

INSTRUCTION MANUAL

FFT ANALYSIS CARD

NX-28FT



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Organization of this manual

This manual describes the functions and operation principles of the FFT Analysis Card NX-28FT which is an optional program card for the Sound Level Meter NA-28. Pages iii and following contain usage license agreement, vii and following contain important safety precautions. Be sure to read these sections carefully.

The manual consists of the chapters listed below.

Outline

Gives basic information on the functions of the software.

Installation

Explains how to install or uninstall the program.

Start up

Explains how to start up the program and how to use the function for loading setup files.

Reading the Display

Explains the various items that appear on the display.

Calibration

Explains how to calibrate the Sound Level Meter NA-28.

Measurement

Explains how to measure, recall and erase saved data.

Setup the menu

Explains how to perform settings for each menu screen.

Waveform Recording Function

Explains how to simultaneously perform waveform recording during measurement.

Store Data

Gives information on measurement data stored on the CompactFlash (CF) card.

Printing

Explains how to print data from the measurement screen and recall screen.

Screen hardcopy

Explains how to save a hard copy of the screen display on the CF card.

Initialize

Describes how to initialize and describes the setup value when initializing this program.

Setup File

Explains the setup file used with this program.

Communication Commands

Explains how to control settings and operation from a computer via the interface.

Specifications

Lists the technical specifications of the NX-28FT.

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Usage License Agreement

Important

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(1) Definition and Scope

The item covered by this agreement is software for the Sound Level Meter NA-28 including the media on which the software is supplied, and documentation that is supplied with the software either in printed form or as an electronic file. This license agreement defines the right of the user to use the software.

(2) Usage

The user may install and use the software on the Sound Level Meter NA-28.

2. Intellectual Property Rights

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3. Limitations

- (1) Based on this agreement, the user only acquires the right to use the software. Any other rights not covered in this agreement are not accorded to the user. The user may not copy or otherwise duplicate the software and the associated documentation by any means, in whole or in part, except for the case stated in "1. (2) Usage". The software and the associated documentation are protected by copyright laws.
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- (4) The user may not use the software to produce any products that imitate the software. Any imitation or simulation of the software is an infringement of copyright laws.

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The user must ensure that all persons using the software are fully aware of all conditions of this agreement. Any violation will be the responsibility of the user.

5. Warranty

- (1) RION CO., LTD. guarantees that the software is supplied on media that have no substantial defect, and that the software contains the functions that are explicitly listed in the specifications. If the software does not operate according to specifications or if any problems described above that are the responsibility of RION CO., LTD. are detected and RION CO., LTD. is informed of this fact within 90 days from the purchase date of the software, RION CO., LTD. will undertake to remedy the problems free of charge.
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6. Limitation of Warranty

- (1) RION CO., LTD. does not guarantee that the software is fit for any particular purpose of the user, whether stated explicitly or implicitly, or that the software is free of errors. RION CO., LTD. does not provide any other kind of warranty except as stated in this agreement. RION CO., LTD. does not accept responsibility for any kind of damage, whether direct or indirect, tangible or intellectual, that may arise from the use of the software or the failure of the software to perform any function.
- (2) Under no circumstances will the responsibility of RION CO., LTD. as stated in "5. Warranty" exceed the equivalent of the price that the user paid for the software.

7. Duration

This agreement is valid until terminated. The user can terminate the agreement at any time by unloading the software from the Sound Level Meter NA-28 and destroying the software and associated documentation. The agreement also terminates when the user violates any of the conditions herein. In this case, the user also must destroy the software and unload the software from the Sound Level Meter NA-28.

8. Jurisdiction

Any disputes or litigation arising from this agreement will be under the jurisdiction of the Tokyo District Court.

FOR SAFETY

In this manual, important safety instructions are specially marked as shown below. To prevent the risk of death or injury to persons and severe damage to the unit or peripheral equipment, make sure that all instructions are fully understood and observed.

⚠ Caution	Disregarding instructions printed here incurs the risk of injury to persons and/or damage to peripheral equipment.
●	

Important	Disregarding instructions printed here incurs the risk of software malfunction or loss of stored data.
●	



Note	Mentioned about the tips to use this program properly. (This messages do not have to do with safety.)
●	

Important

Saving data in internal memory

Before starting up the program provided on the FFT Analysis Card NX-28FT, be sure to copy all data stored in the internal memory of the NA-28 onto a CF card.

This program uses the internal memory during operation. Therefore any stored data in the internal memory will be deleted.

If data exist in the internal memory, a confirmation message will appear when starting up the program by function switching.

Before formatting the card

This program card also contains a program for updating the system version of the NA-28. If you format the card, this capability will be lost.

Note
Before formatting, insert the program card and turn on the NA-28. The next item explains either to startup without executing the automatic version upgrade or wait until the automatic version upgrade completes execution and the power goes off. At this time, the version upgrade is not necessary.

Automatic version upgrading at first use

When you use the FFT Analysis Card NX-28FT for the first time (normally this will be for installation), make sure that the card is inserted in the card slot before you turn power to the NA-28 on. If the system version of the NA-28 is not up to date, the version upgrade process will start automatically when you turn the power on. When the process is completed, power goes off automatically.

Then turn power on again to start installation of the FFT program. For details on this process, refer to the "Installation" section.

After the system version of the NA-28 has been updated, the data in the folder "NA-28" - "system" (version updating information) are no longer needed. You can therefore delete the folder, using a computer.

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Outline

This card is an optional program card that adds FFT analysis functionality to the Sound Level Meter (with 1/3 octave analysis function) NA-28 (hereinafter called "this program" in this manual).

This program is equipped with a frequency range and frequency resolution for performing tonal measurement without switching frequency range as stipulated in ISO 1996-2 Annex C.

Measurement value

The following indicates three measurement values of this program.

- INST value: 1 frame FFT analysis result
However, the main channel and sub channel collects the time-weighted sound level L_p .

Note
A frame is a set of time series or frequency span data necessary for FFT processing. The time of 1 frame is 400 ms.

- LIN value: Power average value by each frequency during the measurement period.

$$Y_n = 10 \log \left(\frac{1}{n} \sum_{i=1}^n 10^{\frac{X_i}{10}} \right)$$

Y_n : Average data

X_i : Data per frame

i : 1, 2, 3, ..., n

n : Power averaged frame count

However, the main channel and sub channel collects the time-averaged sound level L_{eq} during the measurement period.

- MAX value: Maximum value by each frequency during the measurement period.

However, the main channel and sub channel collects the time-weighted sound level maximum value L_{max} .

Measurement mode

The following indicates two measurement modes of this program. Measurement mode is set in the FFT menu screen (page 35).

- LIN mode: Measures (processes) INST value and LIN value.
- MAX mode: Measures (processes) INST value and MAX value.

Installation

The software on this program card can be used only on one NA-28 at a time. To install the software on multiple NA-28 units, multiple program cards are required.

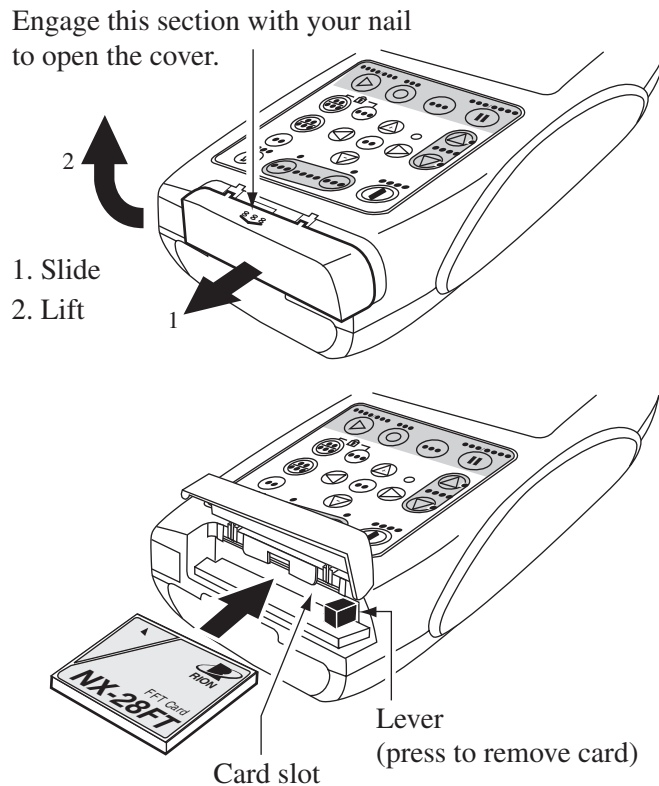
Installing this program

Important

Make sure that power to the unit is turned off before inserting the card.

To install this program in the NA-28, proceed as follows.

1. Open the cover of the card slot and insert the program card.



2. Press the POWER key to turn power on.

Note

If the system version of the NA-28 is not up to date, the version upgrade process will start automatically. When the process is completed, power goes off automatically. Then repeat the procedure from step 1. (Refer to the section "Automatic version upgrading at first use" on page ix.)

