 (MS-DOS)      #
# LA-5100/2100 Series: 9600 Baud, Terminator=CR         #
#                               #
# Copyright (c) 1995 - ONO SOKKI CO., Ltd.              #
#####
,
*** Definition of Parameters
OPTION BASE 1
DIM FRE$(4), TRE$(4), LVLI$(8)
FRE$(1) = "A": FRE$(2) = "C": FRE$(3) = "F": FRE$(4) = "D" ' Freq Weighting
TRE$(1) = "F": TRE$(2) = "S": TRE$(3) = "I": TRE$(4) = "1" ' Time Weighting
LVLI$(1) = "1": LVLI$(2) = "2": LVLI$(3) = "3": LVLI$(4) = "4" ' Level Range
LVLI$(5) = "5": LVLI$(6) = "6": LVLI$(7) = "7": LVLI$(8) = "8"
,
*** Initial set of RS-232C Interface
OPEN "COM1:9600 ,N,8,1 ,DS0" FOR RANDOM AS #1
,
*** Input Conditions
INPUT "Select Frequency Weighting (1:A/2:C/3:F/4:D) ", FREI
INPUT "Select Time Weighting (1:FAST/2:SLOW/3:IMP/4:10m) ", TREI
INPUT "Select Level Range (1--8) ", LVLI
INPUT "Enter Measuring Time (HH:MM:SS ex. 11:59:59) ", MTMI$
,
*** Condition set to LA-5100
SET$ = "FRE" + FREI$(FREI) ' Freq Weighting
SET$ = SET$ + " TRE" + TREI$(TREI) ' Time Weighting
SET$ = SET$ + " LVL" + LVLI$(LVLI) ' Level Range
PRINT #1, SET$
SET$ = "MTM" + MTMI$ ' Measuring Time
NHOURL = VAL(LEFT$(MTMI$, 2))
NMIN = VAL(MID$(MTMI$, 4, 2))
NSEC = VAL(RIGHT$(MTMI$, 2))
NTIME0 = NHOURL * 3600 + NMIN * 60 + NSEC ' Set Time (sec)
PRINT #1, SET$: SLEEP 1
,
```

