RS-232-C INTERFACE MANUAL

INTEGRATING SOUND LEVEL METER NL-04
PRECISION INTEGRATING SOUND LEVEL METER NL-14

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ORGANIZATION OF THE MANUALS

The documentation for the integrating sound level meter NL-04 and precision integrating sound level meter NL-14 consists of the three manuals listed below.
Although there are certain differences in performance and functions, the NL-04 and NL-14 are essentially identical in operation. The manuals therefore apply to both units. When there are differences between the two models, this is indicated in the manuals.

- **Instruction Manual**
  Describes connections, setup, and general operation of the NL-04/NL-14 as well as the optional filter units and printer.

- **RS-232-C Interface Manual**
  Describes communication with a personal computer using the integrated RS-232-C interface of the NL-04/NL-14. Transfer protocols, commands for controlling the sound level meter, format of the sound level meter output data etc. are explained.

- **Technical Notes**
  Gives technical background information covering circuit configuration and performance characteristics of the sound level meter, microphone principles and performance, influence of extension cables and windscreen on the measurement and other topics.

CONTENTS

OUTLINE

The sound level meter NL-04/NL-14 incorporates an RS-232-C interface. This interface allows the use of a computer to set measurement parameters and to control the measurement. It is also possible to send measurement results (current results as well as data stored in the memory of the sound level meter) to the computer for further processing.

This manual describes the use of the RS-232-C interface for interaction with a computer. The manual is divided into the following sections:

- **Connection to a Computer** (⇒ p. 2)
  The separately available interface cable CC-87E is required for connection to a computer. This section explains how to make the connection and gives information on the wiring of the cable CC-87E.

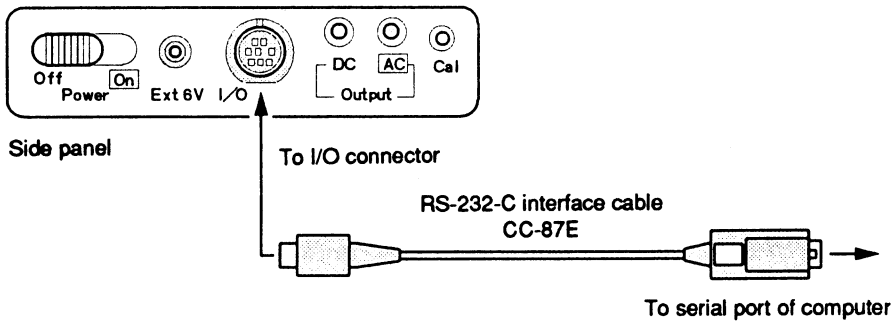
- **Transfer Protocol and Transfer Procedure** (⇒ p. 3)
  This section explains the RS-232-C interface transfer protocol and the procedure to send and receive data.

- **Commands** (⇒ p. 8)
  In this section, all commands which can be used to control the NL-04/NL-14 are listed, and command format and functions are explained.

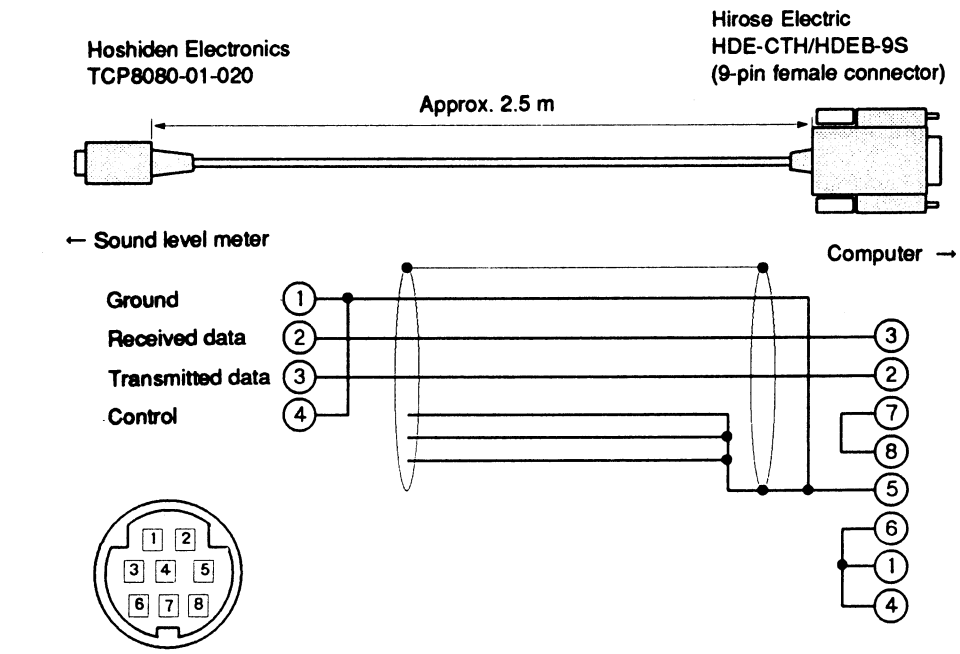
- **Output Data Format** (⇒ p. 18)
  This section explains how measurement data and stored data are output via the RS-232-C interface.

