RS-232-C INTERFACE MANUAL

Precision Integrating Sound Level Meter

NL-18

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Contents

Outline

The precision integrating sound level meter NL-18 incorporates a serial 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
  The separately available interface cable CC-87E is required for connection to a computer.

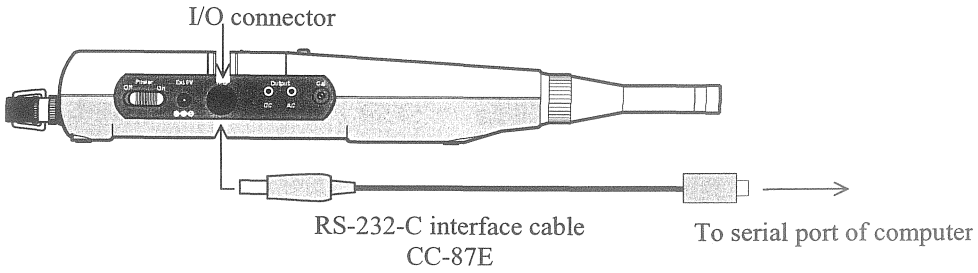
- Transfer Protocol and Transfer Procedure
  This section explains the RS-232-C interface transfer protocol and the procedure to send and receive data.
- Commands
  In this section, all commands which can be used to control the NL-18 are listed, and command format and functions are explained.

- Output Data Format
  This section explains how measurement data and stored data are output via the RS-232-C interface.

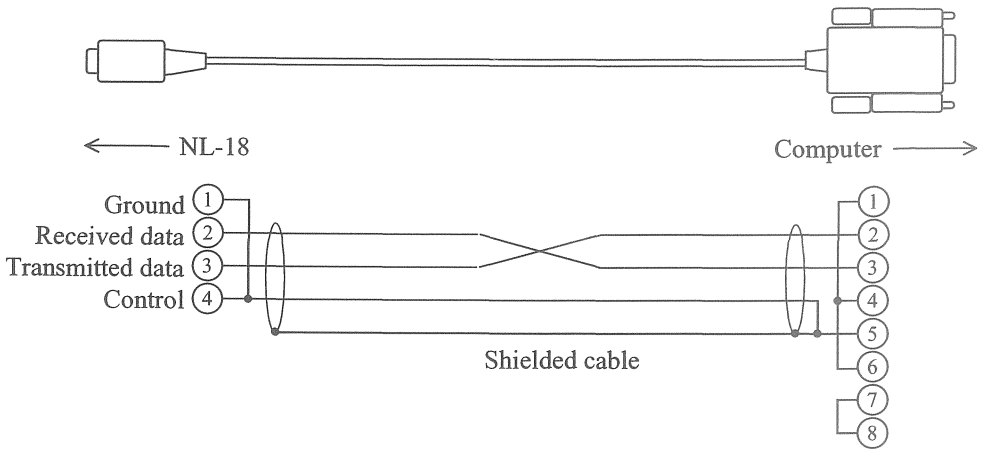
Connection to Computer

The illustration below shows how to connect the NL-18 to a computer. Use the separately available interface cable CC-87E.

The interface cable CC-87E for connection to IBM/AT or compatible computers.



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



Transfer Protocol and Transfer Procedure

Transfer Protocol

Flow control:	yes/no (selectable)
Transfer principle:	synchronous
Transfer rate:	4800/9600 bps (selectable)
Data word length:	8 bit
Stop bits:	2
Parity check:	none
X parameter control:	yes/no (selectable)

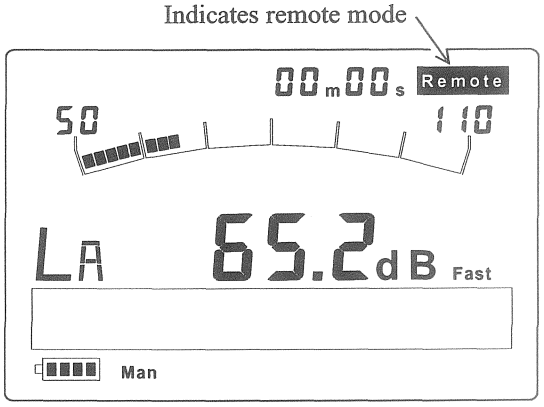
Remote Mode/Local Mode

Local mode

In this mode, the NL-18 is operated with the controls on the unit. Commands from the computer are also accepted.

Remote mode

In this condition, the controls on the sound level meter are inactive, and the unit is operated only by commands from the computer. The indication "Remote" appears on display 1.



Display 1

Remote mode/local mode switching

The RMT command serves to switch between local mode and remote mode.

Transfer Control Procedure

Sending Commands

In order to control the NL-18 from a computer or to retrieve measurement data, certain predetermined commands must be sent to the sound level meter. The data exchange must be performed according to matching rules, to ensure that both the sound level meter and the computer recognize the commands and data properly.

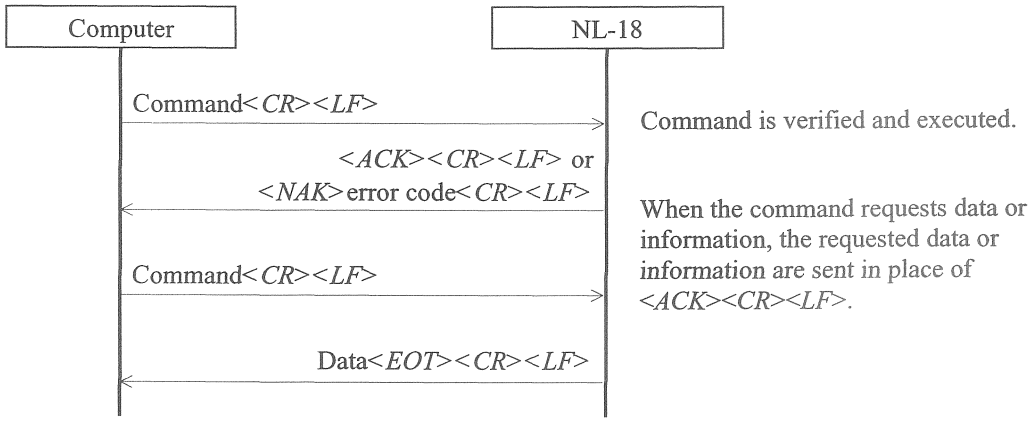
Response Acknowledgment

The NL-18 can be set up to return an acknowledgment when a command has been received. The selection whether to return such an acknowledgment is made using the RET command.