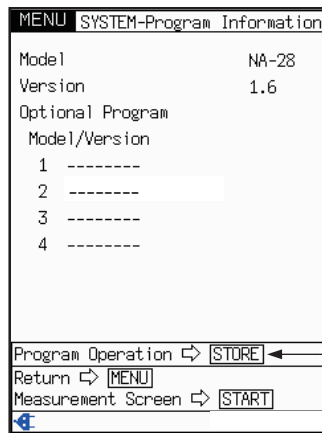
3. Press the MENU key. (The Menu List screen appears.)
4. Select [System] from the list and press the ENT key. (The SYSTEM menu screen appears.)
5. Select [Program Information] and press the ENT key. (The SYSTEM - Program Information screen appears.)



Selecting [Program Information] and pressing ENT brings up the SYSTEM - Program Information screen.

SYSTEM menu screen

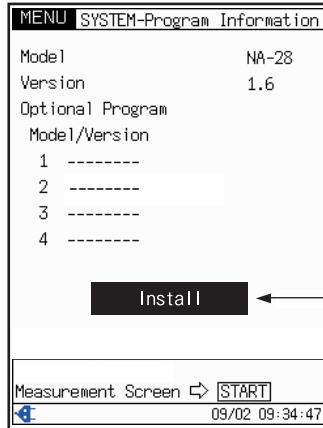
6. Press the STORE key to bring up the installation screen.



Pressing STORE brings up the installation screen.

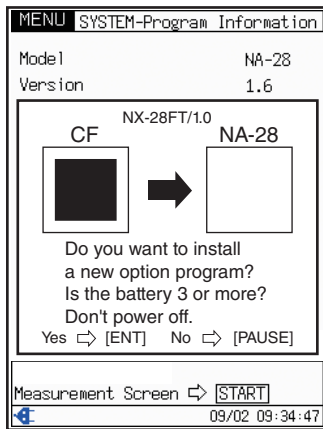
SYSTEM - Program
Information screen

- Use the Δ / ∇ keys to select [Install] and press the ENT key.
A screen for starting the installation process of this program appears.
To install the function, press the ENT key. This will cause the program to be installed from the program card in the NA-28.



Using the Δ / ∇ / \triangleleft / \triangleright keys to select [Install] and pressing ENT brings up the installation screen.

SYSTEM - Program Information screen



Program installation confirmation screen

- (black): Program is installed.
- (white): Program is not installed.

Important

Make sure that the battery indicator has at least 3 segments before starting the installation (page 20).

Do not turn power off during the installation. Otherwise program data may be corrupted.

Note

When this program has been installed from the program card in one NA-28, the card can no longer be used to install the function in another NA-28, unless it is first uninstalled from the former NA-28.

When the installation is completed, the power automatically goes off.
Press the POWER key to restart the unit.

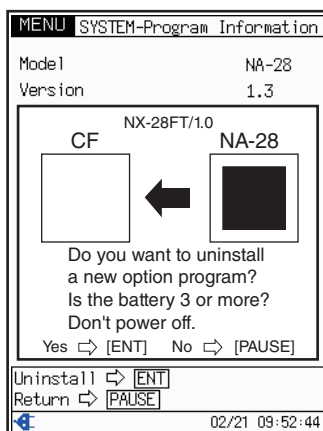
Uninstalling this program

Important
Make sure that power to the unit is turned off before inserting the card.

To uninstall this program from the NA-28, proceed as follows.

1. Open the cover of the card slot and insert the program card.
2. Press the POWER key to turn power on.
3. If this program is running, switch to NA-28 mode.
On the Menu List screen, select [Option] and press the ENT key.
The Selection Function List screen will come up, with [NA-28] already selected. Press the ENT key.
The unit restarts in NA-28 mode.
4. Press the MENU key. (The Menu List screen appears.)
5. Select [System] from the list and press the ENT key. (The SYSTEM menu screen appears.)
6. Select [Program Information] and press the ENT key. (The SYSTEM - Program Information screen appears.)
7. Press the STORE key to bring up the uninstallation screen.

8. Use the \triangle / ∇ keys to select [NX-28FT] and press the ENT key. A screen for starting the uninstallation process of this program appears. To uninstall the function, press the ENT key. This will cause the program to be uninstalled from the NA-28 and reinstalled on the program card.



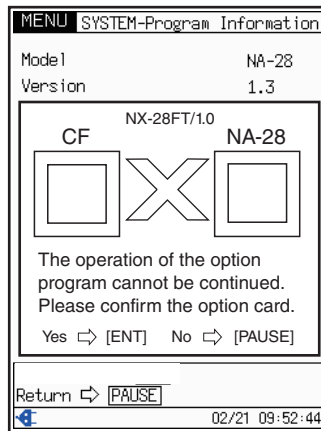
Program uninstallation confirmation screen

Important
Make sure that the battery indicator has at least 3 segments before starting the uninstallation process (page 20).
Do not turn power off during the uninstallation process. Otherwise program data may be corrupted.

To remove the program card, turn power to the NA-28 off and push the lever so that the card pops out.

If the program cannot be installed

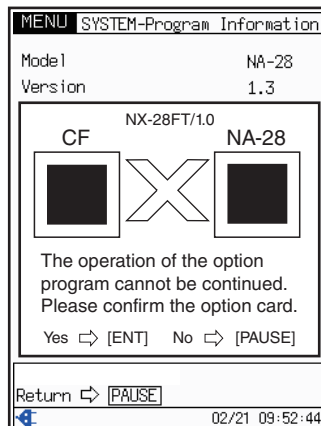
If a program card whose software was installed on a NA-28 is inserted into another NA-28, attempting to install the software in that NA-28 will result in an error screen such as shown below.



Program installation error screen

Press the PAUSE key of the NA-28 to abort the installation.

If you attempt to install this program on a NA-28 where the program is already installed, an error screen such as shown below appears.



Program installation error screen

Press the PAUSE key of the NA-28 to abort the installation.

Important
Do not remove the card during the installation process. Otherwise program data may be corrupted.

To remove the program card, turn power to the sound level meter off and push the lever so that the card pops out.

Start up

NX-28FT start up

The procedure for starting up this program is as follows.

The same steps are also used to return the NA-28 to the standard condition.

Important
Before starting up the program, be sure to copy all data stored in the internal memory onto a CF card. Because this program uses the internal memory during operation, any stored data will be deleted. If data exist in the internal memory when starting up the program, a confirmation message appears.

1. Turn on power to the sound level meter NA-28 where this program (FFT Analysis Card NX-28FT) is installed.

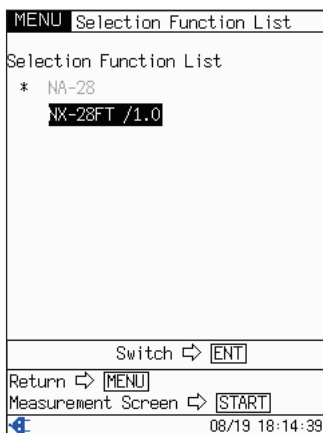
The start up screen is shown for about 10 to 15 seconds, and then the measurement screen appears.

Note
If this program was running in the NA-28 before power was turned off the last time, it will start again at power-up.

2. If this program is not running (NA-28 starts up in normal operation condition or the Building Acoustic Card NX-28BA starts up), press the MENU key to bring up the Menu List screen.

- Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [Option] and press the ENT key.

The Selection Function List screen appears.



Selection Function List screen

- Use the \triangle / ∇ keys to select [NX-28FT] and press the ENT key. The program starts up. This takes about 10 to 15 seconds because the NA-28 will restart.

Verifying whether the program is running

You can use the measurement screen to check whether this program is running.

If the program is running, the indication "FT" is shown at the top left of the measurement screen.

(See the chapter "Reading the Display" on page 15.)

Resume function

When this program is started, the measurement screen will appear. The settings and the measurement values will be the same as those that were active before the last power-down cycle (resume function).

The address is not applicable to the resume function.

Note
When power is turned on while a CF card with a setup file in the specified folder is inserted, the setup file will be loaded and will override the resume function settings (see below).

Loading setup data from a file at startup

If a CF card which contains a setup file in a special folder is inserted in the NA-28 when starting this program, a dialog asking whether to load the settings appears. Either selecting "Yes" at this dialog or waiting for about 10 seconds will cause the settings in the file to be loaded.

