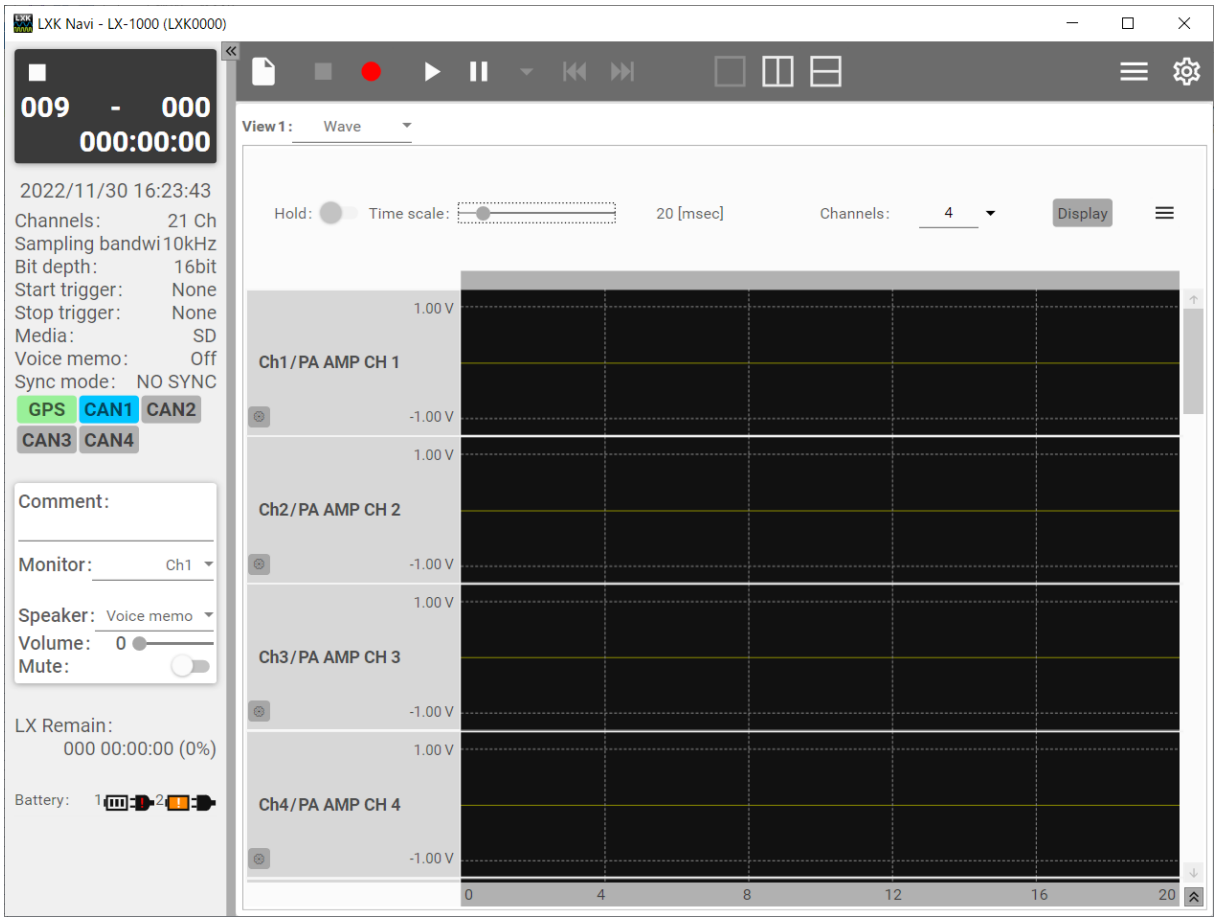
D01361410L

TEAC

LXK Navi

Instructions for Use



Contents

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Operating environment

Supported operating systems

Windows 8.1 (32/64-bit editions)
Windows 10 (32/64-bit editions)
Windows 11
As of September, 2022

Recommended hardware

- CPU: 3.0GHz Intel® Core™ i5* or faster with 4 or more cores
  *6th generation (Skylake) or newer
- Screen resolution: 1280x1024, 1440x900 or higher
- Memory: 4 GB or more
- Storage (HDD/SSD): 1 GB or more open space
- 1000Base-T Gigabit Ethernet port
- .NET Framework 4.7.2 or later
  (4.8 or later recommended)

Supported product

LX-1000

ATTENTION

- Operation with all computers that meet the above requirements is not guaranteed. Moreover, maintenance of continuous recording at high sampling speeds might not be possible depending on the combination of the activity of background applications, services and other driver applications, as well as the speed of the hard disk and other factors.
- Do not change computer settings, including the time, while using this application.

Requirement for .NET Framework

If LXK Navi is installed on a computer that does not have the above version of .NET framework installed and is not connected to the Internet, manual installation of .NET framework will be necessary.
Execute NDP472-KB4054530-x86-x64-AllOS-ENU.exe, which is in the .NET Framework folder on the included CD-ROM, and follow the instructions on screen to install .NET Framework.
If using a Japanese version of Windows, also execute ndp472-kb4054530-x86-x64-allos-jpn.exe.

NOTE

The above version of .NET Framework is installed by default for Windows 10 1803 (April 2018 Update) and later versions or Windows 11.

Installation

Follow these procedures to first install the LXK Navi application. Installation must be conducted by a person with administrative privileges for the computer on which the application is being installed.

ATTENTION

- Restarting the operating system could be necessary during installation. Quit other applications before beginning installation.
- If a User Account Control window appears during installation, click "Yes" to proceed with the installation.

NOTE

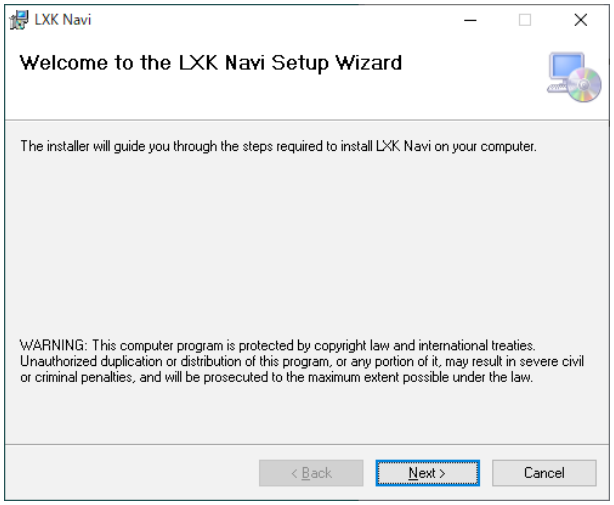
The screens used in this example are from Windows 10.

1 Double-click the LxkNaviSetup.exe file to open the installation wizard.

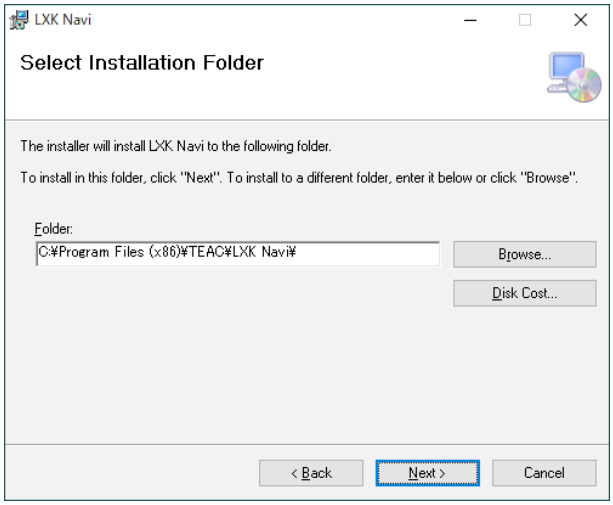
NOTE

If necessary, VC Runtime (Microsoft Visual C++ 2015-2019 Redistributable (x86)) will be installed.

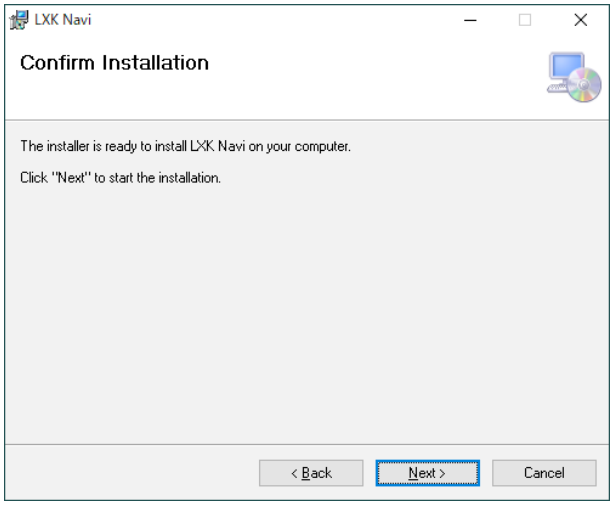
2 Click "Next".



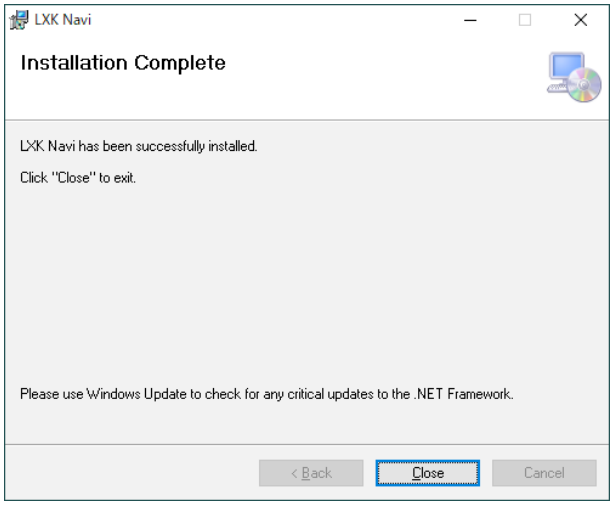
3 Select the installation folder, and click "Next".



4 Click "Next".

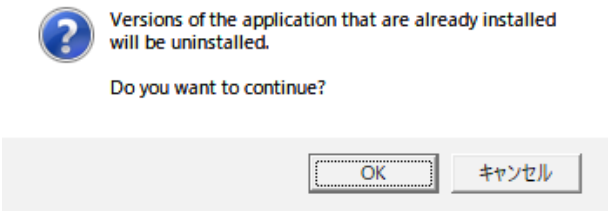


5 When the installation completion screen appears, click "Close" to finish the installation.



Installing over existing versions

The following message will appear if LxkNaviSetup.exe is used to install LXK Navi when another version is already installed on the computer. Click "OK" to proceed with the installation.



Notice about security software

Connection might not be possible if the computer being used has a firewall, antivirus software or other security software installed. Permit transmission on the following ports.

50176 (TCP), 49920 (UDP)

Setting the IP address

For connecting the LX-1000 and the computer, we recommend setting the same subnet mask for both, and setting the same IP address group as the computer.
Set the IP address, for example, on the LX-1000 or the computer as necessary. Use IPv4 to make the setting. When using an LX-1000 connected to a network, make settings in consultation with the network administrator.

Setting the IP address of the LX-1000

The settings are as follows when shipped new from the factory.

IP address: 192.168.0.10
Subnet mask: 255.255.255.0
Gateway: 0.0.0.0
DHCP: disabled

Follow these procedures to first set the IP address.

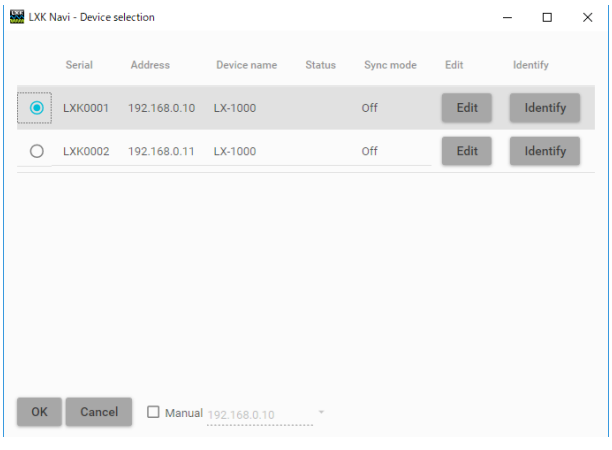
1 Turn the LX-1000 that is connected to a network on.

When connecting multiple LX-1000 units to a network, connect them and set their IP addresses one at a time.

2 Click the Start button and select the TEAC LXK Navi app.

When using Windows 7, select TEAC - LX-1000 - LXK Navi.

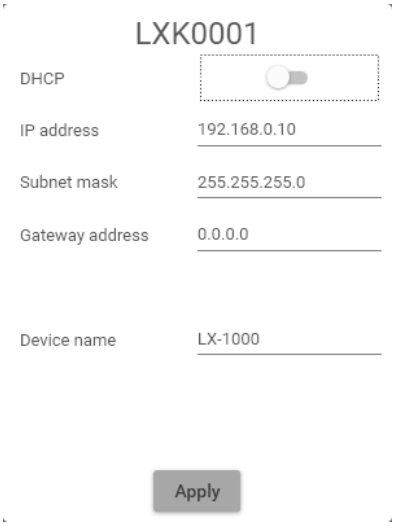
3 On the Device selection screen, click the Edit button for the LX-1000 to be set.



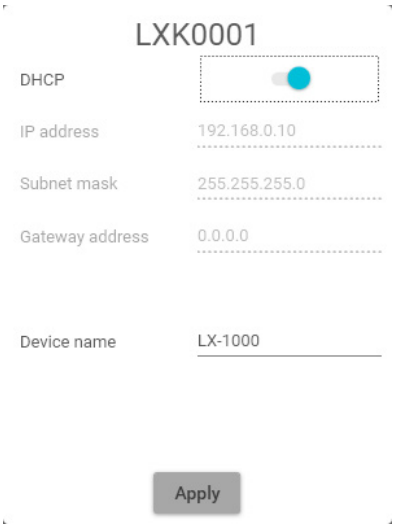
Continued on the next page ➡

4 Set the IP address and click the Apply button.

Change the name of the device if necessary.

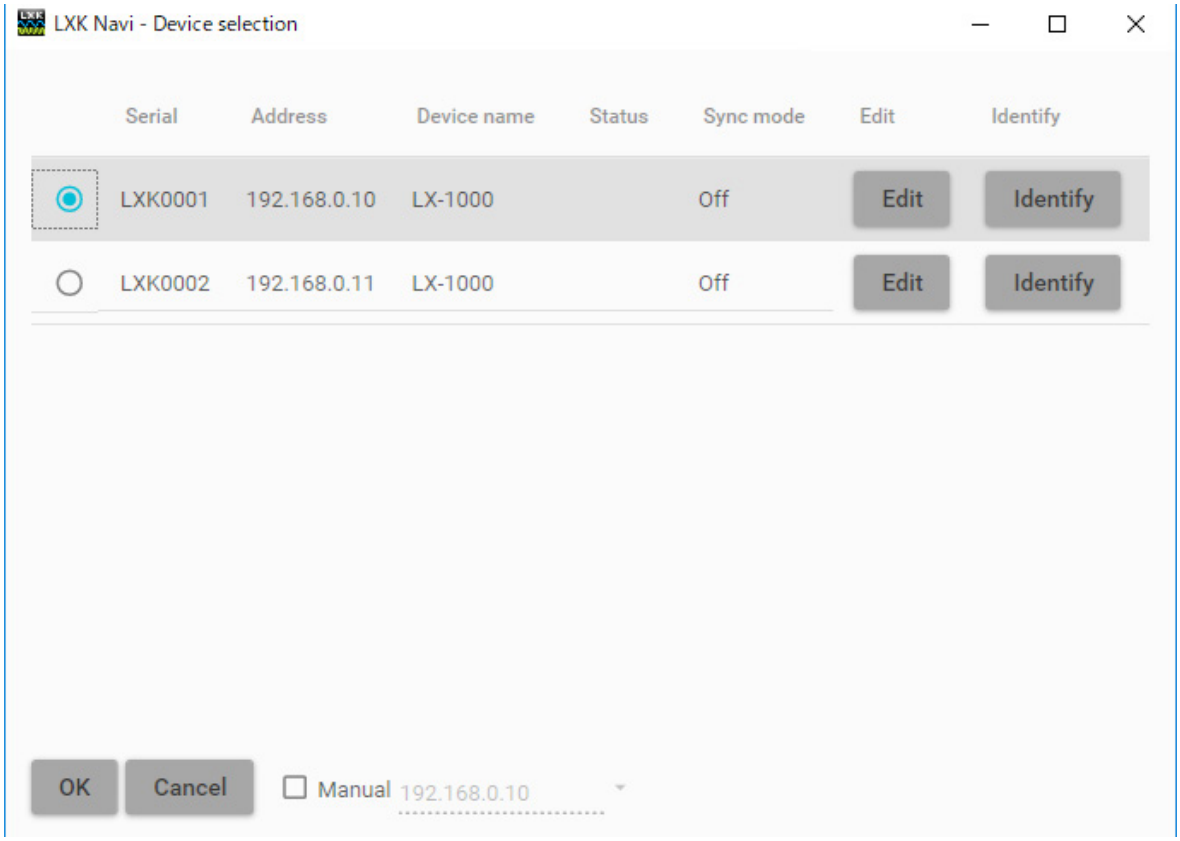


To use DHCP, click the DHCP slide button to enable it.



1-1. Device selection screen

After launching LXK Navi, a selection screen for connected LX-1000 units will open.



LX-1000 units that are on the same subnet mask as the computer will be shown.
Select the LX-1000 unit to connect and click the OK button.

NOTE

- If the LX-1000 that was connected at the last time of operation is detected, it will be selected automatically. Click the OK button to continue.
- To directly specify the IP address of an LX-1000 to connect, put a check next to "Manual", input the IP address of the LX-1000, and click the OK button.

Status

No indication

Connection is possible.

In use

Connection is not possible because it is connected with another computer or a remote control is connected.
End the connection with the other computer or disconnect the remote control to enable connection.

Not reachable

Connection is not possible because of a problem with the IP address of the LX-1000 or the computer.
Confirm that the IP addresses are set correctly.

