INSTRUCTION MANUAL

FFT Analysis Program

NX-42FT

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Organization of this manual

This manual describes functions and other operation principles of the FFT Analysis Program NX-42FT.
The manual consists of the chapters listed below. You should also consult the documentation for the Sound Level Meter NL-42, NL-52 and NL-62.

Outline

Gives basic information on the functions of the NX-42FT.

Change the function to the NX-42FT

Explains how to change to the function of the NX-42FT.

Reading the display

Explains various items that appear on the display and menu screen.

Measurement

Explains the basic procedures for measurement.

Store Data Format and File Structure

Explains the format of stored data and how the files are organized.

Card capacity and store time

Lists the data store time corresponding to the SD memory card capacity, etc.

Recall data

Explains screen and display settings of the recall data.

Default settings

Lists the factory default settings.

Communication commands

Explains commands about functions of the NX-42FT.

Specifications

Lists the technical specifications of the NX-42FT.

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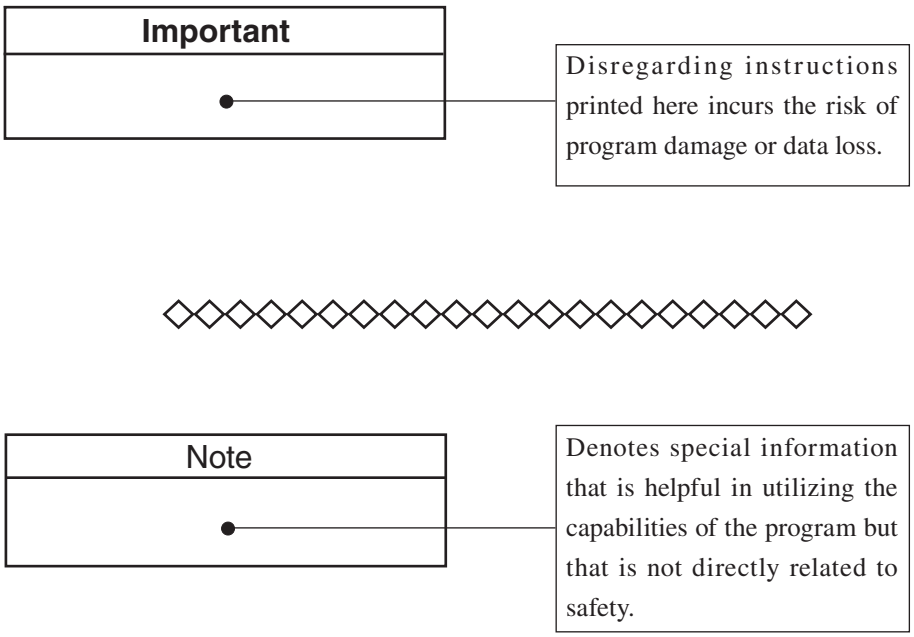
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FOR SAFETY

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



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Outline

The NX-42FT software is designed for installation in the Sound Level Meter NL-42/NL-52/NL-62 (hereinafter called "NL-42/NL-52/NL-62" in this manual), allowing the unit to function as a FFT analyzer.

Main channel — Simultaneous measurement of following items, using selected time weighting and frequency weighting.

Instantaneous sound pressure level	L_p
Equivalent continuous sound pressure level	L_{eq}
Maximum sound pressure level	L_{max}

FFT analysis — Simultaneous measurement of the following items, by performing analysis of each frame (400 ms) using the selected frequency weighting (see page 18).

Spectrum of 1 frame	INST
Power average of Spectrum	LIN
Maximum of Spectrum	MAX

For details on the NL-42/NL-52/NL-62 including information on how to use the operation keys, please refer to the Instruction Manual of the NL-42/NL-52/NL-62.

Change the function to the NX-42FT

NX-42FT installation

Follow the procedure described in the separate “Optional program installation / uninstallation” to install the NX-42FT program in the NL-42/NL-52/NL-62 unit.

Important
Never format the optional program card with SD memory card formatting software (such as SD Formatter etc.). Otherwise the program data on the card will be erased and the respective functions can no longer be used. Restoration of the erased program is not warranted.
Upgrade the firmware of the sound level meter to the latest version before installing the optional program. The latest version firmware can be downloaded from “Software downloads” of Support Room on our web site (http://www.rion.co.jp/english/).

Switching to the NX-42FT function

On the menu list screen of the NL-42/NL-52/NL-62 select [Option] and press the MENU/ENTER key.

The option screen appears. Use the △/▽ keys to move to the [NX-42FT FFT Analysis Program] and press the MENU/ENTER key.

When the message “Please wait” disappears, the function switching procedure is completed, and the unit shows the NX-42FT measurement screen.