CONNECTION TO A COMPUTER

The illustration below shows how to connect the NL-04/NL-14 to a computer. Use the separately available interface cable CC-87E.



RS-232-C interface cable CC-87E wiring



I/O connector of sound level meter

TRANSFER PROTOCOL AND TRANSFER PROCEDURE

Transfer Protocol

Flow control:	Yes
Transmission configuration:	Asynchronous, half-duplex
Data word length:	8 bits
Stop bits:	2
Parity:	None
Baud rate:	4800 bps

Remote Mode / Local Mode

- **Remote mode**
  In this condition, the sound level meter receives commands from the computer and the front-panel keys on the sound level meter are inactive. The indication "Remote" appears on the display.

- **Local mode**
  The sound level meter is operated with the front-panel keys. No commands from the computer except the command to switch to remote mode are accepted. The "Remote" indication is out.

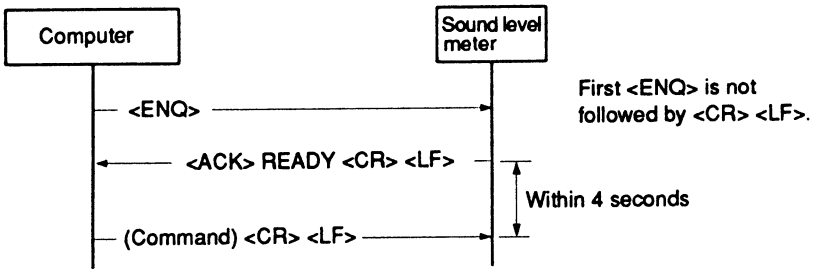
- **Remote mode / local mode switching**
  The RMT command serves to switch between local mode and remote mode (⇒ p. 15).

Transfer Procedure

Sending Commands

In order to control the sound level meter from a computer or to retrieve measurement data, certain commands must be sent to the sound level meter. The data exchange must be performed according to certain rules, to ensure that both the sound level meter and the computer recognize the commands and data properly.
To send commands to the sound level meter, the following procedure must be observed.

1. The computer sends <ENQ> to the sound level meter.
2. When the <ENQ> has been received, the sound level meter returns <ACK> READY <CR> <LF> to the computer.
3. The computer verifies receipt of the <ACK> READY <CR> <LF> and sends a command within 4 seconds.



<ENQ>:	Control code 05H (enquire)
<ACK>:	Control code 06H (acknowledge)
<CR>:	Control code 0DH (carrier return)
<LF>:	Control code 0AH (line feed)
READY:	ASCII string
(Command):	ASCII string (command and parameters)

Note: If the sound level meter is in the local mode, it only accepts the command to switch to remote mode (RMT1). This command must therefore be sent first.

Sending Data

When the sound level meter has received a command (terminated by <CR> <LF>), it immediately proceeds to interpret and execute the command. If the command requests data, the sound level meter sends the data to the computer. If there is a large amount of data, the data are split into several blocks. In this case, one block is sent, and then the sound level meter waits for the string <ACK> NEXT <CR> <LF> from the computer before sending the next block. The <ACK> NEXT <CR> <LF> must be received within 4 seconds.
The format for data sent from the sound level meter is as follows.