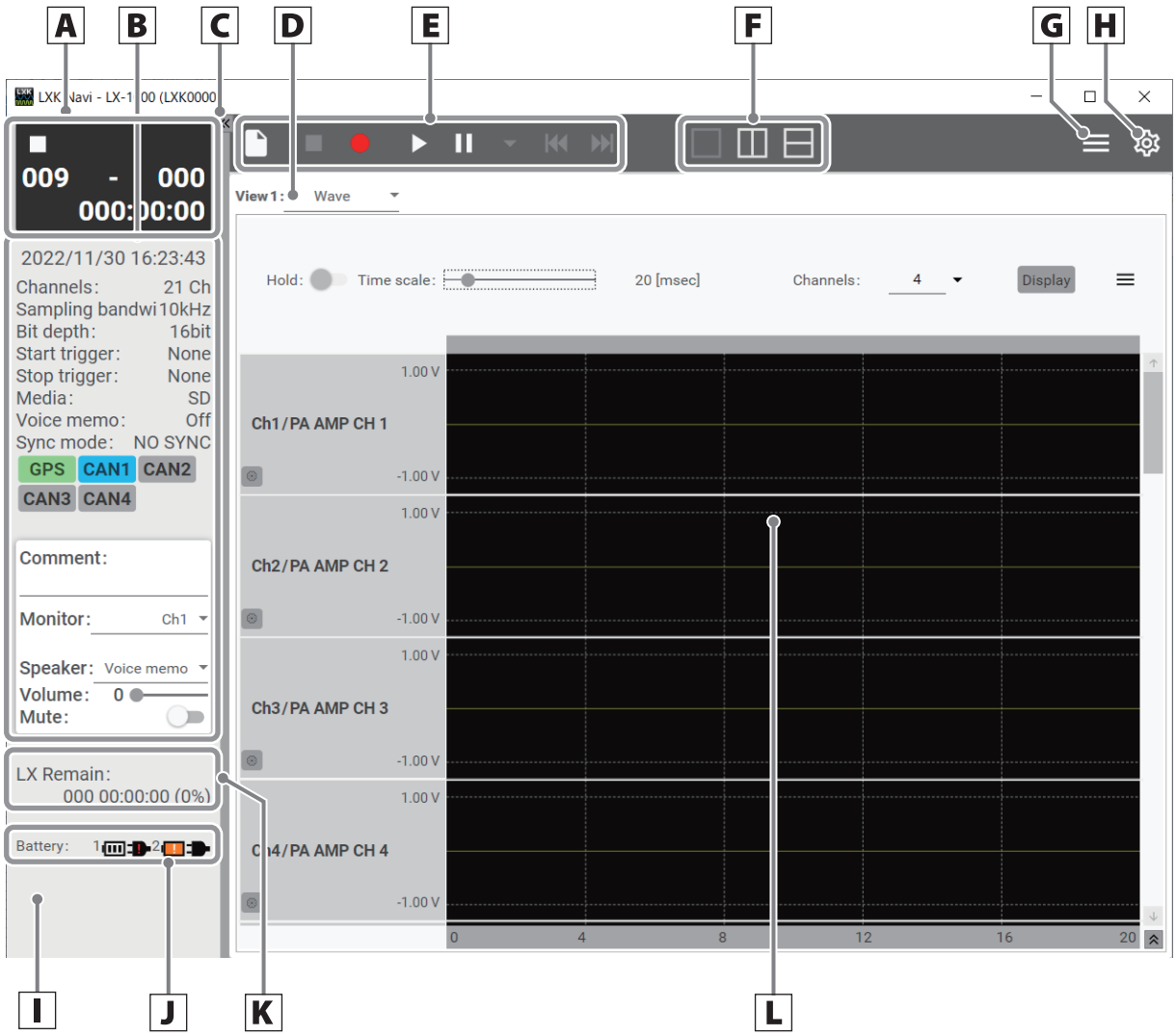
Sync mode

This sets the synchronized operation mode of the LX-1000 (page 33).

Identification

Devices selected on the Device selection screen can be identified.
Select one LX-1000 from the list on the Device selection screen, and click the Identify button to make all LEDs on its front panel blink, showing that it is the one selected.

1-2. Home screen



A Information

The following information is shown in order from the top.

Status icon

■: Stopped
●❚❚: Record ready
●: Recording
▶: Playing back
▶❚❚: Playback ready

Recording/playback information

ID – event mark (pages 16 and 23)
Recording/playback time

B Measurement conditions

Content related to measurements set on the Settings Screen is shown here.

LX-1000 clock time

The display format can be set using the Time setting Date format (page 31).

CAN port display

The CAN ports that can be used are shown as "CAN1" and "CAN2", for example. If CAN data is received during recording, the background will become green (when "Full" is selected).
When set to "Signal recording", it will always be blue.

Comment

This shows the comment entered on the File Settings Screen (page 34).

Monitor

The signal of the specified channel is converted from digital to analog and output from the LX-1000 MONITOR OUT connector (page 32).

- Pulse input cannot be selected.

Volume

This adjusts the volume of the built-in speaker on the side of the LX-1000 and the earphone. Select the signal output with "Speaker source" in the General Settings (page 28).

- When an earphone is connected to the EARPHONE jack, sound will be output from it instead of the speaker built into the side of the LX-1000.

Mute

This mutes the volume of the LX-1000 built-in speaker and the earphone.

C **〈〈 / 〉〉 buttons**

The 〈〈 button closes the information and measurement condition display area on the left side of the window.

The 〉〉 button opens the information and measurement condition display area on the left side of the window when it has been closed.

D **View setting**

This sets the data display.

Wave: waveform display

Bar: bar meter display

Digit: digital value display

CAN: CAN signal display (only for Full)

GPS: GPS information display

E **Recording/playback control**

Click the icons to conduct the following operations.

🗋: Select file

■: Stop

●: Click to ready recording, then click ▶ to start recording

▶: Start playback

❚❚: Pause

The following button is only enabled during recording.

▼: Add event mark

- A maximum of 200 event marks can be added to a single data file.

The following buttons are only enabled during playback.

⏮: Skip to previous recording data

⏭: Skip to next recording data

F **Window layout**

☐: Maximize window View 1

◫: Split into left and right windows

⊟: Split into top and bottom windows

G **☰ button**

This opens a menu (page 20).

H **⚙ button**

Click to open the Settings Screen.

I **GPS information**

This shows GPS information. Click this to hide it.

J **Battery unit status**

When a BU-LX1000 battery unit is connected, this shows its status.

Battery charge high

Battery charge low

Battery voltage low

Using external power supply

External power supply voltage abnormal

NOTE

Battery charge indications are estimates.

K **Recording media information**

This shows the amount of free space on the data recording destination.

The display format is days hours: minutes: seconds.

Input the recording data destination on the File Settings Screen (page 34).

L **Data display**

This shows measurement waveforms and measurement values.

1-2-1. Settings by view

The following items are shown according to the display view.

Wave

Hold	When this is turned on, the waveform display will stop and cursors will be shown.
Time scale	This adjusts the horizontal display range.
Channels	This sets the number of channels shown.
Display	Set which channels to show.
⚙	This shows basic channel properties.
☰ ⌃⌃	These open the Channel Property List.

- The channel names are the names set on the Input/output amplifier module editing screen (page 37).

Digit

RMS	Check this to show root mean square values.
Columns	Set the number of columns shown.
Auto	The number of columns shown is adjusted according to the number of channels.
Display	Set which channels to show.

Bar

%/dB	Change the unit shown.
Clear	Clear peak values.
Peak hold	Check this to hold peak values.
Columns	Set the number of columns shown.
Auto	The number of columns shown is adjusted automatically according to the number of channels.

CAN

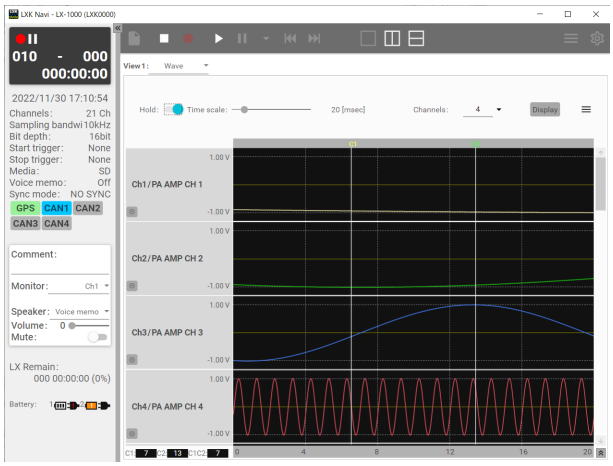
Port	Check the port shown..
Columns	Set the number of columns shown.
Auto	The number of columns shown is adjusted automatically according to the number of channels.
Display	Set which channels to show.

1-2-1-1. Cursor properties

When Hold at the top left of the screen is turned on, the waveform display will stop and cursors will be shown. Drag a cursor to move it.

ATTENTION

- Pausing during playback will automatically turn on the Hold function. Resuming playback will turn it off automatically.
- When stopped, the Hold function turns off automatically and the Hold button becomes disabled.



C1 and C2 at the bottom left of the window show the horizontal positions of each cursor.
C1C2 shows the distance between the two cursors.

1-2-1-2. Channel Property List

Click ☰ or ⌃⌃ to open the channel property list at the bottom of the window.

Number

Channel number

Edit

Use this to edit channel properties.

Channel

Channel name

Offset

Offset used for Physical Quantity Conversion

Zoom

Display magnification rate

Position

Offset of graph display position

C1

Measured value of Cursor 1 position on the horizontal axis

C2

Measured value of Cursor 2 position on the horizontal axis

Abs (C1-C2)

Absolute difference in measured values of Cursor 1 and Cursor 2

Min (C1-C2)

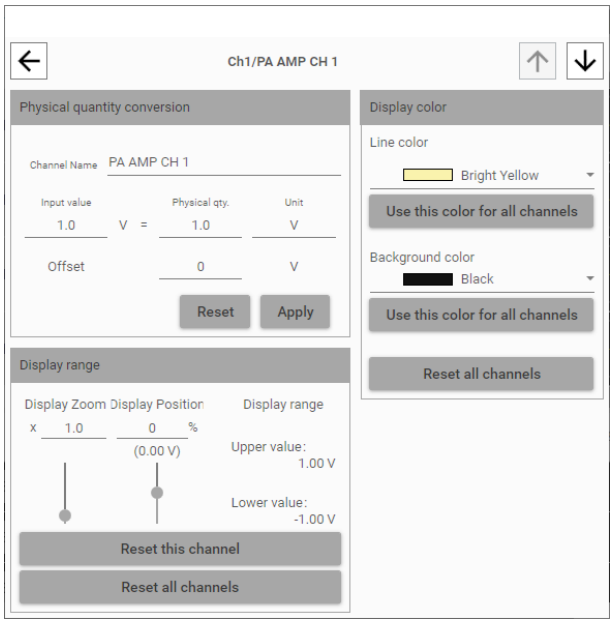
Minimum measured value between Cursor 1 and Cursor 2

Max (C1-C2)

Maximum measured value between Cursor 1 and Cursor 2

1-2-1-2-1. Editing channel properties

Click the Edit button for channel properties to open an editing screen.



↑↓

Use these to change the channel being edited.

Physical Quantity Conversion

The Physical Quantity Conversion setting can be changed without opening the System Screen.

- CAN signal and pulse values cannot be edited.

Display range

Display Zoom

This adjusts the amount displayed on the vertical axis.

Display Position

This changes the vertical range shown in the graph.

Display range

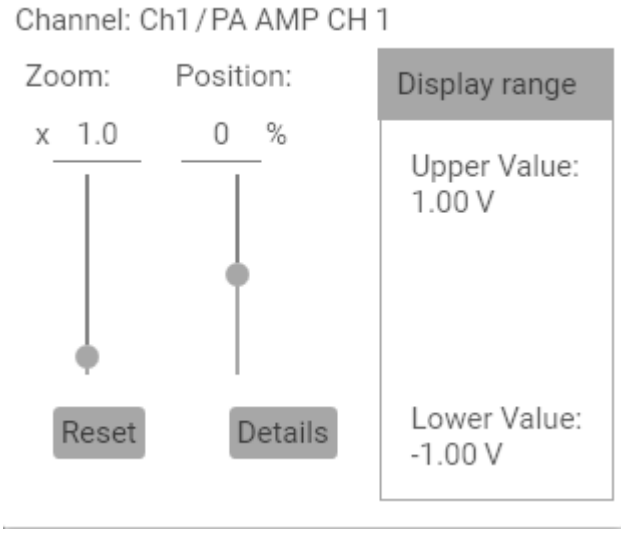
This shows the vertical display range.

Display color

This sets the color of the line in the graph.

1-2-1-2-2. Basic Channel Properties Screen

Click ⚙ on a channel to open this Basic Channel Properties Screen.



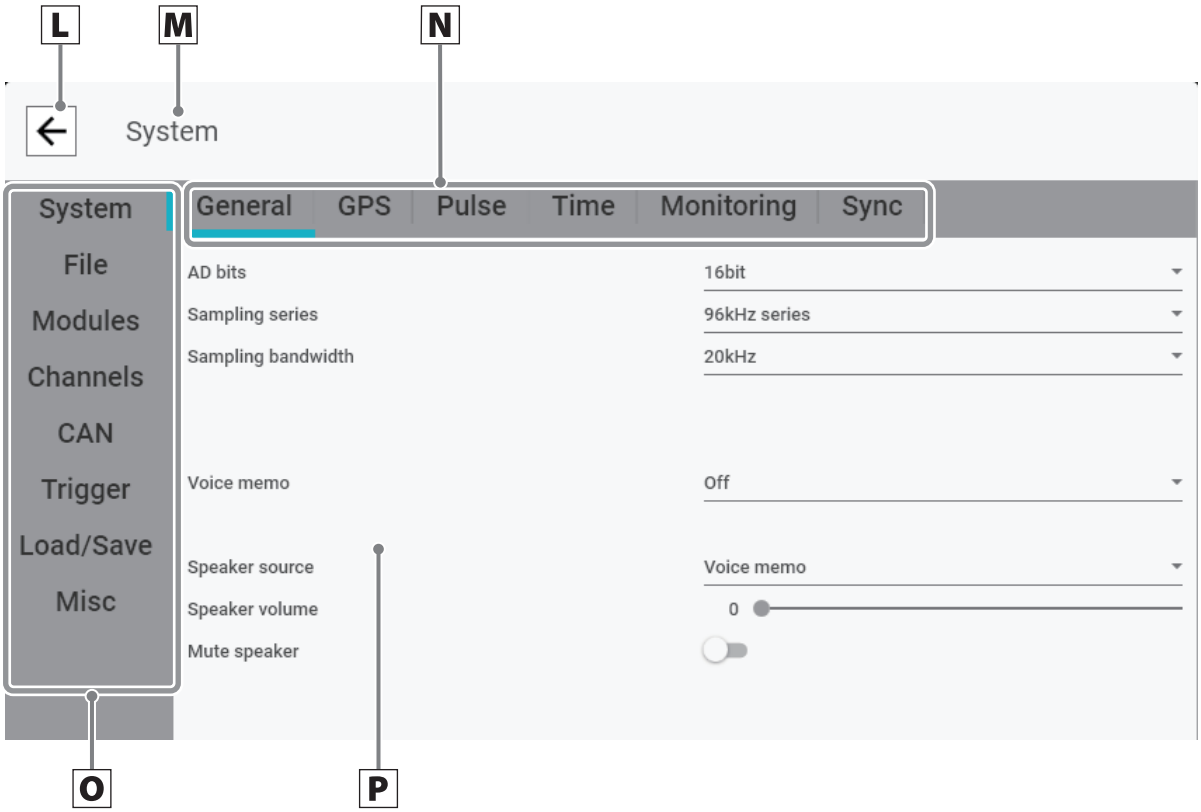
Reset

This sets Zoom to 1 and Position to 0%.

Details

This opens the Channel Properties Screen.

1-3. Settings Screen



Click the ⚙ button on the Home Screen to open the Settings Screen.
See page 27 for details.

M Back button

Return to the Home Screen.

N Settings menu level

This shows the the current Settings menu level.

O Settings sub menus

Sub menus appear here when they are available.
These are the second level of the Settings menu.

P Settings menu

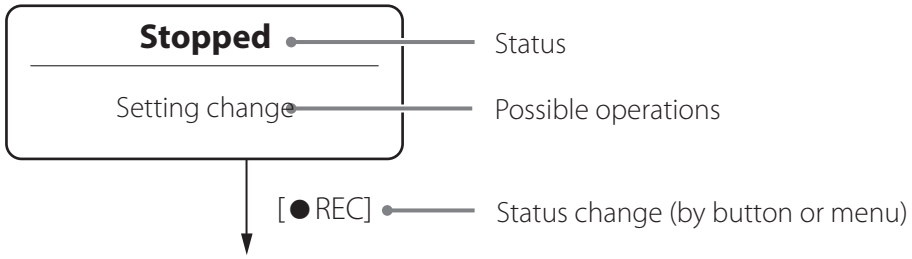
Click a Settings menu item to open it.
These are the first level of the Settings menu.

Q Settings page

1-4. Status changes

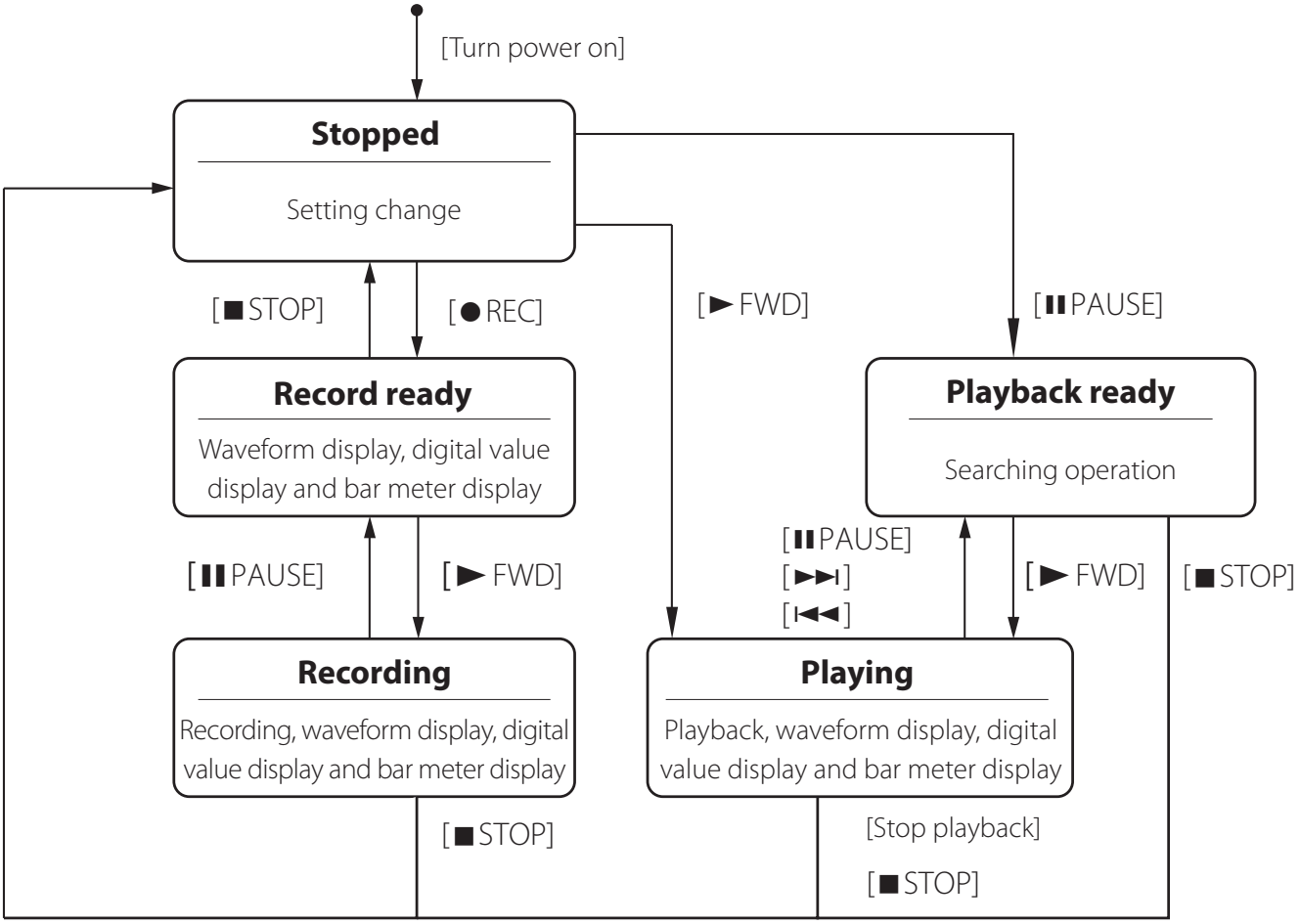
1-4-1. Explanation of status change diagram entry

Entries appear on the status change diagram in the following manner.



