

## **FA-M3V Environment Tool Trace Function**

IM 34M06Q50-21E

### **Applicable Modules:**

Model Code	Model Name
F3SP71-4S (Rev4 or later)	Sequence CPU Module (with network functions)
F3SP76-7S (Rev4 or later)	Sequence CPU Module (with network functions)
F3SPV9-7S (Rev4 or later)	Instrumentation CPU Module (with network functions)
SF630-MCW (R3.01 or later)	FA-M3 Programming Tool WideField3



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# Applicable Product

## ● Range-free Controller FA-M3

Model	Name
F3SP71-4S	Sequence CPU Module (with network functions)
F3SP76-7S	Sequence CPU Module (with network functions)
F3SPV9-7S	Instrumentation CPU Module (with network functions)
SF630-MCW	FA-M3 Programming Tool WideField3

The document number for this manual is given below.

Refer to the document number in all communications, including when purchasing additional copies of this manual.

- Document No.: IM34M06Q50-21E

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# Precautions

## ■ About This Manual

- This Manual should be passed on to the end user.
- This manual is an essential part of the product; keep it in a safe place for future reference.
- This product is designed to be used by a person with specialized knowledge.
- Before using the product, read this manual thoroughly to have a clear understanding of the product.
- This manual explains the functions of this product, but there is no guarantee that they will suit the particular purpose of the user.
- Under absolutely no circumstances may the contents of this manual be transcribed or copied, in part or in whole, without permission.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, should any errors or omissions come to the attention of the user, please contact the nearest Yokogawa Electric representative or sales office.

## ■ Safety Symbols



- **"Handle with care."** This symbol on the product indicates that the operator must follow the instructions laid out in this user's manual to avoid the risk of personnel injuries, fatalities, or damage to the instrument.



- **Protective Conductor Terminal**

This terminal is to prevent electric shock. Before using the instrument, connect to the Protective earth (Comply with the regulation of each country.), and route the line through the shortest path possible.



- **Functional Earth Terminal**

This terminal is for stable operation. Before using the instrument, be sure to ground this terminal.



- **Alternating current.** Indicates alternating current.



- **Direct current.** Indicates direct current.



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The following symbols are used only in the user's manual.

**WARNING**

- Draws attention to information essential to prevent electrical shock or other dangers that may result in injury or the loss of life.

**CAUTION**

- Draws attention to information essential to prevent hardware damage, software damage or system failure.

**NOTE**

- Draws attention to information essential to the understanding of operation and functions.

## ■ Safety Precautions when Using/Maintaining the Product

- For the protection and safe use of the product and the system controlled by it, be sure to follow the instructions and precautions on safety stated in this manual whenever handling the product. Take special note that if you handle the product in a manner other than prescribed in these instructions, the protection feature of the product may be damaged or impaired. In such cases, Yokogawa cannot guarantee the quality, performance, function and safety of the product.
- When installing protection and/or safety circuits such as lightning protection devices and equipment for the product and control system as well as designing or installing separate protection and/or safety circuits for fool-proof design and fail-safe design of processes and lines using the product and the system controlled by it, the user should implement it using devices and equipment, additional to this product.
- If component parts or consumable are to be replaced, be sure to use parts specified by the company.
- This product is not designed or manufactured to be used in critical applications which directly affect or threaten human lives and safety — such as nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, shipboard equipment, aviation facilities or medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
- Do not attempt to modify the product.
- To avoid electrical shock, turn off the power before wiring.
- This product is classified as Class A for use in industrial environments. If used in a residential environment, it may cause electromagnetic interference (EMI).  
In such situations, it is the user's responsibility to adopt the necessary measures against EMI.

## ■ Exemption from Responsibility

- Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa Electric) makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- Yokogawa Electric assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

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- Yokogawa Electric makes no other warranties expressed or implied except as provided in its warranty clause for software supplied by the company.
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- Copying the software for any purposes other than backup is strictly prohibited.
- Store the original media that contain the software in a safe place.
- Reverse engineering, such as decompiling of the software, is strictly prohibited.
- Under absolutely no circumstances may the software supplied by Yokogawa Electric be transferred, exchanged, or sublet or leased, in part or as a whole, for use by any third party without prior permission by Yokogawa Electric.

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## ■ General Requirements for Using the FA-M3 / e-RT3 Controller

### ● Set the product in a location that fulfills the following requirements:

- INDOOR USE ONLY
- This product is an open equipment. The product must be installed in a metallic panel enclosure with an impact rating IK08 or more.
- Where the product will not be exposed to direct sunlight, and where the operating surrounding air temperature is from 0°C to 55°C (32°F to 131°F).

There are modules that must be used in an environment where the operating surrounding air temperature is in a range smaller than 0°C to 55°C (32°F to 131°F). Refer to "Hardware Manual" (IM 34M06C11-01E) or the applicable user's manual. In case of attaching such a module, the entire system's operating surrounding air temperature is limited to the module's individual operating surrounding air temperature.
- Where the relative humidity is from 10 to 90%.

In places where there is a chance of condensation, use a space heater or the like to constantly keep the product warm and prevent condensation.
- For use in Pollution Degree 2 Environment.
- Where there are no corrosive or flammable gases.
- Where the product will not be exposed to mechanical vibration or shock that exceed specifications.
- Where there is no chance the product may be exposed to radioactivity.

### ● Use the correct types of wire for external wiring:

- USE COPPER CONDUCTORS ONLY.
- Use conductors with temperature rating above 75°C.

### ● Securely tighten screws:

- Securely tighten module mounting screws and terminal screws to avoid problems such as faulty operation.
- Tighten terminal block screws with the correct tightening torque as given in this manual. Refer to the "Hardware Manual" (IM 34M06C11-01E) or the applicable user's manual for the appropriate tightening torque.

### ● Securely lock connecting cables:

- Securely lock the connectors of cables, and check them thoroughly before turning on the power.

### ● Interlock with emergency-stop circuitry using external relays:

- Equipment incorporating the FA-M3 / e-RT3 controller must be furnished with emergency-stop circuitry that uses external relays. This circuitry should be set up to interlock correctly with controller status (stop/run).

### ● Ground for low impedance:

- For safety reasons, connect the [FG] grounding terminal to a protective earth (Comply with the regulation of each country.). For compliance to CE Marking, use braided or other wires that can ensure low impedance even at high frequencies for grounding.

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- **Configure and route cables with noise control considerations:**

- Perform installation and wiring that segregates system parts that may likely become noise sources and system parts that are susceptible to noise. Segregation can be achieved by measures such as segregating by distance, installing a filter or segregating the grounding system.

- **Configure for CE Marking Conformance:**

- For compliance to CE Marking, perform installation and cable routing according to the description on compliance to CE Marking in the “Hardware Manual” (IM34M06C11-01E).
- The list of CE conforming models is available in Appendix A2. of “Hardware Manual”.

- **Keep spare parts on hand:**

- We recommend that you stock up on maintenance parts, including spare modules, in advance.
- Preventive maintenance (replacement of the module) is required for using the module beyond 10 years.

- **Discharge static electricity before touching the system:**

- Because static charge can accumulate in dry conditions, first touch grounded metal to discharge any static electricity before touching the system.

- **Wipe off dirt with a soft cloth:**

- Gently wipe off dirt on the product's surfaces with a soft cloth.
- If you soak the cloth in water or a neutral detergent, tightly wring it out before wiping the product. Letting water enter the module interior can cause malfunctions.
- Do not use volatile solvents such as benzine or paint thinner or chemicals for cleaning, as they may cause deformity, discoloration, or malfunctioning.

- **Avoid storing the FA-M3 /e-RT3 controller in places with high temperature or humidity:**

- Since the CPU module has a built-in battery, avoid storage in places with high temperature or humidity.
- Since the service life of the battery is drastically reduced by exposure to high temperatures, take special care (storage surrounding air temperature should be from -20°C to 75°C).
- There is a built-in lithium battery in a Sequence CPU module which serves as backup power supply for programs, device information and configuration information.

In the case of F3SP□□, the service life of the battery is over 10 years in a non-energized state at room temperature. For F3RP6□, F3RP7□ and F3NP5□, see each the User's Manual for the service life of the battery.

Take note that the service life of the battery may be shortened when installed or stored at locations of extreme low or high temperatures. Therefore, we recommend that modules with built-in batteries be stored at room temperature.

- **Always turn off the power before installing or removing modules:**

- Failing to turn off the power supply when installing or removing modules, may result in damage.

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- **Do not touch components in the module:**

- In some modules you can remove the right-side cover and install ROM packs or change switch settings. While doing this, do not touch any components on the printed-circuit board, otherwise components may be damaged and modules may fail to work.

- **Do not use unused terminals:**

- Do not connect wires to unused terminals on a terminal block or in a connector. Doing so may adversely affect the functions of the module.

- **Use the following power source:**

- Use only F3PU□□-□□ as the power supply module.
- If using this product as a UL-approved product, for the external power supply, use a limited voltage / current circuit power source or a Class 2 power source.
- If using this product as a CE-complied product, for the external power supply, use a SELV and limited-energy circuit separated by reinforced insulation or double insulation from hazardous voltage.

- **Refer to the user's manual before connecting wires:**

- Refer to the "Hardware Manual" (IM 34M06C11-01E) or the applicable user's manual for the external wiring drawing.
- Refer to "A3.6.5 Connecting Output Devices" in the "Hardware Manual" before connecting the wiring for the output signal.
- Refer to "A3.5.4 Grounding Procedure" in the "Hardware Manual" for attaching the grounding wiring.

- **Authorized Representative in the EEA:**

- The Authorized Representative for this product in the EEA is:  
**Yokogawa Europe B. V.**  
Euroweg 2, 3825 HD Amersfoort, The Netherlands

- **In relation to UKCA marking, the importer for this product into Great Britain market via the YOKOGAWA sales channel is:**

- **Yokogawa United Kingdom Limited**, Stuart Road Manor Park Runcorn, WA7 1TR, United Kingdom.

## ■ General Requirements for Using the FA-M3 Slave Units (TAH Series)

### ● Connect YHLS cable to SHIELD terminal:

- Connect the DRAIN line of the YHLS cable to the SHIELD terminal of the YHLS master module securely. Failing to do so may affect the performance of the YHLS system.

### ● Do not touch components in the unit:

- Do not remove the back cover of the unit. Doing so may cause a failure.

## ■ Waste Electrical and Electronic Equipment (WEEE)



Waste Electrical and Electronic Equipment (WEEE)

(Only valid in the EEA for EU WEEE Directive and in the UK for UK WEEE Regulation)



This product complies with the WEEE marking requirement.

This marking indicates that you must not discard this electrical/electronic product in domestic household waste.

When disposing of products in the EEA and UK, contact your local Yokogawa office in the EEA and/or UK respectively.

## ■ How to dispose the batteries

(Only valid in the EEA for EU Battery Directive/Regulation and in the UK for UK Battery Regulation)

Batteries are included in some modules of this product.

This marking indicates they shall be sorted out and collected as ordained in the EU battery Directive/Regulation and UK battery Regulation.

The procedure is different when the user can remove or cannot remove.

### ① Batteries the user can remove

The battery of F3RP6□, F3RP7□ and F3NP5□ can be removed by yourself.

When you remove the battery from F3RP6□, F3RP7□ and F3NP5□ dispose it, discard them in accordance with domestic law concerning disposal. See the User's Manual of F3RP6□, F3RP7□ and F3NP5□ for the removal procedure.

If you don't remove the battery from this product, please see ②.

### ② Batteries the user cannot remove

Dispose the battery together with this product.

When you dispose this product in the EEA and UK, contact your local Yokogawa office in the EEA and/or UK respectively.

Do not dispose them as domestic household waste.

Battery category: Lithium battery



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# Introduction

## ■ About This Manual

This Trace Function User's Manual explains the details of the functions that display, in real time, current information of relay devices and register devices in sequence CPU modules (F3SP71-4S, F3SP76-7S, and F3SPV9-7S) and advanced function I/O modules used in FA-M3.

## ■ Other User's Manuals

Refer to different manuals depending on the type of the sequence CPU modules.

### ● For functions, refer to:

- Sequence CPU Instruction Manual - Functions (for F3SP71-4N/4S, F3SP76-7N/7S) (IM 34M06P15-01E)
- Sequence CPU – Network Functions (for F3SP71-4N/4S, F3SP76-7N/7S) (IM 34M06P15-02E)

### ● When creating programs using ladder language, refer to:

- FA-M3 Programming Tool WideField3 (IM 34M06Q16-01E, 02E, 03E, 04E, 11E)

Read the following user's manuals, as required.

### ● For information on the specifications\*, configuration\*, installation, wiring, trial operation, maintenance and inspection of the FA-M3, as well as information on the system-wide limitation of module installation, refer to:

- Hardware Manual (IM 34M06C11-01E).

\*: For information on the specifications of products other than the power supply module, base module, I/O module, cable and terminal block unit, refer to their respective user's manuals.



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# FA-M3V

## Environment Tool Trace Function

IM 34M06Q50-21E

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# A1 Product Overview

This chapter describes the overview and features of the trace functions (sampling trace and live logic analyzer).

Hereinafter, live logic analyzer is referred to as LLA.

## A1.1 Overview and Features of Trace Functions

### ■ About Trace Functions

The FA-M3 Programming Tool WideField3 and sequence CPU/instrumentation CPU modules have two types of trace functions: sampling trace and live logic analyzer. The following describes the overview and features of each type of trace functions. Each trace type can be used in the following CPU modules and WideField3 versions.