If the data can be sent in one block

(Data) <EOT> <CR> <LF>

If the data have to be divided into several blocks

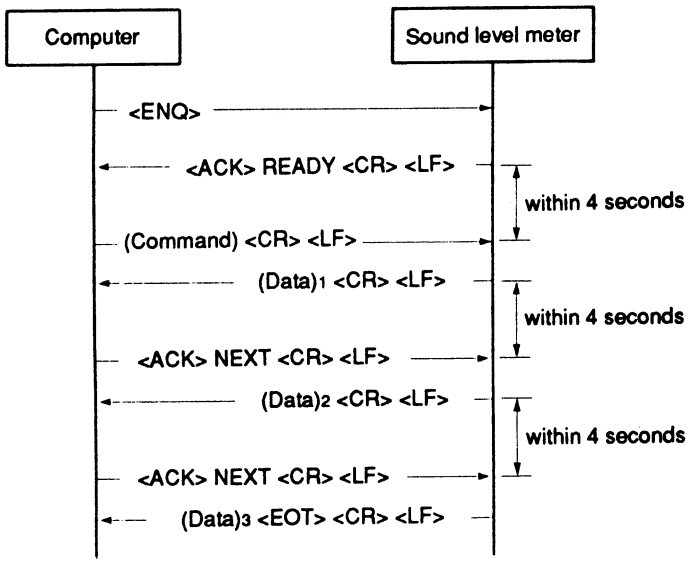
$(Data)_1$ <CR> <LF>	1st block
$(Data)_2$ <CR> <LF>	2nd block
⋮	⋮
$(Data)_N$ <EOT> <CR> <LF>	n-th block (last block)

<EOT>: Control code 04_H (end of transfer)
NEXT: ASCII string
(Data): ASCII string (requested data)

After the last block of data, the sound level meter appends an <EOT> which must be used by the computer to determine whether more data are to follow or not. If there is no <EOT>, the computer should send the <ACK> NEXT <CR> <LF> string to request the next block.

The only type of data which are divided into blocks are data gathered with auto store (⇒p. 20 - 25).

An example for sending three blocks of data is shown below.



Error Handling

In order to ensure correct data exchange between the sound level meter and the computer, the rules described above must be observed. If an error occurs, the following steps should be taken.

- The computer has sent <ENQ> but no response is received from the sound level meter. Send <ENQ> again after about 2 seconds. Repeat this 5 to 6 times. If there is still no response from the sound level meter, one of the following conditions may exist:
  Transfer parameters are not matched.
  Interface cable is defective or not properly connected.
  Sound level meter is not turned on.

- <ACK> READY <CR> <LF> from the sound level meter was received, but the computer has not completed the sending of commands within 4 seconds.
  The sound level meter terminates the standby condition for receiving commands. Restart the procedure by sending an <ENQ> from the computer.

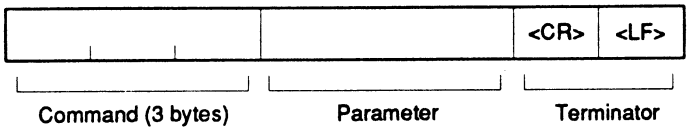
- The computer has not sent <ACK> NEXT <CR> <LF> within 4 seconds to receive the next block.
  The sound level meter cancels the transfer of the remaining data.

- A wrong command was sent.
  When the computer has sent a wrong command (invalid string or parameter out of range), the sound level meter disregards the command.

COMMANDS

Command Format

Commands that can be used by the NL-04 and NL-14 consist of 3 characters (3 bytes), followed by a parameter which specifies the action range of the command.



The following two types of parameters are possible:

- Parameters which specify the range of the command.
- Parameters which request the current condition of the sound level meter and measurement data.

The first type of parameter consists of 1 to 5 numeral characters (1 to 5 bytes). In the following sections of this manual, this type of parameter is denoted by " n ". The second type of parameter is a " ? ". The data output by the sound level meter in response to this parameter are denoted by " p ".

Note:
- The sound level meter cannot handle multiple commands sent together.
- When a great number of commands are sent to the sound level meter during L_{eq} or other processing or during auto store, the time required to handle these commands may lead to sampling failures or to processing errors, resulting in data dropouts or delayed processing.

Command List

Command Description

ADRn Sets the address
ADR? Requests the current address

n = 1 - 9000

This command is valid only when the sound level meter is in the recall mode.
The parameter n specifies the address of the data to be displayed.
When recalling data gathered with auto store, if the specified address contains no data, the command is disregarded.
Data gathered with the Auto 1, Auto 2, and Auto 5 modes are shown with the storage time on the display of the sound level meter, but with the ADR command these data are to be called by address, not by time. The relation between address and time is as follows:

Address = Time / Store interval

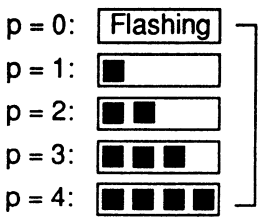
In mode Auto 2, for example, data are stored at 1-second intervals. The address for the data at 1 min 30 s therefore is: (1 x 60 + 30) / 1 = 90.