1-4-2. Status change diagram

This application has the following states.



1-5. Recording and playing data

Recording data can be saved to an LX-1000 SD card and/or a computer.
Install AR-LXAO1000 analog output amplifiers into the LX-1000 as necessary.

ATTENTION

Data saved to an LX-1000 SD card can be played back. Data saved to a computer cannot be played back.

1 Turn an LX-1000 that is connected to the network on.

2 Click the Start button and select the TEAC LXK Navi app.

When using Windows 7, select TEAC - LX-1000 - LXK Navi.

3 Select the LX-1000 to operate.

NOTE

When connecting to an LX-1000 that is not on the same subnet mask as the computer, check "Manual" on the Device selection screen and enter the IP address of that LX-1000.

4 Set the measurement conditions or load them.

Click the ✲ button to open the Settings Screen (page 27).
To load measurement conditions that are saved on an SD card or a computer, click "Load/Save" on the Settings Screen, and click the Load → button (page 48).

ATTENTION

If an input/output amplifier module is changed, the measurement conditions will be reset.

5 Record or play data.

Recording

Press the ● button to make the system ready to record.
If a start trigger has been set, recording will start when a trigger condition is met.
If no start trigger has been set, click the ▶ button to start recording.

Playback

Click the ▶ button to start playback. This will start playback of the most recently recorded data. To play a specific file, click the 🗋 button and select that file (page 25).

ATTENTION

Be careful of the following during recording and playback. Recording and playback could be interrupted.

- Do not allow the computer to go to sleep or suspend operation.
- Do not allow background tasks that put heavy loads on the system.

1-5-1. ID explanation

IDs are consecutive file numbers inside playback and recording folders. These do not always match the file name suffixes (3 digits for SD and 3–5 digits for PC).

- During SD & PC recording, media settings show consecutive file numbers in SD playback or recording folders.

1-5-2. Waveform overview

By default, waveforms are shown in channel number order.

NOTE

The vertical axis scales use the input range values of each channel.

Selecting waveforms to show

Click "Display" at the top right of the screen to open the "Display channels" list. All channels are shown by default. Remove checks next to the channels that do not need to be shown.

NOTE

Click "All" to check/uncheck all the channels at once.

Resetting the waveform display

Click "Display" at the top right of the screen and then click "Reset" at the bottom left to clear the customized waveform display and show all channels in numerical order.

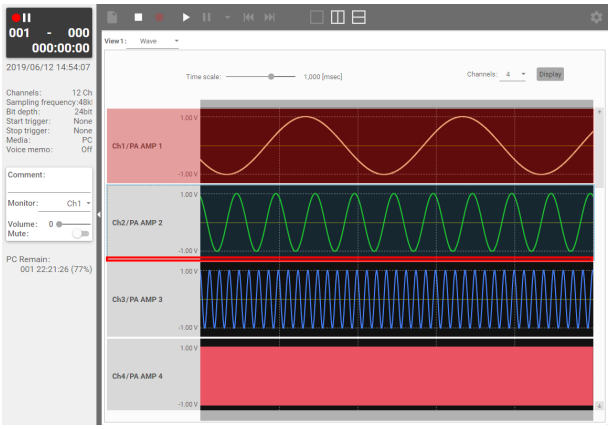
Changing the waveform display order

Waveform windows can be dragged and dropped to change the order that they are displayed.

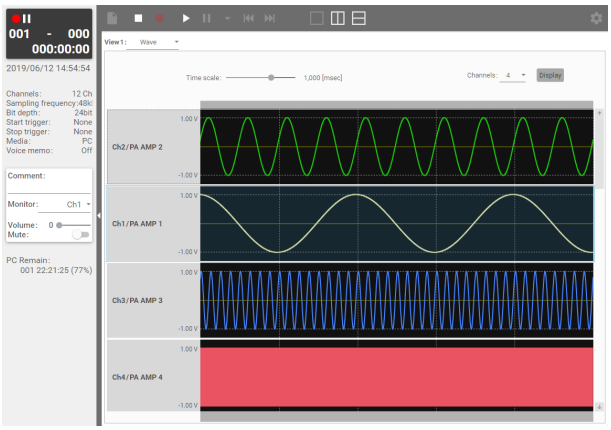
Operation example

Moving Ch1 to between Ch2 and Ch3.

Click the Ch1 waveform window and, without releasing it, drag it to between Ch2 and Ch3, causing a red line to appear between these channels.



Release the left mouse button, dropping the Ch1 waveform window between the Ch2 and Ch3 waveform windows.



Overlaying display of waveforms

Waveform windows can be dragged and dropped on top of each other to overlay their display.

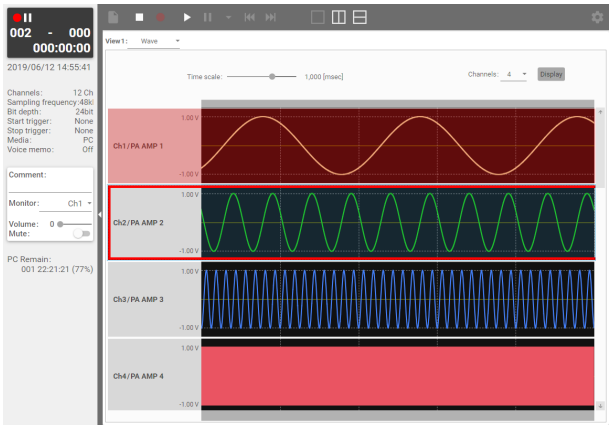
NOTE

- The waveform that is dragged and dropped will appear on top.
- The name of that channel waveform will be shown.
- ◀, ▶ and ✕ buttons appear at the top left of the channel display window during overlay display.
- Waveforms are drawn in order from the bottom channel. If waveforms are the same, only the top waveform will be shown.

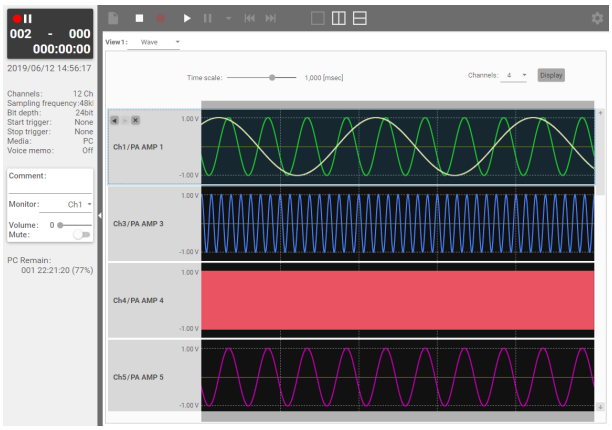
Operation example

Overlaying Ch1 and Ch2 waveforms

Click the Ch1 waveform window and, without releasing it, drag it on to the Ch2 waveform window, causing a red box to appear around it.



Release the left mouse button, dropping the waveform for overlay display.



Changing the overlay order

Click the ◀ and ▶ buttons to change the overlay order.

Ending overlay display

Click the ✕ button to remove the top waveform and show it in the next separate window.

1-6. Synchronization function

For details about master and slave unit connections, refer to "Synchronization function" in the LX-1000 Instructions for Use.
See "Sync" on page 33 for information about master and slave device settings.

1-6-1. Synchronized recording settings

If you set Sampling frequency, AD bits and Media (recording destination) for the master unit, they will also be set for slave units automatically. These settings cannot be changed on the slave units.

The number of recording channels can be set separately for the master and slave units. An error will occur if recording is conducted at a transmission rate higher than the slave units can record.
Confirm that the numbers of recording channels on the slave units are suitable before starting recording.

- Setting triggers on the slave units is not possible.
- The following amount of time is necessary to start synchronized recording from a stopped state.

Sampling frequency	Starting delay
96 kHz – 12 kHz	About 2 seconds
6 kHz	About 3 seconds
3 kHz	About 4 seconds
1.5 kHz	About 5 seconds

- Level triggers and external triggers become effective ten seconds after the unit becomes record ready.
- If recording cannot be continued with the master unit because, for example, it does not have enough recording media capacity, recording will stop at that moment.
  If recording cannot be continued with a slave unit because, for example, it does not have enough recording media capacity, recording will stop only for that unit. Other units will continue recording, but pausing will stop recording.

1-6-2. Synchronized playback settings

After selecting files to play on the slave units, select the file to play on the master unit.

- If the file to play is selected on the master unit without selecting files to play on the slave units, the last recorded/played files will be played.

1-6-3. Limitations when using LXK Navi

Synchronized operation when using LXK Navi has the following limitations.

- **Do not connect LX-1000 units other than the master and slave units being used for synchronized operation to the same subnet**
  Operation on the same subnet is only supported for the master and slave units being used for synchronized operation. Operation of other LX-1000 units connected to the same subnet is not supported.
- **One computer is necessary for each LX-1000 unit when connecting LXK Navi to both master and slave units**
  Only one unit can be controlled from a single computer using LXK Navi. Running multiple instances of LXK Navi on a single computer and connecting them to multiple master and slave units for control is not supported.

1-6-4. VR-24 sync

Preparation

1 Use a synchronization cable to connect the SYNC OUT connector of the LX-1000 to the VR-24/WX SYNC connector of the VR-24.

The VR-24 will operate as the slave unit.

2 Turn the VR-24 on.

3 Set the VR-24 Synchronization type to "WX sync".

4 Turn the LX-1000 on.

5 Use the LX-1000 Sync settings to set "Mode" to "Master" and "Number of synchronized units" to "2". Then, conduct "Connection check".

If there are no connection problems, the "Sync status" will be "OK".

6 Execute "Adjust time" to set the time used by the VR-24 to that used by the LX-1000.

The error is ±1 second.

Recording

When recording operations are conducted with the LX-1000, the same operations will automatically be conducted with the VR-24.

ATTENTION

- Synchronization of one LX-1000 and one VR-24 is possible.
- When the following settings are made on the LX-1000, they will also be made on the VR-24 automatically.
  - Sampling series
  - Sampling frequency
  - AD bits
- Set to a sampling frequency supported by the VR-24.
- Event marks can only be set on the LX-1000.
- Synchronized playback operations are not possible. Set synchronization type to OFF in order to play back recordings.

2. Recording

2-1. Order of procedures

Set recording conditions
↓
Set recording destination
↓
Calibration
↓
Set triggers
↓
Make other settings
↓
Start recording
↓
Stop recording

2-2. Setting recording conditions

On the Settings Screen, make settings for the sampling frequency, analog-digital conversion bit depth, number of recording channels, voice memo activation and amplifiers (page 27).

2-3. Setting recording destination

Set the media and file name for recording.
Set the recording destination on the File Settings Screen (page 34).

- When SD is selected for Media, a "Format media" item is shown. Click the → button to format the SD card loaded in the LX-1000.

2-4. Calibration

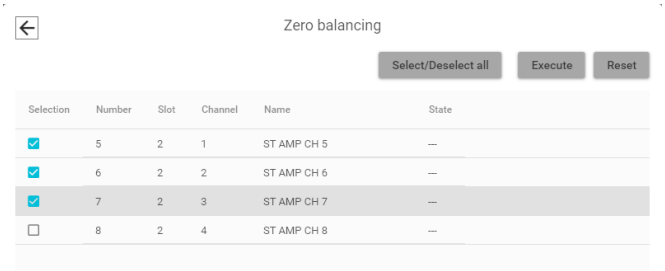
Set the value used to convert sensor output to physical quantities.

2-4-1. Equivalent input calibration

In the Physical quantity conversion field, set the rated output and rated capacity indicated in the sensor test report (page 37).

2-4-2. Adjusting zero balance

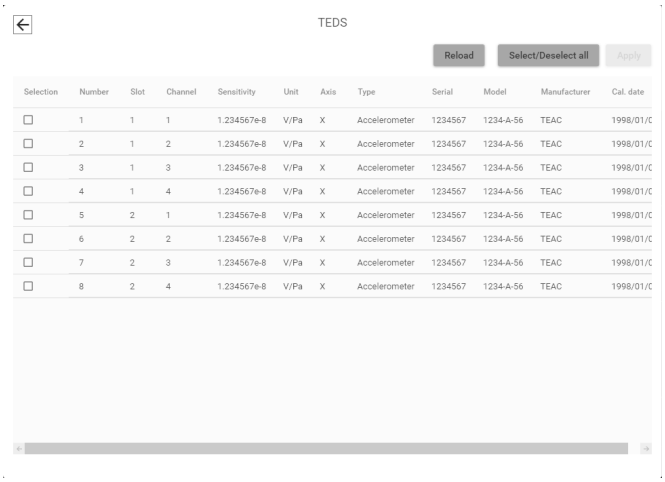
Zero balance can be adjusted for channels with strain amplifiers that have the amplifier mode set to ST.
Click the ≡ button at the top right of the Home Screen and select "Zero balancing".



Put checks into the Selection boxes to select channels for zero balancing. Then, click the Execute button.

2-4-3. TEDS calibration

Click the TEDS Read button on the settings screen for an individual amplifier module that supports TEDS to set its physical quantity conversion value (page 37).
To set TEDS data for multiple channels at the same time, click the ☰ button at the top right of the Home Screen and select "TEDS".



TEDS data for connected sensors will be shown in a list. Put checks into the Selection boxes for channels to set their TEDS data as physical quantity conversion values. Then, click the Apply button.

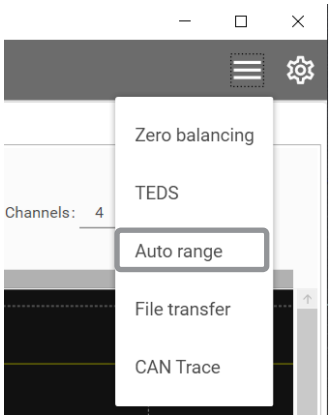
2-5. Auto range

Amp input ranges can be set automatically by inputting a temporary signal before recording.

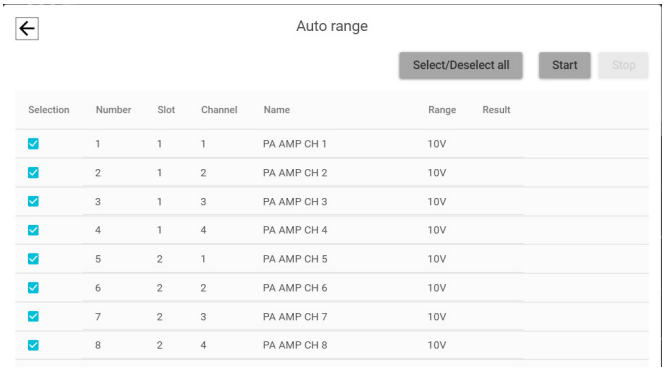
NOTE

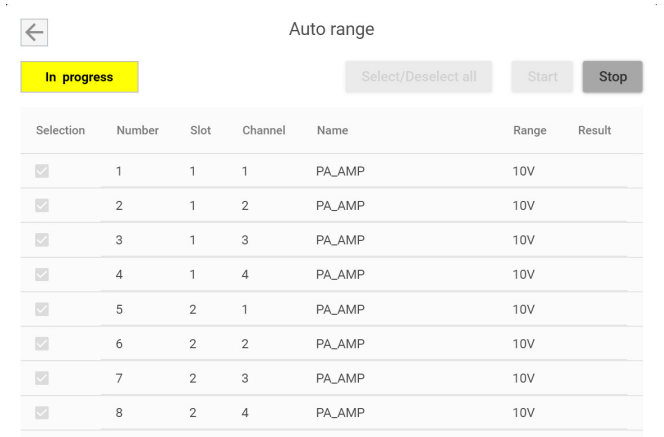
The auto range function can only be used with AR-LXPA1000 analog input amps.

1 Click the ☰ button at the top right of the Home Screen and select "Auto range".



2 Put checks into the Selection boxes to select channels for the auto range function. Then, click the Start button.

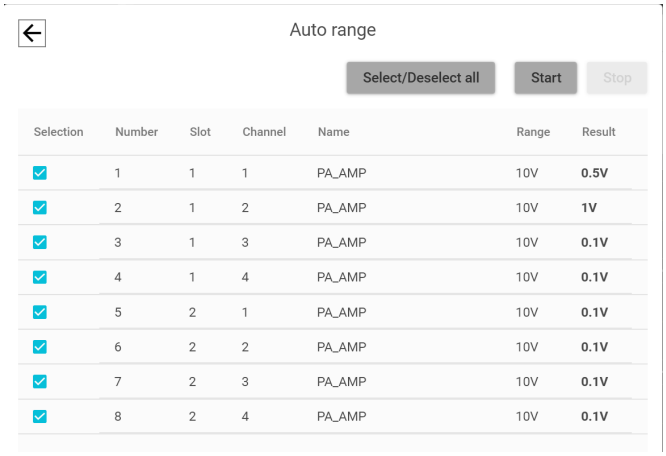




3 Input a signal.

4 Click the Stop button.

From the input signal level, suitable ranges will be shown in the Result column, and ranges will be changed.



5 Click the ← button to return to the Home Screen.

ATTENTION

- Limitations on synchronization function use
  Execution of the auto range function is conducted from the master unit.
  All AR-LXPA1000 analog input amp channels for master and slave units are subject to auto range. Specific channels cannot be selected.
- If there are channels that have been AC coupled, measurement will not start for 10 seconds after starting the auto range function. Input signals after 10 seconds have elapsed.

