SERIAL INTERFACE MANUAL

Sound Level Meter

NA-28

RION CO., LTD.

Organization of the NA-28 Documentation

The documentation for the Sound Level Meter NA-28 consists of three separate manuals.

- Instruction Manual

   Describes operating procedures for the Sound Level Meter NA-28, 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 communication with a computer, using the serial interface built into the Sound Level Meter NA-28. 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 sound level meter performance, microphone construction and characteristics, influence of extension cables and windscreen on the measurement, and other topics.

Organization of This Manual

This manual describes the features of the serial interface built into the Sound Level Meter NA-28.

The manual contains the following three sections.

Chapter 1 Preparations for USB Communication

Describes how to connect the unit to a computer via a USB link and how to install the USB driver. The chapter also contains general information about usage.

Chapter 2 Basic Syntax

Explains USB related syntax and other items.

Chapter 3 Command Reference

Describes the commands for controlling the NA-28, including command format, functions, and other aspects.

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Contents

Chapter 1

Preparations for USB Communication

Contents

About USB Functionality

The NA-28 supports operation control and data transfer via a USB connection. Connection of multiple units is not supported.

Connection to a Computer

The illustration below shows how to connect the USB port on the bottom of the Sound Level Meter NA-28 to the computer, using a generic USB cable. The USB cable is an optional.

DC 5-6V

AC   DC

TRIG   IN/
COMP OUT OUTPUT

USB

USB port

Open cover on bottom

USB (mini-B) male

To USB port of computer

USB (A) male
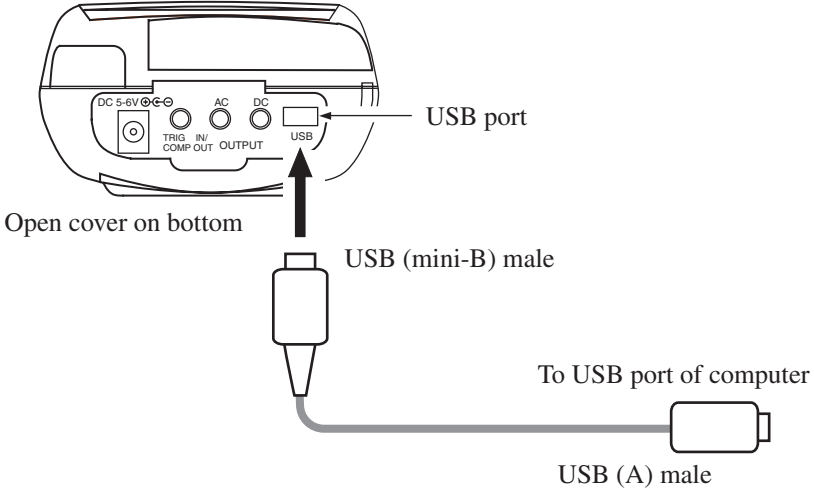
Operating Environment

Supported Operating Systems

- Microsoft Windows XP
- Microsoft Windows 2000

Installing the USB Driver

By connecting the NA-28 to a computer with a USB cable, and using a dedicated communication/control program, the NA-28 can be controlled remotely from the computer, and measurement data can be sent to the computer in real time. To enable use of these functions, you must first download driver software from the RION Corporation web site and install this driver on the computer to be used with the NA-28. The driver will create a virtual COM port on the computer.

Installation procedure

When connecting the NA-28 and the computer for the first time, install the USB driver as follows.

1. Download the latest USB driver from the RION Co., LTD. web site (http://www.rion.co.jp/english/).

2. Turn power to the NA-28 on, select [I/O] (Input/Output) and set [USB communication] to "ON".

Important
The above steps must be completed BEFORE connecting the USB cable.

3. Connect the NA-28 to the computer with a USB cable.

Important
Connect the NA-28 directly with the USB cable to the computer. If the NA-28 is connected via a USB hub, normal operation is not assured.

4. When the computer detects the NA-28, the "Found New Hardware Wizard" appears.
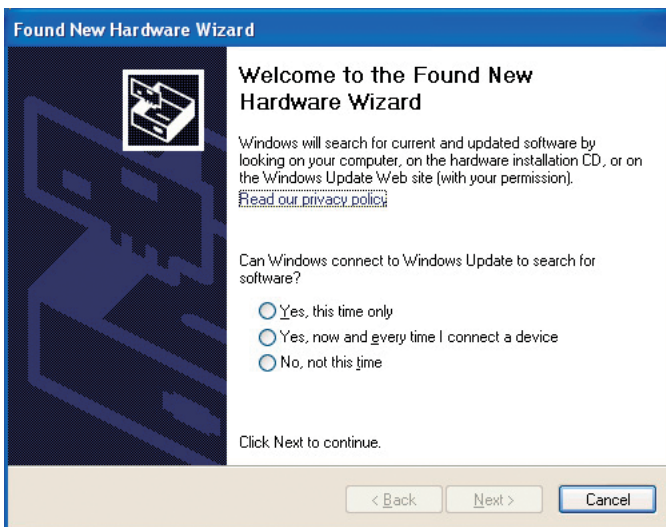
Note
The "Found New Hardware Wizard" appears only the first time you connect the NA-28 to the computer. It will not appear during subsequent use.

5. Select "No, not this time", and click on "Next>".
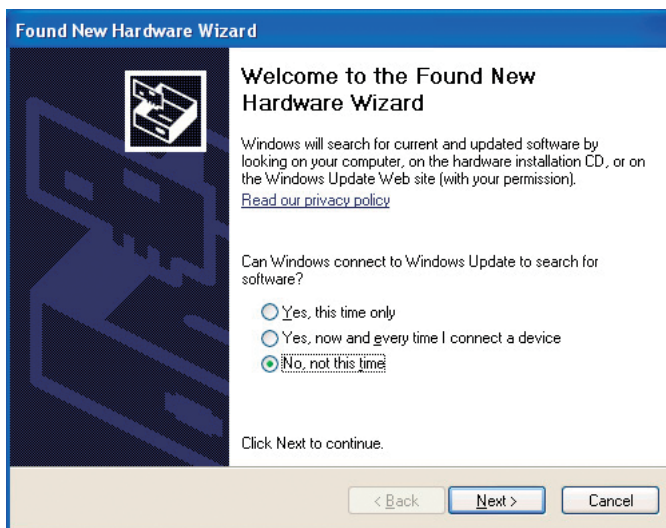
6. Select "Install from a list or specific location (Advanced)", and click on "Next>".
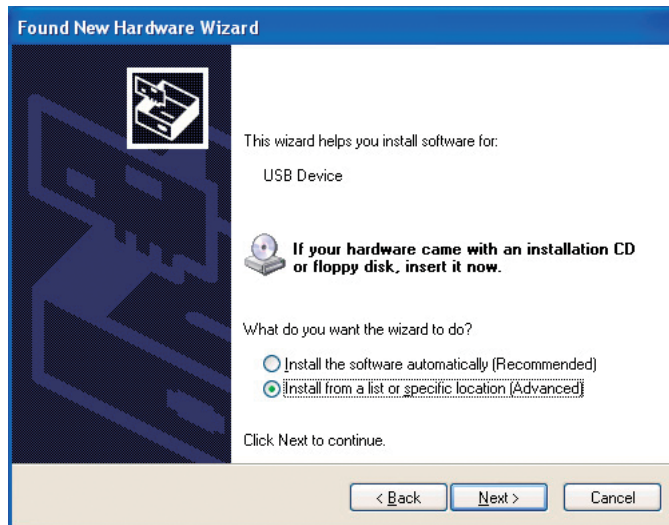
7. Select "Search for the best driver in these locations", and click on "Browse". Then specify the folder to which you have downloaded the driver in step 1.
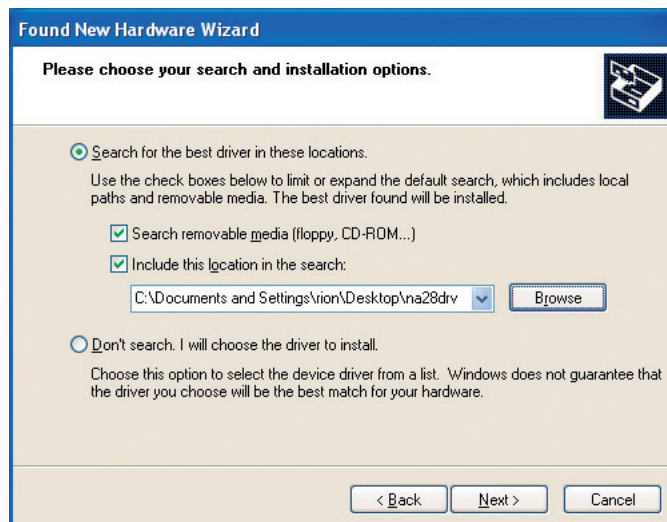
8. The "Hardware Installation" dialog box warning appears. Click on "Continue Anyway".
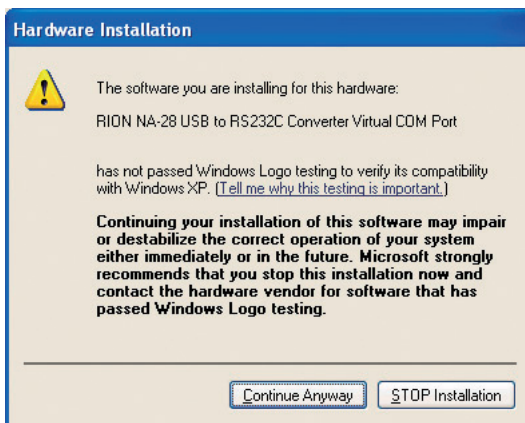
9. A screen like the one below will be shown until the driver installation is complete.
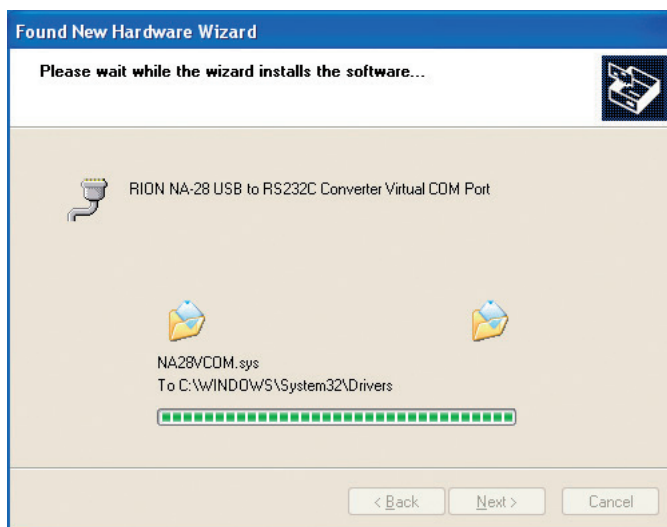
10. Click on "Finish".
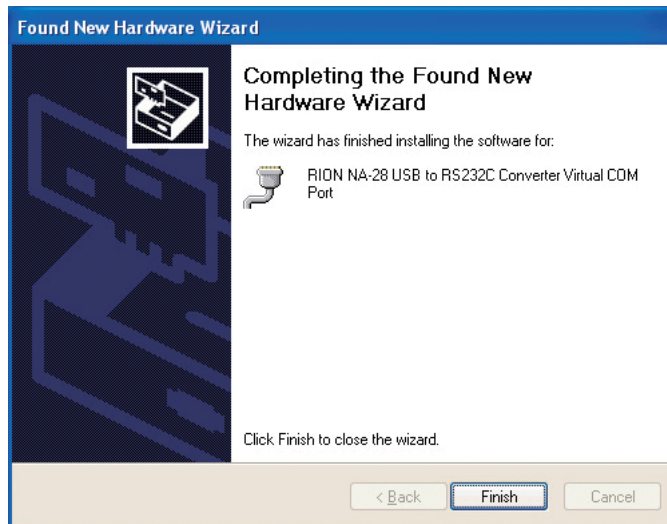
When step 10 has been completed, USB communication is enabled.