Output data in response to ADR?: p
p = 0001 - 9000 (corresponding to n)

Related command
RCLn: Selects the recall or measurement mode (⇒ p. 15)

BAT? Requests the battery condition

Output data in response to BAT?: p



Corresponding to battery condition indication

DOD? Requests current measurement data

If instantaneous values are displayed, instantaneous data are output. If processed values are displayed, processed data are output. The format of the output data is shown on page 18. When the sound level meter is in the recall mode, the current display data cannot be requested with this command.

Related command
DSPn: Set the type of display data (⇒ p. 13)

DORn Requests data stored in the internal memory

For data stored with modes Auto 1 through Auto 4, the parameter n specifies how many addresses are to be retrieved. The range of n depends on which store mode was used.

Store mode	n range	Output data
Man	1	Data for 1 address
Auto 1	1- 9000	Data for n addresses
Auto 2	1- 3600	
Auto 3	1- 999	
Auto 4	1- 999	
Auto 5	1	Data for all addresses
Auto 6	1	Data for 20 groups

To use the DOR command for retrieving data, carry out the following procedure.

1. Use SMDn to specify whether the data to be retrieved were gathered with manual or with auto store (⇒ p. 16).
   - Data gathered with manual store: SMD0
   - Data gathered with auto store: Other than SMD0
2. Set the sound level meter to the recall mode with RCL1 (⇒ p. 15).
3. Use ADRn to specify the start address for the data to be retrieved (⇒ p. 11). For data gathered with Auto 5 or Auto 6, this step is not required.
4. Send the DORn command.

For data gathered with manual store, the data at the specified address is output.
For data gathered with modes Auto 1 through Auto 4, the number of data specified with DORn, starting with the address specified by ADRn are output.
For data gathered with mode Auto 5, all data starting from address 1 are output.
For data gathered with mode Auto 6, data in group 1 (starting from address 1) to group 20 are output.
The output data format is shown on pages 19 - 26.

DSPn Sets the type of display data
DSP? Requests the type of display data

n = 0: L_p	n = 3: L_{max}	n = 6: L_{50}
n = 1: L_{eq}	n = 4: L_5	n = 7: L_{90}
n = 2: L_E	n = 5: L_{10}	n = 8: L_{95}

Output data in response to DSP?: p
p = 0 - 8 (corresponding to n)

FBDn Sets the filter center frequency
FBD? Requests the filter center frequency setting

This command is only valid when the filter is activated (filter switch on filter unit set to On, 1/1 or 1/3, and filter function set to On).

1/1 octave filter {fc: center frequency (Hz)}

n = 0: fc = 16	n = 4: fc = 250	n = 8: fc = 4000
n = 1: fc = 31.5	n = 5: fc = 500	n = 9: fc = 8000
n = 2: fc = 63	n = 6: fc = 1000	n = 10: fc = 16000
n = 3: fc = 125	n = 7: fc = 2000	

1/3 octave filter {fc: center frequency (Hz)}

n = 0: fc = 12.5	n = 11: fc = 160	n = 22: fc = 2000
n = 1: fc = 16	n = 12: fc = 200	n = 23: fc = 2500
n = 2: fc = 20	n = 13: fc = 250	n = 24: fc = 3150
n = 3: fc = 25	n = 14: fc = 315	n = 25: fc = 4000
n = 4: fc = 31.5	n = 15: fc = 400	n = 26: fc = 5000
n = 5: fc = 40	n = 16: fc = 500	n = 27: fc = 6300
n = 6: fc = 50	n = 17: fc = 630	n = 28: fc = 8000
n = 7: fc = 63	n = 18: fc = 800	n = 29: fc = 10000
n = 8: fc = 80	n = 19: fc = 1000	n = 30: fc = 12500
n = 9: fc = 100	n = 20: fc = 1250	n = 31: fc = 16000
n =10: fc = 125	n = 21: fc = 1600	n = 32: fc = 20000

Output data in response to FBD?: p
1/1 octave filter: p = 00 - 10 (corresponding to n)
1/3 octave filter: p = 00 - 32 (corresponding to n)

Related command
FLTn: Set the filter function to on/off (⇒ p. 14)

FLTn Sets the filter function to on/off
FLT? Requests the filter function on/off setting

This command is only valid when the filter switch on the filter unit is set to On, 1/1 or 1/3.
n = 0: Off n = 1: On

Output data in response to FLT?: p
p = 0: Off p = 1: 1/1 octave p = 2: 1/3 octave

Note: To get the filter setting which was used for Auto 5 or Auto 6, enter the recall mode and specify an address which contains bandpass data, then use FLT?. If all-pass data are recalled, the response to FLT? is: p = 0 (Off).