2-6. Setting triggers

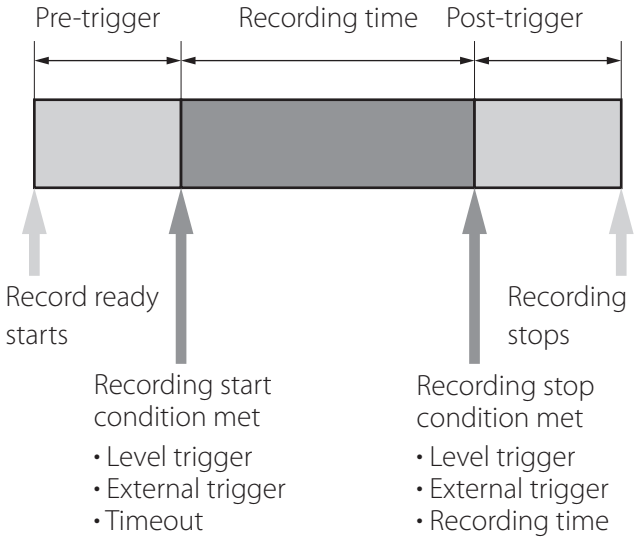
In addition to manually starting and stopping recording, you can also set the system to start and stop recording using triggers and intervals. Make these settings on the Trigger Settings Screen (page 47).
The trigger recording operations are explained below.

ATTENTION

When using triggers and intervals to start recording automatically, put the system into a record ready state. The system will not detect triggers if just in a stopped state.

Trigger recording

Example of one trigger recording repetition



For trigger recording, you can set a combination of recording starting conditions (level trigger, external trigger or timeout) and recording stopping conditions (level trigger, external trigger or recording time).

Recording starting conditions

Level trigger

Use a level change for the set channel as a trigger.

External trigger

Recording starts when the input through the external trigger signal input (TRIG IN) connector becomes the L level (0.4 V or less).

Timeout

If the conditions set to start recording are not met within the set time, recording will be forced to start automatically.

Pre-trigger

By default, the system saves data from the time between when a recording starting condition occurs and when a recording stopping condition occurs. When a pre-trigger interval is set, data is recorded before a recording starting condition occurs, but only after the system is made record ready.

- During this interval, audio memos and CAN data will not be recorded.

Recording stopping conditions

Level trigger

Use a level change for the set channel as a trigger.

External trigger

Recording stops when the input through the external trigger signal input (TRIG IN) connector becomes the H level (open or 2 V or more).

Recording time

Recording continues only for the set amount of time. Recording will not stop if 0 is specified.

Post-trigger

Even after recording stop conditions are met, recording will continue for the set amount of time.

- When recording is stopped manually, however, post-trigger recording will not occur.

Number of repetitions

Sets the number of repetitions. If the number of repetitions is 2 or more, the system will become record ready after recording stops the first time. When the recording starting condition is realized, recording will start again. This will repeat for the number of repetitions. Then, recording will stop.
If "Endless" is checked, recording and pausing will repeat until the recording media is full or recording is stopped manually.

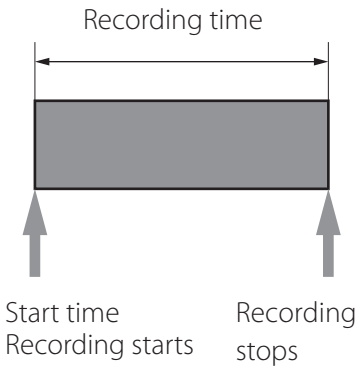
- If "Endless" is checked and recording is conducted until the recording media becomes full, the data for the last recording might not be as long as the Recording time setting

ATTENTION

Triggers cannot be monitored for about two seconds after becoming record ready, or after recording starting or stopping conditions occur (about 10 seconds with synchronized recording).
During this time, nothing will happen even if trigger conditions occur.

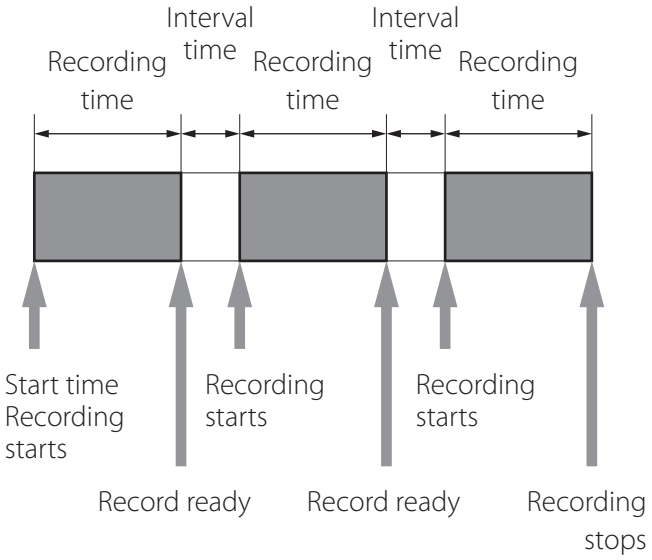
Interval recording

Example of one interval recording repetition



With interval recording, when the Number of repetitions is set to 1, recording will start at the Start time and stop after the set Recording time has elapsed.

Example of three interval recording repetitions



When the Number of repetitions is set to 2 or more, recording will start at the Start time and pause after the set Recording time has elapsed. After the Interval time has elapsed, recording will start again, repeating for the set number of repetitions. Then, recording will stop.

If the Number of repetitions is set to "Endless", interval recording will repeat until the recording media is full or recording is stopped manually.

Start time

Recording starts at the set time.

ATTENTION

If the set time has already passed when the system is made record ready, recording will not start.

The system might take some time to become record ready if, for example, there are already many recorded files. Considering this, set the start time with sufficient spare time.

Recording time

Recording continues for the set amount of time.

Recording will not stop if 0 is specified.

Interval time

If the Number of repetitions is set to 2 or more recordings, this is the amount of time that the system stays in a record ready state from the time one recording ends until the next recording starts.

ATTENTION

- Set the Interval time to at least 6 seconds.
- Even if the system has manually been put in a record ready state during the recording time, the next recording will start after the originally set recording time and interval time have elapsed.

Number of repetitions

Sets the number of repetitions. If "Endless" is checked, recording and pausing will repeat until the recording media is full, the file name suffix exceeds the number of digits (3 for SD, 3–5 for PC), or recording is stopped manually.

If "Endless" is checked and recording is conducted until the recording media becomes full, the data for the last recording might not be as long as the Recording time setting.

2-7. Starting recording

Press the ● button to make the system ready to record.

If a start trigger has been set, recording will start when a trigger condition is met.

If no start trigger has been set, click the ► button to start recording.

2-7-1. Event mark

The ▼ button can be clicked during recording to set an event mark.

- A maximum of 200 event marks can be added to a single data file.

2-8. Stop recording

If a stop trigger has been set, recording will stop when a trigger condition is met.

If no stop trigger has been set, click the ■ button to stop recording.

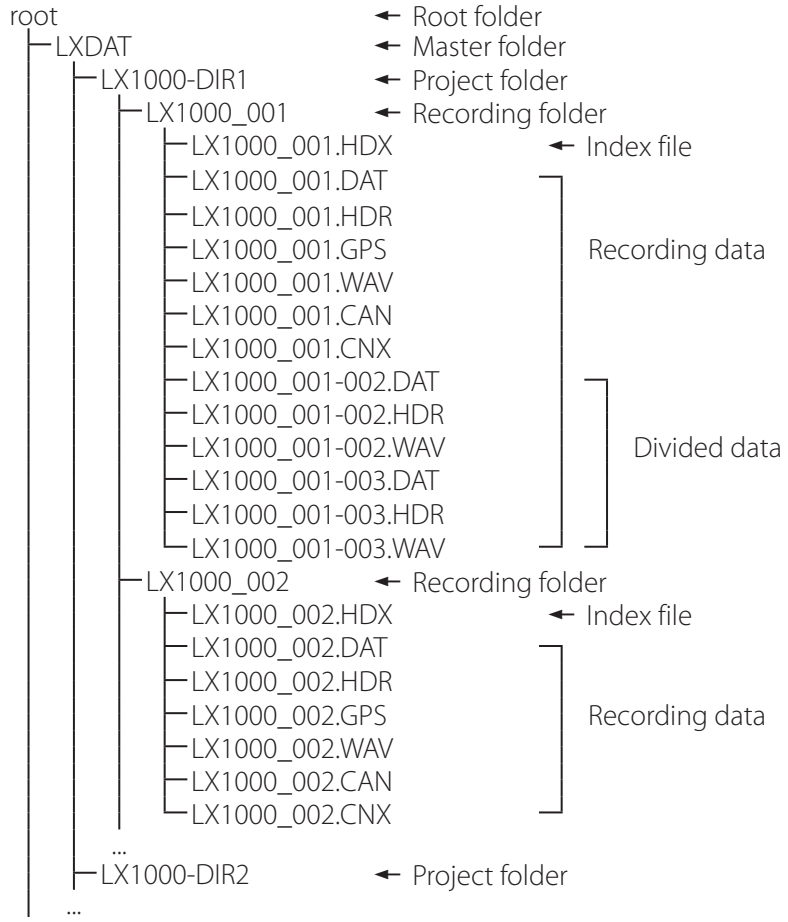
2-9. Recording format

The format used for recording data is TAFFmat.
See the LX-1000 Instructions for Use for details about the TAFFmat format.

2-9-1. Media folder structures

Folder type	Name	Details
Master folder	LXDAT	This is created in the root folder. Data is managed inside it. The name is fixed.
Project folders	Characters as set (Example: LX1000-DIR1)	These are created in the master folder. Their names can be set as desired.
Recording folders	Characters as set (Example: LX1000_)	These are created in project folders. Their names can be set as desired. Each time recording starts, a folder is created with a suffix added automatically (3 digits for SD or 3–5 for PC).
Recording data	Same as recording folder	When a recording is divided at 4 GB, a - followed by a three-digit suffix will be added to the name.

Folder structure example



When saving recording data on a computer, the end of the full path of the folder the data is saved in will be the selected "Base folder" followed by the "Folder".

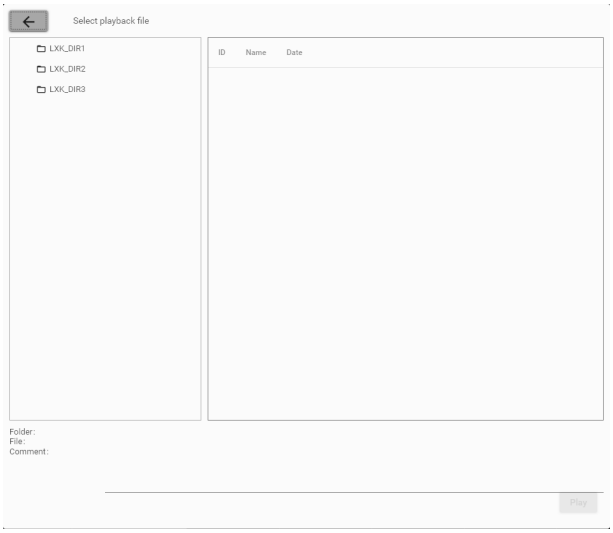
3-1. Playback

Install AR-LXAO1000 analog output amplifiers into the LX-1000 as necessary.

ATTENTION

- Data saved to an LX-1000 SD card can be played back. Data saved to a computer cannot be played back.
- Set media to SD or SD & PC.

1 Click to open the Select playback file window.



A list of folders will appear on the left side.
A list of the files in a folder appears on the right side.

2 Select a folder, select the playback file, and click the Start button to start playback.

Playback will start and playback data will be shown on the Home Screen.
During playback, the following buttons are enabled.
⏮: Skip to previous recording data
⏭: Skip to next recording data

NOTE

- Clicking the ► button on the Home Screen without selecting a file will play the most recently recorded or played data.
- If Behavior after searching is set to Pause, the unit will pause when playing files from a file list (page 49).

3 Click the ■ button to stop playback.

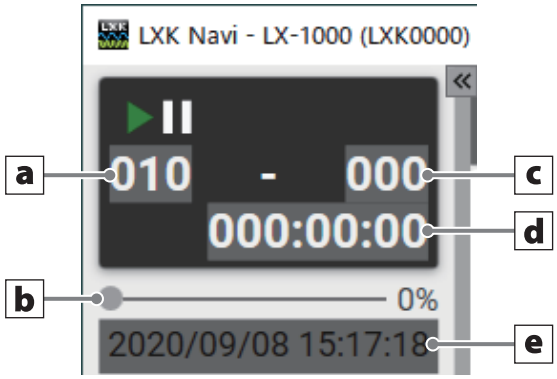
3-1-1. Searching operation

Searching is possible when in a playback ready state.

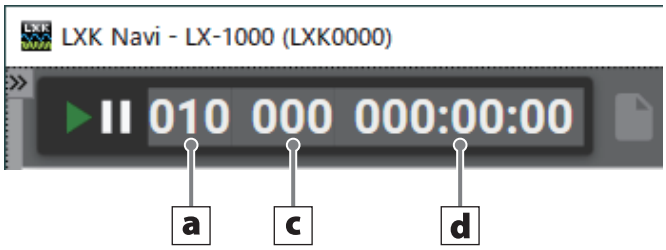
ATTENTION

Searching is not possible if no SD card is loaded in the LX-1000 or if the loaded SD card does not contain measurement data.

When searching is possible, the information display area at the top left of the window will change as follows.



When the information and measurement condition display area is not being shown on the left side of the window, it will change as follows.



The following items can be searched. The current playback position is shown for each item.

a ID

b Playback search bar

c Event mark

d Playback time (count)

e Recording date

Searching

1 Click the item to search.

The search position input window will appear.

The example below shows the window when ID has been clicked.

2 Input the search position.

To input the search position, click ▲ or ▼, or click the number area and input the number directly.
Click "Cancel" to close the window.
Click "Reset" to return ID to the current position.

3 Click "OK".

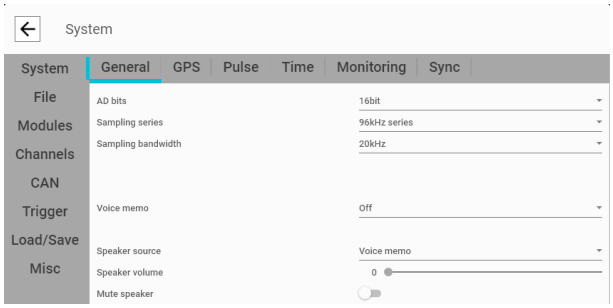
Playback will start from the search position.
If ID search is conducted during synchronized playback, the system will enter a playback ready state at the search position.

NOTE

If Behavior after searching is set to Pause, the unit will pause after using a search function (page 49).

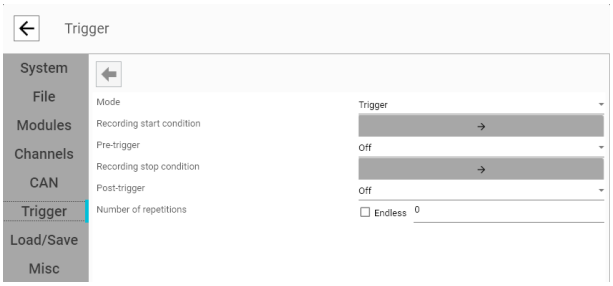
4-1. Basic operation

1 Click the ⚙ button on the Home Screen to open the Settings Screen.

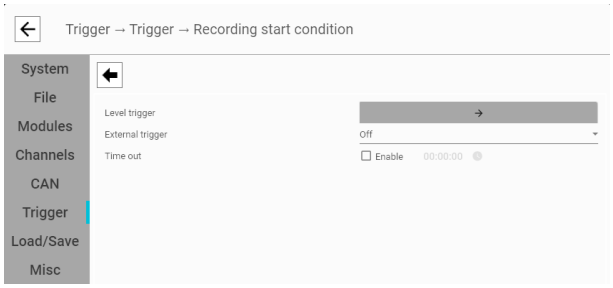


2 Select a setting menu item on the left side of the screen, and change settings.

Select a sub menu item if necessary.
When Mode is set to Trigger on the Trigger Settings Screen, for example, and a lower level of Settings Screen is available, click the → button to open it. Click the → button as necessary to make settings.



To go back from a lower level of Settings Screen, click the ← button above the setting items.



3 Click ← at the top left of the window to return to the Home Screen.

ATTENTION

- If an input/output amplifier module is changed, the measurement conditions will be reset.
- The Settings screen cannot be closed if the set measurement conditions exceed a maximum limit for the number of channels that can be recorded simultaneously.

Review the following settings.

- Sampling frequency (bandwidth)*
- AD bits
- Number of channels

*This cannot be changed for slave units in synchronized operation mode. To change this, change the setting of the master unit.

NOTE

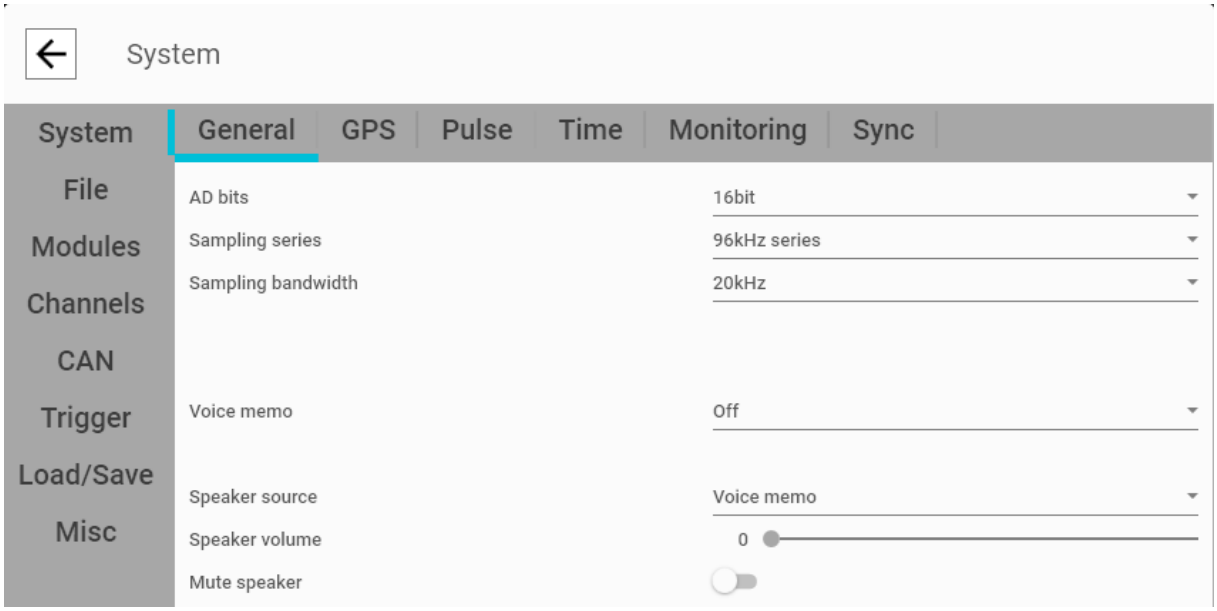
- See the "Number of channels that can be recorded simultaneously" in the Specifications of the LX-1000 Instructions for Use.
- Settings can be saved on the Load/Save Settings Screen.
- Data cannot be loaded if the saved settings are for an input/output amplifier module structure that is different from the current one.