To send commands to the NL-18, the following procedure must be observed.

- With acknowledgment

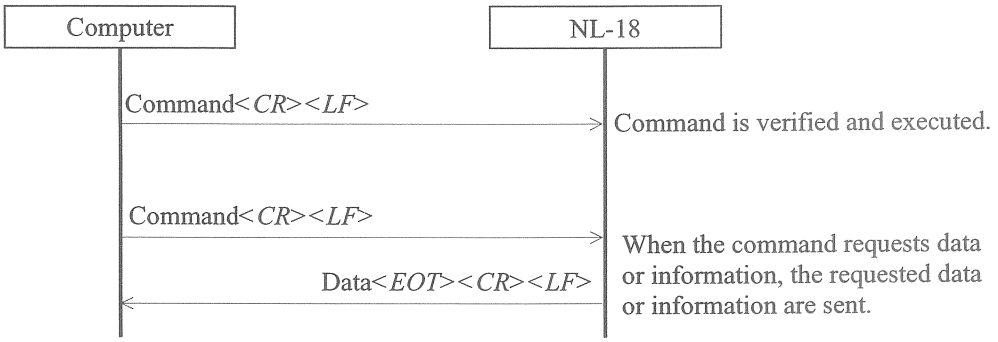
  This mode is slightly slower due to the time required for returning acknowledgement codes, but it ensures reliable communication.



Command:	ASCII string
<*ACK*>:	Control code 06H (acknowledge)
<*NAK*>:	Control code 15H (not acknowledge)
Error code:	Same response as to command EST
<*EOT*>:	Control code 04H (end of transmission)
Data:	ASCII string

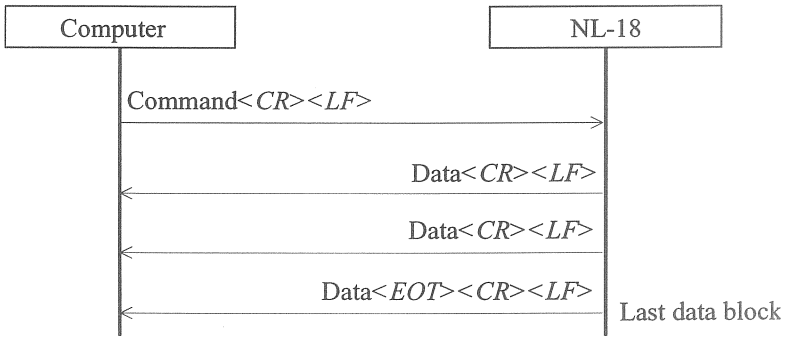
- Without acknowledgment

  This mode is faster since no acknowledgment codes are returned, but errors can occur more easily.



Sending Data

When the NL-18 has received a command which requests measurement data, the data are returned as an ASCII string. If the string is longer than 252 bytes, the data are split into multiple blocks. Each block is terminated by the control code string <*CR*><*LF*>.



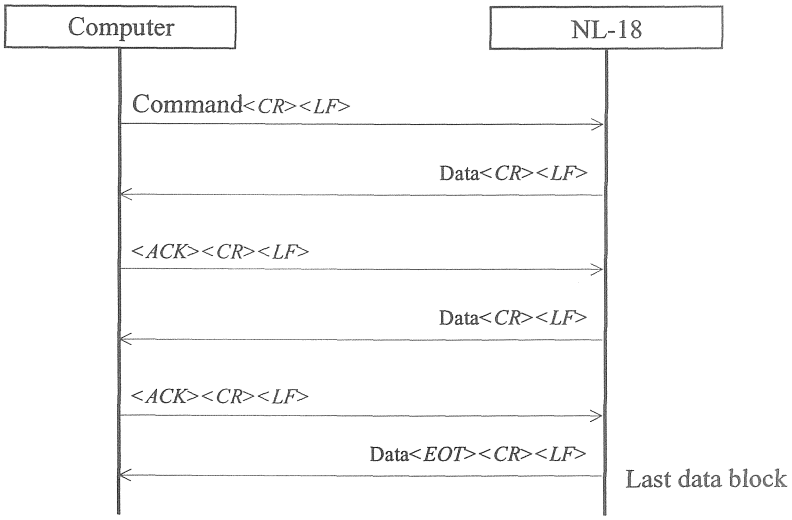
No response acknowledgment

The last data block is terminated by the string <*EOT*>*CR*><*LF*>. If there are no more than 252 bytes of data, <*EOT*><*CR*><*LF*> is appended after the end of the data.

- X parameter control

  If X parameter control is OFF, the computer must return <*ACK*><*CR*><*LF*> for the second and every subsequent data block. If X parameter control is ON, this is not required and data blocks can be sent continuously.

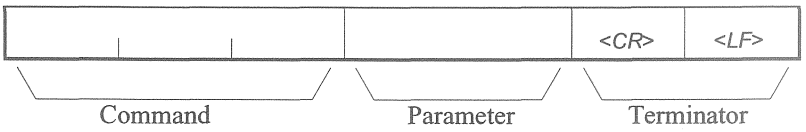
  X parameter control is set with the XON command.