LTI? Requests elapsed processing time or the time since start of auto store

Output data in response to LTI?: p_1, p_2, p_3
p_1: Hours (00 - 99) p_2: Minutes (00 - 59) p_3: Seconds (00 - 59)

MTIn Sets the measurement time
MTI? Requests the current measurement time setting

n = 0: unrestricted

n = 1:10 s	n = 4: 10 min	n = 7: 1 h
n = 2: 1 min	n = 5: 15 min	n = 8: 8 h
n = 3: 5 min	n = 6: 30 min	n = 9: 24 h

If the measurement time is unrestricted, the SRT0 command is used to stop the measurement (⇒ p. 16).

Output data in response to MTI?: p
p = 0 - 9 (corresponding to n)

PSEn Pauses or resumes measurement or auto store process
PSE? Requests the current measurement condition

n = 0: Resume measurement n = 1: Pause measurement

Output data in response to PSE?: p
p = 0: Measurement or store is being carried out.
p = 1: Measurement or store is paused.

RCLn Selects the recall or measurement mode
RCL? Requests the recall/measurement setting

n = 0: Measurement mode n = 1: Recall mode

Output data in response to RCL?: p
p = 0 - 1 (corresponding to n)

Related commands
SMDn: Select the store mode (⇒ p. 16)
Before activating the recall mode, use the SMD command to specify whether the data were gathered with manual store or auto store.
ADRn: Set the address for data to be displayed (⇒ p. 11)

RMTn Selects local or remote mode
RMT? Requests the local/remote setting

n = 0: Local mode n = 1: Remote mode

Output data in response to RMT?: p
p = 0 - 1 (corresponding to n)

RNGn Sets the level range
RNG? Requests the current level range

n = 0: 70 dB	n = 3: 100 dB	n = 6: 130 dB
n = 1: 80 dB	n = 4: 110 dB	n = 7: 140 dB
n = 2: 90 dB	n = 5: 120 dB	

n = 0 (70 dB) is only valid when filter is activated (filter switch on filter unit set to On, 1/1 or 1/3, and filter function set to On).

Output data in response to RNG?: p
p = 0 - 7 (corresponding to n)

SMDn Selects the store mode
SMD? Requests the current store mode setting

n = 0: Man n = 3: Auto 3 n = 6: Auto 6
n = 1: Auto 1 n = 4: Auto 4
n = 2: Auto 2 n = 5: Auto 5

n = 5 (Auto 5) and n = 6 (Auto 6) are only valid when the filter is activated (filter switch on filter unit set to On, 1/1 or 1/3, and filter function set to On).

Output data in response to SMD?: p
p = 0 - 6 (corresponding to n)

Related commands
STOn: Data store operation start/stop (⇒ p. 16)
FLTn: Filter function on/off (⇒ p. 14)

SRTn Causes start/stop of L_{eq}, L_E, L_{max}, L_x measurement
SRT? Requests the L_{eq}, L_E, L_{max}, L_x measurement condition

n = 0: Stop n = 1: Start

When measuring waveform peak value with Peak setting, command SRT1 is used to reset the peak value and start new measurement (NL-14 only).

Output data in response to SRT?: p
p = 0: Measurement is stopped. p = 1: Measurement is being carried out.

STOn Causes start/stop of data store operation
STO? Requests the data store condition

n = 0: Stop n = 1: Start

Output data in response to STO?: p
p = 0: Data store is not being carried out.
p = 1: Data store is being carried out.

Related command
SMDn: Select the store mode (⇒ p. 16)

TMCn Sets the time weighting
TMC? Requests the current time weighting setting

n = 0: Fast n = 2: Imp n = 4: Peak
n = 1: Slow n = 3: 10 ms

Imp (n = 2) and Peak (n = 4) are only valid for NL-14.
Peak setting cannot be used for L_{eq}, L_E, L_{max}, L_x measurement and data store with automatic mode.

Output data in response to TMC?: p
p = 0 - 4 (corresponding to n)

WGTn Sets the frequency weighting
WGT? Requests the current frequency weighting setting

n = 0: A n = 1: C n = 2: Flat

Output data in response to WGT?: p
p = 0 - 2 (corresponding to n)

OUTPUT DATA FORMAT

This section explains the format of the data output by the sound level meter in response to the DOD? and DORn commands. "□" signifies a numeral or character and "_" signifies a space. The instantaneous value (L_P) and the processing results (L_{eq} etc.) are output as "□□□.□". When there is only one or two integer digits, the remaining positions are replaced by spaces. 65.4 dB for example is output as "_ 65.4 ".