```
*** Start Measurement
PRINT #1, "STT" ' Start
MEAS:
SLEEP 1 ' 1sec wait
PRINT #1, "CON" ' Read Status
INPUT #1, STAT$
IF STAT$ = "S" THEN GOTO MEASend ' if Stop,
PRINT #1, "MTR" ' Read Time
INPUT #1, MTRR$
NHOURL = VAL(LEFT$(MTRR$, 2))
NMIN = VAL(MID$(MTRR$, 4, 2))
NSEC = VAL(RIGHT$(MTRR$, 2))
NTIME = NHOURL * 3600 + NMIN * 60 + NSEC ' Time (sec)
PRINT "Time = ", MTRR$
IF NTIME < NTIME0 THEN GOTO MEAS ' Repeat
MEASend:
PRINT "Measurement End"
,
*** End Operation
CLOSE #1
,
END
```

4

Section 5

MEASUREMENT DATA PRINTING (RQ-110)

5.1 Preparing RQ-110 Digital Printer

5.2 Printing Data

5. Measurement Data Printing (RQ-110)

When the optional DP-414 digital printer is connected to the RS-232C connector, data measured by the LA-5120/5111/2111 sound level meter can be printed.

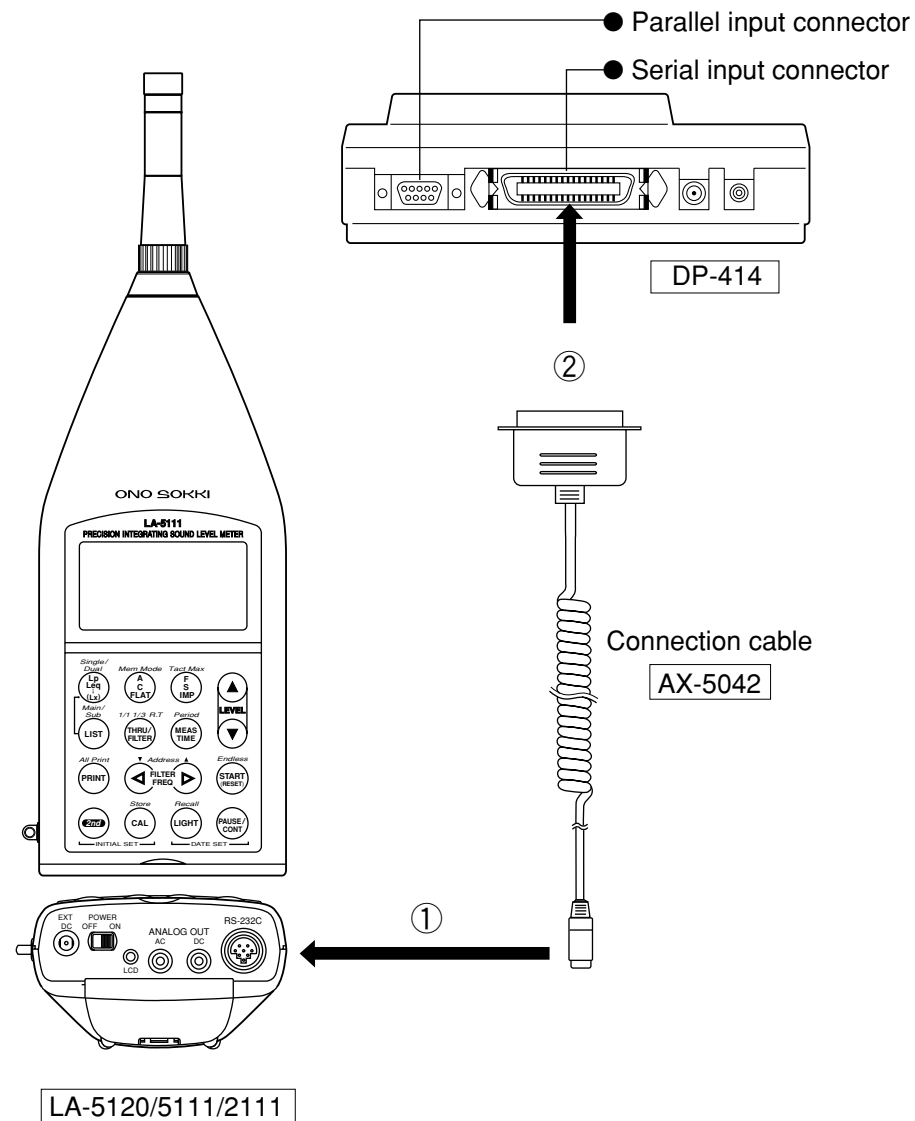
To connect the optional DP-414 digital printer and the LA-5120/5111/2111 sound level meter, use the AX-5042 dedicated cable supplied to the digital printer. For how to handle the DP-414 digital printer, see the operation manual of the digital printer.

5.1 Connecting and Setting Up DP-414 Digital Printer

To connect the optional DP-414 digital printer and the LA-5120/5111/2111 sound level meter, follow the steps below.

◆ Operation

- ① Connect the AX-5042 cable to the RS-232C connector of the sound level meter.
- ② Connect the AX-5042 cable to the serial connector of the DP-414 digital printer.
- ③ Set the receive condition of the DP-414 digital printer.
For details, see the operation manual of the DP-414 digital printer.
