SERIAL INTERFACE MANUAL

Sound Level Meter

NL-22 / NL-32

RION CO., LTD.

3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan

http://www.rion.co.jp/

Organization of the NL-22 / NL-32 Documentation

The documentation for the Sound Level Meter NL-22 / NL-32 consists of three separate manuals.

- Instruction Manual

  Describes operating procedures for the Sound Level Meter NL-22 / NL-32, connection and use of peripheral equipment such as a level recorder and printer, and use of the memory card.
- Serial Interface Manual (this document)

  Describes how to use the serial interface built into the Sound Level Meter NL-22 / NL-32. The manual covers the communication protocol, use of control commands for the sound level meter, format of data output by the sound level meter, and other topics.
- Technical Notes

  This document provides in-depth information about the circuit configuration and performance of the sound level meter, microphone construction and characteristics, influence of extension cables and windscreen on the measurement, and other topics.

Organization of This Manual

This manual describes how to use the serial interface built into the Sound Level Meter NL-22 and NL-32. Besides the RS-232-C serial interface standard, the unit also supports USB. However, correct operation in combination with other USB devices is not assured. If possible, you should avoid connecting other USB devices at the same time.

The manual is divided into four chapters. Chapter 1 covers points that are common to the RS-232-C and USB interface. Chapter 2 contains information for users of the RS-232-C interface. USB users need not read this chapter. Chapter 3 contains information for users of the USB interface. RS-232-C users need not read this chapter. Chapter 4 explains the interface commands. This chapter is for users of either interface. You should read the explanation for the commands that operate the functions you want to use.

Chapter 1 General Information

This chapter contains information that applies both to the RS-232-C and USB interface. (⟶ P1)

Chapter 2 RS-232-C

This chapter explains connection to a computer and transfer principles using the RS-232-C interface. (⟶ P21)

Chapter 3 USB

This chapter explains connection to a computer and transfer principles using the USB interface. (⟶ P27)

Chapter 4 Commands

This chapter explains the commands used to control the NL-22 or NL-32. Information is given about command format, functions, and other relevant points. (⟶ P47)

Contents

Chapter 1 General Information

Contents

Outline

The Sound Level Meter NL-22 and NL-32 incorporate a serial interface. This interface allows the use of a computer to make measurement parameter settings 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.

Local Mode / Remote Mode

Operation mode	Key operation	Communication
Remote	Disabled	Enabled
Local	Enabled	Enabled

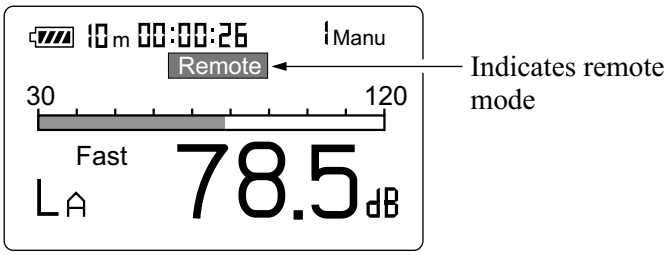
Local mode

In this mode, the NL-22 / NL-32 is operated with the controls on the unit. This is the default mode after power-on.

Communication can also be carried out.

Remote mode

In this condition, the controls on the unit are inactive, and the unit only carries out communication with the computer. The indication "Remote" appears on the display.



Display

Remote mode/local mode switching

Switching between local mode and remote mode is carried out by a command.

Key operation in remote mode

Only the power key is active. All other keys are disabled.

Transfer Codes

The following codes are used for communication with the unit.

Control codes

Code	Hex notation	Meaning
<ENQ>	05H	Enquire
<ACK>	06H	Acknowledge
<NAK>	15H	Not acknowledge
<STX>	02H	Start block
<ETX>	03H	End block
<CR>	0DH	Terminator (1st character)
<LF>	0AH	Terminator (2nd character)
<SUB>	1AH	Stop
<DC3>	13H	Pause
<DC1>	11H	Restart

Special codes

ATTR	Control code or special code	Block attribute
ID	01H to FFH	Other / own station ID
BCC	00H to FFH	Block check code

Commands, parameters, data

ASCII codes 20H to 7EH

Transfer Format

Command block: Command from computer

<STX>	ID	ATTR	Command	Parameter	<ETX>	BCC	<CR>	<LF>
1	1	1	M	N	1	1	1	1 byte

* ATTR = 'C'

If there are two or more parameters, they are separated by single spaces.

Data response block: Data from sound level meter (response data in ASCII)

<STX>	ID	ATTR	Response data	<ETX>	BCC	<CR>	<LF>
1	1	1	N	1	1	1	1 byte

* ATTR = 'A' or 'Q'

If there are two or more data, they are separated by commas.

Acknowledgment block: Computer or sound level meter

<STX>	ID	ATTR	<ETX>	BCC	<CR>	<LF>
1	1	1	1	1	1	1 byte

* ATTR = <ACK>

Negative Acknowledgment block: Computer or sound level meter

<STX>	ID	ATTR	Error code	<ETX>	BCC	<CR>	<LF>
1	1	1	4	1	1	1	1 byte

* ATTR = <NAK>

Verify other station block: Computer

<STX>	ID	ATTR	<ETX>	BCC	<CR>	<LF>
1	1	1	1	1	1	1 byte

* ATTR = <ENQ>

Stop request code: Computer

<SUB>
1

Pause request with X parameter control: Computer

<DC3>
1

Restart request with X parameter control: Computer

<DC1>
1

ID: ID Number

Outline

When multiple units are connected, ID numbers are used to distinguish between individual units. The ID number range is 1 to 255 (01H to FFH). Numbers are expressed in binary notation. In strings sent out by the computer, the ID selects the unit to be controlled. In strings sent out by the sound level meter, the ID identifies the data source.

Broadcasting

In commands sent from the computer, the ID 00 has a special meaning. It selects all units (broadcast command).

Sound level meter response

The sound level meter responds only to a communication block that contains its own ID. Other blocks are disregarded.

When the ID is 00 (zero), setting commands are processed but no response is returned. Request commands are not processed and no response is returned.

ATTR: Block Attribute

The block attribute information is added by the sender, to facilitate processing of the block at the receiving end.

<STX>	ID	ATTR	<ETX>	BCC	<CR>	<LF>
1	1	1	1	1	1	1 byte

* ATTR = <SUB>

BCC: Block Check Code

The BCC is calculated by the sender. The receiver applies checksum processing to the same range to verify the block.

Calculation range: From STX to ETX
Calculation method: Exclusive OR sum of range

If the computer sends a block where BCC is set to 00H (NULL), the sound level meter omits block check processing.
This is to allow simple sending from the computer.

Block Reception Processing

For reception processing, the unit is initially in the <STX> wait (standby) mode, except during a sequence while waiting for response from the computer.
In the idling state, any data received by the sound level meter except for <STX> are disregarded.

Command Types

There are two types of commands: setting commands and request commands.

Setting command

This type of command serves for changing the sound level meter status or measurement parameters. Only some commands of this type will produce a response from the sound level meter. The response consists of status information returned after the setting command has been processed.

Request command

This type of command serves for getting information about unit settings and for obtaining measurement data including display data and stored data. The sound level meter returns the requested data.

Error Processing

Transmission errors

Transmission errors can be detected in the following categories.

Error item	Contents	Processing
Framing error	Character level framing error	Disregard character and wait for next character
Block reset	<STX> received after incomplete block (excluding ID number)	Start block again from that point

Command processing errors

Block format is correct, but command interpretation or processing has resulted in an error.

Error item	Contents	Processing
Undefined command	Command problem	Return error code 0001
Parameter error	Parameter number or value not correct	Return error code 0002
Processing error	Processing cannot be carried out in current state	Return error code 0003
Processing timeout	Timeout interval has elapsed	Return error code 0004

Flow Control

The sound level meter implements X parameter and RTS / CTS flow control. When XON = 1, the X parameter is used to perform control. When XON = 0, RTS / CTS is used to perform control.

X parameter control mode

In the send sequence for multiple blocks, the next block is sent after the computer returns an acknowledge code.

To interrupt, restart, or stop the transfer, the respective code must be sent from the computer.

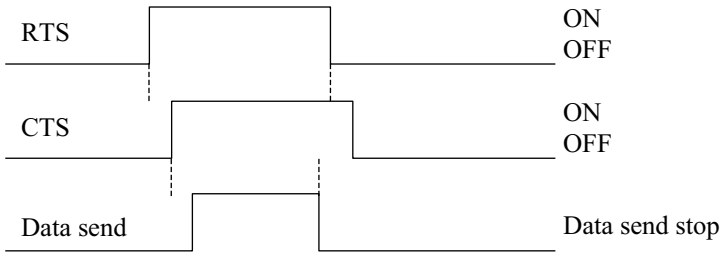
RTS / CTS control is not possible.

RTS/CTS control mode

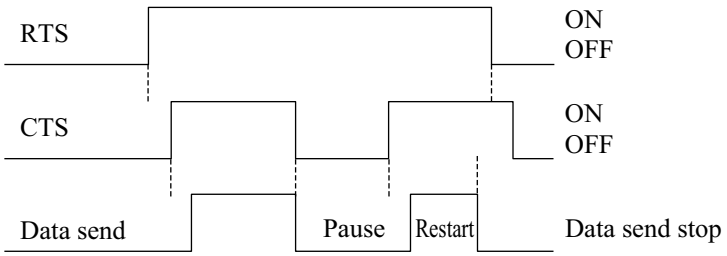
Send

To send data, the sound level meter sets RTS to ON, waits until CTS becomes ON, and then sends the data.