Folder for setup file: NA-28\SETUP\STARTUP

Naming convention for setup file:

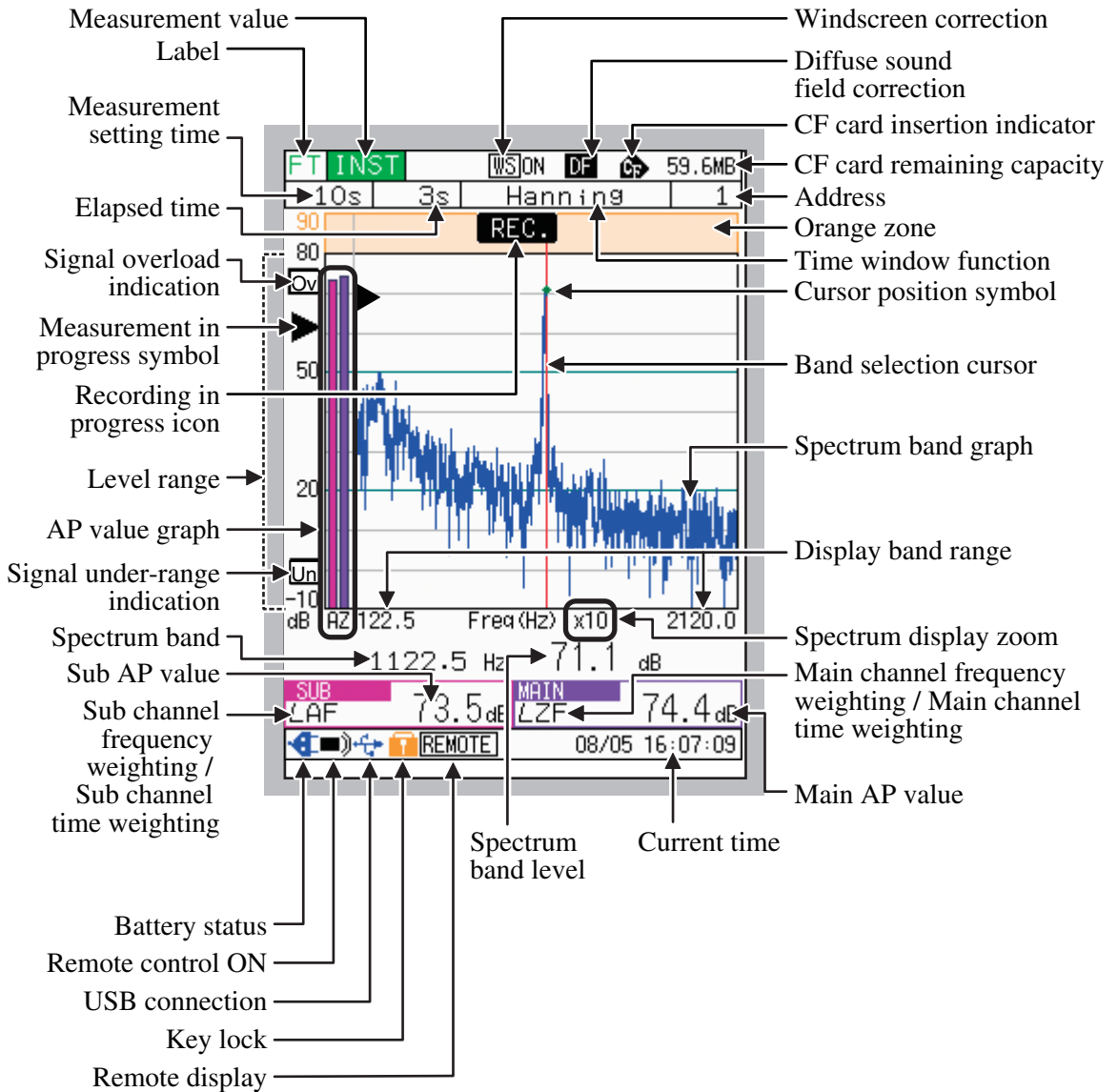
NX28FTSET○.RNS

(where ○ is a number of 1 to 5, and the number is assigned automatically.)

For details on how to create setup files, refer to the instruction manual of the NA-28. However, replace "NA28SET○.rns" with "NX28FTSET○.RNS" when referring to the said file.

Reading the Display

Graphical display



Label

When the program (FFT Analysis Card NX-28FT) is running, the indication "FT" is shown.

Measurement value

Displays the measurement value type currently being displayed.

- When the measurement mode is LIN
Each time the MODE key is pressed, the display order changes from INST → LIN → INST → ...
- When the measurement mode is MAX
Each time the MODE key is pressed, the display order changes from INST → MAX → INST → ...

Windscreen correction

[**WS** ON] is shown when wind screen correction is ON.

[**WS** OFF] is shown when wind screen correction is OFF.

Diffuse sound field correction

DF is shown when diffuse sound field correction is ON.

CF card insertion indicator

Indicates that a CF card has been inserted.

CF card remaining capacity

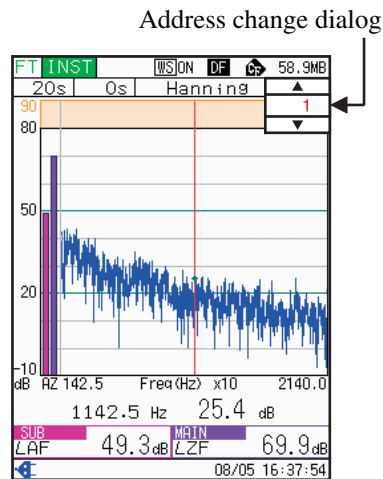
Indicates the remaining capacity of the inserted CF card.

Address

Displays the address to be saved next.

Press the ENT key to display the [Address change dialog] which allows you to change the stored address. Use the \triangle / ∇ keys to select the address and confirm with the ENT key. Red is displayed when data already exists in the selected address, and black is displayed when there is no data.

To change the address, you can also use the method of selecting [Address change] from the Menu List screen to display the [Address change dialog].



Orange zone

Orange is displayed for level ranges over 10 dB. When the level is in this range, an overload may occur depending on the properties of the signal.

Time window function

Displays the time window function set using the FFT menu screen.

Cursor position symbol

A symbol is displayed for the current level of the band where the cursor is indicated.

Band selection cursor

Displays in the band group position including the selected band.

The band selection cursor can be moved using the \triangleleft / \triangleright keys. Also, you can fast forward by pressing and holding one of the keys.

Spectrum band graph

Each band level is displayed as a line graph. However, if the display range exceeds 200 bands, multiple bands will be included in 1 pixel on the horizontal axis, and the maximum value and minimum value of the band will be combined and displayed with a direct line.

Display band range

Displays lower frequency display range/upper frequency display range.

Spectrum display zoom

Displays the zoom rate for the currently selected spectrum band graph.

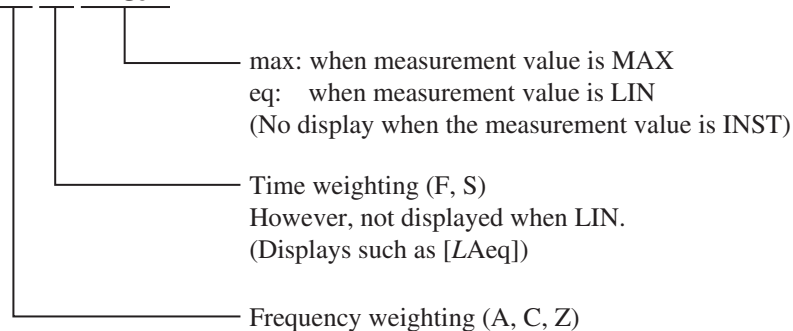
Each time the \triangle key is pressed the zoom rate changes in the order $\times 1 \rightarrow \times 2 \rightarrow \times 5 \rightarrow \times 10 \rightarrow \times 20 \rightarrow \times 40$.

Each time the ∇ key is pressed the zoom rate changes in the order $\times 40 \rightarrow \times 20 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 2 \rightarrow \times 1$.

Main channel frequency weighting/Main channel time weighting

Indicates the frequency weighting characteristic and the time weighting characteristic of the main channel.

L A F max



Note
Each time the FREQ key is pressed the main channel frequency weighting changes in the order of A \rightarrow C \rightarrow Z \rightarrow A \rightarrow
Each time the TIME key is pressed the main channel time weighting changes in the order of F \rightarrow S \rightarrow F \rightarrow

Main AP value

When the measurement value is INST, main channel L_p is displayed, for LIN, L_{eq} is displayed, and for MAX, L_{max} is displayed.

Current time

Displays the current time managed by the system.

Spectrum band level

Displays the selected band level using the cursor.

Remote display

Displayed when remote mode (dedicated communications mode, normal operation of keys is not possible).

Remote mode and local mode (modes that allow key operations) switching is done using the RMT command. For details, refer to "local mode/remote mode", "command reference" in the NA-28 serial interface manual.

Key lock

Pressing the GRP/NUM and MENU keys together activates the key lock, and this symbol appears.

Pressing the GRP/NUM and MENU keys together once more cancels the key lock.

USB connection

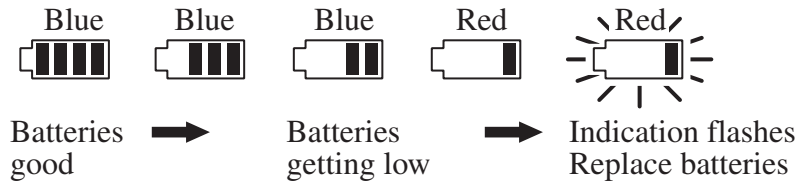
Indicates that the unit is connected to a computer via a USB link and that USB communication is enabled. The symbol does not appear when connected as a removable disc only.

Remote control ON

Indicates that the unit can be controlled with the infrared remote control.

Battery status

When the unit is operated on battery power, it is required to check this indication regularly. The number of blue segments will decrease as the batteries get used up. When the indication starts to flash, correct measurement is not possible. Replace the batteries with a fresh set.



When the unit is being powered from an AC adapter, the power plug symbol (⚡) is shown.

Sub channel frequency weighting/Sub channel time weighting

Indicates the frequency weighting characteristic and the time weighting characteristic of the sub channel. The display content is the same for the main channel.