The driver installation creates a virtual COM port in the computer. For information on how to verify that the installation was successful, see the section "Checking the virtual COM port" on page 12.

Connection to the computer

If you are connecting the NA-28 to the computer for the first time, refer to page 3.

1. Turn power to the NA-28 on, select [I/O] (Input/Output) and set [USB communication] to "ON".

2. Connect the NA-28 to the computer with a USB cable.

Important
Be sure to set [USB communication] to "ON" at the NA-28 before connecting the USB cable.

USB communication is now enabled.

Disconnection from the computer

CF card in NA-28 will be recognized as "removable media". Consequently, the correct procedure as described below must be followed when disconnecting the unit.

1. Click on the "Safely remove hardware" icon in the right section of the taskbar, and select "Safely remove USB Mass Storage Device - Drive (*1)".

   *1: The drive letter (E in the example shown) will differ, depending on the computer configuration.

2. When the message shown below appears, disconnect the USB cable.

The NA-28 is now properly disconnected.

Checking the virtual COM port

1. After installing the driver, set [USB communication] to "ON" at the NA-28 and connect the USB cable.

2. Open the Device Manager ("Hardware" tab under "Properties" in My Computer).
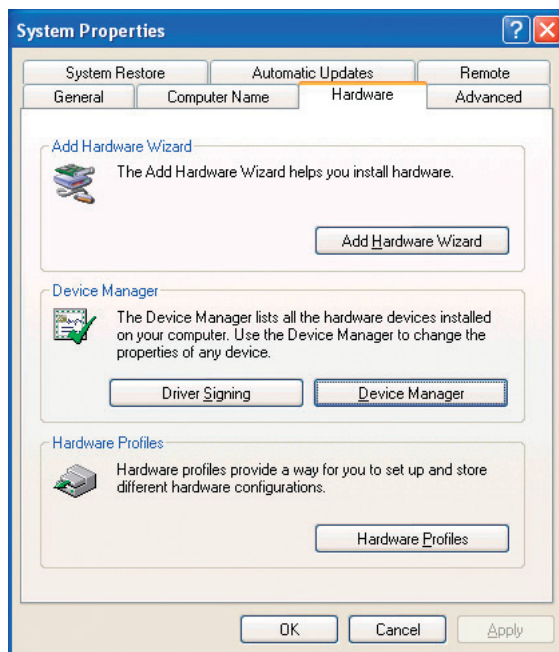
3. Click on the + at the left of "Ports (COM & LPT)".
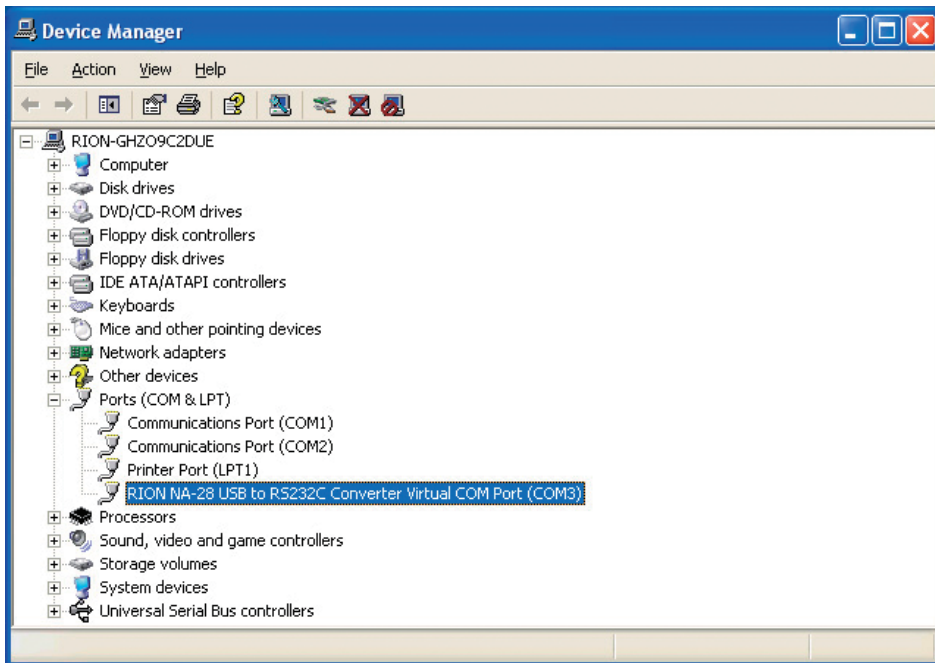
The indication "RION NA-28 USB to RS232C Converter Virtual COM Port" should be shown as COM port name. If this is not shown, check the connection between the NA-28 and the computer (step 1). If there is an "×" over the icon, the port is not functioning normally. Install the driver again.

MEMO

Chapter 2

Basic Syntax

Contents

Outline

The Sound Level Meter NA-28 incorporates a USB interface. This interface allows setting measurement parameters and controlling measurement operation of the NA-28 from a computer by sending prescribed commands. It also allows sending current measurement data from the NA-28 to the computer.

Note
About transfer principle The NA-28 is connected to the computer by COM port connection using a USB interface. Therefore, it is not necessary to set baud rate, data word length, stop bit, parity check, and flow control.

Local Mode/Remote Mode

Operation mode	Key operation	Communication
Remote	Disabled	Enabled
Local	Enabled	Enabled

Local mode

In this mode, the NA-28 can be operated normally with the keys on the unit. This mode is always active after power to the unit is turned on. Communication is also possible in this mode.

Remote mode

This mode is for communication only. The NA-28 cannot be operated with the keys on the unit.

The indication "REMOTE" is shown on the display.
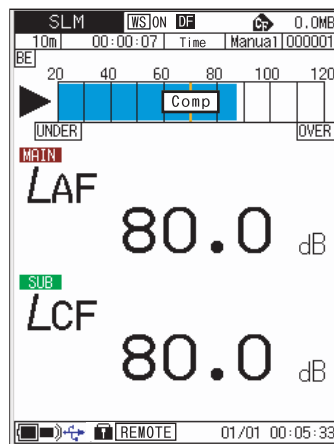
REMOTE indication

Switching between local mode and remote mode

A special command (RMT) is used to switch between local mode and remote mode.

Key operation in remote mode

Only the power key and light key are active. All other keys are disabled.

Transfer Codes

The codes used for communication with the NA-28 are as follows.

Control codes

Code	Hex notation	Meaning
<ENQ>	05$_H$	Enquire
<ACK>	06$_H$	Acknowledge
<NAK>	15$_H$	Not acknowledge
<STX>	02$_H$	Start block
<ETX>	03$_H$	End block
<CR>	0D$_H$	Terminator, (1st character)
<LF>	0A$_H$	Terminator, (2nd character)
<SUB>	1A$_H$	Stop

Special codes

ATTR	Control code or character code	Block attribute
ID	01$_H$ to FF$_H$	Other / own station ID

Commands, parameters, data

ASCII codes 20$_H$ to 7E$_H$

Transfer Format

Command block: Command from computer

$<STX>$	ID	ATTR	Command	Parameter	$<ETX>$	00H	$<CR>$	$<LF>$
1	1	1	M	N	1	1	1	1 byte

∗ ATTR = 'C'

   When there are multiple parameters, a space is used as delimiter.