Immediately after sending the data, the sound level meter sets RTS to OFF.



When the computer sets RTS to OFF (CTS at sound level meter becomes OFF), sending is interrupted immediately.
Because RTS / CTS control is hardware control, sending can be interrupted also midway in a block.
Sending is not resumed until the computer sets RTS to ON (sound level meter CTS becomes ON).



Receive

The sound level meter constantly monitors CTS. CTS = ON while sending is not in progress means that there is a send request from the computer. The sound level meter then sets RTS to ON.
Because no provision is made for receive overflow at the sound level meter, a send request from the computer (sound level meter CTS = ON) always triggers RTS = ON. The sound level meter is always ready for receiving.

When this mode is used, X parameter control is not available.

Transfer Sequence

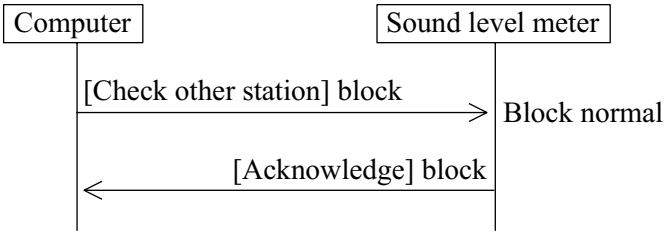
The transfer sequences are as follows.

[Check other station] sequence
[Setting command without response] sequence
[Setting command with response] sequence
[Request] sequence
[Continuous request] sequence
[Error] sequence

The setting sequence can be selected to have a response or not.
The sample sequences shown below generally assume that the block from the computer comprises the ID of the sound level meter.

[Check other station] sequence

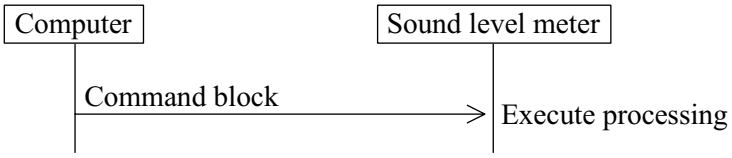
An acknowledge block is returned in response to the [check other station] block. This is an independent sequence. It does not need to come before a command sequence.



[Setting command without response] sequence

This type of command is executed without producing a response. Because it corresponds to an error code request, the processing result (including error) of the last command is retained.
The "RET0" command activates this sequence.

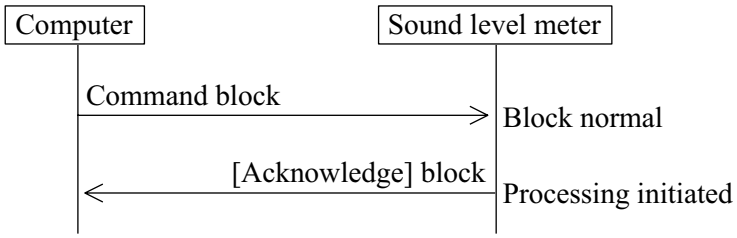
Execute processing



[Setting command with response] sequence

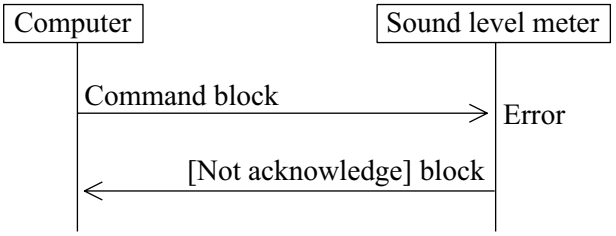
Normal processing

An [acknowledge] response is returned after command processing was initiated. "Initiated" means that for example execution of the "Store" command was started. It does not mean that the store process was completed.



Error processing

When an error has occurred during block or command processing, a [not acknowledge] response is returned.

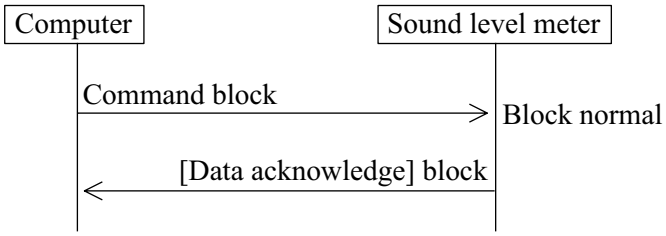


The "RET1" command activates this sequence.

[Request] sequence (1 block)

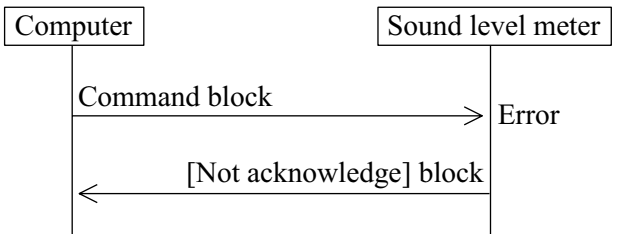
Normal processing

A response is returned immediately to the request command.



Error processing

When an error has occurred during block or command processing, a [not acknowledge] response is returned.



[Request] sequence (multiple blocks)

X parameter flow control

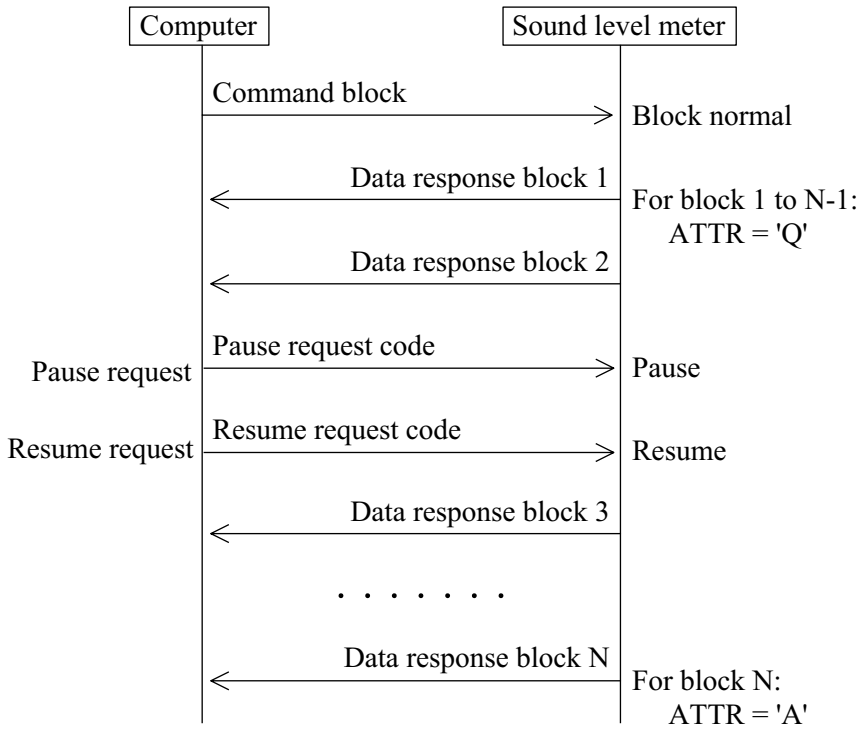
Normal processing

In general, there is no need for returning response codes from the computer. The sound level meter sends blocks continuously.

The computer can send a pause request code to pause the transmission, a resume code to resume the transmission, or a stop code to stop the transmission. The sound level meter disregards any other codes that are received. (Processing is not carried out also after stop.)

When sending a pause or stop code to the sound level meter, wait until the current block has been fully sent. (Do not send a pause or stop code in the middle of a block.)

After the last block has been sent or after stop mode was entered, the sound level meter goes into the idling state.



RTS / CTS flow control

When the computer sets RTS to OFF (CTS at sound level meter becomes OFF), sending is interrupted immediately.

Because RTS / CTS control is hardware control, sending can be interrupted also midway in a block.

Sending is not resumed until the computer sets RTS to ON (sound level meter CTS becomes ON).

Continuous request sequence

This sequence uses only commands to periodically request measurement data.

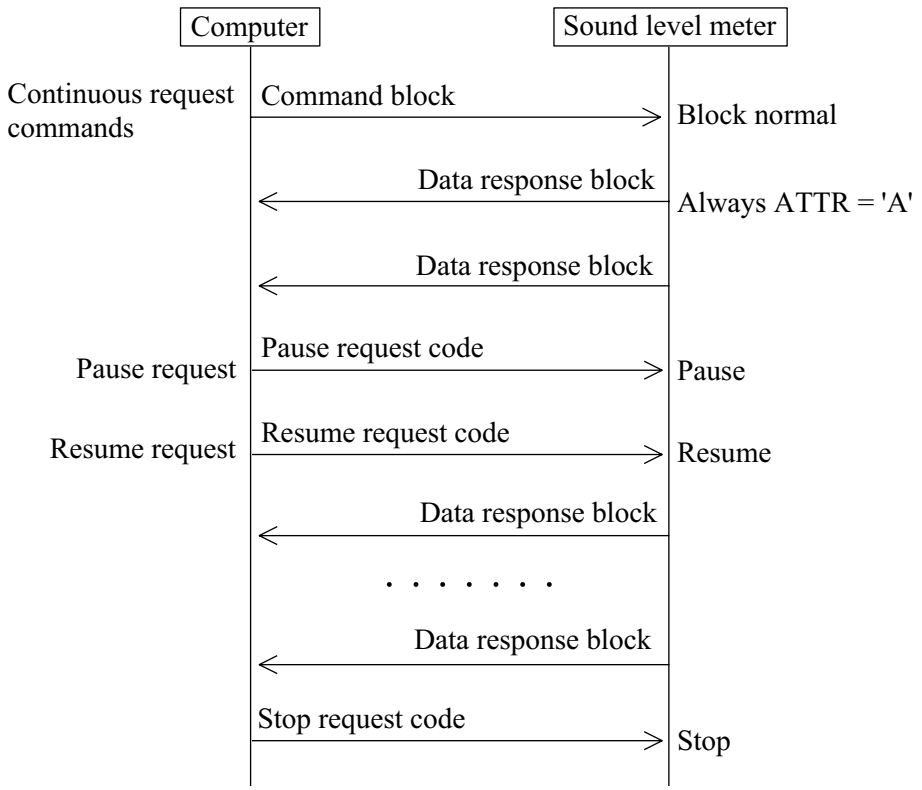
X parameter flow control

In general, there is no need for returning response codes from the computer. The sound level meter sends blocks periodically.