Output Data in Response to DOD?

When the instantaneous value (L_P) is displayed, this value is output. When a processed value (L_{eq}, L_E, L_{max} or L_x) is displayed, all processed values are output.

Instantaneous Value Output Data

Output data: 10 bytes

□□□.□,□ <EOT> <CR> <LF>

- □□□.□ : L_P
- □ : Overload or under-range indication (_: none; O: overload; U: under-range)

Processed Value Output Data

Output data: 52 bytes

□□□.□,□□□.□,□□□.□,□□□.□,.....□□□.□,□ <EOT> <CR> <LF>

- □□□.□ : L_{eq}
- □□□.□ : L_E
- □□□.□ : L_{max}
- □□□.□ : L_5
- □□□.□ : L_{95}
- L_5 to L_{95} : L_x
- □ : Overload indication (_: no; O: yes)

Output Data in Response to DORn

The format of the output data in response to DORn differs, depending on the mode that was used to store the data.

Data Gathered With Manual Store

Output data: 16 bytes

□□□.□,□,□,□,□<EOT> <CR> <LF>

Data (1) (2) (3) (4)

(1) Overload or under-range indication
- O: Overload
- U: Under-range (only for instantaneous value L_P)
- _: None

(2) Data type

0: L_P	3: L_{max}	6: L_{50}
1: L_{eq}	4: L_5	7: L_{90}
2: L_E	5: L_{10}	8: L_{95}

(3) Frequency weighting

0: A	1: C	2: Flat

(4) Time weighting

0: Fast	2: Imp	4: Peak
1: Slow	3: 10 ms	

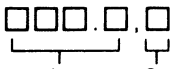
If no data are stored in the specified address, the output looks as follows.

__0. 0, U, 0, 0, 0 <EOT> <CR> <LF>

Data Gathered With Auto 1

The format of the data for one address is as follows.

1 address data: 7 bytes



If data for 31 addresses or less have been requested, all data are output together in one block.
If data for more than 31 addresses have been requested, data are output in several blocks of 31 data each. To receive the second and subsequent blocks, <ACK> NEXT <CR> <LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.
If no data are stored in a specified address, data are output up to the last address containing data.

In the example below, the data for one address are expressed as DATA. When data for n addresses were requested, the output looks as follows.

$n \leq 31$: $DATA_1, DATA_2, DATA_3, \ldots\ldots DATA_n$ <EOT> <CR> <LF>

$n > 31$: $DATA_1, DATA_2, DATA_3, \ldots\ldots DATA_{31}$ <CR> <LF>
$DATA_{32}, DATA_{33}, DATA_{34}, \ldots\ldots DATA_{62}$ <CR> <LF>

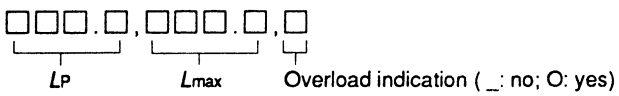
⋮

$\ldots\ldots DATA_{n-2}, DATA_{n-1}, DATA_n$ <EOT> <CR> <LF>

Data Gathered With Auto 2

The format of the data for one address is as follows.

1 address data: 13 bytes



If data for 14 addresses or less have been requested, all data are output together in one block.
If data for more than 14 addresses have been requested, data are output in several blocks of 14 data each. To receive the second and subsequent blocks, <ACK> NEXT <CR> <LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.
If no data are stored in a specified address, data are output up to the last address containing data.

In the example below, the data for one address are expressed as DATA. When data for n addresses were requested, the output looks as follows.

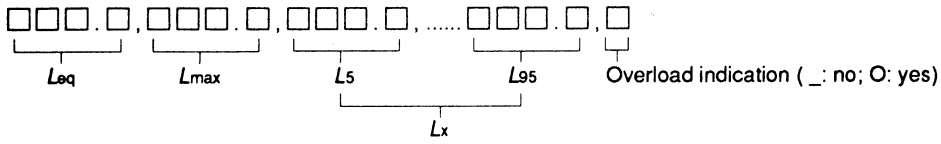
$n \leq 14$: $DATA_1, DATA_2, DATA_3, \ldots\ldots DATA_n$ <EOT> <CR> <LF>

$n > 14$: $DATA_1, DATA_2, DATA_3, \ldots\ldots DATA_{14}$ <CR> <LF>
$DATA_{15}, DATA_{16}, DATA_{17}, \ldots\ldots DATA_{28}$ <CR> <LF>
⋮
$\ldots\ldots DATA_{n-2}, DATA_{n-1}, DATA_n$ <EOT> <CR> <LF>

Data Gathered With Auto 3

The format of the data for one address is as follows.

