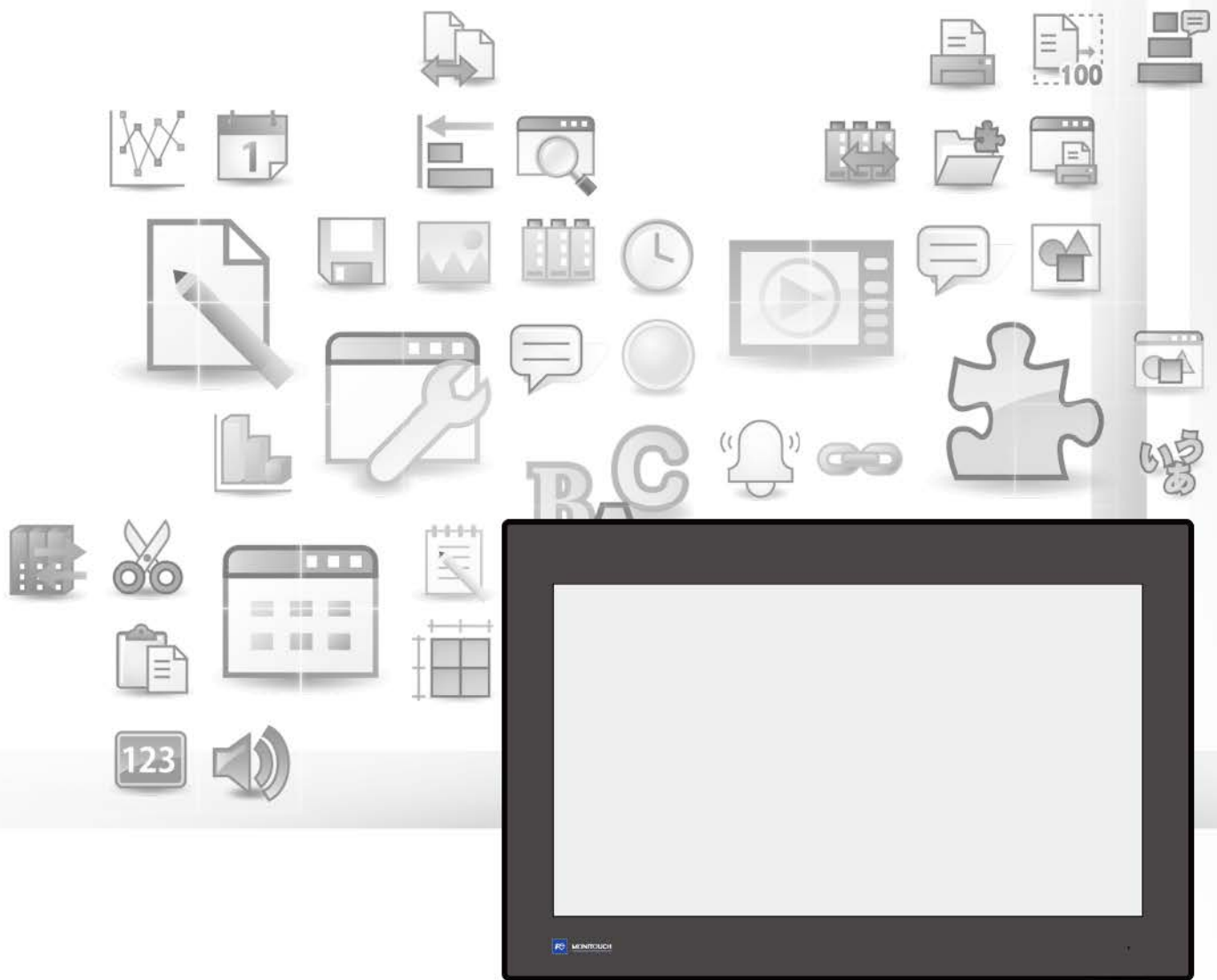


# MONITOUCH

Reference Manual [2]



# X1 Series

## Record of Revisions

Reference numbers are shown at the bottom left corner on the back cover of each manual.

Printing Date	Reference No.	Revised Contents
February, 2021	1091NE0	First edition
July, 2021	1091NE1	Second edition
November, 2021	1091NE2	Third edition <ul style="list-style-type: none"><li>• Chapter 8<ul style="list-style-type: none"><li>- Starting Applications: Switch / external command</li><li>- Multi-display function</li></ul></li><li>• Partial modifications</li></ul>
May, 2022	1091NE3	Fourth edition <ul style="list-style-type: none"><li>• Chapter 8<ul style="list-style-type: none"><li>- Starting Applications: 2-split screen display</li><li>- Task list and on-screen keyboard: Switch / external command</li></ul></li><li>• Chapter 9 Storage: External USB storage</li><li>• Chapter 15 Multi-Display Function: 2-split screen display</li><li>• Partial modifications</li></ul>

# Preface

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Thank you for selecting the MONITOUCH X1 series.

This manual describes the functions and operation procedures of the X1 series in detail.

For correct use of the X1 series, you are requested to read through this manual to understand more about the product.

The manuals shown below are related manuals for the X1 series. Refer to them as necessary.

Manual Name	Contents	Reference No.
X1 Series Reference Manual [1]	Explains the functions and operation of the X1 series.	1090NE
X1 Series Reference Manual [2] (this manual)		1091NE
X1 Series Setup Manual	Explains the X1 series setup procedure, the installation procedure of V-SFT version 6, the creation process of basic screen programs as well as how to transfer a created screen program using V-SFT version 6.	1092NE
X1 Series Hardware Specifications	Explains precautions for handling, hardware specifications and operating procedures and provides an error list for the X1 series.	2024NE
X1 Series Connection Manual [1]	Explains the connection and communication parameters for the X1 series and controllers in detail.	2217NE
X1 Series Connection Manual [2]		2218NE
X1 Series Connection Manual [3]		2219NE

For details on devices including PLCs, inverters, and temperature controllers, refer to the manual for each device.

## Notes:


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2. The information in this manual is subject to change without prior notice.
3. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries.
4. All other company names or product names are trademarks or registered trademarks of their respective holders.
5. This manual is intended to give accurate information about MONITOUCH. If you have any questions, please contact your local sales representative.


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# Notes on Safe Usage of MONITOUCH

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In this manual, you will find various notes categorized under the following levels with the signal words "DANGER" and "CAUTION".

 **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and could cause property damage.

Note that there is a possibility that items listed with  **CAUTION** may have serious ramifications.

## **DANGER**

- Never use the output signal of the X1 series for operations that may threaten human life or damage the system, such as signals used in case of emergency. Design the system so that it can cope with a touch switch malfunction. A touch switch malfunction may result in machine accidents or damage.
- Turn off the power supply when you set up the unit, connect new cables, or perform maintenance or inspections. Otherwise, electrical shock or damage may occur.
- Never touch any terminals while the power is on. Otherwise, electrical shock may occur.
- The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, do not ingest the leaked liquid crystal. If leaked liquid crystal makes contact with skin or clothing, wash it away with soap and water.
- Never disassemble, recharge, deform by pressure, short-circuit, reverse the polarity of the lithium battery, nor dispose of the lithium battery in fire. Failure to follow these conditions will lead to explosion or ignition.
- Never use a lithium battery that is deformed, leaking, or shows any other signs of abnormality. Failure to follow these conditions will lead to explosion or ignition.
- Switches on the screen are operable even when the screen has become dark due to a faulty backlight or when the backlight has reached the end of its service life. If the screen is dark and hard to see, do not touch the screen. Otherwise, a malfunction may occur resulting in machine accidents or damage.
- Tighten the mounting screw on the fixtures of the X1 series to an equal torque of 7.08 lbf-in (0.8 N·m). Excessive tightening may cause deformation, breakage, or malfunction of the touch switch, which may result in damage to the machine or an accident. Loose mounting screws may cause the unit to fall down, malfunction, or short-circuit.

## **CAUTION**

- Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage, or malfunction.
- For use in a facility or as part of a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, consult your local sales representative.
- Operate (or store) the X1 series under the conditions indicated in this manual and related manuals. Failure to do so could cause fire, malfunction, physical damage, or deterioration.
- Observe the following environmental restrictions on use and storage of the unit. Otherwise, fire or damage to the unit may result.
  - Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids, or cutting oil can come into contact with the unit.
  - Avoid high temperatures, high humidity, and outside weather conditions, such as wind, rain, or direct sunlight.
  - Avoid locations where excessive dust, salt, and metallic particles are present.
  - Avoid installing the unit in a location where vibrations or physical shocks may be transmitted.
- Equipment must be correctly mounted so that the main terminal of the X1 series will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Check periodically that terminal screws on the power supply terminal block and fixtures are firmly tightened. Loosened screws or nuts may result in fire or malfunction.
- Tighten the terminal screws on the power supply terminal block of the X1 series to an equal torque of 4.43 to 5.31 lbf-in (0.5 to 0.6 N·m). Improper tightening of screws may result in fire, malfunction, or other serious trouble.
- The X1 series has a glass screen. Do not drop the unit or impart physical shocks to the unit. Otherwise, the screen may be damaged.
- Correctly connect cables to the terminals of the X1 series in accordance with the specified voltage and wattage. Overvoltage, overwattage, or incorrect cable connection could cause fire, malfunction, or damage to the unit.
- Always ground the X1 series unit. The FG terminal must be used exclusively for the X1 series unit with the level of grounding resistance being 100 Ω or less. Failure to do so may result in electric shock, fire, prevent correct touch operations or cause malfunctions.
- Prevent any conductive particles from entering into the X1 series unit. Failure to do so may lead to fire, damage, or malfunction.
- Do not attempt to repair, disassemble, or modify the X1 series unit yourself. Contact Hakko Electronics or the designated contractor for repairs.



## CAUTION

- Do not repair, disassemble, or modify the X1 series. Hakko Electronics Co., Ltd. is not responsible for any damages resulting from repair, disassembly, or modification of the unit that was performed by an unauthorized person.
- Do not use sharp-pointed tools to press touch switches. Doing so may damage the display unit.
- Only technicians are authorized to set up the unit, connect cables, and perform maintenance and inspection.
- Lithium batteries contain combustible material such as lithium and organic solvents. Mishandling may cause heat, explosion, or ignition resulting in fire or injury. Read the related manuals carefully and correctly handle the lithium battery as instructed.
- Take safety precautions during operations such as changing settings when the unit is running, forced output, and starting and stopping the unit. Any misoperations may cause unexpected machine movement, resulting in machine accidents or damage.
- In facilities where the failure of the X1 series could lead to accidents that threaten human life or other serious damage, be sure that such facilities are equipped with adequate safeguards.
- When disposing of the X1 series, it must be treated as industrial waste.
- Before touching the X1 series, discharge static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or trouble.
- There is a heat sink in the back side of the unit which becomes hot during operation. Take care not to touch during operation.
- Capacitive touch switches are used. Note the following limitations.
  - Use a safety extra-low voltage (SELV) power supply for 24 VDC models. Using the X1 series with an unstable power supply may result in incorrect touch switch activation.
  - Because capacitive touch switches are susceptible to the effects of conductors, do not place conductors, such as metal, near the panel screen or use the touch switch panel when the screen is wet. Otherwise, malfunctions may occur.
  - Calibration is performed upon turning the power on. Do not touch the screen for 10 seconds immediately after turning the power on. Otherwise, malfunctions may occur.

### [General Notes]

- Never bundle control cables or input/output cables with high-voltage and large-current carrying cables such as power supply cables. Keep control cables and input/output cables at least 200 mm away from high-voltage and large-current carrying cables. Otherwise, malfunction may occur due to noise.
- When using the X1 series in an environment where a source of high-frequency noise is present, it is recommended that the FG shielded cable (communication cable) be grounded at each end. However, when communication is unstable, select between grounding one or both ends, as permitted by the usage environment.
- Be sure to plug connectors and sockets of the X1 series in the correct orientation. Failure to do so may lead to damage or malfunction.
- If a LAN cable is inserted into the serial communication connector, the device on the other end may be damaged. Check the connector names on the unit and insert cables into the correct connectors.
- Do not use thinners for cleaning because it may discolor the X1 series unit surface. Use commercially available alcohol.
- Clean the display area using a soft cloth to avoid scratching the surface.
- If a data receive error occurs when the X1 series unit and a counterpart unit (PLC, temperature controller, etc.) are started at the same time, read the manual of the counterpart unit to correctly resolve the error.
- Avoid discharging static electricity on the mounting panel of the X1 series. Static charge can damage the unit and cause malfunctions. Discharging static electricity on the mounting panel may cause malfunction to occur due to noise.
- Avoid prolonged display of any fixed pattern. Due to the characteristic of liquid crystal displays, an afterimage may occur. If prolonged display of a fixed pattern is expected, use the backlight's auto OFF function.
- The X1 series is identified as a class-A product in industrial environments. In the case of use in a domestic environment, the unit is likely to cause electromagnetic interference. Preventive measures should thereby be taken appropriately.
- The signal ground (SG) and frame ground (FG) are connected inside the X1 series unit. Take care when designing systems.
- The X1 series is equipped with a battery that contains lithium metal and therefore observance of transport regulations is necessary. Hakko Electronics ships X1 series units packed in accordance with transport regulations. If there is a need to transport an X1 series unit after it is once unpacked, transport the unit in accordance with the IATA Dangerous Goods Regulations, International Maritime Dangerous Goods (IMDG) Code, and transport regulations of the countries concerned. Ask your forwarding agent for details of transport regulations.

### [Notes on the LCD]

Note that the following conditions may occur under normal circumstances.

- The response time, brightness, and colors of the X1 series may be affected by the ambient temperature.
- Tiny spots (dark or luminescent) may appear on the display due to the characteristics of liquid crystal.
- Unevenness in brightness and flickering may occur depending on the screen display pattern due to the characteristics of liquid crystal.
- There are variations in brightness and color between units.
- Display colors may vary depending on the viewing angle because a converging lens is used in the backlight unit.

#### [Notes on the Capacitive Touch Switch]

- Touch switches may be unresponsive if touched with dry fingers. In such a case, use a capacitive stylus pen.
- Touch switches are calibrated each time the power is turned on. Do not touch the screen for 10 seconds immediately after turning the X1 series on. Otherwise, malfunctions may occur.
- When a metal object is near a touch switch for 5 minutes or longer, the touch switch is calibrated to recognize that state as the default state. Note that after the metal object is removed, the touch switch will become inoperable.
- Water droplets or conductive material can cause the sensor to make a false detection and lead to malfunctions.
- When using multi-touch operations, points must be at least 3 cm apart. Points may not be recognized if in close proximity of each other.
- In an environment with excess noise, the responsiveness of touch switches may be lowered and the point that responds may deviate by up to 1 cm. Implement measures such as adding a filter to the input power supply.
- Periodically clean the touch panel surface for optimum touch operations.  
When cleaning, take note of the following points.  
<When cleaning>
  - The panel surface is made of glass. Be sure to clean the surface gently with a cloth or sponge. Otherwise, you may scratch or damage the glass.
  - Take care not to let cleaning detergent seep into the touch panel unit.  
Do not directly apply or spray cleaning detergent on the panel surface.

#### [Notes on the Operating System (OS) and Scope of Operation Guarantee]

- The operating system (OS) used on this product is the Windows 10 IoT Enterprise LTSC by Microsoft. Therefore, Windows Update is not applicable to this OS. Also, the apps Cortana, Microsoft Edge, Microsoft Store, and UWP are not supported.
- Custom user apps for use on Windows can be used on this product. Hakko Electronics does not guarantee the operation of apps installed by the customer. Make sure to thoroughly check the operation before actual use.
- Hakko Electronics shall not be held responsible for dealing with trouble or liable for damages stemming from Microsoft products while using this product. When trouble occurs with a Microsoft product or there is a need to check the specifications, refer to the manual of the Microsoft product or contact Microsoft. Refer to the following website to contact Microsoft.  
<https://support.microsoft.com/en-us/contactus/>

#### [Notes on Turning Power Off]

The System Configurator built into the X1 series unit provides a write filter function. When the write filter function is enabled, the power of the X1 series unit can be turned off suddenly without damaging system files. If the write filter function is disabled, the shutdown procedure is necessary. Perform the shutdown procedure on System Configurator and after waiting for at least 15 seconds from when the screen has gone out, turn the X1 series unit power off.

#### [Notes on the Built-in Solid-state Drive (SSD)]

- The X1 series unit has a built-in SSD (C drive). Do not change partitions or split the drive.
- 3D NAND is used in the built-in SSD of the X1 series unit. Keep in mind the service life of the SSD.

#### [Notes on the Battery]

The X1 series unit has a built-in battery which is used for backing up time data and BIOS settings (retention during power outage). The battery must be replaced within three years after the unit is purchased. Note that the X1 series unit can start up in the same way as usual even if time data and BIOS settings are lost. Time data is reset to the default value in such a case. Set again as necessary.

#### [Notes on Wireless LAN]

For details regarding supported wireless LAN standards, radio law certifications, and countries where wireless LAN can be used, refer to the "X1 Series Notes on Wireless LAN" manual provided with the X1 series unit at delivery.

#### [Notes on the Startup Time]

Since a Windows OS is used, the startup time differs depending on the devices that are connected and software that is additionally installed.

Carefully consider devices and software before use.

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# 1 Image Display

---

## 1.1 JPEG Display

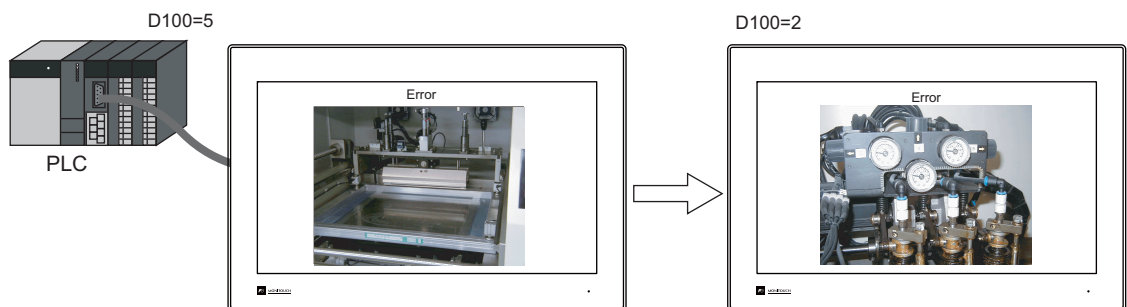
### 1.1.1 Overview

#### JPEG File Display

- The JPEG file display function is used to display JPEG files saved in storage. (Refer to [JPEG Filenames page 1-6](#).)
- JPEG files with a resolution up to  $1920 \times 1080$  can be displayed.  
Note that if the [Screen Size] is changed using the [Scroll] function on the [Screen Setting] window, files with the set resolution can be displayed.

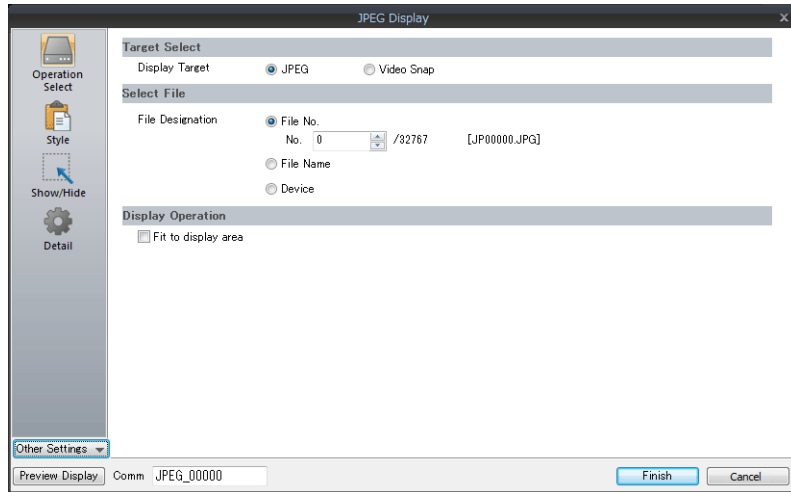


- There are three ways to load JPEG files.
  - Filename specification
  - File number specification (fixed)
  - File number specification (PLC device memory)



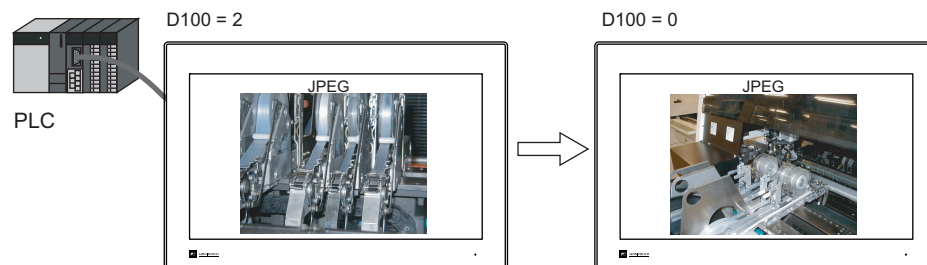
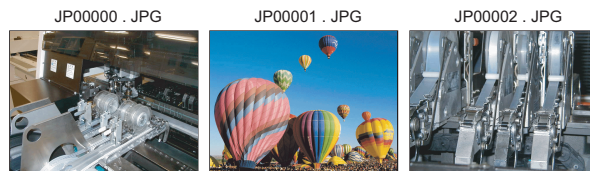
## 1.1.2 Detailed Settings

### Operation Select



Item	Description									
Target Select	Select a display target.									
JPEG	Display a JPEG file prepared in advance. Filename: JPxxxx.jpg (xxxx: 00000 to 32767) Any filename (maximum of 64 one-byte numerals or uppercase alphabetic characters)									
Video Snap	Display a video snapshot image. Filename: VDxxxx.jpg (xxxx: 00000 to 32767) * The X1 app is not capable of displaying videos or saving snapshot images from videos. Prepare JPEG files in advance.									
Select File	Select the file specification method.									
File No.	Specify the "xxxx" part of "JPxxxx.jpg" or "VDxxxx.jpg" with a file number from 0 to 32767.									
File Name	Specify a filename. Maximum of 64 one-byte numerals or uppercase alphabetic characters									
Device <sup>*1</sup>	Set the device memory address that specifies the "xxxx" part of "JPxxxx.jpg" or "VDxxxx.jpg" with a file number from 0 to 32767. This allows the JPEG file to be changed in RUN mode.									
Display Operation	Fit to display area <sup>*2</sup>									
	Unselected: Actual size Selected: Automatically enlarge or reduce the display according to the size of the display area. The level of display detail can be specified at \$s1008 when enlarging or reducing the display.									
	<table border="1"> <thead> <tr> <th>\$s1008</th> <th>Detail</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Coarse</td> <td>Fast</td> </tr> <tr> <td>1</td> <td>Fine</td> <td>Slow</td> </tr> </tbody> </table>	\$s1008	Detail	Speed	0	Coarse	Fast	1	Fine	Slow
\$s1008	Detail	Speed								
0	Coarse	Fast								
1	Fine	Slow								

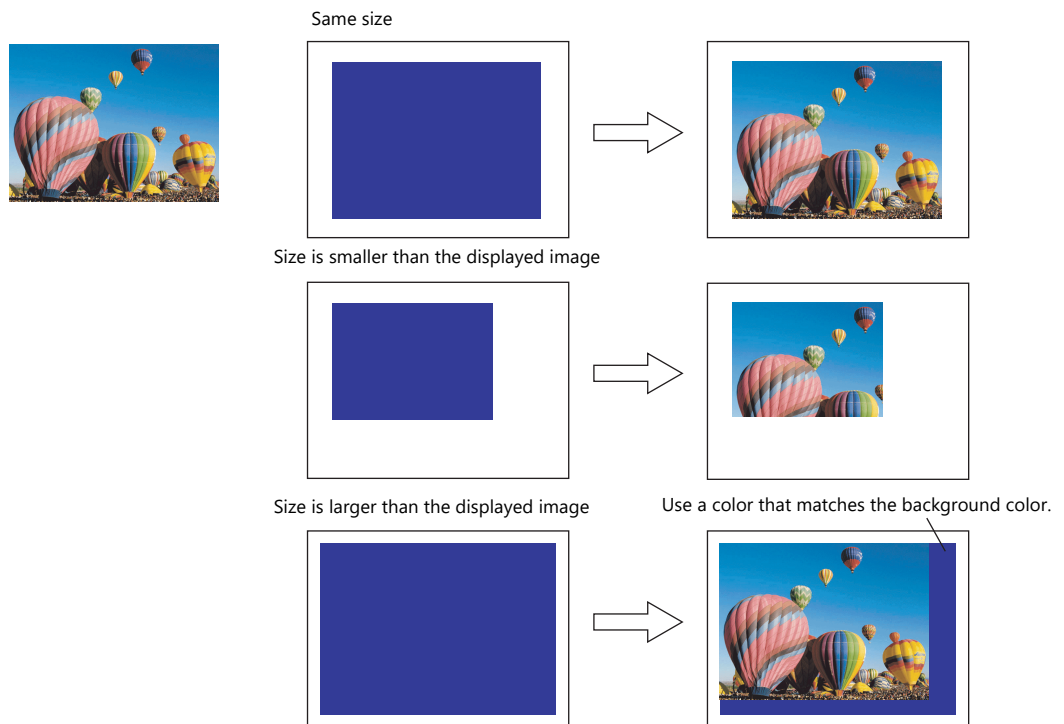
\*1 Display example



## \*2 Display example

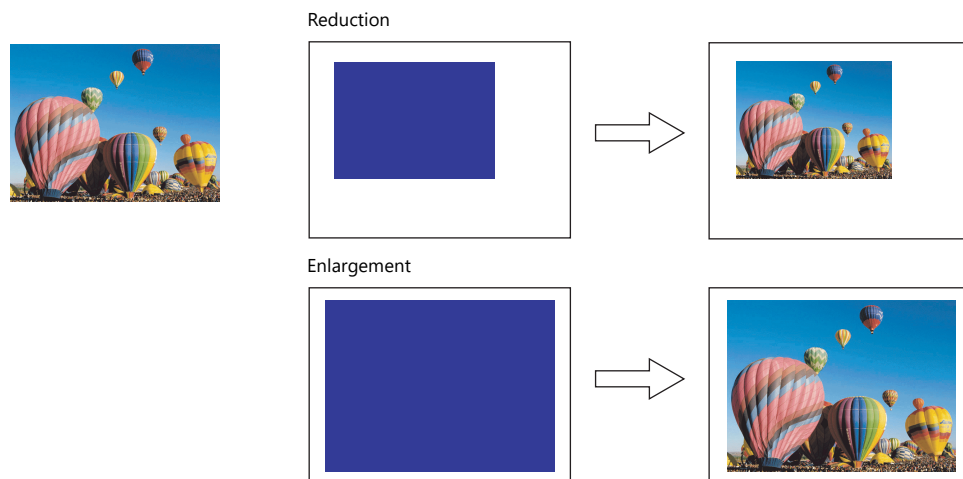
- Checkbox: unselected

The image is displayed at its original size with respect to the top left corner of the display area. If the JPEG image is larger than the display area, the part of the image outside the display area is not shown. Note that the color of the display area is visible when the JPEG image is smaller than the display area. It is recommended that users match the display area color with the background color of the image.

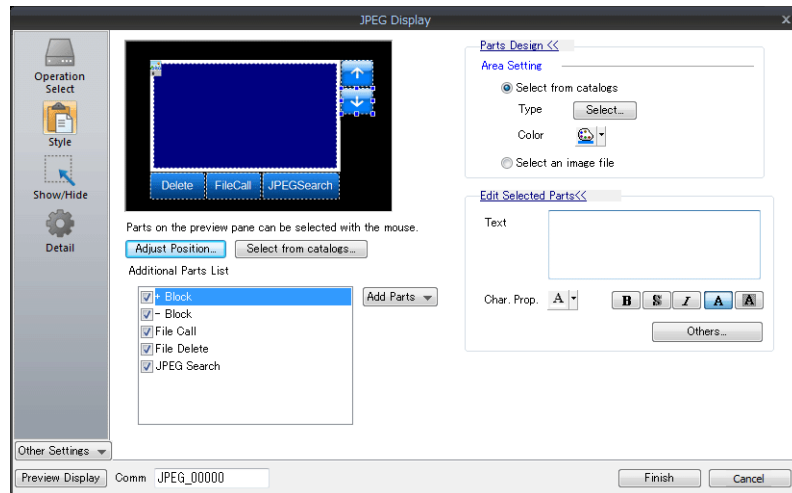


- Checkbox: selected

The image is enlarged or reduced with respect to the top left corner of the display area. The image is enlarged or reduced using the same factor for width and length.



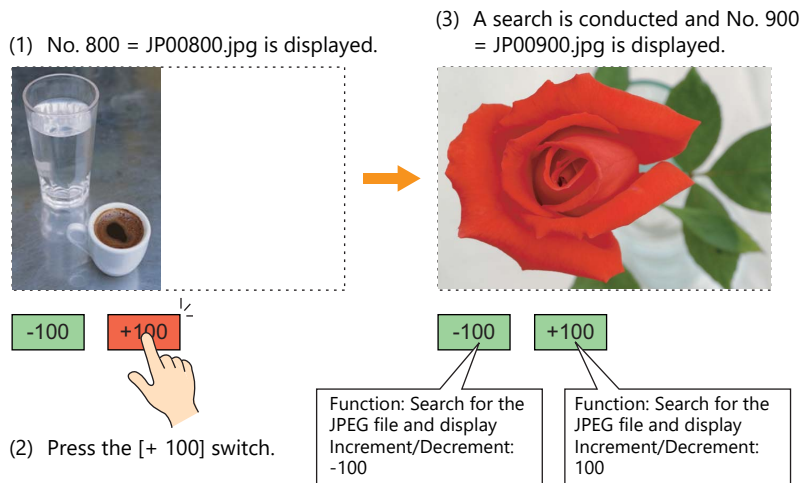
## Style



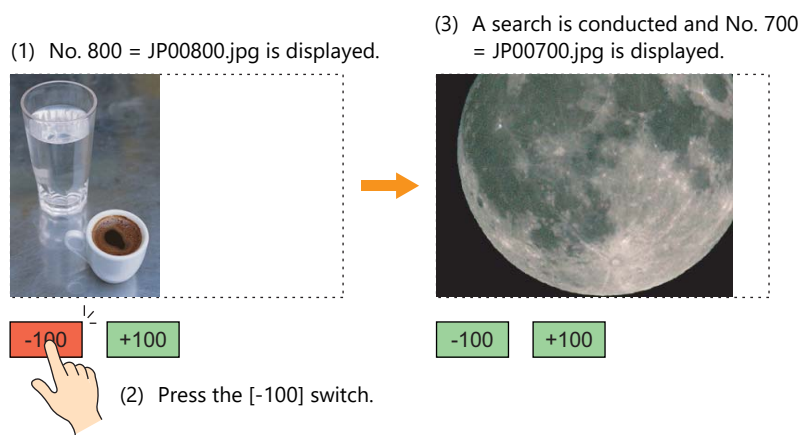
Item	Description	Target file
Additional Parts List	Displays a list of JPEG display switches. Parts can be added to the list using the [Add Parts] button.	
+ Block	Display the JPEG file corresponding to the next file number.	JPxxxx.jpg VDxxxx.jpg
- Block	Display the JPEG file corresponding to the previous file number.	
File Call	Load the JPEG file corresponding to the specified file number.	
File Delete	Delete the JPEG file that is currently displayed.	VDxxxx.jpg
JPEG Search	Set an increment or decrement value to use to search for and display a JPEG file *1.	JPxxxx.jpg VDxxxx.jpg
Adjust Position	Displays the window for adjusting the placement position of each part. The size of parts can also be changed.	
Select from catalogs	Set the part design from the catalog.	
Parts Design	Set the design and color of parts.	
Edit Selected Parts	Configure the part selected in the [Additional Parts List] or preview pane.	

### \*1 Display example

- When the [+100] switch is pressed while file No. 800 is displayed, a search is conducted for file No. 900 or later and the file is displayed. When a search has been conducted to No. 32767, it is continued moving back to No. 0.



- When the [-100] switch is pressed while file No. 800 is displayed, a search is conducted for file No. 700 or prior and the file is displayed. When a search has been conducted to No. 0, it is continued moving back to No. 32767.

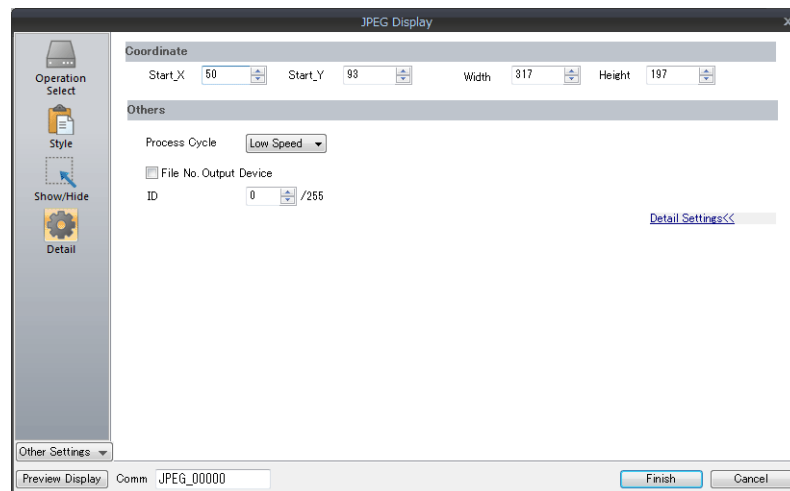


## Show/Hide

Set the show and hide settings of graphic items.

- ☞ For details, refer to "14 Item Shown/Hide Function" in the X1 Series Reference Manual 1.

## Detail



Item		Description
Coordinate	Start X/Start Y	Set the placement position and size of the display area.
	Width/Height *1	
Others	Process Cycle	Set the cycle for the X1 series to read PLC data.
	File No. Output Device	Output the file number of the currently displayed image.
	ID	Set an ID number.



### 1.1.3 JPEG File Location

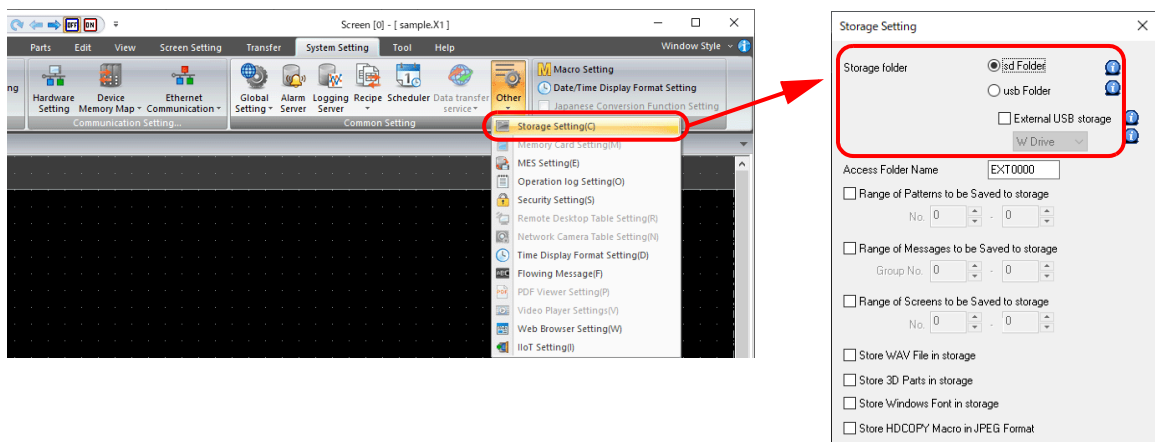
The JPEG file display function is used to display JPEG files saved in storage. Create a "JPEG" or "SNAP" folder in the access folder in a storage and then store files to display in that folder.

#### JPEG Filenames

Display Item	Filename
JPEG	JPxxxx.jpg (xxxx: 00000 to 32767) xxxxxxx.jpg (maximum of 64 one-byte uppercase alphanumeric characters)
Video snapshot	VDxxxx.jpg (xxxx: 00000 to 32767)

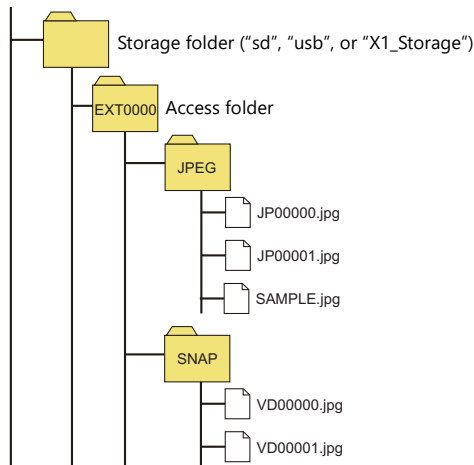
#### Storage Setting Location and File Directory

Specify the directory for storing files in the screen program.  
[System Setting] → [Other] → [Storage Setting] → [Storage folder]



Storage	File Directory
sd Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\sd or usb\(\access folder)\xxxx folder └─ 0: Main app in multi-display      └─ JPEG: JPEG file └─ 1: Sub app in multi-display      └─ SNAP: Video snapshot
usb Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\sd or usb\(\access folder)\xxxx folder └─ 0: Main app in multi-display      └─ JPEG: JPEG file └─ 1: Sub app in multi-display      └─ SNAP: Video snapshot
USB storage device*1	External USB storage (Drive name):\X1_Storage\(\access folder)\xxxx folder └─ JPEG: JPEG file └─ SNAP: Video snapshot

\*1 Selection of the "usb Folder" option is disabled. For details on the [Storage Setting] window, refer to "9 Storage".



## **2 Sound**

---

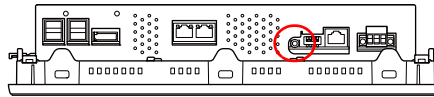
## 2.1 Overview

### 2.1.1 Before Use

#### AUDIO Port

The X1 series is equipped with a built-in stereo mini jack port (AUDIO) for audio playback on the bottom face of the unit.

Bottom view



#### Audio Specifications

Item		Specification
External Connection Terminal		φ3.5-mm stereo mini jack
Max. Output Voltage		1.2 Vrms (0 db)
Connected Amplifier		Input impedance of 1 kΩ or more
Playable Files	Playable Files	WAV (PCM)
	Sampling Frequency	8 KHz / 16 KHz / 32 KHz / 48 KHz / 96 KHz / 192 KHz
	Quantization Bit	8 bit / 16 bit / 24 bit
	Audio Source	- Monaural - Stereo
Volume Control		8 levels

#### Preparation

Prepare the following items to use the audio playback function of the X1 app.

- X1 series unit
- Connected amplifier and external speaker
- Audio files (WAV)

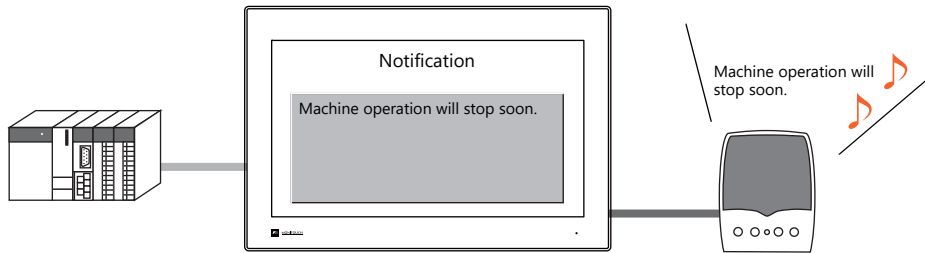
## 2.1.2 Overview

---

Audio files can be played over the connected external speaker using the X1 series unit by turning bits ON and OFF.

The functions that can play audio are listed below.

- Local playback: Settings are required for each screen.
  - Audio item
  - Animation
- Global playback: Settings apply to the entire file.
  - Alarm Server



It is possible to play an audio file of the message displayed on the screen through the speaker by recording an audio file version of the message in advance.

## 2.2 Playing Audio Using Sound Parts

### 2.2.1 Setting Examples

Prepare the following audio files.

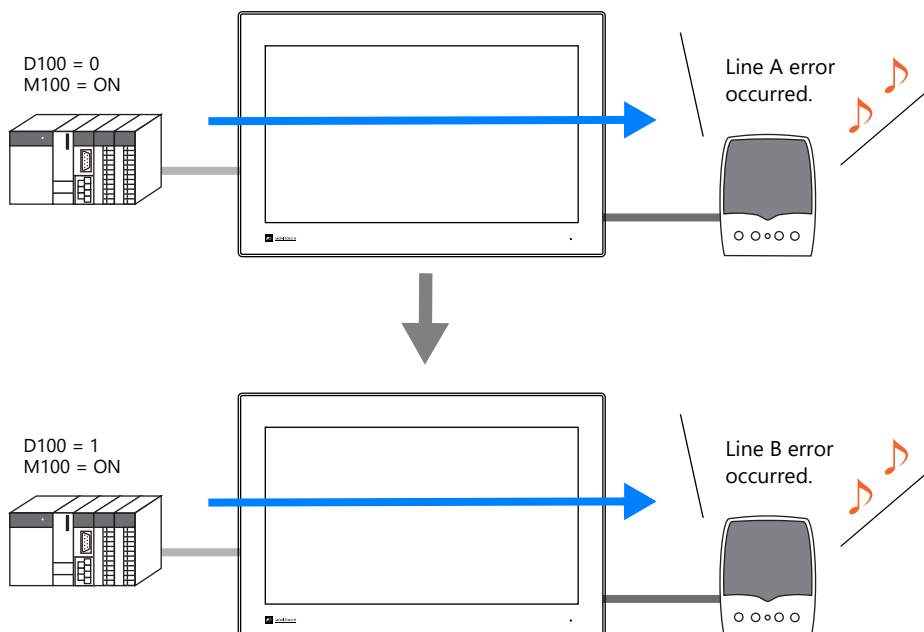
File	Description
WA0000.WAV	Line A
WA0001.WAV	Line B
WA0002.WAV	error
WA0003.WAV	occurred.
WA0004.WAV	recovered.

Configure the following settings using the above files.

Item	Description			
File Select	Play Order	0	Display Method	Device memory address: D100
		1	Display Method	File No. 2
		2	Display Method	File No. 3
Play	Monitoring Device	M100		

### 2.2.2 Conceptual Operation

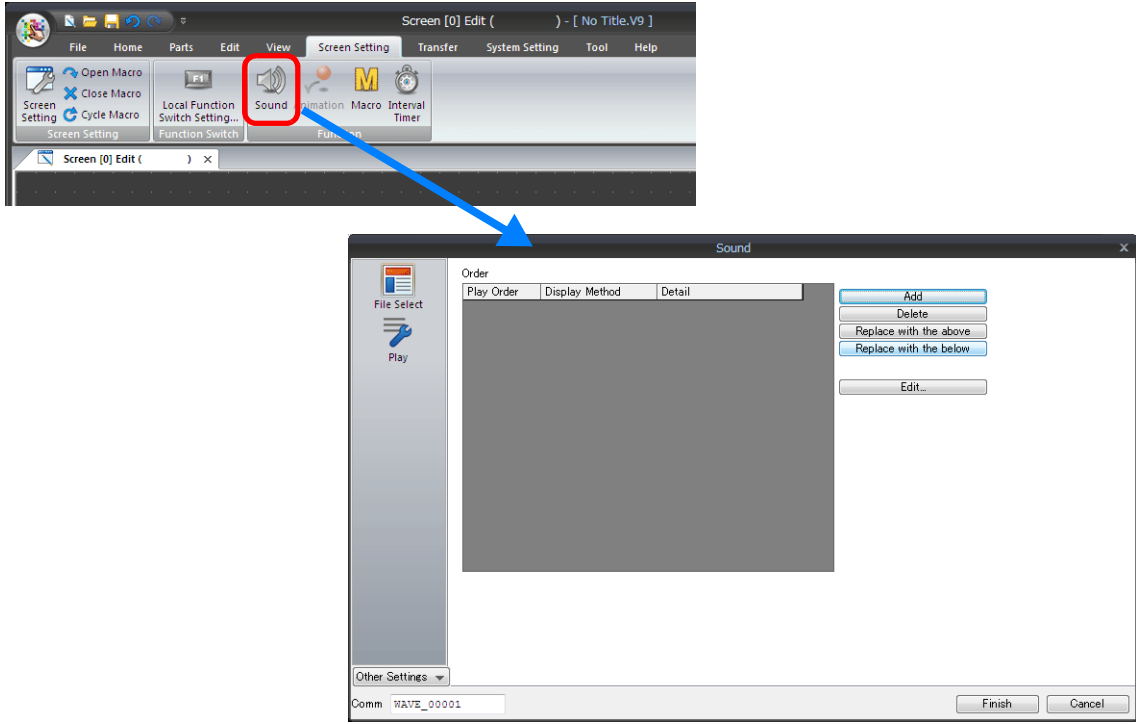
Operation is performed in the following manner when the unit is running with the above settings.



## 2.3 Detailed Settings

### 2.3.1 Sound Part

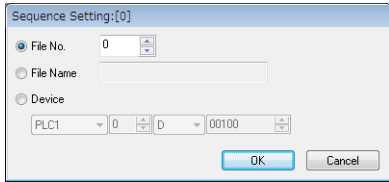
Click the [Screen Setting] menu → the [Sound] button.  
The [Sound] settings window is displayed.



### File Select

Click the [Add] button to add audio to the list under [Order].

Item	Description
Play Order *1	This is the order in which audio files are played.
Specification Method	Select the audio file specification method.
File No.	Specify the audio file to be played using a number. The format of audio filenames that can be specified for [File No.] is shown below. No files in any other name format can be played.  WA xxxx .WAV (xxxx: 0000 to 1023: audio file number)
File Name	Specify the filename of the audio file to be played. The format of audio filenames that can be specified for [File Name] is shown below. No files in any other name format can be played.  xxxxxxxx .WAV (xxxxxxxx: maximum of 64 one-byte numerals or uppercase alphabetic characters)  * Filename specification is only available when the audio file is stored in storage.
Device	Select this option to switch between audio files for playback during RUN mode. Specify the device memory address where the audio file number is stored. The format of audio filenames that can be read using a device memory address is shown below. No files in any other name format can be played.  WA xxxx .WAV (xxxx: 0000 to 1023: audio file number)  * All audio files that are not stored in a storage folder need to be included in the screen program file. For details on including files, refer to "Method 1: Including Audio Files in the Screen Program File" page 2-7.
Detail	Information corresponding to the method selected for [Display Method] is displayed.
Play WAV File	This button is only available when "File No." is selected for [Display Method]. Press this button to play the selected file on the PC.
Add	Click to add an entry to the list.
Delete	Select an entry number to delete and click this button to delete the selected entry from the list.

Item	Description
Replace with the above/Replace with the below	Select an entry in the list and click the desired button to change the order of the entry in the list.
Edit	Select an entry in the list and click this button to configure the [Specification Method] settings. The window shown below is displayed. 

\*1 For details on the order of audio file playback, refer to [“2.5.1 Audio File Playback Priority”](#) page 2-9.

## Play

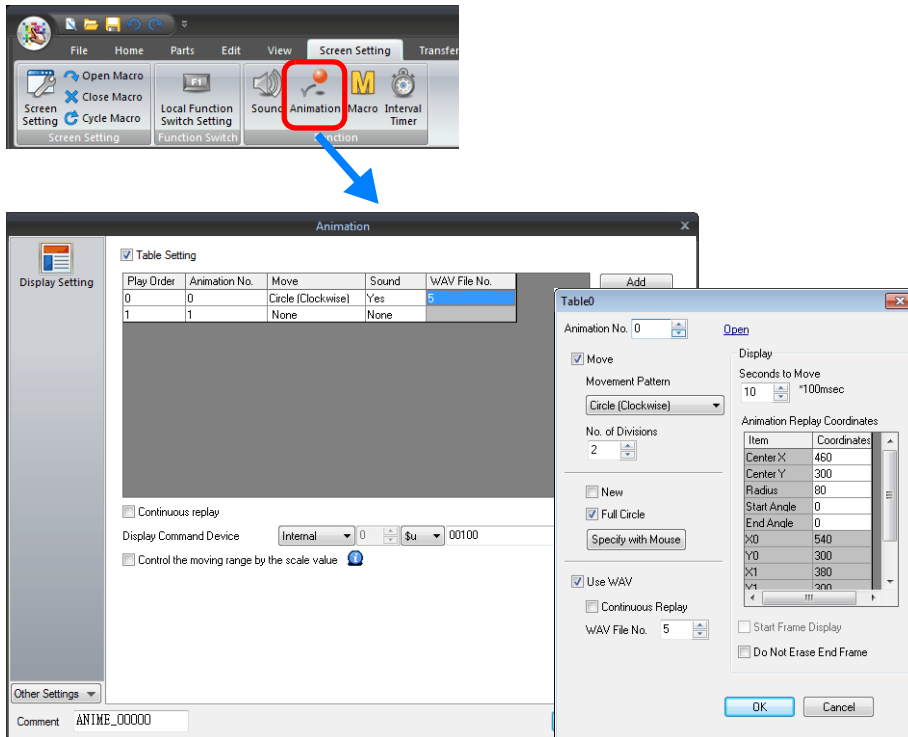
Item	Description
Monitoring Device	Specify the bit memory address to use to play/stop the audio file set in the [File Select] settings (refer to the previous page). Play: [0] → [1] Stop: [1] → [0] (stops even while the file is playing.)
Repeat playback	Select this checkbox to play the audio file repeatedly.
Priority (0 to 511)	When multiple audio items are placed on the screen, set the priority for playing for each item. When multiple bits are set to ON simultaneously, the audio file with the higher priority is played. However, if an audio file linked to an alarm server starts playing, the audio item will stop playing because the alarm server audio has a higher priority.

## Detail

Item	Description
Process Cycle	Set a cycle for the X1 series to read the PLC data while it is communicating with the PLC.
ID	Set the ID. For details on IDs, refer to the V9 Series Operation Manual.

## 2.3.2 Animation

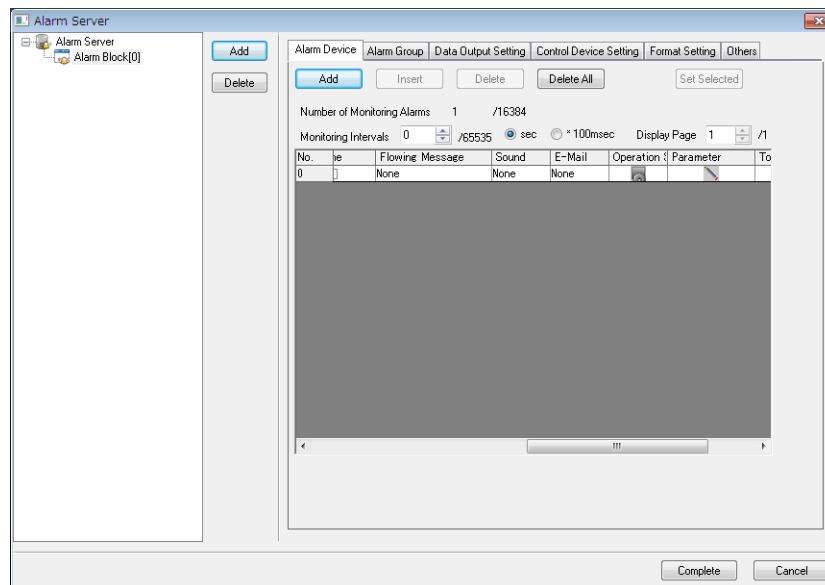
Click the [Screen Setting] → [Animation] button.  
The [Animation] settings window is displayed.



For details on linking audio files, refer to "11.2 Animation" in X1 Series Reference Manual 1.

## 2.3.3 Alarm Server

Click the [System Setting] → the [Alarm Server] button.  
The [Alarm Server] settings window is displayed.



For details on linking audio files, refer to "8 Alarm" in the X1 Series Reference Manual 1.



## 2.4 Methods for Storing Audio Files

Audio files can be handled by either of the following two methods. Settings in the screen program and the location for storing audio files differ between these methods.

- Method 1: Including audio files in the screen program file
- Method 2: Storing audio files in storage

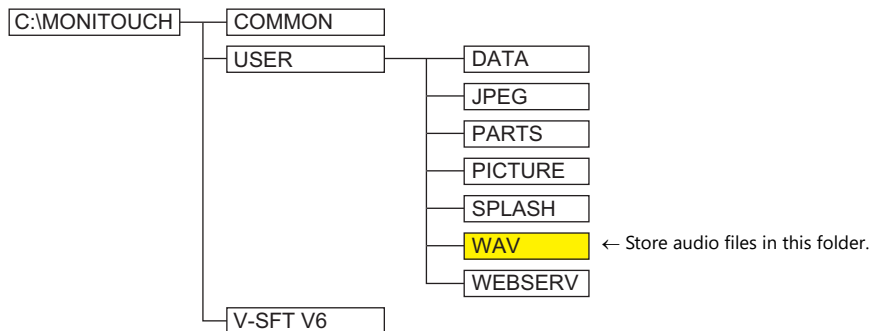
### Method 1: Including Audio Files in the Screen Program File

#### PC for Editing a Screen Program

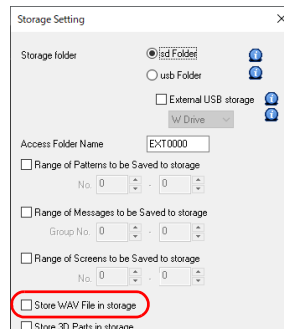
Save the audio files for use to the "WAV" folder in the "USER" folder, which is located in the "MONITOUCH" folder on the drive to which V-SFT Version 6 is installed.

Audio files are transferred as part of the screen program when the screen program is transferred to the unit.

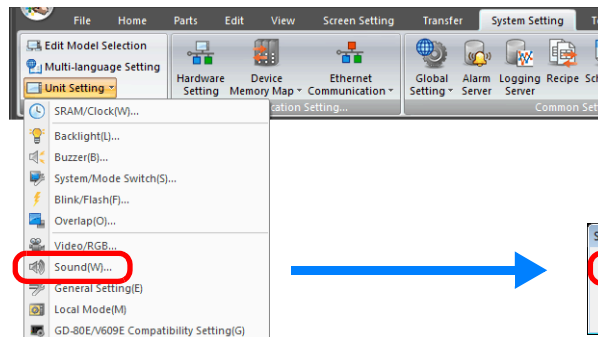
- \* Note that the space available for the screen program will decrease by the space consumed by audio files that are included.



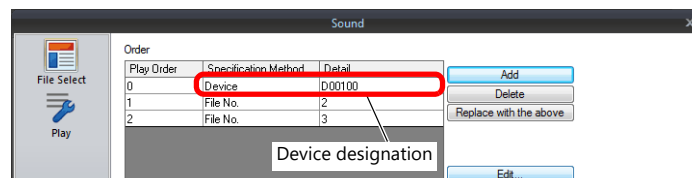
- Deselect the [Store WAV File in storage] checkbox at [System Setting] → [Other] → [Storage Setting]. If the checkbox is selected, audio files cannot be included in the screen program file.



- If an audio file number is specified using a device memory address, be sure to select the [System Setting] → [Unit Setting] → [Sound] → [Import All Files from WAV folder] checkbox. All WAV files in the "WAV" folder will be transferred to the X1 series unit when the screen program is transferred.



Setting to check: [Screen Setting] → [Sound]

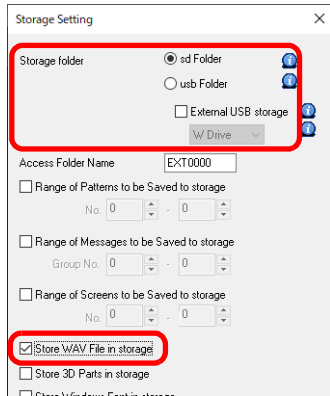


## Method 2: Storing Audio Files in Storage

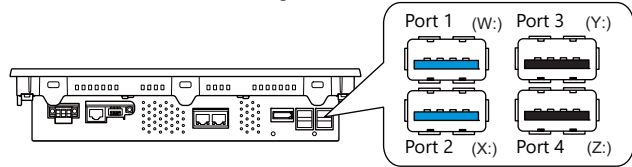
Audio files can be stored in storage.

### V-SFT-6

- [System Setting] → [Other] → [Storage Setting]  
Select which storage to use and also select the [Store WAV File in storage] checkbox.



\* Drive name of external USB storage



### Storage

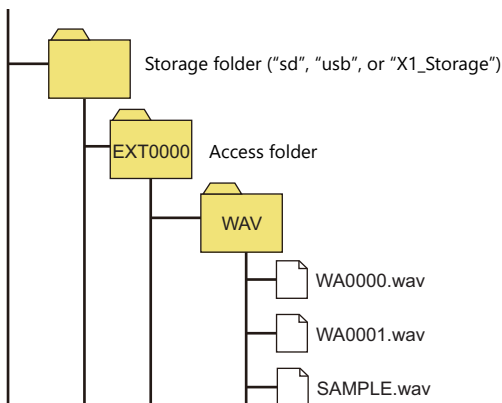
Create a "WAV" folder in the access folder in a storage and then store audio files in that folder.

Storage	File Directory <sup>*1</sup>
sd Folder <sup>*2</sup>	Internal storage C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)\WAV
usb Folder <sup>*2</sup>	Internal storage C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)\WAV
USB storage device <sup>*3</sup>	External USB storage (Drive name):\X1_Storage\(\access folder)\WAV

\*1 Access by the sub app of the multi-display function is not supported.

\*2 Connect a USB flash drive containing audio files to the X1 series unit and copy the files using the Explorer function of System Configurator.

\*3 Selection of the "usb Folder" option is disabled. For details on the [Storage Setting] window, refer to "9 Storage".



For details on System Configurator, refer to the X1 Series Hardware Specifications.

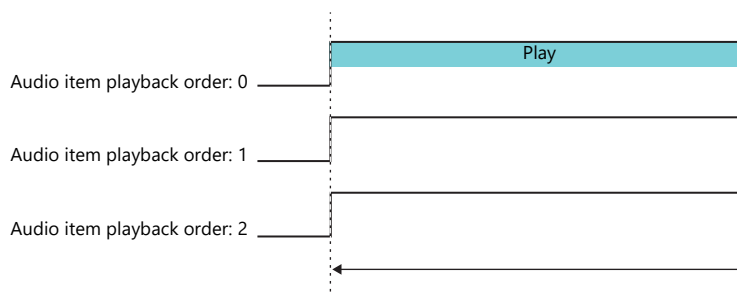
## 2.5 Notes

### 2.5.1 Audio File Playback Priority

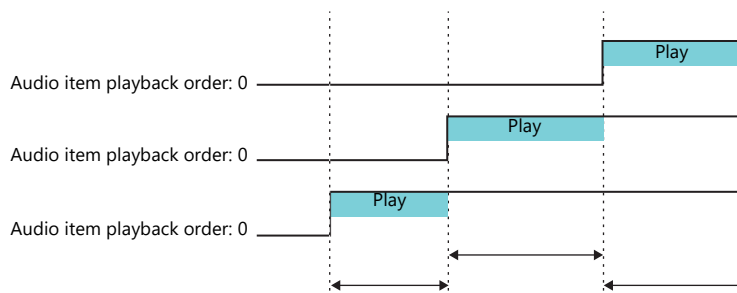
The following describes the playback priority for audio files.

#### Order of File Playback According to Audio Item

The order of playback can be set for each audio item. If the bits of all items turn ON at the same time, the item with the lowest order number is played.



If items have the same order number, the file of the item whose bit turned ON last is played.



#### Order of File Playback According to Part Type

Audio playback for audio items and animation is regarded as local playback.

If an alarm server causes global playback of an audio file during local playback, the audio of the alarm server takes priority and local playback stops.

## 2.6 System Device Memory

---

Sound information is output to internal device memory (\$s).

- \$s1000  
This device memory address stores the number of seconds until the currently playing WAV file will finished playing.
- \$s1001  
This device memory address stores the adjusted volume value of channel L.
- \$s1002  
This device memory address stores the adjusted volume value of channel R.

## **3 Scheduler**

---

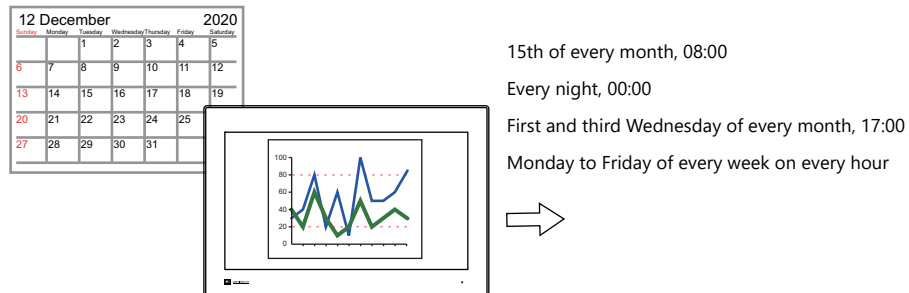
## 3.1 Overview

### 3.1.1 Scheduler

The scheduler function executes specific operations at the specified times.

Operations include turning bits ON/OFF, writing data, and macro execution, and up to 64 schedules can be registered. Registered schedules can be checked in a list.

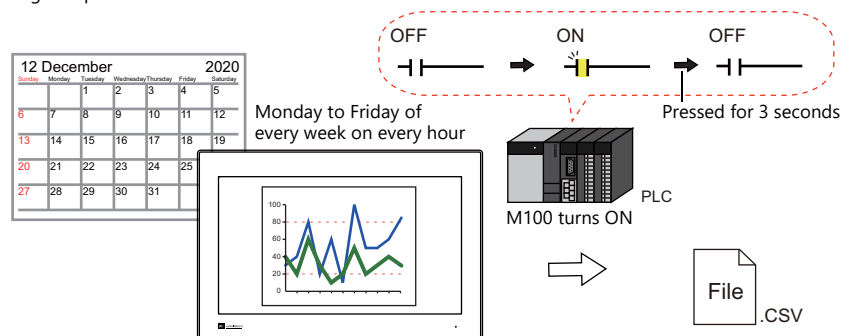
- Schedules can be executed according to a specified date and time or day of the week.



For setting examples, refer to ["3.2.1 Trigger Settings"](#) page 3-3.

- CSV output from a logging server can be easily executed using the scheduler function.

Example: Storage output bit M100



For setting examples, refer to ["3.2.2 Operation Settings"](#) page 3-8.

- Schedules can be executed at any time by setting an operation time to a device memory address.

For setting examples, refer to ["Designation: Device"](#) page 3-7.

- An interlock can be set to a schedule to control execution permission using bit status.

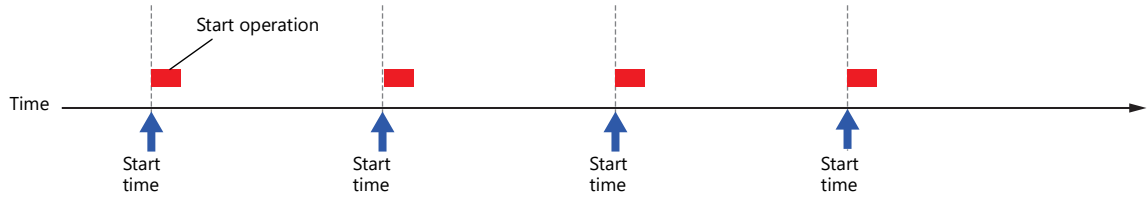
For details, refer to ["Others"](#) page 3-15.

## 3.1.2 Operation Specifications

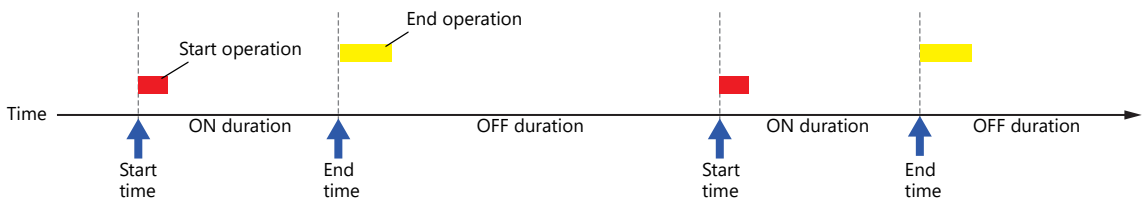
### Execution Timing (Trigger)

There are two types of execution timings that can be specified: start time, and start time and end time.

- Start  
Perform operation once at start time.



- Start and end  
Perform an operation once at the start time and another operation at the end time.



### Operation Item

- Bit output
- Word writing
- Macros

## 3.2 Setting Example

### 3.2.1 Trigger Settings

#### Specification Method: Direct

Set the operation time of the schedule to the screen program.

There are two general methods for setting the operation time: date specification and day of the week specification.

#### Date specification

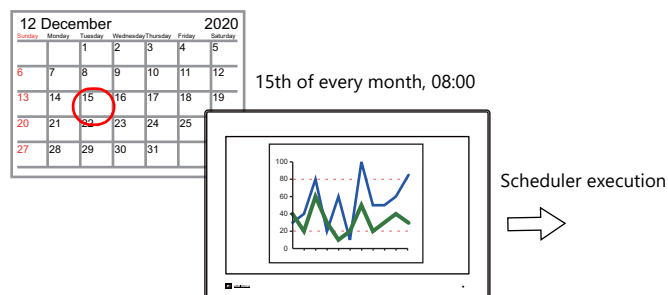
- "Execution Every Month with Date Specifications" page 3-3 (Example: Execution on the 15th of every month at 08:00)
- "Execution Every Day with Time Specifications" page 3-4 (Example: Execution every night at 00:00)

#### Day of the week specification

- "Execution Every Month with Day of the Week Specifications" page 3-5 (Example: Execution on the first and third Wednesday of every month at 17:00)
- "Execution Every Week with Day of the Week Specifications" page 3-6 (Example: Execution at every hour, Monday to Friday of every week)

#### Execution Every Month with Date Specifications

This section explains the setting procedure for execution on the 15th of every month at 08:00.



1. Click [System Setting] → [Scheduler].
2. Click [New].
3. Register the schedule name for [Settings] on the [General] tab window.
4. Configure the following settings on the [Trigger] tab window.

Trigger: Start  
 Designation: Direct  
 Action: 15th of every month  
 Time: 08:00

This completes the necessary settings.

Operation settings are described next.

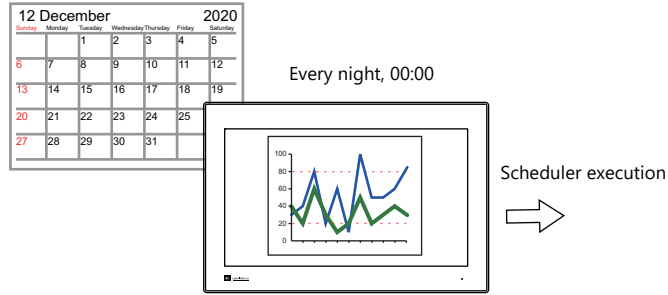


For operation setting examples, refer to "3.2.2 Operation Settings" page 3-8.



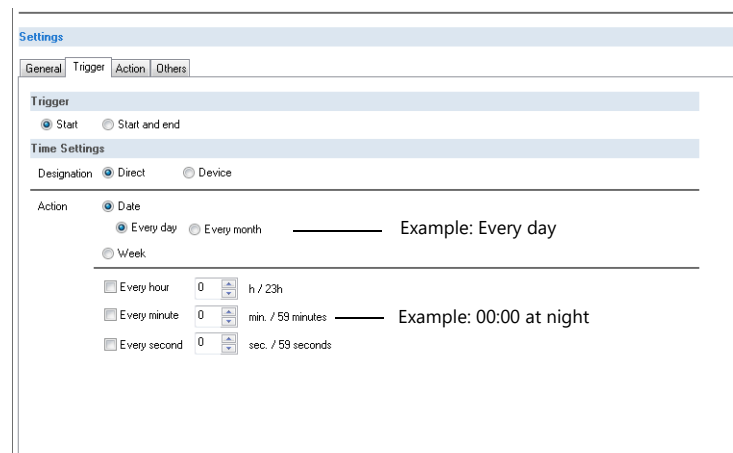
## Execution Every Day with Time Specifications

This section explains the setting procedure for execution on every night at 00:00.



1. Click [System Setting] → [Scheduler].
2. Click [New].
3. Register the schedule name for [Settings] on the [General] tab window.
4. Configure the following settings on the [Trigger] tab window.

Trigger: Start  
 Designation: Direct  
 Action: Every day  
 Time: 0 hour, 0 minutes, 0 seconds

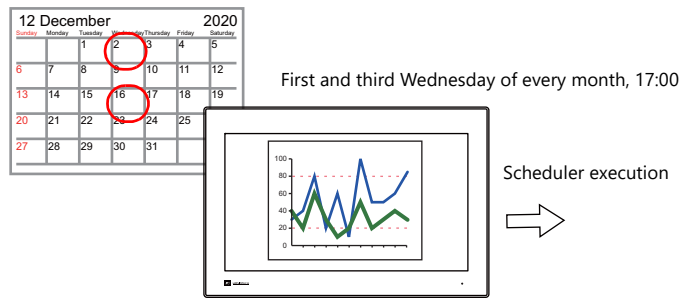


This completes the necessary settings.  
 Operation settings are described next.

For operation setting examples, refer to “3.2.2 Operation Settings” page 3-8.

## Execution Every Month with Day of the Week Specifications

This section explains the setting procedure for execution on the first and third Wednesday of every month at 17:00.



1. Click [System Setting] → [Scheduler].
2. Click [New].
3. Register the schedule name for [Settings] on the [General] tab window.
4. Configure the following settings on the [Trigger] tab window.

Trigger: Start  
 Designation: Direct  
 Action: First and third Wednesday of every month  
 Time: 17:00

Settings

General Trigger Action Others

Trigger

Start  Start and end

Time Settings

Designation  Direct  Device

Action  Date  Week

Every week  1st  2nd  3rd  4th  Last

Sun  Mon  Tue  Wed  Thu  Fri  Sat

Every hour 17 h / 23h Example: 5:00 p.m.

Every minute 0 min. / 59 minutes

Every second 0 sec. / 59 seconds

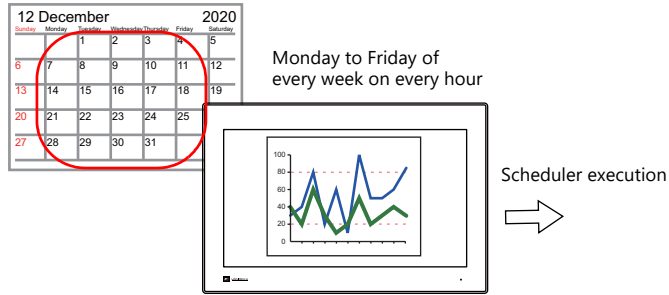
Example: First and third Wednesday of every month

This completes the necessary settings.  
 Operation settings are described next.

For operation setting examples, refer to "3.2.2 Operation Settings" page 3-8.

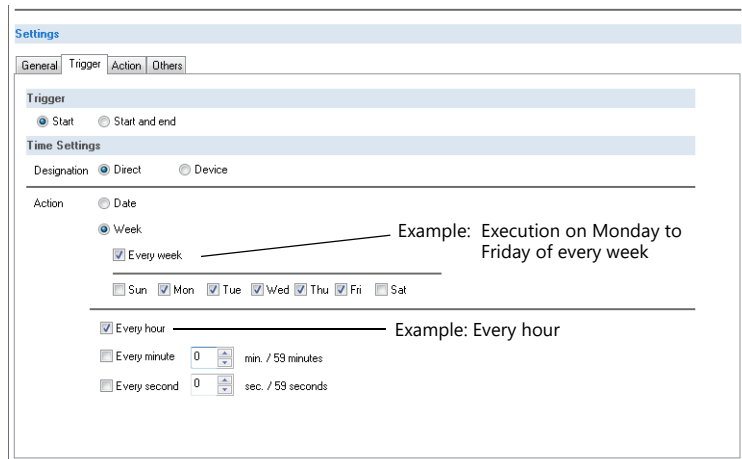
## Execution Every Week with Day of the Week Specifications

This section explains the setting procedure for execution on Monday to Friday of every week on every hour.



1. Click [System Setting] → [Scheduler].
2. Click [New].
3. Register the schedule name for [Settings] on the [General] tab window.
4. Configure the following settings on the [Trigger] tab window.

Trigger: Start  
 Designation: Direct  
 Action: Monday to Friday of every week  
 Time: [Every hour] checkbox selected



This completes the necessary settings.  
 Operation settings are described next.

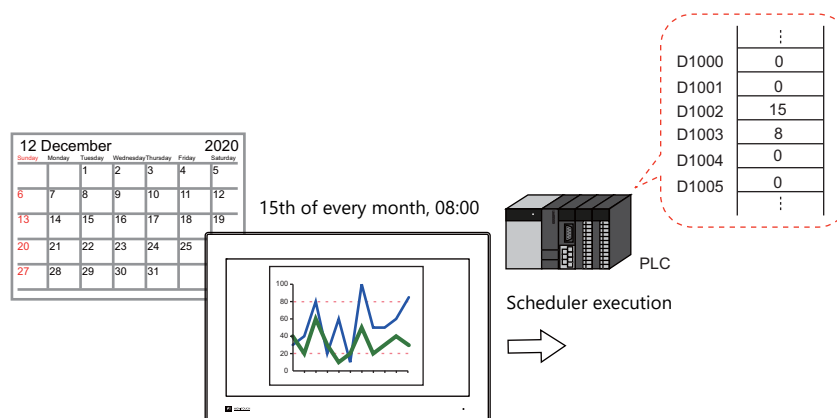
For operation setting examples, refer to “3.2.2 Operation Settings” page 3-8.

## Designation: Device

Set the operation time of the schedule to the screen program using a device memory address. (The date and time are set to all devices memory address.)

The date and time is specified and the schedule is executed in RUN mode.

The setting procedure is described below.



1. Click [System Setting] → [Scheduler].
2. Click [New].
3. Register the schedule name for [Settings] on the [General] tab window.
4. Configure the following settings on the [Trigger] tab window.

Settings

General Trigger Action Others

Trigger

Start  Start and end

Time Settings

Designation  Direct  Device

Time Setting Device: PLC1 0 D 01000 — Example: 6 words from D1000 to D1005

Input Type

Control Device: D01000

n'th Week: D01001

Day/Week: D01002

Action Time

Hour: D01003

Minute: D01004

Second: D01005

The operation date and time is assigned consecutively from the [Time Setting Device]. The number of words used differs depending on the [Trigger] setting.

- [Start]: 6 consecutive words
- [Start and end]: 9 consecutive words

For details, refer to ["Designation: Device" page 3-12](#).

This completes the necessary settings.  
Operation settings are described next.

For operation setting examples, refer to ["3.2.2 Operation Settings" page 3-8](#).

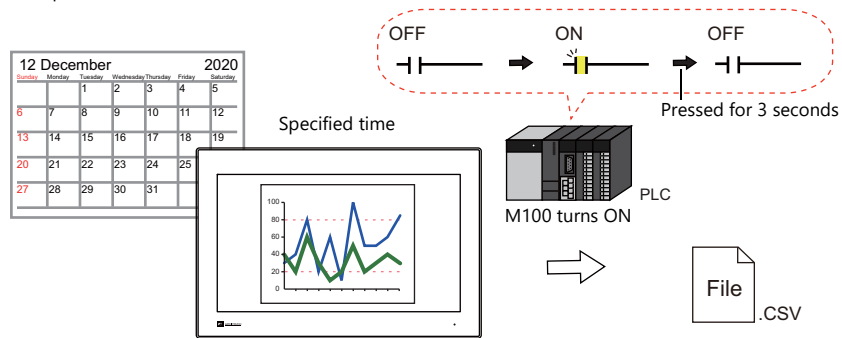
The schedule is started by setting the operation time to [Time Setting Device] on MONITOUCH.

For details on the time specification method, see ["3.4 Example of Date and Time Specification by Device Memory \(Designation: Device\)" page 3-16](#).

### 3.2.2 Operation Settings

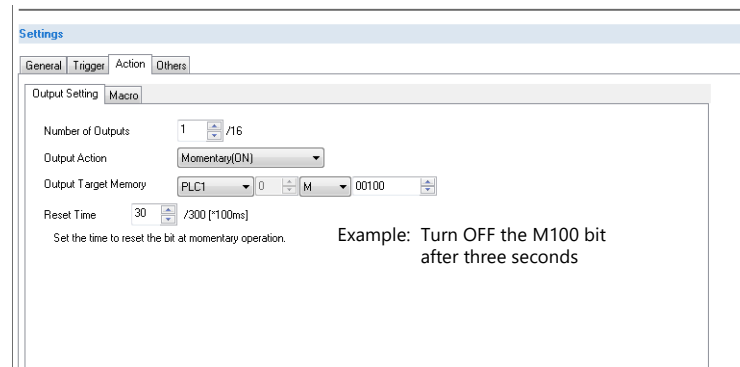
This section explains the setting procedure for turning ON the M100 bit at the specified time. The M100 bit is turned OFF after three seconds.

Example: CSV output bit M100



1. Set "1" for [Number of Outputs] under [Action] → [Output Setting] in the schedule.
2. Configure the operation settings as shown below.

Output Action: Momentary (ON)  
 Output Target Memory: M100  
 Reset Time: 30 \* 100 ms (3 seconds)



Example: Turn OFF the M100 bit after three seconds

This completes the necessary settings.

## 3.3 Detailed Settings

Location of settings: [System Setting] → [Scheduler].

### Schedule List

The screenshot shows the Scheduler interface with a 'Schedule List' table and a 'Settings' panel. The 'Schedule List' table contains the following data:

No.	Schedule Name	Trigger	Action(Start)	Action(End)	Other Settings
0	SCHEDULE_00	15Day 8:00:00	Output device Count : 1 Macro : None	None	Yes
1	SCHEDULE_01	Every day 0:00:00	Output device Count : 2 Macro : None	None	Yes
2	SCHEDULE_02	Every weekMonday Every weekTuesday Every weekWednesday Every weekThursday	Macro : Yes	None	Yes
3	SCHEDULE_03	Time Setting Device : D01000	Output device Count : 1 Macro : Yes	None	Yes

The 'Settings' panel shows the 'General' tab with the 'Schedule Name' field containing 'SCHEDULE\_00'. A line points from the text 'List of currently registered schedules' to the table.

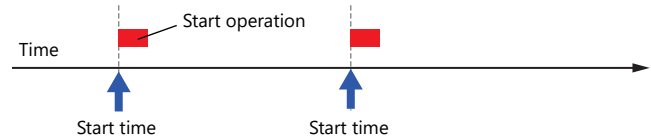
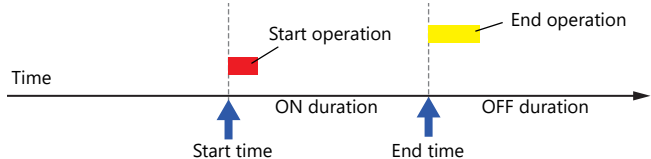
Item	Description
New	Create a new schedule. A maximum of 64 schedules can be registered.
Delete	Delete the selected schedule.
Preview	Currently registered schedules can be checked in a list. Schedules registered with component parts are shown with an asterisk (*) on the left of [No.].

### General

The screenshot shows the 'Settings' panel with the 'General' tab selected. The 'Schedule Name' field contains 'SCHEDULE\_00'.

Item	Description
Schedule Name	Register the schedule name. 256 characters maximum

## Trigger

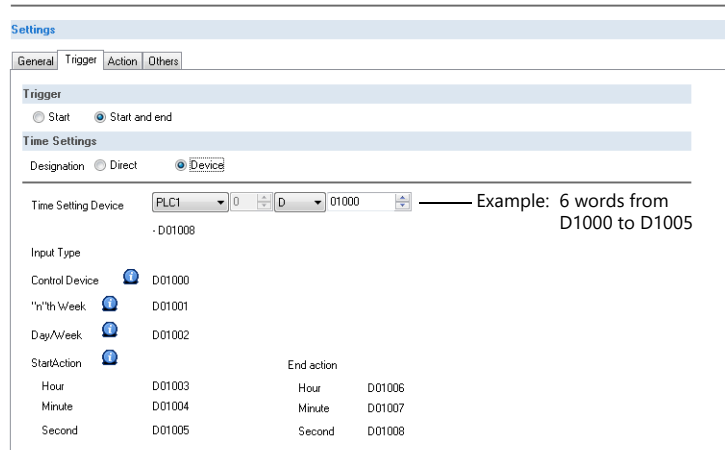
Item	Description
Trigger	<p><b>Start</b> Perform operation once at the start time.</p>  <p><b>Start and end</b> Perform the start operation at the start time and the end operation at the end time.</p> 
Designation	<p><b>Direct</b> Set a specific date and time.</p> <p><b>Device</b> Set the entire date and time using device memory.</p>

**Designation: Direct**

Item	Description																																																	
Action	Date Every day Execute every day.  Every month, x day Execute on the specified day.																																																	
Week	Every week Execute every week.  1st, 2nd, 3rd, 4th, Last Execute on the specified day of the week (Sunday to Saturday) on the specified week. The first week at the start of each month corresponds to [1st]. Multiple checkboxes can be selected. <table border="1"> <thead> <tr> <th>Sun</th> <th>Mon</th> <th>Tue</th> <th>Wed</th> <th>Thu</th> <th>Fri</th> <th>Sat</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>2</td> </tr> <tr> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> <tr> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> <td>16</td> </tr> <tr> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> <td>22</td> <td>23</td> </tr> <tr> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> <td>29</td> <td>30</td> </tr> <tr> <td>31</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>             1st 1st to 7th              2nd 8th to 14th              3rd 15th to 21st              4th 22nd to 28th              Last 25th to 31st             <span style="margin-left: 20px;">Monday 25th corresponds to both 4th and Last</span> </p> <p>           Fridays in this month            1st 1st            2nd 8th            3rd 15th            4th 22nd            Last 29th         </p>	Sun	Mon	Tue	Wed	Thu	Fri	Sat						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
Sun	Mon	Tue	Wed	Thu	Fri	Sat																																												
					1	2																																												
3	4	5	6	7	8	9																																												
10	11	12	13	14	15	16																																												
17	18	19	20	21	22	23																																												
24	25	26	27	28	29	30																																												
31																																																		
Hour, minutes, and seconds	Specify the execution time of the schedule.																																																	



## Designation: Device



Item	Description
Time Setting Device	Specify the device memory address to use to set the time. The time is assigned consecutively starting from this address. The number of words used differs depending on the [Trigger] setting. <ul style="list-style-type: none"> <li>• [Start]: 6 consecutive words (n to n+5)</li> <li>• [Start and end]: 9 consecutive words (n to n+8)</li> </ul>
Input Type	Select the code to use when reading data from the PLC device memory. BCD, DEC, FLOAT

### Details of Time Setting Device

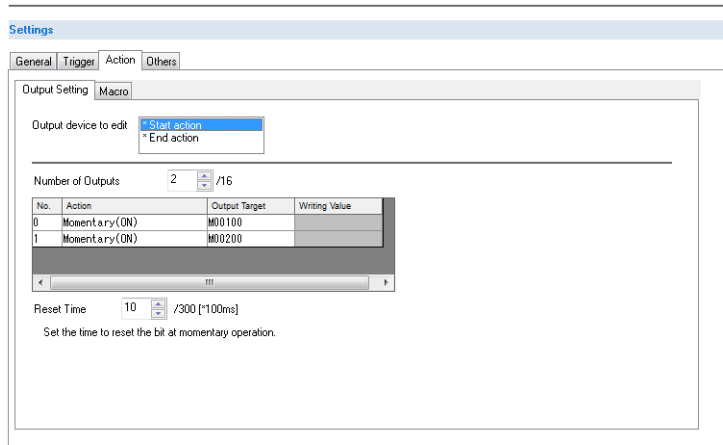
Device Memory	Description																																															
Control Device	<table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="11">MSB</td> <td colspan="4">LSB</td> </tr> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> <p>Not used (always set to "0")</p> <p>Action</p> <p>0 → 1: Confirm 1: Every second 0: Second can be specified</p> <p>1: Every minute 0: Minute can be specified</p> <p>1: Every hour 0: Hour can be specified</p>	MSB											LSB				15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0						
	MSB											LSB																																				
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																																
	0	0	0	0	0	0	0	0	0	0																																						
	Bit 0	Contents control device memory addresses n to n + 8 are determined by a 0 → 1 change in bit status and then the settings take effect.  * When this bit is 1 at startup, the settings take effect.																																														
Action Bit 5	Specify a date or day of the week.																																															
Bit 4	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Date Setting</th> <th>05</th> <th>04</th> </tr> </thead> <tbody> <tr> <td>Every month, date, time</td> <td>0</td> <td>0</td> </tr> <tr> <td>Every day, time</td> <td>0</td> <td>1</td> </tr> <tr> <td>xth week, day of the week, time</td> <td>1</td> <td>0</td> </tr> <tr> <td>Every week, day of the week, time</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Date Setting	05	04	Every month, date, time	0	0	Every day, time	0	1	xth week, day of the week, time	1	0	Every week, day of the week, time	1	1																																
Date Setting	05	04																																														
Every month, date, time	0	0																																														
Every day, time	0	1																																														
xth week, day of the week, time	1	0																																														
Every week, day of the week, time	1	1																																														
Bits 1 to 3	When executing every hour, minute, or second, the corresponding bit is set to 1. When a bit is 0, the time is specified with n+3 to n+8.																																															

Device Memory		Description																																																																																							
"n"th Week	n+1	<p>Specify when control device memory n is set to the following.</p> <table border="1"> <thead> <tr> <th>Date Setting</th> <th>05</th> <th>04</th> </tr> </thead> <tbody> <tr> <td>xth week, day of the week, time</td> <td>1</td> <td>0</td> </tr> </tbody> </table> <p>When setting the ordinal week number of a day of the week, the corresponding bit is set to 1. Multiple selections can be made.</p> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td> </tr> </table> <p style="text-align: right;">             1: Last              1: 4th              1: 3rd              1: 2nd              1: 1st         </p> <table border="1"> <thead> <tr> <th>Sun</th><th>Mon</th><th>Tue</th><th>Wed</th><th>Thu</th><th>Fri</th><th>Sat</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td><td>1</td><td>2</td> </tr> <tr> <td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> <tr> <td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </tr> <tr> <td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td> </tr> <tr> <td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td> </tr> <tr> <td>31</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> <p>             1st 1st to 7th              2nd 8th to 14th              3rd 15th to 21st              4th 22nd to 28th              Last 25th to 31st         </p> <p>Monday 25th corresponds to both 4th and Last</p> <p>Fridays in this month              1st 1st              2nd 8th              3rd 15th              4th 22nd              Last 29th</p>	Date Setting	05	04	xth week, day of the week, time	1	0	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0						Sun	Mon	Tue	Wed	Thu	Fri	Sat						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
Date Setting	05	04																																																																																							
xth week, day of the week, time	1	0																																																																																							
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																																																																										
0	0	0	0	0	0	0	0	0	0	0																																																																															
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24	25	26	27	28	29	30																																																																																			
31																																																																																									
Day/Week	n+2	<p>The setting differs depending on the status of bits 4 and 5 of the control device memory.</p> <ul style="list-style-type: none"> <li>Date specification Set control device memory n to the following value.</li> </ul> <table border="1"> <thead> <tr> <th>Date Setting</th> <th>05</th> <th>04</th> </tr> </thead> <tbody> <tr> <td>Every month, date, time</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>- 1 to 31: Date - 99: Last day of each month</p> <ul style="list-style-type: none"> <li>Day of the week specification Multiple days of the week can also be set. Set control device memory n to the following value.</li> </ul> <table border="1"> <thead> <tr> <th>Date Setting</th> <th>05</th> <th>04</th> </tr> </thead> <tbody> <tr> <td>xth week, day of the week, time</td> <td>1</td> <td>0</td> </tr> <tr> <td>Every week, day of the week, time</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> <p style="text-align: right;">             1: Saturday              1: Friday              1: Thursday              1: Wednesday              1: Tuesday              1: Monday              1: Sunday         </p>	Date Setting	05	04	Every month, date, time	0	0	Date Setting	05	04	xth week, day of the week, time	1	0	Every week, day of the week, time	1	1	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0																																															
Date Setting	05	04																																																																																							
Every month, date, time	0	0																																																																																							
Date Setting	05	04																																																																																							
xth week, day of the week, time	1	0																																																																																							
Every week, day of the week, time	1	1																																																																																							
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																																																																										
0	0	0	0	0	0	0	0	0																																																																																	
Start Action: Hour	n+3	Used when bit 3 of the control device memory is 0 (hour specifiable). 0 to 23																																																																																							
Start Action: Minute	n+4	Used when bit 2 of the control device memory is 0 (minute specifiable). 0 to 59																																																																																							
Start Action: Second	n+5	Used when bit 1 of the control device memory is 0 (second specifiable). 0 to 59																																																																																							
End Action: Hour	n+6	Used when bit 3 of the control device memory is 0 (hour specifiable). 0 to 23																																																																																							
End Action: Minute	n+7	Used when bit 2 of the control device memory is 0 (minute specifiable). 0 to 59																																																																																							
End Action: Second	n+8	Used when bit 1 of the control device memory is 0 (second specifiable). 0 to 59																																																																																							



## Action

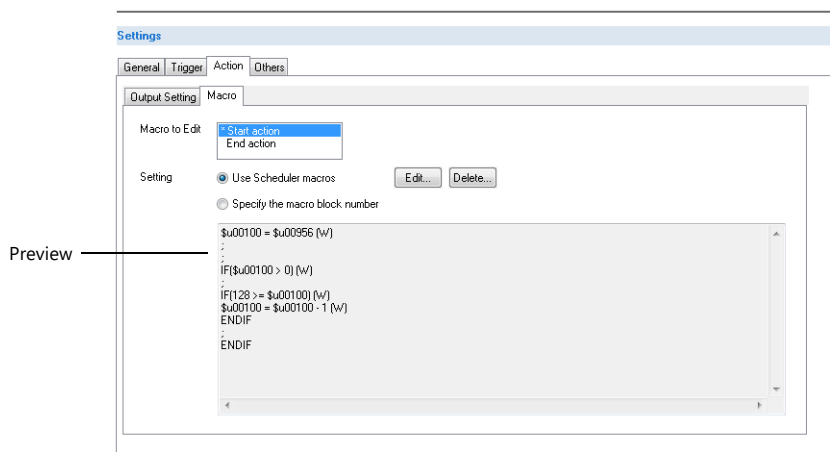
### Output Setting



Item	Description
Output device to edit	This setting is available when [Start and end] is selected for [Trigger]. Select the operation for the start time and end time.
Number of Outputs	Set the number of bits to output. 1 to 16
Output Target	Specify the output device memory address.
Action	<p>Momentary (ON) *</p> <p>Turn the bit ON, and then turn it OFF after the time set for [Reset Time] elapses. [Reset time]: 1 to 300, units: 100 ms</p> <hr/> <p>Momentary (OFF) *</p> <p>Turn the bit OFF, and then turn it ON after the time set for [Reset Time] elapses. [Reset time]: 1 to 300, units: 100 ms</p> <hr/> <p>Set</p> <p>Turn the bit ON.</p> <hr/> <p>Reset</p> <p>Turn the bit OFF.</p> <hr/> <p>Alternate</p> <p>Alternate the bit between ON and OFF.</p> <hr/> <p>Writing in Words</p> <p>Write the data value to the device memory. Set the data length of the value for writing using [Data Length]. 1-Word/2-Words (real numbers use 2 words)</p>

\* When [Momentary] is set multiple times, [Reset Time] is used for all instances.

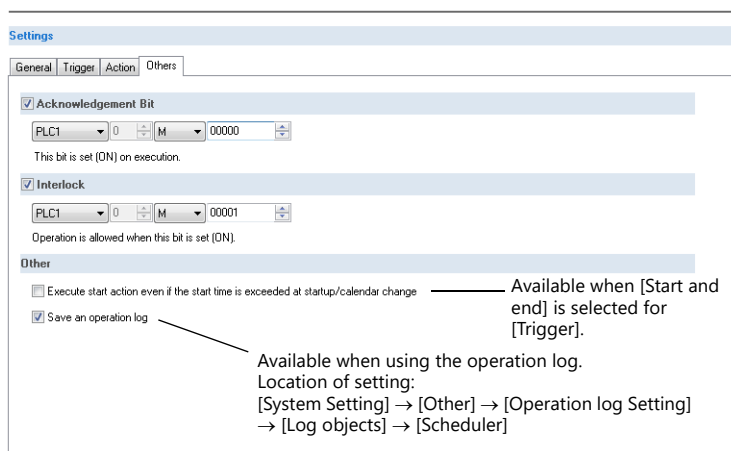
## Macro



Item	Description
Macro to Edit	This setting is available when [Start and end] is selected for [Trigger]. Select the operation for the start time and end time. If settings exist, an asterisk (*) is shown.
Use Scheduler macros	Register a macro for execution using [Edit]. All macros can be deleted at once using [Delete].
Specify the macro block number	Select the macro block number using the pull-down menu. The selected macro block number can be edited using [Edit].
Preview	Displays the details of the currently selected macro.

For details on macros, refer to the V9 Series Macro Reference Manual.

## Others



Item	Description
Acknowledgment Bit	This bit changes to 1 when the schedule is executed.
Interlock	Control the execution permission of the start operation. 1: Permitted 0: Prohibited  * Even if the interlock bit changes to 0 (prohibited) during schedule operation, the end operation is performed.
Execute start operation even if the start time is exceeded at startup/calendar change	This setting is available when [Start and end] is selected for [Trigger]. Set the operation to perform when the time after startup or a calendar change is within the start/end time range (ON time).  Selected The start operation is performed. No operation is performed if the end time is reached but the next start time is not (OFF time). When [Device] is selected for [Time Settings], the start operation is performed only when bit 0 (acknowledgment) of control device memory n is ON.  Unselected The start and end operations are not performed. Operations are performed from the next start time.
Save an operation log	This setting is available when the [Scheduler] checkbox is selected at [System Setting] → [Other] → [Operation log Setting] → [Log objects]. Save a log of schedule execution.

### 3.4 Example of Date and Time Specification by Device Memory (Designation: Device)

If the schedule operation time is set to a device memory address, the schedule will start at the time specified in the device memory.

This section explains the command method with an example where the time setting device memory is D1000.

There are two general methods for setting the operation time: date specification and day of the week specification.

#### Date specification

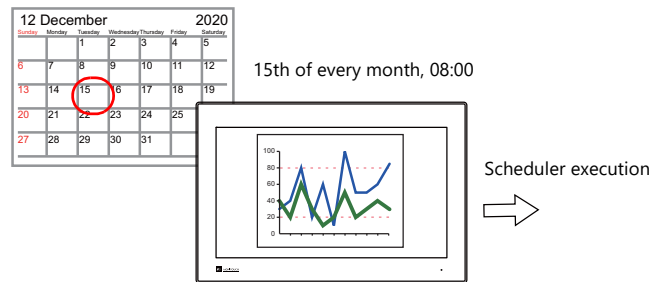
- "Execution Every Month with Date Specifications" page 3-16 (Example: Execution on the 15th of every month at 08:00)
- "Execution Every Day with Time Specifications" page 3-17 (Example: Execution every night at 00:00)

#### Day of the week specification

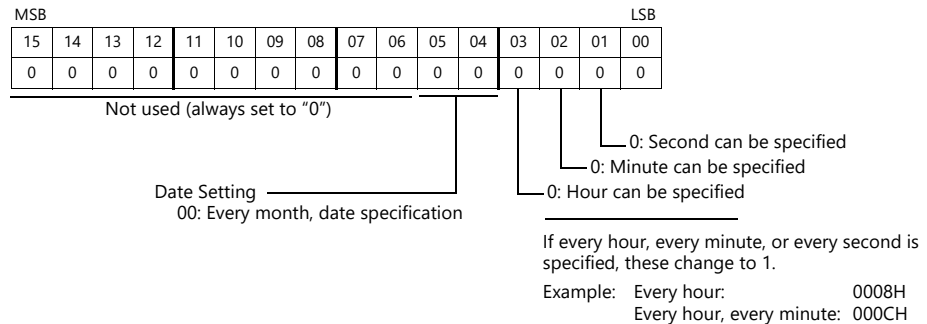
- "Execution Every Month with Day of the Week Specifications" page 3-18 (Example: Execution on the first and third Wednesday of every month at 17:00)
- "Execution Every Week with Day of the Week Specifications" page 3-19 (Example: Execution at every hour, Monday to Friday of every week)

#### Execution Every Month with Date Specifications

This section explains the setting procedure for execution on the 15th of every month at 08:00.



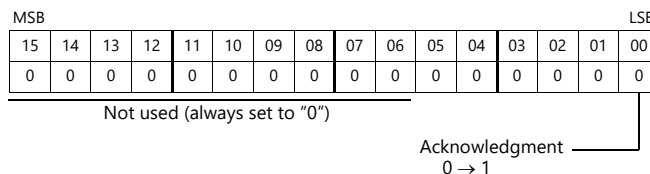
1. Set address D1000 to 0H.



2. Specify "15" for the date in address D1002.
3. Specify the start time in addresses D1003 to D1005.

Item	Device Memory	Setting Value	Remarks
Start Action: Hour	D1003	8	When D1000 bit 3 = 1 (every hour), disabled
Start Action: Minute	D1004	0	When D1000 bit 2 = 1 (every minute), disabled
Start Action: Second	D1005	0	When D1000 bit 1 = 1 (every second), disabled

4. Change bit 0 of address D1000 from 0 to 1.

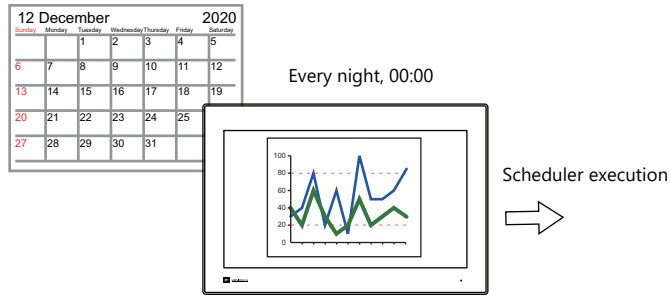


This completes the necessary settings.

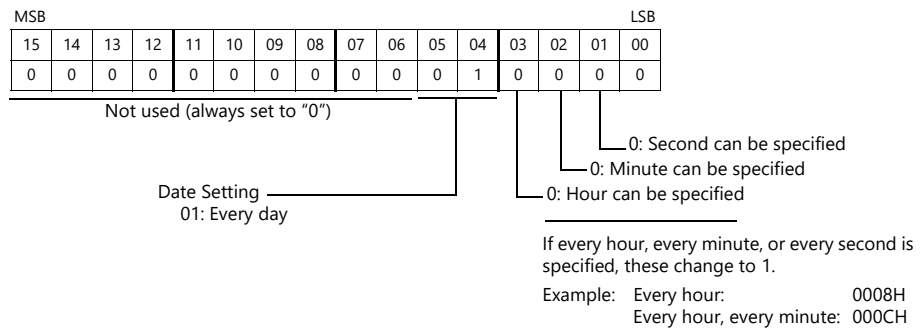
The scheduled operation is performed at the specified time. Perform steps 1 to 4 to change the settings.

## Execution Every Day with Time Specifications

This section explains the setting procedure for execution on every night at 00:00.



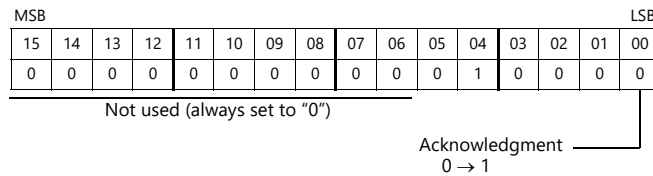
1. Set address D1000 to 10H.



2. Specify the start time in addresses D1003 to D1005.  
(When [Start and end] is selected on the [Trigger] tab window, specify the end time in addresses D1006 to D1008.)

Item	Device Memory	Setting Value	Remarks
Start Action: Hour	D1003	0	When D1000 bit 3 = 1 (every hour), disabled
Start Action: Minute	D1004	0	When D1000 bit 2 = 1 (every minute), disabled
Start Action: Second	D1005	0	When D1000 bit 1 = 1 (every second), disabled

3. Change bit 0 of address D1000 from 0 to 1.

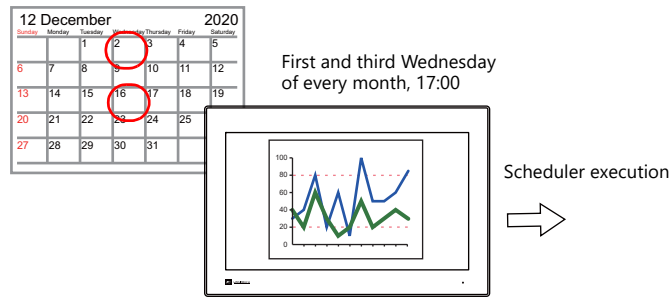


This completes the necessary settings.

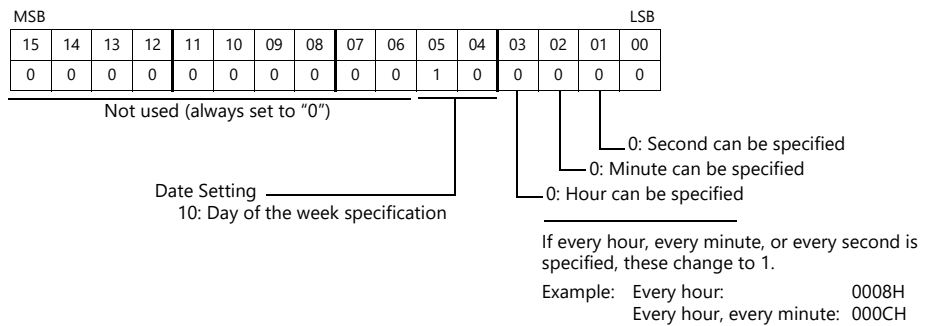
The scheduled operation is performed at the specified time. Perform steps 1 to 3 to change the settings.

## Execution Every Month with Day of the Week Specifications

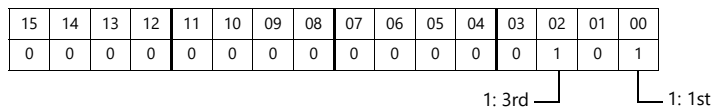
This section explains the setting procedure for execution on the first and third Wednesday of every month at 17:00.



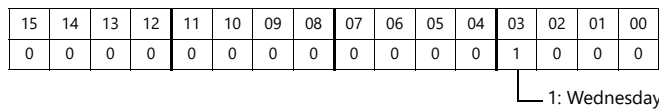
1. Set address D1000 to 20H.



2. Specify 5H for address D1001 so that execution occurs on the first and third weeks.



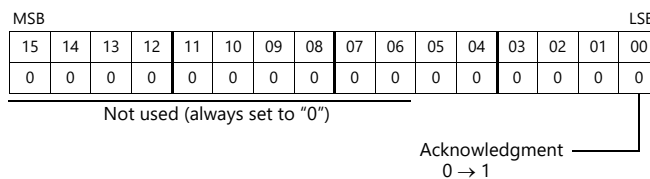
3. Specify 8H for Wednesday in address D1002.



4. Specify the start time in addresses D1003 to D1005.  
(When [Start and end] is selected on the [Trigger] tab window, specify the end time in addresses D1006 to D1008.)

Item	Device Memory	Setting Value	Remarks
Start Action: Hour	D1003	17	When D1000 bit 3 = 1 (every hour), disabled
Start Action: Minute	D1004	0	When D1000 bit 2 = 1 (every minute), disabled
Start Action: Second	D1005	0	When D1000 bit 1 = 1 (every second), disabled

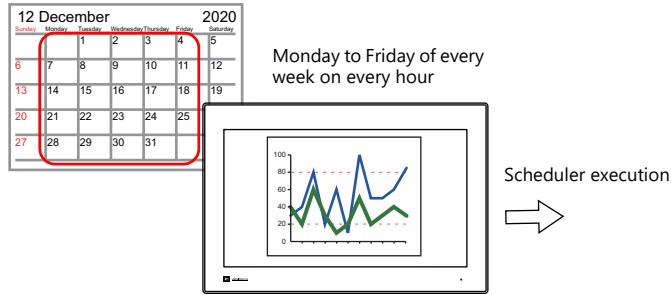
5. Change bit 0 of address D1000 from 0 to 1.



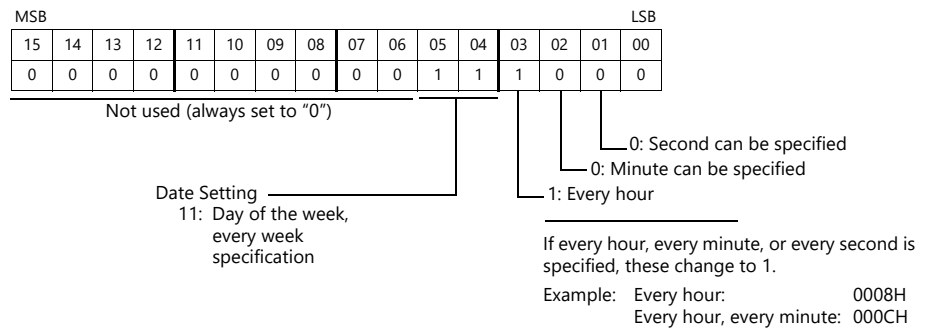
This completes the necessary settings.  
The scheduled operation is performed at the specified time. Perform steps 1 to 5 to change the settings.

## Execution Every Week with Day of the Week Specifications

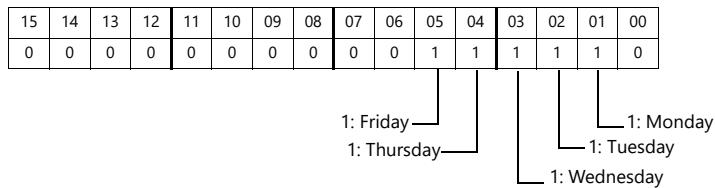
This section explains the setting procedure for execution on Monday to Friday of every week on every hour.



1. Set address D1000 to 38H.



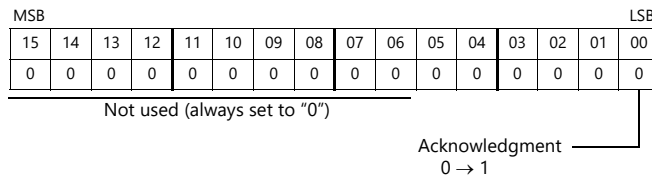
2. Specify 3EH for Monday to Friday in address D1002.



3. Specify the start time in addresses D1003 to D1005.

Item	Device Memory	Setting Value	Remarks
Start Action: Hour	D1003	-	When D1000 bit 3 = 1 (every hour), disabled
Start Action: Minute	D1004	0	When D1000 bit 2 = 1 (every minute), disabled
Start Action: Second	D1005	0	When D1000 bit 1 = 1 (every second), disabled

4. Change bit 0 of address D1000 from 0 to 1.



This completes the necessary settings.

The scheduled operation is performed at the specified time. Perform steps 1 to 4 to change the settings.



### 3.5 System Device Memory (\$s)

The following describes the system device memory associated with the scheduler function.

Device Memory	Description
\$s1650	After specifying device memory addresses n to n + 8 for operation time, the result is output when bit 0 (acknowledgment bit) of control device memory n changes from 0 to 1. When an invalid value is specified, the bit is 1.  1: Error 0: Normal  Example: Invalid values include 40th day, 100 seconds etc.  * When a valid time is set, the bit is 0.
\$s1651	
\$s1652	
\$s1653	

1: Error  
0: Normal

\$s1650	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	← Bit number
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Schedule number
\$s1651	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	← Bit number
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	← Schedule number
\$s1652	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	← Bit number
	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	← Schedule number
\$s1653	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	← Bit number
	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	← Schedule number

## 3.6 Notes

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### Date and Time Settings

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- The start time and end time cannot be set to the same value.
- When specifying a date, operation is not performed if the date does not exist in the particular month.
  - Example:  
When the 31st is specified, operation is not performed for February, April, June, September, or November. In this case, operation at the end of the month can be performed by selecting "Last day".
- Specify the end time within 24 hours of the start time. If the end time is before the start time, the end time will be set on the next day.
  - Example:  
When set as for "every day, start time: 23:00, end time: 01:00", operation starts from 23:00 on the first day and ends at 01:00 on the second day, and starts from 23:00 on the second day and ends at 01:00 on the third day, etc.

### Using a Time Setting Device Memory (Designation: Device)

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- Operation continues unaffected if the time setting device is changed (acknowledgment bit: 0 → 1) during scheduled operation. Subsequent operations are performed at the changed time after the current operation is complete.
- If the time setting device memory is changed after a start operation completes, the end operation is not performed. The subsequent start operation is performed at the changed time.



For details on the acknowledgment bit, refer to "Designation: Device" page 3-12.

### Other

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If multiple schedule times (start or end times) overlap, operations start in order from the lowest schedule number. If the scheduled time of a subsequent operation is reached during execution of an operation within the same schedule number, the subsequent operation is not executed until the current operation is complete. Therefore, the subsequent operation is delayed.



## **4 Operation Log**

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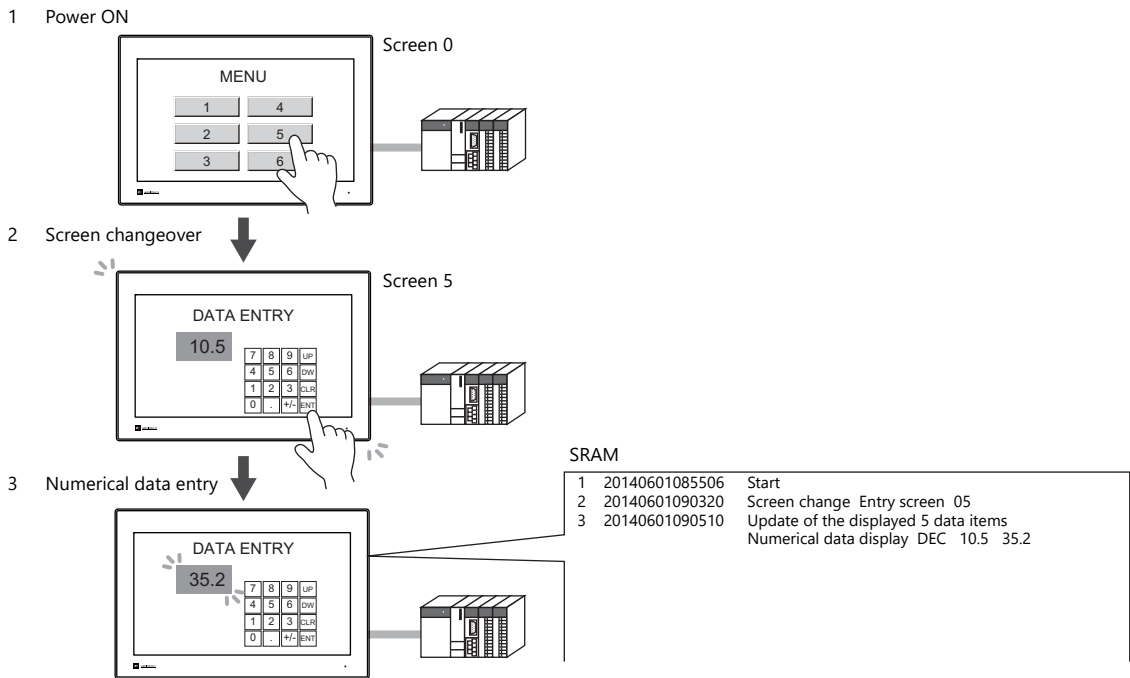
## 4.1 Overview

### 4.1.1 Operation Log

#### Operation Overview

The operation log function stores screen operation records (operation logs) in SRAM. When the SRAM area becomes full, logs can be output to storage.

In the event of an error, these stored logs allow previous operations to be examined in order to determine the cause of the error. Also, when used in conjunction with the security function, operator names can also be recorded.



#### Operation Log Viewer

Operation history records (operation logs) stored in the SRAM area can be displayed on MONITOUCH using the operation log viewer.

The details of operations that were performed when an error occurred can be easily examined in order to determine the cause of the error.

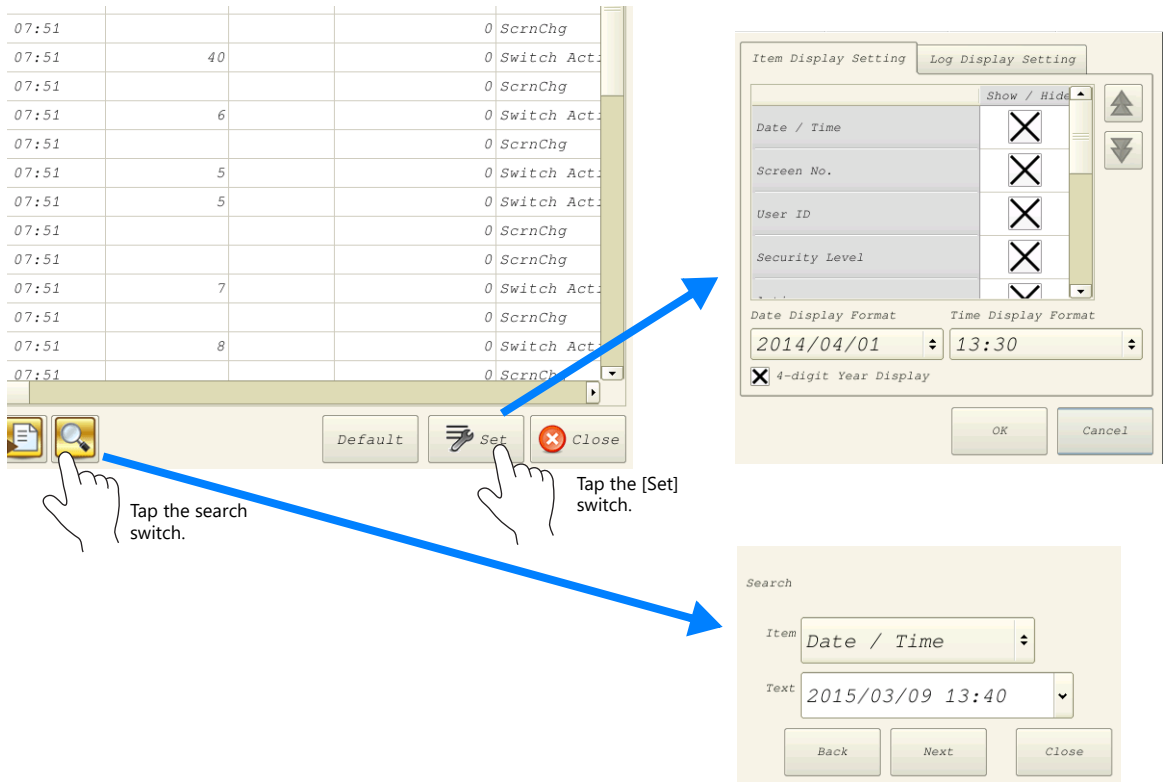
	Date / Time	Screen No.	User ID	Security Level	Action
1	2014/04/12 07:51	35		0	Switch Act
2	2014/04/12 07:51			0	ScrnChg
3	2014/04/12 07:51	10	Double-tap	0	Switch Act
4	2014/04/12 07:51			0	ScrnChg
5	2014/04/12 07:51	40		0	Switch Act
6	2014/04/12 07:51			0	ScrnChg
7	2014/04/12 07:51	6		0	Switch Act
8	2014/04/12 07:51			0	ScrnChg
9	2014/04/12 07:51	5		0	Switch Act
10	2014/04/12 07:51	5		0	Switch Act
11	2014/04/12 07:51			0	ScrnChg
12	2014/04/12 07:51			0	ScrnChg
13	2014/04/12 07:51	7		0	Switch Act
14	2014/04/12 07:51			0	ScrnChg
15	2014/04/12 07:51	8		0	Switch Act
16	2014/04/12 07:51			0	ScrnChg

2014/04/12 07:51  
 Screen No. : 35  
 User ID :  
 Security Level : 0  
 Action : Switch Action  
 Function : Screen  
 Comment :  
 SW\_00000  
 Display Format :  
 Value (Before) :  
 Value (After) :

Close

Log details are displayed.

Use the [Set] switch in the log viewer screen to show/hide items, set the number of characters, and change the date/time format. Use the search switch to select and search for items.



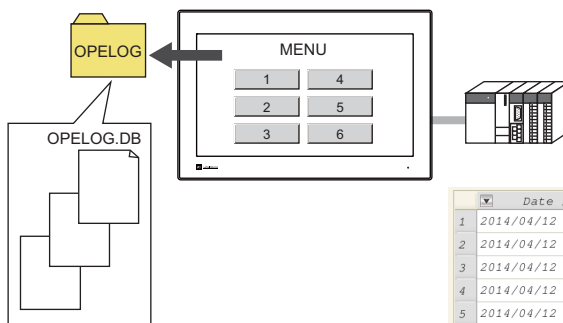
For details on the log viewer, refer to "4.5 Operation Log Viewer" page 4-11.

## Log Storage

When the SRAM area becomes full, logs are output to storage. In addition to the logs stored in the SRAM area, the log files output to storage can also be displayed in the log viewer.

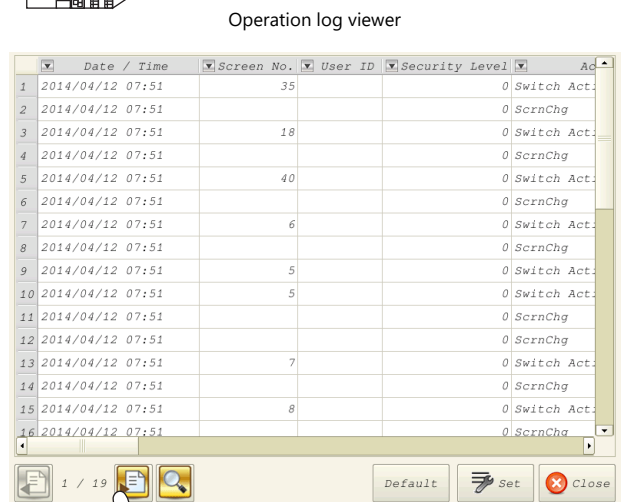
Log files that are output to storage are in database format. The dedicated "LogToCsv" tool can be used to convert such log files to CSV files so their contents can be viewed.

Database files in SRAM are output to the "OPELOG" folder in the storage.



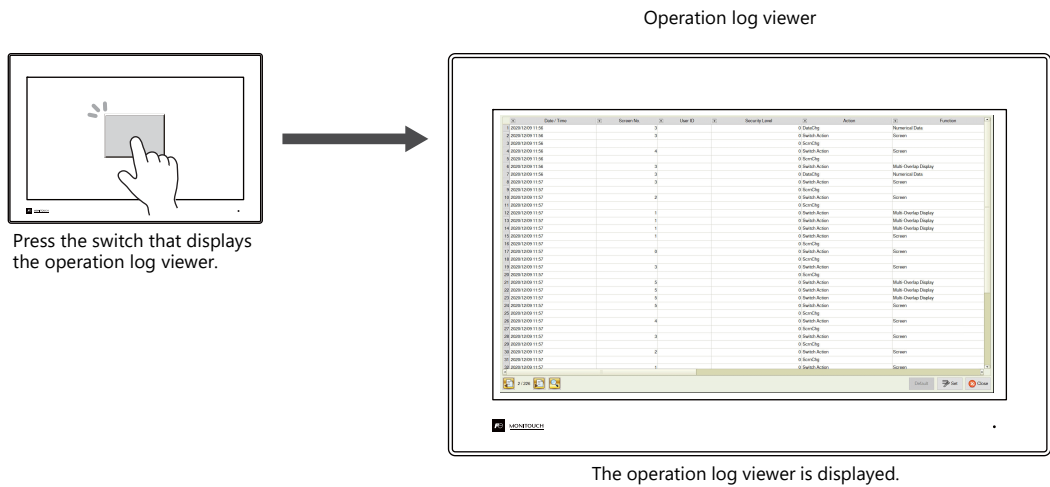
Database files are backed up to the "OPELOG" folder according to the time they were output and saved.

A dedicated "LogToCsv" tool can be used to convert database files to CSV files. For details, refer to "4.6.3 Importing Log Data to Computer (Conversion to CSV Files)" page 4-17.



## 4.2 Using the Operation Log Viewer

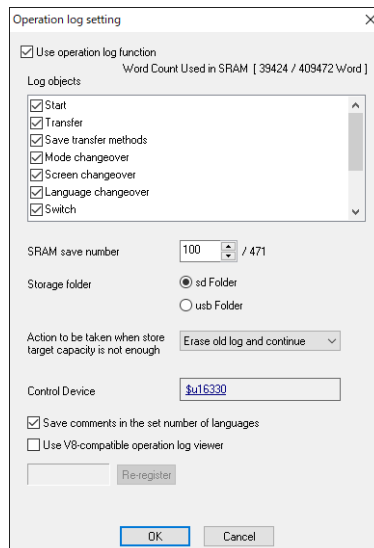
### 4.2.1 Conceptual Operation



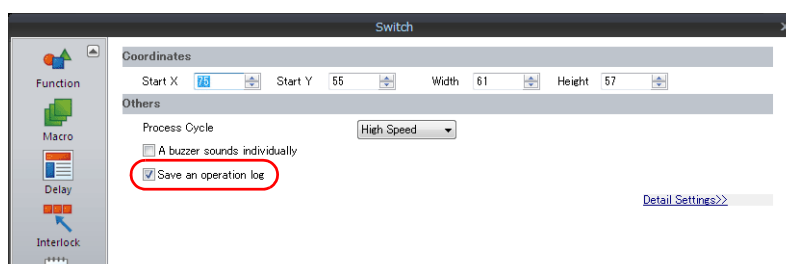
### 4.2.2 Setting Procedure

#### Configuring the Operation Log

1. Click [System Setting] → [Other] → [Operation log Setting]. The [Operation log setting] window is displayed.
2. Select the [Use operation log function] checkbox and select the checkboxes of the relevant items under [Log objects].



3. Set the number of logs to save in SRAM with [SRAM save number].
  4. Select the output destination folder at [Storage folder].
  5. Set any other relevant settings and then click [OK].
- \* When [Switch] or [Data display update] are selected under [Log objects], the [Save an operation log] checkbox must be selected in the settings window of switches, numerical data displays, and character displays targeted for logging.



## Operation Log Viewer Settings

1. Place a switch for displaying the operation log viewer.
2. Select [Operation Log Viewer Display] in the [Function] settings.

This completes the necessary settings. The screen program can be transferred to MONITOUCH.

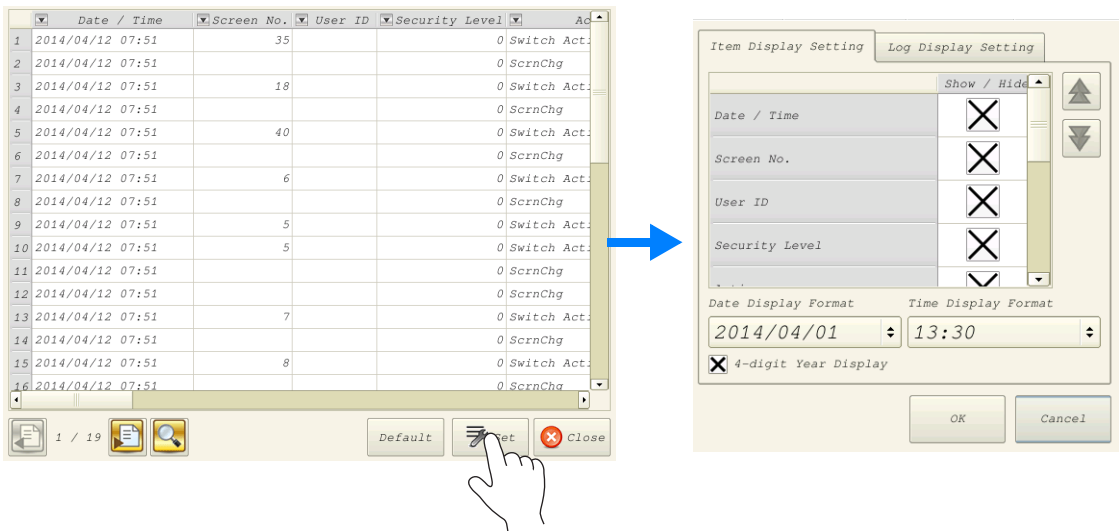
### 4.2.3 Operating Procedure

#### Displaying the Operation Log Viewer

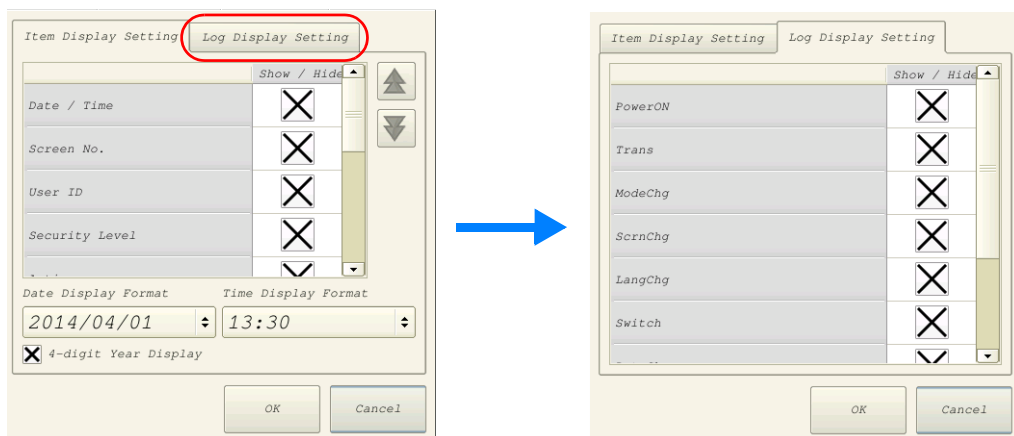
1. Display the screen that contains the switch configured above on MONITOUCH.
2. Press the switch to display the operation log viewer.
  - \* The operation log viewer can be displayed in both RUN mode and Local mode.

#### Settings Menu

1. Press the [Set] switch. The window shown below is displayed.



2. Change the order of titles, hide unnecessary display items, and change the date and time format as desired.
3. To hide log items, switch to the [Log Display Settings] tab window.



For details on other log viewer settings, refer to "4.5 Operation Log Viewer" page 4-11.



## 4.3 Applicable Items

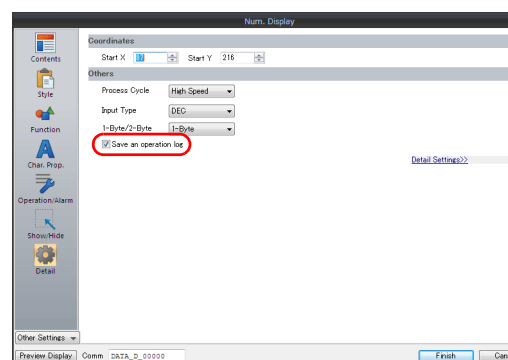
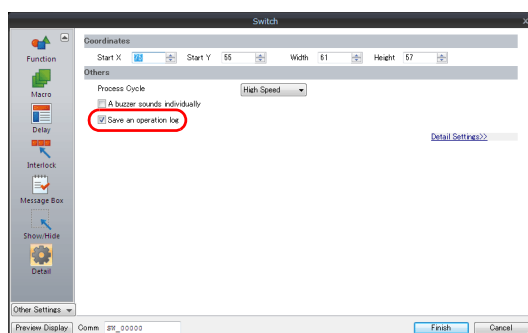
### 4.3.1 Applicable Items and Saving

#### Applicable Items and Timing of Saving

The table below shows the items that can be saved to operation logs and when saving to SRAM takes place.

Items	Timing of Saving																
Start	When power is turned ON																
Transfer	When transferring a screen program																
Transfer method	When transferring a screen program * Valid when [Transfer] is selected as a logging item.																
Mode changeover	When changing between RUN mode and local mode																
Screen changeover	When changing between screens																
Language changeover	When changing between languages																
Switch	When a switch with any of the following functions is pressed. <sup>*1</sup> <table border="1"> <thead> <tr> <th colspan="2">With output device memory</th> <th>Momentary, Set, Reset, Alternate, Momentary W, Word Operation</th> </tr> </thead> <tbody> <tr> <td rowspan="6">Function</td> <td>Standard</td> <td>Screen, overlap display, multi-overlap display, reset, storage disconnection, language changeover</td> </tr> <tr> <td>Entry</td> <td>Delete (alarms only)</td> </tr> <tr> <td>Card</td> <td>Card formatting, transfer from card to PLC, transfer from PLC to card</td> </tr> <tr> <td>Digital switch</td> <td>Digital switch +, digital switch –</td> </tr> <tr> <td>JPEG</td> <td>File deletion</td> </tr> <tr> <td>Security</td> <td>Login/Logout</td> </tr> </tbody> </table>	With output device memory		Momentary, Set, Reset, Alternate, Momentary W, Word Operation	Function	Standard	Screen, overlap display, multi-overlap display, reset, storage disconnection, language changeover	Entry	Delete (alarms only)	Card	Card formatting, transfer from card to PLC, transfer from PLC to card	Digital switch	Digital switch +, digital switch –	JPEG	File deletion	Security	Login/Logout
With output device memory		Momentary, Set, Reset, Alternate, Momentary W, Word Operation															
Function	Standard	Screen, overlap display, multi-overlap display, reset, storage disconnection, language changeover															
	Entry	Delete (alarms only)															
	Card	Card formatting, transfer from card to PLC, transfer from PLC to card															
	Digital switch	Digital switch +, digital switch –															
	JPEG	File deletion															
	Security	Login/Logout															
Data display update <sup>*1 *2</sup>	When updating numerical data/character displays in entry mode (Write/↓/↑ keys)																
Log destruction	When newly storing log data after clearing the SRAM area due to the reasons below: <ul style="list-style-type: none"> <li>SRAM data corruption</li> <li>Failure of output to storage</li> </ul>																
Scheduler	When the scheduler starts or ends																

<sup>\*1</sup> Logs can be saved for switches, numerical data displays, and character displays when the [Save an operation log] checkbox is selected in the [Detail] settings of the item's settings window. (Default: selected)



<sup>\*2</sup> Table data display is not supported.