The computer can send a pause request code to pause the transmission, a resume code to resume the transmission, or a stop code to stop the transmission. The sound level meter disregards any other codes that are received. (Processing is not carried out also after stop.)

When sending a pause or stop code to the sound level meter, wait until the current block has been fully sent. (Do not send a pause or stop code in the middle of a block.)

After the stop mode was entered, the sound level meter goes into the idling state.



RTS / CTS flow control

When the computer sets RTS to OFF (CTS at sound level meter becomes OFF), sending is interrupted immediately.

Because RTS / CTS control is hardware control, sending can be interrupted also midway in a block.

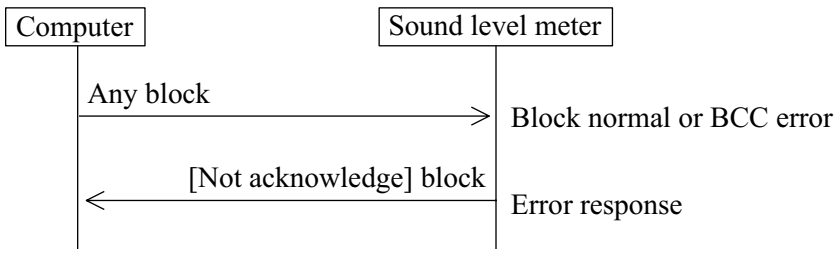
Sending is not resumed until the computer sets RTS to ON (sound level meter CTS becomes ON).

While interrupted, periodic data do not accumulate, but are overwritten.

Error response

When an error has occurred at the block level, the following error sequence occurs.

After an error response, the unit returns to the idling state and does not continue to send multiple blocks etc.



Communication Cutoff

Power Save Mode

When power save mode is enabled, the unit enters the sleep state after the current block has been sent. In the sleep state, the sound level meter does not send or accept commands.

Power Off

During power off processing, communication is terminated after the current block was sent.

Auto Shutdown

Same as power off.

Rated Values

Guaranteed Values

Case	Rated Values	Remarks
Sound level meter response time	Max. 3 s	Processing timeout error response if due to processing reasons
Send character interval	Max. 100 ms	—
Time interval from end of sending data until start of idling state	Max. 200 ms	—

Rated Values

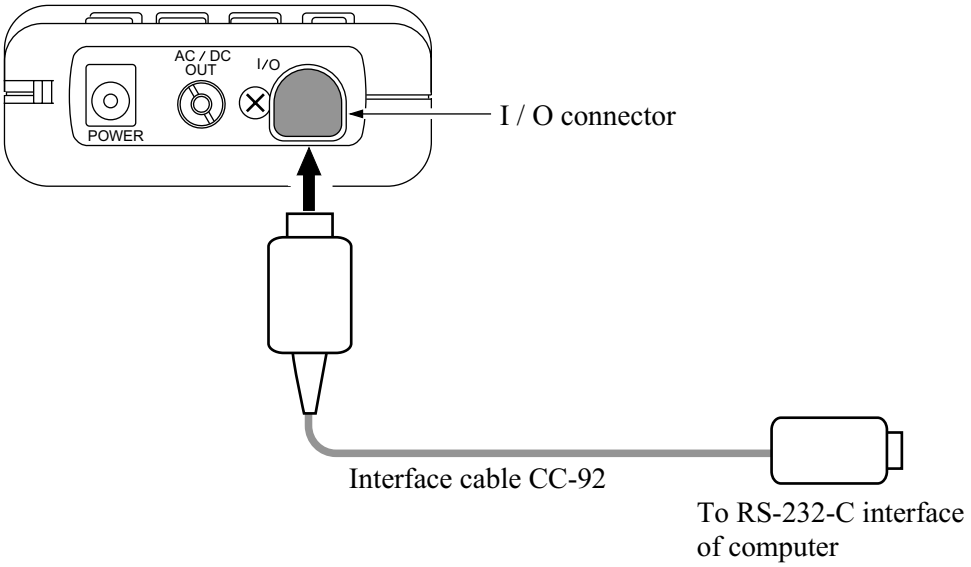
Case	Rated Values	Remarks
Multiple block request sequence ACK wait	10 s	Pause sequence and go into idling state
Send timeout with flow control (except RTS / CTS control)	3 s	Pause sequence and go into idling state
Block generation wait time after receiving <STX>	No limit	—
Receive character interval	No limit	—

Chapter 2 RS-232-C

Contents

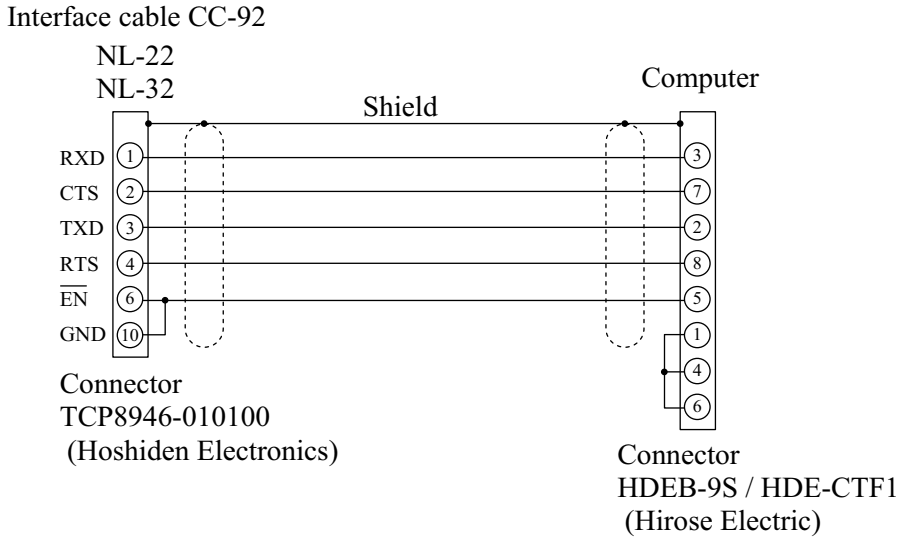
Connection to a Computer

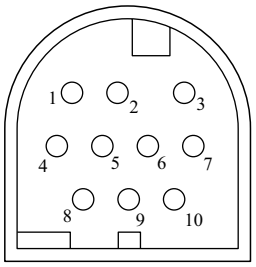
The illustration below shows how to connect the NL-22 / NL-32 to a computer. Use the optional interface cable for this connection.



The CC-92 interface cable uses a 9-pin connector (female). The computer-side connector is a HDE-CTF1 / HDEB-9S (Hirose Electric).

The cable is available as an option.





NL-22, NL-32
I / O connector

Transfer Protocol

Transfer principle:	full duplex
Sync principle:	asynchronous
Baud rate:	4800 / 9600 / 19200 bps
Data word length:	8 bit
Stop bits:	1 bit
Parity check:	none
Flow control:	X parameter or RTS / CTS (selectable)
Maximum block size:	256 bytes
Command flow control:	yes / no (selectable)

Multiple Unit Operation

These specifications also include cases where communication includes several sound level meters of the same type or compatible type. The X parameter and stop request code are received without ID by all units, but during a request sequence, only one unit is supposed to be active and all others are in the idling state, so that processing is carried out normally only by one unit.

When multiple units are connected, observe the following points.

- Do not broadcast request commands. These will be disregarded.
- Do not send a request command sequence simultaneously to multiple units. Wait until processing of a request command sequence at one unit has finished before sending other request commands.

Chapter 3 USB

Contents

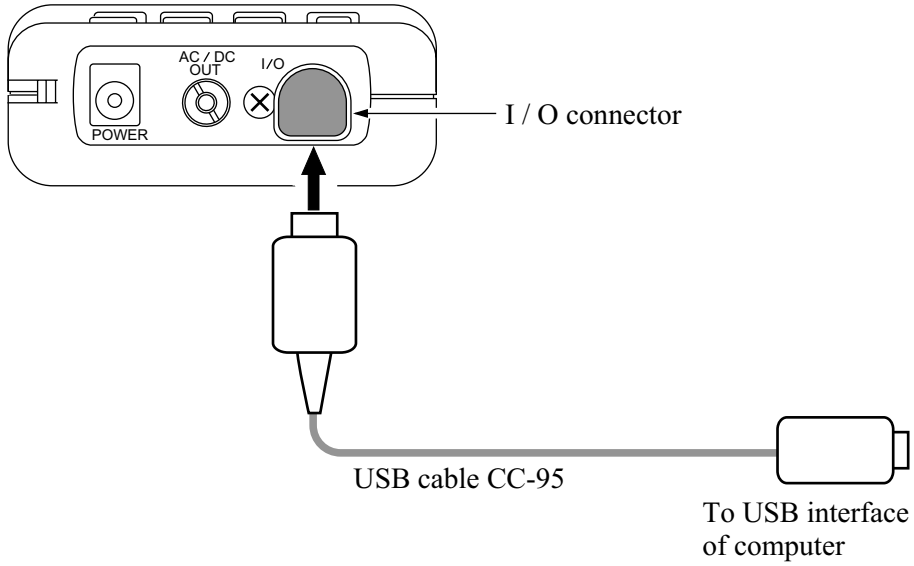
USB

This unit can use a USB connection for operation control and transfer of data. To use the USB interface, the dedicated cable CC-95 is required, and a driver must be installed on the computer.