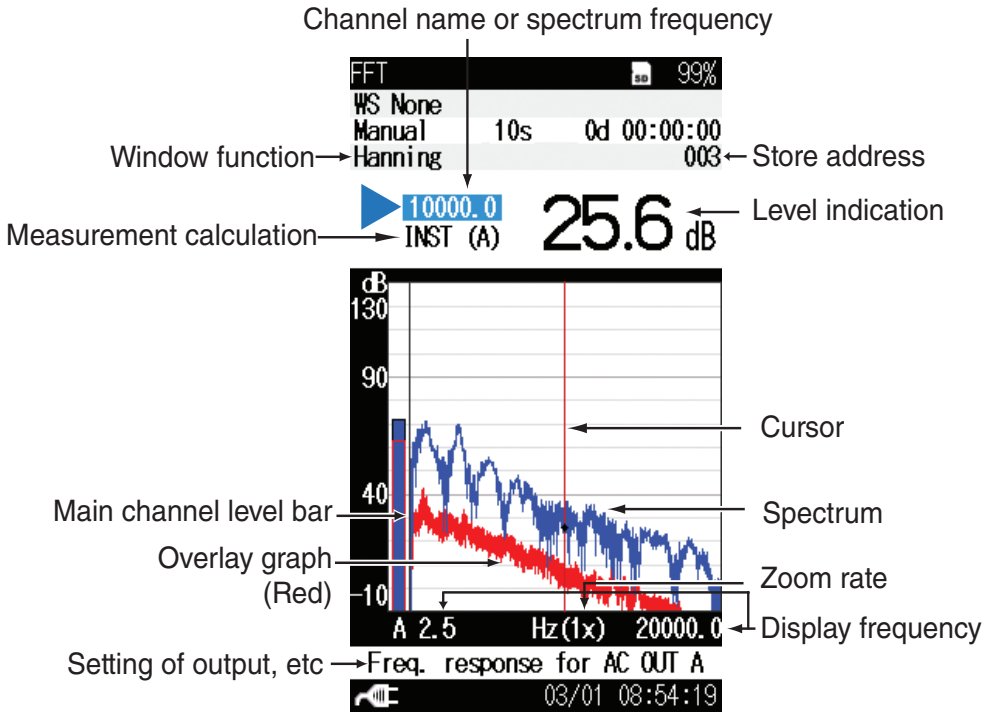
Reading the display

Measurement screen

There are two types of measurement screens: graph screen and numeric list screen. You can switch between the two screen types using the DISPLAY key.

Note
Each time the DISPLAY key is pressed, the display changes in the order graph of INST→ Top list of INST→ graph of LIN→ Top list of LIN→ graph of MAX→ Top list of MAX→ graph of INST …. Any of these, except graph of INST, can be removed from the sequence (see page 20).

Graphical display



Window function

Displays the window function set using the “Measure” in the menu list screen.

Channel name or Spectrum frequency

Shows “MAIN” when the main channel is selected with the cursor, or the frequency when FFT analysis is selected.

Store address

Displays the address to be saved next (see page 14).

Red is displayed when data already exists in the selected address, and black is displayed when there is no data.

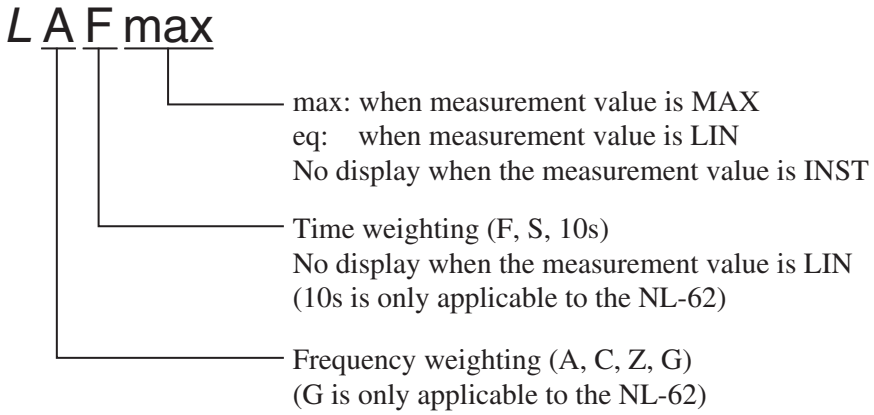
Level indication

Shows the level of the bar selected by the cursor.

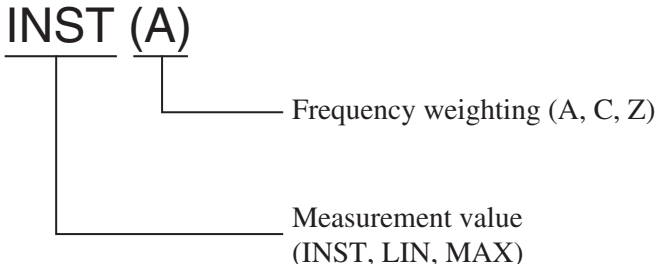
Measurement value

When the main channel is selected with the cursor, the selected frequency weighting and time weighting characteristics are displayed (see page 18). When FFT analysis is selected, the type of measurement value (INST, LIN, MAX) and the selected frequency weighting characteristic are indicated.

When the main channel is selected



When FFT analysis is selected



Cursor

Selects a channel and spectrum frequency in the currently displayed graph. The cursor can be moved using the △/▽ keys. Holding down a key causes a faster moving.

Main channel level bar

The level of the main channel is shown by a blue bar. The frequency weighting characteristic is indicated below the bar.

Spectrum

Each spectrum level is displayed as a line graph. However, if the Zoom rate is changed, multiple lines will be included in 1 pixel on the horizontal axis, and the maximum value and minimum value will be combined and displayed with a direct line.

Display frequency

Displays upper frequency display range/lower frequency display range.

Zoom rate

Displays the zoom rate for the currently selected display frequency.

Each time the △ key is pressed the zoom rate changes in the order × 1 →× 2 → × 5 → × 10 → × 20 → × 40.

Each time the ▽ key is pressed the zoom rate changes in the order × 40 → × 20 → × 10 → × 5 → × 2 → × 1.

Setting of output, etc

Pressing and holding the DISPLAY key cycles the display through the following indications: the number of waveform recording, LPF setting, Freq. response for AC OUT, the number of waveform recording...

•The number of waveform recording (during measurement only)

When the recording function on the WR menu screen was set to [Total], the number of recorded WAV files is shown here.