## Saved Items (Titles)

The following item types are saved.

Saved Item (Title)	Description	Max. No. of Characters (Bytes)
Log No.	-	-
Date/Time	Date/time of log acquisition	-
Screen No.	Screen number (0 to 9999)	-
User ID	User ID registered in security settings	8
Security Level	Security level (0 to 15)	-
Transfer method	Transfer source device (PC or USB flash drive)	3
Action	(Differs depending on the log item. For details on the saved content for each item, refer to the sections below.)	-
Function	(Differs depending on the log item. For details on the saved content for each item, refer to the sections below.)	-
Comment	Comments on screens and parts	32
Display Format	Display format of numerical data displays	-
Value (Before)	Value before change	-
Value (After)	Value after change	-

## Start

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	-	-	-	○	-	-	-	-	-

Details of items are as follows:

Action	Start
--------	-------

## Transfer

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	-	-	○	○	○	-	-	-	-

Details of items are as follows:

Transfer method	Transfer source device (PC or USB flash drive)
Action	Transfer
Function	Screen program

## Mode Changeover

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	-	-	-	○	○	-	-	-	-

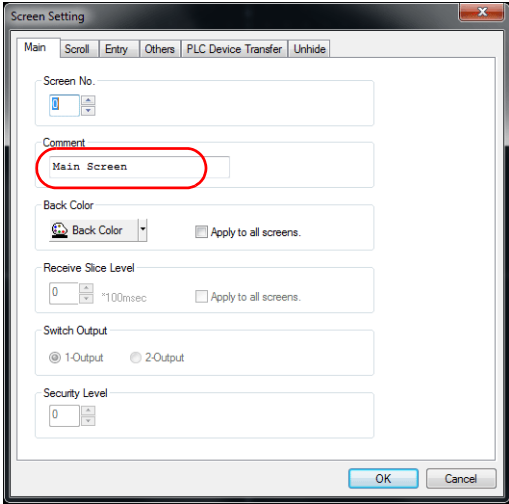
Details of items are as follows:

Action	Mode changeover
Function	Change to RUN mode
	Change to Local mode

## Screen Changeover

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	○	○	-	○	-	○	-	○	○

Details of items are as follows:

Action	Screen changeover
Comment	<p>The comment entered in the [Screen Setting] → [Screen Setting] window is stored. When no comment is entered, the [Comment] field is blank.</p> 
Value (Before)	Stores the screen number before changeover.
Value (After)	Stores the screen number after changeover.

## Language Changeover

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	○	○	-	○	-	-	-	○	○

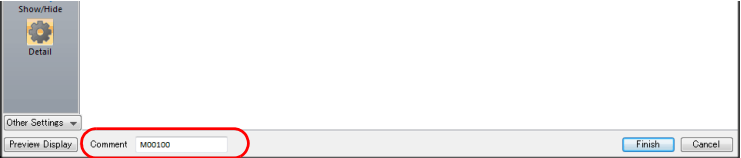
Details of items are as follows:

Action	Language changeover
Value (Before)	Stores the language number before changeover.
Value (After)	Stores the language number after changeover.

## Switch

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	○	○	○	-	○	○	○	-	-	-

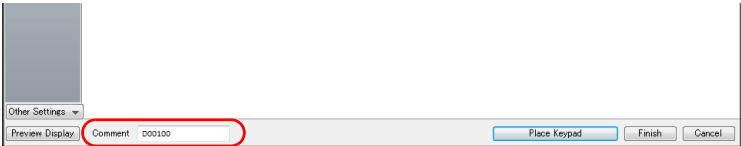
Details of items are as follows:

Action	Switch operations (Mom)/(Set)/(Rst)/(Alt)/(Word)/(Sample)/(Alm)
Function	Screen Overlap control Word operation Reset Storage disconnection Language changeover DELETE Card format, transfer from card to PLC, transfer from PLC to card Digital switch +, digital switch - File deletion Login/Logout
Comment	Outputs the comment in the switch settings window. Data displays/switch comments can be batch changed into device memory notation by clicking [Tool] → [Other] → [Convert item comment to device notation].  <p>* If the [Comment] field is blank, the text entered on the [Char. Prop.] → [OFF] tab is output.</p>

## Data Display Update

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	○	○	○	-	○	○	○	○	○	○

Details of items are as follows:

Action	Data Display Update
Function	Numerical display Character display
Comment	Outputs the comment in the numerical data display and character display settings window. Data displays/switch comments can be batch changed into device memory notation by clicking [Tool] → [Other] → [Convert item comment to device notation]. 

## Log Destruction

This log is saved when the SRAM area is cleared and data is newly output due to SRAM data corruption or failure in outputting to storage. The log contains the following data items.

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	-	-	-	○	-	-	-	-	-

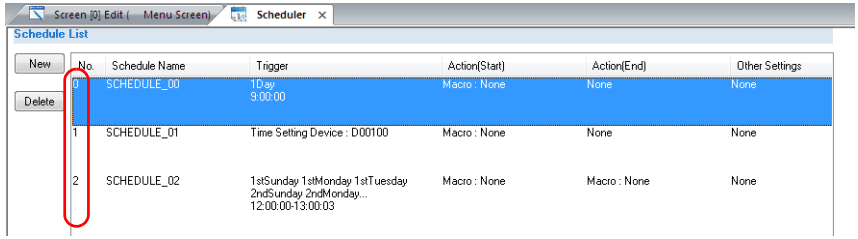
Details of items are as follows:

Action	Log destruction
--------	-----------------

## Scheduler

Date/Time	Screen No.	User ID	Security Level	Transfer Method	Action	Function	Comment	Display Format	Value (Before)	Value (After)
○	-	-	-	-	○	○	○	-	-	-

Details of items are as follows:

Action	Scheduler
Function	Start operation End operation
Comment	The schedule number (0 to 63) is stored. 

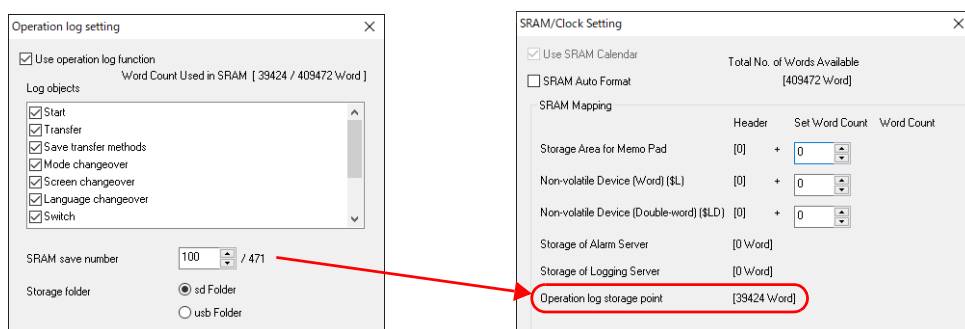
## 4.4 Detailed Settings

### Operation Log Settings

Select the [Use operation log function] to enable the following items.

Item	Description								
Log objects	Select the checkboxes of the items to save to operation logs. For details, refer to "4.3 Applicable Items" page 4-5.								
SRAM save number *1 *2	Set the number of logs to be stored in the SRAM area.								
Storage folder	Select the storage to which operation logs will be output. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Storage</th> <th>File Directory</th> </tr> </thead> <tbody> <tr> <td>sd Folder</td> <td>Internal storage C:\MONITOUCH\X1\0\work\strage\sd\((access folder))\OPELOG                              └── 0: Main app in multi-display                                  1: Sub app in multi-display</td> </tr> <tr> <td>usb Folder</td> <td>Internal storage C:\MONITOUCH\X1\0\work\strage\usb\((access folder))\OPELOG                              └── 0: Main app in multi-display                                  1: Sub app in multi-display</td> </tr> <tr> <td>USB storage device *</td> <td>External USB storage (Drive name):\X1_Storage\((access folder))\OPELOG</td> </tr> </tbody> </table> <p>* Selection is possible when the [System Setting] → [Other] → [Storage Setting] → [External USB storage] checkbox is selected. For details on the [Storage Setting] window, refer to "9 Storage".</p>	Storage	File Directory	sd Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\sd\((access folder))\OPELOG └── 0: Main app in multi-display 1: Sub app in multi-display	usb Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\usb\((access folder))\OPELOG └── 0: Main app in multi-display 1: Sub app in multi-display	USB storage device *	External USB storage (Drive name):\X1_Storage\((access folder))\OPELOG
Storage	File Directory								
sd Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\sd\((access folder))\OPELOG └── 0: Main app in multi-display 1: Sub app in multi-display								
usb Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\usb\((access folder))\OPELOG └── 0: Main app in multi-display 1: Sub app in multi-display								
USB storage device *	External USB storage (Drive name):\X1_Storage\((access folder))\OPELOG								
Action to be taken when store target capacity is not enough	Select the action to take when storage is full.								
Control Device *3	Set the device memory for outputting log data to storage.								
Save comments in the set number of languages *1	This setting is available when using the multi-language function and saving items displayed under [Log objects] that support comments. When selected, comments are saved to logs even in multi-language mode (when displaying a language other than the primary language). When using "LogToCsv.exe", comments can be output to CSV file in the selected language. For details, refer to "4.6.3 Importing Log Data to Computer (Conversion to CSV Files)" page 4-17.								
Use V8-compatible operation log viewer	This checkbox is selected automatically when converting from a V8 series screen program.								

\*1 The required amount of SRAM is automatically secured based on the [SRAM save number] setting.



\*2 The maximum value of the [SRAM save number] setting differs depending on whether or not the [Save transfer methods] checkbox is selected and the number of languages set in the screen program. Refer to the chart shown below.

Number of Languages		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Maximum Number of Logs	[Save transfer methods] deselected	512	512	512	437	379	332	300	271	247	228	211	197	185	174	164	155
	[Save transfer methods] selected	471	471	471	402	349	305	276	249	227	210	194	181	170	160	151	143

\*3 Control device memory

Control device memory	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Control Device	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Reserved for system
Storage output bit

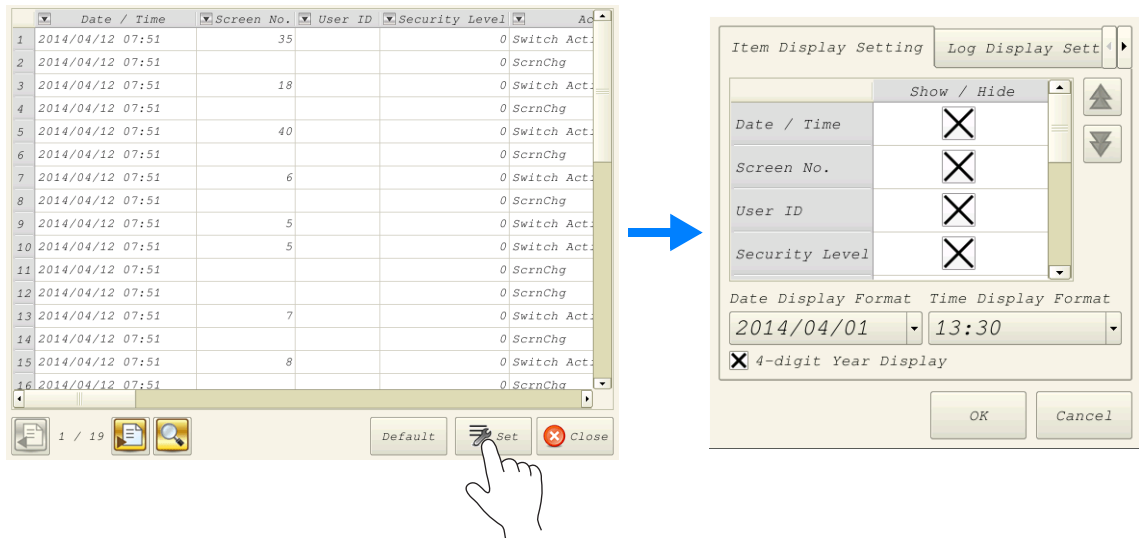
- Bit 0: Storage output bit  
Log data in SRAM is output to storage when the bit state changes from 0 to 1.



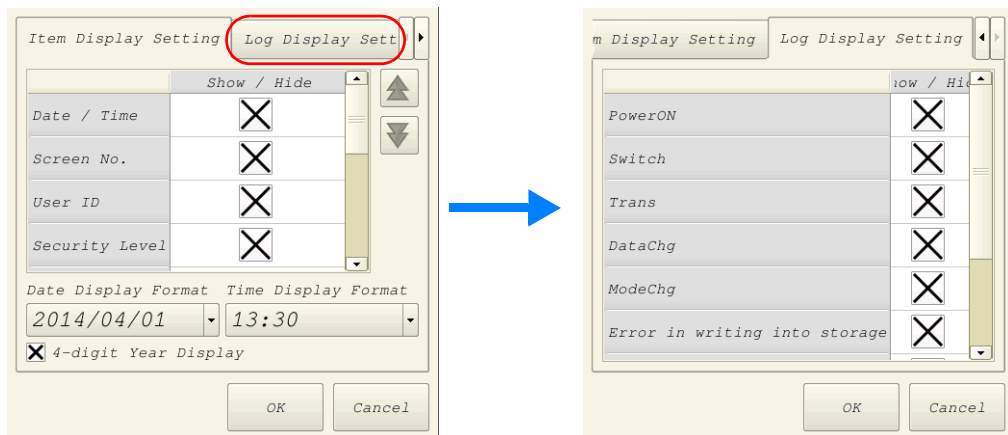
## 4.5.2 Function

### Showing/Hiding Items

Tap the [Set] switch in the operation log viewer. The settings window shown below is displayed.



Select the [Log Display Setting] tab to check a list of items that can be displayed in the operation log viewer. Deselect the checkbox of items to hide and click [OK] to only display items with a selected checkbox.

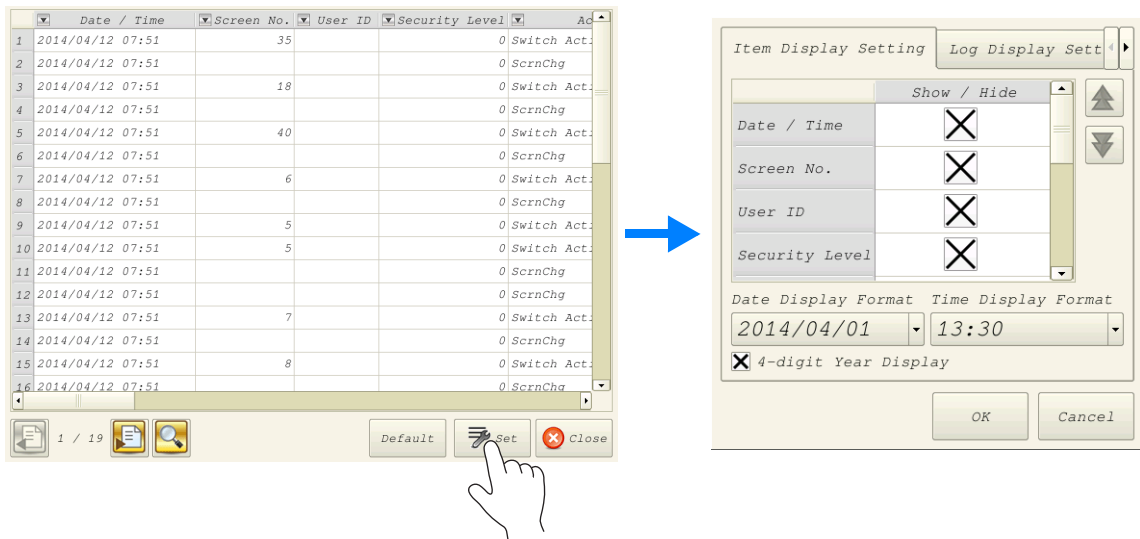


The settings made in this window are stored in SRAM and therefore are retained even if the power is turned off and on.

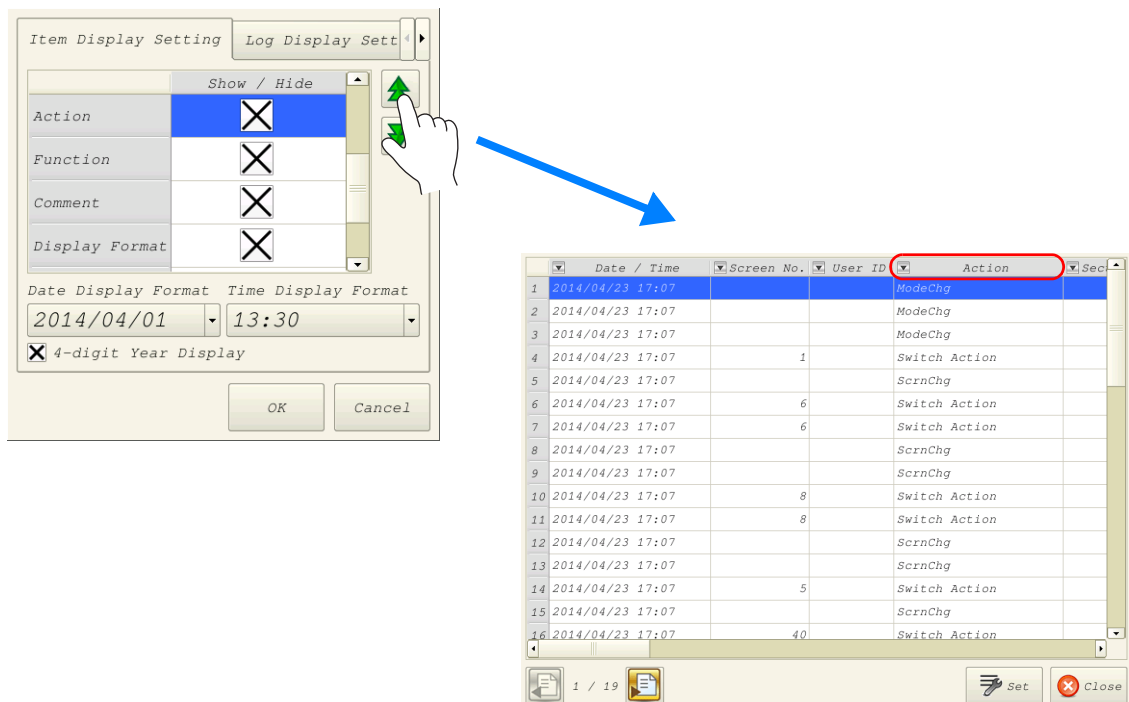


## Changing Order of Display

Tap the [Set] switch in the operation log viewer. The settings window shown below is displayed.



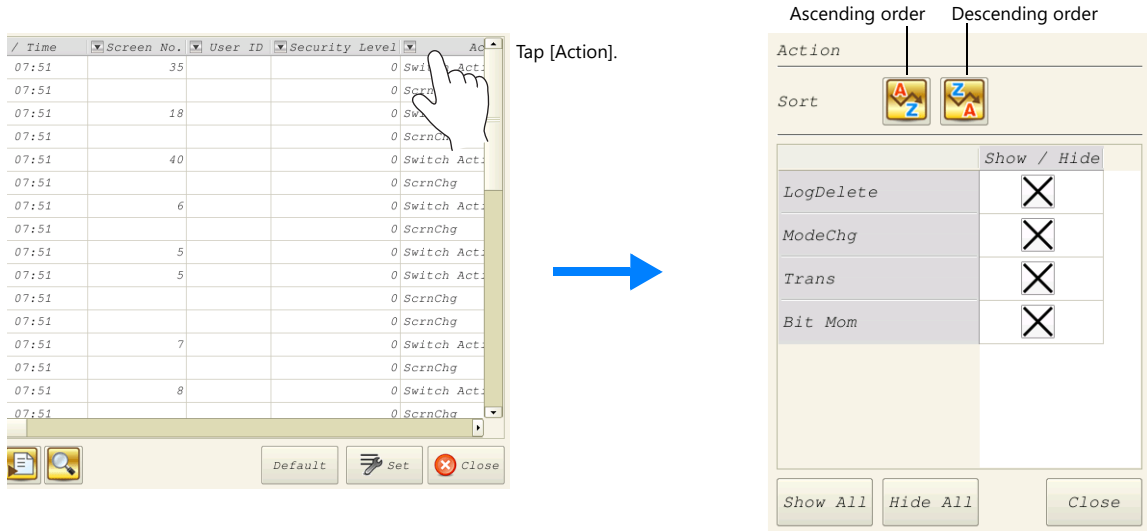
Select the title to move on the [Item Display Setting] tab window and press the [↑] or [↓] switch. The display order changes accordingly. Items are displayed in this order on the operation log viewer of MONITOUCH



The settings made in this window are stored in SRAM and therefore are retained even if the power is turned off and on.

## Filter

Tap an item in the title bar of the operation log viewer. The following filter window is displayed.



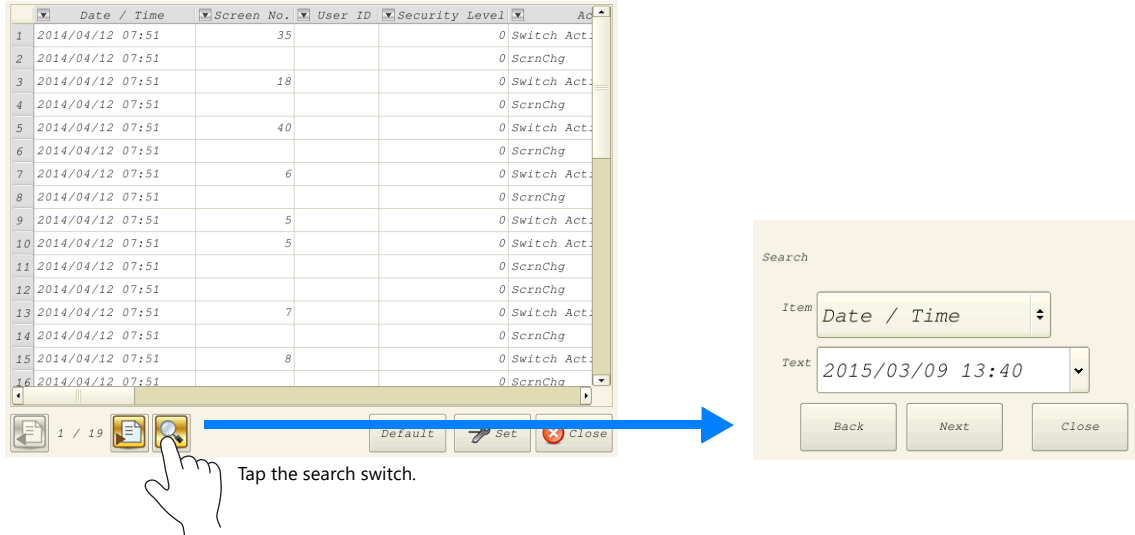
Sort the display using the ascending and descending order switches.

If there are items you wish to hide, deselect the relevant checkbox and click [Close] to only display items with a selected checkbox.

To restore the default display settings, tap the [Default] switch or the file change switch, or close and open the operation log viewer.

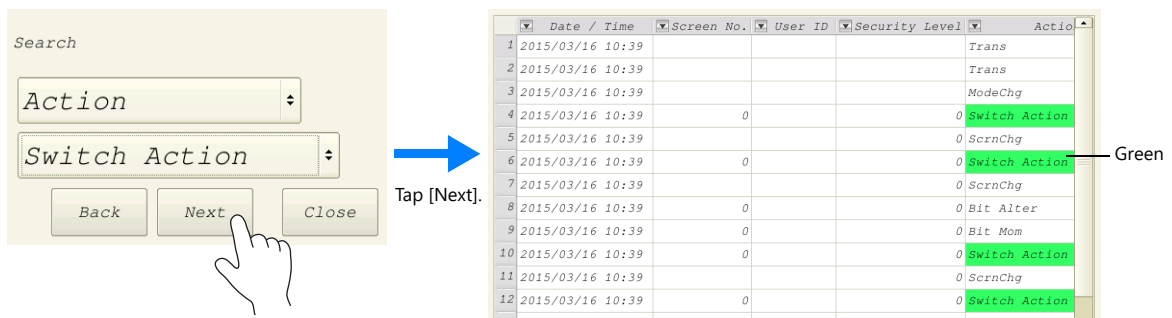
## Search

Tap the search switch in the operation log viewer. The following search window is displayed.



Select the item and text to search for and tap [Next]. Cells that match the search are highlighted in green on the viewer.

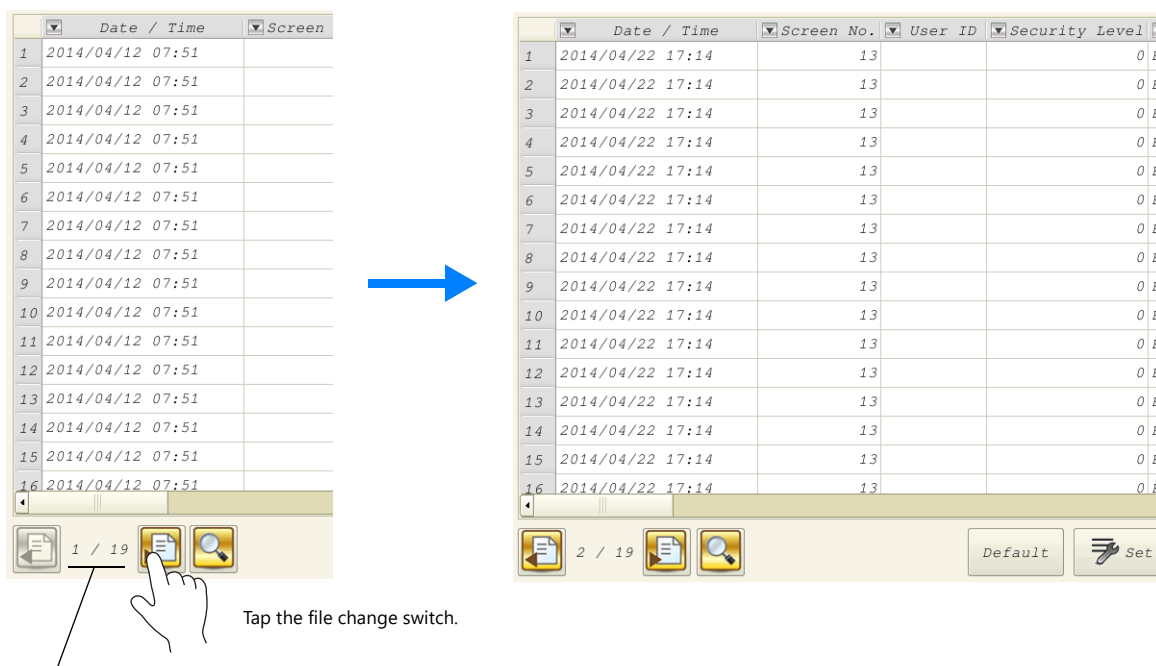
To clear the highlighted display, tap the [Default] switch or the file change switch, or close and open the operation log viewer.



\* The currently displayed items of the current file are searched. Hidden items are excluded.

## Changing Between Log Files

Tap the file change switch in the operation log viewer. This switches the display between the log database file in SRAM and the log database file in storage.



4

### 4.5.3 Note

#### Display Priority

The operation log viewer is displayed on the screen with the same priority as the system menu. This means it is displayed on top of other items.

#### Language of the Operation Log Viewer

The display language of the operation log viewer depends on the display language of Local mode.

In addition to Japanese, the operation log viewer can be displayed in English, Chinese (Traditional), Chinese (Simplified), and Korean.

	日期 / 时间	屏幕号	用户名	安全等级	动作	功能
1	2014/04/23 17:07				模式切换	到RUN
2	2014/04/23 17:07				模式切换	到本地
3	2014/04/23 17:07				模式切换	到RUN
4	2014/04/23 17:07	1		0	开关动作	屏幕
5	2014/04/23 17:07			0	屏幕切换	
6	2014/04/23 17:07	6		0	开关动作	屏幕
7	2014/04/23 17:07	6		0	开关动作	屏幕
8	2014/04/23 17:07			0	屏幕切换	
9	2014/04/23 17:07			0	屏幕切换	
10	2014/04/23 17:07	8		0	开关动作	屏幕
11	2014/04/23 17:07	8		0	开关动作	屏幕
12	2014/04/23 17:07			0	屏幕切换	
13	2014/04/23 17:07			0	屏幕切换	
14	2014/04/23 17:07	5		0	开关动作	屏幕
15	2014/04/23 17:07			0	屏幕切换	
16	2014/04/23 17:07	40		0	开关动作	屏幕

## 4.6 Log Data

### 4.6.1 Output Timing

Log data is first output to SRAM. Log data within SRAM is then output to storage under certain conditions. This section explains the timing of output.

#### Output to SRAM

For information on the output timing of each item, refer to [“Applicable Items and Timing of Saving”](#) page 4-5.

#### Output to Storage

Log data in SRAM is output to storage at the following timings.

- When the area defined by [SRAM save number] in the [Operation log setting] window is full
- When the “storage output bit” defined for [Control Device] in the [Operation log setting] window turns ON
- When a switch with the [Function] set as [Storage Disconnection] is pressed
- When the setting of [SRAM save number] in the [Operation log setting] window is changed
- When the setting of [Interface Language] in the [Font Setting] window for the screen program is changed

### 4.6.2 Details of Output (File Type)

#### Output to SRAM

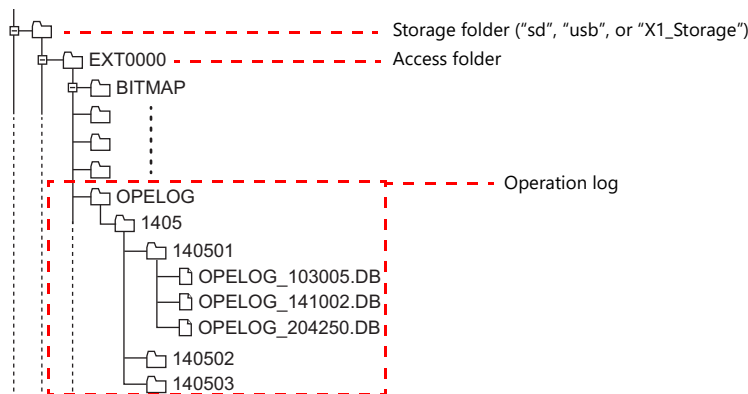
The “OPELOG.DB” database file is output to SRAM.

#### Output to Storage

The directory and file type when outputting to storage are as follows.

Specify the storage to use as described in [“Operation Log Settings”](#) page 4-10.

	File Directory
sd Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)\OPELOG\YYMM\YYMMDD └── 0: Main app in multi-display      Year and month      Year, month, and day 1: Sub app in multi-display
usb Folder	Internal storage C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)\OPELOG\YYMM\YYMMDD └── 0: Main app in multi-display      Year and month      Year, month, and day 1: Sub app in multi-display
USB storage	External USB storage (Drive name):\X1_Storage\(\access folder)\OPELOG\YYMM\YYMMDD Year and month      Year, month, and day



## 4.6.3 Importing Log Data to Computer (Conversion to CSV Files)

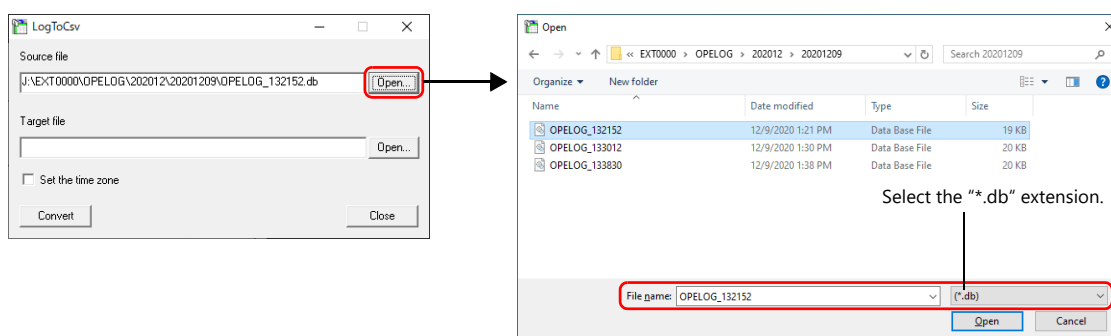
A log file output to a storage folder can be converted to a CSV file for viewing using the dedicated "LogToCsv" tool. "LogToCsv.exe" is installed when V-SFT version 6 (Ver. 6.1.0.0 or later) is installed. If the version of your V-SFT version 6 is an earlier one, download "LogToCsv.exe" from Hakko Electronics' website and install.

### File Conversion Procedure

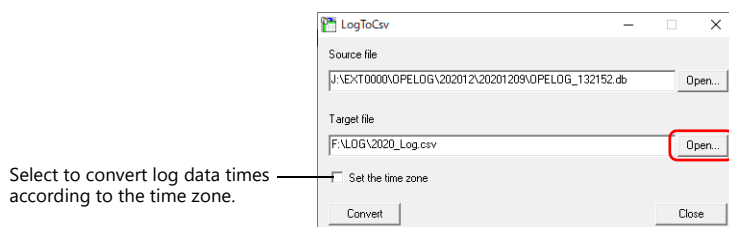
1. Click the start button and start "LogToCsv" from [All Programs] → [V-SFTV6].



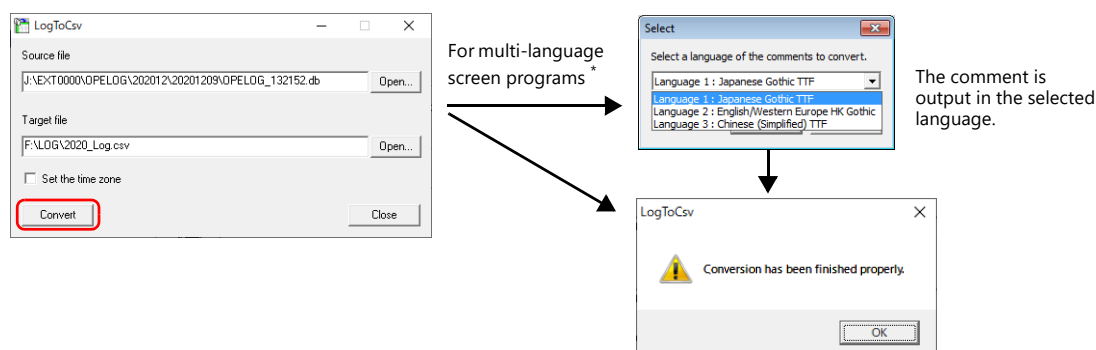
2. Click the [Open] button for [Source file] and select the log file to convert.



3. Click the [Open] button for [Target file] and specify the location for storing the CSV file and the filename.



4. Click the [Convert] button. A conversion complete message is displayed and the CSV file is output to the specified location.



\* To display the language selection window for comments, select the [Save comments in the set number of languages] checkbox at [System Setting] → [Other] → [Operation log Setting]. For details, refer to "4.4 Detailed Settings" page 4-10.

5. Open the CSV file.

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
1	2014/7/23	1:28:53	-			0 ScrnChg	-			0	2
2	2014/7/23	1:28:56	2			0 Bit Mom	-	SW_00012	-	-	
3	2014/7/23	1:28:57	2			0 Bit Mom	-	SW_00012	-	-	
4	2014/7/23	1:28:58	2			0 Switch	Word Operation	SW_00000	-	-	
5	2014/7/23	1:29:06	-	-	-	ModeChg	To Local		-	-	
6	2014/7/23	1:29:13	-	-	-	ModeChg	To Run		-	-	
7	2014/7/23	1:29:15	0			0 Switch	Screen	SW_00000	-	-	
8	2014/7/23	1:29:15	-			0 ScrnChg	-			0	1
9	2014/7/23	1:29:20	-			0 ScrnChg	-			1	0
10	2014/7/23	1:29:22	0			0 Switch	Screen	SW_00000	-	-	
11	2014/7/23	1:29:22	-			0 ScrnChg	-			0	2
12	2014/7/23	1:29:28	2			0 Switch	Screen	SW_00000	-	-	
13	2014/7/23	1:29:28	-			0 ScrnChg	-			2	0
14	2014/7/23	1:29:29	0			0 Switch	Screen	SW_00000	-	-	
15	2014/7/23	1:29:30	-			0 ScrnChg	-			0	2
16	2014/7/23	1:32:21	2			0 Bit Mom	-	SW_00012	-	-	
17	2014/7/23	1:32:36	2			0 Bit Mom	-	SW_00012	-	-	
18	2014/7/23	1:32:37	2			0 Bit Mom	-	SW_00012	-	-	
19	2014/7/23	1:32:37	2			0 Bit Mom	-	SW_00012	-	-	
20	2014/7/23	1:32:39	2			0 Bit Mom	-	SW_00012	-	-	
21	2014/7/23	1:32:39	2			0 Bit Mom	-	SW_00012	-	-	
22	2014/7/23	1:32:40	2			0 Bit Mom	-	SW_00012	-	-	
23	2014/7/23	1:32:41	2			0 Bit Mom	-	SW_00012	-	-	
24	2014/7/23	1:32:44	2			0 Switch	Word Operation	SW_00000	-	-	
25	2014/7/23	1:32:54	2			0 Bit Mom	-	SW_00012	-	-	
26	2014/7/23	1:32:55	2			0 Bit Mom	-	SW_00012	-	-	
27	2014/7/23	1:32:55	2			0 Switch	Word Operation	SW_00000	-	-	
28	2014/7/23	1:32:55	2			0 Bit Mom	-	SW_00012	-	-	

For multi-language screen programs, comments are output in the selected language.

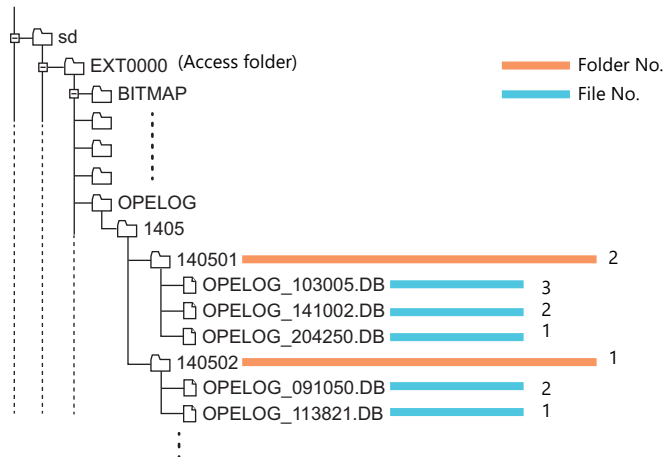
\* The text is not Unicode. Check the text in an OS environment of the relevant language.

## 4.7 System Device Memory

The following describes the system device memory associated with the operation log viewer.

Addresses	Description	Remarks
\$s1365	File number of currently displayed log data	← V
\$s1366	Log folder number being displayed	

- \* When a log data file in SRAM is displayed, "0" is stored at both \$s1365 and \$s1366.  
 When log data files in storage are displayed, the order of files is determined by the date of the files and folders, with the most recent date being regarded as No. 1.  
 The following illustrates the numbering of files and folders.







## **5 Security**

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# 5.1 Overview

## Security

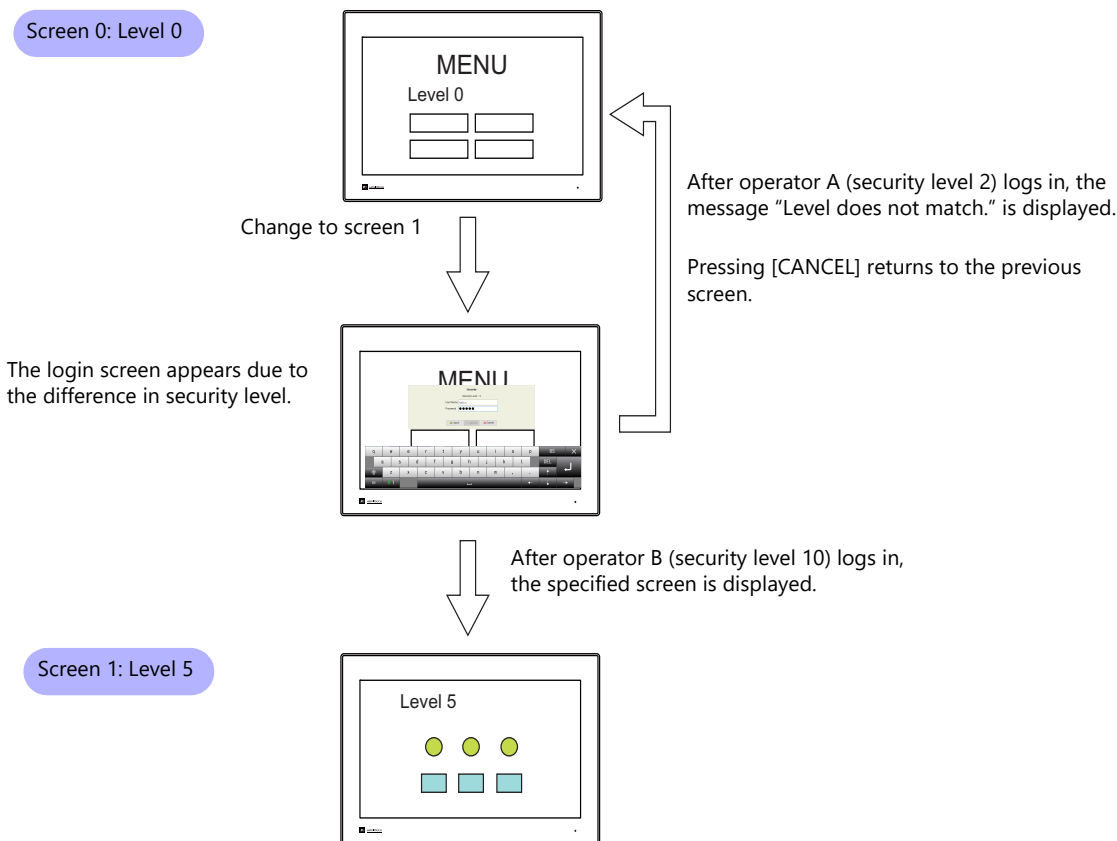
Registering user IDs and passwords at the required security levels in advance enables operators to control the display and operation of screens in accordance with their corresponding security level.

\* Security levels are set on a scale from 0 to 15.

Security Level	Priority	Description
0	Low ↓	Screen display and operation permitted at level 0 (no security)
1		Screen display and operation permitted at levels 0 and 1
:		:
15	High	Screen display and operation permitted at all levels from 0 through 15

## Screen Security Levels

A security level can be set for each screen. An attempt to switch to a higher-security screen will automatically display the login screen. The target screen can be displayed by entering a user ID and password at a level equivalent to or higher than the level required for the target screen.

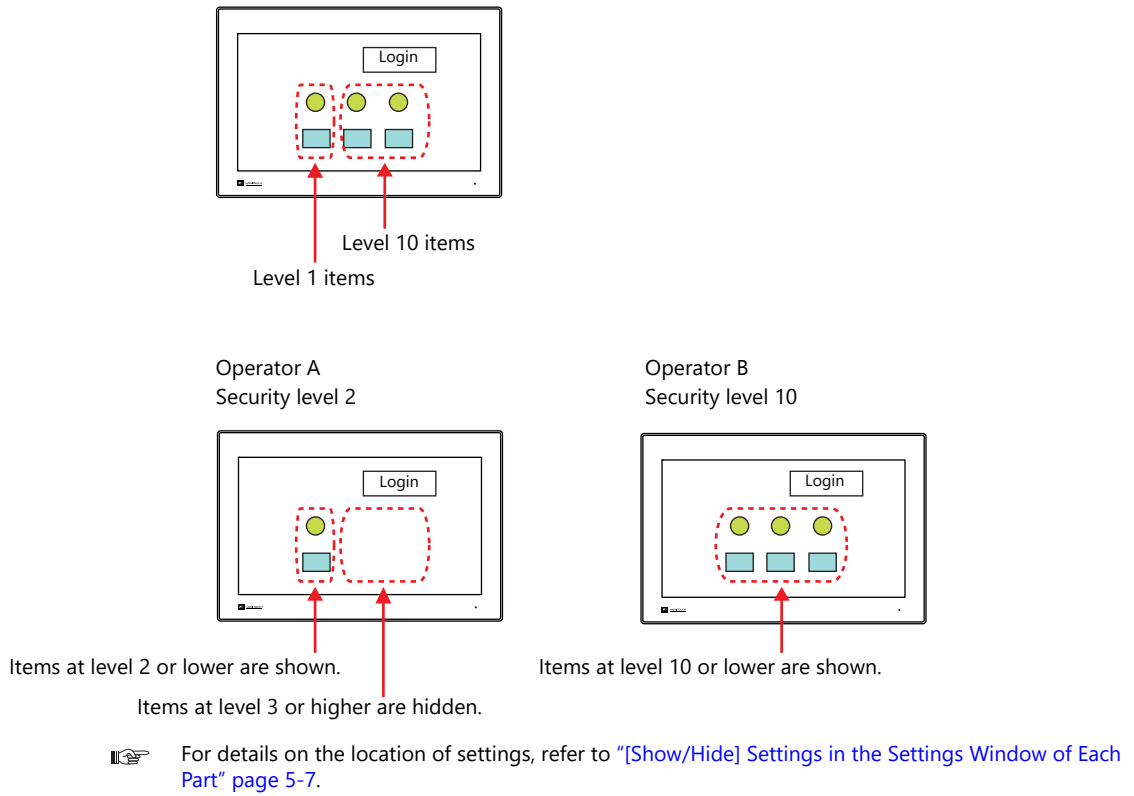


👉 For details on the location of settings, refer to ["Screen Settings" page 5-6](#).

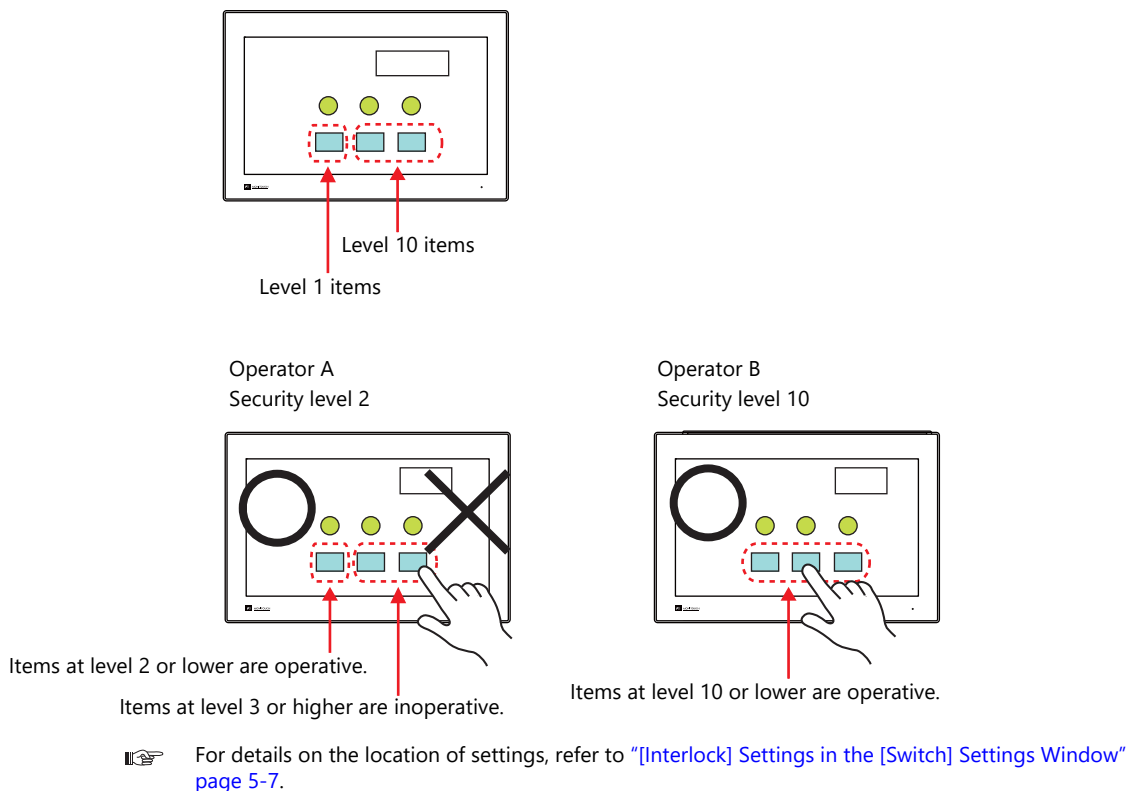
## Item Security Levels

Security levels can be set for each item on the screen, such as switches and data displays. Once security levels are specified for screen items, these items can be shown or hidden based on the security level selected when an operator logs into the system. Also, switches can be configured with an interlock setting.

### Showing/Hiding Items



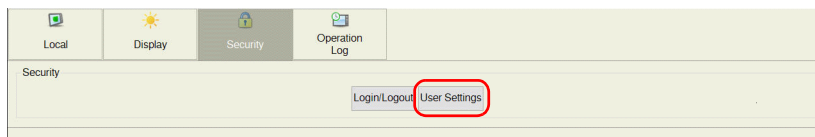
### Prohibiting Switch Operations



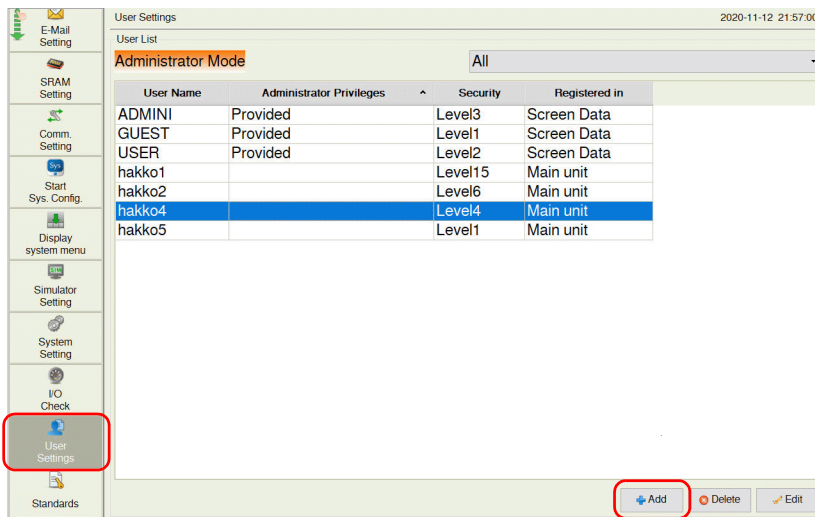
## User ID and Password Registration

User IDs and passwords can be set to screen programs in advance, but can also be added from the system menu of MONITOUCH (or in Local mode). The system offers the flexibility to add new users in situations where sudden changes are required on the factory floor.

System menu



Local mode

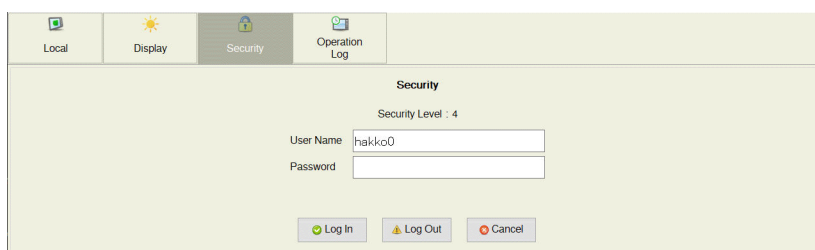


\* Only users with administrator privileges can register, edit, and delete user accounts.

## Login/Logout

The security level can be changed by logging in or out with the screen that is automatically displayed when a screen change occurs as well as from the system menu or a switch.

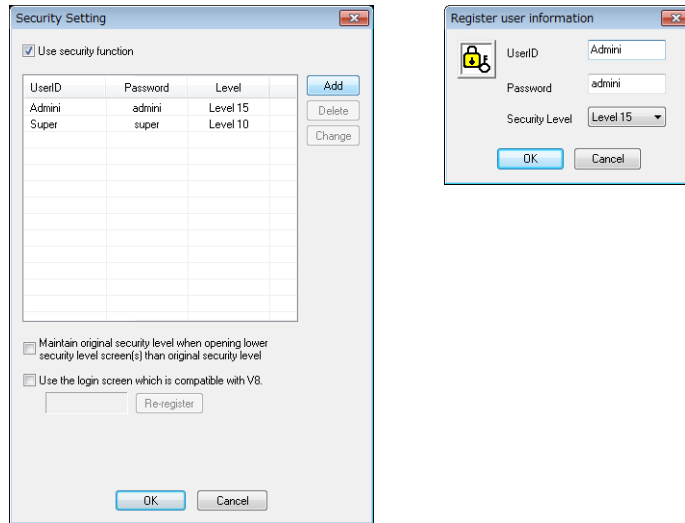
System menu



For details, refer to "5.4 Login/Logout" page 5-8.

## 5.2 Security Settings

Location of settings: [System Setting] → [Other] → [Security Setting].



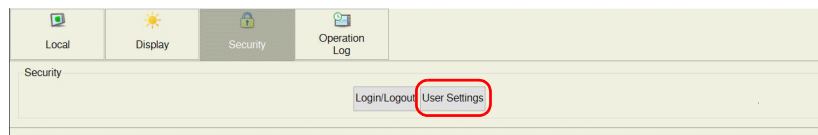
Item	Description
Use security function	Select this checkbox to use the security function.
UserID *1 Password Level	Register user IDs, passwords, and security levels using the [Add], [Delete], and [Change] buttons. A maximum of 64 users can be registered. Use eight or less one-byte alphanumeric characters. Input is case-sensitive. * The same user ID cannot be registered more than once. However, the same password can be registered for different user IDs. All users registered to the screen program are granted administrator privileges.
Maintain original security level when opening lower security level screen(s) than original security level *2	Select the operation to perform when a screen change occurs. Unselected When switching to a screen with a lower security level, the currently valid security level is also lowered to the level of the target screen. When switching to a higher-security screen next, the operator is prompted to enter a password. Selected The same security level is maintained until the level is changed when another user logs in with a different security level or when the user logs out.
Use the login screen which is compatible with V8.	When changing from a V8 series screen program, select this checkbox to use the same login screen as the V8 series.

\*1 User IDs and passwords can be registered from the system menu (or in Local mode). Only users with administrator privileges can register, edit, and delete user accounts. While users without administrator privileges can view a list of all users registered in a screen program, editing and deletion is prohibited.

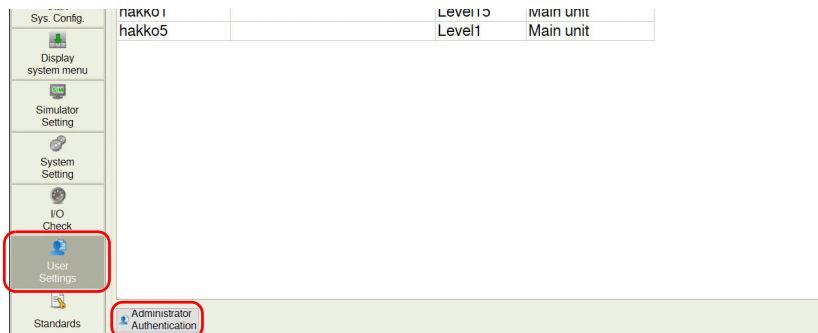


The currently logged in administrator user's account can be deleted. After deletion, the screen returns to the administrator authentication screen. Other administrators' accounts cannot be deleted.

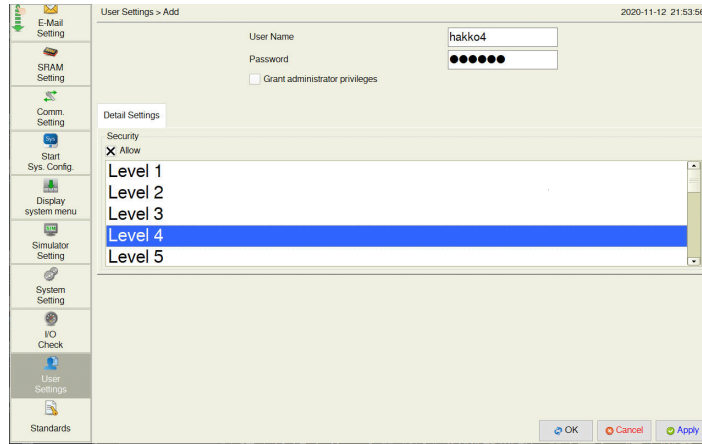
- System menu → [Security] → [User Settings] → enter administrator user ID and password



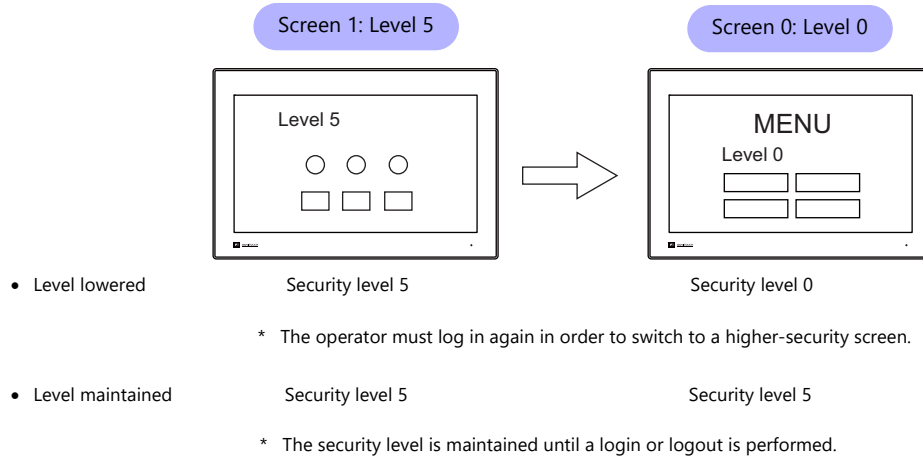
- Local mode → [User Settings] → [Administrator Authentication] → enter administrator user ID and password



User registration screen



\*2 When the currently displayed screen is switched to a lower-security screen, the security level may be maintained or automatically lowered, depending on the selected option.



## 5.3 Security Level Settings

The security level can be set at the following three locations. The setting procedure at each location is different.

- Screen settings (page 5-6)
- [Show/Hide] settings in the settings window of each part (page 5-7)
- [Interlock] settings in the [Switch] settings window (page 5-7)

### Screen Settings

Screen switching can be prohibited according to security level.

#### Location of settings

[Screen Setting] → [Screen Setting] → [Main] tab window → [Security Level] setting

Security level: 0 to 15

Conditions: =, ≥ (up to five AND or OR operators can be selected)

The screenshot shows the 'Screen Setting' dialog box with the 'Main' tab selected. The 'Security Level' section is highlighted with a red box. It contains a 'Level' dropdown menu set to '5' and a 'for display' dropdown menu set to '>='.

No.	Type	Setting
Condition1	Security Level	>= 5

Buttons: Add, Delete, Replace with the above, Replace with the below

AND/OR Setting

Buttons: OK, Cancel

## [Show/Hide] Settings in the Settings Window of Each Part

Screen items can be shown or hidden according to their security level.

### Applicable items

The following items can be configured with security level settings.

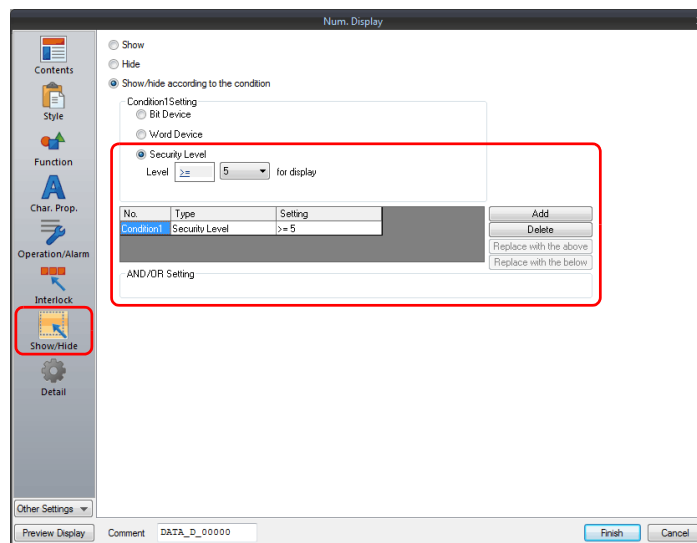
- Switches, lamps
- Numerical data displays, character displays, message displays (excluding table data displays)
- Graphs, statistical graphs, closed area graphs
- Linked parts
- Grouped items (including graphic items)

### Location of settings

In the setting window of each part, set the security level at [Show/Hide] → [Show/Hide according to the condition] → [Security Level].

Security level: 0 to 15

Conditions: =, ≥ (up to five AND or OR operators can be selected)



## [Interlock] Settings in the [Switch] Settings Window

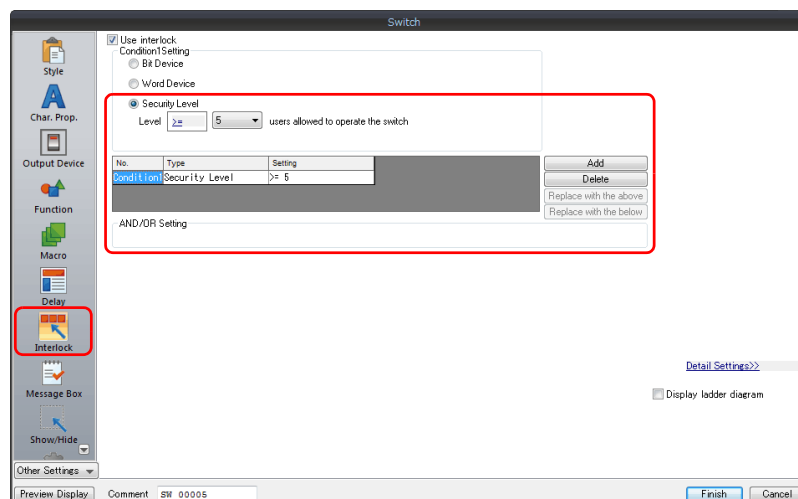
The operation of switches can be prohibited according to their security level.

### Location of settings

In the switch settings window, set the security level at [Interlock] → [Security Level].

Security level: 0 to 15

Conditions: =, ≥ (up to five AND or OR operators can be selected)



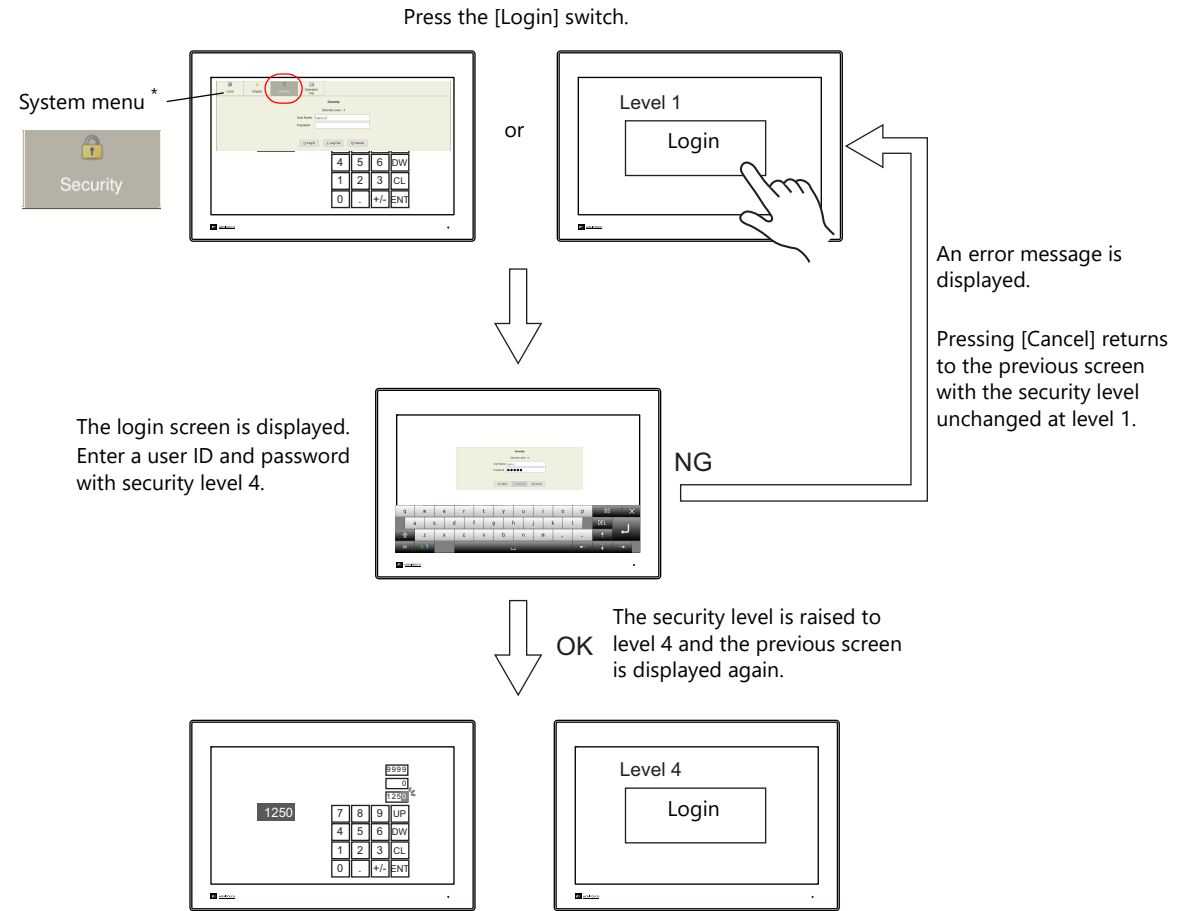


## 5.4 Login/Logout

The security level can be changed by logging in or out with the screen that is automatically displayed when a screen change occurs as well as from the system menu or a switch.

### Login

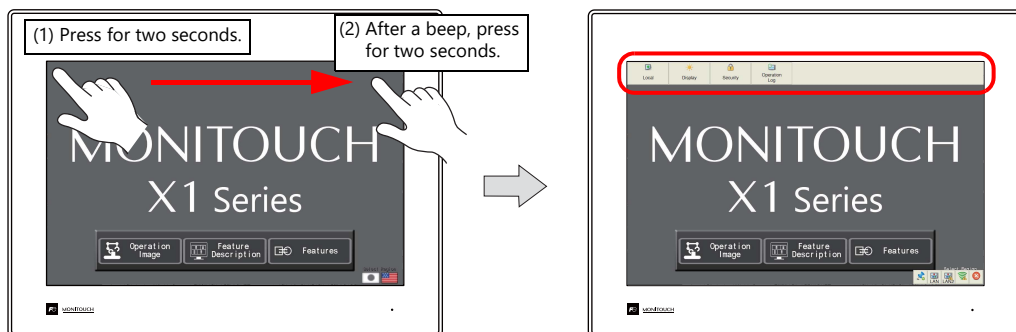
The security level can be changed using a switch with [Log In] set for [Function] or from the system menu.



Login is prohibited for users with a security level lower than that of the currently displayed screen. Any login attempt yields the error message "Level does not match."

### System menu display method

1. Press one corner of the screen for at least two seconds and release your finger when there is a beep.
2. Then within one second, press a different corner and hold for at least two seconds. The system menu appears.



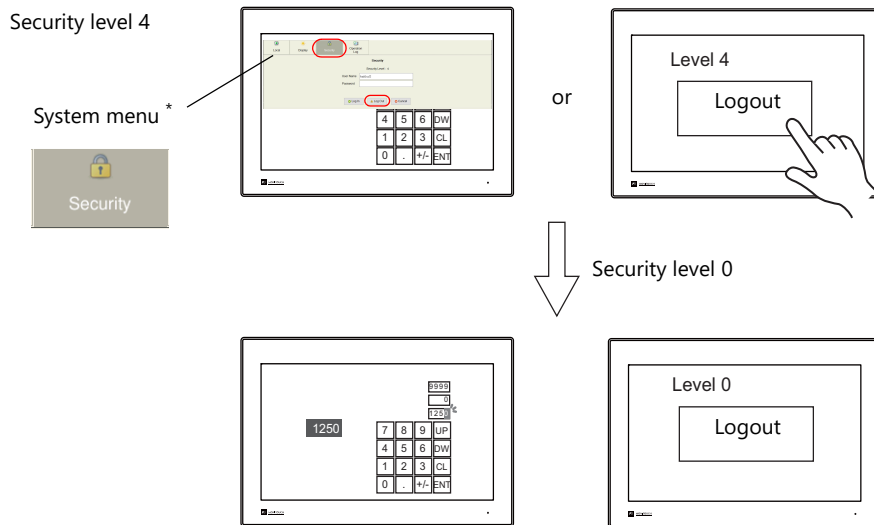
\* If any of the items given below are placed in a corner on the screen, the system menu will not be displayed. Be sure to press a corner where none of the items are placed. If these items are placed in all four corners of the screen, switch the screen to one that has open corners and perform the above procedure to display the system menu.

Switches, data display parts with switches, display areas, scrolling messages, slider switches, scroll bars, and table data display parts

## Logout

The security level is set to zero (0) when a switch with [Log Out] set for [Function] is pressed.

Press the [Logout] switch.



\* For the system menu display method, refer to [page 5-8](#).

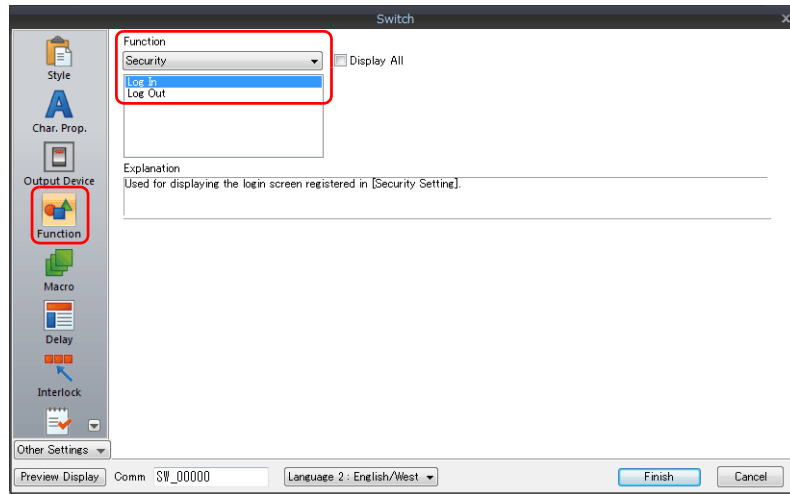


The screen does not change after logging out. When logging out on a low security level screen or using a switch, use in conjunction with the SET\_SCRN macro (for screen number change) to change the screen when a user logs out.

## Location of Settings

### Switch

Configure the following settings at [Parts] → [Switch] → [Function].



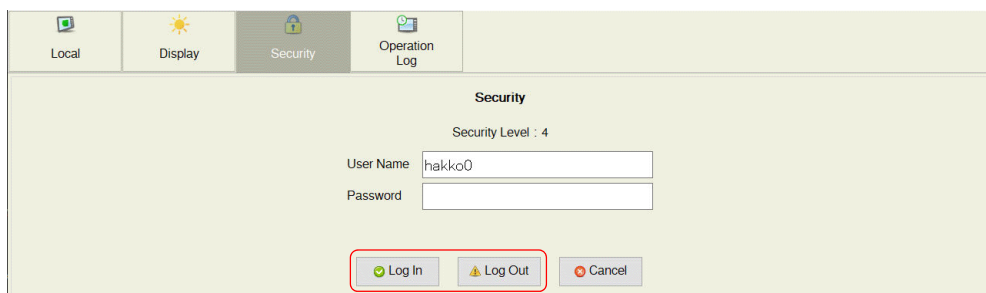
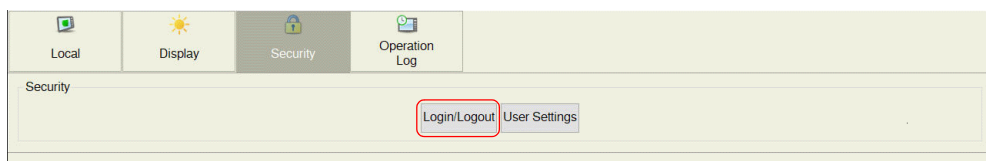
Item	Description
Function	<p>Log In Display the login screen.</p> <p>Log Out Change the security level to zero (0).</p>



The screen does not change after logging out. When logging out on a low security level screen or using a switch, use in conjunction with the SET\_SCRN macro (for screen number change) to change the screen when a user logs out.

### System Menu

There are no settings in particular.



## 5.5 System Device Memory (\$s)

The following system device memory are associated with the security function.

Device Memory	Description
\$s1360	Stores the user ID of the operator who is currently logged into the system.
\$s1361	
\$s1362	
\$s1363	
\$s1364	



## **6 Ethernet Communication Function**

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- 6.1 Preface
- 6.2 IP Address Settings of X1 Series Unit
- 6.3 X1 Port Numbers
- 6.4 Ethernet Terminology
- 6.5 Screen Program Transfer
- 6.6 PLC Communication
- 6.7 Transferring Data Between MONITOUCH Units (Macro Command)
- 6.8 DLL Communication
- 6.9 MES Interface Function
- 6.10 E-mail Notification

## 6.1 Preface

### 6.1.1 List of Functions

The X1 series features the following Ethernet functions.

An IP address for the X1 series unit must be configured in order to use the Ethernet functions. Refer to [“6.2 IP Address Settings of X1 Series Unit” page 6-2](#).

Other settings differ depending on the function to be used.

Function		Port Availability			Refer to
		LAN	LAN2	WLAN	
Screen program transfer		○	○	○	<a href="#">“6.5 Screen Program Transfer”</a>
Simulator		○	○	×	V9 Series Operation Manual
PLC communication <sup>*1</sup>	TCP/IP	○	○	×	X1 Series Connection Manual
	UDP/IP	○	○	×	
Macro <sup>*2</sup>	ERead/EWRITE	○	○	○	V9 Series Macro Reference Manual
	SEND	○	○	○	
	MES	○	○	○	
DLL communication	HKEthn20.dll <sup>*3</sup>	○	○	○	DLL Function Specifications
	VCFAcs.dll <sup>*4</sup>	○	○	○	
E-Mail		○	○	○	<a href="#">“6.10 E-mail Notification”</a>
IIoT function	MQTT	○	○	○	<a href="#">“7.1 MQTT”</a>
	OPC UA server	○	○	×	<a href="#">“7.2 OPC UA”</a>

\*1 For details on selecting TCP/IP and UDP/IP for PLC communication, refer to the X1 Series Connection Manual.

\*2 The network table settings must be configured in the screen program settings.

\*3 When using the SEND command, the network table settings must be configured in the screen program settings.

\*4 This is available only when using internal storage of the X1 series unit. (sd Folder / usb Folder)

## 6.2 IP Address Settings of X1 Series Unit

IP address settings for the X1 series unit must be configured in order to use the Ethernet function. The IP address of the X1 series unit is set using System Configurator.

### 6.2.1 Starting System Configurator

#### Brand New X1 Series Unit

System Configurator starts when the power is turned on. Configure the IP address settings.

#### Existing X1 Series Unit

##### When [Startup Settings] Is Set to [System Configurator]

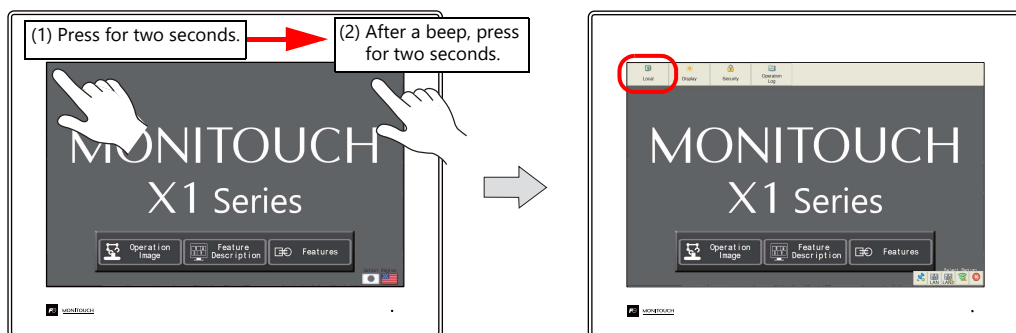
System Configurator starts when the power is turned on. Configure the IP address settings.

##### When [Startup Settings] Is Set to [HMI (Normal Use)]

The X1 app starts when the power is turned on. Start System Configurator by the following method.

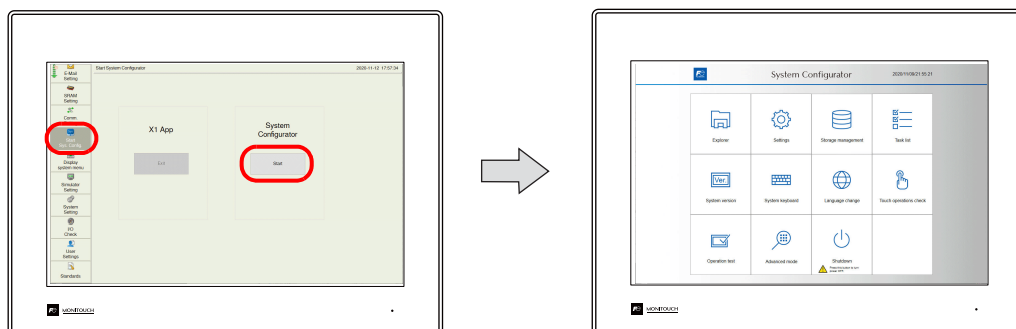
#### Method1: Starting from Local mode

1. Press one corner of the screen for at least two seconds and release your finger when there is a beep.
2. Then within one second, press a different corner and hold for at least two seconds. The system menu appears.



\* If any of the items given below are placed in a corner on the screen, the system menu will not be displayed. Be sure to press a corner where none of the items are placed. If these items are placed in all four corners of the screen, switch the screen to one that has open corners and perform the above procedure to display the system menu.  
Switches, data display parts with switches, display areas, scrolling messages, slider switches, scroll bars, and table data display parts

3. Press the [Local] switch to change the X1 app to Local mode. Scroll the menu icons on the left side of the screen and press [Start Sys. Config.] to display the Start System Configurator screen and then start System Configurator.



#### Method 2: Setting DIP switches 1 and 2 on the backside of the X1 series unit to the ON position and turning the power on

1. Turn off the X1 series unit power.
2. Set DIP switches 1 and 2 to the ON position.
3. System Configurator starts when the power is turned on.



## 6.2.2 IP Address Settings

Configure IP address settings using System Configurator.



- Settings cannot be changed when [Write filter setting] is set to [Valid]. Set [Settings] → [Write filter setting] to [Invalid] and then configure IP address settings. For details, refer to the X1 Series Hardware Specifications.
- In order to set the IP address, either connect a USB keyboard or display the system keyboard on the X1 series unit. For details, refer to the X1 Series Hardware Specifications or the X1 Series Setup Manual.
- Set an IP address of a different network group for each of the following: [LAN Setting], [LAN2 Setting], and [WLAN Setting] (only for wireless LAN models). If set in the same network group, the system will not operate correctly.

1. Start System Configurator and tap [Settings] → [IP Address Setting].
2. Select a port on the [IP Address Setting] screen and configure settings.

IP address allocation: Manual

IP address allocation: Auto



For details on configuring settings, refer to the X1 Series Hardware Specifications.

Item	Description	
IP address allocation	Select the method for setting the IP address. Manual: Input the IP address on this screen. Auto: Press the [OK] switch and an IP address is automatically allocated by the DHCP server.	
	Auto	Manual
Automatically allocated IP address	Indicates the IP address allocated by the DHCP server.	-
IP Address	-	Set the IP address. Default LAN: 192.168.0.100 LAN2: 192.168.1.100 WLAN: 192.168.10.100
Subnet Mask	-	Set the subnet mask.
Gateway	-	Set the gateway.
DNS server 1	Set the address of the preferred DNS server.	
DNS server 2	Set the address of the alternate DNS server.	
Speed and duplex	Set the speed and duplex mode. Auto-negotiation (default): Automatic setting through correspondence with the connected device 10 Mbps half duplex: 10 Mbps, bidirectional transmission, one direction at a time 10 Mbps full duplex: 10 Mbps, bidirectional transmission, simultaneous 100 Mbps half duplex: 100 Mbps, bidirectional transmission, one direction at a time 100 Mbps full duplex: 100 Mbps, bidirectional transmission, simultaneous 1.0 Gbps full duplex: 1.0 Gbps, bidirectional transmission, simultaneous	

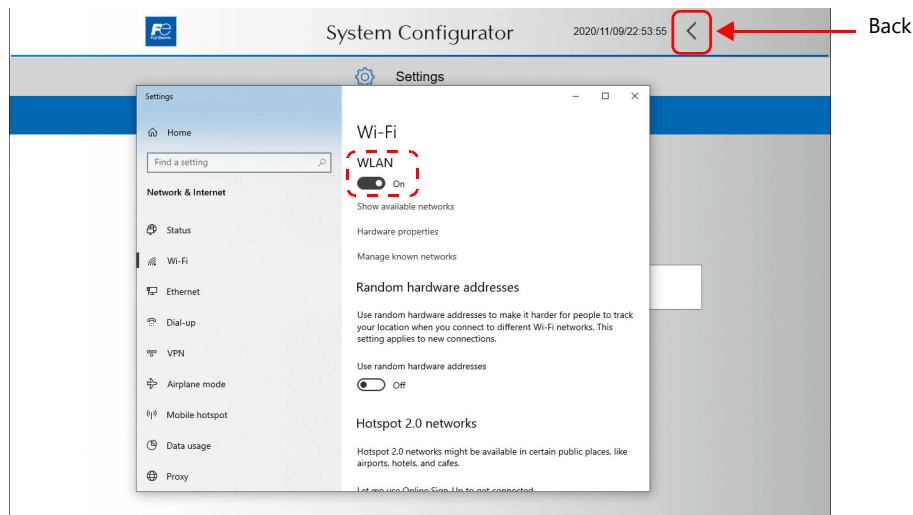
### When Using a WLAN

Wi-Fi settings need to be made.  
The X1 series unit operates in station mode.

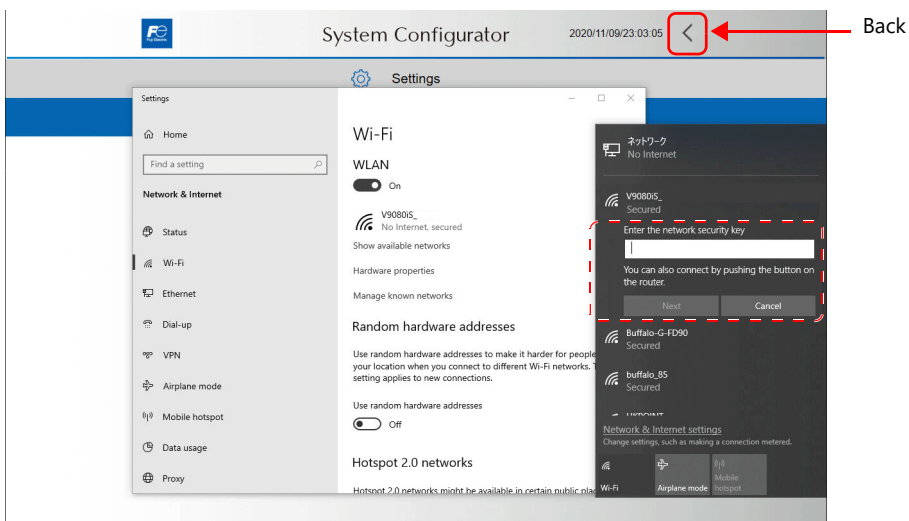


- Displaying and setting changes are not possible when [Write filter setting] is set to [Valid]. Set [Settings] → [Write filter setting] to [Invalid]. For details, refer to the X1 Series Hardware Specifications.
- X1121iSD and X1151iSD do not support WLAN.

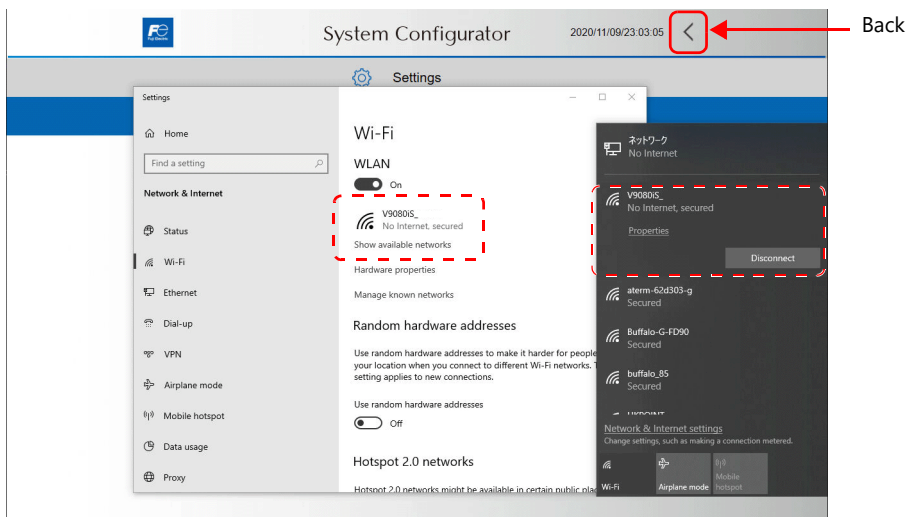
1. Start System Configurator and tap [Settings] → [Wi-Fi setting] → [Station mode].
2. Set [WLAN] to [On].



- 3. Press [Show available networks], select the respective SSID and then press [Connect].
- 4. Input the security key.



Setting is complete when a connection is established.



## 6.3 X1 Port Numbers

The following port numbers are used on the X1 series unit. When changing any port number, select an unused number from the range of 1024 to 65535.

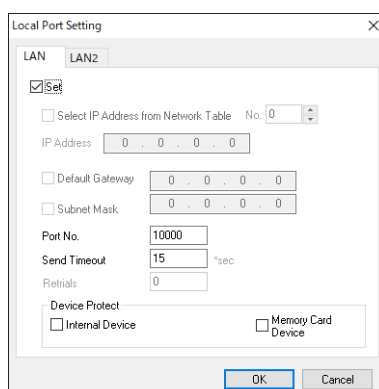
Default Port No.	Setting Range	Functions	Setting Location	Remarks
502	502, 1024 to 65535	Modbus slave (TCP/IP)	-	
8001	Fixed	Screen program transfer (Including transfer of screen programs with [Multi-Display Settings] → [Editing Screen] set to [Main])	[Transfer] → [Download] → [Communication Setting] → [Option] *1	
8002	Fixed	Transfer of screen programs with [Multi-Display Settings] → [Editing Screen] set to [Sub]		For details, refer to "8.7 Task List and On-Screen Keyboard Display".
8020	1024 to 65535	Simulator (Ethernet)	-	
10000	1024 to 65535	Ethernet macros ERead, EWrite, SEND, MES	When setting on the editor "Setting Using the V-SFT Editor" page 6-7	
		Ethernet DLL functions HKEtn20.DLL VCFacs.DLL	When setting on the X1 series unit "Setting Using Local Mode on the Unit" page 6-8	
10001 to 10008	1024 to 65535	8-way communication		
10021 to 10028	1024 to 65535	8-way communication	MITSUBISHI ELECTRIC L series (built-in Ethernet) connections only A port number that is 20 higher than the port number set at [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Port No.] is secured automatically.	
64000	Fixed	Valid when using the multi-display setting.	-	For details, refer to "8.7 Task List and On-Screen Keyboard Display".
64001	Fixed		-	
64500	Fixed		-	
64501	Fixed		-	

\*1 When transferring screen programs over the Internet, specify the router port number in the [Transfer] window of the V-SFT editor.

## 6.3.1 Setting Using the V-SFT Editor

### X1 Port Used by Ethernet Macro Commands and Ethernet DLL Functions

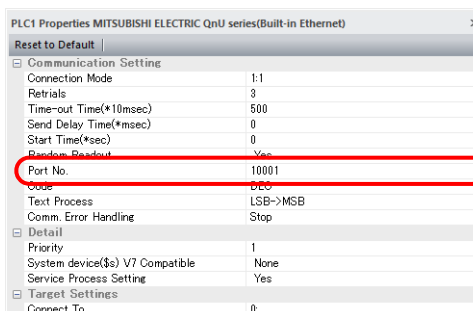
Set the port at [System Setting] → [Ethernet Communication] → [Local Port].



Item	Description
Port No. *	Set a port number (1024 to 65535). (except for "8001")
Send Timeout	Set a timeout period for transmitting macro commands EREAD, EWRITE, SEND, MES, or Ethernet DLL functions.
Device Protect Internal Device Memory Card Device	Select these checkboxes to write-protect the corresponding device memory from PCs or other stations.

### X1 Port Used for 8-Way Communication

Set the port at [System Setting] → [Hardware Setting] → [PLC Properties] → [Port No.].

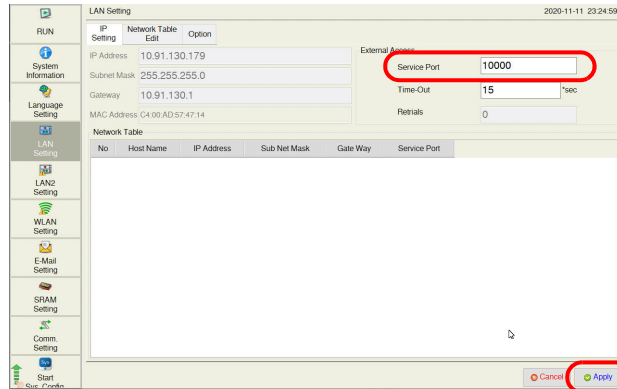


## 6.3.2 Setting Using Local Mode on the Unit

### X1 Port Used by Ethernet Macro Commands and Ethernet DLL Functions

1. Press one corner of the screen for at least two seconds and release your finger when there is a beep.
2. Then within one second, press a different corner and hold for at least two seconds. The system menu appears.
3. Press the [Local] switch to change the X1 app to Local mode.  
Press the [LAN Setting], [LAN2 Setting] or [WLAN Setting] menu icon and change the [Service Port] setting.

LAN Setting screen



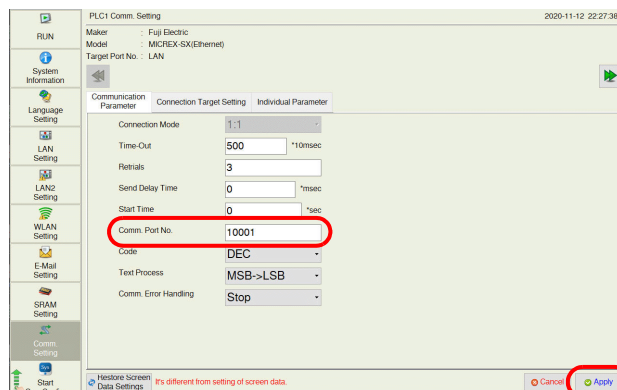
4. Press the [Apply] switch and end settings.



The IP address cannot be changed via the [LAN Setting], [LAN2 Setting] and [WLAN Setting] menu icons (only for models with wireless LAN) in Local mode. Change the IP address setting using System Configurator. For details, refer to "IP Address Settings of X1 Series Unit" page 6-2.

### X1 Port Used for 8-Way Communication

1. Press one corner of the screen for at least two seconds and release your finger when there is a beep.
2. Then within one second, press a different corner and hold for at least two seconds. The system menu appears.
3. Press the [Local] switch to change the X1 app to Local mode.  
Press the [Comm. Setting] menu icon and set the [Comm. Port No.] setting.



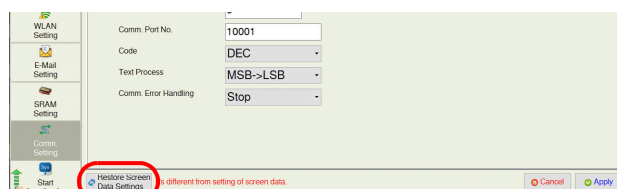
4. Press the [Apply] switch and end settings.

### Restoring the screen program settings

If a setting is changed in Local mode, the Local mode setting takes priority.

To restore the settings of the screen program, press the [Restore Screen Data Settings] switch at the bottom of the Local mode screen.

When this switch is pressed, settings configured in Local mode are invalidated and the settings of the screen program are restored.



## 6.4 Ethernet Terminology

### IP Address

This address is used for recognizing each node on the Ethernet network and must be unique.

An IP address is 32-bit data that consists of a network address and a host address, and is classified as A to C depending on the network size.

Class A	0	Network address (7 bits)	Host address (24 bits)
Class B	10	Network address (14 bits)	Host address (16 bits)
Class C	110	Network address (21 bits)	Host address (8 bits)

### Notation

Data consisting of 32 bits is divided into four segments in decimal notation and each segment is delimited with a period.

Example: The following class C IP address is represented as "192.128.1.50".

11000000 10000000 00000001 00110010

### Unusable IP addresses

- "0" is specified for the first byte, e.g. 0.x.x.x
- "127" is specified for the first byte (which is reserved as the loop back address), e.g. 127.x.x.x
- "224" or more is specified for the first byte (which is reserved for multi-casting or experiments), e.g. 224.x.x.x
- The host address consists of only "0" or "255" (broadcast address), e.g. 128.0.255.255, 192.168.1.0

### Port No.

Multiple applications run on each node and communications are carried out for each application between the nodes. Consequently, it is necessary to have a means to identify the application that data should be transferred to. The port number works as this identifier. While the range of port numbers is 0 to 65535, the lower port numbers of 0 to 1024 are generally reserved for other uses. When assigning port numbers, use numbers higher than 1024.

### X1 port numbers

 Refer to "X1 Port Numbers" page 6-6.

### Default Gateway

A gateway and a router are used for communication between different networks.

The IP address of the gateway (router) should be set to communicate with the node(s) on other networks.

### Subnet Mask

A subnet mask is used for dividing one network address into multiple networks (subnets).

A subnet is assigned by specifying a part of the host address in the IP address as the subnet address.

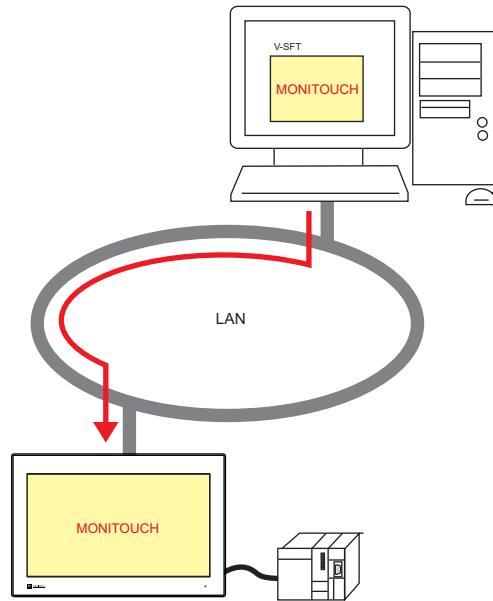
Class B	10	Network address (14 bits)	Host address (16 bits)
Subnet Mask	255.	255.	255. 0
	11111111	11111111	11111111 00000000
	Network address	Subnet address	Host address

### Unusable subnet masks

- When all bits are set to "0", e.g. 0.0.0.0
- When all bits are set to "1", e.g. 255.255.255.255

## 6.5 Screen Program Transfer

Screen programs can be uploaded and downloaded using Ethernet communication.



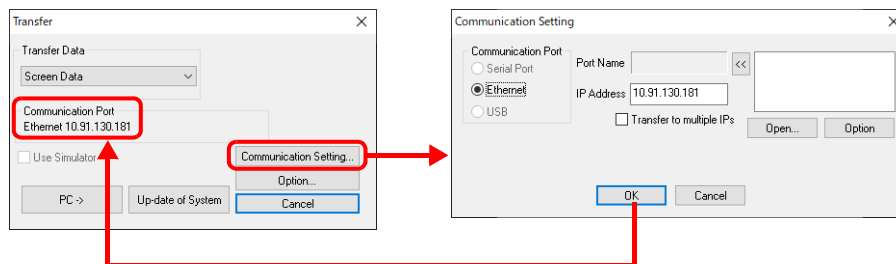
### 6.5.1 Transfer Procedure

#### Downloading (PC → X1)

1. Click [Transfer] → [Download]. The [Transfer] menu is displayed.



2. Select [Screen Data] for [Transfer Data].
3. Check the [Communication Port] setting.
  - If Ethernet is set and the IP address is correct, proceed to the next step.
  - If [Serial Port] or [USB] is set, click the [Communication Setting] button and select [Ethernet] under [Communication Port].

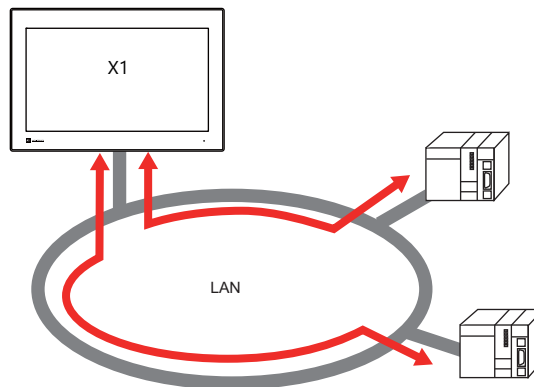


4. Click [PC →] to start the transfer.

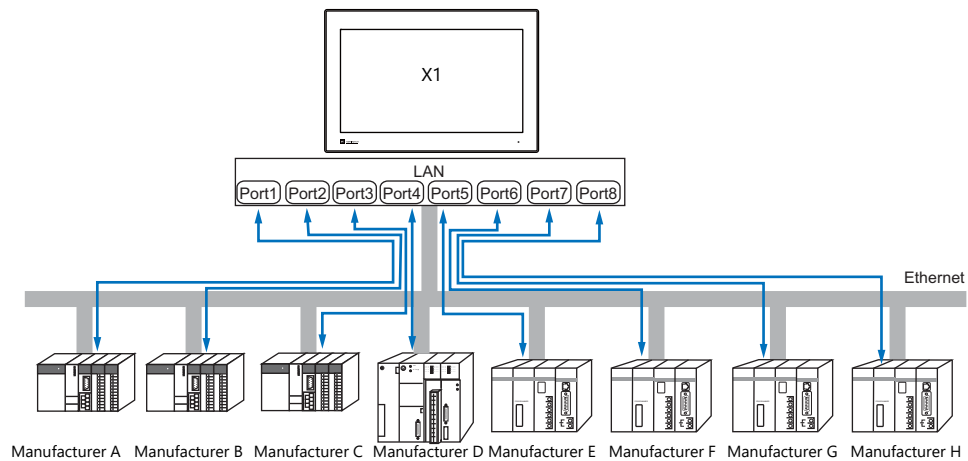


## 6.6 PLC Communication

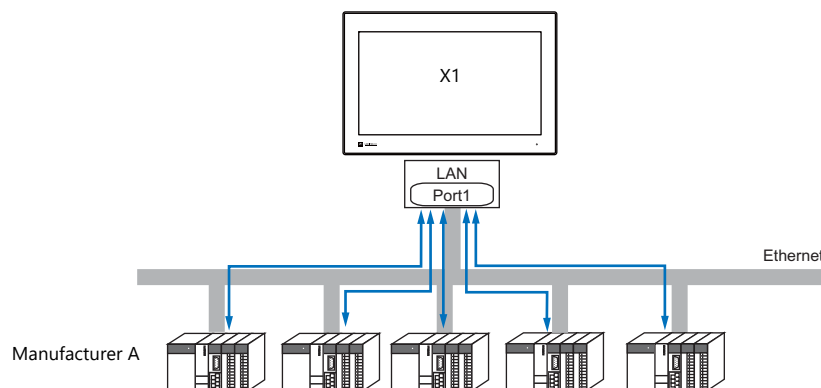
- High-speed communication with the Ethernet port of the PLC can be performed at 1000 Mbps, 100 Mbps or 10 Mbps.





- The X1 series unit can open up to eight ports for communication, which means that the unit can simultaneously communicate with up to eight types of PLCs.



- When multiple PLCs of the same model are connected, a single port on the X1 series unit can be used to perform 1:n communication with these PLCs.

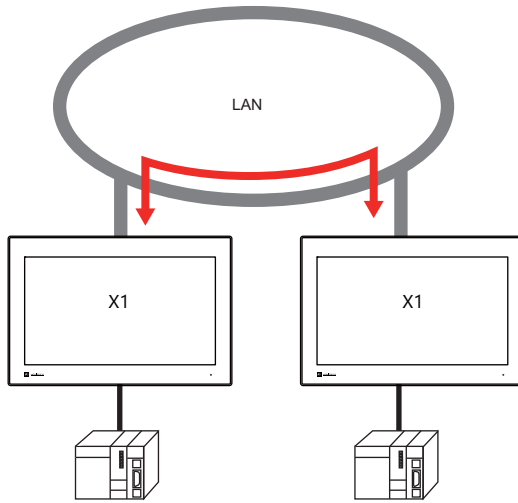


 For details on PLC communication, refer to the X1 Series Connection Manual.

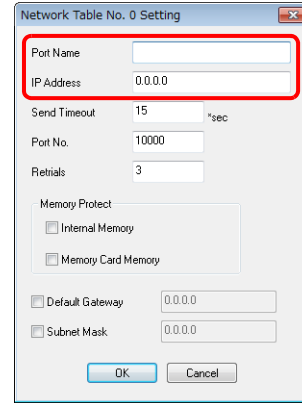
 For details on LAN ports available with the X1 series, refer to ["6.1.1 List of Functions" page 6-1](#).

## 6.7 Transferring Data Between MONITOUCH Units (Macro Command)

- Communication can be performed and data shared between MONITOUCH units on the same LAN using the "ERead" and "EWrite" macro commands.



- Network table editing Register the IP address of the counterpart unit.



For details on macros, refer to the V9 Series Macro Reference Manual.

- Network table Register the IP address of the counterpart unit in the [Network Table Edit] window in order to specify the destination using a macro.

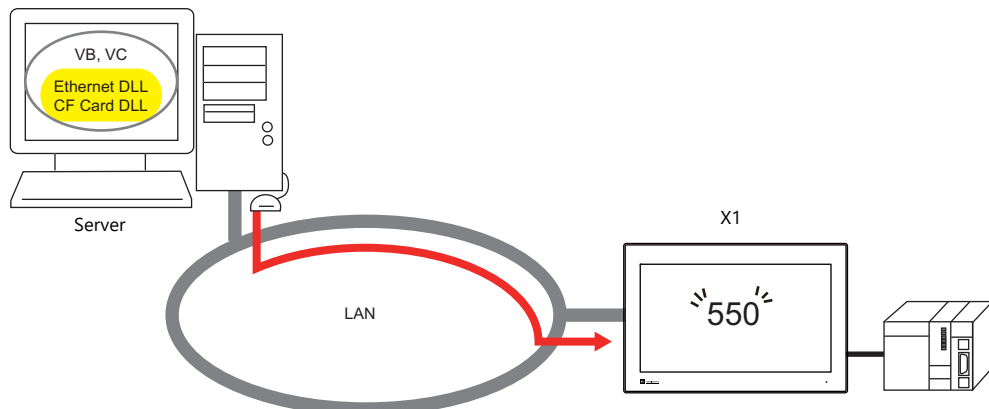
Click [System Setting] → [Ethernet Communication] → [Network Table].

For details on LAN ports available with the X1 series, refer to "6.1.1 List of Functions" page 6-1.

## 6.8 DLL Communication

- Ethernet access functions (that support UDP/IP) for executing device memory read and write operations with respect to X1 series units from a server and CF card access functions\* for executing read and write operations with respect to files in storage are provided.

By creating an application on a server using an environment such as Visual C++ 6.0 and Visual Basic, data can be collected from X1 series units and transferred to the server.



- \* When the [System Setting] → [Other] → [Storage Setting] → [External USB storage] checkbox is selected, a USB storage device cannot be accessed.

Only the internal storage of the X1 series unit can be accessed. (sd Folder / usb Folder)

For details on DLL functions, refer to the V Series DLL Function Specifications.

For details on LAN ports available with the X1 series, refer to "6.1.1 List of Functions" page 6-1.

# 6.9 MES Interface Function

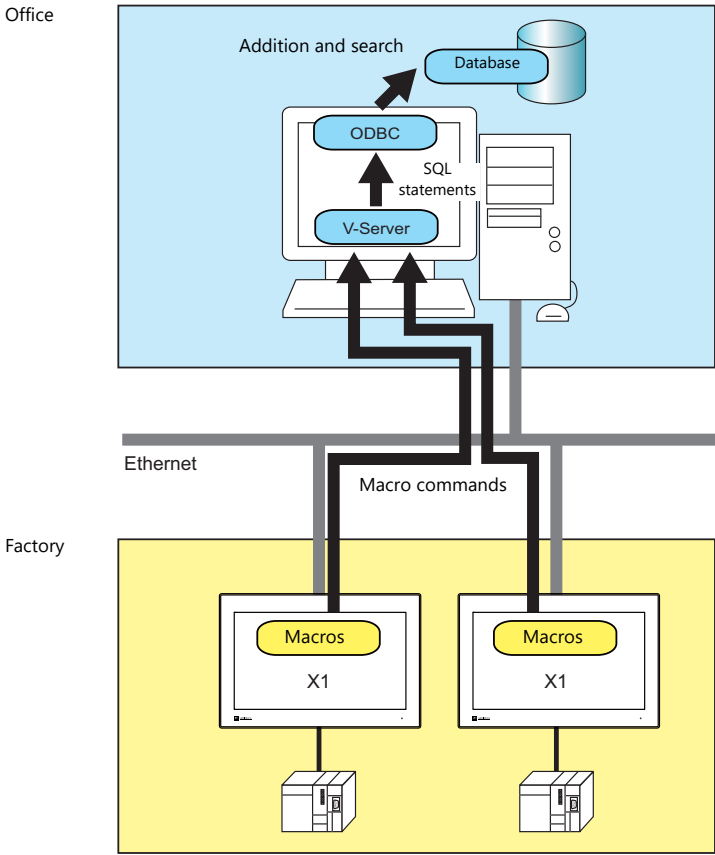
## 6.9.1 Overview

- The X1 series supports the MES interface function.

**MES: Manufacturing Execution System**

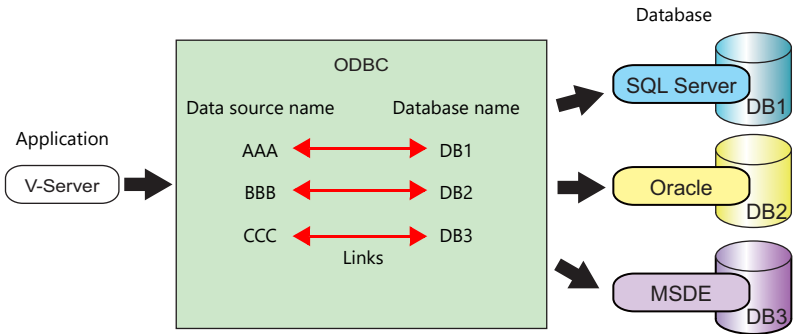
MES provides information necessary to optimize production activities (such as quality, yield, time of delivery, and cost) throughout processes from order receipt until product completion. Based on real-time information obtained from the manufacturing floor, MES serves as a bridge linking management and production, for the purpose of improving management in manufacturing.

- The MES interface function enables the X1 series to add, search, and delete data on databases. Production control from a PC in the office is made simple by using real-time production information transmitted from the factory to the database.
- The X1 series sends commands to V-Server on the PC connected via Ethernet. V-Server sends the commands as SQL statements to ODBC, and ODBC accesses the database.

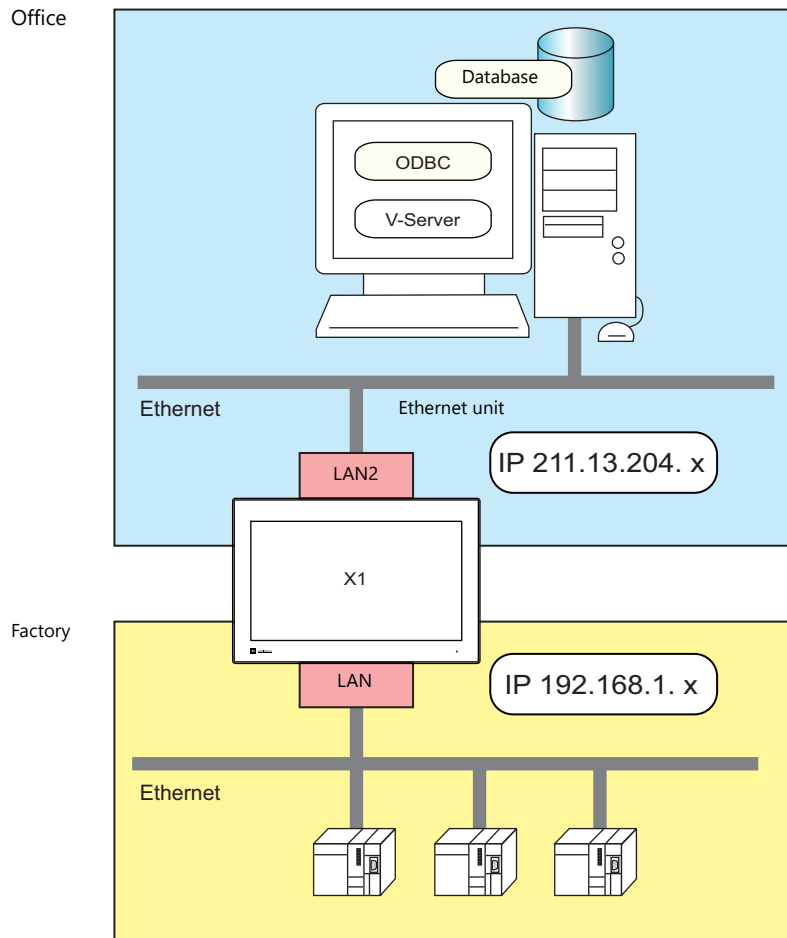


**ODBC: Open DataBase Connectivity**

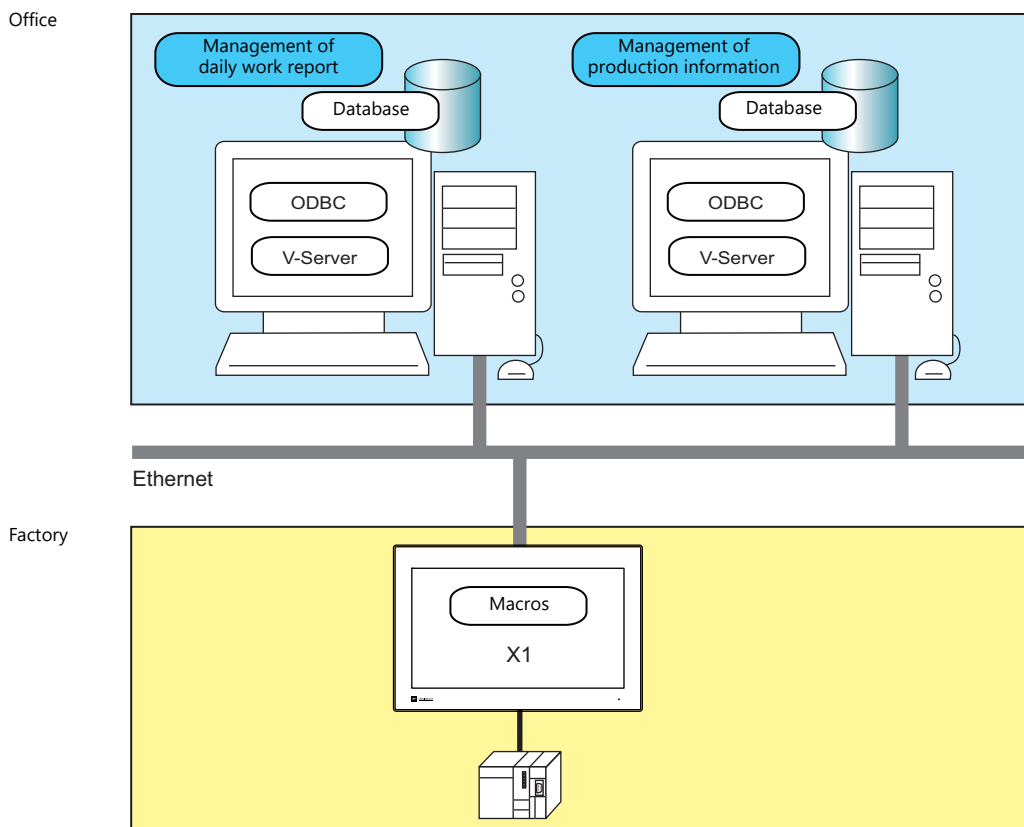
ODBC is the interface between an application (V-Server) and the database. Because ODBC accommodates the differences in specifications between databases, users only need to create programs based on the ODBC-specified procedure in order to access those databases.



- By using LAN2 or WLAN, multiple IP addresses can be set for an X1 series unit, thereby allowing networks to be established separately between the factory and office. System configuration is therefore made simple in the existing facilities.



- Separate management through multiple V-Servers is enabled.



- Stand-alone MES

The MES interface function can be used with a single X1 series unit. Since the function runs on the X1 series unit itself, there is no need for V-Server, ODBC, or Ethernet.

By creating a database in storage, it is possible to add, search, and delete records in the database directly from the X1 series unit.

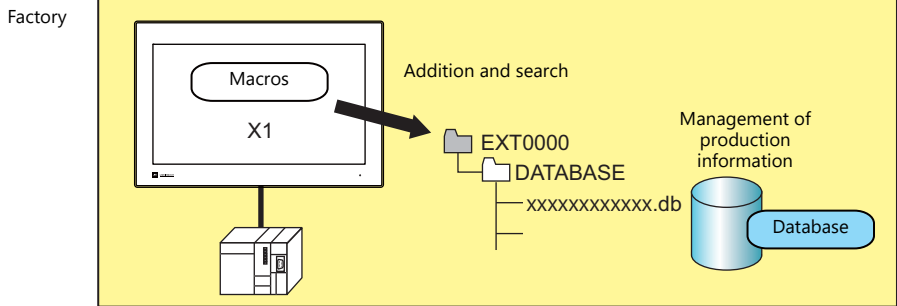
Create a database file (extension: .db) using the "MES WRITE" macro command.

---

Stand-alone

An environment in which a computer or information device operates alone without connecting to or depending on a network, other devices, and software

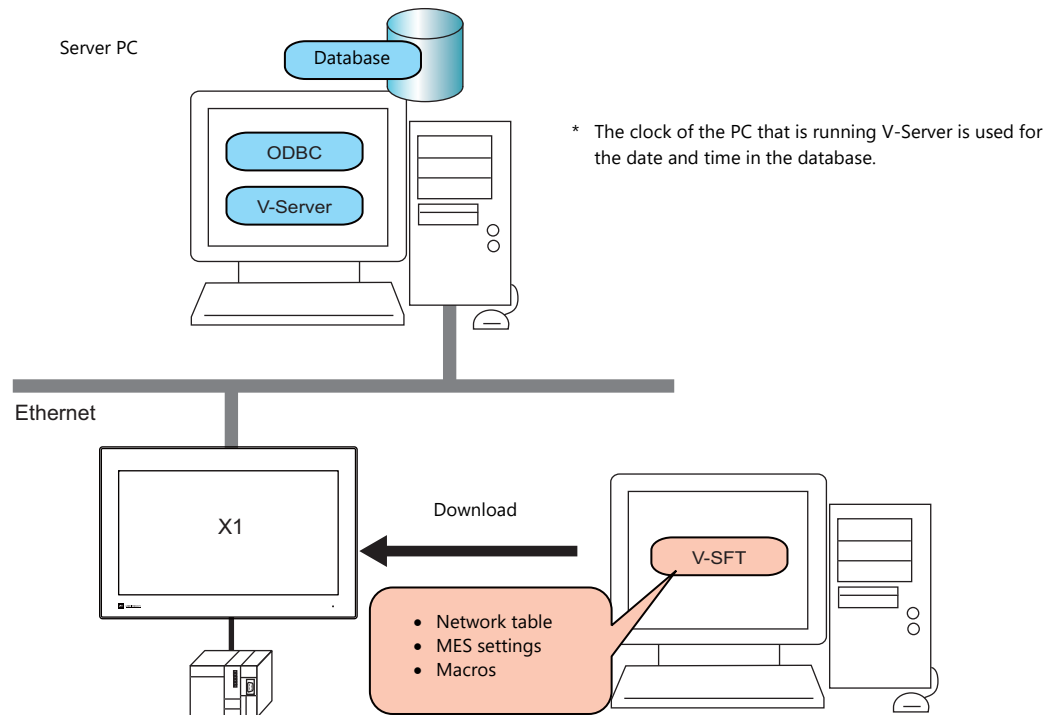
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## 6.9.2 System Configuration

There are two system configurations for using the MES interface. Configure the necessary settings as described below.

### Using a PC as a Server



### Required Settings

#### X1

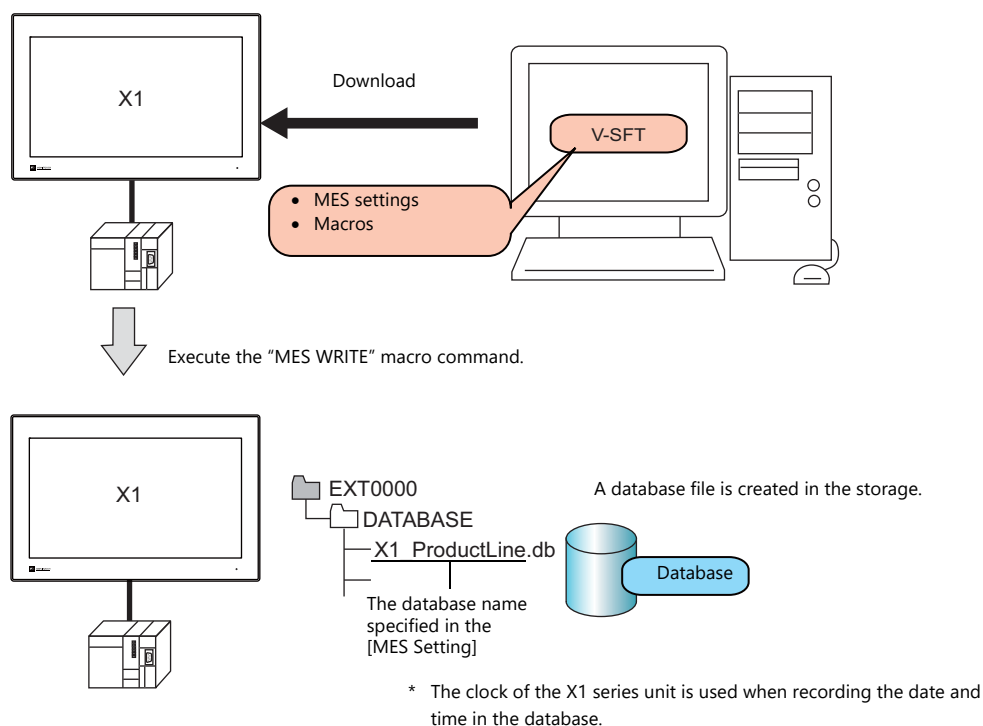
Configure the required settings for the X1 series in the screen program.

1. Network table editing ([page 6-18](#))
2. IP address settings for the X1 series unit ([page 6-2](#))
3. MES setting ([page 6-19](#))
4. Macro programming ([page 6-23](#))

#### Server PC

1. V-Server installation ([page 6-31](#))
2. Database installation and table creation ([page 6-32](#))
3. ODBC settings ([page 6-45](#))

## Stand-Alone Configuration (Using Storage)



### Required Settings

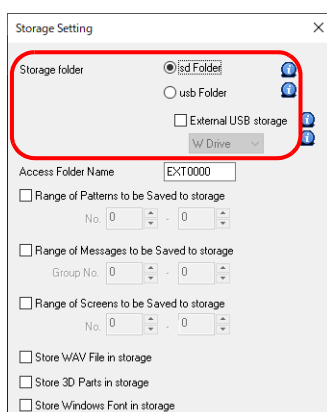
#### X1

Configure the required settings for the X1 series in the screen program.

1. MES setting ([page 6-19](#))
2. Macro programming ([page 6-23](#))

#### Storage

Specify the storage to use on the [System Setting] → [Other] → [Storage Setting] window.



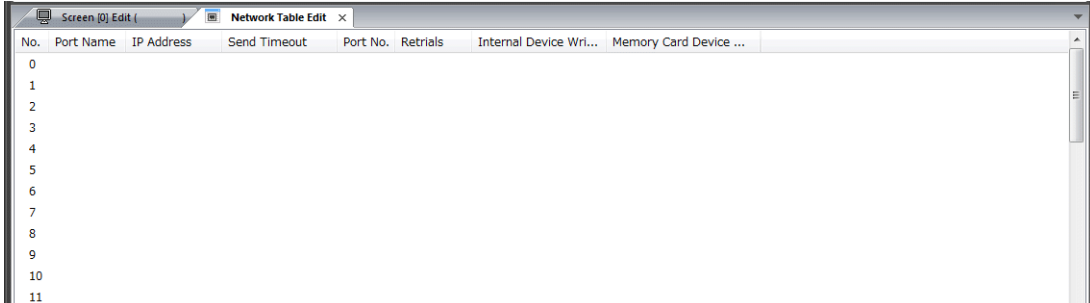
For details on the [Storage Setting] window, refer to "9 Storage".

## 6.9.3 X1 Series Unit Settings

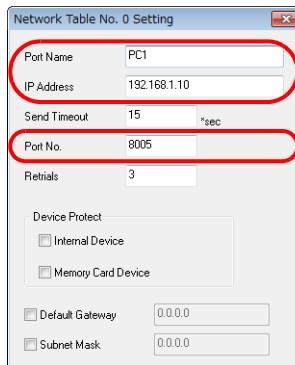
### Network Table Editing

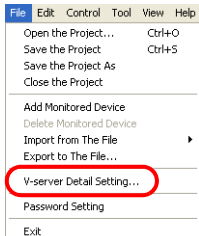
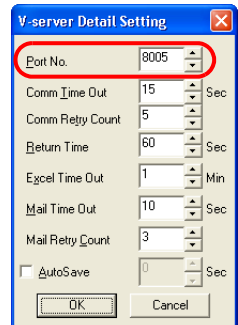
Register the IP address and port number of the PC installed with V-Server in the network table.

1. Click [System Setting] → [Ethernet Communication] → [Network Table]. The [Network Table Edit] window is displayed.



2. Double-click a number in the [No.] column to display the [Network Table Setting] window and configure the following settings.



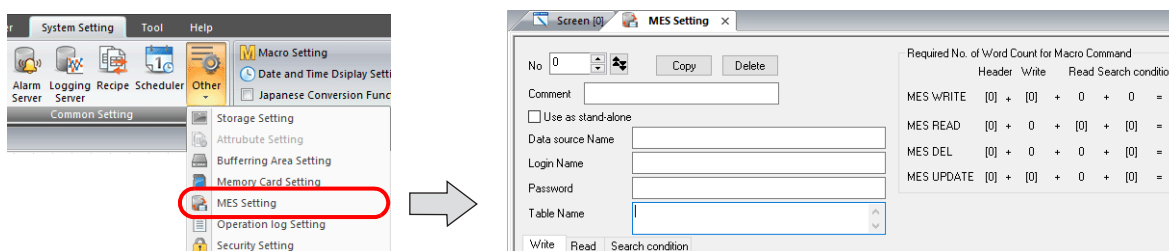
Item	Description
Port Name	Set the name of the PC.
IP Address	Set the IP address of the PC.
Port No.	<p>Specify the port number of V-Server. (Default: 8005)                      * The port number can be checked in V-Server software via [File] → [V-server Detail Setting] → [Port No.].</p> <div style="display: flex; align-items: center; justify-content: center;">  <span style="margin: 0 10px;">→</span>  </div>
Send Timeout Retrials Device Protect Default Gateway Subnet Mask	Setting these items is not required when registering the IP address of the PC.

3. Click [OK]. The settings are registered to the network table.
4. If multiple PCs are connected, perform the above registration steps for each PC.



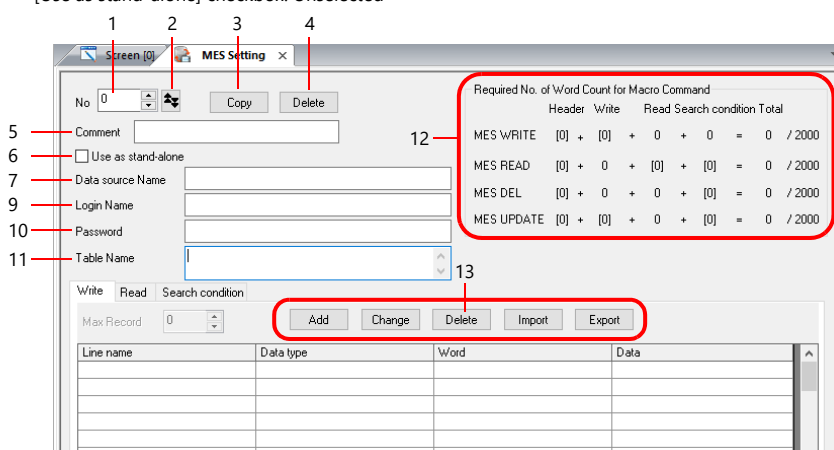
## MES Settings

Click [System Setting] → [Other] → [MES Setting]. The [MES Setting] window is displayed.

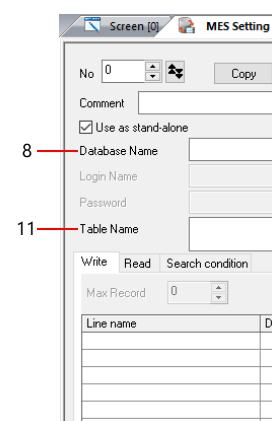


### Common settings

- [Use as stand-alone] checkbox: Unselected



- [Use as stand-alone] checkbox: Selected



No	Item	Description								
1	No.	Switch between MES setting numbers (0 to 255).								
2	Skip Unregistered No.	Click this button to skip unregistered numbers when switching between MES setting numbers.								
3	Copy	Copy data associated with the current MES settings to the specified destination.								
4	Delete	Delete the current MES settings.								
5	Comment	Enter a comment describing the MES settings. Maximum of 16 one-byte characters (8 two-byte characters.)								
6	Use as stand-alone	<p>A database file is created in storage. Adding, searching, and deleting of database records is possible.</p> <p>Filename (database name).db (database name).db-journal *1)</p> <p>Storage to Use Specify the storage to use on the [System Setting] → [Other] → [Storage Setting] window.</p> <table border="1"> <thead> <tr> <th>Storage</th> <th>File Directory</th> </tr> </thead> <tbody> <tr> <td>sd Folder (Internal storage)</td> <td>C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)\DATABASE            └── 0: Main app in multi-display            1: Sub app in multi-display</td> </tr> <tr> <td>usb Folder (Internal storage)</td> <td>C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)\DATABASE            └── 0: Main app in multi-display            1: Sub app in multi-display</td> </tr> <tr> <td>USB storage device *2</td> <td>(Drive name):\X1_Storage\(\access folder)\DATABASE</td> </tr> </tbody> </table> <p>For details on the [Storage Setting] window, refer to "9 Storage".</p> <p>Execute the "MES WRITE" macro command to create a database file. The clock of the X1 series unit is used when recording the date and time in the database.</p>	Storage	File Directory	sd Folder (Internal storage)	C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)\DATABASE └── 0: Main app in multi-display 1: Sub app in multi-display	usb Folder (Internal storage)	C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)\DATABASE └── 0: Main app in multi-display 1: Sub app in multi-display	USB storage device *2	(Drive name):\X1_Storage\(\access folder)\DATABASE
Storage	File Directory									
sd Folder (Internal storage)	C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)\DATABASE └── 0: Main app in multi-display 1: Sub app in multi-display									
usb Folder (Internal storage)	C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)\DATABASE └── 0: Main app in multi-display 1: Sub app in multi-display									
USB storage device *2	(Drive name):\X1_Storage\(\access folder)\DATABASE									
7	Data source Name	Specify the data source name of the database. 32 bytes maximum								
8	Database Name	Specify the name of the database file to create in storage. Maximum of 32 bytes using one-byte alphanumeric characters (uppercase/lowercase) and underscore ( _ )								
9	Login Name	Specify a login name used for accessing the database. 32 bytes maximum								
10	Password	Specify a password used for accessing the database. 32 bytes maximum								
11	Table Name	Specify the name of the table in the database. 128 bytes maximum								

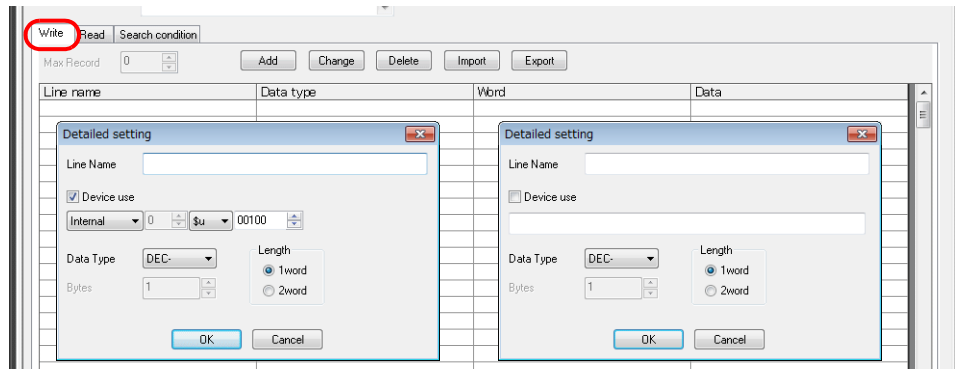
No	Item	Description
12	Required No. of Word Count for Macro Command	<p>This area shows the number of words used for each macro command based on the current settings. A number of words more than the maximum of 2,000 is highlighted in red. Adjust the number of registrations, length of line names, and number of words so that 2,000 words are not exceeded.</p> <p>Words in total for each macro command</p> <p>Number of words used for Write, Read and Search condition          With [ ]: Valid_          Without [ ]: Invalid (always "0")</p>
13	Write Read Search condition	<p>Display the [Detailed setting] window. Enter a line name as targeted for writing and the data type in this window. 256 maximum</p> <hr/> <p>Display the [Detailed setting] window. Change the registered settings.</p> <hr/> <p>Delete the registered settings.</p> <hr/> <p>Import a CSV file into the current MES settings.</p> <hr/> <p>Export the current MES settings into an CSV file.</p>

\*1 Temporary file created during data update.