**Table A1.1 CPU Modules and WideField3 Versions That Support Each Trace Type**

Trace Type	Trace Mode	CPU Modules	WideField3
Sampling trace	Single trace	F3SP71-4S/F3SP76-7S/F3SPV9-7S (all revisions)	All revisions
	Multi-trace, Endless trace		R2.01 or later
	Toolless trace		N/A
Live logic analyzer	N/A	F3SP71-4S/F3SP76-7S/F3SPV9-7S (revision 4 or later)	R3.01 or later

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## ■ Overview of Sampling Trace

Sampling trace stores the values of relay devices and registered devices of CPU modules, advanced function I/O modules, and DIO modules in the CPU memory, based on a specified sampling method. After sampling is completed, sampling results can be displayed in time chart format or scan chart format in the sampling trace tool.

## ■ Features of Sampling Trace

### ● Various Trace Modes

Sampling trace has the following three modes:

- Single trace: Collects data from devices specified to be traced as many as the trace count and then stops.
- Multi-trace: Repeats the single trace operation up to 100 times.
- Endless trace: Repeats the single trace operation until you stop the trace operation.

### ● Use with Other Applications

Sampling trace can be started and used together with the Ladder Programming Tool WideField3 and FA-M3 ToolBox.

Collected trace data can be saved in CSV file format.

You can also use the data to create a document using Microsoft Excel and so on.

### ● Device Monitoring without Affecting the Control

You can collect data with minimum effect to the scan speed of the CPU module.

### ● Toolless Trace

You can execute a sampling trace and obtain the results at your site without using the Ladder Programming Tool WideField3 or sampling trace tool.

You can execute the trace with a card batch by using an SD card or with virtual directory commands.

You can obtain trace results via the SD card or through FTP file transfer.



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## ■ Overview of Live Logic Analyzer

Live logic analyzer allows you to view real-time changes in values of relay devices and registered devices of CPU modules, advanced function I/O modules, and DIO modules.

Because you can use this function together with the Ladder Programming Tool WideField3, you can check the operation and status using live logic analyzer while changing ladders in the ladder monitor.

## ■ Features of Live Logic Analyzer

### ● Device Monitoring without Affecting the Control

You can collect data and perform monitoring with minimum effect to the scan speed of the CPU module.

### ● Improved Debugging Efficiency

Because you can start and use live logic analyzer together with the Ladder Programming Tool WideField3, you can immediately see the change in operation due to an edited ladder.

### ● Simple and Easy Setting Function

In live logic analyzer, you can configure the settings for monitoring devices in the same way as in the sampling trace tool. You can also register a device of a created ladder to monitor it by dragging and dropping while holding down the [Alt] key or copying and pasting the device.

### ● Use with Other Applications

Live logic analyzer can be started and used together with the Ladder Programming Tool WideField3 and FA-M3 ToolBox. Collected trace data can be saved in RTTD file format or CSV file format.

If you save the data in CSV file format, you can use the data to create a document using Microsoft Excel and so on. If you save the data in RTTD file format, you can display the previous trace results.

## A1.2 Comparison of Trace Functions

The following table compares the functions of sampling trace and live logic analyzer.

**Table A1.2 Comparison of Trace Functions**

Function	Sampling Trace	Live Logic Analyzer
CPU connection I/F	Ethernet/USB/FL-net	Ethernet/USB
Toolless trace	Card batch/virtual directory	N/A
Sampling method	Scan/periodic/TRC instruction	Scan/periodic/TRC instruction
Save destination of trace results	CPU module: CPU memory/SD card WideField3: Dedicated file format/CSV file	CPU module: N/A WideField3: Dedicated file format/CSV file
Trace start condition setting	Available	None
Trace end condition setting	Can be enabled or disabled. (Enabled by default)	Can be enabled or disabled. (Disabled by default)
Number of devices to be traced	Relay: 64 points Register: 128 points	Relay: 64 points Register: 32 points
Data display timing	After a trace is completed	During a trace
Data display method	Static chart	Dynamic chart
Data display format	Bit/decimal/hexadecimal	Bit/decimal/hexadecimal/float/double precision float
Zoom in	Available	Available
Trace start by configuration settings	Available	N/A

## A1.3 Using Trace Functions

### A1.3.1 Using Sampling Trace

Sampling trace collects data of (relay/register) devices of advanced function I/O modules and displays all collected data at a time so that you can check the behavior of the devices.

Sampling trace is suitable for a data trace with specific trace start timing or a trace for checking a phenomenon that occurs only after a long waiting time. For example, this function is useful for troubleshooting a problem that occurs due to a known cause but at a very low frequency.

Although you can execute a toolless trace without using the sampling trace tool to debug ladder programs, the sampling trace tool is useful for investigating problems and troubles.

The following table shows the use cases of the functions of sampling trace.

**Table A1.3.1 Use Cases of Sampling Trace and Available Functions**

Use Case	Available Function	SEE ALSO
Start tracing device statuses at power on.	Configuration	B3.14, "Sampling Trace Setup Using the Project Settings/Configuration Window" (Pages B3-34)
Start tracing with a specific device status as a trigger.	Start trigger	B3.4, "Setup of Trigger Conditions" (Pages B3-16 to 17)
Stop tracing with a specific device status as a trigger.	End trigger	B3.4, "Setup of Trigger Conditions" (Pages B3-18 to 19)
Check device statuses before and after a specific device status.	Delay	B3.3, "Setup of Sampling Method" (Page B3-12)
Save trace results to an SD card.	Save destination setting	B3.6, "Setup of Location to Store Trace Results" (Pages B3-27 to 28)
Perform sampling traces several times with the same conditions.	Multi-trace	B3.4, "Setup of Trigger Conditions" (Pages B3-14 to 15)
Continue a sampling trace until the trace is cancelled.	Endless trace	B3.4, "Setup of Trigger Conditions" (Pages B3-20)
Start and end a trace from a PC with a network connection when WideField is unavailable.	Virtual directory command	B7.2, "Sampling Trace by Using the Virtual Directory Command" (Pages B7-5 to 7)
Perform a trace when WideField and a PC are unavailable.	Card batch	B7.1, "Sampling Trace by Using Card Batches" (Pages B7-2 to 3)
Restore the last trace condition.	Load the last execution condition	B3.2, "Sampling Trace Setup Dialog Box" (Page B3-9)
Export obtained data as a CSV file.	Export to a CSV file	B5.1, "Export Format" (Page B5-2)
Stop a sampling trace when WideField, an SD card, and a PC with a network connection are unavailable.	Cancel a trace by the rotary switch	B7.3, "Canceling a Sampling Trace by Using the Rotary Switch" (Page B7-8)



#### CAUTION

It is not possible to perform both sampling trace and live logic analyzer simultaneously on a CPU. Perform one type of the traces suitable for your purpose.

## A1.3.2 Using Live Logic Analyzer

Live logic analyzer displays the real-time change in collected device data on the screen. Live logic analyzer is useful to perform a trace for checking the change status of device data in real time.

For example, this function can be used to debug the operation timing of the device.

It is especially useful for operation tests and debugging of a high-speed application that is difficult to be checked through visual and sound inspection.

You can use live logic analyzer to continuously record data like a data logger and also to perform debugging to check device statuses quickly.

The following table shows the use cases of the functions of live logic analyzer.

**Table A1.3.2 Use Cases of Live Logic Analyzer and Available Functions**

Use Case	Available Function	SEE ALSO
Change the display position of a waveform during a trace.	Move a waveform	C4.1, "Expanding, Contracting, and Moving Waveforms" (Page C4-2)
Change the width of a displayed waveform during a trace.	Expand or contract a waveform	C4.1, "Expanding, Contracting, and Moving Waveforms" (Page C4-1)
Zoom in a displayed waveform during a trace.	Display Zoomed-in Graph (Split)	C4.2, "Display Zoomed-in Graph (Split)" (Page C4-3)
Stop a trace and check the value of a specific part of a displayed waveform.	Cursors A/B/M	C4.3, "Cursor Display" (Pages C4-4 to 5) C4.4, "Cursors A and B Fixing Function" (Page C4-6)
Check the value of a specific part of a displayed waveform during a trace.	Cursor M	C4.3, "Cursor Display" (Page C4-5)
Automatically end a trace when a specific device status occurs.	Trace end function	C4.5, "Trace End Function" (Page C4-7)
After a trace end condition is met, continue the trace for a while and then end it.	Sampling count after a trace ends	C3.1, "Trace Settings Tab" (Pages C3-13 to 14)
Check if a specific device status occurs during a trace.	User marker function	C4.6, "User Marker Function" (Page C4-8)
Pause a trace and display a specific data position such as the position where the trace end condition is met.	Data jump function	C4.7, "Data Jump Function" (Page C4-9)
Stop a trace and check the position where a specific device status occurs.	Data search function	C4.8, "Data Search Function" (Pages C4-10 to 13)
Capture displayed waveforms during a trace.	Copy as image function	C4.10, "Copy as Image Function" (Pages C4-17 to 18)
Restore the last trace condition.	Load the last execution condition	C2.1, "List of Live Logic Analyzer Menu Items" (Page C2-1) C2.2, "List of Toolbar Items of the Live Logic Analyzer" (Page C2-5)



### CAUTION

It is not possible to perform both sampling trace and live logic analyzer simultaneously on a CPU. Perform one type of the traces suitable for your purpose.

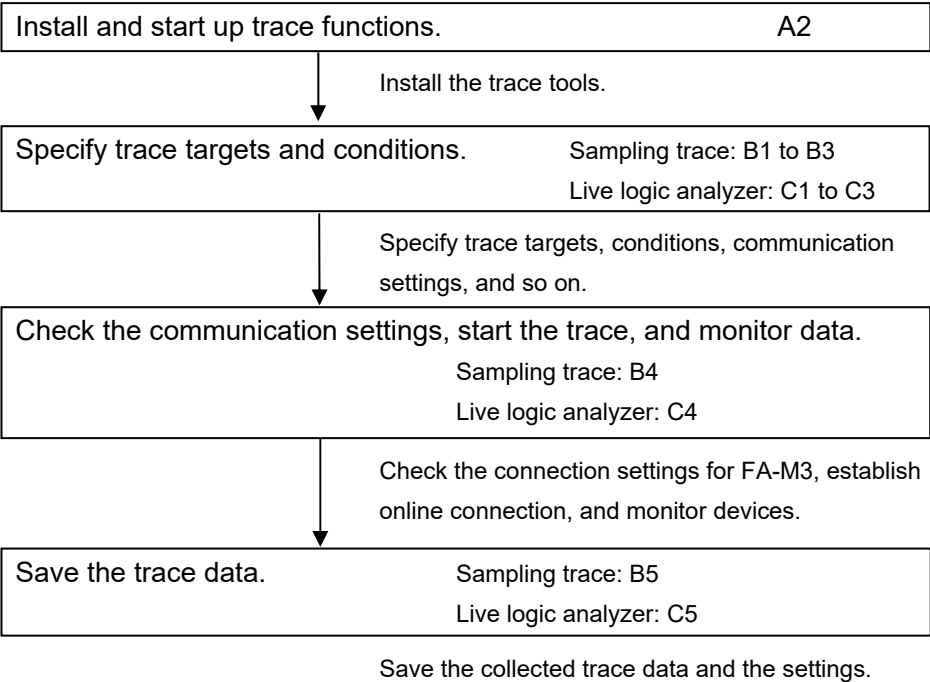
# A2 Preparing Trace Functions

This chapter describes how to install and start up the trace functions (sampling trace and live logic analyzer).

- Procedure for Using Trace Functions → A2.1
- Operating Environment of Trace Functions → A2.2
- Installing and Uninstalling Trace Tools → A2.3
- Starting and Exiting Trace Tools → A2.4
- Connecting the Trace Tools to an FA-M3 System → A2.5

## A2.1 Procedure for Using Trace Functions

[Chapter]



## A2.2 Operating Environment of Trace Functions

### ■ Operating Environment

The following describes the operating environment of each trace.

**Table A2.1 Operating Environment of Sampling Trace**

Item	Specifications
PC	PC/AT compatible
Operating System	Microsoft Windows 11 (64bit) Microsoft Windows 10 (32bit/64bit)
Required Software	.NET Framework2.0
Software Media	CD-R
CPU	1GHz or better, and can run an operating system listed above
Memory	1GB or more, and can run an operating system listed above
Hard Disk Capacity	400MB or more available
Display	800×600 dots or more (1024×768 recommended)
Communications *1*2	USB, Ethernet, FL-net
Printer	Any printer compatible with the operating systems listed above and supports A4 printing
Compatible CPU Modules *3	F3SP71-4S, F3SP76-7S, F3SPV9-7S
Supported WideField versions *4	WideField2 and WideField3 (all versions)

\*1: For FL-net communications, network card must support TCP/IP protocol.

Usable communications conditions vary with CPU type.

\*2: Depending on the chipset used by the PC running the WideField3 software, reliable USB connection is not always guaranteed.

\*3: This user's manual is intended for F3SP7□-□N, F3SP7□-□S, and F3SPV9-7S. For the compatibility of older CPU modules, see "FA-M3 Programming Tool WideField3 Read Me First Installing and Starting WideField3 (IM 34M06Q16-11E)".

\*4: Available functions vary depending on the combination of the CPU modules and WideField.