•LPF setting (NL-62 only)

When the [LPF setting] was selected on the measurement screen, the cutoff frequency is shown here.

•Freq. response for AC OUT

When the frequency weighting characteristic was selected on the [AC OUT] of the [I/O] menu screen, the selected characteristic is shown here.

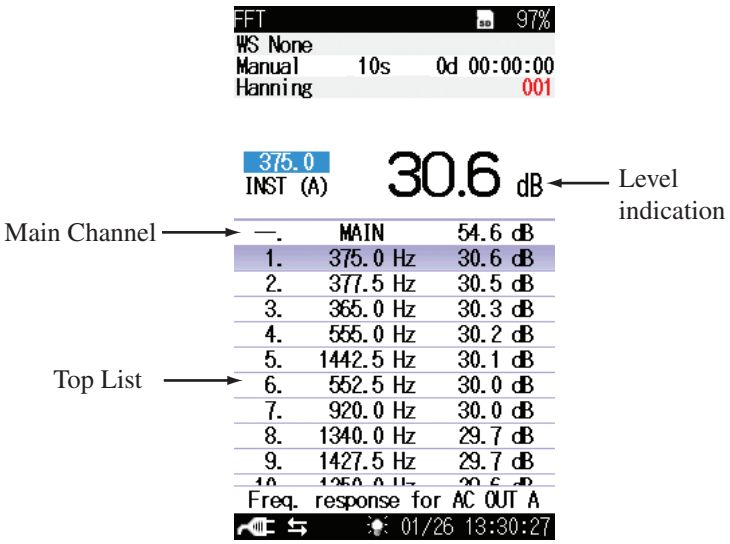
Overlapping

When the [Overlapping] setting is ON, the measured data are shown together with a graph for saved data (see page 10).

Top List display

Switch to the Top List display by pressing the DISPLAY key on the Graphical display screen.

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



Note
Pressing the MENU/ENTER key while MAIN is selected shows the main channel. Pressing the MENU/ENTER key while Top List is selected shows a bar graph for the frequency under the cursor.

Main channel

Shows the level value of the main channel.

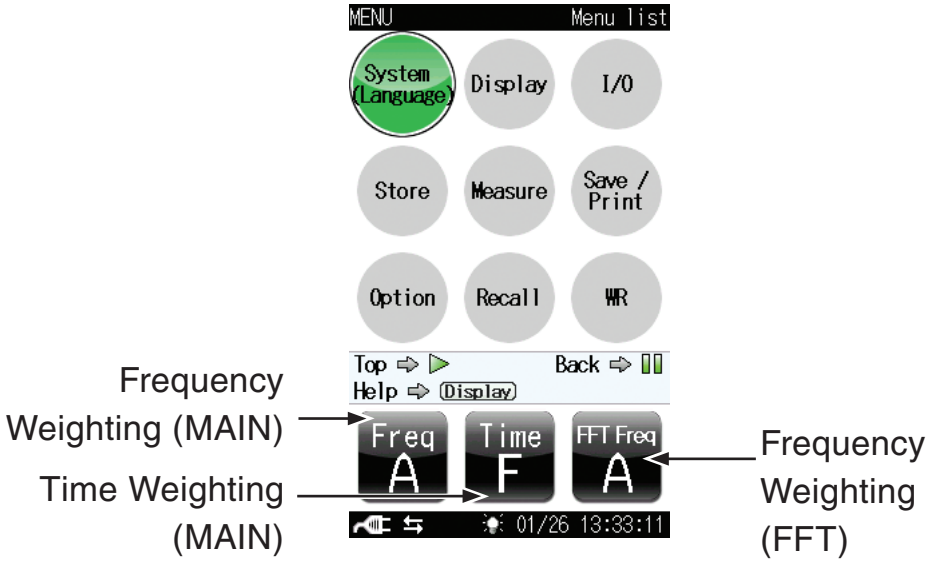
Top List

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

Use the △/▽ keys to select the band.

Menu list screen

When the measurement screen is displayed, pressing the MENU/ENTER key brings up the menu list screen as shown below.
Use the △/▽/◁/▷ keys to select the desired menu and press the MENU/ENTER key.
Pressing the DISPLAY key displays explanation screen of the item that has been selected.
Pressing the PAUSE/CONT key or the START/STOP key switches back to the measurement screen.



Note
Because the explanation shown when the DISPLAY key is pressed applies in part also to the sound level meter function, there will be functions that cannot be used.

The following settings of Frequency Weighting (MAIN), Time Weighting (MAIN) and Frequency Weighting (FFT) can be done with the touch panel. (The current setting is shown when the menu list screen is displayed.) Touch the screen directly with your finger.

Frequency Weighting (MAIN)

Selects Frequency Weighting of MAIN.

Using the finger, each press of the “Frequency Weighting (MAIN)” cycles through the following settings.

“A”, “C”, “Z”, “G”

(G is only applicable to the NL-62.)

Time Weighting (MAIN)

Selects Time Weighting of MAIN.

Using the finger, each press of the “Time Weighting (MAIN)” cycles through the following settings.

“F[Fast]”, “S[Slow]”, “10s” (10 s is only applicable to the NL-62.)

Frequency Weighting (FFT)

Selects Frequency Weighting of FFT.

Using the finger, each press of the “Frequency Weighting (FFT)” cycles through the following settings.