\*2 Selection of the "usb Folder" option is disabled. For details on the [Storage Setting] window, refer to "9 Storage".

### [Write] tab window

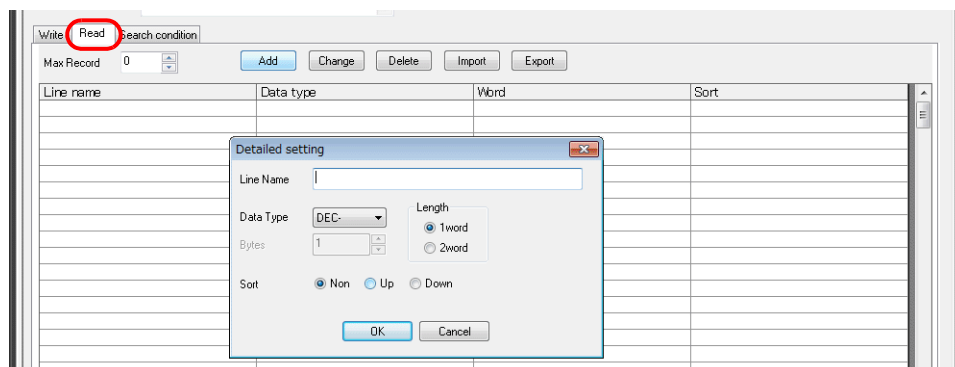
The [Write] tab window is used for adding data to the database.



Item	Description															
Line Name	Specify the name of the line to which you will add data. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . ( / ) ` space															
Device use	Specify the data for writing. 256 bytes maximum <ul style="list-style-type: none"> <li>With device memory specification: Set the device memory address to store the data for writing.                             <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Device Memory</th> <th>Input Type</th> <th>Text Processing</th> </tr> </thead> <tbody> <tr> <td>PLC1 - PLC8</td> <td colspan="2">Depends on the input type of each PLC.</td> </tr> <tr> <td>Internal</td> <td>DEC</td> <td>LSB → MSB</td> </tr> </tbody> </table> </li> <li>Without device memory specification: Set a constant or fixed string of text.</li> </ul>	Device Memory	Input Type	Text Processing	PLC1 - PLC8	Depends on the input type of each PLC.		Internal	DEC	LSB → MSB						
Device Memory	Input Type	Text Processing														
PLC1 - PLC8	Depends on the input type of each PLC.															
Internal	DEC	LSB → MSB														
Data Type Length Bytes	Set the data type of the data for writing, data length, and number of bytes. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Data type</th> <th>Length</th> <th>Bytes</th> </tr> </thead> <tbody> <tr> <td>DEC-</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>CHAR</td> <td>128 word</td> <td>256 bytes maximum</td> </tr> <tr> <td>BCD</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>FLOAT</td> <td>2 word</td> <td>-</td> </tr> </tbody> </table>	Data type	Length	Bytes	DEC-	1 words/2 words	-	CHAR	128 word	256 bytes maximum	BCD	1 words/2 words	-	FLOAT	2 word	-
Data type	Length	Bytes														
DEC-	1 words/2 words	-														
CHAR	128 word	256 bytes maximum														
BCD	1 words/2 words	-														
FLOAT	2 word	-														

### [Read] tab window

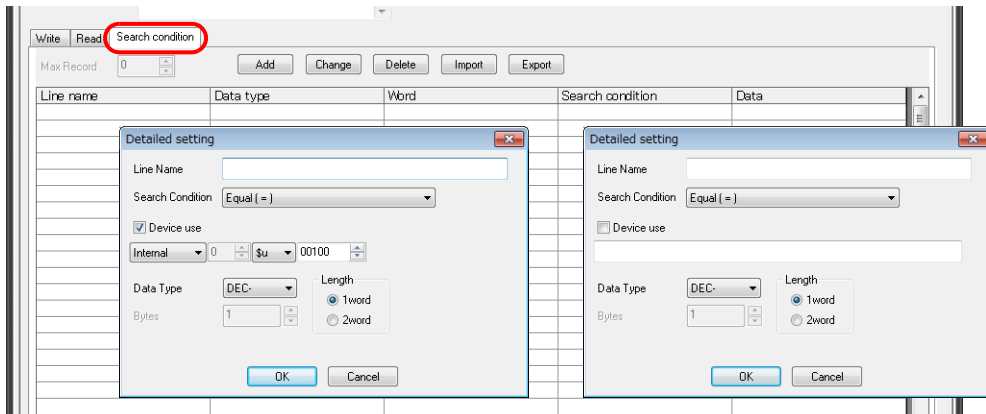
Configure settings for searching the database.



Item	Description															
Max Record	Specify the maximum number of records to display in the search results. 65536 maximum															
Line Name	Specify the line name targeted in searching. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . ( / ) ` space															
Data Type Length Bytes	Specify the data type, data length, and number of bytes of the data targeted in searching. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Data type</th> <th>Length</th> <th>Bytes</th> </tr> </thead> <tbody> <tr> <td>DEC-</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>CHAR</td> <td>128 word</td> <td>256 bytes maximum</td> </tr> <tr> <td>BCD</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>FLOAT</td> <td>2 word</td> <td>-</td> </tr> </tbody> </table>	Data type	Length	Bytes	DEC-	1 words/2 words	-	CHAR	128 word	256 bytes maximum	BCD	1 words/2 words	-	FLOAT	2 word	-
Data type	Length	Bytes														
DEC-	1 words/2 words	-														
CHAR	128 word	256 bytes maximum														
BCD	1 words/2 words	-														
FLOAT	2 word	-														
Sort	Set an option for sorting the search results. Non / Up / Down															

### [Search condition] tab window

Configure settings for searching the database. This tab is also used to delete data from the database.



Item	Description																		
Line Name	Specify the line name targeted in searching. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . ( / ) ` space																		
Search Condition	Set the search conditions. When searching based on multiple conditions, use AND. <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Search condition</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>Equal (=)</td> <td></td> </tr> <tr> <td>Not equal (!=)</td> <td></td> </tr> <tr> <td>Big (&gt; value)</td> <td></td> </tr> <tr> <td>Small (&lt; value)</td> <td></td> </tr> <tr> <td>Upper (&gt;= value)</td> <td></td> </tr> <tr> <td>Under (&lt;= value)</td> <td></td> </tr> <tr> <td>Include character string</td> <td>Wildcard (%) usable Example: AA%: Text beginning with AA to be searched</td> </tr> <tr> <td>Update</td> <td>Extract records that do not match the data for searching from the specified line name. These records are then replaced as the data for searching.</td> </tr> </tbody> </table>	Search condition	Remarks	Equal (=)		Not equal (!=)		Big (> value)		Small (< value)		Upper (>= value)		Under (<= value)		Include character string	Wildcard (%) usable Example: AA%: Text beginning with AA to be searched	Update	Extract records that do not match the data for searching from the specified line name. These records are then replaced as the data for searching.
Search condition	Remarks																		
Equal (=)																			
Not equal (!=)																			
Big (> value)																			
Small (< value)																			
Upper (>= value)																			
Under (<= value)																			
Include character string	Wildcard (%) usable Example: AA%: Text beginning with AA to be searched																		
Update	Extract records that do not match the data for searching from the specified line name. These records are then replaced as the data for searching.																		
Device use	Specify the data targeted for searching. 256 bytes maximum <ul style="list-style-type: none"> <li>With device memory specification: Set the device memory address to store the data for searching.                             <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Device Memory</th> <th>Input Type</th> <th>Text Processing</th> </tr> </thead> <tbody> <tr> <td>PLC1 - PLC8</td> <td colspan="2">Depends on the input type of each PLC.</td> </tr> <tr> <td>Internal</td> <td>DEC</td> <td>LSB → MSB</td> </tr> </tbody> </table> </li> <li>Without device memory specification: Set a constant or fixed string of text.</li> </ul>	Device Memory	Input Type	Text Processing	PLC1 - PLC8	Depends on the input type of each PLC.		Internal	DEC	LSB → MSB									
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PLC1 - PLC8	Depends on the input type of each PLC.																		
Internal	DEC	LSB → MSB																	
Data Type Length Bytes	Specify the data type, data length, and number of bytes of the data targeted in searching. <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Data type</th> <th>Length</th> <th>Bytes</th> </tr> </thead> <tbody> <tr> <td>DEC-</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>CHAR</td> <td>128 word</td> <td>256 bytes maximum</td> </tr> <tr> <td>BCD</td> <td>1 words/2 words</td> <td>-</td> </tr> <tr> <td>FLOAT</td> <td>2 word</td> <td>-</td> </tr> </tbody> </table>	Data type	Length	Bytes	DEC-	1 words/2 words	-	CHAR	128 word	256 bytes maximum	BCD	1 words/2 words	-	FLOAT	2 word	-			
Data type	Length	Bytes																	
DEC-	1 words/2 words	-																	
CHAR	128 word	256 bytes maximum																	
BCD	1 words/2 words	-																	
FLOAT	2 word	-																	

## Macros

The MES interface function uses the following five types of macros.

### MES macro command list

Category	Command Name	Mnemonic	Description	Refer to
MES	MES	MES CHECK (F1, F2, F3)	V-server start check *	<a href="#">page 6-23</a>
		MES WRITE (F1, F2, F3)	Adding data to the database	<a href="#">page 6-24</a>
		MES READ (F1, F2, F3)	Searching the database	<a href="#">page 6-25</a>
		MES DEL (F1, F2, F3)	Deleting data from the database	<a href="#">page 6-27</a>
		MES UPDATE (F1, F2, F3)	Updating the database	<a href="#">page 6-28</a>

\* This command is not used when the [Use as stand-alone] checkbox is selected at [System Setting] → [Other] → [MES Setting].

### MES CHECK (F1, F2, F3)

Function: V-server start check

This macro is used to check whether V-Server at the location specified in table No. [F2] is running. The returned value specified in [F3] is stored in the memory at the return address of [F1].

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	⊙		
F2	○		○
F3	○		○

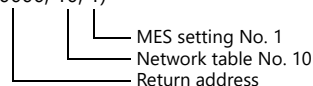
○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

Range

	Value
F0	MES CHECK
F1	Return address
F2	0 to 255: Network table number
F3	0 to 65535 (-32768 to 32767): Return value

Operation Example

MES CHECK (\$u0000, 10, 1)



The above macro checks whether V-Server is running on the PC registered to network table number 10. If V-Server is running, a return value of "1" is stored at the return address of \$u0000.

Supplementary information


- Execute the macro after setting a value other than the returned value at the return address.
- The execution type of the macro can be set using \$s514. For details, refer to [page 6-29](#).  
When a macro command is executed, if "1" (other than "0") is set for \$s514 while V-Server is not running, no response is given from V-Server and the X1 series unit will enter the standby state. It is recommended to execute this command when "0" is set for \$s514.
- The result of the macro execution is stored in the device memory address \$s515. For details, refer to [page 6-29](#).
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the X1 series unit.
- This command is not used when the [Use as stand-alone] checkbox is selected at [System Setting] → [Other] → [MES Setting].
- The port of the X1 series unit for transmitting and receiving commands can be changed by storing a value in \$s512.
  - 0: LAN
  - 2: LAN2
  - 3: WLAN

## MES WRITE (F1, F2, F3)

Function: Adding data to the database

This macro is used to add the data set on the [Write] tab window under MES setting No. [F3] to the database. The data is added using V-Server at the location specified in table No. [F2]. The result is stored at the [F1] return address.

When used in the stand-alone configuration, table No. [F2] is not used. If the database file is not found in storage, it is newly created.

 For a stand-alone configuration, the [Use as stand-alone] checkbox must be selected at [System Setting] → [Other] → [MES Setting]. For details on the stand-alone configuration, refer to [page 6-17](#).

Device memory used

	Internal	PLC 1 to 8	Constant	Remarks
F1	⊙			
F2	○		○	Invalid with stand-alone configuration
F3	○		○	

○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

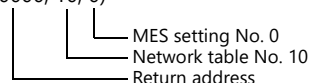
Range

	Value		Remarks
F0	MES WRITE		
F1	Return address	Return value 0: Successful completion -1: Ended in error	
F2	0 to 255: Network table No.		Invalid with stand-alone configuration
F3	0 to 255: MES setting No.		

Operation Example

- PC used as server

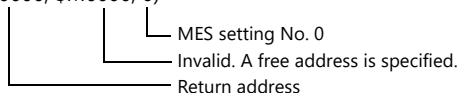
MES WRITE (\$u0000, 10, 0)



The above macro adds data to the database of the PC specified in network table No. 10. The data to be added depends on the settings made for MES setting No. 0. When the data update is completed normally, a return value of "0" is stored at the return address of \$u0000.

- Stand-alone configuration

MES WRITE (\$u0000, \$M0000, 0)



The above macro command adds a record to a database file in storage. The data to be added depends on the settings made for MES setting No. 0.

If a database is not found, it is newly created.

When writing of data is completed normally, a return value of "0" is stored at the return address \$u0000.

Supplementary information

- The execution type of the macro can be set using \$s514. For details, refer to [page 6-29](#).
- The result of the macro execution is stored in the device memory address \$s515.
  - 40: The [Write] tab window setting is not made in the specified MES setting number, or any setting error is found. For details on other error numbers, refer to [page 6-29](#).
- On a stand-alone configuration, storage-related errors that occur while a macro command is being executed are stored in \$s1030 ("sd" folder) and \$s1035 ("usb" folder, USB storage device).
  - 12: Read error due to corrupted the database file or there is not enough free space.
  - 16: Write error due to corrupted the database file.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- The primary key for V-Server must be set to the database table. ([page 6-42](#)) On a stand-alone configuration, the key is registered when a database is created using the "MES WRITE" macro command.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the X1 series unit.
- The port of the X1 series unit for transmitting and receiving commands can be changed by storing a value in \$s512.
  - 0: LAN
  - 2: LAN2
  - 3: WLAN

## MES READ (F1, F2, F3)

Function: Searching the database

This macro is used to search the line set on the [Read] tab window for MES setting No. [F3]. The search is performed based on the specified search conditions via V-Server at the location specified in table No. [F2]. The result is stored at the [F1] return address.

When used in the stand-alone configuration, table No. [F2] is not used.



For a stand-alone configuration, the [Use as stand-alone] checkbox must be selected at [System Setting] → [Other] → [MES Setting]. For details on the stand-alone configuration, refer to [page 6-17](#).

Device memory used

	Internal	PLC 1 to 8	Constant	Remarks
F1	⊙			
F2	○		○	Invalid with stand-alone configuration
F3	○		○	

○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

Range

	Value	Remarks
F0	MES READ	
F1	Return address	
F2	0 to 255: Network table No.	Invalid with stand-alone configuration
F3	0 to 255: MES setting No.	

Return address

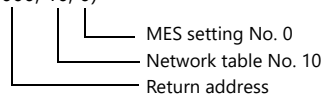
The following data is stored at the addresses starting from the [F1] return address.

Return address	Value
n	Execution result Normally finished: 0 Error: Other than 0
n+1	Number of retrieved records The number of records that match the search conditions is stored. If no records are found, 0 is stored. The maximum number of records is set on the [Read] tab window in the MES settings.
n+2 -	Obtained data 1 The retrieved data is stored in the format specified on the [Read] tab window in the MES settings.
:	Obtained data 2
:	Obtained data 3
:	:
:	Obtained data m (maximum number of records)

Operation example

- PC used as server

MES READ (\$u0000, 10, 0)

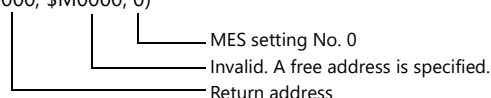


The above macro command searches the database on the PC specified in network table No. 10.

The search is performed according to the settings on the [Read] and [Search condition] tab windows of MES setting No. 0. When the search is completed successfully, a return value of "0" and the obtained data are stored at the addresses starting from the return address \$u0000.

- Stand-alone configuration

MES READ (\$u0000, \$M0000, 0)



The above macro command searches the database data in storage.

The search is performed according to the settings on the [Read] and [Search condition] tab windows of MES setting No. 0.

When the search is completed successfully, a return value of "0" and the obtained data are stored at the addresses starting from the return address \$u0000.

Supplementary information

- The execution type of the macro can be set using \$s514. For details, refer to [page 6-29](#).
- The result of the macro execution is stored in the device memory address \$s515.
  - 40: The [Read] tab window setting is not made in the specified MES setting number, or any setting error is found. For details on other error numbers, refer to [page 6-29](#).
- On a stand-alone configuration, storage-related errors that occur while a macro command is being executed are stored in \$s1030 ("sd" folder) and \$s1035 ("usb" folder, USB storage device).
  - 12: Read error due to corrupted the database file or there is not enough free space.
  - 16: Write error due to corrupted the database file.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- If settings are not configured on the [Search condition] tab window for the specified MES setting number, all records are extracted as the results of the search.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the X1 series unit.
- The port of the X1 series unit for transmitting and receiving commands can be changed by storing a value in \$s512.
  - 0: LAN
  - 2: LAN2
  - 3: WLAN




## MES DEL (F1, F2, F3)

Function: Deleting records from the database

This macro is used to search the database according to the settings on the [Search condition] tab window for MES setting No. [F3]. The search is performed via V-Server at the location specified in table No. [F2]. The records that match the conditions are deleted. The result is stored at the [F1] return address.

When used in the stand-alone configuration, table No. [F2] is not used.

 For a stand-alone configuration, the [Use as stand-alone] checkbox must be selected at [System Setting] → [Other] → [MES Setting]. For details on the stand-alone configuration, refer to [page 6-17](#).

Device memory used

	Internal	PLC 1 to 8	Constant	Remarks
F1	⊙			
F2	○		○	Invalid with stand-alone configuration
F3	○		○	

○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

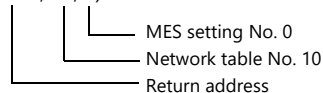
Range

	Value		Remarks
F0	MES DEL		
F1	Return address	Return value 0: Successful completion -1: Ended in error	
F2	0 to 255: Network table No.		Invalid with stand-alone configuration
F3	0 to 255: MES setting No.		

Operation example

- PC used as server

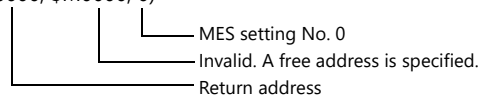
MES DEL (\$u0000, 10, 0)



The above macro command searches the database of the PC specified in network table No. 10 and deletes the retrieved data. The search is performed according to the settings on the [Search condition] tab window of MES setting No. 0. When the data is successfully deleted, a return value of "0" is stored at the return address \$u0000.

- Stand-alone configuration

MES DEL (\$u0000, \$M0000, 0)



The above macro command searches the database data in storage and deletes the retrieved data. The search is performed according to the settings on the [Search condition] tab window of MES setting No. 0. When the data is successfully deleted, a return value of "0" is stored at the return address \$u0000.

Supplementary information


- The execution type of the macro can be set using \$s514. For details, refer to [page 6-29](#).
- The result of the macro execution is stored in the device memory address \$s515.
  - 40: The [Search condition] tab window setting is not made in the specified MES setting number, or any setting error is found.
    - For details on other error numbers, refer to [page 6-29](#).
- On a stand-alone configuration, storage-related errors that occur while a macro command is being executed are stored in \$s1030 ("sd" folder) and \$s1035 ("usb" folder, USB storage device).
  - 12: Read error due to corrupted the database file or there is not enough free space.
  - 16: Write error due to corrupted the database file.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the X1 series unit.
- The port of the X1 series unit for transmitting and receiving commands can be changed by storing a value in \$s512.
  - 0: LAN
  - 2: LAN2
  - 3: WLAN

## MES UPDATE (F1, F2, F3)

Function: Updating the database

This macro is used to search the line set on the [Write] tab window for MES setting No. [F3]. The search is performed based on the specified search conditions via V-Server at the location specified in table No. [F2], and then the database is updated. The result is stored at the [F1] return address.

When used in the stand-alone configuration, table No. [F2] is not used.

 For a stand-alone configuration, the [Use as stand-alone] checkbox must be selected at [System Setting] → [Other] → [MES Setting]. For details on the stand-alone configuration, refer to [page 6-17](#).

Device memory used

	Internal	PLC 1 to 8	Constant	Remarks
F1	⊙			
F2	○		○	Invalid with stand-alone configuration
F3	○		○	

○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

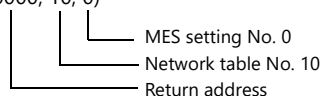
Range

	Value		Remarks
F0	MES UPDATE		
F1	Return address	Return value 0: Successful completion -1: Ended in error	
F2	0 to 255: Network table No.		Invalid with stand-alone configuration
F3	0 to 255: MES setting No.		

Operation example

- PC used as server

MES UPDATE (\$u0000, 10, 0)

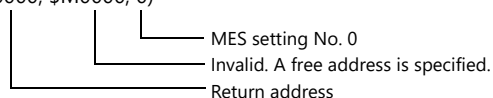


The above macro command searches the database on the PC specified in network table No. 10 and updates the database. The search is performed according to the settings on the [Write] and [Search condition] tab windows of MES setting No. 0.

When the data is successfully updated, a return value of "0" is stored at the return address \$u0000.

- Stand-alone configuration

MES UPDATE (\$u0000, \$M0000, 0)



The above macro command searches and updates the database data in storage. The search is performed according to the settings on the [Write] and [Search condition] tab windows of MES setting No. 0. When the data is successfully updated, a return value of "0" is stored at the return address \$u0000.

Supplementary information

- The execution type of the macro can be set using \$s514. For details, refer to [page 6-29](#).
- The result of the macro execution is stored in the device memory address \$s515.
  - 40: Settings are not configured on the [Write] or [Search condition] tab window for the specified MES setting number, or any setting error is found.
  - For details on other error numbers, refer to [page 6-29](#).
- On a stand-alone configuration, storage-related errors that occur while a macro command is being executed are stored in \$s1030 ("sd" folder) and \$s1035 ("usb" folder, USB storage device).
  - 12: Read error due to corrupted the database file or there is not enough free space.
  - 16: Write error due to corrupted the database file.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- This macro command cannot be executed when "Update" is set on the [Search condition] tab window.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the X1 series unit.
- The port of the X1 series unit for transmitting and receiving commands can be changed by storing a value in \$s512.
  - 0: LAN
  - 2: LAN2
  - 3: WLAN

## System Device Memory (\$s)

The system device memory related to MES macros are shown below.

Addresses	Description	Remarks																																				
\$s512 *1	Selection from two Ethernet ports 0: LAN 2: LAN2 3: WLAN	→ X1																																				
\$s514 *2	Macro Wait request  <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td>MSB</td> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> <td>LSB</td> </tr> <tr> <td></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td></td> </tr> </table> <p style="text-align: center;">System reserved (setting 0)</p> <p style="text-align: right;">Wait request 0: No 1: Yes</p> </div>	MSB	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	LSB		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		→ X1
MSB	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	LSB																					
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																						
\$s515	Macro Wait request execution result	X1 →																																				

\*1 Not used in a stand-alone configuration

\*2 When requests for MES macro commands (30 maximum) accumulate in the X1 series unit in a stand-alone configuration, the X1 series unit operates while waiting regardless of the \$s514 value.

### \$s514, 515

Device memory related to MES macros and Ethernet macros (SEND/ERead/EWRITE).

Executed with respect to the port specified with \$s512.

- \$s514: Set whether a macro wait request is on or off.
  - [0]: No wait  
During the execution of a macro command, the execution of the next macro command takes place before the completion of the current one.
  - Other than [0]: With wait  
During the execution of a macro command, the next macro command is put on hold and is executed after the completion of the current command.
- \* In the case of successive accesses to the same port on one single macro sheet, specify a value other than "0" (with wait). If "0" (no wait) is specified, a macro command issued afterward will not be accepted.
- \$s515: Store the macro execution result.  
When \$s514 is set to "0", the issue of a macro command is stored. When \$s514 is set to "1", the response returned for the command is stored.

Code *1	Description	Solution	PC as Server	Stand-alone
0	Normal	-	○	○
200 to 2001	Communication error between a device targeted by a macro command and a connected device Target device <ul style="list-style-type: none"> <li>• V9: 801 (link down)</li> <li>• V8/TS2060i/V7/V6: 200 to 2001</li> </ul>	A communication error code is stored when the device targeted by a macro command and a device are connected via Ethernet. For error contents and solutions, refer to the connection manual of the target device.	○	-
-8	Communication unavailable Inaccessible	Check whether the counterpart unit is running normally.	○	-
-32	The specified table is not used.	Check the network table settings.	○	-
-34	The specified table is in use.	Check whether system device memory \$s514 is set. If it is not to be set, reduce the number of communications.	○	-
-40	Setting data error	<ul style="list-style-type: none"> <li>• Check that [Write], [Read], and [Search condition] settings are configured for the specified MES setting number.</li> <li>• Check that the set data is correct.</li> </ul>	○	○
-51	Specified address error	<ul style="list-style-type: none"> <li>• Check that the specified address is correct.</li> <li>• For a \$L address, check if the setting is made.</li> </ul>	○	○
-60	Database access error	<ul style="list-style-type: none"> <li>• Check if the storage has enough free space.</li> <li>• Check if the storage to be accessed exists.</li> </ul>	-	○

Code *1	Description	Solution	PC as Server	Stand-alone
-61	Error during SQL execution	<ul style="list-style-type: none"> <li>Check that the [Table Name] setting is not left blank in the MES settings.</li> <li>Check that a schema name is not included in the table name.</li> </ul>	-	○
-62	Database not found	<ul style="list-style-type: none"> <li>Check that the [Database Name] setting is not left blank in the MES settings.</li> <li>Check if the database file exists. If the file is not found, newly create by executing "MES WRITE".</li> </ul>	-	○
-63	Database in use	Check if the database file is corrupted.	-	○
-64	Database format error	Check that the [Line name] contents and number of rows in the MES settings are the same as the column in the table that is referenced.	-	○
-65	Folder creation failure	<ul style="list-style-type: none"> <li>If executing the "MES WRITE" macro command, check if the storage folder to be accessed is full.</li> <li>If executing a macro command other than "MES WRITE", check if the access folder exists in the storage folder to access. Location to check: access folder\DATABASE\</li> </ul>	-	○

\*1 Number of records (lower 10 digits) in the "VsPrimaryKey" database  
 Depending on when an error occurs, attempts to write a record will be counted even if they are not successful. Therefore, a subsequently written record may be numbered non-consecutively.


All successful

VsPrimaryKey	Total	Name
210309140554608000000000	1000	Yama
210309144642142000000001	250	Sato
210309145006120000000002	123	Taki

An error has occurred

VsPrimaryKey	Total	Name
210309140554608000000000	1000	Yama
210309145006120000000002	123	Taki

The preceding "1" is missing.

 For details on the "VsPrimaryKey" database, refer to [page 6-42](#).

## 6.9.4 V-Server

### V-Server

Hakko Electronics V-Server is the software that enables accesses to databases.

Once V-Server is installed on a PC, no additional configuration is needed. The system requirements for V-Server are listed in the table below.

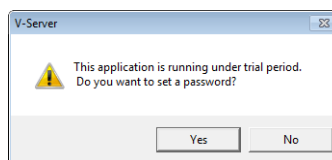
### System requirements

Item	Description
Computer	PC/AT compatible computer running Windows
OS	Windows 10 (32 bit, 64 bit)/ 8.1 (32 bit, 64 bit)/ 8 (32 bit, 64 bit)/ 7 (32 bit, 64 bit)/ Vista (32 bit, 64 bit)/ XP/ XP64 Edition/ Server 2016/ Server 2012/ Server 2008 R2
CPU	Pentium 4, 1 GHz or higher
Memory	Min. 256 MB
Hard disk	At installation: 2.5 GB or more
Display resolution	XGA (1024 × 768) or higher, Display color: High color (16-bit) or higher
Database	SQL Server (Microsoft) MSDE (Microsoft) Oracle (Oracle Corporation)

### Installation

1. Download the V-Server software to your PC from the Hakko Electronics website.
2. Install V-Server on the PC.
3. Start V-Server.

\* The message that appears at start-up indicates that V-Server is usable for one hour. To use V-Server without this limitation, please apply for a software license and obtain a password. For details, refer to the TELLUS and V-Server Manual.



## 6.9.5 Database

### Types of Databases

The following databases can be used.

- SQL Server: Microsoft
- MSDE: Microsoft
- Oracle: Oracle Corporation

This manual describes an example of configuration using Microsoft SQL Server 2019 Express Edition.

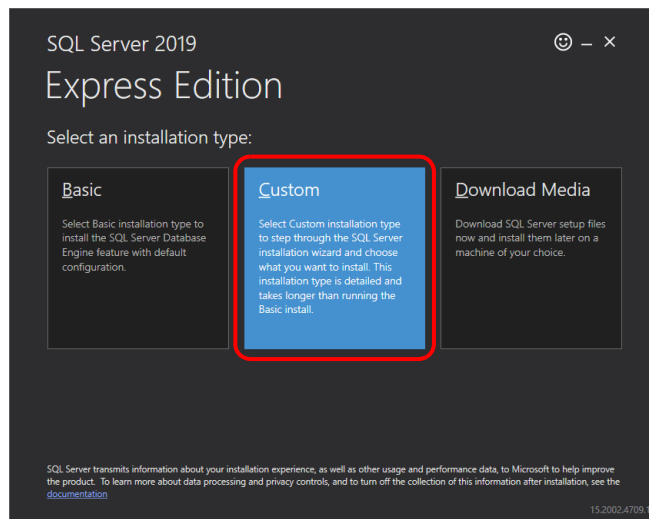
#### SQL Server 2019 Express Edition

This is a simplified version of SQL Server 2019. This software can be downloaded free of charge from Microsoft's website.

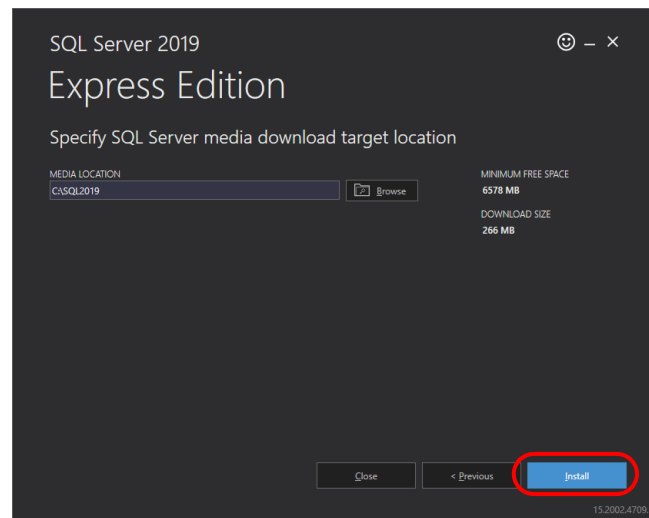
### SQL Server 2019 Express Edition

#### Installation

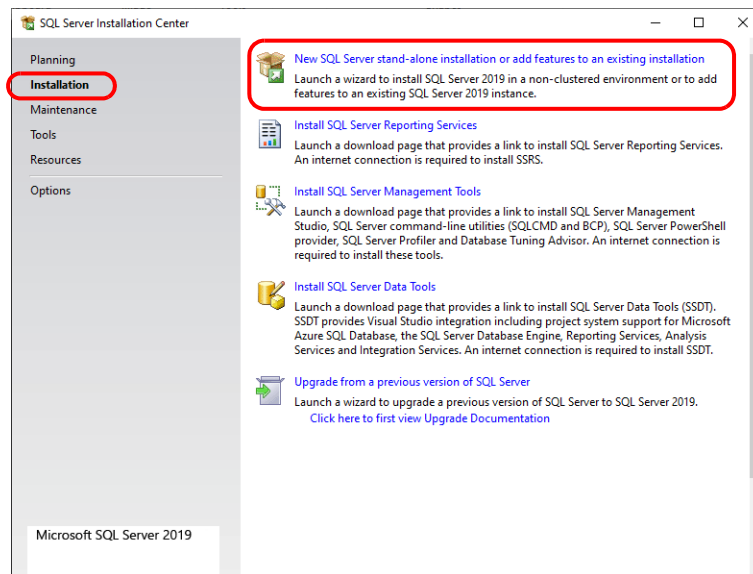
1. Download SQL Server 2019 Express Edition from Microsoft's website.
2. Double-click the downloaded executable file.
3. The following window is displayed. Select [Custom].



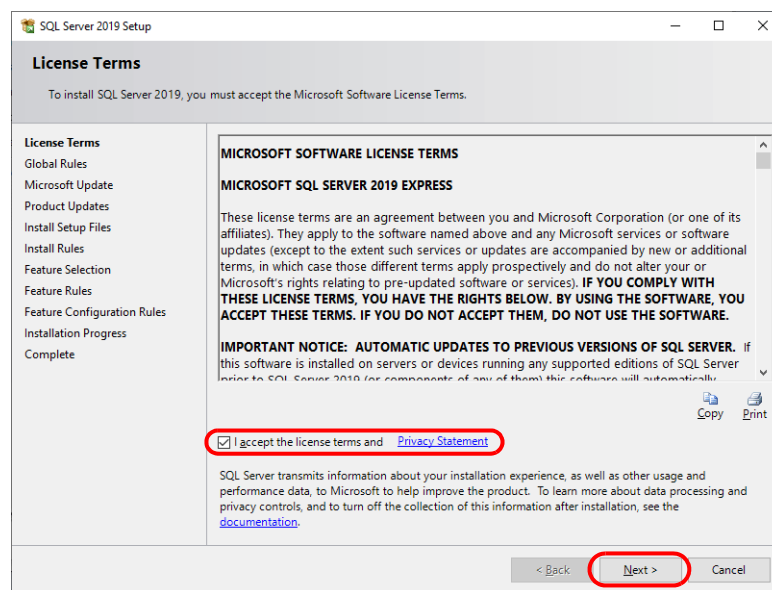
4. Specify the download target location and click [Install]. The installation package is downloaded.



5. The [SQL Server Installation Center] window is displayed. Select [New SQL Server stand-alone installation or add features to an existing installation].

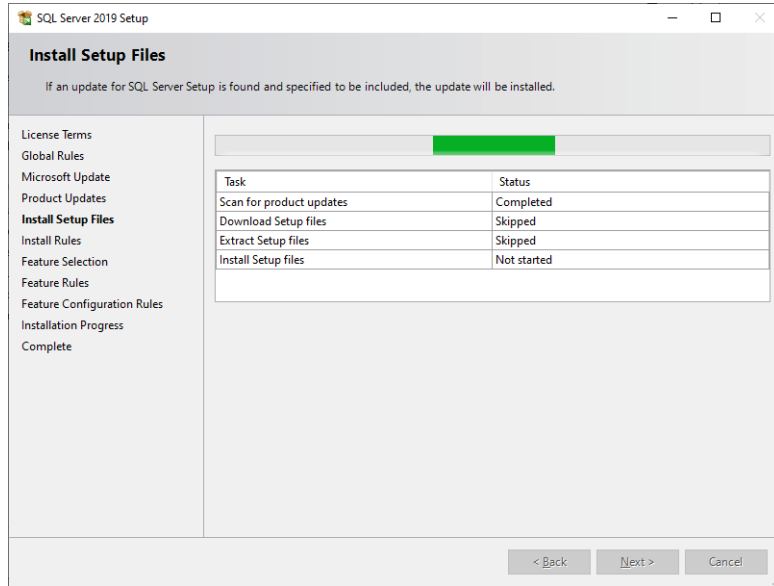


6. The license terms are displayed. Select the [I accept the license terms and Privacy Statement] checkbox and click the [Next] button.

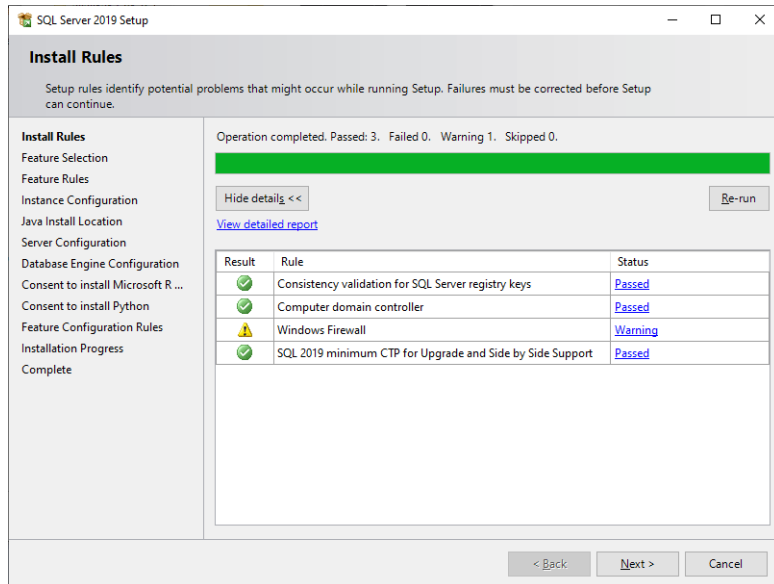


7. The [Product Updates] window is displayed. Proceed by following the instructions.

8. The [Install Setup Files] window is displayed and installation of setup files starts.

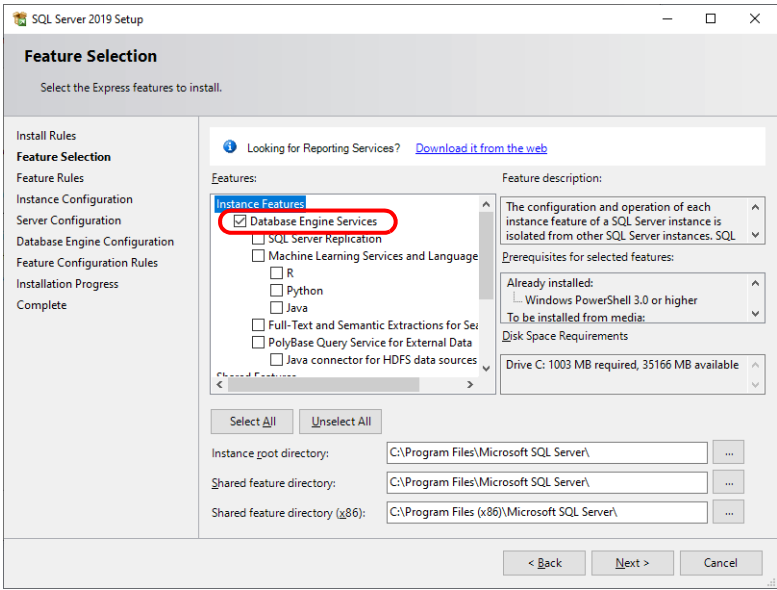


9. The [Install Rules] window is displayed. Proceed by following the instructions.

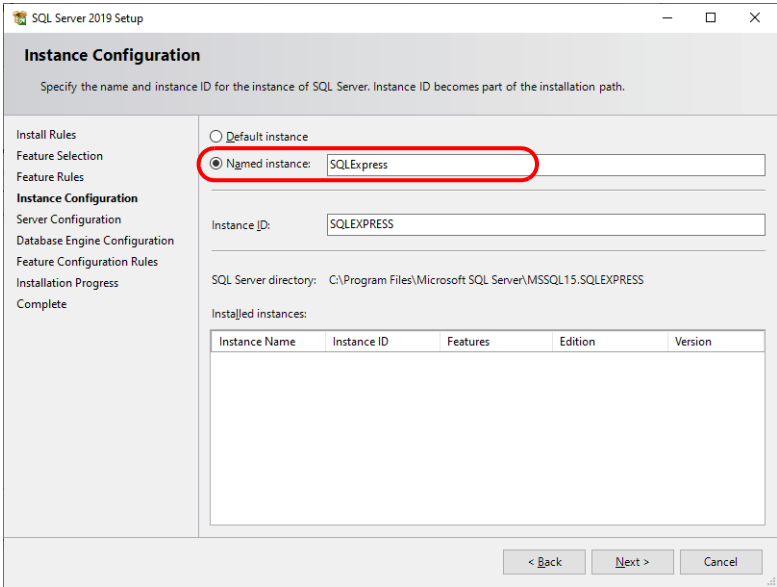




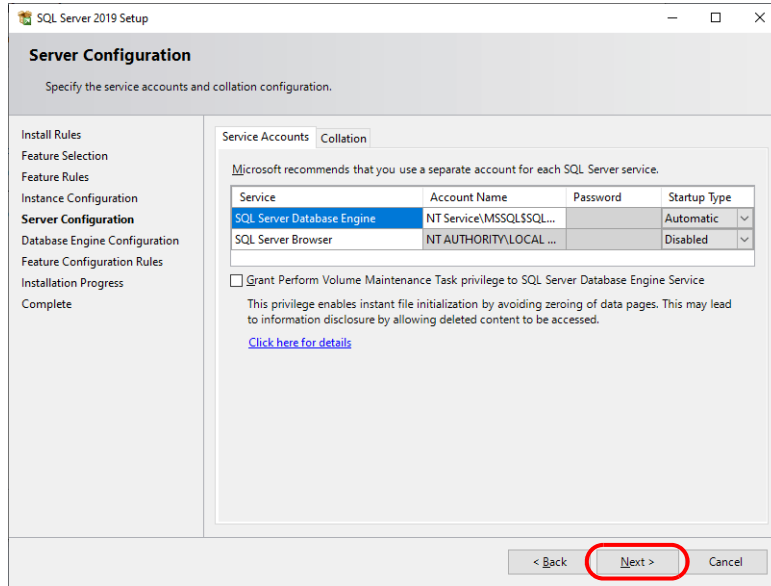
10. The [Feature Selection] window is displayed. Select the [Database Engine Services] checkbox and proceed to the next screen.



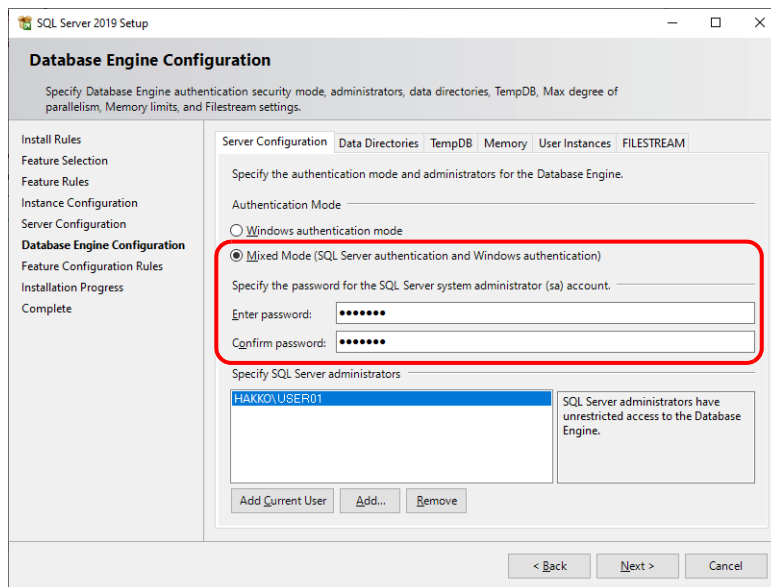
11. The [Instance Configuration] window is displayed. Select the [Named instance] radio button and proceed to the next screen.



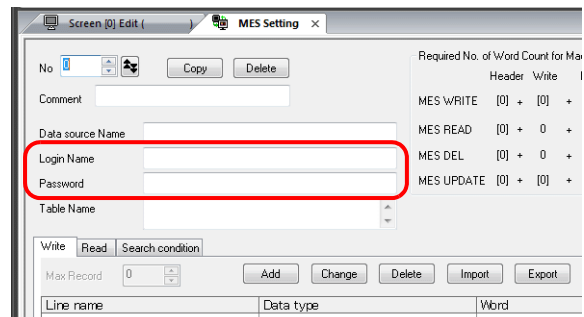
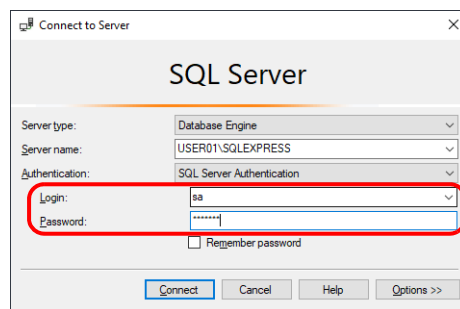
12. The [Server Configuration] window is displayed. Click the [Next] button.



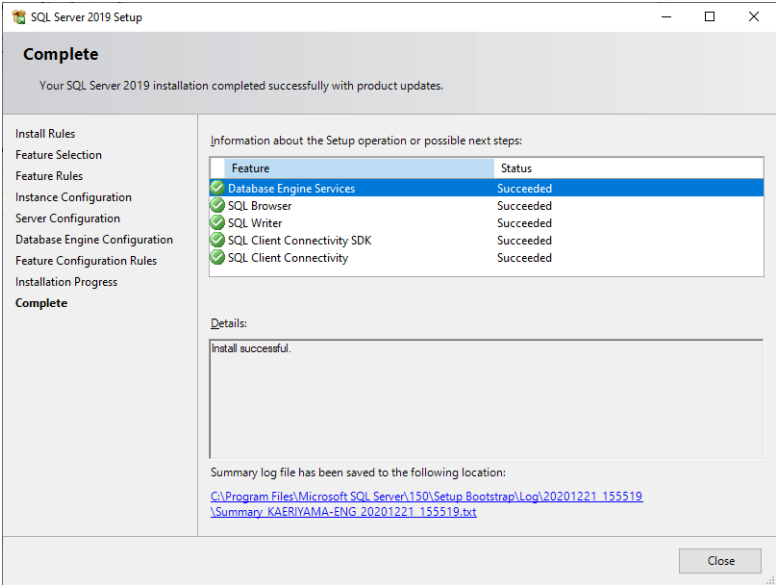
13. The [Database Engine Configuration] window is displayed. Select the [Mixed Mode] radio button and enter a password. Click the [Next] button to start installation.



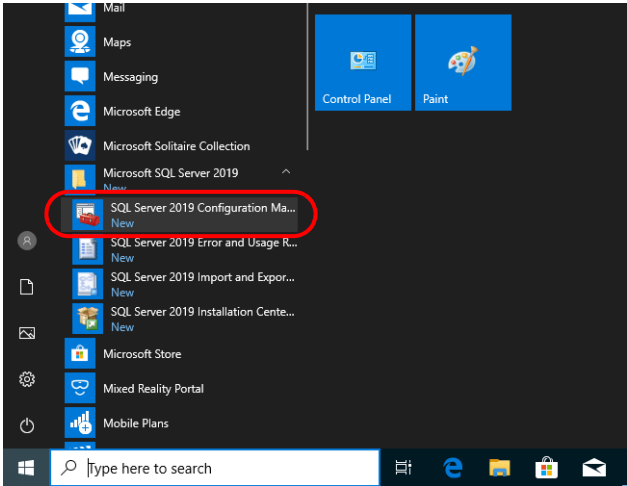
The password is required when connecting to the database and configuring MES settings in the V-SFT editor. Take care managing your password and do not lose it.



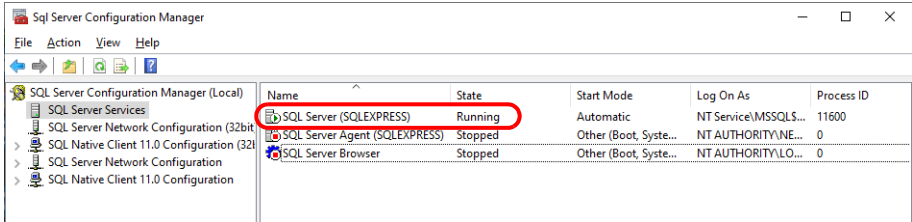
14. The [Complete] window is displayed when installation is finished. Click the [Close] button to exit.



- 15. Restart the PC.
- 16. Click the Windows start menu icon → [Microsoft SQL Server 2019] → [SQL Server 2019 Configuration Manager].



17. SQL Server Configuration Manager starts. Check that SQL Server (SQL Express) is running.



This completes the installation procedure.

## Creating an SQL Server Database

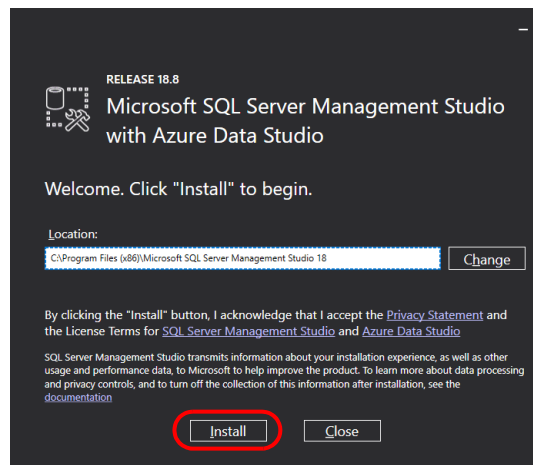
An SQL Server database can be created using Microsoft SQL Server Management Studio.

### Microsoft SQL Server Management Studio: SSMS

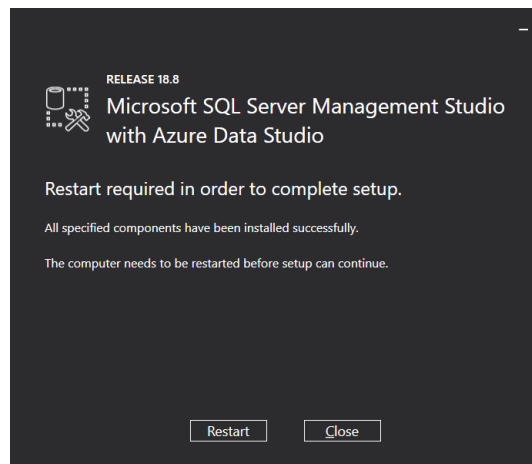
An easy-to-use, graphical management tool intended for management of SQL Server 2019 Express Edition

## Installation

1. Download SQL Server Management Studio from Microsoft's website.
2. Double-click the downloaded file.
3. The following window is displayed. Click [Install] to start installation.



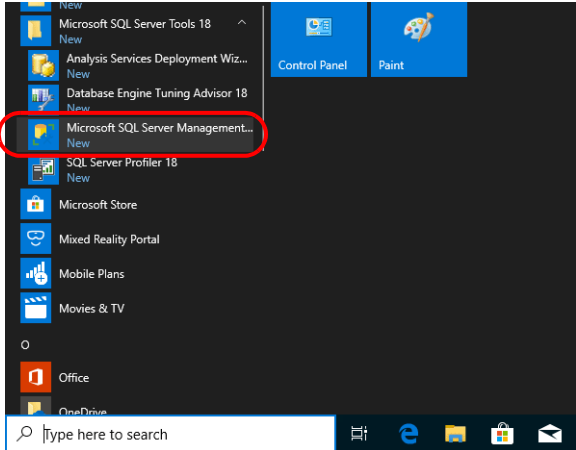
4. When installation is complete, the following window is displayed. Click [Restart].



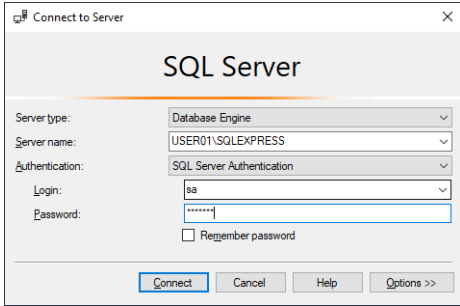
5. The PC reboots.  
This completes the installation procedure.

### Starting SQL Server Management Studio

- 1. Click the Windows start menu icon → [Microsoft SQL Server Tools 18] → [SQL Server Management Studio].

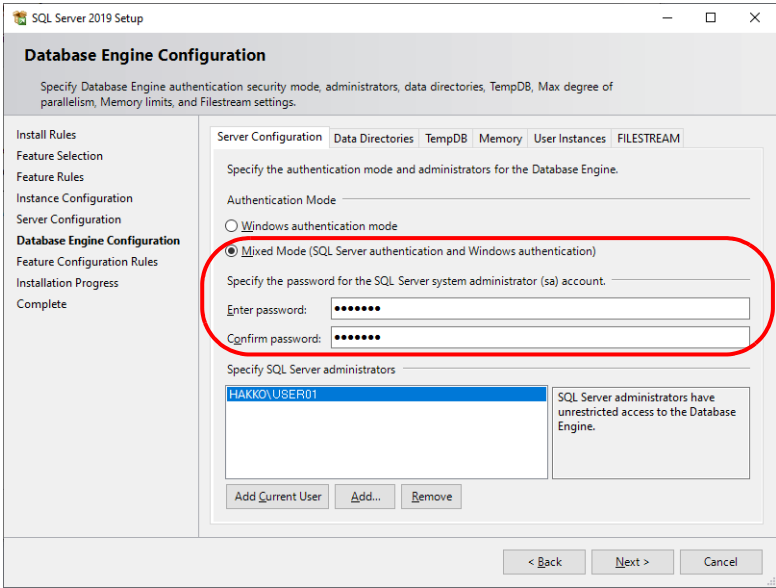


- 2. The [Connect to Server] window is displayed. Enter the required information and click [Connect].

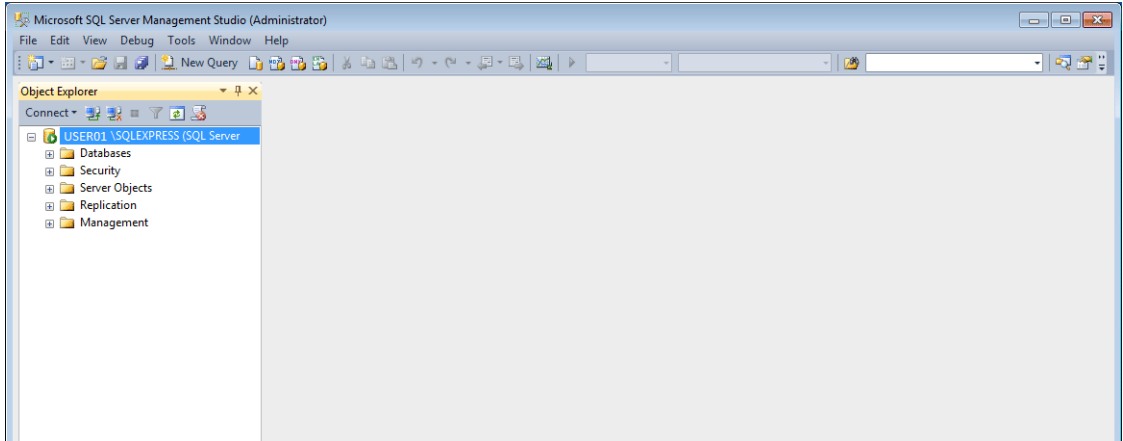


Item	Description
Server name	Select the server name of the SQL Server.
Authentication	Select "SQL Server Authentication".
Login	Enter a user name. The user name "sa" is entered in this example.
Password	Enter the password.

The password for "sa" was specified on the [Authentication Mode] window displayed during installation of SQL Server 2019 Express Edition (see page 6-36).

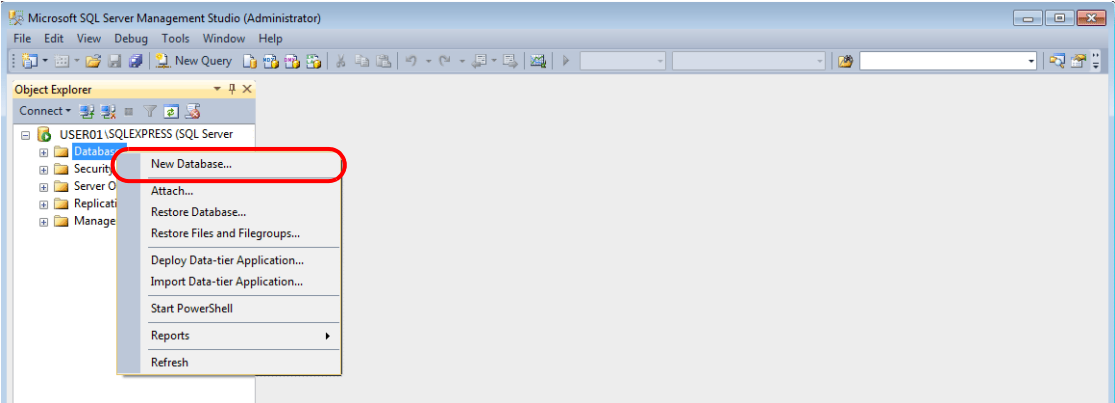


3. SQL Server Management Studio starts up.

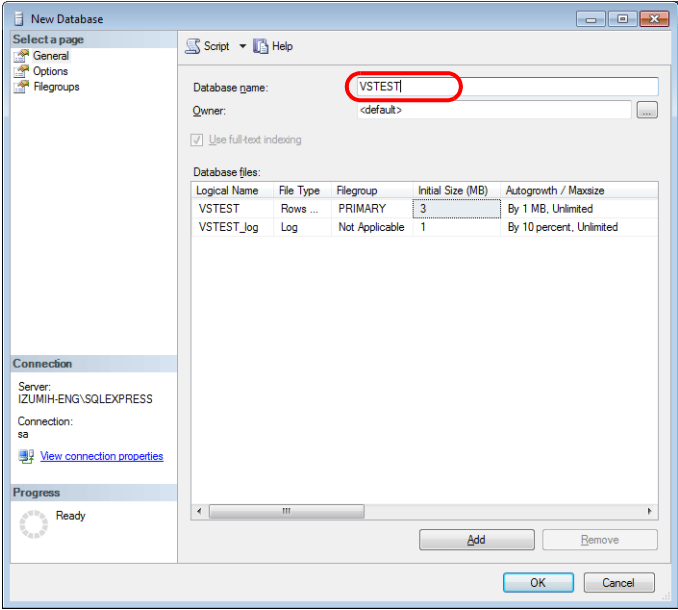


### Creating a new database

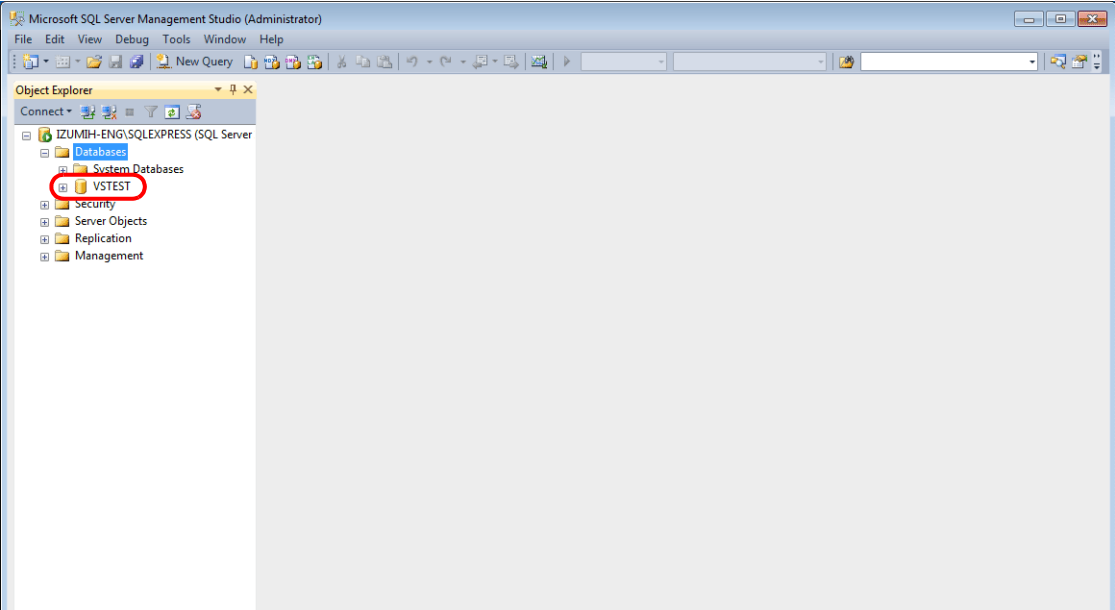
- 1. Select [Databases] and click [New Database] on the right-click menu.



- 2. The [New Database] window is displayed. Specify a database name and click the [OK] button.

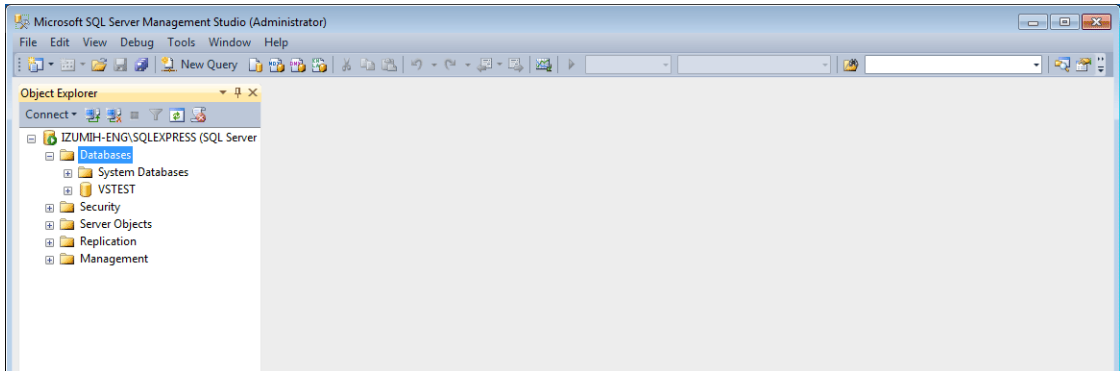


- 3. A new database is created.

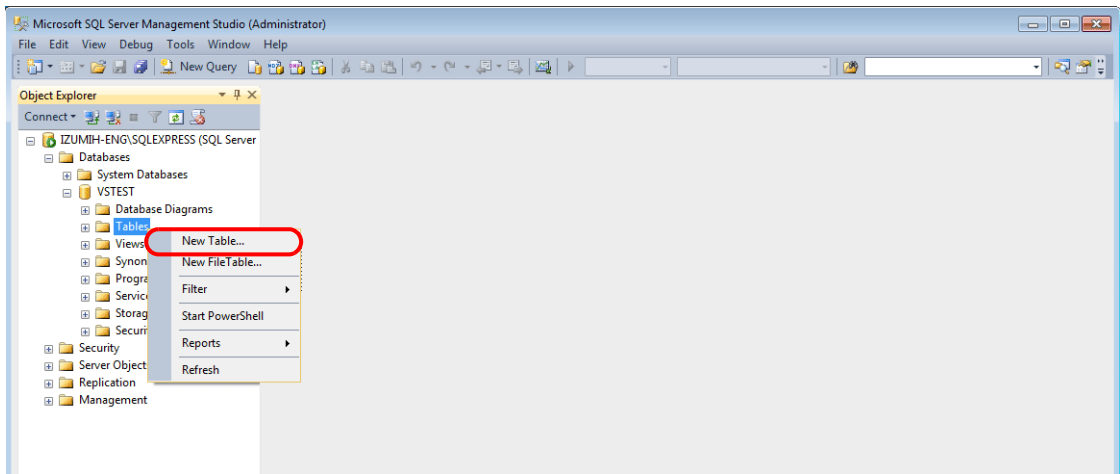


## Creating a new table

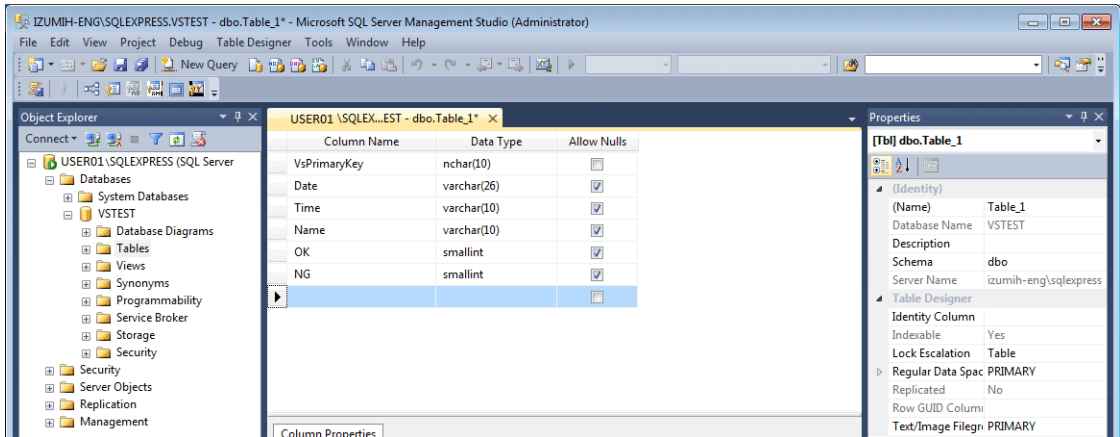
1. Start SQL Server Management Studio.



2. Select the database created in the previous section and click [New Table] on the right-click menu.



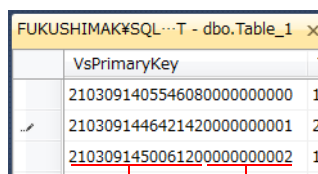
3. The table creation screen is displayed. Create a table by registering a line name and data type.



- Always set the primary key for V-Server for a database table to which data will be added.

Line Name	Data Type	Length	Allow Nulls	Primary Key
VsPrimaryKey	varchar	26 bytes or more	No	<input type="radio"/>

Example: Database results



Upper 15 digits: Date and time (March 9, 2021, 14:50:6120)

Lower 10 digits:

Number of records from 0 to 9999999999 (first record is "0")

- PC as server  
Records are numbered consecutively starting from "0" when V-Server starts. The numbering is reset to "0" when V-Server is terminated. \*
- Stand-alone configuration (storage folder)  
Records are numbered consecutively starting from "0" when the X1 series unit enters RUN mode. The numbering is reset to "0" when the X1 series unit exits RUN mode. \*

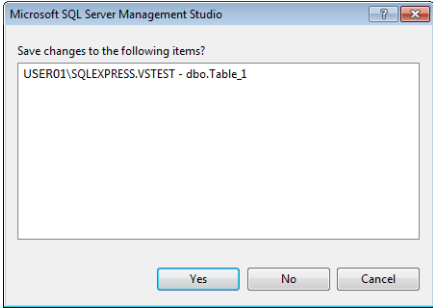
\* The numbering is also reset to "0" when the maximum number "9999999999" is reached.



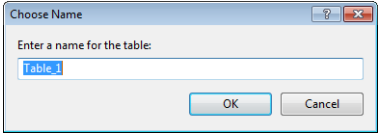
- The following data types can be used with the MES interface function. These correspond to the data types in the MES settings in V-SFT.

Database: Table				V-SFT: MES settings	
Line Name	Data Type	Length	Allow Nulls	Data type	Length
(Arbitrary)	smallint	1 word	Permitted	DEC-BCD	1 word
(Arbitrary)	int	2 word	Permitted		2 word
(Arbitrary)	Float	2 word	Permitted	FLOAT	2 word
(Arbitrary)	varchar	Arbitrary	Permitted	CHAR	256 bytes maximum

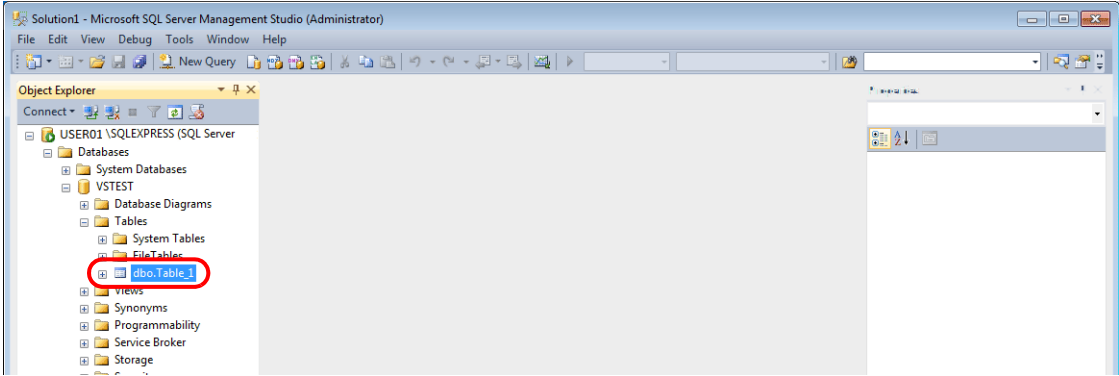
4. When the table settings are complete, close the table. The confirmation dialog box is displayed. Click the [Yes] button.



5. Enter a name and click the [OK] button.



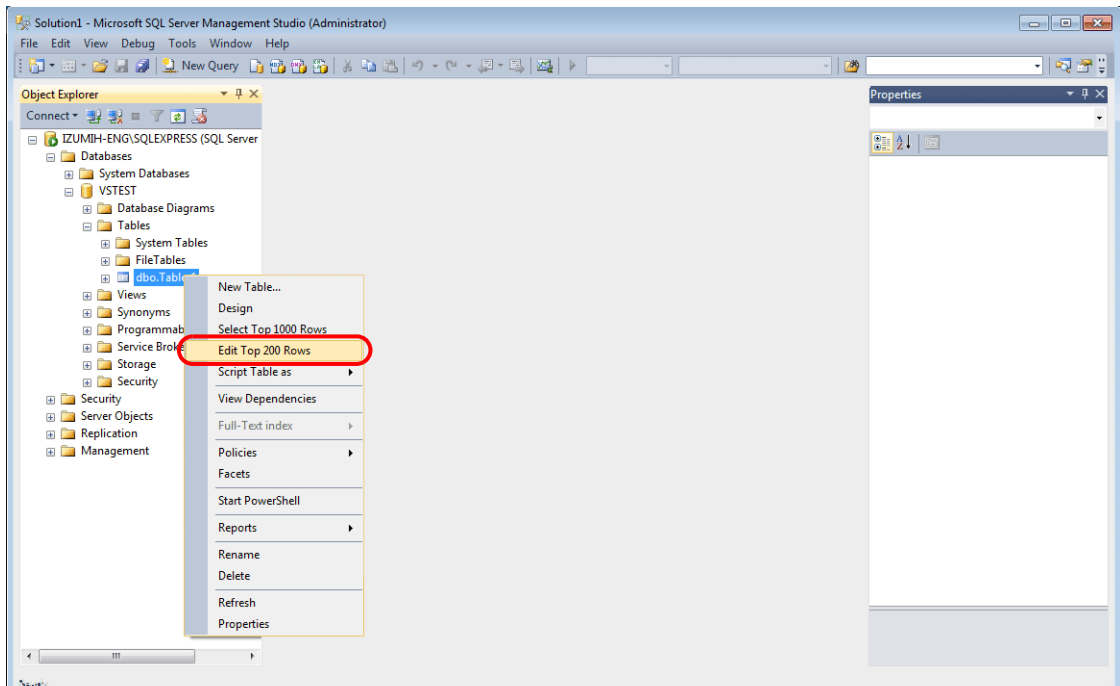
6. The table is created.



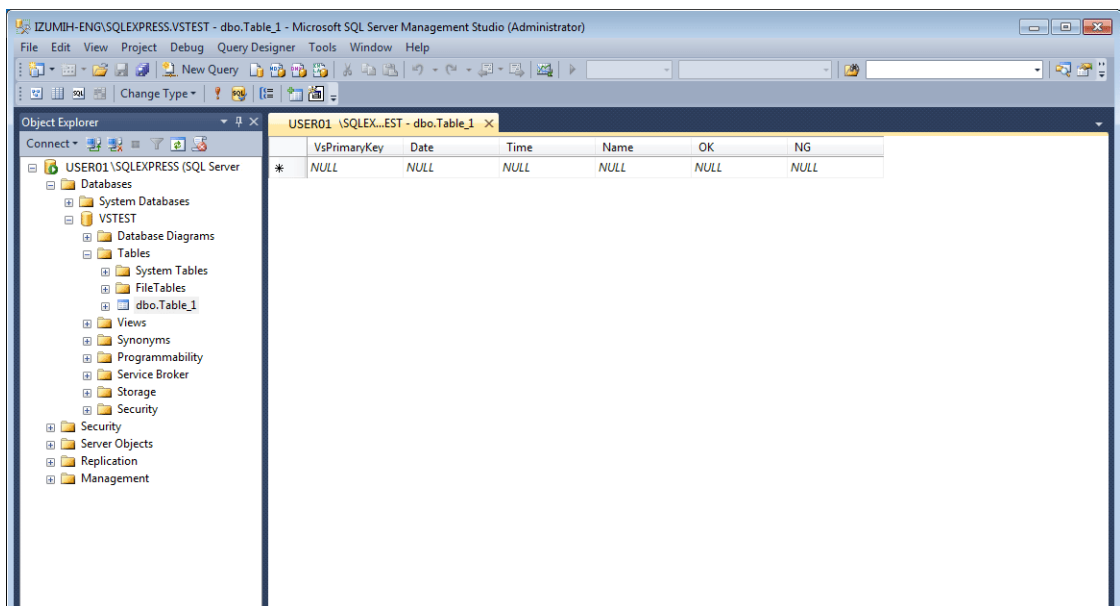
## Opening a table

The data saved in the database can be checked according to the following procedure.

1. Select a table and click [Edit Top 200 Rows] on the right-click menu.



2. The table is opened. The line name registered when the table was created is displayed. Data is saved in each "NULL" field.

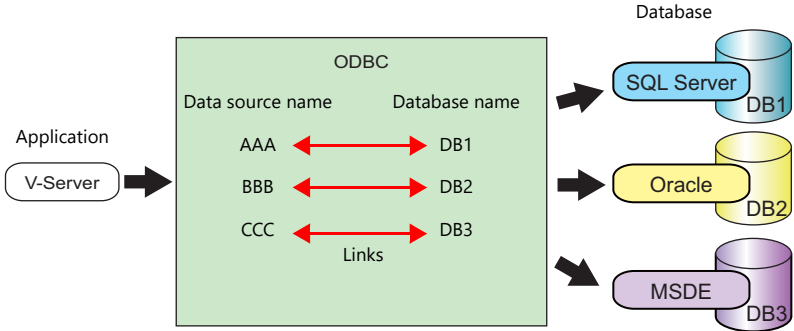


# 6.9.6 Data Source (ODBC) Settings

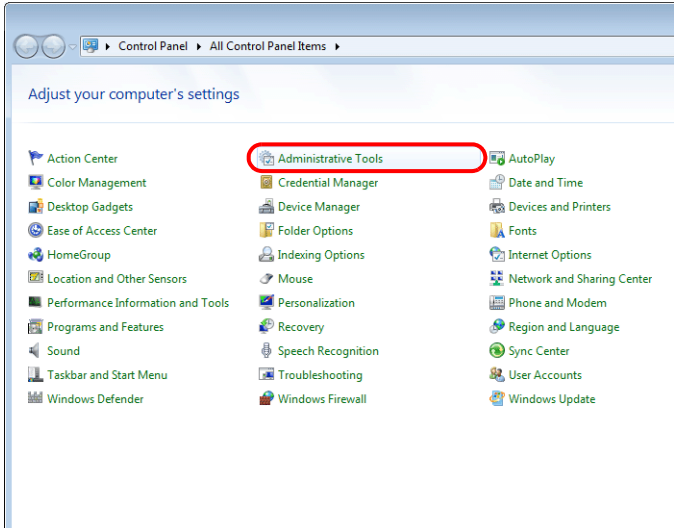
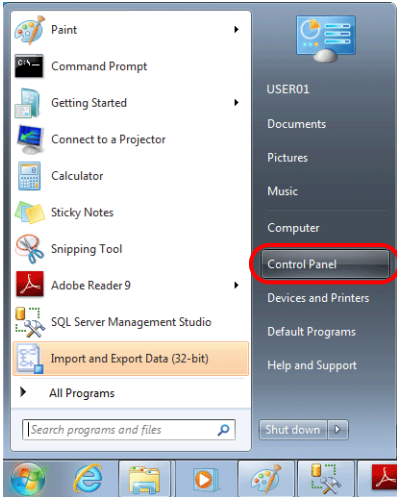
V-Server accesses the database via a data source (ODBC). Data source settings need to be configured to allow V-Server access to the database. This manual describes an example of configuration using Microsoft SQL Server 2012 Express Edition.

### ODBC: Open DataBase Connectivity

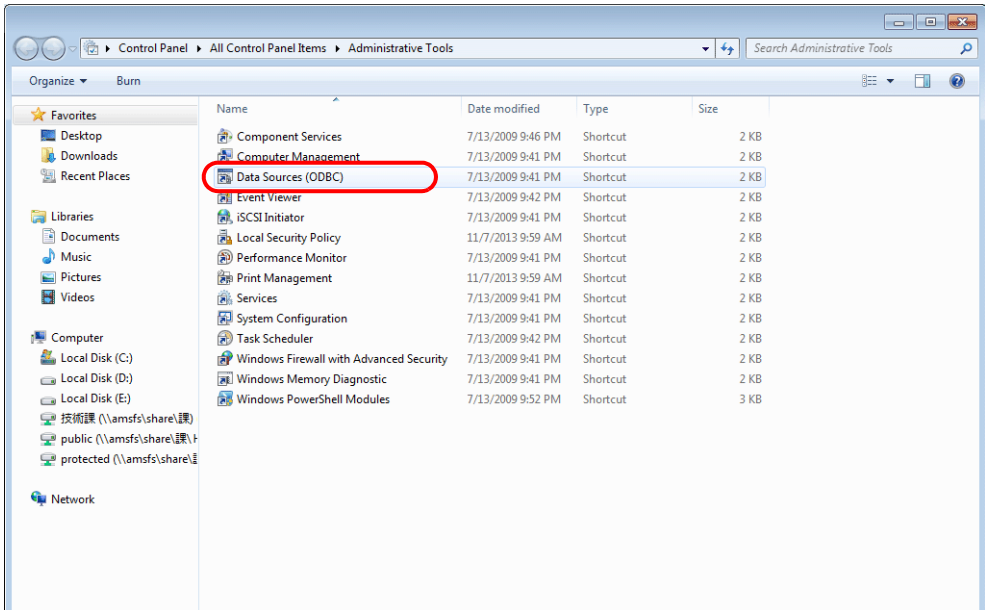
ODBC is the interface between an application (V-Server) and the database. Because ODBC accommodates the differences in specifications between databases, users only need to create programs based on the ODBC-specified procedure in order to access those databases.



- 1. From the Windows [Start] menu, click [Control Panel] to display the Control Panel.
- 2. Click [Administrative Tools].



- 3. The [Administrative Tools] window is displayed. Double-click [Data Sources (ODBC)].

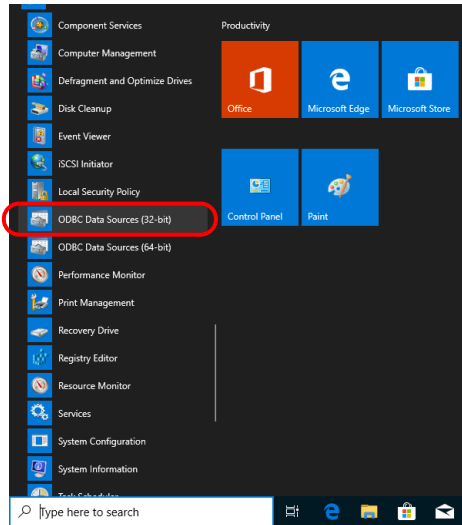




## For 64-bit versions of Windows XP/Vista/7/8/10

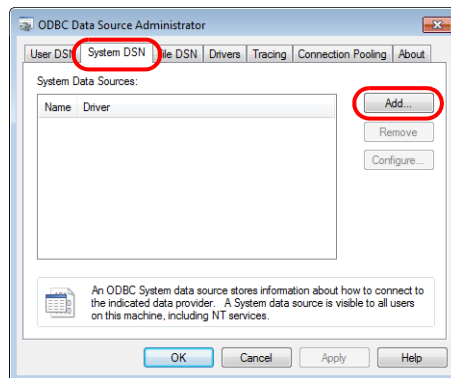
The 32-bit version of ODBC must be used because V-Server is a 32-bit application.

- For Windows 10  
Click the Windows start menu icon → [Windows Administrative Tools] → [ODBC Data Sources (32-bit)].

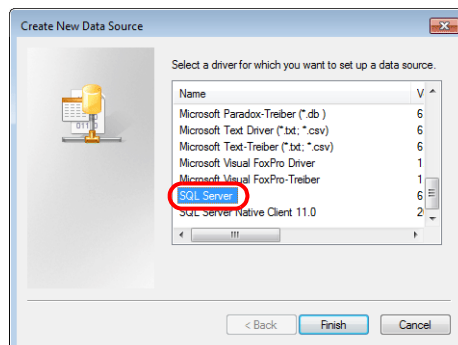


- For Windows XP/Vista/7/8
  - 1) From the Windows [Start] menu, click [Computer], double-click [Local Disk (C:)] → [Windows] → [SysWOW64].
  - 2) Double-click the "odbcad32" application. The 32-bit version of ODBC starts up.
  - 3) Press the [Ctrl] + [Shift] + [Esc] keys together to start Windows Task Manager and check which version of ODBC is running.  
On the [Processes] tab, the 32-bit version is running if "odbcad32.exe \*32" is shown in the list.

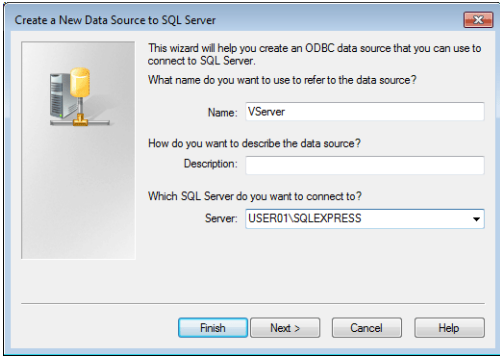
4. The [ODBC Data Source Administrator] window is displayed. Select the [System DSN] tab and click the [Add] button.



5. The [Create New Data Source] window is displayed. Select [SQL Server] and click the [Finish] button.

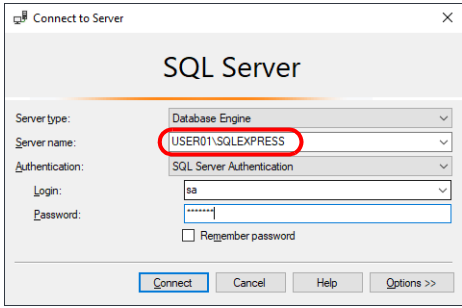
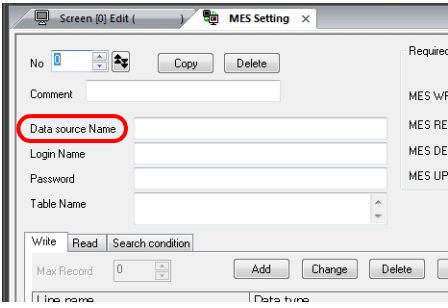


6. The following window is displayed. Configure the required settings and click the [Next] button.



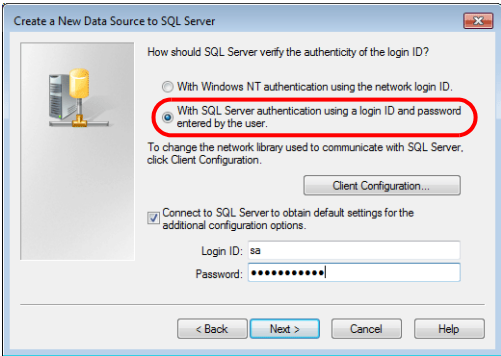
Item	Description
Name	Specify a data source name.
Server	Specify a SQL Server name.

- The data source name is used in the MES settings in V-SFT.
- The SQL Server name can be checked in SQL Server Management Studio.



7. The following window is displayed.

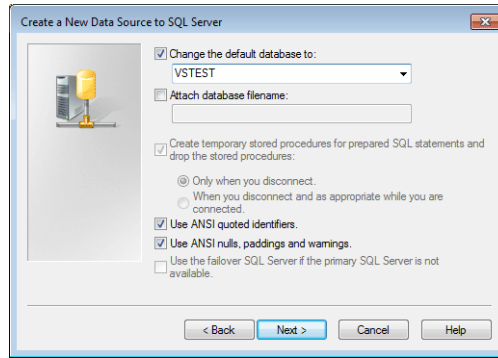
Select the [With SQL Server authentication using a login ID and password entered by the user] radio button and specify a login ID and password.



Item	Description
Login ID	Enter a login ID ("sa" in this example).
Password	Enter the password.

The login ID ("sa") and password were specified on the [Authentication Mode] window displayed during installation of SQL Server 2012 Express Edition (see [page 6-36](#)).

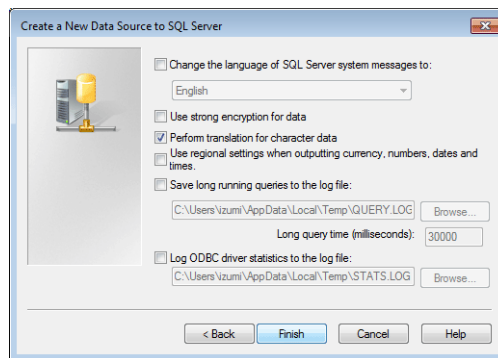
8. Click the [Next] button. The following window is displayed.



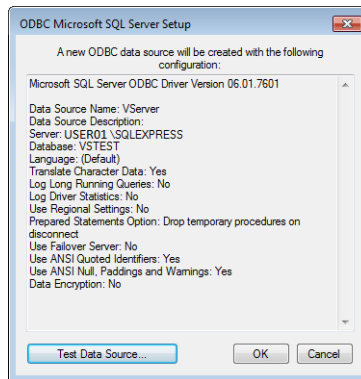
9. Select the [Change the default database to] checkbox and select a database.

Select the database created using Microsoft SQL Server Management Studio (see [page 6-41](#)).

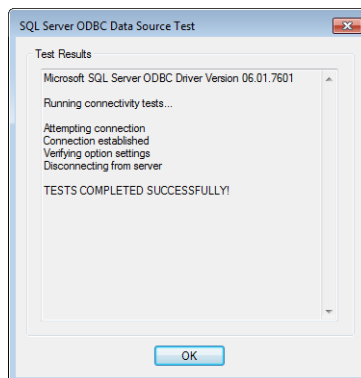
10. Click the [Next] button. The following window is displayed.



11. Click the [Finish] button. The following window is displayed.

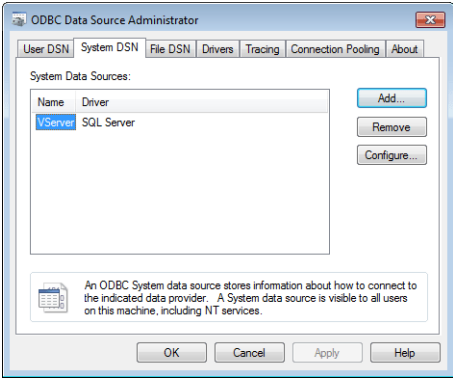


12. Click the [Test Data Source] button. When a connection has been successfully established, the following window is displayed.



13. Click [OK]. The previous screen reappears.

14. Click [OK]. The data source is registered.

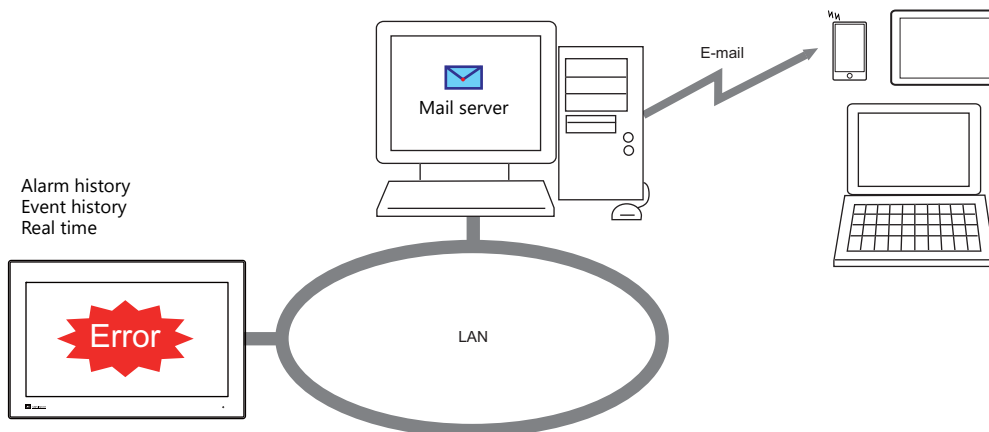


This completes the configuration of settings.

## 6.10 E-mail Notification

### 6.10.1 Overview

- Send e-mail notifications using the alarm function.
- In the alarm function, e-mail notifications can be sent according to the ON/OFF status of alarm bits. If a problem occurs, you can be notified of the fault even at a remote location.



- Encrypted communication using SSL/TLS or STARTTLS is also supported.
- When e-mail notifications are sent from multi-language screens by using the alarm function, notification messages are sent in all relevant languages.

Example of e-mail notification main body

```

2014/04/10 18:55:04 <ON>   A タンク異常発生
Apr/10/2014 18:55:04 <ON>  Tank A Error
2014/04/10 18:55:04 <ON>   A 罐 异常发生
2014/04/10 18:55:04 <ON>   A 罐 發生異常
2014/04/10 18:55:04 <ON>   탱크 A 에러
    
```

- Supported items and ports used

Port	Item	Others
LAN LAN2 WLAN	Alarm history Event history Real time	<ul style="list-style-type: none"> <li>• The mail server must reside on the LAN.</li> <li>• Gateway must be set on the X1 series unit (multiple ports cannot be set at the same time).</li> </ul>



## 6.10.2 Detailed Settings

To send e-mail notifications, IP address settings on the X1 series unit and e-mail settings for registering the mail server and recipients of notification must be configured.

### IP Address Settings

Decide on one port from LAN/LAN2/WLAN to set for use in sending e-mail notifications. In addition to IP address settings, default gateway settings are also required. When using [Sending Mail Server (SMTP)], DNS settings on the X1 series unit are also required.

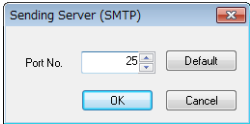
For information on IP address settings, refer to "IP Address Settings of X1 Series Unit" page 6-2.

### E-mail Settings

There are two ways to configure e-mail settings: using the V-SFT editor or using local mode on the X1 series unit.

#### Setting using the V-SFT editor

[System Setting] → [Ethernet Communication] → [E-Mail]

Item	Description
Mail server	Set the mail server using an IP address or server name.
SMTP IP Address	Set the IP address of the mail server.
Sending Mail Server (SMTP)	Set the server name of the mail server (within 255 one-byte alphanumeric characters and symbols) Setting of [DNS server] in System Configurator on the X1 series unit via [LAN] / [LAN2] / [WLAN] is necessary.
Port Setting	Set the SMTP port number of the mail server. 0 to 65535 (default: 25)    Example: Port No. 465 for SSL/TLS communication Port No. 587 for STARTTLS communication
Certify Type	Set the authentication method in accordance with the specifications of the mail server. Select "SMTP-AUTH" when attaching a file.
No authorization	No authentication is performed.
POP before SMTP *1	Authentication is performed with the POP3 server. Configure the following settings. <ul style="list-style-type: none"> <li>POP3 IP Address</li> <li>Account Name (63 one-byte characters or less)</li> <li>Password (63 one-byte characters or less)</li> </ul>
SMTP-AUTH *2 LOGIN PLAIN CRAM-MD5 DIGEST-MD5 *3	Authentication is performed with the SMTP server. Configure the following settings. <ul style="list-style-type: none"> <li>Encryption Method               <ul style="list-style-type: none"> <li>None</li> <li>SSL/TLS *4</li> <li>STARTTLS *5 *6</li> </ul> </li> <li>Account Name (63 one-byte characters or less)</li> <li>Password (63 one-byte characters or less)</li> </ul>

Item	Description
Sender's Mail Address	Set the sender's mail address. It is recommended to create a dedicated account for the X1 on the mail server and to set its address here.
Sender's Name	Set the sender's name. A name consisting of both one- and two-byte characters is not valid. It is displayed in the "Sender" field in an incoming e-mail.
Subject	Set the subject. It is displayed in the "Subject" field in an incoming e-mail.
Receiver's Mail Address	8 maximum Register the recipient mail addresses. Register all mail addresses to receive notifications from the X1 series unit. * When creating a screen program and the recipients of e-mail notification is yet to be determined, dummy recipients from numbers 0 to 8 can be used instead. The actual recipient addresses can be changed later on the X1 series unit in the [E-Mail Setting] in Local mode.
Add	Register a new recipient address.
Change	Change a registered address.
Delete	Delete a registered address.

\*1 POP before SMTP

POP before SMTP uses POP3 authentication that is performed when e-mail is received. SMTP permits the sending of e-mail from the authenticated IP address for a limited time.  
Since authentication is disabled after a specific time has elapsed, authentication with POP3 will be required again.  
In the case of authentication with POP3, a password is sent in plain text. POP before SMTP using APOP is also available. APOP allows a password to be sent in encrypted form. Note that the X1 series only supports POP3.

\*2 SMTP Authentication

Authentication is performed with the SMTP server. SMTP Authentication is classified into several authentication methods. The X1 series supports LOGIN, PLAIN, CRAM-MD5, and DIGEST-MD5 methods.  
Since the SMTP server automatically performs authentication according to the available method, users are not requested to make configurations.

<Automatic authentication steps>

1. Compliant with PLAIN?
2. Compliant with LOGIN?
3. Compliant with CRAM-MD5?
4. Compliant with DIGEST-MD5?
5. Authentication failure

About the authentication methods

- PLAIN  
The PLAIN method sends user names and passwords in plain text (not in encrypted form).
- LOGIN  
LOGIN is similar to PLAIN but it often sends information, such as USER xxxxx or PASS xxxxxx, separately (as performed with POP3). Because the standard specifications of LOGIN are not established, there are e-mail servers that use LOGIN in their own way.
- CRAM-MD5  
With CRAM-MD5, the server sends an arbitrary character string (a challenge string) to the client. The client then performs a specific computing process called Message Digest 5 (MD5) by using the challenge string and password, and returns the result to the server. The server that receives the result also performs the same process. When both results match each other, the server judges that the client knows the correct password and grants authorization.
- DIGEST-MD5  
DIGEST-MD5, an expanded version of CRAM-MD5, has an enhanced resistance to dictionary attacks and brute force attacks.

\*3 Only "auth" mode is supported for "quality protection". It does not support "auth-int" and "auth-conf" modes.

\*4 If using Gmail, set "Access for less secure apps" in the Google account security settings to "Turn on".

\*5 Mail servers that can use STARTTLS for sending e-mail

- Microsoft 365 smtp.outlook.com, smtp.office365.com
- Gmail smtp.gmail.com

\*6 If using Gmail, the following settings are required in the Google account security settings.

- Access for less secure apps: Off
- 2-Step Verification: On
- Generate a password from [App passwords] by setting [Select app] to "Mail" and [Select device] to "Other", and then inputting a device name (example: X1). Register the 16-digit password at [E-Mail Setting] → [Password] for the X1 series unit.

### Generated app password

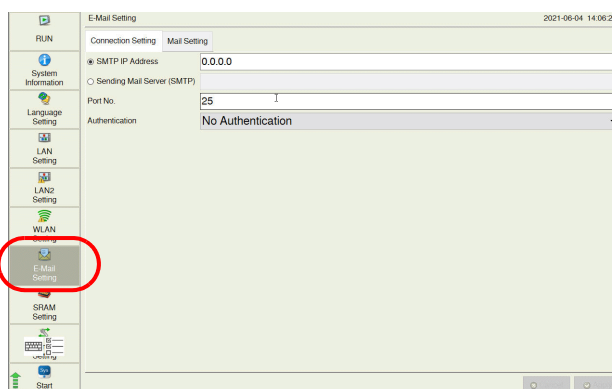
Your app password for your device

comk tufe wjsb nbtu

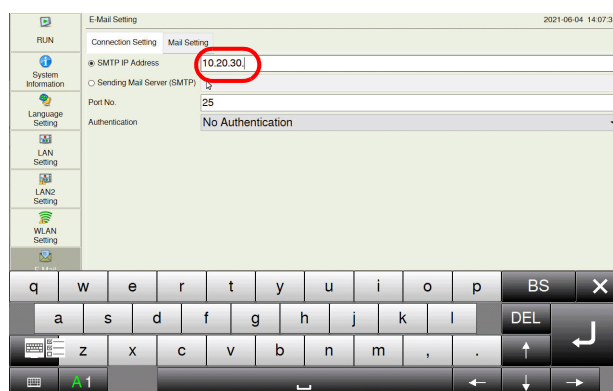
16 digits  
Register at [E-Mail Setting] → [Password] for the X1 series unit.

## Setting using Local mode on the unit

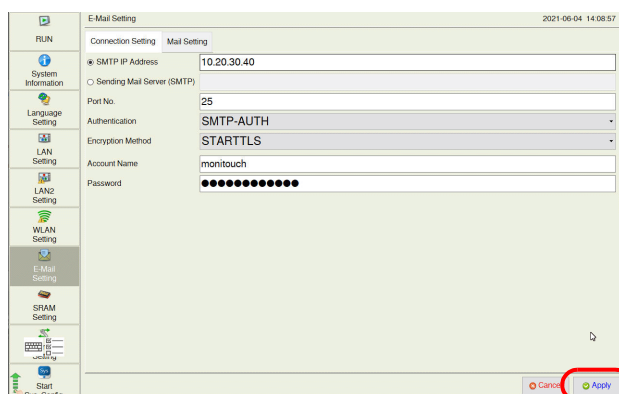
1. Press one corner of the screen for at least two seconds and release your finger when there is a beep.
2. Then within one second, press a different corner and hold for at least two seconds. The system menu appears.
3. Press the [Local] switch to change the X1 app to Local mode.  
Tap the [E-Mail Setting] icon to display the [E-Mail Setting] screen.



4. Tap an item to change its setting if necessary.



5. Press the [Apply] switch at the bottom right of the screen and end settings.

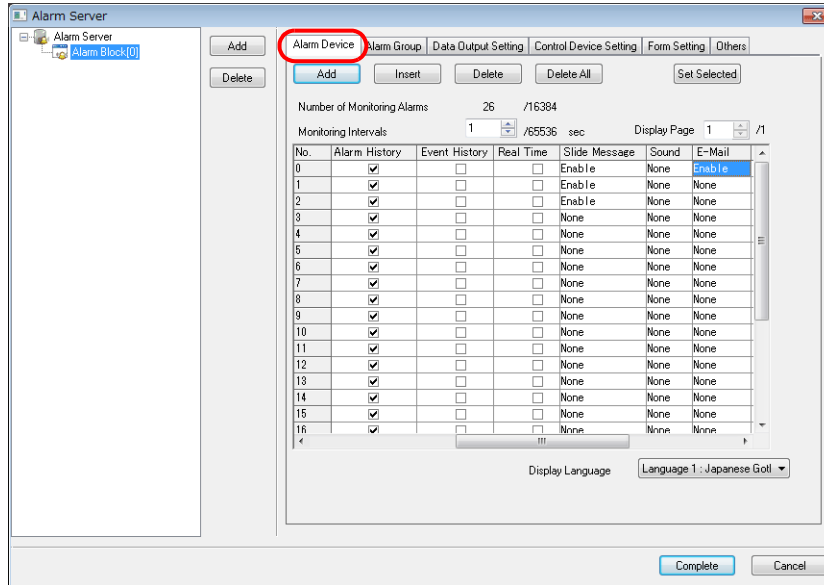


## Alarm Server

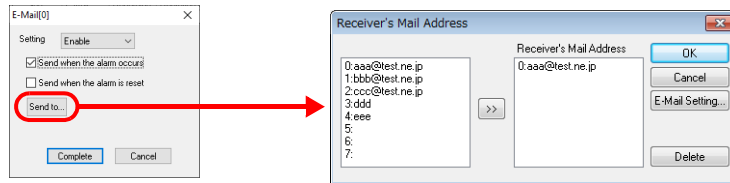
If sending e-mail notifications linked to alarm bits, select the [E-mail Enable/None] setting and recipient e-mail addresses in the alarm server settings.

This section describes the settings required for sending e-mail notifications. For details on other settings, refer to "8 Alarm" in X1 Series Reference Manual 1.

1. Click [System Setting] → [Alarm Server] → [Alarm Block] to display [Alarm Device].



2. Select "Enable" for [E-Mail] for the device memory to send e-mail notifications and configure the detailed settings.



Item	Description
Send when the alarm occurs	Send an e-mail notification when an error occurs.
Send when the alarm is reset	Send an e-mail notification when the system recovers from an error.
Send to	<p>Select the recipient e-mail addresses.</p> <p>Dummy settings</p> <p>* When creating a screen program and the recipients of e-mail notification is yet to be determined, dummy recipients from numbers 0 to 8 can be used instead. The actual recipient addresses can be changed later on the X1 series unit in the [E-Mail Setting] in Local mode.</p>

### 6.10.3 System Device Memory (\$s)

Information on sent e-mail messages is output to system device memory (\$s).

\$s	Description	
\$s1005	If the X1 series unit receives send requests continually, the number (0 to 16) of e-mail messages waiting to be sent is stored. The X1 series can keep up to 16 e-mail messages. Any more than 16 messages are discarded.	
\$s1006	Stores error information on e-mail messages.	
	Error No.	Cause
	0	Normal -
	1	E-mail address error Incorrect recipient mail address
	6	Network not connected Incorrect SMTP/POP3 server IP address SMTP server refusal Incorrect port number Incorrect SSL/TLS, STARTTLS settings Incorrect account name/password
50	SMTP transmission error Authentication method error Incorrect sender's mail address Connection lost	



# 7 IIoT Function

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7.1 MQTT

7.2 OPC UA

## 7.1 MQTT

### 7.1.1 Overview

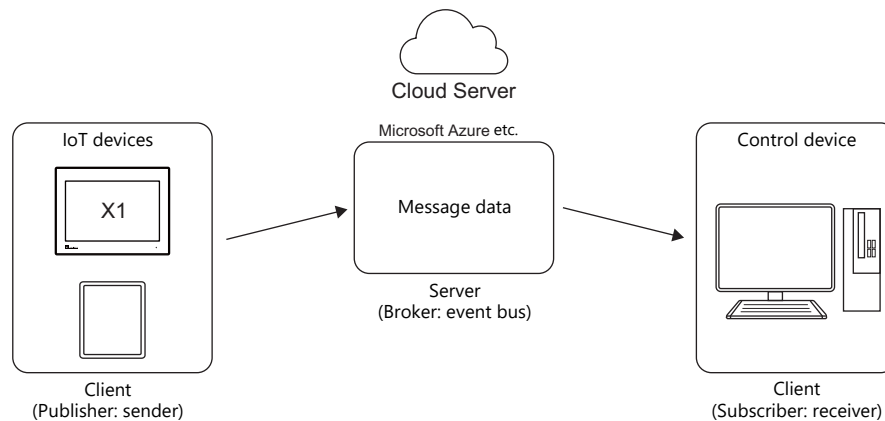
#### MQTT

MQTT (Message Queue Telemetry Transport) is a protocol that was invented and developed in the late 1990's by IBM and is built on the TCP/IP stack. In 2014, it became open source.

MQTT has become the standard communication protocol for IoT communications.

#### Features

- Publish/Subscribe (Pub/Sub) messaging pattern  
A communication system in which communications are performed between Publishers (senders) and a Broker (event bus) and between the Broker and Subscribers (receivers).



- Since MQTT is a lightweight protocol, high-speed communication and cost reduction are possible.
- The reliability of message delivery (QoS: Quality of Service) can be selected.

### 7.1.2 X1 Series Specifications

Item	Specification		Remarks
Supported MQTT version	Ver.3.1.1		Ver. 5 not supported
Supported server	Microsoft Azure		
Ethernet ports	LAN1 / LAN2 / WLAN		Use one of the ports. The port to use requires the setting of a default gateway.
Port number	8883: Secure MQTT (TLS)		1883 not supported
TLS	TLS1.2 / TLS1.1 / TLS1.0		
Server function	Broker (event bus)	Not supported	
Client function	Supported		
	Publisher (sender)	Message sending	Supported*1
		File uploading	Not supported
	Subscriber (receiver)	Message receiving	Not supported
		File downloading	Not supported
QoS	1 (Fixed)		

\*1 Notes on message sending

- Microsoft Azure does not support message sending using topics.
- Connection via a proxy server is not supported.
- Character string data is encoded in UTF-8 and then sent to the server.

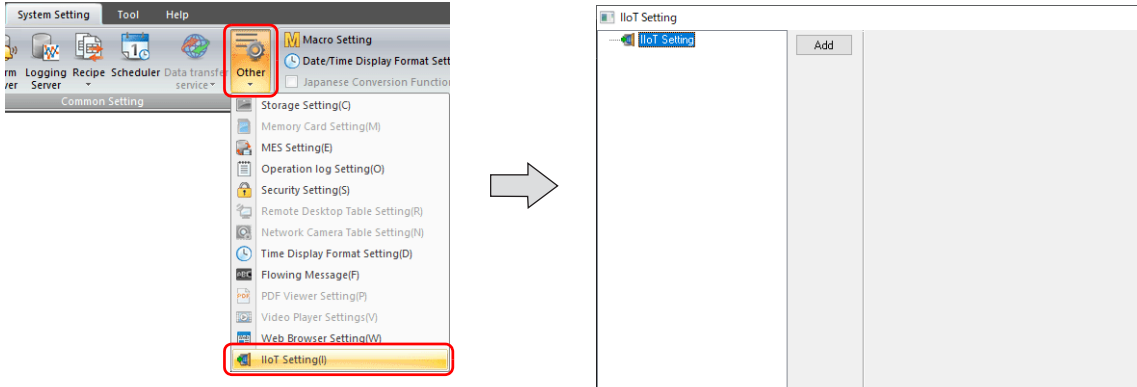


## 7.1.3 Settings on the Editor

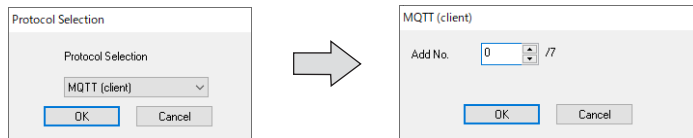
When connecting as an MQTT client, [MQTT client] settings must be configured.

### MQTT Client Settings

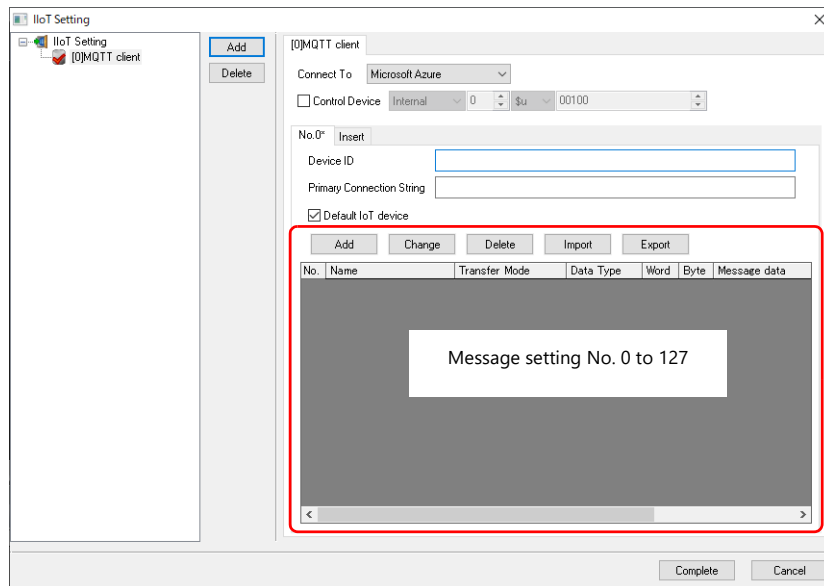
1. Click [System Setting] → [Other] → [IIoT Setting].



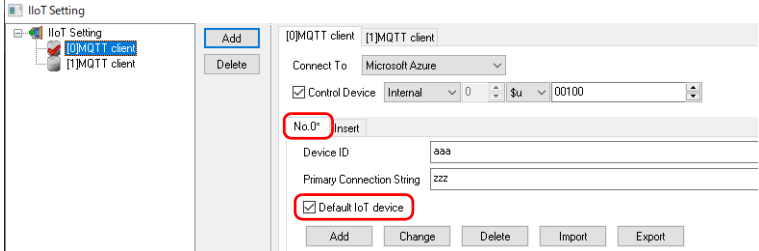
2. Click [Add] and set the following.  
 [Protocol Selection]: MQTT (client)  
 [Add No.]: 0 to 7



3. Configure settings on the [MQTT client] tab window.



Item	Description
Connect To	Specify the MQTT server. Microsoft Azure (fixed)

Item	Description																																																																																			
Control Device	<p>Setting is possible on the [MQTT client] tab window on which the [Default IoT device] checkbox is selected.</p> <p>Specify a control device memory address when using a trigger to send IoT device information.*1 Two words are secured for use.</p> <table border="1"> <tr> <td>n</td> <td colspan="16">Default IoT device No.</td> </tr> <tr> <td rowspan="2">n+1</td> <td colspan="8">MSB</td> <td colspan="8">LSB</td> </tr> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td> <td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td></td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td></td> <td colspan="8">Not used</td> <td colspan="8">0 → 1: Execute message sending</td> </tr> </table>	n	Default IoT device No.																n+1	MSB								LSB								15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		Not used								0 → 1: Execute message sending							
n	Default IoT device No.																																																																																			
n+1	MSB								LSB																																																																											
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																																																																				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																																					
	Not used								0 → 1: Execute message sending																																																																											
No. 0 to 7	<p>IoT device No. 0 to 7 An asterisk (*) appended to a number denotes the default number.</p> <p>[Insert]: Adds an IoT device. [Delete IoT device]: Deletes the currently displayed IoT device.</p>																																																																																			
Device ID	<p>Set the ID by which the MQTT server is to recognize the X1 series unit. One-byte alphanumeric characters, symbols (excluding + and #)</p> <p>Set the device ID that is registered in the Azure IoT device settings. Refer to <a href="#">page 7-12</a>.</p>																																																																																			
Primary Connection String	<p>Set the connection string necessary for the X1 series unit to communicate with Azure IoT Hub. Check the [Primary Connection String] or [Secondary Connection String] setting in the Azure IoT device settings and set the string. Refer to <a href="#">page 7-12</a>.</p>																																																																																			
Default IoT device	<p>Select the checkbox for one IoT device number from among 0 to 7 from MQTT client numbers 0 to 7. The messages of the selected IoT device number are sent to the server.</p> <p>An asterisk (*) is appended to the IoT device number.</p> 																																																																																			
Message settings	<p>Register the messages to send to the server. Refer to the next page for details. No. 0 to 127</p> <p>[Add]: Adds a message setting number. [Change]: Edits a message setting number. [Deletes]: Deletes a message setting number. [Import]: Imports message settings from a CSV file.*2 [Export]: Exports registered message settings to a CSV file.</p>																																																																																			

\*1 When using control device memory, messages are not sent according to the fixed interval set by the [Transmission interval] setting on the [Message Settings] window.

\*2 When importing message settings, registered settings will be discarded.  
Refer to "CSV file (comma delimited) format" on [page 7-4](#).

## Message settings

Item	Description	Remarks															
Name	Register an identifier. Up to 32 one-byte alphanumeric characters and symbols	Entry required															
Transfer Mode	Unit → Server (send)																
Message data Data Type Length Bytes	Set the device memory address and data type of the data to send. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>Message data</th> <th>Data Type</th> <th>Length/Bytes</th> </tr> </thead> <tbody> <tr> <td>Internal device memory</td> <td>DEC-</td> <td>1 word / 2 word</td> </tr> <tr> <td>PLC device memory</td> <td>CHAR</td> <td>1 to 256 bytes</td> </tr> <tr> <td>Tag</td> <td>BCD</td> <td>1 word / 2 word</td> </tr> <tr> <td></td> <td>FLOAT</td> <td>2 word</td> </tr> </tbody> </table>	Message data	Data Type	Length/Bytes	Internal device memory	DEC-	1 word / 2 word	PLC device memory	CHAR	1 to 256 bytes	Tag	BCD	1 word / 2 word		FLOAT	2 word	When [Data Type] is set to [CHAR]: Character string data is encoded in UTF-8 and then sent to the server.
Message data	Data Type	Length/Bytes															
Internal device memory	DEC-	1 word / 2 word															
PLC device memory	CHAR	1 to 256 bytes															
Tag	BCD	1 word / 2 word															
	FLOAT	2 word															
Transmission interval	Set the cycle for sending the message. Range: 1 to 3600 sec	Default: 10 sec  Invalid when control device memory is used.															
QoS (Quality of Service)	Set the reliability of message delivery between the X1 series unit and the server.  QoS 1 (fixed): After sending a message, the X1 series checks for a message from the server acknowledging receipt. Since the message is sent until the receipt message is received from the server, a message may be delivered multiple times when the X1 series fails to receive the receipt message due to a communication error.	Azure does not support QoS 0 and QoS 2.															

- CSV file (comma delimited) format

	A	B	C	D	E	F	G	H	I	J
1	Name	Transfer Mode	Data Type	Word	Byte	Message data	Transmiss	Topic	Topic filter	QoS
2	DARA1	Unit -> Server	DEC-	1		\$u00100	10			1
3	DATA2	Unit -> Server	CHAR		10	\$u00101	10			1
4	DATA3	Unit -> Server	DEC-	1		PLC1[WM00000100]	10			1
5	DATA4	Unit -> Server	DEC-	1		PLC1[WM00000101]	10			1
6										

↑ ↑  
Not used: blank

## 7.1.4 Settings on the X1 Series Unit

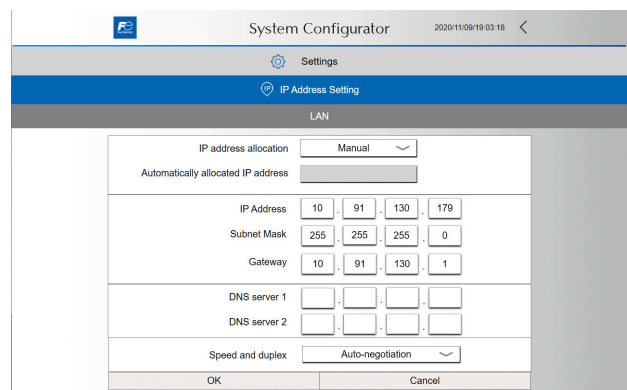
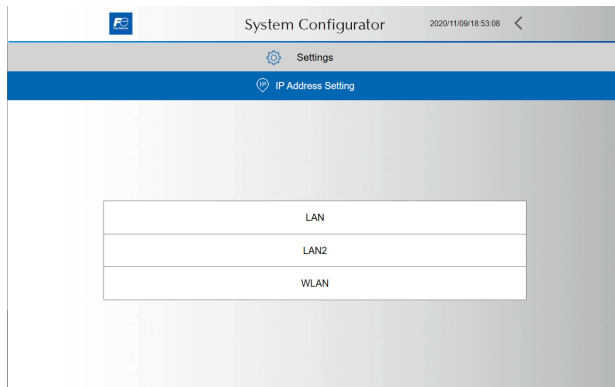
When connecting as an MQTT client, the following settings need to be configured on the X1 series unit.


### IP Address Settings

Any one of the LAN, LAN2, or WLAN ports is used for MQTT connection.

Configure IP address and gateway settings of the port to use for MQTT connection.

The IP address and gateway settings can be configured on the System Configurator → [Settings] → [IP Address Setting] screen.



 For details on System Configurator, refer to the X1 Series Hardware Specifications.

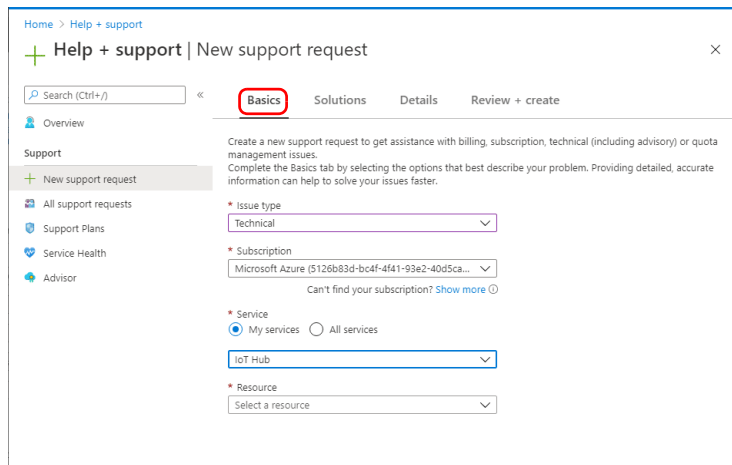
An internet connection is also necessary in order to connect to the server (Azure). Messages cannot be sent via the proxy server.

## 7.1.5 System Device Memory

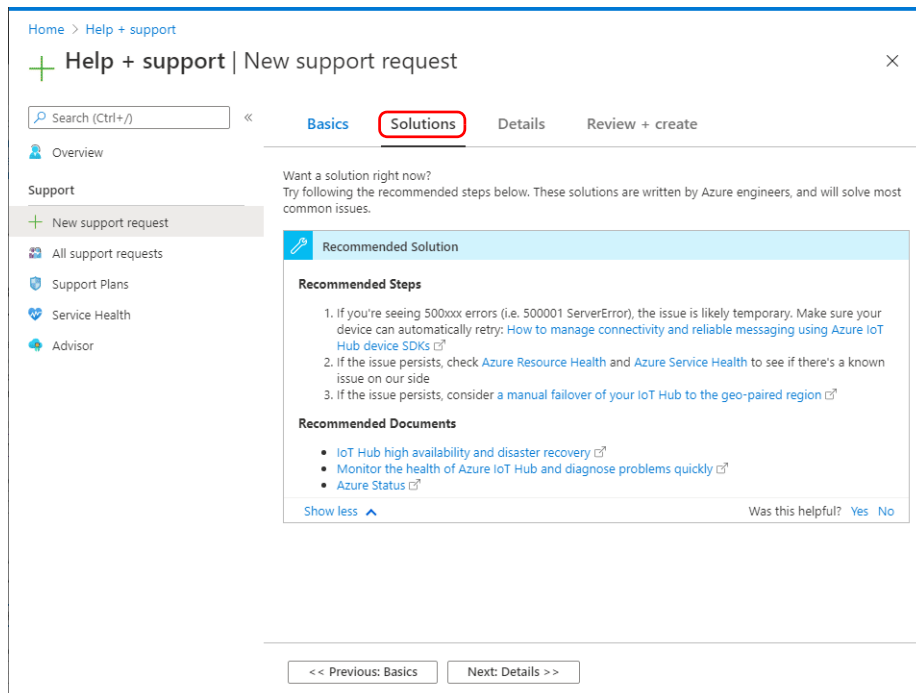
Error information is stored in system device memory of the X1 series unit.

Code	Description	Remarks	Operation
404	<ul style="list-style-type: none"> <li>IoT hub does not exist.</li> <li>Device ID does not exist.</li> </ul>	<ul style="list-style-type: none"> <li>Check the settings of the IoT hub and device ID.</li> <li>Check the connection of the LAN cable.</li> <li>Check that connection is not via the proxy server.</li> </ul>	X1 →
429	<ul style="list-style-type: none"> <li>Requests from the X1 series unit are in excess.</li> <li>Request is rejected since daily limit of messages is exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Adjust the transmission interval of the X1 series unit.</li> <li>Upgrade the IoT hub tier.</li> <li>Increase the number of F1 IoT hub units. (Possible with Basic and Standard tiers.)</li> </ul>	
500	Internal error occurred.	There may be a server problem. Try sending again later. If the error persists, create a support request*1 from Azure Portal.	

- \*1 Support request  
 Click [Help + support] → [New support request] and search for a solution.
- [Basics]: Input the required fields.



- [Solutions]: Check the recommended solution.

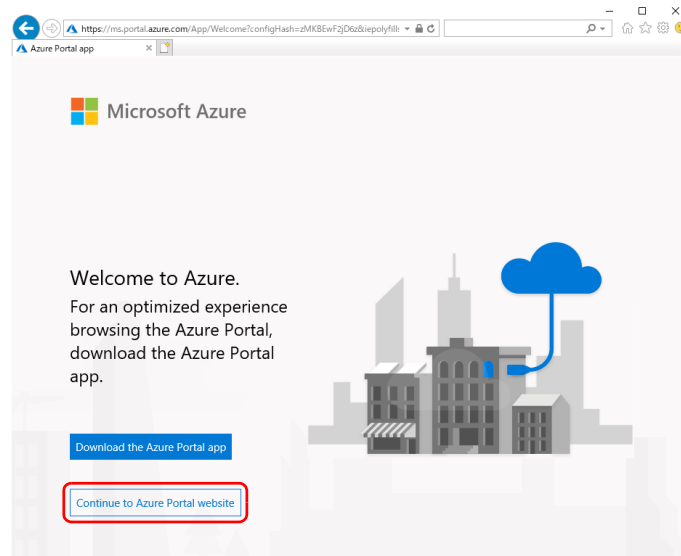


- [Details]: Receive technical support from your purchased support plan.

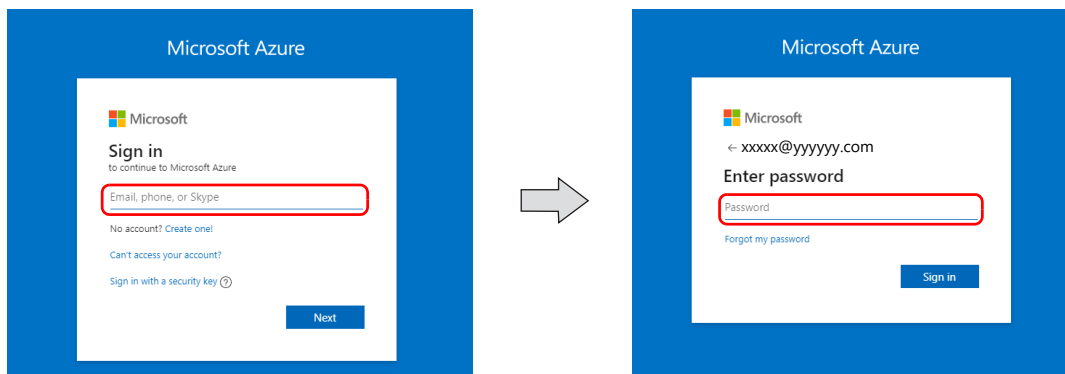
## 7.1.6 Settings on Microsoft Azure

### Preparing IoT Hub

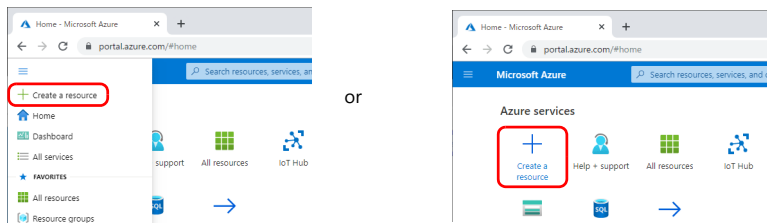
1. Access the Azure Portal (<https://ms.portal.azure.com>) using Google Chrome. The [Sign in] screen is displayed.



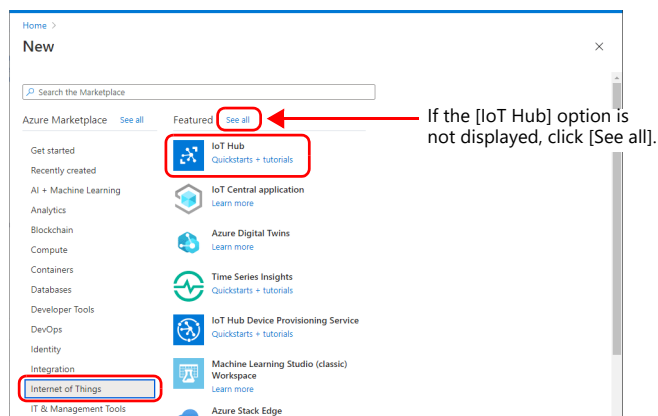
2. Sign in with your account.  
If you do not have an account, create an account and then sign in.



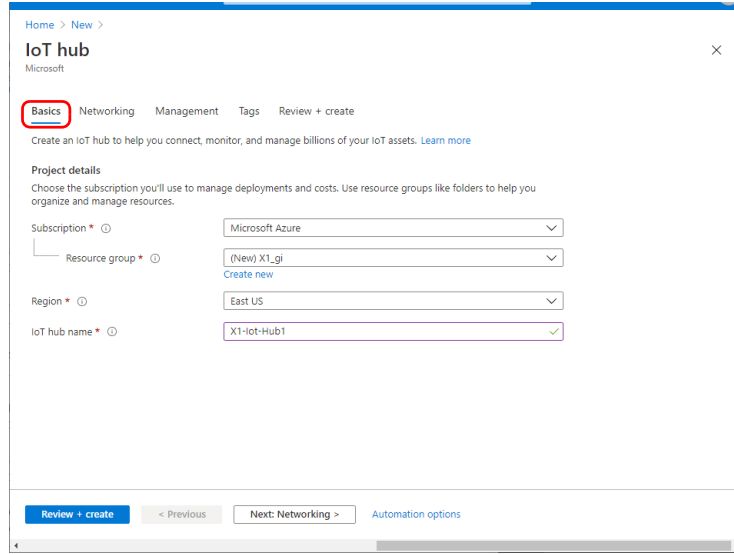
3. Select [Create a resource] from the menu.



4. Select [Internet of Things] → [IoT Hub] and configure settings.

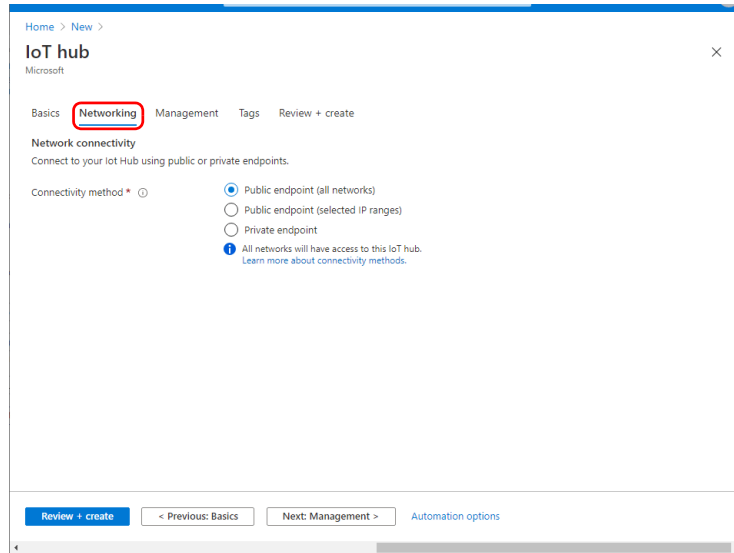


• IoT hub: [Basics]



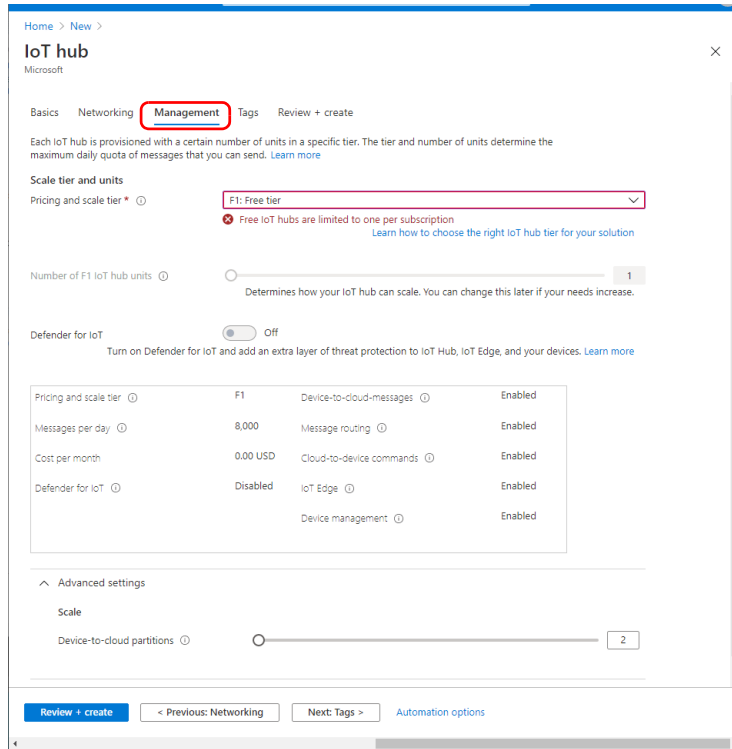
Item	Description	Remarks
Subscription	Select the subscription for using IoT hub.	
Resource group	Select or create a resource group.	
Region	Select the region close to the location where the X1 series unit is to be installed if placing priority on the transmission speed for sending messages.	
IoT hub name	Input the name for your IoT hub. This name must be globally unique. A green checkmark is displayed when the input name is available.	The IoT hub will be publicly discoverable as a DNS endpoint. Be sure not to enter any sensitive or personally identifiable information.