The command exchange uses ActiveX, and ActiveX must therefore also be installed. All necessary files are contained on the floppy disk supplied with the CC-95. Installation procedures are explained in this manual. The use of multiple USB devices at the same time is not supported.

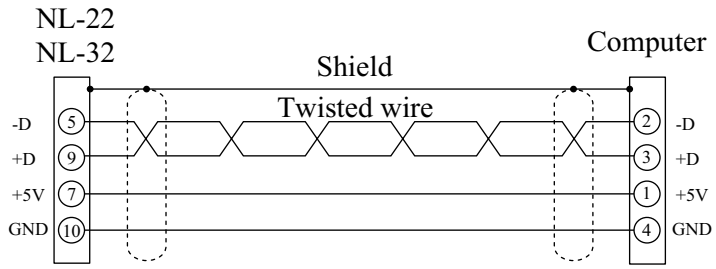
Connection to a Computer

Connect the I / O port on the bottom of the unit to the USB interface of the computer, using the optional USB cable.



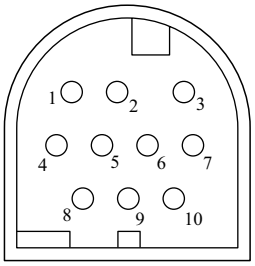
The required USB cable is the CC-95, optional. Drivers and all other required software files are supplied with the USB cable.

USB cable CC-95



Connector
TCP8946-010100
(Hoshiden Electronics)

Connector
CMP1400 (Hoshiden Electronics)
(or Equivalent connector)



NL-22, NL-32
I / O connector

Operating Environment

Supported hardware

- IBM PC compatible computer with USB interface

Supported operating systems

- Microsoft Windows 98 Second Edition
- Microsoft Windows 2000
- Microsoft Windows Me

Note
The explanation of the installation procedure assumes that the device driver has been installed from the floppy disk.

Installing the USB Driver

Before starting

The setup procedure differs, depending on the operating system. In each case, power to the sound level meter must be ON.

When using Windows 98

Setup
Setup on the computer (for Windows 98)
↓
Connection check (for Windows 98)

Deleting setup information
Uninstalling (for Windows 98)

When using Windows 2000

Setup
Setup on the computer (for Windows 2000)
↓
Connection check (for Windows 2000)

Deleting setup information
Uninstalling (for Windows 2000)

When using Windows Me

Setup
Setup on the computer (for Windows Me)
↓
Connection check (for Windows Me)

Deleting setup information
Uninstalling (for Windows Me)

Installation procedure

The install procedure of Windows Me and Windows 2000 is same as Windows 98 procedure.

For Windows 98

1. Connect the USB cable from the NL-22 / NL-32 to the USB connector of the computer. After a while, the "Add New Hardware Wizard" dialog box appears. Click on "Next".

2. Click on "Search for the best driver for your device. (Recommended)", and click on "Next".

3. Insert the floppy disk with the driver into the computer, click on "Specify a location (L)" to place a check mark in the box, and enter "A:\". Then click on "Next".

4. When the driver file has been found, the dialog box shown below appears. Click on "Next".

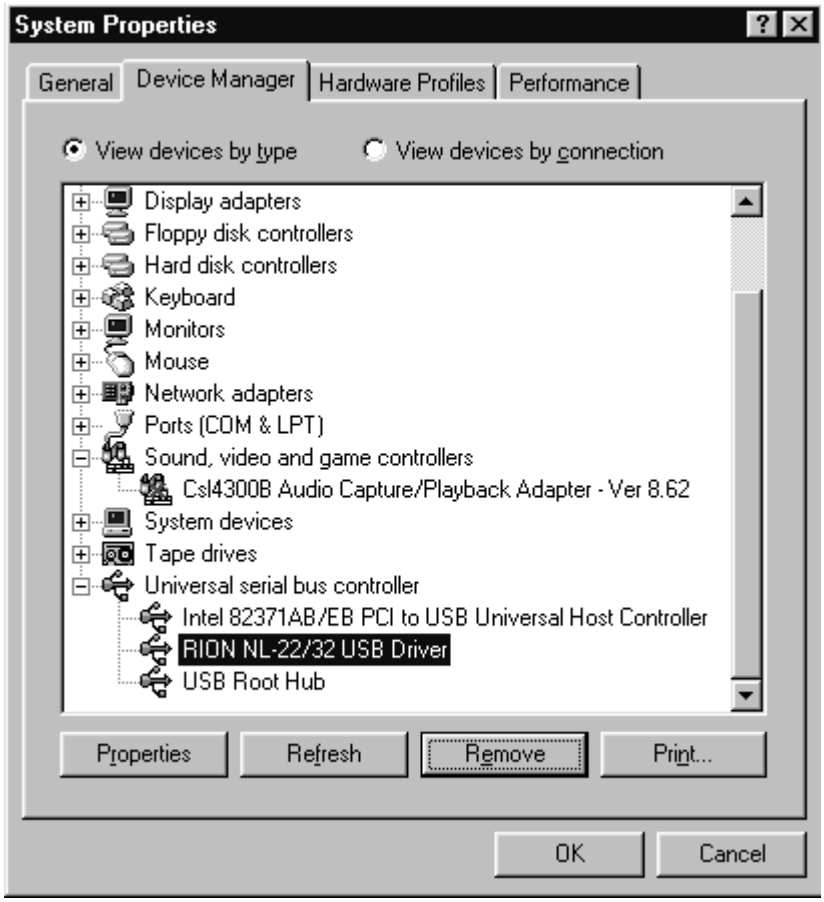
5. The installation of the driver is now complete. Click on "Finish".

Connection check

For Windows 98

Open the Device Manager.

Verify that the item "RION NL-22 / 32 USB Driver" appears under "Universal Serial Bus Controller".



For Windows 2000

Open the Device Manager.

Verify that the item "RION NL-22 / 32 USB Driver" appears under "USB (Universal Serial Bus)".

For Windows Me

Open the Device Manager.

Verify that the item "RION NL-22 / 32 USB Driver" appears under "Universal Serial Bus Controller".

Uninstalling

For Windows 98

Connect the NL-22 / 32 USB cable to the computer.

Open the Device Manager.

Select "RION NL-22 / 32 USB Driver" and click on "Remove".

For Windows 2000

Connect the NL-22 / 32 USB cable to the computer.

Open the Device Manager.

Select "RION NL-22 / 32 USB Driver" and click on "Remove".

For Windows Me

Connect the NL-22 / 32 USB cable to the computer.

Open the Device Manager.

Select "RION NL-22 / 32 USB Driver" and click on "Remove".

ActiveX Control

Installing and uninstalling ActiveX control

Installing

Double-click (execute) the file Install.bat in the ActiveX folder on the floppy disk supplied with the CC-95.

Uninstalling

Double-click (execute) the file UnInstall.bat in the ActiveX folder on the floppy disk supplied with the CC-95.

Module names

- Product name: RION NL-22 / 32 USB Component
- File name: RionUsbNL22.ocx
- Object name: UsbControl

Interface table

Properties

ReceiveMode:	Set receive event mode
ID:	Set ID
Attribute:	Set attribute
Data:	Receive data
Data1:	DRD d1 receive data
Data2:	DRD d2 receive data
Data3:	DRD d3 receive data
Data4:	DRD d4 receive data
Data5:	DRD d5 receive data
DataOver:	DRD overrun information
DataUnder:	DRD underrun information
ErrorStatus:	Receive status

Method

Reset:	Reset this control
Send:	Send data

Events

OnReceive:	Indicate data receive event
OnDRDReceive:	Indicate DRD data receive event
OnReceiveDataError:	Indicate receive error event

Properties explanation

Receive Mode

Function: Set receive event mode

Format: [form.]UsbControl.Receive [= ReceiveMode]

Setting value: ReceiveMode sets the following values.

0: Data receive event mode

1: DRD receive event mode

ID

Function: Set ID

Format: [form.]UsbControl.ID [= ID]

Setting value: Setting range for ID is 0 to 255

Attribute

Function: Set attribute for receive data

Format: [form.]UsbControl.Attribute [= Attribute]

Setting value: Receive data attribute

Data

Function: Set receive data

Format: [form.]UsbControl.Data [= Data]

Setting value: Response data part in receive data only

Data1

Function: Set d1 of DRD receive data

Format: [form.]UsbControl.Data1 [= Data1]

Setting value: d1 part of DRD receive data

Data2

Function: Set d2 of DRD receive data

Format: [form.]UsbControl.Data2 [= Data2]

Setting value: d2 part of DRD receive data

Data3

Function: Set d3 of DRD receive data
Format: [form.]UsbControl.Data3 [= Data3]
Setting value: d3 part of DRD receive data

Data4

Function: Set d4 of DRD receive data
Format: [form.]UsbControl.Data4 [= Data4]
Setting value: d4 part of DRD receive data

Data5

Function: Set d5 of DRD receive data
Format: [form.]UsbControl.Data5 [= Data5]
Setting value: d5 part of DRD receive data

DataOver

Function: Set overrun information of DRD receive data
Format: [form.]UsbControl.DataOver [= DataOver]
Setting value: Data overrun information of DRD receive data

DataUnder

Function: Set underrun information of DRD receive data
Format: [form.]UsbControl.DataUnder [= DataUnder]
Setting value: Data underrun information of DRD receive data

The default value for Data1 to Data5 is 0. If there are no normal value data for 0.0 to 200.0, 999.9 is set. If analysis is not possible, 888.8 is set.