**Table A2.2 Operating Environment of Live logic Analyzer**

Item	Specifications
PC	PC/AT compatible
Operating System	Microsoft® Windows® 11 (64bit) Microsoft® Windows® 10 (32bit/64bit)
Required Software	Microsoft Visual C++2005 Redistributable Ver.6.0.2900.2180, MSXML4.0, .NET Framework2.0, DirectX9.0c or later
Software Media	CD-R
CPU	1GHz or better, and can run an operating system listed above
Memory	1GB or greater (for 32-bit) or 2GB or greater (for 64-bit) RAM with which the above operating systems can operate normally 300MB*1 or more available space in the physical memory
Hard Disk Capacity	400MB or more available
Display	1024×768 dots or more
Communications	USB, Ethernet
Printer	N/A (No print function is supported.)
Compatible CPU Modules	F3SP71-4S, F3SP76-7S, F3SPV9-7S (revision 4 or later)
Supported WideField versions	WideField3 (R3.01 or later)
Graphics processor	DirectX® 9 graphics processor with a Windows Display Driver Model (WDDM) 1.0 or later driver recommended

\*1: It may increase depending on the number of devices to be traced and sampling count.

---

## A2.3 Installing and Uninstalling the Trace Tools

### A2.3.1 Installing/Uninstalling the Trace Tools

This section describes how to install and uninstall the trace tools.

Before installation, read the following precautions.



#### CAUTION

---

Log in with Administrator privileges to set up, perform maintenance on, or remove WideField3 that supports the trace tools. Users without Administrator privileges cannot set up, perform maintenance on, or remove WideField3.

---

#### 1. Installing Trace Functions

Live logic analyzer is installed as a function of WideField3 R3.01 or later.

Sampling trace has been embedded as a function in WideField3 since its first release, and sampling trace is installed together with WideField3 by running the installer for WideField3 R3.01 or later. Insert the CD-R that contains the installer for WideField3 R3.01 or later in the computer and follow the instructions on the screen to complete the installation.

#### 2. Uninstalling Trace Functions

Because the trace tools are functions of WideField3, you can uninstall the trace tools by uninstalling WideField3.

#### Note

---

For details on how to install WideField3, see Sections below.

- A4.1, "Setting up WideField3" of "FA-M3 Programming Tool WideField3" (IM 34M06Q16-01E)

For details on how to uninstall WideField3, see Sections below.

- A4.2, "Removing WideField3" of "FA-M3 Programming Tool WideField3" (IM 34M06Q16-01E)
-

## A2.4 Starting and Exiting the Trace Tools

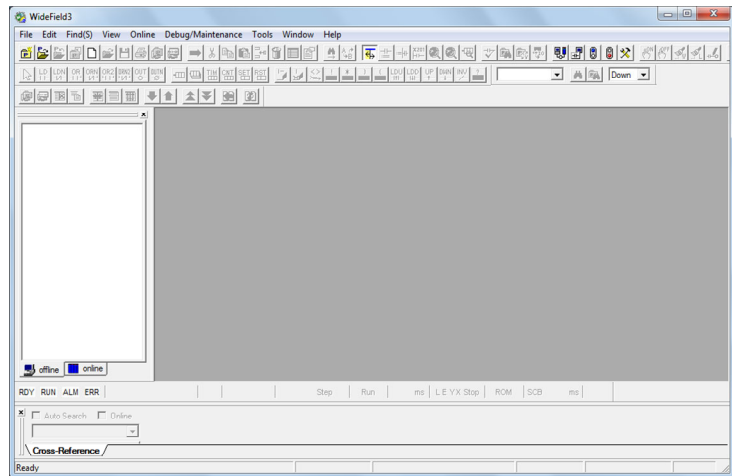
### A2.4.1 Starting the Sampling Trace

- (1) Select [All Programs] - [FA-M3 Application] - [WideField3] from the [Start] menu.

⇒ WideField3 starts.

#### Note

You can also start WideField3 from the [WideField3] shortcut in the "FA-M3 Application" folder.

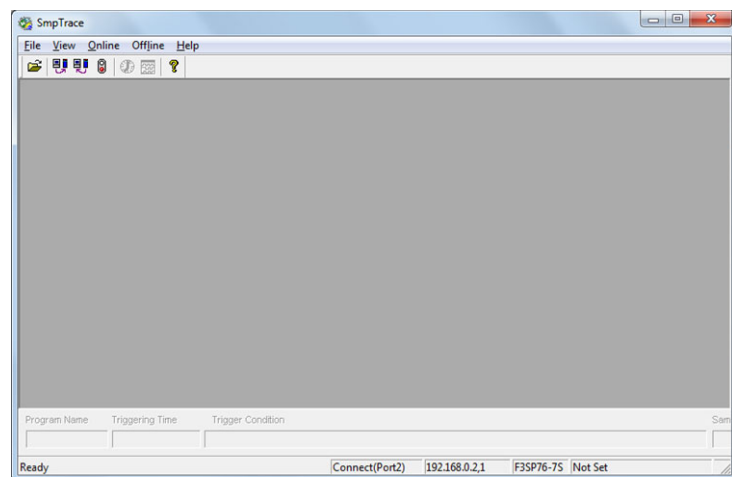


Step (1)

A0204\_1.VSD

- (2) Connect WideField3 and relevant CPU modules with Ethernet cables or USB cables, and then select [Online] - [Connect] from the menu bar to establish the connection. After the connection is established, select [Tools] - [Sampling Trace] from the menu bar.

⇒ The sampling trace tool starts.



Step (2)

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## A2.4.2 Exiting the Sampling Trace Tool

Select [File] - [Exit] from the menu bar of the sampling trace tool.

⇒ The sampling trace tool exits.

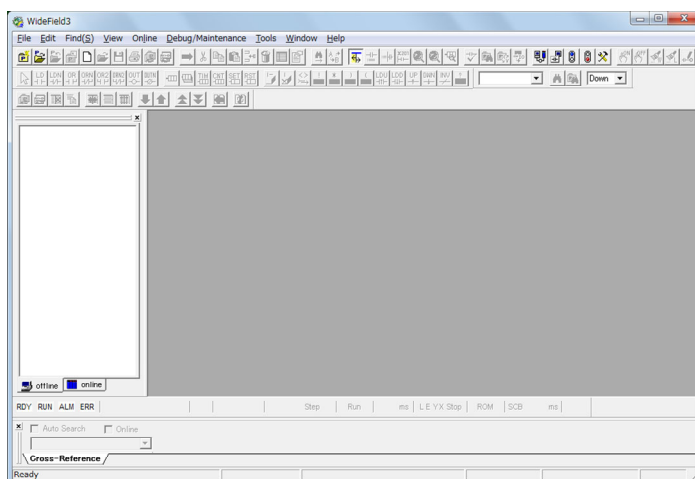
### Note

For details on the menu bar, see Section B2.1, "List of Sampling Trace Menu Items."

## A2.4.3 Starting the Live Logic Analyzer

- (1) Select [All Programs] - [FA-M3 Application] - [WideField3] from the [Start] menu.

⇒ WideField3 starts.

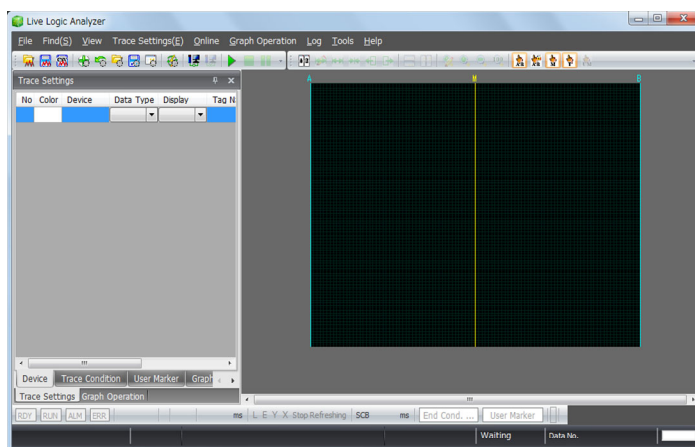


Step (1)

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- (2) Select [Online] - [Connect] from the menu bar to establish the connection. After the connection is established, select [Tools] - [Live Logic Analyzer] from the menu bar. Alternatively, without establishing online connection for WideField3, select [Tools] - [Live Logic Analyzer] from the menu bar.

⇒ The live logic analyzer starts.



Step (2)

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### Note

You can also start WideField3 from the [Live Logic Analyzer] shortcut in the "FA-M3 Application" folder.

---

## A2.4.4 Exiting the Live Logic Analyzer

Select [File] - [Exit] from the menu bar of the live logic analyzer.

⇒ The live logic analyzer exits.

### **Note**

---

For details on the menu bar, see Section C2.1, "List of Live Logic Analyzer Menu Items."

---

## A2.5 Connecting the Trace Tools to an FA-M3 System

### A2.5.1 Connecting the Sampling Trace Tool to an FA-M3 System

#### ● Available Communication Media

The connection between the Sampling Trace Tool and an FA-M3 system is the same as one between WideField3 and an FA-M3 system, as shown below.

**Table A2.5.1 Available Communication Media of the Sampling Trace Tool**

Communication Media	F3SP71-4S F3SP76-7S F3SPV9-7S	Remarks	Recommended
USB	Available	Direct connection to the USB port of a CPU module to be traced	Yes
	Available	Connection to a CPU module via the USB port of another CPU module in a multi-CPU configuration	Yes
RS-232C	Not available	Connection via KM13, SIO port connection, connection via an RS-232C interface module, connection via a modem, and so on.	No
Ethernet	Available	Direct connection to the Ethernet port of a CPU module to be traced	Yes
	Available	Connection to a CPU module via the Ethernet port of another CPU module in a multi-CPU configuration	Yes
	Available	Connection via an Ethernet interface module	Yes
FL-net	Available	Connection via a FL-net (OPCN-2) interface module	Yes

#### Note

For details on how to connect WideField3 to an FA-M3 system, see Chapters below.

- H1, "Overview of Online Functions" of "FA-M3 Programming Tool WideField3 (Online)" (IM 34M06Q16-03E)

### A2.5.2 Connecting the Live Logic Analyzer to an FA-M3 System

#### ● Available Communication Media

The connection between the Live Logic Analyzer and an FA-M3 system is the same as one between WideField3 and an FA-M3 system, but we recommend connecting with a port number different from the port number WideField3 is using.

**Table A2.5.2 Available Communication Media of the Live Logic Analyzer**

Communication Media	F3SP71-4S F3SP76-7S F3SPV9-7S	Remarks	Recommended
USB	Available	Direct connection to the USB port of a CPU module to be traced	Yes
	Available	Connection to a CPU module via the USB port of another CPU module in a multi-CPU configuration	Refer to *1
RS-232C	Not available	Connection via KM13, SIO port connection, connection via an RS-232C interface module, connection via a modem, and so on.	No
Ethernet	Available	Direct connection to the Ethernet port of a CPU module to be traced	Yes
	Available	Connection to a CPU module via the Ethernet port of another CPU module in a multi-CPU configuration	Refer to *1
	Not available	Connection via an Ethernet interface module	No
FL-net	Not available	Connection via a FL-net (OPCN-2) interface module	No

\*1: Depending on the trace settings, trace results may not be displayed correctly.

## A2.5.3 Connection Configurations and Connection Methods of the Live Logic Analyzer

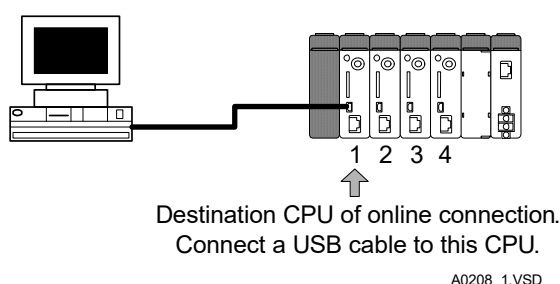
The live logic analyzer supports the following connection configurations for connecting to an FA-M3 system.

### (1) USB Connection

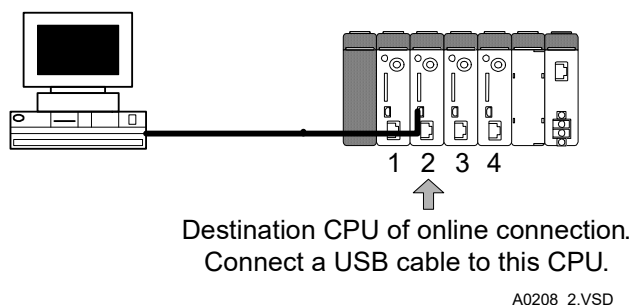
Two types of connection are possible: direct connection to the USB port of a CPU module on which a live logic analyzer function is performed (Figure A2.5.1) and connection via the USB port of another CPU module on which a live logic analyzer function is not performed (Figure A2.5.2).

**Figure A2.5.1 Examples of Direct Connection**

Example 1: Connect a USB cable to the USB port of the CPU module in Slot 1 and establish online connection.

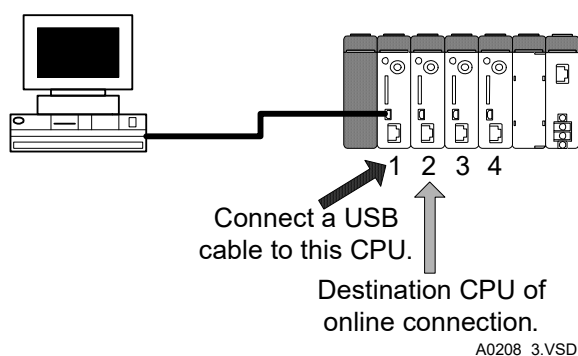


Example 2: Connect a USB cable to the USB port of the CPU module in Slot 2 and establish online connection.



**Figure A2.5.2 Example of Connection via the USB port of Another CPU Module**

Example 1: Connect a USB cable to the USB port of the CPU module in Slot 1 and establish online connection to the CPU module in Slot 2.