• IoT hub: [Networking]



Item	Description	Remarks
Connectivity method	Select a connectivity method.	

• IoT hub: Management



Item	Description	Remarks
Pricing and scale tier	Based on the available functions <sup>*1</sup> of Azure and the number of messages to be sent daily, select a level <sup>*2</sup> appropriate for your hub.	
Number of F1 IoT hub units	Set the number of units. The maximum number of messages that can be sent daily is determined by this setting.	Fixed to "1" for the free tier
Device-to-cloud partitions	Set the number of simultaneous readers of messages.	

\*1 List of functions

No.	Function	Free / Standard	Basic
1	Device-to-cloud telemetry	<input type="radio"/>	<input type="radio"/>
2	Per-device identity	<input type="radio"/>	<input type="radio"/>
3	Message routing and Event Grid integration	<input type="radio"/>	<input type="radio"/>
4	HTTP, AMQP, and MQTT protocols	<input type="radio"/>	<input type="radio"/>
5	Device Provisioning Service	<input type="radio"/>	<input type="radio"/>
6	Monitoring and diagnostics	<input type="radio"/>	<input type="radio"/>
7	Device streams	<input type="radio"/>	-
8	Cloud-to-device messaging	<input type="radio"/>	-
9	Device management, Device twins, and Module twins	<input type="radio"/>	-
10	IoT Edge	<input type="radio"/>	-

\* Function numbers 1, 2, and 4 are used for sending messages from the X1 series unit.

\* Upgrading from the free tier to the standard or basic tiers is not supported. Downgrading from the standard tier to the basic tier is also not supported.

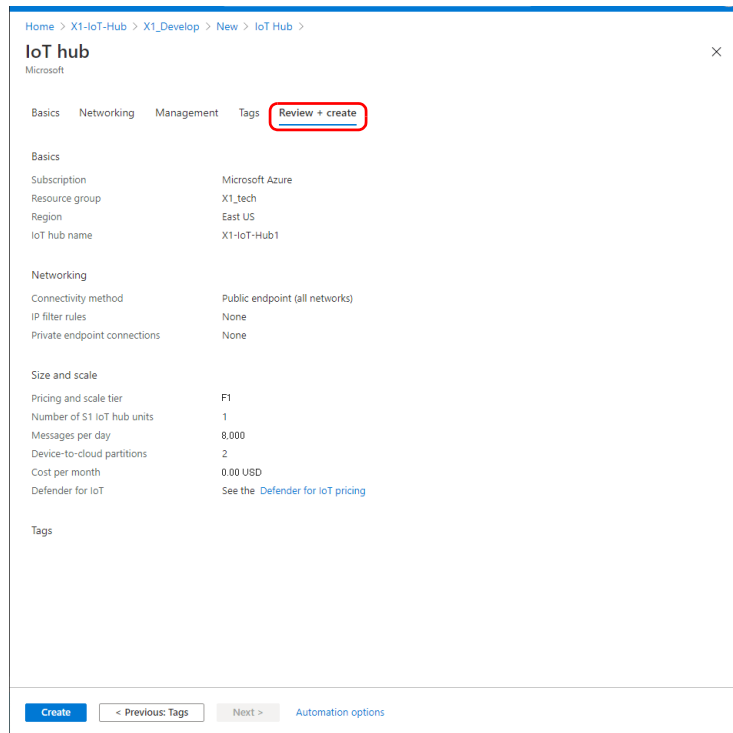
\*2 List of tiers

Tier	Price per Unit (Per month)	Total Number of Messages (Per day)
F1: Free tier	Free	8,000
S1: Standard tier	\$25 (USD)	400,000
S2: Standard tier	\$250 (USD)	6,000,000
S3: Standard tier	\$2,500 (USD)	300,000,000
B1: Basic tier	\$10 (USD)	400,000
B2: Basic tier	\$50 (USD)	6,000,000
B3: Basic tier	\$500 (USD)	300,000,000

\* Check Microsoft's website for details. <https://azure.microsoft.com/en-us/pricing/details/iot-hub/>



- [Review + create]  
Check that settings are correct and click [Create]. Your IoT hub is created in about 5 to 10 minutes.

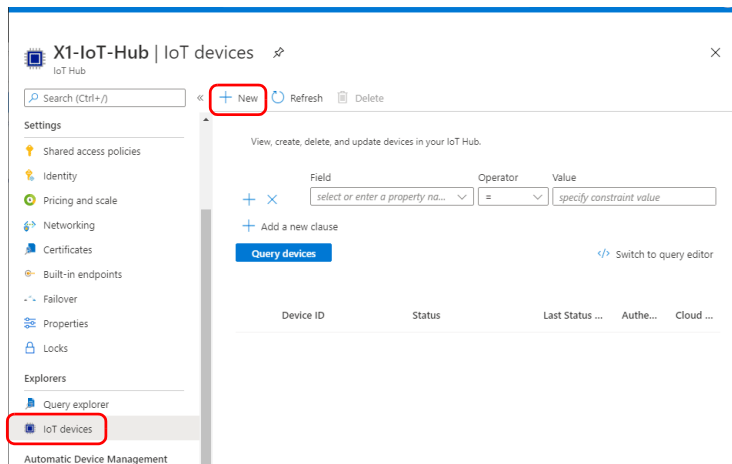


With the free tier, only one IoT hub can be created per subscription.

## Registering as an IoT Device

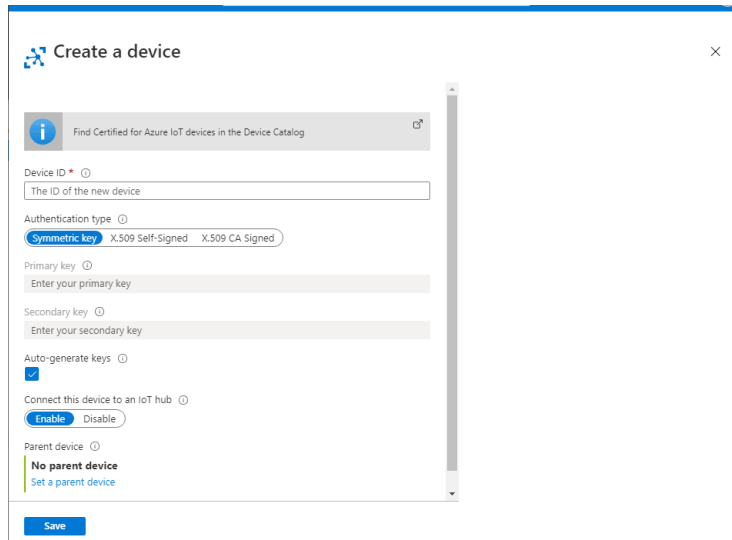
Register the X1 series unit as an IoT device to the created IoT hub.

1. Click [Explorer] → [IoT devices] → [New].



2. Follow the instructions on the [Create a device] screen.

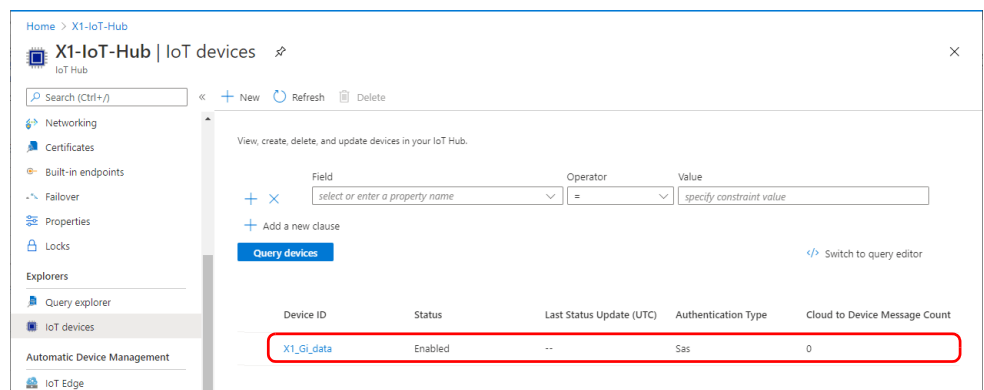
- [Create a device] screen



Item	Description	Remarks
Device ID	Register an ID for recognizing the X1 series unit. One-byte alphanumeric characters, symbols (excluding + and #)	This setting is to be used on the [MQTT client] tab window of the screen program. Refer to <a href="#">page 7-2</a> .
Auto-generate keys	Selected	

Use the default settings for all other items.

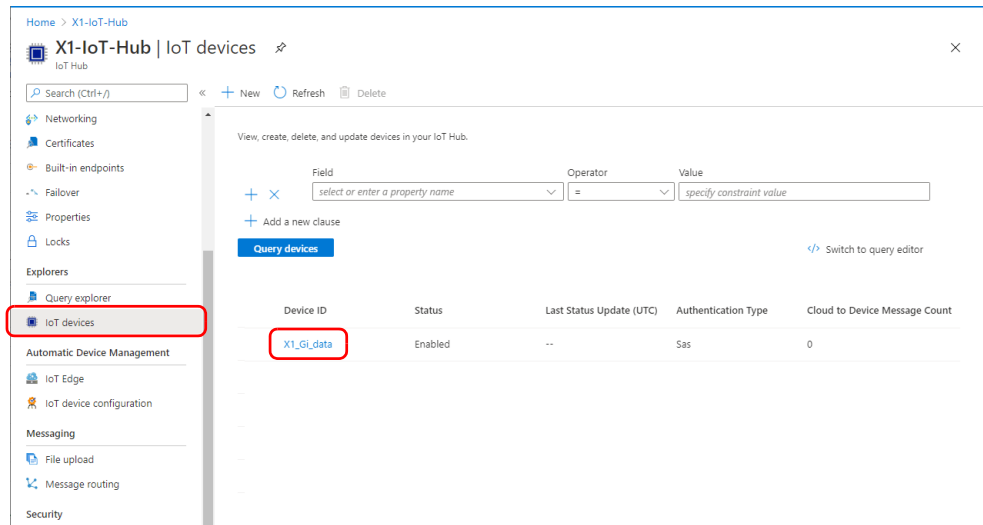
3. Click [Save]. The device is created.



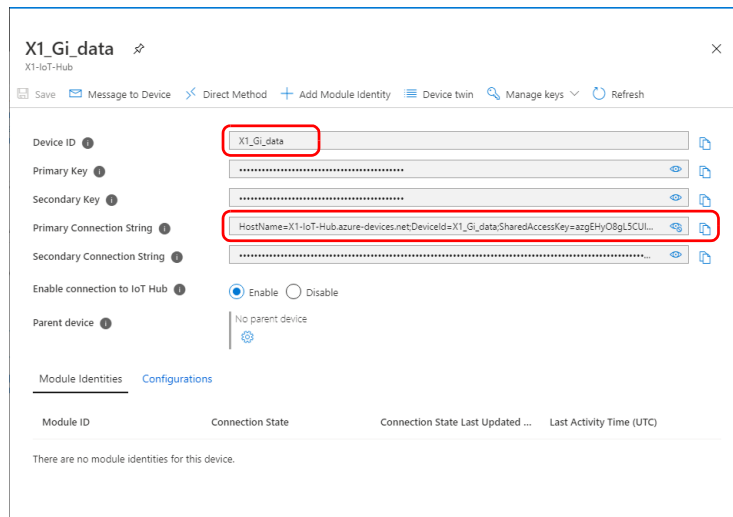
## Acquiring the Primary Connection String

In order for the X1 series unit to send a message to the server, the [Device ID] and [Primary Connection String] settings need to be registered in the screen program of the X1 series unit.

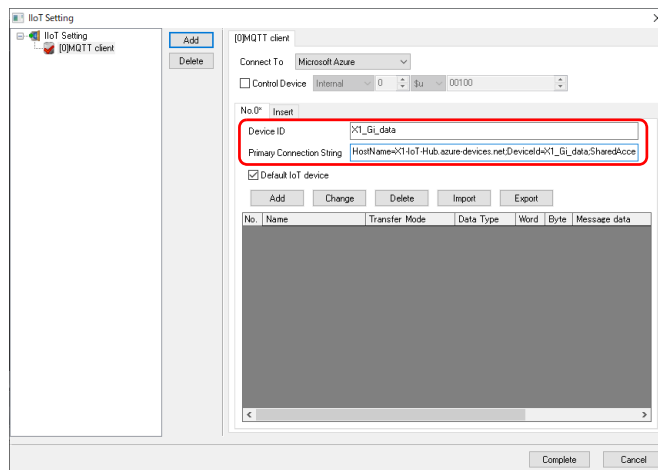
1. Click [Explorer] → [IoT devices] and then click on the device ID.



2. Copy the [Device ID] and [Primary Connection String] settings and paste them on the [MQTT client] tab window.



- V-SFT-6 [MQTT client] tab window



## 7.1.7 Checking Messages

The messages received by the IoT hub from the X1 series unit can be checked by installing a client tool on the computer. Use a tool that satisfies your purposes.

Client Tool	Purpose	Available From
Device Explorer	Viewing messages in a list <ul style="list-style-type: none"> <li>• Stored messages can be displayed by specifying the date and time.</li> <li>• Messages can be monitored in real time.</li> </ul>	Download page: <a href="https://github.com/Azure/azure-iot-sdks/releases">https://github.com/Azure/azure-iot-sdks/releases</a>  Download file: SetupDeviceExplorer.msi
Azure IoT Explorer	Checking raw data <ul style="list-style-type: none"> <li>• Messages can be monitored in real time.</li> <li>• System properties can be checked.</li> </ul>	Download page: <a href="https://github.com/Azure/azure-iot-explorer/releases">https://github.com/Azure/azure-iot-explorer/releases</a>  Download file: Azure.IoT.explorer.preview.x.x.x.msi
Service Bus Explorer	Efficient management of Microsoft Azure Service Bus resources <ul style="list-style-type: none"> <li>• Messages can be monitored in real time.</li> <li>• Stored messages can be checked.</li> </ul>	Download page: <a href="https://github.com/paolosavatori/ServiceBusExplorer/releases">https://github.com/paolosavatori/ServiceBusExplorer/releases</a>  Download file: ServiceBusExplorer-x.x.x.zip

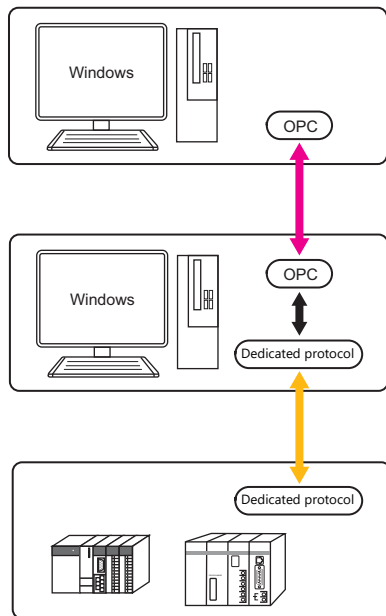
## 7.2 OPC UA

### 7.2.1 Overview

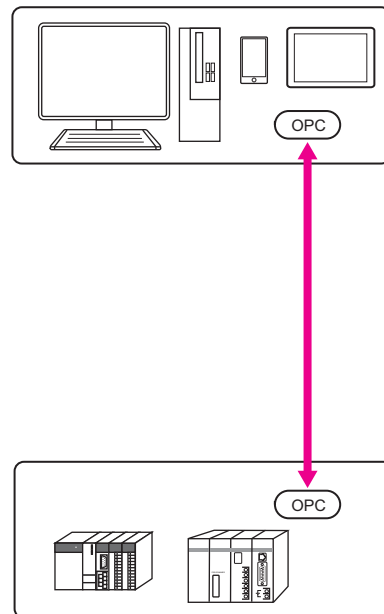
#### Overview of OPC

- OPC (Open Platform Communications) is a standard used in the industrial automation field and other areas to achieve interoperability for safe and reliable data exchange. There is the OPC Classic specification and the OPC UA (OPC Unified Architecture) specification.
- OPC Classic is the original architecture that was first developed in 1996 and is also referred to as first-generation OPC. The main specifications are OPC DA (Data Access), OPC AE (Alarm & Events), and OPC HDA (Historical Data Access). OPC Classic runs on Microsoft Windows.
- OPC UA is the new generation of OPC technology and was released in 2008. In October 2011, it became an international standard as IEC 62541. The technology is also referred to as the next-generation OPC. OPC UA is a service-oriented architecture that integrates all the functionalities of OPC Classic and has essential new features such as platform independence, diagnostics, discovery, rendering of complex information models, security, and reliability. Since it is platform independent, operation is possible on various control equipment in addition to Windows. Information can be sent from the factory and process control devices through to the enterprise information system.

• OPC Classic



• OPC UA

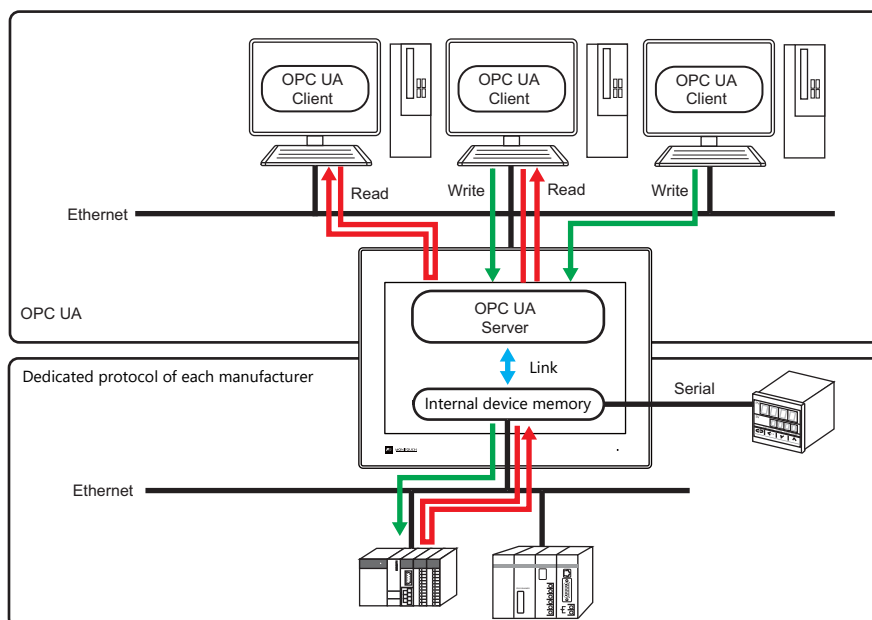


## OPC UA Functions of the X1 Series

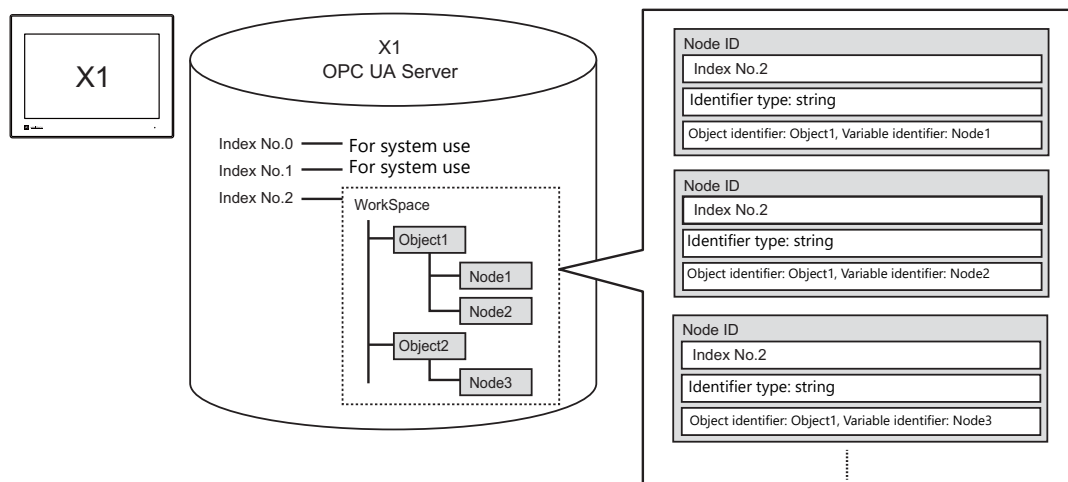
The X1 series features both the OPC UA server and client functions.

### Server function

- Connection with up to four OPC UA clients is possible.
- When accessed by a client device, the X1 series unit sends the data that it has.
- If a PLC that does not support OPC UA is connected to the X1 series unit, a client can still access such a PLC via the X1 series unit.

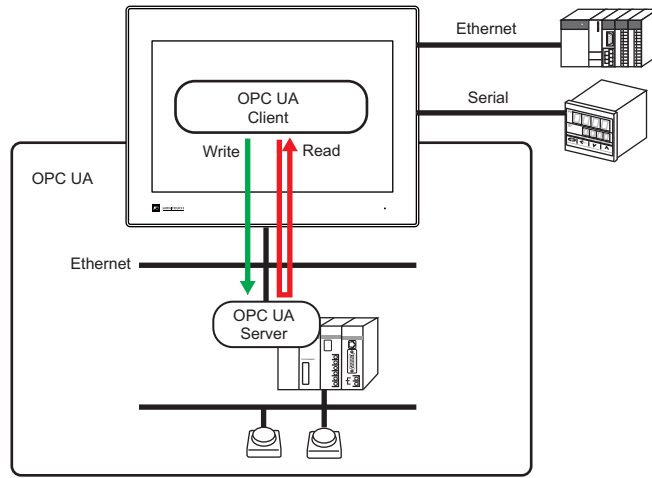


- The OPC UA server has points called nodes and clients access these nodes. Each node is allocated a node ID comprising multiple elements: namespace index No. 2, identifier type, and identifier. Register nodes on the [OPC UA Server] tab window of the X1 screen program.



## Client function

- Connection with one OPC UA server is possible.
- The X1 series unit can read data from and write data to the OPC UA server.



- The "SignAndEncrypt" security mode (messages are signed and then encrypted) is supported.

## 7.2.2 Server Function

### Function Specifications

Item	Specifications		Remarks	
Version	1.03			
Number of client connections	4			
Port used	LAN/LAN2		Either one port only	
Communication method	TCP/IP			
Communication port number	1024 to 65535		Default: 4840	
Session timeout	60 to 86400 seconds			
Node ID elements	Namespace index	1	Fixed to index number 2	
	Identifier type	String	Maximum of 64 one-byte alphanumeric characters	
	Identifier	Object node	Max. registrations: 64	Nodes for collectively managing Variable nodes
		Variable node	Max. registrations: 2048	Nodes that hold data
Data type of nodes	BOOLEAN	Bit	Refer to <a href="#">page 7-20</a>	
	SBYTE	8-bit integer with sign		
	BYTE	8-bit integer without sign		
	INT16	16-bit integer with sign		
	UINT16	16-bit integer without sign		
	INT32	32-bit integer with sign		
	UINT32	32-bit integer without sign		
	FLOAT	32-bit real number		
STRING	Character string			
User authentication	None			
Security policy	None			
List of functions	Security model	Not supported		
	Data access	Supported		
	Alarms and conditions	Not supported		
	Program	Not supported		
	Historical access	Not supported		
	Discovery	Not supported		
	Aggregation	Not supported		
	PubSub	Not supported		



## Settings on the Editor

When connecting with OPC UA clients, [OPC UA Server] settings must be configured.

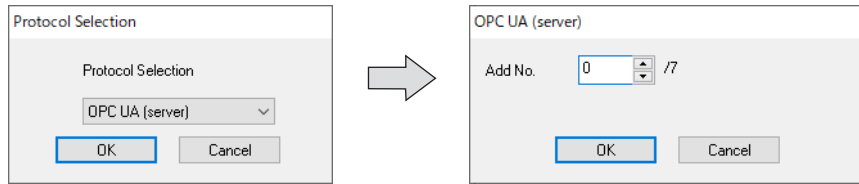
### OPC UA server settings

1. Click [System Setting] → [Other] → [IIoT Setting].
2. Click [Add] and set the following.

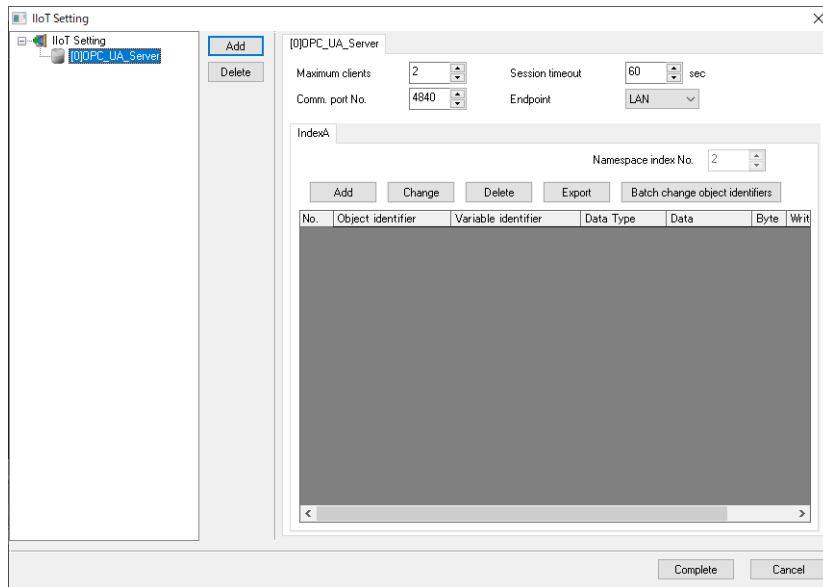
[Protocol Selection]: OPC UA (server)

[Add No.]: 0 to 7

Only one set of OPC UA server settings can exist on the [IIoT Setting] window. If settings are already registered, [OPC UA (server)] cannot be selected.  
Also, server settings cannot coexist with OPC UA client settings.



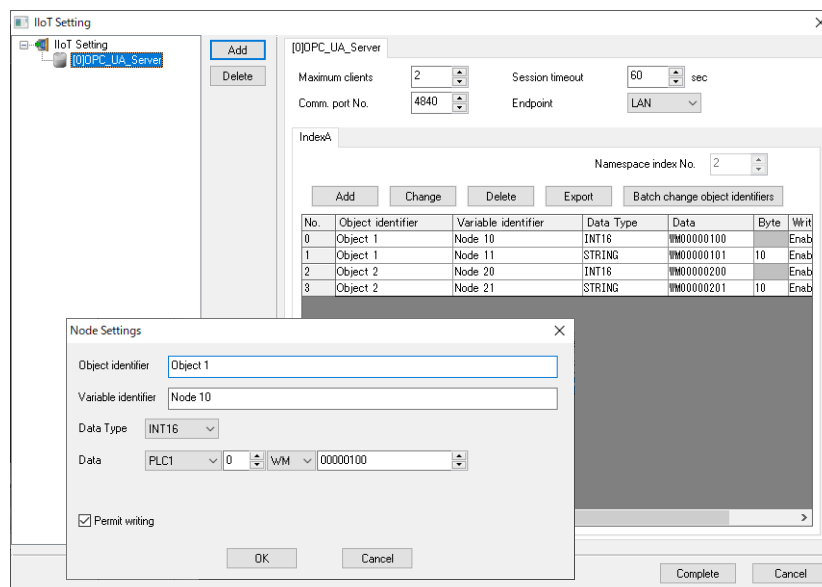
3. Configure settings on the [OPC UA Server] tab window.



Item	Description
Maximum clients	Set the number of clients to connect to the X1 series unit. Setting range: 2 to 4 (default: 2)
Comm. port No.	Set the port number of the X1 series unit to be used for communicating with clients. Setting range: 1024 to 65535 (default: 4840)
Session timeout	Set the time to disconnect from a client counting from the last request received from the client. Setting range: 60 to 86400 sec (default: 60)
Endpoint	Select an Ethernet port of the X1 series unit. LAN/LAN2
IndexA	Configure settings to link the OPC UA server function of the X1 series unit with PLC data. These settings are necessary for a client to be able to access the X1 series unit. For details, refer to the next page.

## [IndexA] Settings

The OPC UA server function of the X1 series has one index number (namespace index No. 2). Register the node identifier and PLC device memory in this index.



Item	Description										
Namespace index No.	2 (Fixed)										
Object identifier	Set the identifier of the Object node. An identifier that is already registered to a Variable node and "WorkSpace" cannot be set. Registration: Max. 64 Number of characters: Max. 64 one-byte alphanumeric characters (uppercase/lowercase) <sup>*1</sup> and symbols <sup>*2</sup>										
Variable identifier	Set the identifier of the Variable node. An identifier that is already registered to an Object node or Variable node cannot be set. Registration: Max. 2048 Number of characters: Max. 64 one-byte alphanumeric characters (uppercase/lowercase) <sup>*3</sup> and symbols <sup>*2</sup>										
Data Type	Set the data type of the device memory. Refer to " <a href="#">Data types supported by the X1 series</a> " page 7-20.										
Data	Specify a device memory address. <ul style="list-style-type: none"> <li>PLC device memory</li> <li>Internal device memory</li> <li>Tag</li> </ul>										
Bytes	This setting is valid when [Data Type] is set to [STRING]. Specify the number of bytes. Setting range: Max. 127 bytes										
Permit writing	This setting is valid when a PLC device memory address is selected at [Data]. Use this setting to control write operations from clients. Selected: Write operations from clients are allowed. Unselected: Write operations from clients are prohibited.										
Editing buttons	Use these buttons to add and edit node settings. Node settings can also be added from an Excel file or CSV file (tab delimited) by right-clicking and pasting. <sup>*4</sup> <table border="1"> <tbody> <tr> <td>Add</td> <td>Adds a node. Object node: Max. 64 Variable node: Max. 2048</td> </tr> <tr> <td>Change</td> <td>Edits the selected node settings.</td> </tr> <tr> <td>Delete</td> <td>Deletes the selected node settings.</td> </tr> <tr> <td>Export</td> <td>Exports node settings in XML format.</td> </tr> <tr> <td>Batch change object identifiers</td> <td>Batch changes registered Object identifiers.</td> </tr> </tbody> </table>	Add	Adds a node. Object node: Max. 64 Variable node: Max. 2048	Change	Edits the selected node settings.	Delete	Deletes the selected node settings.	Export	Exports node settings in XML format.	Batch change object identifiers	Batch changes registered Object identifiers.
Add	Adds a node. Object node: Max. 64 Variable node: Max. 2048										
Change	Edits the selected node settings.										
Delete	Deletes the selected node settings.										
Export	Exports node settings in XML format.										
Batch change object identifiers	Batch changes registered Object identifiers.										

\*1 Input is case-sensitive when newly registering. However, registration of a new identifier that differs only by its case usage from a registered identifier is not possible.

For example, the string "test" cannot be registered as an identifier if "TEST" is already registered. This is because the string "test" will be converted to "TEST" to match with the existing identifier and then registered.

To change the case usage of a registered identifier, click [Batch change object identifiers].

\*2 The following four symbols cannot be used. ", &, <, -

\*3 Input is case-sensitive when newly registering. However, registration of a new identifier that differs only by its case usage from a registered identifier is not possible.

## \*4 CSV file (tab delimited) format

	A	B	C	D	E	F
1	Object A	Node A	STRING	WM00000100	10	Enabled
2	Object A	Node B	STRING	WM00000105	10	Enabled
3	Object A	Node C	STRING	WM00000110	10	Enabled
4	Object B	DATA 1	UINT16	WM00000200		Prohibited
5	Object B	DATA 2	INT16	WM00000202		Prohibited

↑
↑
↑
↑
↑
↑

Object node identifier      Variable node identifier      Data type      Device memory      Number of bytes      Write allowed /prohibited

1. Select all and copy.
  2. Select one row on the [IndexA] tab of V-SFT and paste. The settings are registered to the selected row and subsequent rows.
- \* Any settings that are already registered will be overwritten.
- \* Pasting is not possible if no settings are registered on the [IndexA] tab. Register one row (No. 0) in advance as dummy data.

\* The number of bytes is set only when [Data Type] is set to [STRING]. The cell is left blank with other settings.

## Data types supported by the X1 series

Data Type		X1 Display Format	Range
BOOLEAN	Bit device	Bit device	true/false <sup>*1</sup>
SBYTE	8-bit integer with sign	DEC (with "-" sign), 1 word DEC (with "+" or "-" sign), 1 word	-128 to 127 <sup>*2</sup>
BYTE	8-bit integer without sign	DEC (without sign), 1 word	0 to 255 <sup>*2</sup>
INT16	16-bit integer with sign	DEC (with "-" sign), 1 word DEC (with "+" or "-" sign), 1 word	-32768 to 32767
UINT16	16-bit integer without sign	DEC (without sign), 1 word	0 to 65535
INT32	32-bit integer with sign	DEC (with "-" sign), 2 words DEC (with "+" or "-" sign), 2 words	-2147483648 to 147483647
UINT32	32-bit integer without sign	DEC (without sign), 2 words	0 to 4294967295
FLOAT	32-bit real number	Real number, 2 words	Sign: 1 bit Exponent: 8 bits Mantissa: 23 bits
STRING	Character string	Character string display (LSB → MSB) <sup>*3</sup>	1 to 127 bytes

\*1 Only for parts such as switches and lamps that support bit specification

\*2 Any data input from the X1 that is outside the range is invalid.

\*3 Text processing by MSB → LSB is not supported.

## Example configuration

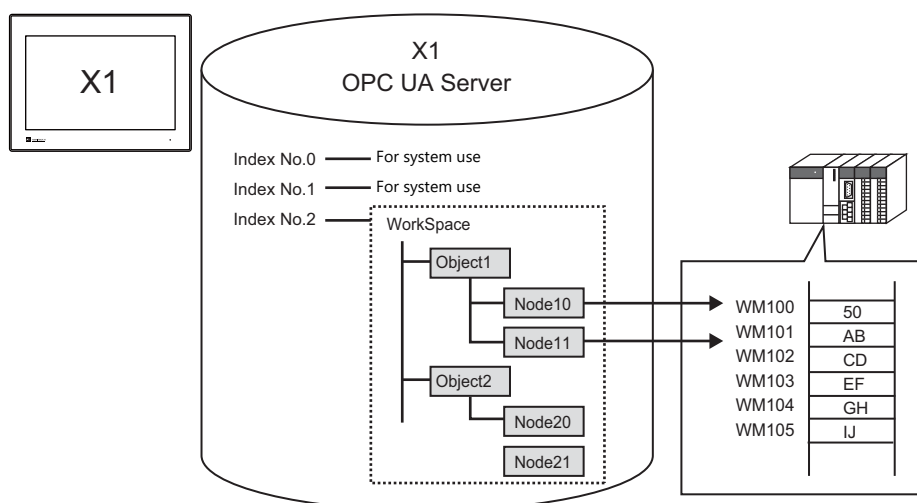
- Settings on the [IndexA] tab for the X1 series unit and schematic of server contents

The screenshot shows the configuration window for the OPC UA Server. The 'IndexA' tab is active, displaying the following settings:

- Maximum clients: 2
- Session timeout: 60 sec
- Comm. port No.: 4840
- Endpoint: LAN
- Namespace index No.: 2

Below the settings are buttons for 'Add', 'Change', 'Delete', 'Export', and 'Batch change object identifiers'. A table lists the objects in the workspace:

No.	Object identifier	Variable identifier	Data Type	Data	Byte	Writ
0	Object 1	Node 10	INT16	WM0000100		Enab
1	Object 1	Node 11	STRING	WM0000101	10	Enab
2	Object 2	Node 20	INT16	WM0000200		Enab
3	Object 2	Node 21	STRING	WM0000201	10	Enab



## Status Codes

The OPC UA server responds (status code) only when a request from a client is received.

The X1 series accepts server connection, server disconnection, data write, and data read requests only and does not respond to any other requests.

The main status codes of the X1 series are shown below.

Code	Details	Remarks
00000000	Successful	
80340000	The selected node does not exist.	
803B0000	Writing is not allowed to the selected node.	

For other status codes, refer to the following URL. <https://opcfoundation.org/UA/schemas/1.04/StatusCode.csv>

## Authentication

The OPC UA server function of the X1 series runs without a security policy and no user authentication.

Set the security policy setting of the OPC UA client to [None].

## Server Statuses

The server function of the X1 series starts when the RUN mode screen is displayed and stops when the Local mode screen is displayed.

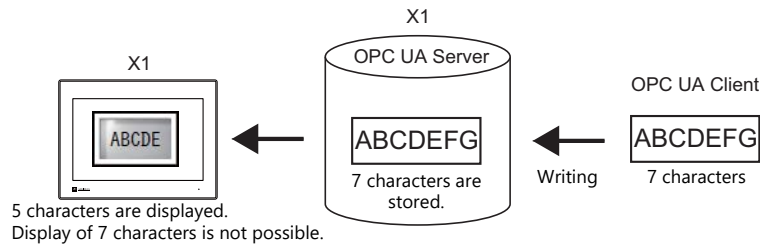
The status is stored at \$s2000 in the system device memory.

System Device Memory	Description	Remarks
\$s2000	Status of server 0: No OPC UA server setting 1: OPC UA server setting configured, server startup complete -1: OPC UA server setting configured, server startup failure	

## Limitations

- Only real-time data of the PLC device memory is used. Accessing of old data (Historical Access) is not supported.
- Communication is not encrypted.
- The OPC UA server runs only while the RUN mode screen is displayed.
- When the OPC UA server is running, switching to Local mode will take about 10 seconds.
- A node with an array as the data value cannot be set.
- When the node [Data Type] is set to [STRING]:
  - Text processing is done by "LSB → MSB". "MSB → LSB" is not supported.
  - The OPC UA server accepts character string inputs from OPC UA clients even if the string is longer than the [Bytes] settings. In such cases, the X1 series unit displays the character string by the number of set bytes only.

Example: When [Data Type] is set to [STRING] and [Bytes] is set to 5 bytes in the OPC UA server settings



- After changing a node setting and transferring the screen program to the X1 series unit, be sure to disconnect and then reconnect clients. Otherwise, data of changed nodes cannot be acquired.
- [OPC UA Server] and [OPC UA Client] settings cannot coexist in the [IIoT Setting] window.

## 7.2.3 Client Function

### Function Specifications

Item	Specifications		Remarks
Version	1.03		
Number of server connections	1		
Port used	LAN / LAN2		Either one port only
Communication method	TCP/IP		
Node ID elements	Namespace index	0 to 65535	
	Identifier type	string numeric	
	Identifier	string: 0 to 256 bytes numeric: 0 to 65535	
Data type of nodes	BOOLEAN	Bit	
	SBYTE	8-bit integer with sign	
	BYTE	8-bit integer without sign	
	INT16	16-bit integer with sign	
	UINT16	16-bit integer without sign	
	INT32	32-bit integer with sign	
	UINT32	32-bit integer without sign	
	FLOAT	32-bit real number	
User authentication	None		When security policy is set to "None"
	Yes (User name, password)		
Security policy	None Basic128Rsa15 Basic256 Basic256Sha256		
Certificate file format	DER format		Extension: .der
List of functions	Security model	Supported	User authentication and security policy
	Data access	Supported	
	Alarms and conditions	Not supported	
	Program	Not supported	
	Historical access	Not supported	
	Discovery	Not supported	
	Aggregation	Not supported	
	PubSub	Not supported	

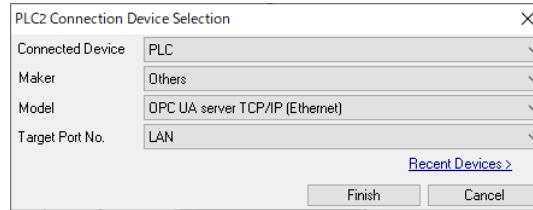
## Settings on the Editor

When connecting with an OPC UA server, connection device settings and [OPC UA Client] settings must be configured.

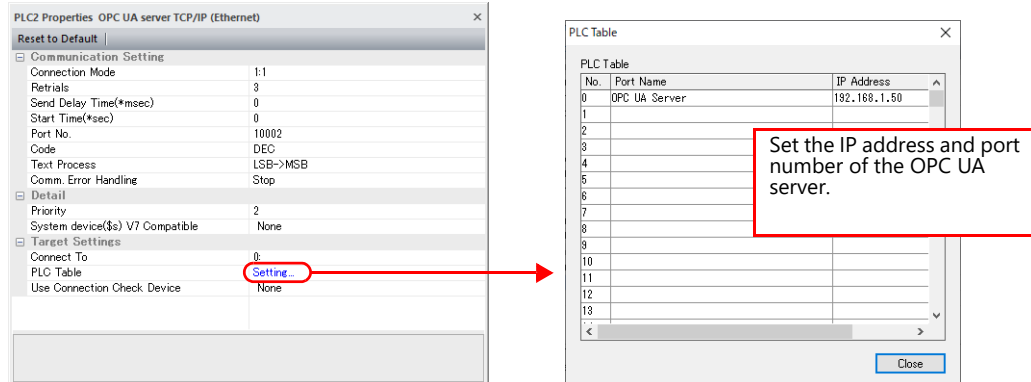
### Connection device settings

1. Click [System Setting] → [Hardware Setting].
2. Select the following model for any one of PLC1 to PLC8.  
 [Maker]: Others  
 [Model]: OPC UA server TCP/IP (Ethernet)  
 [Target Port No.]: LAN or LAN2 (Select the port to use.)

The model [OPC UA server TCP/IP (Ethernet)] can be set only once among PLC1 to PLC8.

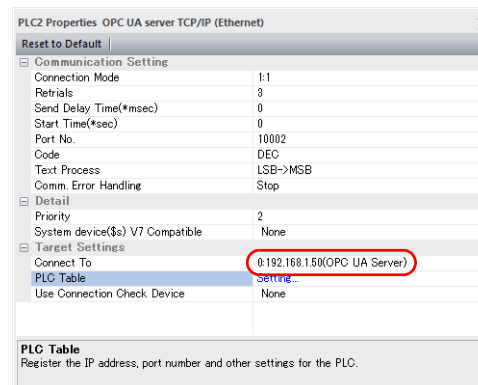


3. Configure the [PLC Table] from the [PLC Properties] window.



The [Connection Mode] setting is fixed to "1:1" and the [Time-out Time] is fixed to 10 seconds.

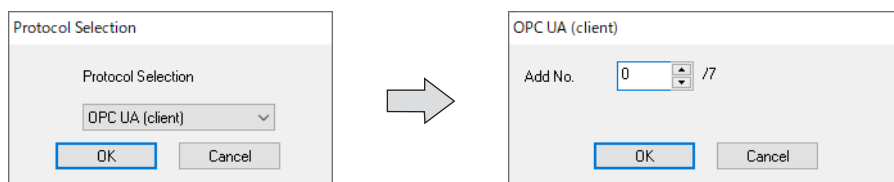
4. Select the number registered on the PLC table at [Connect To].



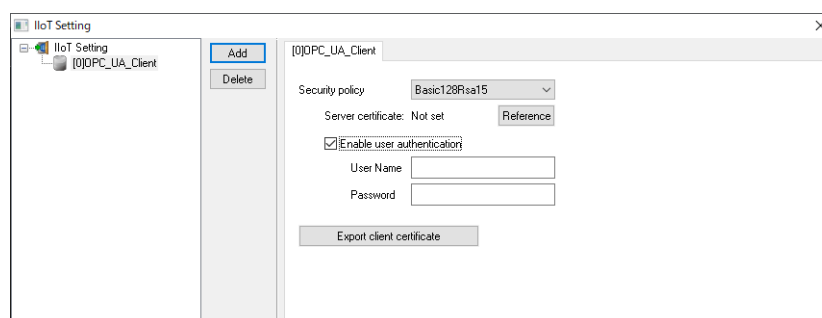
## OPC UA client settings

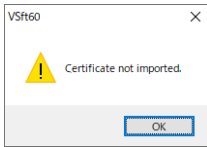
1. Click [System Setting] → [Other] → [IIoT Setting].
2. Click [Add] and set the following.  
[Protocol Selection]: OPC UA (client)  
[Add No.]: 0 to 7

Only one set of OPC UA client settings can exist on the [IIoT Setting] window. If settings are already registered, [OPC UA (client)] cannot be selected. Also, client settings cannot coexist with OPC UA server settings.



3. Set the security policy settings on the [OPC UA Client] tab window.

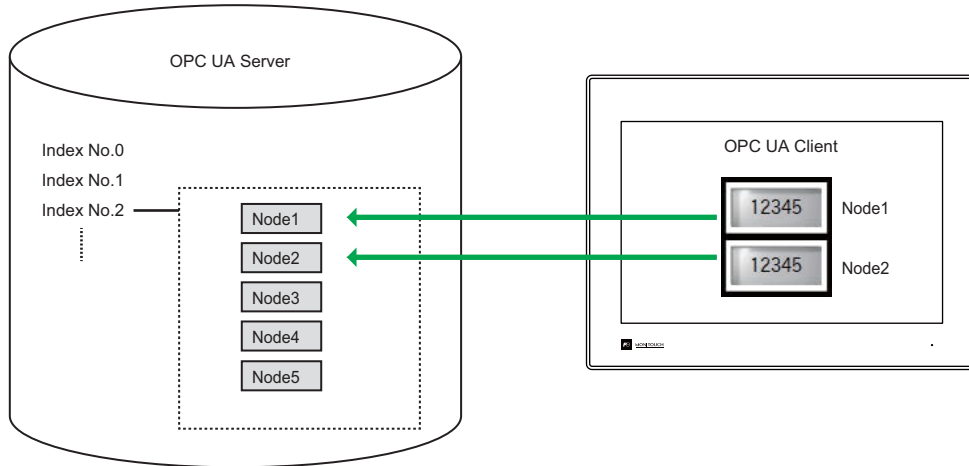


Item	Description
Security policy	Security mode: SignAndEncrypt supported Communication by signing and then encrypting messages is possible so as to prevent eavesdropping and tampering. The server certificate needs to be imported in order to recognize the connection target.
None (no encryption)	No security
Basic128Rsa15	Medium security
Basic256	Medium to high security
Basic256Sha256	High security
Server certificate	Import the server certificate for application authentication. A certificate needs to be imported in order to complete settings if a security policy is selected. 
Enable user authentication	This setting is valid when a security policy is selected. Select the checkbox to enable user authentication. Prevent eavesdropping and tampering by authenticating the user by user name and password.
User Name	Up to 256 one-byte alphanumeric characters (case-sensitive)
Password	Up to 256 one-byte alphanumeric characters (case-sensitive) The entry is indicated as asterisks (*).
Export client certificate	A certificate of the X1 series unit needs to be stored to the OPC UA server if a security policy is selected. Click this button to export the X1 series certificate to any given location. File extension: .der  The X1 series certificate is also stored on the X1 series unit. The certificate can be copied from the X1 series unit to a USB flash drive.  Storage location C:\MONITOUCH\X1\opcua\client\PKI\certs\client.der



## Device Memory Settings

The X1 series unit accesses nodes on the OPC UA server. Each node is allocated a node ID comprising multiple elements: a namespace index No., identifier type, and identifier. The ID and data type of OPC UA server nodes are to be set to parts of the X1 series such as switches, lamps, and numerical data display parts.



Therefore, be sure to check node IDs of the OPC UA server using a tool and then create the screen program for the X1 series. If node IDs cannot be checked by using an OPC UA server tool, try using free client tools such as UaExpert.

### Node ID

A node ID comprises the following three elements.

- Namespace index No.
- Identifier type
- Identifier

There are two types to the identifier type element of node IDs: string and numeric. Settings change depending on which type is selected.

Identifier Type	Identifier	Range	Setting Example
string	Character string	1 to 256 bytes	<p>← Identifier</p>
numeric	Numerical	0 to 65535	<p>← Identifier</p>

## Data types supported by the X1 series

Data Type		X1 Display Format	Range
BOOLEAN	Bit device	Bit device	true/false <sup>*1</sup>
SBYTE	8-bit integer with sign	DEC (with "-" sign), 1 word DEC (with "+" or "-" sign), 1 word	-128 to 127 <sup>*2</sup>
BYTE	8-bit integer without sign	DEC (without sign), 1 word	0 to 255 <sup>*2</sup>
INT16	16-bit integer with sign	DEC (with "-" sign), 1 word DEC (with "+" or "-" sign), 1 word	-32768 to 32767
UINT16	16-bit integer without sign	DEC (without sign), 1 word	0 to 65535
INT32	32-bit integer with sign	DEC (with "-" sign), 2 words DEC (with "+" or "-" sign), 2 words	-2147483648 to 147483647
UINT32	32-bit integer without sign	DEC (without sign), 2 words	0 to 4294967295
FLOAT	32-bit real number	Real number, 2 words	Sign: 1 bit Exponent: 8 bits Mantissa: 23 bits
STRING	Character string	Character string display	1 to 127 bytes

\*1 Only for parts such as switches and lamps that support bit specification

\*2 Invalid if input value is out of range.

## Connecting to and Disconnecting from the OPC UA Server

### Connecting

If [OPC UA server TCP/IP (Ethernet)] is selected at [Connection Device Selection], the X1 series accesses the OPC UA server when the X1 app starts.

When a connection is established, reading and writing of data is enabled. If connection fails, an error screen is displayed.

### Disconnecting

The X1 series disconnects from the OPC UA server in the following situations.

- Upon physical disconnection from the server (LAN cable disconnection, etc.)  
The X1 reconnects when the physical disconnection is resolved.
- Upon screen program transfer  
After transfer is complete, the X1 series reconnects if [OPC UA server TCP/IP (Ethernet)] is selected at [Connection Device Selection].
- When the Local mode screen is displayed  
The X1 reconnects when the RUN mode screen is displayed.

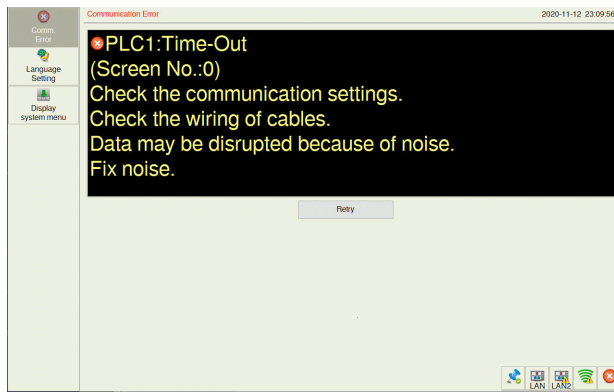
## Error Display

Errors displayed on the X1 screen

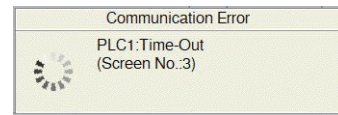
Error Message		Description
Communication Error*1	Time-Out	This error message is displayed when communication with the OPC UA server or other devices is not established, or when an abnormality (noise) is detected. <ul style="list-style-type: none"> <li>• Check the settings at [Hardware Setting] → [PLC Properties] of the X1 screen program.</li> <li>• Check the wiring.</li> <li>• Implement measures against noise.</li> </ul>
	Error code received	When the X1 series unit sends a data read/write request to the OPC UA server, the OPC UA server sends back a status code.*2 If this status code indicates an error, the message "Communication Error: Error code received" appears on the screen.

\*1 The display differs depending on the option selected for [Comm. Error Handling].

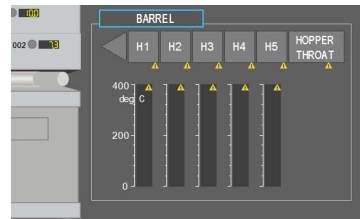
- [Stop]



- [Continue]



- [Disconnect] (exclamation marks indicated)



\*2 The main status codes displayed on the X1 series are shown below.

For other status codes, refer to the following URL. <https://opcfoundation.org/UA/schemas/1.04/StatusCode.csv>

Status Code	Details
00000000	Normal
80340000	The selected node does not exist.
803B0000	Writing is not allowed to the selected node.

## Limitations

- Do not change server configurations while the X1 series is connected to the OPC UA server. Operation is not guaranteed in such a case.
- Access to a node with an array is not supported.
- [OPC UA Server] and [OPC UA Client] settings cannot coexist in the [IIoT Setting] window.

## **8 Convenient Functions**

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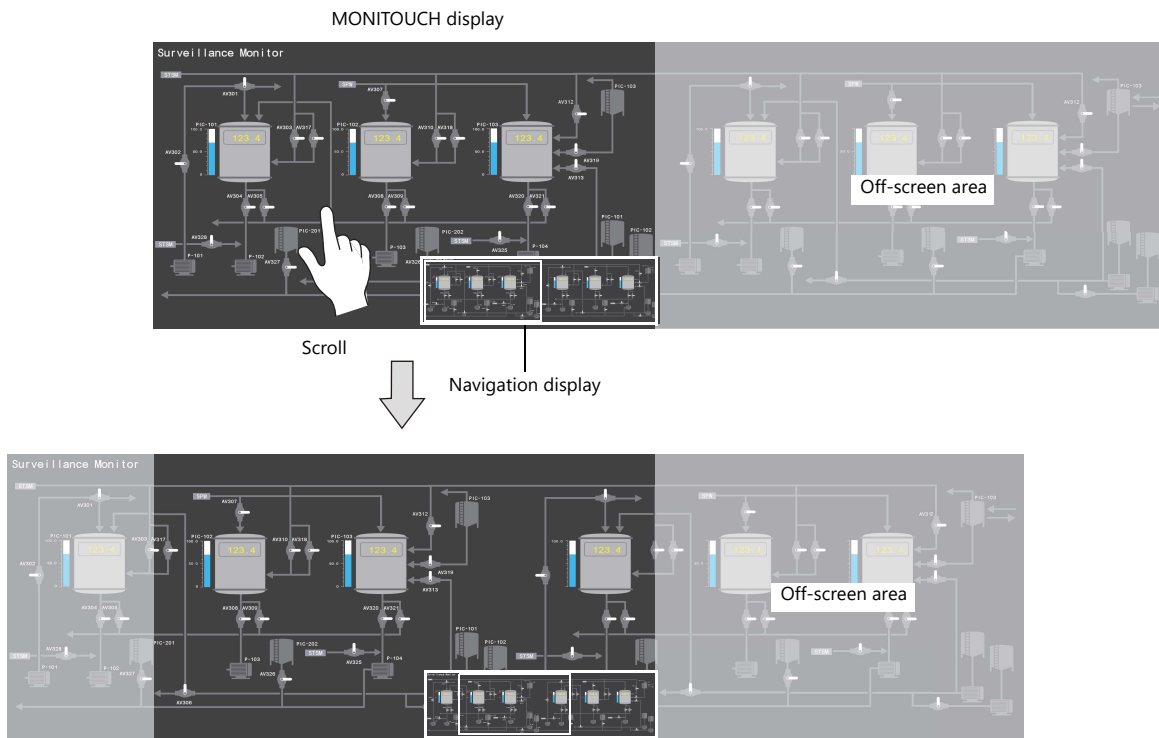
- 8.1 Enlarging and Scrolling Screens
- 8.2 Splash Screen
- 8.3 Web Browser Display
- 8.4 Starting Applications
- 8.5 Dedicated Macro Commands
- 8.6 Vector Rendering
- 8.7 Task List and On-Screen Keyboard Display

# 8.1 Enlarging and Scrolling Screens

## 8.1.1 Overview

### Enlarging the Screen Size

Screen sizes larger than the display size (resolution) of the X1 series unit can be registered. When a display is partially off-screen, the display can be scrolled to display the off-screen content. A navigation display (a miniaturized display of the entire screen) is shown during scrolling to indicate the current display position.



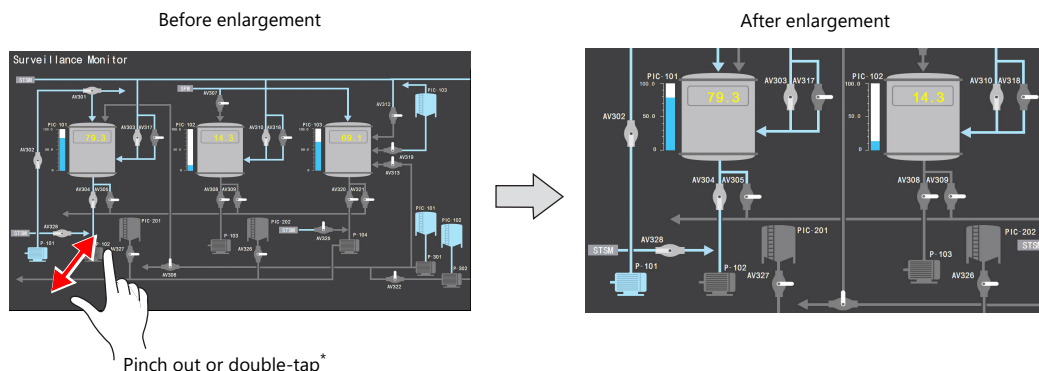
For details on settings, refer to "Enlarging the Screen Size" page 8-2.

### Location of Settings

- Screen
- Overlap

### Enlarged Display

The screen display can be enlarged by up to 200%. Zooming in and out is done using pinch-out and pinch-in gestures. The screen display can also be enlarged by double-tapping. After enlarging the screen, the display can be scrolled to show off-screen content.



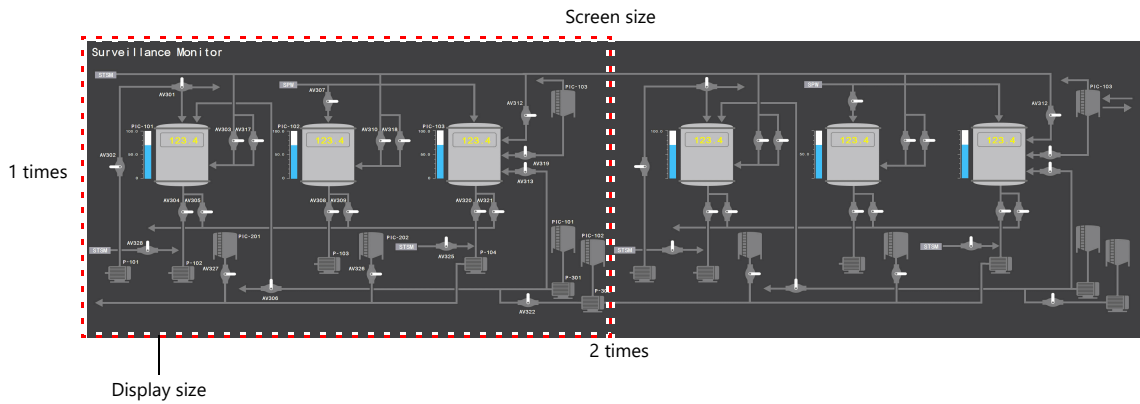
\* After enlargement to the maximum magnification by double-tapping, the screen display returns to its original size.

For details on settings, refer to "Enlarged Display" page 8-3.

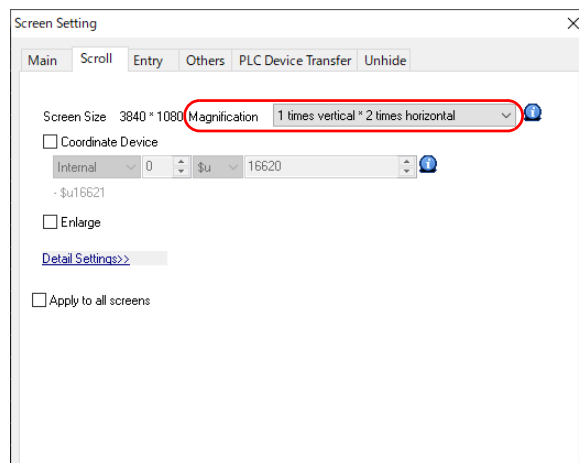
## 8.1.2 Setting Example

### Enlarging the Screen Size

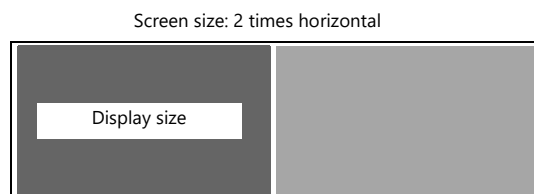
This section explains the settings used when displaying and scrolling a screen that is two times larger in horizontal direction than the display of the X1 series unit.



1. Display the scrolling settings
  - For screens: [Screen Setting] → [Screen Setting] → [Scroll] tab window
  - For overlaps: Overlap setting window → [Scroll] settings
2. Set [Magnification] to "1 times vertical × 2 times horizontal".

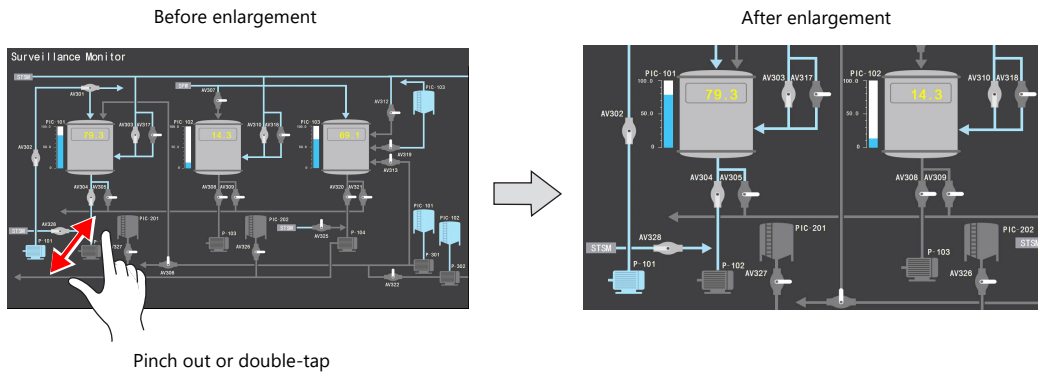


This completes the necessary settings.  
 The screen size is extended two fold in the horizontal direction.  
 Scrolling becomes available on the MONITOUCH.

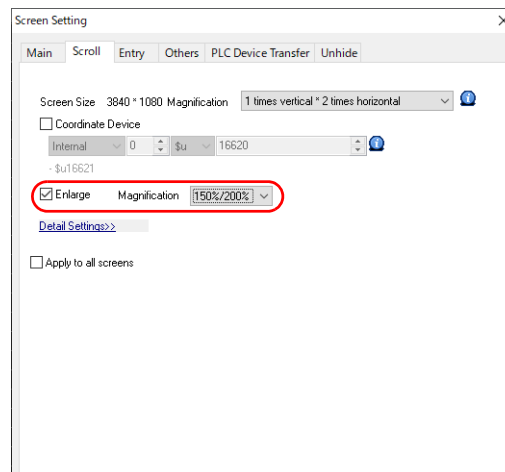


## Enlarged Display

This section explains the settings for enlarging the screen display.



1. Display the [Screen Setting] → [Screen Setting] → [Scroll] tab window.
2. Select the [Enlarge] checkbox and set a magnification.



This completes the necessary settings.

Pinch-out and pinch-in gestures are used for zooming in and out respectively.

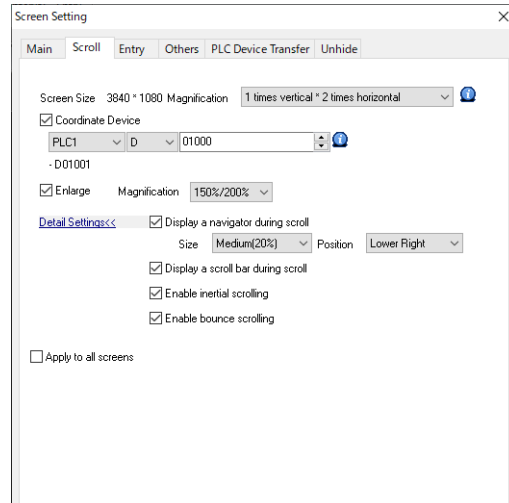
By double-tapping, the magnification changes to 150% → 200% → 100% by each double-tap gesture.

## 8.1.3 Detailed Settings

### Screen

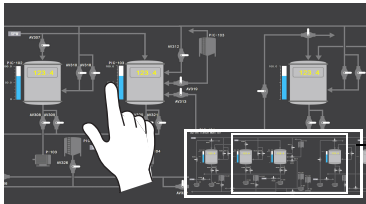
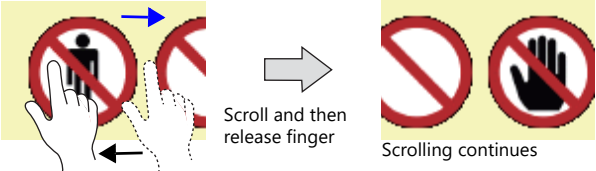
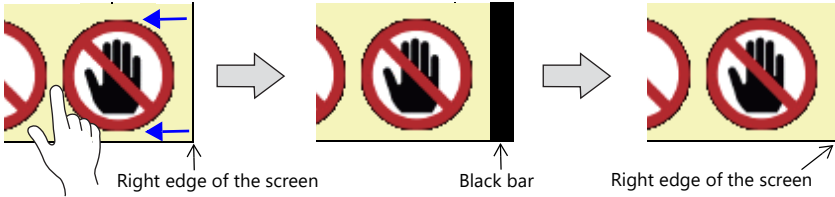
Location of settings: [Screen Setting] → [Screen Setting]

### Scroll



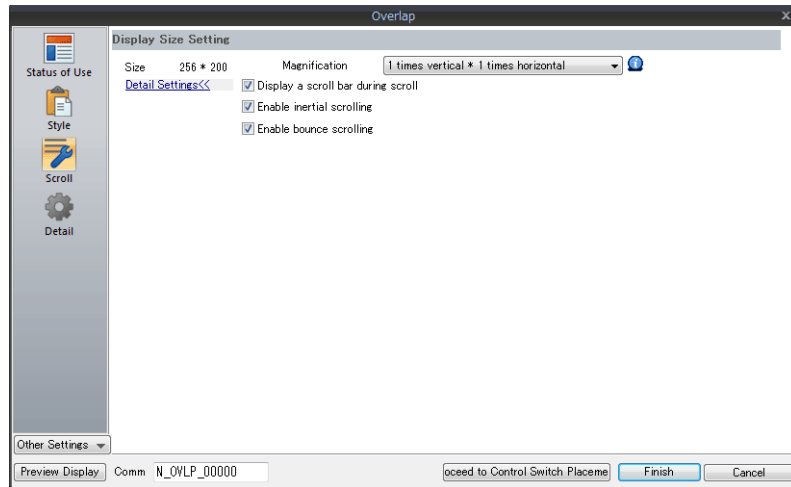
Item	Description
Screen Size	Displays the screen size.
Coordinate Device	<p>Stores the coordinates of the current display position (upper left). Two words are occupied consecutively. Unit: dots n: X coordinate n + 1: Y coordinate</p> <p>The display position can also be changed by specifying coordinates. However, if a value that exceeds the maximum value is specified, the screen is displayed at the maximum value and the maximum value is written to the coordinate device memory.</p> <p>Example: FHD, 2 times vertical * 2 times horizontal</p> <ul style="list-style-type: none"> <li>- When n = 1000, n + 1 = 500 is specified (normal values)</li> <li>- When n = 3000, n + 1 = 3000 is specified (outside range)</li> </ul> <div style="display: flex; justify-content: space-around;"> <div> </div> <div> </div> </div> <p>* 1920 is written to "n" and 1080 is written to "n + 1" in the coordinate device memory.</p>
Magnification	<p>Set the editing size of the screen.</p> <p>1 times vertical × 1 times horizontal / 1 times vertical × 2 times horizontal                      1 times vertical × 3 times horizontal / 1 times vertical × 4 times horizontal                      2 times vertical × 1 times horizontal / 2 times vertical × 2 times horizontal                      3 times vertical × 1 times horizontal / 4 times vertical × 1 times horizontal</p> <p>Example: 1 times vertical × 4 times horizontal</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">  X1 unit resolution: 1920 × 1080 pixels                 </div> <div style="border: 1px solid gray; padding: 5px;">Screen size: 7680 × 1080 pixels</div> </div>
Enlarge	<p>Double-tap on the screen to zoom in. The current magnification is output to \$s1641. If the enlargement setting is not selected, \$s1641 always stores "100".</p>



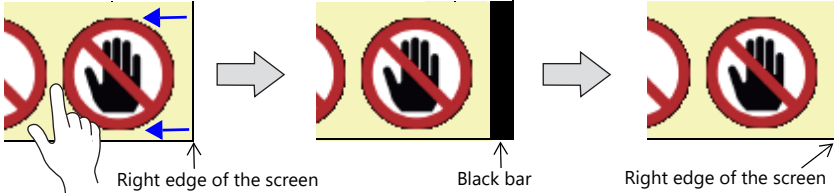
Item	Description
Display a navigator during scroll	Show a miniaturized display of the entire screen when scrolling.  Navigation display
Size	Set the size of the navigation window (as a percentage of the screen resolution of the X1 series unit). Small (15%), Medium (20%), Large (25%)
Position	Set the display position of the navigation window. Lower Right, Lower Left, Upper Right, Upper Left
Display a scroll bar during scroll	Display a scroll bar at the right edge and bottom when scrolling. The scroll bar itself cannot be operated.
Enable inertial scrolling	Allow scrolling to continue after releasing your finger from the screen when scrolling. The speed of scrolling gradually decreases until it stops.  Scroll and then release finger Scrolling continues
Enable bounce scrolling	Scrolling will bounce to indicate that movement in the particular direction has reached its limit. A black bar is displayed momentarily.  Right edge of the screen Black bar Right edge of the screen
Apply to all screens	Apply the same settings to all screens.

# Overlap

## Scroll



Item	Description
Size	Displays the size of the overlap.
Coordinate Device	<p>Stores the coordinates of the current display position (upper left). Two words are occupied consecutively.                      Unit: dots                      n: X coordinate                      n + 1: Y coordinate</p> <p>The display position can also be changed by specifying coordinates. However, if a value that exceeds the maximum value is specified, the screen is displayed at the maximum value and the maximum value is written to the coordinate device memory.</p> <p>Example: FHD, 2 times vertical * 2 times horizontal</p> <ul style="list-style-type: none"> <li>- When n = 1000, n + 1 = 500 is specified (normal values)</li> <li>- When n = 3000, n + 1 = 3000 is specified (outside range)</li> </ul> <p>* 1920 is written to "n" and 1080 is written to "n + 1" in the coordinate device memory.</p>
Magnification	<p>Set the editing size of the overlap.                      1 times vertical × 1 times horizontal / 1 times vertical × 2 times horizontal /                      1 times vertical × 3 times horizontal / 1 times vertical × 4 times horizontal                      2 times vertical × 1 times horizontal / 2 times vertical × 2 times horizontal /                      3 times vertical × 1 times horizontal / 4 times vertical × 1 times horizontal</p> <p>Example: 1 times vertical × 4 times horizontal</p>
Display a scroll bar during scroll	Display a scroll bar at the right edge and bottom when scrolling. The scroll bar itself cannot be operated.
Enable inertial scrolling	<p>Allow scrolling to continue after releasing your finger from the screen when scrolling. The speed of scrolling gradually decreases until it stops.</p>

Item	Description
Enable bounce scrolling	<p>Scrolling will bounce to indicate that movement in the particular direction has reached its limit. A black bar is displayed momentarily.</p>  <p>Right edge of the screen</p> <p>Black bar</p> <p>Right edge of the screen</p>

## 8.1.4 Notes

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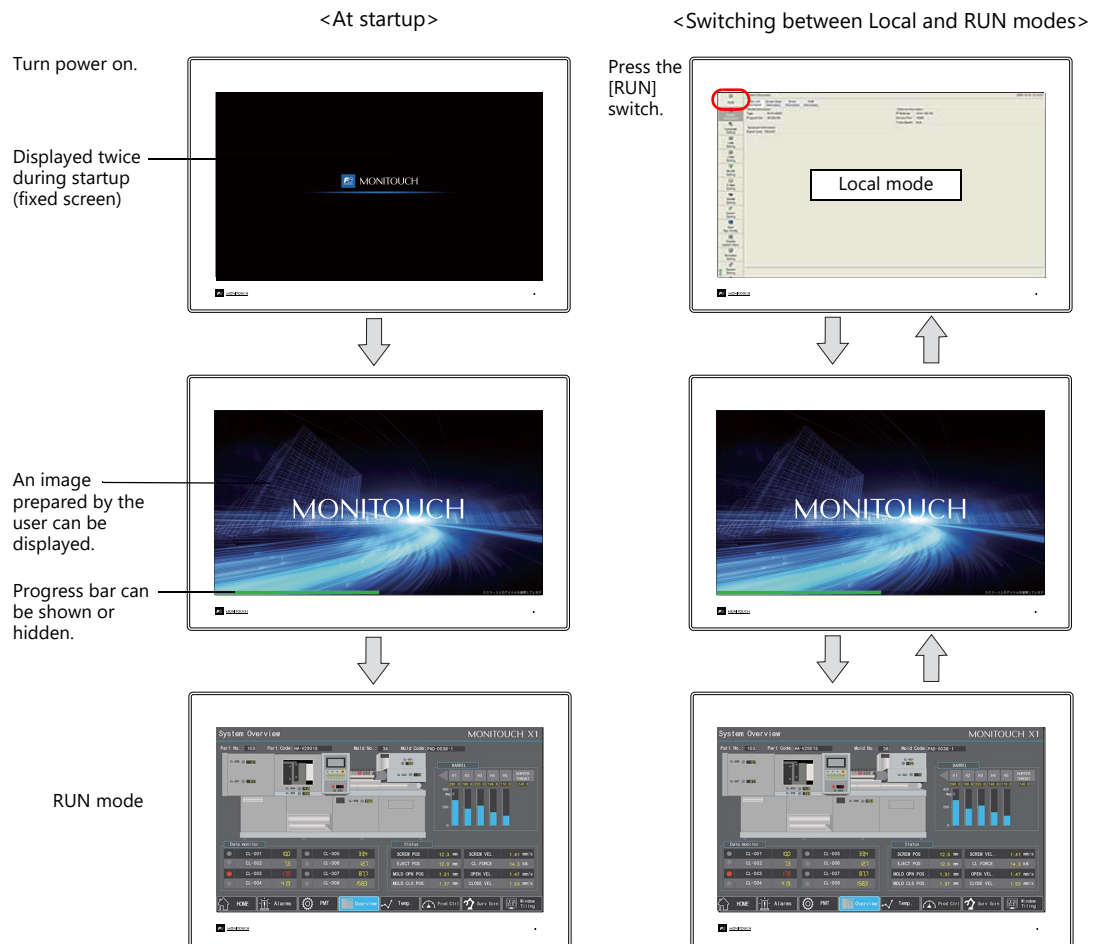
- Scrolling cannot be performed at locations where there are switches.
- Magnification defaults to 100% after changing screens or executing the "RESET\_SCRN" macro command.
- Navigation items cannot be operated. In addition, items placed under the navigation window cannot be operated.
- Increasing the editing size does not change the number of items that can be placed on the screen.
- The display size of the X1 series unit is the maximum editing size for patterns.
- When an overlap transition is in progress, screen enlargement and scrolling cannot be performed. In addition, if an overlap transition is initiated during screen enlargement or scrolling, the transition only starts after the enlargement or scrolling operation is finished.

## 8.2 Splash Screen

### 8.2.1 Overview

An image prepared by the user can be used as the splash screen which is displayed while the X1 series unit is starting up. Images relevant to the usage environment, such as a company logo or precautions can be displayed. The set image will also be displayed when switching between RUN mode and Local mode.

#### Operation schematic



#### Splash Screen

A splash screen is an image displayed on a computer while software is starting up.

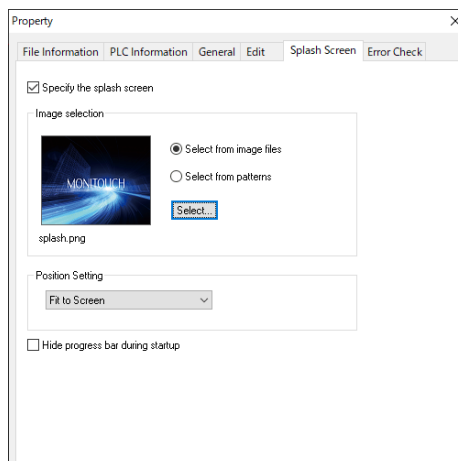
## 8.2.2 Setting Example

This section explains how to set the following image as the splash screen.

Filename: Splash.png



1. Prepare a PNG file, e.g. Splash.png
2. Select the [File] → [Property] → [Splash Screen] → [Specify the splash screen] checkbox.
3. Click [Select from image files] → [Select] and select the PNG file prepared in step 1.



The image is copied to the following location when selected.

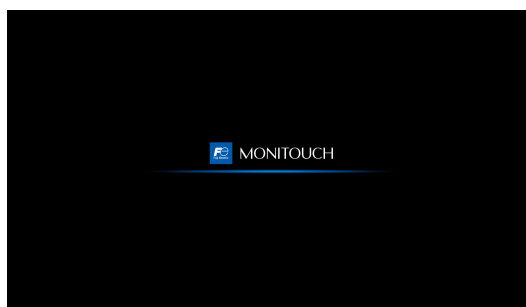
C:\MONITOUCH\User\Splash

4. Set the display position of the image under [Position Setting].

This completes the necessary settings.

---

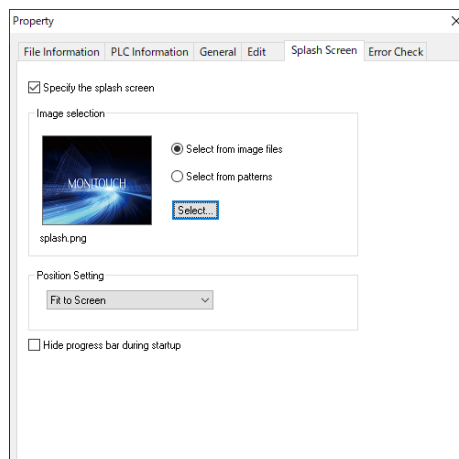
The following image is displayed when the [Specify the splash screen] checkbox is not selected.



## 8.2.3 Detailed Settings

Location of settings: [File] → [Property] → [Splash Screen]

### Splash Screen



Item	Description
Specify the splash screen	Display a user-prepared image on the screen during startup.
Select from image files	Select a PNG file from the desired folder. File extension: png The selected png file is stored at the following location. C:\MONITOUCH\User\Splash
Select from patterns	Select a pattern registered in the screen program. Patterns are registered at [Home] → [Registration Item ▼] → [Pattern].
Position Setting	Specify the display position of the image. Fit to Screen/Fit to Width/Fit to Height/Display in Center
Hide progress bar during startup	Select this checkbox to hide the progress bar at the bottom of the screen.

## 8.2.4 Notes

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- Any area outside the image is displayed in black.
- Patterns set to blink are displayed without blinking.
- When a PNG file is modified, it must be reselected from [Select from images] → [Select].
- If opening a screen program in which PNG files are selected on a different computer or reading the screen program from the X1 series unit, the PNG file is stored at the following location. If a filename with the same name already exists, it is overwritten.

C:\MONITOUCH\User\Splash

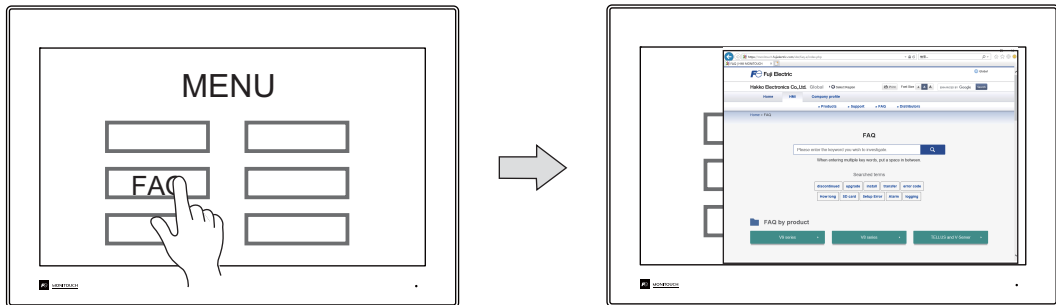


## 8.3 Web Browser Display

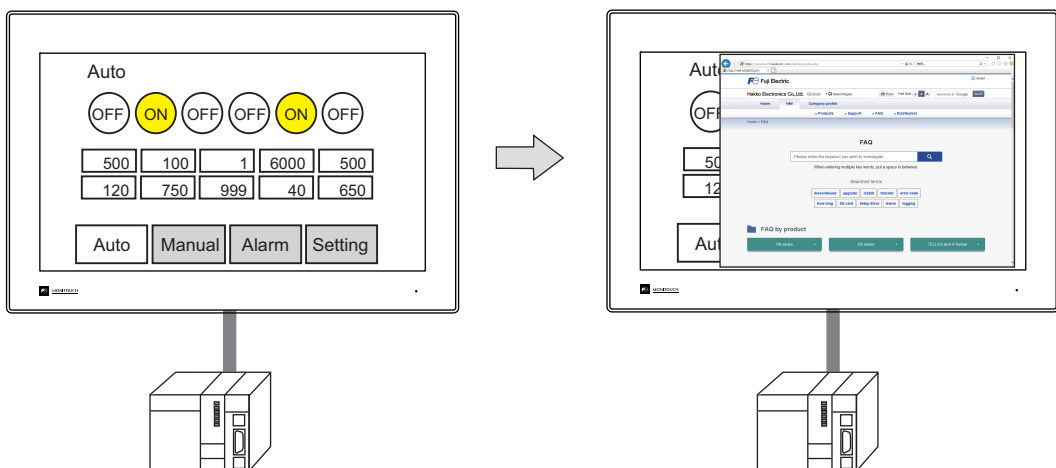
### 8.3.1 Overview

- A web browser (Internet Explorer) can be started from the X1 app.
- A specific page can be specified for display upon starting the browser.
- Display is possible by either a switch part or by a command from a PLC.

- Switch



- PLC command



- When the web browser is started multiple times, the second instance and after will be opened in a new tab.



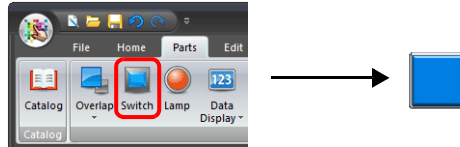
The X1 series unit needs to be connected to the network.

## 8.3.2 Setting Example

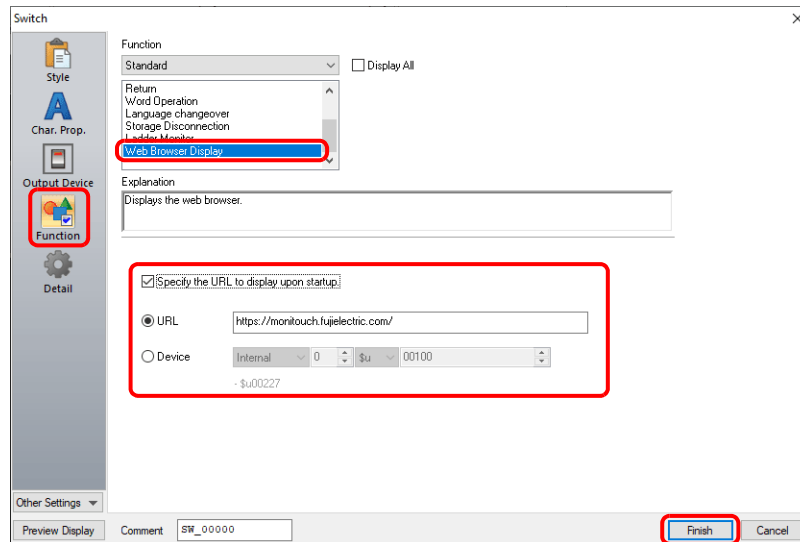
### Displaying Using a Switch

#### V-SFT settings

1. Click [Parts] → [Switch] and place a switch on the screen.



2. Double-click on the switch to display the settings window. For [Function], select [Web Browser Display] and specify the URL of the site to display when the web browser starts.

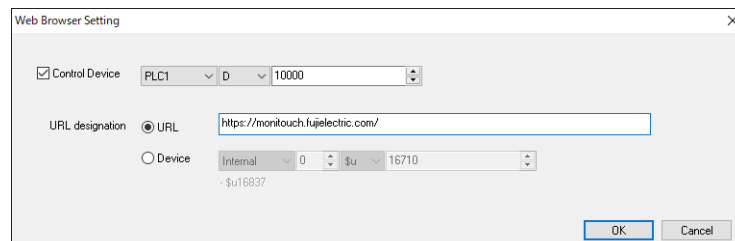


3. Click [Finish]. This completes the necessary settings.

### Displaying by Commanding from PLC

#### V-SFT settings

1. Click [System Setting] → [Other] → [Web Browser Setting].
2. Configure the [Control Device] and [URL designation] settings on the [Web Browser Setting] window.



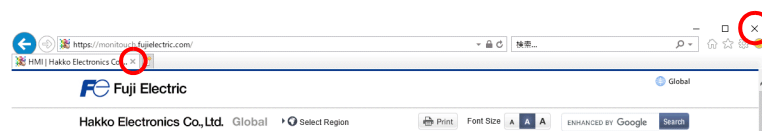
3. Click [OK]. This completes the necessary settings.

#### PLC command

The web browser is displayed when the D10000-00 control device memory address is set to ON.

### Exiting the Web Browser

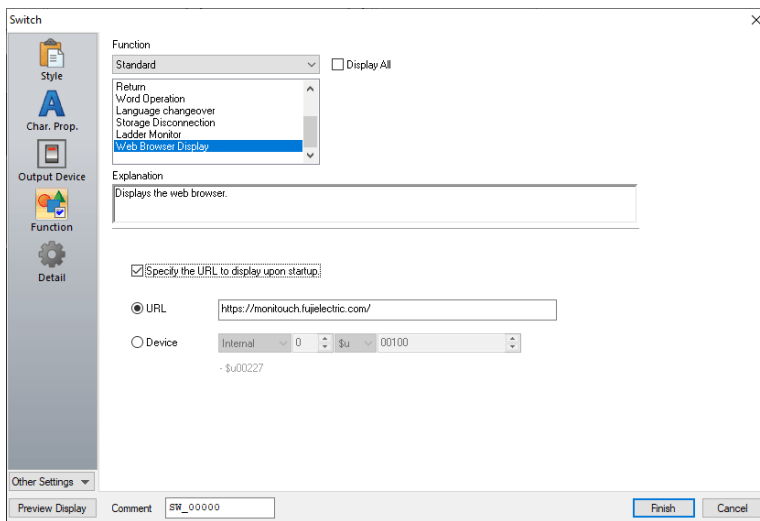
Tap the [X] button of the Internet Explorer window to exit.



### 8.3.3 Startup Method

#### Switch Function

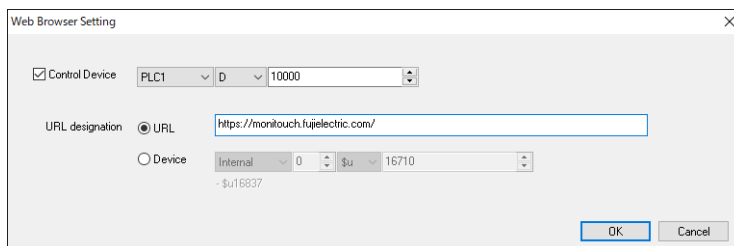
The following settings are available when the [Function] of a switch is set to [Web Browser Display].



Item	Description
Specify the URL to display upon startup.	Select this checkbox to specify an URL. * When the checkbox is unselected, a blank page will be displayed.
URL	Directly specify the URL. Within 256 one-byte characters * When this field is left blank, a blank page will be displayed.
Device	Set the top device memory address that specifies the URL. 256 bytes (128 words) are secured for use. * Text processing: Fixed to "LSB → MSB"

#### PLC Command

The following settings are available at [System Setting] → [Other] → [Web Browser Setting].



Item	Description																																
Control Device	The web browser is displayed when the least significant bit of the specified device memory address is set to ON. <div style="text-align: center;"> <table border="1" style="margin: 0 auto;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="margin: 5px 0 10px 100px;">Reserved for system</p> <p style="margin: 0 0 10px 700px;">Web browser display 0 → 1 (edge): Display</p> </div>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		
URL designation	Select the method for specifying the URL to display. * When this field is left blank, a blank page will be displayed.  URL: Directly specify the URL. Within 256 one-byte characters Device: Set the top device memory address that specifies the URL. 256 bytes (128 words) are secured for use. * Text processing: Fixed to "LSB → MSB"																																



## 8.3.4 Notes

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- Be sure to display only trusted websites.
- There is no limitation on the number of websites that can be displayed simultaneously. However, if a large number of websites are displayed or a slow-loading website is displayed, the performance of the X1 series unit may be slowed down.
- Functions of Internet Explorer (bookmarks, internet options, etc.) can be used. However, Hakko Electronics does not provide support regarding setting changes of Internet Explorer.
- If a path on the X1 series unit is specified at [URL designation], Explorer will start. If a file stored on the X1 series unit is specified, the [View Downloads] window is displayed.
- Internet Explorer may not be displayed in the foreground when started from the X1 app. This is due to Windows specifications.  
In such a case, Internet Explorer can be displayed by using a switch with [Window tiling] set as the [Function] or from the [Task list] function of System Configurator.
- The Internet Explorer window is hidden behind the X1 app window if the X1 app is tapped while Internet Explorer is running.  
In such a case, Internet Explorer can be displayed by using a switch with [Window tiling] set as the [Function] or from the [Task list] function of System Configurator.



- For details on the [Window tiling] switch, refer to ["8.4.4 Window Tiling" page 8-28](#).
- For details on System Configurator, refer to the X1 Series Hardware Specifications.

## 8.4 Starting Applications

### 8.4.1 Overview

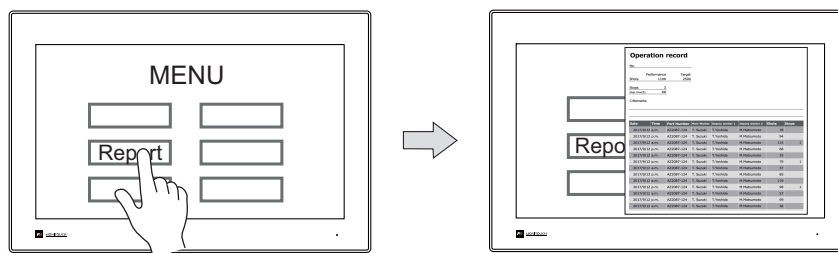
User apps can be started from the X1 series unit.

#### Startup Method

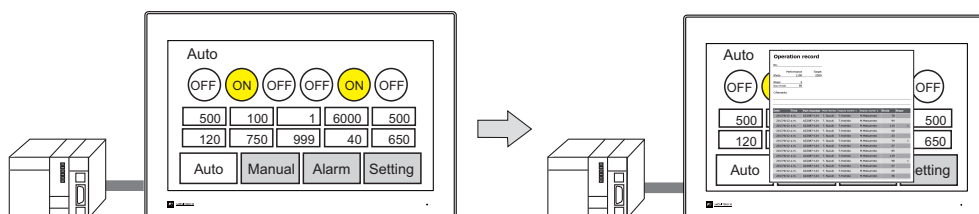
There are three methods for starting an app: using a switch, a PLC command, or a macro command. (Examples are given below.)

When a PLC command or a macro command is used, apps can be started at various timings.

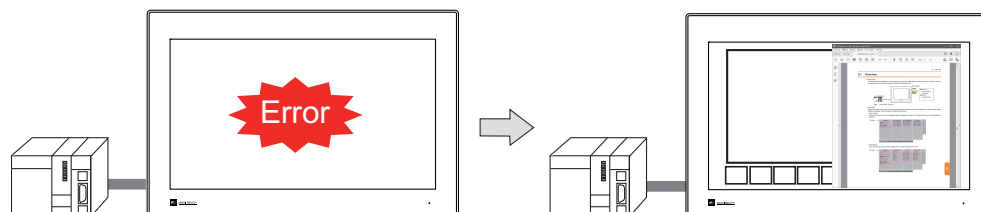
- Switch



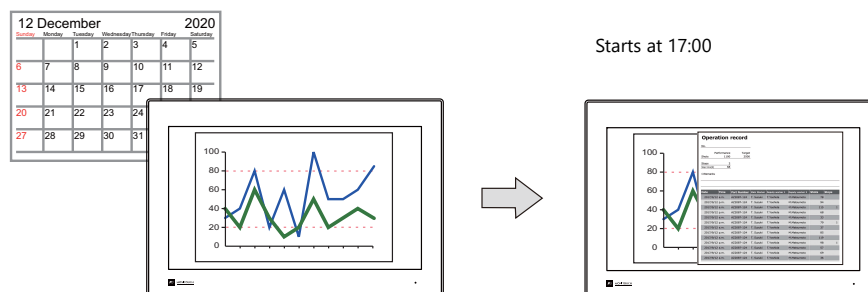
- PLC bit: ON



- When an alarm occurs (PLC or macro command)



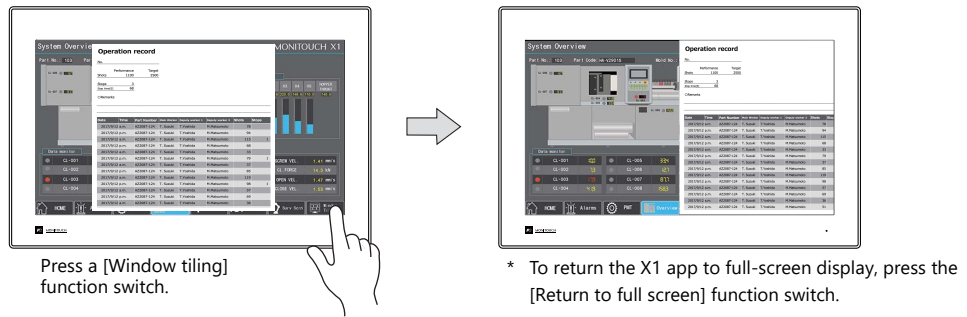
- Linking with the scheduler function (PLC or macro command)



For details, refer to "8.4.3 Startup Method" page 8-25.

## Tiling App Windows

Windows of currently running apps can be tiled by a single tap.

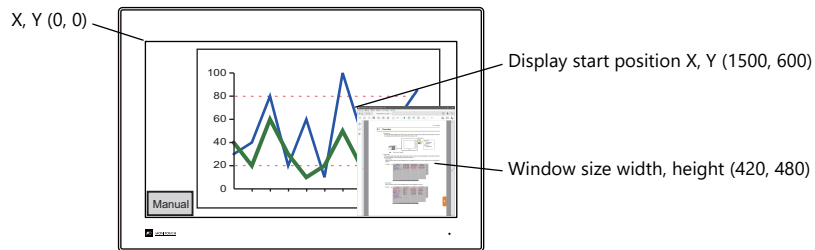


For details, refer to "8.4.4 Window Tiling" page 8-28.

## Changing the Display Position and Window Size of a User App

The display position and window size can be specified for when starting a user app. The layout of user app windows can be specified as desired.

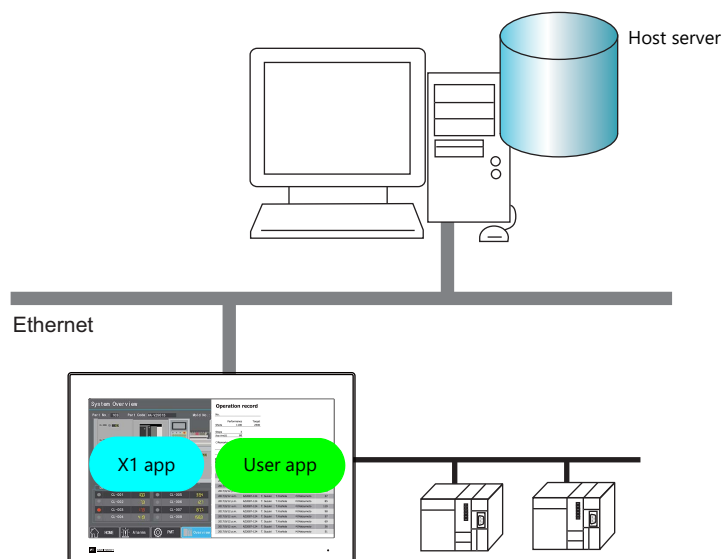
Example: X115



For details on settings, refer to "8.4.2 Setting Example" page 8-19.

## 2-Split Screen Display (User App-Dedicated Display Area)

By using the 2-split screen display function and configuring a screen program that uses only half of the X1 series unit's display area, it is possible to create a layout that allocates the other half to user apps. This allows the user to operate the X1 app while also checking production control information from a host server using Excel or in a database.



For details, refer to "2-Split Screen Display (User App Display Area)" page 8-23.

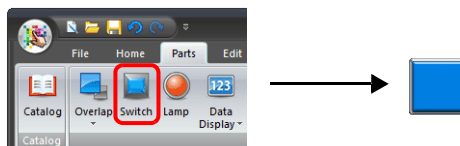
It is also possible to display two instances of X1 apps on the X1 series unit. For details, refer to "Multi-Display Function" page 15-1.

## 8.4.2 Setting Example

### Displaying Using a Switch

#### V-SFT settings

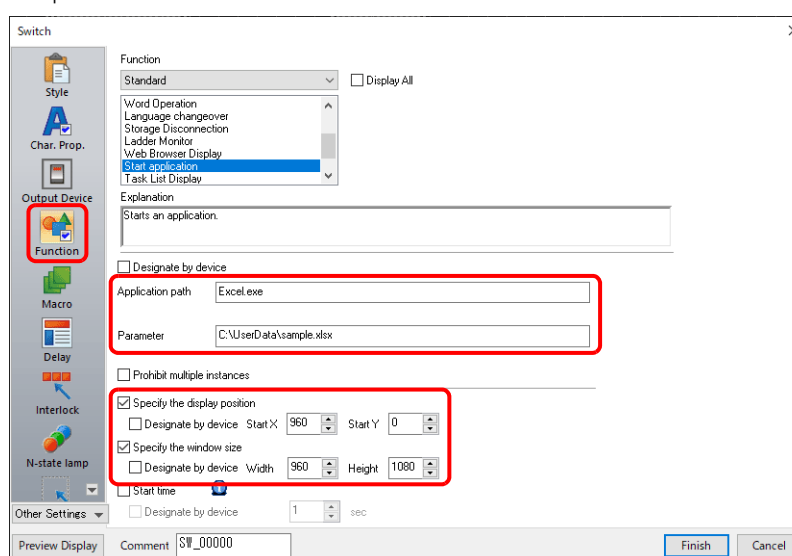
1. Click [Parts] → [Switch] and place a switch on the screen.



2. Double-click on the switch to display the settings window.  
Select [Function] → [Standard] → [Start application] and set as follows.

- Registration example: Opening a file named "sample.xlsx" located at "C:\UserData" using Excel

Example: X115



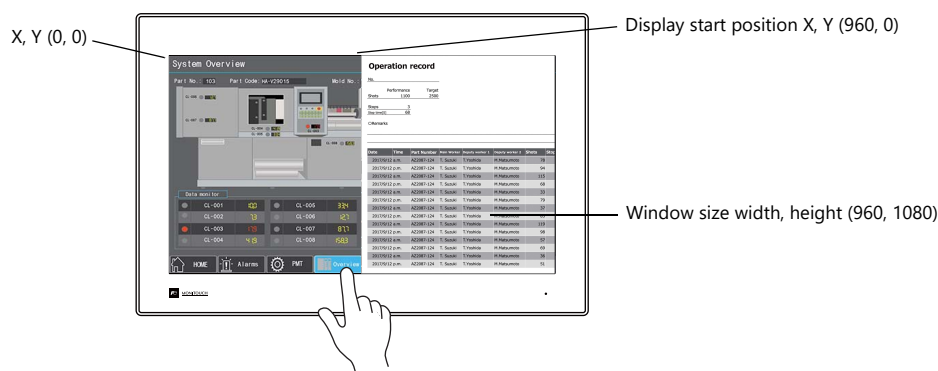
For details, refer to "8.4.3 Startup Method".

3. Click [Finish] on the switch settings window to complete the settings.

For details on switch settings, refer to the X1 Series Reference Manual 1.

### Operation on the X1 series

Pressing a switch starts the specified file.



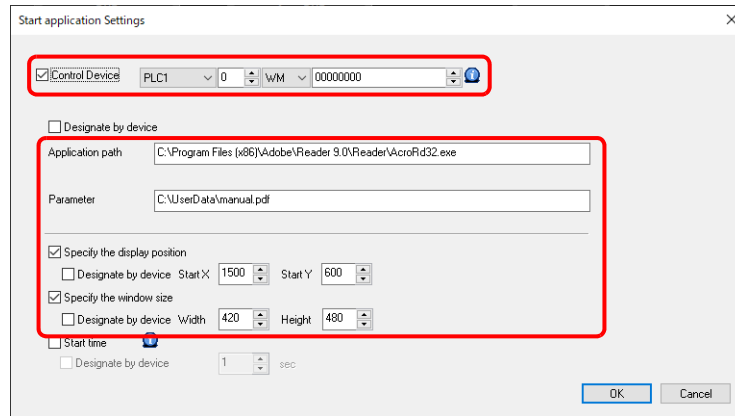
## Displaying by Commanding from PLC

### V-SFT settings

1. Click [System Setting] → [Other] → [Start application].
2. Select [Control Device] and set as follows.

- Registration example: Control device memory WM0  
Opening a file named "manual.pdf" located at "C:\UserData" using Adobe Acrobat Reader

Example: X115



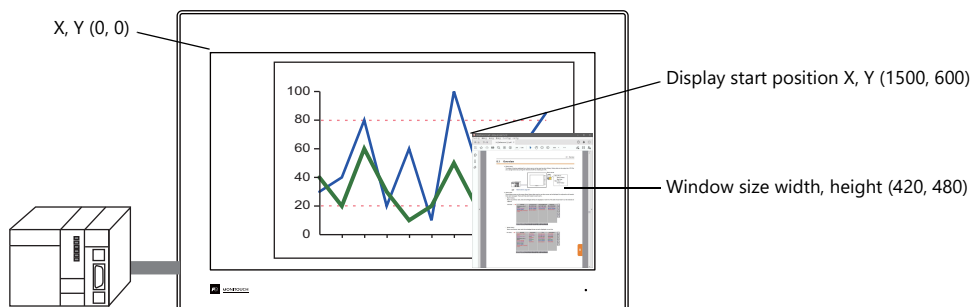
Item	Description																																
Control Device	<p>The app starts when the least significant bit of the specified device memory address turns ON. When bit 1 is ON, running multiple instances of a file is prohibited.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system</p> <p style="text-align: right;">Multiple instance startup 1: Prohibited 0: Permitted</p> <p style="text-align: right;">0 → 1 (edge): Startup</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		

For details, refer to "8.4.3 Startup Method".

3. Click [OK].

### PLC command

The specified file starts when bit 0 of control device memory WM0 turns ON. (When bit 1 of WM0 is ON, running multiple instances of a file is prohibited.)



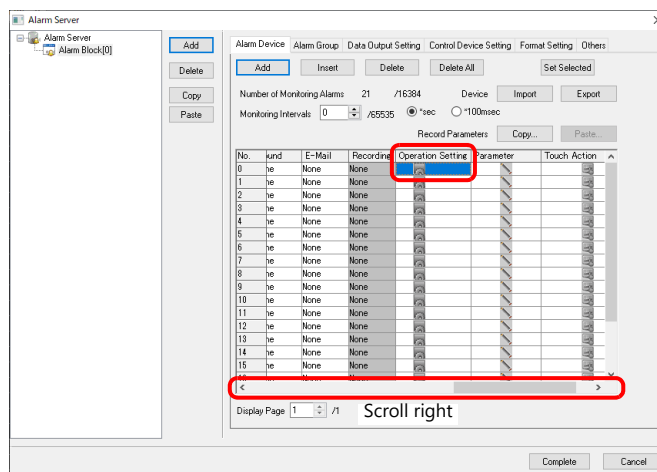


## Displaying by Macro Command

### Displaying upon occurrence of an alarm (alarm macro command)

- V-SFT settings

- 1) Click [System Setting] → [Alarm Server].
- 2) Display the [Alarm Device] tab window, scroll the device memory list and double-click the [Operation Setting] cell.



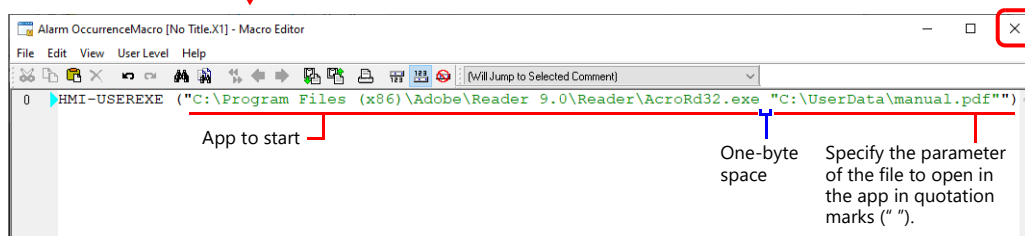
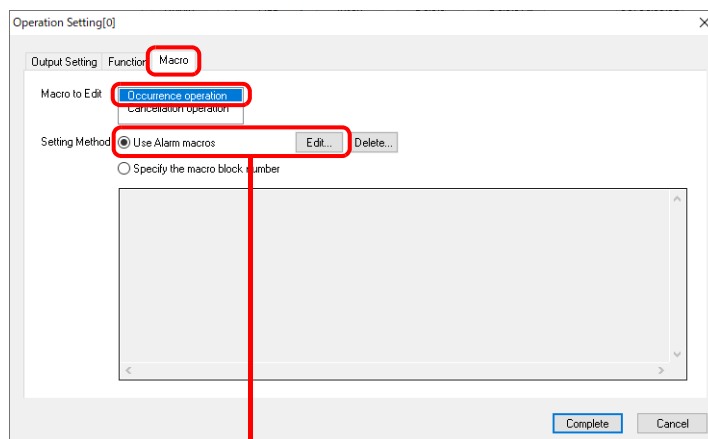
- 3) The [Operation Setting] window is displayed. Display the [Macro] tab window and select [Occurrence operation]. Then click the [Edit] button next to [Use Alarm macros] to display the macro editor.

Register the following macro command.

Macro command HMI-USEREXE ("xxxx")

Specify the parameters of the exe file of the app to start or the file to open in an app in the quotation marks in place of "xxxx".

- Registration example: Opening the "manual.pdf" file located in "C:\UserData" using Adobe Acrobat Reader



- 4) Click [Complete].

- PLC command

The specified file starts when an alarm occurs.

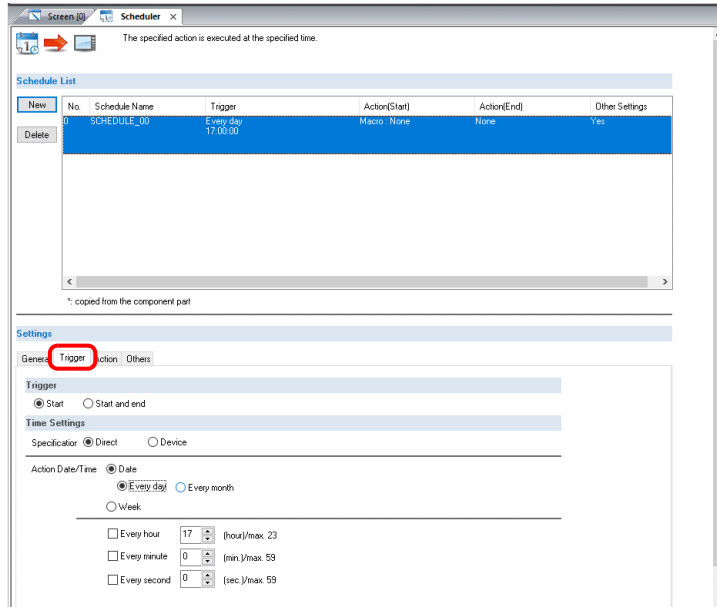


For details on the alarm function, refer to the X1 Series Reference Manual 1.

## Displaying using the scheduler function (scheduler macro command)

- V-SFT settings

- 1) Click [System Setting] → [Scheduler].
- 2) Click [New] to create a schedule.  
Register the schedule for starting an app on the [Trigger] tab window.  
Example: [Trigger]: Start  
[Action Date/Time]: Every day, 17:00

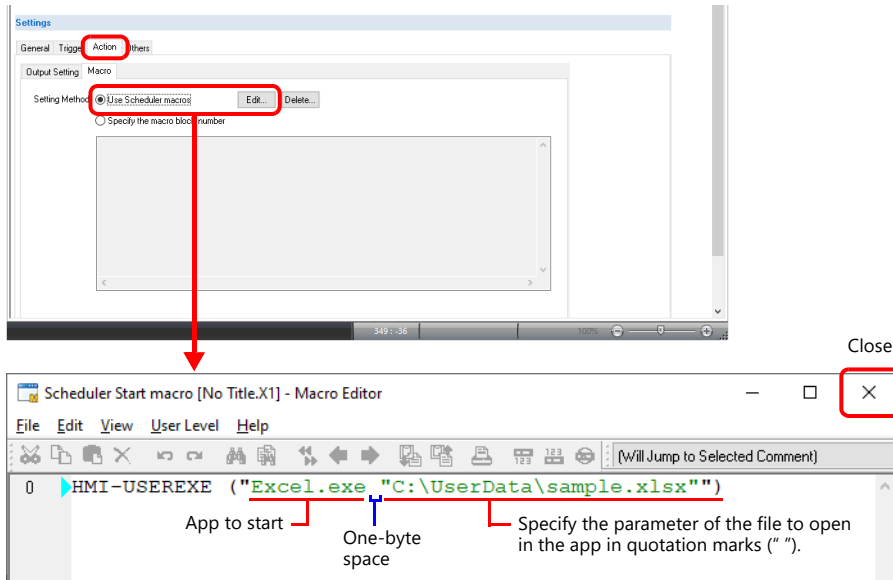


- 3) On the [Action] tab window, select the [Macro] tab and then click the [Edit] button next to [Use scheduler macros] to display the macro editor. Register the following macro command.

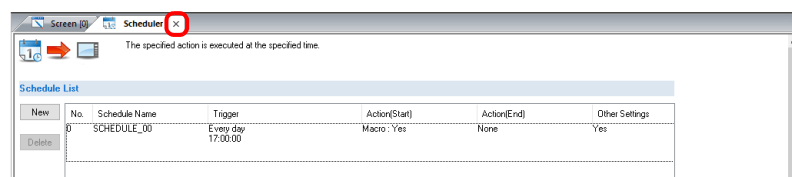
Macro command HMI-USEREXE ("xxxx")

Specify the parameter of the exe file of the app to start or the file to open in an app in the quotation marks in place of "xxxx".

- Registration example: Opening the "sample.xlsx" file located in "C:\UserData" using Excel



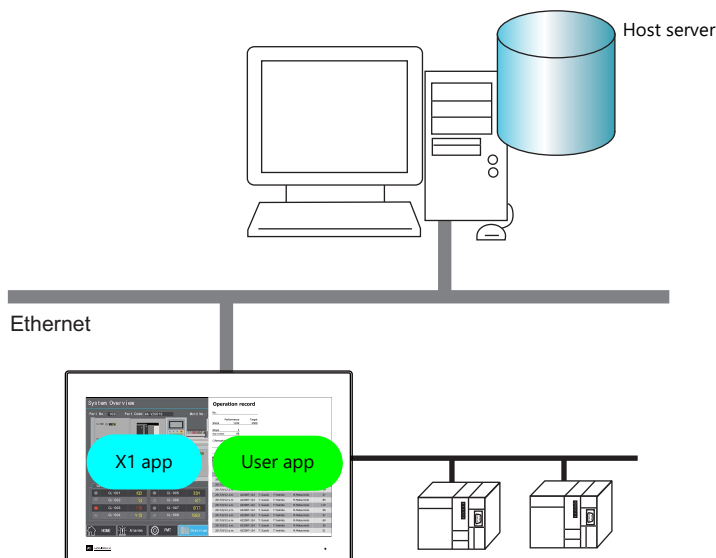
- 4) Click [x] to exit the scheduler settings.



For details on the scheduler function, refer to "3 Scheduler" page 3-1.

## 2-Split Screen Display (User App Display Area)

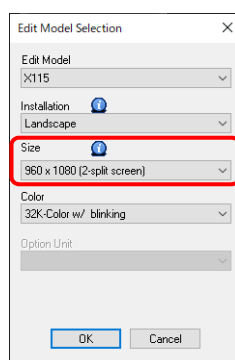
By using the 2-split screen display function and configuring a screen program that uses only half of the X1 series unit's display area, it is possible to create a layout that allocates the other half to user apps. This allows the user to operate the X1 app while also checking production control information from a host server using Excel or in a database.



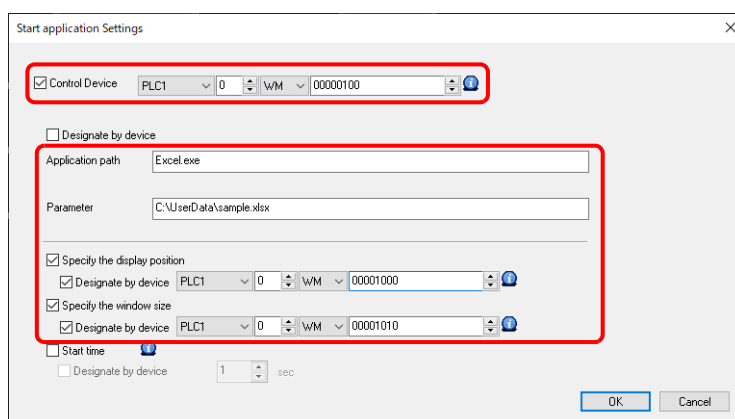
### V-SFT settings


Example: X115, Starting an app by commanding from a PLC

- Click [System Setting] → [Edit Model Selection] and select "960 x 1080 (2-split screen)". The display size of the X1 app is halved.



- Click [System Setting] → [Other] → [Start application].
- Select [Control Device] and set as follows.
  - Registration example: Opening a file named "sample.xlsx" located at "C:\UserData" using Excel



 For details, refer to "8.4.3 Startup Method".

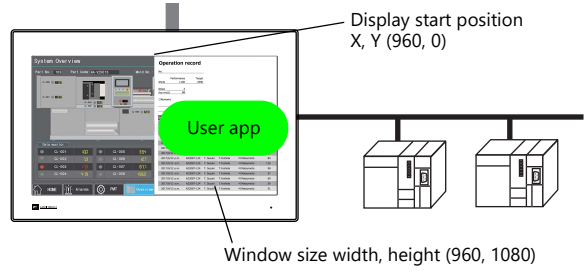
- Click [OK].

### PLC command

The specified file starts in the user app display area when bit 0 of control device memory WM100 turns ON with the following values specified.

- Display position  
Start X: WM1000 = 960  
Start Y: WM1001 = 0
- Window size  
Width: WM1010 = 960  
Height: WM1011 = 1080

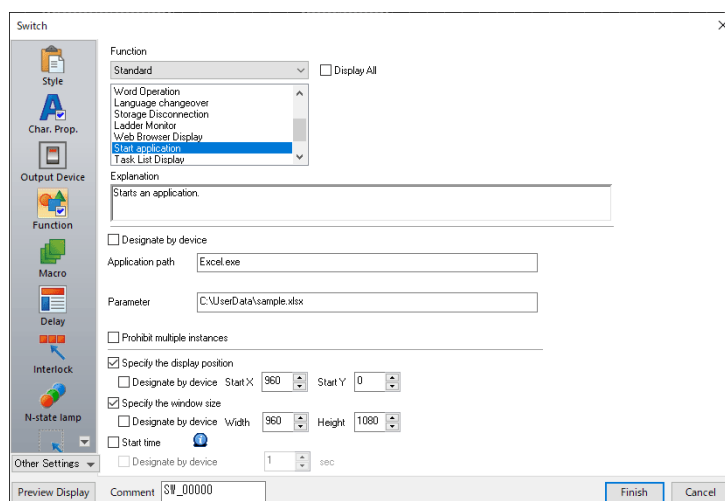
Example: X115

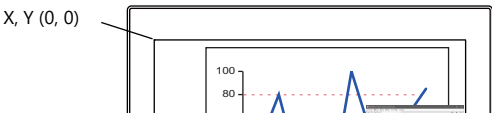
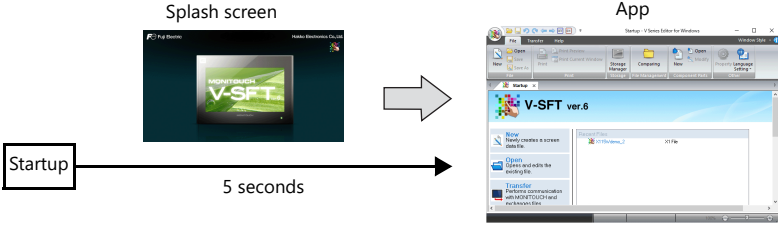


## 8.4.3 Startup Method

### Switch Function

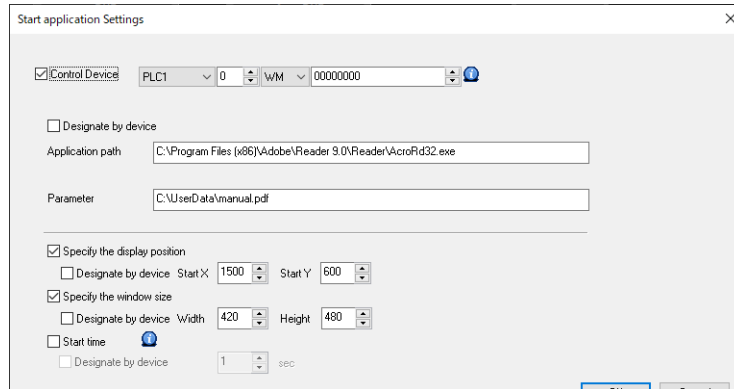
The following settings are available when the [Function] of a switch is set to [Start application].

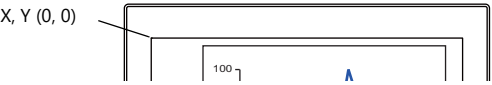
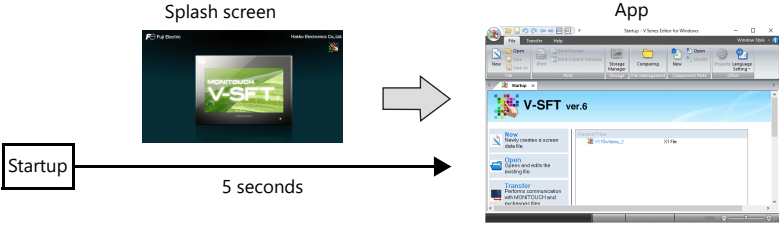


Item	Description
Designate by device	Select this checkbox to specify the [Application path] and [Parameter] settings using device memory. * When the checkbox is not selected, the settings need to be set directly.
Application path	Specify the path of the app to start. Max. 256 one-byte alphanumeric characters When the [Designate by device] checkbox is selected, 256 bytes (128 words) are secured for use. * The following symbols are prohibited: \ / : * ? " < >
Parameter	Specify the path of the file to open using the app. Max. 256 one-byte alphanumeric characters When the [Designate by device] checkbox is selected, 256 bytes (128 words) are secured for use. * The following symbols are prohibited: \ / : * ? " < >
Prohibit multiple instances	Select to prohibit running multiple instances of a file. This option takes effect when the path and name of the file matches with those of a running file.
Specify the display position	Specify the position for displaying the app. Set values by taking the upper left corner of the X1 series unit screen as the reference point (0, 0). If not specified, the app is displayed according to Windows specifications or specifications of that app. When the [Designate by device] checkbox is selected, two words are used. n : Start X n+1 : Start Y   * When displaying an app on the sub app screen with the [System Setting] → [Other] → [Multi-Display Settings] → [Expand display screen] or [Split the screen] checkbox selected, specify coordinates in the same way by taking the upper left corner of the main app screen as the reference point (0, 0). For details, refer to "Specification of Display Position and Window Size" page 8-30.
Specify the window size	Specify the size of the app window. When the [Designate by device] checkbox is selected, two words are used. n : Width n+1 : Height
Start time	* This setting is available when the [Specify the display position] or [Specify the window size] checkbox is selected. Use this setting when displaying an app that shows a splash screen (an image displayed while an app is starting up). The delay time for starting the app can be specified. 1 to 30 sec  Example: If V-SFT version 6 takes about five seconds to start up, specify "5 sec".   If this setting is not specified, the display position and window size are applied to the splash screen.

## PLC Command

The following settings are available at [System Setting] → [Other] → [Start application Settings].



Item	Description																																
Control Device	<p>The app starts when the least significant bit of the specified device memory address turns ON. When bit 1 is ON, running multiple instances of a file is prohibited. This option takes effect when the path and name of the file matches with those of a running file.</p> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system</p> <p style="text-align: right;">Multiple instance startup 1: Prohibited 0: Permitted</p> <p style="text-align: right;">0 → 1 (edge): Startup</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		
Designate by device	<p>Select this checkbox to specify the [Application path] and [Parameter] settings using device memory. * When the checkbox is not selected, the settings need to be set directly.</p>																																
Application path	<p>Specify the path of the app to start. Max. 256 one-byte alphanumeric characters When the [Designate by device] checkbox is selected, 256 bytes (128 words) are secured for use. * The following symbols are prohibited: \ / : * ? " &lt; &gt;  </p>																																
Parameter	<p>Specify the path of the file to open using the app. Max. 256 one-byte alphanumeric characters When the [Designate by device] checkbox is selected, 256 bytes (128 words) are secured for use. * The following symbols are prohibited: \ / : * ? " &lt; &gt;  </p>																																
Specify the display position	<p>Specify the position for displaying the app. Set values by taking the upper left corner of the X1 series unit screen as the reference point (0, 0). If not specified, the app is displayed according to Windows specifications or specifications of that app. When the [Designate by device] checkbox is selected, two words are used. n : Start X n+1 : Start Y</p>  <p>* When displaying an app on the sub app screen with the [System Setting] → [Other] → [Multi-Display Settings] → [Expand display screen] or [Split the screen] checkbox selected, specify coordinates in the same way by taking the upper left corner of the main app screen as the reference point (0, 0). For details, refer to "Specification of Display Position and Window Size" page 8-30.</p>																																
Specify the window size	<p>Specify the size of the app window. When the [Designate by device] checkbox is selected, two words are used. n : Width n+1 : Height</p>																																
Start time	<p>* This setting is available when the [Specify the display position] or [Specify the window size] checkbox is selected. Use this setting when displaying an app that shows a splash screen (an image displayed while an app is starting up). The delay time for starting the app can be specified. 1 to 30 sec Example: If V-SFT version 6 takes about five seconds to start up, specify "5 sec".</p>  <p>If this setting is not specified, the display position and window size are applied to the splash screen.</p>																																

## Macro Command: HMI-USEREXE (" ")

Use the "HMI\_USEREXE" macro command to start an app.

### Function: executing an application file (.exe)

The specified executable file (.exe) is executed.

### Setting value

	Value
F0	HMI-USEREXE
Characters	The exe file and parameters of the file to start simultaneously * Specify the full path within 256 bytes. The following symbols cannot be used in folder and file names. / : * ? " < >

### Setting example

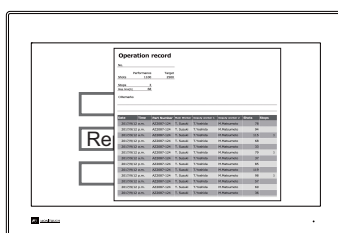
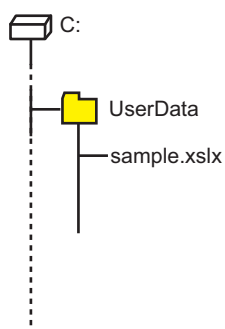
- Macro command

```
HMI_USEREXE ("EXCEL.exe "C:\UserData\sample.xlsx")
```

In quotation marks (" "), specify the parameter of the file to open using the app.  
 \* Starting is possible without this setting.

One space

Path of app to start

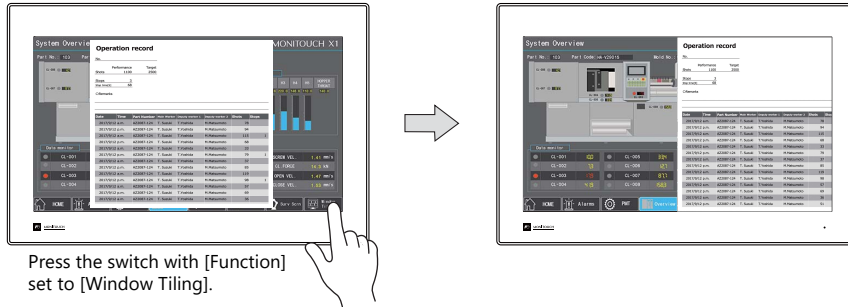


### Notes

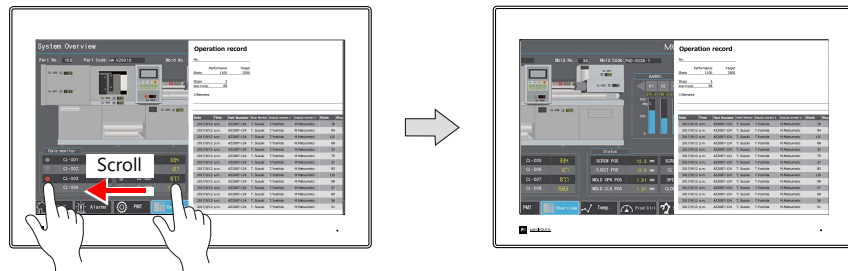
- When starting an app that takes time to start up, other macro command operations stop until the startup process is completed.
- Prohibition of running multiple instances of the same file and specification of the display position and window size are not supported.

### 8.4.4 Window Tiling

- App windows that are currently running can be tiled by pressing a switch with the [Function] set to [Window tiling].

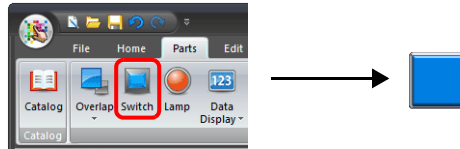


- During tiled display, the display of the X1 app window can be scrolled.

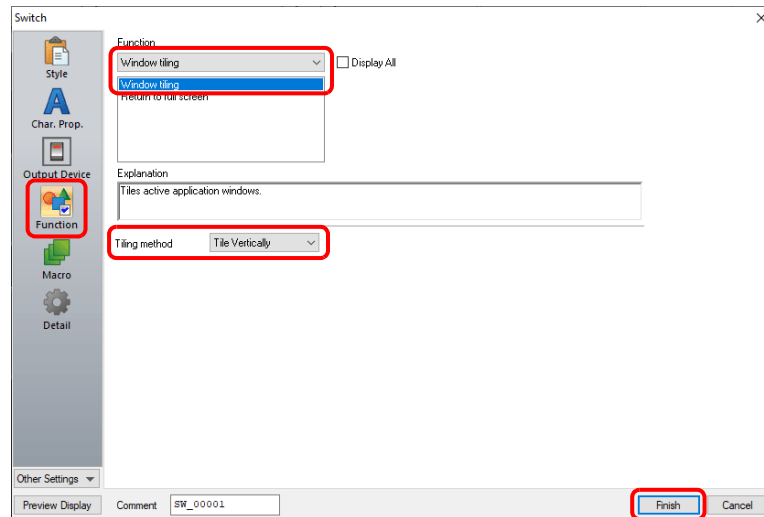


#### Setting Example

- Click [Parts] → [Switch] and place a switch on the screen.



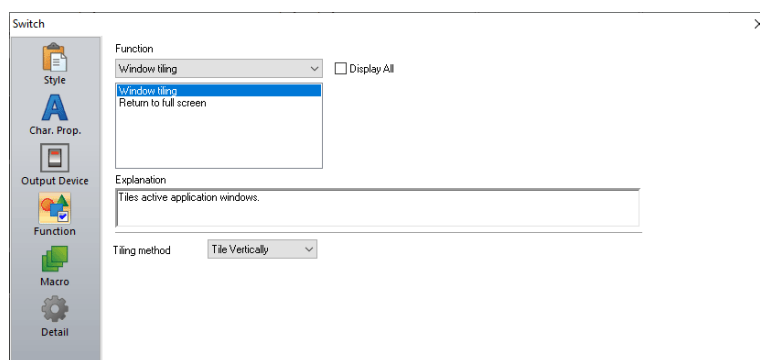
- Double-click on the switch to display the settings window. For [Function], select [Window tiling] and specify the tiling method.




Click [Finish] to complete the settings.



## Switch Setting Details



Function	Description
Window tiling	Currently running app windows are tiled.
Tiling method	Tile Horizontally: App windows are tiled by stacking in equal size.
Tiling method	Tile Vertically: App windows are tiled side-by-side in equal size.
Return to full screen	Returns the X1 app window from a tiled state back to full-screen display. The X1 app is displayed in full screen in the foreground. Other apps are hidden behind the X1 app.