ErrorStatus

Function: Set status information for receive data

Format: [form.]UsbControl.ErrorStatus [= ErrorStatus]

Setting value: One of the following values is set in ErrorStatus.

NO_ERROR:	No error has occurred.
DRD_ANALYSIS_ERROR:	DRD analysis failed.
NO RETURN:	No data were returned for 3 seconds after command was received.

Method explanation

Reset

Function: Initialize this control

Format: [Val=][form.]UsbControl.Reset

Argument: None

Return value: 0 = Not completed
1 = Reset completed successfully
2 = Reset failed

Send

Function: Send a command

Format: [form.]UsbControl.Send

Argument: Attribute + command + parameter

Return value: None

Event explanation

OnReceive

Function: When data receive event generation mode is set in data receive mode properties, receiving data triggers this event. Data indicates receive data, and ErrorStatus indicates error status.
When data are received, the following information is given.
NO_ERROR: No error

Format: Sub UsbControl_OnReceive( )

Argument: None

OnDRDReceive

Function: When DRD data receive event generation mode is set in data receive mode properties, receiving data triggers this event. Data1 to Data5, DataOver, and DataUnder indicate receive data, and ErrorStatus indicates error status.
When DRD data are received, the following information is given.
NO_ERROR: No error

Format: Sub UsbControl_OnDRDReceive( )

Argument: None

OnReceiveDataError

Function: When DRD data receive event generation mode is set in data receive mode properties, receiving data triggers this event. Data1 to Data5, DataOver, and DataUnder indicate receive data, and ErrorStatus indicates error status.
The error status is indicated as follows.
DRD_ANALYSIS_ERROR: DRD analysis failed
NO_RETURN: No data were returned for 3 seconds after command was received

Format: Sub UsbControl_OnReceiveDataError( )

Argument: None

Constant definition

The following constants are defined for this control as ErrorStatus values.

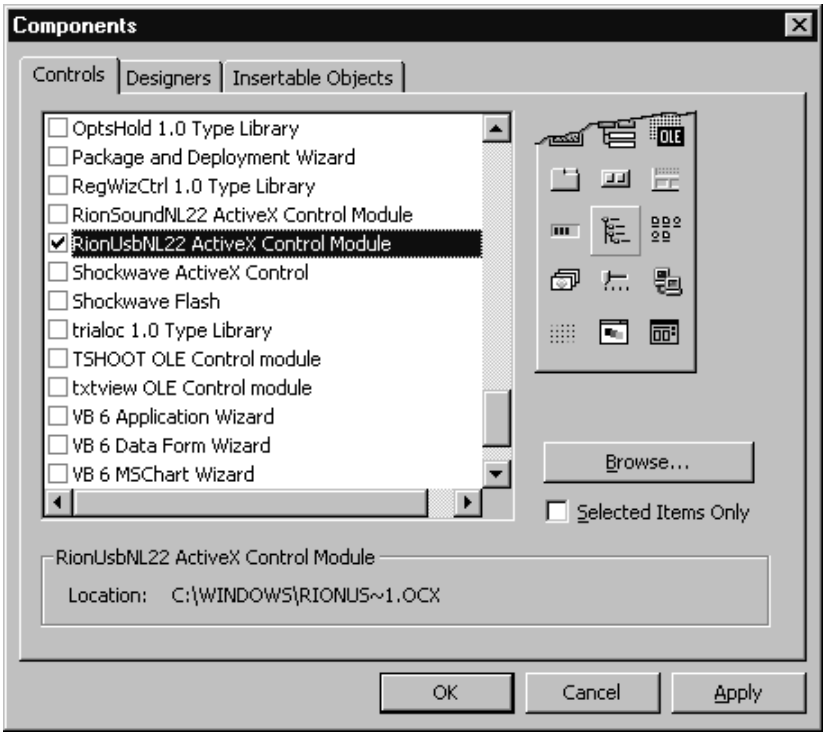
ErrorStatus

0	:	NO_ERROR	: No error has occurred.
-1	:	NO_RETURN	: No data were returned for 3 seconds after command was received.
-2	:	DRD_ANALYSIS_ERROR	: DRD analysis failed.
-3	:	NO_CONNECTED	: The driver is not being installed (NL-22/32 is not connected).
-4	:	OPEN_ERROR	: Driver open error.
-5	:	SEND_ERROR	: Transmitting failed.
-6	:	RECEIVE_ERROR	: Receiving failed.

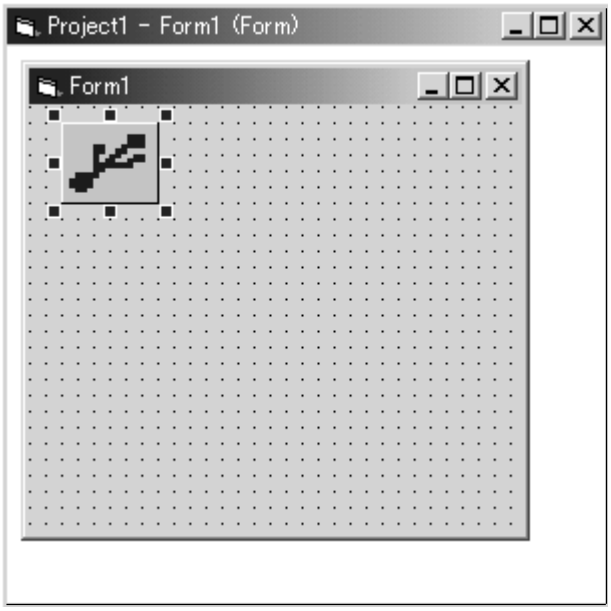
Usage examples

An example for using this control in Visual Basic 6.0 is shown below.

1. From the main menu, select "Project" - "Component" - "RionUsbNL22 ActiveX control module" to add the component.



2. From "Toolbox", select RionUsbNL22, and paste it into the form.



3. Enter the following code in the code input window.

```
Private Sub From_Load( )
    UsbControl1.Reset
End Sub

Private Sub Command1_Click( )
    UsbControl1.Send(Text1.Text)
End Sub

Private Sub UsbControl1_OnReceive( )
    Dim RecData As String

    Label1.Caption = UsbControl1.Data
    Label2.Caption = UsbControl1.ErrorStates
        Label3.Caption = Chr(UsbControl1.Attribute)
End Sub
```

Chapter 4 Commands

Contents

Commands

Command List

Command Format

In this manual, 1 character is represented as "□", a space as "_", parameters as "p1,p2,...", and response data as "d1,d2,...". Parameters and response data may be more than 1 character long.

Commands consists of three letters which are not case-sensitive (upper-case or lower-case can be used).

□□□

When a command has one parameter, the parameter follows the command. It can be appended to the command either directly or with a separating space.

□□□p1 Acceptable
□□□_p1 Acceptable

When a command has several parameters, the parameters must be separated by a space.

□□□p1_p2 Acceptable
□□□p1p2 Not acceptable

Note
One command block can only contain one command. Do not include several commands in a block.

A request command consists of the command, any required parameter, and a "?". The command and "?" or parameter and "?" may be separated by a space.

□□□? Acceptable
□□□_? Acceptable
□□□p1? Acceptable
□□□p1_? Acceptable

Unless specified otherwise, parameters and response data are of variable length. Depending on the value range, the length of the parameter will differ. There is no need for padding with spaces or other measures.

□□□_1	Acceptable
□□□_10	Acceptable
□□□_01	Not acceptable

Command Send Example

To set frequency weighting to "C"

<STX>	01	C	WGT	1	<ETX>	00	<CR><LF>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) Start of transfer data and command

(2) ID number (hexadecimal). The ID number range is 0 to 255. In a command string, this is expressed as 01 (= ID number 1) to FF (= ID number 255).

Note
ID number should be expressed by binary code "01", not by ASCII code "1".

(3) Attribute ("C" for command)

(4) Command

(5) Parameter (corresponds to p1, p2, etc. in command description section of the manual)

(6) Command end

(7) BCC (Entering 00 disables BCC checking for (1) to (6).)

(8) Transfer data end

Command Description

For details on the transfer format, please refer to page 5.

Basic setting and display commands

BER

Set data exclusion (back-erase) function

BER_p1

p1 = 0: Back-erase off

p1 = 1: Back-erase on

Transfer format: Command block

BER?

Get data exclusion (back-erase) function setting

NL-22 / NL-32 response data to BER?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

DPI

Set display of various processing values

DPIp1_p2

p1 = 1:	L_{eq}	p1 = 2:	L_E
p1 = 3:	L_{max}	p1 = 4:	L_{min}
p1 = 5:	L_{N1}	p1 = 6:	L_{N2}
p1 = 7:	L_{N3}	p1 = 8:	L_{N4}
p1 = 9:	L_{N5}	p1 = 10:	L_y (auxiliary processing)
p1 = 11:	List	p1 = 12:	Time-Level
p2 = 0:	Off	p2 = 1:	On

Operation: Sets p1 display to p2. Toggles the On / Off setting on the display menu.