- ④ Set the power switch of the DP-414 digital printer to ON.
Make sure that the ONLINE LED (green) of the DP-414 digital printer goes on.
If ONLINE LED does not go on, press the ON/OFFLINE switch of the DP-414 digital printer.
For details, see the operation manual of the DP-414 digital printer.



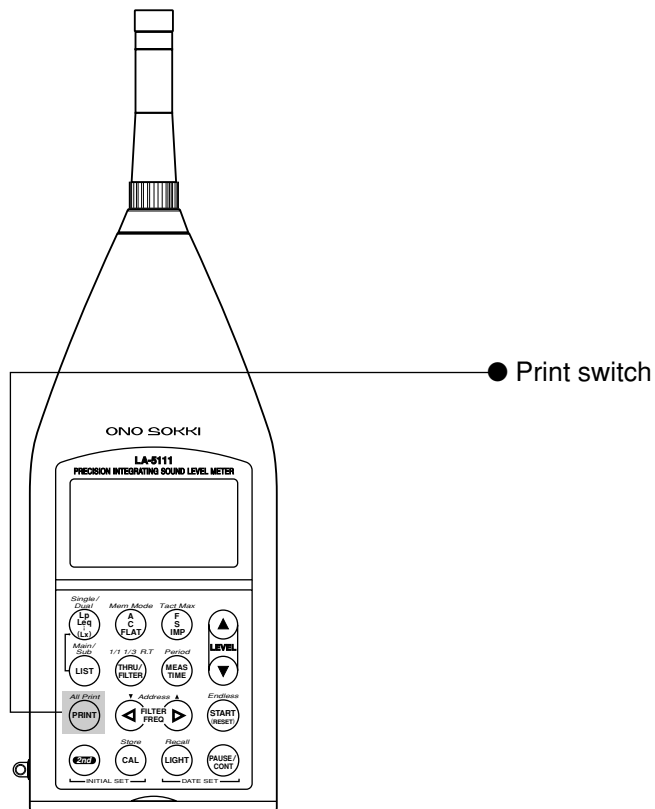
5.2 Printing Data

Data to be printed varies depending on the screen type displayed on the sound level meter.

For relationship between the display screen and print data, refer to sub section 5.3, "Display Screen and Print Data".

◆ Operating procedure

- ① Display the measurement data on the sound level meter.
- ② Press the print switch [PRINT] or [All print] on the sound level meter.
The data displayed on the sound level meter is printed. To stop printing, press [PRINT] or [All Print] again.



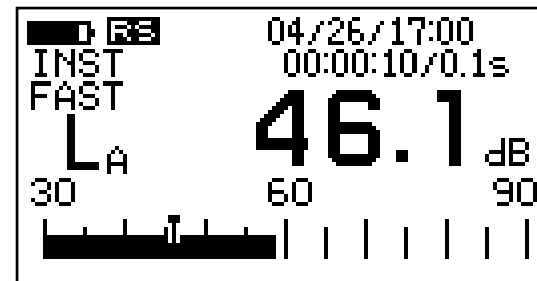
5.3 Display Screen and Print Data

The data printed out on the DP-414 differs according to the screen displayed on the sound level meter. Referencing this subsection, print the desired data depending on your application and purpose.

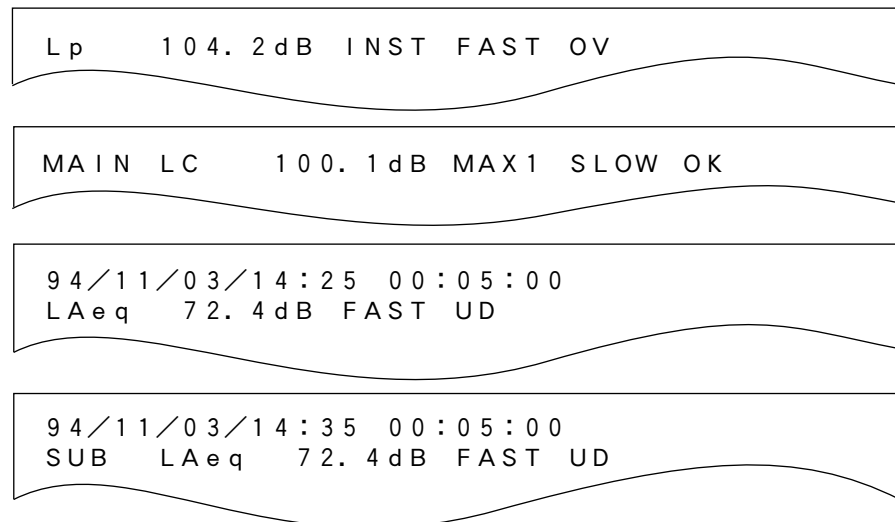
■ Standard Screen (Large Screen)

Conditions specified at measurement and measured values are printed.

[Display screen]



[Print data]

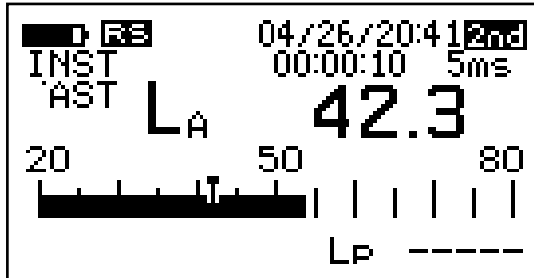


5. Measurement Data Printing (RQ-110)

■ Standard Screen (Small Screen)

Conditions specified at measurement and measured values are printed.

[Display screen]



[Print data]