 For notes on tiling app windows, refer to ["8.4.6 Notes"](#).

## 8.4.5 System Device Memory

System device memory addresses associated with starting applications are shown below.

- \$s2020  
The execution result of an app is stored.

Code	Description	Solution	Remarks
0	Normal	-	← X1
1	A display position or window size is not specified within the display area.	Check if the display position or window size is not specified within the display area of the X1 series unit or the multi-display area when [Multi-Display Settings] → [Expand display screen] is selected.	
2	Display position or window size specification error	Check if the intended app exists and if the display position and window size are set to defaults.	
3	The display position and window size could not be changed because an application is starting up or there is an app that is on standby according to the [Start time] setting.	Try again later.	

- \$s2021  
The execution completed status of specifying the display position and window size of an app is stored.

Code	Description	Remarks
1	Completed execution of specifying the display position and window size * Clear to zero before executing.	← X1

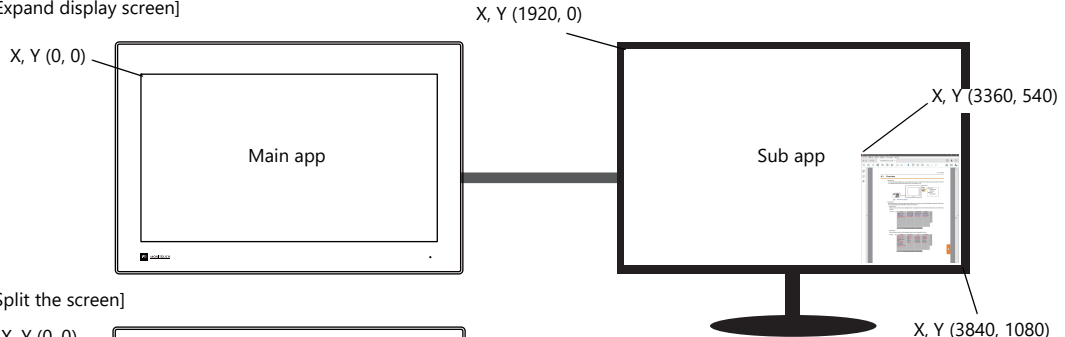
## 8.4.6 Notes

### Specification of Display Position and Window Size

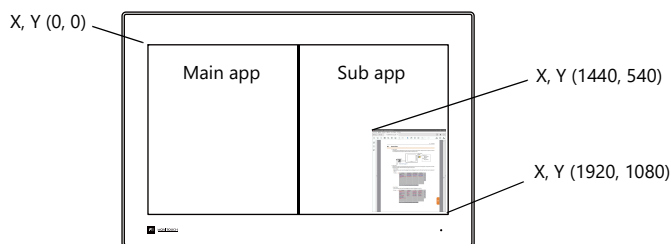
- When starting multiple instances of a Microsoft Office app (for example, starting multiple instances of Excel), the display position and window size settings are invalid for the second instance and after. (Microsoft Office specifications)
- If an app has default display position and window size settings, the app is displayed according to those settings.
- When starting an app and an associated dialog or tooltip is displayed, specification is not executed correctly. Hide the dialog or tooltip and try again.
- Display position and window size setting values are invalid if specified outside of the display area. The app will be displayed according to Windows specifications or specifications of that app.
- When the write filter function is enabled, the specified display position and window size are cleared when the power is turned off.
- If there is an app that is starting up (including an app that is on standby according to the [Start time] setting), the display position and window size are not changed for apps that are executed thereafter. The app is also not displayed in the foreground.
- When displaying an app on the sub app screen with the [System Setting] → [Other] → [Multi-Display Settings] → [Expand display screen] or [Split the screen] checkbox selected, specify coordinates in the same way by taking the upper left corner of the main app screen as the reference point (0, 0).

Example: X115

- [Expand display screen]



- [Split the screen]



### Window Tiling

- The following functions of the X1 app cannot be scrolled during tiled display.  
Scrolling messages, Local mode screen, splash screen, system keyboard, system menu display settings, system menu security settings, security function login screen, operation log screen, status bar details window, scrolling navigation display
- Minimized apps are not tiled.
- After tiling is executed, the state before tiling cannot be restored.
- Display only the X1 app in full screen.  
If any other app is displayed in full screen, operation is not guaranteed.
- The maximum number of apps that can run at the same time is four, including the X1 app.
- If the [Window tiling] switch is pressed while only the X1 app is running, the X1 app switches to window display. To return to full-screen display, press the [Return to full screen] switch.
- This function is not available when using the 2-split screen display function.

### Prohibition of Multiple Instances

- Depending on the specifications of an app, prohibition of multiple instances may not be possible. (Example: Microsoft Office apps)
- When using the multi-display function, the main app (X1) and sub app (display) are displayed independently of each other.  
Even if running of multiple instances is prohibited, the same file can be displayed on the main and sub apps respectively.

## 8.5 Dedicated Macro Commands

### 8.5.1 HMI-FUNC

The "HMI-FUNC" macro command dedicated to TELLUS can be used. The X1 supports three macro commands for starting apps and executing DLL functions.

The "HMI-FUNC" command is located under [Others] on the [Macro Editing Support] window. For details of each command, refer to the following pages.

The screenshot illustrates the configuration of the HMI-FUNC macro command. The main editor window shows the command being entered: `0) HMI-USERFUNC (0, "")`. The **Macro Editing Support** window is open, displaying a list of available commands. **HMI-FUNC** is selected in the list. Below the list, the **F0: Command** dropdown is set to **HMI-USERFUNC**, and the **F1: Table No.** dropdown is also set to **HMI-USERFUNC**. The **Device Setting** window shows the configuration for the macro command, with **F0** set to **HMI-USERFUNC** and **F1** set to **HMI-USERFUNC**. A **Preview** window shows the resulting macro command: `HMI-USERFUNC (0, "")`.

## HMI-USERFUNC (F1, " ")

### Function: Execution of DLL functions

This command executes DLL functions loaded at table number [F1].

### Available Device Memory

	PLC Device Memory	Internal Device Memory	Constant
F1			○

### Setting Value

	Value
F0	HMI-USERFUNC
	000: Table number
F1	{ 255
Characters	Function name

### Setting Example

- Macro command

HMI\_USERFUNC ( 000, " DspMsg ")

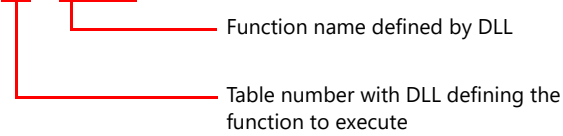
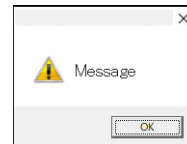


Table No.	DLL	Function Defined by DLL
000	Test2.dll	DspMsg
001	Test1.dll	aa
{	}	{
255		

- Execution result



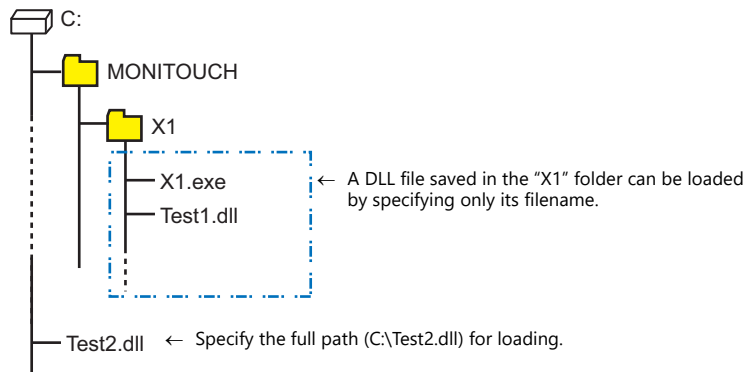
### Notes

The DLL file must be loaded in advance using the "HMI-LOADDLL" command.

## HMI-LOADDLL (F1, " ")

### Function: loading a DLL file

This command is used to load a DLL file prepared by the user to table number [F1] (000 to 255).



### Available device memory

	PLC Device Memory	Internal Device Memory	Constant
F1			○

### Setting value

	Value
F0	HMI-LOADDLL
F1	000: Table number { 255
Characters	Location where DLL file is saved (path) * Specify the full path within 256 bytes. The following symbols cannot be used in folder and file names. / : * ? " < >

### Setting example

- Macro command

```
HMI_LOADDLL ( 000, " C:\Test2.dll ")
```

Specify the full path of the DLL file to load.  
 \* If the DLL file is saved in the "C:\MONITOUCH\X1" folder, loading is possible by specifying only the filename of the DLL file.  
 The table number (0 to 255) for loading the DLL file

- After loading

Table No.	DLL	Function Defined by DLL
000	Test2.dll	DspMsg
001	Test1.dll	aa
{	}	}
255		

### Notes

- The "HMI-USERFUNC" command is used to execute loaded DLL functions.
- DLL functions need to be loaded only once. Thereafter, they can be executed by using the "HMI-USERFUNC" command. Execute with the initial macro, etc.

## HMI-UserExe (" ")

### Function: executing an application file (.exe)

Refer to "Macro Command: HMI-USEREXE (" ") page 8-27

## 8.5.2 Other Macro Commands

### List of Supported Macro Commands

The following macro commands can be used on the X1 series.

For details on each macro command, refer to the V9 Series Macro Reference Manual.

Category	Command Name	Mnemonic	Description
Arithmetical Operation	ADD(+)	F0 = F1 + F2 (W) F0 = F1 + F2 (D)	Addition
	SUB(-)	F0 = F1 - F2 (W) F0 = F1 - F2 (D)	Subtraction
	MUL(X)	F0 = F1 × F2 (W) F0 = F1 × F2 (D)	Multiplication
	DIV(/)	F0 = F1 / F2 (W) F0 = F1 / F2 (D)	Division
	MOD(%)	F0 = F1 % F2 (W) F0 = F1 % F2 (D)	Division remainder
Logical Operation	AND(&)	F0 = F1 & F2 (W) F0 = F1 & F2 (D)	Logical conjunction
	OR( )	F0 = F1   F2 (W) F0 = F1   F2 (D)	Logical disjunction
	XOR(^)	F0 = F1 ^ F2 (W) F0 = F1 ^ F2 (D)	Exclusive disjunction
	SHL(<<)	F0 = F1 << F2 (W) F0 = F1 << F2 (D)	Left shift
	SHR(>>)	F0 = F1 >> F2 (W) F0 = F1 >> F2 (D)	Right shift
Statistic	MAX	F0 = MAX (F1 C:F2) (W) F0 = MAX (F1 C:F2) (D)	Maximum
	MIN	F0 = MIN (F1 C:F2) (W) F0 = MIN (F1 C:F2) (D)	Minimum
	AVG	F0 = AVG (F1 C:F2) (W) F0 = AVG (F1 C:F2) (D)	Average
	SUM	F0 = SUM (F1 C:F2) (W) F0 = SUM (F1 C:F2) (D)	Total
Mathematics/ trigonometric	EXP	F0 = EXP (F1) (F)	Exponent
	EXPT	F0 = EXPT (F1,F2) (F)	Exponentiation
	LN	F0 = LN (F1) (F)	Natural logarithm
	LOG	F0 = LOG (F1) (F)	Common logarithm
	SQRT	F0 = SQRT (F1) (F)	Square root
	ABS	F0 = ABS (F1) (W) F0 = ABS (F1) (D) F0 = ABS (F1) (F)	Absolute value
	NEG	F0 = NEG (F1) (W) F0 = NEG (F1) (D) F0 = NEG (F1) (F)	Negation
	SIN	F0 = SIN (F1) (F)	Sine
	COS	F0 = COS (F1) (F)	Cosine
	TAN	F0 = TAN (F1) (F)	Tangent
	ASIN	F0 = ASIN (F1) (F)	Arcsine
	ACOS	F0 = ACOS (F1) (F)	Arccosine
	ATAN	F0 = ATAN (F1) (F)	Arctangent
	DEG	F0 = DEG (F1) (F)	Radians to degrees conversion
RAD	F0 = RAD (F1) (F)	Degrees to radians conversion	
Bit Operation	BSET	F0 (ON)	Bit ON
	BCLR	F0 (OFF)	Bit OFF
	BINV	F0 (INV)	Bit reversal

Category	Command Name	Mnemonic	Description
Conversion	BCD	F0 = F1 BCD (W) F0 = F1 BCD (D)	BCD conversion
	BIN	F0 = F1 BIN (W) F0 = F1 BIN (D)	BIN conversion
	CWD	F0 = F1 D <- W	1 → 2 word conversion
	CVP	F0 = F1 PLC <- (W) F0 = F1 PLC <- (D)	DEC → PLC1 conversion
	CVPFMT	F0 = F1 (W) PLC F2 <- F0 = F1 (D) PLC F2 <-	DEC → PLCn conversion
	CVB	F0 = F1 (W) <- PLC F0 = F1 (D) <- PLC	PLC1 → DEC conversion
	CVBFMT	F0 = F1 (W) <- PLC F2 F0 = F1 (D) <- PLC F2	PLCn → DEC conversion
	SWAP	F0 C:F1	MSB, LSB conversion
	CHR	F0 = ' '	Character string → code conversion (Fixed to PLC1 code)
	STRING	F0 = ' ' (STRING)	Character string → code conversion
	CVFD	F0 (D) <- F1 (F) F2 (D)	Real number → BIN conversion
	CVDF	F0 (F) <- F1 (D) F2 (D)	BIN → real number conversion
	CLND_TO_GRE	CLND_TO_GRE F0 F1 F2	Conversion from calendar data to Greenwich time
	GRE_TO_CLND	GRE_TO_CLND F0 F1 F2	Conversion from Greenwich time to calendar data
	FORMAT_DATA	FORMAT_DATA F0 F1 F2	Conversion from a string to numerical data
FORMAT_STR	FORMAT_STR F0 F1 F2	Conversion from numerical data to a string	
Transfer	MOV	F0 = F1 (W) F0 = F1 (D)	Transfer
	BMOV	F0 = F1 C:F2 (BMOV) (W) F0 = F1 C:F2 (BMOV) (D)	Block transfer
	CVMOV	F0 = F1 C:F2 (CVMOV) (W) F0 = F1 C:F2 (CVMOV) (D)	(with numerical data conversion) Block transfer
	CVSMOV	F0 = F1 C:F2 (CVSMOV) (W) F0 = F1 C:F2 (CVSMOV) (D)	(with string conversion) Block transfer
	FILL	F0 = F1 C:F2 (FILL)	Batch transfer
Comparison	CMP	IF (F0 = F1)F2 (W) IF (F0 = F1)F2 (D)	Condition comparison
	TST	IFZ (F0 & F1) F2 (W) IFZ (F0 & F1) F2 (D)	Logical conjunction comparison
	IF ELSE ENDIF	IF (F0 (condition) F1) (W) IF (F0 (condition) F1) (D) IF ((condition) F0) (B) ELSE ENDIF	Conditional branch
Macro Operation Control	CALL	CALL F0	Macro block call
	JMP	JMP F0	Jump
	LABEL	LB F0:	Label
	FOR / NEXT	FOR F0 / NEXT	Looping between FOR and NEXT
	RET	RET	Ending macro command processing
	SWRET	SWRET	Execution of switch function
	EN_INT	EN_INT	Permitting interruption
FROM Backup	FROM_WR	FROM_WR F0 F1	Writing to FROM area
	FROM_RD	FROM_RD F0 F1	Reading from FROM area
Printer	MR_OUT	MR_OUT F0	Execution of MR400 call setting
	MR_REG	MR_REG F0	Execution of MR400 registration setting
	OUT_PR	OUT_PR F0 F1	Execution of printer command * Available only with MR400 connected

Category	Command Name	Mnemonic	Description
PLC	PLC_CLND	PLC_CLND F0 PLC F1 F2 F3	Calendar control for PLCn
	PLC_CTL	PLC_CTRL PLC F0 F1 F2	Control of PLCn
	TBL_READ	TBL_READ F0 <- TABLE : PLC F1 : F2	Memory reading of device memory map
	TBL_WRITE	TBL_WRITE TABLE : PLC F1 : F0 <- F2	Memory writing of device memory map
Ethernet	SEND	SEND F0 C:F1 TO F2	Data transfer between networks
	EREAD	EREAD F0 = F1 C:F2 F3	Data reading between networks
	EWRITE	EWRITE F0 F1 = F2 C:F3	Data writing between networks
MES	MES	MES CHECK F1 F2 F3	V-Server start check
		MES WRITE F1 F2 F3	Adding data to the database
		MES READ F1 F2 F3	Searching the database
		MES DEL F1 F2 F3	Database Deleting a record from the database
		MES UPDATE F1 F2 F3	Updating the database
Storage (Recipe)	LD_RECIPE	LD_RECIPE F0 F1	Reading a CSV file
	LD_RECIPE2	LD_RECIPE2 F0 F1 F2	
	LD_RECIPESEL	LD_RECIPESEL F0 F1	
	LD_RECIPESEL2	LD_RECIPESEL2 F0 F1 F2	
	SV_RECIPE	SV_RECIPE F0 F1 F2	Saving a CSV file
	SV_RECIPE2	SV_RECIPE2 F0 F1 F2 F3	
	SV_RECIPESEL	SV_RECIPESEL F0 F1	
	SV_RECIPESEL2	SV_RECIPESEL2 F0 F1 F2	
	SET_RECIPEFOLDER	SET_RECIPEFOLDER F0	Folder definition
	RD_RECIPE_FILE	RD_RECIPE_FILE F0 F1	Reading a CSV file
	RD_RECIPE_LINE	RD_RECIPE_LINE F0 F1 F2 F3	
	RD_RECIPE_COLUMN	RD_RECIPE_COLUMN F0 F1 F2 F3	
	WR_RECIPE_FILE	WR_RECIPE_FILE F0 F1	Saving a CSV file
	WR_RECIPE_LINE	WR_RECIPE_LINE F0 F1 F2 F3	
	WR_RECIPE_COLUMN	WR_RECIPE_COLUMN F0 F1 F2 F3	
GET_RECIPE_FILEINFO	GET_RECIPE_FILEINFO F0 F1 F2	CSV file information	
Storage (Sampling)	SMPL_BAK	SMPL_BAK F0	Saving backup
	SMPL_CSV	SMPL_CSV F0	Creating a CSV file
	SMPL_CSV2	SMPL_CSV2 F0 F1	Creating a CSV file (filename designation)
	SMPL_SAVE	SMPL_SAVE	Saving logging/alarm data in SRAM
	SMPLCSV_BAK	SMPLCSV_BAK F0	Saving backup (CSV file)
	SMPLCSV_BAK2	SMPLCSV_BAK2 F0 F1	Saving backup (CSV file, filename designation)
Storage (Others)	HDCOPY	HDCOPY	Hard copy
	HDCOPY2	HDCOPY2 F0	Hard copy
	HDCOPY3	HDCOPY3 F0	Hard copy (filename designation)
	SET_DRIVE	SET_DRIVE F0	Switching between drives
	COPY_FILE	COPY_FILE F0 F1	Copying a file
	MOVE_FILE	MOVE_FILE F0 F1 F2	Moving a file
	READ_FILE	READ_FILE F0 F1 F2 F3	Reading a universal file
	WRITE_FILE	WRITE_FILE F0 F1 F2	Writing to a universal file
Real No. Arithmetical Operation	F_ADD(+)	F0 = F1 + F2 (F)	Real number addition
	F_SUB(-)	F0 = F1 - F2 (F)	Real number subtraction
	F_MUL(X)	F0 = F1 × F2 (F)	Real number multiplication
	F_DIV(/)	F0 = F1 / F2 (F)	Real number division
Real No. Statistics	F_SUM	F0 = F_SUM (F1 C:F2) (F)	Real number total
	F_AVG	F0 = F_AVG (F1 C:F2) (F)	Real number average
	F_MAX	F0 = F_MAX (F1 C:F2) (F)	Real number maximum
	F_MIN	F0 = F_MIN (F1 C:F2) (F)	Real number minimum



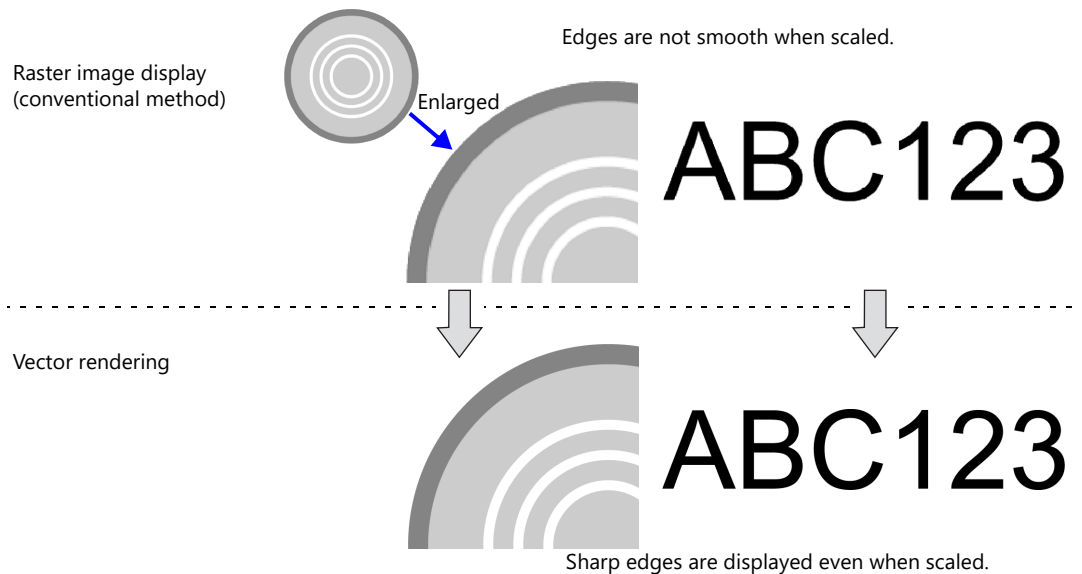
Category	Command Name	Mnemonic	Description
	;(Comment)	;	Comment
	BRIGHT	BRIGHT F0	Brightness adjustment
	GET_MSGBLK	GET_MSGBLK F0 F1	Message acquisition
	PLC_ULR	PLC_ULR F0 F1	Reading user logs
	RECONNECT	RECONNECT F0	Multi-drop reconnection (PLC1)
	RECONNECT_EX	RECONNECT_EX PLC F0 F1	Reconnection
	SAMPLE	SAMPLE F0 F1 F2	Logging/alarm data acquisition
	SEARCH_FILE	SEARCH_FILE F0 F1	Searching JPEG files
	ADJ_VOLUME	ADJ_VOLUME F0 F1 F2	Volume adjustment
	SAVE_VOLUME	SAVE_VOLUME	Saving volume adjustment result
	TREND REFRESH	TREND REFRESH F0 F1	Refreshing trend data display
Others	SYS	SYS (SET_SCRN) F1	Screen number specification
		SYS (SET_MOVL) F1	Multi/global overlap setting
		SYS (OVLV_SHOW) F1	Overlap display ON/OFF
		SYS (OVLV_POS) F1	Changing overlap display position
		SYS (GET_MSG) F1	Message acquisition
		SYS (GET_XY) F1	Acquisition of circumference XY coordinate values
		SYS (SET_BZ) F1	Buzzer control
		SYS (GET_TIME) F1	Acquisition of system time
		SYS (STA_TIME) F1	Timer setting
		SYS (GET_CLND) F1	Calendar acquisition
		SYS (SET_CLND) F1	Calendar setting * Writing to PLC1 only is allowed.
		SYS (SET_BUFNO) F1	Logging information Alarm log information
		SYS (GET_SMPL) F1	Logging/alarm data acquisition
		SYS (GET_SCUR) F1	Acquisition of cursor point
		SYS (DSP_DATA) F1	Showing/hiding a numerical data display
		SYS (CHG_DATA) F1	Changing properties of a numerical data display
		SYS (STA_LIST) F1	Printing data sheets
		SYS (SET_BKLT) F1	Backlight control
		SYS (CHG_LANG) F1	Language changeover
		SYS (RESET_SCRN) F1	Refreshing screen
		SYS (OUT_ENQ) F1	Universal serial (interrupt)
		SYS (OUT_ENQ_EX) F1	Universal serial (interrupt)

## 8.6 Vector Rendering

### 8.6.1 An Introduction to Vector Rendering on the X1 Series

Vector rendering is a rendering method that uses the SVG (Scalable Vector Graphics) image format. The SVG image format is an XML-based text file comprising parameters that utilize tags, etc., to display graphics through mathematical calculation of parameters representing reference points, lines, and curves. Scaling is possible without losing sharpness, thereby achieving high image quality.

Conventionally, the display of raster images was adopted, in which color and density information are specified for each pixel of an image. However, the demerit of such images was that when scaled, the outlines become blurry or pixilated. By using the vector rendering function adopted on the X1 series, images can be displayed in high quality even when scaled. High quality display is also possible on the screen configuration software.



### 8.6.2 Supported Specifications

#### SVG Versions

SVG 1.1 Tiny Profile and SVG Tiny 1.2 are supported.

#### Supported Parts

Part	Remarks
Switch	<ul style="list-style-type: none"> <li>Supported for parts in the "Vector" category of [Shape]</li> <li>Vector rendering of text is also possible for parts of the "Vector" category of [Shape].</li> <li>Vector rendering of text is supported for system fonts described below.</li> <li>Vector rendering is not possible when [Function] is set to [Mode].</li> </ul>
Lamp	
Numerical data display	Vector rendering is possible when [Function] is set to [Num. Display], [Entry Target], or [Entry Display Part].
Character string display	
Text	Vector rendering is supported for the system fonts described below.
Multi-text	

#### Supported System Fonts

Vector rendering is possible for the following fonts which are selected on the [System Setting] → [Multi-language Setting] → [Font Setting] window of V-SFT-6.

Font Type	Display Font	Remarks
TrueType font	Japanese Gothic TTF	<ul style="list-style-type: none"> <li>Although setting of TrueType fonts other than those listed is possible, operation is not guaranteed.</li> <li>Bitmap font and gothic font do not support vector rendering.</li> </ul>
	Japanese Times TTF	
	English/Western Europe Gothic TTF	
	English/Western Europe Times TTF	
	Chinese (Simplified) TTF	
	Chinese (Simplified) TTF	

## 8.6.3 Part Settings

### Switches and Lamps

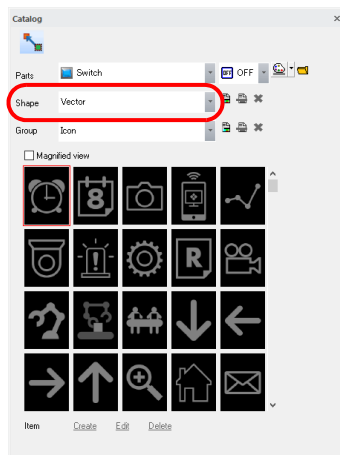
#### Placement Procedure

#### Placement from the [Catalog] window

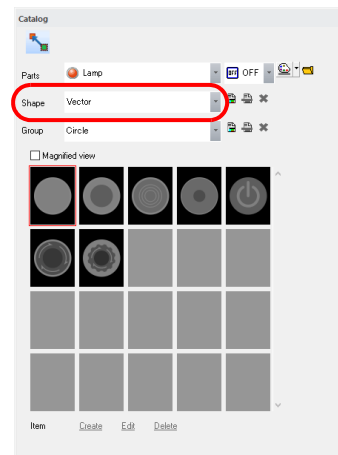
Click [Parts] → [Catalog].

Select a part from the "Vector" category of [Shape] and place it on the screen.

Switch



Lamp



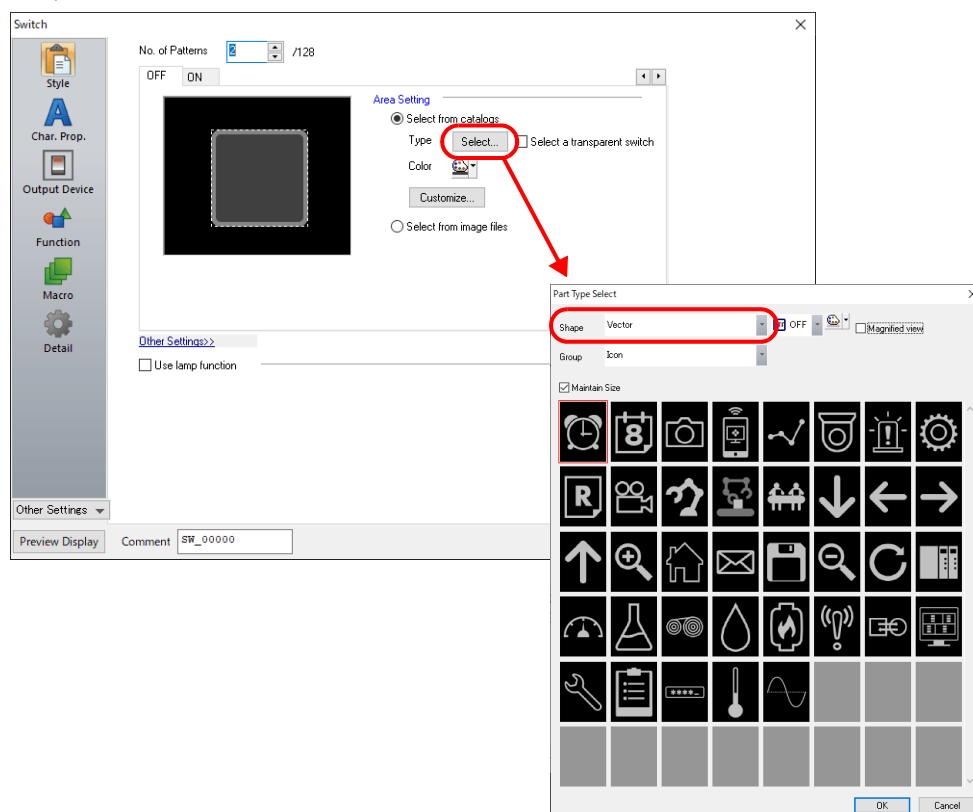
Part	[Group] Categories Supporting Vector Rendering
Switch	Icon, Circle, Dial, Square, Rocker, Toggle, Tank, Pipe, Valve, Motor, Blower
Lamp	Circle, Dial, Square, Rocker, Toggle, Tank, Pipe, Valve, Motor, Blower

#### Changing parts from the settings window

A switch or lamp already placed on the screen can be changed to a vector part.

Click [Style] → [Type] → [Select] to display the [Catalog] window. Select a part from the "Vector" category of [Shape].

Example: Switch

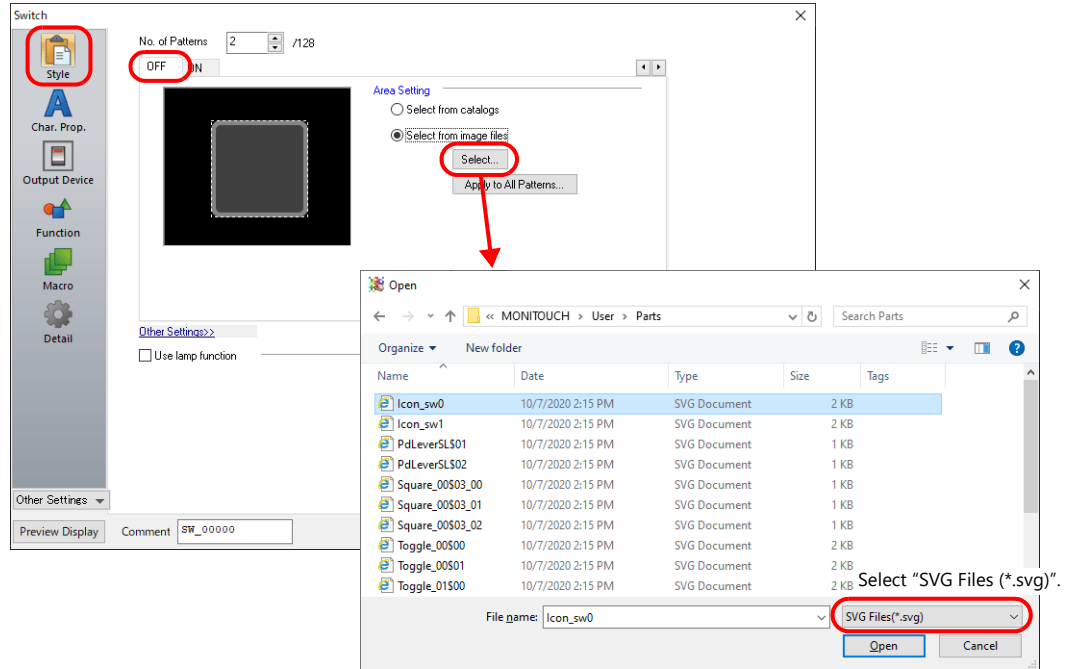


## Using an SVG file

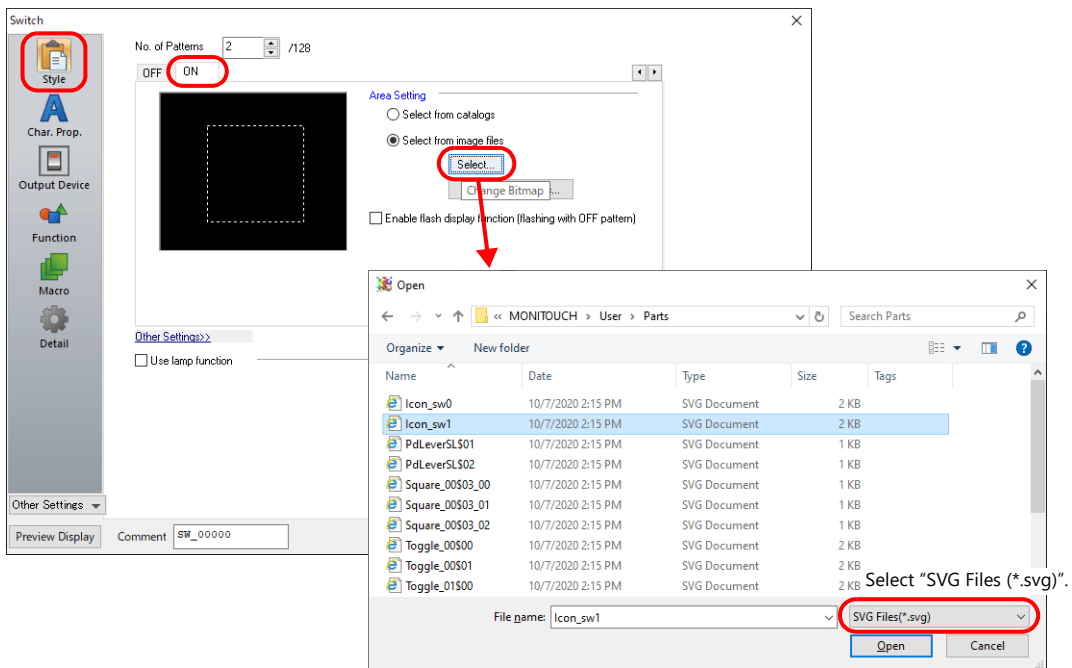
An SVG file can be used as a switch or lamp part.  
Use a file of the SVG Tiny 1.2 specification.

After placing a switch or lamp, display the settings window and select an SVG file from [Style] → [Select from image files].

Example: Switch (OFF pattern)



Example: Switch (ON pattern)

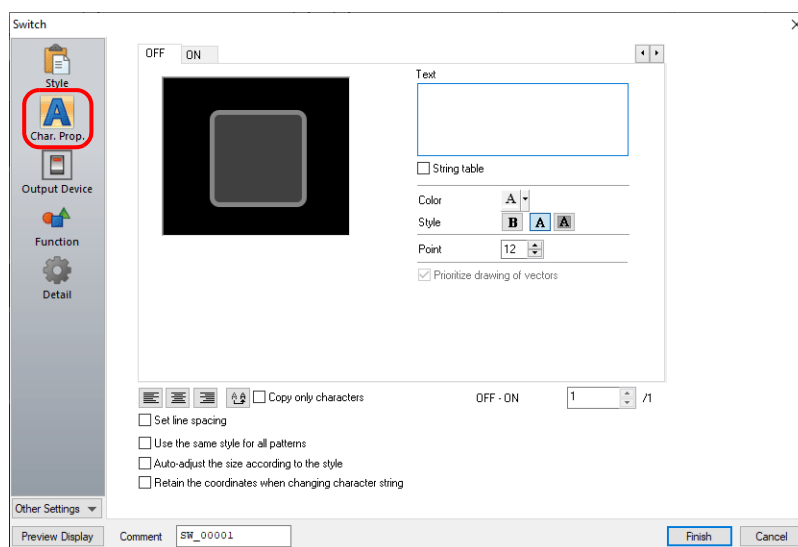


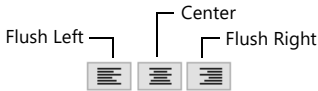
- Batch setting of patterns is possible.  
For setting details, refer to the V9 Series Operation Manual.
- Parts can also be created by selecting an image file from [Parts] → [Image] → [Parts].  
For setting details, refer to the V9 Series Operation Manual.



Different file types cannot be specified for a single part, such as a PNG file for the OFF pattern and an SVG file for the ON pattern.

## Character Properties



Item	Description
[OFF], [ON] to [P128]	Specify the text to be displayed on each pattern.
Pattern No. (0 to 127)	
Text	Enter the text to be displayed on the switch or lamp part. Up to 4 lines can be registered. Text properties can be set for each line. Text can be justified within the part.
String table	Select this checkbox when using strings registered to the string table. For details, refer to <a href="#">"13 String Table Function"</a> .
Color (text color, background color)	Set the color for text. The background color can also be set if set as "no transparency" in the following [Style] setting.
Style	Set the text style.
Point (6 to 999)	Set the text size.
Prioritize drawing of vectors	Indicates whether or not vector rendering is applied to text. * Shown only for vector parts. Selected: Vector rendering is applied. Unselected: Vector rendering is not applied. (Text registration for switches is not available.)  * Vector rendering of text is possible only for Japanese, English, Chinese (Simplified), and Chinese (Traditional) when [TrueType font] is selected at [System Setting] → [Multi-language Setting] → [Font Type]. When any other font is selected, operation differs depending on the selected font. - When any TrueType font other than the above is selected: Vector rendering is applied but operation is not guaranteed. - When [Bitmap font] or [Gothic font] is selected: Text input in the [Char. Prop.] settings is not displayed on the X1 series unit. To enable vector rendering, separately place text in front of the switch or lamp.
Alignment	Set the text alignment. 
Text copy Copy only characters	The text and its attributes for the current pattern (OFF, ON, P3) are copied to the other patterns. Select the [Copy only characters] checkbox to copy text and coordinate data to all other patterns. Text properties will not be copied. However, if the destination for copy has no text, text properties will also be copied.
Set line spacing	Set the pitch between lines.
Use the same style for all patterns	Select this checkbox to configure the same settings as the opened pattern attributes for all switch/lamp patterns (for each respective line if multiple lines are included).
Auto-adjust the size according to the style	Select this checkbox to automatically adjust the part size to the entered text.
Retain the coordinates when changing character string	Newly registered text is placed by centering. When any registered text is changed while this checkbox is selected, the coordinates remain the same. When a line is added to the existing text while this checkbox is selected, the added line is aligned with the preceding line.

# Numerical Data Displays and Character Displays

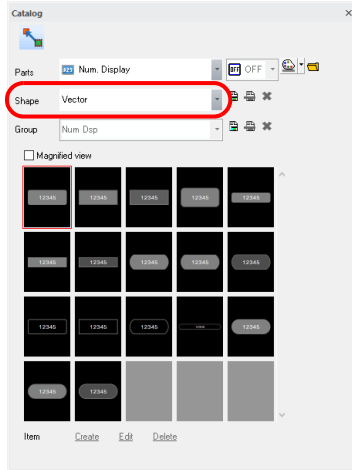
## Placement Procedure

### Placement from the [Catalog] window

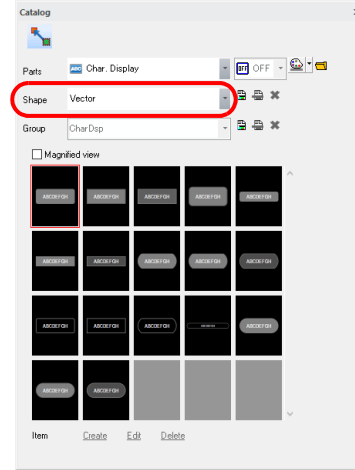
Click [Parts] → [Catalog].

Select a part from the "Vector" category of [Shape] and place it on the screen.

Numerical data display



Character display

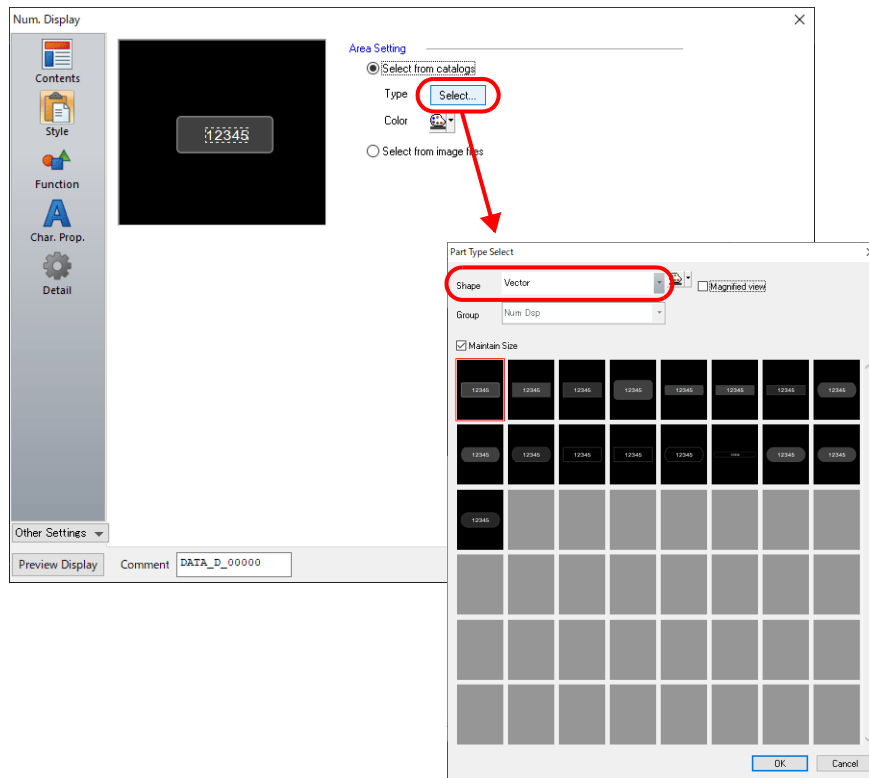


### Changing parts from the settings window

A numerical data display or character display already placed on the screen can be changed to a vector part.

Click [Style] → [Type] → [Select] to display the [Catalog] window. Select a part from the "Vector" category of [Shape].

Example: Numerical data display

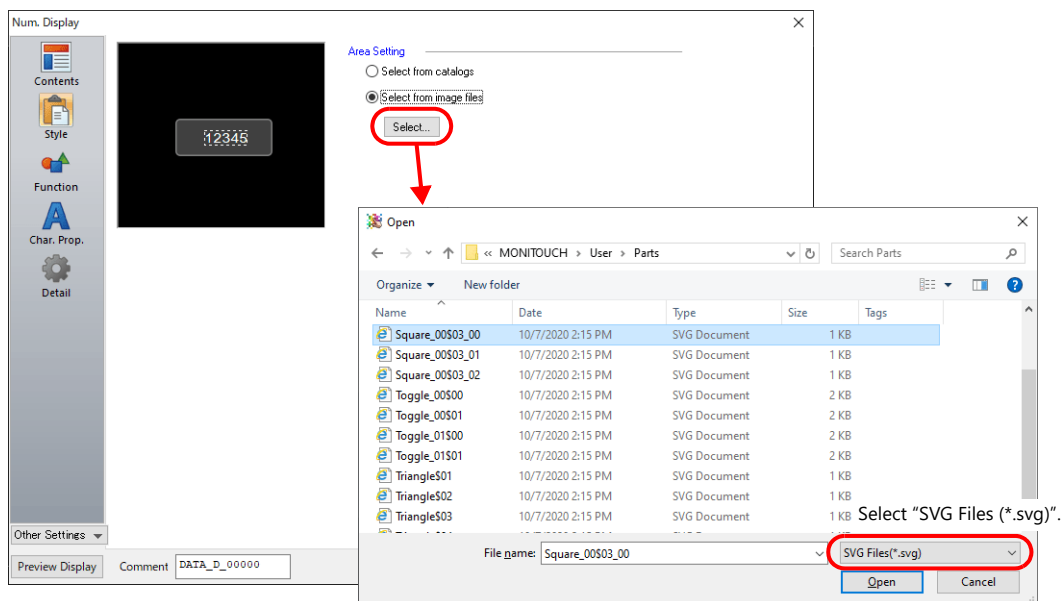


## Using an SVG file

An SVG file can be used as a numerical data display part or character display part. Use a file of the SVG Tiny 1.2 specification.

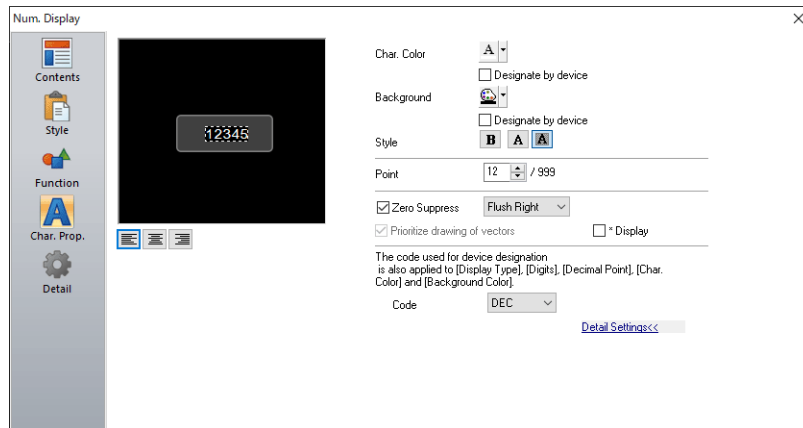
After placing a numerical data display or character display, display the settings window and select an SVG file from [Style] → [Select from image files].

Example: Numerical data display



- Parts can also be created by selecting an image file from [Parts] → [Image] → [Parts]. For setting details, refer to the V9 Series Operation Manual.

## Character Properties



Item	Description
Alignment	Set the text alignment. 
Value to Display on Preview	This item is available when the [Display for the editor] checkbox is selected on the [View] → [Display Environment] → [Display] tab. Set the value to display on the editor.
Char. Color	Set the color for text.
Designate by device <sup>*1</sup>	Select this checkbox to change the text color according to the value specified for the device memory address.
Background	Set the background color of text.
Designate by device <sup>*1</sup>	Select this checkbox to change the background color according to the value specified for the device memory address.
Style (Bold, Italic, Transparent, Not Transparent)	Set the text style.
Point (6 to 999)	Set the text size.
Zero Suppress	Select this checkbox to use zero suppression. * Available only for numerical data displays <p>When this checkbox is selected, select either [Flush Left] or [Flush Right].</p> <p>Flush Left →                        Flush Right → </p>
Character Position	Select [Flush Left] or [Flush Right]. * Available only for character displays <p>Flush Left →                        Flush Right → </p>
Prioritize drawing of vectors	Indicates whether or not vector rendering is applied to text. * Shown only for vector parts. Selected: Vector rendering is applied. Unselected: Vector rendering is not applied. * Vector rendering of text is possible only for Japanese, English, Chinese (Simplified), and Chinese (Traditional) when [TrueType font] is selected at [System Setting] → [Multi-language Setting] → [Font Type]. When any other font is selected, operation differs depending on the selected font. <ul style="list-style-type: none"> <li>- When any TrueType font other than the above is selected: Vector rendering is applied but operation is not guaranteed.</li> <li>- When [Bitmap font] or [Gothic font] is selected: Vector rendering is not applied to text.</li> </ul>
* Display	Select this checkbox to display asterisks (*) instead of numbers.
Code	When a [Designate by device] checkbox is selected, set the code used when reading values from the device memory address. This setting applies to [Display Format], [Digits], [Decimal Point], [Char. Color], and [Background Color].

<sup>\*1</sup> For details on the method for specifying attributes using device memory, refer to "5. Data Display" in the X1 Series Reference Manual 1.

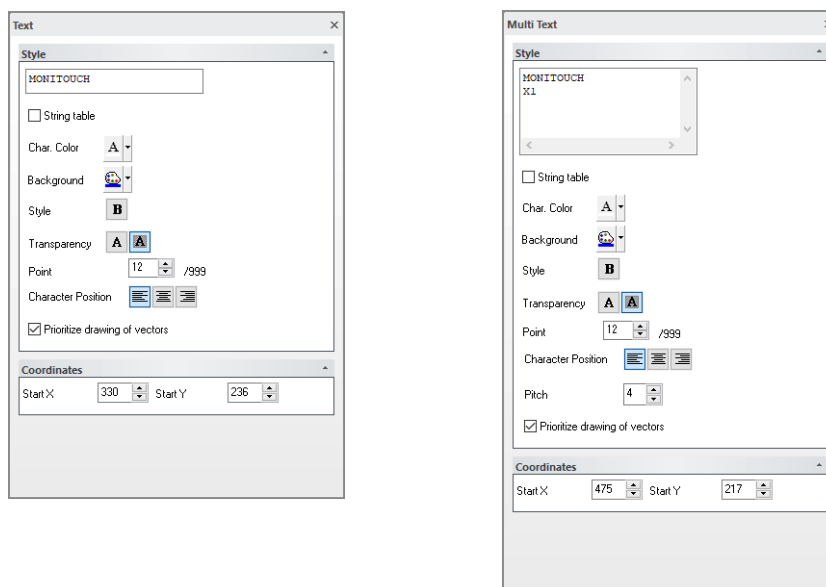


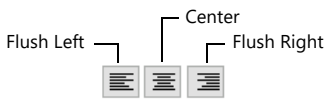
## Text and Multi Text

### Placement Procedure

Click [Parts] → [Text] and place a text part or multi-text part by clicking [Text] or [Multi Text] respectively.

### Detailed Settings



Item	Description
Character string	Enter the text for display.
String table	Select this checkbox when using strings registered to the string table. For details, refer to <a href="#">"13 String Table Function"</a> .
Char. Color / Background	Set the color for text. The background color can also be set if the [Transparency] setting described below is set to [Not Transparent].
Style (Bold, Italic)	Set the text style.
Transparency	Select whether or not to make the background color transparent.
Point (6 to 999)	Set the text size.
Character Position	Set the text alignment. 
Pitch	Set the pitch between lines. * Available only for multi-text parts.
Prioritize drawing of vectors	Select whether or not to apply vector rendering to text. Selected: Vector rendering is applied. Unselected: Vector rendering is not applied.  * Vector rendering is possible only for Japanese, English, Chinese (Simplified), and Chinese (Traditional) when [TrueType font] is selected at [System Setting] → [Multi-language Setting] → [Font Type]. When any other font is selected, operation differs depending on the selected font. <ul style="list-style-type: none"> <li>- When any TrueType font other than the above is selected: Vector rendering is applied but operation is not guaranteed. Unselect the [Prioritize drawing of vectors] checkbox.</li> <li>- When [Bitmap font] or [Gothic font] is selected: Vector rendering is not applied.</li> </ul>
Coordinates	Set the display position of text and multi-text parts (bottom-left corner as start position).

## 8.6.4 Notes

- Vector rendering is not allowed when the following items are selected at [System Setting] → [Unit Setting] → [General Setting].  
If settings are configured to use vector rendering with any of the following items selected, an error will occur upon error check. Also, if the screen program is transferred to the X1 series unit, an error will occur on the unit.

<[General Setting] items>

- Retain the previous picture in graphic mode (V8 compatible)
- Drawing process (V8 compatible)
- Draw background when switching screen (V8 compatible)
- XOR drawing of switch/lamp
- Graph drawing (V8 compatible)

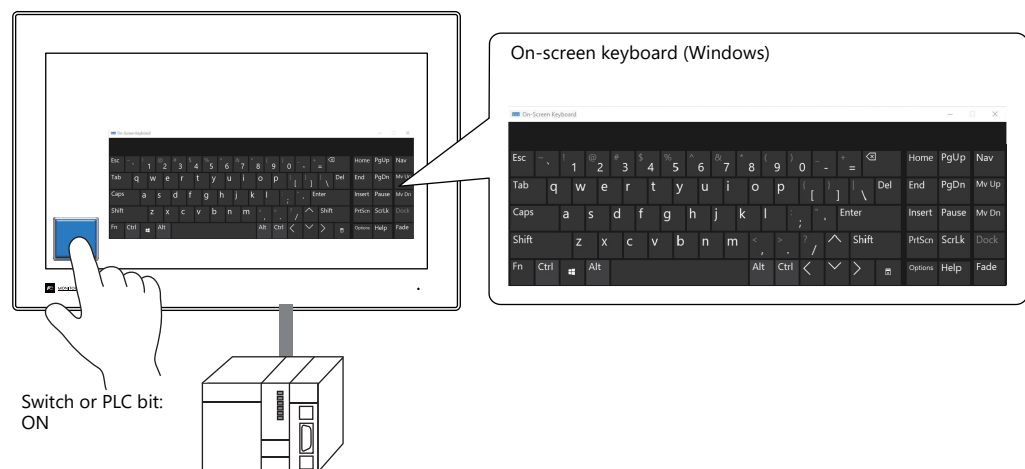
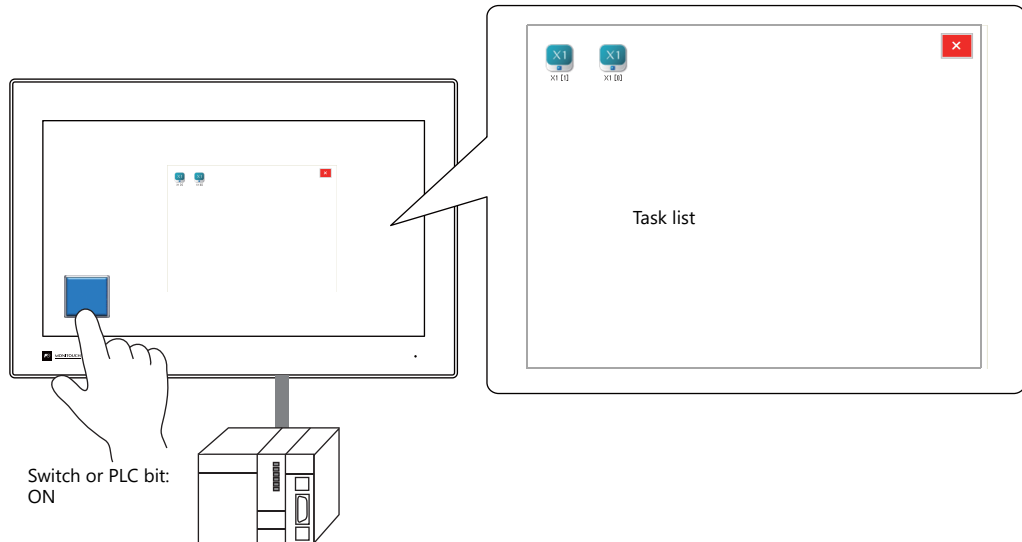
<Errors that occur>

Error	Description
Error: 400	Vector parts cannot be used because vector rendering is not allowed.
Error: 402	Vector rendering of text is not possible because vector rendering is not allowed.

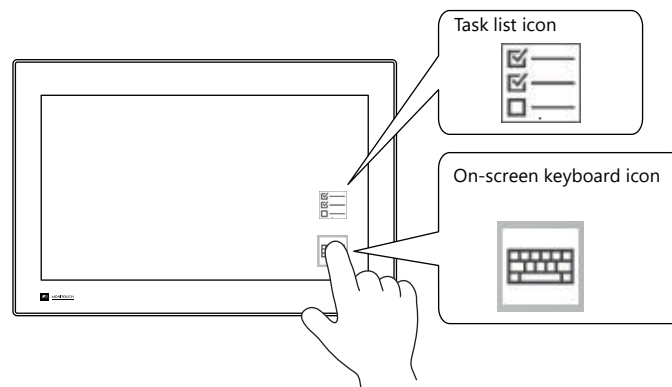
- Compared to displaying raster images, the rendering speed is slightly slow.
- When using an SVG file as a part, blank areas on the left and upper sides of the graphic may be cropped upon display. In such a case, specify the "width" and "height" attributes or the "viewBox" attribute in the <svg> element of the SVG file.
- The appearance of an SVG file displayed on the X1 series and V-SFT-6 may differ from that on various browsers (Internet Explorer, Google Chrome, etc.) due to differences in the rendering engines, supported SVG versions, and supported tags.
- Vector rendering settings are invalid on the [Modify Part] window. Vector graphics and raster graphics cannot coexist in a part.
- External characters are not supported.

## 8.7 Task List and On-Screen Keyboard Display

- The task list and on-screen keyboard can be displayed by using a switch part or by a command from a PLC. There is no need to keep the task list icon or the on-screen keyboard icon (set using System Configurator) displayed on the screen and the task list and on-screen keyboard can be displayed at the desired timing on the desired screen.
- Display is possible regardless of the [Task list] and [System keyboard] setting in System Configurator.



For details on using the task list icon or the on-screen keyboard icon, refer to the X1 Series Hardware Specifications.

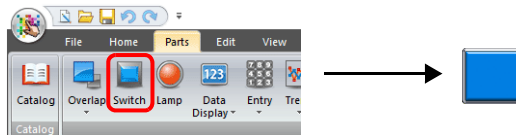


## 8.7.1 Startup Method

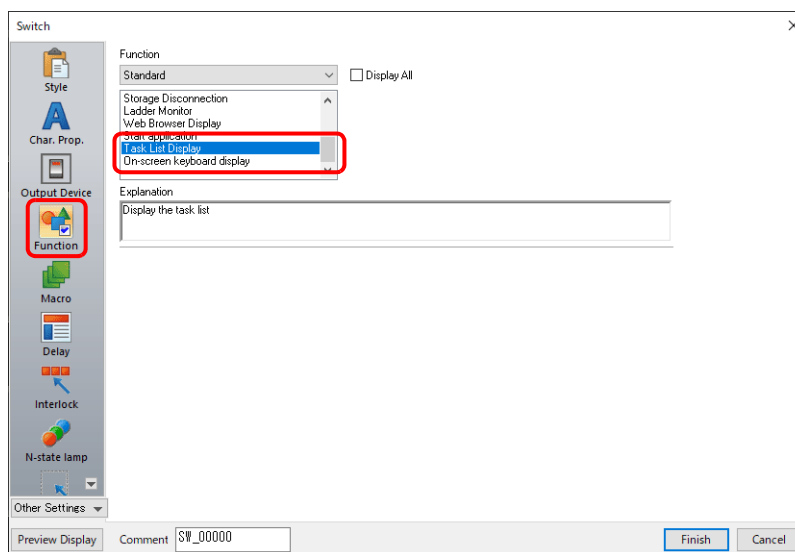
### Displaying Using a Switch

#### V-SFT settings

1. Click [Parts] → [Switch] and place a switch on the screen.



2. Double-click on the switch to display the settings window.  
Select [Function] → [Standard] → [Task List Display] or [On-screen keyboard display].

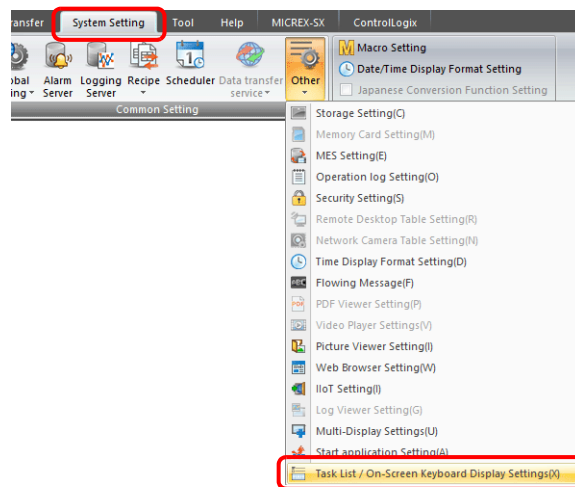


3. Click [Finish] on the switch settings window to complete the settings.

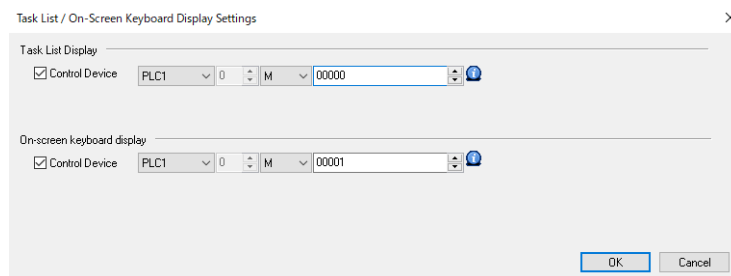
## Displaying by Commanding from PLC

### V-SFT settings

1. Click [System Setting] → [Other] → [Task List / On-Screen Keyboard Display Settings].



2. Select the [Control Device] checkbox for [Task List Display] or [On-screen keyboard display].



Item	Description
Task List Display Control Device	This is used to display the task list. 0 → 1 (edge): Show
On-screen keyboard display Control Device	This is used to display the on-screen keyboard. 0 → 1 (edge): Show

3. Click [OK].

### PLC command

Turn ON control device memory M0 to display the task list.

Turn ON control device memory M1 to display the on-screen keyboard.

## 8.7.2 Limitations

### Task List Display

- Multiple instances of the task list cannot be displayed. When [Multi-Display Settings] → [Expand display screen] (sub app: external display unit) is selected and task list display is executed on the sub app while the task list is displayed on the main app, the task list on the main app is hidden and the task list is newly displayed on the sub app.

### On-Screen Keyboard Display

- Multiple instances of the on-screen keyboard cannot be displayed. When [Multi-Display Settings] → [Expand display screen] (sub app: external display unit) is selected and on-screen keyboard display is executed on the sub app while the on-screen keyboard is displayed on the main app, the on-screen keyboard on the main app is hidden and the on-screen keyboard is newly displayed on the sub app.



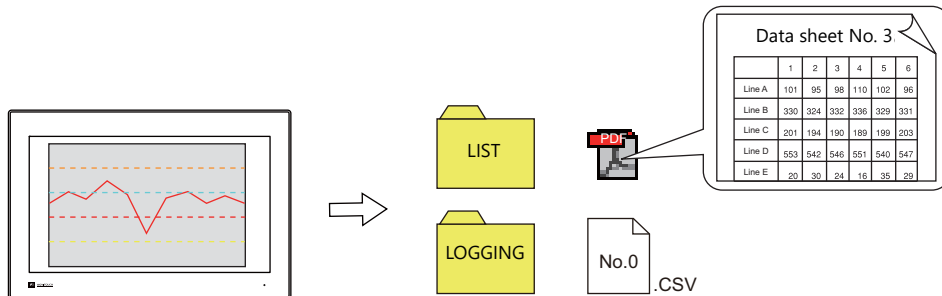
## **9 Storage**

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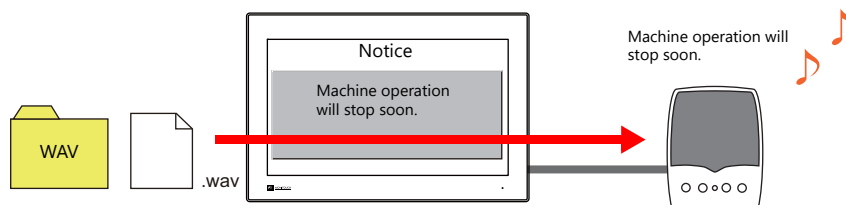
## 9.1 Overview

- Storage can be used to save data collected by using various functions of the X1 app, such as log data and data sheets, and also to import such data into the X1 app. Reading and writing of data is done using folders dedicated to respective functions within a storage.

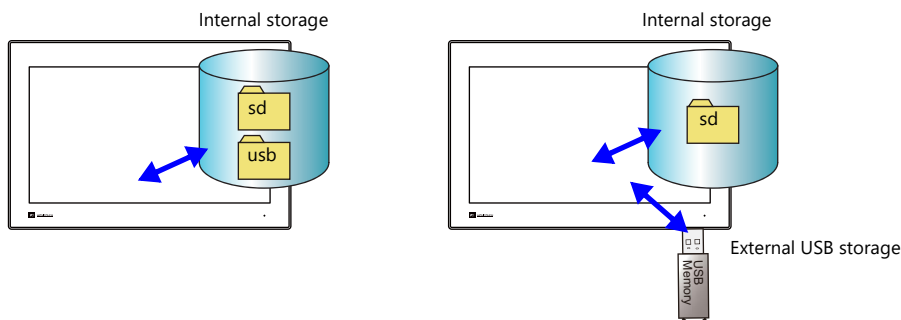
- Example: Output of data sheets to PDF file, and logging data to CSV file



- Example: Storage of audio files



- Internal storage ("sd" folder and "usb" folder) of the X1 series unit or external USB storage can be used. Which storage to use is to be specified in the screen program.



For details, refer to "9.2 Folder Configuration".

### External USB Storage Device

#### Supported versions

	Program Ver.	V-SFT-6	Remarks
X115	Version 1.300 or later	Version 6.1.6.0 or later	
X112			



## 9.2 Folder Configuration

### 9.2.1 Overview

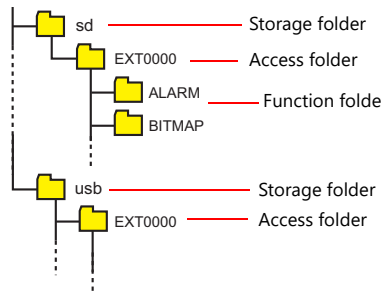
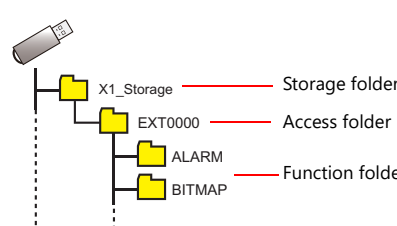
Internal storage ("sd" folder and "usb" folder) of the X1 series unit or external USB storage can be used as storage. Which storage to use is to be specified in the screen program.

Specify at [System Setting] → [Other] → [Storage Setting] → [Storage folder].

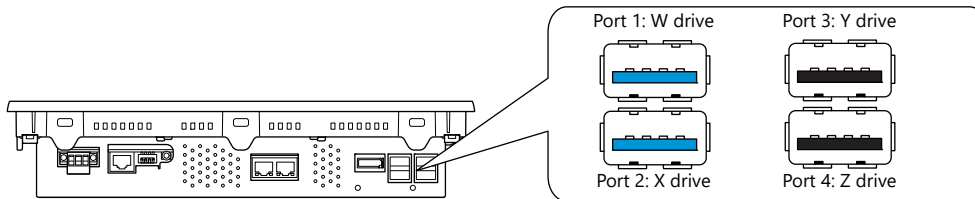
 For details, refer to "9.2.3 Storage Settings" page 9-6.

An access folder is created in the storage folder as specified in the screen program.

The X1 series writes and reads data to and from folders dedicated to respective functions within the access folder.

Category	Internal storage	External USB storage
Storage medium	X1 series unit	USB flash drive
File directory	<p>"sd" folder C:\MONITOUCH\X1\0\work\strage\sd\(\access folder)</p> <p style="margin-left: 20px;">└ 0: Main app in multi-display   1: Sub app in multi-display</p> <p>"usb" folder C:\MONITOUCH\X1\0\work\strage\usb\(\access folder)</p> <p style="margin-left: 20px;">└ 0: Main app in multi-display   1: Sub app in multi-display</p> 	<p>(Drive name<sup>*1</sup>):\X1_Storage(\access folder)</p> 
Storage folder name	Fixed to "sd" Fixed to "usb"	Fixed to "X1_Storage" <sup>*3</sup>
Access folder name <sup>*2</sup>	Specified in screen program <sup>*3</sup>	Specified in screen program <sup>*3</sup>
Function folder names	Fixed <sup>*3*4</sup>	Fixed <sup>*3*4</sup>

\*1 Specify which USB port to use in the screen program. The drive names of USB ports 1 to 4 are fixed.



 Location of setting: [System Setting] → [Other] → [Storage Setting]  
For details, refer to "9.2.3 Storage Settings" page 9-6.

\*2 The access folder is accessed regularly in RUN mode.

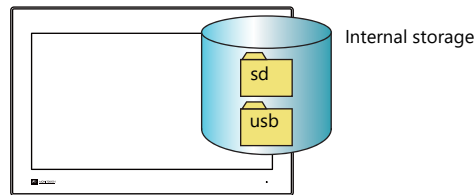
\*3 A folder is created when a screen program is written using the storage manager or when a function is executed on the X1 series unit.

\*4 Depending on the function, different paths or folders can be accessed.

## 9.2.2 Location of Folders

### Internal Storage

Storage folders are created in the X1 series unit. There are the "sd" folder and "usb" folder.



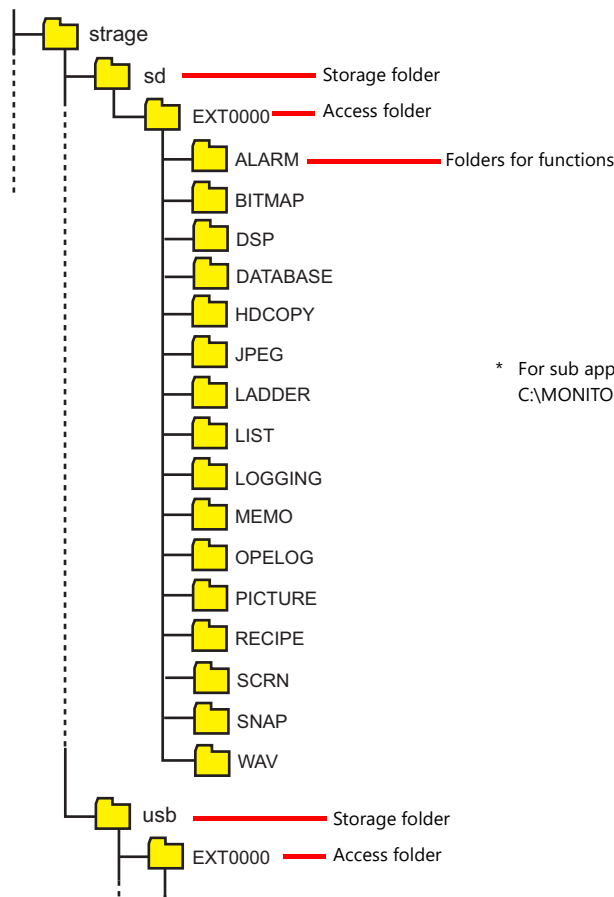
Item	Details
Storage medium	X1 series unit
File directory	"sd" folder C:\MONITOUCH\X1\0\work\strage\sd\ (access folder) L—0: Main app in multi-display 1: Sub app in multi-display  "usb" folder C:\MONITOUCH\X1\0\work\strage\usb\ (access folder) L—0: Main app in multi-display 1: Sub app in multi-display
Storage folder name	Fixed to "sd" and "usb"
Access folder name* <sup>1</sup>	Specified in screen program* <sup>2</sup>
Function folder names	Fixed* <sup>2</sup> * <sup>3</sup>

\*1 The access folder is accessed regularly in RUN mode.

\*2 A folder is created when a screen program is written using the storage manager or when a function is executed on the X1 series unit.

\*3 Depending on the function, different paths or folders can be accessed.

C:\MONITOUCH\X1\0\work\

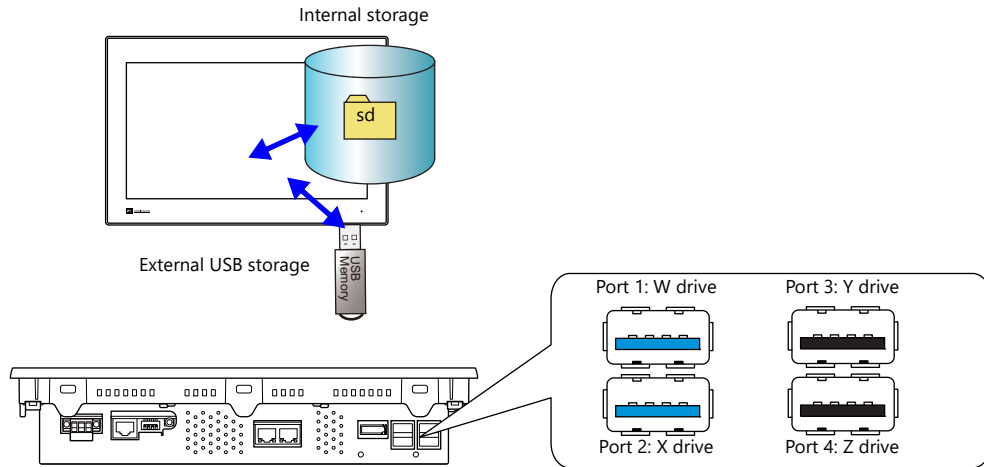


\* For sub app using multi-display function:  
C:\MONITOUCH\X1\1\work\

For details on the usage of internal storage, refer to "9.2.3 Storage Settings" page 9-6.

## External USB Storage

- External USB storage can be used with the X1 series. The name of the storage folder is fixed to "X1\_Storage".
- The drive names of USB ports 1 to 4 on the X1 series are fixed. Select one port to use in the screen program.



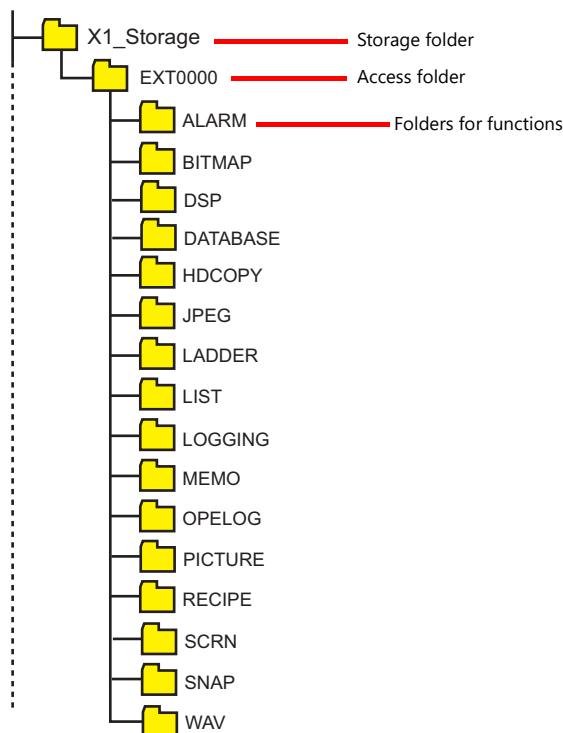
Item	Details
Storage medium	USB flash drive
Capacity	32 GB max.
File system	FAT / FAT32 / exFAT / NTFS
File directory	(Drive name):\X1_Storage\ (access folder)
Storage folder name	Fixed to "X1_Storage"*2
Access folder name*1	Specified in screen program*2
Function folder names	Fixed *2*3

\*1 The access folder is accessed regularly in RUN mode.

\*2 A folder is created when a screen program is written using the storage manager or when a function is executed on the X1 series unit.

\*3 Depending on the function, different paths or folders can be accessed.

(Drive name)

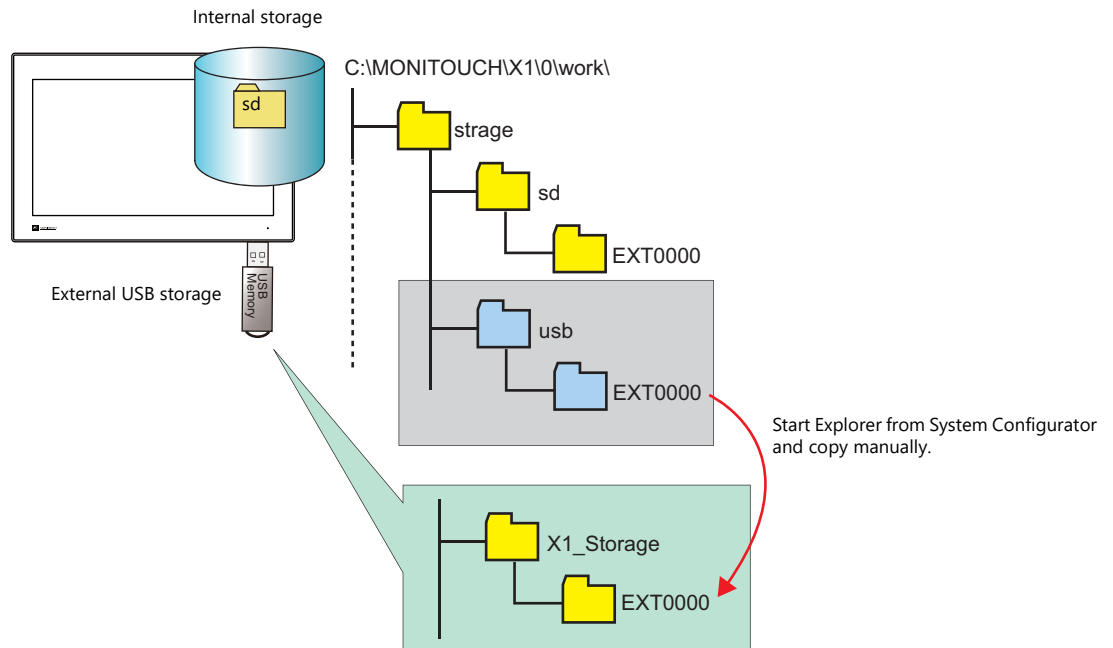


For details on the usage of external USB storage, refer to "9.2.3 Storage Settings" page 9-6.

## Notes on Using External USB Storage


- When the [System Setting] → [Other] → [Storage Setting] → [Storage folder] → [External USB storage] checkbox is selected, the “usb” folder of the internal storage cannot be used. When changing the settings to use external USB storage, copy data from the “usb” folder to the “X1\_Storage” folder on the USB flash drive before transferring the screen program.

Example: [External USB storage] selected



- For the sub app when using the multi-display function, the external USB storage cannot be used except for the following macro commands.

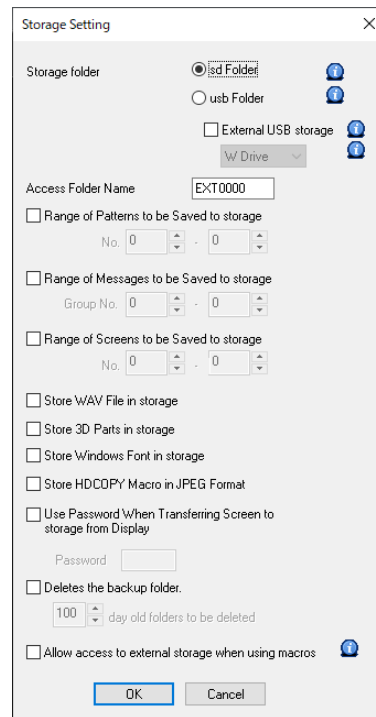
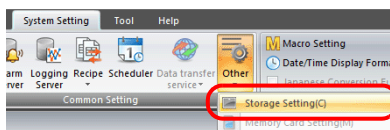
Macro commands: COPY\_FILE / MOVE\_FILE / DEL\_FILE / READ\_FILE / WRITE\_FILE

-  In order to use the above macro commands, the [System Setting] → [Other] → [Storage Setting] → [Allow access to external storage when using macros] checkbox must be selected. For details, refer to ["9.2.3 Storage Settings"](#).

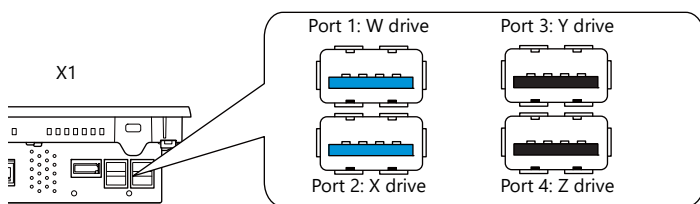
## 9.2.3 Storage Settings

Settings including which storage to use, the access folder name, and other storage-related items are configured in the [Storage Setting] window.

[System Setting] → [Other] → [Storage Setting]



<Drive letter assignment for external USB storage>

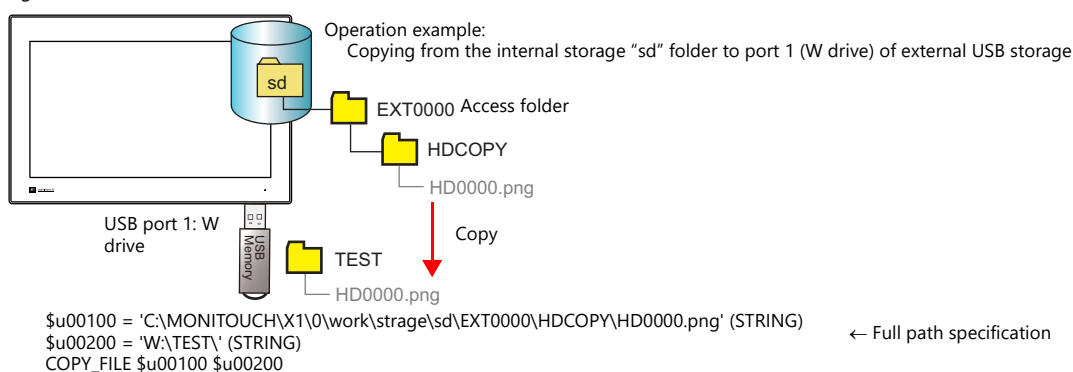


The drive names of USB ports 1 to 4 are fixed.

Item	Description
Storage folder	Select the location to access in RUN mode. For details, refer to <a href="#">“Storage Folders” page 9-9</a> . sd Folder (internal storage) usb Folder (internal storage)* USB Storage (Available when [External USB storage] is selected.) * * It is not possible to use both [usb Folder] (internal storage) and [USB Storage].
External USB storage: W / X / Y / Z drive *1	Select the drive to access when using an external USB storage. The specified drive is labeled “In Use” at [I/O Check] → [Touch switches and media] in Local mode. On the [Storage Transfer] screen in Local mode, only the drive (USB port) selected here is available. (Selection is not necessary for automatic uploading. Uploading is possible from any drive.) * When the [External USB storage] checkbox is selected, the “usb” folder of the internal storage cannot be used. When changing the settings to use external USB storage, copy data from the “usb” folder to the “X1_Storage” folder on the USB flash drive before transferring the screen program. <a href="#">“Notes on Using External USB Storage” page 9-5</a>
Access Folder Name	Set a different folder name for each screen program below the storage folder. (default: EXT0000) One-byte characters: Within 64 characters (not case-sensitive)*2 Two-byte characters: Within 32 characters If the same folder name already exists, data will be overwritten.
Range of Patterns to be Saved to storage	Stores pattern data in a storage folder.
Range of Messages to be Saved to storage	Stores messages in a storage folder.
Range of Screens to be Saved to storage	Stores screens in a storage folder.
Store WAV File in storage	Stores audio files in a storage folder.
Store 3D Parts in storage	Stores images for 3D parts in a storage folder.
Store Windows Font in storage	Stores Windows fonts in a storage folder.
Store HDCOPY Macro in JPEG Format	Sets the file format for saving data to a storage device when using the “HDCOPY”, “HDCOPY2”, or “HDCOPY3” macro commands (with only filename specified and no extension specified*3).  Unselected Saves as a PNG file. Selected Saves as a JPEG file.

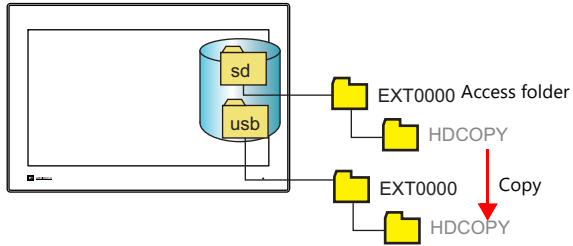
Item	Description																											
Use Password When Transferring Screen to storage from Display	A password can be set on the [Storage Transfer] screen in Local mode for when transferring data from MONITOUCH to storage. This setting is valid even if no password is set. Password: Within 6 one-byte numeric characters																											
Deletes the backup folder*4	Deletes backup folders older than the set number of days from the X1 series unit calendar. Setting range: 30 to 2,000 days Items to delete: <ul style="list-style-type: none"> <li>- Items in the "LOGGING" folder for the logging server</li> <li>- Items in the "ALARM" folder for the alarm server</li> <li>- Items in the "LIST" folder for outputting datasheet PDFs</li> </ul>																											
Allow access to external storage when using macros	Allows access to the desired external USB storage or folder when using the following macro commands.*5 COPY_FILE / MOVE_FILE / DEL_FILE / READ_FILE / WRITE_FILE Regarding the X1 series unit, areas other than the internal storage area can also be accessed. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th>Selected</th> <th>Unselected</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="writing-mode: vertical-rl; transform: rotate(180deg);">Accessible area</td> <td>External USB storage</td> <td>All USB ports 1 to4 (The [External USB storage] checkbox does not need to be selected.)</td> <td>Only the drive (USB port) selected at [External USB Storage]*1  (Drive name):\X1_Storage</td> </tr> <tr> <td>X1 series unit*6</td> <td> <ul style="list-style-type: none"> <li>• C:\MONITOUCH</li> <li>• C:\UserProgramFiles</li> <li>• C:\UserData</li> </ul> </td> <td>Internal storage only "sd" folder "usb" folder</td> </tr> <tr> <td colspan="2">Macro path specification method*7</td> <td>                     Full path specification                     <ul style="list-style-type: none"> <li>• External USB storage                             <table style="margin-left: 20px;"> <tr><td>Port 1</td><td>W:\</td></tr> <tr><td>Port 2</td><td>X:\</td></tr> <tr><td>Port 3</td><td>Y:\</td></tr> <tr><td>Port 4</td><td>Z:\</td></tr> </table> </li> <li>• X1 series unit Specify a path within the above "Accessible area". Example: Internal storage "sd" folder C:\MONITOUCH\X1\0\work\strage\sd  <table style="margin-left: 20px;"> <tr><td>0:</td><td>Main app in multi-display</td></tr> <tr><td>1:</td><td>Sub app in multi-display</td></tr> </table> </li> </ul> </td> <td>                     Relative path specification                     <ul style="list-style-type: none"> <li>• External USB storage D:\</li> <li>• Internal storage "sd" folder C:\ "usb" folder D:\</li> </ul> </td> </tr> </tbody> </table>			Selected	Unselected	Accessible area	External USB storage	All USB ports 1 to4 (The [External USB storage] checkbox does not need to be selected.)	Only the drive (USB port) selected at [External USB Storage]*1  (Drive name):\X1_Storage	X1 series unit*6	<ul style="list-style-type: none"> <li>• C:\MONITOUCH</li> <li>• C:\UserProgramFiles</li> <li>• C:\UserData</li> </ul>	Internal storage only "sd" folder "usb" folder	Macro path specification method*7		Full path specification <ul style="list-style-type: none"> <li>• External USB storage                             <table style="margin-left: 20px;"> <tr><td>Port 1</td><td>W:\</td></tr> <tr><td>Port 2</td><td>X:\</td></tr> <tr><td>Port 3</td><td>Y:\</td></tr> <tr><td>Port 4</td><td>Z:\</td></tr> </table> </li> <li>• X1 series unit Specify a path within the above "Accessible area". Example: Internal storage "sd" folder C:\MONITOUCH\X1\0\work\strage\sd  <table style="margin-left: 20px;"> <tr><td>0:</td><td>Main app in multi-display</td></tr> <tr><td>1:</td><td>Sub app in multi-display</td></tr> </table> </li> </ul>	Port 1	W:\	Port 2	X:\	Port 3	Y:\	Port 4	Z:\	0:	Main app in multi-display	1:	Sub app in multi-display	Relative path specification <ul style="list-style-type: none"> <li>• External USB storage D:\</li> <li>• Internal storage "sd" folder C:\ "usb" folder D:\</li> </ul>
		Selected	Unselected																									
Accessible area	External USB storage	All USB ports 1 to4 (The [External USB storage] checkbox does not need to be selected.)	Only the drive (USB port) selected at [External USB Storage]*1  (Drive name):\X1_Storage																									
	X1 series unit*6	<ul style="list-style-type: none"> <li>• C:\MONITOUCH</li> <li>• C:\UserProgramFiles</li> <li>• C:\UserData</li> </ul>	Internal storage only "sd" folder "usb" folder																									
Macro path specification method*7		Full path specification <ul style="list-style-type: none"> <li>• External USB storage                             <table style="margin-left: 20px;"> <tr><td>Port 1</td><td>W:\</td></tr> <tr><td>Port 2</td><td>X:\</td></tr> <tr><td>Port 3</td><td>Y:\</td></tr> <tr><td>Port 4</td><td>Z:\</td></tr> </table> </li> <li>• X1 series unit Specify a path within the above "Accessible area". Example: Internal storage "sd" folder C:\MONITOUCH\X1\0\work\strage\sd  <table style="margin-left: 20px;"> <tr><td>0:</td><td>Main app in multi-display</td></tr> <tr><td>1:</td><td>Sub app in multi-display</td></tr> </table> </li> </ul>	Port 1	W:\	Port 2	X:\	Port 3	Y:\	Port 4	Z:\	0:	Main app in multi-display	1:	Sub app in multi-display	Relative path specification <ul style="list-style-type: none"> <li>• External USB storage D:\</li> <li>• Internal storage "sd" folder C:\ "usb" folder D:\</li> </ul>													
Port 1	W:\																											
Port 2	X:\																											
Port 3	Y:\																											
Port 4	Z:\																											
0:	Main app in multi-display																											
1:	Sub app in multi-display																											

- \*1 For the sub app when using the multi-display function, the external USB storage cannot be used except for the following macro commands.  
Macro commands: COPY\_FILE / MOVE\_FILE / DEL\_FILE / READ\_FILE / WRITE\_FILE  
In order to use the above macro commands, the [Allow access to external storage when using macros] checkbox must be selected.
- \*2 All characters of the input string are recognized as uppercase characters. Even if lowercase characters are input on the editor screen, they are converted into uppercase characters when [OK] is clicked, and are recognized as uppercase characters on MONITOUCH.
- \*3 When using the "HDCOPY3" macro command with the extension specified in the filename as "\*.JPG" or "\*.PNG", data is saved in the format specified in the macro.
- \*4 Old backup files can also be deleted by selecting the [Delete folders from the oldest if Storage is lacking in space for backup] checkbox at [System Setting] → [Unit Setting] → [General Settings].
- \*5 Usage method when selected



- \*6 If a path outside the accessible area is specified, the macro results in an execution error.

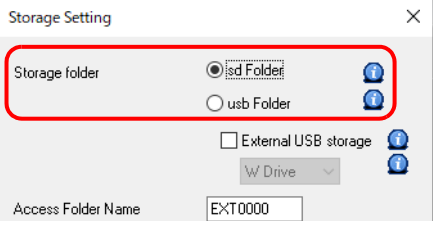
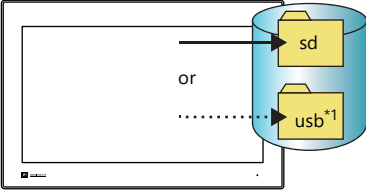
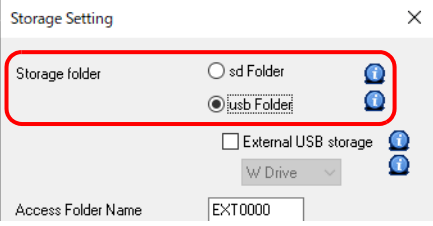
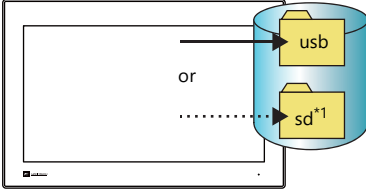
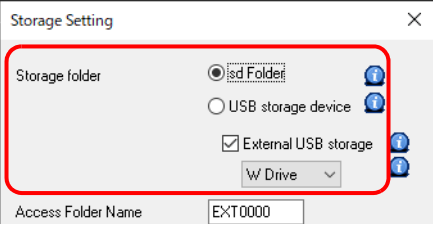
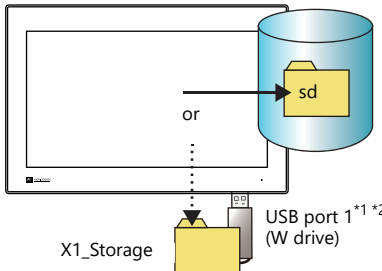
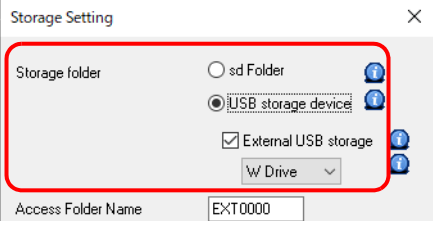
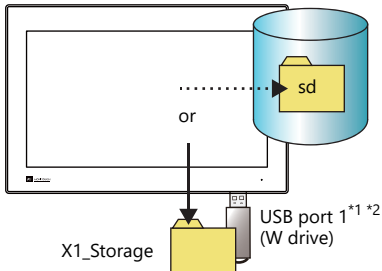
\*7 If a path to the internal storage ("sd" folder or "usb" folder) of the X1 series unit is already specified, the setting needs to be changed.



- Unselected
  - \$u00300 = 'C:\EXT0000\HDCOPY\' (STRING) ← Relative path specification "sd" folder: C:\
  - \$u00400 = 'D:\EXT0000\HDCOPY\' (STRING) "usb" folder: D:\
  - COPY\_FILE \$u00300 \$u00400
- Selected
  - \$u00300 = 'C:\MONITOUCH\X1\0\work\strage\sd\EXT0000\HDCOPY\' (STRING) ← Full path specification
  - \$u00400 = 'C:\MONITOUCH\X1\0\work\strage\usb\EXT0000\HDCOPY\' (STRING)
  - COPY\_FILE \$u00300 \$u00400

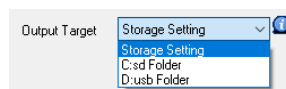
## Storage Folders

The storage folder setting determines the location to access in RUN mode. There are four variations.

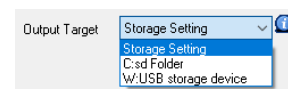
No.	Storage Setting	Details
1	<p>[sd Folder] selected</p> 	<p>The "sd" folder in the internal storage is accessed. Functions that allow selection of storage<sup>*1</sup> can also access the "usb" folder.</p> 
2	<p>[usb Folder] selected</p> 	<p>The "usb" folder in the internal storage is accessed. Functions that allow selection of storage<sup>*1</sup> can also access the "sd" folder.</p> 
3	<p>[sd Folder] selected [External USB storage] selected (Example: W drive)<sup>*2</sup></p> 	<p>The "sd" folder in the internal storage is accessed. Functions that allow selection of storage<sup>*1</sup> can also access the "X1_Storage" folder of external USB storage.</p> 
4	<p>[External USB storage] selected (Example: W drive)<sup>*2</sup> [USB storage device] selected</p> 	<p>The "X1_Storage" folder in the external USB storage is accessed. Functions that allow selection of storage<sup>*1</sup> can also access the "sd" folder of internal storage.</p> 

<sup>\*1</sup> Logging server, alarm server, data sheet (PDF output), operation log, picture viewer  
Example: Alarm server

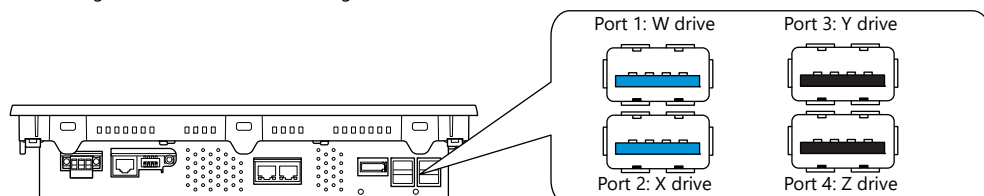
For No. 1 and No. 2



For No. 3 and No. 4



<sup>\*2</sup> Drive letter assignment for external USB storage



The drive names of USB ports 1 to 4 are fixed.



## 9.2.4 Folder Details

The names of folders in a storage folder and the files and their names within each folder are as described below.

- Internal storage: "sd" folder and "usb" folder
- External USB storage: "X1\_Storage" folder

### Contents of access folder (default EXT0000)

Folder Name	Description	Filename	Transfer Direction	Refer to
ALARM	Alarm history	ALARM00.BIN - ALARM11.BIN * <sup>1</sup> ALARM00.BIN-journal - ALARM11.BIN-journal * <sup>2</sup> EVENT00.BIN - EVENT11.BIN * <sup>1</sup> EVENT00.BIN-journal - EVENT11.BIN-journal * <sup>2</sup> ALARM_aa_bb.CSV * <sup>1</sup> (aa: Block No., bb: No.) (arbitrary filename).CSV * <sup>1</sup> * <sup>3</sup> ALARMxx_nnn_XX_YYYYMMDDHHMMSS.mp4	X1 ← storage folder * <sup>7</sup> X1 → storage folder	<a href="#">page 9-20</a>
BITMAP	Pattern data	BMP0000.BIN to BMP1023.BIN	X1 ← storage folder	<a href="#">page 9-13</a>
DATABASE	MES database file (stand-alone configuration)	(arbitrary filename).db * <sup>4</sup>	X1 → storage folder	<a href="#">page 9-22</a>
DSP	Screen program	DSP0000.BIN	X1 ← storage folder X1 → storage folder	<a href="#">page 9-29</a>
HDCOPY	Screenshot image	HD0000.PNG - HD9999.PNG HD000~yy.PNG - HD999~yy.PNG (arbitrary filename).PNG * <sup>3</sup>	X1 → storage folder	<a href="#">page 9-21</a>
JPEG	JPEG file * Create manually when necessary.	JP00000.JPG - JP32767.JPG (arbitrary filename).JPG * <sup>3</sup>	X1 ← storage folder	<a href="#">page 9-18</a>
LADDER	Ladder monitor files * Create manually when necessary.	Differs by PLC * <sup>5</sup>	X1 ← storage folder X1 → storage folder	<a href="#">page 9-20</a>
LIST	Data sheet PDF output	LISTxxxx.PDF * <sup>6</sup> (arbitrary filename)xxxx.PDF * <sup>3</sup> * <sup>6</sup> (xxx: Top page number)	X1 → storage folder	<a href="#">page 9-22</a>
LOGGING	Logging data	LOGGING00.BIN - LOGGING11.BIN * <sup>1</sup> LOGGING00.BIN-journal - LOGGING11.BIN-journal * <sup>2</sup> LOGGING_aa_bb.CSV * <sup>1</sup> (aa: Block No., bb: No.) (arbitrary filename).CSV * <sup>1</sup> * <sup>3</sup>	X1 ← storage folder * <sup>7</sup> X1 → storage folder	<a href="#">page 9-21</a>
MEMO	Memo pad data	MEM0000.PNG - MEM0007.PNG	X1 → storage folder	<a href="#">page 9-23</a>
MSG	Message file	MSGxyyy.BIN MSGxyyy.TXT	X1 ← storage folder	<a href="#">page 9-13</a> <a href="#">page 9-16</a>
OPELOG	Operation log file	OPELOG_hhmmss.DB	X1 ← storage folder X1 → storage folder	<a href="#">page 9-21</a>
PICTURE	Image file * Create manually when necessary.	PICT00000.JPG to PICT99999.JPG (arbitrary filename).JPG * <sup>3</sup> PICT00000.PNG to PICT99999.PNG (arbitrary filename).PNG * <sup>3</sup> PICT00000.BMP to PICT99999.BMP (arbitrary filename).BMP * <sup>3</sup>	X1 ← storage folder	<a href="#">page 9-20</a>
RECIPE	Recipe data * Create manually when necessary.	REC0000.CSV - REC9999.CSV (arbitrary filename).CSV * <sup>3</sup> REC0000.BIN - REC9999.BIN (arbitrary filename).BIN * <sup>3</sup>	X1 ← storage folder X1 → storage folder	<a href="#">page 9-20</a>
SCRN	Header file	SCHEADER.BIN	X1 ← storage folder	<a href="#">page 9-13</a>
	Screen file	SC0000.BIN to SC9999.BIN		
	Component parts (Macro blocks)	MCR0000.BIN to MCR1023.BIN		
	Component parts (messages)	MSG0000.BIN to MSG0011.BIN		
	3D part file	3D0001.BIN to 3D1023.BIN		
	Windows font file (for screen creation)	WFS0000.BIN to WFS4095.BIN		
	Windows font file (messages)	WFM0000.BIN to WFM4095.BIN		
SNAP	Snapshot image * Create manually when necessary.	VD00000.JPG - VD32767.JPG	X1 ← storage folder	<a href="#">page 9-18</a>

Folder Name	Description	Filename	Transfer Direction	Refer to
WAV	WAV files for audio output * Create manually when necessary.	WA0000.WAV - WA9999.WAV (arbitrary filename).WAV * <sup>3</sup>	X1 ← storage folder	<a href="#">page 9-17</a>

- \*1 When saving to a backup folder, the year, month, day, hour, minutes, and seconds (\_yyymmddhhmmss) are added to the end of the filename.  
E.g.: ALARM00\_20140320150040.BIN
- \*2 Temporary file during data update
- \*3 Filename: 64 or less one-byte uppercase alphanumeric characters or 32 or less two-byte characters
- \*4 Filename: 32 or less one-byte alphanumeric characters (two-byte characters invalid)
- \*5 For more information, refer to the V9 Series Ladder Monitor Specifications manual.
- \*6 When a timestamp is added, the year, month, day, hour, minute, and second (\_yyymmddhhmmss) are appended to the filename.  
Example: LIST0000\_20140320150040.PDF
- \*7 BIN files only

### Contents of DSPDEF folder (for automatic upload)

Folder Name	Description	Filename	Transfer Direction	Refer to
DSP	Screen program file for auto uploading	DSPDEF.BIN	X1 ← Storage	<a href="#">page 9-27</a>

## 9.3 Function Descriptions

### 9.3.1 List of Functions

- The following table lists the functions that use storage. For details, refer to the corresponding reference.

Function		Refer to
Reduction of screen program data size	Storing pattern (bitmap) data	<a href="#">page 9-13</a>
	Storing screen data	
	Storing 3D parts	
	Storing Windows fonts	
	Storing message data	<a href="#">page 9-13, page 9-16</a>
Storing audio (WAV) files		<a href="#">page 9-17, "2 Sound"</a>
Storing JPEG data		<a href="#">page 9-18, "1.1 JPEG Display"</a>
Storing image files (picture viewer)		<a href="#">page 9-19, "14 Picture Viewer"</a>
Recipe data		<a href="#">page 9-20, "15 Recipes" in X1 Series Reference Manual 1</a>
Saving alarm history		<a href="#">page 9-20, "8 Alarm" in X1 Series Reference Manual 1</a>
Saving logging data		<a href="#">page 9-21, "7 Trend" in X1 Series Reference Manual 1</a>
Operation logs		<a href="#">page 9-21, "4 Operation Log"</a>
Saving screenshot images		<a href="#">page 9-21, V9 Series Macro Reference Manual</a>
PDF output of data sheets		<a href="#">page 9-22, 16.3 "Printing Data Sheets" in X1 Series Reference Manual 1</a>
Saving MES (stand-alone) database files		<a href="#">page 9-22, "6.9 MES Interface Function"</a>
Memo pad data backup		<a href="#">page 9-23, "13.1 Memo Pad" in X1 Series Reference Manual 1</a>

- Screen program transfer can be done using storage. For details, refer to the corresponding reference.

Function		Refer to
Screen program transfer	Automatic upload	<a href="#">page 9-27</a>
	Transfer in Local mode	<a href="#">page 9-29</a>

## 9.3.2 Reducing Screen Program Data Size

The memory capacity of the X1 series that can be used for screen program data is 64 MB. Part of the screen program data, such as screens, patterns, and messages, can be put in storage. This can reduce the size of the actual screen program data.

- Pattern files (bitmap)
- Messages (BIN files, TXT files \*1)
- Screens (Max. 4000)
- 3D parts
- Windows fonts

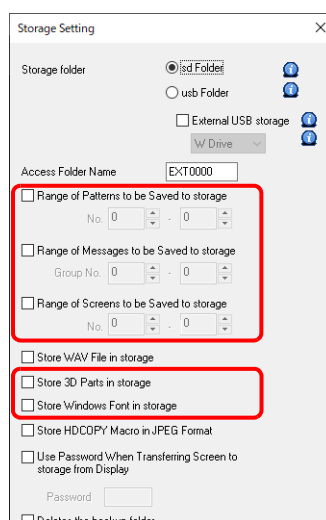
\*1 Messages can be saved to a storage folder as a BIN file or TXT file. For details on saving a TXT file, refer to “9.3.3 Storing Messages (TXT Files)” page 9-16.

### File Storage Target and Filename

Item		Filename	Storage target
Patterns		BMPxxxx.BIN (xxxx: 0000 to 1023)	(Access folder)\BITMAP
Messages (BIN)		MSGyyyy.BIN (xx: Language number 00 to 31) (yyy: Message group number 000 to 127)	(Access folder)\MSG
Screens 3D parts Windows fonts	Header	SCHEADER.BIN	(Access folder)\SCRN
Screens	-	SCxxxx.BIN (xxxx: 0 to 9999)	
	Component parts (macro blocks)	MCRxxxx.BIN (xxxx: 0 to 1023)	
	Component parts (alarm messages)	MSGxxxx.BIN (xxxx: 0 to 11)	
3D parts		3Dxxxx.BIN (xxxx: 0 to 1023)	
Windows fonts	Graphics	WFSxxxx.BIN (xxxx: 0 to 4095)	
	Messages	WFMxxxx.BIN (xxxx: 0 to 4095)	

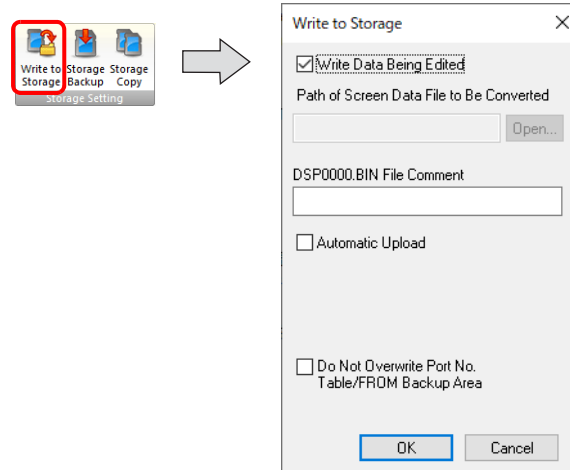
### Preparation for Storing Data in Storage

1. Connect a USB flash drive to the PC.
2. Configure the following settings on the screen program in advance. Click [System Setting] → [Other] → [Storage Setting]. The [Storage Setting] window is displayed.
3. Select the items to save to the storage folder. When the settings are complete, click [OK] and save the screen program file.



4. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
5. Specify the drive where the USB flash drive is connected and click [OK]. The [Storage Manager] window is displayed.

6. Click [Storage Setting] → [Write to Storage]. The [Write to storage] window is displayed.



7. If the screen program is currently being edited, select the [Write Data Being Edited] checkbox. If the screen program is not the one currently opened with V-SFT, deselect the [Write Data Being Edited] checkbox and select the relevant screen program from the [Open] button.
8. When the settings are complete, click [OK]. The file is saved to the access folder.


## Procedures on the X1 Series Unit

The procedure differs between internal storage and external USB storage.

### Internal storage of X1 series unit (“sd” folder, “usb” folder)

Connect the USB flash drive containing the created files to the X1 series unit. Then using System Configurator, start Explorer and copy the “EXT0000” folder (access folder) to the X1 series unit storage folder specified on the [System Setting] → [Other] → [Storage Setting] window.

When opening a screen program on the X1 series unit, the storage folder will automatically be referred to for showing the screen.

 For details on System Configurator, refer to the X1 Series Hardware Specifications.

### External USB storage

Connect a USB flash drive to the USB port specified on the [System Setting] → [Other] → [Storage Setting] window.

## Notes on File Storage

- Up to 512 KB of screen data can be saved to a storage folder per screen. The per screen data size can be viewed at [Tool] → [List of Memory Use]. However, the size of the screen data that was selected for storage at [System Setting] → [Other] → [Storage Setting] cannot be viewed on the [List of Memory Use] tab window. We recommend checking the data size before configuring [Storage Setting].
- For the restoration of the screen data in the “SCRN” folder to the original data file (.X1), the “DSP0000.BIN” file in the “DSP” folder is required. However, if data information of “DSP0000.BIN” in the “DSP” folder and “SCHEADER.BIN” in the “SCRN” folder do not match, the compilation of files from these folders does not take place, and thus the screen program is created with screen data in the “SCRN” folder omitted. For details on the conversion procedure, refer to [“BIN File Conversion” page 9-26](#).

## Limitations

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- If screen data is not stored correctly in a storage folder, the X1 series operates in the same way as when screen data does not exist.  
Therefore, if calling a screen using a switch with [Screen Change-over] selected for [Function], a short intermittent beep will sound and the request will not be processed. If using a [Displaying Screen Device] from the PLC to specify a screen, the screen will not changeover. (If immediately after power-on, the screen with the smallest number will be displayed.)
- If 3D parts are not stored correctly in a storage folder, 3D parts will not be displayed on the X1 series unit.
- If Windows fonts are not stored correctly in a storage folder, Windows font characters will not be displayed on the X1 series unit.
- If patterns are not stored correctly in a storage folder, patterns will not be displayed on the X1 series unit.
- When both BIN files (MSGxyyy.BIN) and TXT files (MSGxyyy.TXT) coexist in the "MSG" folder in a storage folder, reference to TXT files takes priority.
- Screen data stored in a storage folder takes slightly longer to display than data included in a screen program transferred to the X1 series unit.

### 9.3.3 Storing Messages (TXT Files)

Messages (in TXT file format) can be stored in storage to reduce the size of the screen program. In addition, since the messages are in TXT file format, they can be edited even without V-SFT.

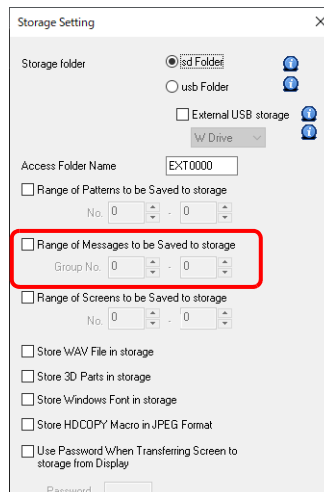
\* Message files can be stored in BIN and TXT file formats. For details on storing BIN files, refer to "9.3.2 Reducing Screen Program Data Size" page 9-13.

#### File Storage Target and Filename

Item	Filename	Storage target
Messages (TXT format)	MSGxxyyy.TXT (xx: Language number 00 to 31) (yyy: Message group number 000 to 127)	(Access folder)\MSG

#### Preparation for Storing Data in Storage (For TXT Files)

1. Configure the following settings on the screen program in advance. Click [System Setting] → [Other] → [Storage Setting]. The [Storage Setting] window is displayed.
2. Select the [Range of Messages to be Saved to storage] checkbox and specify the range of messages to be stored. When the settings are complete, click [OK] and save the screen program file.



3. Create a file in TXT format and save it to a USB flash drive.  
 Filename: MSGxxyyy.txt (xx: Language number 00 to 31, yyy: Message group number 000 to 127 \*1)  
 \*1 TXT files must be created in accordance with the message group numbers specified in the [System Setting] → [Storage Setting] window.  
 Any TXT file with a number not within the specified range will not be recognized.

#### Procedures on the X1 Series Unit

The procedure differs between internal storage and external USB storage.

##### Internal storage of X1 series unit ("sd" folder, "usb" folder)

Connect the USB flash drive to the X1 series unit. Then using System Configurator, start Explorer and copy the "MSGxxyyy.TXT" file to the "MSG" folder in the X1 series unit access folder specified on the [System Setting] → [Other] → [Storage Setting] window.

When the screen program is displayed, the stored messages are displayed accordingly.

\* When both BIN files (MSGxxyyy.BIN) and TXT files (MSGxxyyy.TXT) coexist in the "MSG" folder in a storage folder, reference to TXT files takes priority.

For details on System Configurator, refer to the X1 Series Hardware Specifications.


##### External USB storage

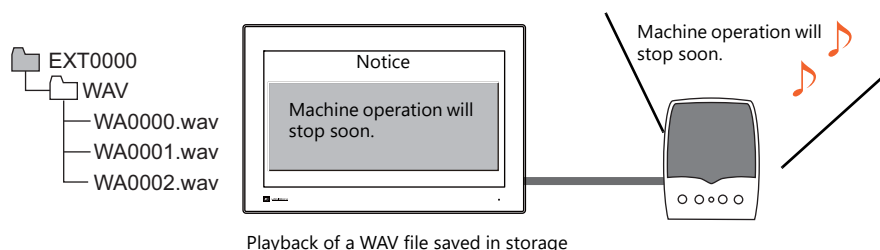
Connect a USB flash drive to the USB port specified on the [System Setting] → [Other] → [Storage Setting] window. When the screen program is displayed, the stored messages are displayed accordingly.

## 9.3.4 Storing Audio (WAV) Files

There are two methods for storing audio files used by the audio playback function: importing audio files into the screen program or storing separately in storage.

The size of the screen program can be reduced by storing audio files in storage.

 For details on audio, refer to "2 Sound".



### WAV File Directory and Filename

Files\* stored at the following location can be played.

Filename	File directory
WAxxxx.WAV (xxxx: 0000 to 1023) xxxxxxx.WAV (within 64 one-byte characters or 32 two-byte characters)	(Access folder)\WAV

\* For specifications of playable audio files, refer to "Audio Specifications" page 2-1.

### V-SFT Settings

Select the [System Setting] → [Other] → [Storage Setting] → [Store WAV File in storage] checkbox.

### Storing Files in Storage

The procedure differs between internal storage of the X1 series unit and external USB storage.

#### Internal storage of X1 series unit ("sd" folder, "usb" folder)

Files can be put in storage by the following two methods.

- Creating a folder on the X1 series unit
  - 1) Connect a USB flash drive containing the necessary WAV files to the X1 series unit.
  - 2) Then on the X1 series unit, start Explorer from System Configurator, create a "WAV" folder in the access folder of the storage folder, and copy the WAV files into that folder.

Audio files can be played in RUN mode.


- Using the storage manager
  - Preparation for storing data in a storage folder
    - 1) Store the WAV files to be used to "C:\MONITOUCH\User\WAV" on the PC in advance.
    - 2) Connect a USB flash drive to the PC.
    - 3) Click [File] → [Storage Manager] and write the selected files to storage using [Write to Storage].

 "9.4 Storage Manager" page 9-24

- Storing in an X1 series unit storage folder
 

Connect the USB flash drive containing the necessary files to the X1 series unit. Then using System Configurator, start Explorer and copy the "EXT0000" folder (access folder) to a storage folder in the X1 series unit.

Audio files can be played in RUN mode.

 For details on System Configurator, refer to the X1 Series Hardware Specifications.

#### External USB storage

Copy WAV files into the "\X1\_Storage\EXT0000 (access folder)\WAV" folder of the USB flash drive using Explorer.

Connect a USB flash drive to the USB port specified on the [System Setting] → [Other] → [Storage Setting] window.

Audio files can be played in RUN mode.



### 9.3.5 Storing JPEG Files (JPEG Display)

JPEG files can be displayed on the X1 series unit. Always store JPEG files in storage.

 For details on JPEG display, refer to "1.1 JPEG Display".



#### JPEG File Directory and Filename

Files stored in the following location can be displayed.

Filename	File Directory
JPxxxxx.JPG (xxxxx: 00000 to 32767) xxxxxxx.JPG (within 64 one-byte characters or 32 two-byte characters)	(Access folder)\JPEG
VDxxxxx.JPG (xxxxx: 00000 to 32767)	(Access folder)\SNAP

#### Storing Files in Storage

The procedure differs between internal storage of the X1 series unit and external USB storage.

##### Internal storage of X1 series unit ("sd" folder, "usb" folder)

Files can be put in storage by the following two methods.

- Creating a folder on the X1 series unit
  - 1) Connect a USB flash drive containing the necessary JPEG files to the X1 series unit.
  - 2) Then on the X1 series unit, start Explorer from System Configurator, create "JPEG" and "SNAP" folders in the access folder of the storage folder, and copy the files into those folders.

The JPEG files in storage can be displayed in RUN mode.


- Using the storage manager
  - Preparation for storing data in a storage folder
    - 1) Store the JPEG files to be used to the "JPEG" or "SNAP" folder in "C:\MONITOUCH\User" on the PC in advance.
    - 2) Connect a USB flash drive to the PC.
    - 3) Click [File] → [Storage Manager] and write the selected files to storage using [Write to Storage].

 "9.4 Storage Manager" page 9-24

- Storing in an X1 series unit storage folder
 

Connect the USB flash drive containing the necessary files to the X1 series unit. Then using System Configurator, start Explorer and copy the "EXT0000" folder (access folder) to a storage folder in the X1 series unit.

The JPEG files in storage can be displayed in RUN mode.

 For details on System Configurator, refer to the X1 Series Hardware Specifications.


#### External USB storage

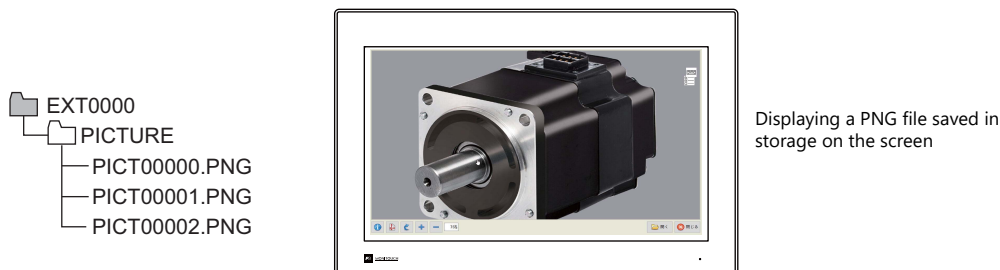
Copy JPEG files into the "JPEG" or "SNAP" folder located in "\X1\_Storage\EXT0000 (access folder)" of the USB flash drive using Explorer.

Connect a USB flash drive to the USB port specified on the [System Setting] → [Other] → [Storage Setting] window. The JPEG files in storage can be displayed in RUN mode.

## 9.3.6 Storing Image Files (Picture Viewer)

Image files can be displayed on the X1 series unit. JPEG, bitmap, and PNG format files can be displayed. Always store image files in storage.

 For details on the picture viewer, refer to ["14 Picture Viewer"](#).



### Image File Directory and Filename

Files stored in the following location can be displayed.\*

Filename	File Directory*
PICTxxxx.JPG (xxxx: 00000 to 99999) PICTxxxx.PNG (xxxx: 00000 to 99999) PICTxxxx.BMP (xxxx: 00000 to 99999) Or any filename (within 64 one-byte characters or 32 two-byte characters)	(Access folder)\PICTURE

\* **Images that are to be displayed from the system menu or by selecting on the picture viewer can be stored in any desired folder.**

### Storing Files in Storage (Example: Saving to "PICTURE" Folder)

The procedure differs between internal storage of the X1 series unit and external USB storage.

#### Internal storage of X1 series unit ("sd" folder, "usb" folder)

Files can be put in a storage folder by the following two methods.

- Creating a folder on the X1 series unit
  - 1) Connect a USB flash drive containing the necessary image files to the X1 series unit.
  - 2) Then on the X1 series unit, start Explorer from System Configurator, create a "PICTURE" folder in the access folder of the storage folder, and copy the files into that folder.


The image files saved in storage are displayed on the screen using the picture viewer.

- Using the storage manager
  - Preparation for storing data in a storage folder
    - 1) Store the image files to be used to "C:\MONITOUCH\User\PICTURE" on the PC in advance.
    - 2) Connect a USB flash drive to the PC.
    - 3) Click [File] → [Storage Manager] and write the selected files to storage using [Write to Storage].

 ["9.4 Storage Manager" page 9-24](#)

- Storing in an X1 series unit storage folder
 

Connect the USB flash drive containing the necessary image files to the X1 series unit. Then using System Configurator, start Explorer and copy the "EXT0000" folder (access folder) to a storage folder in the X1 series unit. The image files saved in storage are displayed on the screen using the picture viewer.

 For details on System Configurator, refer to the X1 Series Hardware Specifications.

#### External USB storage

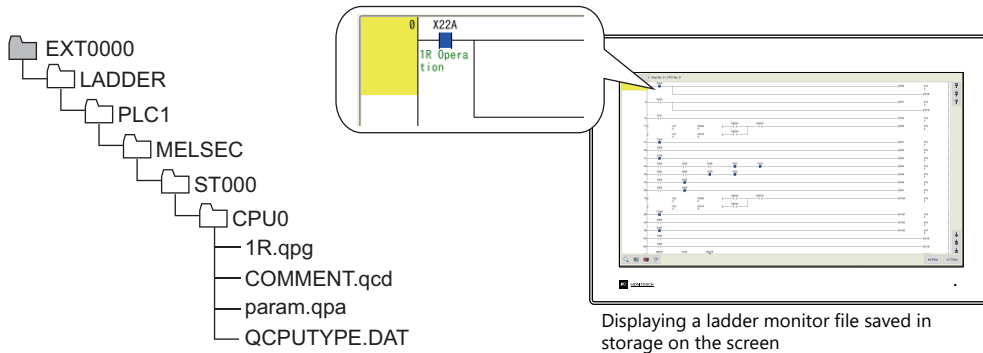
Copy image files into the "\X1\_Storage\EXT0000 (access folder)\PICTURE" folder of the USB flash drive using Explorer.

Connect a USB flash drive to the USB port specified on the [System Setting] → [Other] → [Storage Setting] window. The image files saved in storage are displayed on the screen using the picture viewer.

### 9.3.7 Storing Ladder Monitor Files

PLC data (ladder monitor and I/O monitor) can be displayed on the X1 series unit. Always store ladder monitor files in storage.

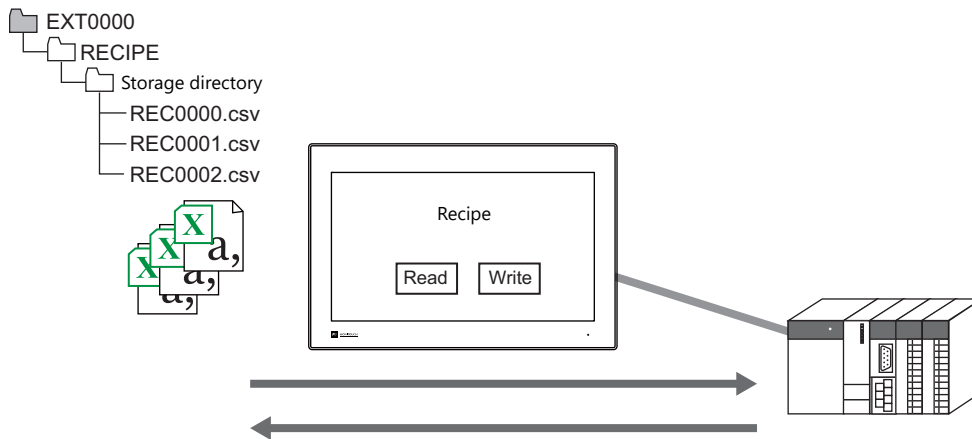
Example: Mitsubishi Electric PLC



☞ Refer to the V9 Series Ladder Monitor Specifications.

### 9.3.8 Transferring Recipe Data

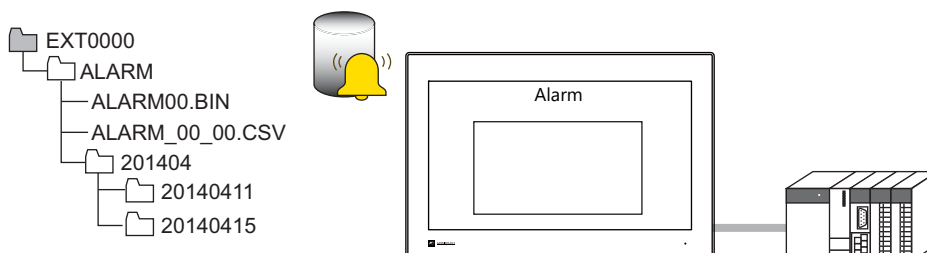
Recipe files (BIN/CSV) created on the PC can be saved in storage and then be read or written using a transfer command bit or a switch with [Recipe] set for [Function].



☞ Refer to "15 Recipes" in the X1 Series Reference Manual 1.

### 9.3.9 Saving Alarm History

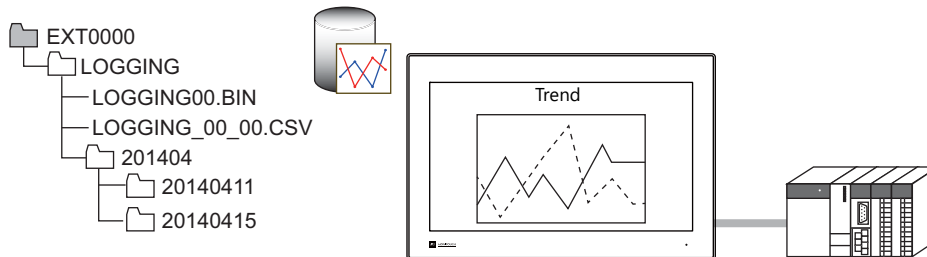
Alarm history and event history can be saved to a backup folder. BIN files in the backup folder can be displayed on the X1 series unit and CSV files can be readily checked and edited on a PC. Directories for storing files can be specified separately, such as using internal storage ("sd" folder) for the latest history data and external USB storage for backup files.



☞ Refer to "8 Alarm" in the X1 Series Reference Manual 1.

### 9.3.10 Saving Logging Data

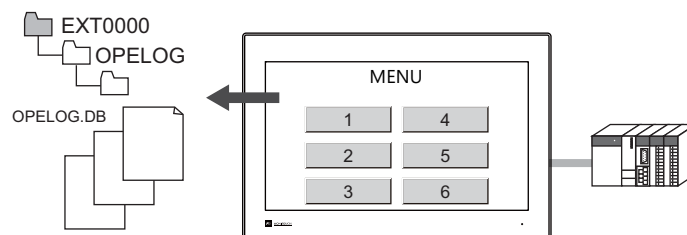
History data that contains numeric values and text can be saved to a backup folder. BIN files in the backup folder can be displayed on the X1 series unit and CSV files can be readily checked and edited on a PC. Directories for storing files can be specified separately, such as using internal storage ("sd" folder) for the latest history data and external USB storage for backup files.



☞ Refer to "7 Trends" in the X1 Series Reference Manual 1.

### 9.3.11 Operation Logs

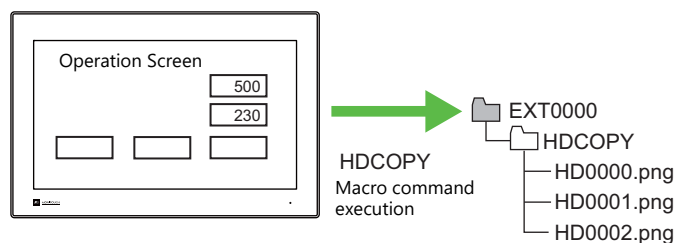
Screen operation history records (operation logs) can be output to storage. In the event of an error, these stored logs allow previous operations to be examined in order to determine the cause of the error.



☞ Refer to "4 Operation Log".

### 9.3.12 Saving Screenshot Images

Screenshot images can be saved in storage as PNG files using a macro command. When it is difficult to connect a printer on the factory floor, screenshot images can be saved in storage for printing at a later time.

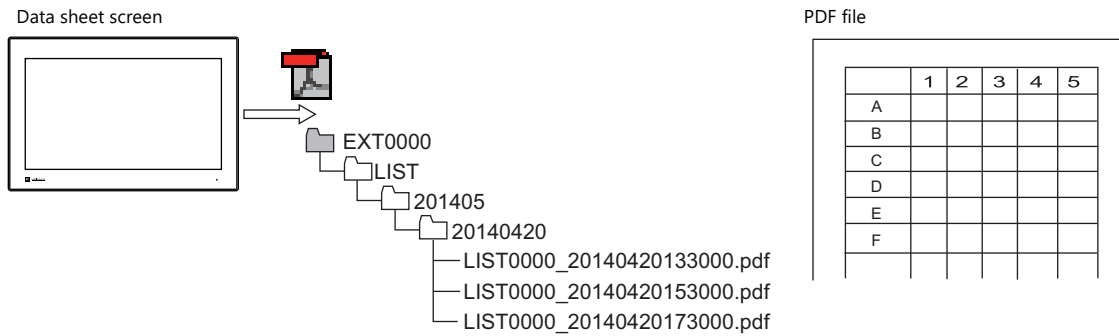


☞ Refer to the V9 Series Macro Reference Manual.

### 9.3.13 PDF Output of Data Sheets

The current data of numerical data displays or character displays that are registered to a data sheet screen can be output as a PDF file into storage.

In addition, using the memo pad function allows outputting to a PDF with an electronic signature.

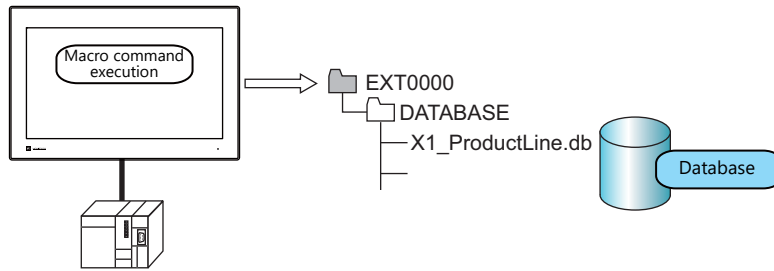


☞ Refer to "16.4 Printing Data Sheets" in the X1 Series Reference Manual 1.