Transfer format: Command block

DPI?

Get display setting for various processing values

NL-22 / NL-32 response data to DPI?

Response data d1,d2,d3,...,dn,...,d12

dn corresponds to pn for the display on/off setting of processing values.

dn = 0: Off (not displayed)

dn = 1: On (displayed)

Transfer format: Response block

DSP

Set type of display data

DSPp1

P1 = 0:	L_p		
p1 = 1:	L_{eq}	p1 = 2:	L_E
p1 = 3:	L_{max}	p1 = 4:	L_{min}
p1 = 5:	L_{N1}	p1 = 6:	L_{N2}
p1 = 7:	L_{N3}	p1 = 8:	L_{N4}
p1 = 9:	L_{N5}	p1 = 10:	L_y (auxiliary processing)
p1 = 11:	List	p1 = 12:	Time-Level

Transfer format: Command block

DSP?

Get currently displayed processing types

NL-22 / NL-32 response data to DSP?

Response data d1

d1 = 1 to 12: Displayed processing types

Transfer format: Response block

LXI

Set percentile level

LXIp1_p2

p1 = 1 to 5: Specify number out of 5

p2 = 1 to 99: Specify percentage

Transfer format: Command block

LXI?

Get percentile level settings

NL-22 / NL-32 response data to LXI?

Response data d1,d2,d3,d4,d5: Percentage for five settings

d1 to d5: Corresponds to p2

Transfer format: Response block

LYY

Set auxiliary processing type

LYYp1

p1 = 0:	L_{Ceq}	p1 = 1:	L_{Cpeak}
p1 = 2:	L_{peak}	p1 = 3:	L_{AI}
p1 = 4	L_{AIeq}	p1 = 5:	L_{Atm5}

Transfer format: Command block

LYY?

Get auxiliary processing type

NL-22 / NL-32 response data to LYY?

Response data d1

d1 = 0 to 5: Auxiliary processing type

Transfer format: Response block

MTI

Set measurement time

MTIp1

p1 = 0	Arbitrary	p1 = 1 to 3:	Not accepted
p1 = 4:	10 sec	p1 = 5:	1 min
p1 = 6:	5 min	p1 = 7:	10 min
p1 = 8:	15 min	p1 = 9:	30 min
p1 = 10:	1 hour	p1 = 11:	8 hour
p1 = 12	24 hour		

Transfer format: Command block

MTI?

Get measurement time setting

NL-22 / NL-32 response data to MTI?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

RNG

Set level range

RNGp1

p1 = 7:	*(10 to 70 dB)	p1 = 8:	20 to 80 dB
p1 = 9:	20 to 90 dB	p1 = 10:	20 to 100 dB
p1 = 11:	20 to 110 dB	p1 = 12:	30 to 120 dB
p1 = 13:	40 to 130 dB		

* is valid only if filter (1 / 1 oct, 1 / 3 oct, Univ.) is set to On.

Transfer format: Command block

RNG?

Get level range setting

NL-22 / NL-32 response to RNG?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

TMC

Set time weighting for main processing

TMCp1

p1 = 0: Fast

p1 = 1: Slow

Transfer format: Command block

TMC?

Get time weighting setting

NL-22 / NL-32 response data to TMC?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

WGT

Set frequency weighting

WGTp1

p1 = 0: A weighting

p1 = 1: C weighting

p1 = 2: FLAT response

Transfer format: Command block

WGT?

Get frequency weighting setting

NL-22 / NL-32 response data to WGT?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

Operation commands

PSE

Pause / restart measurement and memory store

PSEp1

p1 = 0: Restart measurement or memory store

p1 = 1: Pause measurement or memory store

Transfer format: Command block

PSE?

Get measurement and memory store pause status

NL-22 / NL-32 response data to PSE?

Response data d1

d1: 1 if paused, otherwise 0

Transfer format: Response block

SRT

Start / stop measurement

SRTp1

p1 = 0: Stop measurement

p1 = 1: Start measurement

Transfer format: Command block

SRT?

Get measurement running status

NL-22 / NL-32 response data to SRT?

Response data d1

d1: 1 if measurement in progress, otherwise 0

Transfer format: Response block

STO

Start memory store

STOp1

When manual store is selected

p1 = 1: Execute store (data number incremented by 1)

When Auto1 or Auto2 store is selected

p1 = 1: Start store

(Use SRT0 to end.)

Transfer format: Command block

STO?

Get memory store running status

NL-22 / NL-32 response data to STO?

Response data d1

d1 = 0: Memory store not in progress

d1 = 1: Memory store in progress

Transfer format: Response block

Memory and store commands

ADR

Set address

Valid only in manual store mode. During recall, the command sets the address corresponding to the store mode.

Address setting

ADRp1

p1 = Any address

Transfer format: Command block

ADR?

Get address setting

NL-22 / NL-32 response data to ADR?

Response data d1

d1: Currently selected address number (displayed address)

Transfer format: Response block

CDR?

Get remaining card capacity

NL-22 / NL-32 response data to CDR?

Response data d1

d1: Card capacity in kByte

Transfer format: Response block

CDV?

Verify whether card is inserted

NL-22 / NL-32 response data to CDV?

Response data d1

d1 = 0: Card not inserted

d1 = 1: Card inserted

Transfer format: Response block

FMT

Delete all files from memory card

No parameter

Transfer format: Command block

MDC

Delete manual data from internal memory

No parameter

Transfer format: Command block

PLP

Set Auto 1 store cycle

PLPp1

p1 = 1:	Not accepted		
p1 = 2:	100 ms	p1 = 3:	200 ms
p1 = 4:	1 sec	p1 = 5:	$L_{eq,\ 1sec}$

Transfer format: Command block

PLP?

Get store cycle setting

NL-22 / NL-32 response data to PLP?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

RCL

Activate recall state

This command immediately calls up the recall screen. The displayed address is the address that was selected when the recall screen was last terminated.

RCLp1_p2

p1 = 0: Cancel recall mode

p1 = 1: Activate recall mode

p2: File name

(Example: AU1_0001; where "AU" is in capitals)

When p1 = 0 or internal manual recall is activated, p2 is disregarded.

- To cancel the recall mode, use RCL0_X (where X is 0000).
- Also for internal manual recall, enter 0000 for p2.

For internal manual data recall, MANUAL is returned. For other card recall, the store name is returned.

Transfer format: Command block

RCL?

Get recall state

NL-22 / NL-32 response data to RCL?

Response data d1

d1=0: Not recall state

d1=1: Recall state

Transfer format: Response block

SMD

Set memory store format (Manu, Auto1, Auto2)

SMDp1

p1 = 0:	Manual	p1 = 1:	Auto 1
p1 = 2:	Auto 2	p1 = 3:	Timer Auto 1
p1 = 4:	Timer Auto 2		

Transfer format: Command block

SMD?

Get memory store setting

NL-22 / NL-32 response data to SMD?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

SNR?

Get store name shown on recall menu

- No parameter

  Example: AU1_0001

- Return data format

  When there are two or more store data, the names are returned as separate blocks.

When card recall is used and there are no store data, the string "NO FILE NAME" is returned.

Transfer format: Response block

SNS

Set store name

The store mode setting is made with the SMD command.

SNSp1

p1 = 0000 to 9999

Takes a 4-digit integer. If a string other than a 4-digit integer is specified, an error (0002) is returned.

If the same store name already exists on the card, an error (0004) is returned (the setting is effective).

Transfer format: Command block

SNS?

Get store name

SNS?

d1 = p1

Example: 0010 ("0010" part of "AU1_0010")

Transfer format: Response block

TMT

Set timer mode time

TMTp1_p2_p3_p4_p5_p6_p7_p8_p9

p1:	Start month	p2:	Start day
p3:	Start hours	p4:	Start minutes
p5:	End month	p6:	End day
p7:	End hours	p8:	End minutes
p9:	Interval time		
	p9 = 0: Off	1: 5 min	2: 10 min
	3: 15 min	4: 30 min	5: 1 hour

Transfer format: Command block

TMT?

Get timer mode time setting

NL-22 / NL-32 response data to TMT?

Response data d1,d2,d3,d4,d5,d6,d7,d8,d9

d1 to d9: Correspond to p1 to p9

Transfer format: Response block

Calibration commands

CAL

Activate calibration mode

CALp1

p1 = 0: Cancel calibration mode

p1 = 1: Internal calibration mode

p1 = 2: External calibration mode

Transfer format: Command block

CAL?

Get calibration status

NL-22 / NL-32 response data to CAL?

Response data d1

d1: Corresponds to p1

d1 = 1: Internal calibration mode

d1 = 2: External calibration mode

d1 = 0: Other mode

Transfer format: Response block

CBM

Perform adjustment with Cal control

CBMp1

p1 = 0: Reduce level setting

p1 = 1: Increase level setting

Transfer format: Command block

CBM?

Get Cal control level setting

NL-22 / NL-32 response data to CBM?

Response data d1

p1 = 118 to 670 (irregular steps)

Transfer format: Response block

Various setting and information commands

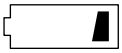
BAT?

Get battery status

NL-22 / NL-32 response data to BAT?

Response data d1

d1 = 0: Battery indicator flashing

d1 = 1:  d1 = 2: 

d1 = 3:  d1 = 4: 

Transfer format: Response block

BLA

Set backlight auto turn-off function

BLAp1

p1 = 0: Disable

p1 = 1: Enable

Transfer format: Command block

BLA?