The procedure for online connection using USB is described below.

The table below lists the setup required for USB connection.

◆ Items to be specified in [Online] - [Connect] - [Select Communication Port] menu		
Item	Description	Value
Communication Port No.	Specify the port number to be connected to.	1-16
◆ Items to be specified in [Online] - [Connect] - [Communication Settings] dialog box		
Item	Description	Value
Communication Media	Select [USB].	
CPU Number	Specify the installation number of the CPU module that is actually connected to be traced. Note: Specifying 0 initiates connection attached with the USB cable.	0-4



## CAUTION

- We recommend that when you use the live logic analyzer, you select a port number for connection that is different from the connection port number at which WideField3 is online.
- For connection via the USB port of another CPU module, trace data may not be displayed correctly depending on the device data sampling cycle and the number of sampling points.

## ◆ Connection Procedure ◆

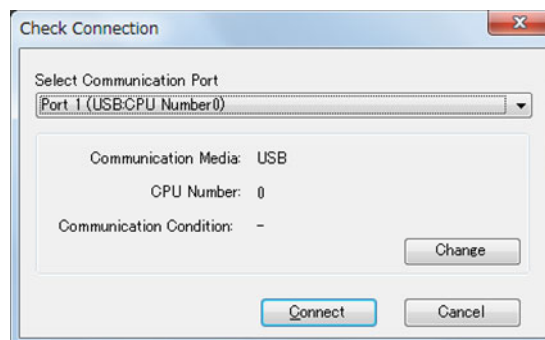
(1) Select [Online]–[Connect] from the menu bar.

⇒ A check connection box appears.

(2) Enter the communication port number used for connection.

### Note

If the required communication port settings have not been specified yet, click [Change] and in the displayed Communication Settings dialog box, specify the communication settings.



Steps (1) to (3)

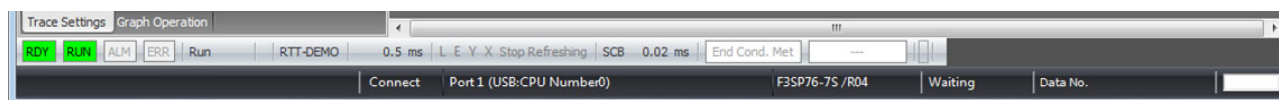
A0210\_1.VSD

(3) Confirm that the communication media is shown as "USB", and click [Connect].

### Note

If the executable program downloaded in the CPU is protected, a dialog box is displayed to confirm the password. Enter the password and click [OK].

⇒ If the FA-M3 connects successfully, the Action Monitor displays the LEDs and a 'RUN' status as shown below. Information about the connection destination is also displayed in the status bar.



A0210\_2.VSD

### Note

CPUs to which operation protection has been set in FA-M3 Defender might require a user name and password when a connection attempt is made.

### Note

- Before initiating online connection using USB, USB driver software for FA-M3 must be installed on the personal computer. For more details on the installation, see Section A4.5, "Installing USB Driver" of "FA-M3 Programming Tool WideField3 (Introduction and Troubleshooting)" (IM 34M06Q16-01E).
- For details on FA-M3 Defender, see Chapter H11, "FA-M3 Defender (User Authentication and Operation Protection)" of "FA-M3 Programming Tool WideField3 (Online)" (IM 34M06Q16-03E).

**CAUTION**

---

If a USB connection is disconnected due to communication error, the USB driver may be in an unknown state. To rectify the problem, remove and re-attach the USB cable, or power off and then power on the FA-M3.

A USB connection may become unreliable or even disconnected due to noise. If this happens, remove and re-attach the USB cable to the PC.

---

**CAUTION**

---

- You can connect up to two ports of sequence CPU modules from a PC per port with a USB cable per PC.
  - When a PC is connected to multiple sequence CPU modules with a USB cable per sequence CPU module, the USB ports other than the port connected to the first sequence CPU module cannot be used correctly. Because such a configuration causes incorrect data display, we recommend that you connect a PC to only one sequence CPU module by running one instance of WideField3 and one instance of the live logic analyzer on the PC.
-

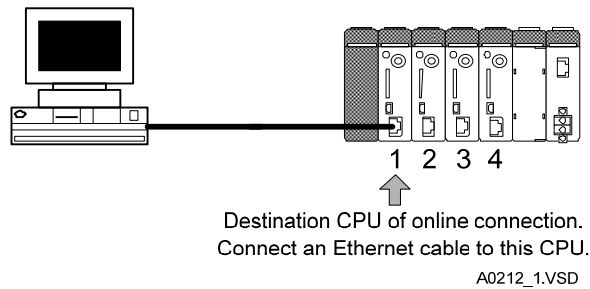
## (2) Ethernet Connection

Two types of connection are possible: direct connection to the Ethernet port of a CPU module on which a live logic analyzer function is performed (Figure A2.5.3) and connection via the Ethernet port of another CPU module on which a live logic analyzer function is not performed (Figure A2.5.4).

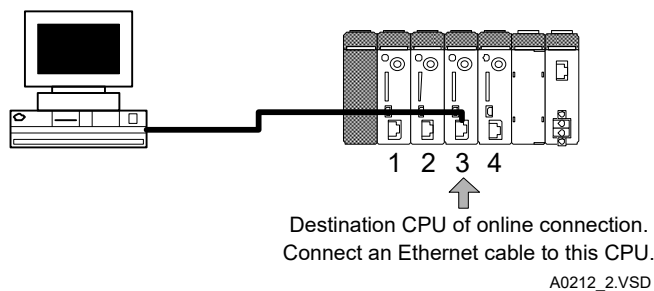
Connection via the Ethernet port of an Ethernet communication module is not possible (Figure A2.5.5).

### Figure A2.5.3 Examples of Direct Connection

Example 1: Connect an Ethernet cable to the Ethernet port of the CPU module in Slot 1 and establish online connection.

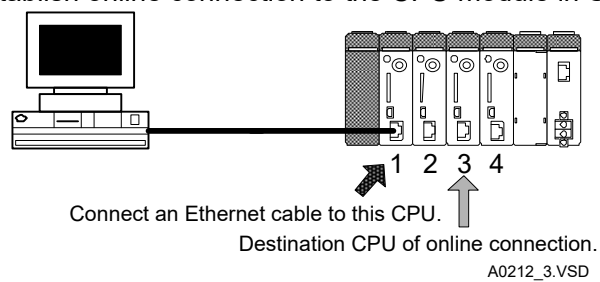


Example 2: Connect an Ethernet cable to the Ethernet port of the CPU module in Slot 3 and establish online connection.

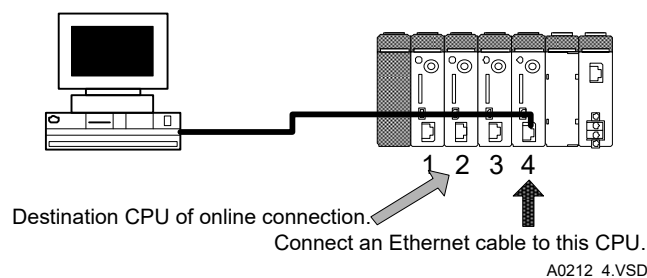


### Figure A2.5.4 Example of Connection via the Ethernet port of Another CPU Module

Example 1: Connect an Ethernet cable to the Ethernet port of the CPU module in Slot 1 and establish online connection to the CPU module in Slot 3.

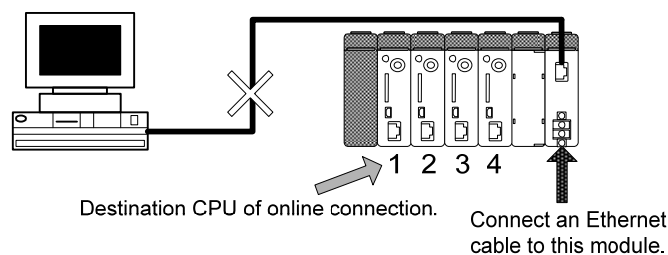


Example 2: Connect an Ethernet cable to the Ethernet port of the CPU module in Slot 4 and establish online connection to the CPU module in Slot 2.





**FigureA2.5.5 Example of Invalid Connection (Connection via the Ethernet Port of the Ethernet Module F3LE□-□)**



A0213\_1.VSD

The procedure for online connection using Ethernet is described below.

The table below lists the setup required for Ethernet connection.

◆ Items to be specified in [Online] - [Connect] - [Select Communication Port] menu		
Item	Description	Value
Communication Port No.	Specify the port number to be connected to.	1-16
◆ Items to be specified in [Online] - [Connect] - [Change] dialog box		
Item	Description	Value
Communication Media	Select [Ethernet].	
Destination IP Address	Specify the network IP address or hostname defined in the Ethernet interface.	—
Connection Timeout	Specify a timeout interval for bad connection during communications.	1-120 s
Refer to Host Name	Specify the IP address or hostname defined in the network Ethernet interface. By default, the window displays the value defined in the environment setup or specified for the most recent connection.	—
CPU Number	Specify the installed slot number of the actual CPU module to be connected.	1-4



## CAUTION

- We recommend that when you use the live logic analyzer, you select a port number for connection that is different from the connection port number at which WideField3 is online.
- For connection via the USB port of another CPU module, trace data may not be displayed correctly depending on the device data sampling cycle and the number of sampling points.

## ◆ Connection Procedure ◆

(1) Select [Online]–[Connect] from the menu bar.

⇒ A check connection dialog box appears.

(2) Enter the communication port number used for connection.

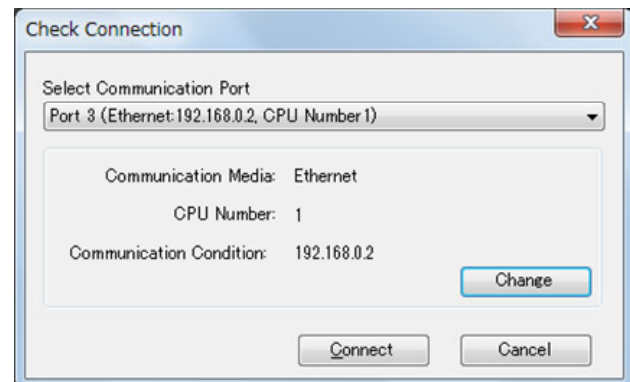
### Note

If the required communication port settings have not been specified yet, click [Change] and in the displayed Communication Settings dialog box, specify the communication settings.

(3) Confirm that the communication media is shown as "Ethernet", and click [Connect].

### Note

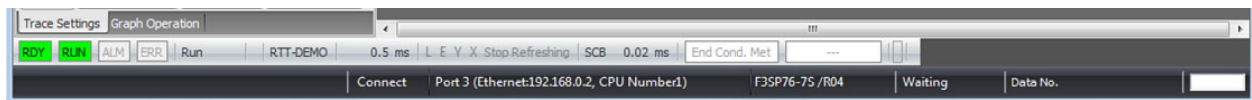
If the executable program downloaded in the CPU is protected, a dialog box is displayed to confirm the password. Enter the password and click [OK].



Steps (1) to (3)

A0214\_1.VSD

⇒ FA-M3 is connected. If the FA-M3 connects successfully, the Action Monitor displays the LEDs and a 'RUN' status at the bottom of the screen. Information about the connection destination is also displayed in the status bar.



A0214\_2.VSD

### Note

CPUs to which operation protection has been set in FA-M3 Defender might require a user name and password when a connection attempt is made.

### Note

- For details on FA-M3 Defender, see Chapter H11, "FA-M3 Defender (User Authentication and Operation Protection)" of "FA-M3 Programming Tool WideField3 (Online)" (IM 34M06Q16-03E).

## A2.5.4 Disconnecting the Live Logic Analyzer

To disconnect the live logic analyzer from FA-M3 system, use the following procedure.

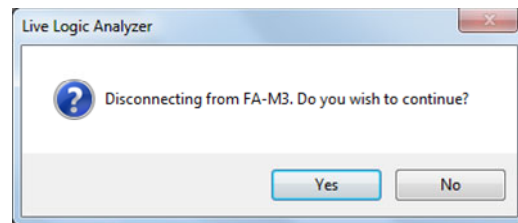
### ◆ Disconnection Procedure ◆

(1) Select [Online]–[Disconnect] from the menu bar.

⇒ A confirmation dialog box appears.

(2) Click [Yes].

⇒ All online operation windows close.

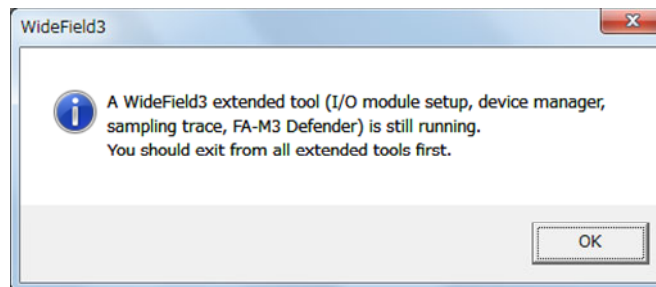


A0215\_1.VSD



### CAUTION

- When WideField3 and the live logic analyzer or sampling trace tool are online at the same time, if you try to disconnect WideField3, the following dialog box is displayed and the WideField3 disconnection processing is stopped.



A0215\_2.VSD

Figure A2.5.6 Confirmation Dialog Box

- You must exit from all extended tools before you can disconnect from WideField3.

## A2.5.5 Performing Multiple Module Connection

The live logic analyzer allows you to trace multiple CPU modules from a PC by running multiple instances of WideField3 or multiple instances of the live logic analyzer to connect and trace each CPU module per instance.