### 9.3.14 Saving MES (Stand-Alone) Database Files

A database can be created in storage. Adding, searching, and deleting of database records is possible without using a network.

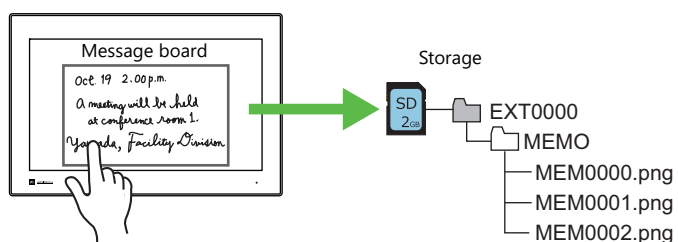
By using the internal storage of the X1 series unit, a production control system can be easily built using only the X1 series unit.




☞ Refer to "MES Interface Function" page 6-13.

## 9.3.15 Saving Memo Pad Data

Data from the memo pad function can be saved in storage as PNG files.



 Refer to "13.1 Memo Pad" in the X1 Series Reference Manual 1

### Memo Pad Data Directory and Filename

Filename	File Directory
MEMxxxx.PNG (xxxx: 0000 to 0007)	(Access folder)\MEMO

### Operation of the X1 Series

When using the memo pad in RUN mode, the memo pad data is automatically saved in storage.

- \* When the [Store Area for Memo Pad] checkbox is selected on the [SRAM/Clock Setting] screen on the [System Setting] menu, memo pad data is stored in SRAM.

### Timing of Saving

The timing for saving memo pad data in storage is as follows.

- When switching the memo pad display using a switch with [+ Block], [- Block], or [Block Call] set for [Function]
- When the screen is changed

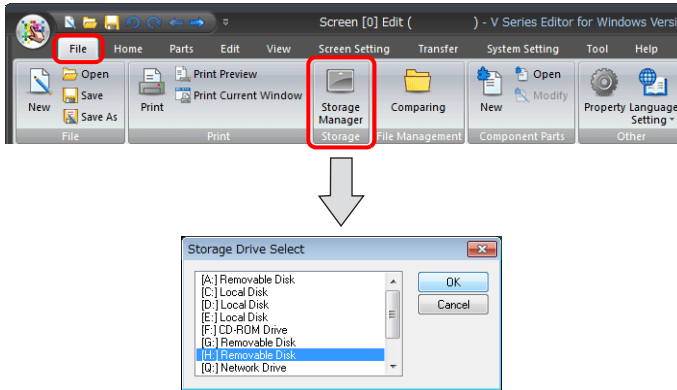
## 9.4 Storage Manager

The storage manager is an application that outputs data used by the X1 series unit into data that can be saved in storage and also imports data from storage for conversion into other file formats.

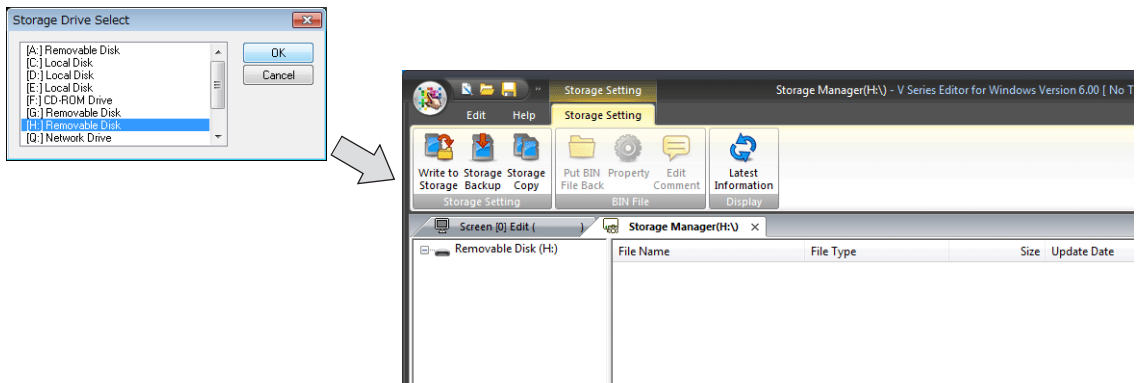
### 9.4.1 Starting and Ending

#### Starting

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window shown below is displayed.

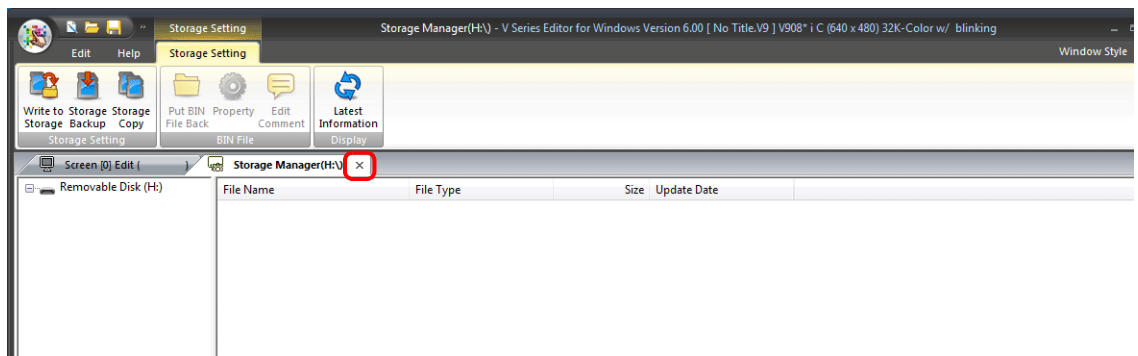


3. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window is displayed.



#### Ending

1. Click the [X] button on the corner of the [Storage Manager] tab.



2. The screen editing window reappears.

## 9.4.2 Writing

The procedure for writing data to a storage device is explained below.

Always use the storage manager to write the data in the following table to a storage device. Other files can be copied using Windows Explorer.

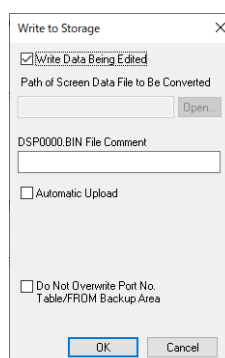
Data	Storage Manager		Remarks
	Extension before Writing	Extension after Writing	
Screen program	.X1	.BIN	
SRAM backup data	.RAM	.BIN	
Text file	.TXT	.BIN	

### Writing Procedure

1. Click [Storage Setting] → [Write to Storage].



2. The [Write to storage] window is displayed.



Item	Description
Write Data Being Edited	Write the screen program that is open (being edited) in V-SFT.
Path of Screen Data File to Be Converted	Select the data for writing to the storage device from the [Open] button. File extensions: [*.*X1], [*.*RAM], [*.*TXT]
DSP0000.BIN File Comment	Add a comment to the screen program file (DSP0000.BIN). This comment can be checked via the file's [Property] window.
Automatic Upload	Create an automatic upload file. For details, refer to <a href="#">"Automatic Upload" page 9-27</a> .
Do Not Overwrite Port No. Table/FROM Backup Area <sup>*1 *2</sup>	Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when transferring a screen program from a storage device.

**\*1 Station number table**

The station number of a counterpart device can be changed in RUN mode when connecting to the following models.

- PLC: Mitsubishi QnH (Q) series (Ethernet) (1 : n connection only)
- PLC: Mitsubishi QnA series (Ethernet) (1 : n connection only)
- PLC: OMRON SYSMAC CS1/CJ1/CJ2/CP series (Ethernet Auto) (1 : n connection only)
- PLC: OMRON SYSMAC CS1/CJ1/CJ2/CP series DNA (Ethernet) (1 : n connection only)
- Temperature controller: Fuji Electric F-MPC04P (loader)
- Temperature controller: Fuji Electric F-MPC04S (UM03)

**\*2 FROM backup area**

The FROM backup area is where a backup copy of the data in the PLC or internal device memory can be stored. To retain the data, use the macro commands "FROM\_RD" and "FROM\_WR". For details on macros, refer to the V9 Series Macro Reference Manual.

3. When the settings are complete, click [OK]. A BIN file is written to each of the folders under the access folder.



### 9.4.3 Conversion of BIN Files

Files with the extension “.BIN” are stored in folders within storage. The storage manager can be used to convert and check file information of the following BIN files.

- Located in access folder

Location	File	Extension after Conversion	File Type
DSP	DSP0000.BIN	.X1	Screen program
BITMAP	BMPxxxx.BIN	.BMP	Pattern file
MSG	MSGxyyyy.BIN	.TXT	Message

- Located in DSPDEF folder (for automatic upload)

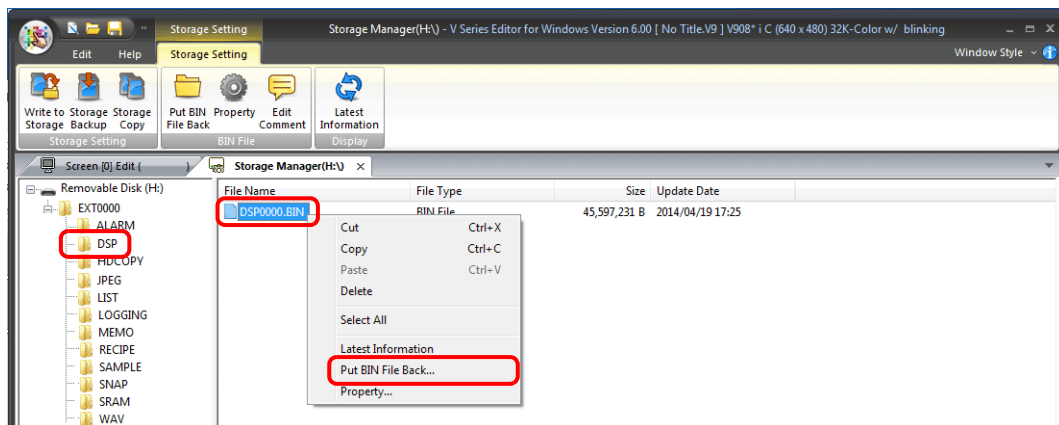
Location	File	Extension after Conversion	File Type
DSP	DSPDEF.BIN	.X1	Screen program

#### BIN File Conversion

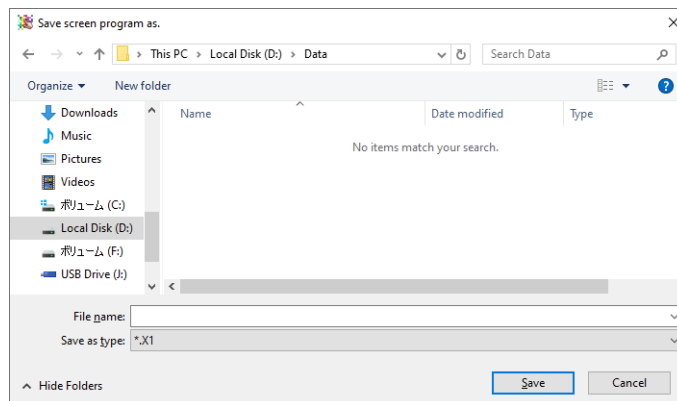
All BIN files can be restored to their original state.

1. Select a file from an access folder.
2. Right-click on the file and select [Put BIN File Back].

Example: DSP0000.BIN



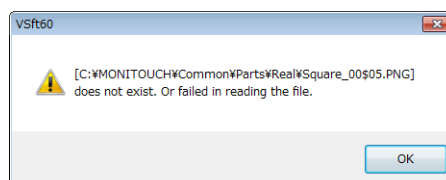
3. The window shown below is displayed. Specify the folder to save in and the filename and click [Save].



4. A converted file is created.

#### Notes

- Note that BIN files in the “BITMAP”, “MSG”, and “SCRN” folders are required to convert “DSP0000.BIN” into a X1 file. If these files are missing, the X1 file will be created without pattern data and 3D parts.



## 9.4.4 Screen Program Transfer

Screen programs can be transferred between the X1 series unit and storage by using a USB flash drive. The program is transferred as a BIN file.

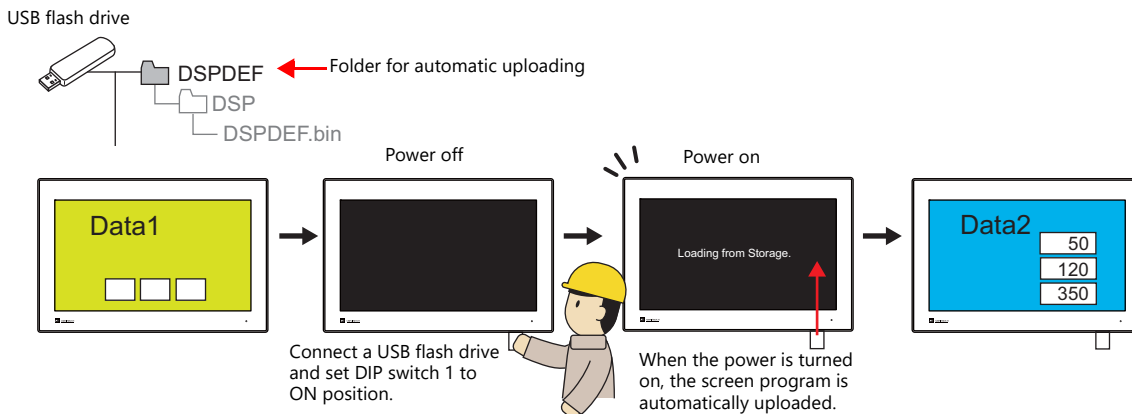
There are two methods for writing a screen program from storage to the X1 series unit: automatically uploading upon power-on (page 9-27) and selecting a screen program in Local mode (page 9-29).

### Automatic Upload

The storage manager can be used to store a screen program on a USB flash drive for automatic uploading.

Simply connect a USB flash drive to the X1 series unit and then turn the power on. The screen program will be automatically uploaded to the X1 series unit.

This allows the screen program to be easily updated without bothering operators.



### Supported USB Flash Drives

Item	Specifications
Capacity	32 GB max.
File System	FAT / FAT32 / exFAT / NTFS

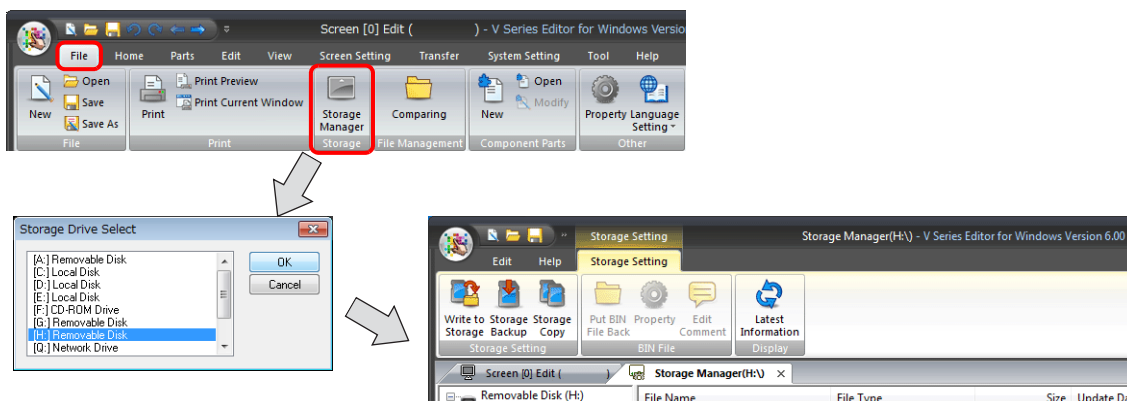
### Notes



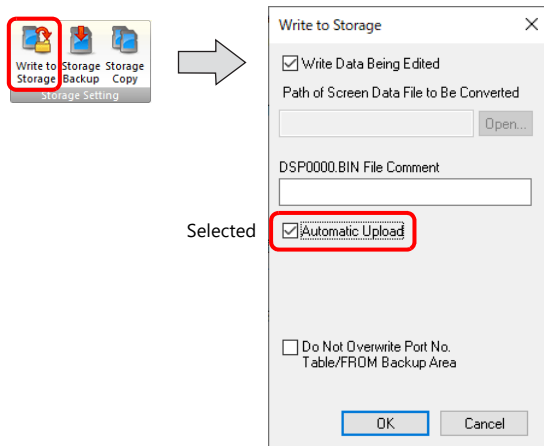
- USB flash drives that have a security function cannot be used.
- Do not turn off power to the unit when the USB flash drive is being accessed.
- Do not attempt removing a USB flash drive when it is being accessed.
- If a disk error occurs and data read/write operation is disabled, execute ScanDisk on Windows and try to restore the disk. If the disk cannot be restored, format the storage device. Note that formatting will completely erase all stored data. (For information on executing ScanDisk on Windows, refer to the relevant Windows manual.)

### Writing from PC to USB Flash Drive

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
3. Specify the drive where the storage device is connected and click [OK]. The [Storage Manager] tab window is displayed.

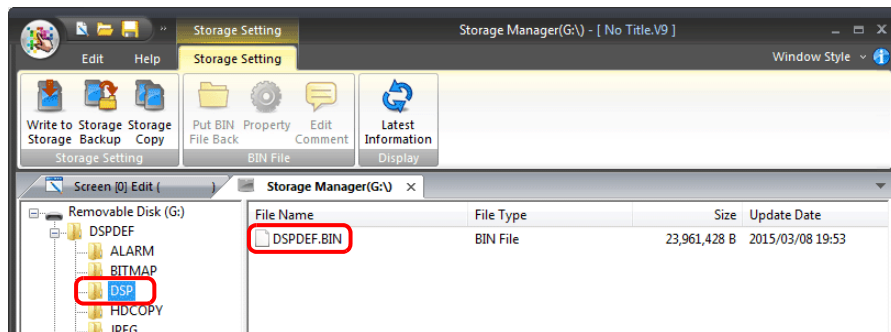


- Click [Storage Setting] → [Write to Storage]. The [Write to Storage] window is displayed. Configure the following settings.



Item	Description
Write Data Being Edited	Write the screen program that is open (being edited) in V-SFT.
Path of Screen Data File to Be Converted	Select the screen program for writing to the storage device from the [Open] button. [Screen program file (*.X1)]
DSP0000.BIN File Comment	Add a comment to the screen program file (DSPDEF.BIN) written to the storage device. This comment can be checked via the file's [Property] window.
Automatic Upload	Create an automatic upload file.
Do Not Overwrite Port No. Table/FROM Backup Area	Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when uploading a screen program from a storage device.

- When the settings are complete, click [OK]. A "DSPDEF.BIN" file is saved to the "DSPDEF" → "DSP" folder.



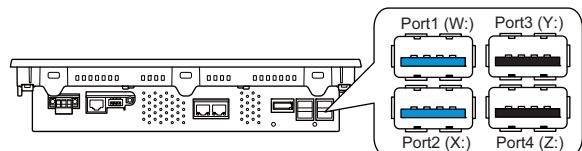
### Operation of the X1 Series

After storing data on a USB flash drive, upload the data to the X1 series unit according to the following procedure.

- Turn off the X1 series unit power.
- Set DIPSW1 on the X1 series unit to the ON position.
- Connect the USB flash drive to the X1 series unit.\*
- Turn on the X1 series unit power. After the "MONITOUCH" screen, a "Loading from Storage" message is displayed, and then the screen program saved in storage is loaded.

When transfer is complete, the RUN screen (or Local mode screen) is displayed automatically.

\* The screen program is transferred from the USB flash drive that is connected to the youngest USB port among the connected USB flash drives, regardless of the setting made on the [Storage Setting] window in the screen program.



### Notes on Write Operations

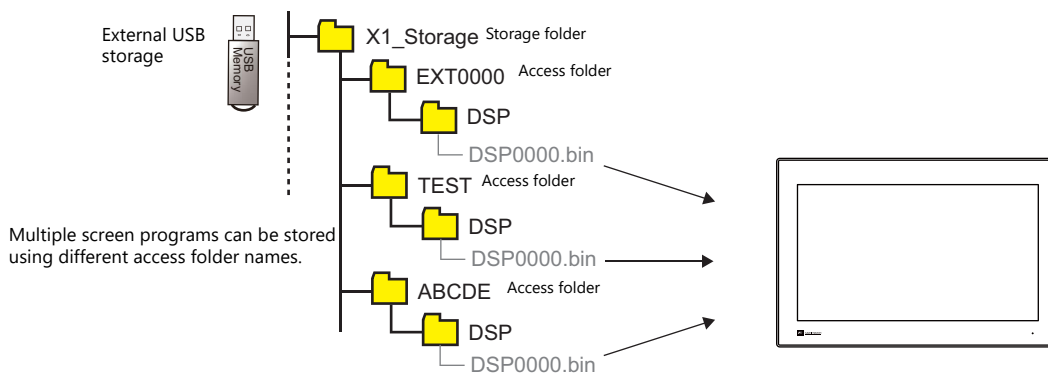
- When using the "DSPDEF" screen program for automatic uploading, only one type of data can be stored per storage device.
- If the USB flash drive is removed after automatic uploading and the power is turned off and on again, the message "Insert Storage in X1." is displayed and the X1 series unit does not start correctly. Either connect the USB flash drive or set DIPSW1 to the OFF position and then turn the power off and back on.
- When automatic uploading is performed, the screen program that exists on the X1 series unit is overwritten by the screen program that is automatically uploaded newly. Note that even if the USB flash drive is removed and DIPSW1 is set to the OFF position again, it is not possible to restore the state prior to upload.

## [Storage Transfer] Screen in Local Mode

Screen programs can be transferred between the X1 series unit and storage from the [Storage Transfer] screen in Local mode. Screen programs are transferred as a BIN file.

Because multiple screen programs can be saved in storage, the screen program to use can be switched as required. This section describes how to read and write data between a PC and storage.

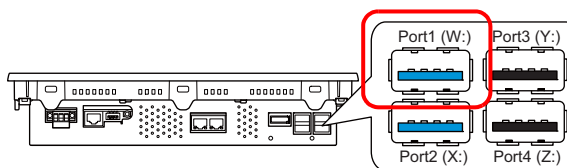
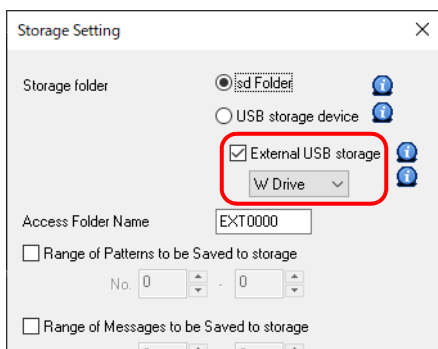
For details on Local mode screen operations, refer to the X1 Series Hardware Specifications.



## Screen Program Setting

1. Select the [System Setting] → [Other] → [Storage Setting] → [External USB storage] checkbox and then select a drive.

Example: W Drive (USB port 1)



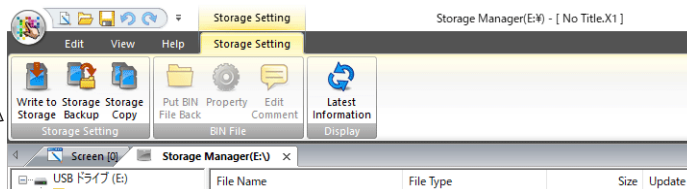
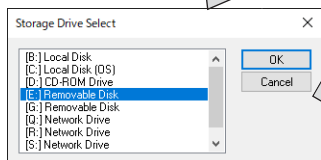
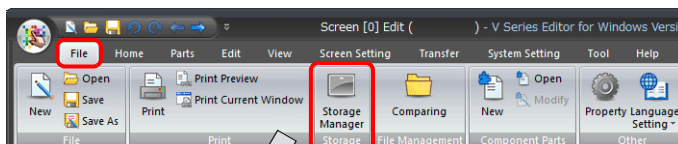
2. Transfer a screen program to the X1 series unit.



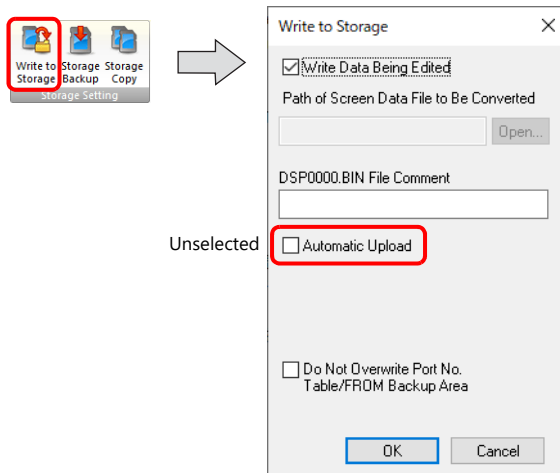
If a screen program without the above setting is transferred to an X1 series unit, the [Storage Transfer] screen in Local Mode is not available.

## Writing from a PC to Storage

1. Click [File] → [Storage Manager] on V-SFT. The window for specifying a drive is displayed.
2. Specify the drive where the storage is located and click [OK]. The [Storage Manager] tab window is displayed.

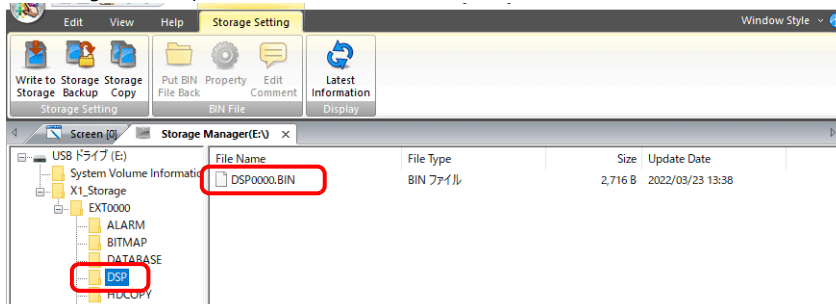


- Click [Storage Setting] → [Write to Storage]. The [Write to Storage] window is displayed. Configure the following settings.

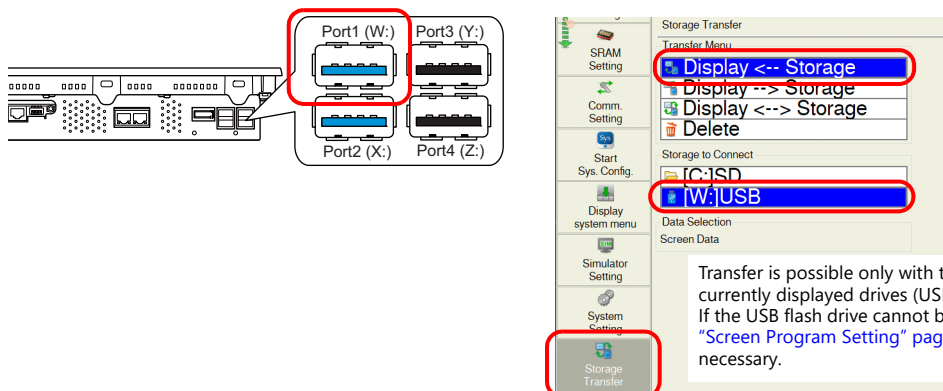


Item	Description
Write Data Being Edited	Write the screen program that is open (being edited) in V-SFT.
Path of Screen Data File to Be Converted	Select the screen program to write to storage from the [Open] button. [Screen program file (*.X1)]
DSP0000.BIN File Comment	Add a comment to the screen program file (DSP0000.BIN) written into storage. This comment can be checked via the file's [Property] window.
Automatic upload	(This is not to be selected when transferring a screen program.)
Do Not Overwrite Port No. Table/FROM Backup Area	Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when uploading a screen program from storage.

- When the settings are complete, click [OK]. A "DSP0000.BIN" file is saved to "(access folder)\DSP" on the selected storage.



- Connect the USB flash drive to USB port 1 (W drive) on the X1 series unit. Transfer the screen program using the [Storage Transfer] screen in Local mode.



For details on Local mode screen operations, refer to the X1 Series Hardware Specifications.

## Reading from Storage to a PC

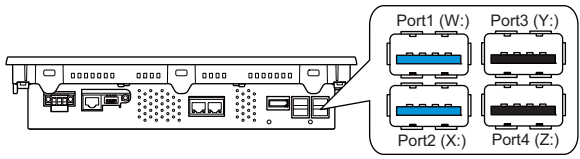
Convert the "DSP0000.BIN" file in the "DSP" folder located in the access folder of the storage back into a screen program (extension ".X1") using the storage manager.

For details, refer to "9.4.3 Conversion of BIN Files" page 9-26.

## 9.5 System Device Memory (\$s)

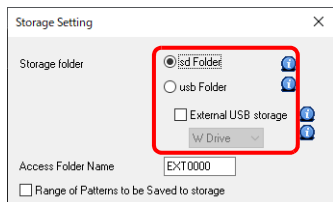
Information about the status and the free space of the storage folders of the X1 series unit are stored in system device memory (\$s).

Address	Description	Internal Storage		External USB Storage	Device Memory Type																														
		sd Folder	usb Folder	USB Storage Device																															
\$s497	Error state of storage	0*1	0*1	0*1																															
	<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>Not connected</td> <td>When [USB storage device] is selected</td> </tr> <tr> <td>5</td> <td>Format error</td> <td></td> </tr> <tr> <td>9</td> <td>JPEG/BMP file read error</td> <td></td> </tr> <tr> <td>12</td> <td>Write error</td> <td></td> </tr> <tr> <td>15</td> <td>Disk error (open failure)</td> <td></td> </tr> <tr> <td>16</td> <td>Read error</td> <td></td> </tr> </tbody> </table>	Value	Description	Remarks		4	Not connected	When [USB storage device] is selected	5	Format error		9	JPEG/BMP file read error		12	Write error		15	Disk error (open failure)		16	Read error													
	Value	Description	Remarks																																
	4	Not connected	When [USB storage device] is selected																																
	5	Format error																																	
	9	JPEG/BMP file read error																																	
	12	Write error																																	
15	Disk error (open failure)																																		
16	Read error																																		
\$s498	Free space on storage device (kB)	-	-	0*1																															
\$s499																																			
\$s500	[Storage Disconnection] switch status	0*1	0*1	0*1																															
	<p>MSB <span style="float:right">LSB</span></p> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p>Reserved for system (set to "0") <span style="margin-left: 200px;">0: Switch OFF (accessing)</span>  <span style="margin-left: 200px;">1: Switch ON (access stopped)</span></p>	15	14	13		12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				
\$s1030	Error state of storage Refer to \$s497.	0	-	-																															
\$s1033	[Storage Disconnection] switch status Refer to \$s500.	0	-	-																															
\$s1035	Error state of storage Refer to \$s497.	-	0*1	0*1																															
\$s1038	[Storage Disconnection] switch status Refer to \$s500.	-	0*1	0*1																															
\$s1050	Background processing flag	0	0	0	← X1																														
	<p>MSB <span style="float:right">LSB</span></p> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p>Reserved for system (set to "0") <span style="margin-left: 100px;">File operation macro command *</span>  <span style="margin-left: 100px;">0: Not processed, 1: Being processed</span></p> <p>Operation log <span style="margin-left: 100px;">Alarm/logging data backup and CSV file output</span>  <span style="margin-left: 100px;">0: Not processed, 1: Being processed</span></p> <p>* COPY_FILE, MOVE_FILE, DEL_FILE, READ_FILE, WRITE_FILE <span style="margin-left: 100px;">Hard copy macro command</span>  <span style="margin-left: 100px;">0: Not processed, 1: Being processed</span></p>	15	14	13		12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				
\$s1051	Background processing completion flag	0	0	0																															
	<p>When processing has been completed (when \$s1050 turns OFF), this turns ON. When the operation has been verified, the user must clear it to zero.</p> <p>MSB <span style="float:right">LSB</span></p> <table border="1"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p>Reserved for system (set to "0") <span style="margin-left: 100px;">File operation macro command *</span>  <span style="margin-left: 100px;">0: Not completed, 1: Completed</span></p> <p>Operation log <span style="margin-left: 100px;">Alarm/logging data backup and CSV file output</span>  <span style="margin-left: 100px;">0: Not completed, 1: Completed</span></p> <p>* COPY_FILE, MOVE_FILE, DEL_FILE, READ_FILE, WRITE_FILE <span style="margin-left: 100px;">Hard copy macro command</span>  <span style="margin-left: 100px;">0: Not completed, 1: Completed</span></p>	15	14	13		12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				

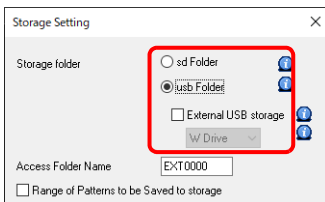
Address	Description	Internal Storage		External USB Storage	Device Memory Type																																
		sd Folder	usb Folder	USB Storage Device																																	
\$s1052	<p>Background processing error flag If an error occurs at the time when processing has been completed (when \$s1050 turns OFF), this turns ON. When the operation has been verified, the user must clear it to zero.</p> <p>MSB <span style="float:right">LSB</span></p> <table border="1" style="width:100%; text-align:center;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p>Reserved for system (set to "0")</p> <p>File operation macro command* 0: Normal, 1: Error</p> <p>Operation log 0: Normal, 1: Error</p> <p>Alarm/logging data backup and CSV file output 0: Normal, 1: Error</p> <p>Hard copy macro command 0: Normal, 1: Error</p> <p>* COPY_FILE, MOVE_FILE, DEL_FILE, READ_FILE, WRITE_FILE</p>	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	○	○	○	← X1
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																						
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																						
\$s2022	<p>Outputs the connection status of USB ports 1 to 4.</p> <p>MSB <span style="float:right">LSB</span></p> <table border="1" style="width:100%; text-align:center;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p>Reserved for system (set to "0")</p> <p>0: Disconnected 1: Connected</p> <p>Port 4 (Z drive)</p> <p>Port 3 (Y drive)</p> <p>Port 2 (X drive)</p> <p>Port 1 (W drive)</p>  <p>* The connection status can also be checked in Local mode. For details, refer to the X1 Series Hardware Specifications.</p>	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	○	← X1
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00																						
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																						

\*1 Information of the storage folder selected at [System Setting] → [Other] → [Storage Setting] → [Storage folder] is stored.

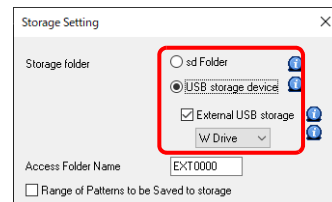
When [sd Folder] is selected



When [usb Folder] is selected



When [USB storage device] is selected



## 9.6 Limitations

### When Using External USB Storage

- Drive letters X to Z are assigned (fixed) to USB ports 1 to 4 of the X1 series unit. Do not use them for any other devices.
  - External drive devices such as DVD drives and HDDs cannot be used.
  - USB hubs and USB reader/writers cannot be used.
  - When multiple USB flash drives are connected simultaneously, initial recognition may take time.
  - Connecting multiple USB flash drives simultaneously or connecting and disconnecting USB flash drives quickly may cause initial recognition operations, such as drive letter assignment, to take time or recognition may fail. Gently connect/disconnect USB flash drives one at a time.
- If a USB flash drive cannot be recognized, disconnect all connected USB flash drives from the X1 series unit and then try reconnecting them.

## **10 Language Changeover**

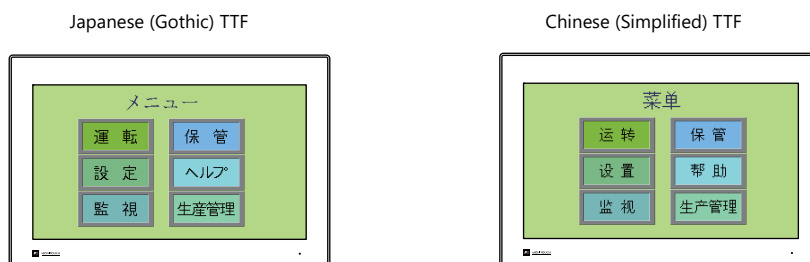
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## 10.1 Overview

### 10.1.1 Fonts

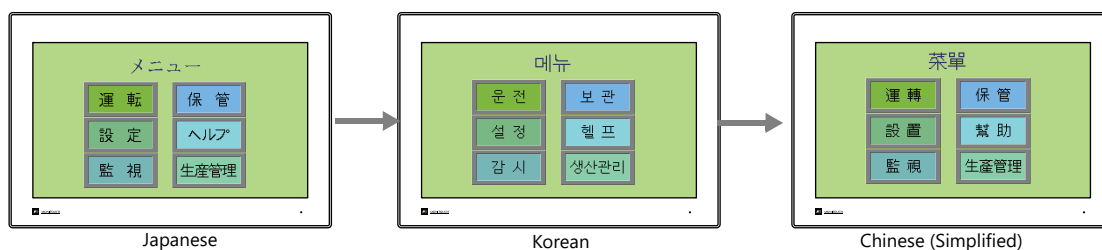
- Select a base language (font) first and then edit the screen using text that can be displayed in the selected font.



For details on font types and supported languages, refer to [“10.1.2 Font Types”](#) page 10-2.

- A maximum of 32 languages can be used on the same screen just by switching the text for display.

Example: Registration of screen program “ABC.X1” in three languages



For details, refer to [“10.1.3 Language Selection”](#) page 10-4.

- Use “Windows fonts” to display two or more languages on a single screen or display Windows-type characters on the screen.



For details on Windows fonts, refer to the V9 Series Operation Manual.

## 10.1.2 Font Types

Fonts are generally divided into three types.

Because the mixed use of fonts is not permitted on the X1 series unit, select one font type in the [System Setting] → [Multi-language Setting] → [Font Setting] window \*1.

However, local screen always uses True type font regardless of the font setting.

Type	Size Specification Method	Features	Image
TrueType font	Point specification	Supports smoothing. Used on the Local mode screen.	8ポイント 運転 MONITOUCH 10ポイント 運転 MONITOUCH 12ポイント 運転 MONITOUCH 16ポイント 運転 MONITOUCH 18ポイント 運転 MONITOUCH 24ポイント 運転 MONITOUCH
Gothic font		Supports smoothing.	8ポイント 運転 停止 モニタッチ 10ポイント 運転 停止 モニタッチ 12ポイント 運転 停止 モニタッチ 16ポイント 運転 停止 モニタッチ 18ポイント 運転 停止 モニタッチ 24ポイント 運転 停止 モニタッチ  There are automatic/manual setting restrictions depending on the function.
Bitmap font	XY magnification factor specification	Designed in sizes of 16 × 16 dots and 32 × 32 dots (two-byte characters). Smoothing not supported.	1×1 運転 MONITOUCH 2×2 運転 MONITOUCH 3×3 運転 MONITOUCH



### Windows Fonts

No font data is stored on MONITOUCH. Fonts used on Windows, such as "Times New Roman" or "Arial", are used as image data. Settings can be configured for each item. For details, refer to the V9 Series Operation Manual.

- \*1 Stroke fonts are not supported. Although selection is possible on the [Font Setting] window, TrueType fonts will be used instead on the X1 unit.
- \*2 Of the TrueType fonts, only Japanese, English, Chinese (Simplified), and Chinese (Traditional) support vector rendering. For details on vector rendering, refer to "8.6 Vector Rendering".

## Supported Language List

The following table lists the fonts and corresponding languages supported by the X1 series.

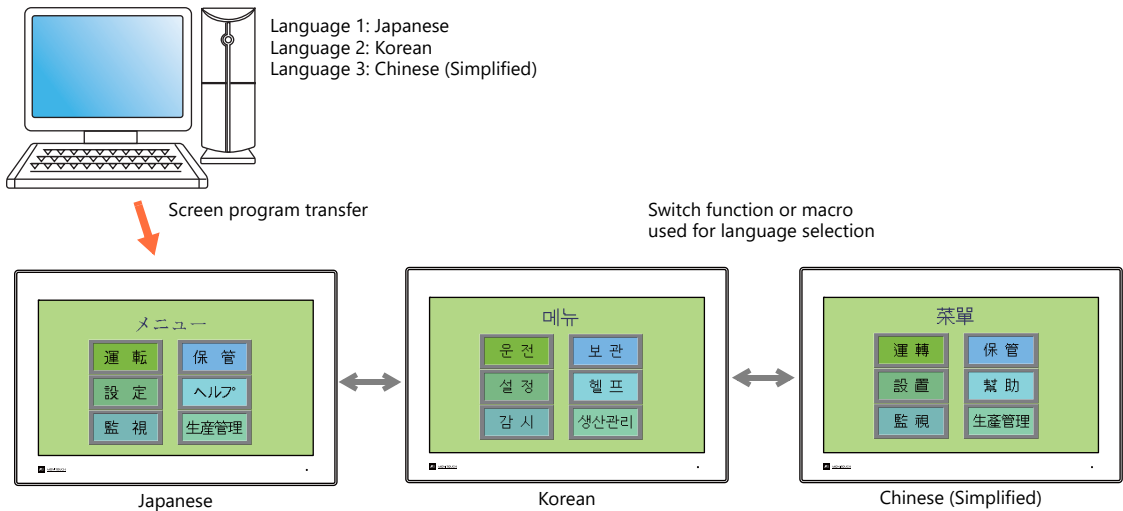
Font Setting *1	Supported Language	Supported Character Code	Remarks	
TrueType font	Japanese (Gothic) TTF	Japanese, English	JIS level-1 to level-4 + ANK code	
	Japanese Times TTF			
	English/Western Europe Gothic TTF	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faroese, French	ISO-8859-1: Latin1 (Extended ASCII code)	
	English/Western Europe Times TTF			
	Chinese (Traditional) TTF	Chinese (traditional), English	BIG5 code (A141 to F9FE) + ASCII code	A344 to A373 not displayable
	Chinese (Simplified) TTF	Chinese (simplified), English	GB2312 code (A1A1 to F7FE) + ASCII code	A021 - A07E A6A1 - A6B8 A6C1 - A6D8 A7A1 - A7C0 A7D1 - A7F1 A8BB, A8BD, A8BE, A8C0 not displayable
	Korean TTF	Hangul, English	KS code (A1A1 to FDFE) + ASCII code	A2E6 and A2E7 not displayable Vector rendering not supported
	Central Europe TTF	Croatian, Czech, Hungarian, Polish, Hrvatska (Croatian), Romanian, Slovakian, Slovene	CP1250 code	Vector rendering not supported
	Cyrillic TTF	Russian, Ukrainian, Kazakh, Bulgarian, Uzbek, Azerbaijani	CP1251 code	
	Greek TTF	Greek	CP1253 code	
	Turkish TTF	Turkish	CP1254 code	
Baltic TTF	Estonian, Latvian, Lithuanian	CP1257 code		
Bitmap font	Japanese	Japanese, English	JIS level-1 and level-2 + ANK code	Vector rendering not supported
	Japanese 32		JIS level-1 + ANK code	
	English/Western Europe	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faroese, French	ISO-8859-1: Latin1 (Extended ASCII code)	
	Chinese (Traditional)	Chinese (traditional), English	BIG5 code (A141 to C67E) + ASCII code	
	Chinese (Simplified)	Chinese (simplified), English	GB2312 code (A1A1 to FEFE) + ASCII code	
	Korean	Hangul, English	KS code (A1A2 to C8FE) + ASCII code	
	Central Europe	Croatian, Czech, Hungarian, Polish, Hrvatska (Croatian), Romanian, Slovakian, Slovene	CP1250 code	
			ISO code (ISO-8859-2: Latin2) *2	
	Cyrillic	Russian, Ukrainian, Kazakh, Bulgarian, Uzbek, Azerbaijani	CP1251 code	
			ISO code (ISO-8859-5: Latin5) *2	
	Greek	Greek	CP1253 code	
			ISO code (ISO-8859-7: Latin7) *2	
	Turkish	Turkish	CP1254 code	
ISO code (ISO-8859-9: Latin9) *2				
Baltic	Estonian, Latvian, Lithuanian	CP1257 code		
Gothic font	Gothic	Japanese, English	JIS level 1 + level 2 + ANK code	Vector rendering not supported
	Gothic (IBM Extended Character)	Japanese, English	JIS level 1 + level 2 + IBM extended code (FA40 to FC4B) + ANK code	
	English/Western Europe HK Gothic	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faeroese, French	ISO-8859-1: Latin1 (Extended ASCII code)	
	English/Western Europe HK Times			

\*1 The mixed use of fonts is not possible.

\*2 Select the [ISO Code] checkbox when selecting the corresponding fonts in the [System Setting] → [Multi-language Setting] → [Font Setting] window.

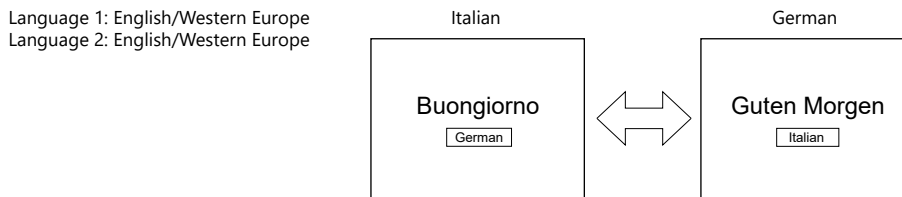
### 10.1.3 Language Selection

- All required fonts can be stored on MONITOUCH in advance and then displayed by changing between character sets.



☞ For details on settings, refer to [“10.2 Setting Procedure” page 10-5.](#)

- The text for display can be changed even when using a single font, such as German ↔ Italian or Japanese ↔ English. Using only one font reduces the space required by the screen program.



☞ For details on languages that are supported by each font, refer to [“Supported Language List” page 10-3.](#)

☞ For details on settings, refer to [“10.2 Setting Procedure” page 10-5.](#)

- When using a Windows font, it is possible to change only the text. The text for display can be changed using a single font.

☞ For details on Windows fonts, refer to the V9 Series Operation Manual.

- To change the language in the RUN mode, use a switch with [Function] set to “Language changeover” or use the “CHG\_LANG” macro command.

☞ For details, refer to [“10.2.3 Language Selection” page 10-12.](#)

- The following methods are available for language editing.

☞ For details, refer to [“10.2.2 Language Editing” page 10-6.](#)

☞ For details, refer to [“10.4 Convenient Editing Procedures” page 10-19.](#)

## 10.2 Setting Procedure

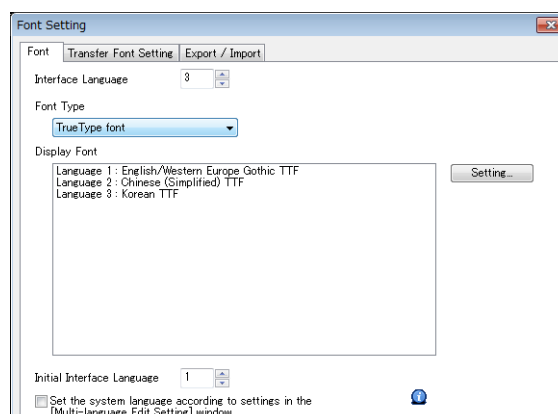
This section describes the procedure for configuring settings that allow changing languages that use different fonts when in RUN mode.

(The procedure is explained assuming that the setting for Language 1 has been completed.)

1. Font settings (refer to [page 10-5](#))
2. Editing of each language (refer to [page 10-6](#))
3. Language selection using the switch function or "CHG\_LANG" macro command (refer to [page 10-12](#))

### 10.2.1 Font Setting

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.
2. Set a value for [Interface Language]. (Example: set "3" to allow changing between three languages.)
3. Set [Font Type] to "TrueType font" and set the languages to be displayed.
  - Example 1: Changing between Japanese, Chinese (Simplified) and Korean
    - Language 1: Japanese (Gothic) TTF
    - Language 2: Chinese (Simplified) TTF
    - Language 3: Korean TTF
  - Example 2:
    - Changing between German and Italian
      - Language 1: English/Western Europe Gothic TTF
      - Language 2: English/Western Europe Gothic TTF
    - Changing between Japanese and English
      - Language 1: Japanese (Gothic) TTF
      - Language 2: Japanese (Gothic) TTF
4. Select a language number for [Initial Interface Language] so that the corresponding language is displayed when a screen program is transferred.



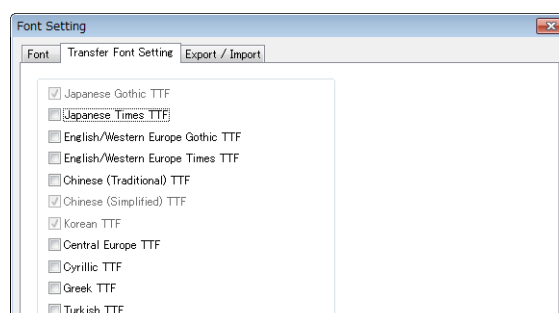
This completes the necessary settings.



#### Transfer font setting

Select the checkboxes of the fonts required on the X1 series unit. More fonts selected for transfer results in less capacity available for the screen program.

Do not select fonts that are not necessary.



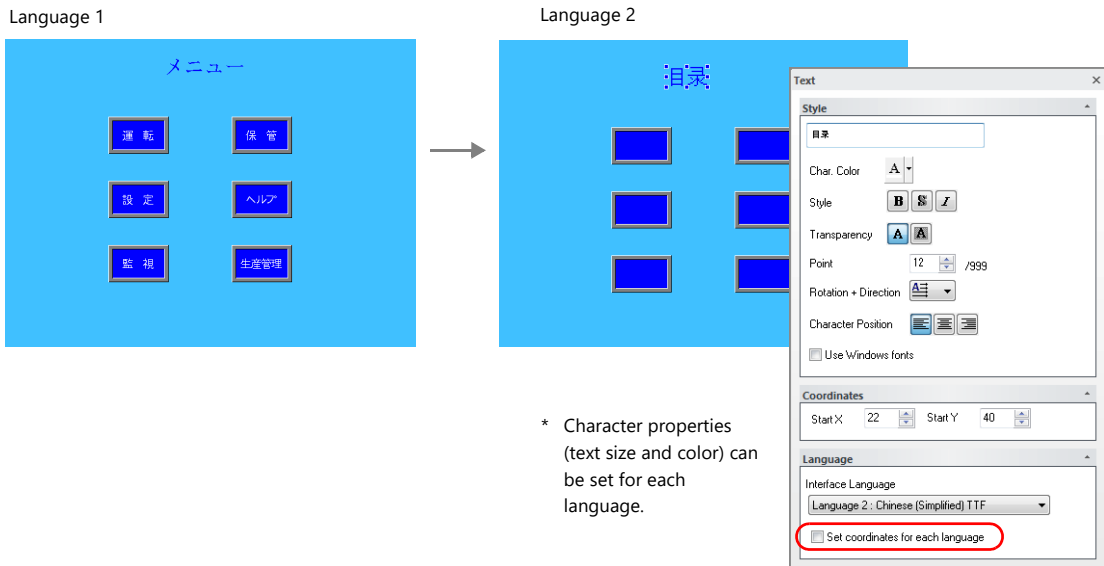
## 10.2.2 Language Editing

This section explains the multi-language editing procedure assuming that the version of Microsoft Windows on the PC used is capable of editing the required foreign languages. There are three methods for editing languages.

\* For details on the settings and notes for editing foreign languages on a Japanese version of Microsoft Windows, refer to the V9 Series Operation Manual.

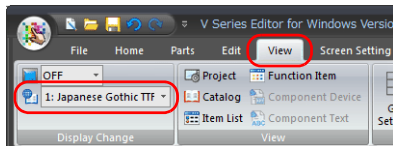
### A. Directly Edit Items

By specifying the interface language number on the [Language] changing menu, text for Language 2 and later can be edited on the screen in the same way as Language 1.

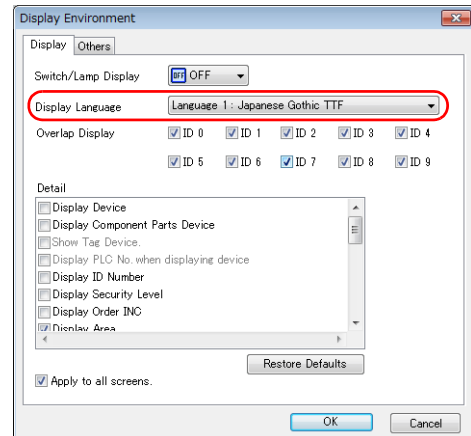


\* The interface language number can also be changed using the [Display Language] drop-down menu.

- [View] → [Display Change]



- [View] → [Display Environment]



### Checking the layout

After editing, always check the layout of each language for problems using the [Language] changing menu.

Character properties can be set for each language.

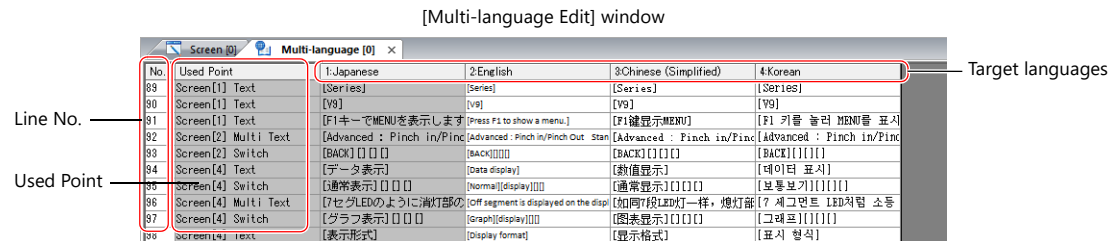
The point size and color settings can be changed for specific languages.

## B. Editing in the [Multi-language Edit] Window

Display the text in the screen program edited using Language 1 in the [Multi-language Edit] window and directly enter the desired text in another language.

Text can be copied and pasted between the [Multi-language Edit] window and Excel (pasted as "Unicode text" in Excel).

Editing location: [Home] → [Registration Item ▼] → [Multi-language]

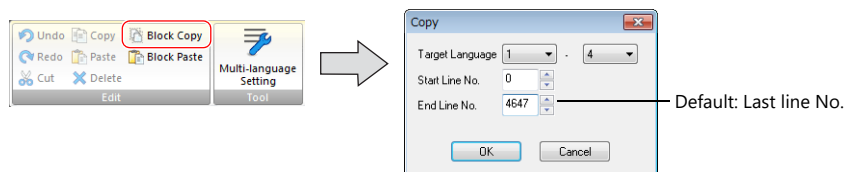


Language 1 cannot be edited in the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

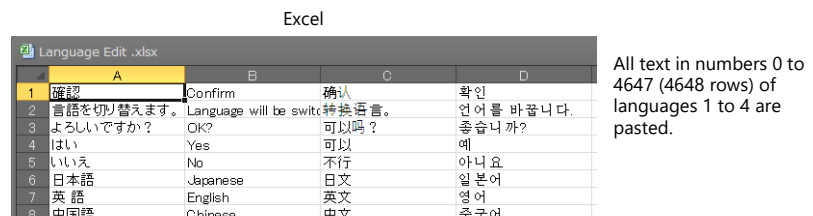
- \* The [Multi-language Edit] window can be used to register up to 1000 lines (No. 0 to 999) per sheet. When batch copying over 1000 lines (from the second sheet onwards) for editing in Excel, use the following procedure.

Example: Example: Batch copy of languages 1 to 4, numbers 0 to 4647 (4648 rows) in the [Multi-language Edit] window

- 1) Click [Edit] → [Block Copy]. The [Copy] window is displayed. Specify target languages and start/end line numbers to copy, and click the [OK] button.



- 2) Select a cell in Excel and paste.



\* If text cannot be pasted correctly, click [Paste Special] and select [Paste As: Unicode Text] to paste. Default: Unicode text

- 3) After editing in Excel, select the multi-language columns for Language 2 through 4 by dragging and copy them.



Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

- 4) Click [Edit] → [Block Paste] in the [Multi-language Edit] window in V-SFT to display the [Paste] dialog. Select the languages for pasting and the starting row number, and click [OK].



This completes the editing.  
After editing, always check the layout of each language for problems using the [Language] changing menu.  
For details, refer to [page 10-6](#).

## C. Export / Import

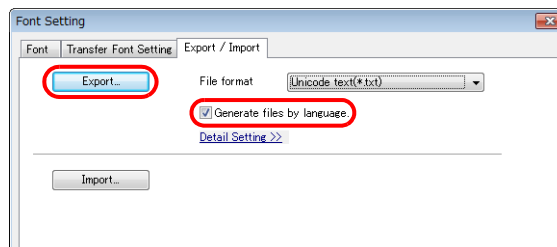
Export and import can be performed by compiling all languages in a text file per language.

Using this function allows text to be imported after undergoing translation and editing by viewing multiple languages side by side on an Excel spreadsheet.

### Outputting a File for Each of the Languages for Switching

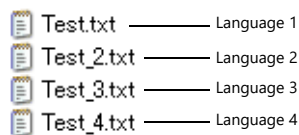
#### Export procedure

1. Select [System Setting] → [Multi-language Setting] to display the [Font Setting] window and click the [Import/Export] tab.
2. Configure the settings as shown below and click [Export].



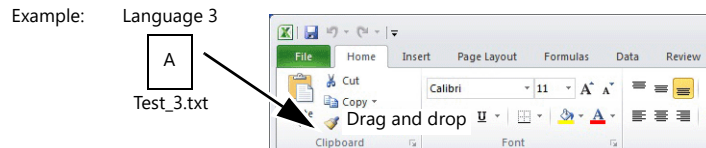
To export to CSV files instead of Unicode text files, select "\*.csv" for [File format].

3. The [Save As] window is displayed. Enter a filename and click [Save] to output text files.



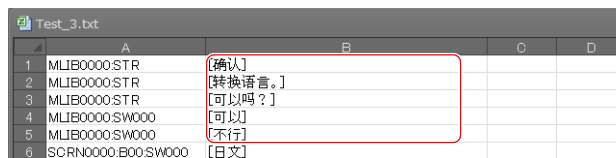
The same number of files are created as there are languages.

4. Start Excel and drag and drop the exported text into the Excel window to open it.



Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

5. Register the text in square brackets in column B.



Do not edit column A. Also, do not delete any square brackets in column B. If these are edited or deleted, file import will end in failure.

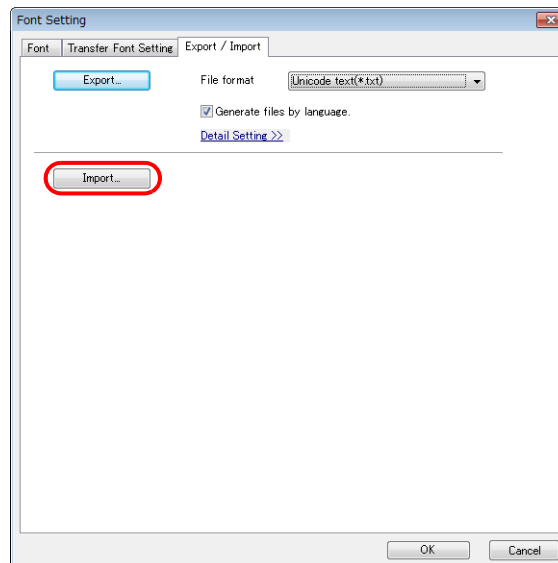
6. After editing, click [File] → [Save As]. Select "Unicode Text (\*.txt)" for [Save as type] and save the file using the same filename.

This completes the necessary settings.

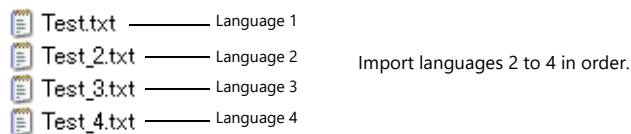


## Import procedure

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.
2. Display the [Export/Import] tab and click the [Import] button.



3. The [Open] window is displayed.  
Select "Unicode text (\*.txt)" for [Save as type] and open each file one at a time.



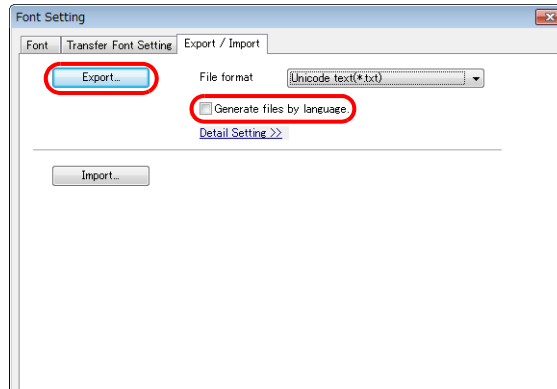
Be sure to save the files for languages 1 to 4 in the same place and using the original filenames. If any file is renamed or the Language 1 file is edited or deleted, file import will end in failure.  
 The Language 1 file cannot be imported.

This completes the file importing process.  
 After editing, always check the layout of each language for problems using the [Language] changing menu.  
 For details, refer to [page 10-6](#).

## Outputting All Languages to a Single File

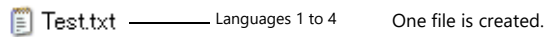
### Export procedure

1. Select [System Setting] → [Multi-language Setting] to display the [Font Setting] window and click the [Import/Export] tab.
2. Configure the settings as shown below and click [Export].



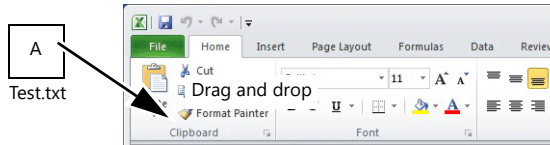
To export to CSV files instead of Unicode text files, select "\*.csv" for [File format].

3. The [Save As] window is displayed.  
Enter a filename and click [Save] to output text files.



4. Start Excel and drag and drop the exported text into the Excel window to open it.

Example: Languages 1 to 4



Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

5. Register the text in square brackets in column C, D, and E (red frame).

	A	B	C	D	E
1	<< header start -->>		Language 2	Language 3	Language 4
2	Export Multi Languages Text List				
3	Ver:1.0	Info:0,1,1,1,1			
4	Language:	1:Japanese	2:English	3:Chinese (Simplified)	4:Korean
5	<<-- header end -->>				
6	MUB0000:STR	[確認]	[Confirm]	[확인]	[확인]
7	MUB0000:STR	[言語を切り替えます。]	[Language will be switched.]	[언어를 바꿉니다.]	[언어를 바꿉니다.]
8	MUB0000:STR	[よろしいですか?]	[OK?]	[可以吗?]	[중요니까?]
9	MUB0000:SW000	[はい]	[Yes]	[可以]	[예]
10	MUB0000:SW000	[いいえ]	[No]	[不行]	[아니요]
11	SOP00000:END:SW000	[日本語]	[English]	[中文]	[이보러]



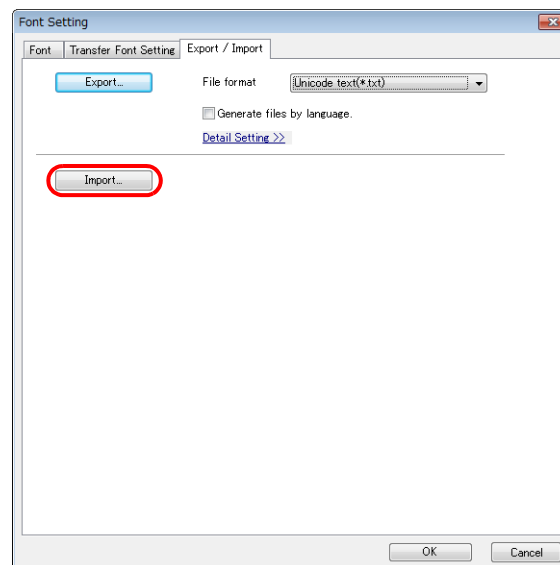
Do not edit the first to fifth rows (header) and columns A/B (language 1). Also, do not delete any square brackets from column C, D, or E. If these are edited or deleted, file import will end in failure.

6. After editing, click [File] → [Save As].  
Select "Unicode Text (\*.txt)" for [Save as type] and save the file using the same filename.

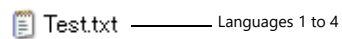
This completes the necessary settings.

## Import procedure

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.
2. Display the [Export/Import] tab and click the [Import] button.



3. The [Open] window is displayed.  
Select "Unicode text (\*.txt)" for [Save as type] and open the file.



This completes the file importing process.

After editing, always check the layout of each language for problems using the [Language] changing menu.

For details, refer to [page 10-6](#).

## 10.2.3 Language Selection

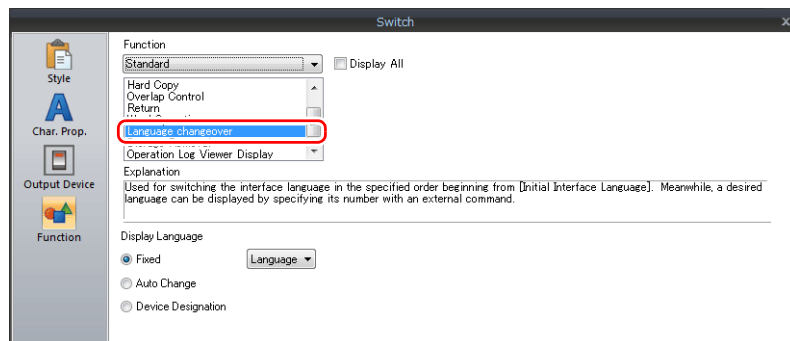
There are two ways to change the language.  
Use either a switch function or macro command.

### Switch Function

The interface language can be changed using a switch with the function [Language changeover].  
Each time a [Language changeover] switch is pressed, the interface language switches in the specified order beginning from the [Initial Interface Language]. A desired language can also be displayed by specifying its number with an external command.

### Location of Settings

Switch settings window → [Function] → [Function] → [Language changeover]



Item	Description
Fixed	Display the interface language of the specified language number. Language 1 to 32
Auto Change	Change the interface language in the specified order beginning from the [Initial Interface Language] set in the [Font Setting] window. Languages that are not selected in the window will not be displayed.
Device Designation	Display the interface language of the number stored at the specified device memory. 0: Language 1 1: Language 2 2: Language 3 : 31: Language 32



If a nonexistent language number is specified for display, an error beep sounds and no action takes place. The number of interface languages can be checked at [System Setting] → [Multi-language Setting] → [Font Setting] window.

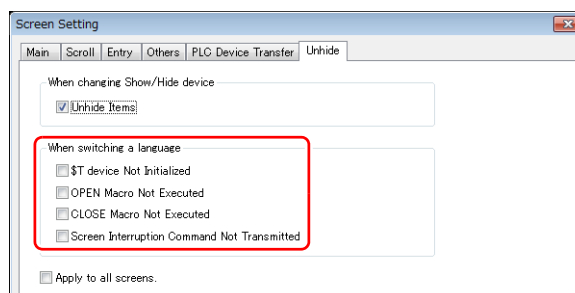
### Redraw Timing

When the interface language is switched, the screen is redrawn. The following actions also take place at the same time.

- Open macro, close macro (screen, multi-overlap library)
- Cycle macro (screen)
- \$T device memory zero clear (screen)
- Screen interrupt command transfer (PLC type: universal serial) (screen)

Prevent execution of these operations when redraw occurs by selecting the checkboxes as required.

Location of settings: [Screen Setting] → [Screen Setting] → [Unhide]



## SYS (CHG\_LANG) Macro Command

The "SYS (CHG\_LANG)" macro command can be used to change the interface language. This command is useful when changing the language using the ON macro of a switch or an external command.

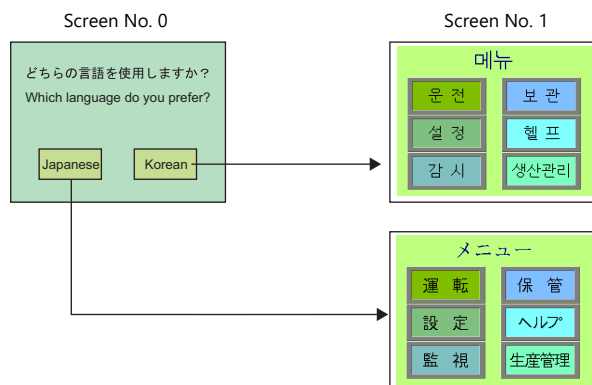


The language is switched over when the screen is changed after the macro command has been executed. For switching the language on the same screen, use the "RESET\_SCRN" macro command. For details on macro commands, refer to the V9 Series Macro Reference Manual.

### Setting Example

Example: Changing the language by switching the screen

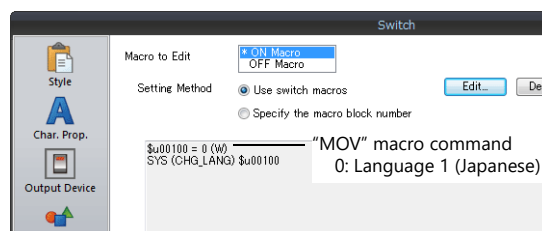
Language 1: Japanese  
Language 2: Korean



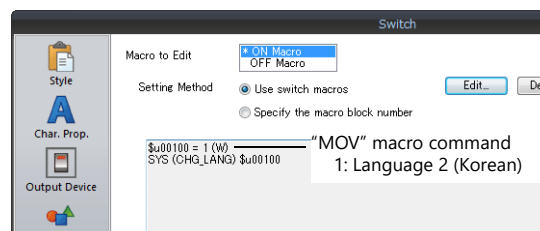
With either switch, the interface language can be switched over when screen No. 1 is displayed.

1. Configure the switch ON macro as shown below.

- "Japanese" switch ON macro



- "Korean" switch ON macro



2. Set the function of each switch to "Language changeover: 1".

This completes the necessary settings.

### Detail

#### Device used

	Internal Device	PLC1 to PLC8 Devices	Memory card	Constant
F1	⊙			

○: Setting enabled (indirect designation disabled) ⊙: Setting enabled (indirect designation enabled)

#### Range

	Value	Remarks
F1	0: Language 1 1: Language 2 : 31: Language 32	Although the setting range for [Interface Language] in the [System Setting] → [Multi-language Setting] → [Font Setting] window and [Display Language] in the [Display Environment] window is "1" to "32", the range for "CHG_LANG" is "0" to "31".

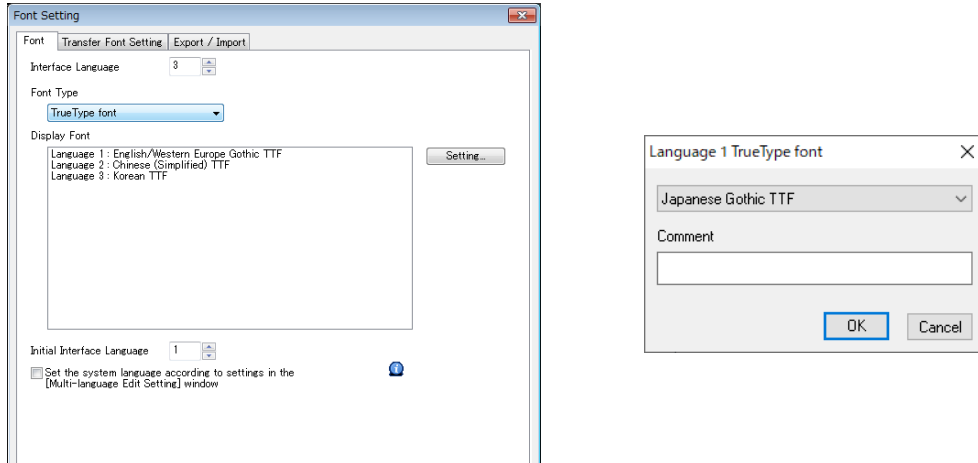
#### Editing procedure

For details on macro editing, refer to the V9 Series Macro Reference Manual.

## 10.3 Detailed Settings

### 10.3.1 Font Setting

Set the number of languages and fonts for display on the X1 series app. \*1  
 Location of settings: [System Setting] → [Multi-language setting].



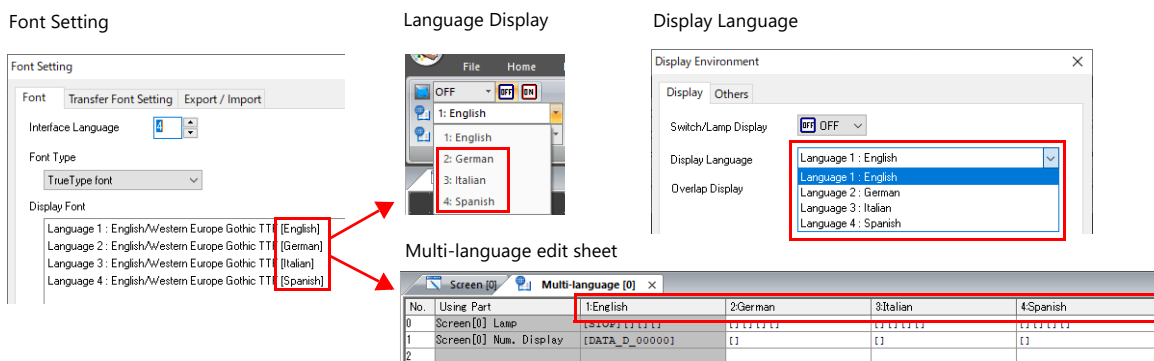
Item	Description															
Interface Language	Set the number of interface languages. 1 to 32 Example: [5]: Languages 1 to 5															
Font Type	Select either [TrueType font], [Bitmap font], or [Gothic font]. *2 *3															
Setting	Set the languages to use and comments *4 respectively.															
Initial Interface Language	Select the language to be displayed immediately after screen program transfer. 1 to 32 Operation is as follows after transfer. <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Operation</th> <th>Display Language</th> </tr> </thead> <tbody> <tr> <td>Power ON</td> <td>The language displayed when the power was turned OFF is displayed.</td> </tr> <tr> <td>Switching from RUN mode to Local mode</td> <td>The language used in RUN mode is displayed.</td> </tr> <tr> <td>Switching from Local mode to RUN mode</td> <td>The language used in Local mode is displayed. *5</td> </tr> <tr> <td>In Local mode during screen program transfer</td> <td rowspan="2">The language specified for [Initial Interface Language] in the screen program is displayed.</td> </tr> <tr> <td>In RUN mode during screen program transfer</td> </tr> <tr> <td>Displaying System Configurator from Local mode</td> <td>The interface language selected in System Configurator is displayed.</td> </tr> <tr> <td>Switching from System Configurator to the X1 app</td> <td>The language that was last used on the X1 app is displayed.</td> </tr> </tbody> </table>	Operation	Display Language	Power ON	The language displayed when the power was turned OFF is displayed.	Switching from RUN mode to Local mode	The language used in RUN mode is displayed.	Switching from Local mode to RUN mode	The language used in Local mode is displayed. *5	In Local mode during screen program transfer	The language specified for [Initial Interface Language] in the screen program is displayed.	In RUN mode during screen program transfer	Displaying System Configurator from Local mode	The interface language selected in System Configurator is displayed.	Switching from System Configurator to the X1 app	The language that was last used on the X1 app is displayed.
Operation	Display Language															
Power ON	The language displayed when the power was turned OFF is displayed.															
Switching from RUN mode to Local mode	The language used in RUN mode is displayed.															
Switching from Local mode to RUN mode	The language used in Local mode is displayed. *5															
In Local mode during screen program transfer	The language specified for [Initial Interface Language] in the screen program is displayed.															
In RUN mode during screen program transfer																
Displaying System Configurator from Local mode	The interface language selected in System Configurator is displayed.															
Switching from System Configurator to the X1 app	The language that was last used on the X1 app is displayed.															
Set the system language according to settings in the [Multi-language Edit Setting] window (setting available for two or more interface languages)	Select this checkbox when setting the interface languages of the following screens. (This setting is convenient when all the same fonts are selected using [Setting...]) The supported languages are Japanese, English/Western Europe, Chinese (Simplified), Chinese (Traditional), and Korean. Local screen, error message screen, operation log viewer, video player The following settings are required. <ul style="list-style-type: none"> <li>• Set each language at [Home] → [Registration Item] → [Multi-language] → [Multi-language Edit] → [Multi-language Edit Setting].</li> <li>• Select the checkboxes of the interface languages at [System Setting] → [Multi-language Setting] → [Transfer Font Setting].</li> </ul>															

\*1 The interface language of Windows functions such as the web browser are set using System Configurator. For details on System Configurator, refer to the X1 Series Hardware Specifications.

\*2 Stroke fonts are not supported. Although selection is possible at [Font Type], TrueType fonts will be used instead on the X1 unit.

\*3 Of the TrueType fonts, only Japanese, English, Chinese (Simplified), and Chinese (Traditional) support vector rendering. For details on vector rendering, refer to "8.6 Vector Rendering".

- \*4 Comments are displayed on the [Language Display] menu, multi-language edit sheets, etc.  
This is useful when editing multiple languages with the same font setting.



#### \*5 Exceptions

- Example 1: When the same font is registered multiple times, the language number displayed before switching to Local mode is displayed.

[Interface Language]: 2, [Transfer Font Setting]: Japanese (Gothic) TTF, [Initial Interface Language]: 1

- Language 1: Japanese (Gothic) TTF
- Language 2: Japanese (Gothic) TTF

- Example 2: In the following case, the lowest language number in the font settings is displayed.

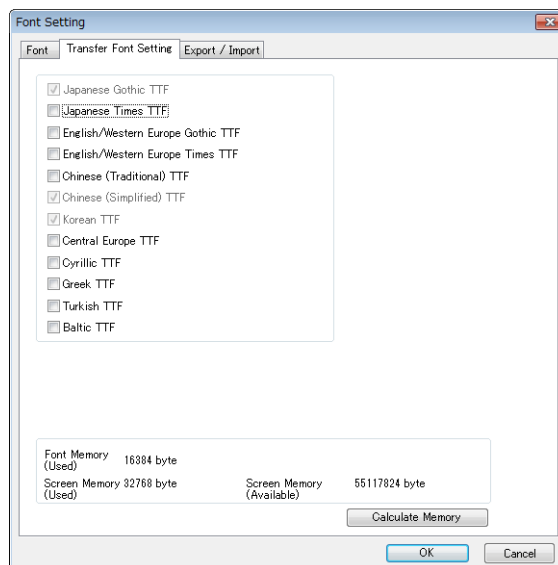
[Interface Language]: 3, [Transfer Font Setting]: Japanese (Gothic) TTF, English/Western Europe Gothic TTF, Central Europe TTF, [Initial Interface Language]: 1

- Language 1: Japanese (Gothic) TTF
- Language 2: English/Western Europe Gothic TTF
- Language 3: Central Europe TTF

Operation example:

RUN (Japanese (Gothic) TTF)  
 ↓  
 Local mode (switch from Japanese to English)  
 ↓  
 RUN (Language 2 is displayed)

### 10.3.2 Transfer Font Setting



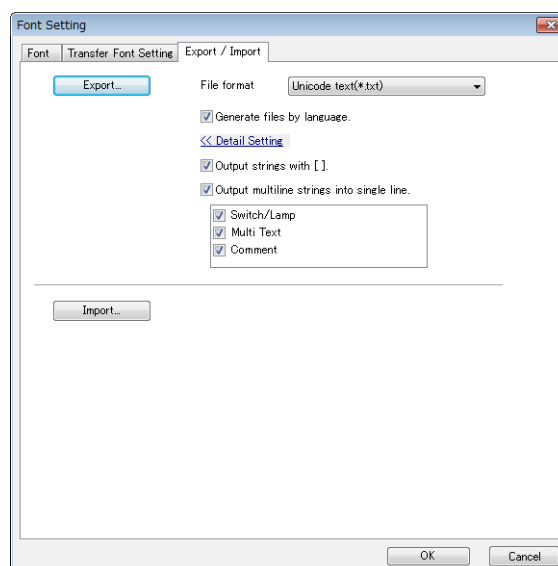
Item	Description
Transfer Font Setting <sup>*1</sup>	Select the checkboxes of the fonts required on the X1 series unit. * More fonts selected for transfer results in less capacity available for the screen program. If capacity is insufficient, do not select unnecessary fonts.
Font Memory (Used)	Displays the total memory size used for the currently selected fonts for transfer.
Screen Memory (Used)	Displays the size of the screen program currently being created.
Screen Memory (Available)	Displays the space available for the screen program.
Calculate Memory	Recalculate the volume of data from the current settings.









\*1 Languages that can be displayed in Local mode are listed below. Which languages are available for display is determined by selecting the corresponding checkboxes on the [Transfer Font Setting] tab.

Transfer Font Setting	Local Mode
Japanese (Gothic) TTF	Japanese, English
Japanese Times TTF	
English/Western Europe Gothic TTF	English
English/Western Europe Times TTF	
Chinese (Traditional) TTF	Chinese (Traditional), English
Chinese (Simplified) TTF	Chinese (Simplified), English
Korean TTF	Korean, English
Central Europe TTF	English
Cyrillic TTF	
Greek TTF	
Turkish TTF	
Baltic TTF	



## 10.3.3 Import and Export




Item	Description									
Export	Use this button when editing text for a language other than Language 1 in another application. For details, refer to <a href="#">page 10-8</a> .									
File format	Select the type of the file to be exported.									
Generate files by language.	<p>Set the file creation method used in exporting.</p> <ul style="list-style-type: none"> <li>Selected The same number of files are created as there are languages.</li> <li>Unselected One file is created.</li> </ul> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Test.txt — Language 1</p>  <p>Test_2.txt — Language 2</p>  <p>Test_3.txt — Language 3</p>  <p>Test_4.txt — Language 4</p> </div> <div style="text-align: center;">  <p>Test.txt — Languages 1 to 4</p> </div> </div>									
Output strings with [.]	<p>Selected Add square brackets to text in output files.</p> <p>Unselected Delimit output with commas. When a file is opened in Excel, some text like the following will not be imported correctly.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Characters on V-SFT</th> <th>Output File (Standard cell format)</th> <th></th> </tr> </thead> <tbody> <tr> <td>0123</td> <td>123</td> <td>← Leading zeros dropped</td> </tr> <tr> <td>+BK</td> <td>#NAME?</td> <td>← Not recognized as a character string</td> </tr> </tbody> </table>	Characters on V-SFT	Output File (Standard cell format)		0123	123	← Leading zeros dropped	+BK	#NAME?	← Not recognized as a character string
Characters on V-SFT	Output File (Standard cell format)									
0123	123	← Leading zeros dropped								
+BK	#NAME?	← Not recognized as a character string								
Output multiline strings into single line.	<p>Set how multiple lines of text located on a switch or lamp are output.</p> <p>Selected Lines of text are output in one cell with the line feed code “\n”.</p> <p>Unselected Text is output line by line in separate cells.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Switch</th> <th>Checkbox</th> <th>Output Result</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;"></td> <td>Selected</td> <td>[Error \n Screen]</td> </tr> <tr> <td>Unselected</td> <td>[Error] [Screen]</td> </tr> </tbody> </table>	Switch	Checkbox	Output Result		Selected	[Error \n Screen]	Unselected	[Error] [Screen]	
Switch	Checkbox	Output Result								
	Selected	[Error \n Screen]								
	Unselected	[Error] [Screen]								
Import	Use this button to import an exported file. For details, refer to <a href="#">page 10-8</a> .									

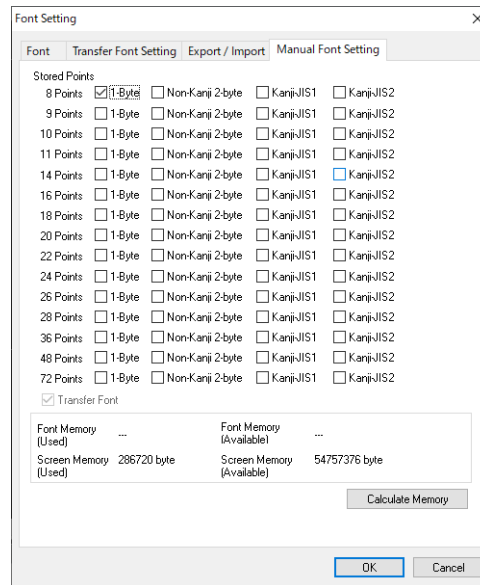
## 10.3.4 Manual Font Setting

[Manual Font Setting] tab appears when gothic font is selected.

There are two types of Gothic fonts: automatic fonts and manual fonts.

Items that are subject to manual fonts setting are mainly "Text display" and "Message display", which needs to sets the size to use on the screen.

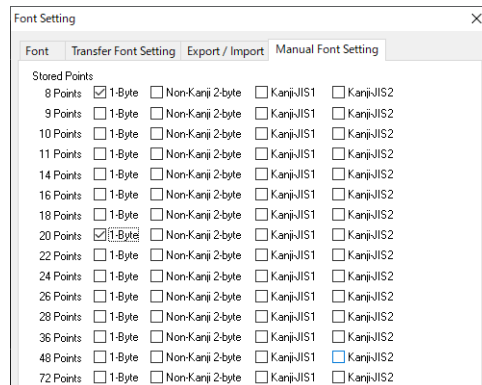
 Refer to "V9 Operation Manual 10. Font"



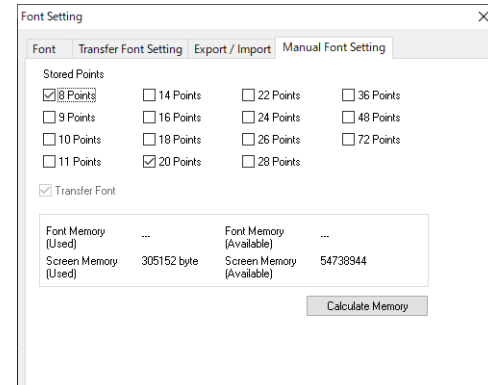
### For language changeover:

The [1-Byte] setting of each point of the language 1 (e.g.: Gothic) is directly reflected to each setting of the language 2 (e.g.: English/Western Europe HK Gothic). Note that if you change the setting in one, the setting in the other also changes.

Language 1:



Language 2:



### About automatic fonts

For language changeover, the automatic font of the language 1 is automatically transferred to the X1 when the screen program is transferred, but the automatic font is not recognized in the language 2 or later.

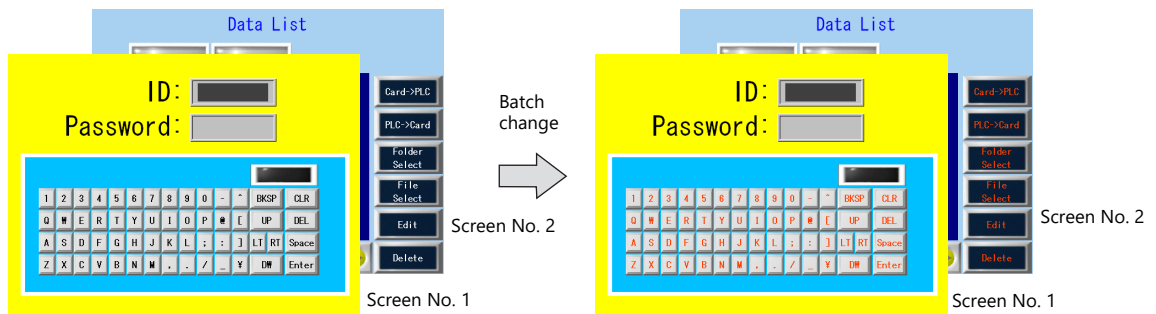
For the language 2 and later, consider the automatic fonts as the manual fonts and set it by "Manual Font Settings".

## 10.4 Convenient Editing Procedures

### 10.4.1 Multi-language Batch Change

#### Overview

Item properties (text color etc.) for multiple languages from language 1 to 32 can easily be changed at once.

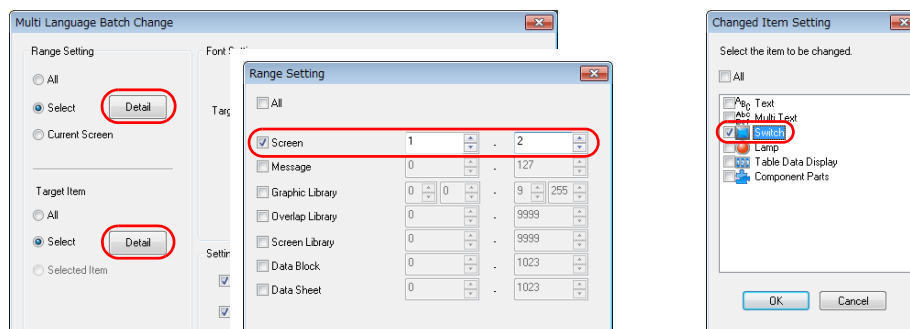


#### Setting Example

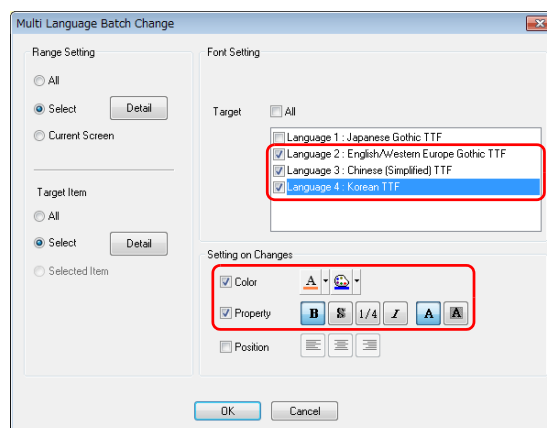
The procedure is explained with an example shown below.

Example: Changing the switch properties on screen numbers 1 and 2  
Text color: black to orange, text property: standard to boldface

1. Select [Tool] → [Multi Language] → [Multi Language Batch Change] to display the [Multi Language Batch Change] window.
2. Click the [Select] → [Detail] button under [Range Setting] and specify a screen range of 1 to 2. Click the [Select] → [Detail] button under [Target Item] and select the [Switch] checkbox.



3. Select the [Target] checkbox under [Font Setting].
4. In the [Setting on Changes] area, select the [Color] checkbox and select orange. Also select the [Property] checkbox and select boldface.



5. Review the settings made in the previous steps, and click [OK].

The settings are updated.

## 10.4.2 Multi-language Batch Copy

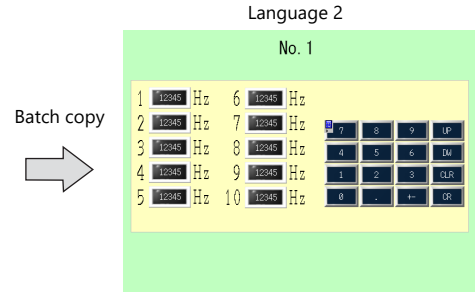
### Overview

If exactly the same text, such as text on switches and item numbers, as language 1 is to be used, it can be easily copied at once.

- Before copying



- After copying



### Setting Example

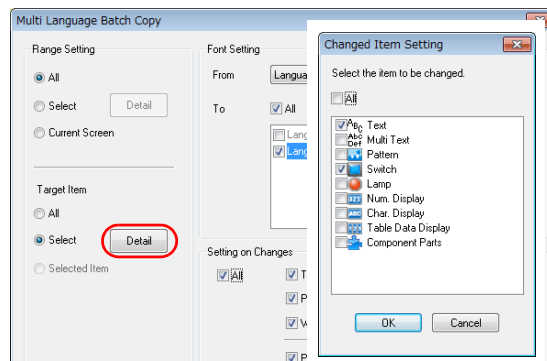
The procedure is explained with an example shown below.

In this example, the text and characters on the switches placed on all screens in language 1 are copied to screens in language 2.

Language 1: Japanese (Gothic) TTF

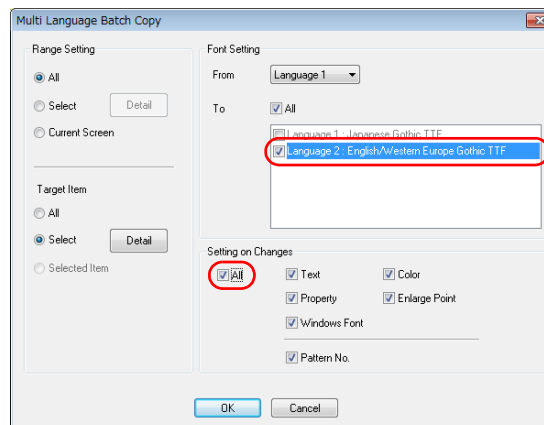
Language 2: English/Western Europe Gothic TTF

1. Select [Tool] → [Multi Language] → [Multi Language Batch Copy] to display the [Multi Language Batch Copy] window.
2. Select [All] under [Range Setting] and set the target items to [Select] → [Detail] → [Text] and [Switch].



3. In the [Font Setting] area in the [Multi Language Batch Copy] window, select [Language 1] for [From] and [Language 2] for [To].

4. Batch copy in this example targets all properties. In the [Setting on Changes] area, select the [All] checkbox.



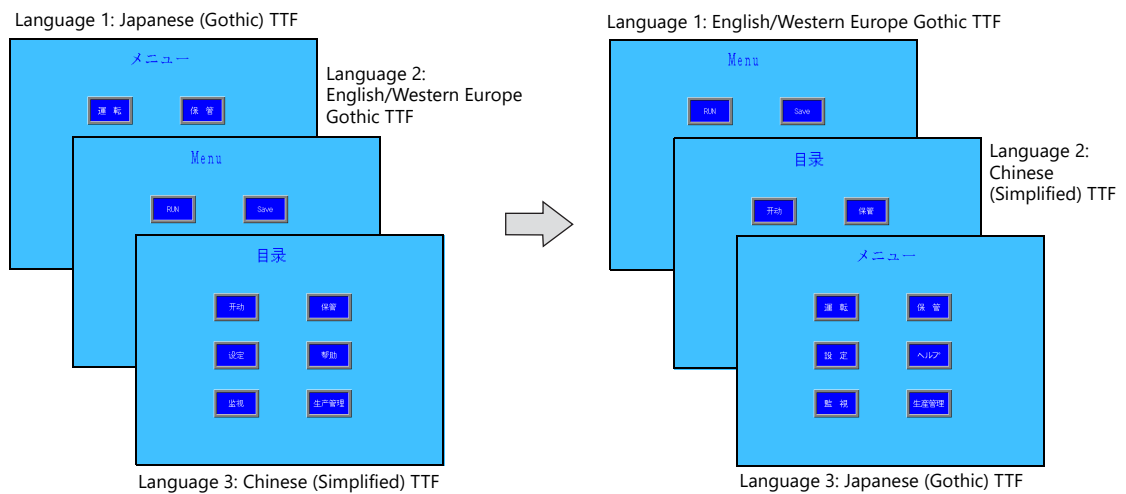
5. Review the settings made in the previous steps, and click [OK].

The settings are updated.

## 10.4.3 Multi-language Reordering

### Overview

Interface languages from language 1 to language 32 can be reordered easily.

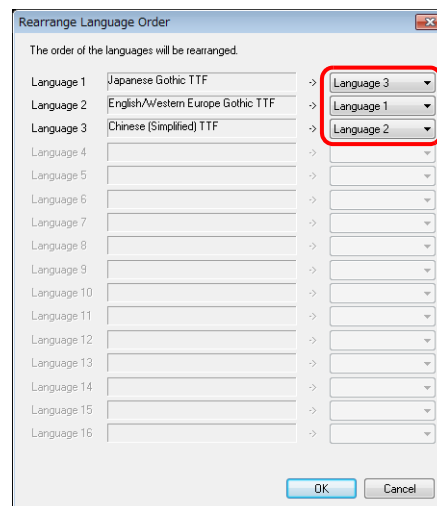


### Setting Example

The procedure is explained with the settings shown below as an example.

Language 1: Japanese (Gothic) TTF → Language 1: English/Western Europe Gothic TTF  
 Language 2: English/Western Europe Gothic TTF → Language 2: Chinese (Simplified) TTF  
 Language 3: Chinese (Simplified) TTF → Language 3: Japanese (Gothic) TTF

1. Select [Tool] → [Multi Language] → [Rearrange Language Order] to display the [Rearrange Language Order] window.
2. Select the language number using the pull-down menus next to [Language 1], [Language 2], and [Language 3].



3. Review the settings made in the previous steps, and click [OK].

The settings are updated.



**11 Tag**

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# 11.1 Overview

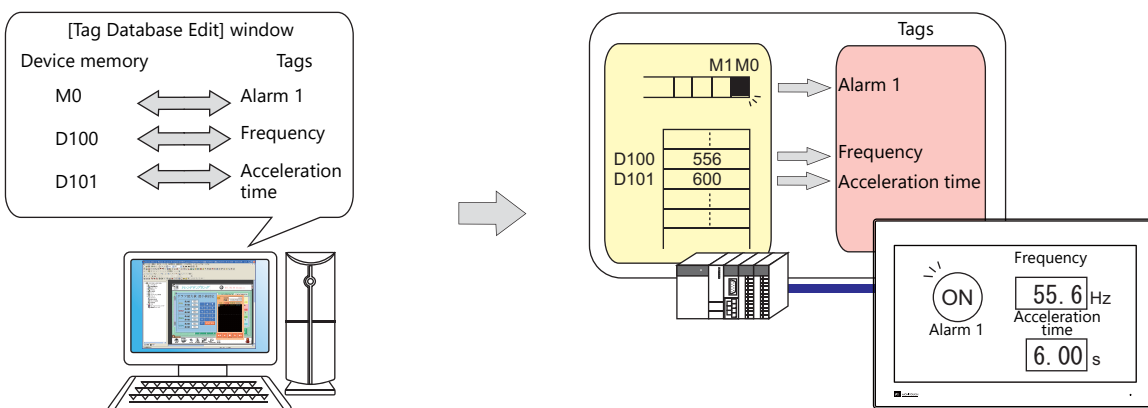
“Tag editing” is a function used to assign names (tags) to PLC or internal device memory (\$u, \$L, etc.) used on the X1 series unit and use these names for screen program creation. Tags can be divided into three general types: device memory designated tags, variable designated tags, and array designated tags.

## 11.1.1 Tag Types

### Device Designation

Assign a tag name to a PLC device memory or internal device memory, and set the device memory for the part or item using the assigned name.

Example: In the [Tag Database Edit] window, register PLC device memory addresses “M0”, “D100” and “D101” with names “Alarm 1”, “Frequency” and “Acceleration Time”, respectively.



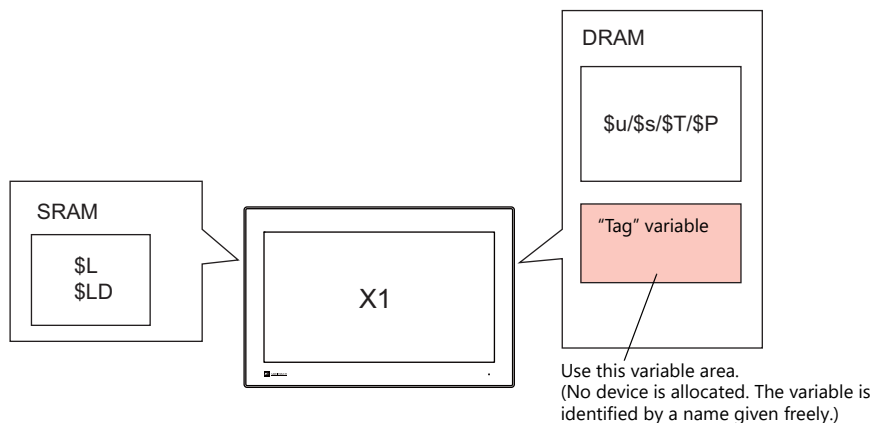
Set device memory addresses for parts using tags.  
 Lamp device memory: “Alarm 1” (M0)  
 Numerical data display device memory: “Frequency” (D100), “Acceleration time” (D101)

☞ For details on the procedure for editing tags, refer to “11.2 Editing Tags” page 11-3.

### Variable Designation

Assign a tag name to a variable in the variable area of the X1 unit, and set the device memory variable for parts and items using the assigned names. This is useful for specifying a working area for X1 internal processing, such as for macro and password functions etc.

Example: Variable area in the X1 series unit



☞ For details on the editing procedure, refer to “11.2 Editing Tags” page 11-3.

#### Variables

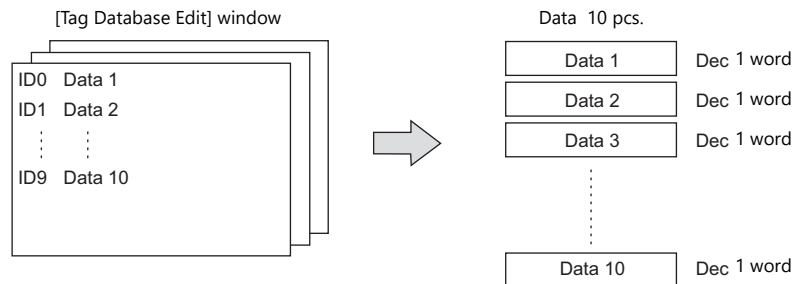
A “variable” is an area that stores data temporarily. This area is used for temporarily storing data, such as a default value or calculated value. The capacity of the variable area is 4096 words for both single words and double words, respectively. For details, refer to ““Tag” Variable Capacity” page 11-24.



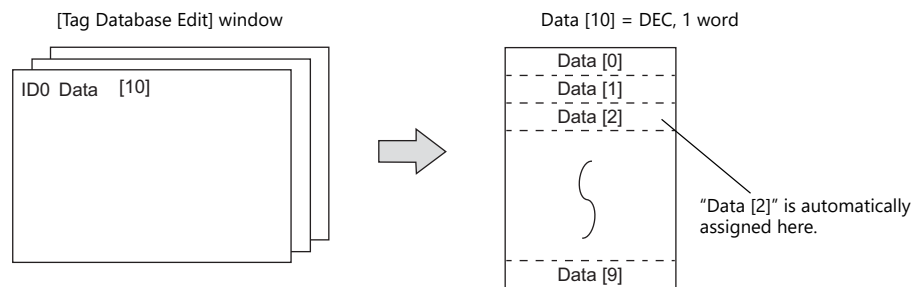
## Array Designation

The array format can be specified for the tag. If there is multiple data of the same type, they can be registered at one time. This makes data management and maintenance easier.

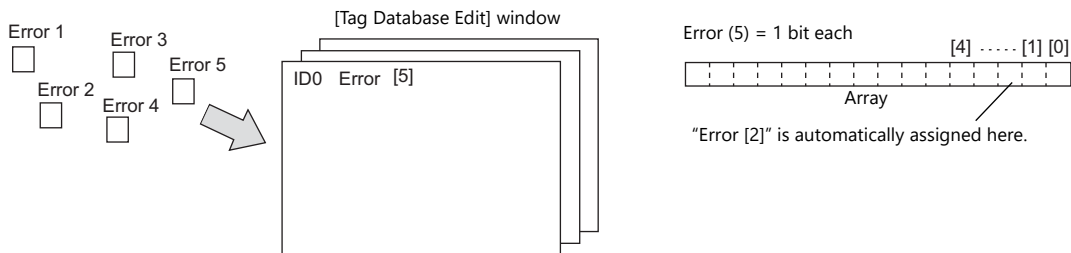
For example, when allocating 10 variables that have the same properties (DEC, 1 word) without using the array format, 10 variables must be registered individually as shown below.




When registering one tag with 10 elements in the array format, 10 variables can be secured in the same way as shown above. If there is multiple data of the same type, the array format can be used to make configuration easier.




In the case of the bit variable:



 For details on the editing procedure, refer to ["11.2.3 Configuring Arrays" page 11-6.](#)

### 11.1.2 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.

-  For details, refer to the following.
- ["MITSUBISHI ELECTRIC" page 11-13](#)
  - Siemens
    - ["SIMATIC Manager \(Ver. 5.5 / Ver. 5.4\)" page 11-17](#)
    - ["TIA Portal" page 11-20](#)
    - ["SIMATIC STEP 7-Micro/WIN \(S7-200\)" page 11-22](#)

### 11.1.3 Operation and Scaling Functions (For Logging Server and Numerical Data Display)




- Operation and scaling functions can be used with respect to tags.  
By setting these functions to tags, it is possible to register and edit only tags when there is a need for such operations on tags that are used in multiple locations and items, thereby contributing to reduction of work hours.
- These tags can also be used in the logging server. Therefore, even when handling data that requires operation processing such as temperatures and rotation speeds, logging and display are possible without operation processing on the PLC or using macro commands.

## 11.2 Editing Tags

Click [Home] → [Registration Item ▼] → [Tag Database], specify a group number, and register tags in the [Tag Database Edit] window.

There are three ways to edit tags.

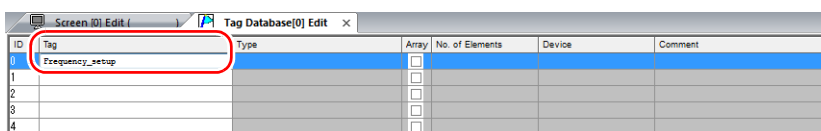
Refer to the following.

-  ["11.2.1 Direct Registration in the \[Tag Database Edit\] Window" page 11-3](#)
-  ["11.2.2 Editing in a CSV File" page 11-4](#)
-  ["11.5 Importing Tags" page 11-13](#)

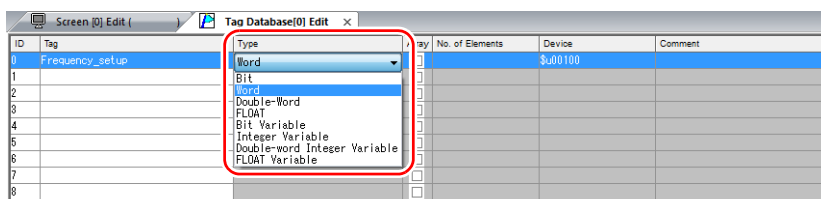
### 11.2.1 Direct Registration in the [Tag Database Edit] Window

This section describes the procedure for registering "D100" and "D101" (word device memory) and "M0" (bit device memory) of the PLC1 device memory using tags.


1. Click the [Tag] field and register a tag name.



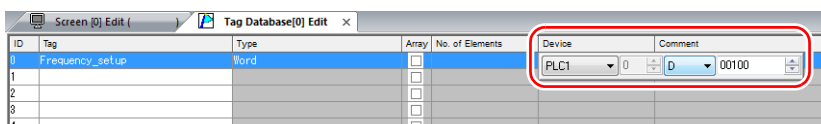
2. Click the [Type] field and select a data type from the list.



- \* To register the same type of data at once with consecutive device memory addresses, use the array format.

 For details, refer to "11.2.3 Configuring Arrays".

3. Click the [Device] field and set a device memory address.



4. Click the [Comment] field and enter a comment describing the tag.

5. To register a new device memory address using a tag, select another ID number and repeat steps 1 to 5.

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Frequency_setup	Word	<input type="checkbox"/>		D00100	Inverter Port No.1
1	Acceleration_time	Word	<input type="checkbox"/>		D00101	Inverter Port No.1
2	Alarm1	Bit	<input type="checkbox"/>		M00000	ON:Abnormal OFF:Normal
3			<input type="checkbox"/>			
4			<input type="checkbox"/>			

This completes the necessary settings.

Tags can be specified in the settings window of each part.

- Word designation:

Device

- Bit designation:

Lamp Device   (Bit device)

Lamp Device   (Word Device)

\* -xx is the manually entered part of the bit.  
xx: 00 - 15, 00 - 31

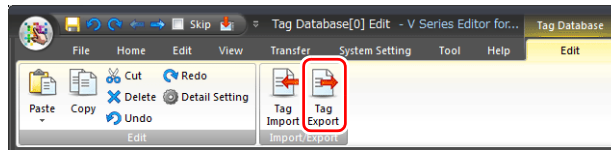
## 11.2.2 Editing in a CSV File

The data registered in the [Tag Database Edit] window for a screen program can be exported to a CSV file. The CSV file can be edited on a PC and then imported back into the screen program. In the example below, changes are made to the data registered with ID No. 0 in the [Tag Database Edit] window using Excel.

- Tag: Frequency\_setup → Run\_status
- Device: D100 → D105
- Comment: Inverter Port No. 1 → ON: RUN, OFF: STOP

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Frequency_setup	word	<input type="checkbox"/>		D00100	Inverter Port No.1
1	Acceleration_time	word	<input type="checkbox"/>		M00000	Inverter Port No.1
2	Alarm1	Bit	<input type="checkbox"/>		M00000	ON: Abnormal OFF: Normal
3	Alarm2	Bit	<input type="checkbox"/>		M00001	ON: Abnormal OFF: Normal
4	Flag1	Bit	<input type="checkbox"/>			Within macro
5	Count_value1	Integer Variable	<input type="checkbox"/>			Within macro
6	Title	Word	<input checked="" type="checkbox"/>	5	D00200	Production_A-line

1. Click [Edit] → [Tag Export].

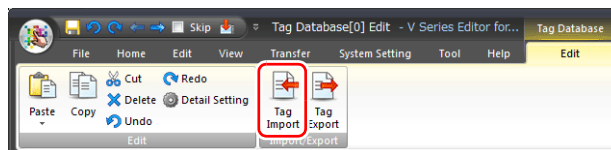


2. Enter an arbitrary filename in the window, select "Csv File (\*.csv)" for the [Save as type] field, and click [Save].
3. Open the CSV file in Excel, edit each field for ID number 0, and save the file.

ID	Tag	Type	Array Setting	No. of Elements	Address	Comment
0	Frequency_setup	word	<input type="checkbox"/>		PLC1 [D00100]	Inverter Port No.1
1	Acceleration_time	word	<input type="checkbox"/>		PLC1 [M00000]	Inverter Port No.1
2	Alarm1	Bit	<input type="checkbox"/>		PLC1 [M00000]	ON: Abnormal OFF: Normal
3	Alarm2	Bit	<input type="checkbox"/>		PLC1 [M00001]	ON: Abnormal OFF: Normal
4	Flag1	Bit	<input type="checkbox"/>			Within macro
5	Count_value1	Integer Variable	<input type="checkbox"/>			Within macro
6	Title	Word	<input checked="" type="checkbox"/>	5	PLC1 [D00200]	Production_A-line

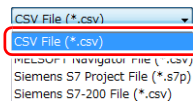
For details on the data in CSV files, refer to "CSV File Configuration" page 11-5.

4. Open the [Tag Database Edit] window and click [Edit] → [Tag Import].



5. Select the CSV file saved in step 3, select "Csv File (\*.csv)" for the [Files of type] field, and click [Open].

File types



This completes the necessary settings.

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Run_status	word	<input type="checkbox"/>		D00105	ON: RUN, OFF: STOP
1	Acceleration_time	word	<input type="checkbox"/>		M00000	Inverter Port No.1
2	Alarm1	Bit	<input type="checkbox"/>		M00000	ON: Abnormal OFF: Normal
3	Alarm2	Bit	<input type="checkbox"/>		M00001	ON: Abnormal OFF: Normal
4	Flag1	Bit Variable	<input type="checkbox"/>			Within macro
5	Count_value1	Integer Variable	<input type="checkbox"/>			Within macro
6	Title	Word	<input checked="" type="checkbox"/>	5	D00200	Production_A-line

\* IDs that already have tags are overwritten with the imported data.

# CSV File Configuration

A CSV file opened in Excel is formatted as shown below.

[Tag Database Edit] data exported to a CSV file

	A	B	C	D	E	F	G
1	SYMBOL=1	VER=1	REV=0				
2	ID	Tag	Type	Array Setting	No. of Elements	Address	Com
3		0 Frequency_setup	1			PLC1 [D00100]	Inver
4		1 Acceleration_time	1	0		PLC1 [D00101]	Inver
5		2 Alarm1	0	0		PLC1 [M00000]	ON:A
6		3 Alarm2	0	0		PLC1 [M00001]	ON:A
7		4 Flag1	3	0			Withi
8		5 Count_value1	4	0			Withi
9		6 Title	1	1	5	PLC1 [D00200]	Production_A-line
10	[0]						
11	[1]						
12	[2]						
13	[3]						
14	[4]						

The number of elements in an array must be the same as the number shown in [No. of Elements].

\* Do not change the header information enclosed in the red dotted frame. Otherwise, the data in the CSV file cannot be correctly imported into the screen program.

Column	Item	Description	Remarks
A	ID	0 - 65535 Numbers within square brackets [ ]: Element No. 0 to 4095 with the use of arrays	1-byte
B	Tag *1	Within 100 one-byte characters	1-byte / 2-byte
C	Type	0: Bit device memory 1: Word Device memory 2: Double-word device memory 3: Bit variable 4: Integer variable 5: Double-word integer variable 6: Real number variable 7: Real number device memory	1-byte
D	Array Setting	0: Not used, 1: Used	1-byte
E	No. of Elements	1 - 4096	1-byte, only when "1" is specified for [D. Array Setting]
F	Address	<p>PLC device memory</p> <p>PLCx [xxxxx]   PLCNo.1 - 8 Device memory + address</p> <p>Example: Specifying PLC1 Mitsubishi D100</p> <ul style="list-style-type: none"> <li>1:1 connection Word designation: PLC1 [D00100] Bit designation: PLC1 [D00100-00]</li> <li>1:n connection (port No. 0) Word designation: PLC1 [0:D00100] Bit designation: PLC1 [0:D00100-00]</li> </ul> <p>Internal device memory: xxxxx \$u/\$T/\$s/\$L/\$LD   Device memory + address</p> <p>Example: Specifying internal device memory \$u100 Word designation: \$u00100, bit designation: \$u00100-00</p> <p>Memory card device [xx:xxxx] #xxxx File No. 0 to 15     Data No. 0 to 4096 Record No. 0 to 4095</p> <p>Example: Specifying File No. 0, Record No. 0, and Data No. 100 Word designation: [0:0] #0100, bit designation: [0:0] #0100-00</p> <p>I/O device memory PLCx [xxxxx]   PLCNo.1 - 8 Device memory + address</p> <p>Example: Specifying PLC1 Fuji Electric T-link T100 Word designation: PLC1 [T100], bit designation: PLC1 [T100-00]</p> <p>Common device memory: CW/CB/MW/MB/VW PLCx [xxxxx]   PLCNo.1 - 8 Device memory + address</p> <p>Example:  <ul style="list-style-type: none"> <li>Specifying CW100 Word designation: PLC1 [CW0100], bit designation: PLC1 [CW0100-00]</li> <li>Specifying MW100 (port No. 1) Word designation: PLC1 [1:MW0100], bit designation: PLC1 [1:MW0100-00]</li> </ul> </p>	1-byte
G	Comment	Within 130 one-byte characters	1-byte / 2-byte

\*1 Data that includes unusable characters cannot be imported. Refer to "Detailed Settings" (page 11-7).

## 11.2.3 Configuring Arrays

This section describes the procedure when "5" is specified for [No. of Elements] for the PLC1 device memory "D200", and "3" for the integer variable in the array format.

1. Select the [Array] checkbox and specify the number for the [No. of Elements] field.

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	ProductName	Word	<input checked="" type="checkbox"/>	5	D00200	ALine
1	Parameter	Integer Variable	<input checked="" type="checkbox"/>	3		ALine
2			<input type="checkbox"/>			
3			<input type="checkbox"/>			
4			<input type="checkbox"/>			
5			<input type="checkbox"/>			
6			<input type="checkbox"/>			

Annotations in the screenshot:  
 - A red box highlights the 'Array' and 'No. of Elements' columns for rows 0 and 1.  
 - An arrow points from the '5' in row 0 to the text: "D200 to D204 are used."  
 - An arrow points from the '3' in row 1 to the text: "3 words are used in the variable area."



- A maximum of 4096 elements can be set.
- If the bit variable is specified in the array format, 1 word is occupied in the variable area even if "16" or a smaller number is specified for the number of elements.  
For details, refer to "Tag Settings" page 11-24.

2. Double-click on the ID number and enter a description in the [Comment] field of the [Detail Setting] window.

The screenshot shows the 'Detail Setting' dialog box for tag '0' (ProductName). The dialog includes fields for Tag, Type (Word), Array Setting (checked), and No. of Element (5). It also features a table for Element No. and Comment, and fields for Device (PLC1) and Comment (ALine).

Element No.	Comment
0	D200 (Read)
1	D201
2	D202
3	D203
4	D204

Annotations in the screenshot:  
 - Lines connect the following text to the 'Comment' column of the Element No. table:  
 - Total [0] (= D200) points to row 0.  
 - Total [1] (= D201) points to row 1.  
 - Total [2] (= D202) points to row 2.  
 - Total [3] (= D203) points to row 3.  
 - Total [4] (= D204) points to row 4.

\* The [Detail Setting] window can also be displayed from the [Tag Database Edit] tab or by right-clicking and selecting [Detail Setting].

This completes the necessary settings.

Tag arrays can be specified in the settings window of each part.

- Tag [n] (n: number of elements in the array)

Device    Tag    Parameter[0]

\* Manually enter a value for [n].

## 11.2.4 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.



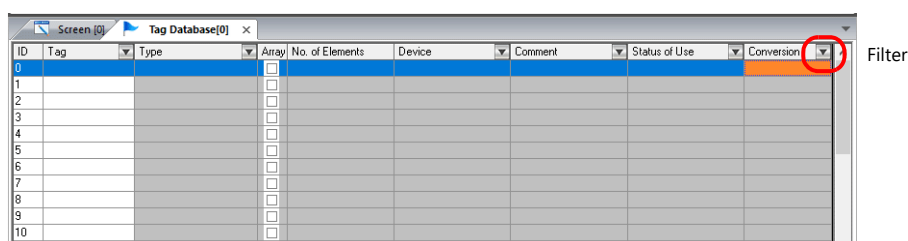
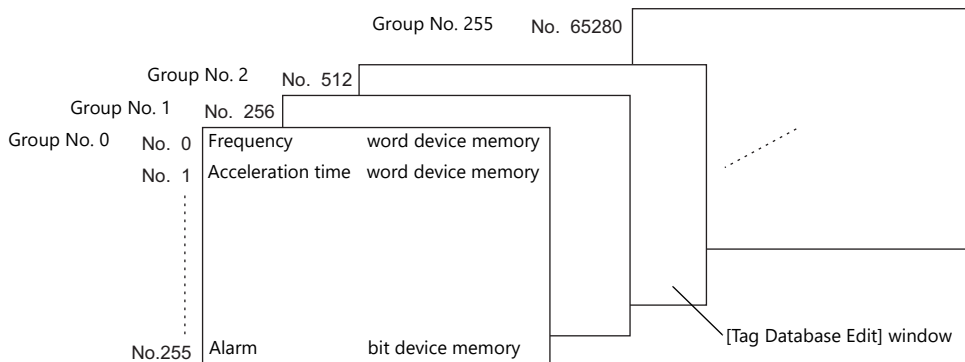
For details, refer to "11.5 Importing Tags" page 11-13.

# 11.3 Detailed Settings

## [Tag Database Edit] Window

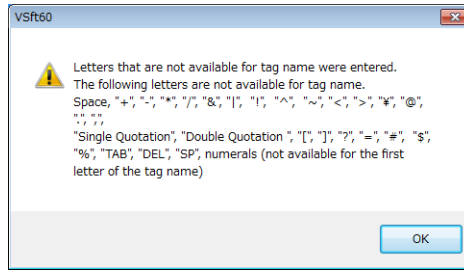
The [Tag Database Edit] window consists of 256 groups, and 256 lines can be registered per group. Accordingly, a maximum of 65536 lines can be registered in total.

Location of settings: [Home] → [Registration Item ▼] → [Tag Database]

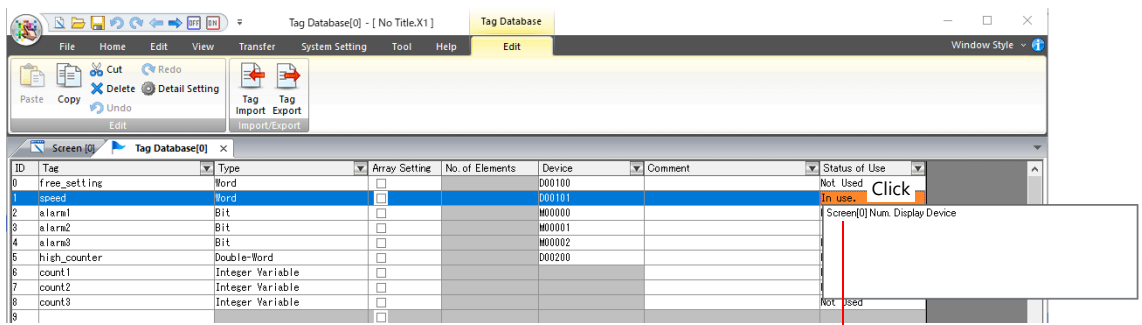


Item	Description																														
ID	Line No. 0 to 65535																														
Tag <sup>*1</sup>	Specify a tag name. Max. 100 one-byte characters (two-byte characters allowed, one-byte/two-byte/uppercase/lowercase are treated as different characters.)																														
Type, Device	Specify the data type for the tag. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Device memory</th> <th>Type</th> <th>Data Type</th> </tr> </thead> <tbody> <tr> <td>PLC device memory</td> <td>Bit</td> <td>1-bit data</td> </tr> <tr> <td>Internal device memory</td> <td>Word</td> <td>1-word data</td> </tr> <tr> <td>Memory card</td> <td>Double-word</td> <td>Double-word data</td> </tr> <tr> <td>I/O device memory</td> <td>Real number</td> <td>32-bit single precision real number format</td> </tr> <tr> <td>Common device memory</td> <td></td> <td></td> </tr> <tr> <td>Variable</td> <td>Bit variable</td> <td>1-bit data</td> </tr> <tr> <td></td> <td>Integer variable</td> <td>1-word data</td> </tr> <tr> <td></td> <td>Double-word integer variable</td> <td>Double-word data</td> </tr> <tr> <td></td> <td>Real number variable</td> <td>32-bit single precision real number format</td> </tr> </tbody> </table>	Device memory	Type	Data Type	PLC device memory	Bit	1-bit data	Internal device memory	Word	1-word data	Memory card	Double-word	Double-word data	I/O device memory	Real number	32-bit single precision real number format	Common device memory			Variable	Bit variable	1-bit data		Integer variable	1-word data		Double-word integer variable	Double-word data		Real number variable	32-bit single precision real number format
Device memory	Type	Data Type																													
PLC device memory	Bit	1-bit data																													
Internal device memory	Word	1-word data																													
Memory card	Double-word	Double-word data																													
I/O device memory	Real number	32-bit single precision real number format																													
Common device memory																															
Variable	Bit variable	1-bit data																													
	Integer variable	1-word data																													
	Double-word integer variable	Double-word data																													
	Real number variable	32-bit single precision real number format																													
Array	Use an array. For details on setting arrays, refer to "11.2.3 Configuring Arrays" page 11-6.																														
No. of Elements	When [Array] is checked, specify the number of elements to be used in the array. Max. 4096																														
Comment	Enter a description for the tag. Max. 130 one-byte characters (two-byte characters allowed, one-byte/two-byte/uppercase/lowercase are treated as different characters.)																														
Status of Use <sup>*2</sup>	If a tag is used as device memory in the screen program, "In use" is indicated. Click a cell indicating "In use" to show where the tag is set. Double-click the indicated location field to jump to that location.																														
Conversion <sup>*3</sup>	Set alarm, operation and scaling settings. These settings are used for numerical data display parts and the logging server. For details, refer to "Conversion Settings" page 11-8.																														

\*1 If an unavailable character is used, the following message box will appear. In this case, perform registration again.



\*2 Display example



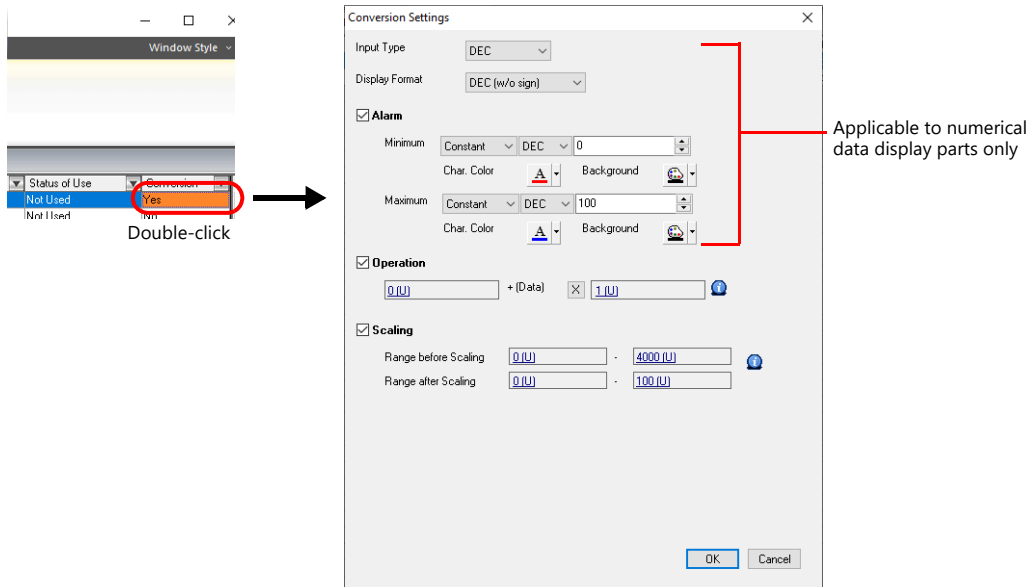
Double-click to jump to the location of use.

\*3 Not supported if [Type] is set to "Bit" or "Bit Variable".

### Conversion Settings

Operation and scaling functions can be used with respect to device memory addresses of tags. Configure the following settings.

- Applicable items:
  - Logging server
  - Numerical data display



Item *1	Description																		
Input Type (BCD, DEC, FLOAT)	Select the code to use when reading data from device memory.																		
Display Format	Select the format for displaying on the screen.																		
Alarm *2	Select this checkbox to display data in a different color when it exceeds or falls short of a specific range. When "Entry Target" is selected for [Function], the range of values that can be entered using a keypad can be set.																		
<table border="1"> <tr> <td rowspan="4">Minimum</td> <td></td> <td>Set the minimum value used to trigger an alarm.</td> </tr> <tr> <td>Use offset value designation device</td> <td>Set the device memory address and code used for storing an offset value for the minimum value.</td> </tr> <tr> <td>Char. Color</td> <td>Set the color for text.</td> </tr> <tr> <td>Background</td> <td>Set the background color of text.</td> </tr> <tr> <td rowspan="4">Maximum</td> <td></td> <td>Set the maximum value used to trigger an alarm.</td> </tr> <tr> <td>Use offset value designation device</td> <td>Set the device memory address and code used for storing an offset value for the maximum value.</td> </tr> <tr> <td>Char. Color</td> <td>Set the color for text.</td> </tr> <tr> <td>Background</td> <td>Set the background color of text.</td> </tr> </table>	Minimum		Set the minimum value used to trigger an alarm.	Use offset value designation device	Set the device memory address and code used for storing an offset value for the minimum value.	Char. Color	Set the color for text.	Background	Set the background color of text.	Maximum		Set the maximum value used to trigger an alarm.	Use offset value designation device	Set the device memory address and code used for storing an offset value for the maximum value.	Char. Color	Set the color for text.	Background	Set the background color of text.	
Minimum			Set the minimum value used to trigger an alarm.																
		Use offset value designation device	Set the device memory address and code used for storing an offset value for the minimum value.																
		Char. Color	Set the color for text.																
	Background	Set the background color of text.																	
Maximum		Set the maximum value used to trigger an alarm.																	
	Use offset value designation device	Set the device memory address and code used for storing an offset value for the maximum value.																	
	Char. Color	Set the color for text.																	
	Background	Set the background color of text.																	
Operation	Select this checkbox to perform an operation on the value of the device memory address specified in [Contents].  <div style="text-align: center;"> <p>Offset value (constant)      "x" or "/" (÷)      Multiplier or divisor (constant)</p> <p>Device memory specified in [Contents]</p> </div>																		
Scaling	Select this checkbox to display data after automatically converting the data read from the PLC ([Range before Scaling]) to the specified range ([Range after Scaling]).  <div style="text-align: center;"> <p>PLC      MONITOUCH</p> <p>4000      100</p> <p>0      0</p> <p>(Range before scaling)      (Range after scaling)</p> </div> <table border="1"> <tr> <td>Range before Scaling</td> <td>Specify the data to be read from the PLC</td> </tr> <tr> <td>Range after Scaling</td> <td>Specify the range of data to be shown on MONITOUCH.</td> </tr> </table>	Range before Scaling	Specify the data to be read from the PLC	Range after Scaling	Specify the range of data to be shown on MONITOUCH.														
Range before Scaling	Specify the data to be read from the PLC																		
Range after Scaling	Specify the range of data to be shown on MONITOUCH.																		

\*1 For details, refer to "5.1 Numerical Display" in the X1 Series Reference Manual 1.

\*2 The alarm setting uses the values before operation and scaling.

### Logging server

1. Select a tag with [Conversion] settings at [System Setting] → [Logging Server] → [Logging Data].
2. Double-click the [Conversion] cell and select the [Use tag operation/scaling] checkbox.