X parameter control OFF

Command Format

Commands that can be used by the NL-18 consist of 3 characters (3 bytes), followed by one or several parameters which specify the action range of the command.



The following two types of parameters are possible:

- Parameters which set a function
- Parameters which request a current setting

The first type of parameter consists of one or several numeral characters, and the second type of parameter is a "?". The command description below indicates parameters as "p1,p2,p3" etc. The response supplied by the NL-18 in response to the inquiry is indicated as "d1, d2, d3" etc.

- When there are several parameters, they must be separated with spaces. In this manual, a space (20H) is indicated as "_".
  Example: CLKp1_p2_p3_p4_p5_p6<*CR*><*LF*>
- The command and the first parameter may also be separated by a space.
  Example: TMCp1_p2<*CR*><*LF*> or TMC_p1_p2<*CR*><*LF*>

Important
When a great number of commands is sent to the sound level meter during Leq 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.

Commands

Command List

Command Description

● Commands for setting measurement and display conditions

Enable display of various processing results

DPIp1_p2<*CR*><*LF*>

p1=0: L_p (Instantaneous value)

p1=1: L_{eq} (Equivalent continuous sound pressure level)

p1=2: L_E (Sound exposure level)

p1=3: L_{max} (Maximum level)

p1=4: L_{min} (Minimum level)

p1=5: L_{X1} (Initial value is L_5)

p1=6: L_{X2} (Initial value is L_{10})

p1=7: L_{X3} (Initial value is L_{50})

p1=8: L_{X4} (Initial value is L_{90})

p1=9: L_{X5} (Initial value is L_{95})

p1=10: L_{tm3} (Takt-max sound pressure levels within 3-second interval)

p1=11: L_{tm5} (Takt-max sound pressure levels within 5-second interval)

p2=0: Off (Enable display)

p2=1: On (Disable display)

<Example> DPI2_0<*CR*><*LF*>

Display of sound exposure level is disabled.

Get display enable/disable status of processing results

DPI?<*CR*><*LF*>

Output data of NL-18 in response to DPI?

d1,d2,d3 .. dn .. d11<*CR*><*LF*>

dn=0: Off (display disabled)

dn=1: On (display enabled)

Display type sequence is as follows.

L_p,L_{eq},L_E,L_{max},L_{min},L_{X1},L_{X2},L_{X3},L_{X4},L_{X5},L_{tm3},L_{tm5}

<Example> 1,1,1,0,0,1,1,1,1,1,0,0<*EOT*><*CR*><*LF*>

Display of L_{max},L_{min},L_{tm3},L_{tm5} is disabled, display of other processing results is enabled.

Set the type of display data

DSPp1_p2<*CR*><*LF*>

p1=0: Main channel

p1=1: Sub channel

p2=0: L_p (Instantaneous value)

p2=1: L_{eq} (Equivalent continuouss sound pressure level)

p2=2: L_E (Sound exposure level)

p2=3: L_{max} (Maximum level)

p2=4: L_{min} (Minimum level)

p2=5: L_{X1} (Initial value is L_5)

p2=6: L_{X2} (Initial value is L_{10})

p2=7: L_{X3} (Initial value is L_{50})

p2=8: L_{X4} (Initial value is L_{90})

p2=9: L_{X5} (Initial value is L_{95})

p2=10: L_{tm3} (Takt-max sound pressure levels within 3-second interval)

p2=11: L_{tm5} (Takt-max sound pressure levels within 5-second interval)

If the sub channel is selected and time weighting is set to Peak, p2 can only by set to 0.

<Example> DSP0_1<*CR*><*LF*>

L_{eq} value is displayed in main channel.

Get the type of display data

DSP?<*CR*><*LF*>

Output data of NL-18 in response to DSP?

d1,d2<*EOT*><*CR*><*LF*>

d1=0-11: Type of data displayed in main channel

d2=0-11: Type of data displayed in sub channel

<Example> 3,4<*EOT*><*CR*><*LF*>

Main channel maximum value and sub channel minimum value are displayed.

Set the filter center frequency

FBDp1<*CR*><*LF*>

For 1/1 octave filter

p1=0:	16 Hz	p1=6:	1000 Hz
p1=1:	31.5 Hz	p1=7:	2000 Hz
p1=2:	63 Hz	p1=8:	4000 Hz
p1=3:	125 Hz	p1=9:	8000 Hz
p1=4:	250 Hz	p1=10:	16000 Hz
p1=5:	500 Hz		

For 1/3 octave filter

p1=0:	12.5 Hz	p1=17:	630 Hz
p1=1:	16 Hz	p1=18:	800 Hz
p1=2:	20 Hz	p1=19:	1000 Hz
p1=3:	25 Hz	p1=20:	1250 Hz
p1=4:	31.5 Hz	p1=21:	1600 Hz
p1=5:	40 Hz	p1=22:	2000 Hz
p1=6:	50 Hz	p1=23:	2500 Hz
p1=7:	63 Hz	p1=24:	3150 Hz
p1=8:	80 Hz	p1=25:	4000 Hz
p1=9:	100 Hz	p1=26:	5000 Hz
p1=10:	125 Hz	p1=27:	6300 Hz
p1=11:	160 Hz	p1=28:	8000 Hz
p1=12:	200 Hz	p1=29:	10000 Hz
p1=13:	250 Hz	p1=30:	12500 Hz
p1=14:	315 Hz	p1=31:	16000 Hz
p1=15:	400 Hz	p1=32:	20000 Hz
p1=16:	500 Hz		

<Example> FBD6<*CR*><*LF*>

Set filter center frequency to 1000 Hz (for 1/1 octave filter).