### ● Connecting to Multiple CPU Modules

You can use Ethernet connection to connect a PC to multiple FA-M3s.

To connect a PC to multiple FA-M3s, you must set up a communication port for each connection destination.

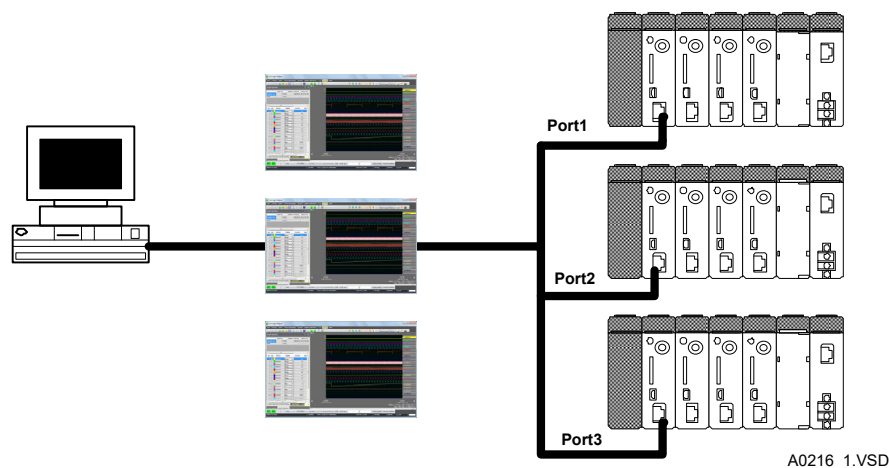


Figure A2.5.7 Example of Connection to Multiple CPU Modules via Ethernet

When the live logic analyzer is used via USB connection, we do not recommend connecting a PC to multiple FA-M3s because trace data may not be displayed correctly.



### CAUTION

- When the live logic analyzer is used in multiple module connection, trace results may not be displayed correctly depending on the PC specs and the communication status of the network.
- You can configure up to 16 communication ports in the live logic analyzer.
- You can connect to only one port at a time using the live logic analyzer.
- We recommend using different communication ports for each module.

### Note

- For details on communication settings in the Communications Communication Settings dialog box, see Section D1.2.3, "Communication Setup" (Offline).
- For details on FA-M3 Communication Server, see Chapter H12, "FA-M3 Communication Server" of "FA-M3 Programming Tool WideField3 (Online)" (IM 34M06Q16-03E).
- For details on FA-M3 Defender, see Chapter H11, "FA-M3 Defender (User Authentication and Operation Protection)" of "FA-M3 Programming Tool WideField3 (Online)" (IM 34M06Q16-03E).

## A2.6 Limitations of Online Operations

The following limitations apply to connection to FA-M3.

### A2.6.1 CPU Operating Mode and Trace Operating Mode

A CPU module has three operating modes: Run, Debug, and Stop.

In Run or Debug mode, you can perform traces using three sampling methods: each scan, periodic, and TRC instruction. In Stop mode, you can trace only when using periodic sampling.

Tracing in Stop mode is useful, for example when you use ToolBox to tune a positioning module.

**Table A2.6.1 CPU Operating Mode and Trace Operating Mode**

CPU Operating Mode	Trace Operating Mode		
	Each Scan	Periodic	TRC Instruction
Run	✓	✓	✓
Debug	✓	✓	✓
Stop	×	✓ *1	×

\*1: For CPU form Rev4 and later

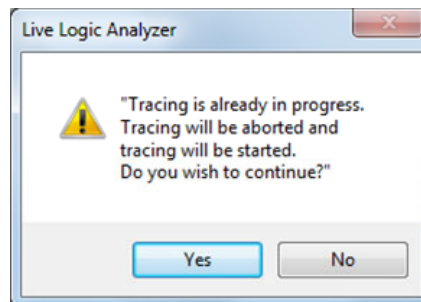
### A2.6.2 Concurrent Access from Multiple PCs

When a live logic analyzer function is being performed on a sequence CPU module from a PC via a network, if another live logic analyzer function is performed on the same sequence CPU module from another PC via the network, the first live logic analyzer function is stopped.



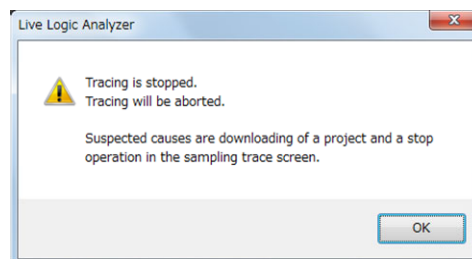
#### CAUTION

- When the second live logic analyzer is connected, the following dialog box is displayed.



A0217\_1.VSD

When you select [Yes], the following dialog box is displayed on the PC on which the first live logic analyzer is running and the trace is stopped.



A0217\_2.VSD



## B1. Sampling Trace Tool

The sampling trace tool stores the status and contents of devices designated for sampling in the sampling trace buffer memory. After the status and contents of the devices are stored, you can check them at a time using the tool. It is one of the WideField3 extended tools.

The results of a sampling trace (trace results) can be displayed using the sampling trace in time chart or scan chart formats.

Before using the sampling trace tool to perform online setup, you must have WideField3 running in online connected mode.



### CAUTION

- You can use the sampling trace tool online only when WideField3 is online and open.
- To use the sampling trace functions, always connect to the FA-M3 using WideField3 in online connected mode before starting the sampling trace tool. If you start the sampling tool before performing online connection using WideField3, you will not be able to use the sampling trace functions.

## ■ Operation Overview

The sampling trace functions sequentially sample values from user-specified devices to the CPU memory according to the sampling method. If configured to save trace results to files, the functions write the results to the specified trace results file after tracing is complete.

Sampling traces are divided into single trace, which performs a trace only once, and multi-trace, which repeats a trace several times.

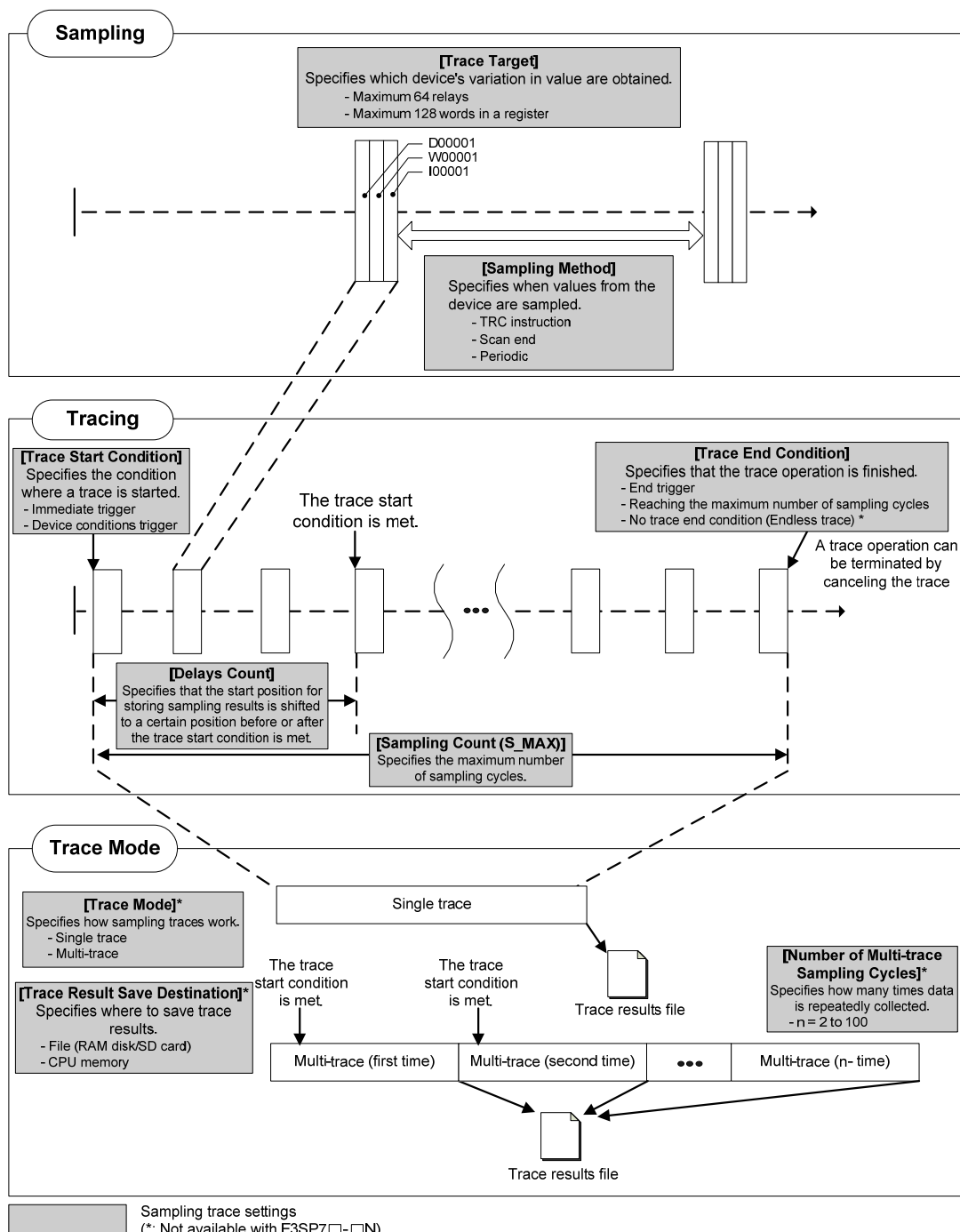


Figure B1.1 Overview of Sampling Trace Operations

## Note

In Stop mode, sampling trace results are collected only when the sampling method is "periodic".



## B1.1 Sampling Trace Tool Window

The following figure illustrates the layout of the sampling trace tool window.

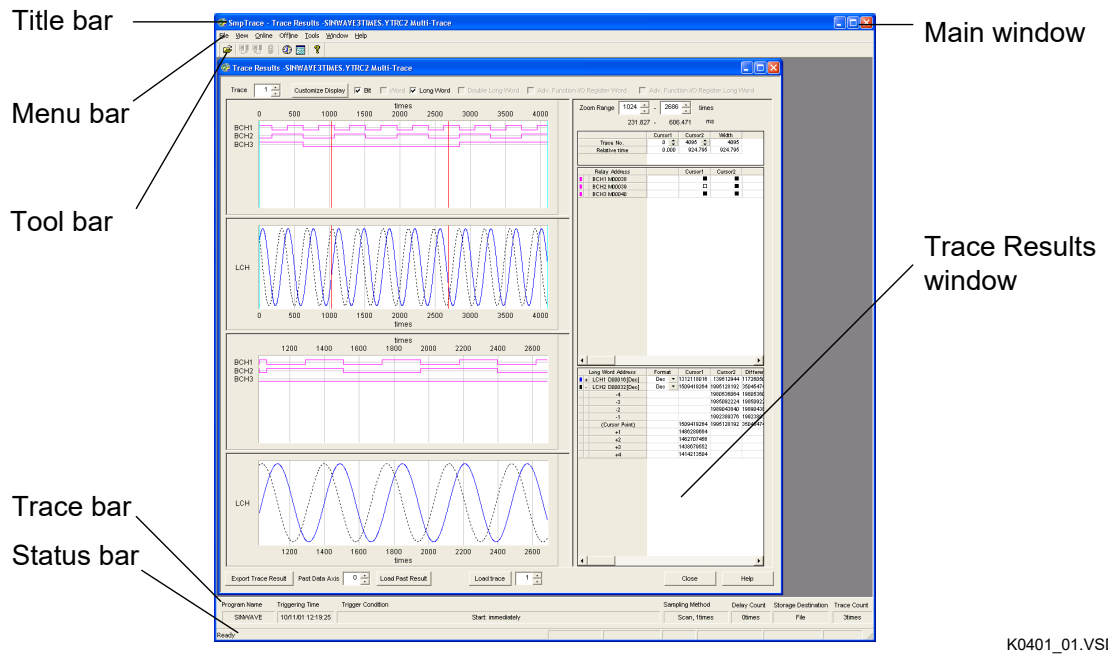


Figure K4.1 Sampling Trace Tool Window

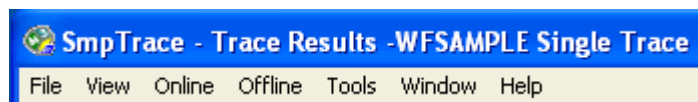
K0401\_01.VSD

### ■ Title Bar

The title bar displays the name of the project file open in WideField3 or the name of a file containing sampling trace results.

### ■ Menu Bar

The menu bar displays the names of menus you can select within the tool.



K0401\_02.VSD

Figure K4.2 Title Bar and Menu Bar

### ■ Toolbar

The toolbar displays often used menu items of the menu bar as icons. Selecting [View]–[Toolbar] from the menu bar switches between showing and hiding the toolbar. Moving the mouse cursor over an icon displays its explanation in TipHelp. The status bar displays the operation status.

■ Status Bar

The status bar displays status information of the sampling trace tool.  
Selecting [View]–[Status Bar] from the menu bar switches between showing and hiding the status bar.