1 address data: 43 bytes



If data for 5 addresses or less have been requested, all data are output together in one block.
If data for more than 5 addresses have been requested, data are output in several blocks of 14 data each. To receive the second and subsequent blocks, <ACK> NEXT <CR> <LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.
If no data are stored in a specified address, data are output up to the last address containing data.

In the example below, the data for one address are expressed as DATA. When data for n addresses were requested, the output looks as follows.

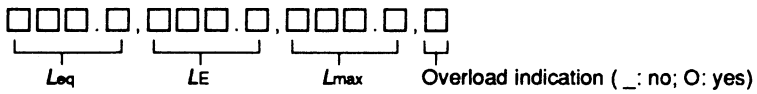
$n \leqq 5$: $DATA_1, DATA_2, DATA_3, \ldots\ldots DATA_n$ <EOT> <CR> <LF>

$n > 5$: $DATA_1, DATA_2, DATA_3, DATA_4, DATA_5$ <CR> <LF>
$DATA_6, DATA_7, DATA_8, DATA_9, DATA_{10}$ <CR> <LF>
⋮
$\ldots\ldots DATA_{n-1}, DATA_n$ <EOT> <CR> <LF>

Data Gathered With Auto 4

The format of the data for one address is as follows.

1 address data: 19 bytes



If data for 12 addresses or less have been requested, all data are output together in one block. If data for more than 12 addresses have been requested, data are output in several blocks of 14 data each. To receive the second and subsequent blocks, <ACK> NEXT <CR> <LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.
If no data are stored in a specified address, data are output up to the last address containing data.

In the example below, the data for one address are expressed as DATA. When data for n addresses were requested, the output looks as follows.

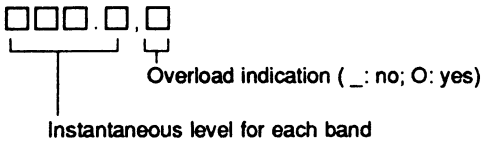
$n \leq 12$: $DATA_1$, $DATA_2$, $DATA_3$, ... $DATA_n$ <EOT> <CR> <LF>

$n > 12$: $DATA_1$, $DATA_2$, $DATA_3$, ... $DATA_{12}$ <CR> <LF>
$DATA_{13}$, $DATA_{14}$, $DATA_{15}$, ... $DATA_{24}$ <CR> <LF>
⋮
..... $DATA_{n-2}$, $DATA_{n-1}$, $DATA_n$ <EOT> <CR> <LF>

Data Gathered With Auto 5

The format of the data for one address is as follows.

1 address data: 7 bytes



Data are divided into blocks of 31 addresses, and all stored data are output. To receive the second and subsequent blocks, <ACK> NEXT <CR> <LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.

In the example below, the data for one address are expressed as DATA. When data are stored up to address n, the output looks as follows.

DATA1, DATA2, DATA3, ... DATA31 <CR> <LF>
DATA32, DATA33, DATA34, ... DATA62 <CR> <LF>
DATA63, DATA64, DATA65, ... DATA93 <CR> <LF>
⋮
..... DATAn-2, DATAn-1, DATAn <EOT> <CR> <LF>

Data format with 1/1 octave filter

DATA1	- DATA100:	All-pass level *1
DATA101	- DATA200:	31.5 Hz ┐
⋮		⋮ ├ Bandpass level *1 (10 bands)
DATA1001	- DATA1100:	16 kHz ┘
DATA1101	- DATA1200:	All-pass level *2

Data format with 1/3 octave filter

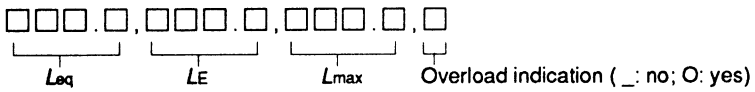
DATA1	- DATA100:	All-pass level *1
DATA101	- DATA200:	20 Hz ┐
⋮		⋮ ├ Bandpass level *1 (31 bands)
DATA3101	- DATA3200:	20 kHz ┘
DATA3201	- DATA3300:	All-pass level *2

*1: Value after frequency weighting as selected at sound level meter
*2: Value with "A" frequency weighting (regardless of sound level meter setting)

Data Gathered With Auto 6

The format of the data for one address is as follows.