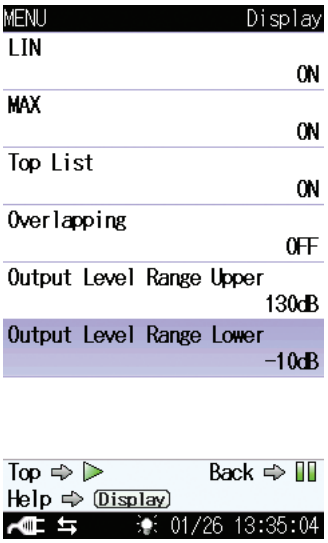
“A”, “C”, “Z”

Explanation of menu screen items

This section explains items on the various menu screens that are related to the NX-42FT function. For information on other items, please refer to the Instruction Manual of NL-42/NL-52/NL-62.

Display

This screen sets the measurement calculation and other items displayed on the measurement screen.



LIN

Selects whether or not to display LIN value.

Use the △/▽ keys to select [LIN] and press the MENU/ENTER key.

The ON/OFF setting screen appears. Use the △/▽ keys to select the ON/OFF setting and press the MENU/ENTER key.

MAX

Selects whether or not to display MAX value.

Use the △/▽ keys to select [MAX] and press the MENU/ENTER key.

The ON/OFF setting screen appears. Use the △/▽ keys to select the ON/OFF setting and press the MENU/ENTER key.

Top List

Selects whether or not to display Top list.

Use the △/▽ keys to select [Top List] and press the MENU/ENTER key. The ON/OFF setting screen appears.

Use the △/▽ keys to select the ON/OFF setting and press the MENU/ENTER key.

Overlapping

Selects whether the measurement data preceding the currently displayed data are shown as an overlay.

Select [Overlapping] and press the MENU/ENTER key. The ON/OFF setting screen appears.

Use the △/▽ keys to select the ON/OFF setting and press the MENU/ENTER key.

Data delete

This item is shown when [Overlapping] was set to ON.

When the display shows [There is data], loaded data are used for overlay when a new measurement is started in graph display mode.

When the display shows [There is no data], overlay display is activated only after data have been loaded. For information on how to load data, refer to page 26.

When the display shows [There is data], pressing the MENU/ENTER key brings up a confirmation screen for deleting data. Select [Yes] and press the MENU/ENTER key if the data can be deleted. Selecting [No] and pressing the MENU/ENTER key causes the unit to return to the Display screen.

Output Level Range Upper

Displays the screen to set the upper bound value of the bar graph on the measurement screen.

Select [Output Level Range Upper] and press the MENU/ENTER key. The upper limit of bar graph screen appears.

Use the △/▽ keys to set the value (70 to 130, 10 dB step). Then press the MENU/ENTER key.

The upper limit value cannot be the same or less than the lower limit value [Output Level Range Lower].

Output Level Range Lower

Displays the screen to set the lower bound value of the bar graph on the measurement screen.

Select [Output Level Range Lower] and press the MENU/ENTER key. The lower limit of bar graph screen appears.

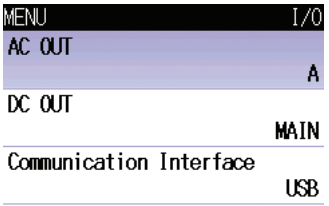
Use the △/▽ keys to set the value (-10 to 80, 10 dB step: differs from NL-42/NL-52/NL-62). Then press the MENU/ENTER key.

The lower limit value cannot be the same or more than the upper limit value [Output Level Range Upper].

I/O

This screen sets the type of output signal etc.

Note
The NX-42FT program does not support comparator signal output.





AC OUT

Displays the screen to select the type of frequency weighting characteristic of the signal output from the AC OUT connector of the unit.

Select [AC OUT] and press the MENU/ENTER key. The AC OUT setting screen appears.

Use the △/▽ keys to select the frequency weighting characteristic (OFF, Inter lock, A, C, Z, G) and press the MENU/ENTER key. (G is only applicable to the NL-62.)

DC OUT

Displays the screen to select the type of DC signal output from the DC OUT connector of the unit.

Select [DC OUT] and press the MENU/ENTER key. The DC OUT setting screen appears.

Use the △/▽ keys to select the type of DC signal output (OFF, MAIN) and press the MENU/ENTER key. If [MAIN] is selected, the DC OUT signal corresponds the main channel level.

Store

This screen sets the address and name that stores the operation result data and measurement time.

Only Manual store is available.

For details regarding Store mode, please refer to the Instruction Manual of the NL-42/NL-52/NL-62.

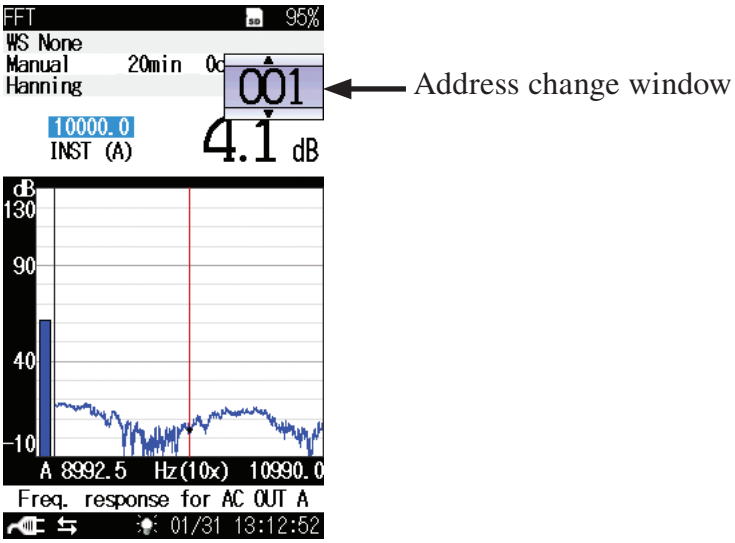


Store Address

Displays the screen to set the address (001 to 100) to be saved next.