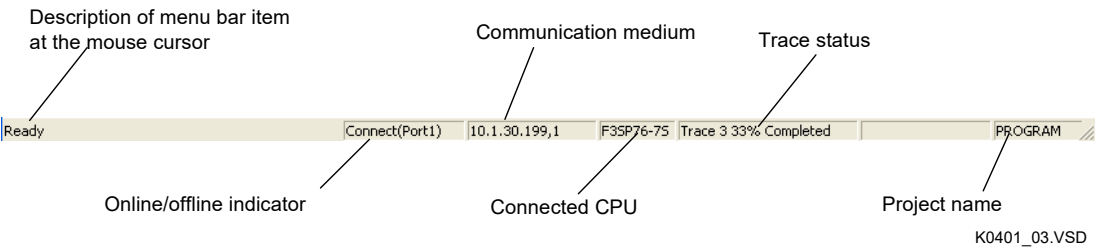


Figure K4.3 Status Bar

Note

The trace status shows the status of the sampling trace on the CPU side and changes values as follows:

Not set →Wait for Trigger→Trace ? ??% Completed→Trace completed

If a file error occurs during a trace, "File Error (SE\*\*)" is displayed as the trace status.  
For details on the error codes (SE\*\*), see "Error Codes (Page B7-9)."

■ Trace Bar

The trace bar displays trace setup information for the Trace Results window currently open.  
Selecting [View]–[Trace Bar] from the menu bar switches between showing and hiding the trace bar.



Figure K4.4 Trace Bar

■ Main Window

The Trace Results window, the Sampling Trace Setup dialog box, and other screens are displayed in the main window.

## B2 Sampling Trace Tool Menus and Starting the Tool

This section describes the sampling trace tool menus and how to start the tool.

### B2.1 List of Sampling Trace Menu Items

The sampling trace tool menus differ depending on whether the Trace Results window is open.

The tables below list the menus of the sampling trace tool for each case.

**Table B2.1.1 List of Menus (when the Trace Results window is not open)**

Menu bar	Menu command	Description
File	Open	Opens a sampling trace results file.
	Restore Display Status	Restores the display status, which has been saved using the [Save Current Display Status] menu item.
	Recent Files	Displays up to 8 most recently-used sampling trace results files.
	Exit	Exits this application.
View	Toolbar	Shows or hides the toolbar.
	Status Bar	Shows or hides the status bar.
	Trace Bar	Shows or hides the trace bar.
Online	Setup Sampling Trace	Displays the Sampling Trace Setup dialog box.
	Sampling Trace Results	Reads the sampling trace results from the CPU and displays the Trace Results window.
	Cancel Trace	Stops the sampling trace process.
	Sampling Trace Setup Wizard	Starts the sampling trace setup wizard.
Offline	Setup Sampling Trace	Displays the Sampling Trace Setup dialog box.
	Sampling Trace Setup Wizard	Starts the sampling trace setup wizard.
Help	Sampling Trace Help	Displays help information.
	Contents and Index	Searches by keyword and displays help information.
	About Sampling Trace	Displays the version number of the sampling trace tool.

**Table K4.3 List of Menus (when the Trace Results window is open)**

Menu bar	Menu command	Description
File	Open	Opens a sampling trace results file.
	Close	Closes a sampling trace results file.
	Save As	Saves the sampling trace results currently open to a file with a different name.
	Save Current Display Status	Saves the display status of the current sampling trace results.
	Restore Display Status	Restores the display status, which has been saved using the [Save Current Display Status] menu item.
	Recent Files	Displays up to 8 most recently-used sampling trace results files.
	Exit	Exits this application.
View	Toolbar	Shows or hides the toolbar.
	Status Bar	Shows or hides the status bar.
	Trace Bar	Shows or hides the trace bar.
	Time Chart Scan Chart	Switches between using a time axis or a number-of-scans axis in the trace results chart. Displays as "Scan Chart" when time axis is used. Displays as "Time Chart" when number-of-scans axis is used.
	Display Format	Displays or hides the [Display Format] column in the detailed view pane.
Online	Setup Sampling Trace	Displays the Sampling Trace Setup dialog box.
	Sampling Trace Results	Reads the sampling trace results from the CPU and displays the Trace Results window.
	Cancel Trace	Stops the sampling trace process.
	Sampling Trace Setup Wizard	Starts the sampling trace setup wizard.
Offline	Setup Sampling Trace	Displays the Sampling Trace Setup dialog box.
	Sampling Trace Setup Wizard	Starts the sampling trace setup wizard.
Tools	Export Trace Result	Exports sampling trace results in various formats.
	Customize Display	Changes settings of the sampling trace results display screen.
	Load Past Result	Loads past sampling trace results. The loaded results can be overlapped with the sampling trace results currently displayed.
Window	Cascade	Overlaps the windows in the display.
	Tile	Displays the windows alongside in tiles.
	Arrange Icons	Arranges the icons
	Currently open windows	Displays the windows currently open.
Help	Sampling Trace Help	Displays help information.
	Contents and Index	Searches by keyword and displays help information.
	About Sampling Trace	Displays the version number of the sampling trace tool.

---

## B2.2 Starting Sampling Trace

To start sampling trace from WideField3, use the following procedure.

### ◆ Procedure ◆

(1) Select [Tools]–[Sampling Trace] from the menu bar.

⇒ The sampling trace tool starts.



### CAUTION

You cannot run multiple copies of the Sampling Trace Tool concurrently for a single instance of WideField3.

---



## B3 Sampling Trace Setup

You can set up sampling trace in any of the following three ways.

- Using [Sampling Trace Setup Wizard]
- Using the Sampling Trace Setup Dialog Box
- Using the Project Settings/Configuration window

Sampling trace setup using the Project Settings/Configuration window is stored and will not be affected when power is turned off. By setting up sampling trace to sample devices when a user system generates an error, you can save device status before and after an error.



### CAUTION

- Sampling trace setup online using the sampling trace tool is normally used during debugging or when you want to sample data temporarily. In this case, the setup data is deleted when the power is turned off.
- Sampling trace setup using the Project Settings/Configuration window is saved to CPU together with the program and is not affected when power is turned off. When power is turned off and turned on again, the sampling trace setup earlier using the Project Settings/Configuration window is automatically retrieved and becomes effective.

## B3.1 Setup Procedure

This section describes how to setup a sampling trace.

### ■ Setup using [Sampling Trace Setup Wizard]

You can set up sampling trace online by using [Sampling Trace Setup Wizard].

#### Note

You can also use [Sampling Trace Setup Wizard] for offline setup of sampling trace, but there are some limitations on the settings.

Use the following procedure.

### ◆ Procedure ◆

- (1) Before you can perform setup directly to the CPU, you must ensure that WideField3 is connected online.

#### Note

For details on online connection procedures, see Section A2.5, "Connecting the Trace Tools to an FA-M3 System."

- (2) Select [Tools]–[Sampling Trace] from the menu bar.

⇒ The sampling trace tool starts.

- (3) Select [Online]–[Sampling Trace Setup Wizard] from the menu bar.

⇒ The sampling trace setup wizard starts.

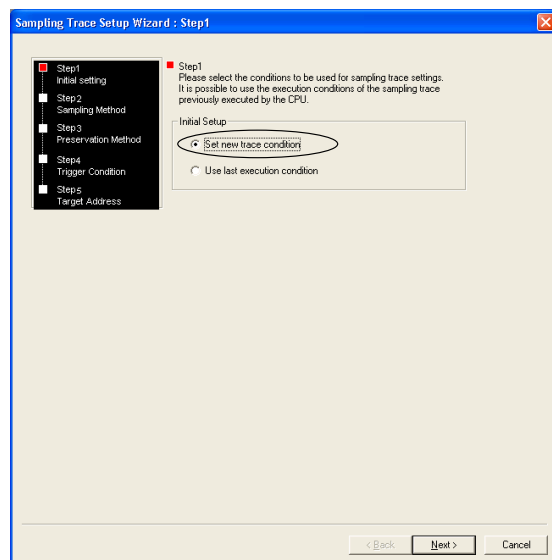
- (4) Specify initial settings. Select [Set new trace condition] and click [Next].

#### Note

To use the previous set of trace conditions, select the [Last execution condition is used] button and click [Finish].

When you click [Finish], the Sampling Trace Setup dialog box is displayed with the previous trace conditions being set.

⇒ Proceed to the next step.



Step (4)

K0403\_01.VSD



(5) Select a sampling method and click [Next].

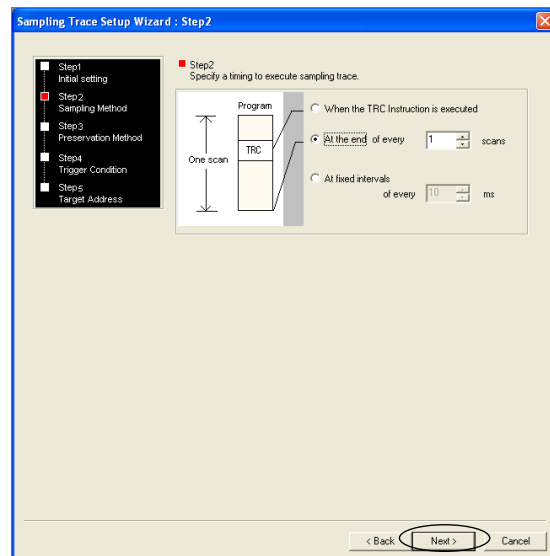
### Note

Click [Back] to go back to the previous step.

### Note

For details on sampling methods, see Section B3.3, "Setup of Sampling Method."

⇒ Proceed to the next step.



Step (5)

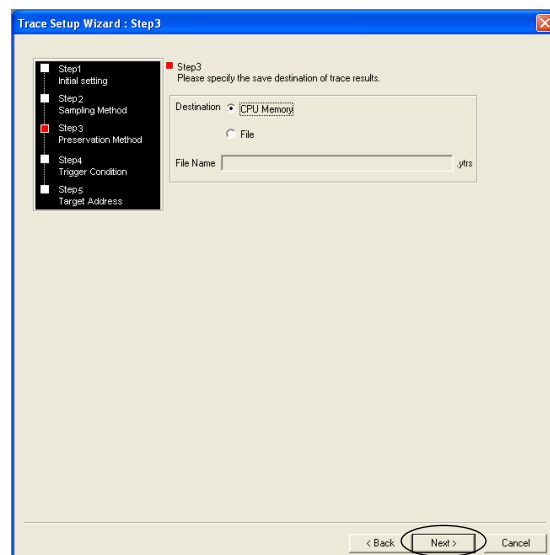
K0403\_02.VSD

(6) Specify where and in what form sampling trace results are to be saved and click [Next].

### Note

- Only the CPU modules F3SP71-4S and F3SP76-7S allow the trace result save destination to be specified. This step is skipped for the other CPU modules.
- The file name should be an absolute path of less than or equal to 127 characters (including its file extension) that starts with "¥CARD1¥" (for an SD card) or "¥RAMDISK¥" (for a RAMDISK).

⇒ Proceed to the next step.



Step (6)

K0403\_03.VSD

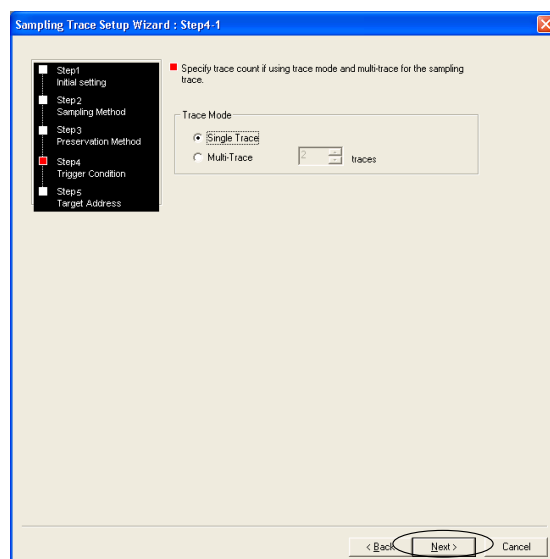
(7) Specify trace mode and click [Next].

### Note

Only CPU types F3SP71 and F3SP76 allow the trace mode to be specified. This step is skipped for CPU types other than F3SP71 and F3SP76.

Also, this step is skipped if [CPU Memory] is selected for the trace result save destination.

⇒ Proceed to the next step.



Step (7)

K0403\_04.VSD

**(8) Specify the trace start condition and click [Next].**

### Note

The current condition for starting sampling trace is displayed in the text box in the lower part of the setup screen.

### Note

When a project is open, you can also click the [Browse] button and in the displayed Register Device Dialog, specify a trigger target device.

### Note

For details on trace start conditions, see Section B3.4, "Setup of Trigger Conditions."

⇒ Proceed to the next step.

**(9) Specify the trace end condition and click [Next].**

### Note

Only the CPU types F3SP71 and F3SP76 allow the number of sampling cycles to be specified. This step is skipped for CPU types other than F3SP71 and F3SP76.

### Note

The current condition for ending sampling trace is displayed in the text box in the lower part of the setup screen.

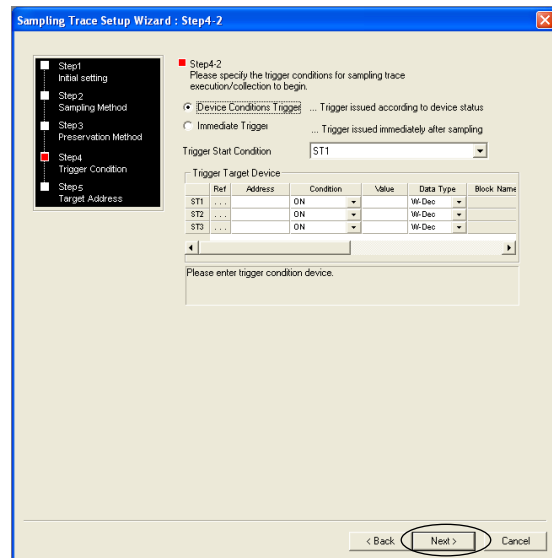
### Note

When a project is open, you can also click the [Browse] button and in the displayed Register Device Dialog, specify a trigger target device.