Note
Each time the MENU and FREQ keys are pressed together the sub channel frequency weighting changes in the order of A → C → Z → A →
Each time the MENU and TIME keys are pressed together the sub channel time weighting changes in the order of F → S → F →

Sub AP value

When the measurement value is INST, sub channel L_p is displayed, for LIN, L_{eq} is displayed, and for MAX, L_{max} is displayed.

Spectrum band

Displays the frequency of the selected band using the cursor.

Signal under-range indication

When a signal under-range condition is detected, the indication **Un** (white on black) is shown.

If this indication appears frequently, use the LEVEL \triangle / ∇ keys to decrease the level range setting.

If processed data contain signal under-range data, the indication **Un** is shown. This indication remains on the display until the next processing measurement is started.

Displays **Un** if both occur at the same time.

AP value graph

The main channel and sub channel AP value graph are displayed.

Displays each selected frequency weighting (A/C/Z) as an X axis label.

Level range

Indicates the sound pressure level measurement range. This can be switched with the LEVEL \triangle / ∇ keys.

Recording in progress icon

Icon that indicates actual recording using the waveform recording function is operating.

Flashes when the waveform recording function is available (if it is installed and the function is available), during the measurement (process).

Measurement in progress symbol

When a processing is in progress, the **▶** symbol flashes, and the indicator LED flashes in green. During standby processing the **■** symbol flashes. During processing pause, the **||** symbol is shown, and the indicator LED flashes in blue.

Signal overload indication

When a signal overload condition is detected, the indication **Ov** (white on black) is shown for at least 1 second. If this indication appears frequently, use the LEVEL \triangle / ∇ keys to increase the level range setting.

If processed data contain signal overload data, the indication **Ov** is shown. This indication remains on the display until the next processing measurement is started.

Displays **Ov** if both conditions occur at the same time.

Elapsed time

During measurement, displays the current elapsed time.

When other than during measurement, displays the elapsed time of the previous measurement.

Measurement setting time

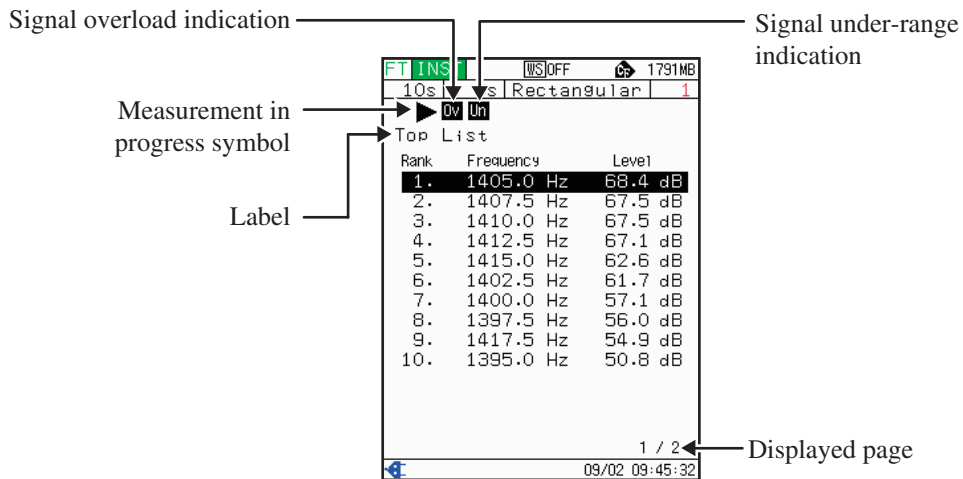
Displays the measurement time set using the FFT menu screen. The unit is seconds.

Top List display

Switch to the Top List display by pressing the GRP/NUM key on the graph display screen.

This screen displays the Top List frequency of the top 20 bands and values in order from the highest level.

Bands 1 to 10 are displayed on the 1st page, and 11 to 20 are displayed on the 2nd page.



Explains unique items in the Top List display. Please read pages 15 to 22 regarding other items.

Label

Indicates Top List display.

Displayed page

1/2 or 2/2 is displayed indicating the displayed page.

The ◀/▶ keys switch the page.

Also, the ▲/▼ keys move the cursor (reversed display).

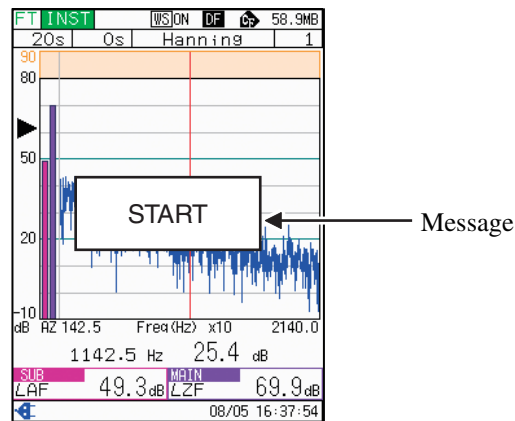
Press the GRP/NUM key or the ENT key to return to the graph display.

Press the GRP/NUM key to display the same range graph as the immediately preceding and press the ENT key to display the graph of the currently selected band (reversed display) by moving the cursor.

Message indication

When you press the START/STOP key, the STORE key or other keys, a message such as shown below is shown for about 1 second.

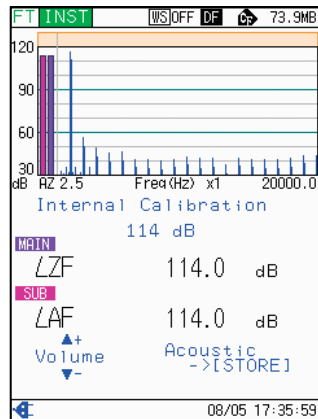
START	START/STOP key was pressed and measurement has started
STOP	START/STOP key was pressed and measurement has ended
STORE 0003	STORE key was pressed (Displays the store address, too)
PAUSE	PAUSE/CONT key was pressed and unit is in pause condition
CONTINUE	PAUSE/CONT key was pressed and measurement was resumed



Display example

Calibration

Before starting a measurement, the NA-28 must be calibrated. For details, refer to the NA-28 instruction manual. On the measurement screen, press the CAL key to display the calibration screen.



Calibration screen

Measurement

Measurement value

The following indicates three measurement values of this program.

- INST value: 1 frame FFT analysis result
However, the main channel and sub channel collects the time-weighted sound level L_p .

Note
A frame is a set of time series or frequency span data necessary for FFT processing. The time of 1 frame is 400 ms.

- LIN value: Power average value by each frequency during the measurement period.

$$Y_n = 10 \log \left(\frac{1}{n} \sum_{i=1}^n 10^{\frac{X_i}{10}} \right)$$

Y_n : Average data

X_i : Data per frame

i : 1, 2, 3, ..., n

n : Power averaged frame count

However, the main channel and sub channel collects the time-averaged sound level L_{eq} during the measurement period.

- MAX value: Maximum value by each frequency during the measurement period.

However, the main channel and sub channel collects the time-weighted sound level maximum value L_{max} .

Measurement mode

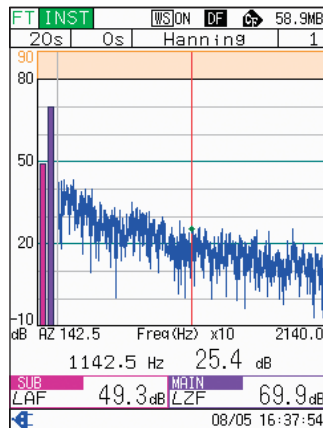
The following indicates two measurement modes of this program. Measurement mode is set in the FFT menu screen (page 35).

- LIN mode: Measures (processes) INST value and LIN value.
- MAX mode: Measures (processes) INST value and MAX value.

Measurement/Processing

When the power is turned on, the screen display is the same as the last time it was turned off.

1. Press the MENU key and the Menu List screen is displayed. If selecting [FFT], the FFT menu screen is displayed and the measurement mode, store name, measurement time, and time window function are all set. For operation details, refer to page 35.
2. Set the sub channel. For operation details, refer to page 37.
3. Press the START/STOP key to return to the measurement screen.



Measurement screen

4. Use the **FREQ WEIGHT** key to set the main channel frequency weighting.
5. Use the **TIME WEIGHT** key to set the main channel time weighting.
6. Use the **LEVEL** \triangle / ∇ key to set the level range. Set the AP value graph so it is indicated near the center. If the **OV** or **Un** indication appears frequently, change the level range settings.

Note

After processing has started, the level range setting cannot be changed.
Before starting processing, confirm the appropriate level range.

7. When necessary, use the \triangle / ∇ keys to enlarge/decrease the display.
8. Press the START/STOP key to start processing.
During processing, the \blacktriangleright symbol flashes to indicate processing and the elapsed time is also displayed.

Note
<p>If the delay time has been set, processing starts after delay time elapsed and if the trigger condition has been set, processing starts after the trigger condition has been cleared.</p> <p>During standby, the \blacksquare symbol flashes.</p>

9. When the measurement time set in procedure 1 elapses, measurement automatically ends.
Press the START/STOP key to end measurement before the set time.