Select [Store Address] and press the MENU/ENTER key to display the [Address change window] which allows you to change the stored address. Use the △/▽ keys to select the address and confirm with the MENU/ENTER key.

Red is displayed when data already exists in the selected address, and black is displayed when there is no data.



Store Name

Displays the screen to set the identification number of the store data (0000 to 9999).

Select [Store Name] and press the MENU/ENTER key. The store name screen appears.

Note
When the SD memory card has not been inserted, [Store Name] is not displayed.

Measurement Time

Displays the screen to select the measurement time.

Select [Measurement Time] and press the MENU/ENTER key. The measurement time screen appears.

Setting range: 1 to 59 seconds, 1 to 20 minutes

Measure

This screen sets the weighting, measurement correction, etc (the example below is a screen of NL-62).



Frequency Weighting

Displays the screen to select the frequency weighting of MAIN.

Select [Frequency Weighting] and press the MENU/ENTER key. The frequency weighting screen appears.

Use the △/▽ keys to select the frequency weighting (A, C, Z, G) and press the MENU/ENTER key. (G is only applicable to the NL-62)

Time Weighting

Displays the screen to select the time weighting of MAIN.

Select [Time Weighting] and press the MENU/ENTER key. The time weighting screen appears.

Use the △/▽ keys to select the time weighting (F[Fast], S[Slow], 10s) and press the MENU/ENTER key. (10 s is only applicable to the NL-62)

Frequency Weighting (FFT)

Displays the screen to select the frequency weighting of FFT.

Select [Frequency Weighting (FFT)] and press the MENU/ENTER key. The frequency weighting (FFT) screen appears.

Use the △/▽ keys to select the frequency weighting (A, C, Z) and press the MENU/ENTER key.

Window Function

Displays the screen to select the window function of FFT.

Select [Window Function] and press the MENU/ENTER key. Window Function screen appears.

Use the △/▽ keys to select the window function ([Hanning], [Rectangular]) and press the MENU/ENTER key.

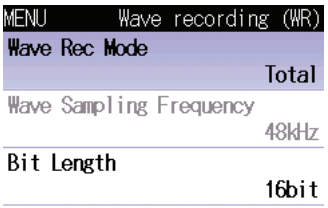
Wave recording (WR)

Select this screen to record the waveform using optional program NX-42WR.

If NX-42WR is not installed, it is not possible to select this screen.

For details, please refer to the instruction manual of Waveform Recording Program NX-42WR.

Note
Sampling frequency is fixed at 48 kHz.
Recording mode is fixed at Total.





Measurement

Measurement value

The following indicates three measurement values of FFT.

- INST: Spectrum of 1 frame

  However, the main 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: Power average of Spectrum during the measurement period.

  However, the main channel collects the equivalent continuous sound pressure level L_{eq} 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

- MAX: Maximum of Spectrum during the measurement period.

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

Measurement procedure

1. Press the POWER key to turn the unit on.
   After the power-on screen has been shown, the measurement screen appears.
   The measurement parameter settings that were active before the unit was turned off will show on the screen. Therefore the actual display may not always be the same.
2. Set Frequency Weighting (MAIN). Press the MENU/ENTER key and use the touch panel on the menu list screen to select “A”, “C”, “Z” or “G”. (G is only applicable to the NL-62.)
   Set Time Weighting (MAIN). Press the MENU/ENTER key and use the touch panel on the menu list screen to select “F(Fast)”, “S(Slow)”, or “10 s”. (10 s is only applicable to the NL-62.)
   Set Frequency Weighting (FFT). Press the MENU/ENTER key and use the touch panel on the menu list screen to select “A”, “C”, “Z”.
   Frequency Weighting and Time Weighting can also be selected via the [Measure] item in the menu list screen.
3. Select [Display] on the menu list screen and set the measurement values you want to display to ON. If necessary, select overlapping display of the data.
4. Select [Display] on the menu list screen and set the upper and lower limit of the bar graph. Choose a setting in which the bar graph indication registers to about the middle of the range.
5. Set the required items under “Measure” in the menu list screen.
6. Using the [Store] item in the menu list screen, select the store name and the measurement time.

Note
The NX-42FT only has a Manual store

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

- Pressing the DISPLAY key during and after measurement switches the measurement value shown on the display screen.

Sequence of measurement values		
Sequence	Measurement value	Setting of [Display]
	INST, Graph	— (ON)
	INST, Top List	ON/OFF
	LIN, Graph	ON/OFF
	LIN, Top List	
	MAX, Graph	ON/OFF
	MAX, Top List	

The measurement value which is set [OFF] is skipped except INST.

- While the graph display screen is shown during and after measurement, the ◁/▷ keys can be used to move the cursor. The spectrum under the cursor and its level reading are shown at the top of the screen. Use the △/▽ keys to change the zoom rate (see page 5).

8. Start the measurement.

- How to measure LIN, MAX

  Press the START/STOP key to start the measurement.

  At this point, previous measurement values are cleared.

  While the measurement is in progress, the ▶ symbol flashes and the elapsed time is displayed. In addition, the indicator LED flashes red.

  The PAUSE/CONT key can be used to pause and restart.

  During pause, the pause symbol (II) is shown and the indicator LED flashes blue.

  The measurement stops automatically when the specified measurement time has elapsed.

  To stop the measurement before the end of the specified measurement time, press the START/STOP key once more.

  In the window that appears, select either [Data saved …] or [Cancel].