Menu structure

⚙
- System
  - General
  - GPS
  - Pulse
  - Time
  - Monitoring
  - Sync
- File
  - Format media
- Modules
- Channels
- CAN
- Trigger
- Load/Save
- Misc
  - Misc
  - Version
  - Environment

4-2. System settings

4-2-1. General



AD bits

Sets the analog-digital resolution (quantization bit depth).

Sampling series

Sets the sampling frequency series.

Sampling frequency

Set the sampling frequency.

Decimation filter

This setting item appears when the sampling frequency series is set to "Low speed series".

When using a low-speed sampling frequency series, set whether or not to use a decimation filter to prevent aliasing.

ON: Use.

OFF: Do not use. Aliasing will occur, but delay will not.

Voice memo

Set voice memo recording. The recording level is adjusted automatically.

Off: Not recorded

On: Recorded

- Voice memos are not recorded during the pre-trigger interval.
- When playing data recorded using the pre-trigger function, the beginning of the voice memo will be lined up with the recording data, so the voice memo and recording data playback positions will be shifted by the amount of pre-trigger data.

ATTENTION

The maximum file size of voice memo data is 4 GB. Voice memo data in excess of 4 GB will not be recorded, but normal recording will not be interrupted. (For voice memo data to exceed 4 GB, it would take about 6 days.)

Speaker source

Voice memo

Monitor

Speaker volume

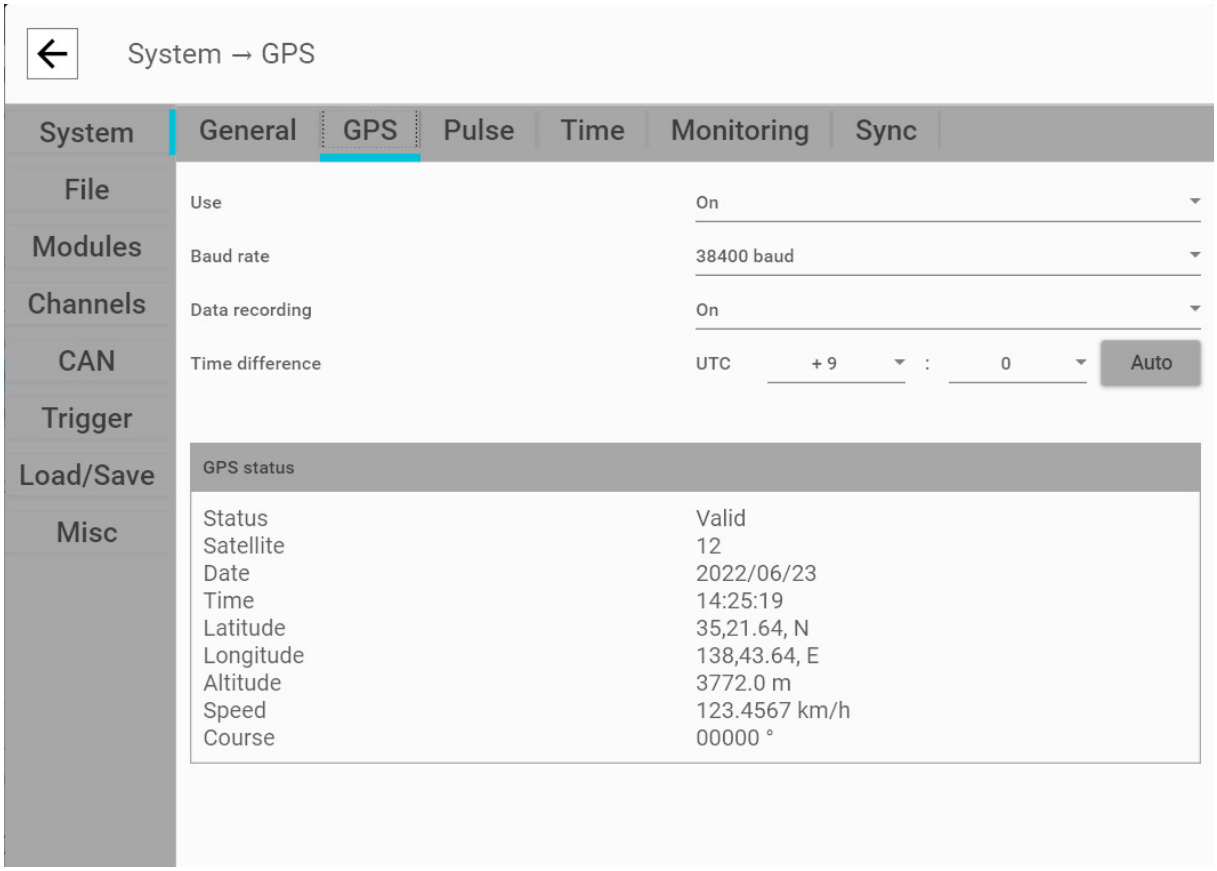
This adjusts the volume of the LX-1000 speaker and the earphone.

The minimum is 0, and the maximum is 100.

Mute speaker

This temporarily minimizes the volume.

4-2-2. GPS



Use

On: Use

Off: Do not use

Baud rate

4800 baud

9600 baud

19200 baud

38400 baud

- Set this to 38400 baud usually.

Data recording

Off: Not recorded

On: Recorded

Time difference

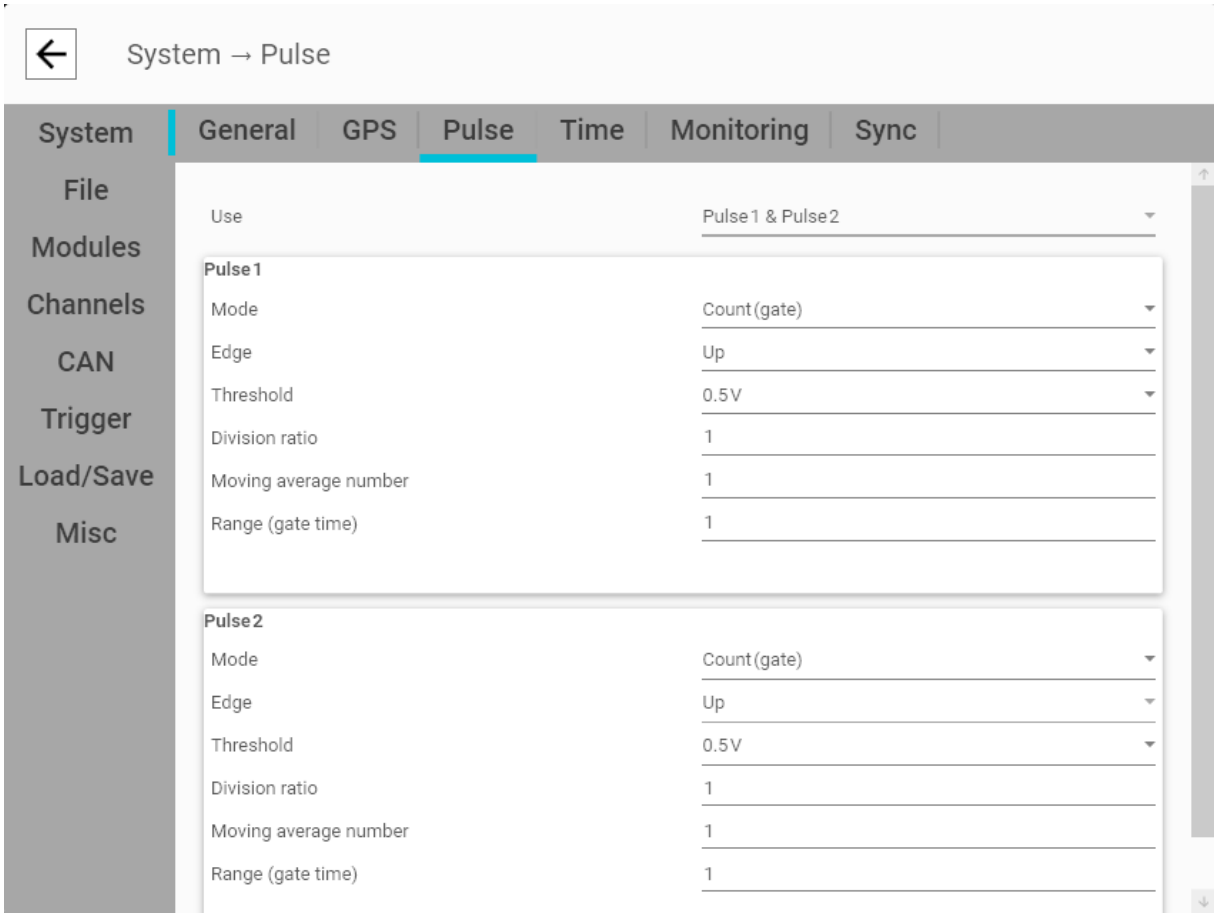
Enter the time difference from UTC.

- Click the Auto button to load the operating system setting.
- For example, input +9:00 for Japan.

GPS status

This shows the status of the GPS receiver.

4-2-3. Pulse



Use

Select the pulse input (PULSE IN) connector to use.

Mode

Select the pulse mode.

Count (total)

The total pulse count is recorded from the record ready state.

Count (gate)

The pulse count is recorded during the gate time.

Period

The pulse period is recorded.

Frequency

The pulse frequency is recorded.

rpm

The number of revolutions per minute is recorded.

Edge

This sets the timing for counting pulses.

Threshold

This sets the voltage level for counting.

Division ratio

This sets the division ratio when dividing before counting pulses. Set to 1 to not divide.

Moving average number

This sets the number of data to use for the moving average. Set to 1 to not use a moving average.

Range

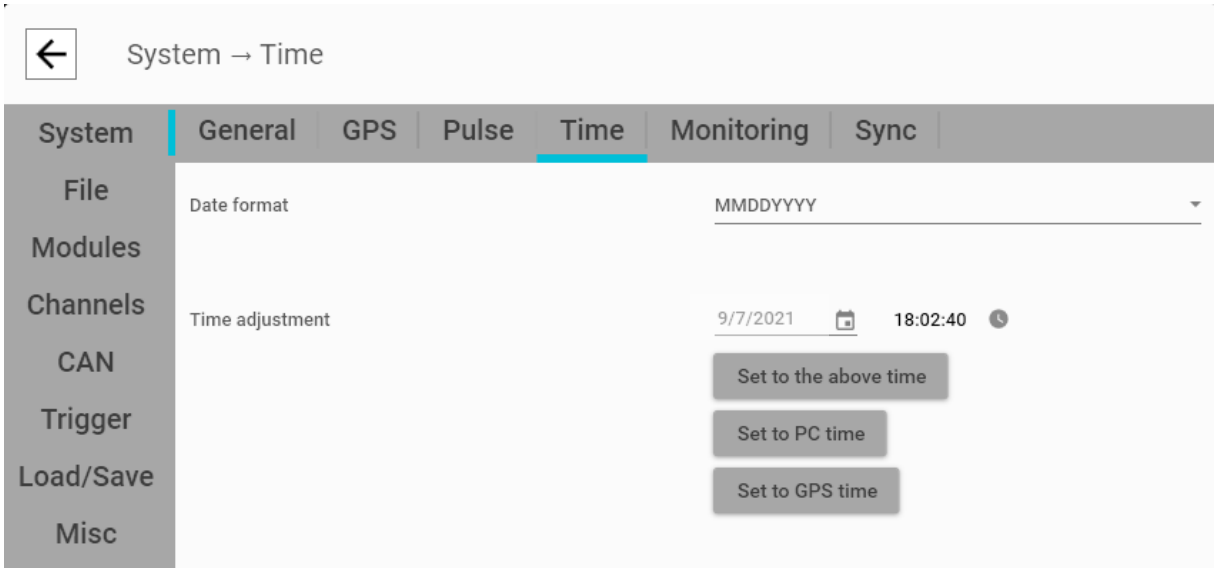
Select the measurement range.

- The units shown depend on the mode selected.

PPR (pulses per revolution)

This is shown when the mode is set to rpm.
Set the number of pulses per revolution.

4-2-4. Time



Date format

One of the following three date formats can be selected.
(YYYY: year, MM: month, DD: day)
YYYYMMDD
MMDDYYYY
DDMMYYYY

Time adjustment

Set the date and time of the LX-1000 clock.

Set to the above time

Input the date and time and click this button.

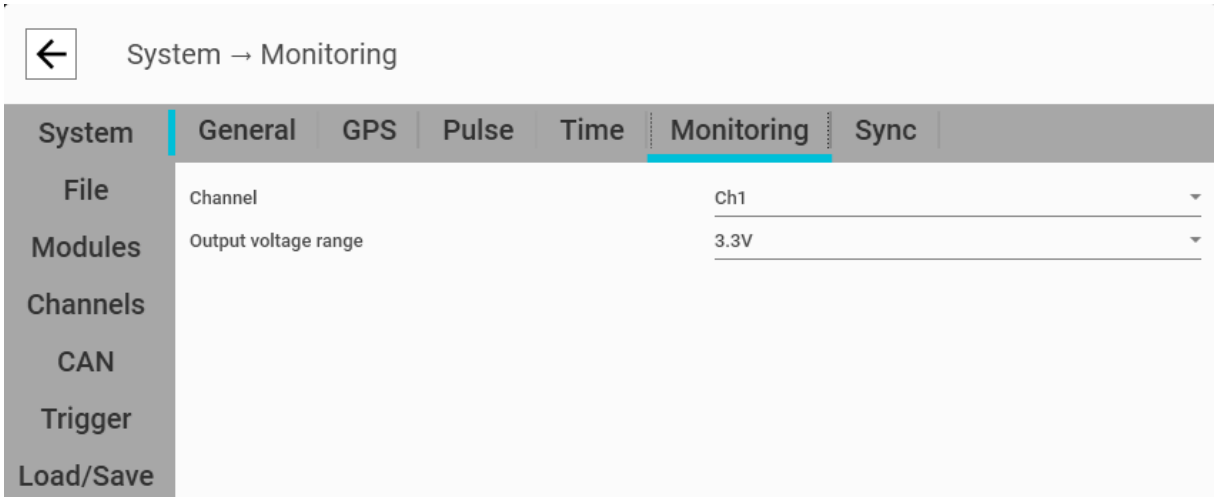
Set to PC time

Click to set it to the computer time at that instant.

Set to GPS time

Click to set it to the GPS time at that instant.

4-2-5. Monitoring



Measured values of the specified channel are converted from digital to analog and output from the MONITOR OUT connector.

- Only channels that have been assigned to input amplifier modules can be selected.

Target channel

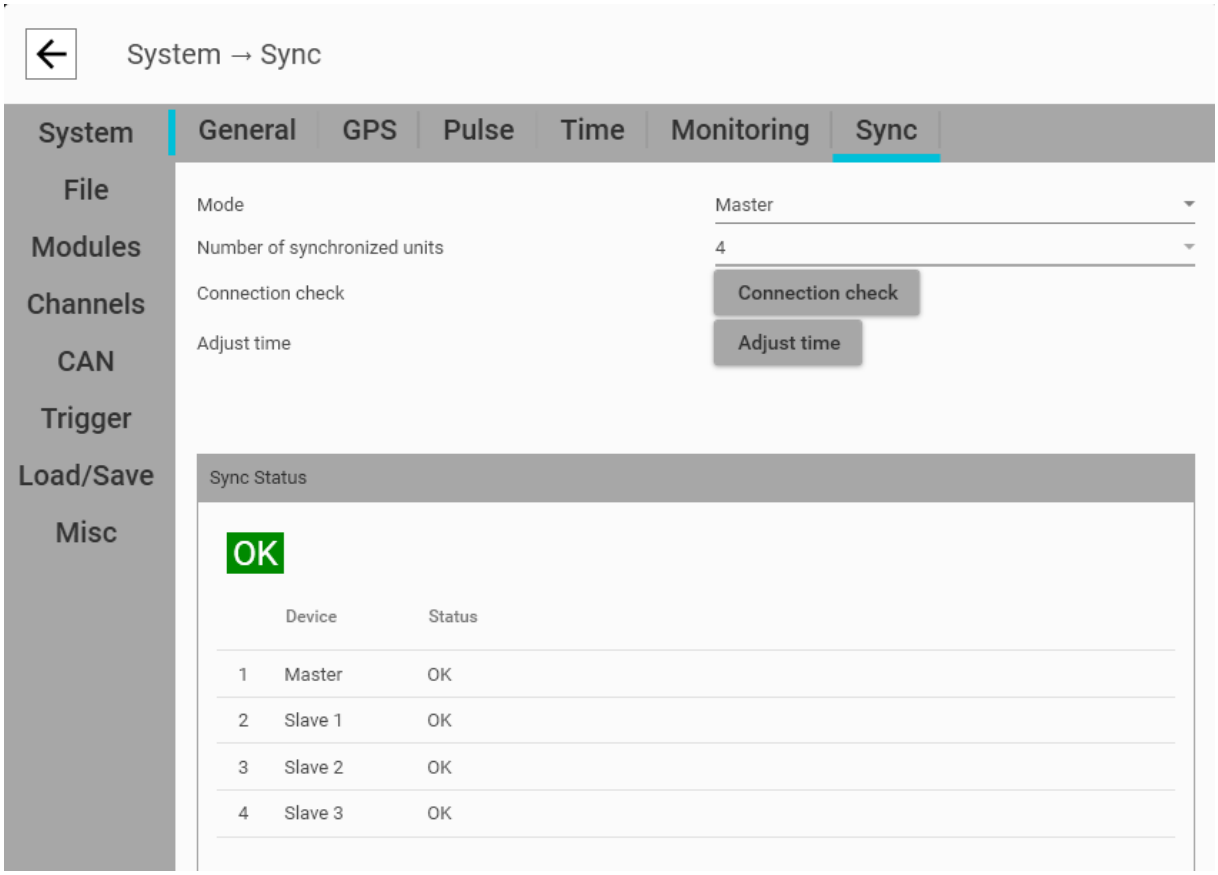
Select the channel output from the MONITOR OUT connector.

- Set this to Off when you do not want to output signals from the MONITOR OUT connector.
- Nothing will be output when an unrecorded channel is selected.
- Pulse input cannot be selected.

Output voltage range

This sets the voltage output when the input of the selected channel is 100% of the input range.

4-2-6. Sync



Mode

This sets the synchronized operation mode of the unit.

Number of synchronized units*

This sets the number of units operating with synchronization.

Connection check*

Use to check connections between master and slave units.