### Note

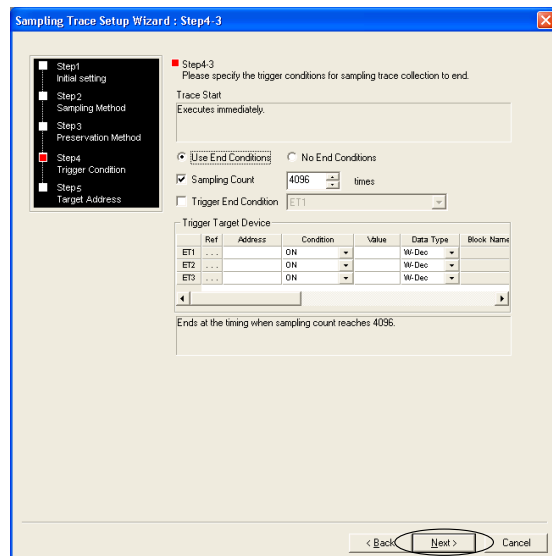
For details on trace end conditions, see Section B3.4, "Setup of Trigger Conditions."

⇒ Proceed to the next step.



Step (8)

K0403\_05.VSD



Step (9)

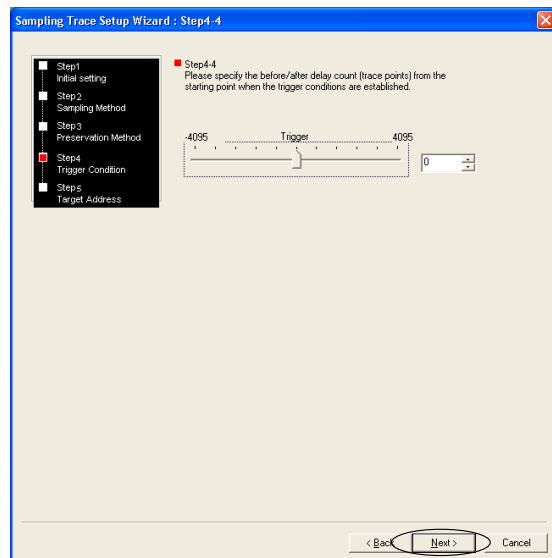
K0403\_06.VSD

(10) Specify the number of delays and click [Next].

### Note

For details on specifying the number of delays, see Section B3.3, "Setup of Sampling Method."

⇒ Proceed to the next step.



Step (10)

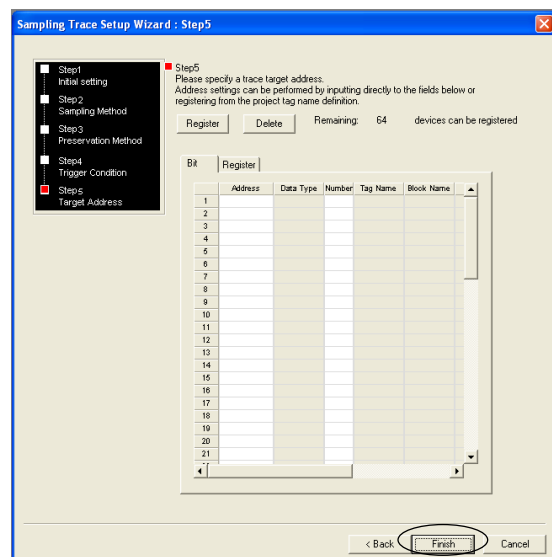
K0403\_07.VSD

(11) Specify the target to be traced and click [Finish].

⇒ The Sampling Trace Setup dialog box is displayed with the settings specified in the wizard being shown.

### Note

When a register is to be traced, the CPU types F3SP71 and F3SP76 allow long-word and double-long-word devices to be specified. For CPU types other than F3SP71 and F3SP76, long-word and double-long-word devices cannot be specified as target.



Step (11)

K0403\_08.VSD

### Note

For details on these settings, see Sections below.

- B3.3, "Setup of Sampling Method"
- B3.4, "Setup of Trigger Conditions"
- B3.5, "Specifying Devices to be Traced and Registering using Tag Names"
- B3.6, "Setup of Location to Store Trace Results"

## ■ Setup using the Sampling Trace Setup Dialog Box

To set up sampling trace online, use the following procedure.

### ◆ Procedure ◆

- (1) Before you can perform setup directly to the CPU, you must ensure that WideField3 is connected online.

#### Note

For details on online connection procedures, see Section A2.5, "Connecting the Trace Tools to an FA-M3 System."

- (2) Select [Tools]–[Sampling Trace] from the menu bar.

⇒ The sampling trace tool starts.

- (3) Select [Online]–[Setup Sampling Trace] from the menu bar.

⇒ The Sampling Trace Setup dialog box is displayed.

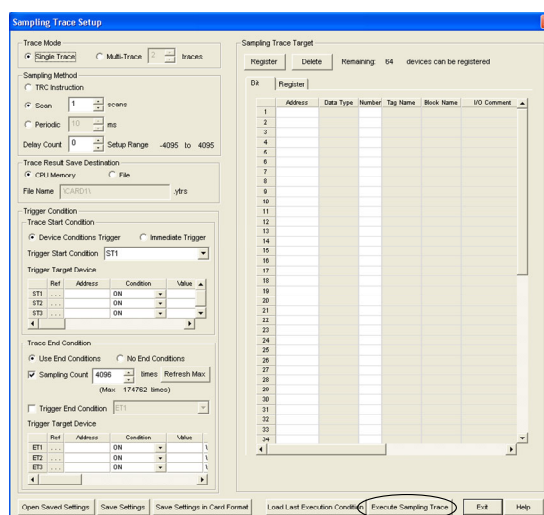
- (4) In the Sampling Trace Setup dialog box, specify required settings.

#### Note

For details on how to set up individual items, see the relevant descriptions given later in this chapter.

- (5) Click [Execute Sampling Trace].

⇒ Tracing starts and the status bar of the sampling trace tool displays the "Waiting for trigger" status text. When tracing is completed, the trace bar displays the "Trace completed" status text.



Steps (4) and (5)

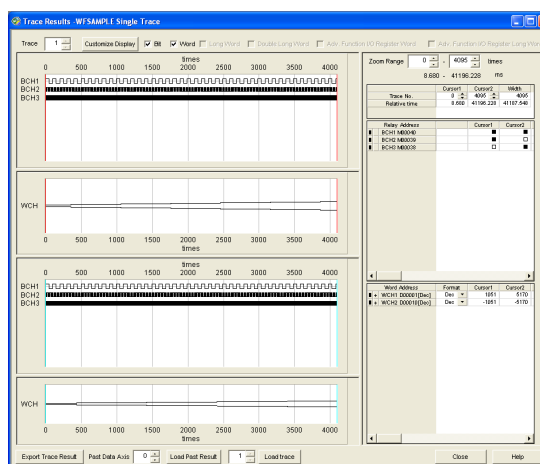
K0403\_09.VSD

**(6) Select [Online]–[Sampling Trace Results] from the menu bar.**

⇒ The Trace Results window is displayed.

### Note

Trace results may be printed or presented in graphs using Microsoft Excel.



Step (6)

K0403\_11.VSD

**(7) Check the trace results, and close the Trace Results window.**

⇒ You are returned to the sampling trace tool window.

### Note

For details on these settings, see Sections below.

- B3.3, "Setup of Sampling Method"
- B3.4, "Setup of Trigger Conditions"
- B3.5, "Specifying Devices to be Traced and Registering using Tag Names"
- B3.6, "Setup of Location to Store Trace Results"

## ■ Offline Setup

Even when WideField3 is offline, you can set up sampling trace for later use by using the sampling trace setup wizard or the Sampling Trace Setup dialog box.

This section shows the setup using the Sampling Trace Setup dialog box.

To do this, use the following procedure.

### ◆ Procedure ◆

(1) Confirm that WideField3 is offline.

(2) Select [Tools]–[Sampling Trace] from the menu bar.

⇒ A dialog box opens to remind that WideField3 is offline.

(3) Click [Yes].

⇒ The sampling trace tool starts.

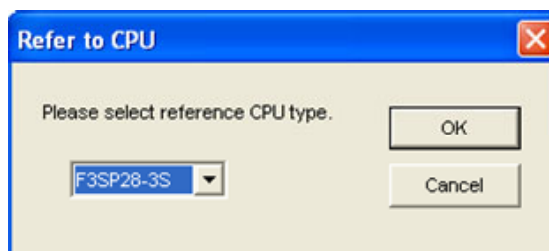
(4) Select [Offline]–[Setup Sampling Trace] from the menu bar.

⇒ The Refer to CPU dialog box is displayed.

(5) Select the CPU type you want to trace, and click [OK].

⇒ The Sampling Trace Setup dialog box is displayed.

(6) Enter required data in the Sampling Trace Setup dialog box.



Step (5)

K0403\_12.VSD

### Note

For details on how to set up individual items, see the relevant descriptions given later in this chapter.

(7) Click [Save Settings].

⇒ The data is saved to a file.



### CAUTION

You can register tag name definitions or local devices in offline mode only when a project is open.

## B3.2 Sampling Trace Setup Dialog Box

Select [Online]–[Set up Sampling Trace] from the menu bar of the sampling trace tool to open the Sampling Trace Setup dialog box.

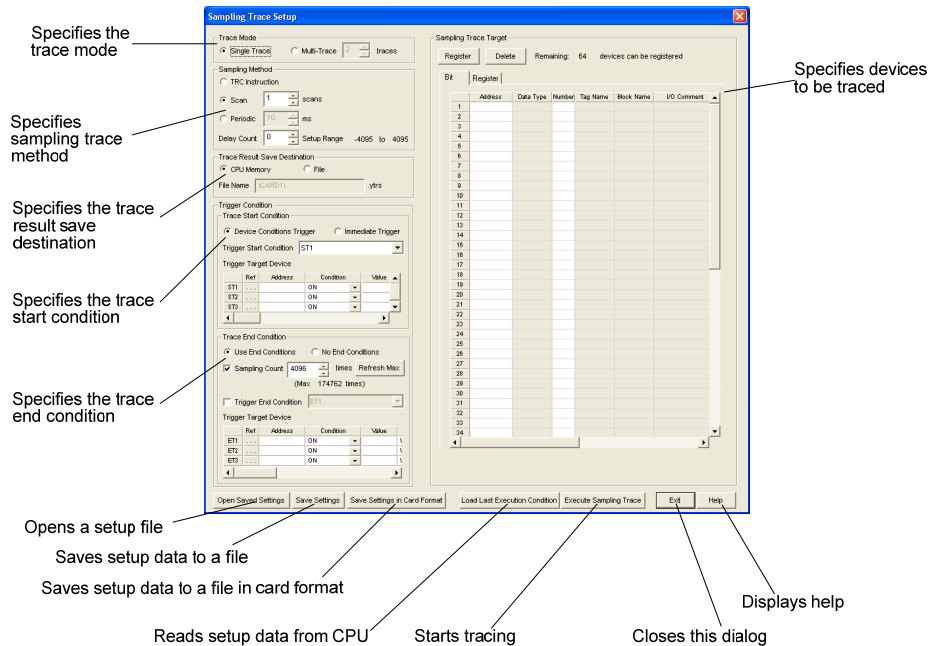


Figure B3.1.2 Sampling Trace Setup Dialog Box



### CAUTION

- To trace by tag name, you must open a project using WideField3 before starting the sampling trace tool. If no project is open, sampling trace setup by tag name is not allowed. Structure member names cannot be specified for tag names in sampling trace.
- After performing a live logic analyzer function, you can load the settings of the last live logic analyzer function by starting the sampling trace tool without turning off the CPU module and clicking [Load Last Execution Condition]. When you want to perform a sampling trace without using the settings of the last live logic analyzer function, configure the settings again without clicking [Load Last Execution Condition].

### Note

For details on individual settings, see the relevant descriptions given later in this chapter.

## B3.3 Setup of Sampling Method

This section describes the three sampling methods available: TRC instruction, End instruction and Periodic. Further, by specifying a delay, you can start collecting data before or after a trigger condition becomes true.

### ● Using the TRC Instruction

Data is sampled when the TRC instruction is executed in the program. By using the TRC instruction in a program, designated contacts or data can be sampled at any point in a scan cycle.

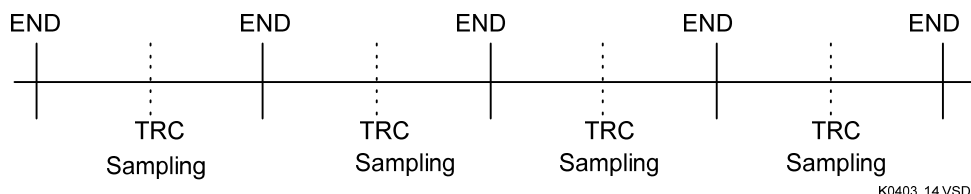


Figure B3.1.3.1 Using the TRC Instruction

### ● Sampling for Each Scan (Using the END Instruction)

Designated contacts and data can be sampled when an END instruction is executed. An END instruction is always executed at the end of a scan cycle.