Get the filter center frequency

FBD?<*CR*><*LF*>

Output data of NL-18 in response to FBD?

d1<*EOT*><*CR*><*LF*>

d1=0-32: filter center frequency

<Example> 22<*EOT*><*CR*><*LF*>

Filter center frequency is set to 2000 Hz (for 1/3 octave filter).

Set the filter to on/off

FLTp1<*CR*><*LF*><*CR*><*LF*>

p1=0: Off (disable filter)

p1=1: On (enable filter)

<Example> FLT1<*CR*><*LF*>

Enable filter.

Get the filter on/off setting

FLT?<*CR*><*LF*>*v*

Output data of NL-18 in response to FLT?

d1<*EOT*><*CR*><*LF*>

d1=0: Off

d1=1: 1/1 octave filter

d1=2: 1/3 octave filter

<Example> 2<*EOT*><*CR*><*LF*>

1/3 octave filter is enabled.

Set the time percentile level (user selectable)

LXIp1_p2<*CR*><*LF*>

p1=1-5: Number of percentile level item out of five

p2=1-99: Percent value

<Example> LXI2_25<*CR*><*LF*>

Set second L_x to L_{25}.

Get the time percentile level setting

LXI?<*CR*><*LF*>

Output data of NL-18 in response to LXI?

d1,d2,d3,d4,d5<*EOT*><*CR*><*LF*>

d1-d5: corresponding to p2

<Example> 5,20,40,60,90<*EOT*><*CR*><*LF*>

L_5, L_{20}, L_{40}, L_{60}, L_{90} are set.

Set the measurement time

MTIp1<*CR*><*LF*>

p1=0: arbitrary

p1=1: 1 s

p1=2: 3 s

p1=3: 5 s

p1=4: 10 s

p1=5: 1 m

p1=6: 5 m

p1=7: 10 m

p1=8: 15 m

p1=9: 30 m

p1=10: 1 h

p1=11: 8 h

p1=12: 24 h

<Example> MTI10<*CR*><*LF*><*CR*><*LF*>

Set measurement time to 1 hour.

Get the measurement time setting

MTI?

Output data of NL-18 in response to MTI?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 7<*EOT*><*CR*><*LF*>

Measurement time is set to 10 minutes.

Pause or resume measurement and memory store

PSEp1<*CR*><*LF*>

p1=0: Restart measurement and memory store

p1=1: Pause measurement and memory store

<Example> PSE1<*CR*><*LF*>

Pause measurement and memory store.

Get the current measurement/pause status

PSE?<*CR*><*LF*>

Output data of NL-18 in response to PSE?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

Measurement is paused.

Set the level range

RNGp1<*CR*><*LF*>

p1=7: 10-70 dB

p1=8: 20-80 dB

p1=9: 30-90 dB

p1=10: 40-100 dB

p1=11: 50-110 dB

p1=12: 60-120 dB

p1=13: 70-130 dB

p1=14: 80-140 dB

Get the current level range setting

RNG?<*CR*><*LF*>

Output data of NL-18 in response to RNG?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 11<*EOT*><*CR*><*LF*>

Level range is set to 50-110 dB.

Set sub channel display to on/off

SCHp1<*CR*><*LF*>

p1=0: Set sub channel display to Off

p1=1: Set sub channel display to On

<Example> SCH1<*CR*><*LF*>

Get the current sub channel display setting

SCH?<*CR*><*LF*>

Output data of NL-18 in response to SCH?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

Start/stop measurement

SRTp1<*CR*><*LF*>

p1=0: Start measurement

p1=1: Stop measurement

<Example> SRT1<*CR*><*LF*>

Get the measurement start/stop status

SRT?<*CR*><*LF*>

Output data of NL-18 in response to SRT?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

Set the time weighting

TMCp1_p2<*CR*><*LF*>

p1=0: Set time weighting for the main channel

p1=1: Set time weighting for the sub channel

p2=0: Fast

p2=1: Slow

p2=2: 10 ms

p2=3: Impulse

p2=4: Peak hold

For the main channel, p2 can be 0, 1, or 2.

For the sub channel, p2 can be 0, 1, 3, or 4.

<Example> TMC0_0<*CR*><*LF*>

Set main channel time weighting to "Fast".

Get the current time weighting setting

TMC?<*CR*><*LF*>

Output data of NL-18 in response to TMC?

d1,d2<*EOT*><*CR*><*LF*>

d1: Corresponds to p2 for main channel.

d2: Corresponds to p2 for sub channel.

<Example> 0,3<*EOT*><*CR*><*LF*>

Main channel is set to "Fast" and sub channel to "Impulse".

Set the frequency weighting

WGTp1_p2<*CR*><*LF*>

p1=0: Set frequency weighting for the main channel

p1=1: Set frequency weighting for the sub channel

p2=0: A weighting

p2=1: C weighting

p2=2: Flat

<Example> WGT0_2<*CR*><*LF*>

Set main channel frequency weighting to "Flat".

Get the frequency weighting setting

WGT?<*CR*><*LF*>

Output data of NL-18 in response to WGT?

d1,d2<*EOT*><*CR*><*LF*>

d1: Corresponds to p2 for main channel.

d2: Corresponds to p2 for sub channel.

<Example> 2,0<*EOT*><*CR*><*LF*>

Main channel is set to "Flat" and sub channel to "A".

Set the date and time

CLKp1_p2_p3_p4_p5_p6<*CR*><*LF*>

p1: Year

p2: Month

p3: Day

p4: Hour (24-hour format)

p5: Minute

p6: Second

January can be specified as either 01 or 1.

<Example> CLK1996_4_1_8_30_0<*CR*><*LF*>

Set the NL-18 to 1996, April 1, 8:30:00.