```
LP      00023
LA      104.2dB INST SLOW OV
```

```
AUTO    00018
94/12/23/09:42 00:05:00
LAE     132.2dB FAST OK
```

```
1/3    3.15kHz
LA      104.2dB INST 10ms OK
```

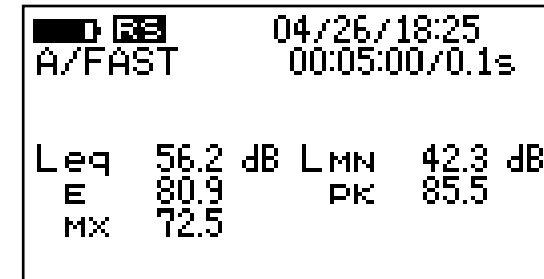
```
95/01/13/20:15 00:01:00
1/1    1kHz
LAMX   82.1dB IMP  OU
```

```
FSCAN  15
95/01/23/13:35 00:01:00
1/1    1kHz
LAMX   82.1dB IMP  OU
```

■ Leq List Display Screen (Normal Mode)

Leq conditions specified at measurement and five types of measured values are printed.

[Display screen]



[Print data]

```
95/01/12/19:51 00:03:43
A FAST UD
Leq  93.8dB / LE  117.3dB / LMX 100.2dB /
LMN  62.2dB / LPK 112.8dB
```

```
AUTO    01412
95/01/12/20:00 00:01:00
F 10ms OV
Leq  94.7dB / LE  112.5dB / LMX 115.7dB /
LMN  68.1dB / LPK 124.9dB
```


■ Leq List Display Screen (Dual Calculation Mode)

MAIN and SUB conditions specified at measurement and 10 types of measured values for MAIN and SUB are printed.

[Display screen]

```

04/26/18:52
00:01:00/10ms
A/FAST C/SLOW
Leq 54.4 dB 59.3 dB
E 72.2 77.1
MX 62.1 64.5
MN 44.4 55.1
PK 86.7 85.8

```

[Print data]

```

95/01/12/19:51 00:02:11
MAIN A FAST OK
Leq 93.8 dB / LE 115.0 dB / LPK 112.8 dB
LMX 100.2 dB / LMN 62.0 dB
SUB C IMP OV
Leq 98.2 dB / LE 119.4 dB / LPK 119.2 dB
LMX 110.1 dB / LMN 82.2 dB

```

```

AUTO 00002
95/01/13/14:07 00:00:10
MAIN A FAST OK
Leq 93.0 dB / LE 103.0 dB / LPK 112.1 dB
LMX 108.5 dB / LMN 62.0 dB
SUB A SLOW OK
Leq 93.0 dB / LE 103.0 dB / LPK 112.0 dB
LMX 99.2 dB / LMN 72.2 dB

```

■ Lx List Display Screen

Lx conditions specified at measurement and 10 types of measured values are printed.

[Display screen]

```

04/26/18:52
A/FAST 00:01:00/10ms
L01 60.5 dB L95 47.0 dB
05 58.9 99 45.4
10 57.6 LO 44.4
50 53.1 HI 62.1
90 48.3 AV 54.4

```

[Print data]