Note
<p>During processing, press the FREQ WEIGHT, TIME WEIGHT, LEVEL \triangle, LEVEL ∇ key to insert a marker into the data. For details, refer to the NA-28 instruction manual.</p>

Note
<p>When the level that is displayed on the measurement screen is lower than "-2 dB of lower limit level range", [--.-dB] is displayed. However, when the level range is "80 to -10 dB" and the level is lower than -10 dB, [--.-dB] is displayed.</p> <p>In the case of the spectrum band level, the data that is saved when the STORE key is pressed is not [--.-dB], but the "lower limit level range to -2 dB" value. However, when the level range is "80 to -10 dB", -9.9 is saved.</p>

Measurement (processing) pause

During measurement (during processing), press the PAUSE/CONT key to pause and restart (continue) measurement (processing).

The time duration when paused is not included in the measurement.

When paused, the **||** symbol appears.

Storing data

Press the STORE key after processing ends to store FFT analysis data to the CF card.

When storing the LIN value or MAX value, the INST value is also saved at the same time.

After storing, the address increments automatically by 1.

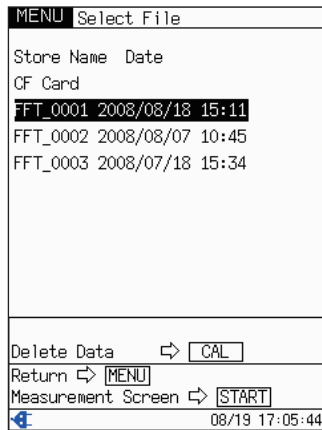
Address changes

Saved addresses can be changed. For details, refer to page 17.

Recall

Recall procedure

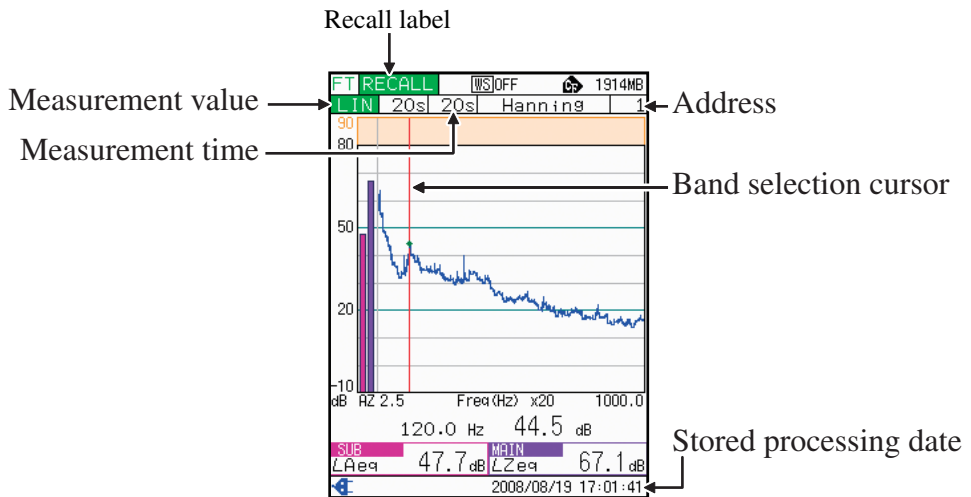
1. Press the MENU key to bring up the Menu List screen.
2. Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [Recall] and press the ENT key.
The Select File screen appears.



Select File screen

3. Using the \triangle / ∇ keys, select the FFT analysis data (Store name data that begins with "FFT") to be recalled and press the ENT key.
The recall screen is displayed.

Recall screen



Recall screen (Graph display)

Recall label

Indicates the recall screen.

Measurement value

Indicates the measurement value type of the data being recalled.

Measurement time

Displays the actual elapsed time of the executed measurement.

Stored processing date

When INST is displayed, the time is displayed when the data was saved.

When LIN or MAX is displayed, the processing start time is displayed.

Band selection cursor

Displays in the band group position including the selected band.

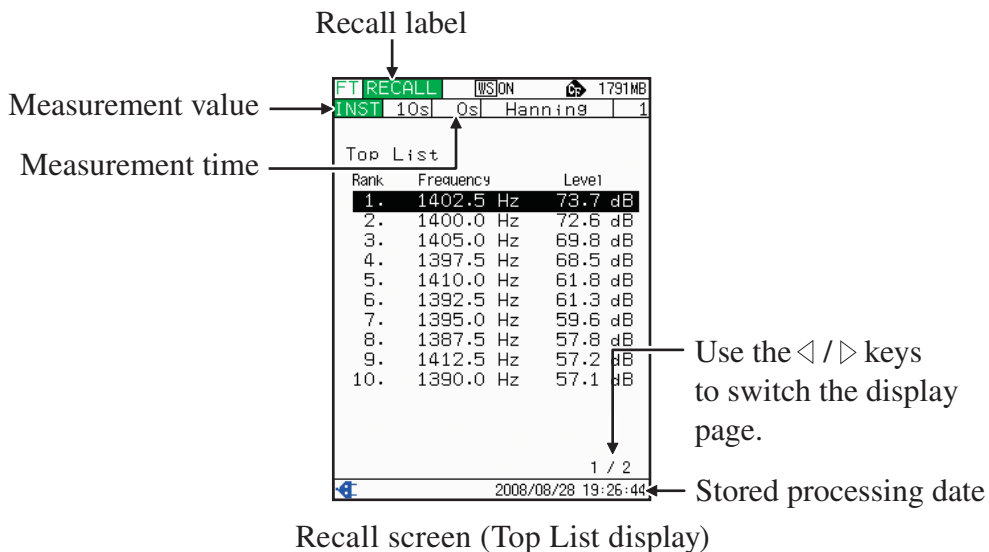
The band selection cursor can be moved using the $\triangleleft/\triangleright$ keys. Also, you can fast forward by pressing and holding one of the keys.

Address

Displays the address of the data being recalled. To change the address, press the ENT key and the Recall menu screen is displayed. The [Address change dialog] is displayed by selecting [Address change], use the $\triangleup/\triangledown$ keys to select the address and press the ENT key to confirm.

Refer to pages 15 to 22 regarding other items.

On the graph display, switch to the Top List display by pressing the GRP/NUM key. Return to the immediately preceding graph display by pressing the GRP/NUM key on the Top List display.



Press the MODE key to change the measurement value.

- When measurement value is LIN:
Each time the MODE key is pressed, the display changes in the order INST → LIN → INST →
- When measurement value is MAX:
Each time the MODE key is pressed, the display changes in the order INST → MAX → INST →

Note
The INST value displayed here is not the current INST value, rather the INST value saved together with the processing result.

The recall screen (Graph display) can be printed (refer to the section on "Printing" on page 48). The Recall screen (Top List display) cannot be printed.

Press the ENT key to display the Recall menu screen for the graph display, or display the Recall screen (graph display) for the Top List display by moving the cursor to the selected band (reversed display).

Press the MENU key to return to the Select File screen.

Press the START/STOP key to return to the measurement screen.

Deleting stored data

Measurement data stored on the CF card can be deleted as follows.

1. Display the Select File screen.
 - When the measurement screen is displayed:
First, press the MENU key to display the menu list screen.
Select [Recall] and press the ENT key, to display the Select File screen.
 - When the recall screen is displayed:
Press the MENU key to display the Select File screen.

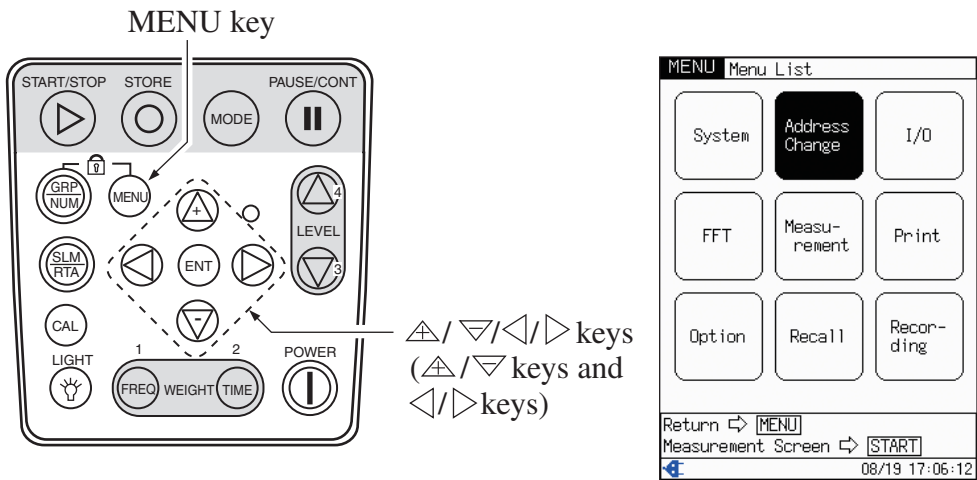


Select File screen

2. Select the data to delete and press the CAL key.
3. A confirmation message appears. Press the ENT key to go ahead with the delete process.
To cancel the delete process, press the PAUSE key.

Setup the menu

Pressing the MENU key on the measurement screen brings up the Menu List screen. Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [Menu] and press the ENT key.



Operating panel

Menu List screen

On the menu list, the following menu items are displayed.

- System..... Refer to the NA-28 instruction manual.
- Address Change..... Refer to the section on "Reading the Display" (page 17)
- I/O..... Refer to the NA-28 instruction manual.
- FFT Explained in this section. Please read page 35.
- Measurement..... Explained in this section. Please read page 36.
- Print Refer to the section on "Printing" (page 48)
- Option Refer to the section on "Start up" (pages 12 to 13)
- Recall Refer to the section on "Measurement" (page 30)
- Recording..... Refer to the section on "Waveform Recording Function" (page 38)

[FFT] menu

Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [FFT] and press the ENT key. The FFT menu screen appears.