Adjust time*

This sets the time used by slave units to that used by the master unit.

* This is shown when the mode is set to Master.

NOTE

For information about synchronized operation, see "Synchronization function" on page 18.

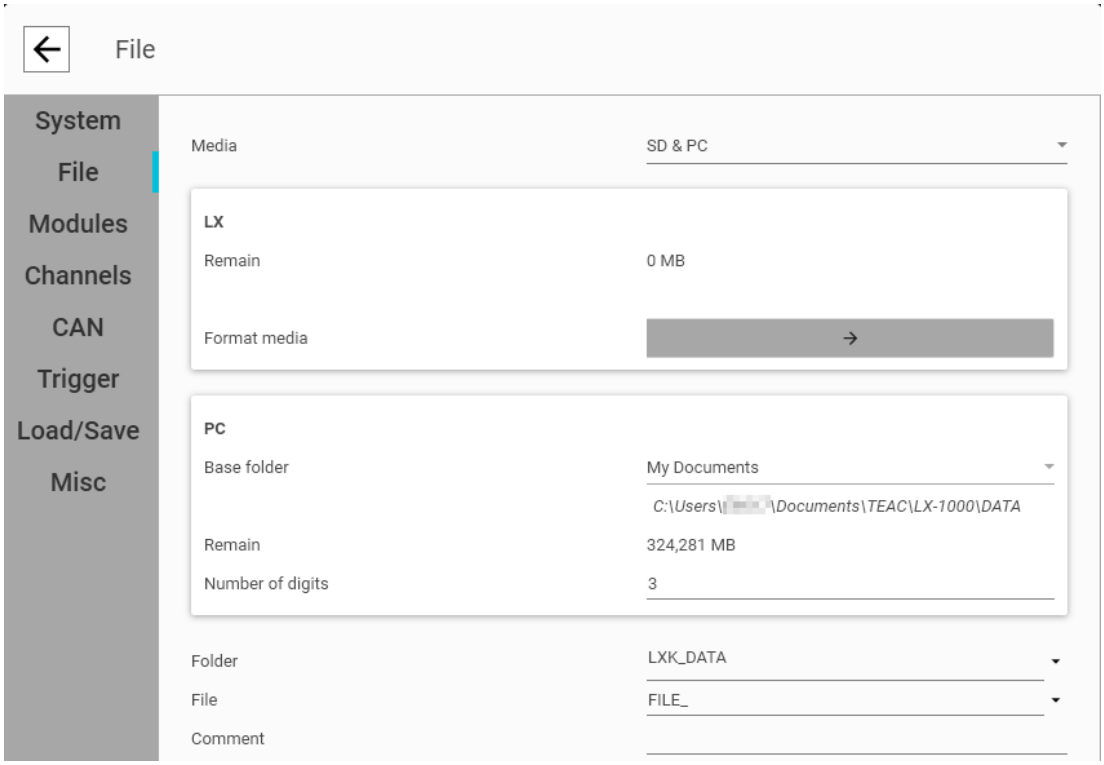
Mode settings

Assign the number of units that will be synchronized, starting with the master, followed by the slave units in order from number 1.

For example, when synchronizing three units, set one as Master and the other two as Slave 1 and Slave 2.

Synchronized operation is not possible if a unit is set as Slave 2 but no unit is set as Slave 1 or if two units are both set as Slave 1.

4-3. File



Media

This sets the media where recordings are saved.
SD: LX-1000 SD card
PC: computer
SD & PC: LX-1000 SD card and computer

Remain (Open capacity)

This shows the amount of free space on the saving location.

Number of digits (PC only)

This sets the number of digits in the suffix (page 24).

Format media

This appears when Media is set to SD.
To format the LX-1000 SD card, click the → button.

NOTE

Putting a check next to "Erase format" and executing it could improve writing performance that has decreased due to repeated use.

Base folder

Set when saving to a computer.
Select the folder name from the list or select "Custom" and enter the name as desired to set another folder.

- We do not recommend saving to removable media or network drives because stable recording might not be possible.

Folder

Use these to set the name of the folder where recording data is saved.

File

Set the beginning of the names given to recording data files.

Comment

Input a comment for recording data.

Folders where recording data is saved

When Media is set to SD

Data will be saved in the folder set with "Folder name" in the root directory of the SD card.
With the settings in the screen shown above, data will be saved in ¥LXK_DATA.

When Media is set to PC

When saving recording data, the folder the data is saved in will be the set "Folder" inside the "Base folder".
With the settings in the screen shown above, data will be saved in
C:¥Users¥(user name)¥Documents¥TEAC¥LX-1000¥DATA¥LXK_DATA.

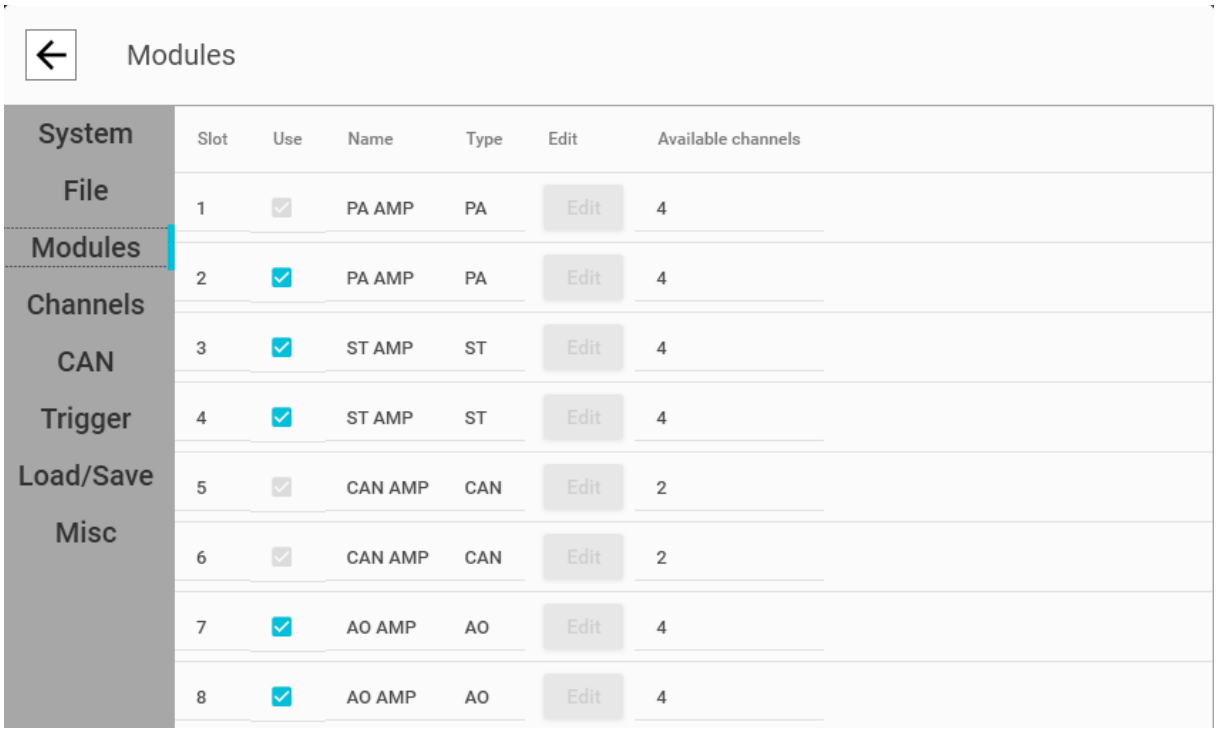
When Media is set to SD & PC

Data will be saved to both the SD card and computer as explained above.

NOTE

- If a folder that does not exist is set, it will be created.
- Recording folder and file name suffixes are 3 digits (fixed) for SD cards and 3–5 digits (settable) for computers (page 24).
- Quit this application before deleting recorded data on a computer.

4-4. Modules



Set whether input/output amplifier modules are used or not. In addition, if an input/output amplifier module has its own settings, the Edit button will be enabled. Use Channels to make individual channel settings.

Slot

LX-1000 slot number

Use

Put a check next to an input/output amplifier module to use it for measurements. Putting a check next to the slot number of the last input amp module used will automatically add checks to the lower slots starting with slot 1.

- The LX-1000 design requires that input amplifier modules used for measurement must be installed consecutively from slot 1. Disabling only an input amplifier module between the first and last slot is not possible.
- Whether individual output amplifier modules are used or not can be set.
- CAN modules are always checked, and this cannot be changed. Use the settings explained in "4-6. CAN" on page 40 to set whether each port is used or not.

Name

Type

This shows information about the input/output amplifier modules.

Edit

This is enabled when input/output amplifier modules have settings.

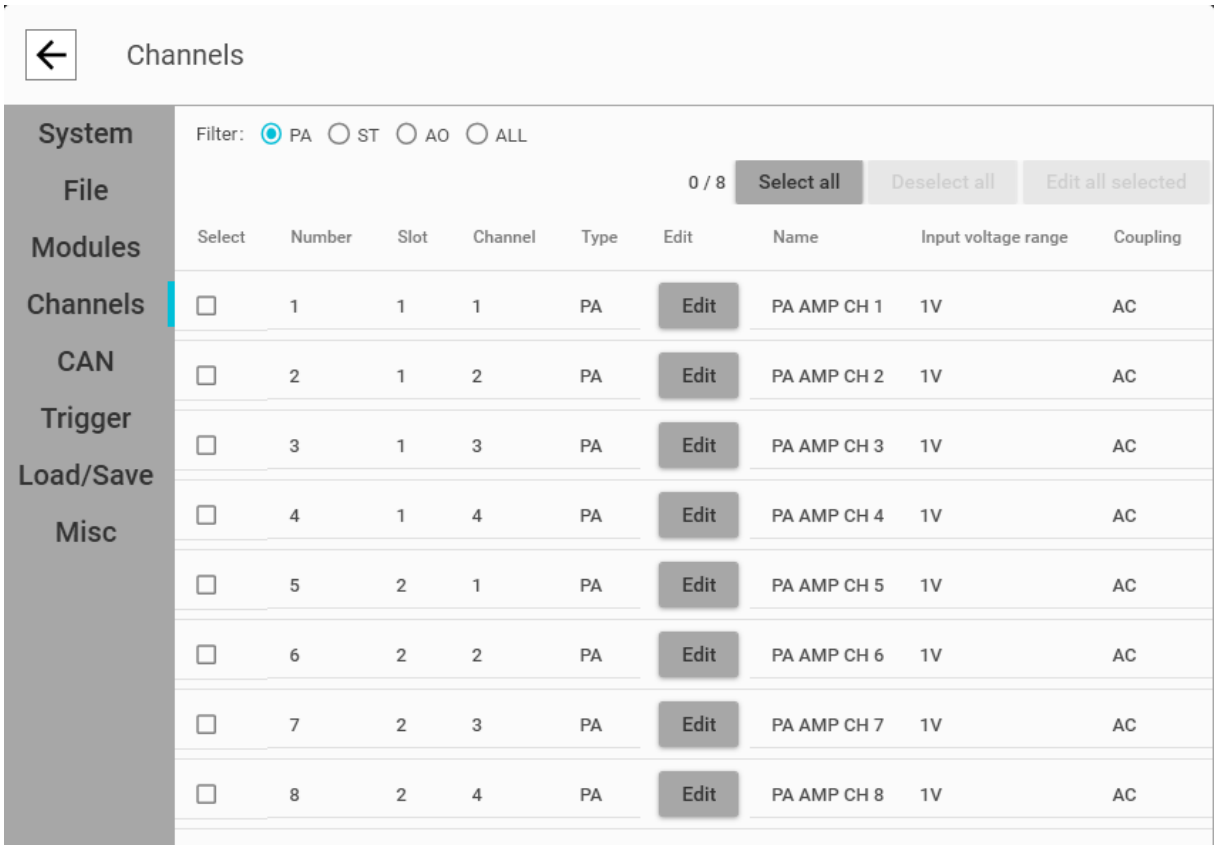
Available channels

This shows the number of channels each input/output amplifier module has.

ATTENTION

When the Back button is pressed, if "CAN signal recording channels are not consecutive." appears, confirm that "Conditions for when signal recording is selected" on page 42 have been met.

4-5. Channels



Make settings for the individual channels of the input/output amplifier modules that have been checked in the Modules settings.

Filter

Input/output amplifier modules can be shown by type.
Select the type to show.

4-5-1. Simultaneous editing

Settings can be simultaneously made for input/output amplifier modules of the same type.

1 Set Filter to a type other than All to show input/output amplifier modules of the same type.

2 Check the Select column for channels to be set the same way.

3 Click the "Edit all selected" button.

4 Make the necessary settings, and close the settings window.

- When making settings, items that have different values set will appear blank. Change settings to make them the same for all the selected channels at once. If nothing is done, individual setting values will not be changed.
- Channel names cannot be changed simultaneously.

4-5-2. Input/output amplifier module setting screens

On the Channels Settings Screen, click the Edit button for the input/output amplifier module that you want to set to open its editing screen.

4-5-2-1. AR-LXPA1000 analog input amplifier (PA amplifier)

Name

Set the input channel signal name.

Input voltage range

Select a range that covers the input signal changes.

Coupling

- When using an IEPE sensor current, set Coupling to AC.

IEPE current

Set the IEPE sensor current.

Weighting

Select the weighting filter.

- When using HPF, set Weighting to Flat.

HPF

Set the high pass filter.

TEDS

Click the Read button to load TEDS data from the connected sensor and set the Physical quantity conversion values.

Physical quantity conversion

Set the parameters used to convert signals to physical quantities.

This is a physical quantity conversion unit. These characters can be set as desired.

4-5-2-2. AR-LXST1000 Strain amplifier (ST amplifier)

Name

Set the input channel signal name.

Amplifier mode

ST: Function as a strain amplifier.
DC: Function as a DC amplifier.

Input range

Select a range that covers the input signal changes.

Bridge voltage

Set the bridge voltage.

- This appears only when the amplifier mode is ST.

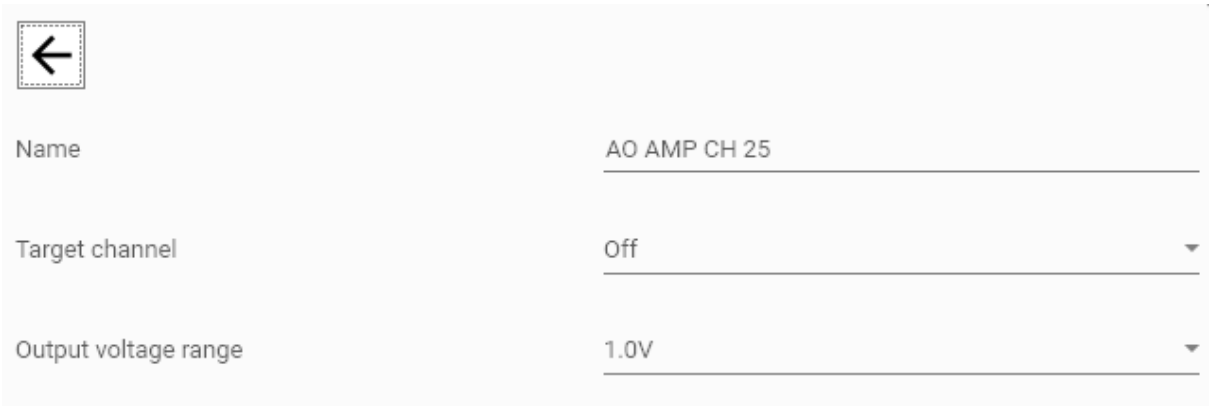
LPF

Set the low pass filter.

Physical quantity conversion

Set the parameters used to convert signals to physical quantities.
This is a physical quantity conversion unit. These characters can be set as desired.

4-5-2-3. AR-LXAO1000 analog output amplifier (AO amplifier)



Name

Set the input channel signal name.

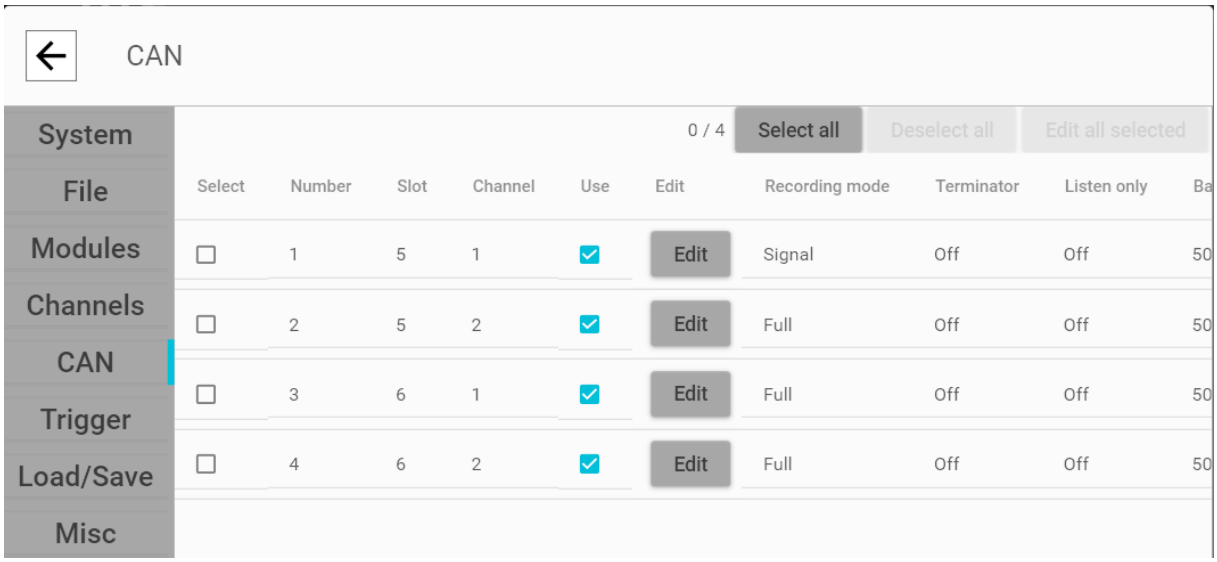
Target channel

The measured values of the set channel will be converted from digital to analog and output.

Output voltage range

This sets the voltage output when the input of the selected channel is 100% of the input range.

4-6. CAN



Select

Put checks next to multiple items and click the "Edit all selected" button to edit them simultaneously. See "Simultaneous editing" on page 36.