Data response block: Response from NA-28. Response data are ASCII.

$<STX>$	ID	ATTR	Response data	$<ETX>$	00H	$<CR>$	$<LF>$
1	1	1	N	1	1	1	1 byte

∗ ATTR = 'A' or 'Q'

   When there are multiple data, a comma "," is used as delimiter.

Acknowledge response block: Computer or NA-28

$<STX>$	ID	ATTR	$<ETX>$	00H	$<CR>$	$<LF>$
1	1	1	1	1	1	1 byte

∗ ATTR = $<ACK>$

Not Acknowledge response block: Command from NA-28

$<STX>$	ID	ATTR	Error code	$<ETX>$	00H	$<CR>$	$<LF>$
1	1	1	4	1	1	1	1 byte

∗ ATTR = $<NAK>$

Enquire block: From computer to NA-28

$<STX>$	ID	ATTR	$<ETX>$	00H	$<CR>$	$<LF>$
1	1	1	1	1	1	1 byte

∗ ATTR = $<ENQ>$

Stop request block: From computer to NA-28

$<SUB>$
1

   Stop the continuous output of data started by the request command DRD?

This section explains the functions of "ID" and "ATTR" in the transfer format block.

ID: ID Number

Outline

Each device has an individual ID number for identification.

The ID number range is 1 to 255 (01_H to FF_H), and hexadecimal notation is used.

In a send block from the computer, the ID number identifies the target device for communication. In a send block from the measuring device, the ID number identifies the device itself.

Broadcast

ID number 00 is reserved for broadcasting a command from the computer to all devices.

Response from measuring device

The measuring device responds only to a communication block that contains its own ID. Other blocks are disregarded.

However, if the ID number is 00, 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\>*	00н	*\<CR\>*	*\<LF\>*
1	1	1	1	1	1	1	byte

∗ ATTR = *\<SUB\>*

Block Reception Processing

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

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.
For commands that have a response, this 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 is 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

Transfer Types

The following transfer types exist.

Check device sequence
Setting 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 device sequence

An acknowledge block is returned in response to the check device block.

```
┌────────────┐                    ┌──────────────────┐
│  Computer  │                    │ Sound level meter │
└────────────┘                    └──────────────────┘
      │         Check device block        │
      │──────────────────────────────────▶│  Block normal
      │                                    │
      │          Acknowledge block         │
      │◀───────────────────────────────────│
      │                                    │
```
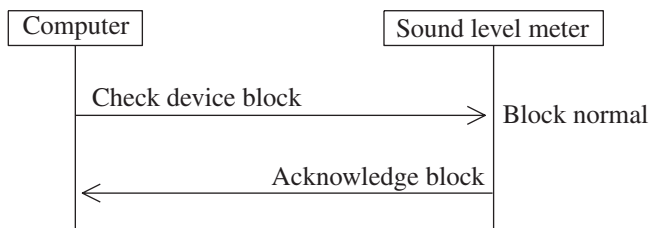
Setting sequence

Regular execution

After command processing, an Acknowledge response is sent.

"After command processing" refers to the point where processing has commenced, not where processing is completed. For example, for the "Execute store" command, it is the point where the store execution has started.
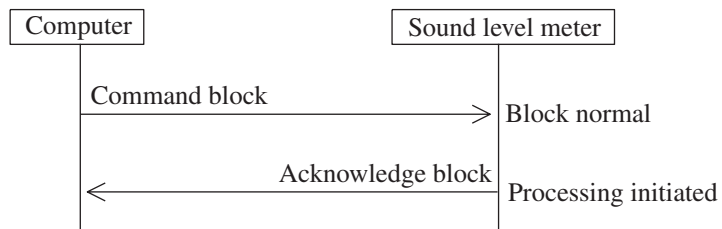
```
┌──────────┐                          ┌──────────────────┐
│ Computer │                          │ Sound level meter │
└──────────┘                          └──────────────────┘
     │          Command block              │
     │─────────────────────────────────────▶  Block normal
     │                                     │
     │          Acknowledge block          │
     │◀─────────────────────────────────────  Processing initiated
     │                                     │
```

Irregular execution

When a block or command processing error has occurred, a Not Acknowledge response is sent.

```
┌──────────┐                          ┌──────────────────┐
│ Computer │                          │ Sound level meter │
└──────────┘                          └──────────────────┘
     │          Command block              │
     │─────────────────────────────────────▶  Block error
     │                                     │
     │        Not Acknowledge block        │
     │◀─────────────────────────────────────│
     │                                     │
```
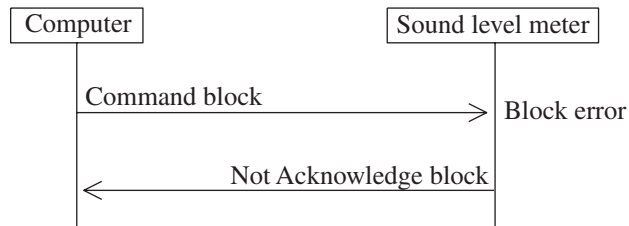
Request sequence

Regular execution

The response is sent immediately after receiving the request command.
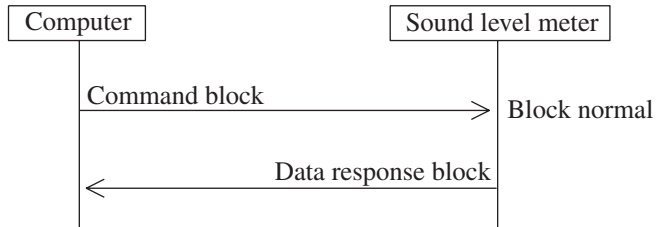
```
┌──────────┐                    ┌──────────────────┐
│ Computer │                    │ Sound level meter │
└──────────┘                    └──────────────────┘
     │                                   │
     │      Command block                │
     │──────────────────────────────────▶│  Block normal
     │                                   │
     │         Data response block       │
     │◀──────────────────────────────────│
     │                                   │
```

Irregular execution

When a block or command processing error has occurred, a Not Acknowledge response is sent.

```
┌──────────┐                    ┌──────────────────┐
│ Computer │                    │ Sound level meter │
└──────────┘                    └──────────────────┘
     │                                   │
     │      Command block                │
     │──────────────────────────────────▶│  Error
     │                                   │
     │        Not Acknowledge block      │
     │◀──────────────────────────────────│
     │                                   │
```
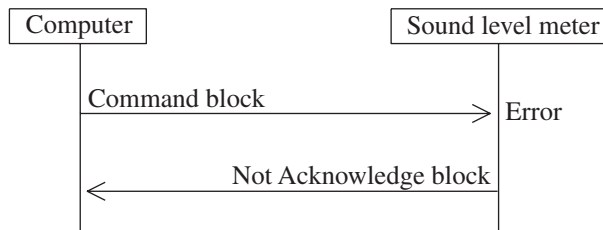
Continuous request sequence

This sequence uses only commands to periodically request measurement data.

The DRD command follows this pattern.

The sound level meter periodically sends out blocks.

To stop the process, the stop request command <*SUB*> is sent from the computer. Any other command is disregarded by the sound level meter.

The block sending process continues indefinitely as long as the <*SUB*> command is not received.

Computer		Sound level meter
Continuous request command	Command block →	Block normal
	← Data response block	Always ATTR = 'A
	← Data response block	
	← Data response block	
	. . . .	
	← Data response block	
	Stop request code <*SUB*> →	Stop
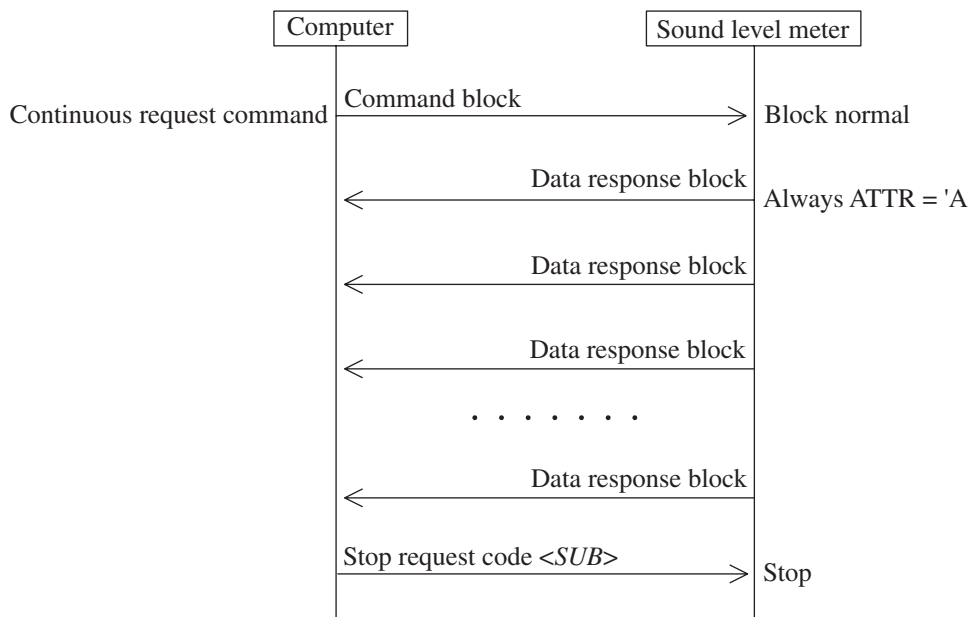
Irregular sequence