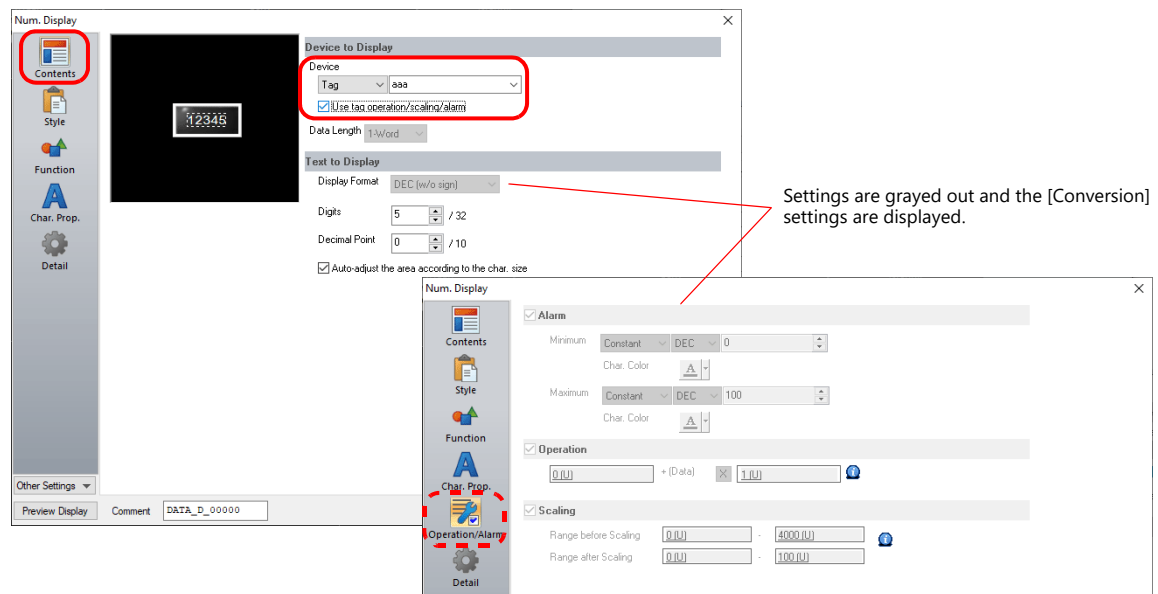
Settings are grayed out and the [Conversion] settings are displayed.

\* Available when [Logging Method] is set to "Trigger" or "Constant Cycle".



## Numerical data display

1. Display the settings window for the numerical data display and select the tag with [Conversion] settings at [Contents] → [Device to Display].
2. Select the [Use tag operation/scaling/alarm] checkbox.

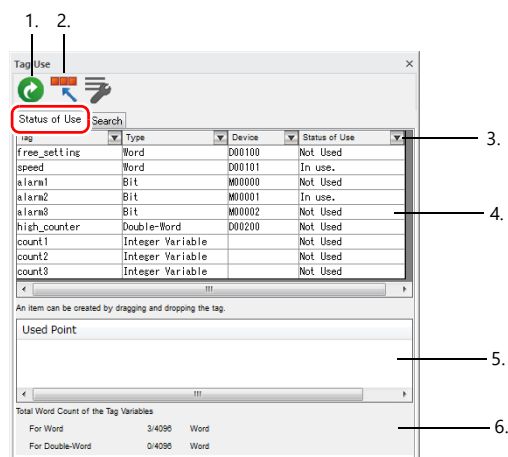


## 11.4 Tag Status List

The tag status list of the entire screen program can be searched and the total word count of tag variables can be checked.  
Display method: [Tool] → [Search] → [Tag Use]

### Status of Use

#### Details

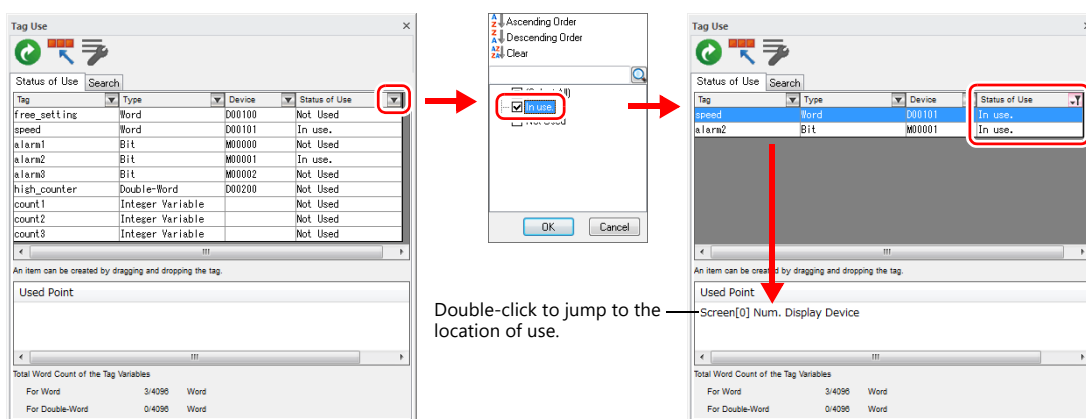


No.	Item	Description
1	Update	Updates the display.
2	VIEW JUMP	When the cursor is over the [Status of Use] list (4): [Tag Database Edit] window is displayed. When the cursor is over the [Use Point] area (5): The relevant screen item is displayed.
3	Filter button	Set the search conditions.
4	List of Memory Use	Displays the search result.
5	Used Point	Displays the location of use of the tag selected in the [Status of Use] list (4).
6	Total Word Count of the Tag Variables	Displays the status of the variable area. Max. 4096 words for single and double words * If the occupied word count exceeds the 4096 words, the value is displayed in red. Set a value smaller than 4096 words. For details, refer to " <a href="#">Tag Variable Capacity</a> page 11-24 .

### Operation Method

The procedure of searching for tags currently in use is explained as an example.

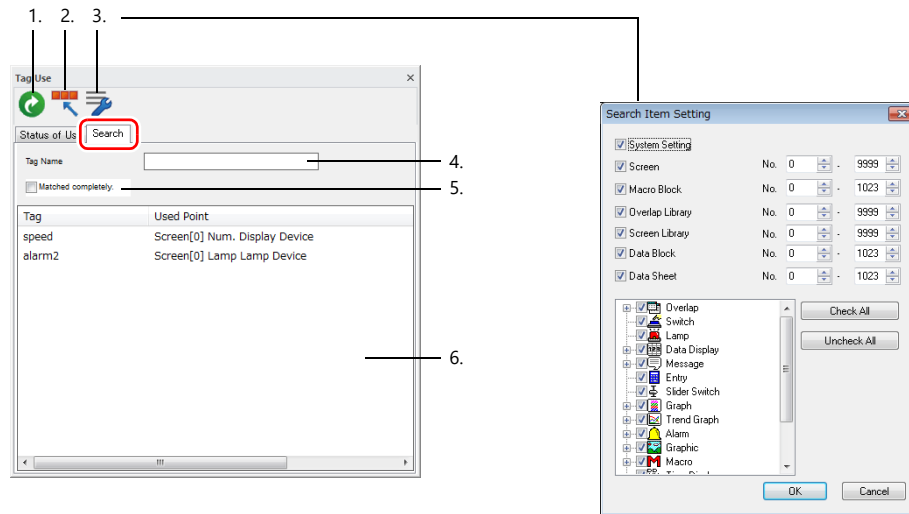
1. Select [In use] from the [▼] filter button on the [Status of Use] list and then click [OK] to display the search results.



2. Selecting a tag displays the location of use. Double-click to jump to the location of use.

# Search

## Details

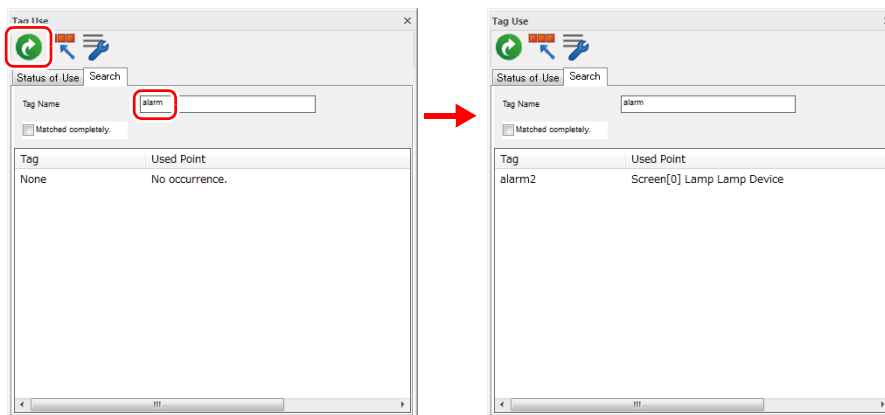


No.	Item	Description
1	Update	Updates the display. Set [Tag Name] (4) and [Search Range] (3), and then click this icon.
2	VIEW JUMP	Displays the location of use of the tag selected in the search results (6).
3	Search Range Setting	Specify the search range.
4	Tag Name	Enter a tag name to search. If a search is performed with this field left blank, all tags in use will be displayed. * One-byte and two-byte characters and uppercase and lowercase characters are treated as separate characters.
5	Matched completely.	Selected: Search for a tag name exactly the same as the one specified for [Tag Name] (4). Unselected: Search for all tags including characters specified for [Tag Name] (4).
6	Search results	Displays the search result.

## Operation Method

This section describes the procedure for searching for the locations of use of the "alarm" tag as an example.

1. Click the [Search] tab.
2. Enter "alarm" into [Tag Name] and click the [Update] icon to display the search results.  
Unused tags are not returned in the search results.



3. Double-click the tag to jump to the location of use.

## 11.5 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.

### Manufacturers of supported PLCs

- "MITSUBISHI ELECTRIC" page 11-13
- Siemens
  - "SIMATIC Manager (Ver. 5.5 / Ver. 5.4)" page 11-17
  - "TIA Portal" page 11-20
  - "SIMATIC STEP 7-Micro/WIN (S7-200)" page 11-22

### MITSUBISHI ELECTRIC

Global labels registered in Simple Project (with labels) or Structured Project in MITSUBISHI ELECTRIC's software GX Works2 can be registered as system labels in the software MELSOFT Navigator. These system labels can be exported in CSV file format. When such CSV files are imported using V-SFT, system labels in the files can be used as tags in V-SFT.

\* **For details on using PLC software, refer to the relevant PLC manual.**



When whole program compiling is executed in GX Works2, device memory addresses registered with global labels will be reassigned to global labels. If there are global labels with no PLC device memory addresses assigned, addresses of such labels will be assigned according to the automatic assignment setting made in GX Works2.

Therefore, assigning PLC device memory addresses to global labels is recommended.

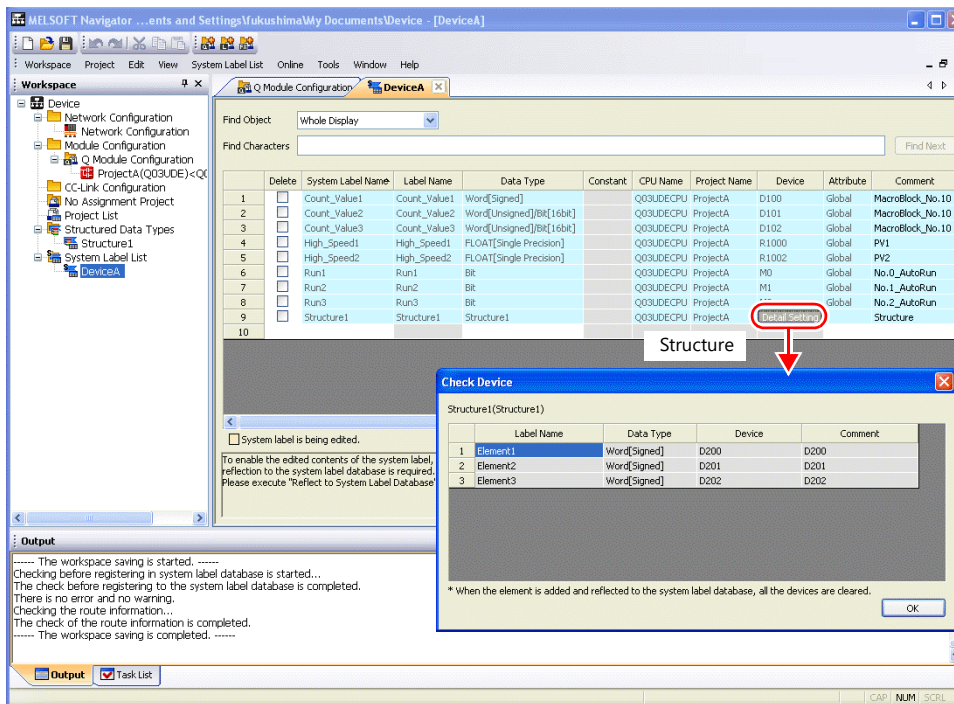
### Supported PLC Models

Manufacturer	PLC Model
MITSUBISHI ELECTRIC	QnH (Q) series link
	QnH (Q) series CPU
	QnH (Q) series CPU (multi CPU)
	QnH (Q) series link (multi CPU)
	QnH (Q) series (Ethernet)
	QnH (Q) series (multi CPU) (Ethernet)
	QnH (Q) series (Ethernet ASCII)
	QnH (Q) series (multi CPU) (Ethernet ASCII)
	QnU series CPU
	QnU series (built-in Ethernet)
	L series link
	L series CPU
	L series (built-in Ethernet)
	FX2N/1N series CPU
	FX1S series CPU
	FX series link (A protocol)
	FX3U/3UC/3G series CPU
	FX3U/3GE series (Ethernet)
	FX3U/3UC/3G series link (A protocol)

\* **Importing using V-SFT is allowed provided that [PLC1] and a 1:1 connection mode are set in the [System Setting] → [Hardware Setting] window. Importing is not possible for PLC2 and subsequent PLCs.**

## Procedure

This section describes the steps to import "Device A" data registered in the system label list into a screen program.



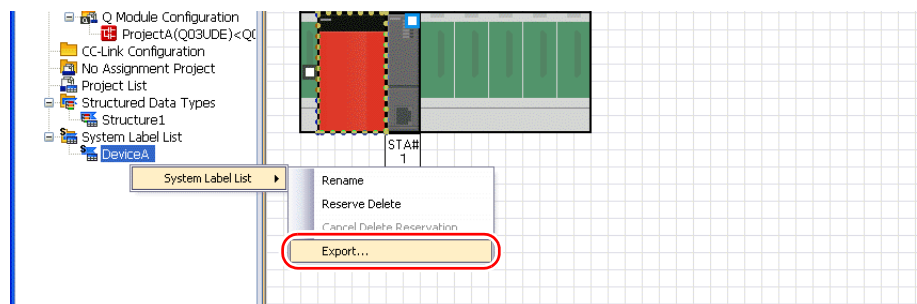
\* The following table lists the types of data that can be imported using V-SFT and the data types after importing.

MITSUBISHI ELECTRIC "System Label"		Data Type for Tags in V-SFT
Data Type *1	Length	
Bit	1 bit	Word
Word [Signed]	1 word	
Word [Unsigned]	1 word	
Timer	1 word	
Counter	1 word	
Retentive Timer *2	1 word	
Double Word [Signed]	2 words	Double-word
Double Word [Unsigned]	2 words	
Time	2 words	Real number
FLOAT [Single Precision]	2 words	

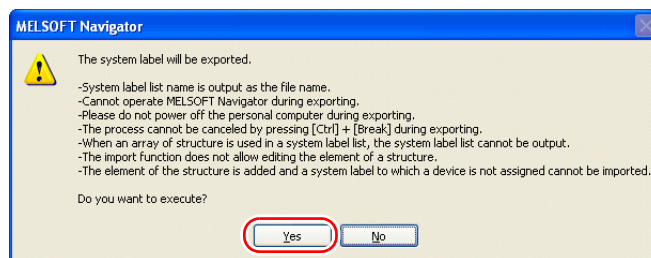
\*1 No other types of data can be imported using V-SFT.

\*2 With the PLC model QnH (Q) series (CC-LINK), data of the type "Retentive Timer" cannot be imported.

1. Start MELSOFT Navigator.
2. Right-click [DeviceA] under [System Label List], and then click [System Label List] → [Export].



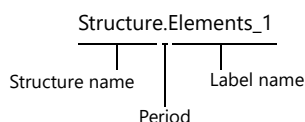
- A message dialog box is displayed. Click the [Yes] button.



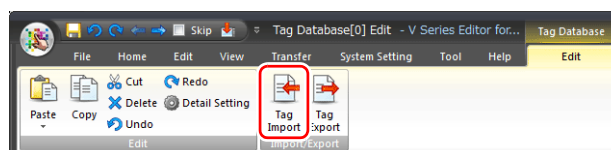
- The [Select Export Destination Folder] window is displayed. Select "CSV" for [Save as type] and click [Save].
- Open the destination folder. Check that the CSV file with the same name in the system label list is created. (Example: DeviceA.csv)

System Label Name	Label Name	Data Type	Constant	CPU Name	Project Name	Device	Attribute	Comment	Remark
Count_Value1	Count_Value1	Word[Signed]		G03UDECPU	ProjectA	D100	Global	MacroBlock_No.10	
Count_Value2	Count_Value2	Word[Unsigned]/Bit[16bit]		G03UDECPU	ProjectA	D101	Global	MacroBlock_No.10	
Count_Value3	Count_Value3	Word[Unsigned]/Bit[16bit]		G03UDECPU	ProjectA	D102	Global	MacroBlock_No.10	
High_Speed1	High_Speed1	FLOAT[Single Precision]		G03UDECPU	ProjectA	R1000	Global	PV1	
High_Speed2	High_Speed2	FLOAT[Single Precision]		G03UDECPU	ProjectA	R1002	Global	PV2	
Run1	Run1	Bit		G03UDECPU	ProjectA	M0	Global	No.0_AutoRun	
Run2	Run2	Bit		G03UDECPU	ProjectA	M1	Global	No.1_AutoRun	
Run3	Run3	Bit		G03UDECPU	ProjectA	M2	Global	No.2_AutoRun	
Structure1	Structure1	Structure1		G03UDECPU	ProjectA			Structure	
Structure1 Element1	Structure1	Word[Signed]		G03UDECPU	ProjectA	D200		D200	
Structure1 Element2	Structure1	Word[Signed]		G03UDECPU	ProjectA	D201		D201	
Structure1 Element3	Structure1	Word[Signed]		G03UDECPU	ProjectA	D202		D202	

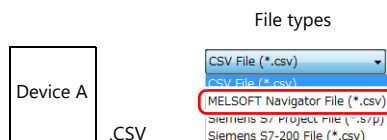
\* The dotted line frame indicates the structure. A structure name with a period is added to the top of each label name.



- Open the screen program in V-SFT. Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.
- Click [Edit] → [Tag Import].



- The [Open] window is displayed. Select "MELSOFT Navigator File (\*.csv)" for [Files of type]. Select the desired CSV filename (e.g. "DeviceA.csv") and click [Open].



The contents of the file are registered as tags in the "tag database edit" window. Types ([Type]) are specified for individual device memory addresses. This completes the import procedure.

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Count_Value1	Word	<input type="checkbox"/>		D00100	MacroBlock_No.10
1	Count_Value2	Word	<input type="checkbox"/>		D00101	MacroBlock_No.10
2	Count_Value3	Word	<input type="checkbox"/>		D00102	MacroBlock_No.10
3	High_Speed1	FLD0AT	<input type="checkbox"/>		R01000	PV1
4	High_Speed2	FLD0AT	<input type="checkbox"/>		R01002	PV2
5	Run1	Bit	<input type="checkbox"/>		M00000	No.0_AutoRun
6	Run2	Bit	<input type="checkbox"/>		M00001	No.1_AutoRun
7	Run3	Bit	<input type="checkbox"/>		M00002	No.2_AutoRun
8	Structure1_Element1	Word	<input type="checkbox"/>		D00200	D00
9	Structure1_Element2	Word	<input type="checkbox"/>		D00201	D01
10	Structure1_Element3	Word	<input type="checkbox"/>		D00202	D02
11			<input type="checkbox"/>			
12			<input type="checkbox"/>			
13			<input type="checkbox"/>			

**\* Periods "." cannot be used with tags. If any system label exported from MELSOFT Navigator includes a period, the period is converted to an underscore "\_".**

## Notes

Note the following when importing.

- Tag names must be within 100 one-byte characters.
- If a file to be imported includes a tag that is already registered, the existing tag is overwritten. Unregistered tags are registered to blank ID numbers (in the [Tag Database Edit] window).
- Only device memory addresses available on the X1 series unit can be imported. For details, refer to the X1 Series Connection Manual.

## Siemens

### Supported PLC Models

Manufacturer	PLC Model	PLC Software		
		SIMATIC Manager	TIA Portal	SIMATIC STEP 7-Micro/WIN
Siemens	S7	page 11-17	page 11-20	-
	S7-300/400 (Ethernet ISOTCP)			
	S7-300/400 (Ethernet TCP/IP PG protocol)			
	S7-1200/1500 (Ethernet ISOTCP)	-	-	page 11-22
	S7-200 (Ethernet ISOTCP)			

\* Importing using V-SFT is allowed provided that the PLC is specified at [PLC1] in the [System Setting] → [Hardware Setting] window. Importing is not possible for PLC2 and subsequent PLCs.  
If the connection mode is "1:n", importing occurs via port number 0.

### SIMATIC Manager (Ver. 5.5 / Ver. 5.4)

When a project file (\*.s7p) created in Siemens software "SIMATIC Manager (version 5.5 or 5.4)" is imported using V-SFT, names registered in data blocks "DBx" can be used as tags in V-SFT.

 For details on using PLC software, refer to the relevant PLC manual.

### Supported data types

The following table lists the data types that can be imported into V-SFT. The corresponding data types in V-SFT are also listed.

Siemens "DBxx"		Data Type for Tags in V-SFT
Data Type *1	Data Length	
BOOL	1 bit	Bit
BYTE *2	1 byte	Word
CHAR *2	1 byte	
WORD	1 word	
S5TIME	1 word	
DATE	1 word	
INT	1 word	
DWORD	2 words	Double-word
DINT	2 words	
TIME	2 words	
TIME_OF_DAY	2 words	
REAL	2 words	Real number

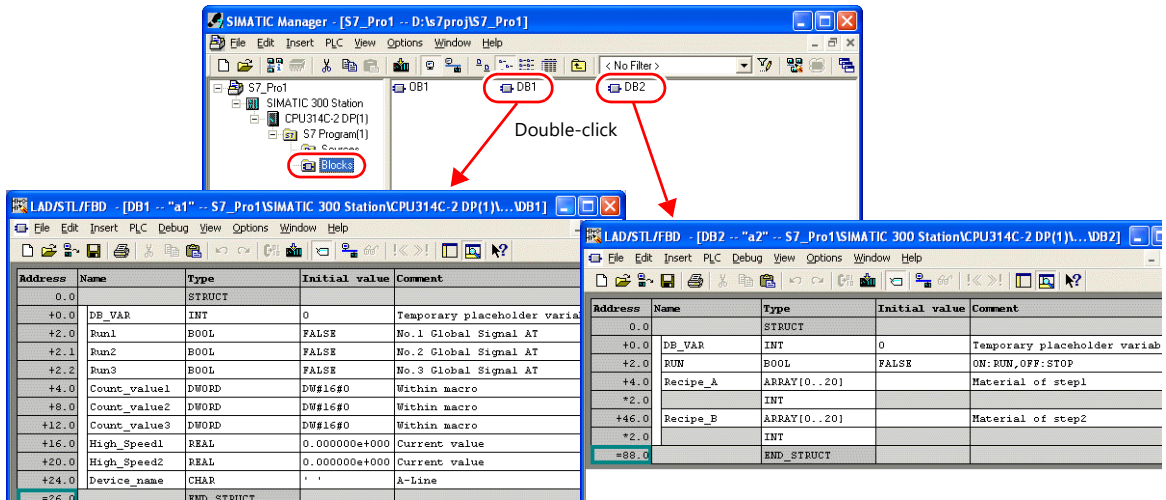
\*1 No other types of data can be imported using V-SFT.

\*2 Data types BYTE and CHAR (bytes) are imported as word device memory. If any odd bytes are registered in the PLC software, the data cannot be imported.

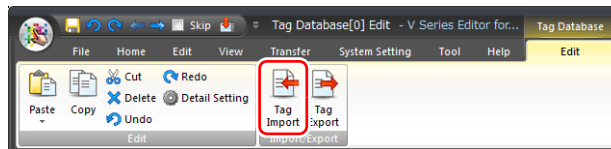


## Procedure

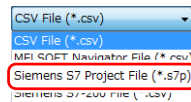
This section describes the steps to import a project file (e.g. "test.s7p"), in which data blocks DB1 and DB2 are registered, to a screen program.



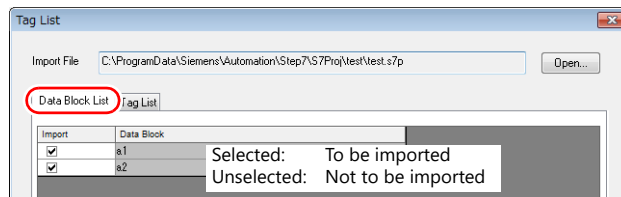
1. Start V-SFT and open the screen program.  
Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.
2. Click [Edit] → [Tag Import].



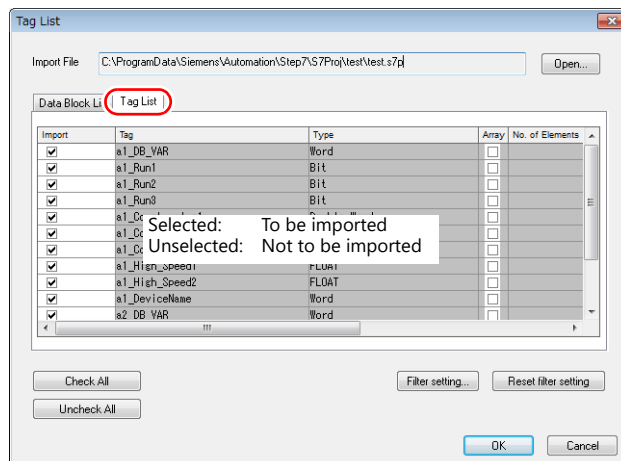
3. The [Open] window is displayed.  
Specify "Siemens S7 Project File (\*.s7p)" for [Files of type].  
Select the desired project file (e.g. "test.s7p") and click [Open].



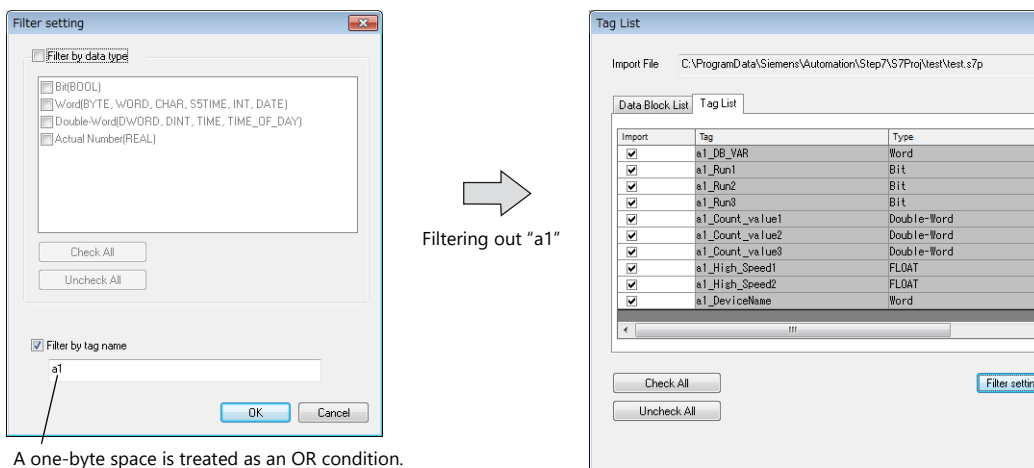
4. The [Tag List] window is displayed. Select the tags to import.
  - [Data Block List]: Displayed block by block (data block "DBx")



- [Tag List]: All tags displayed\_



\* When specifying further search criteria, go to [Filter setting]. Only tags that match the specified data type, data block name, or tag name will be displayed in the [Tag List] window.



A one-byte space is treated as an OR condition. (Case-sensitive)

5. Click [OK].

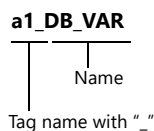
The contents of the file are registered as tags in the "tag database edit" window. Types ([Type]) are specified for individual device memory addresses.

This completes the import procedure.

Example: Only DB1 imported

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	a1_DB_VAR	Word	<input type="checkbox"/>		DB0001:0000	Place-Holder Variables
1	a1_Run1	Bit	<input type="checkbox"/>		DB0001:0002-0	No.0 Global Signal AT
2	a1_Run2	Bit	<input type="checkbox"/>		DB0001:0002-1	No.1 Global Signal AT
3	a1_Run3	Bit	<input type="checkbox"/>		DB0001:0002-2	No.2 Global Signal AT
4	a1_Count_value1	Double-Word	<input type="checkbox"/>		DB0001:0004	Within macro
5	a1_Count_value2	Double-Word	<input type="checkbox"/>		DB0001:0008	Within macro
6	a1_Count_value3	Double-Word	<input type="checkbox"/>		DB0001:0012	Within macro
7	a1_High_Speed1	FLDAt	<input type="checkbox"/>		DB0001:0016	Current value
8	a1_High_Speed2	FLDAt	<input type="checkbox"/>		DB0001:0020	Current value
9	a1_DeviceName	Word	<input type="checkbox"/>		DB0001:0024	A-LINE
10						
11						
12						
13						

\* Periods "." cannot be used with tags. If a period is added to a tag, it is converted to an underscore "\_".  
 The tag name registered in the SIMATIC Manager data block (DBxx) is prefixed to each tag together with an underscore "\_".



Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	DB_VaR	INT	0	Temporary placeholder variable
+2.0	Run1	BOOL	FALSE	No.1 Global Signal AT
+2.1	Run2	BOOL	FALSE	No.2 Global Signal AT
+2.2	Run3	BOOL	FALSE	No.3 Global Signal AT
+4.0	Count_value1	DWORD	D#16#0	Within macro
+8.0	Count_value2	DWORD	D#16#0	Within macro
+12.0	Count_value3	DWORD	D#16#0	Within macro
+16.0	High_Speed1	REAL	0.000000e+000	Current value
+20.0	High_Speed2	REAL	0.000000e+000	Current value
+24.0	Device_name	CHAR	' '	A-Line
+26.0		END_STRUCT		

### Notes

Note the following when importing.

- Tag names must be within 100 one-byte characters.
- If a file to be imported includes a tag that is already registered, the existing tag is overwritten. Unregistered tags are registered to blank ID numbers (in the [Tag Database Edit] window).
- Device memory addresses unavailable on the X1 series unit cannot be imported.  
 For details on device memory available on the X1 series, refer to the X1 Series Connection Manual. Data types BYTE and CHAR (bytes) are imported as word device memory. If any odd bytes are registered to device memory in the PLC software, the data cannot be imported.

## TIA Portal

When a TIA project file (\*.ap11 to \*.ap17) created in Siemens software "TIA Portal (Ver. 11 to Ver. 17)" is imported into V-SFT, the contents of the file can be used as tags.

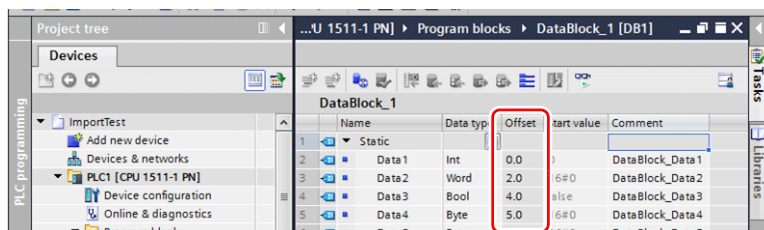
 For details on using PLC software, refer to the relevant PLC manual.


### Supported data types

The following table lists the data types that can be imported into V-SFT. The corresponding data types in V-SFT are also listed.

Siemens "DBxx" *1		Data Type for Tags in V-SFT
Data Type *2	Data Length	
BOOL	1 bit	Bit
BYTE *3	1 byte	Word
CHAR *3	1 byte	
WORD	1 word	
S5TIME	1 word	
DATE	1 word	
INT	1 word	
DWORD	2 words	Double-word
DINT	2 words	
TIME	2 words	
TIME_OF_DAY	2 words	
REAL	2 words	Real number

\*1 The "Offset" settings on the PLC must be configured. If the "Offset" settings are not configured, importing cannot be performed.



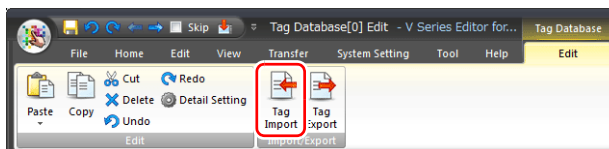
 For details on using PLC software, refer to the relevant PLC manual.

\*2 No other types of data can be imported using V-SFT.

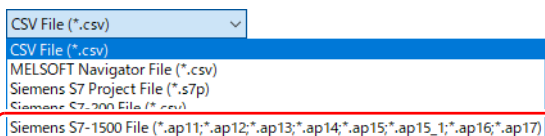
\*3 Data types BYTE and CHAR (bytes) are imported as word device memory. If any odd bytes are registered in the PLC software, the data cannot be imported.

### Procedure


1. Start V-SFT and open the screen program.  
Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] tab window.
2. Click [Edit] → [Tag Import].



3. The [Open] window is displayed.  
Specify "Siemens S7-1500 File (\*.ap11 to \*.ap17)" for [Files of type].  
Select the desired project file and click [Open].



4. The [Tag List] window is displayed. Select the tags to import.

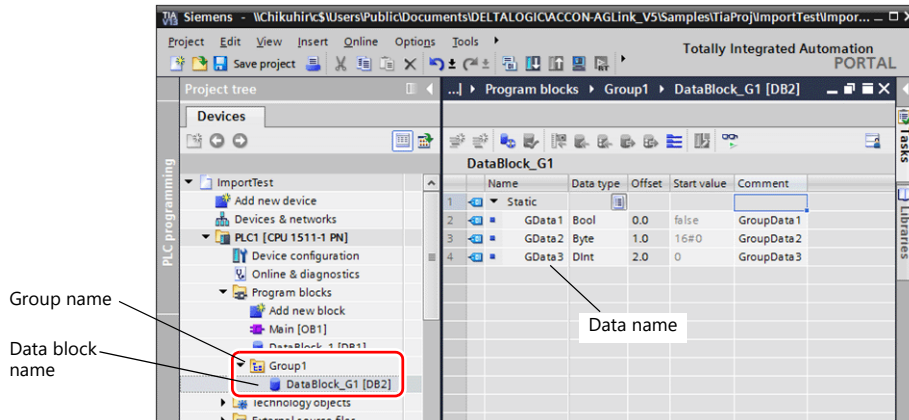
 A filter can be applied. For details, refer to [page 11-19](#).

5. Click [OK].

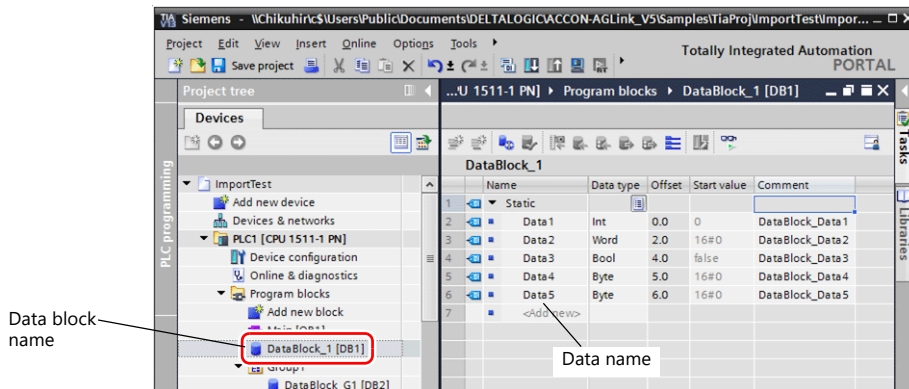
The contents of the file are registered as tags in the tag database edit window. Types ([Type]) are specified for individual device memory addresses. This completes the import procedure.

Importing occurs as follows according to the group settings of the TIA project file.

<Example 1: Group settings exist>



<Example 2: Group settings do not exist>



Example of imported tags in V-SFT

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Group1_DataBlock_G1_GData1	Bit	<input checked="" type="checkbox"/>	1	DB002:0000.0	GroupData1
1	Group1_DataBlock_G1_GData3	Double-Word	<input type="checkbox"/>		DB002:0002	GroupData3
2	DataBlock_1_Data1	Word	<input type="checkbox"/>		DB001:0000	DataBlock_Data1
3	DataBlock_1_Data2	Word	<input type="checkbox"/>		DB001:0002	DataBlock_Data2
4	DataBlock_1_Data3	Bit	<input type="checkbox"/>		DB001:0004.0	DataBlock_Data3
5	DataBlock_1_Data5	Word	<input type="checkbox"/>		DB001:0006	DataBlock_Data5
6			<input type="checkbox"/>			
7			<input type="checkbox"/>			
8			<input type="checkbox"/>			

Example 1  
With group settings

Example 2  
Without group settings

- With group settings: group name\_data block name\_data name

- Without group settings: data block name\_data name

\*1 Periods "." cannot be used with tags. If a period is added to a tag, it is converted to an underscore "\_".

The tag name registered in the SIMATIC Manager data block (DBxx) is prefixed to each tag together with an underscore "\_".

## Notes


Note the following when importing.

- Tag names must be within 100 one-byte characters.
- Only tags registered in one-dimensional arrays in TIA Portal can be imported. Multi-dimensional arrays are not supported.
- Structures with more than six levels cannot be imported.
- Only comments registered to "Editing language" in TIA Portal can be imported.
- If a file to be imported includes a tag that is already registered, the existing tag is overwritten. New tags are registered to blank ID numbers (in the [Tag Database Edit] window).
- Device memory addresses unavailable on the X1 series unit cannot be imported.

For details on device memory available on the X1 series, refer to the X1 Series Connection Manual. Data types BYTE and CHAR (bytes) are imported as word device memory. If any odd bytes are registered to device memory in the PLC software, the data cannot be imported.

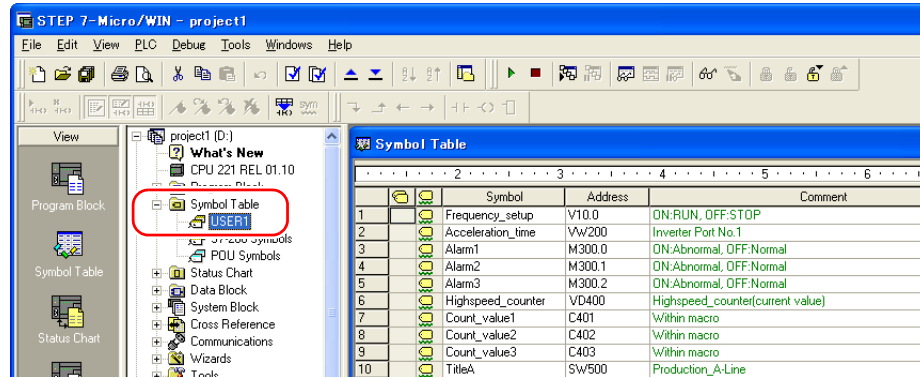
## SIMATIC STEP 7-Micro/WIN (S7-200)

When a CSV file copied from the Symbol Table in the software “SIMATIC STEP 7-Micro/WIN” for Siemens S7-200 is imported using V-SFT, the contents in the file can be used as tags.

 For details on using PLC software, refer to the relevant PLC manual.

### Procedure

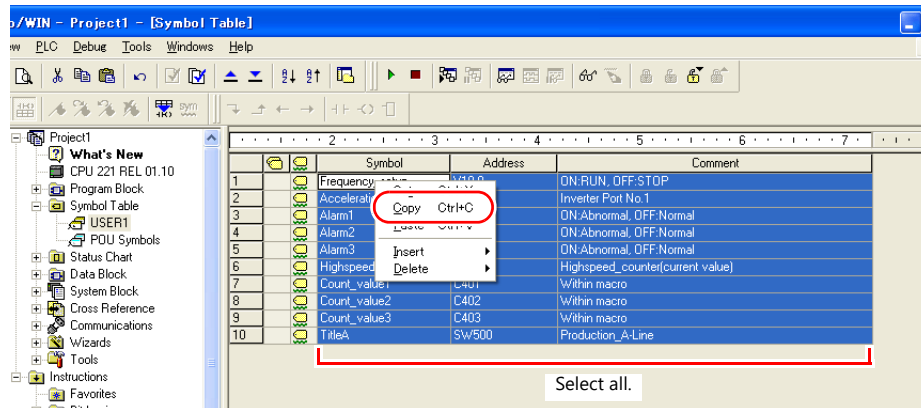
1. Start the software “SIMATIC STEP 7-Micro/WIN” for Siemens S7-200.
2. Open [Symbol Table].



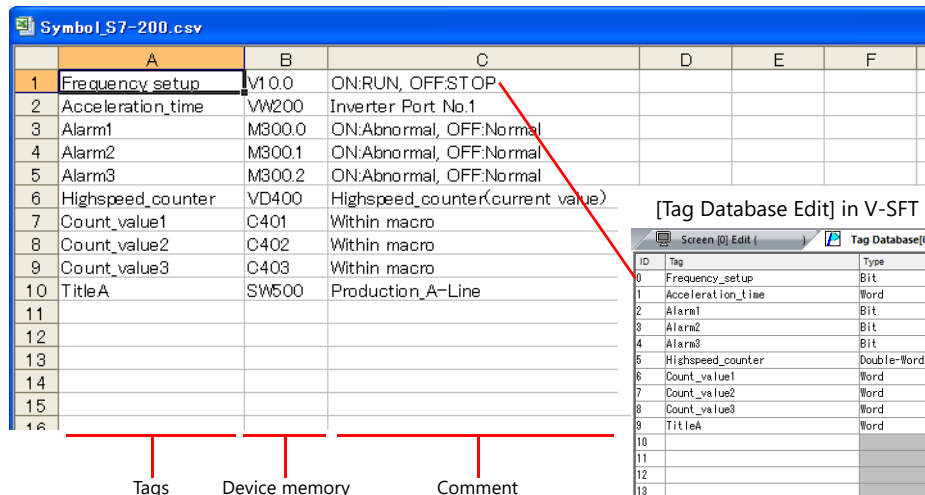
Only device memory addresses available on the X1 series unit can be imported using V-SFT. For details, refer to the X1 Series Connection Manual. Double-word device memory are imported as word device memory.

Device memory: VD → VW, ID → IW, QD → QW, MD → MW, SMD → SMW, SD → SW

3. Select all columns under [Symbol], [Address], and [Comment]. Right-click and select [Copy] from the right-click menu.

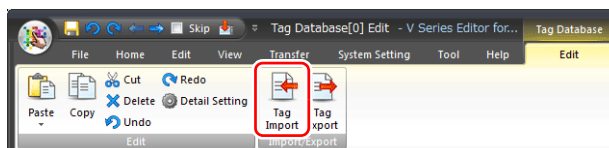


4. Start Excel. Paste the copied data to the worksheet from cell A1.

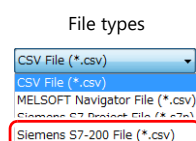


\* The first row on the Excel sheet corresponds to tag ID No. 0. The copied data on the worksheet is imported from its first row to the [Tag Database Edit] window. (65536 maximum)

5. Click [File] → [Save As]. The [Save As] window is displayed.
6. Enter a filename. Select "CSV" for [Save as type] and click [Save].
7. Open the screen program. Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.
8. Click [Edit] → [Tag Import].



9. The [Open] window is displayed. Select the CSV file saved in step 6. Specify "Siemens S7-200 File (\*.csv)" for [Files of type] and click [Open].



The contents of the file are registered as tags in the "tag database edit" window. Types ([Type]) are specified for individual device memory addresses.

This completes the import procedure.

ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Frequency_setup	Bit	<input type="checkbox"/>		Y000100	Place-Holder Variables
1	Acceleration_time	Word	<input type="checkbox"/>		Y000200	No.0 Global Signal AT
2	Alarm1	Bit	<input type="checkbox"/>		M003000	No.1 Global Signal AT
3	Alarm2	Bit	<input type="checkbox"/>		M003001	No.2 Global Signal AT
4	Alarm3	Bit	<input type="checkbox"/>		M003002	Within macro
5	Highspeed_counter	Double-Word	<input type="checkbox"/>		Y000400	Within macro
6	Count_value1	Word	<input type="checkbox"/>		C00401	Within macro
7	Count_value2	Word	<input type="checkbox"/>		C00402	Current value
8	Count_value3	Word	<input type="checkbox"/>		C00403	Current value
9	TitleA	Word	<input type="checkbox"/>		SW00500	A-LINE
10			<input type="checkbox"/>			
11			<input type="checkbox"/>			
12			<input type="checkbox"/>			
13			<input type="checkbox"/>			

## Notes

Note the following for importing CSV files.

- IDs that already have tags are overwritten with the imported data.
- Device memory addresses unavailable on the X1 series unit cannot be imported. If such a device memory address is included, the row is left blank.

For details on device memory available on the X1 series, refer to the X1 Series Connection Manual. Note that double-word device memory are imported as word device memory.

Device memory: VD → VW, ID → IW, QD → QW, MD → MW, SMD → SMW, SD → SW

## 11.6 Notes

### Tag Settings

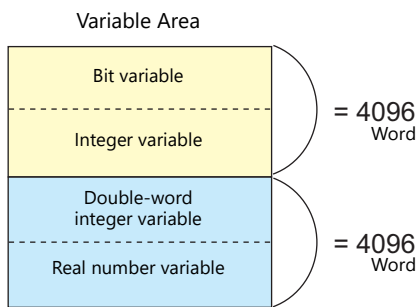
Tags cannot be specified for the following items.

- [Screen Setting] → [PLC Device Transfer]
- Device memory map (transfer source device memory, transfer destination device memory 1, transfer destination device memory 2, control device memory)
- Modbus device memory table

### “Tag” Variable Capacity

When “tag” variables are registered in the [Tag Database Edit] window, the variable area in the MONITOUCH is used. Since the capacity of the variable area is limited, check the word count currently used, and be careful not to exceed the capacity.

#### Capacity of Variable Area

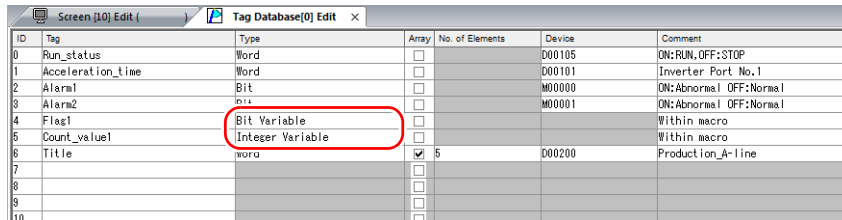


Variable Type	Data Type	Capacity
Bit variable *	1-bit data	4096 word
Integer variable	1-word data	
Double-word integer variable	Double-word data	4096 word
Real number variable	32-bit single precision real number format	

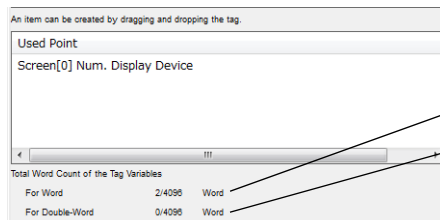
\* If the bit variable is specified in array format, 1 word is occupied in the variable area even if “16” or a smaller number is specified for the number of elements.

### Checking the Capacity of “Tag” Variable

Check the capacity when the “tag” variables are registered as shown below.



2 words are occupied in the variable area.



Integer variable “1” + bit variable “1”  
Two words are used per double-word integer variable  
Example: A total of four words are used when two double-word integer variables are registered

For details on status list operations, refer to “11.4 Tag Status List”.



The value is indicated in red when it exceeds the maximum value. If the tag indicated in red is used on the screen, the message “Error: 46” appears and the unit will not run. Set a value smaller than the maximum.

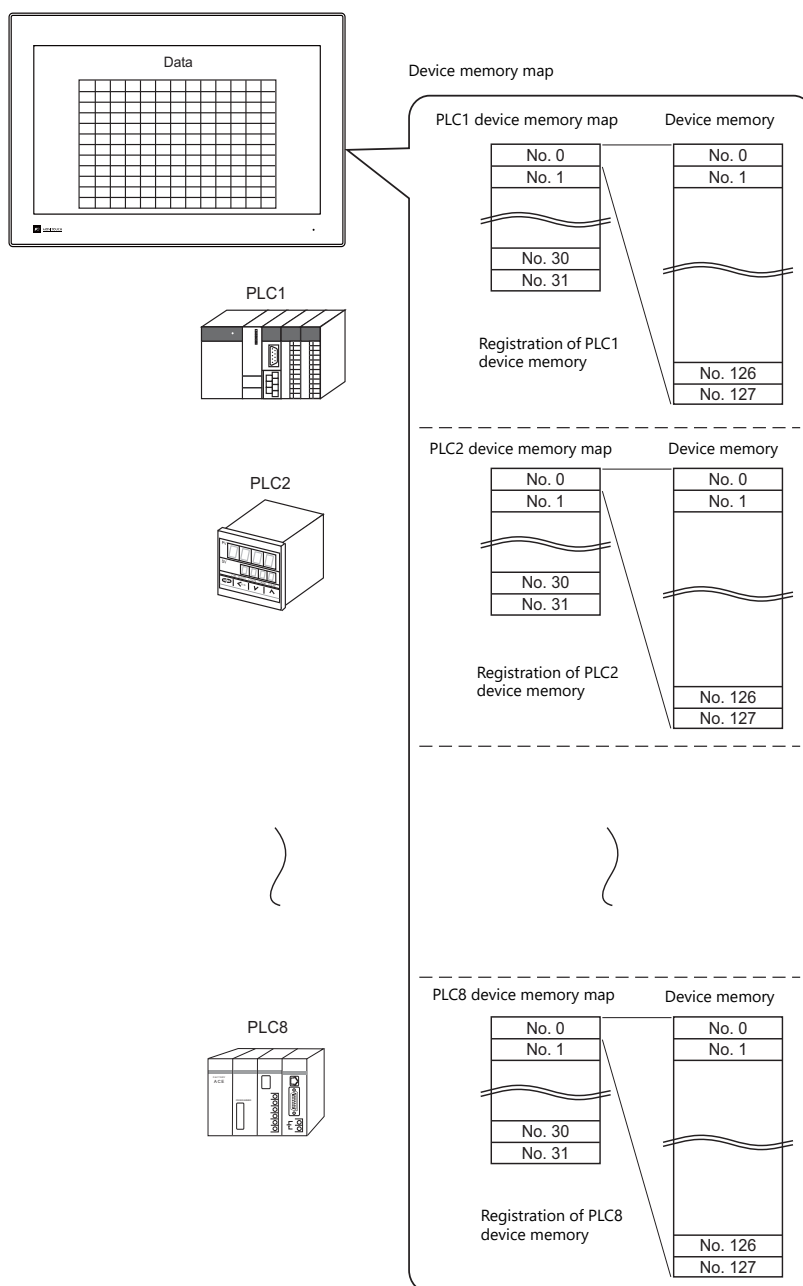
## **12 Device Memory Map**

---



## 12.1 Overview

- The X1 series unit contains device memory map numbers 0 to 31 (32 total) with respect to a single logical port. 128 addresses can be registered to a single device memory map and batch transfer of addresses can be performed between each equipment.



- Functions that use device memory maps
  - Periodical reading
 

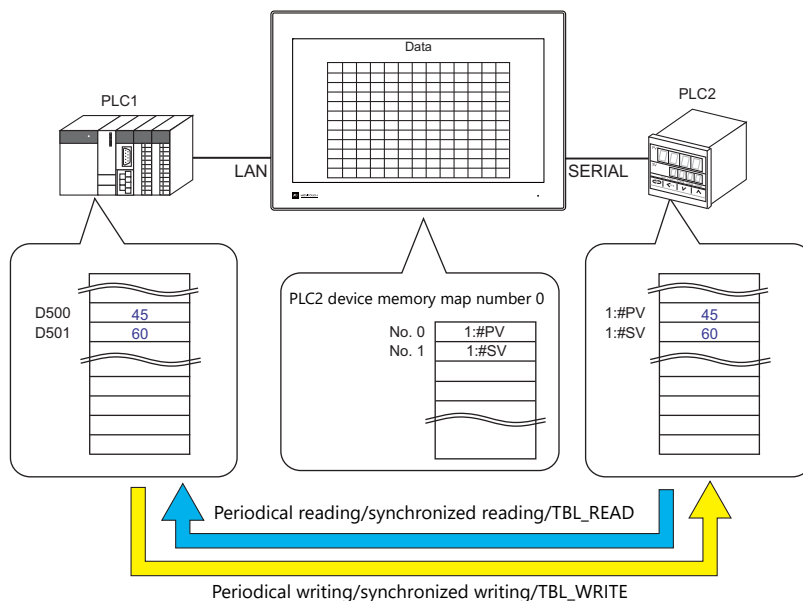
Data in device memory addresses registered on a device memory map is periodically transferred to other equipment. (“12.3 Periodical Reading” page 12-7)
  - Periodical writing
 

Data in other equipment is periodically transferred to device memory addresses registered on a device memory map. (“12.7 Control Device” page 12-12)
  - Synchronized reading
 

Data in device memory addresses registered on a device memory map is transferred to other equipment when the relevant bit turns ON. (“12.4 Synchronized Reading” page 12-8)
  - Synchronized writing
 

Data in other equipment is transferred to device memory addresses registered on a device memory map when the relevant bit turns ON. (“12.6 Synchronized Writing” page 12-11)
  - Macros (TBL\_READ, TBL\_WRITE)
 

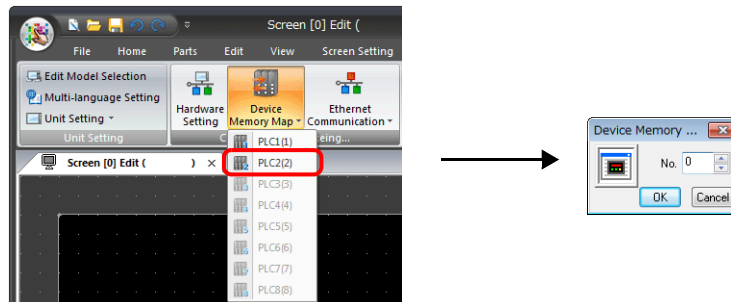
Data in device memory addresses registered on a device memory map is transferred using the “TBL\_READ” and “TBL\_WRITE” macro commands. (“12.8 TBL\_READ/TBL\_WRITE” page 12-13, “12.9 System Device Memory” page 12-14)



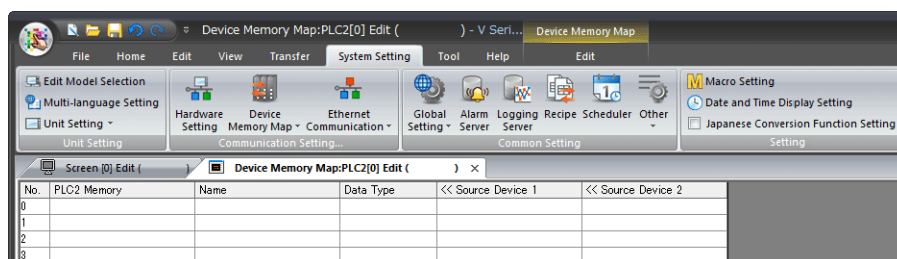
## 12.2 Editing Device Memory Maps

### 12.2.1 Starting

1. Click [System Setting] → [Device Memory Map] → [PLCn].  
The [Device Memory Map: PLCn] window is displayed.



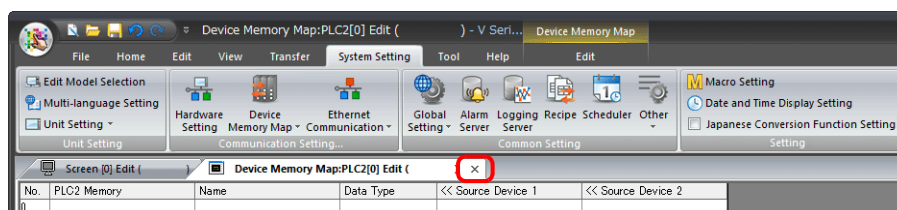
2. Select a device memory map number and click [OK].  
The [Device Memory Map Edit] window is displayed.



A device memory map has numbers 0 to 31 (32 total) with respect to a single logical port and 128 addresses can be registered to each device memory map.

### 12.2.2 Quitting

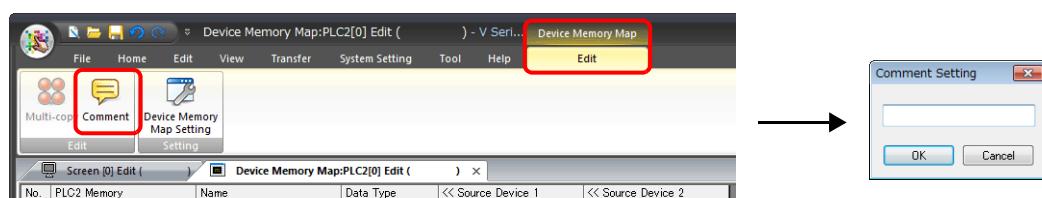
Click the close button.



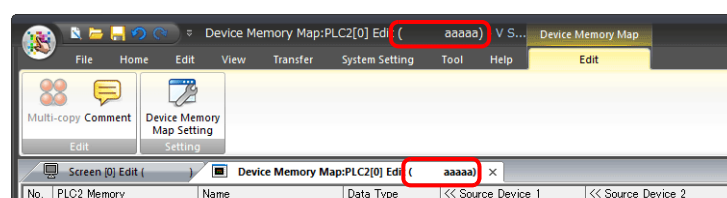
### 12.2.3 Comment Settings

A comment can be set to each device memory map.

1. With the device memory map displayed, click [Edit] → [Comment]. The [Comment Setting] window is displayed.

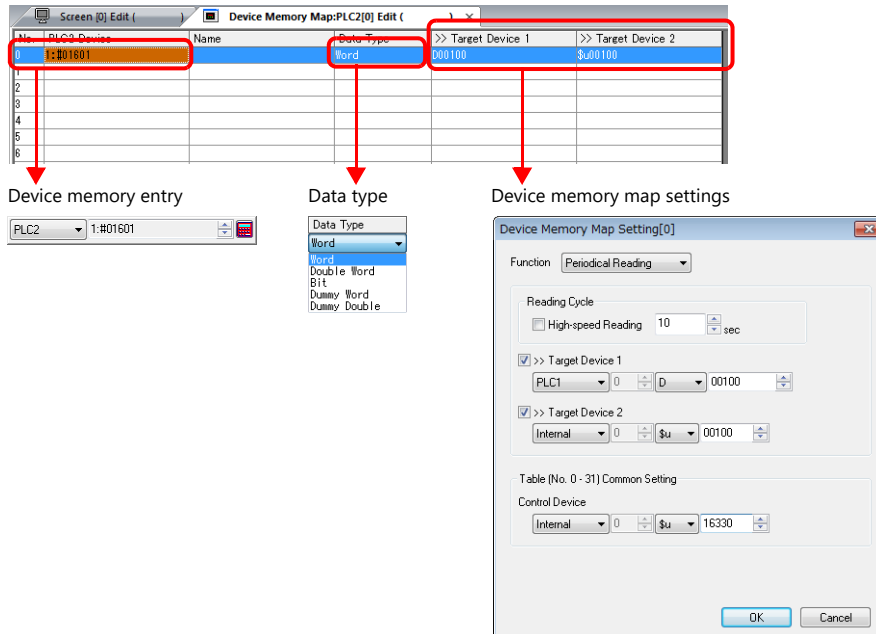


2. Enter a comment and click the [OK] button. The comment is displayed.



## 12.2.4 Editing the Device Memory Map

Double-click a cell to display the settings window.

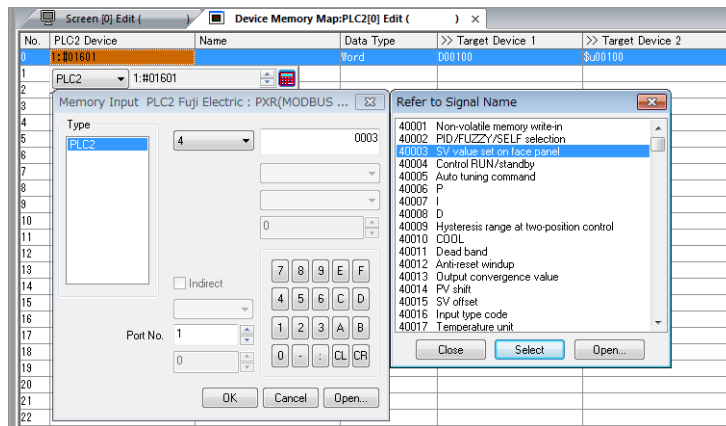


\* The [Device Memory Map Setting] window can also be displayed by clicking [Edit] → [Device Memory Map Setting] with the device memory map displayed.

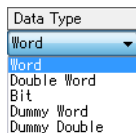
### 1. Device memory entry

Set the device memory for transfer. If the [Device Memory Map Edit] window for PLC2 is open, register PLC2 device memory.

The following figure shows the list view.



### 2. Data type



Item	Description
Word	Data is handled as single-word numerical data. Data is transferred based on the [Communication Setting] → [Code] setting of each logical port. *1
Double Word	Data is handled as two-word numerical data. Data is transferred based on the [Communication Setting] → [Code] setting of each logical port. *1
Bit	Data is handled as single-word bit information. Data is transferred as is without conversion. *2
Dummy Word Dummy Double	The transfer source/target device memory addresses are automatically registered with consecutive numbers. If there is an address to be skipped, leaving it not configured (blank) will result in either a dummy word or double word being assigned. When reading: "0" is always stored in the transfer target device memory. Cannot be used for any other purpose. When writing: The transfer source device memory can be used for other purposes.

\*1 When Word or Double Word is selected:

The internal device memory of the X1 series unit are always handled as "DEC (with sign)".

	Code	Bit status																																																
Reading ↓ Transfer source PLC	Communication setting BCD	<table border="1"> <tr><td colspan="15">MSB</td><td colspan="1">LSB</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>	MSB															LSB	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	MSB															LSB																																		
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																		
	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0																																		
X1 internal device memory	DEC	<table border="1"> <tr><td colspan="15">MSB</td><td colspan="1">LSB</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr> </table>	MSB															LSB	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
MSB															LSB																																			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0																																			
Transfer target PLCm	Communication setting DEC	<table border="1"> <tr><td colspan="15">MSB</td><td colspan="1">LSB</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr> </table>	MSB															LSB	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
	MSB															LSB																																		
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0																																			
Communication setting BCD	<table border="1"> <tr><td colspan="15">MSB</td><td colspan="1">LSB</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>	MSB															LSB	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
MSB															LSB																																			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0																																			

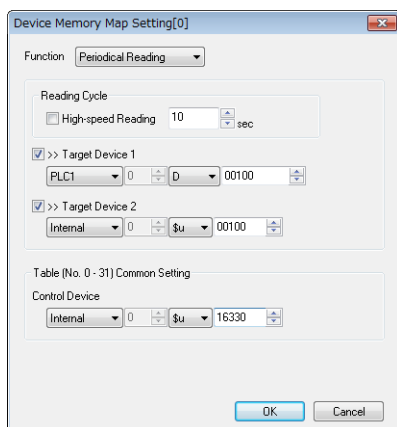
\*2 When Bit is selected:

	Code	Bit status																																																
Reading ↓ Transfer source PLC	Communication setting BCD																																																	
	X1 internal device memory	<table border="1"> <tr><td colspan="15">MSB</td><td colspan="1">LSB</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table>	MSB															LSB	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	MSB															LSB																																		
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0																																			
Transfer target PLCm	Communication setting DEC																																																	
	Communication setting BCD																																																	

### 3. Device memory map settings

Set the purpose of each device memory map.

- TBL\_READ/TBL\_WRITE → [page 12-13](#)
- Periodical reading → [page 12-7](#)
- Synchronized reading → [page 12-8](#)
- Periodical writing → [page 12-10](#)
- Synchronized writing → [page 12-11](#)



## 12.2.5 Permitting Interruption

Interruption can be permitted by right-clicking on the relevant device memory map number and selecting [Enabling Interruption] on the menu.

When interruption is permitted, an asterisk mark (\*) is shown next to the device memory map number. Switch output, cycle reading, trend/alarm reading operations can be performed during device memory map processing.

Operation for the following settings

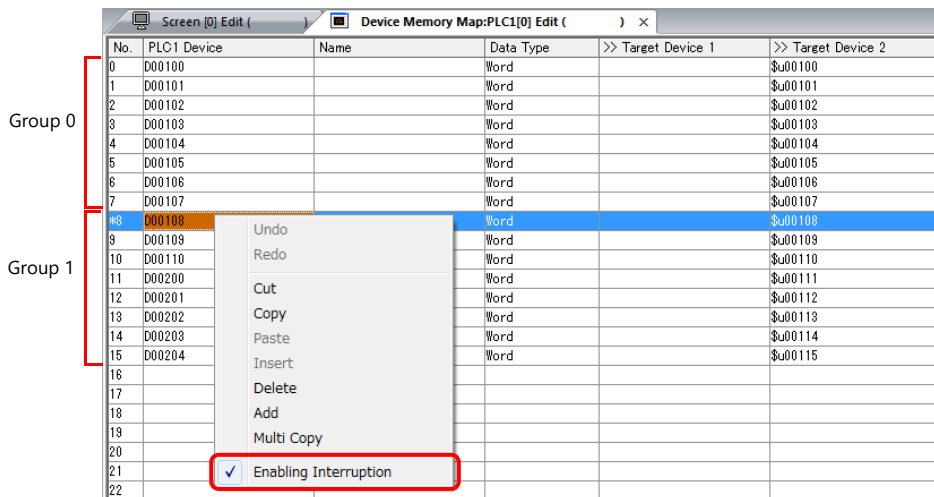
Reading group 0 (numbers 0 to 7)

↓

Switch output, cycle reading, trend/alarm reading

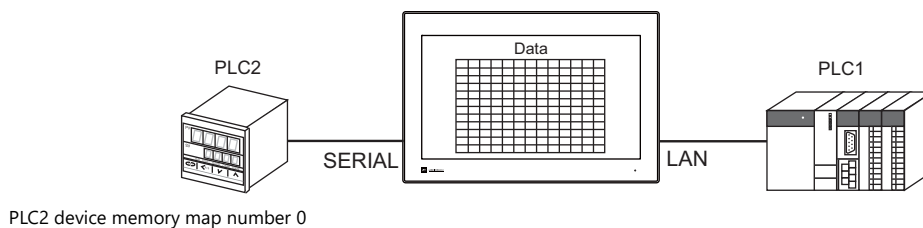
↓

Reading group 1 (numbers 8 to 15)



## 12.3 Periodical Reading

Data in a device memory address registered on a device memory map is transferred to the targeted address at the timing set for [Reading Cycle].



No.	PLC2 Device	Name	Data Type	>> Target Device 1	>> Target Device 2
0	1: #31001	Process value (PV)	Word	D00100	
1	1: #41003	SV value controlled on face panel	Word	D00101	
2					
3					
4					
5					

Transferred at 5 second intervals

### Settings

Settings required for periodical reading

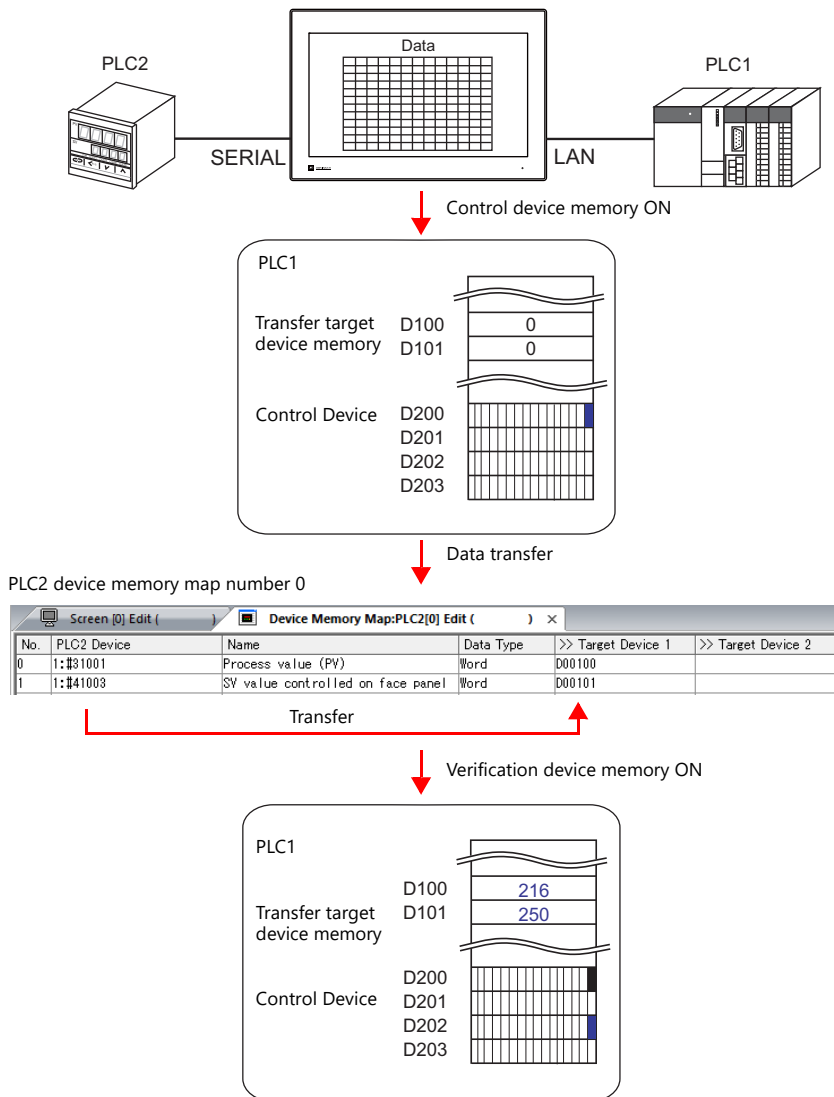
- "Editing Device Memory Maps" (page 12-3)
- "Device Memory Map Settings"

Disabled when [Periodical Reading] is selected

Item	Description											
Function	Periodical reading											
Reading Cycle	Set the cycle for periodical data reading. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">[High-speed Reading] checkbox</th> <th colspan="2">Reading Cycle</th> </tr> <tr> <th>Setting Range</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Unselected</td> <td>1 - 3600</td> <td>1s</td> </tr> <tr> <td>Selected</td> <td>1 - 3600</td> <td>100ms</td> </tr> </tbody> </table>	[High-speed Reading] checkbox	Reading Cycle		Setting Range	Unit	Unselected	1 - 3600	1s	Selected	1 - 3600	100ms
[High-speed Reading] checkbox	Reading Cycle											
	Setting Range	Unit										
Unselected	1 - 3600	1s										
Selected	1 - 3600	100ms										
Target Device 1 Target Device 2	Set the device memory address for storing the read data.											
Control Device	Disabled when [Periodical Reading] is selected.											

## 12.4 Synchronized Reading

Data in a device memory address registered on a device memory map is transferred to the targeted address when the relevant bit changes from 0 to 1.

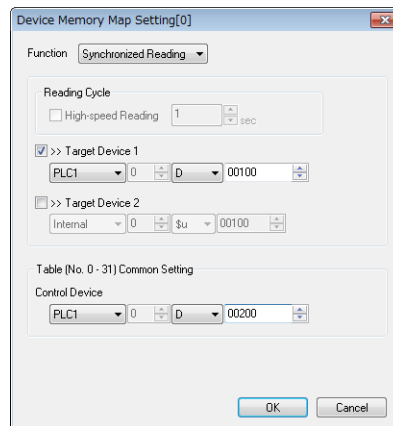




## Settings

Settings required for synchronized reading

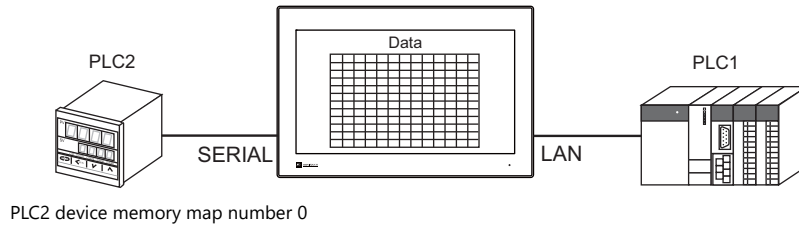
- "Editing Device Memory Maps" (page 12-3)
- "Device Memory Map Settings"



Item	Description
Function	Synchronized reading
Target Device 1 Target Device 2	Set the device memory address for storing the read data.
Control Device	Set the device memory address that serves as the trigger for synchronized reading. Four words are used for an address common to device memory map numbers 0 to 31. For details, refer to "Control Device" page 12-12.

## 12.5 Periodical Writing

Data in a source device memory address is transferred to the address registered on the device memory map at the timing set for [Writing Cycle].



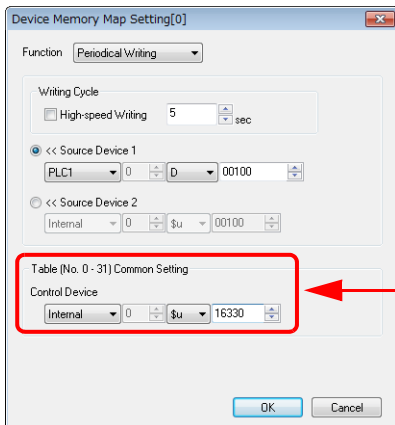
No.	PLC2 Device	Name	Data Type	<< Source Device 1	<< Source Device 2
0	1: #41003	SV value controlled on face panel	Word	D00100	
1					
2					
3					
4					
5					

Transferred at 5 second intervals

### Settings

Settings required for periodical writing

- "Editing Device Memory Maps" (page 12-3)
- "Device Memory Map Settings"

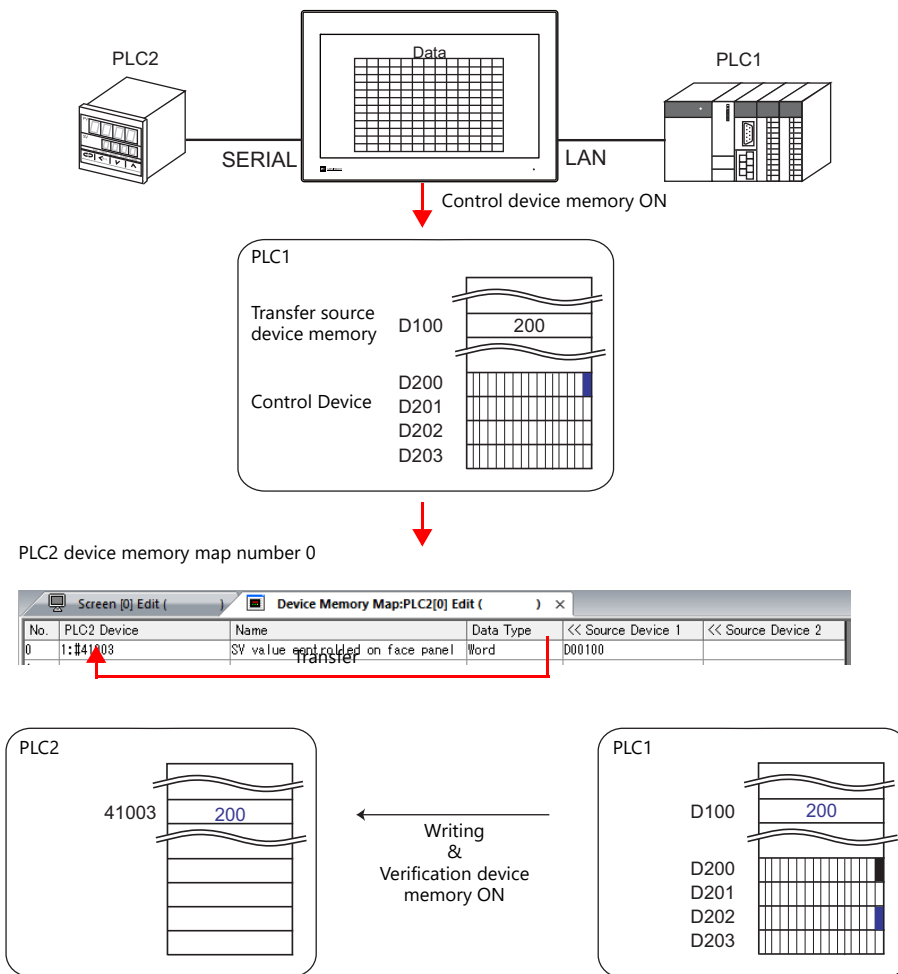


Disabled when [Periodical Writing] is selected

Item	Description											
Function	Periodical writing											
Periodical Writing	Set whether to perform periodical data writing.											
	<table border="1"> <thead> <tr> <th rowspan="2">[High-speed Reading] checkbox</th> <th colspan="2">Reading Cycle</th> </tr> <tr> <th>Setting Range</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Unselected</td> <td>1 - 3600</td> <td>1s</td> </tr> <tr> <td>Selected</td> <td>1 - 3600</td> <td>100ms</td> </tr> </tbody> </table>	[High-speed Reading] checkbox	Reading Cycle		Setting Range	Unit	Unselected	1 - 3600	1s	Selected	1 - 3600	100ms
	[High-speed Reading] checkbox		Reading Cycle									
Setting Range		Unit										
Unselected	1 - 3600	1s										
Selected	1 - 3600	100ms										
Source Device 1 Source Device 2	Set the device memory address of the source data to transfer.											
Control Device	Disabled when [Periodical Writing] is selected.											

# 12.6 Synchronized Writing

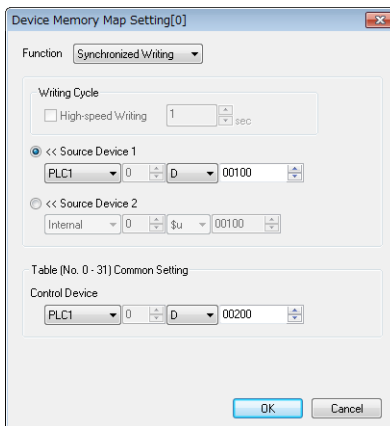
Data in a source device memory address is transferred to the address registered on the device memory map when the control device memory changes from 0 to 1.



## Settings

Settings required for synchronized writing

- "Editing Device Memory Maps" (page 12-3)
- "Device Memory Map Settings"



Item	Description
Function	Synchronized writing
Source Device 1 Source Device 2	Set the device memory address for storing data from the transfer source.
Control Device	Set the device memory address that serves as the trigger for synchronized writing. Four words are used for an address common to device memory map numbers 0 to 31. For details, refer to "Control Device" page 12-12.

## 12.7 Control Device

This type of device memory is used when synchronized reading or synchronized writing is performed. Four consecutive words are used from control device memory n.

The control device memory can also be changed via [System Setting] → [Device Memory Map] → [PLCn] → [Edit] → [Device Memory Map Setting].

Control Device	Description	Device Memory Type
n	Command device memory for reading/writing	→ X1
n+1		
n+2	Verification device memory for reading/writing	← X1
n+3		

### Reading/Writing Command Device Memory (Control device memory n, n+1)

One bit is assigned to each device memory map.

Reading and writing for the specified device memory map is executed according to the change in bit status from 0 to 1.

n

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	←

Device memory map numbers 0 to 15

n+1

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	←

Device memory map numbers 16 to 31

### Reading/Writing Verification Device Memory (Control device memory n+2, n+3)

One bit is assigned to each device memory map.

The turning ON (0 → 1) of the command device memory is recognized, and when the reading/writing finishes, the corresponding bit of the verification device memory turns ON (0 → 1).

Also, when the turning OFF (1 → 0) of the command device memory is recognized, the verification bit of the corresponding device memory map number turns OFF (1 → 0).

n+2

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	←

Device memory map numbers 0 to 15

n+3

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	←

Device memory map numbers 16 to 31

- Synchronized reading  
Only one address needs to be successfully read among the addresses registered on the device memory map for the verification device memory to turn ON.  
If no addresses were successfully read, the verification bit does not turn ON.
- Synchronized writing  
Regardless of whether writing succeeds or fails, the verification bit turns ON after writing is finished.

## 12.8 TBL\_READ/TBL\_WRITE

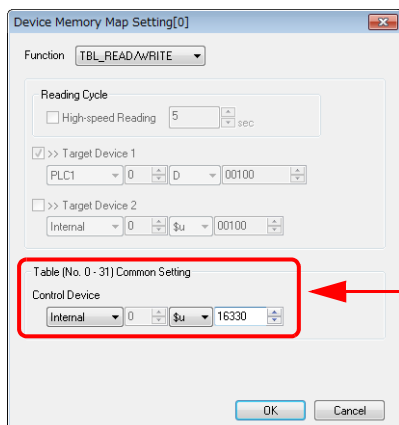
Data in device memory addresses registered on a device memory map is transferred at once using the “TBL\_READ” and “TBL\_WRITE” macro commands.

### Settings

Settings required for device memory map transfer

- “Editing Device Memory Maps” (page 12-3)
- Device memory map settings
- Macros (TBL\_READ/TBL\_WRITE)

### Device Memory Map Settings



Disabled when TBL\_READ/TBL\_WRITE is selected

Item	Description
Function	TBL_READ/TBL_WRITE * Transfer is possible using a macro even for device memory maps selected for other functions.
Control Device	Disabled when TBL_READ/TBL_WRITE is selected.

### Macros

Register a switch ON macro, interval timer etc. For details on macro commands, refer to the V9 Series Macro Reference Manual.

- TBL\_READ  
Transfers data in device memory addresses registered on a device memory map to device memory of other equipment.
- TBL\_WRITE  
Transfers data from other equipment to a device memory address registered on a device memory map.

## 12.9 System Device Memory

This section explains the system device memory addresses of the X1 series that are related to device memory maps.

\$Pn (n=1 - 8)	\$s*1	Description	Device Type
493	762 (PLC2)	Device memory map reading prohibition flag 0: Periodical reading/synchronized reading executable Other than 0: Periodical reading/synchronized reading stopped	→ X1
494	763 (PLC2)	Device memory map TBL_READ/TBL_WRITE macro forced execution Macro operation setting when a port is not communicating 0: Do not execute the macro with respect to all ports Other than 0: Execute the macro with respect to connected ports	
495	764 (PLC2)	Device memory map writing prohibition flag 0: Periodical writing/synchronized writing executable Other than 0: Periodical writing /synchronized writing stopped	

\*1 When controlling a device memory map using \$s762, \$s763, or \$s764, set [PLC Properties] → [Detail] → [System memory (\$s) V7 Compatibility] to [Yes] for PLC2. In this case, \$P2:493/494/495 cannot be used.

### \$Pn:493, 495

These system device memory addresses can be used to temporarily stop periodical reading/synchronized reading or periodical writing/synchronized writing set in the device memory map.

\$Pn:493

- 0: Periodical reading/synchronized reading is always executed.
- Other than 0: Periodical reading/synchronized reading is stopped.

\$Pn:495

- 0: Periodical writing/synchronized writing is always executed.
- Other than 0: Periodical writing/synchronized writing is stopped.

• Example: Periodical reading

When PLC2 device memory is accessed by a macro, macro completion is delayed when periodical reading of the device memory map is executed (as shown in figure A). To avoid this, periodical reading can be stopped temporarily using \$P2:493 (as shown in Figure B).

Figure A

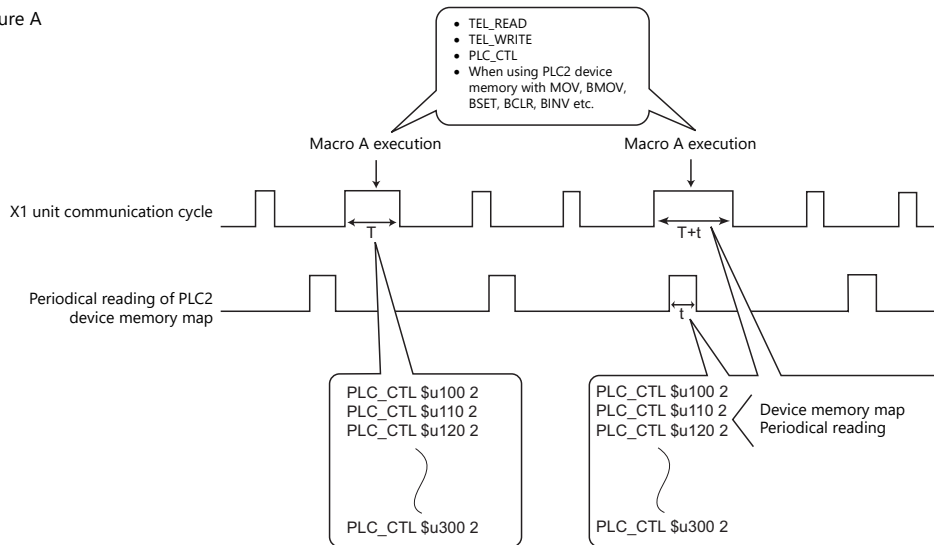
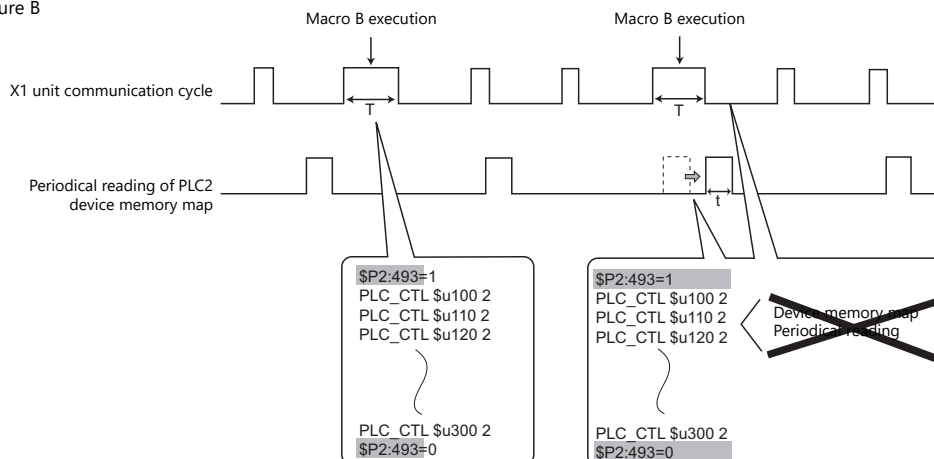


Figure B



## **13 String Table Function**

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# 13.1 Overview

- Strings that are used many times throughout the screen program can be registered to a string table. Once registered, they can be used for text items as well as switches and lamps by simply selecting the string from the string table. If a string needs to be changed, changing the string in the string table will change all occurrences in the screen program, thereby shortening the time required to modify the screen program.

String table

No.	Text	Group Name
0	MENU	Title
1	Logging	Title
2	Alarm History	Title
3	Operation Screen	Title
4	Manual Operation	Title
5	Current	Logging
6	Humidity	Logging
7	Temperature	Logging
8		

Screen[0] Text  
Screen[1] Switch  
Screen[2] Switch  
Screen[3] Switch  
Screen[4] Switch

Refer to the string table and set the string to use for each item and part.  
(Example string: MENU)

Screen No. 0 Text

Screen No. 1 Switch

Screen No. 2 Switch

- Additions and modifications can be made on the string table from each item and part as well.

## Items and Parts that can Use the String Table

- Switch
- Lamp
- Text
- Multi-text



## 13.2 Registration Method

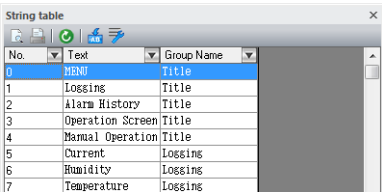
This section describes how to register strings to the string table and how to use the registered strings. There are two registration methods.

- Registration from the string table
- Direct registration from each part and item

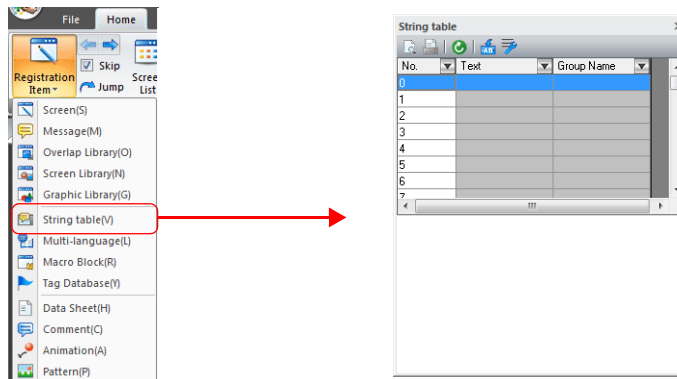
### 13.2.1 Registration from String Table

This section describes the procedure for preparing the following string table as an example and selecting strings for switches from the prepared string table.

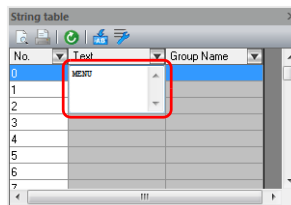
Text	Group Name
MENU Logging Alarm History Operation Screen Manual Operation	Title
Current Humidity Temperature	Logging



1. Click [Home] → [Registration Item] → [String table] to open a string table.

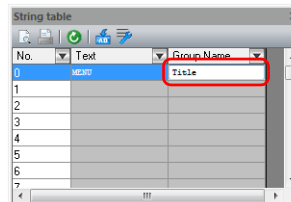


2. Double-click a [Text] field and enter the string.



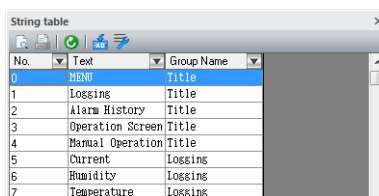
When entering multiple lines in the displayed field, press the [Enter] key.

3. Double-click a [Group Name] field and enter the name for categorizing the string.

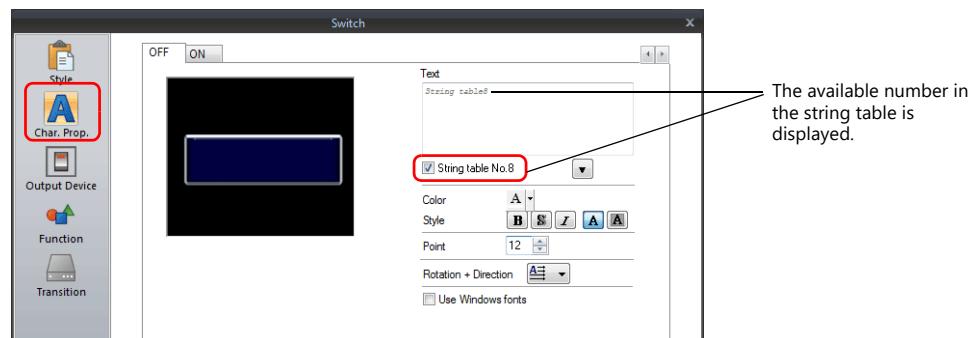


This field can be left blank if a group name is not required.

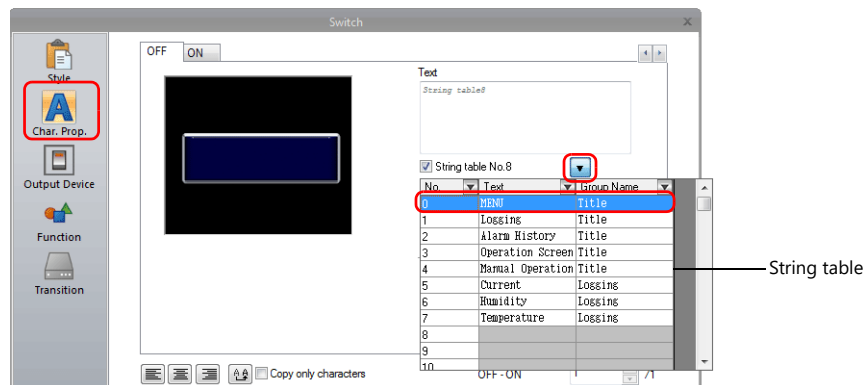
4. Register the other strings in the same procedure by following steps 2 and 3.



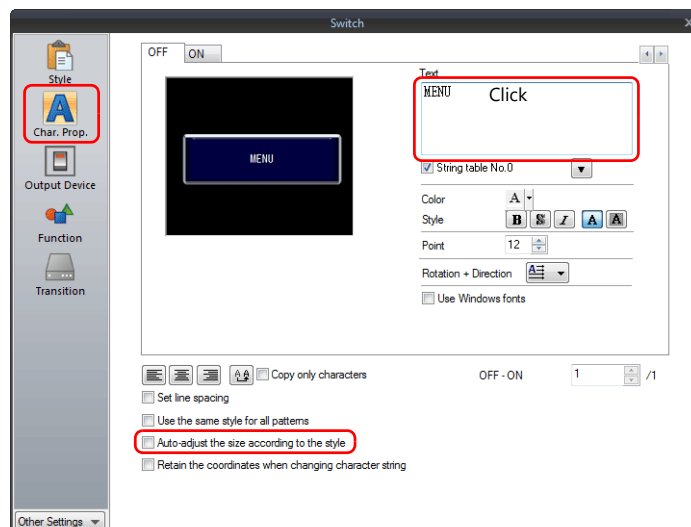
5. Double-click a switch to display its settings window.
6. Click [Char. Prop.] in the left menu pane and select the [String table No. XX] checkbox.



7. Click the down button to display the string table and then select the string to use from the table.



8. Click inside the [Text] field of the settings window. The selected string is displayed in the [Text] field.



For switch and lamp parts, the text display will vary according to the setting for [Auto-adjust the size according to the style].

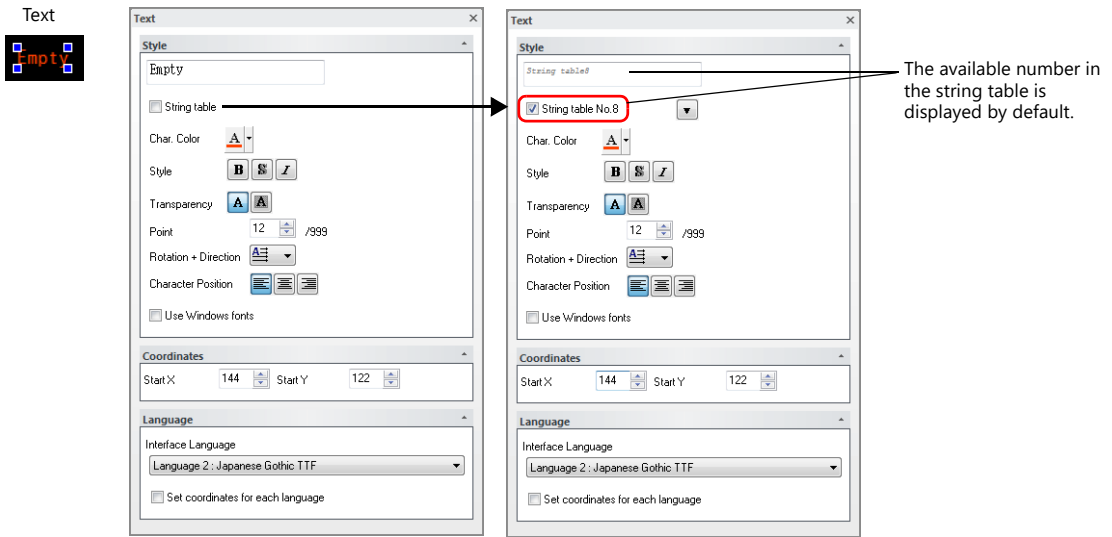
- Selected  
The part will be resized according to the length of the string.
- Unselected  
Only the characters that will fit in the current part size are displayed.  
(The number of rows that can be displayed depends on the maximum number of rows for the part/item type. Switches and lamps: 4 rows, Multi-text: 38 rows)

This completes the necessary settings.  
Configure the font size and color as necessary.

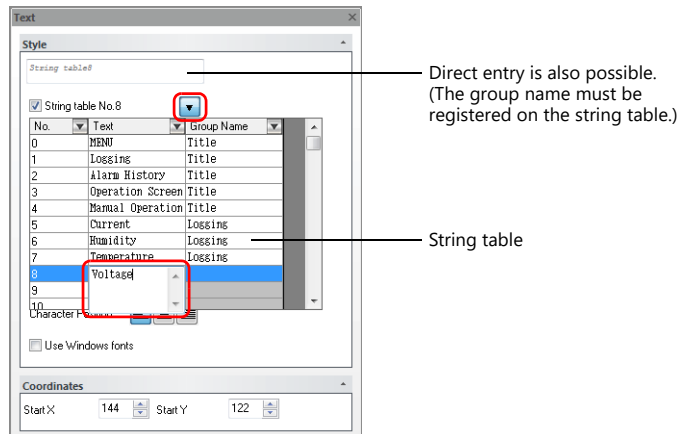
## 13.2.2 Direct Registration from Parts and Items

This section describes the procedure for registering a string from a text item to the string table as an example.

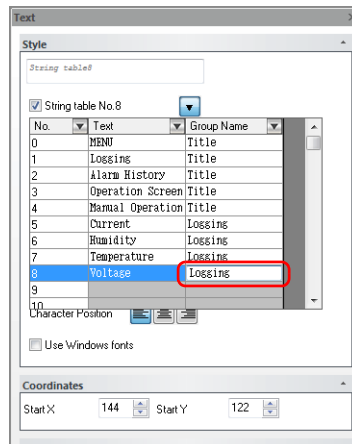
1. Click or double-click a text item placed on the screen to display its item view window. Select the [String table] checkbox.



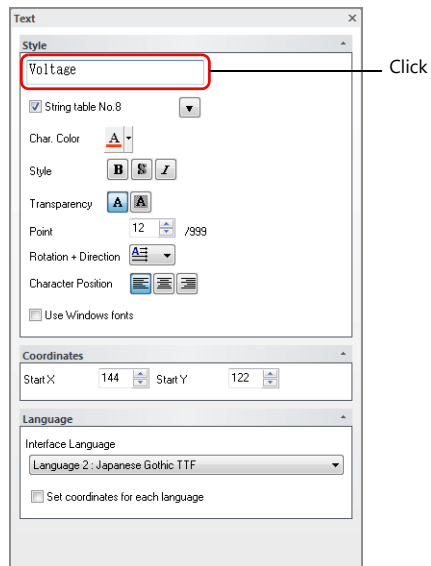
2. Click the down button to display the string table and then enter a string in an available number.



3. Register the group name.



4. With the relevant string table number selected, click on the text field. The string is displayed in the text field.



This completes the registration process.  
Configure the font size and color as necessary.

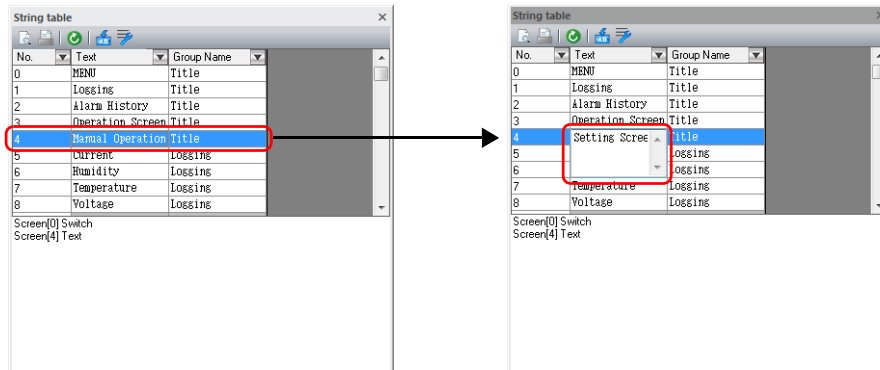
## 13.3 Changing Strings

This section describes the procedure for changing a string that is referencing the string table. There are two methods.

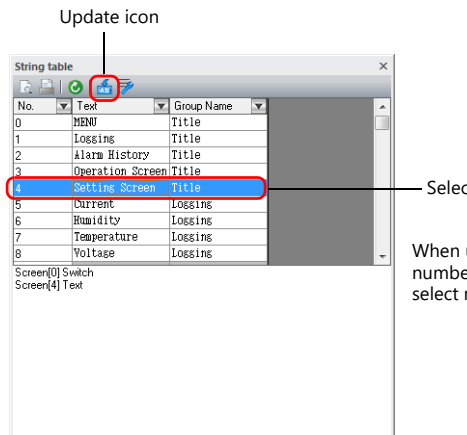
- Changing from the string table
- Changing from parts and items

### 13.3.1 Changing from String Table

1. Click [Home] → [Registration Item] → [String table] to open the string table and modify the relevant string.

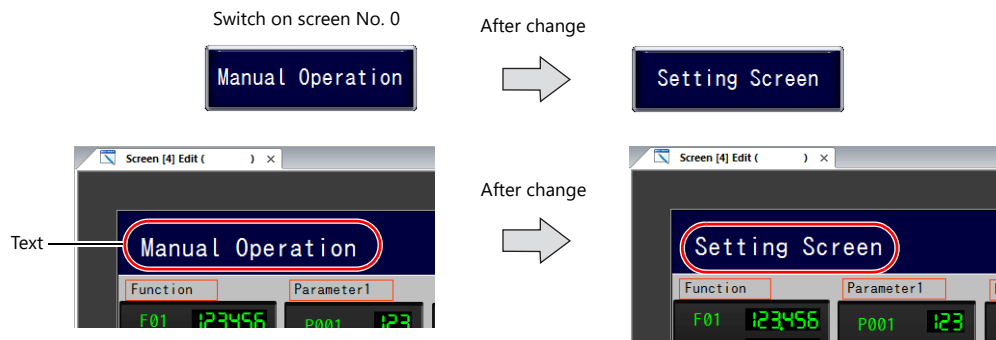


2. With the changed string number selected, click the update icon.



When updating changes for multiple string numbers at once, hold down the [Shift] key to select multiple strings.

All locations where the string is used are updated.



This completes the change.

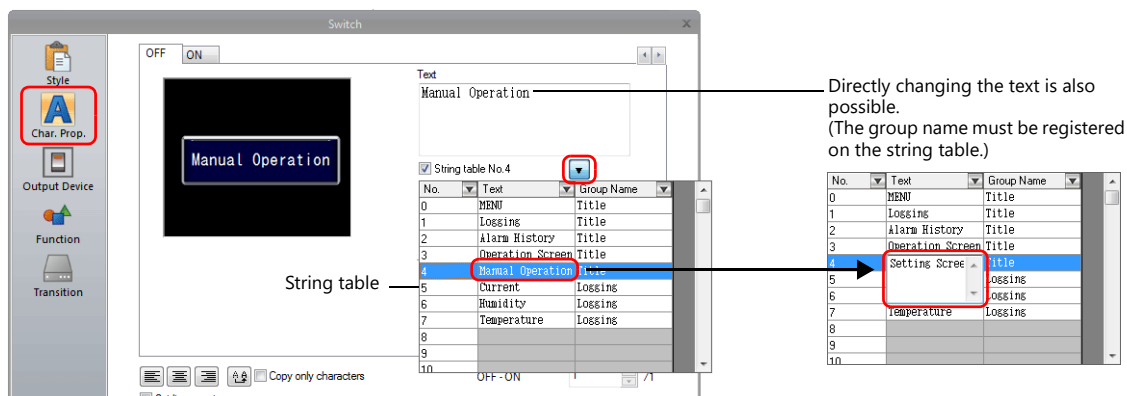


If a string has been changed, be sure to click the update icon. Locations where the string is currently in use will not be updated unless the icon is clicked.

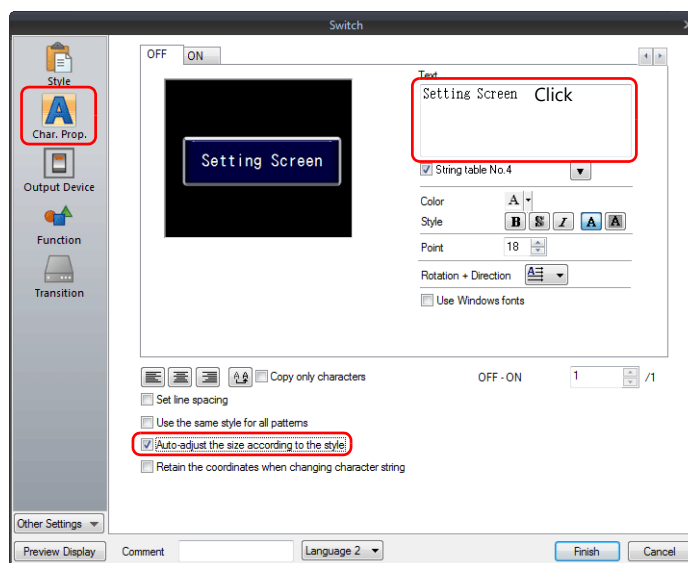
## 13.3.2 Changing from Parts and Items

This section describes the procedure for changing the text on a switch.

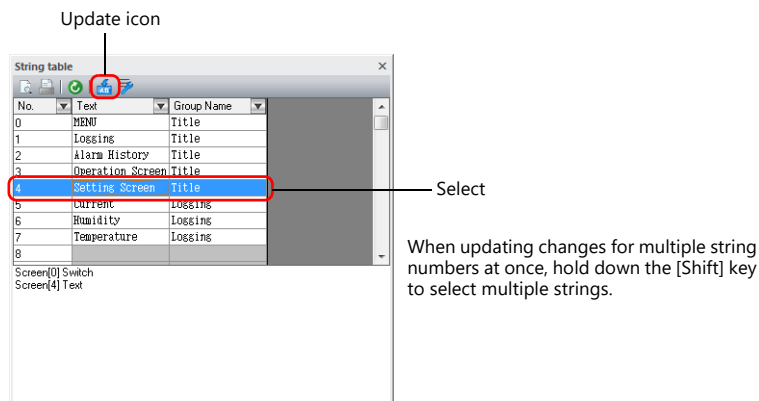
1. Double-click a switch to display its settings window.
2. Click [Char. Prop.] in the left menu pane.
3. Click the down button to display the string table and then change the relevant string on the table.



4. With the relevant string table number selected, click on the text field. The string is displayed in the text field. (The string table is updated as well.)



5. Click [Home] → [Registration Item] → [String table] to open the string table. With the changed string number selected, click the update icon.

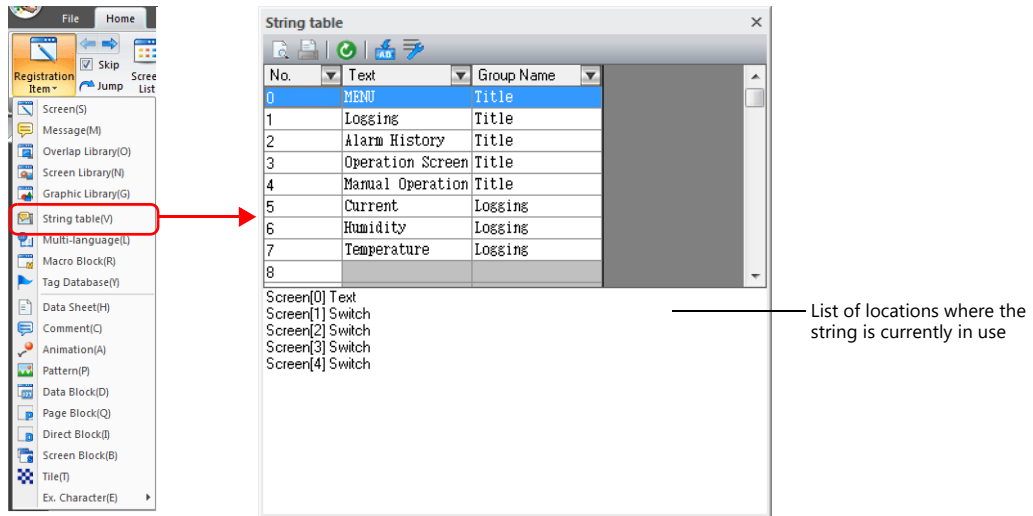


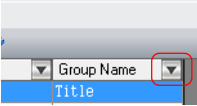
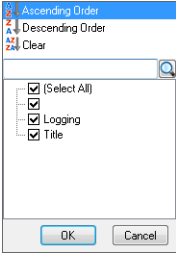
All locations where the string is used are updated.

This completes the change.

## 13.4 Editing the String Table

Click [Home] → [Registration Item] → [String table].



Item	Description
No.	Indicates the registration number of the string. No. 0 to 32767
Text	Register strings. Press [Enter] to input line breaks. Maximum of 254 characters, 128 lines
Group Name	Register a group name for categorizing the string. This field can be left blank if a group name is not required. Maximum of 256 characters, 1 line
Sort	Sort the table by [No.], [Text], or [Group Name].  
List of locations where the string is currently in use	List of locations where the selected string is currently in use Double-click on a location to jump to the relevant location.

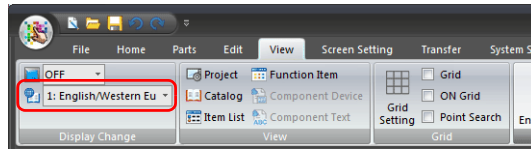
Enlarged view



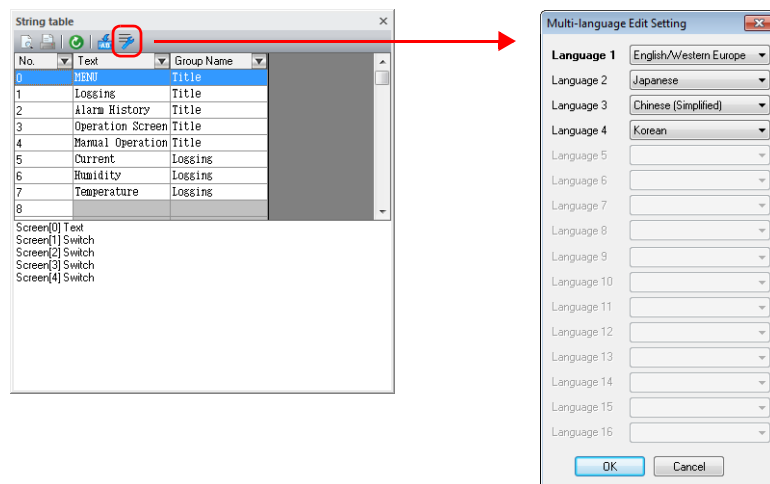
Item	Description
1. Print preview	Preview printer output of the string table.
2. Print current window	Print the string table.
3. Refresh	Refresh to the latest state.
4. Update	Update the locations where the currently selected string is used. Use this icon for updating after editing strings on the string table.
5. Multi-language edit setting	Specify the display language for the [Text] and [Group Name] columns on the string table. * The window displayed from this icon is also displayed from [Home] → [Registration Item] → [Multi-language].

## 13.5 Multi-language Configuration

- When creating a multi-language screen program, a string table can be prepared per language. Change the language for editing from the [View] → [Display Change] group.



- The [Text] and [Group Name] columns of the string table are displayed in the languages selected in the [Multi-language edit Setting] window. When displaying languages using Windows fonts, the display and editing of such languages is also possible regardless of the settings configured in the [Font Setting] window.



- \* The settings made on the [Multi-language edit Setting] window are saved to the screen program.



## 13.6 Notes

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### Multi-language Screen Programs

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- When using the string table for a part or item, all of the text displayed on that part or item must be selected on the string table.
- When exporting from [System Setting] → [Font Setting], only the string table is exported. The locations where the strings are used are not exported.  
If strings are changed on the exported file, the locations where the relevant string is used will be updated when the file is imported.
- In the [Multi-language Edit] tab window ([Home] → [Registration Item] → [Multi-language]), the string table is displayed but the locations where the strings are used are not.  
Changes made to the string table on the [Multi-language Edit] tab window are reflected to the locations where the string is used.

### Other Notes

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- When a string registered to the string table with multiple rows is selected for a text item, all line breaks are ignored and the entered characters are displayed in one line.
- When all numbers of the string table are used (No. 0 to 32767) and there is no available number, if the checkbox for using the string table is selected on any item settings window, No. 0 will be automatically selected.

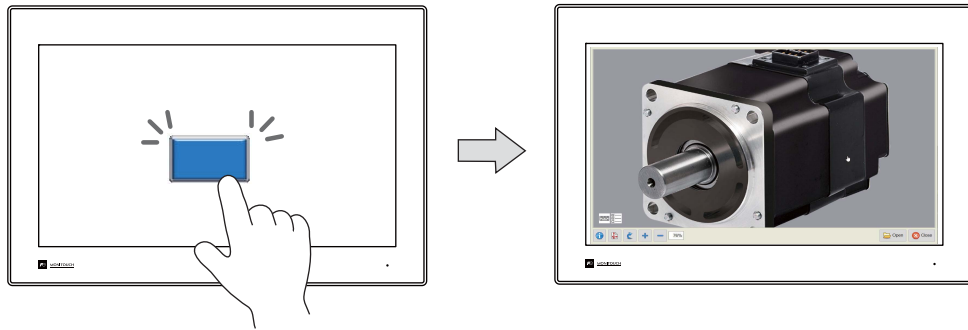
## **14 Picture Viewer**

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# 14.1 Overview

- Image files saved to a storage folder can be displayed on the X1 series unit. JPEG, bitmap, and PNG format files can be displayed.
- The storage folder to refer to can be selected (between the sd folder and usb folder) from the picture viewer.
- The picture viewer can be displayed using a switch part, the [Picture Viewer] switch on the system menu, or by a command from a PLC.

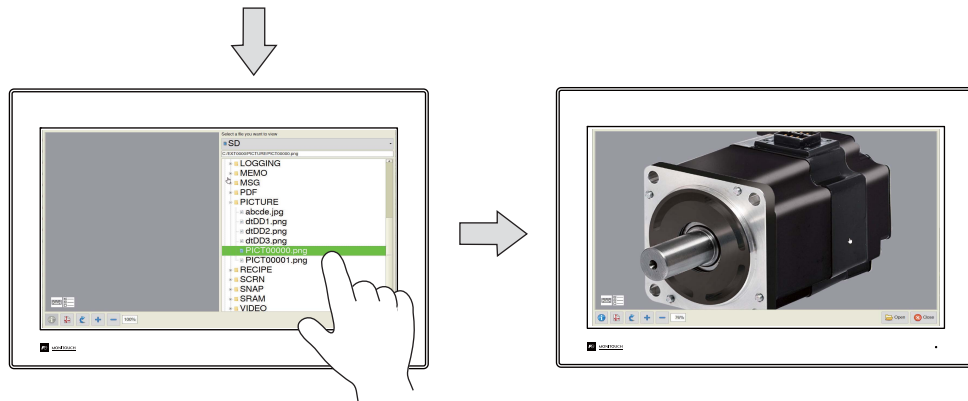
- Switch



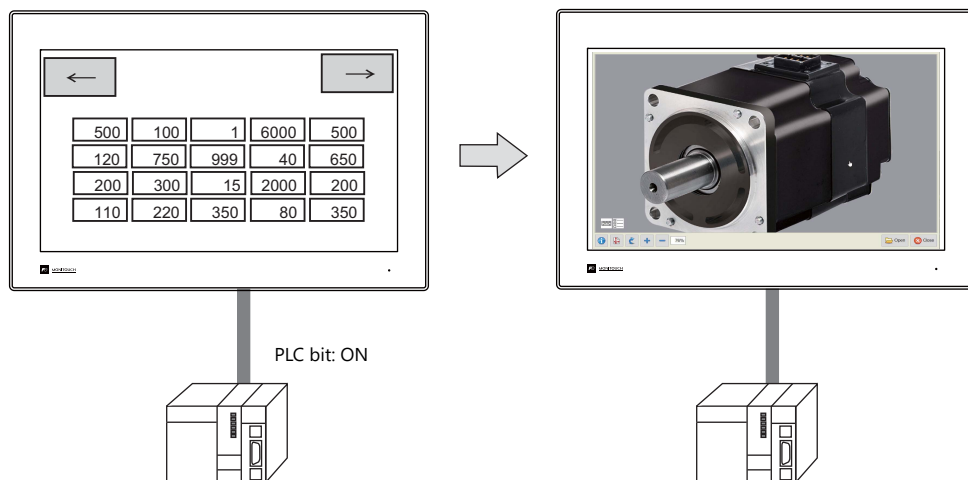
- System menu



\* Display is also possible in Local mode.



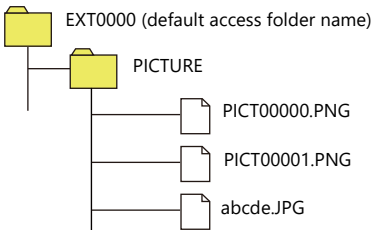
- PLC command



☞ For details on settings, refer to "14.3 Setting Example" page 14-3.

## 14.2 Specifications

### Image File Specifications

Item	Specifications
File types	JPEG (.JPG) PNG (.PNG) BITMAP (.bmp)
Filename* <sup>1</sup>	<ul style="list-style-type: none"> <li>• PICTxxxx (xxxx: 00000 to 99999) (For specification by file number)</li> <li>• Arbitrary filename (64 or less one-byte characters or 32 or less two-byte characters)</li> </ul>
File size	No limitation * <sup>2</sup>
Storage location	<p>Computer C:\MONITOUCH\User\PICTURE (default) Store files to the storage device using the storage manager.</p> <p>Storage folder</p> <ul style="list-style-type: none"> <li>• When displaying by selecting on the picture viewer: No settings are required.</li> <li>• When displaying using the switch function or by giving a command (control device memory) from a PLC: C:\MONITOUCH\X1\0\work\strage\storage folder\access folder\PICTURE</li> </ul>  <pre> graph TD     EXT0000[EXT0000 (default access folder name)] --&gt; PICTURE[PICTURE]     PICTURE --&gt; PICT0000.PNG[PICT0000.PNG]     PICTURE --&gt; PICT00001.PNG[PICT00001.PNG]     PICTURE --&gt; abcde.JPG[abcde.JPG]   </pre>

\*1 Files can have the duplicate filenames if the extension differs. When a PLC command is used to display an image, the file of the format selected at [Picture Viewer Setting] → [File Type] is displayed.

\*2 Larger files will take more time to load.

### Storing Files in a Storage Folder

This section describes the procedure for storing files in the "PICTURE" folder.

1. Create a "PICTURE" folder in the access folder located in a storage folder of the X1 series unit.
2. Connect a USB flash drive containing image files to the X1 series unit and copy the files to the "PICTURE" folder using the Explorer function of System Configurator.

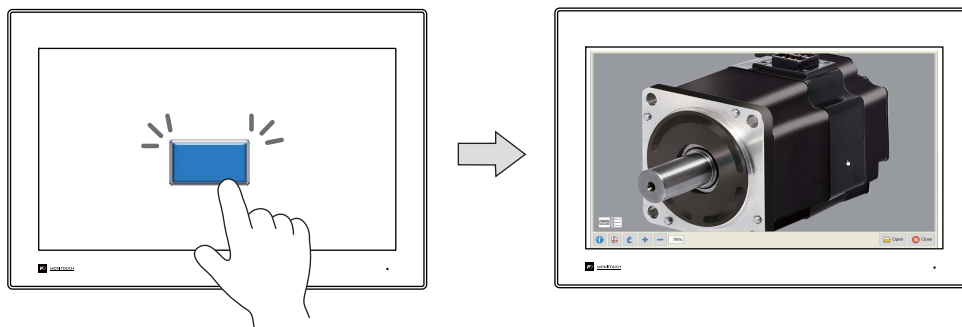
When displaying by the System Menu and selecting on the picture viewer, the image files can be stored in the desired folder of the internal storage folders ("sd" folder and "usb" folder).

## 14.3 Setting Example

The picture viewer can be displayed using a switch part, the [Picture Viewer] switch on the system menu, or by a command from a PLC.

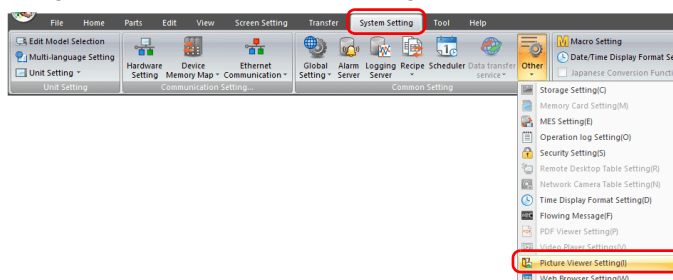
### 14.3.1 Displaying Using a Switch Part

The picture viewer can be displayed by using a switch part.

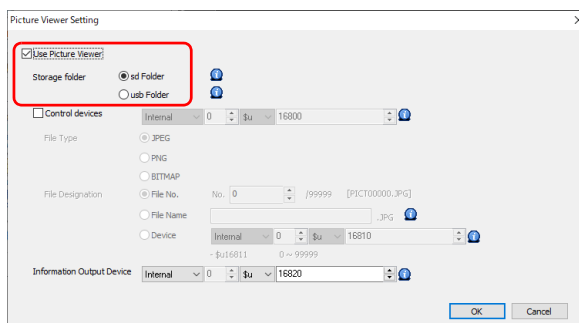


## V-SFT Settings

1. Click [System Setting] → [Other] → [Picture Viewer Setting].



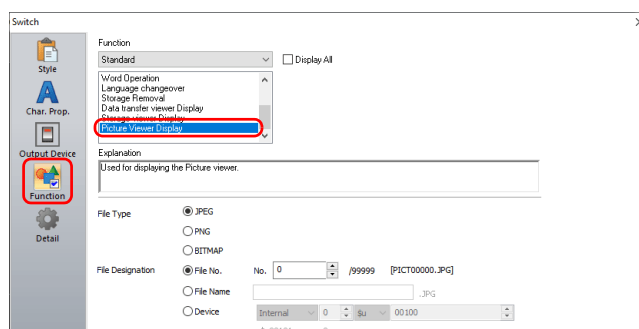
2. In the [Picture Viewer Setting] window, select the [Use Picture Viewer] checkbox and select a [Storage Folder].



3. Click [OK].

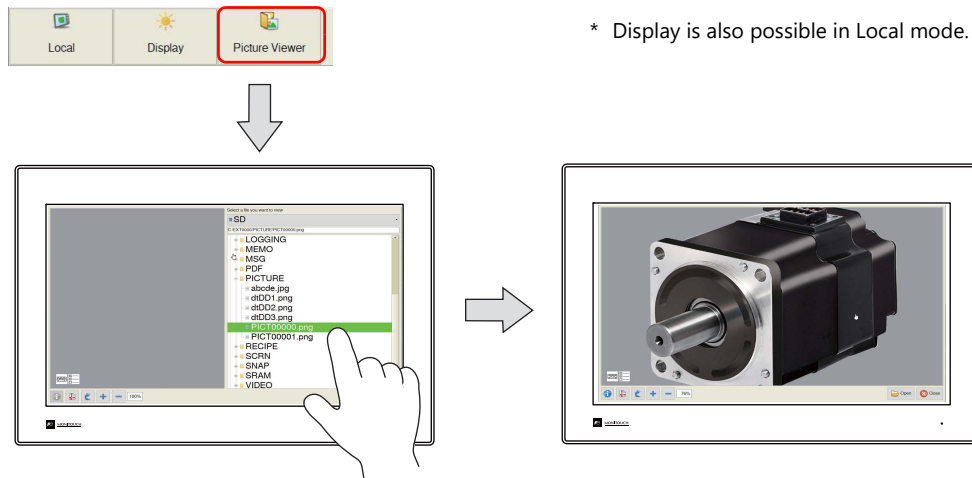
## Placing a Switch

1. Place a switch from the [Parts] menu.
2. Click [Function] → [Standard] → [Picture Viewer Display] and configure the [File Type] and [File Designation] settings.



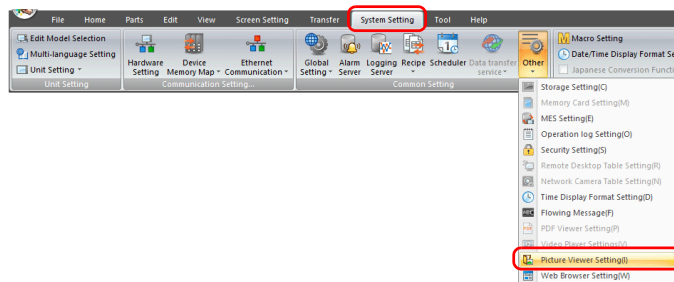
## 14.3.2 Displaying from the System Menu

The picture viewer can be displayed by pressing the [Picture Viewer] switch on the system menu. Select the file to display from the File List screen.

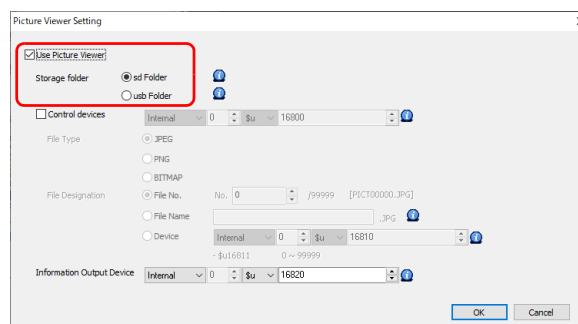


## V-SFT Settings

1. Click [System Setting] → [Other] → [Picture Viewer Setting].



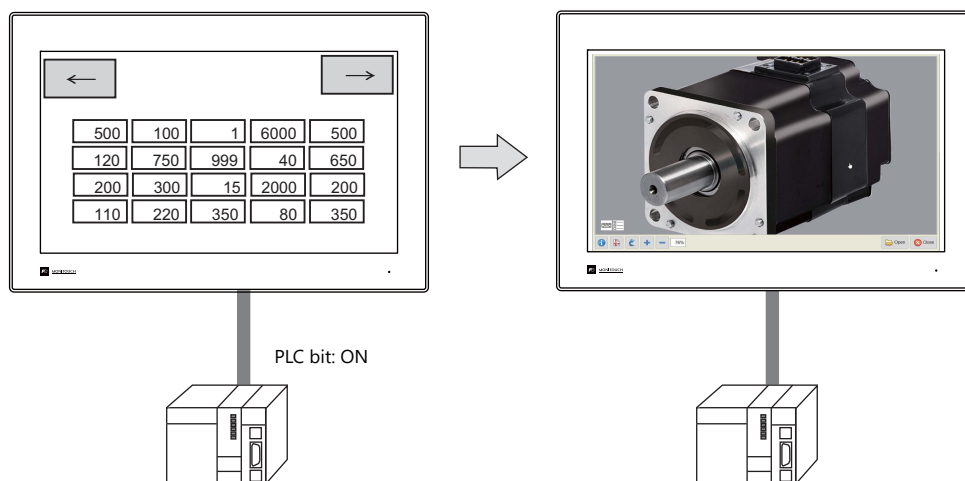
2. In the [Picture Viewer Setting] window, select the [Use Picture Viewer] checkbox and select a [Storage Folder].



3. Click [OK]. This completes the necessary settings.

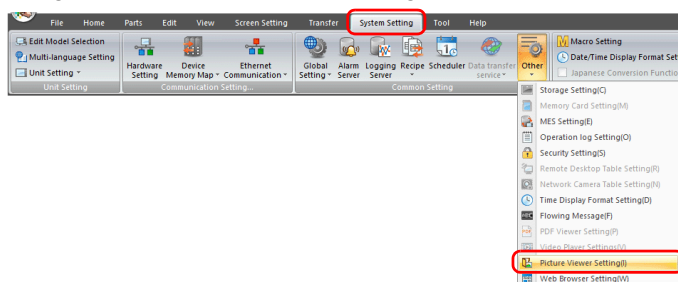
### 14.3.3 Displaying by Commanding from PLC

The picture viewer can be displayed by setting the relevant PLC device memory bit to ON.

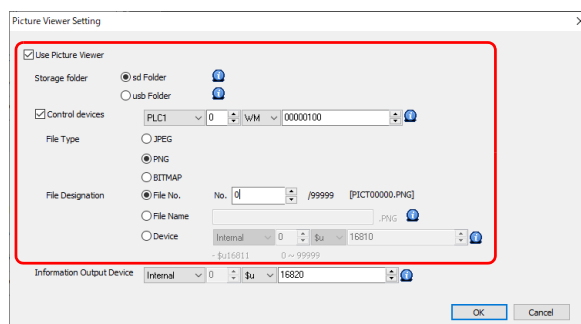


### V-SFT Settings

1. Click [System Setting] → [Other] → [Picture Viewer Setting].



2. In the [Picture Viewer Setting] window, select the [Use Picture Viewer] checkbox and configure the following settings.



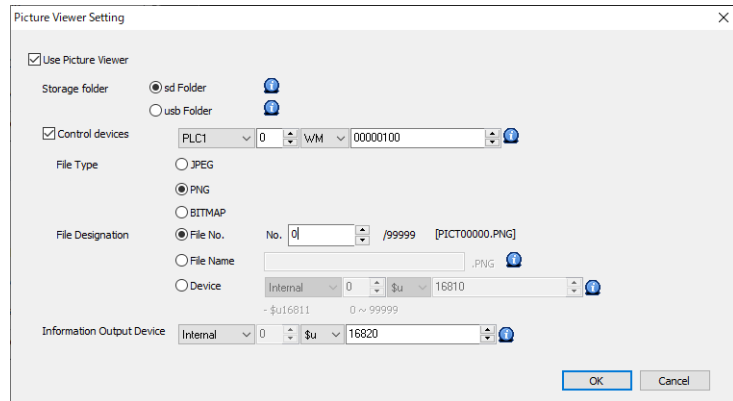
3. Click [OK]. This completes the necessary settings.

### PLC Commands

Turn ON bit 0 of the control device memory WM100 to display the "PICT00000.PNG" file.

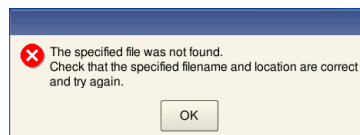
## 14.4 Detailed Settings

Select the [Use Picture Viewer] checkbox to enable the following settings.