```

95/01/13/17:09 00:04:10/5s
A FAST OK
L01 85.1 dB / L05 80.0 dB / L10 75.8 dB
L50 52.7 dB / L90 47.9 dB / L95 47.8 dB
L99 47.3 dB / LLO 47.1 dB / LHI 85.1 dB
LAV 71.2 dB

```

```

MAN 01
95/01/13/17:09 00:04:10/5s
A FAST OK
L01 85.1 dB / L05 80.0 dB / L10 75.8 dB
L50 52.7 dB / L90 47.9 dB / L95 47.8 dB
L99 47.3 dB / LLO 47.1 dB / LHI 85.1 dB
LAV 71.2 dB

```

```

MAN 02
95/01/13/18:11 00:04:10/5s
A FAST 1/1 2kHz OK
L01 85.1 dB / L05 80.0 dB / L10 75.8 dB
L50 52.7 dB / L90 47.9 dB / L95 47.8 dB
L99 47.3 dB / LLO 47.1 dB / LHI 85.1 dB
LAV 71.2 dB

```

5. Measurement Data Printing (RQ-110)

■ 1/1 Octave Filter Scan Memory List Display Screen

Conditions specified at measurement and 15 types of measured values displayed on screens 1 and 2 of the sound level meter are printed.

[Display screen]

```

03/06/03:08 2nd
A/FAST RCL 00:01:00
Leq FSCAN 01
31.5Hz 36.0dB 1kHz 62.1dB
63 39.6 2 53.2
125 38.9 4 60.0
250 48.9 8 59.7
500 54.4
    
```

[Print data]

```

FSCAN 01
95/01/20/11:19 00:00:10
A FAST Leq 1/1 UD
31.5 45.3dB/63 49.9dB/125 55.4dB
250 51.5dB/500 61.3dB/1k 57.1dB
2k 63.8dB/4k 57.4dB/8k 55.6dB
A 64.9dB/C 72.3dB/F 76.2dB
A 63.8dB/C 77.1dB/F 78.6dB
    
```

■ 1/3 Octave Filter Scan Memory List Display Screen

Conditions specified at measurement and 35 types of measured values displayed on screens 1 through 4 of the sound level meter are printed.

[Display screen]

```

03/06/03:08 2nd
A/FAST RCL 00:01:00
Leq FSCAN 01
20Hz 36.0dB 63Hz 52.2dB
25 38.1 80 53.5
31.5 36.8 100 58.2
40 38.0 125 59.3
50 44.4 160 43.2
    
```

[Print data]

```

FSCAN 02
95/01/20/15:07 00:00:10
A FAST LMX 1/3 UD
20 47.2dB
25 48.1dB/31.5 49.3dB/40 50.1dB
50 59.5dB/63 53.7dB/80 54.2dB
100 61.7dB/125 53.3dB/160 57.0dB
200 62.7dB/250 54.2dB/315 63.2dB
400 68.3dB/500 67.2dB/630 66.1dB
800 62.9dB/1k 61.7dB/1.25k 59.9dB
1.6k 63.5dB/2k 62.4dB/2.5k 64.9dB
3.15k 63.8dB/4k 68.7dB/5k 65.2dB
6.3k 64.6dB/8k 60.1dB/10k 59.3dB
12.5k 56.2dB
A 83.7dB/C 89.1dB/F 91.3dB
A 79.4dB/C 90.4dB/F 90.1dB
    