When an error generating a response on the block level has occurred, the following sequence occurs.
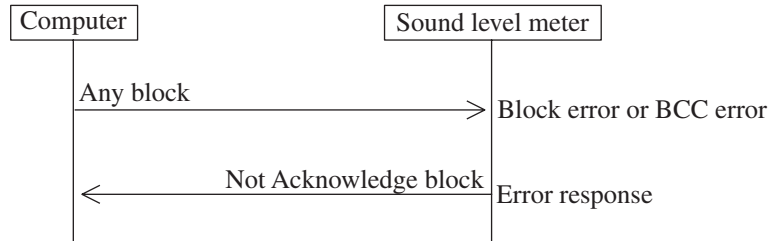
Communication Cutoff

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 has been 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	–
Interval until sound level meter enters idling state after sending data	Max. 200 ms	After receiving data from the sound level meter, wait at least 200 ms before sending the next command (For DOD, at least 1s)

Rated Values

Case	Rated Values	If exceeded
Block generation wait time after receiving *<STX>*	No limit	–
Receive character interval timeout	No limit	–

Chapter 3

Command Reference

Contents

Commands

Command List

S: Setting command (command for making a NA-28 setting)

R: Request command (command for obtaining status information or measurement data from NA-28)

Measurement parameter related commands

Command	Function	Corresponding key /menu item	Page
IMD	Toggle SLM/RTA mode (S/R)	SLM/RTA key	41
DSP	Set display data (S/R)	MODE key	42
GRP	Toggle graphical/numeric display (S/R)	GRP/NUM key	43
WGT	Set frequency weighting characteristic (S/R)	FREQ WEIGHT key	43
TMC	Set time weighting characteristic (S/R)	TIME WEIGHT key	44
RNG	Select level range (S/R)	LEVEL △▽ keys	45
MTI	Set measurement time (S/R)	Measurement → Measurement time	46
BER	Set back-erase (S/R)	Measurement → Back-erase	46
DLT	Set delay time (S/R)	Measurement → Delay time	47
MAX	L_{max}/L_{min} type (S/R)	Measurement → L_{max}/L_{min} type	47

Command	Function	Corresponding key /menu item	Page
MXD	Peak hold (S/R)	Display $\rightarrow$ MAX hold	48
LNM	L_N mode (S/R)	Measurement $\rightarrow$ L_N mode	48
WSC	Windscreen compensation (S/R)	Measurement $\rightarrow$ Windscreen compensation	49
DFC	Diffuse sound field compensation (S/R)	Measurement $\rightarrow$ Diffuse sound field compensation	49
SET	Get all measurement parameters (R)	N/A	50
SYS	Apply setup file (S)	System $\rightarrow$ Save/Load Settings	54

Data related commands

Command	Function	Corresponding key /menu item	Page
LTI	Elapsed measurement time (R)	N/A	55
SCH	Display sub channel (S/R)	Measurement $\rightarrow$ Sub channel measurement	56
DPI	Toggle display (S/R)	Display $\rightarrow$ [respective item] ON/OFF	57
LXI	Percentile level (S/R)	Display $\rightarrow$ [respective item] L_N	58
ADP	Sub channel additional processing (S/R)	Sub channel measurement $\rightarrow$ L_{peak}/L_{tm5}	58
MKP	Cursor position (S/R)	$\triangleleft\,\triangleright$ keys	59

Measurement control commands

Command	Function	Corresponding key /menu item	Page
SRT	Measurement processing	START/STOP key	60
STO	Store	STORE key	60
PSE	Pause	PAUSE key	61

Calibration commands

Command	Function	Corresponding key /menu item	Page
CAL	Calibration status (S/R)	CAL/STORE key	62
CBM	Calibration volume (S/R)	△▽ keys during calibration	62

Memory related commands

Command	Function	Corresponding key /menu item	Page
SMD	Store mode (S/R)	Store → Store mode	63
SNS	Store name (S/R)	Store → Store name	63
PLP	Auto 1 store cycle	Store → Sampling cycle	64
ADR	Store address (S/R)	N/A	65

Command	Function	Corresponding key /menu item	Page
CDR	Card capacity/remaining (R)	System → CF Capacity	65
CDV	Card insertion check (R)	CF symbol display	66
MDC	Clear stored data from internal memory (S)	Recall → CAL	66
SPM	Sleep mode (S/R)	Measurement → Trigger mode → Sleep mode	67

System commands

Command	Function	Corresponding key /menu item	Page
BAT	Battery status (R)	N/A	68
CLK	Current date/time (S/R)	System → Current Date/Time	68
DCL	Initialization (S)	System → Save/Load Settings	69
VER	Version (R)	N/A	69

Input/output related commands

Command	Function	Corresponding key /menu item	Page
ACO	Select AC output (S/R)	Input/Output → AC output	70
DCO	Select DC output (S/R)	Input/Output → DC output	70
TRG	Trigger (S/R)	Measurement → Trigger mode	71
LTR	Trigger level (S/R)	Measurement → Trigger mode	71
LTB	Trigger band for RTA mode (S/R)	Measurement → Trigger mode	72
LTC	Trigger channel for SLM mode (S/R)	Measurement → Trigger mode	73
TTR	Trigger time (S/R)	Measurement → Trigger mode	74
CMP	Comparator (S/R)	Input/Output → Comparator	75
CML	Comparator level (S/R)	Input/Output → Comparator	75
CMB	Comparator band for RTA mode (S/R)	Input/Output → Comparator	76
CMC	Comparator channel for SLM mode (S/R)	Input/Output → Comparator	77
RMC	Remote control (S/R)	Input/Output → Remote control	77
LNG	Language (S/R)	System → Language	78
BLA	Backlight auto off interval (S/R)	Input/Output → Backlight auto off	78

Command	Function	Corresponding key /menu item	Page
BLB	Backlight brightness (S/R)	Input/Output → Backlight brightness	79
BEP	Beep tone (S/R)	Input/Output → Beep	79
IDX	Index (S/R)	Input/Output → Index	80

Communication control commands

Command	Function	Corresponding key /menu item	Page
RMT	Remote mode (S/R)	N/A	81
EST	Error information (R)	N/A	81

Data output related commands

Command	Function	Corresponding key /menu item	Page
DOD	Output displayed value (R)	N/A	82
DRD	Continuous output (R)	N/A	85

Command Format

In this manual, a single 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 a parameter, the parameter follows the command. It can be appended to the command either directly or with a separating space.

☐☐☐ p1   Valid
☐☐☐ _ p1   Valid

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

☐☐☐ p1_p2   Valid
☐☐☐ p1p2   Not valid

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.

☐☐☐ ?   Valid
☐☐☐ _?   Valid
☐☐☐ p1?   Valid
☐☐☐ p1_?   Valid

Unless specified otherwise, parameters and response data are of variable length. Depending on the value range, the length of the parameter will differ. Padding with leading zeros or other measures are not implemented.

☐☐☐_1   Valid
☐☐☐_10   Valid
☐☐☐_01   Not valid

Error Codes

Error code	Meaning
0001	Undefined command or other command problem
0002	Parameter number or value not valid
0003	Processing not possible in current state
0004	Processing completion timeout interval has elapsed

Parameters

When there are multiple parameters, using a "#" for a parameter indicates that the current state of the parameter is maintained.

Command Send Example

To set frequency weighting to "C"

<STX>	01H	C	WGT	0_2	<ETX>	00H	<CR><LF>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) Start of transfer data and command   Always *<STX>*

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

Note
Do not use ASCII "01" here. Express "01" in 2-digit hexadecimal notation, i.e. 01H.

(3) Attribute ("C" for command)   Always C

(4) Command   3 alpha characters

(5) Parameter (corresponds to p1, p2, etc. in command description section of manual [following pages])

(6) Command end   Always *<ETX>*

(7) Always 00H

(8) Transfer data end   Always *<CR><LF>*

Command Description

Measurement parameter related commands

IMD

Toggle SLM/RTA mode (corresponds to SLM/RTA key operation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   IMD p1

Parameter	Content
p1 = 0	SLM (sound level meter) mode
p1 = 1	OCT (octave analysis) mode
p1 = 2	1/3OCT (1/3 octave analysis) mode
p1 = 3	OCT & 1/3OCT (simultaneous octave & 1/3 octave analysis) mode

Request command   IMD ?

Response data	d1
Return value	Content

* Same as for setting command

DSP

Set display data (corresponds to MODE key operation)

Only valid if the unit is currently in L_p mode (including pause). In other cases, error 0003 is returned.

Setting command   DSP p1

Parameter	Content
p1 = 0	L_p screen
p1 = 1	L_{eq} screen
p1 = 2	L_E screen
p1 = 3	L_{max} screen
p1 = 4	L_{min} screen
p1 = 5	L_{N1} screen
p1 = 6	L_{N2} screen
p1 = 7	L_{N3} screen
p1 = 8	L_{N4} screen
p1 = 9	L_{N5} screen
p1 = 10	List screen
p1 = 11	Time-Level screen

* Specifying a screen that is set to OFF on the "Display" menu results in error code 0003 being returned.

* Also refer to the DPI command.

Request command   DSP ?

Response data   d1

Return value	Content

* Same as for setting command

* List screen is settable only sound level meter mode. In analyzer mode, error 0003 is returned.

GRP

Toggle graphical/numeric display (corresponds to GRP/NUM key operation)

Switches between graphical display and numeric display in analyzer mode.