Item	Description																																
Storage folder*1	Select the storage folder to refer to for image files. This can be changed on the picture viewer as necessary.																																
Control devices	Showing and hiding is performed according to the value of the least significant bit. *2 <table border="1" style="margin: 10px auto;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system</p> <p style="text-align: right;">Picture viewer 1 → 0 (edge): Hide 0 → 1 (edge): Show</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		
File Type	Select an image file type. JPEG (.JPG) PNG (.PNG) BITMAP (.bmp)																																
File Designation	Specify the method for specifying files. [File No.]: 0 to 99999 ([File Name]: PICT00000 to PICT99999) [File Name]: Maximum of 64 one-byte uppercase alphanumeric characters, or 32 two-byte characters [Device]: Set the device memory address (2 words) for specifying the file number (No. 0 to 99999)																																
Information Output Device	The state of the picture viewer is output. <table border="1" style="margin: 10px auto;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system</p> <p style="text-align: right;">1: The specified image file is not found. Status of picture viewer 0: Hidden 1: Displayed</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		

\*1 If the specified file is not found on the storage folder, an error is indicated when the picture viewer is displayed.

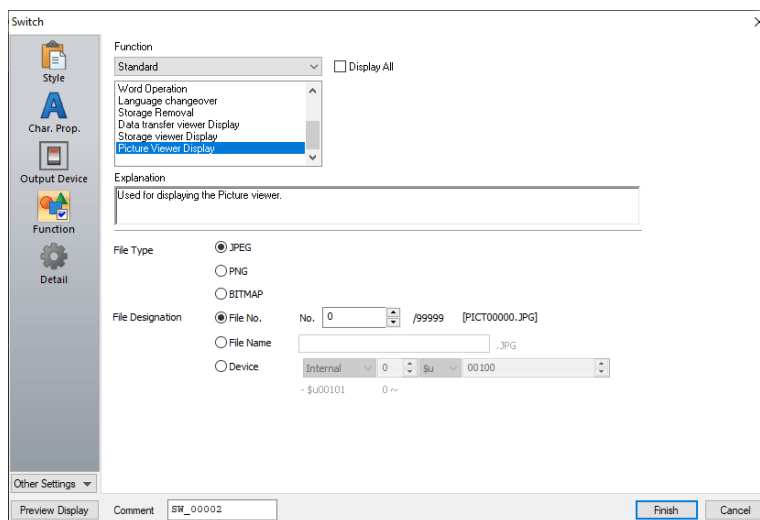


\*2 If the display bit is ON when entering RUN mode, the picture viewer is displayed. When the picture viewer is displayed by turning the display bit ON but the picture viewer is then closed using the [Close] switch, the display bit stays ON. Turn the display bit OFF by using bit 0 of the information output device memory (0: hide).



## Switch Function

The following settings are available when a switch is set as [Function: Picture Viewer Display].



Item	Description
File Type	Select an image file type. JPEG (.JPG) PNG (.PNG) BITMAP (.bmp)
File Designation	Specify the method for specifying files. [File No.]: 0 to 99999 ([File Name]: PICT00000 to PICT99999) [File Name]: Maximum of 64 one-byte uppercase alphanumeric characters, or 32 two-byte characters [Device]: Set the device memory address (2 words) for specifying the file number (No. 0 to 99999)

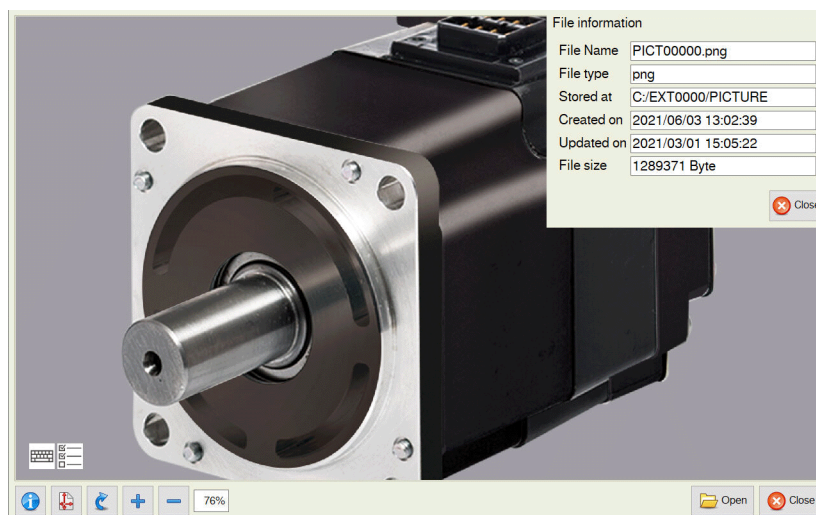
# 14.5 Configuration of Picture Viewer

## Overview



No.	Item	Details	No.	Item	Details
1	Display area	Images are displayed in full-screen without changing the aspect ratio.	5	Zoom in/out	Changes the display scale within 200% to 50%. [+]: Enlarge in 25% increments [-]: Reduce in 25% increments
2	File information	Displays information of the currently displayed file. *	6	Display scale	Shows the current display scale (100% = Actual size).
3	Scale to fit	Scales the image to fit the display area.	7	Open	Displays the file selection window.
4	Rotate	Rotates the image clockwise in 90° increments.	8	Close	Returns to RUN or Local mode.

\* File information is displayed at the upper right of the picture viewer.



## Changing the Displayed Image File

Tap the [Open] switch on the picture viewer. Select the image file to display and tap the [Open] switch.

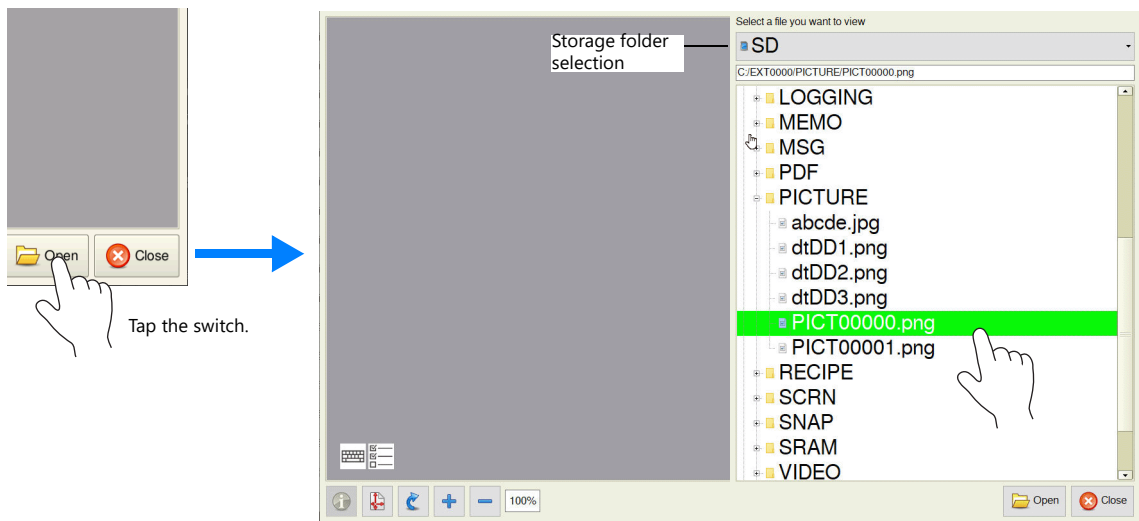


Image files saved in locations other than the "PICTURE" folder can be opened as well.

\* Larger image files will take more time to load.



## **15 Multi-Display Function**

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## 15.1 Overview

### Multi-Display Function

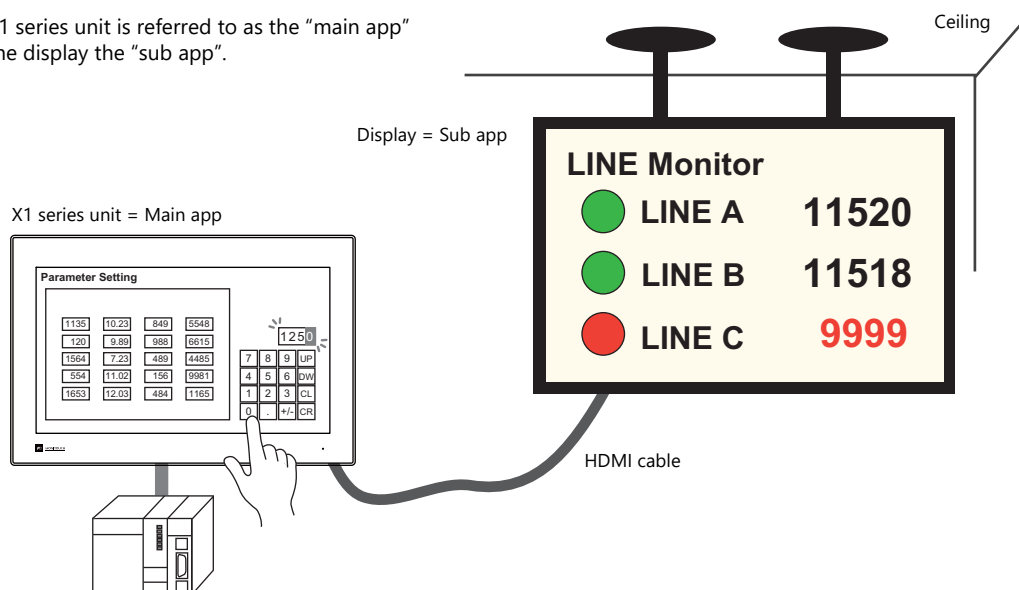
- Two screens can be displayed simultaneously and each screen can display different screens and be operated independently.
- A multi-display environment can be made by either using an external display (expanding the display screen) or displaying two screens on the X1 series unit (2-split screen display).

### Expanding the Display Screen (Using a Display)

By connecting a display to the X1 unit using an HDMI cable, the X1 unit and display can both display screens and be operated independently.\*1

A large display can be used to notify people on site that an error has occurred or of information such as the production quantity and number of defects. It can also be used together with the X1 unit to increase the information that can be displayed and checked at a time, thereby improving work efficiency.

The X1 series unit is referred to as the "main app" and the display the "sub app".



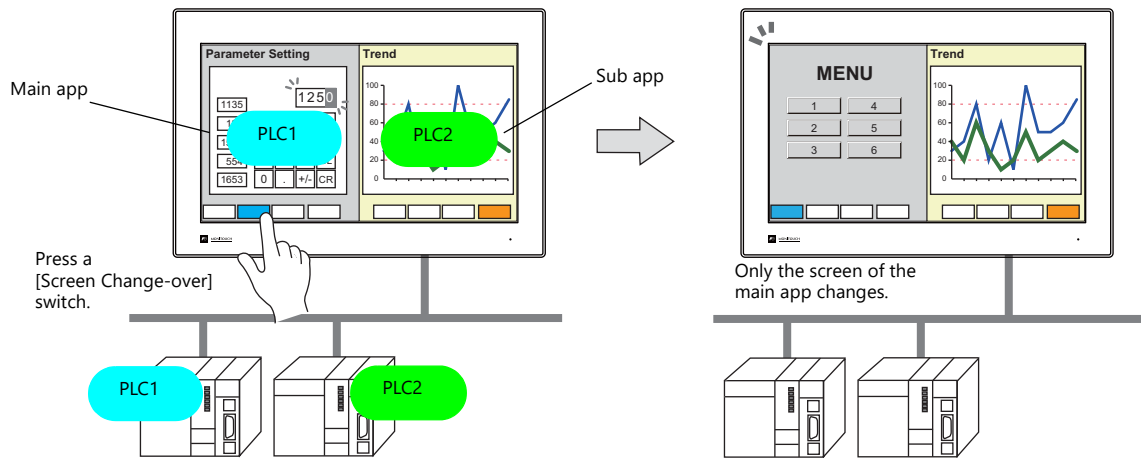
\*1 If a display is connected to the X1 series unit using an HDMI cable without using this function, the screen will simply be duplicated (same screen displayed on X1 series unit and display).



For details, refer to "15.2 Expanding the Display Screen".

## 2-Split Screen Display

Two X1 apps can be started on a single X1 series unit. The apps can be arranged side-by-side (landscape orientation) or stacked (portrait orientation) and each app can display screens and be operated independently. This function is convenient when workers on site need to operate screens with different purposes or when there is a screen that needs to be displayed at all times.



- For details, refer to ["15.3 2-Split Screen Display"](#).
- By configuring a screen program that uses only half of the X1 series unit's display area and using the 2-split screen display function, it is possible to create a layout that allocates the other half to user apps.  
For details, refer to ["8.4 Starting Applications"](#).

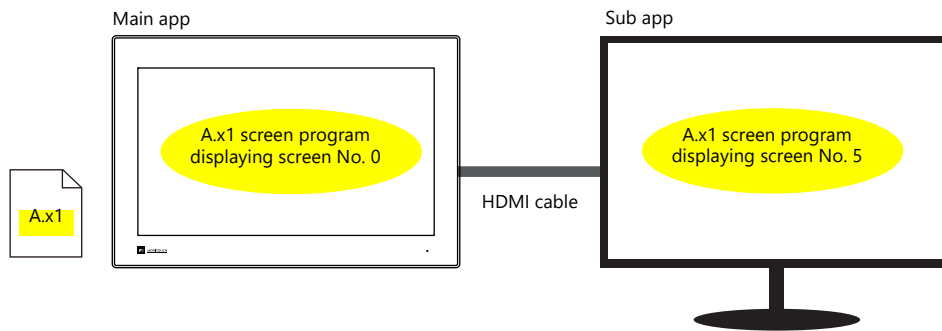
## 15.2 Expanding the Display Screen

### 15.2.1 Features

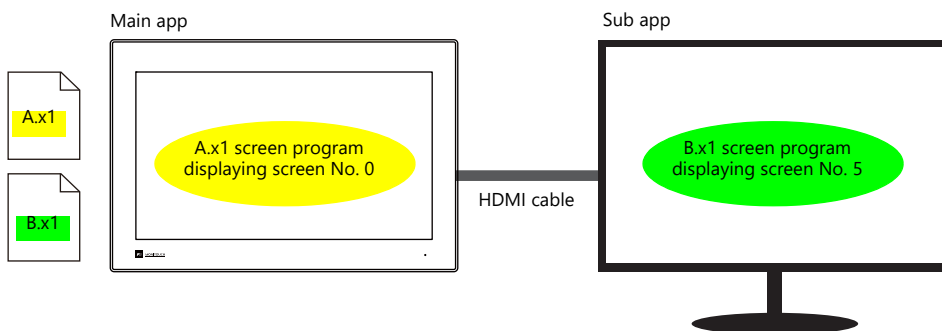
#### Handling of Screen Programs

It is possible to use the same screen program for the main and sub apps and also use different screen programs for the apps. Screens can be displayed without synchronization.

#### Using the same screen program



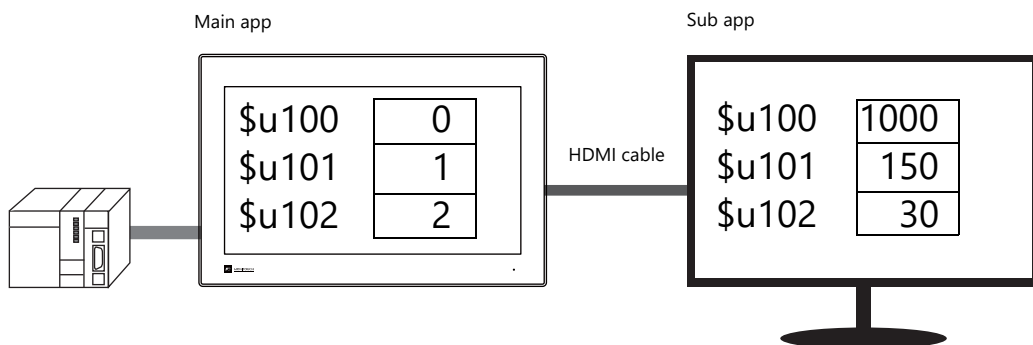
#### Using different screen programs



Limitations apply to the screen program that is dedicated to the sub app. For details, refer to ["15.11 Limitations"](#).

#### Handling of PLC1 to PLC8 and Internal Device Memory

- The device memory of PLC1 to PLC8 can be accessed from both the main and sub apps. For an Ethernet connection, both the main and sub apps access the device memory directly, while for a serial connection, the sub app accesses the device memory via the main app.
- The main and sub apps each have an internal device memory area, and each app accesses its own area. (\$u100 of the main app ≠ \$u100 of the sub app)



By using the [Internal Device Share Settings], internal device memory can be shared between the main and sub apps. Sharing can be executed at a fixed cycle or by using an external command.

Note, however, that the internal device memory that can be shared is limited to \$u, \$T, \$s, and \$P.

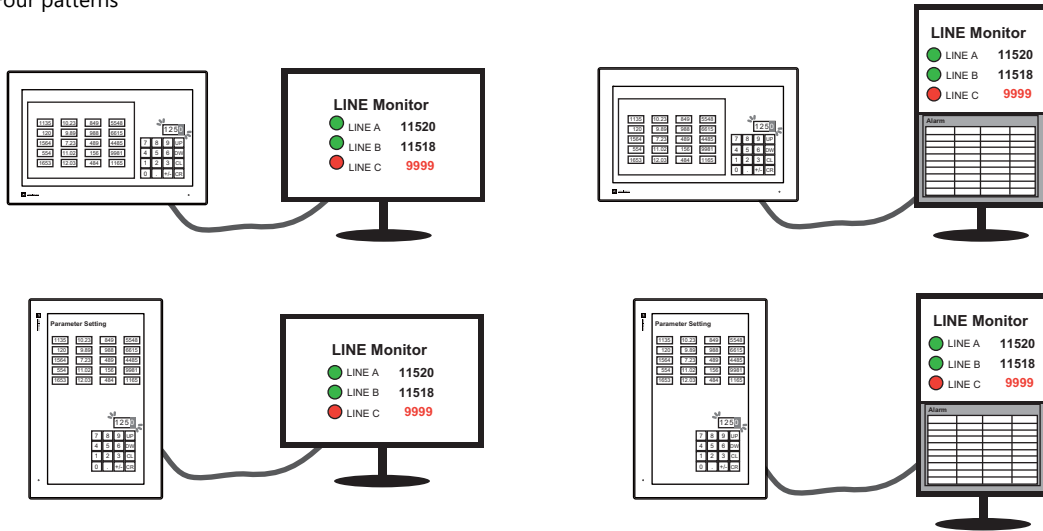
For details on the setting method, refer to ["Sharing Internal Device Memory Between the Main and Sub Apps"](#) page 15-11.



## Orientation

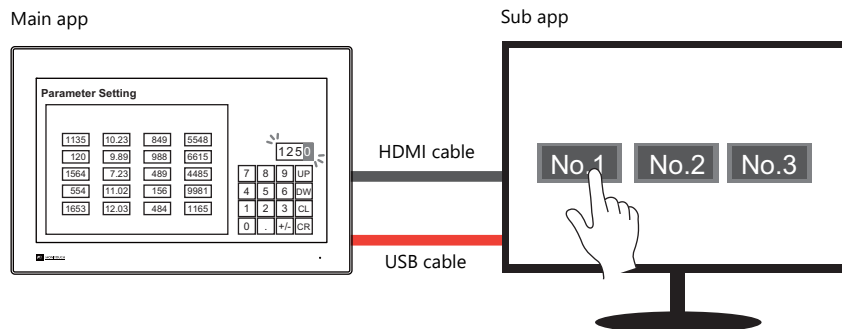
The X1 series unit and the display can each be placed in landscape orientation or portrait orientation (rotated clockwise by 90°). Install according to the environment and space available at the installation site.

- Four patterns



## Touch Operations on the Display

If a display that supports touch operations\* is used for the sub app, touch operations can be made on the display by additionally connecting a USB cable between the display and the X1 series unit.



\* If the display does not support touch operations, a mouse can be used to operate the screen.

## 15.2.2 Specifications

### Applicable Models

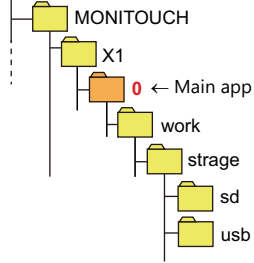
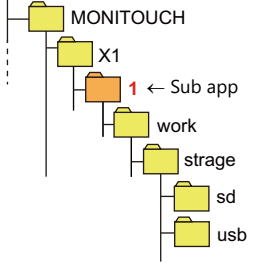
Model	Orientation	Program Ver.	V-SFT-6	Remarks
X115	Landscape Portrait (Clockwise by 90°)	Version 1.200 or later	Version 6.1.3.0 or later	* When using a USB flash drive as external USB storage
X112		Version 1.300 or later*	Version 6.1.6.0 or later*	

### Display Specifications

- A display unit that supports HDMI connection (The display resolution is the same as the X1 series unit.)

### Primary Operation Specifications

- Specifications are as follows when using this function.

Item	Main App = X1 Series Unit	Sub App = Display	Remarks	
Screen program	File	Dedicated	Select from the following: <ul style="list-style-type: none"> <li>Use the same screen program as for the main app</li> <li>Use a screen program different from that for the main app</li> </ul>	
	Edit model (Size)	X115 (1920 × 1080) X112 (1280 × 800)	Match with the main app	
	Orientation	Landscape / Portrait (Clockwise by 90°)	Landscape / Portrait (Clockwise by 90°)	
Supported PLC models	Models supported by the X1 series	Models supported by the X1 series * Note, however, that the following settings must be the same as the screen program for the main app regarding the model set at [System Setting] → [Hardware Setting] → "SERIAL". <ul style="list-style-type: none"> <li>PLC No. 1 to 8</li> <li>PLC model</li> <li>[Comm. Error Handling] setting (Stop, Continue, Disconnect)</li> </ul>	The following are not supported: <ul style="list-style-type: none"> <li>Universal serial</li> <li>V-Link</li> <li>Modbus slave</li> </ul>	
Screen changeover	Not synchronized	Not synchronized		
Device memory	Internal device memory	Area dedicated to main app \$u/\$T/\$s/\$P/\$L/\$LD	Area dedicated to sub app \$u/\$T/\$s/\$P/\$L/\$LD	\$u/\$T/\$s/\$P: Can be shared with [Internal Device Share Settings]
	PLC1 to 8 device memory	Directly accessible	Directly accessible (For "SERIAL", access is via the main app.)	
Storage	Internal storage C:\MONITOUCH\X1\0\work\strage\ (storage folder)\(access folder)  External USB storage (Drive name):\X1_Storage\ (access folder)	Internal storage only C:\MONITOUCH\X1\1\work\strage\ (storage folder)\(access folder) 	Notes on external USB storage Supporting programs Ver. 1.300 V-SFT Ver. 6.1.6.0  Configuration of [System Setting] → [Other] → [Storage Setting] is required. For details, refer to "9.2.3 Storage Settings".	
Touch operations	Supported	Possible if using an external display supporting touch operations * If the external display does not support touch operations, a mouse can be used to operate the screen.		
Buzzer sound	Supported	Not supported		
Audio output	Supported	Not supported		
Screen program transfer port No.	Download: Fixed to "8001" Upload: Fixed to "8001"	Download: 8002 ("8001" also allowed) Upload: Fixed to "8002"	For details on other port numbers, refer to Chapter 6 "6.3 X1 Port Numbers".	



Limitations apply. For details, refer to "15.11 Limitations".

- The operation of the sub app changes depending on the display status of the main app as shown below.

Main App		Sub App		Remarks	
Screen Display		Operation	Screen Program Transfer with [Use different screen program] Selected <sup>*1</sup>		
RUN mode		Switching between RUN mode and Local mode is allowed.	Supported		
Local mode (including screen program transfer)		The end screen is displayed. <sup>*2</sup>	Not supported	The sub app resumes automatically after the main app switches to RUN mode.	
Error	Communication error [Comm. Error Handling] setting	Stop	The end screen is displayed. <sup>*2</sup>	Not supported	The sub app resumes automatically after the main app switches to RUN mode.
		Disconnect	Switching between RUN mode and Local mode is allowed.	Supported	
		Continue	Switching between RUN mode and Local mode is allowed.	Supported	
	Screen program error		The end screen is displayed. <sup>*2</sup>	Not supported	The sub app resumes automatically after the main app switches to RUN mode.
Setup error		The end screen is displayed. <sup>*2</sup>	Not supported	The sub app resumes automatically after the main app switches to RUN mode.	

\*1 Screen program transfer for the sub app is not possible if an external display is not connected using an HDMI cable.

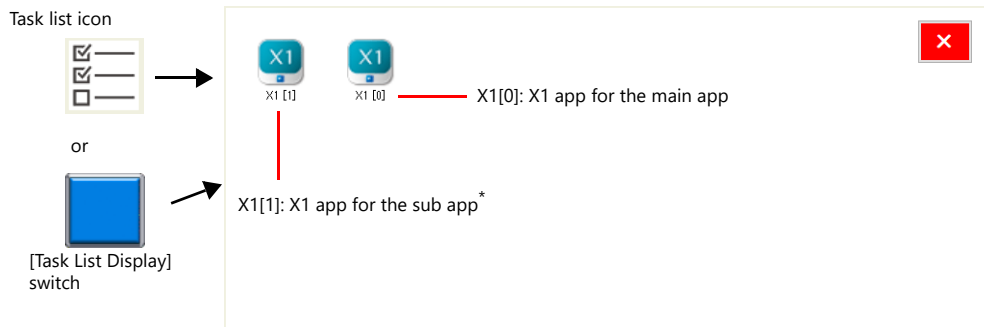
\*2 End screen displayed on the sub app



When this screen is displayed, switching to Local mode is not possible.

Main app not in RUN mode; sub app is ended.

- Task list  
Since the main and sub apps start up as separate X1 apps, the task list is shown as follows.



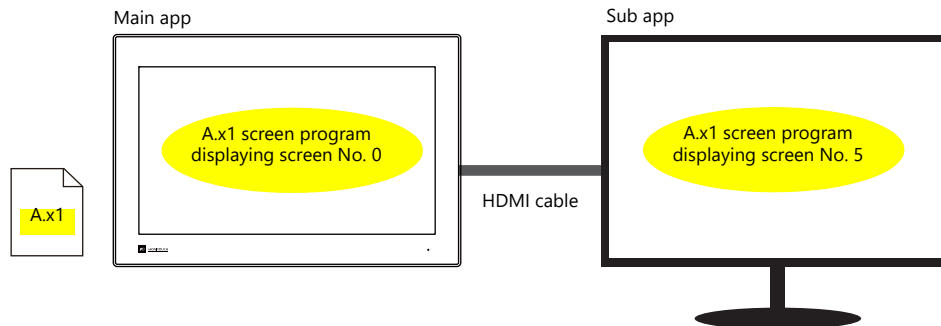
\* If an external display is not connected using an HDMI cable, only "X1[0]" is displayed.

Specify to display the task list icon from System Configurator → [Task list]. For details, refer to the X1 Series Hardware Specifications.

## 15.2.3 Setting Example

### Using the Same Screen Program for the Main and Sub Apps

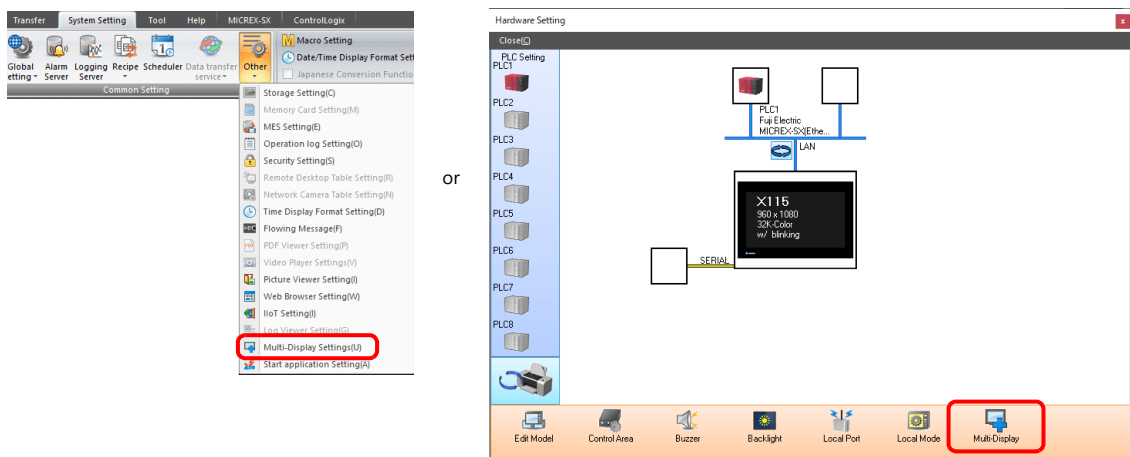
The same screen program can be used on for both the main app and the sub app. Screens can be displayed/operated\* on the main and sub apps without synchronization.



\* If the external display does not support touch operations, use a mouse.

### V-SFT Settings

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].



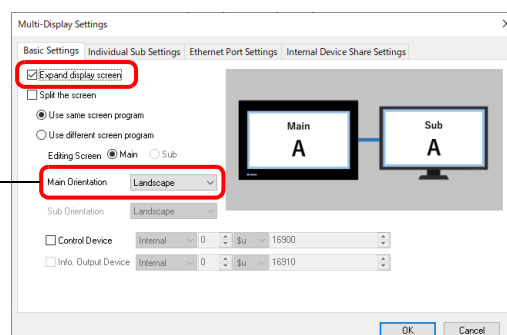
2. The multi-display settings window is displayed. Configure the following settings in order.

- [Basic Settings]
  - [Expand display screen]: Selected
  - [Use same screen program]: Selected
  - [Main Orientation]: Landscape / Portrait (Right 90°)

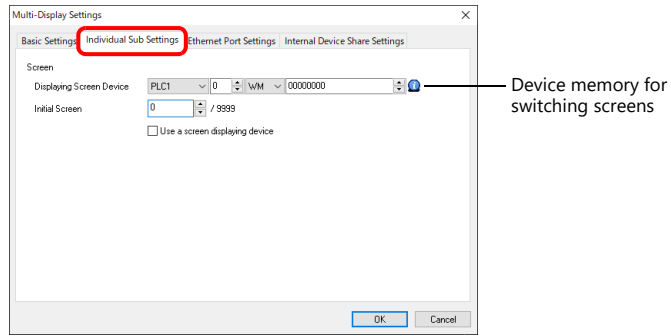
The orientation for the main app is the same as the X1 series unit (sub app also used in same orientation)

When the [Main Orientation] setting is changed, the [System Setting] → [Edit Model Selection] → [Installation] setting also changes.

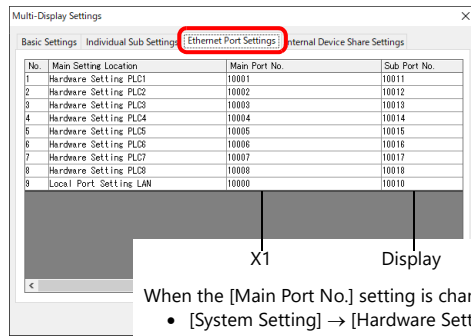
\* Only [Right 90°] is possible for [Portrait].



- [Individual Sub Settings]  
Set the initial screen to display and the device memory for switching screens on the sub app.



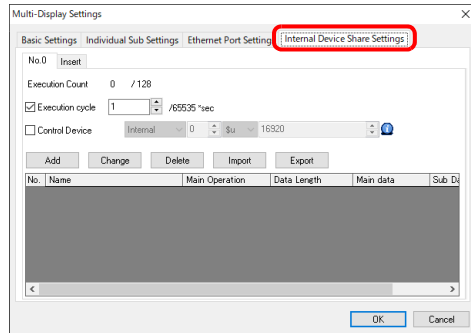
- [Ethernet Port Settings] (for Ethernet connection of PLC1 to PLC8, and setting the [Local Port Setting])  
Set the transmit/receive port number of the main and sub apps. Change the port number if it is used by a different function.  
(Default sub port number: the main port number + 10)



When the [Main Port No.] setting is changed, the following settings also change.

- [System Setting] → [Hardware Setting] → [PLCx Properties] → [Port No.]
- [System Setting] → [Ethernet Communication] → [Local Port] → [Port No.]

- [Internal Device Share Settings]  
Configure settings to share internal device memory (\$u/\$T/\$s/\$P) between the main and sub apps.



☞ For a detailed setting example, refer to [“Sharing Internal Device Memory Between the Main and Sub Apps” page 15-11.](#)

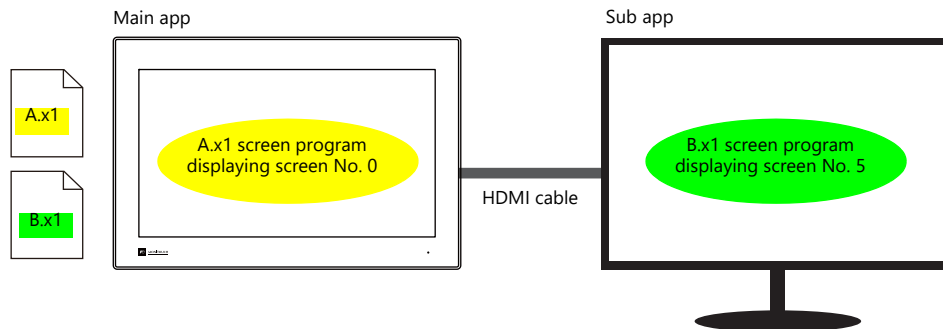
3. Click [OK] to save the screen program.

This completes the necessary settings.  
Transfer the screen program.

☞ For details on transferring, refer to [“15.5 Screen Program Transfer”.](#)

## Using Different Screen Programs for the Main and Sub Apps

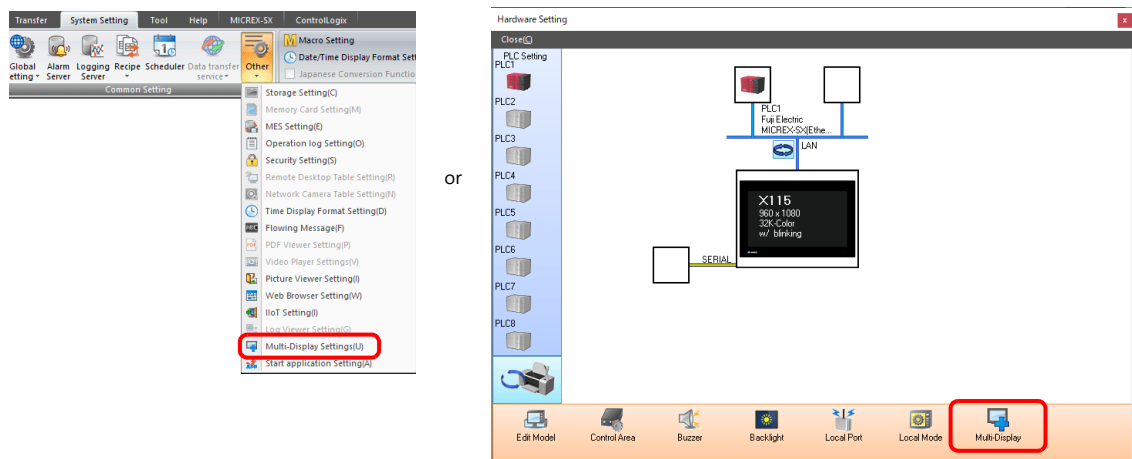
Different screen programs can be used for the main and sub apps. Screens can be displayed/operated\* on the main and sub apps without synchronization.



\* If the external display does not support touch operations, use a mouse.

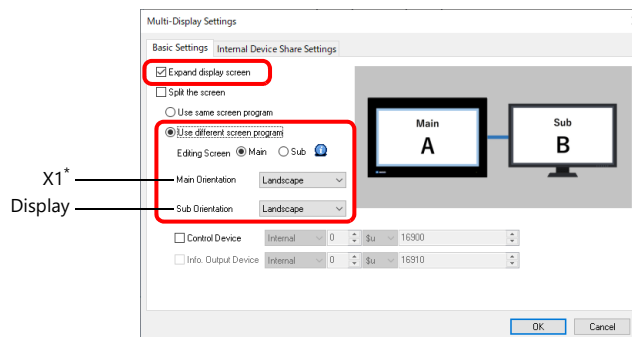
### V-SFT Settings (Main App)

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].



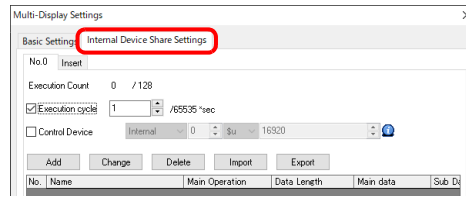
2. The multi-display settings window is displayed. Configure the following settings in order.

- [Basic Settings]
  - [Expand display screen]: Selected
  - [Use different screen program]: Selected
  - [Editing Screen]: Main
  - [Main Orientation]: Landscape / Portrait (Right 90°)
  - [Sub Orientation]: Landscape / Portrait (Right 90°)



\* When the [Main Orientation] setting is changed, the [System Setting] → [Edit Model Selection] → [Installation] setting also changes.  
(Only [Right 90°] is possible for [Portrait].)

- [Internal Device Share Settings]  
Configure settings to share internal device memory (\$u/\$T/\$s/\$P) between the main and sub apps.



For a detailed setting example, refer to “Sharing Internal Device Memory Between the Main and Sub Apps” page 15-11.

3. Click [OK] to save the screen program.

This completes configuration of the screen program for the main app. Next, proceed to configuring the screen program for the sub app.

## V-SFT Settings (Sub App)

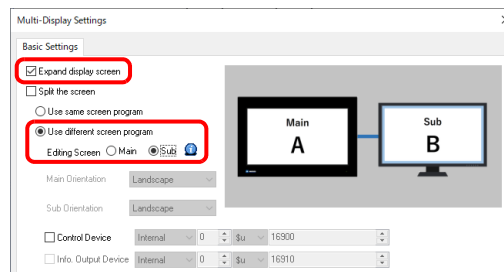


Be sure to make the following settings the same as those made for the main app.

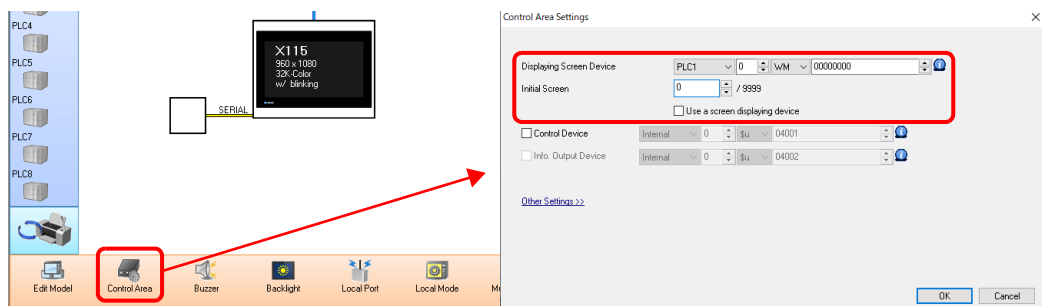
- [System Setting] → [Edit Model Selection] → [Edit Model], [Size]
- The following three settings for the model set at [System Setting] → [Hardware Setting] → “SERIAL”
  - PLC No. 1 to 8
  - PLC model
  - [Comm. Error Handling] setting (Stop, Continue, Disconnect)

Note that there are other functions that are not supported. For details, refer to “Limitations on Functions of the Sub App Screen Program” page 15-40.

1. Click [System Setting] → [Other] → [Multi-Display Settings].
2. The multi-display settings window is displayed. Configure the following settings in order and click [OK].
  - [Basic Settings]
    - [Expand display screen]: Selected
    - [Use different screen program]: Selected
    - [Editing Screen]: Sub



3. Set the initial screen to display and the device memory for switching screens on the sub app. Configure the settings at [System Setting] → [Hardware Setting] → [Control Area].



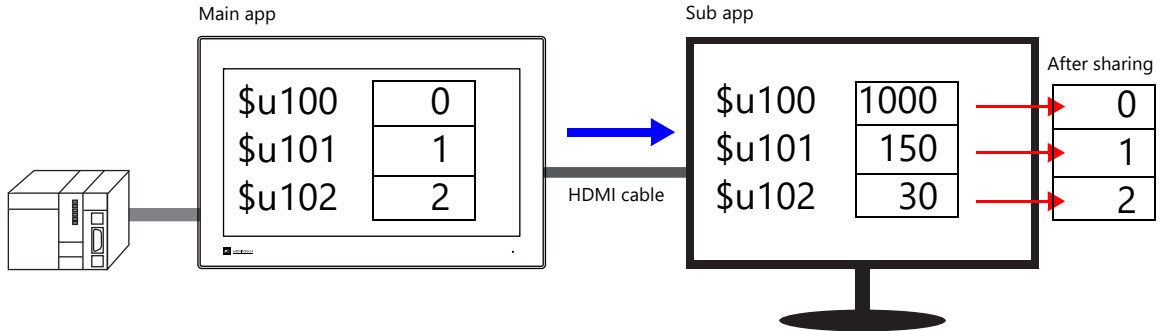
4. Close the [Hardware Setting] window and save the screen program.

This completes configuration of the screen program for the sub app. Transfer the screen program.

For details on transferring, refer to “15.5 Screen Program Transfer”.

## Sharing Internal Device Memory Between the Main and Sub Apps

The main and sub apps each have an internal device memory area, and each app accesses its own area. To share internal device memory between the main and sub apps, use the [Internal Device Share Settings].

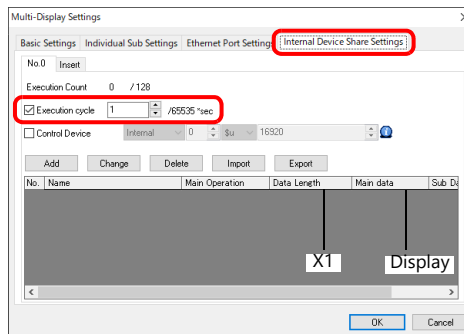


### V-SFT Settings

\* **Setting is possible on a screen program if [System Setting] → [Other] → [Multi-Display Settings] → [Basic Settings] → [Editing Screen] is set to [Main]. Setting is not possible if [Editing Screen] is set to [Sub].**

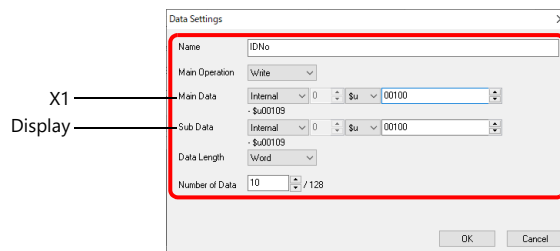
Example: Writing the ten words from internal device memory addresses \$u100 to \$u109 from the main app to the sub app at a one second cycle

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].
2. Select the [Execution cycle] checkbox and set the cycle to one second.



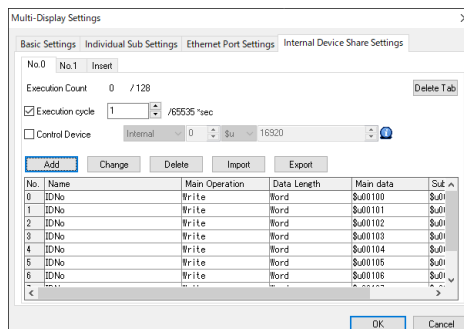
\* Tabs can be added from No. 0 to No. 7, each allowing registration of 128 operations.

3. Click [Add] to display the [Data Settings] window. Configure as shown below and click [OK].



\* [Write]: Main app → Sub app  
\* [Read]: Main app ← Sub app

This completes the necessary settings.



For details, refer to "Internal Device Share Settings" page 15-25.  
For details on transferring, refer to "15.5 Screen Program Transfer".



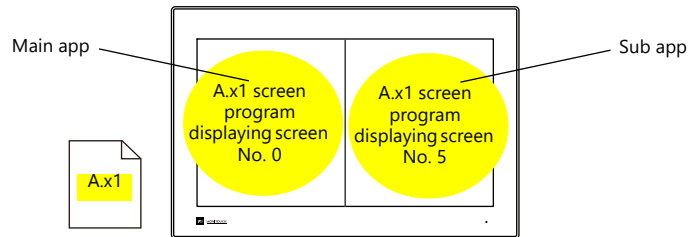
## 15.3 2-Split Screen Display

### 15.3.1 Features

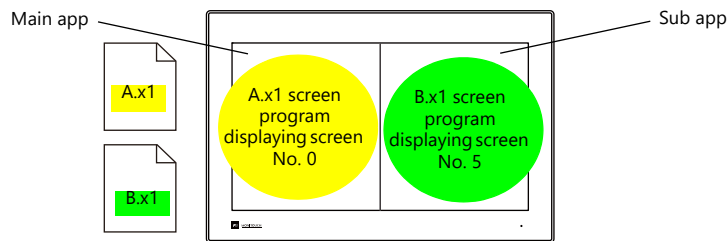
#### Handling of Screen Programs

It is possible to use the same screen program for the main and sub apps and also use different screen programs for the apps. Screens can be displayed without synchronization. Configure screen programs in advance to half the resolution of the X1 series unit.

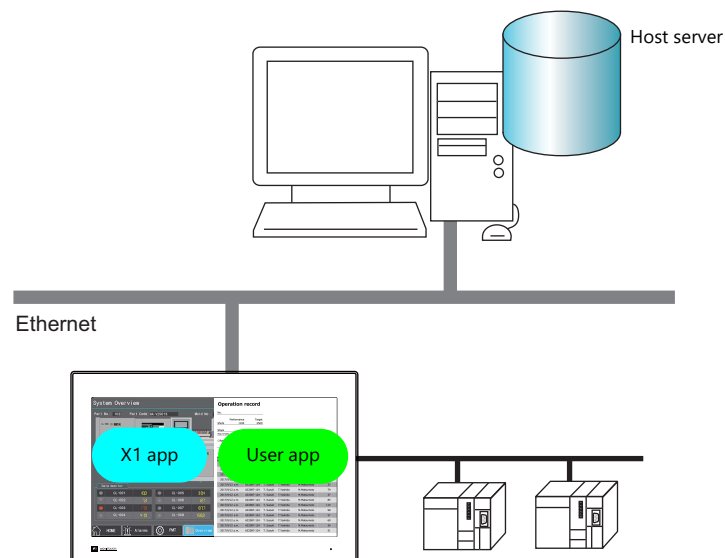
#### Using the same screen program



#### Using different screen programs

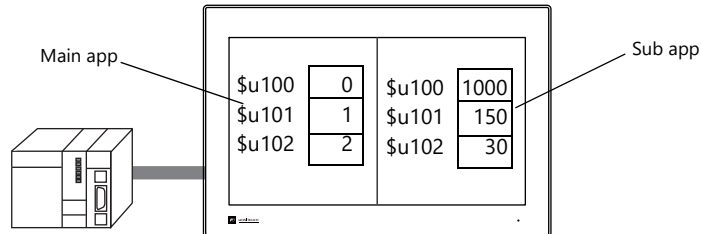


- Limitations apply to the screen program that is dedicated to the sub app. For details, refer to [“15.11 Limitations”](#).
- By configuring a screen program that uses only half of the X1 series unit’s display area and using the 2-split screen display function, it is possible to create a layout that allocates the other half to user apps. For details, refer to [“8.4 Starting Applications”](#).



## Handling of PLC1 to PLC8 and Internal Device Memory

- The device memory of PLC1 to PLC8 can be accessed from both the main and sub apps. With an Ethernet connection, both the main and sub apps access the device memory directly, while in a serial connection, the sub app accesses the device memory via the main app.
- The main and sub apps each have an internal device memory area, and each app accesses its own area. (\$u100 of the main app ≠ \$u100 of the sub app)



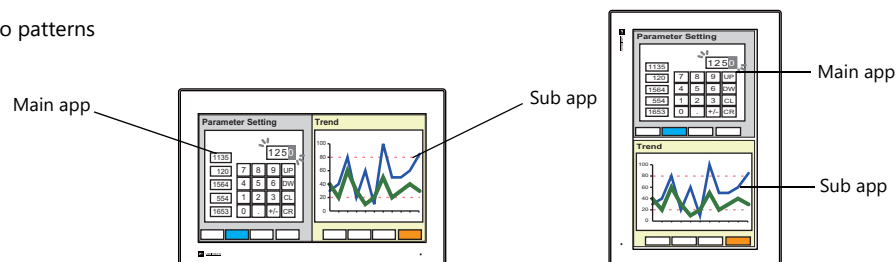
By using the [Internal Device Share Settings], internal device memory can be shared between the main and sub apps. Sharing can be executed at a fixed cycle or by using an external command. Note, however, that the internal device memory that can be shared is limited to \$u, \$T, \$s, and \$P.

 For details on the setting method, refer to “[Sharing Internal Device Memory Between the Main and Sub Apps](#)” page 15-11.

## Orientation

The X1 series unit can be placed in landscape orientation or portrait orientation (rotated clockwise by 90°). Install according to the environment and space available at the installation site.

- Two patterns



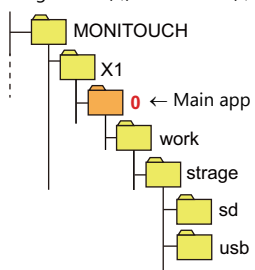
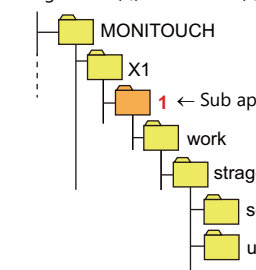
## 15.3.2 Specifications

### Applicable Models

Model	Orientation	Program Ver.	V-SFT-6	Remarks
X115	Landscape Portrait (Clockwise by 90°)	Version 1.300 or later	Version 6.1.6.0 or later	
X112				

### Primary Operation Specifications

- Specifications are as follows when using this function.

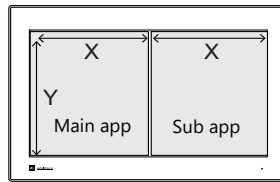
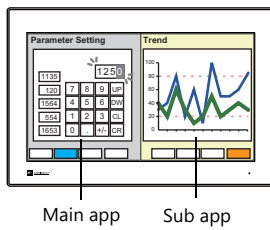
Item	Main App	Sub App	Remarks
Screen program	Dedicated	Select from the following: <ul style="list-style-type: none"> <li>• Use the same screen program as for the main app</li> <li>• Use a screen program different from that for the main app</li> </ul>	
File			
Edit model (Size)	X115 (960 × 1080 (2-split screen display)) X112 (640 × 800 (2-split screen display))	Match with the main app	
Orientation	Landscape / Portrait (Clockwise by 90°)	Match with the main app	
Supported PLC models	Models supported by the X1 series	Models supported by the X1 series * Note, however, that the following settings must be the same as the screen program for the main app regarding the model set at [System Setting] → [Hardware Setting] → "SERIAL". <ul style="list-style-type: none"> <li>• PLC No. 1 to 8</li> <li>• PLC model</li> <li>• [Comm. Error Handling] setting (Stop, Continue, Disconnect)</li> </ul>	The following are not supported: <ul style="list-style-type: none"> <li>• Universal serial</li> <li>• V-Link</li> <li>• Modbus slave</li> </ul>
Screen changeover	Not synchronized	Not synchronized	
Device memory	Area dedicated to main app \$u/\$T/\$s/\$P/\$L/\$LD	Area dedicated to sub app \$u/\$T/\$s/\$P/\$L/\$LD	\$u/\$T/\$s/\$P: Can be shared with [Internal Device Share Settings]
PLC 1 to 8 device memory	Directly accessible	Directly accessible (For "SERIAL", access is via the main app.)	
Storage	Internal storage C:\MONITOUCH\X1\0\work\strage\ (storage folder)\(access folder)  External USB storage (Drive name):\X1_Storage\ (access folder)	Internal storage only C:\MONITOUCH\X1\1\work\strage\ (storage folder)\(access folder) 	Configuration of [System Setting] → [Other] → [Storage Setting] is required. For details, refer to "9.2.3 Storage Settings".
Touch operations	Supported	Supported	
Buzzer sound	Supported	Supported (cannot be changed in Local mode)	
Audio output	Supported	Not supported	
Screen program transfer port No.	Download: Fixed to "8001" Upload: Fixed to "8001"	Download: 8002 ("8001" also allowed) Upload: Fixed to "8002"	For details on other port numbers, refer to Chapter 6 "6.3 X1 Port Numbers".



Limitations apply. For details, refer to "15.11 Limitations".

- The display size of main and sub apps is half the display area of the X1 series unit.  
Example: X115

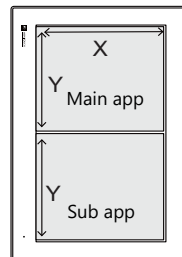
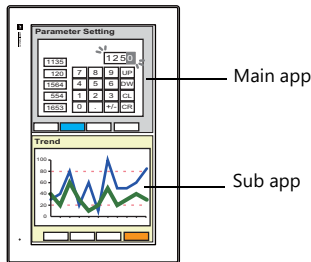
- Landscape



Unit: dots

	X	Y
X112	640	800
X115	960	1080

- Portrait



Unit: dots

	X	Y
X112	800	640
X115	1080	960

- The operation of the sub app changes depending on the display status of the main app as shown below.

Main App		Sub App		Remarks	
Screen Display	Operation	Screen Program Transfer with [Use different screen program] Selected <sup>*1</sup>			
RUN mode	Switching between RUN mode and Local mode is allowed.	Supported			
Local mode (including screen program transfer)	The end screen is displayed. <sup>*1</sup>	Not supported		The sub app resumes automatically after the main app switches to RUN mode.	
Error	Communication error [Comm. Error Handling] setting	Stop	The end screen is displayed. <sup>*1</sup>	Not supported	The sub app resumes automatically after the main app switches to RUN mode.
		Disconnect	Switching between RUN mode and Local mode is allowed.	Supported	
		Continue	Switching between RUN mode and Local mode is allowed.	Supported	
	Screen program error	The end screen is displayed. <sup>*1</sup>	Not supported		The sub app resumes automatically after the main app switches to RUN mode.
Setup error	The end screen is displayed. <sup>*1</sup>	Not supported		The sub app resumes automatically after the main app switches to RUN mode.	

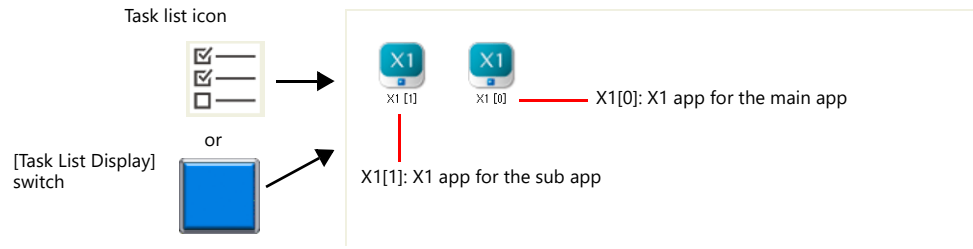
\*1 End screen displayed on the sub app




When this screen is displayed, switching to Local mode is not possible.

Main app not in RUN mode; sub app is ended.

- Since the main and sub apps start up as separate X1 apps, the task list is shown as follows.

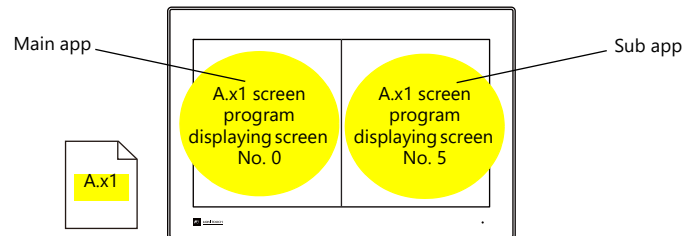


 Specify to display the task list icon from System Configurator → [Task list].  
For details, refer to the X1 Series Hardware Specifications.

## 15.3.3 Setting Example

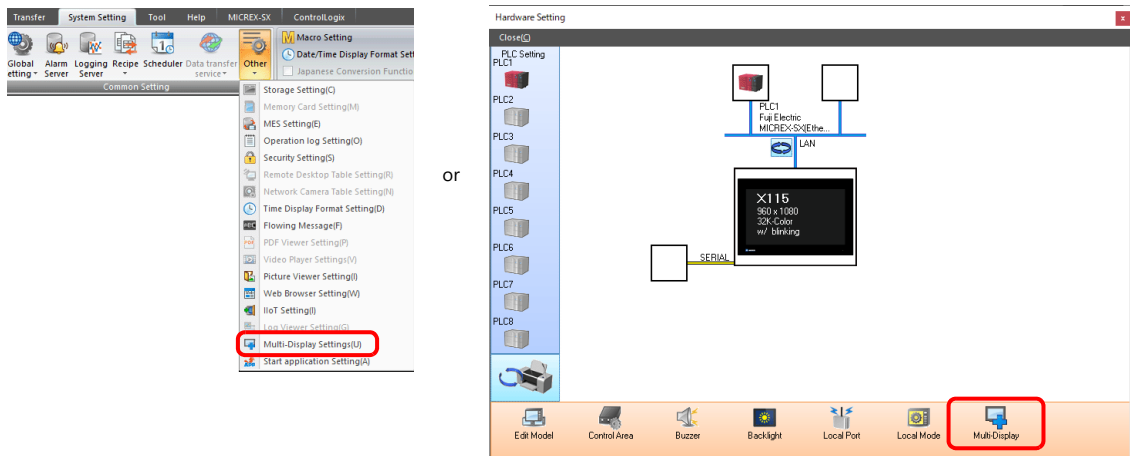
### Using the Same Screen Program for the Main and Sub Apps

The same screen program can be used on for both the main app and the sub app. Screens can be displayed/operated on the main and sub apps without synchronization.



### V-SFT Settings

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].



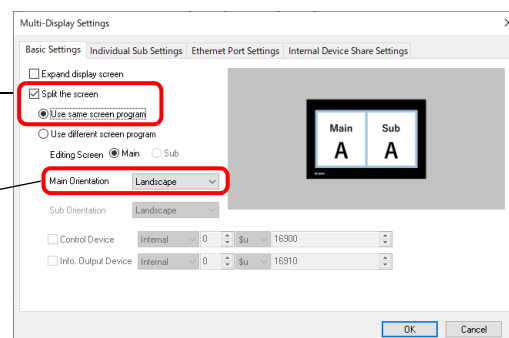
2. The multi-display settings window is displayed. Configure the following settings in order.

- [Basic Settings]
  - [Split the screen]: Selected
  - [Use same screen program]: Selected
  - [Main Orientation]: Landscape / Portrait (Clockwise by 90°)

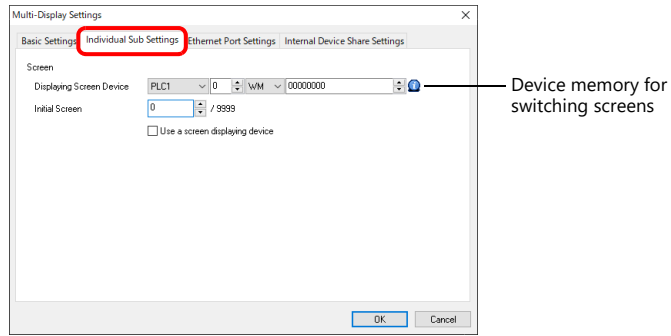
When the [Split the screen] checkbox is selected, the [System Setting] → [Edit Model Selection] → [Size] setting changes accordingly.

Orientation of main app (sub app also used in same orientation)  
When the [Main Orientation] setting is changed, the [System Setting] → [Edit Model Selection] → [Installation] setting also changes.

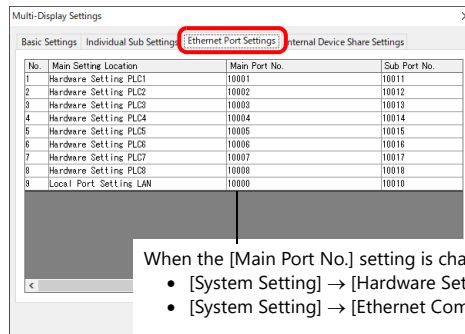
\* Only [Right 90°] is possible for [Portrait].



- [Individual Sub Settings]  
Set the initial screen to display and the device memory for switching screens on the sub app.

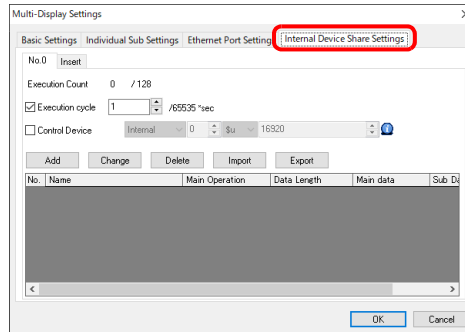


- [Ethernet Port Settings] (for Ethernet connection of PLC1 to PLC8, and setting the [Local Port Setting])  
Set the transmit/receive port number of the main and sub apps. Change the port number if it is used by a different function.  
(Default sub port number: the main port number + 10)



- [System Setting] → [Hardware Setting] → [PLCx Properties] → [Port No.]
- [System Setting] → [Ethernet Communication] → [Local Port] → [Port No.]

- [Internal Device Share Settings]  
Configure settings to share internal device memory (\$u/\$T/\$s/\$P) between the main and sub apps.



☞ For a detailed setting example, refer to [“Sharing Internal Device Memory Between the Main and Sub Apps”](#) page 15-11.

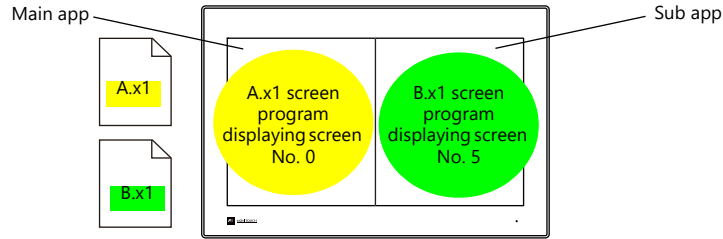
3. Click [OK] to save the screen program.

This completes the necessary settings.  
Transfer the screen program.

☞ For details on transferring, refer to [“15.5 Screen Program Transfer”](#).

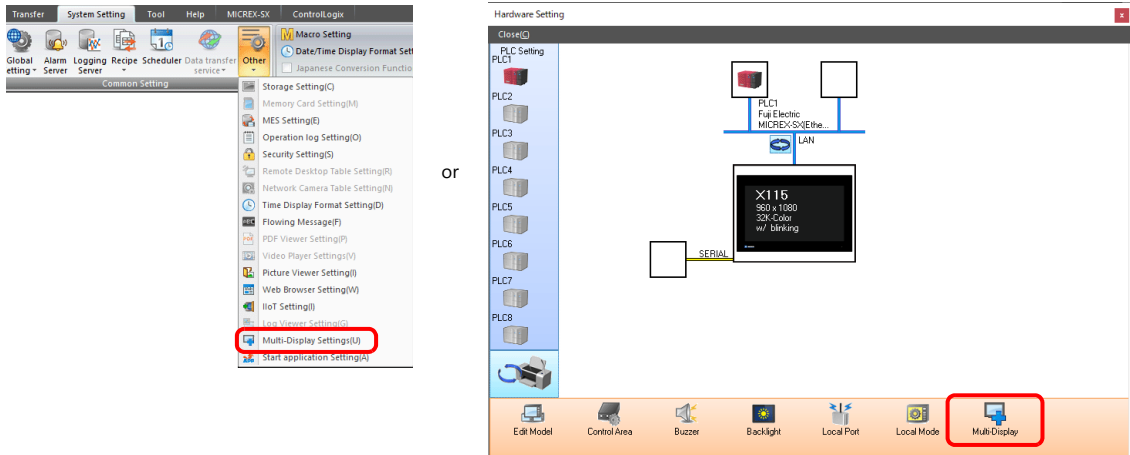
## Using Different Screen Programs for the Main and Sub Apps

Different screen programs can be used for the main and sub apps. Screens can be displayed/operated on the main and sub apps without synchronization.



### V-SFT Settings (Main App)

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].



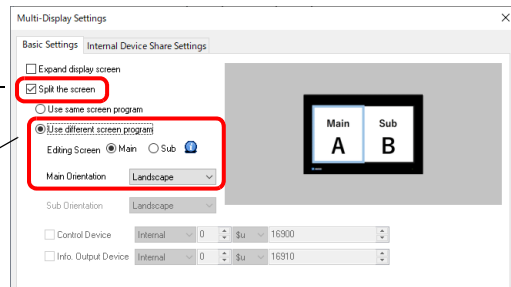
2. The multi-display settings window is displayed. Configure the following settings in order.

- [Basic Settings]
  - [Split the screen]: Selected
  - [Use different screen program]: Selected
  - [Editing Screen]: Main app
  - [Main Orientation]: Landscape / Portrait (Clockwise by 90°)

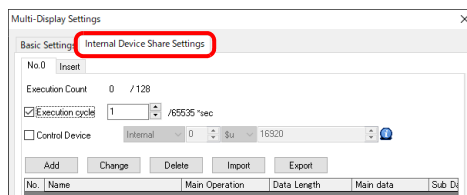
When the [Split the screen] checkbox is selected, the [System Setting] → [Edit Model Selection] → [Size] setting also changes.

When the [Main Orientation] setting is changed, the [System Setting] → [Edit Model Selection] → [Installation] setting also changes.

\* Only [Right 90°] is possible for [Portrait].



- [Internal Device Share Settings]
  - Configure settings to share internal device memory (\$u/\$T/\$s/\$P) between the main and sub apps.



For a detailed setting example, refer to [“Sharing Internal Device Memory Between the Main and Sub Apps” page 15-11.](#)

3. Click [OK] to save the screen program.

This completes configuration of the screen program for the main app. Next, proceed to configuring the screen program for the sub app. (Proceed to next page.)



## V-SFT Settings (Sub App)

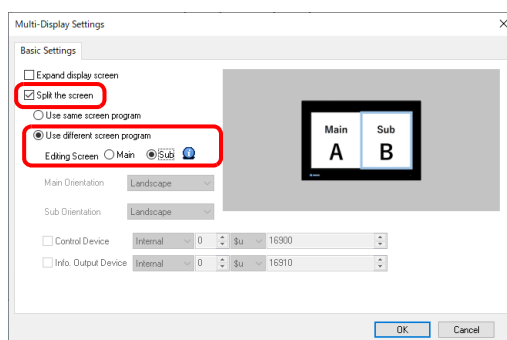


Be sure to make the following settings the same as those made for the main app.

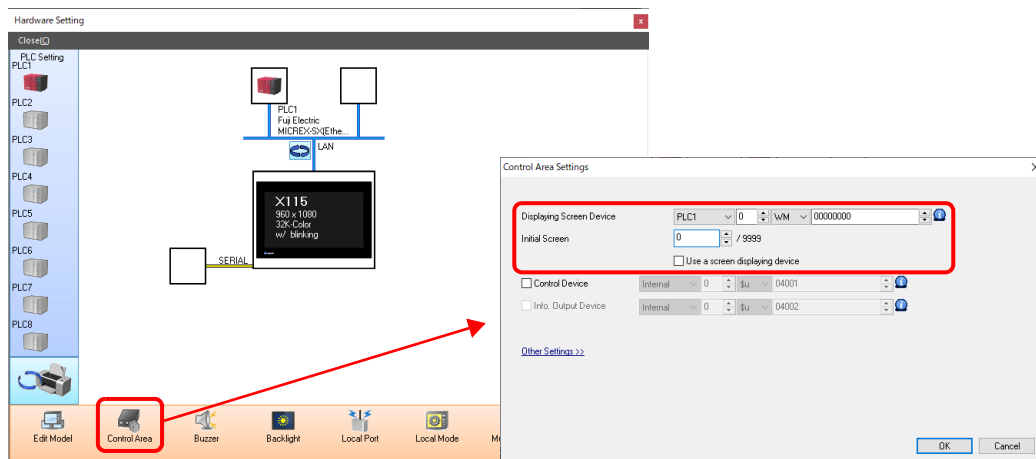
- [System Setting] → [Edit Model Selection] → [Edit Model], [Size]
- The following three settings for the model set at [System Setting] → [Hardware Setting] → "SERIAL"
  - PLC No. 1 to 8
  - PLC model
  - [Comm. Error Handling] setting (Stop, Continue, Disconnect)

Note that there are other functions that are not supported. For details, refer to "Limitations on Functions of the Sub App Screen Program" page 15-40.

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].
2. The multi-display settings window is displayed. Configure the following settings in order and click [OK].
  - [Basic Settings]
    - [Split the screen]: Selected
    - [Use different screen program]: Selected
    - [Editing Screen]: Sub



3. Set the initial screen to display and the device memory for switching screens on the sub app. Configure the settings at [System Setting] → [Hardware Setting] → [Control Area].



4. Close the [Hardware Setting] window and save the screen program.

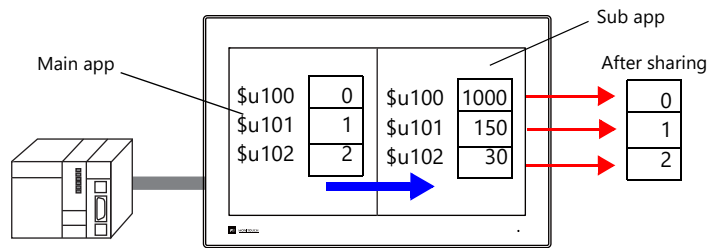
This completes configuration of the screen program for the sub app.  
Transfer the screen program.



For details on transferring, refer to "15.5 Screen Program Transfer".

## Sharing Internal Device Memory Between the Main and Sub Apps

The main and sub apps each have an internal cycle device memory area, and each app accesses its own area. To share internal device memory between the main and sub apps, use the [Internal Device Share Settings].

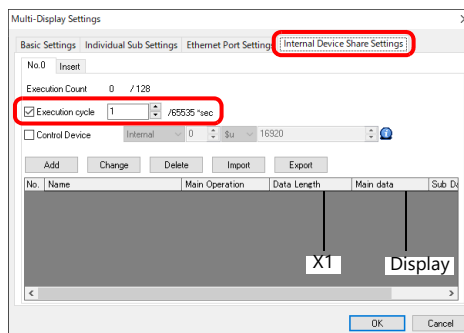


### V-SFT Settings

\* Setting is possible on a screen program if [System Setting] → [Other] → [Multi-Display Settings] → [Basic Settings] → [Editing Screen] is set to [Main]. Setting is not possible if [Editing Screen] is set to [Sub].

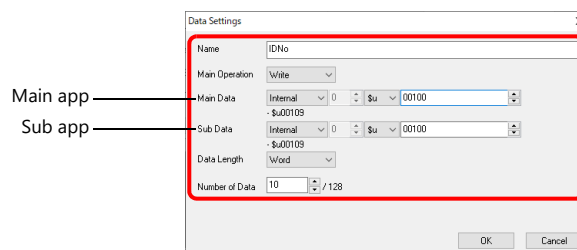
Example: Writing the ten words from internal device memory addresses \$u100 to \$u109 from the main app to the sub app at a one second cycle

1. Click [System Setting] and then click [Other] → [Multi-Display Settings] or click [Hardware Setting] → [Multi-Display].
2. Select the [Execution cycle] checkbox and set the cycle to one second.



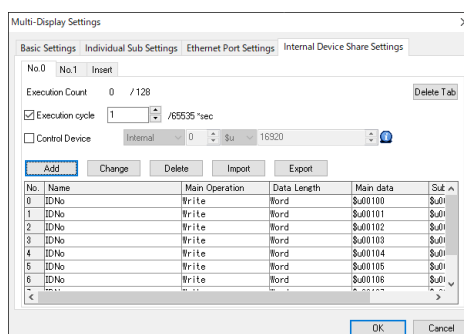
\* Tabs can be added from No. 0 to No. 7, each allowing registration of 128 operations.

3. Click [Add] to display the [Data Settings] window. Configure as shown below and click [OK].



\* [Write]: Main app → Sub app  
\* [Read]: Main app ← Sub app

This completes the necessary settings.



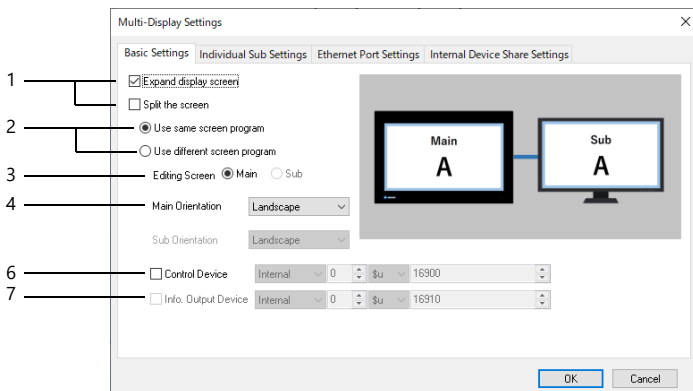
For details, refer to "Internal Device Share Settings" page 15-25.  
For details on transferring, refer to "15.5 Screen Program Transfer".

## 15.4 Detailed Settings

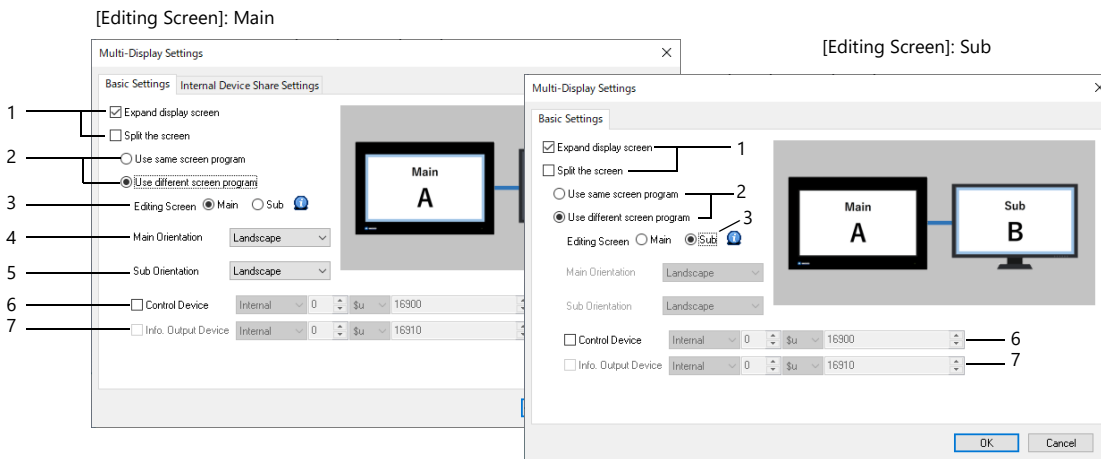
Selecting the [Expand display screen] or [Split the screen] checkbox enables the following items.

### Basic Settings

- When [Use same screen program] is selected



- When [Use different screen program] is selected

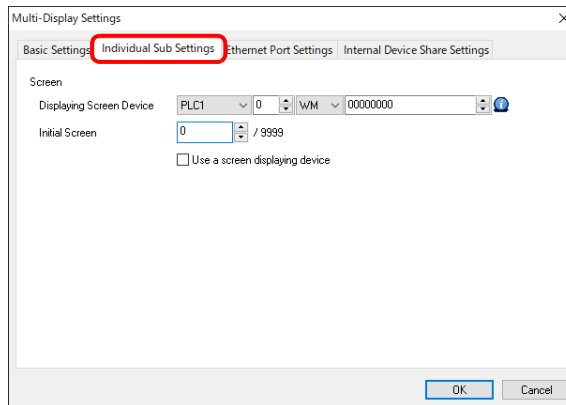


No.	Item	Description	Remarks	
1	Expand display screen	Select this checkbox to use the X1 series unit for displaying the main app and an external display for displaying the sub app. * If a display is connected to the X1 series unit using an HDMI cable without enabling this function, the screen will simply be duplicated (same screen displayed on X1 series unit and display).		
	Split the screen	Select this checkbox to split the X1 series unit's display area for displaying a main app and a sub app. * If deselected, it is possible to configure a screen program that uses only half of the X1 series unit's display area and thereby create a layout that allocates the other half to user apps. For details, refer to "8.4 Starting Applications". To return the screen program to the original display size, change the [System Setting] → [Edit Model Selection] → [Size] setting.	Setting is linked with [Edit Model Selection] → [Size] setting.	
2	Use same screen program	Specify whether to use the same screen program for the main and sub apps or to use different screen programs for the apps.	"15.11 Limitations" on the sub app screen program	
	Use different screen program			
3	Editing Screen Main/Sub	Select whether this screen program is to be used for the main app or the sub app.		
		Use same screen program      Use different screen program		
		Main	Main      Sub	
4	Main Orientation Landscape / Portrait (Right 90°)	Select the orientation of the X1 series unit. (The sub app is used in the same orientation as the main app.)	Select the orientation of the X1 series unit.	Only [Right 90°] is possible for [Portrait]. Setting is linked with [Edit Model Selection] → [Orientation] setting.

No.	Item	Description	Remarks																																
5	Sub Orientation Landscape / Portrait (Right 90°)	Select the orientation for the sub app.	Only [Right 90°] is possible for [Portrait]. Setting possible when [Expand display screen] is selected.																																
6	Control Device	<p>This is used when the sub app is not displayed correctly with an HDMI connection.</p> <ul style="list-style-type: none"> <li>Control device memory for main app Change Windows display settings to match with the settings of the screen program.</li> <li>Control device memory for sub app Move the sub app screen to the display and display it.</li> </ul> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system      0 → 1 (edge): Execute</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Setting possible when [Expand display screen] is selected.
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				
7	Info. Output Device	<p>This outputs the execution result of the control device memory.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> <p style="text-align: center;">Reserved for system      0: Normal 1: Error</p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Setting possible when [Expand display screen] is selected.
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				

### Individual Sub Settings

This is displayed only when [Basic Settings] → [Use same screen program] is selected.  
Set the initial screen to display on the sub app and the device memory for switching screens.

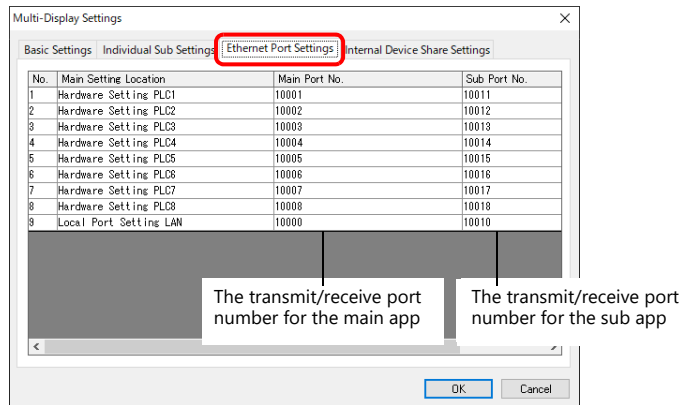


Item	Description
Displaying Screen Device	This device memory is used to switch over the screen by an external command. When the screen number to show is specified, the display switches to the corresponding screen. Also, the currently displayed screen number is stored in this device memory.
Initial Screen	Set the screen number to display at startup. * When recovering from a communication error, the initial screen number is displayed.
Use a screen displaying device	When this is selected, the screen number which was set for [Displaying Screen Device] is displayed as the initial screen.

## Ethernet Port Settings

This is displayed only when [Basic Settings] → [Use same screen program] is selected.

The local port number at [Local Port Setting] for PLC1 to PLC8 in the [Hardware Setting] is displayed as the main port number. Set a unique port number as the sub port number so as not to interfere with other functions.

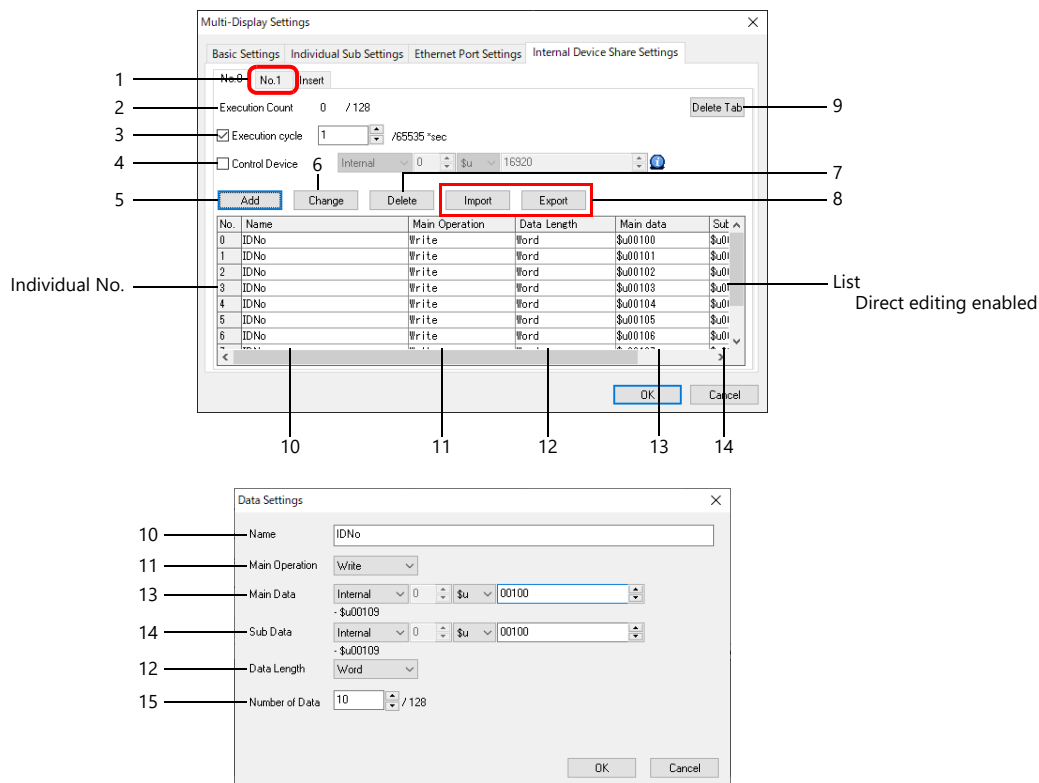


Item	Description
Main Setting Location	This is displayed when PLC1 to PLC8 use Ethernet connection or when the [System Setting] → [Ethernet Communication] → [Local Port] → [Set] checkbox is selected.
Main Port No.	Check the transmit/receive port number for the main app. When the [Main Port No.] setting is changed, the following settings also change. <ul style="list-style-type: none"> <li>• [System Setting] → [Hardware Setting] → [PLCx Properties] → [Port No.]</li> <li>• [System Setting] → [Ethernet Communication] → [Local Port] → [Port No.]</li> </ul>
Sub Port No. *	Set the transmit/receive port number for the sub app. The default port number is the main port number + 10. Set a unique port number so as not to interfere with other functions.

\* If the PLC requires setting of the target port number, register the sub port number as well.

## Internal Device Share Settings

This is displayed only when [Basic Settings] → [Editing Screen] is set to [Main].  
 Configure settings to share internal device memory between the main and sub apps.\*



\* When this setting is used, Ethernet port numbers 64500 and 64501 are occupied.

No.	Item	Description																																																																																		
1	Insert	Adds a tab. Maximum of 8 (No. 0 to No. 7)																																																																																		
2	Execution Count	Indicates the number of currently registered data. Maximum of 128																																																																																		
3	Execution cycle	Data is shared between the main and sub apps at a fixed cycle. 1 to 65535 second																																																																																		
4	Control Device	Sharing of data between the main and sub apps is executed by an external command. Three words are used. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">n</td> <td>Sharing is executed when the following bit turns ON.*<sup>1</sup></td> <td style="text-align: right;">X1 ←</td> </tr> <tr> <td></td> <td style="text-align: center;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td> </tr> </table> <p style="text-align: center;">All Nos. on tab: 0 → 1 (edge) _____</p> <p style="text-align: center;">Individual No.: 0 → 1 (edge) _____</p> </td> <td></td> </tr> <tr> <td></td> <td>n+1</td> <td>Set the individual number to execute in bit 0 of "n".*<sup>2</sup> 0 to 127</td> <td style="text-align: right;">X1 ←</td> </tr> <tr> <td></td> <td>n+2</td> <td>The corresponding bit turns ON when processing according to "n" turning ON (0 → 1) is completed. Turn OFF the bit before the next execution.</td> <td style="text-align: right;">X1 →</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td> </tr> </table> <p style="text-align: center;">All Nos. on tab _____</p> <p style="text-align: center;">Individual No. _____</p> </td> <td></td> </tr> </table> <p>* The execution result (normal/error) is output to \$s2002.                      For details, refer to "15.8 System Device Memory".</p>	n	Sharing is executed when the following bit turns ON.* <sup>1</sup>	X1 ←		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td> </tr> </table> <p style="text-align: center;">All Nos. on tab: 0 → 1 (edge) _____</p> <p style="text-align: center;">Individual No.: 0 → 1 (edge) _____</p>	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0					n+1	Set the individual number to execute in bit 0 of "n".* <sup>2</sup> 0 to 127	X1 ←		n+2	The corresponding bit turns ON when processing according to "n" turning ON (0 → 1) is completed. Turn OFF the bit before the next execution.	X1 →			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td> </tr> </table> <p style="text-align: center;">All Nos. on tab _____</p> <p style="text-align: center;">Individual No. _____</p>	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
n	Sharing is executed when the following bit turns ON.* <sup>1</sup>	X1 ←																																																																																		
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Usage example: Executing individual number 20 using control device memory address "D100" D101 = 20 D100-00 turns ON (0 → 1) Bit 0 of "D102" turns ON after transfer of internal device memory specified for No. 20 is executed. (Clear bit 0 of "D102" to OFF before the next execution.)																																																																																				

No.	Item	Description																																																																								
5	Add	Adds data. If a data entry is selected on the list, a new entry is added above the selected row.																																																																								
6	Change	Changes the selected data entry.																																																																								
7	Delete	Deletes the selected data entry.																																																																								
8	Import Export	Used to import/export the data on the selected tab in CSV format for editing.  <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>CSV Format</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Name</td> <td>Main Operation</td> <td>Data Length</td> <td>Main data</td> <td>Sub Data</td> </tr> <tr> <td>2</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00100</td> <td>\$u00100</td> </tr> <tr> <td>3</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00101</td> <td>\$u00101</td> </tr> <tr> <td>4</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00102</td> <td>\$u00102</td> </tr> <tr> <td>5</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00103</td> <td>\$u00103</td> </tr> <tr> <td>6</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00104</td> <td>\$u00104</td> </tr> <tr> <td>7</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00105</td> <td>\$u00105</td> </tr> <tr> <td>8</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00106</td> <td>\$u00106</td> </tr> <tr> <td>9</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00107</td> <td>\$u00107</td> </tr> <tr> <td>10</td> <td>ID</td> <td>Write</td> <td>1</td> <td>\$u00500</td> <td>\$P2:00493</td> </tr> <tr> <td>11</td> <td>ID</td> <td>Read</td> <td>2</td> <td>\$u02000</td> <td>\$u01000</td> </tr> </tbody> </table> </div> <div> <p>Excel example</p> <p>Red frame: Editing enabled (all one-byte characters, excluding "Main Operation")</p> <p>Main Data / Sub Data: \$u/\$T/\$s   xxxxx                   Address</p> <p>\$P   xxxx       Address       PLC 1 to 8</p> </div> </div>		A	B	C	D	E	1	Name	Main Operation	Data Length	Main data	Sub Data	2	ID	Write	1	\$u00100	\$u00100	3	ID	Write	1	\$u00101	\$u00101	4	ID	Write	1	\$u00102	\$u00102	5	ID	Write	1	\$u00103	\$u00103	6	ID	Write	1	\$u00104	\$u00104	7	ID	Write	1	\$u00105	\$u00105	8	ID	Write	1	\$u00106	\$u00106	9	ID	Write	1	\$u00107	\$u00107	10	ID	Write	1	\$u00500	\$P2:00493	11	ID	Read	2	\$u02000	\$u01000
	A	B	C	D	E																																																																					
1	Name	Main Operation	Data Length	Main data	Sub Data																																																																					
2	ID	Write	1	\$u00100	\$u00100																																																																					
3	ID	Write	1	\$u00101	\$u00101																																																																					
4	ID	Write	1	\$u00102	\$u00102																																																																					
5	ID	Write	1	\$u00103	\$u00103																																																																					
6	ID	Write	1	\$u00104	\$u00104																																																																					
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8	ID	Write	1	\$u00106	\$u00106																																																																					
9	ID	Write	1	\$u00107	\$u00107																																																																					
10	ID	Write	1	\$u00500	\$P2:00493																																																																					
11	ID	Read	2	\$u02000	\$u01000																																																																					
9	Delete Tab	Deletes the selected tab.																																																																								
10	Name	Register an arbitrary name. (duplicate names, blanks allowed)   Within 32 one-byte characters																																																																								
11	Main Operation	Set the transfer operation. Write: Main app → Sub app Read: Main app → Sub app																																																																								
12	Data Length	Set the data length. Word / Double Word																																																																								
13	Main Data	Specify the internal device memory address of the main app to share. Only \$u/\$s/\$P/\$T																																																																								
14	Sub Data	Specify the internal device memory address of the sub app to share. Only \$u/\$s/\$P/\$T																																																																								
15	Number of Data	Set the number of data entries. Maximum of 128																																																																								


\*1 Data sharing is not executed if the bit turns ON during execution. When both bits turns ON, all numbers on the tab (bit 1) are executed.  
 \*2 An error is not output even if an individual number that is not registered is set.

## 15.5 Screen Program Transfer

### Checking the Version of the X1 Series Unit

The program version requirements for the X1 series unit are as follows. If the version is old, update the X1 series unit.

Multi-Display Function	Program Ver.	V-SFT-6	Remarks
Expand display screen	Version 1.200 or later	Version 6.1.3.0 or later	
2-split screen display	Version 1.300 or later	Version 6.1.6.0 or later	

 For details on the updating procedure, refer to the X1 Series Setup Manual.

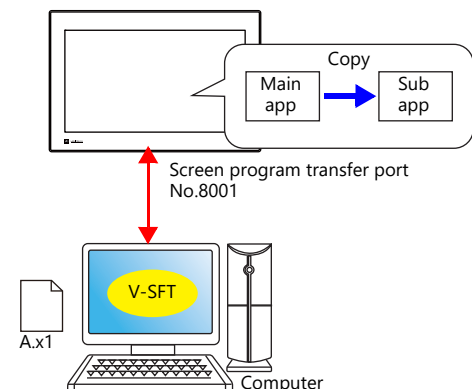
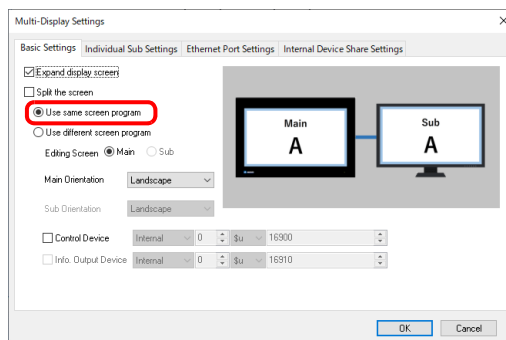
### 15.5.1 Download

The transfer method differs between when [Use same screen program] and [Using different screen programs] is selected.

#### When [Use Same Screen Program] is Selected

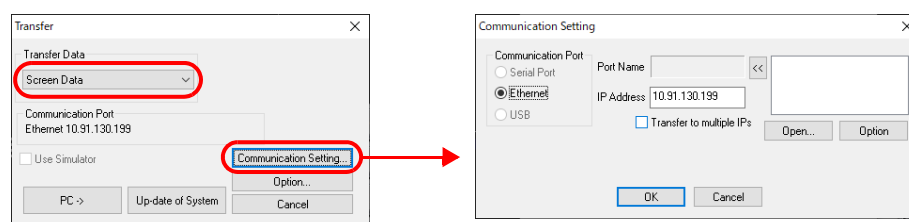
The X1 series has internal screen program areas for the main and sub apps. After downloading the screen program to the main app area, the program is copied to the sub app area when RUN mode starts.

Example: [Expand display screen] selected



Transfer a screen program from the computer to the X1 series unit.

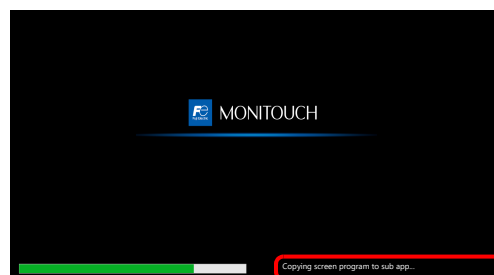
1. Click [Transfer] → [Download].
2. Set [Transfer Data] to "Screen Data" in the [Transfer] window. Specify the IP address of the X1 series unit in the [Communication Setting] window.



3. Click [PC →] to start downloading.

After transfer, copying of the screen program for the sub app always starts when RUN mode starts on the main app. When copying is finished, both the main and sub apps switch to RUN mode.

Example:  
[Expand display screen]  
selected



Copying screen program to sub app...





- Do not turn off the power of the X1 series unit while copying is in progress. If the power is turned OFF and copying is interrupted, copying will be executed the next time the power of the X1 series is turned ON.
  - When a copying error occurs, the message "Setup Error: Screen Data not setting." is displayed on the main app.  
If this happens, transfer the screen program again.
  - The time until RUN mode starts will be slightly extended for the purpose of copying the screen program. (The degree of extension depends on the size of the screen program file and the number of PLCs that are used.)
-

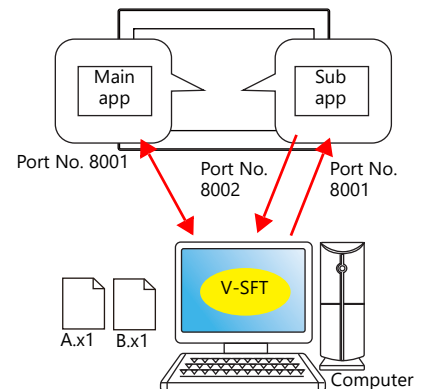
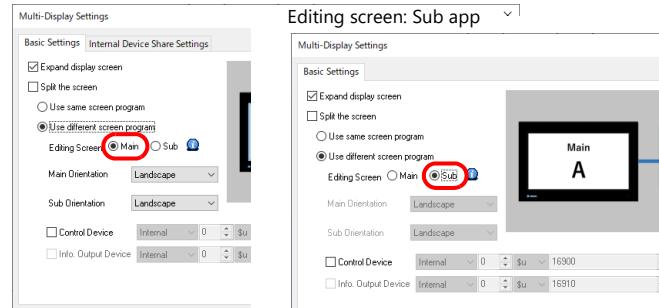
## When [Use Different Screen Program] is Selected

The X1 series has internal screen program areas for the main and sub apps. Download each screen program to the corresponding area.

Transfer the screen program for the main app first and then transfer the screen program for the sub app.

Example: [Expand display screen] selected

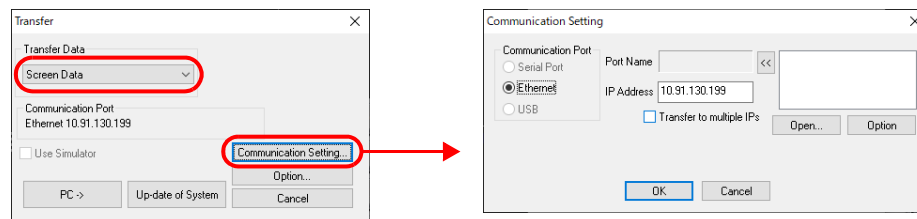
Editing screen: Main app



## Downloading for the main app

Transfer the screen program for the main app from a computer to the X1 series unit.

1. Click [Transfer] → [Download].
2. Set [Transfer Data] to "Screen Data" in the [Transfer] window. Specify the IP address of the X1 series unit in the [Communication Setting] window.



3. Click [PC →] to download the screen program for the main app.
4. After transfer, switch the main app to RUN mode.

\* The message "Setup Error: Screen Data not setting." is displayed on the sub app screen at this time.

## Downloading for the sub app

Transfer the screen program for the sub app from a computer to the X1 series unit. Follow steps 1 and 2 of "Downloading for the main app".



Always transfer the screen program for the main app before transferring the screen program for the sub app.


- Conditions for transferring the sub app screen program

Display Status of Main App		Sub App Screen Program Transfer*	Remarks
RUN mode		Supported	
Local mode (including screen program transfer)		Not supported	
Error	Communication error [Comm. Error Handling] setting	Stop	Not supported
		Disconnect	Supported
		Continue	Supported
Screen program error		Not supported	
Setup error		Not supported	

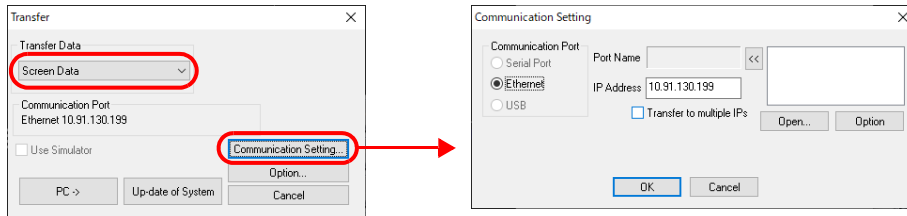
\* When [Multi-Display Settings] → [Expand display screen] is selected but an external display is not connected using an HDMI cable, screen program transfer for the sub app is not possible.

## 15.5.2 Upload

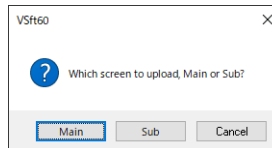
\* When uploading the sub app screen program with [Use different screen program] selected, refer to “Conditions for transferring the sub app screen program” page 15-29 on the previous page.

 To check the setting from the X1 series unit, refer to “Checking Settings” page 15-31.

1. Click [Transfer] → [Upload].
2. Set [Transfer Data] to “Screen Data” in the [Transfer] window. Specify the IP address of the X1 series unit in the [Communication Setting] window.



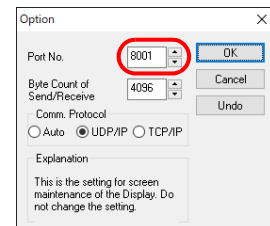
3. Click [PC ←] to start uploading the screen program.  
If the screen programs in the X1 series unit are set to [Use different screen program], the following window\* is displayed. Select the screen program to upload.



\* If the program version of the X1 series unit is earlier than version 1.200 or if V-SFT version 6.1.5.0 or earlier is used, the main app screen program is uploaded without displaying this window.

When uploading the sub app screen program with [Use different screen program] selected, set [Transfer] → [Upload] → [Communication Setting] → [Option] → [Port No.] to “8002”.

Return the setting to “8001” when downloading a screen program.



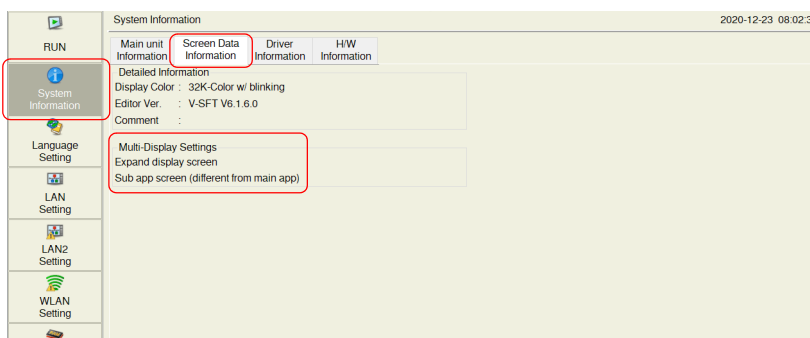
## 15.6 Checking Settings and the HDMI Connection Status in Local Mode

The Local mode screen can be used to check the multi-display function settings and if an external display is recognized when connected with an HDMI cable.

### Checking Settings

The [Screen Data Information] tab window on the System Information screen shows information of the screen programs for the main and sub apps.

Example: Local mode screen of sub app

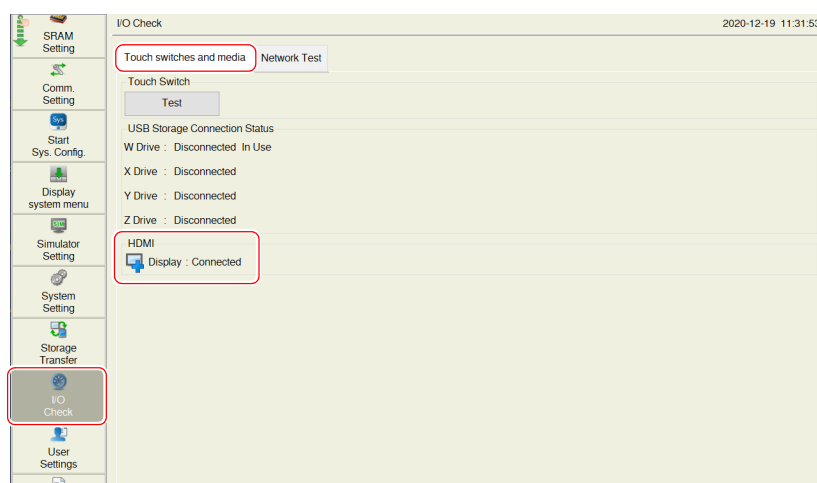


Item	Description	
Multi-Display Settings	None (duplicate)	When an external display is connected, the display is duplicated.
	Expand display screen	This is displayed when the [System Setting] → [Other] → [Multi-Display Settings] → [Expand display screen] checkbox is selected using V-SFT version 6.  Whether the screen program is for the main app or the sub app is indicated. Main app screen: X1 series unit Sub app screen (same as main app): External display Sub app screen (different from main app): External display
	Split the screen	This is displayed when the [System Setting] → [Other] → [Multi-Display Settings] → [Split the screen] checkbox is selected using V-SFT version 6.  Whether the screen program is for the main app or the sub app is indicated. Main app screen Sub app screen (same as main app) Sub app screen (different from main app)

\* The Local mode screen of the sub app can be displayed only when the main app is in RUN mode.

### Checking Recognition of the HDMI Cable

The connection status of an external display can be checked on the [I/O Check] → [Touch switches and media] tab window.

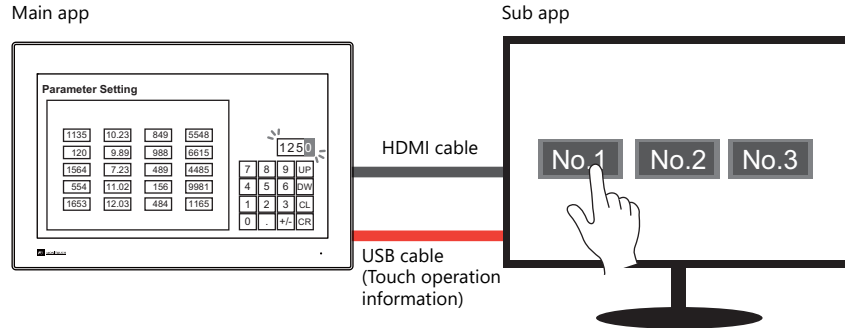


Item	Description	
HDMI	Display	The connection status of an external display is indicated. Disconnected: External display not connected Connected: External display connected (This is displayed even if the external display is turned off.)

## 15.7 Usage Example

### Using an External Display Supporting Touch Operations

When the [Expand display screen] checkbox is selected and a display that supports touch operations is used for the sub app, touch operations can be made on the display by additionally connecting a USB cable between the display and the X1 series unit.



\* Sounds for touch operations on the display cannot be output.

#### Items to Prepare

- External display supporting Windows 10 and touch operations
- USB cable

#### Settings and Transferring Using V-SFT

Refer to "15.3.3 Setting Example" and "15.5 Screen Program Transfer".  
(No settings are required for the external display supporting touch operations.)

#### Settings on the X1 Series Unit

Connect a USB cable between the USB-A port of the X1 series unit and the external display supporting touch operations.

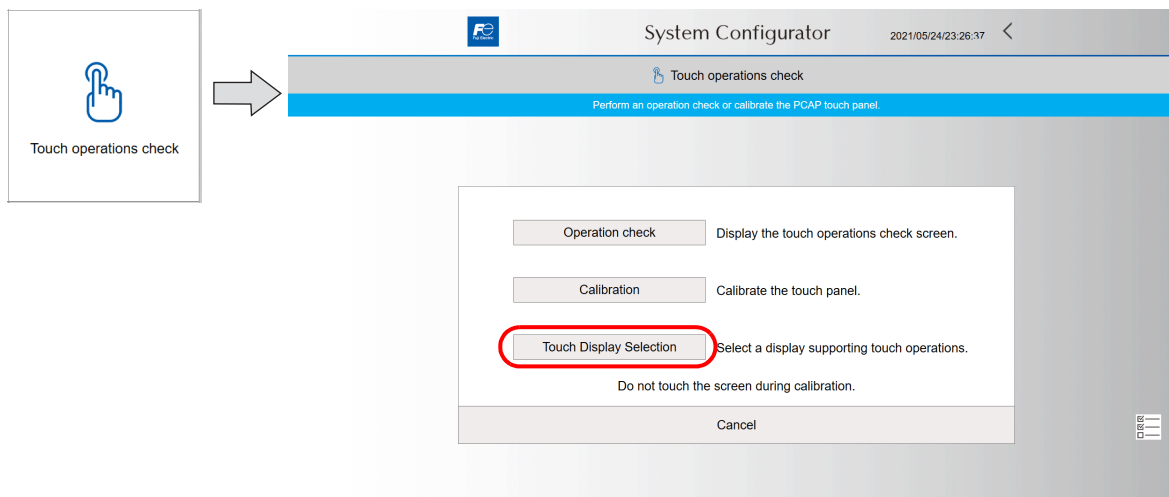
#### Checking touch operations

If a display that supports touch operations is connected via the HDMI port but the touch operations of the display are not recognized, configure settings on the following screen.

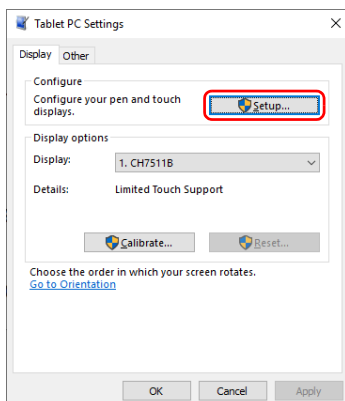


- A keyboard is required for these settings. Be sure to connect a keyboard.
- If the external display does not support touch operations, these settings are not necessary.

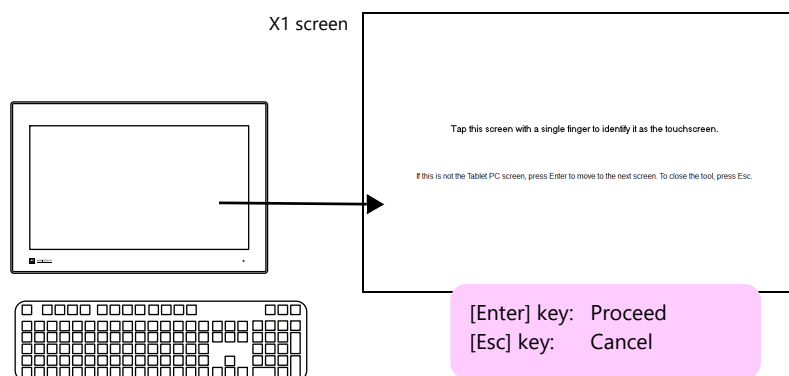
1. Start System Configurator on the X1 series unit and tap [Touch operations check] → [Touch Display Selection].



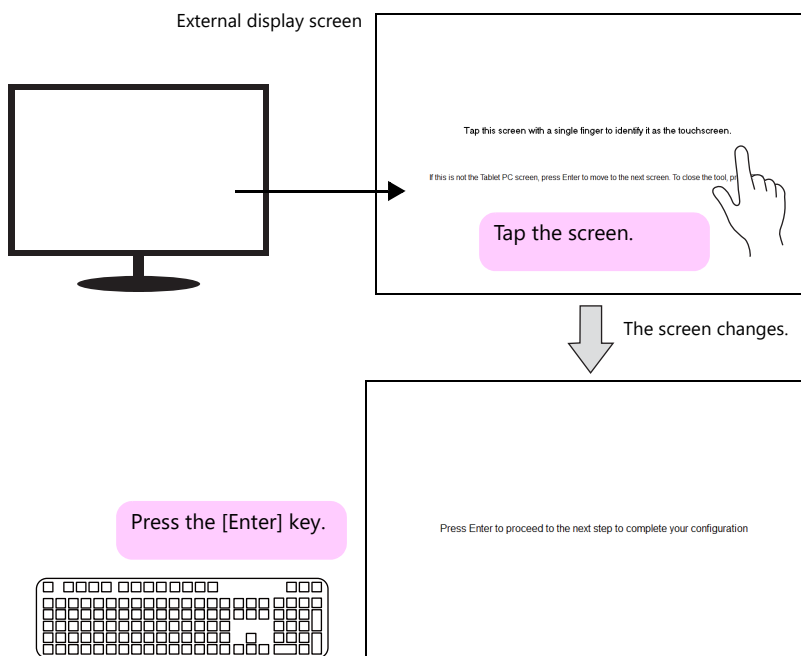
2. Tap [Tablet PC Settings] → [Setup].



3. The following window is displayed on the X1 series unit. Press the [Enter] key on the keyboard to proceed.



4. The same screen is displayed on the external display. Tap the screen according to the displayed instructions. The next window is displayed. Press the [Enter] key on the keyboard to complete settings.

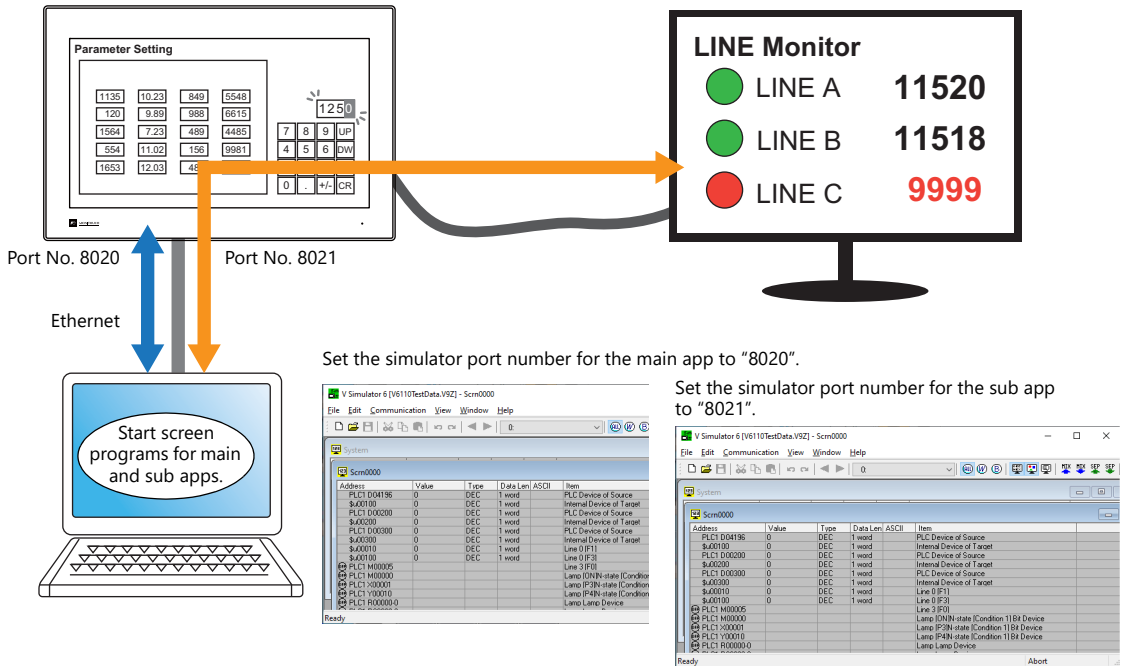


5. Tap [Tablet PC Settings] → [OK] to return to the System Configurator screen.

## Using the Simulator

Individual simulator instances can be used for the main and sub apps by using different port numbers for each instance.

Example: [Expand display screen] selected

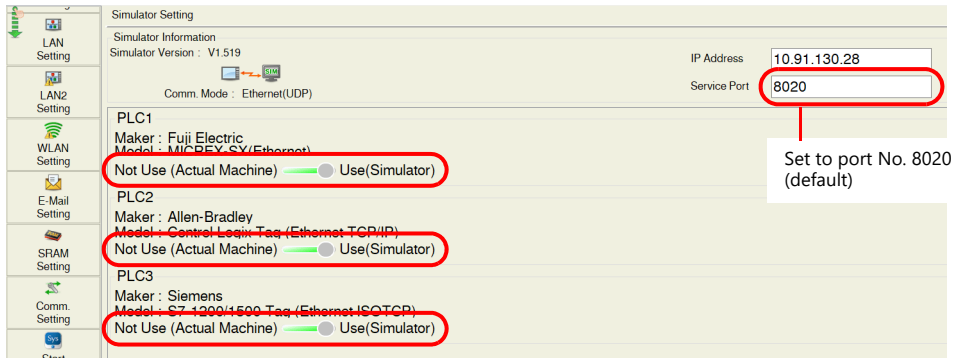


For details on the simulator, refer to the V9 Series Operation Manual.

## Local Mode Settings

### Main app

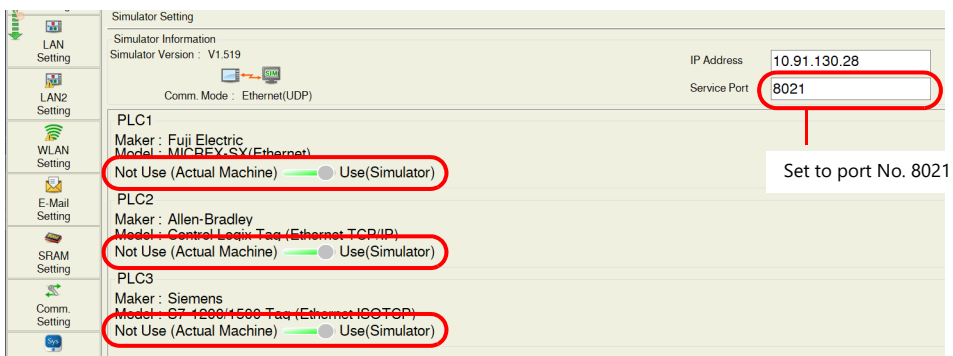
On the Local mode screen, set [Simulator Setting] → [Service Port] to "8020" (default).



### Sub app

On the Local mode screen, set [Simulator Setting] → [Service Port] to "8021".

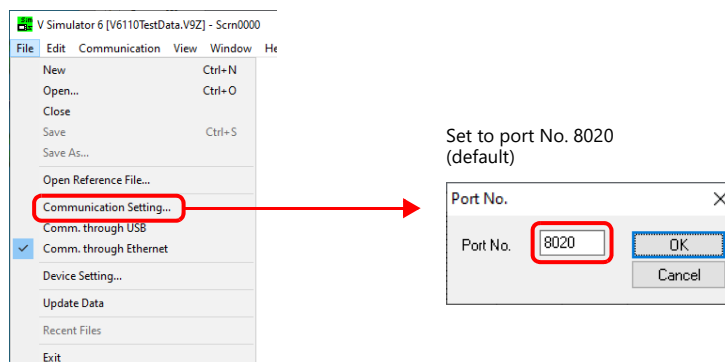
\* If the external display does not support touch operations, a mouse is required.



## Simulator Settings

### [Editing Screen: Main]

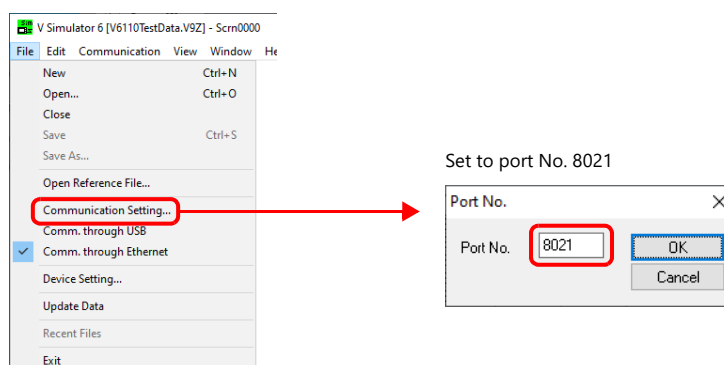
1. Start the screen program for the main app on a computer.
2. Click [Transfer] → [Simulate] to start the simulator.
3. Set the communication icon on the simulator in the deactivated state (not communicating) or click [Communication] → [End]. Then set [File] → [Communication Setting] → [Port No.] to "8020".



4. Set the communication icon on the simulator in the activated state (communicating) or click [Communication] → [Start]. Communication between the simulator and the main app starts.

### [Editing Screen: Sub]

1. Start the screen program for the sub app on a computer.
2. Click [Transfer] → [Simulate] to start the simulator.
3. Set the communication icon on the simulator in the deactivated state (not communicating) or click [Communication] → [End]. Then set [File] → [Communication Setting] → [Port No.] to "8021".



4. Set the communication icon on the simulator in the activated state (communicating) or click [Communication] → [Start]. Communication between the simulator and the sub app starts.



When [Use same screen program] is selected, start two instances of the same screen program on the computer and use the simulator port numbers given above for the main and sub app respectively.



## 15.8 System Device Memory

The system device memory address associated with the multi-display function is shown below.

Address	Description	Remarks																																
\$s2002	<p>Error information This outputs the execution result of the tab number registered in the [Internal Device Share Settings]. 0: No errors 1: Error</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> <p style="text-align: center;"> <span style="margin-right: 100px;">Reserved for system</span> <span style="margin-right: 20px;">No. 7</span> <span style="margin-right: 20px;">No. 6</span> <span style="margin-right: 40px;">...</span> <span style="margin-right: 20px;">No. 1</span> <span>No. 0</span> </p>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0									← X1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																			
0	0	0	0	0	0	0	0																											
	Check that the RUN mode screen is displayed on the sub app.																																	

## 15.9 Errors

When an error occurs on a screen program that uses the multi-display function, the following error codes are displayed on the main app or sub app screen.

Check the error code and resolve the problem.

Error	Description	Solution	Main app	Sub app
Error: 403	The PLC No. and model do not match between the main and sub app settings.	Make the PLC No. and model settings match in [Hardware Setting].	-	○
Error: 404	[Multi-Display Settings] is not used, or [Multi-Display Settings] is used and a screen program with the [Editing Screen: Main] setting is transferred for the sub app.	Transfer for the main app with [Transfer] → [Communication Setting] → [Option] → [Port No.] set to "8001". When transferring for the sub app, transfer the program with [Multi-Display Settings] → [Editing Screen] set to [Sub].	-	○
Error: 405	The PLC model specified for SERIAL does not support multi-display.	Check the model specified for SERIAL. Refer to the X1 Series Reference Manual for models that support the function.*	○	○
Setup Error	Screen Data not setting.	Transfer the screen program again.	○	○

\* Models that are not supported:

- Universal serial
- V-Link
- Modbus slave




For details on other error codes, refer to the X1 Series Hardware Specifications.

## 15.10 Notes

### Notes Common to [Expand Display Screen] and [Split the Screen] Settings

- The following Ethernet port numbers are used. Avoid duplicated use of port numbers.

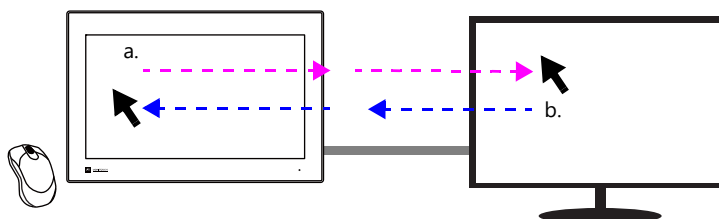
Port No.	Setting Range	Description	Setting Location	Remarks
8001	Fixed	Transferring a screen program with [Editing Screen] set to [Main]	[Transfer] → [Download] → [Communication Setting] → [Option]	
8002	Fixed	Transferring a screen program with [Editing Screen] set to [Sub]		
8020	1024 to 65535	Simulator (Ethernet)	Simulator, Local mode	
64000	Fixed	For a serial connection with a PLC (For [Editing Screen: Main])	[System Setting] → [Hardware Setting] → "SERIAL"	Local host address IP 127.0.0.1 also used
64001	Fixed	For a serial connection with a PLC (For [Editing Screen: Sub])		
64500	Fixed	When using [Internal Device Share Settings] (For [Editing Screen: Main])	[System Setting] → [Other] → [Multi-Display Settings] → [Internal Device Share Settings]	
64501	Fixed	When using [Internal Device Share Settings] (For [Editing Screen: Sub])		

 For details on other port numbers, refer to Chapter 6 "6.3 X1 Port Numbers".

### Notes on the [Expand Display Screen] Setting

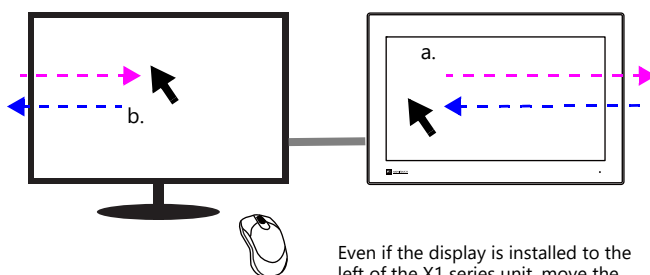
- Use a mouse to operate the sub app or use an external display that supports touch operations.
- When using a mouse, the cursor can be moved between the main and sub apps only as shown below.
  - From main app to sub app: Rightward
  - From sub app to main app: Leftward

When the display is to the right of the X1 series unit



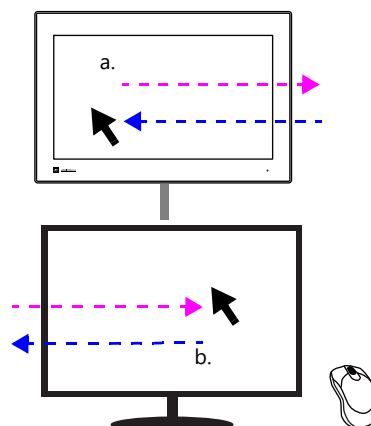
The movement of the cursor will be as shown below depending on the orientation.

When the display is to the left of the X1 series unit

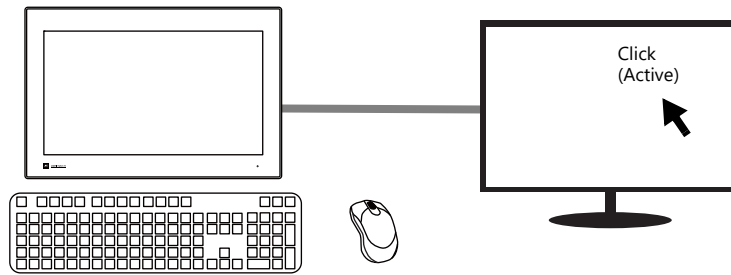


Even if the display is installed to the left of the X1 series unit, move the cursor to the display by moving rightward.

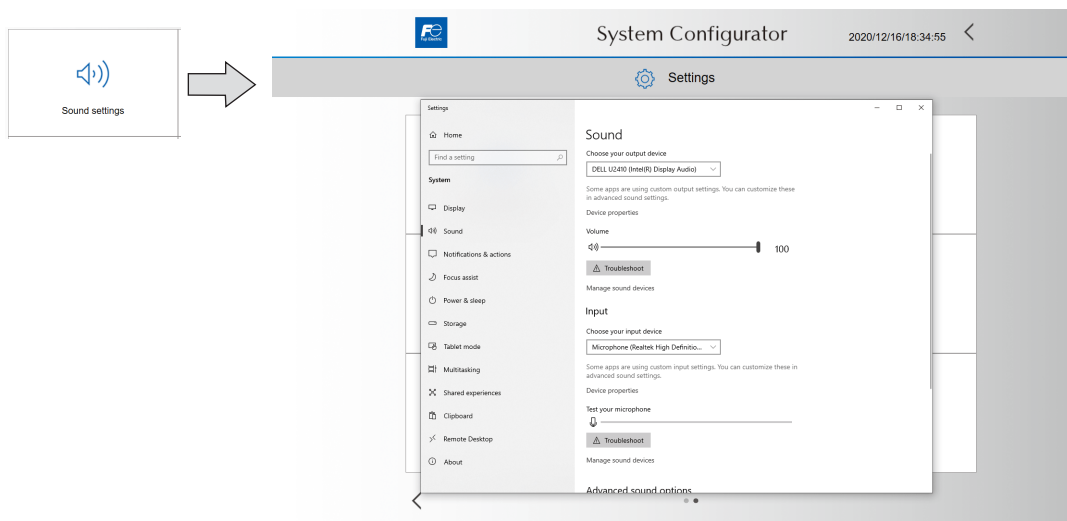
When the display is below the X1 series unit



- When using a keyboard for inputting to the sub app, first activate input on the sub app by either clicking the sub app screen with the mouse or tapping the screen if the external display supports touch operations.



- When using an external display equipped with speakers, start System Configurator on the X1 series unit and select the speakers to use.  
System Configurator → [Settings] → [Sound settings]



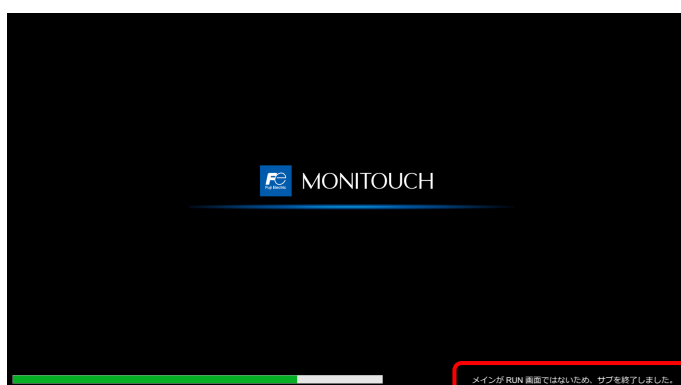
## 15.11 Limitations

### Limitations Common to [Expand Display Screen] and [Split the Screen] Settings

- When configuring screen programs, be sure to make the following settings the same between the main and sub apps.
  - [System Setting] → [Edit Model Selection] → [Edit Model], [Size]
  - The following three settings for the model set at [System Setting] → [Hardware Setting] → "SERIAL"
    - PLC No. 1 to 8
    - PLC model
    - [Comm. Error Handling] setting (Stop, Continue, Disconnect)
- The following models are not supported. "Error: 405" is displayed on the main or sub app if any of the following is set at [Hardware Setting] → "SERIAL".
  - Universal serial
  - V-Link
  - Modbus slave
- If the main app fails (including Local mode), the sub app is terminated. The sub app will recover when the main app switches to RUN mode.
- Operation of the multi-display function cannot be checked with the emulator. (The simulator can be used for checking. For details, refer to "Using the Simulator" page 15-34.)
- The function can be used only when System Configurator → [Settings] → [Startup settings (operation mode)] → [HMI (Normal use)] is selected. (The function is invalid if the HMI app is started from System Configurator → [Operation test] → [Start HMI app].)

### Limitations on the [Expand Display Screen] Setting

- If the HDMI cable connecting the external display is disconnected, the sub app ends. The sub app recovers automatically when reconnected.



The sub app shut down because the HDMI cable is not connected.

- Operation is not guaranteed regarding the Windows [Display settings] → [Multiple displays] → [Show only on 1] (X1) and [Show only on 2] (external display) settings.

### Limitations on the [Split the Screen] Setting

- The X1 series unit reboots when the screen program is transferred for the first time.
- The window tiling function is invalid.

## Limitations on Functions of the Sub App Screen Program

- The following functions are unavailable.

Category	Item	Description	Remarks
Macro command	BRIGHT	Brightness adjustment	Error output \$s1063=-1
	ADJ_VOLUME	Volume adjustment	
	SAVE_VOLUME	Saving of volume adjustment	
	SET_BZ	Buzzer	Error output \$s72=-1
	SET_BKLT	Backlight control	Error output \$s72=-1 (\$s72=0 if backlight setting is "Always ON")
	OUT_ENQ	Universal serial (interrupt), A-link + Net10	Error output \$s72=-1
	OUT_ENQ_EX	Universal serial (interrupt)	
	STA_LIST	Data sheet printing, PDF output	
	MR_OUT	Execution of MR400 call setting	Error output \$s1060=-1
	MR_REG	Execution of MR400 registration setting	
OUT_PR	Dedicated to printers Command execution		
Function	System	Buzzer	
		Audio	
		Backlight	
	Printer	Hard copy	
		Log printing	
		Data sheet printing, PDF output	
		MR-400	
	Alarm	Audio playback	
		Sending E-mail	
	MQTT client	-	
	OPC UA	Server	
		Client	
	Transfer	Automatic upload of a screen program with [Editing Screen] set to [Sub]	

- The following are unavailable.

Category	Item	Description	Remarks
Local mode	E-Mail Setting	-	
	Start Sys. Config.	-	
	System Setting	Buzzer Setting	
		Backlight Setting	
		Hard Copy Setting	
Serial Setting			
I/O Check	Touch switches and media		
System menu	Display	-	

- Others

- When [Use same screen program] is selected, the read/write areas for the sub app are not used.
- When [Use different screen program] is selected, the following areas cannot be used by the sub app.

Category	Item	Description	Remarks
Read area (V8-compatible setting)	Read area "n"	Bit 8: Single shot buzzer Bit 9: Error buzzer Bit 10: Continuous buzzer	For details, refer to the V8 Series Reference Manual.
	Read area "n+1"	Bit 9: Data sheet output Bit 10: Screen hard copy (printing) Bit 11: Backlight control Bit 14: Screen internal switching control	
Write area (V8-compatible setting)	Write area "n"	Bit 8 to 10: Same as read area "n"	
	Write area "n+1"	Bit 9 to 14: Same as read area "n+1"	

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