1 address data: 19 bytes

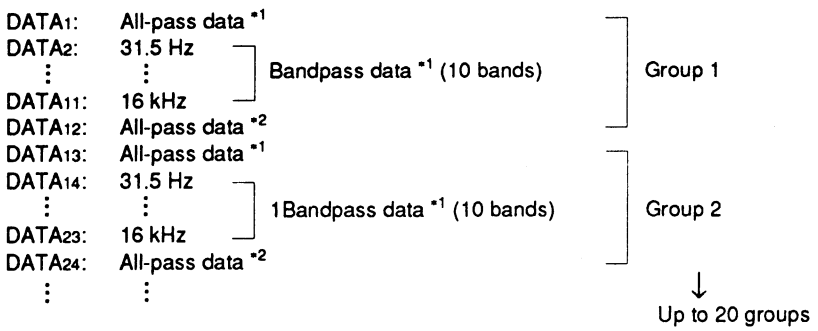


Data are divided into blocks of 12 addresses, and data in group 1 to group 20 are output. To receive the second and subsequent blocks, <ACK>NEXT<CR><LF> must be sent from the computer to the sound level meter.
The data for each address are delimited by a comma.

In the example below, the data for one address are expressed as DATA. When data are stored up to address n, the output looks as follows.

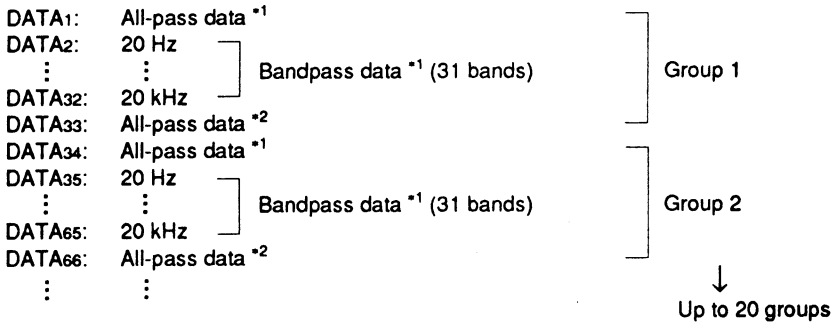
DATA1, DATA2, DATA3, ... DATA12 <CR> <LF>
DATA13, DATA14, DATA15, ... DATA24 <CR> <LF>
DATA25, DATA26, DATA27, ... DATA36 <CR> <LF>
⋮
..... DATAn-2, DATAn-1, DATAn <EOT> <CR> <LF>

Data format with 1/1 octave filter



*1: Value after frequency weighting as selected at sound level meter
*2: Value with "A" frequency weighting (regardless of sound level meter setting)

Data format with 1/3 octave filter



*1: Value after frequency weighting as selected at sound level meter
*2: Value with "A" frequency weighting (regardless of sound level meter setting)

SAMPLE PROGRAM

This program serves to read instantaneous data from the sound level meter NL-04/ NL-14 and display them on the computer screen. The program does not provide for error processing when a transfer error or similar has occurred.

Hardware: IBM PC and compatible
Programming language: Microsoft GW-BASIC (version 3.32)

```
1000    SCREEN 8
1010    CLS
1020    OPEN "COM1: 4800, N, 8, 2" AS #1
1030    GOSUB 1130                                  ' Send ENQ
1040    IF B$<>CHR$(6)+"READY"+CHR$(13)+CHR$(10) THEN 1030
1050    PRINT #1,"RMT1"+CHR$(13)+CHR$(10);          ' Set to remote mode
1060    GOSUB 1130                                  ' Send ENQ
1070    IF B$<>CHR$(6)+"READY"+CHR$(13)+CHR$(10) THEN 1060
1080    PRINT #1,"DOD?"+CHR$(13)+CHR$(10);          ' Request data
1090    GOSUB 1220                                  ' Receive data
1100    PRINT B$;
1110    GOTO 1060
1120  REM
1130  REM First handshake (ENQ)
1140    PRINT #1,CHR$(5);
1150    B$=" "
1160    WHILE LOC(1)=0:WEND
1170    A$=INPUT$ (1,#1)
1180    B$=B$+A$
1190    IF ASC (A$)<>10 THEN 1160
1200    RETURN
1210  REM
1220  REM Receive data
1230    B$=" "
1240    WHILE LOC(1)=0:WEND
1250    A$=INPUT$(1,#1)
1260    B$=B$+A$
1270    IF ASC (A$)<>10 THEN 1240
1280    RETURN
```

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