Only valid if the unit is currently in L_p mode and currently processing (including pause). In other cases, error 0003 is returned.

Setting command	GRP p1
Parameter	Content
p1 = 0	Graphical screen
p1 = 1	Numeric screen

Request command	GRP ?
Response data	d1
Return value	Content

* Same as for setting command

WGT

Set frequency weighting characteristic (corresponds to FREQ WEIGHT key operation [main]/Sub channel measurement → Frequency weighting [sub])

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command	WGT p1 p2
Parameter	Content
p1,p2 = 0	A-weighting
p1,p2 = 1	C-weighting
p1,p2 = 2	Z-weighting

* p1 specifies the frequency weighting for the main channel and p2 for the sub channel.

Request command	WGT ?
Response data	d1,d2
Return value	Content

* Same as for setting command
* d1 specifies the frequency weighting for the main channel and d2 for the sub channel.

TMC

Set time weighting characteristic (corresponds to TIME WEIGHT key operation [main]/Sub channel measurement → Time weighting [sub])

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   TMC p1 p2

Parameter	Content
p1,p2 = 0	F (Fast)
p1,p2 = 1	S (Slow)
p1,p2 = 2	10 ms
p2 = 3	I (Impulse)

* p1 specifies the time weighting for the main channel and p2 for the sub channel.

Request command   TMC ?

Response data   d1,d2

Return value   Content

* Same as for setting command

* d1 specifies the time weighting for the main channel and d2 for the sub channel.

RNG

Select level range (corresponds to LEVEL $\triangle\triangledown$ key operation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command　　　RNG p1

Parameter	Content
p1 = 0	80 dB range
p1 = 1	90 dB range
p1 = 2	100 dB range
p1 = 3	110 dB range
p1 = 4	120 dB range
p1 = 5	130 dB range

Request command　　　RNG ?

Response data　　　d1

Return value　　　Content

* 　Same as for setting command

MTI

Set measurement time (corresponds to Measurement → Measurement time)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

If the time setting results in a contradictory or invalid condition, error 0002 is returned.

Setting command	MTI p1 p2
Parameter	Content
p1 = 1 to 1000	Value
p2 = 0	s (Seconds)
p2 = 1	m (Minutes)
p2 = 2	h (Hours)

* The maximum allowable setting time is 24 hour when store mode is Manual or Auto2.

Request command	MTI ?
Response data	d1,d2
Return value	Content

* Same as for setting command

* d1 specifies the value and d2 specifies the unit.

BER

Set back-erase (corresponds to Measurement → Back-erase)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command	BER p1
Parameter	Content
p1 = 0	Back-erase function off
p1 = 1	5 s

Request command	BER ?
Response data	d1
Return value	Content

* Same as for setting command

DLT

Set delay time (corresponds to Measurement → Delay time)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   DLT p1

Parameter	Content
p1 = 0 to 10	Delay time (seconds)

Request command   DLT ?

Response data	d1
Return value	Content

   *   Same as for setting command

MAX

L_{max}/L_{min} type (corresponds to Measurement → L_{max}/L_{min} type)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   MAX p1

Parameter	Content
p1 = 0	Band
p1 = 1	AP
p1 = 2	AP(S)

Request command   MAX ?

Response data	d1
Return value	Content

   *   Same as for setting command

MXD

Peak hold (corresponds to Display → MAX hold)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   MXD p1

Parameter	Content
p1 = 0	OFF
p1 = 1	ON

*   Peak hold display is performed only in analyzer mode, not in sound level meter mode.
*   When the setting is made via remote communication, the sound level meter will accept the MXD command also if it is in sound level meter mode.

Request command   MXD ?

Response data	d1
Return value	Content

*   Same as for setting command

LNM

L_N mode (corresponds to Measurement → L_N mode)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   LNM p1

Parameter	Content
p1 = 0	L_p
p1 = 1	$L_{eq,\ 1s}$

*   Selecting Japanese as language is not valid (error 0003 will be returned).

Request command   LNM ?

Response data	d1
Return value	Content

*   Same as for setting command
*   If Japanese is selected as language, p1 = 0 is returned (operation also corresponds to p1 = 0).

WSC

Windscreen compensation (corresponds to Measurement → Windscreen compensation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command	WSC p1
Parameter	Content
p1 = 0	OFF (no compensation)
p1 = 1	ON

Request command	WSC ?
Response data	d1
Return value	Content

* Same as for setting command

DFC

Diffuse sound field compensation (corresponds to Measurement → Diffuse sound field compensation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command	DFC p1
Parameter	Content
p1 = 0	OFF (no compensation)
p1 = 1	ON

Request command	DFC ?
Response data	d1
Return value	Content

* Same as for setting command

SET

* Get all measurement parameters (no corresponding operation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Request command	SET ?
Response data	d1,d2,...,d65
Return value	Content
d1	SLM/RTA mode
	Corresponds to IMD ? command
d2	Main channel frequency weighting characteristic
	Corresponds to d1 of WGT ? command
d3	Sub channel frequency weighting characteristic
	Corresponds to d2 of WGT ? command
d4	Main channel time weighting characteristic
	Corresponds to d1 of TMC ? command
d5	Sub channel time weighting characteristic
	Corresponds to d2 of TMC ? command
d6	Level range
	Corresponds to RNG ? command
d7	Measurement time setting (value)
	Corresponds to d1 of MTI ? command
d8	Measurement time setting (unit)
	Corresponds to d2 of MTI ? command
d9	Back-erase setting
	Corresponds to BER ? command
d10	Delay time setting
	Corresponds to DLT ? command
d11	L_{max}/L_{min} type
	Corresponds to MAX ? command
d12	Peak hold
	Corresponds to MXD ? command
d13	L_N mode
	Corresponds to LNM ? command
d14	Windscreen compensation
	Corresponds to WSC ? command

d15	Diffuse sound field compensation
	Corresponds to RFC ? command
d16	Sub channel display
	Corresponds to SCH ? command
d17	L_{eq} display
	Corresponds to d1 of DPI ? command
d18	L_E display
	Corresponds to d2 of DPI ? command
d19	L_{max} display
	Corresponds to d3 of DPI ? command
d20	L_{min} display
	Corresponds to d4 of DPI ? command
d21	L_{N1} display
	Corresponds to d5 of DPI ? command
d22	L_{N2} display
	Corresponds to d6 of DPI ? command
d23	L_{N3} display
	Corresponds to d7 of DPI ? command
d24	L_{N4} display
	Corresponds to d8 of DPI ? command
d25	L_{N5} display
	Corresponds to d9 of DPI ? command
d26	L_{N1} percentile value
	Corresponds to d1 of LXI ? command
d27	L_{N2} percentile value
	Corresponds to d2 of LXI ? command
d28	L_{N3} percentile value
	Corresponds to d3 of LXI ? command
d29	L_{N4} percentile value
	Corresponds to d4 of LXI ? command
d30	L_{N5} percentile value
	Corresponds to d5 of LXI ? command
d31	Sub channel additional processing
	Corresponds to ADP ? command

d32	Store mode
	Corresponds to SMD ? command
d33	Store name
	Corresponds to SNS ? command
d34	Auto1 store sampling cycle in analyzer mode
	Corresponds to d1 of PLP ? command
d35	Auto1 store sampling cycle in sound level meter mode
	Corresponds to d2 of PLP ? command
d36	Sleep mode
	Corresponds to SPM ? command
d37	AC output setting
	Corresponds to ACO ? command
d38	DC output setting
	Corresponds to DCO ? command
d39	Trigger mode
	Corresponds to TRG ? command
d40	Trigger level
	Corresponds to d1 of LTR ? command
d41	Trigger slope
	Corresponds to d2 of LTR ? command
d42	Trigger band (octave)
	Corresponds to d1 of LTB ? command
d43	Trigger band (top/center/bottom)
	Corresponds to d2 of LTB ? command
d44	Trigger channel (sound level meter mode)
	Corresponds to LTC ? command
d45	Time trigger start date/time (month)
	Corresponds to d1 of TTR ? command
d46	Time trigger start date/time (day)
	Corresponds to d2 of TTR ? command
d47	Time trigger start date/time (hour)
	Corresponds to d3 of TTR ? command
d48	Time trigger start date/time (minutes)
	Corresponds to d4 of TTR ? command

d49	Time trigger end date/time (month)	
		Corresponds to d5 of TTR ? command
d50	Time trigger end date/time (day)	
		Corresponds to d6 of TTR ? command
d51	Time trigger end date/time (hour)	
		Corresponds to d7 of TTR ? command
d52	Time trigger end date/time (minutes)	
		Corresponds to d8 of TTR ? command
d53	Time trigger interval time	
		Corresponds to d9 of TTR ? command
d54	Comparator	
		Corresponds to CMP ? command
d55	Comparator level	
		Corresponds to CML ? command
d56	Comparator band (octave)	
		Corresponds to d1 of CMB ? command
d57	Comparator band (top/center/bottom)	
		Corresponds to d2 of CMB ? command
d58	Comparator band (sound level meter mode)	
		Corresponds to CMC ? command
d59	Remote control	
		Corresponds to RMC ? command
d60	Language	
		Corresponds to LNG ? command
d61	Always 0	
d62	Backlight auto off	
		Corresponds to BLA ? command
d63	Backlight brightness	
		Corresponds to BLB ? command
d64	Beep tone	
		Corresponds to BEP ? command
d65	Index	
		Corresponds to IDX ? command

* There is no setting command.