Get backlight auto turn-off setting

NL-22 / NL-32 response data to BLA?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

CLK

Set current year, month, day, hours, minutes

CLKp1_p2_p3_p4_p5_p6

p1:	4-digit year	p2:	month
p3:	day	p4:	hours
p5:	minutes	p6:	seconds

1 can also be specified as 01.

Transfer format: Command block

CLK?

Get year, month, day, hours, minutes setting

NL-22 / NL-32 response data to CLK?

Response data d1,d2,d3,d4,d5,d6

d1 to d6: Correspond to p1 to p6

1 is returned as 01.

Transfer format: Response block

CMP

Set comparator level

CMPp1

p1: 0 or 30 to 130 in 1-dB steps

0 means that comparator is disabled.

Transfer format: Command block

CMP?

Get comparator level

NL-22 / NL-32 response data to CMP?

Response data d1

d1: Corresponds to p1 (comparator level setting)

Transfer format: Response block

DCL

Initialize unit (reset to factory defaults)

- Clock is not reset.
- Contents of manual store memory are not cleared.
- Option function setting is not changed.
- No parameter

Transfer format: Command block

LTI?

Get elapsed time since start of measurement or memory store

NL-22 / NL-32 response data to LTI?

Response data d1,d2,d3

d1: Hours

d2: Minutes

d3: Seconds

Maximum: 200:00:00

Transfer format: Response block

OUT

Set NL-22 / NL-32 output signal output to AC or DC

OUTp1

p1 = 0: AC OUT

p1 = 1: DC OUT

Transfer format: Command block

OUT?

Get AC / DC output setting

NL-22 / NL-32 response data to OUT?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

VER?

Get version information

NL-22 / NL-32 response data to VER?

Response data d1,d2

d1: Sound level meter model

Example: NL-22

d2: Software version

Example: 1.00

Transfer format: Response block

Filter commands

OPT

Set optional function

OPTp1

p1 = 0: No optional functions

p1 = 1: 1 / 1 octave filter

p1 = 2: 1 / 3 octave filter

p1 = 3: Universal filter

Transfer format: Command block

OPT?

Get optional function setting

NL-22 / NL-32 response data to OPT?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

FLB

Set center frequency of 1 / 1 octave and 1 / 3 octave filter

This command is only accepted when bandpass filter option is enabled.

FLBp1

1 / 1 octave filter

p1 = 0:	All-pass (no filtering)		
p1 = 1:	16 Hz	p1 = 2:	31.5 Hz
p1 = 3:	63 Hz	p1 = 4:	125 Hz
p1 = 5:	250 Hz	p1 = 6:	500 Hz
p1 = 7:	1 kHz	p1 = 8:	2 kHz
p1 = 9:	4 kHz	p1 = 10:	8 kHz

1 / 3 octave filter

p1 = 0:	All-pass (no filtering)		
p1 = 1:	Not accepted	p1 = 2:	12.5 Hz
p1 = 3:	16 Hz	p1 = 4:	20 Hz
p1 = 5:	25 Hz	p1 = 6:	31.5 Hz
p1 = 7:	40 Hz	p1 = 8:	50 Hz
p1 = 9:	63 Hz	p1 = 10:	80 Hz
p1 = 11:	100 Hz	p1 = 12:	125 Hz
p1 = 13:	160 Hz	p1 = 14:	200 Hz
p1 = 15:	250 Hz	p1 = 16:	315 Hz
p1 = 17:	400 Hz	p1 = 18:	500 Hz
p1 = 19:	630 Hz	p1 = 20:	800 Hz
p1 = 21:	1 kHz	p1 = 22:	1.25 kHz
p1 = 23:	1.6 kHz	p1 = 24:	2 kHz
p1 = 25:	2.5 kHz	p1 = 26:	3.15 kHz
p1 = 27:	4 kHz	p1 = 28:	5 kHz
p1 = 29:	6.3 kHz	p1 = 30:	8 kHz
p1 = 31:	10 kHz	p1 = 32:	12.5 kHz
p1 = 33:	16 kHz		

Transfer format: Command block

FLB?

Get octave filter setting

Response data d1

d1: Corresponds to p1

Transfer format: Response block

FLU

Set frequencies for universal filter

This command is only accepted when bandpass filter option is enabled.

p1 is lower limit frequency, p2 is upper limit frequency.

FULp1,p2

p1 = 0:	None	p1 = 1:	10 Hz
p1 = 2:	12.5 Hz	p1 = 3:	16 Hz
p1 = 4:	20 Hz	p1 = 5:	25 Hz
p1 = 6:	31.5 Hz	p1 = 7:	40 Hz
p1 = 8:	50 Hz	p1 = 9:	63 Hz
p1 = 10:	80 Hz	p1 = 11:	100 Hz
p1 = 12:	125 Hz	p1 = 13:	160 Hz
p1 = 14:	200 Hz	p1 = 15:	250 Hz
p1 = 16:	315 Hz	p1 = 17:	400 Hz
p1 = 18:	500 Hz	p1 = 19:	630 Hz
p1 = 20:	800 Hz	p1 = 21:	1 kHz
p1 = 22:	1.25 kHz	p1 = 23:	1.6 kHz
p1 = 24:	2 kHz	p1 = 25:	2.5 kHz
p1 = 26:	3.15 kHz	p1 = 27:	4 kHz
p1 = 28:	5 kHz	p1 = 29:	6.3 kHz
p1 = 30:	8 kHz	p1 = 31:	10 kHz
p1 = 32:	12.5 kHz		

Transfer format: Command block

FLU?

Get universal filter setting

NL-22 / NL-32 response data to FLU?

Response data d1,d2

d1,d2: Correspond to p1,p2

Transfer format: Response block

Measurement data retrieve commands

DOD?

Get level value shown on display

DODp1?

p1 omitted: Get data shown on screen

p1 = 0:	L_p (sound level)	p1 = 1:	L_{eq}
p1 = 2:	L_E	p1 = 3:	L_{max}
p1 = 4:	L_{min}	p1 = 5:	L_{N1}
p1 = 6:	L_{N2}	p1 = 7:	L_{N3}
p1 = 8:	L_{N4}	p1 = 9:	L_{N5}

p1 = 10: L_y (selected auxiliary processing value)

Response data d1,d2,d3

d1: Level value

d2: Over-range information (yes: 1, no: 0)

d3: Under-range information (yes: 1, no: 0)

Transfer format: Response block

DOR?

Get data stored in memory

DORp1?

1 to 100 when stored in manual mode (not significant)

When Auto 1: 1 to 7200000 (specifying the number of requested data)

When Auto 2: 1 to 99999 (specifying the number of requested data)

When manual store

d1,d2 ... d16

d1: L_p

d2: Sound level over-range information (yes: 1, no: 0)

d3: Sound level under-range information (yes: 1, no: 0)

d4:	L_{eq}	d5:	L_E
d6:	L_{max}	d7:	L_{min}
d8:	L_{N1}	d9:	L_{N2}
d10:	L_{N3}	d11:	L_{N4}

d12: L_{N5}

d13: L_y (0.0 if no data)

d14: Processing over-range information (yes: 1, no: 0)
d15: Processing under-range information (yes: 1, no: 0)
d16: Processing pause information (yes: 1, no: 0)

Auto 1 store
d1,d2,d3,d4
d1: Level value
d2: Over-range information (yes: 1, no: 0)
d3: Under-range information (yes: 1, no: 0)
d4: Pause information (yes: 1, no: 0)

DORp1? additional info
Auto1 store mode
In Auto1 store mode, a maximum of 22 data are sent in one response block. For example, when DOR23? is sent from the computer, the response data will look as shown in the example below. The data for one address contain the d1 sound level (fixed to 5 bytes; padded with a space if there is no 100 dB digit), followed by one byte each for d2, d3, and d4. Data are delimited by 1-byte commas. Therefore the total length of one address is 11 bytes (fixed). Data for the next address follow without delimiter.

<STX><SOH>Q_41.5,0,0,0_40.2,0,0,0_39.4,0,0,0_38.5,0,0,0_37.2,0,0,0_37.3,0,0,0_3
7.7,0,0,0_45.9,0,0,0・・・

d1 d2 d3 d4 d1

・・・55.9,0,0,0_75.7,0,0,0108.0,0,0,_・・・・・・
・・・・・_47.6,0,0,0<EXT>Y<CR><LF>
<STX><SOH>A_44.4,0,0,0<EXT>f<CR><LF>

Auto 2 store

d1,d2, ... d17

d1: Data number (1 to 99999)

d2: Measurement start date (4-digit year/month/day)

d3: Measurement start time (hours:minutes:seconds)

d4: Measurement time (hours:minutes:seconds)

d5: L_{eq} d6: L_{E}

d7: L_{max} d8: L_{min}

d9: L_{N1} d10: L_{N2}

d11: L_{N3} d12: L_{N4}

d13: L_{N5}

d14: L_{y} (0.0 if no data)

d15: Processing over-range information (yes: 1, no: 0)

d16: Processing under-range information (yes: 1, no: 0)

d17: Processing pause information (yes: 1, no: 0)

Transfer format: Response block

DRD?