- How to measure INST

  While no measurement is in progress, pressing the PAUSE/CONT key will freeze the sound level displayed at that point. Press the PAUSE/CONT key again to cancel the display freeze.

  When the display shows the measurement value you want to store, fix the display. Press the MENU/ENTER key and select [Save/Print] from the menu list screen. Then select the data store method.

  Refer to “Store Data Format and File Structure” for information on the folder where data will be stored.

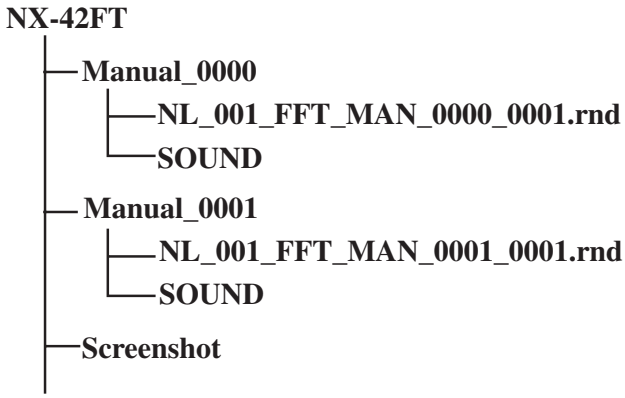
Note
To store the data SD memory card is required. Please make sure that SD memory card is inserted in the NL-42/NL-52/NL-62.
After installation is complete, the SD memory card from which the NX-42FT program was installed can be used as a memory card for storing data.
Prior to measurement, it is recommended first to format the memory card for storing data with this unit.

Store Data Format and File Structure

Store destination folder

Under the NX-42FT folder on the SD memory card, the sub folder "Manual_store name" will be created, and data are stored as CSV files (extension ".rnd") in that folder.

When a file with the same name exists in the same directory, it will always be overwritten. A sample configuration is shown below.



Important
Use SD memory cards provided by Rion. The performance of other cards is not guaranteed.
Note that we assume no responsibility for any damage or loss of stored measurement data.

File name of recording data

Recording files are named as shown below.

Store name: 0000 to 9999

Address: 0000 to 0100

Recording mode: Fixed as ST0001

Note
Up to 20 store names with data for up to 100 addresses each can be stored, provided that the storage capacity of the SD memory card is not exceeded.



Card capacity and store time

The amount of measurement data which can be stored on an SD memory card depends on the capacity of the inserted card. Approximate data sets are listed below. Approximate data size is 200 kByte per a file.

	SD memory card capacity	
Data sets	512 MByte	2 GByte
	2,000 sets	8,000 sets

When performing waveform recording

Wave Sampling Frequency is fixed at 48 kHz.

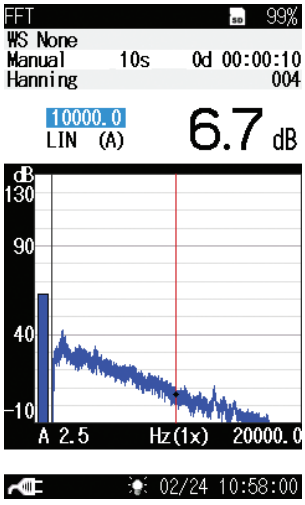
Approximate recording time in case of the 16 bit are listed below.

	SD memory card capacity	
Recording time	512 MByte	2 GByte
	1 h	4 h 40 min.

The duration of recording with 24 bit becomes shorter than that with 16 bit because the data volume of 24 bit is about 1.5 times more.

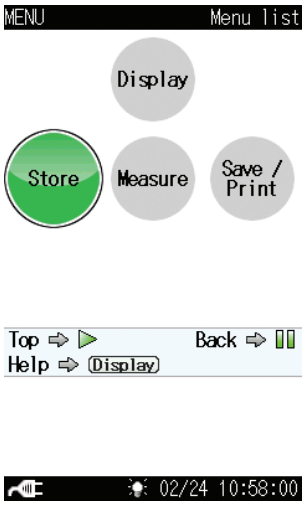
Recall data

Use the [Recall] item in the menu list screen to call up saved measurement data onto the display (see the NL-42/NL-52/NL-62 Instruction Manual).



Recall data display screen (graph display)

Pressing the MENU/ENTER key while the recall data display screen is shown brings up the recall data menu list screen. Pressing the PAUSE/CONT key returns the unit to the recall data display screen.

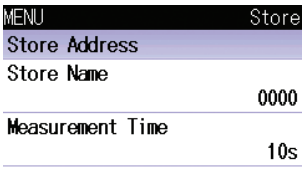


Recall data menu list screen

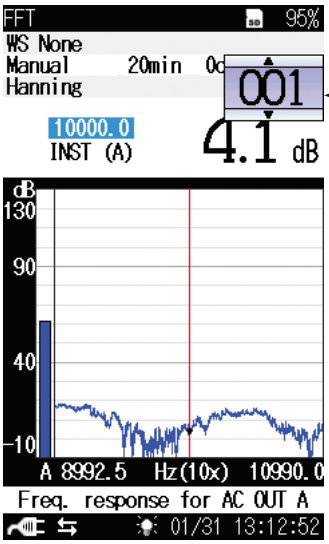
Selecting store address

Select [Store] in the recall data menu list screen and press the MENU/ENTER key to display as shown below. Pressing the PAUSE/CONT key returns the unit to the recall data menu list screen.

Select [Store Address] and press the MENU/ENTER key to display the [Address change window] which allows you to change the stored address.







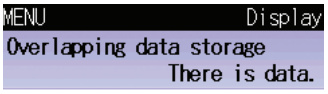
Address change window

Overlapping data storage

Saves recalled data for use on the overlay display.