SYS

Apply setup file (corresponds to System → Save/Load Settings)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   SYS p1

Parameter	Content
p1 = 1 to 5	Setup file number

* Note that if USB communication is set to OFF in the specified setup file, communication will no longer be possible after sending the command. In this case, use the menus on the NA-28 to enable USB communication again.

Data related commands

LTI

Elapsed measurement time

If the unit is displaying a menu or is in recall, calibration, or adjustment mode, error 0003 is returned. In other cases, the command is valid.

Request command	LTI ?
Response data	d1,d2,d3
Return value	Content
d1	Hours
d2	Minutes
d3	Seconds

In case of the store mode is Auto1 or Auto2, the response data as follows.

Response data	d1,d2,d3,d4
Return value	Content
d1	Days
d2	Hours
d3	Minutes
d4	Seconds

* If this command is sent after completion of a measurement, the elapsed measurement time at the point of measurement completion is returned.

* There is no setting command.

SCH

Display sub channel (corresponds to Measurement → Sub channel
measurement → Sub channel measurement setting)

Only valid if the unit is currently in L_p mode (except pause). In other
cases, error 0003 is returned.

Setting command   SCH p1

Parameter	Content
p1 = 0	OFF (sub channel not displayed)
p1 = 1	ON (sub channel displayed)

Request command   SCH ?

Response data   d1

Return value   Content

* Same as for setting command

DPI

Toggle display (corresponds to Display → L_{eq}, L_E, L_{max} etc.)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

*   The value set here will affect the DSP command.

Setting command   DPI p1 p2 p3...p11

Parameter	Content
p1 to p11 = 0	OFF
p1 to p11 = 1	ON
p1	L_{eq} screen
p2	L_E screen
p3	L_{max} screen
p4	L_{min} screen
p5	L_{N1} screen
p6	L_{N2} screen
p7	L_{N3} screen
p8	L_{N4} screen
p9	L_{N5} screen
p10	List screen
p11	Time-Level screen

Request command   DPI ?

Response data	d1,d2,...,d11
Return value	Content

*   Same as for setting command

LXI

Percentile level (corresponds to Display → L_{N1} to L_{N5} setting value)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   LXI p1 p2 p3 p4 p5

Parameter	Content
p1 = 1 to 99	L_{N1} setting
p2 = 1 to 99	L_{N2} setting
p3 = 1 to 99	L_{N3} setting
p4 = 1 to 99	L_{N4} setting
p5 = 1 to 99	L_{N5} setting

Request command   LXI ?

Response data   d1,d2,d3,d4,d5

Return value   Content

* Same as for setting command

ADP

Sub channel additional processing (corresponds to Sub channel measurement → L_{peak}/L_{tm5})

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   ADP p1

Parameter	Content
p1 = 0	OFF
p1 = 1	L_{peak}
p1 = 2	L_{tm5}

Request command   ADP ?

Response data   d1

Return value   Content

* Same as for setting command

* When the setting is made via remote communication, the sound level meter will accept the ADP command also if it is in analyzer mode.

MKP

Cursor position (corresponds to cursor positioning operation in analyzer mode)

If the unit is displaying a menu or is in recall, calibration, or adjustment mode, the command is not valid and error 0003 is returned.

In sound level meter (SLM) mode, the command is not valid and error 0003 is returned.

Setting command   MKP p1 p2

Parameter	Content
p1 = 0	Not available (Do not specify this.)
p1 = 1	Not available (Do not specify this.)
p1 = 2	16 Hz band
p1 = 3	31.5 Hz band
p1 = 4	63 Hz band
p1 = 5	125 Hz band
p1 = 6	250 Hz band
p1 = 7	500 Hz band
p1 = 8	1 kHz band
p1 = 9	2 kHz band
p1 = 10	4 kHz band
p1 = 11	8 kHz band
p1 = 12	16 kHz band
p2 = 0	Bottom band
p2 = 1	Center band
p2 = 2	Top band

*   In 1/3 octave analysis mode/simultaneous analysis mode, p1 specifies the octave band unit, and p2 the 1/3 octave band unit as bottom/center/top.

*   For example, to specify the 1.25 kHz band, use p1 = 8 and p2 =2.

*   Use p1 = specified frequency and p2 = 1 when set the octave band.

Request command   MKP ?

Response data	d1,d2
Return value	Content

*   Same as for setting command

Measurement control commands

SRT

Measurement processing (corresponds to START/STOP key operation)

If the unit is displaying a menu or is in recall, calibration, or adjustment mode, the command is not valid and error 0003 is returned.

Setting command   SRT p1

Parameter	Content
p1 = 1	Start processing measurement
p1 = 0	Stop processing measurement or auto store

* During auto store, p1 = 1 is not valid (0003).
* If p1 = 1 is sent while a processing measurement is in progress, processing will restart.

Request command   SRT ?

Response data	d1
Return value	Content
d1 = 1	Processing measurement
d1 = 0	Processing measurement stopped or auto store in progress

STO

Store (corresponds to STORE key operation)

Only valid if the unit is currently in L_p mode (including pause). It is also valid in the request only store condition.

Setting command   STO p1

Parameter	Content
p1 = 1	Execute store process/Start auto store

* To stop auto store, use the SRT command.

Request command   STO ?

Response data	d1
Return value	Content
d1 = 1	Auto store in progress
d1 = 0	Auto store stopped

PSE

Pause (corresponds to PAUSE key)

If the unit is displaying a menu or is in recall, calibration, or adjustment mode, the command is not valid and error 0003 is returned. During auto store, the command is not valid and error 0003 is returned.

Setting command	PSE p1
Parameter	Content
p1 = 1	Activate pause
p1 = 0	Cancel pause

Request command	PSE ?
Response data	d1
Return value	Content
d1 = 1	Pause active
d1 = 0	Pause canceled

Calibration commands

CAL

Calibration status (corresponds to calibration mode on/off by CAL key operation and selection of internal/acoustic calibration by STORE key operation)

Only valid if the unit is currently in L_p mode (except pause) and calibration mode. In other cases, error 0003 is returned.

Setting command   CAL p1

Parameter	Content
p1 = 0	Cancel calibration mode
p1 = 1	Activate internal calibration
p1 = 2	Activate acoustic calibration

Request command   CAL ?

Response data   d1

Return value   Content

*   Same as for setting command

CBM

Calibration volume (corresponds to $\triangle\triangledown$ key operation during calibration)

Only valid if the unit is currently in calibration mode. In other cases, error 0003 is returned.

Setting command   CBM p1

Parameter	Content
p1 = 0	Set CAL volume to minimum
p1 = 1	Set CAL volume to maximum

*   If p1 = 0 is sent when CAL volume is at minimum, error 0002 is returned.

*   If p1 = 1 is sent when CAL volume is at maximum, error 0002 is returned.

*   To obtain the displayed value during calibration, use the DOD command described on page 82 to 84.

*   Perform calibration with the CBM command while checking the displayed value with the DOD command.

Memory related commands
SMD

Store mode (corresponds to Store → Store mode)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   SMD p1

Parameter	Content
p1 = 0	Manual
p1 = 1	Auto1
p1 = 2	Auto2

Request command   SMD ?

Response data	d1
Return value	Content

*   Same as for setting command

SNS

Store name (corresponds to Store → Store name)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

This specifies the name of the store folder on the CF card.

Setting command   SNS p1

Parameter	Content
p1 = 0000 to 9999	Numeric portion of MAN_○○○○, AU1_○○○○, AU2_○○○○

*   To specify a number of less than 4 digits, use leading zeros.

*   For example, to specify 20, use "SNS_0020". "SNS_20" will result in an error.

Request command   SNS ?

Response data	d1
Return value	Content

*   Same as for setting command

*   The name set with the SNS command is the folder name that will be used when storing data on CF card. The store name is not used when storing data in the internal memory.

PLP

Auto 1 store cycle (corresponds to Store → Sampling cycle)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   PLP p1 p2

Parameter	Content
p1 = 1 to 9	1 ms to 10 ms, in 1-ms steps
p1 = 10 to 1000	10 ms to 1000 ms, in 10-ms steps
p1 = 0	$L_{eq,1s}$ (use "0" to specify 1-second L_{eq})
p2 = 0	100 ms (in sound level meter mode, only "0" can be specified)

* In analyzer mode, sampling cycle is p1.

   In sound level meter mode, sampling cycle is p2.

* Between 10 and 1000, use steps of 10. For example, "25" cannot be specified.

* In sound level meter mode, the setting is fixed to 100 ms and cannot be changed.

Request command   PLP ?

Response data	d1,d2
Return value	Content

* Same as for setting command

ADR

Store address (no corresponding operation)

The setting is valid only if the unit is currently in L_p mode or in L_p pause mode and in store mode. In other cases, error 0003 is returned.

The request command is not valid if the unit is displaying a menu or is in recall, calibration, or adjustment mode. In such cases, error 0003 is returned.

Setting command   ADR p1

    Parameter   Content

    p1 = 1 to 1000   Address for manual store

    *   Cannot be set if the store mode is not manual.

Request command   ADR ?

    Response data   d1

    Return value   Content

    d1 = 1 to 1000   When unit is in manual store mode

    *   When the unit is not in manual store mode, an indeterminate value may be returned.

CDR

Card capacity/remaining (corresponds to System → CF Capacity, capacity indication at top right of current screen)

If the unit is displaying a menu or is in recall or calibration mode, the command is not valid and error 0003 is returned.

Request command   CDR ?

    Response data   d1,d2

    Return value   Content

    d1,d2 = 0.0 to 1945.3

                      Unit is MB

    *   d1 indicates total CF card capacity, and d2 remaining free capacity.