FFT menu screen

Measurement Mode

Available settings: [LIN], [MAX]. (Refer to page 26)

Store Name

FFT_xxxx (xxxx is any 4-digit number that is set)

Name of the folder where measurement result data files are stored.

This is used for identification when the data is recalled later.

[FFT_] is fixed. Cannot change.

Measurement Time

1 to 999 seconds, setting of 1 second step is possible.

Specifies the time interval for which measurement data are collected.

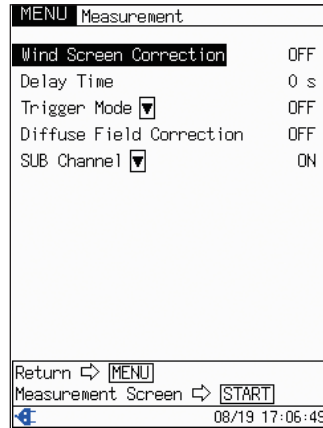
Window Function

Available settings: [Hanning] or [Rectangular].

Sets the time window function.

[Measurement] menu

Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [Measurement] and press the ENT key. The Measurement menu screen appears.



Measurement menu screen

Wind Screen Correction

Available settings: [ON] or [OFF].

For details, refer to the NA-28 instruction manual.

Delay Time

Setting range: 0 to 10 seconds.

Specifies the delay time between the points where the START key is pressed and the actual start of measurement.

Trigger Mode

Available settings: [OFF], [Level], or [EXT.].

For [Level], further settings for [Trigger Level] and [Trigger Band] are required.

Trigger level: Available range setting is 25 to 130 dB.

Trigger band: Available settings are [SUB AP], [MAIN AP].

Diffuse Field Correction

Available settings: [ON] or [OFF].

For details, refer to the NA-28 instruction manual.

Sub Channel

Available settings: [ON] or [OFF].

For [ON], further settings for [Frequency weighting] and [Time weighting] are required.

Frequency weighting: Select either [A], [C], or [Z].

Time weighting: Select either [F], or [S].

Waveform Recording Function

If program data from the Waveform Recording Card NX-28WR have been installed in the NA-28, the waveform recording function can be used in conjunction with this program to record the actual sound pressure waveform at the time of measurement.

The recorded waveform is saved to the CF card as a PCM format WAVE file along with the process result file.

- Refer to the NX-28WR instruction manual regarding how to install NX-28WR.
- Refer to the section on "Store data" on page 41 regarding WAVE file storage.
- The recordable range is the frame for FFT analysis.

Important
The file split function is not available while the waveform recording function is operating.

Waveform recording start/stop

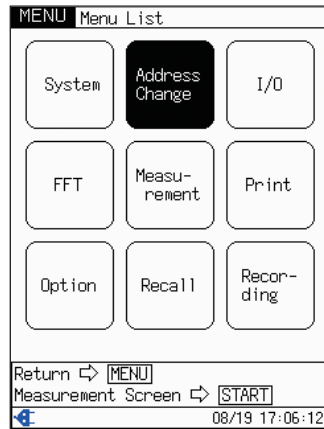
Waveform recording is performed simultaneously with the collection of process values.

Recording starts from the point where the START/STOP key is pressed, and terminates when the preset processing time has elapsed. Also, to stop the processing at any time, press the START/STOP key.

To save the waveform, press the STORE key.

Starting the waveform recording function

1. Press the MENU key to bring up the Menu List screen.



Menu List screen

2. Use the Δ / ∇ / \triangleleft / \triangleright keys to select [Recording] and press the ENT key. The Recording menu screen appears.



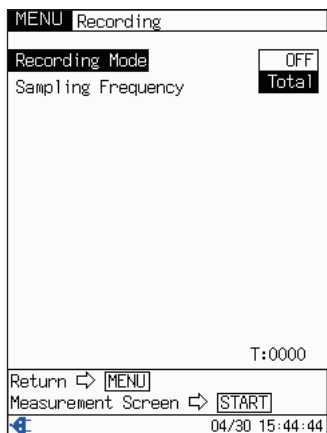
Recording menu screen

3. (Set [Recording Mode] to [Total])

[Recording mode] is selected, press the ENT key.

Next, select [Total] using the \triangle / ∇ keys, press the ENT key and the waveform recording function starts.

While this program is active, event recording is not available.



Recording Mode selection screen

Note

Sampling frequency is fixed at 48 kHz.

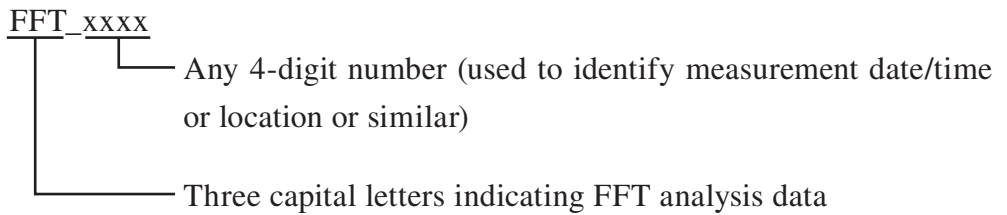
4. If you press the MENU key, the Menu List screen appears again.
If you press the START/STOP key, the measurement screen appears again.

Store Data

Store name

This program assigns a store name to measurement result data for storing on the CF card.

Store name configuration



FFT analysis data

File name: (Address name) .RND

File format: CSV (ASCII code)

The following is the contents of the file structure.

Root block	Sub block L1	Sub block L2	Block member
CSV			
[Setting]			
	[NA-28]	-	Frequency Weighting (Main) Lp
			Frequency Weighting (Main)
			Frequency Weighting (Sub) Lp
			Frequency Weighting (Sub)
			(Omission)
			Trigger
			Trigger Level (dB)
			Trigger Band
			Index
	[NX-28FT]	-	Version
			Store Name
			Address
			Time Setting (Num)
			Time Window Lp
			Time Window
	[NX-28WR]*1	-	Recording Mode
[Data]			
	-		Frequency
			Sub AP
			Main AP
			2.5
			5.0
			(Omission)
			19997.5
			20000.0

*1: [NX-28WR] block saves only when waveform recording function is installed.

Data content is as follows.

- Each item is organized in list order using CR+LF as the delimiter.
- Each item is organized and positioned using "(Title character string) (content) (CR + LF)".
- "_" in the title character string and content field indicates space.

Item	Title string	Num. of bytes	Content	Num. of bytes	Description
Separator type	(None)	-	CSV	3	Indicates a CSV file
Block label	(None)	-	[Setting]	9	Indicates the beginning [Setting] block
Block label	(None)	-	[NA-28]	7	Indicates the beginning [NA-28] block
Main channel frequency weighting	Frequency_Weighting(Main)_Lp	28	A, C, Z	1	
Main channel frequency weighting processing value	Frequency_Weighting(Main)	25	A, C, Z	1	
Sub channel frequency weighting	Frequency_Weighting(Sub)_Lp	27	A, C, Z	1	
Sub channel frequency weighting processing value	Frequency_Weighting(Sub)	24	A, C, Z	1	
Main channel time weighting	Time_Weighting(Main)_Lp	23	F, S, -	1	
Main channel time weighting processing value	Time_Weighting(Main)	20	F, S, -	1	
Sub channel time weighting	Time_Weighting(Sub)_Lp	22	F, S, -	1	
Sub channel time weighting processing value	Time_Weighting(Sub)	19	F, S, -	1	
Level range	Level_Range(dB)_Lp	18	80, 90, 100, 110, 120, 130	2 to 3	
Level range processing value	Level_Range(dB)	15	80, 90, 100, 110, 120, 130	2 to 3	
Measurement elapsed time	Measurement_Time	16	0 to 999	1 to 3	
Delay time value	Delay_Time(s)	13	0 to 10	1 to 2	

Item	Title string	Num. of bytes	Content	Num. of bytes	Description
Windscreen correction	Wind_Screen_Lp	14	OFF, ON	2 to 3	
Windscreen correction processing value	Wind_Screen	11	OFF, ON	2 to 3	
Diffuse sound field correction	Diffuse_Field_Lp	16	OFF, ON	2 to 3	
Diffuse sound field correction processing value	Diffuse_Field	13	OFF, ON	2 to 3	
Main channel inst under	Under(Main)_Lp	14	-----, Under	5	
Main channel processing under	Under(Main)	11	-----, Under	5	
Sub channel inst under	Under(Sub)_Lp	13	-----, Under	5	
Sub channel processing under	Under(Sub)	10	-----, Under	5	
Main channel inst over	Over(Main)_Lp	13	----, Over	4	
Main channel processing over	Over(Main)	10	----, Over	4	
Sub channel inst over	Over(Sub)_Lp	12	----, Over	4	
Sub channel processing over	Over(Sub)	9	----, Over	4	
Sub channel effective	Sub_Lp	6	OFF, ON	2 to 3	
Sub channel effective processing value	Sub	3	OFF, ON	2 to 3	
Processing start time	Start_Time	10	yyyy/mm/dd_hh:mm:ss	19	Example: 2008/05/14_12:34:56
Store start time	Store_Time	10	yyyy/mm/dd_hh:mm:ss	19	Example: 2008/05/14_12:34:56
Marker 1	Marker-1	8	OFF, ON	2 to 3	
Marker 2	Marker-2	8	OFF, ON	2 to 3	
Marker 3	Marker-3	8	OFF, ON	2 to 3	
Marker 4	Marker-4	8	OFF, ON	2 to 3	
Trigger mode	Trigger	7	OFF, Level, ----, External	3 to 8	