Get the set date and time

CLK?<*CR*><*LF*>

Output data of NL-18 in response to CLK?

d1,d2,d3,d4,d5,d6<*EOT*><*CR*><*LF*>

d1 - d6: Correspond to p1 - p6.

<Example> 1996,4,1,9,10,9<*EOT*><*CR*><*LF*>

The NL-18 is set to 1996, April 1, 9:10:00.

Set the back-erase function

BERp1<*CR*><*LF*>

p1=0: Off (no back-erase)

p1=3: 3 s (back-erase interval set to 3 seconds)

p1=5: 5 s (back-erase interval set to 5 seconds)

Get the back-erase setting

BER?

Output data of NL-18 in response to BER?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 5<*EOT*><*CR*><*LF*>

Data back-erase function is set to 5 seconds.

● Commands related to memory

Set the data number

ADRp1<*CR*><*LF*>

p1=1-100: When memory mode is set to Manual

p1=1-100000: When memory mode is set to Auto 1

p1=1-7200: When memory mode is set to Auto 2

p1=1-100: When memory mode is set to Auto 3

<Example> ADR10<*CR*><*LF*>

Set data number to "10".

Get the selected data number

ADR?

Output data of NL-18 in response to ADR?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 30<*EOT*><*CR*><*LF*>

Data number is set to "30".

Set the recall mode to on/off

RCLp1<*CR*><*LF*>

p1=0: Cancel data recall mode

p1=1: Activate data recall mode

<Example> RCL1<*CR*><*LF*>

Activate data recall mode

Get the recall/measurement status

RCL?

Output data of NL-18 in response to RCL?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

NL-18 is set to data recall mode.

Select the memory store mode (Manual, Auto 1-3)

SMDp1<*CR*><*LF*>

p1=0: Manual

p1=1: Auto 1

p1=2: Auto 2

p1=3: Auto 3

<Example> SMD1<*CR*><*LF*>

Set memory store mode to "Auto 1".

Get the current memory store mode setting

SMD?

Output data of NL-18 in response to SMD?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 0<*EOT*><*CR*><*LF*>

Memory store mode is set to "Manual".

Start/stop memory store

STOp1<*CR*><*LF*>

If memory store mode is set to "Manual"

p1=0: No action

p1=1: Execute store

If memory store mode is set to "Auto 1 - 3"

p1=0: Cancel standby

p1=1: Activate standby

This command has the same effect as the Store key on the NL-18.

<Example> STO1<*CR*><*LF*>

Get the memory store status

STO?

Output data of NL-18 in response to STO?

d1<*EOT*><*CR*><*LF*>

d1=0: Store is not being performed.

d1=1: Store is being performed.

<Example> 1<*EOT*><*CR*><*LF*>

Set the Auto 1 store cycle

PLPp1<*CR*><*LF*>

p1=1: 10 ms

p1=2: 100 ms

p1=3: 1 s

<Example> PLP1<*CR*><*LF*>

Set the store cycle to 10 milliseconds.

Get the Auto 1 store cycle setting

PLP?

Output data of NL-18 in response to PLP?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 3<*EOT*><*CR*><*LF*>

Store cycle is set to 1 second.

● Commands related to data output

Get the battery condition

BAT?

Output data of NL-18 in response to BAT?

d1<*EOT*><*CR*><*LF*>

d1=0: Battery indicator is flashing

d1=1: 

d1=2: 

d1=3: 

d1=4: 

<Example> 0<*EOT*><*CR*><*LF*>

Batteries are almost exhausted.

Get currently displayed measurement data

DOD?

In response to the DOD? command, the NL-18 outputs the currently displayed data for the main channel and sub channel. For information on the output data format, please refer to page 30.

DODp1_p2?

In response to DODp1_p2?, the NL-18 outputs the p1 (main channel processing type code) and p2 (sub channel processing type code) data. The codes and corresponding processing type are shown below.

0: L_p (Instantaneous value)
1: L_{eq} (Equivalent continuoussound pressure level)
2: L_E (Sound exposure level)
3: L_{max} (Maximum level)
4: L_{min} (Minimum level)
5: L_{X1} (Initial value is L_5)
6: L_{X2} (Initial value is L_{10})
7: L_{X3} (Initial value is L_{50})
8: L_{X4} (Initial value is L_{90})
9: L_{X5} (Initial value is L_{95})
10: L_{tm3} (Takt-max sound pressure levels within 3-second interval
11: L_{tm5} (Takt-max sound pressure levels within 5-second interval

<Example> DOD1_3?<CR><LF>
Get equivalent noise level data for main channel and maximum noise level data for sub channel.

For information on the output data format, please refer to page 31.

Get data stored in memory

DORp1?

While this command is being executed, nothing is shown on display 2.

p1=1-100000

Range is 1-100 when memory store mode is "Manual" or "Auto 3", but in these modes the parameter is not significant.

Range is 1-100000 if memory store mode is "Auto 1". Signifies the number of requested data.

Range is 1-7200 if memory store mode is "Auto 2". Signifies the number of requested data.

<Example> DOR20?*<CR><LF>*
Get the 20 data stored. For information on the output data format, please refer to page 32.

Get continuous instantaneous values of main channel

DRDp1?

While this command is being executed, nothing is shown on display 2. While Leq processing or memory store is being carried out, no data will be output for the relevant cycle.

p1=1: 20 ms

p1=2: 100 ms

While this command is being executed, do not send any codes other than *<SUB>*(1AH, Ctrl+Z), S (13H, Ctrl+S), and Q (11H, Ctrl+Q).

<Example> DRD1?*<CR><LF>*
Get the instantaneous values in the main channel, using a cycle of 20 ms.

For information on the output data format, please refer to page 37.

Get elapsed processing time or time since start of memory store

LTI?