Set continuous output of sound level or short-term value L_{eq}

DRDp1?

p1 = 1: 100 msec p1 = 2: 200 msec

p1 = 3: 1 sec p1 = 4: $L_{eq,\ 1\ sec}$

p1 = 5: 100 msec (L_p, L_{eq}, L_{max}, L_{min}, L_y)

Response data format

For response data p1 = 1 to 4

d1,d2,d3

d1: XXX.X (level value)

d2: Over-range information (yes: 1, no: 0)

d3: Under-range information (yes: 1, no: 0)

For response data p1 = 5

d1,d2,d3,d4,d5,d6,d7

d1: XXX.X L_p value (instantaneous value)

d2: XXX.X L_{eq} for 100 msec interval

d3: XXX.X L_{max} for 100 msec interval

d4: XXX.X L_{min} for 100 msec interval

d5: XXX.X auxiliary processing value for 100 msec interval ("-.-" if not selected)

d6: Over-range information (yes: 1, no: 0)

d7: Under-range information (yes: 1, no: 0)

Transfer format: Response block

When auxiliary processing is set to "On" on the menu screen, one of the following processing values is output, depending on the selected processing type.

LCeq: LCeq for every 100 msec ("-.-" if C weighting is selected for main processing)

Lpeak: Lpeak for every 100 msec

LCpeak: LCpeak for every 100 msec

LAtm5: LAmax for every 100 msec ("-.-" if setting other than A weighting is selected for main processing)

LAI: LAI for every 100 msec ("-.-" if setting other than A weighting is selected for main processing)

LAIeq: LAIeq for every 100 ms ("-.-" if setting other than A weighting is selected for main processing)

Important
Do not use the DRD command during Auto store. While data are being sent with the DRD command, the interval between sending commands must be at least 1 second.

Communication control commands

BRT

Set baud rate

BRTp1

p1 = 2: 4800 bps

p1 = 3: 9600 bps

p1 = 4: 19200 bps

The baud rate setting is changed after a confirmation response.

Transfer format: Command block

EST?

Get error information

NL-22 / NL-32 response data to EST?

Response data d1

d1: Error processing or command processing error (see page 9)

Recorded 4-digit error code

Transfer format: Response block

IDX

Set index number

IDXp1

p1 = 1 to 255, default: 1

Transfer format: Command block

IDX?

Get index number

NL-22 / NL-32 response data to IDX?

Response data d1

d1 = Corresponds to p1 (selected index number)

Transfer format: Response block

RET

Set response processing for commands to On or Off

RETp1

p1 = 0: Disable response processing

p1 = 1: Enable response processing

Transfer format: Command block

RET?

Get response processing setting

NL-22 / NL-32 response data to RET?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

RMT

Set remote / local mode

RMTp1

p1 = 0: Set to local mode

p1 = 1: Set to remote mode

Transfer format: Command block

RMT?

Get remote / local mode setting

NL-22 / NL-32 response data to RMT?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

XON

Select control mode

XONp1

p1 = 0: Use RTS / CTS control (no X parameter control)

p1 = 1: Use X parameter control
(no RTS / X parameter control)

Transfer format: Command block

XON?

Get control mode setting

NL-22 / NL-32 response data to XON?

Response data d1

d1: Corresponds to p1

Transfer format: Response block

Examples for Control Via External Commands

This section contains several examples for controlling operation of the sound level meter via commands. Some initial steps are common to all operations:

- Check baud rate setting
- Check index number
- Enable or disable response sequence (with RET command)
- Select X parameter or RTS / CTS control (with XON command)

To check whether a setting was made properly, using a request command after sending a setting command is recommended.

Example: Get sound pressure level (sound exposure level)

(Measured with frequency weighting "FLAT", dynamic characteristics "Fast", level range "20 to 110 dB")

Power ON

Settings
- WGT2 (FLAT characteristics)
- TMC0 (Fast)
- RNG11 (20 to 110 dB)

Establish above settings to prepare sound level meter for measurement

DOD? (Get display value)

Example: Get sound pressure level (continuous)

(Measured with frequency weighting "A", dynamic characteristics "Slow", level range "40 to 130 dB")

Power ON

↓

Settings
- WGT0 (A characteristics)
- TMC1 (Slow)
- RNG13 (40 to 130 dB)

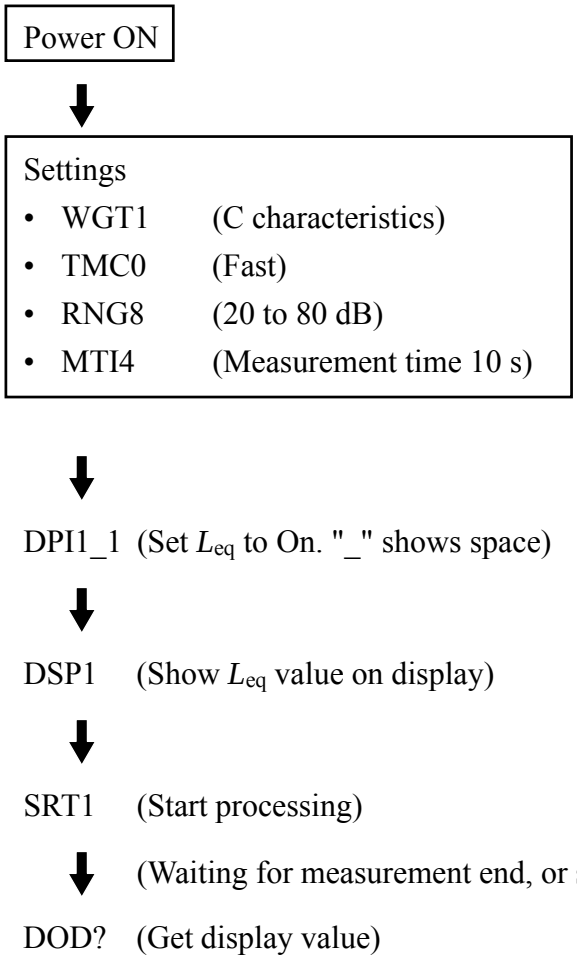
Establish above settings to prepare sound level meter for measurement

↓ (For continuous output at 100 ms intervals)

DRD1? (Stop with <SUB>)

Example: L_{eq} measurement (sound exposure level)

(Measured with frequency weighting "C", dynamic characteristics "Fast", level range "20 to 80 dB", measurement time "10 s")



Manual store example

(Measured with frequency weighting "A", dynamic characteristics "Slow", file name "MAN_0001" [when storing on memory card], processing time "10 s", level range "20 to 100 dB")

Power ON

Settings

- WGT0 (A characteristics)
- TMC1 (Slow)
- RNG10 (20 to 100 dB)
- MTI4 (Measurement time 10 s)
- SMD0 (Store mode manual)
- SNS0001 (File name setting; not needed when storing in internal memory)

Establish above settings to prepare sound level meter for manual store operation

SRT1 (Start processing)

(Measurement end, or stopped by SRT0)

STO1 (Perform store operation. Data are stored and address is incremented by one.)

Auto 1 store example

(Measured with frequency weighting "C", dynamic characteristics "Fast", file name "AU1_0001", store cycle "100 ms", measurement time "5 min", level range "40 to 130 dB")

Power ON, memory card inserted

↓

Settings

- CDV? (Check for card presence)
- WGT1 (C characteristics)
- TMC0 (Fast)
- RNG13 (40 to 130 dB)
- MTI6 (Measurement time 5 min)
- SMD1 (Store mode Auto 1)
- SNS0001 (File name setting)
- PLP2 (Store cycle 100 ms)

Establish above settings to prepare sound level meter for Auto 1 operation

↓

STO1 (Perform store operation)

↓

SRT0 (Stop measurement)

Auto 2 store example

(Measured with frequency weighting "FLAT", dynamic characteristics "Fast", file name "AU2_0001", measurement time "10 min", level range "20 to 80 dB")

Power ON, memory card inserted

↓

Settings

- CDV? (Check for card presence)
- WGT2 (FLAT characteristics)
- TMC0 (Fast)
- RNG8 (20 to 80 dB)
- MTI7 (Measurement time 10 min)
- SMD2 (Store mode Auto 2)
- SNS0001 (File name setting)

Establish above settings to prepare sound level meter for Auto 2 operation

↓

STO1 (Perform store operation)

↓

SRT0 (Stop measurement)

Auto 1 timer mode store example

(Measured with frequency weighting "A", dynamic characteristics "Fast", file name "AU1_0001", store cycle "200 ms", measurement time "manual", level range "30 to 120 dB", measurement start time "04/01, 6:00", measurement end time "4/4, 22:00", interval time "Off")

Power ON, memory card inserted

Settings

- CDV? (Check for card presence)
- WGT0 (A characteristics)
- TMC0 (Fast)
- RNG12 (30 to 120 dB)
- MTI0 (Measurement time manual)
- SMD3 (Store mode Auto 1)
- SNS0001 (File name setting)
- PLP3 (Store cycle 200 ms)
- TMT4_1_6_00_4_4_22_0_0
  (Timer mode time settings)
  ("_" shows space)

Establish above settings to prepare sound level meter for Auto 1 timer mode operation

STO1 (Perform store operation)

Auto 2 timer mode store example

(Measured with frequency weighting "C", dynamic characteristics "Slow", file name "AU2_0001", measurement time "10 min", level range "30 to 120 dB", measurement start time "04/01, 6:00", measurement end time "4/4, 22:00", interval time "1 h")

Power ON, memory card inserted

↓

Settings

- CDV? (Check for card presence)
- WGT1 (C characteristics)
- TMC1 (Slow)
- RNG12 (30 to 120 dB)
- MTI7 (Measurement time 10 min)
- SMD4 (Store mode Auto 2)
- SNS0001 (File name setting)
- TMT4_1_6_00_4_4_22_0_5
  (Timer mode time settings)
  ("_" shows space)

Establish above settings to prepare sound level meter for Auto 2 timer mode operation

↓

STO1 (Perform store operation)

No. 33632 05-09