*   There is no setting command.

CDV

Card insertion check (corresponds to CF symbol display at top right of current screen)

If the unit is displaying a menu or is in recall or calibration mode, the command is not valid and error 0003 is returned.

Request command   CDV ?

    Response data   d1

    Return value   Content

    d1 = 0   No CF card inserted

    d1 = 1   CF card inserted

    d1 = 2   CF card being checked

  *   There is no setting command.

MDC

Clear stored data from internal memory (corresponds to Recall → Delete selected data [CAL key] operation)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   ADR

    *   There is no parameter.

    *   Data stored in internal memory are deleted.

    *   Data and setup files etc. stored on CF card are not deleted.

SPM

Sleep mode (corresponds to Measurement → Trigger mode → Sleep mode)

Sleep mode (low power consumption mode) is applicable only during use of the time trigger function.

When the unit is in sleep mode (low power standby), USB communication is also disabled, and no commands will be accepted.

Use of this command therefore is usually not recommended.

The command is only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   SPM p1

Parameter	Content
p1 = 0	Do not use sleep mode when using time trigger
p1 = 1	Use sleep mode when using time trigger

Request command   SPM ?

Response data   d1

Return value   Content

*   Same as for setting command

System commands
BAT

Battery status (no corresponding operation)

This command is valid in any operation state of the unit.

Request command	BAT ?
Response data	d1,d2
Return value	Content
d1 = 1	Flashing (Empty)
d1 = 2	1 segment (Low)
d1 = 3	2 segments (Mid)
d1 = 4	3 segments (High)
d1 = 5	4 segments (Full)
d2 = 1	Unit is powered by internal batteries
d2 = 2	Unit is powered by external DC supply

* There is no setting command.

CLK

Current date/time (corresponds to System → Current Date/Time)

The setting command is only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

The request command is not valid if the unit is displaying a menu or is in recall or calibration mode. In such cases, error 0003 is returned.

Setting command	CLK p1 p2 p3 p4 p5 p6
Parameter	Content
p1 = 2000 to 2063	4-digit calendar year
p2 = 1 to 12	Month
p3 = 1 to 31	Day
p4 = 0 to 24	Hours
p5 = 0 to 59	Minutes
p6 = 0 to 59	Seconds

Request command	CLK?
Response data	d1,d2,d3,d4,d5,d6
Return value	Content

* Same as for setting command

DCL

Initialization (corresponds to System → Save/Load Settings → Set default values)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   DCL
* There is no parameter.
* The USB communication setting will remain ON.
* All other settings except USB communication are returned to the default condition.
* The unit index is incremented by 1. Keep this in mind if you are using an index other than 1.

VER

Version (no corresponding operation)

Only valid if the unit is currently in L_p mode (except pause) or in calibration mode. In other cases, error 0003 is returned.

Request command   VER ?

Response data	d1,d2
Return value	Content
d1 = 0	NA-28
d2 = x.y	System version

* There is no setting command.

Input/output related commands
ACO

Select AC output (corresponds to Input/Output → AC output)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   ACO p1

Parameter	Content
p1 = 0	OFF
p1 = 1	MAIN
p1 = 2	SUB

Request command   ACO ?

Response data	d1
Return value	Content

* Same as for setting command

DCO

Select DC output (corresponds to Input/Output → DC output)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   DCO p1

Parameter	Content
p1 = 0	OFF
p1 = 1	MAIN
p1 = 2	SUB

Request command   DCO ?

Response data	d1
Return value	Content

* Same as for setting command

TRG

Trigger (corresponds to Measurement → Trigger mode → Trigger mode setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   TRG p1

Parameter	Content
p1 = 0	OFF
p1 = 1	Level 1
p1 = 2	Level 2
p1 = 3	Time
p1 = 4	EXT.

Request command   TRG ?

Response data   d1

Return value   Content

* Same as for setting command

LTR

Trigger level (corresponds to Measurement → Trigger mode → Trigger level setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   LTR p1 p2

Parameter	Content
p1 = 25 to 130	Trigger level for level 1 and level 2 trigger (1-dB steps)
p2 = 0	+ slope (Use p2 = 0 in level 2 trigger)
p2 = 1	− slope

Request command   LTR ?

Response data   d1,d2

Return value   Content

* Same as for setting command

* d1 indicates trigger level, and d2 indicates trigger slope.

LTB

Trigger band for RTA mode (corresponds to Measurement → Trigger mode → Trigger band setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   LTB p1 p2

Parameter	Content
p1 = 0	SUB AP
p1 = 1	MAIN AP
p1 = 2	16 Hz
p1 = 3	31.5 Hz
p1 = 4	63 Hz
p1 = 5	125 Hz
p1 = 6	250 Hz
p1 = 7	500 Hz
p1 = 8	1 kHz
p1 = 9	2 kHz
p1 = 10	4 kHz
p1 = 11	8 kHz
p1 = 12	16 kHz
p2 = 0	Bottom band
p2 = 1	Center band
p2 = 2	Top band

* To specify a 1/3 octave band, use p1 to specify the octave band, and p2 to specify the bottom/center/top band for the trigger.

Request command   LTB ?

Response data   d1,d2

Return value   Content

* Same as for setting command
* d1 indicates octave band, and d2 indicates bottom/center/top band.

LTC

Trigger channel for SLM mode (corresponds to Measurement →
Trigger mode → Trigger band setting)

Only valid if the unit is currently in L_p mode (except pause). In other
cases, error 0003 is returned.

Setting command   LTC p1

    Parameter   Content

    p1 = 0   SUB AP

    p1 = 1   MAIN AP

Request command   LTC ?

    Response data   d1

    Return value   Content

    *   Same as for setting command

TTR

Trigger time (corresponds to Measurement → Trigger mode → Trigger start time/Trigger end time setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   TTR p1 p2 p3 p4 p5 p6 p7 p8 p9

Parameter	Content
p1 = 1 to 12	Start Month
p2 = 1 to 31	Start Day
p3 = 0 to 23	Start Hours
p4 = 0 to 59	Start Minutes
p5 = 1 to 12	End Month
p6 = 1 to 31	End Day
p7 = 1 to 23	End Hours
p8 = 0 to 59	End Minutes
p9 = 0	Trigger interval OFF
p9 = 1	Trigger interval 5 m
p9 = 2	Trigger interval 10 m
p9 = 3	Trigger interval 15 m
p9 = 4	Trigger interval 30 m
p9 = 5	Trigger interval 1 h
p9 = 6	Trigger interval 8 h
p9 = 7	Trigger interval 24 h

Request command   TTR ?

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

Return value   Content

*   Same as for setting command

*   d1 to d9 correspond to p1 to p9

CMP

Comparator (corresponds to Input/Output → Comparator → Comparator setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   CMP p1

Parameter	Content
p1 = 0	OFF
p1 = 1	ON

Request command   CMP ?

Response data   d1

Return value   Content

*   Same as for setting command

CML

Comparator level (corresponds to Input/Output → Comparator → Comparator level setting)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   CML p1

Parameter	Content
p1 = 25 to 130	dB

Request command   CML ?

Response data   d1

Return value   Content

*   Same as for setting command

CMB

Comparator band for RTA mode (corresponds to Input/Output → Comparator → Comparator band)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   CMB p1 p2

Parameter	Content
p1 = 0	SUB AP
p1 = 1	MAIN AP
p1 = 2	16 Hz
p1 = 3	31.5 Hz
p1 = 4	63 Hz
p1 = 5	125 Hz
p1 = 6	250 Hz
p1 = 7	500 Hz
p1 = 8	1 kHz
p1 = 9	2 kHz
p1 = 10	4 kHz
p1 = 11	8 kHz
p1 = 12	16 kHz
p2 = 0	Bottom band
p2 = 1	Center band
p2 = 2	Top band

*   To specify a 1/3 octave band, use p1 to specify the octave band, and p2 to specify the bottom/center/top band for the comparator.

*   Use p1 = specified frequency and p2 = 1 when set the octave band.

Request command   CMB ?

Response data	d1,d2
Return value	Content

*   Same as for setting command

*   d1 indicates octave band, and d2 indicates bottom/center/top band.

CMC

Comparator channel for SLM mode (corresponds to Input/Output
→ Comparator → Comparator band)

Only valid if the unit is currently in L_p mode (except pause). In other
cases, error 0003 is returned.

Setting command	CMC p1
Parameter	Content
p1 = 0	SUB AP
p1 = 1	MAIN AP

Request command	CMC ?
Response data	d1
Return value	Content

* Same as for setting command

RMC

Remote control (corresponds to Input/Output → Remote control)

Only valid if the unit is currently in L_p mode (except pause). In other
cases, error 0003 is returned.

Setting command	RMC p1
Parameter	Content
p1 = 0	OFF
p1 = 1	ON

Request command	RMC ?
Response data	d1
Return value	Content

* Same as for setting command

LNG

Language (corresponds to System → Language)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   LNG p1

Parameter	Content
p1 = 0	Japanese
p1 = 1	English
p1 = 2	Deutsch
p1 = 3	Español
p1 = 4	French

Request command   LNG ?

Response data   d1

Return value   Content

* Same as for setting command

BLA

Backlight auto off interval (corresponds to Input/Output → Backlight auto off)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   BLA p1

Parameter	Content
p1 = 0	30 sec
p1 = 1	3 min
p1 = 2	Cont

Request command BLA ?