Output data of NL-18 in response to LTI?

d1,d2,d3<*EOT*><*CR*><*LF*>

d1: Hours

d2: Minutes

d3: Seconds

<Example> 1,7,30<*EOT*><*CR*><*LF*>

1 hour 7 minutes 30 seconds have elapsed.

Get the NL-18 program version

VER?

Output data of NL-18 in response to VER?

X.X<*EOT*><*CR*><*LF*>

<Example> 1.0<*EOT*><*CR*><*LF*>

● Commands related to data transfer

Set the baud rate

BRTp1<*CR*><*LF*>

p1=2: 4800 bps

p1=3: 9600 bps

<Example> BRT2<*CR*><*LF*>

Set baud rate to 4800 bps.

Get error status

EST?

Output data of NL-18 in response to EST?

d1,d2,d3,d4,d5,d6,d7,d8<*EOT*><*CR*><*LF*>

If d1 - d8 are 0, no error has occurred.

d1=1: Undefined command received

d2=1: Parameter is out of range

d3=1: Command cannot be executed.

d4=1: Undefined (not used)

d5=1: Undefined (not used)

d6=1: Undefined (not used)

d7=1: Undefined (not used)

d8=1: Undefined (not used)

<Example> 0,0,1,0,0,0,0,0<*EOT*><*CR*><*LF*>

A command that cannot be executed was received.

Set the command return mode to on/off

RETp1<*CR*><*LF*>

p1=0: Do not acknowledge commands

p1=1: Acknowledge commands

<Example> RET1<*CR*><*LF*>

Set NL-18 to acknowledge commands.

Get the command return mode setting

RET?

Output data of NL-18 in response to RET?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

NL-18 is set to acknowledge commands.

Select local or remote mode

RMTp1<*CR*><*LF*>

p1=0: Set to local mode

p1=1: Set to remote mode

<Example> RMT1<*CR*><*LF*>

Set NL-18 to remote mode.

Get the local/remote setting

RMT?

Output data of NL-18 in response to RMT?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<EOT><CR><LF>

Set X parameter control

XONp1<*CR*><*LF*>

p1=0: Disable X parameter control

p1=1: Enable X parameter control

<Example> RMT1<*CR*><*LF*>

Get X parameter control setting

XON?

Output data of NL-18 in response to XON?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

● Other commands

Select default settings

DCL<*CR*><*LF*>

This command resets the NL-18 to the factory default condition.

The reset process causes the levels in the main channel and sub channel to go out of sync. Be sure to perform calibration after executing this command.

<Example> DCL<*CR*><*LF*>

Activate the calibration function

CALp1<*CR*><*LF*>

p1=0: Cancel calibration mode

p1=1: Activate calibration mode

Get the current calibration status

CAL?

Output data of NL-18 in response to PLP?

d1<*EOT*><*CR*><*LF*>

d1: Corresponds to p1

<Example> 1<*EOT*><*CR*><*LF*>

Output Data Format

This section explains the format of the data output by the NL-18 in response to the DOD, DOR, and DRD commands.
□ signifies a numeral or character and _ signifies a space. Data are output as □□□ . □ . When there is only one or two integer digits, the remaining positions are replaced by spaces. For example, 63.0 dB is output as _63.0 .

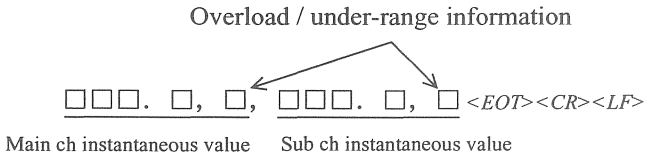
The overload status is indicated in one of the following three ways.

_:	No overload
O:	Instantaneous value overload (Over) has occurred. At least one "Over" occurrence is included in the processed values. Overload and under-range have occurred.
U:	Instantaneous value under-range (Under) has occurred.

During data output, nothing is shown on display 2.

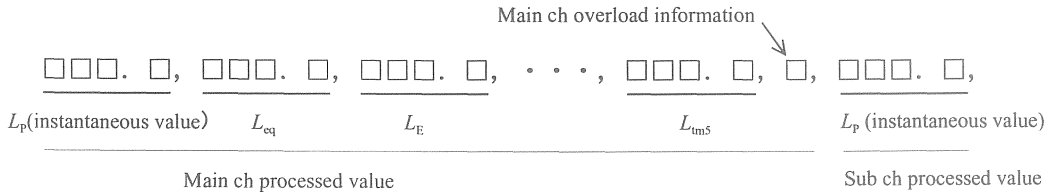
Output Data in response to DOD?

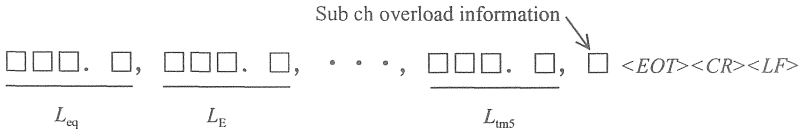
When instantaneous value is displayed in main channel



If the sub channel is set to Off, the sub channel data are omitted.

When processed values are displayed in main channel





Overload information: "O" applies to insatntaneous value and processed values.

If the sub channel is set to Off, the sub channel data are omitted.

The data sequence is as follows. Processed values which are set to "no display" are also output.

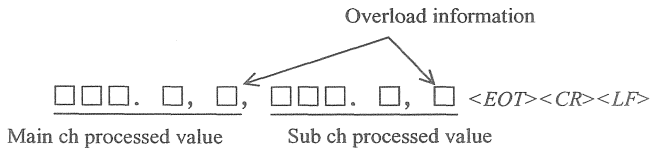
L_p,L_{eq},L_E,L_{max},L_{min},L_{X1},L_{X2},L_{X3},L_{X4},L_{X5},L_{tm3},L_{tm5}

If L_{tm3} and L_{tm5} are both set to "no display", these two data are omitted.