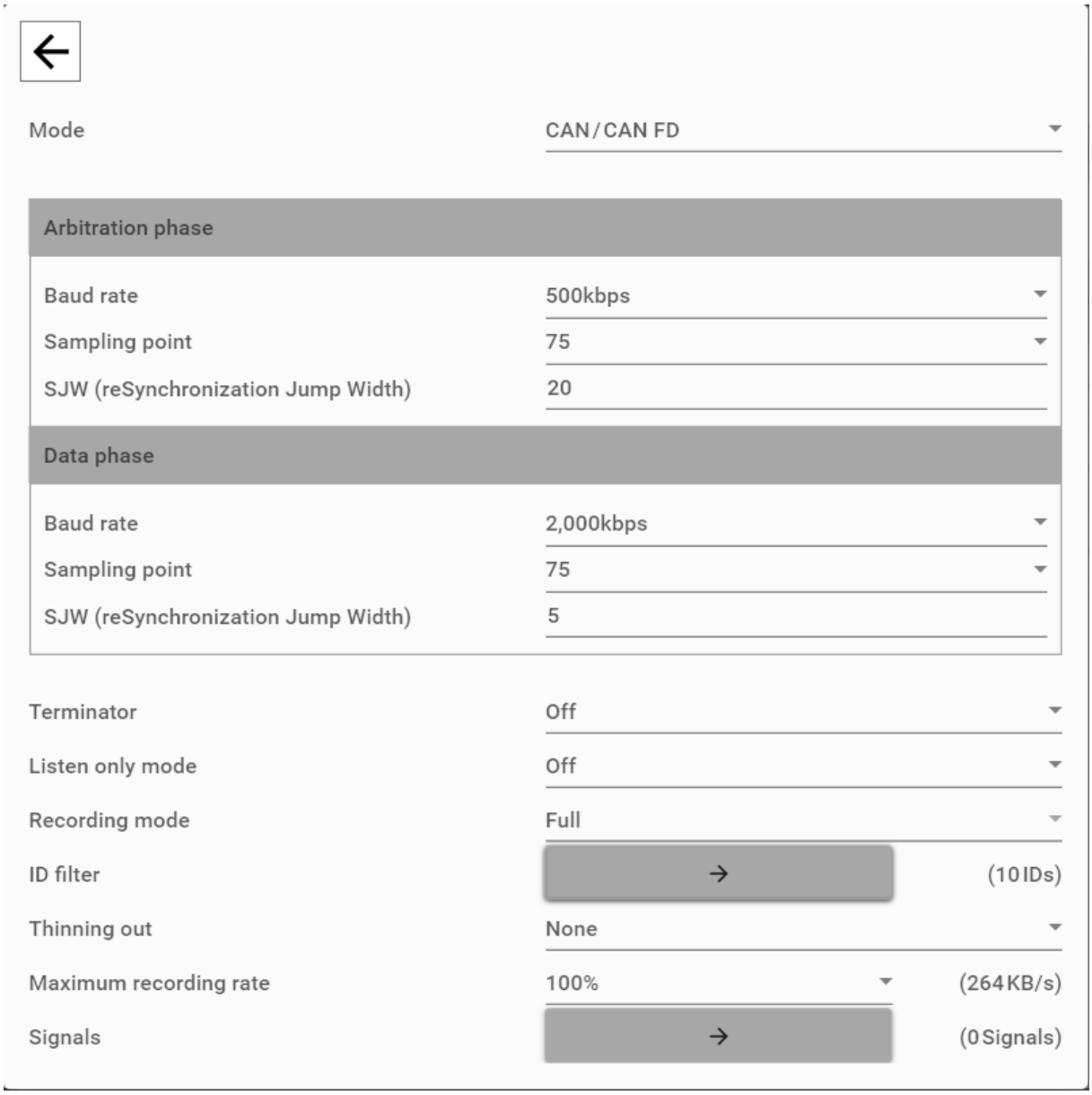
Use

Put a check next to a CAN port to use it for measurements.

NOTE

Regardless of other settings, terminators will be off for ports that do not have checks in the Use column.

4-6-1. Port settings screen



Mode

CAN/CAN FD

Record CAN and CAN FD.

CAN only

Record CAN only. Do not record CAN FD.

Baud rate

Set the transmission speed.

Sampling point

Set the sampling timing.

SJW (reSynchronization Jump Width)

Set the resynchronization jump width.

Terminator

Set the terminator to On/Off for the CAN bus built into the CAN module.

Listen only mode

Off: Return ACK when data frame received.

On: Do not return ACK when data frame received.

Recording mode

Set the recording mode. See "Recording mode" on page 42 for details.

NOTE

When "Recording mode" is set to "Signal", "ID filter", "Thinning out" and "Maximum recording rate" setting items will not be shown.

ID filter

Receive only specified ID data frames. Up to 32 IDs can be added for each port.

Thinning out

Limit to 1 received data frame during the set time window for each ID.

Maximum recording rate

Set the maximum recording rate for each CAN port separately.
Data that exceeds the set rate will be discarded.
Set to 100% for no maximum limit.

Signals

Make settings related to monitor signals.

4-6-1-1. Recording mode

Recording mode	Full	Signal
Recorded content	All CAN data is recorded without specifying CAN signals.	Only necessary CAN data is recorded by specifying CAN signals in advance.
Saved data	Saved in files with "CAN" extension	Saved in files with "DAT" extension
Analog monitoring	Not possible	Possible
Monitoring during playback	Not possible	Possible
CAN indicator	Green (when receiving data)	Blue (always)
Recording ports	All ports of CAN module	Port 1 of CAN module
Recording signal setting quantity (per port)	32 signals maximum	4 signals maximum
Setting items	ID filter, Thinning out, Maximum recording rate, Signals	Signals

ATTENTION

When the Back button is pressed, if "CAN signal recording channels are not in consecutive order." appears, confirm that the following conditions for when signal recording is seldected have been met.

Conditions for when signal recording is selected

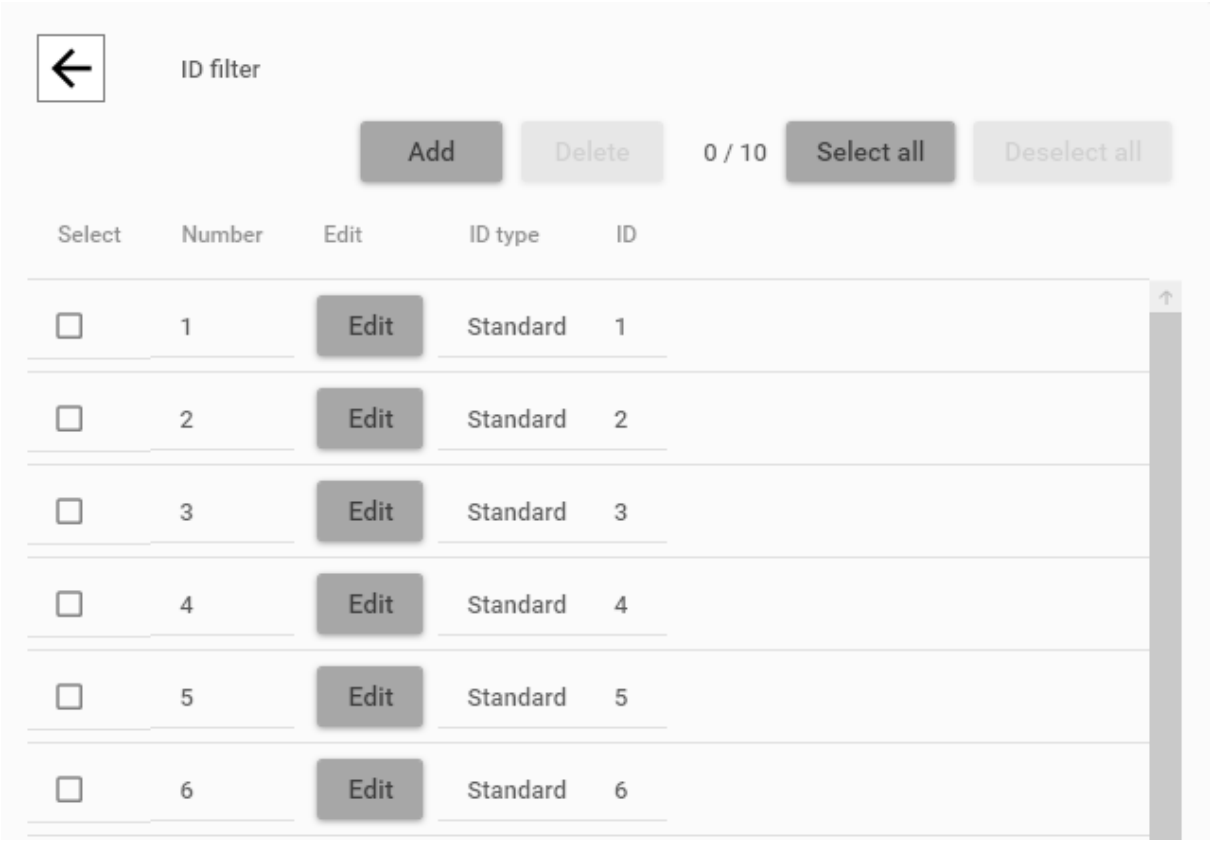
- Enable all amplifier modules in the slots numbered lower than the CAN modules that are set for signal recording.
- To use "Recording mode" set to "Signal" recording, use CAN modules that are installed in consecutive order after the analog channels.
  Example
  Analog amplifier modules ➡ CAN modules (signal recording) ➡ CAN modules (full recording)

  CAN modules cannot be set for signal recording if they are installed after CAN modules that are set for full recording.

NOTE

- Signal recording will record up to 4 signals that have been set in the same way as other analog channels. Signals that have not been set will not be recorded.
- Signal recording is conducted in the same manner as with analog channels, so level triggers, analog outputs and monitor outputs can be used.
- Even if Port 1 on a CAN module is set to signal recording, Port 2 can be used for full recording. By splitting the CAN bus and using Ports 1 and 2 as inputs, Port 1 can be used for signal recording of 4 signals, while Port 2 is used for full recording as a backup.

4-6-1-2. ID filter

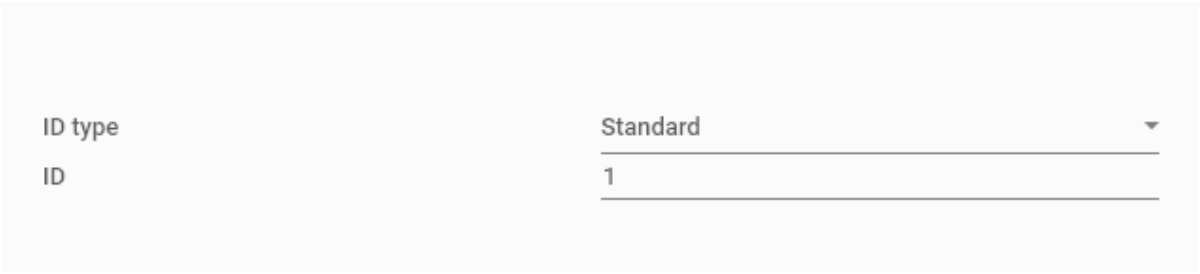


Select
To delete an ID filter setting, put a check in the Select column box, and click the Delete button.

Add button
Add a filter.

Delete button
Delete selected filters.

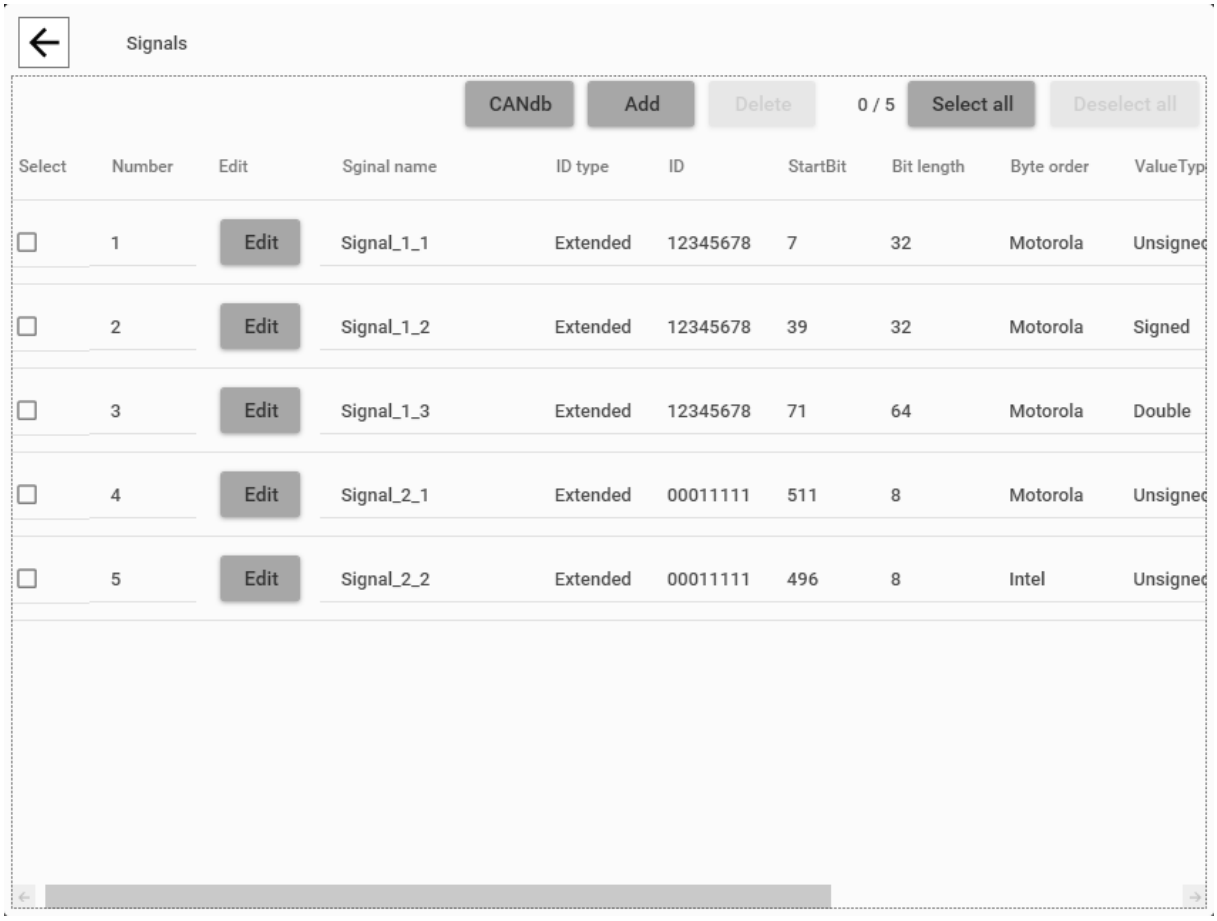
Editing ID filters



ID type
Set the ID type.

ID
Set the ID (hexadecimal).

4-6-1-3. Signals



CANdb button

Load saved CANdb files, and select CAN signals.

Add button

Set the monitoring signal items manually.

Delete button

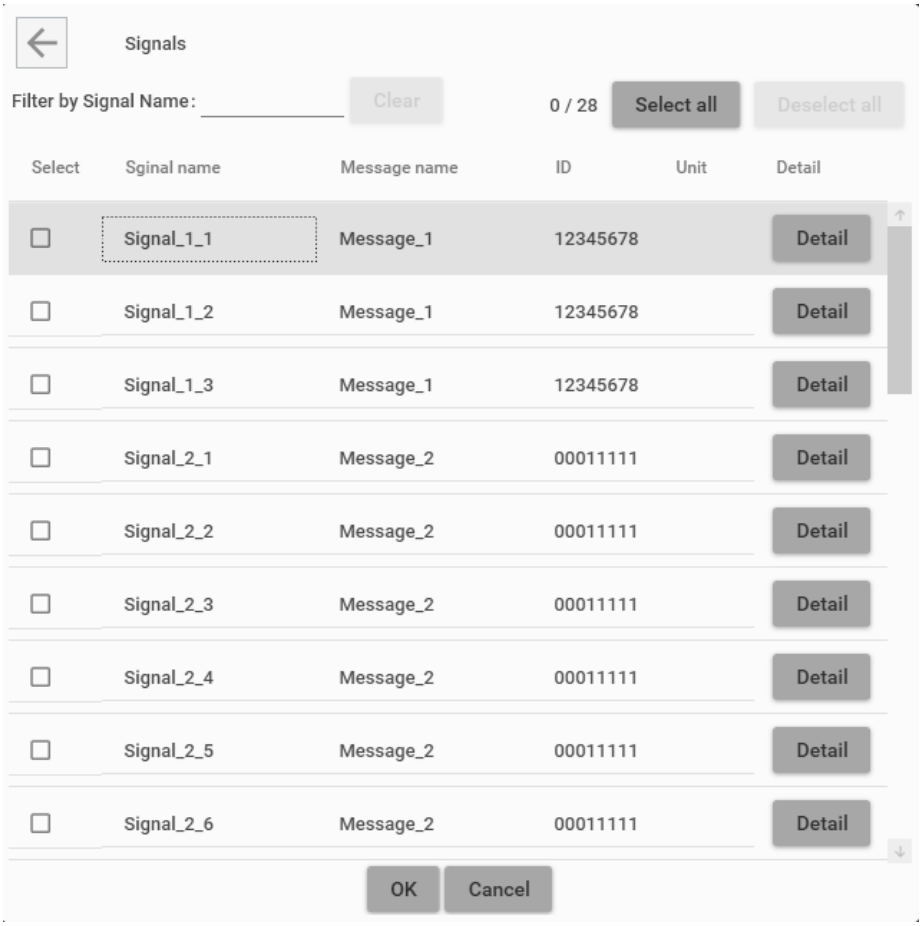
Delete selected signals.

Loading CANdb files

1 Click the CANdb button to open the Open dialog. Select a CANdb file and open it.

A list of CANdb signals in the file is shown.

2 Put checks in the boxes next to the names of signals to be loaded and click the OK button.



Filter by Signal Name

This will show a list of signals with names that partially match the value set in the "Filter by Signal Name" field.

Details

Click this to show details about the signal.

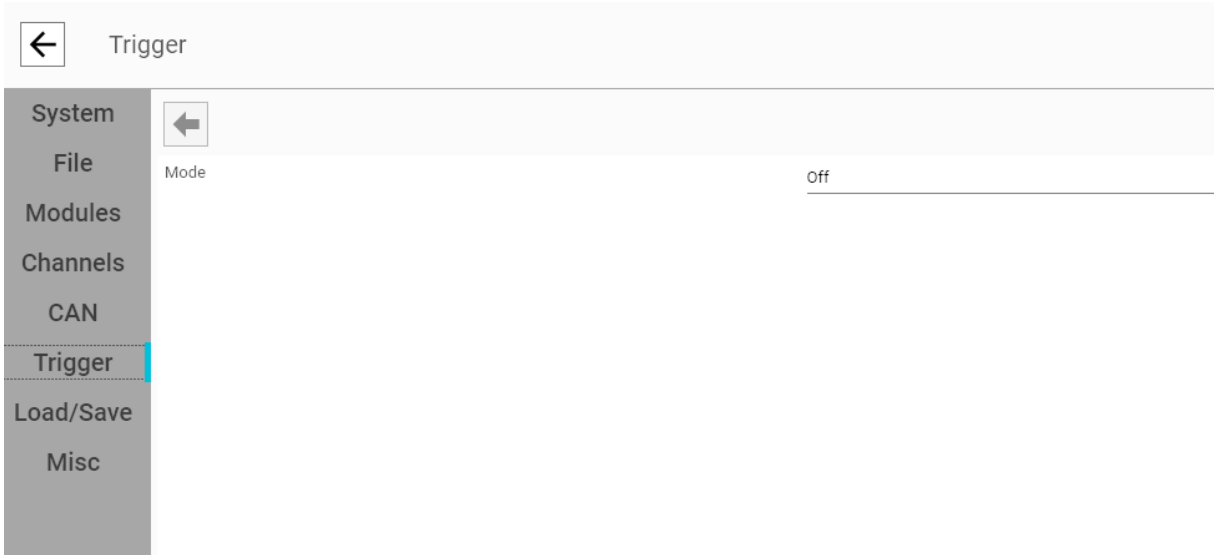
Adding signals

Set the monitoring signal items.