Item	Title string	Num. of bytes	Content	Num. of bytes	Description
Trigger level	Trigger_Level(dB)	17	25 to 130	2 to 3	
Trigger band	Trigger_Band	12	Sub_Ap, Main_Ap	6 to 7	
Index	Index	5	1 to 255	1 to 3	
Block label	(None)	-	[NX-28FT]	9	Indicates the start of [NA-28FT] block
FT version	Version	7	0.0 to the end-less	3	Version of this program
Store name	Store_Name	10	0000 to 9999	4	
Address	Address	7	001 to 100	3	
Measurement time	Time Setting_(Num)	16	0 to 999	1 to 3	
Time window function	Time_Window_Lp	14	Hanning, Rectangular	7, 11	
Time window function processing value	Time_Window	11	Hanning, Rectangular	7, 11	
Block label	(None)	-	[NX-28WR]	9	Indicates the start of [NA-28WR] block [NX-28WR] block saves only when waveform recording function is installed
Recording mode	Recording_Mode	14	OFF, Total	3, 5	
Separator	(None)	-	-	-	Indicates the end of [Setting] block and [Data] block

Item	Title string	Num. of bytes	Content	Num. of bytes	Description
Block label	(None)	-	[Data]	6	Indicates the start of [Data] block
Title	Frequency	9	INST,LIN or INST,MAX	8	Complies with processing mode
Sub AP	Sub_AP	6	xxx.y,_--.	11	xxx.y is the INST processing value. Space is used to adjust digits
Main AP	Main_AP	7	xxx.y,_--.	11	
2.5Hz	2.5	3	xxx.y, zzz.w • xxx.y is the INST processing value. Space is used to adjust digits • zzz.w is the LIN or MAX processing value. Space is used to adjust digits	11	The frequency is stored as a title character string
5.0Hz	5.0	3		11	
7.5Hz	7.5	3		11	
⋮	⋮	⋮		⋮	
19995.0Hz	19995.0	7		11	
19997.5Hz	19997.5	7		11	
20000.0Hz	20000.0	7		11	

Printing

The various measurement screens can be printed out on a printer.

Data stored on CF card can be printed from a recall screen.

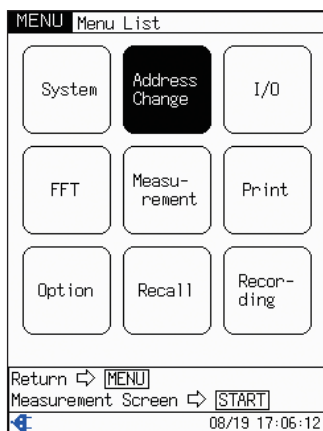
In both cases, except when printing a specified range from a recall screen, the printed content will be a hard copy of the current screen contents. When carrying out the steps for printing, a menu screen appears, but the actual printout will reflect the immediately preceding screen content.

When printing a specified range from a recall screen, the data for all address points in the recalled range can be printed continuously.

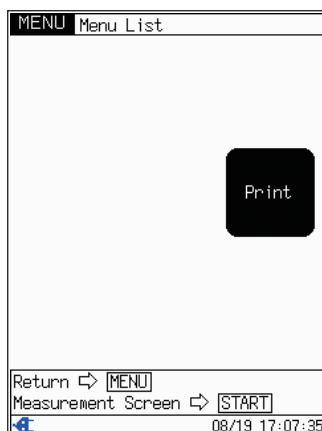
Measurement screen printing

1. While the measurement screen that you want to print is displayed, press the MENU key.

The Menu List screen is displayed when in the state before pressing the START/STOP key, and when paused, the print menu screen is displayed.



Menu List screen



Print menu screen

2. Use the \triangleup / \triangledown / \triangleleft / \triangleright keys to select [Print] and press the ENT key.

The immediately preceding measurement screen is displayed and a print confirmation message is displayed as a pop up. For details refer to the section in the NA-28 instruction manual "Printer BL-112UI" on "Optional Accessories".

3. Press the ENT key to start printing.
To cancel printing, press the PAUSE key.

Recall screen printing

Data stored on the CF card can be printed out from the recall screen while being shown.

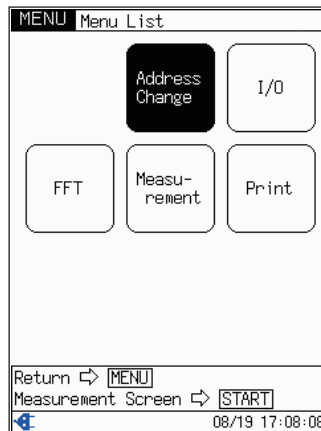
Please refer to the respective Measurement section regarding recall procedures.

Note
Only the recall screen (graph display) can be printed. Recall screen (Top List display) and selection menu screens cannot be printed.

Printing measurement results

1. While the recall screen you want to print is displayed, press the ENT key.

The recall menu screen is displayed.



Recall menu screen

2. Use the \triangle / ∇ / \triangleleft / \triangleright keys to select [Print] and press the ENT key.
3. The immediately preceding recall screen is displayed again, and a print confirmation message is displayed as a pop up. For details refer to the section in the NA-28 instruction manual "Printer BL-112UI" on "Optional Accessories".
4. Press the ENT key to execute printing.
Press the PAUSE key to cancel printing.

Screen hardcopy

Press the LEVEL ∇ key while pressing and holding the MENU key and the displayed screen can be saved to the CF card as bitmap data.

Storage folder \SCREENSHOT\
File name hhmmss.BMP



6-digit number (time when saved)

Note
You cannot take a hard copy of the message dialog.

Initialize

The following indicates three methods of initializing the setup data.

1. From the [System] menu, select [Save/Load Settings] → [Reset to default values] and press the ENT key.
2. When switching unit power on, press the START/STOP key at the same time.
3. Using DCL command (USB function selection does not initialize).

Default settings are indicated in the following. The clock is not reset by the following action. The inserted CF card is also not effected by the following.

Measurement Screen	Graphical display
Calibration Mode	Internal
Main Channel Frequency Weighting	A
Main Channel Time Weighting	F
Level Range Full Scale	120 dB
Spectrum display zoom	×1
Memory Address	1

[FFT] menu

Measurement Mode	LIN
Store Name	0000
Measurement Time	10 s
Window Function	Hanning

[I/O] menu

AC Out	MAIN
DC Out	MAIN
USB Communication	OFF
Remote Control	OFF
Backlight Brightness	Dark
Backlight Auto-Off	30 s
Beep	ON
Index	1

[Measurement] menu

Wind Screen Correction	OFF
Delay Time	0 s
Trigger Mode	OFF
Trigger Level	70 dB
Band	MAIN AP
Diffuse Field Correction	OFF
Sub Channel	OFF
Sub Channel Frequency Weighting	C
Sub Channel Time Weighting	F

[Recording] menu

Recording Mode	OFF
Sampling Frequency	48 kHz

Setup File

Setup file that is used

The content of setup files will differ, depending on the installed option program and the startup condition at the time when the setup file is created. Make sure that the startup condition at the time when you use the file is the same as the startup condition that existed at the time when the file was created. Specifically, the following conditions must be met.

- (1) The setup file (file name: NX28FTSET○.RNS) created at the time of program startup exists.
- (2) The condition when NX-28WR was installed must be the same as for both the time of startup and when created.

The condition of setup when the setup file was created can be confirmed below by opening the setup file (NX28FTSET○.RNS) using a text editor.

```
CSV
std NA,1,2,0,0,0,2,0,0,0,9,-----
opt FT,0,0,0,-----
opt WR,0,0,0,0,0,0,0,70,-----
```

← When NX -28WR is installed, there will be lines such as this.

The setup file contents are listed on the next page.

Setup file contents

A setup file created with this program contains the following items.

Calibration Mode
Spectrum display zoom
Display Start Position
Display Processing Value type
Graph Display/Numeric Display
Main Channel Frequency Weighting
Main Channel Time Weighting
Level Range Full Scale
Slope
Start Address
End Address

[FFT] menu

Measurement Mode
Store Name
Measurement Time
Window Function

[I/O] menu

AC Out
DC Out
USB Communication
Remote Control
Backlight Brightness
Backlight Auto-Off
Beep
Index

[Measurement] menu

Wind Screen Correction
Delay Time
Trigger Mode
Trigger Level
Band
Diffuse Field Correction
Sub Channel
Sub Channel Frequency Weighting
Sub Channel Time Weighting

[Recording] menu

Recording mode
Sampling Frequency

[System] menu

Language

Communication Commands

When this program is installed, the communication commands listed from page 60 can be used in addition to the regular communication commands of the NA-28. However, as explained below, some regular commands cannot be used or are subject to limitations.