If time weighting in the sub channel is set to "Peak", L_p only is output.

Output Data in response to DODp1_p2?

In response to DODp1_p2?, the NL-18 outputs the p1 (main channel processing type code) and p2 (sub channel processing type code) data.



If the sub channel is set to Off, the sub channel data are omitted.

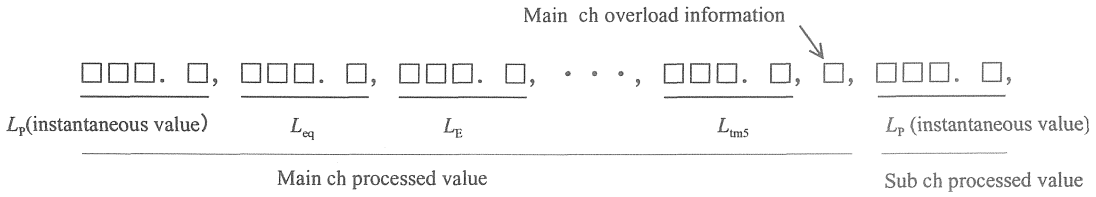
Processed values which are set to "no display" are also output.

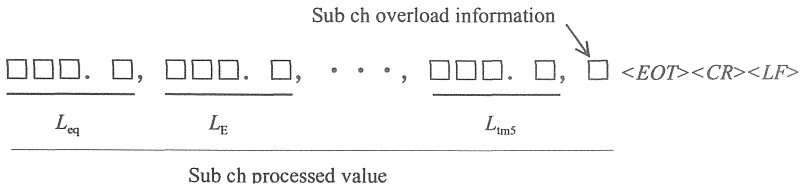
Output Data in response to DORp1?

The data returned by the NL-18 in response to this command depend on the currently selected memory store mode.

Manual mode

The data stored in the specified data number are output, regardless of the parameter value.





If the sub channel was set to Off while the data were stored in memory, the sub channel data are omitted.

The data sequence is as follows. Processed values which are set to "no display" are also output.

L_p,L_{eq},L_E,L_{max},L_{min},L_{X1},L_{X2},L_{X3},L_{X4},L_{X5},L_{tm3},L_{tm5}

If L_{tm3} and L_{tm5} were both set to "no display", these two data are omitted.

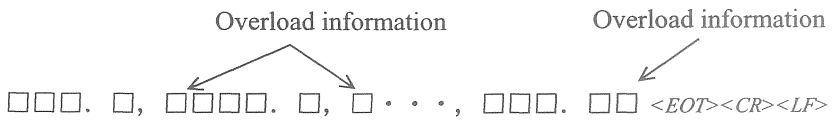
If time weighting in the sub channel was set to "Peak" while the data were stored in memory, L_p only is output.

Auto 1

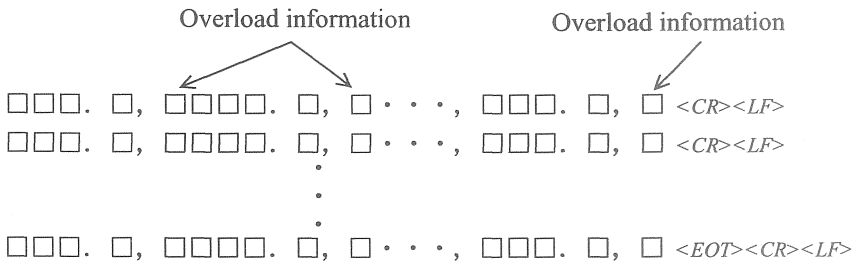
Starting from the currently selected data number, the number of instantaneous values specified by the parameter p1 is output.

If the number of data specified by the parameter is higher than the number of actually stored data, the stored data are output, and the remainder are output as 0.0U.

- If parameter is 31 or lower (data can be sent as 1 block)



- If parameter is 32 or higher (data are sent in several 31-data blocks)



Auto 2

Starting from the currently selected data number, the number of data sets specified by the parameter p1 is output.

The data sequence is as follows. Processed values which are set to "no display" are also output.

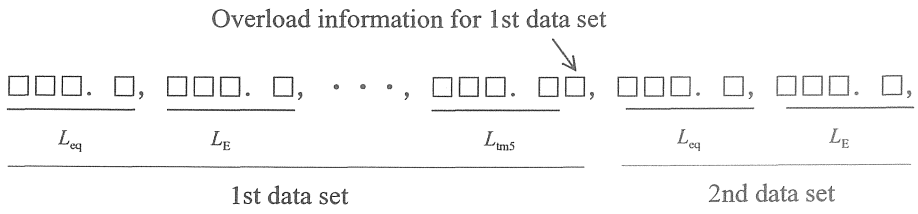
L_p,L_{eq},L_E,L_{max},L_{min},L_{X1},L_{X2},L_{X3},L_{X4},L_{X5},L_{tm3},L_{tm5}

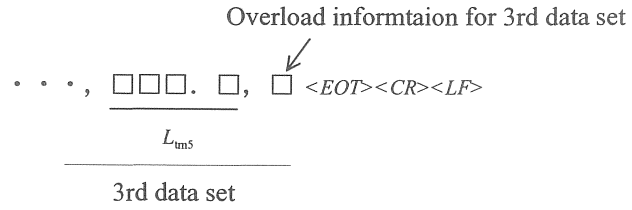
If L_{tm3} and L_{tm5} were both set to "no display", these two data are omitted.

If L_{tm3} or L_{tm5} was set to "display", but the measurement time was less than 3 seconds, 0.0 is output.

If the number of data specified by the parameter is higher than the number of actually stored data, only the stored data are output.