NOTE

For different bit arrangements due to the byte order, see "CAN signal start bit explanation" on page 53.

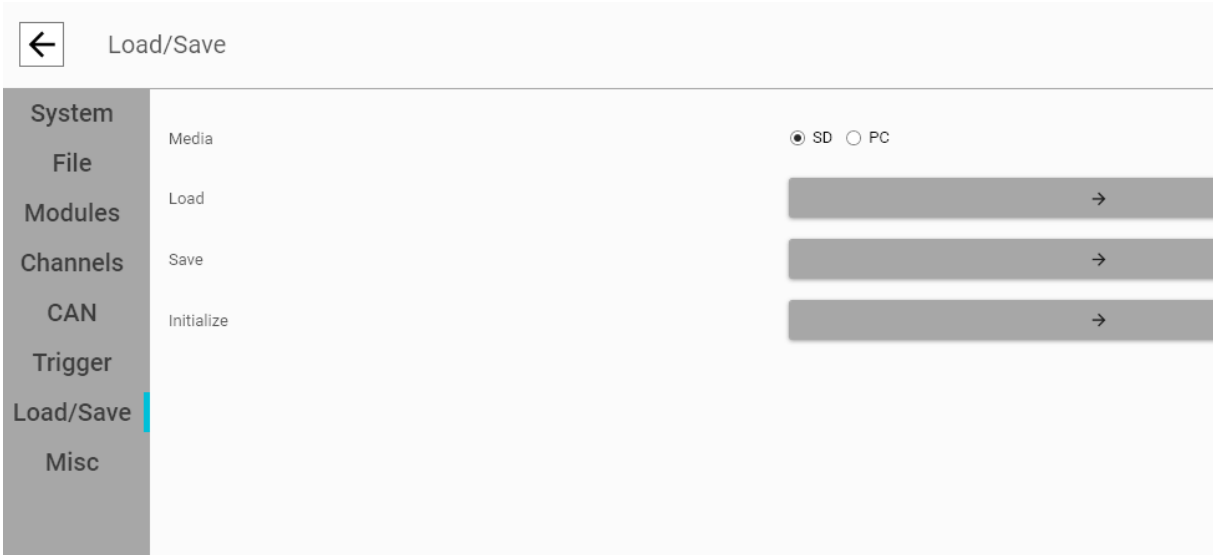
4-7. Trigger



When the mode is Trigger or Interval, setting items for the mode are shown.

See “Setting triggers” on page 22 for details about Trigger settings.

4-8. Load/Save



- This affects settings related to the unit.

Media

Location for saving Settings data
SD: LX-1000 SD card
PC: computer

Load

Load Settings.

Save

Save the current settings.

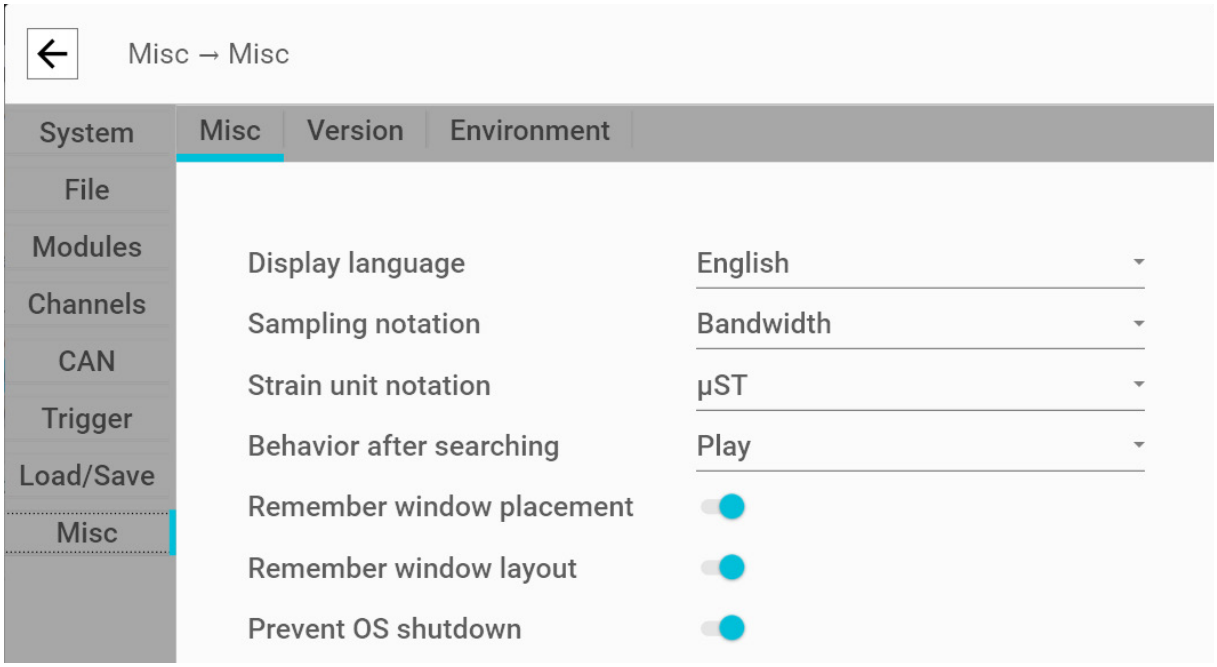
Initialize

Restore settings to their default values.

- Network settings are not initialized.

4-9. Misc

4-9-1. Misc



Display language

Auto: Japanese will be used if the operating system language setting is Japanese. Otherwise, English will be used.

Japanese: Japanese will be used.

English: English will be used.

- This setting is applied the next time the application is launched.

Sampling notation

Set the sampling notation used by this application.

Strain unit notation

This affects channels with strain amplifiers that have the amplifier mode set to ST.

The strain unit can be switched between µST and mV/V. When changed, unit conversion of the setting value will occur.

ATTENTION

Channel units will not be changed if they have been changed with physical quantity conversion settings in the channel settings.

Behavior after searching

Select whether playback starts or pauses after using a search function (ID, count, event mark, date) as well as when playing files from a file list.

NOTE

During synchronized playback, the unit will pause regardless of this setting.

Remember window placement

When this is On, window placement will be remembered and restored the next time the application is launched.

Remember window layout

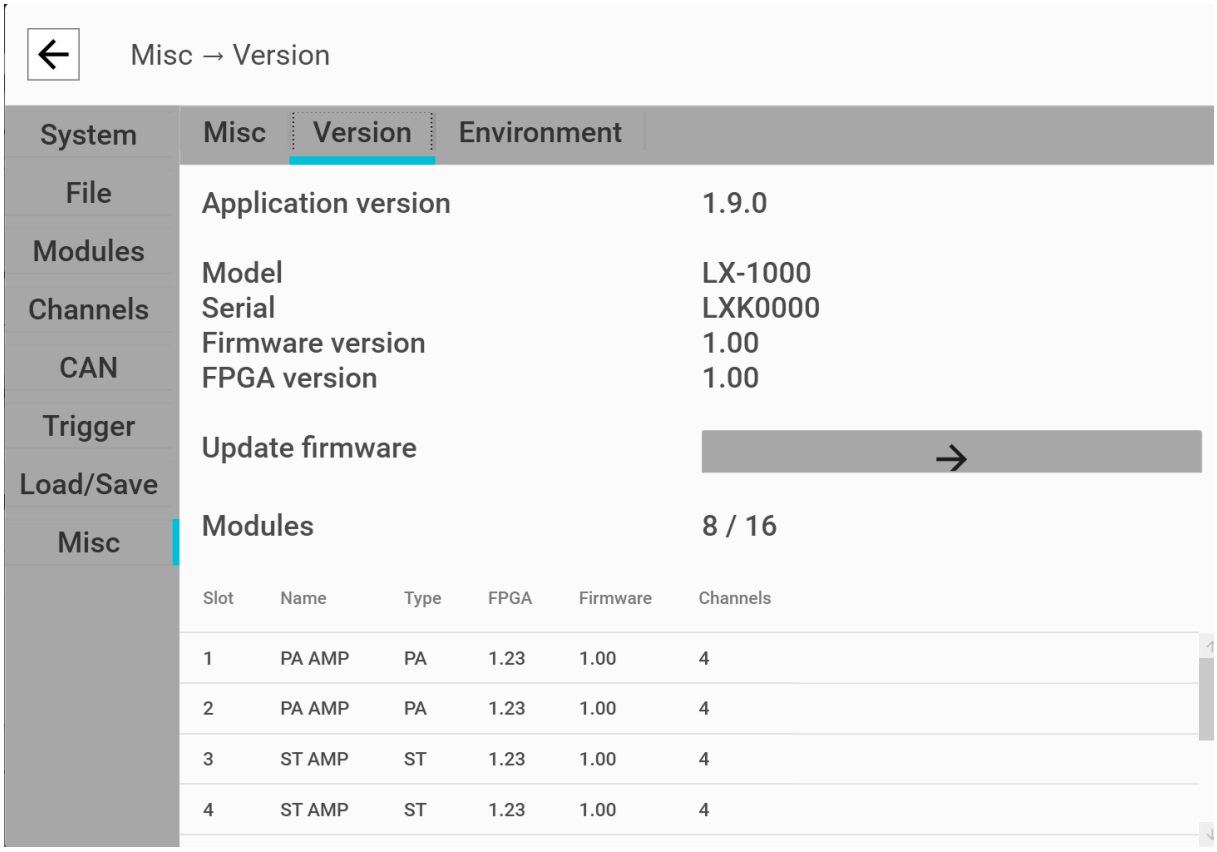
When this is On, the Home Screen window layout will be remembered and restored the next time the application is launched.

Prevent OS shutdown

Turning this on will prevent the OS from shutting down while this application is running.

Turn this off if shutting down the OS is necessary when a signal is received during a power outage, for example.

4-9-2. Version



Application version

This is the LXK Navi version.

Model

This is the model communicating with the application. "LX-1000" will usually be shown.

Serial

This is the LX-1000 serial number.

Firmware version

This is the LX-1000 firmware version.

FPGA version

This is the LX-1000 FPGA version.

Update firmware

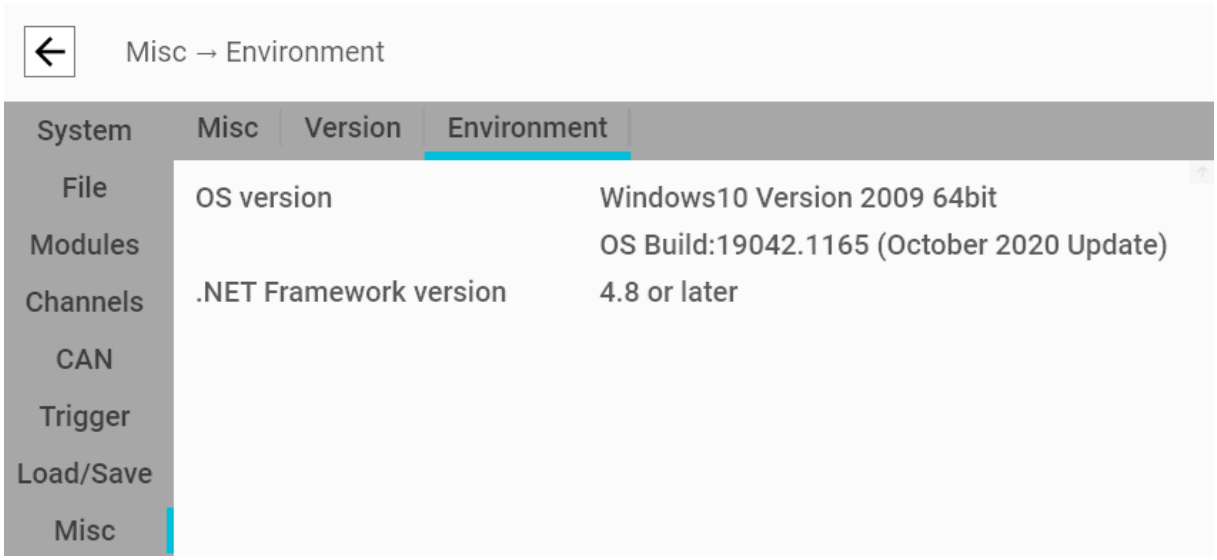
Use this to update the firmware of the LX-1000 and amplifier modules.

To update the firmware, follow the documentation included with the new firmware.

Modules

This shows information about the amplifier modules installed in the LX-1000.

4-9-3. Environment



OS version

This shows information about the operating system of the computer that LXK Navi is running on.

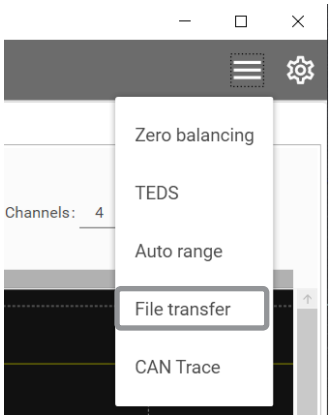
.NET Framework version

This shows the .NET Framework version installed in the computer operating system.

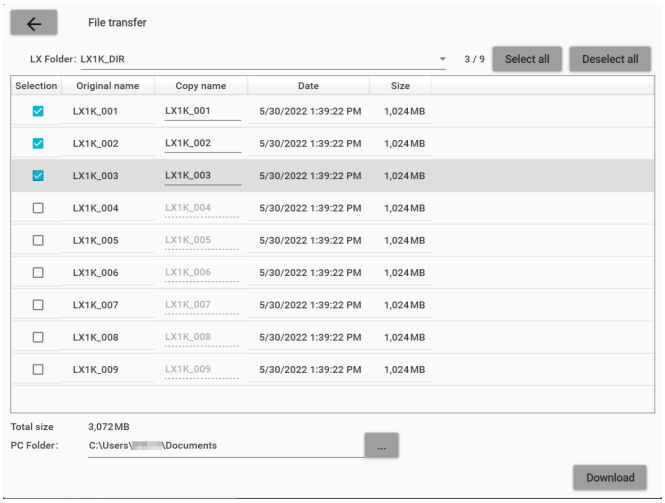
5. File transfer

The data on the SD card inserted in the LX-1000 can be transferred to a computer.

1 Click the ☰ button at the top right of the Home Screen and select "File transfer".



2 Put check marks next to files in the SD card data list to select them for transfer.



NOTE

The copy destination file name can be changed. After selecting a file, edit the file name in the Copy name column.

3 Click the ... button, and set the transfer destination folder on the computer.

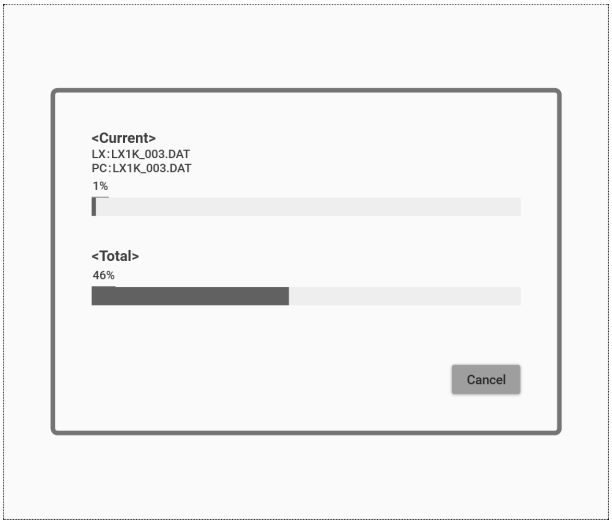
The default folder is the Documents folder on the computer.

NOTE

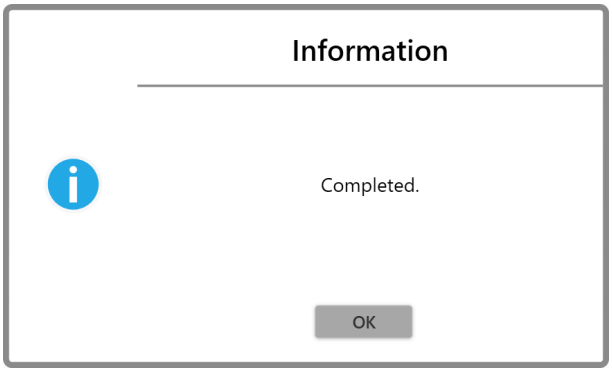
The last selected folder will be used as the default folder when transferring files the next time.

4 Click the Download button.

The following screen appears during transfer.



When all files have been transferred, the following screen will appear.



NOTE

If a file or folder with the same name already exists at the copy destination, "(1)" will be added to the end of the file name when saving.

If the same name with "(1)" added already exists, the number will be increased to, for example, "(2)" to prevent duplicate names.

Example

LX1K_0001 → LX1K_001(1) → LX1K_001(2) → LX1K_001(3) …

CAN signal start bit explanation

The counting method for the bit arrangement differs according to whether the byte order is Intel or Motorola.
The start bit setting value of the LX-1000 is compatible with CANdb++ Editor made by Vector Informatik GmbH.

Example
When setting the start bit of a 9-bit CAN signal (DLC = 3)

	Byte	0								1								2							
Intel	bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
(LSB first)	Total bits	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Motorola	bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
(MSB first)	Total bits	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16

9-bit length

Start bit setting value

Intel	LX-1000/CANdb++Editor	bit13
Motorola	LX-1000/CANdb++Editor	bit18

- If the byte order is Motorola, when creating CANdb (when using the CANdb++ Editor), DLC is not determined, so an irregular order as shown above is used.

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CommunityToolkit.Mvvm

Windows Community Toolkit

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SkiarSharp.Views.Desktop.Common
SkiaSharp.Views.Wpf

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System.Collections.Immutable

System.ComponentModel.Annotations

System.Drawing.Common, System.Memory

System.Numerics.Vectors, System.Runtime.CompilerServices.Unsafe

System.Threading.Tasks.Extensions

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