Selecting [Display] on the recall data menu list screen and then pressing the MENU/ENTER key brings up the following screen. Pressing the PAUSE/CONT key returns the unit to the recall data menu list screen. If there are already saved data, the indication “There is data.” is shown, otherwise the indication “There is no data.” is shown. Selecting [Overlapping data storage] and pressing the MENU/ENTER key saves the recalled data for overlay use.

Note
Data saved for overlay use have a yellow background on the graph display.





Default settings

The factory default settings of the unit are listed below.

- Main channel frequency weighting ..... A
- Main channel time weighting ..... F(Fast)
- FFT Analysis frequency weighting ..... A
- Window Function ..... Hanning
- Windscreen correction ..... WS None
- Diffuse sound field correction (DF) ..... OFF
- LPF Setting (only applicable to the NL-62) ..... OFF
- Delay time ..... OFF
- Backlight auto off ..... 30 s
- Backlight brightness 2
- Battery type ..... Alkaline
- Index 1
- Touch panel lock ..... OFF
- LIN ..... ON
- MAX ..... ON
- Top List ..... ON
- Overlapping ..... OFF
- Output level range upper ..... 130 dB
- Output level range lower ..... 30 dB
- AC OUT ..... Inter lock
- DC OUT ..... MAIN
- Communication interface ..... OFF
- Baud rate ..... 9600 bps
- Store address 001
- Store name 0000
- Measurement time ..... 10 min
- Calibration mode ..... Internal

When you turn power to the unit on while holding down the START/STOP key, the unit will be initialized to the above settings. When wishing to set the unit to the factory default values, select [menu] → [system – Read/Save Setting] → [Load Default Settings] and then press the MENU/ENTER key (please refer to the chapter “Setup Files” of the NL-42/52/62 instruction manual). The time, language and store data are not initialized.

Communication commands

This section lists commands about the function of the NX-42FT. For information on other commands, please refer to the Serial Interface Manual of the NL-42/52/62.

List of commands

S: Setting command (for making the unit settings)

R: Request command (for obtaining information on the unit status and measurement results)

Command	Function	See page
Display LIN	Display LIN (S/R)	29
Display MAX	Display MAX (S/R)	29
Display Top List	Display Top List (S/R)	29
Display Screen Number	Selecting Measurement Value (S/R)	30
Display Graph Numeric	Switching display (S/R)	30
FFT Cursor Type	Selecting the position of the cursor (S/R)	30
FFT Cursor Line	Selecting Spectrum frequency (S/R)	31
FFT Zoom	Zoom rate (S/R)	31
Manual Address	Store Address (S/R)	31
Measurement Time Manual (Num)	Numeric of Measurement Time (S/R)	32
Measurement Time Manual (Unit)	Unit of Measurement Time (S/R)	32
Time Window	Time Window (S/R)	32
Frequency Weighting (FFT)	Frequency Weighting FFT analysis (S/R)	33
FFT Data	Spectrum Level (R)	33
Top List	Top List (R)	33

Command Description

Display LIN

Display LIN

Setting the LIN displayed on a screen

Setting command	Display␣LIN, p1
Parameter	p1= “Off”
	p1= “On”
Request command	Display␣LIN?
Response data	d1
Returned value	Same as for setting command

Display MAX

Display MAX

Setting the MAX displayed on a screen

Setting command	Display␣MAX, p1
Parameter	p1= “Off”
	p1= “On”
Request command	Display␣MAX?
Response data	d1
Returned value	Same as for setting command

Display Top List

Display Top List

Setting the Top List displayed on a screen

Setting command	Display␣Top␣List, p1
Parameter	p1= “Off”
	p1= “On”
Request command	Display␣Top␣List?
Response data	d1
Returned value	Same as for setting command

Display Screen Number

Selecting Measurement Value

Selecting the measurement value displayed on a screen

Setting command	Display␣Screen␣Number, p1	
Parameter	p1= FFTINST	(INST)
	p1= FFTLIN	(LIN)
	p1= FFTMAX	(MAX)
Request command	Display␣Screen␣Number?	
Response data	d1	
Returned value	Same as for setting command	

Display Graph Numeric

Switching display

Switching the Top List display and the Graphical display

Setting command	Display␣Graph␣Numeric, p1	
Parameter	p1= “Graph”	(Graphical display)
	p1= “Num”	(Top List display)
Request command	Display␣Graph␣Numeric?	
Response data	d1	
Returned value	Same as for setting command	

FFT Cursor Type

Selecting the position of the cursor

Switching main channel and FFT analysis

Setting command	FFT␣Cursor␣Type, p1	
Parameter	p1= “Main”	
	p1= “FFT”	
Request command	FFT␣Cursor␣Type?	
Response data	d1	
Returned value	Same as for setting command	

FFT Cursor Line

Selecting Spectrum frequency

If you have selected the “FFT” at the cursor position, select the spectrum frequency. To specify the frequency, use the Spectrum line number. One line shows 2.5 Hz.