Unavailable command

When this program is installed, the following regular communication command of the NA-28 cannot be used:

DRD

Continuous output

MXD

Peak hold

LNM

L_N mode

DPI

Toggle display

LXI

Percentile level

ADP

Sub channel additional processing

PSE

Pause

SMD

Store mode

SNS

Store name

PLP

Auto 1 store cycle

CMC

Comparator channel for SLM mode

MDC

Clear stored data from internal memory

IMD

Toggle SLM/RTA mode

TTR

Trigger time

Commands with changed function or limitations

When this program is installed, the following regular communication commands of the NA-28 have different parameter requirements or operate differently.

DSP

Set display data

The following settings are available. When other values are specified, error 0002 is returned.

Parameter	Content
p1 = 0	INST
p1 = 1	LIN
p1 = 3	MAX

MTI

Measurement setting time

The following settings are available. When other values are specified, error 0002 is returned.

Parameter	Content
p1 = 1 to 999	Measurement setting time (seconds)
p2 = 0	s (seconds)

ADR

Memory address

The following settings are available. When other values are specified, error 0002 is returned.

Parameter	Content
p1 = 1 to 100	Address name when storing

DOD

Display value output request (Applicable operation does not exist)

On the graph display screen, the displayed 200 band and main channel, sub channel level is returned.

This is valid only when the spectrum display zoom is $\times 40$. If you want to obtain band data outside the display range, change the display start position and then perform the DOD command again.

Send the request command at one second interval or longer.

This is not available from the menu screen or recall screen. Error 003 is returned.

Request command		DOD?
Response data	d1, d2, ..., d204	
Return value	content	
d1	sub channel AP	
d2	main channel AP	
d3	display lower band level	} 200 band level
⋮	⋮	
d202	display upper band level	
d203	over information (Yes:1, No:0)	
d204	under information (Yes:1, No:0)	

There is no setting command.

Command List

Dedicated communication commands for this program are listed below.

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

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

Command	Function	See page
OPE	Measurement mode (S/R).....	61
FSN	Store name (Folder name when storing) (S/R)	61
ZOM	Spectrum display zoom (S/R)	62
FDS	Display start position (S/R).....	62
FCU	Cursor position (S/R)	63
WND	Time window function (S/R)	63
FPL	Get Top list (R).....	64
FST	Get all measurement parameters (R)	64

Command Description

OPE

Measurement mode

Measurement mode setting command OPE p1

Parameter	Content
p1 = 0	LIN
p1 = 1	MAX

Request command OPE?

Response data	d1
Return value	Content
Same as for setting command	

FSN

Store name (Folder name when storing)

Store name setting command FSN p1

Parameter	Content
p1 = 0 to 9 999	Store name (Folder name when storing)

Request command FSN?

Response data	d1
Return value	Content
Same as for setting command	

ZOM

Spectrum display zoom

Spectrum display zoom setting command ZOM p1

Parameter	Content
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p1 = 0	× 1
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p1 = 1	× 2
--------	-----

p1 = 2	× 5
--------	-----

p1 = 3	× 10
--------	------

p1 = 4	× 20
--------	------

p1 = 5	× 40
--------	------

Request command ZOM?

Response data	d1
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Return value	Content
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Same as for setting command

FDS

Display start position

Display start position setting command FDS p1

Parameter	Content
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p1 = 1 to 7 801	Display range start position
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Request command FDS?

Response data	d1
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Return value	Content
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Same as for setting command

FCU

Cursor position

Cursor position setting command FCU p1

Parameter	Content
p1 = 1 to 8 000	Cursor position

Request command FCU?

Response data	d1
Return value	Content
Same as for setting command	

WND

Time window function

Time window function setting command WND p1

Parameter	Content
p1 = 0	Hanning
p1 = 1	Rectangular

Request command WND?

Response data	d1
Return value	Content
Same as for setting command	

FPL

Get Top list

Top list (Band), Top list (Level value)

Request command		FPL?
Response data	d1, d2, ..., d40	
Return value	Content	
	d1 to d20: 1 to 8 000	Band (line number)
	d21 to d40: -9.9 to 160.0	Level value

There is no setting command.

FST

* Get all measurement parameters (no corresponding operation)

Only valid if the unit is currently in measurement screen (Measurement in progress symbol is not displayed). In other cases, error 0003 is returned.

Request command		FST?
Response data	d1, d2, ..., d7	
Return value	Content	
d1	Measurement mode	
	Corresponds to OPE? command	
d2	Store name (Folder name when storing)	
	Corresponds to FSN? command	
d3	Spectrum display zoom	
	Corresponds to ZOM? command	
d4	Display start position	
	Corresponds to FDS? command	
d5	Cursor position	
	Corresponds to FCU? command	
d6	Time window function	
	Corresponds to WND? command	
d7	Memory address	
	Corresponds to ADR? command	

There is no setting command.

Specifications

Applicable standard

ISO 1996-2:2007 Annex C see Note 1

Acoustics - - Description, measurement and assessment of environmental noise - - Part 2: Determination of environmental noise levels

Note 1: Measurement was only performed on this unit and guideline calculations were performed on a computer.

Applicable sound level meter Sound level meter (with 1/3 octave analysis function)
NA-28

Function specifications

Measurement mode

FFT mode Sub channel all-pass value measurement is performed with main channel all-pass value and FFT analysis.

Measurement item LIN or MAX is measured simultaneously along with INST.

INST

LIN

MAX

measurement time

1 to 999 seconds

Frequency weighting A, C, Z weighting

Time weighting (all-pass value)

Main channel: F, S

Sub channel: F, S

Dynamic range 100 dB

Analysis frequency range

20 kHz (fixed)

Time window function Hanning, Rectangular

Spectrum line count	8 000 lines fixed (Frame time 400 ms, Frequency resolution 2.5 Hz)
Sampling frequency	48 kHz (fixed)
Level range	Bar graph display range 90 dB 40 to 130 dB 30 to 120 dB 20 to 110 dB 10 to 100 dB 0 to 90 dB -10 to 80 dB

However, the actual graph display in addition to the above can also display a +10 dB overload area

Correction function

Windscreen correction function

Reduces the effects of frequency weighting when using the windscreen.

The correction function's ON and OFF are performed using the menu screen.

Diffuse field correction function

Correction for frequency response characteristics to conform with the standard (ANSI S1.4) for diffuse sound fields.

The correction function's ON and OFF are performed using the menu screen.

Display

Measurement screen

FFT analysis result and all-pass level simultaneous display screen

FFT display line count

200 lines

Zoom rate

× 1, ×2, ×5, ×10, ×20, ×40

Top List screen Displays the list of frequency and level values of the top 20 lines in order of high level.

Trigger	Controls measurement and the start of memory storage.
Level trigger	Measurement starts with trigger level (1 dB increment) as the threshold and ends after set measurement time expires. Trigger target is only the main channel all-pass value. Slope is + fixed.
External trigger	Starts detecting external trigger terminal logic level trailing edge signals.
Delay time	Sets the measurement start time or the time until trigger monitoring by pressing the start key. Measurement time: 0 to 10 second range that is set in 1 second increments
Store	
Manual store	Measurement results are stored along with the measurement start time 1 address at a time manually.
Storage media	CF card (cannot save to internal memory)
Recorded data count	A maximum of 100 groups can be used per store name of which 20 store names can be saved.
Data recall	Perform stored data browsing.
Recall process	None
Setting to Memory	Up to a maximum of 5 groups can be stored to or read from internal memory. Startup can also be done using file settings performed in advance stored on the CF card.
Print out	Display screen can be printed on a dedicated USB printer.
Hard copy	Screen can be saved as bitmap data to a CF card.

Input/Output

AC output All-pass signal from either the main channel or sub channel is selected and output.

Output voltage: 1 V in range full scale (actual value)

Output resistance: 600 Ω

Load resistance: 10 k Ω or higher

DC output The all-pass signal from either the main channel or sub channel is selected and output.

Output voltage: 3.00 V, 25 mV/dB in range full scale

Output resistance: 50 Ω

Load resistance: 10 k Ω or higher

Comparator output

Unusable

External trigger input

Detects 0-5 V logic level trailing edge

USB

Control on the computer is possible by connecting as a storage device as well as by communication commands using the communications device class. However, you cannot perform setting saved data transfer using communications commands

Remote control reception

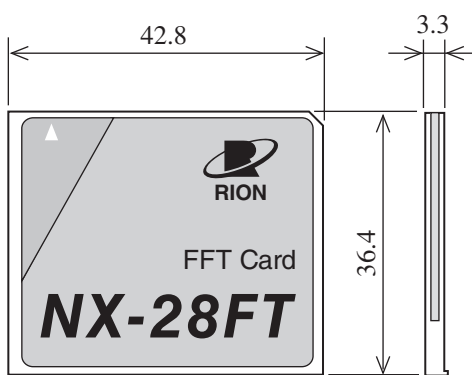
Perform control using infrared remote control. (Remote control is optional)

Use together with the NX-28WR

It is possible to use together with the Waveform Recording Card NX-28WR. When used together, waveform recording is performed during LIN, MAX measurement. Waveform data is stored to the CF card along with manual stored data

Supplied accessories

Instruction Manual	1
Inspection Certificate	1



Unit: mm

Dimensional Drawings

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