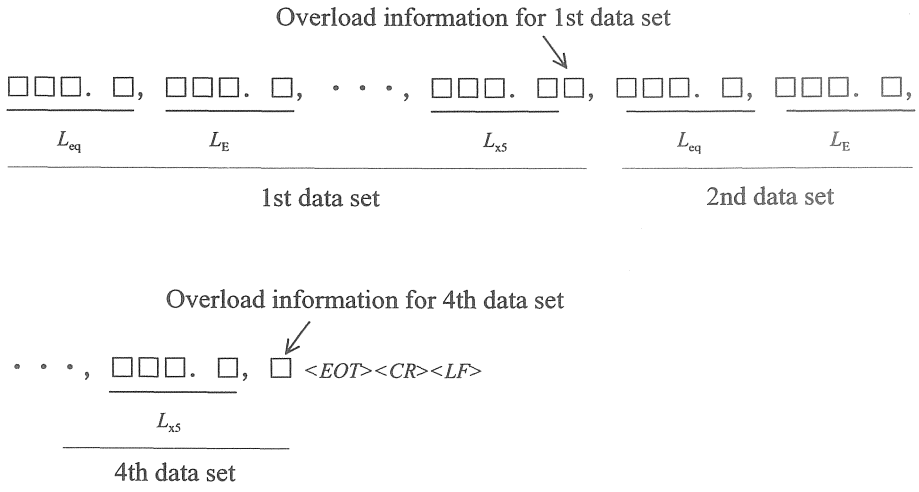
- L_{tm3}, L_{tm5} are output, and parameter is 3 or lower (data can be sent as 1 block)





- L_{tm3}, L_{tm5} are output, and parameter is 4 or higher (data are sent in several 3-data blocks)

- L_{tm3}, L_{tm5} are not output, and parameter is 4 or lower (data can be sent as 1 block)



- L_{tm3}, L_{tm5} are not output, and parameter is 5 or higher (data are sent in several 4-data blocks)

Auto 3

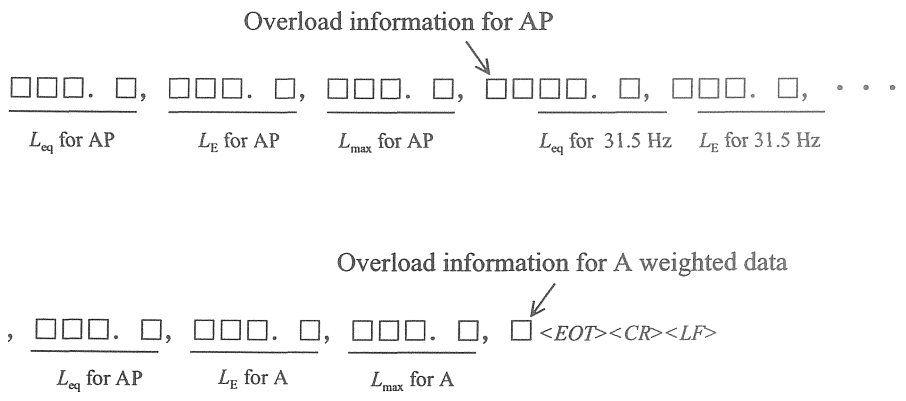
Data are output from the specified data number, regardless of the parameter value.

The data sequence is as shown below. Processed values which are set to "no display" are also output.

- 1/1 octave analysis

  L_{eq}, L_E, L_{max}, and overload information is output for each of the following: AP, 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz 2 kHz, 4 kHz, 8 kHz, 16 kHz, A weighted data

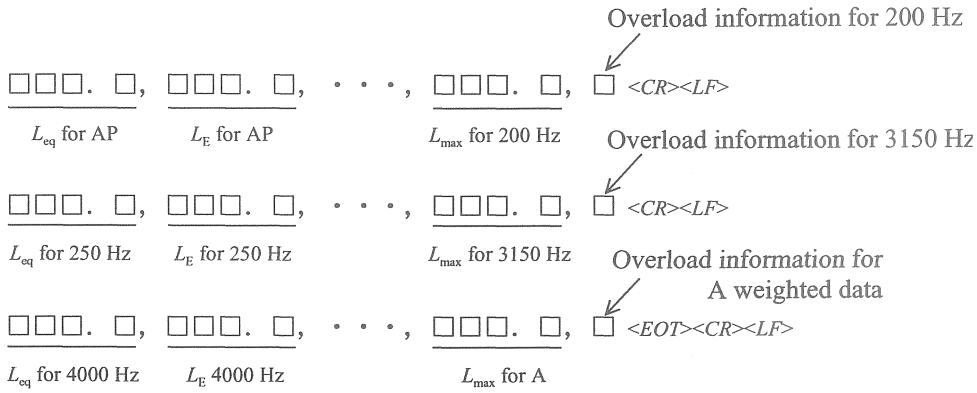
  Data transfer is completed in one block.



- 1/3 octave analysis

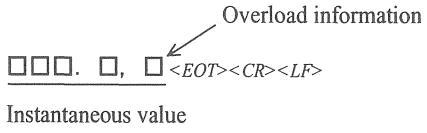
  L_{eq}, L_E, L_{max}, and overload information is output for each of the following: AP, 20 Hz, 25 Hz, 31.5 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, 2 kHz, 2.5 kHz, 3.15 kHz, 4 kHz, 5 kHz, 6.3 kHz, 8 kHz, 10 kHz, 12.5 kHz, 16 kHz, 20 kHz, A weighted data

  Data transfer is completed in three blocks.



Output Data in response to DRDp1?

Instantaneous values for the main channel are output continuously.



After this command has been executed, do not send any codes other than the codes shown below. When wishing to send other commands, send the <*SUB*> code first to terminate the output.

<*SUB*> code (1AH, Ctrl+Z)	Terminate output
S code (13H, Ctrl+S)	Pause output
Q code (11H, Ctrl+Q)	Resume output

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