Example: If you select 1 kHz, enter “400”

(2.5 Hz × 400 lines = 1 kHz)

Setting command	FFT␣Cursor␣Line, p1
Parameter	p1= “1 to 8000” (2.5 Hz to 20 kHz)
Request command	FFT␣Cursor␣Line?
Response data	d1
Returned value	Same as for setting command

FFT Zoom

Zoom rate

Setting the zoom rate for the currently selected spectrum

Setting command	FFT␣zoom, p1
Parameter	p1= “x1”
	p1= “x2”
	p1= “x5”
	p1= “x10”
	p1= “x20”
	p1= “x40”
Request command	FFT␣Zoom?
Response data	d1
Returned value	Same as for setting command

Manual Address

Store Address

Setting the Store Address

Setting command	Manual␣Address, p1
Parameter	p1= “1 to 100”
Request command	Manual␣Address?
Response data	d1
Returned value	Same as for setting command

Measurement Time Manual (Num)

Numeric of Measurement Time

Setting the Numeric of Measurement Time

Setting command	Measurement␣Time␣Manual␣(Num), p1
Parameter	p1= “1 to 59”
	(When measurement time unit is “s”)
	p1= “1 to 20”
	(When measurement time unit is “m”)
Request command	Measurement␣Time␣Manual␣(Num)?
Response data	d1
Returned value	Same as for setting command

Measurement Time Manual (Unit)

Unit of Measurement Time

Setting the Unit of Measurement Time

Setting command	Measurement␣Time␣Manual␣(Unit), p1
Parameter	p1= “s”
	p1= “m”
Request command	Measurement␣Time␣Manual␣(Unit)?
Response data	d1
Returned value	Same as for setting command

Time Window

Time Window

Setting the Time Window

Setting command	Time␣Window, p1
Parameter	p1= “Hanning”
	p1= “Rectangular”
Request command	Time␣Window?
Response data	d1
Returned value	Same as for setting command

Frequency Weighting (FFT)

Frequency Weighting FFT analysis

Setting the Frequency Weighting of the FFT analysis

Setting command	Frequency␣Weighting␣(FFT), p1	
Parameter	p1= “A”	
	p1= “C”	
	p1= “Z”	
Request command	Frequency␣Weighting␣(FFT)?	
Response data	d1	
Returned value	Same as for setting command	

FFT Data

Spectrum Level

Acquiring the spectrum level

Request command	FFT␣Data?p1	
Parameter	p1= Main	
	p1= 1 to 8000	(Spectrum line number)
Response data	d1	
Returned value	d1= “xxx.x”	(Spectrum Level)

*There is no Setting command (d1 is sent with fixed 5-digit length (xxx.x), padded with spaces from the top if necessary.)

Top List

Top List

Acquiring numeric of the top list

Request command	Top␣List?	
Response data	d1, d2,…, d40	
Returned value	d1 to d20= 1 to 8000	(Spectrum line number)
	d21 to d40= “xxx.x”	(Spectrum Level)

*There is no Setting command (d21 to d40 are sent with fixed 5-digit length (xxx.x), padded with spaces from the top if necessary.)

Specifications

Compatible model	Sound Level Meter NL-42/NL-52/NL-62	
Media	SD memory card, 512 MByte	
Measurement function	Simultaneous measurement of following items, using selected time weighting and frequency weighting.	
Main channel	Instantaneous sound pressure level	L_p
	Equivalent continuous sound pressure level	L_{eq}
	Maximum sound pressure level	L_{max}
FFT analysis	The processing time of 1 frame is 400 ms	
	Spectrum of 1 frame	INST
	Power average of Spectrum	LIN
	Maximum of Spectrum	MAX
Frequency Weighting		
	Main channel	A, C, Z, G
	(G is only applicable to the NL-62)	
	FFT analysis	A, C, Z
Time Weighting		
	Main channel	F(Fast), S(Slow), 10s
	(10s is only applicable to the NL-62)	
Dynamic range (FFT analysis)		
	100 dB (80 dB if the frequency is less than 10 Hz)	
Analysis frequency range		
	20 kHz (fixed)	
Window Function		
	Hanning, Rectangular	
Spectrum line	8,000 lines fixed	
	(Frame time 400 ms, Frequency resolution 2.5 Hz)	
Sampling Frequency	48 kHz (fixed)	

Previous data removal function (Back-erase function) None

Display

Measurement screen

Sound level and FFT analysis 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.

Store

Manual store Measurement result and measurement start time are stored manually on an address to address basis

Measurement time

1 sec to 59 sec, 1 minute to 20 minutes

Data store capacity

External memory depends on the card capacity (only the performance of genuine Rion cards is guaranteed)

The processing result is not stored in the internal memory

Output

DC output Outputs DC signals corresponding to the level in the main channel with the frequency weighting selected for processing

DC output: 2.5 V, 25 mV/dB at display full-scale point

Output impedance: approx. 50 Ω

Load impedance: 10 kΩ or more

AC output Outputs AC signals with the frequency weighting selected for processing

Output voltage: 1 Vrms (effective value) at display full-scale point

Output impedance: approx. 600 Ω

Load impedance: 10 kΩ or more

DC/AC simultaneous output

Enables simultaneous output of DC output and AC output.

Comparator output

None

Overload characteristics

OVER (including OUTPUT OVER) appears in all-pass level AP field when level reaches +8.3 dB of full scale point.

Printout — Prints measurement results via the dedicated printer DPU-414.

Screen print mode

Makes a copy of displayed screen.

Overlay graph — Displays the measured data together with the graph based on the recalled data.

Waveform recording — In combination with the Waveform Recording Program NX-42WR, simultaneous waveform recording along with FFT analysis is possible.

Power requirements — Four AA batteries or external power supply.

Battery life (at 23°C):

Alkaline batteries LR6: Approx. 12 hours
Ni-MH secondary batteries: Approx. 12 hours
(Depending on the manufacturer)

Battery life varies depending on the setting of this unit.

Current Consumption

130 mA (normal operation, rated voltage)

Dimensions — 32 (H) × 24 (W) × 2.1 (D) mm

Weight — Approx. 5 g

Supplied accessories

Inspection certificate 1

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