Response data   d1

Return value   Content

* Same as for setting command

BLB

Backlight brightness (corresponds to Input/Output → Backlight brightness)

If the unit is displaying a menu or is in recall or calibration mode, the command is not valid and error 0003 is returned.

Setting command   BLB p1
    Parameter   Content
    p1 = 0   Dark
    p1 = 1   Bright

Request command   BLB ?
    Response data   d1
    Return value   Content
    *   Same as for setting command

BEP

Beep tone (corresponds to Input/Output → Beep)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   BEP p1
    Parameter   Content
    p1 = 0   OFF
    p1 = 1   ON

Request command   BEP ?
    Response data   d1
    Return value   Content
    *   Same as for setting command

IDX

Index (corresponds to Input/Output → Index)

Only valid if the unit is currently in L_p mode (except pause). In other cases, error 0003 is returned.

Setting command   IDX p1

     Parameter   Content

     p1 = 1 to 255   Index value

     *   When changing the index setting, keep in mind that the new index will have to be specified in subsequent communication.

Request command   IDX ?

     Response data   d1

     Return value   Content

     *   Same as for setting command

Communication control commands
RMT

Remote mode (no corresponding operation)

If the unit is displaying a menu or is in recall or calibration mode, the command is not valid and error 0003 is returned.

When remote mode has been set to On (1), the operation keys on the unit are inactive (except for the POWER key).

Infrared remote control is also inactive, regardless of its setting.

When remote mode has been set to Off (0), the operation keys on the unit are active, and the infrared remote control operates according to its setting.

Setting command	RMT p1
Parameter	Content
p1 = 0	Remote mode OFF
p1 = 1	Remote mode ON

Request command	RMT ?
Response data	d1
Return value	Content

* Same as for setting command

EST

Error information (no corresponding operation)

This command can be used in all modes.

Request command	EST ?
Response data	d1
Return value	Content
d1 = error code	Returns the most recent error code.

Data output related commands
DOD

Output displayed value (no corresponding operation)

If the unit is displaying a menu or is in recall mode, the command is not valid and error 0003 is returned.

Send the request command at one second interval or longer.

Request command   DOD ?

    <Sound level meter mode>

Response data	d1,d2,...,d23
d1 = xxx.x	Main channel L_p
d2 = xxx.x	Main channel L_{eq}
d3 = xxx.x	Main channel L_E
d4 = xxx.x	Main channel L_{max}
d5 = xxx.x	Main channel L_{min}
d6 = xxx.x	Main channel L_{N1}
d7 = xxx.x	Main channel L_{N2}
d8 = xxx.x	Main channel L_{N3}
d9 = xxx.x	Main channel L_{N4}
d10 = xxx.x	Main channel L_{N5}
d11 = xxx.x	Sub channel L_p
d12 = xxx.x	Sub channel L_{eq}
d13 = xxx.x	Sub channel L_E
d14 = xxx.x	Sub channel L_{max}
d15 = xxx.x	Sub channel L_{min}
d16 = xxx.x	Sub channel L_{N1}
d17 = xxx.x	Sub channel L_{N2}
d18 = xxx.x	Sub channel L_{N3}
d19 = xxx.x	Sub channel L_{N4}
d20 = xxx.x	Sub channel L_{N5}
d21 = xxx.x	Sub channel L_{peak}/L_{tm5}
d22 = 0 or 1	Overload information (1: Yes, 0: No)
d23 = 0 or 1	Under-range information (1: Yes, 0: No)

*   d1 to d21 are fixed at 5 digit length. Higher digits are padded with spaces as required.

*   When display is set to OFF, d1 to d21 are returned as "_--.-" (with a leading space).

<Octave analyzer mode>

Response data	d1,d2,...,d15	
d1 = xxx.x	Sub channel AP	
d2 = xxx.x	Main channel AP	
d3 = xxx.x	16 Hz	
d4 = xxx.x	31.5 Hz	
d5 = xxx.x	63 Hz	
d6 = xxx.x	125 Hz	
d7 = xxx.x	250 Hz	
d8 = xxx.x	500 Hz	
d9 = xxx.x	1 kHz	
d10 = xxx.x	2 kHz	
d11 = xxx.x	4 kHz	
d12 = xxx.x	8 kHz	
d13 = xxx.x	16 kHz	
d14 = 0 or 1	Overload information (1: Yes, 0: No)	
d15 = 0 or 1	Under-range information (1: Yes, 0: No)	

*   When sub channel display is set to OFF, d1 is returned as "_--.-"
    (with a leading space).

<1/3 octave analyzer mode>

Response data	d1,d2,...,d37	
d1 = xxx.x	Sub channel AP	
d2 = xxx.x	Main channel AP	
d3 = xxx.x	12.5 Hz	
d4 = xxx.x	16 Hz	
d5 = xxx.x	20 Hz	
⋮		
d34 = xxx.x	16 kHz	
d35 = xxx.x	20 kHz	
d36 = 0 or 1	Overload information (1: Yes, 0: No)	
d37 = 0 or 1	Under-range information (1: Yes, 0: No)	

*   When sub channel display is set to OFF, d1 is returned as "_--.-"
    (with a leading space).

<Simultaneous analyzer mode>

Response data	d1,d2,...,d48
d1 = xxx.x	Sub channel AP
d2 = xxx.x	Main channel AP
d3 = xxx.x	16 Hz (OCT)
d4 = xxx.x	31.5 Hz (OCT)
⋮	
d12 = xxx.x	8 kHz (OCT)
d13 = --.-	16 kHz (OCT)
d14 = xxx.x	12.5 Hz (1/3OCT)
d15 = xxx.x	16 Hz (1/3OCT)
d16 = xxx.x	20 Hz (1/3OCT)
⋮	
d44 = xxx.x	12.5 kHz (1/3OCT)
d45 = --.-	16 kHz (1/3OCT)
d46 = --.-	20 kHz (1/3OCT)
d47 = 0 or 1	Overload information (1: Yes, 0: No)
d48 = 0 or 1	Under-range information (1: Yes, 0: No)

* d13, d45, and d46 are always returned as "_--.-" (with a leading space) in simultaneous analyzer mode.

* There is no setting command.

DRD

Continuous output (no corresponding operation)

If the unit is displaying a menu or is in recall or calibration mode, the command is not valid and error 0003 is returned.

Data are sent periodically to the computer every 100 msec.

If the store mode is AUTO 1, DRD ? is available when the sampling period of AUTO 1 is 100 msec.

* To stop the data transfer, send the stop request code <*SUB*>.

Request command   DRD ?

    <Sound level meter mode>

    Response data   d1,d2,...,d10

d1 = xxx.x	Main channel L_p
d2 = xxx.x	Main channel L_{eq}
d3 = xxx.x	Main channel L_{max}
d4 = xxx.x	Main channel L_{min}
d5 = xxx.x	Sub channel L_p
d6 = xxx.x	Sub channel L_{eq}
d7 = xxx.x	Sub channel L_{max}
d8 = xxx.x	Sub channel L_{min}
d9 = 0 or 1	Overload information (1: Yes, 0: No)
d10 = 0 or 1	Under-range information (1: Yes, 0: No)

    * When sub channel display is set to OFF, d5 to d8 are returned as "_--.-" (with a leading space).

    <Octave analyzer mode>

    Response data   d1,d2,...,d15

    * Response data are the same as for the DOD command.

    <1/3 octave analyzer mode>

    Response data   d1,d2,...,d37

    * Response data are the same as for the DOD command.

    <Simultaneous analyzer mode>

    Response data   d1,d2,...,d48

    * Response data are the same as for the DOD command.

* There is no setting command.

Examples for Control Via External Commands

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

- Check index number

To check whether a setting was made properly, using a request command after sending a setting command is recommended.
Refer to the page 40 for sending a command format.

Example: Get sound level

* Power ON cannot be controlled by a communication command.

Power ON

⬇ IMD0 (SLM mode)

Settings
- WGT0_1 (Main: A, Sub: C)
- TMC0_0 (Main: F, Sub: F)
- RNG3 (20 to 110 dB)

Establish the above settings to prepare the sound level meter for measurement.

⬇

DOD ? (Get display value)

_ stands for a space.

Example: L_{eq} measurement

(Frequency weighting: C, Time weighting: FAST, Level range: 20 to 80 dB,
Measurement time: 10 sec)

Power ON

↓

Settings
- WGT1_#   (Main: C)
- TMC0_#   (Main: F)
- RNG0   (20 to 80 dB)
- MTI10_0   (10 s)

↓

DPI1_1   (Set L_{eq} to On.)
          11 parameters must be set

↓

DSP1   (Show L_{eq} value on display)

↓

SRT1   (Start processing)

↓   (Measurement end, or stopped by SRT0)

DOD ?   (Get display value)

_ stands for a space.

Auto 1 store example

(Frequency weighting: C, Time weighting: FAST, Level range: 40 to 130 dB,
Measurement time: 5 min, File name: AU1_0001, Sampling cycle: 100 msec)

Power ON, CF card inserted

⬇

CDV?   (Confirm inserting a CF card)

⬇

Settings
- WGT1_#   (Main: C)
- TMC0_#   (Main: F)
- RNG5   (40 to 130 dB)
- MTI5_1   (5 m)
- SMD1   (AUTO1)
- SNS0001   (File name)
- PLP100_# (100 msec)

Establish the above settings to prepare the Auto1 measurement.

⬇

STO1   (Start store operation)

⬇

SRT0   (Stop measurement)

Data are stored on the CF card as a text file.

To copy the data to the computer, access the card recognized by the computer
as "removable media".

_ stands for a space.