```

■ Realtime Bar Graph Display Screen

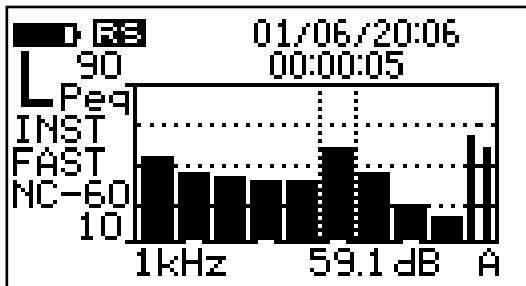
The hardcopy of the display screen is printed out.

When the [PRINT] switch is pressed during bar graph display, the hardcopy is printed out.

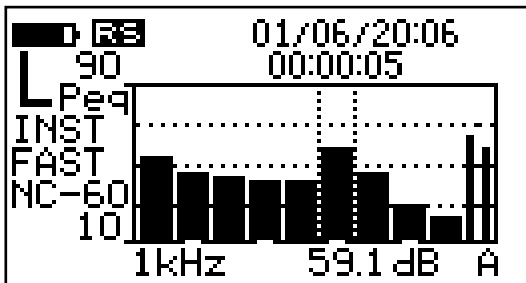
When the [All Print] switch is pressed, double-sized hardcopy is printed out.

Note: • When [All Print] switch is pressed, the screen is not updated until printing is completed. An attempt to print out hardcopy during calculation, the calculation time may be varied.

[Display screen]



[Print data]



■ Realtime List Display Screen

The conditions set at the time of measurement and 13 measurement values are printed out.

[Display screen]

01/06/20:06		00:00:05	
P/FAST			
Leg			
31.5Hz	54.9dB	1kHz	59.1dB
63	47.9	2	46.8
125	45.7	4	30.6
250	43.9	8	24.6
500	42.3		

01/06/20:06		00:00:05	
FAST			
Leg			
P/ALLPASS1	64.0dB		
PEAK HOLD	76.6		
A/ALLPASS2	59.5		
PEAK HOLD	67.6		

[Print data]

```

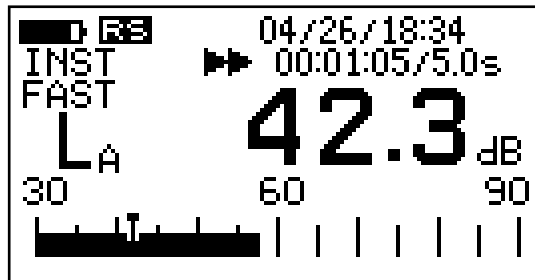
00/01/06/20:06 00:00:05
F/A FAST Leq NC-60
31.5 54.9dB/63 47.9dB/125 45.7dB
250 43.9dB/500 42.3dB/1k 59.1dB
2k 46.8dB/4k 30.6dB/8k 24.6dB
AP1 64.0dB/AP2 59.5dB
PKH 76.6dB/PKH 67.6dB
    
```

5. Measurement Data Printing (RQ-110)

■ Lx Sample Print

When measurement is started with the Lx sampling interval set to 5 sec. and the PRINT key is pressed, Lx sampling data are printed as follows:

[Display screen]



[Print data]

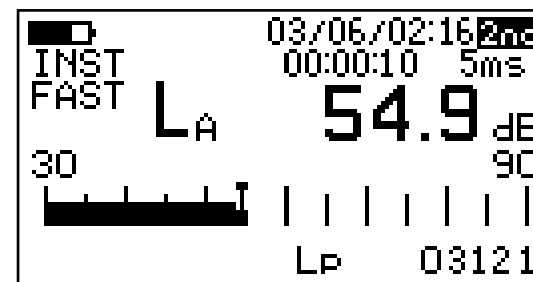
```

95/01/13/17:09 00:04:10/5 s
A FAST
 1 76.4 dB OK
 2 73.1 dB OK
 3 67.3 dB OK
 4 65.9 dB OK
 5 64.8 dB OK
 6 63.2 dB OK
 7 64.8 dB OK
 8 69.4 dB OK
 9 71.3 dB OK
10 73.5 dB OK
  
```

■ Memory Data Print

When memory mode is specified and the panel switch [All Print] is pressed after address setting, data at the specified address and all subsequent addresses are printed. The data print format, other than that of Lp record memory, varies depending on the displayed screen.

[Display screen]



[Print data]

```

Lp
95/01/19/11:57 0.1 s
F 10ms
3121 85.2 dB OK
3122 84.1 dB OK
3123 83.8 dB OK
3124 88.1 dB OK
3125 90.2 dB OK
3126 92.1 dB OK
3127 91.3 dB OK
3128 86.4 dB OK
3129 84.8 dB OK
3130 82.5 dB OK
3131 78.9 dB OK
  
```

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*Outer appearance and specifications are subject to change without prior notice.

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B00000908/IM98100202(1),033(UT)020