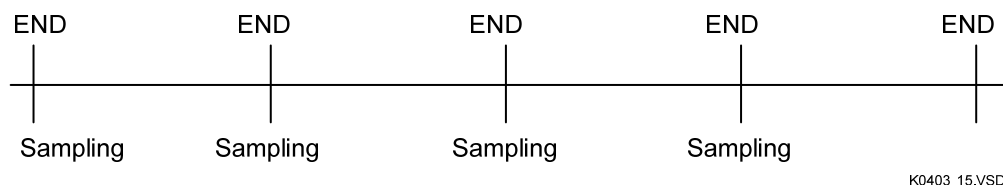


Figure B3.1.3.2 Using the END Instruction

### ● Periodic Sampling

Designated contacts and data can be sampled at fixed intervals.

Data is collected and stored at the end of a scan cycle after a specified period of time.

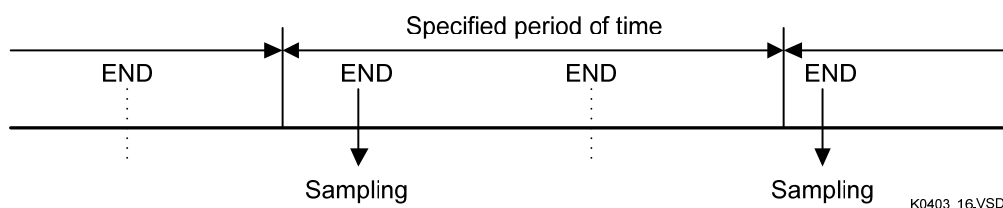


Figure B3.1.3.3 Sampling at Fixed Intervals



### CAUTION

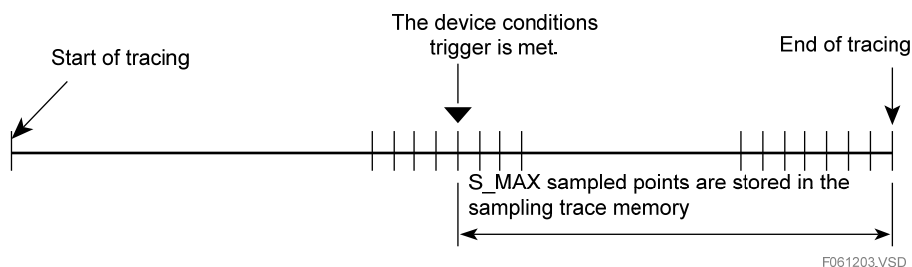
- F3SP71 and F3SP76 have no limitation on the number of TRC instructions executed in a scan cycle.
- On F3SP 71/76-□S, when the sampling method is "periodic", even if the CPU module is in Stop mode, the trace continues.



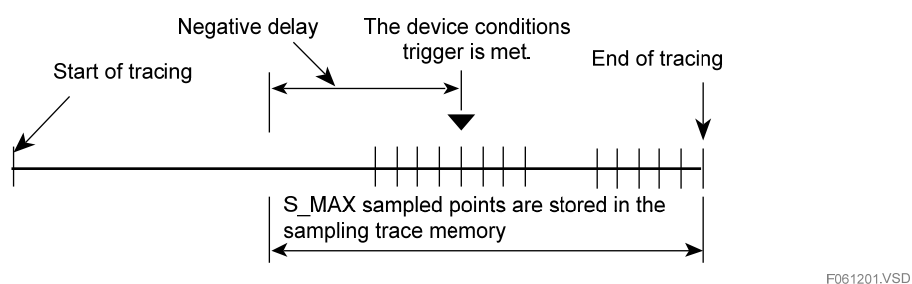


## ■ Delay Count

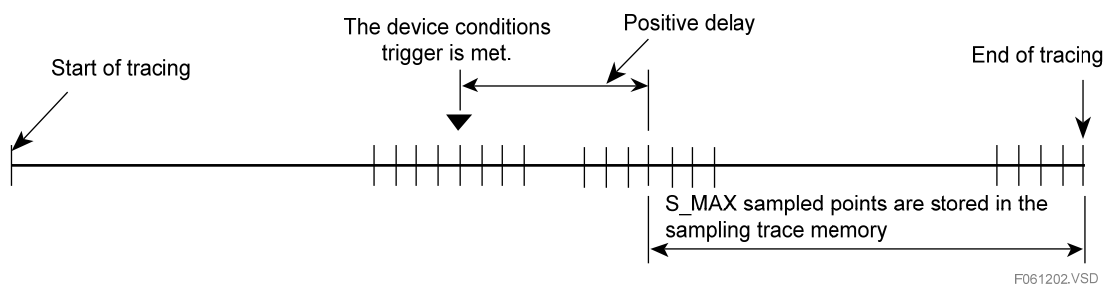
By specifying the number of delays, you can shift the sampling start position to a certain position before or after the start trigger. Specifying a negative delay (in units of scan cycles) starts buffering earlier; specifying a positive delay (in units of scan cycles) starts buffering later. The number of delays can be between  $-(S\_MAX-1)$  and  $(S\_MAX-1)$ , and its initial value is 0.



**Figure B3.1.3.4 Sampling when No Delay Is Defined**



**Figure B3.1.3.5 Sampling when a Negative Delay Is Defined**



**Figure B3.1.3.6 Sampling when a Positive Delay Is Defined**

## B3.4 Setup of Trigger Conditions

You can specify trigger conditions.

Sampling starts or ends when a trigger condition becomes true.

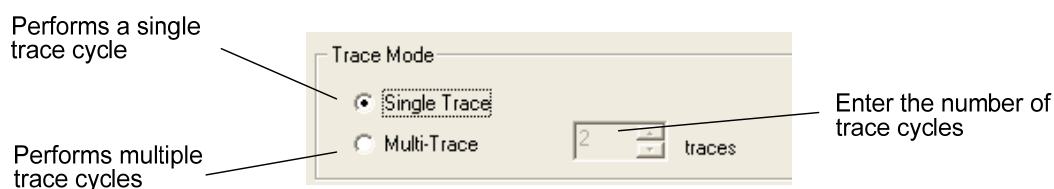
### Note

The upper limit of the number of sampling trace cycles varies depending on the number of devices to be sampled.

### Note

For details on the upper limit of the number of sampling trace cycles, see "Sequence CPU - Functions."

### ■ Trace Mode Group Box in the Sampling Trace Setup Dialog Box



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**Figure B3.1.4.1** Trace Mode

## ■ Trace Mode

The trace mode determines how sampling traces work. The following two modes are available, and you select and run one of these modes.

### ● Single Trace

This mode performs a sampling trace only once.

The single trace mode includes the method of continuing sampling until a user cancels the sampling trace if "no end conditions" is specified (endless trace), in addition to the method of ending sampling automatically if a trace end condition is met.

**Table B3.1.4.1 Settings Available for Single Traces**

Settings		Single Trace
Sampling Method	Sampling trace (TRC) instruction	✓
	Scan end	✓
	Periodic	✓
Trace Start Condition	Immediate trigger	✓
	Device conditions trigger	✓
Delay Count		✓
Trace End Condition	No end conditions (Endless trace)	✓
	Use end conditions	Sampling count
		Trigger end condition
Trace Result Save Destination	CPU memory	✓
	File	✓

### ● Multi-trace

This mode performs multiple sampling traces successively.

After one cycle of sampling is complete, the sampling trace functions output results to files and then automatically wait for the trigger to occur. Therefore, you can successively sample data from 2 to 100 times.

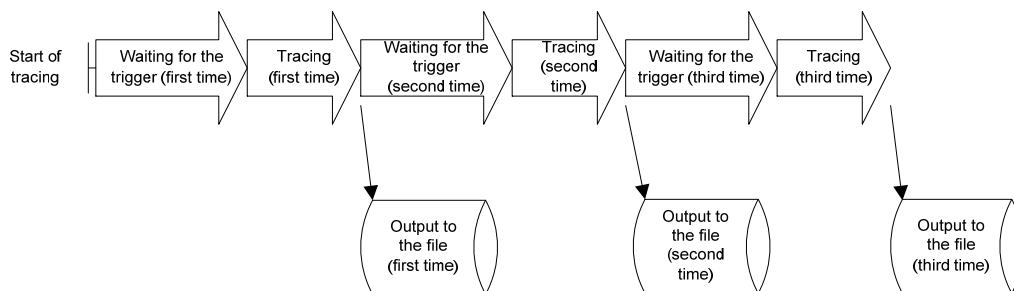
You can only save trace results to files but cannot save them to the CPU memory.

The trace results are appended to the same specified file every time one cycle of collection is finished.

In multi-trace mode, the trace buffer is divided into two segments and each of them are used alternatively, so the sampling count per trace is half of that in single trace mode.

**Table B3.1.4.2 Settings Available for Multi-Traces**

Settings		Multi-trace
Sampling Method	Sampling trace (TRC) instruction	✓
	Scan end	✓
	Periodic	✓
Trace Start Condition	Immediate trigger	✓
	Device conditions trigger	✓
Delay Count		✓
Trace End Condition	No end conditions (Endless trace)	×
	Use end conditions	Sampling count
		Trigger end condition
Trace Result Save Destination	CPU memory	×
	File	✓

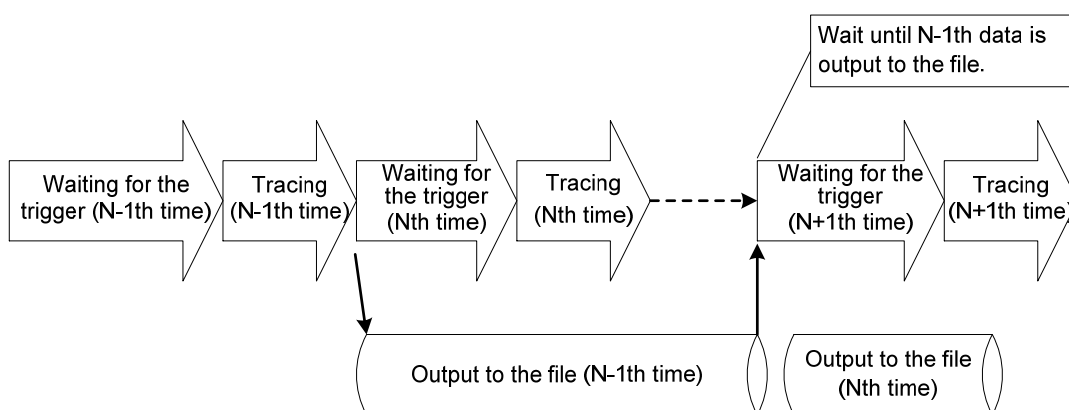


**Figure B3.1.4.2 Multi-trace Mode**

If you use the multi-trace mode, you must specify the number of consecutive multi-trace sampling cycles and the file name for the save destination.

The multi-trace mode uses two trace buffers to enable consecutive sampling cycles by alternately saving trace data and outputting the data to files.

Therefore, processing is delayed because the trigger is not set until the second file-output is complete.



**Figure B3.1.4.3 When the Start Trigger is Delayed**

## Note

In the example above, when Nth file output results are displayed, the trace results window shows "Waiting for trace execution" on its title.

If this happens frequently, take actions such as making the interval between each trace longer.



## CAUTION

When you view the trace results file from multi-tracing online, you need to exercise some caution with the data size.

The file needs to be read in several times whenever the data size is large because it will take a very long time to display a large file.

## Trace Start Condition Group Box in the Sampling Trace Setup Dialog Box

Specify the condition for starting sampling trace.

Starts a trace when the device condition becomes true

Select a start trigger condition

Select trigger target devices

Starts a trace immediately after the program is executed

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Figure B3.1.4.4 Trace Start Condition



### CAUTION

You cannot specify macro devices as trigger targets.

## Trace Start Condition

This condition specifies when a trace operation is started.

The trace start condition has two types of triggers; the immediate trigger and device conditions trigger.

### ● Immediate Trigger

The trigger start condition is met immediately after a sampling trace operation is started and the trace is started.

### ● Device Conditions Trigger

The states of up to three device points can be set in the trigger start condition (ST1, ST2, and ST3). The conditions for each device are checked at the end of a scan, and a trace will be started only if the conditions are met. Therefore, even if the conditions are met in the middle of the scan, the trace will not be started if they are not met at the end of the scan.

Table B3.1.4.3 Device Conditions Trigger

Trigger start condition	Description
ST1	Trace is started if trigger start condition ST1 is met.
ST1 AND ST2	Trace is started if trigger start conditions ST1 and ST2 are met.
ST1 OR ST2	Trace is started if trigger start condition ST1 or ST2 is met.
(ST1 AND ST2) AND ST3	Trace is started if trigger start conditions ST1 and ST2 are met, and if ST3 is met.
(ST1 AND ST2) OR ST3	Trace is started if trigger start conditions ST1 and ST2 are met, or if ST3 is met.
(ST1 OR ST2) AND ST3	Trace is started if trigger start condition ST1 or ST2 is met, and if ST3 is met.
(ST1 OR ST2) OR ST3	Trace is started if trigger start condition ST1 or ST2 is met, or if ST3 is met.

**Table B3.1.4.4 Device Condition Expression**

Data Type	Trigger predicate	Input value
Bit	ON, OFF, Rising, Falling	None
Word	=, <>, ≥, >, ≤, <	Decimal: -32768 to 32767 Hexadecimal: \$0 to \$FFFF
Long-word		Decimal: -2,147,483,648 to 2,147,483,647 Hexadecimal: \$0 to \$FFFFFFFF
Double long-word		Decimal: -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 Hexadecimal: \$0 to \$FFFFFFFFFFFFFFFF

## Note

If a device for which "Rising" is specified in the trace start condition is ON before a trace is started, the start trigger condition is met when the device is switched from ON to OFF to ON again after the trace is started.

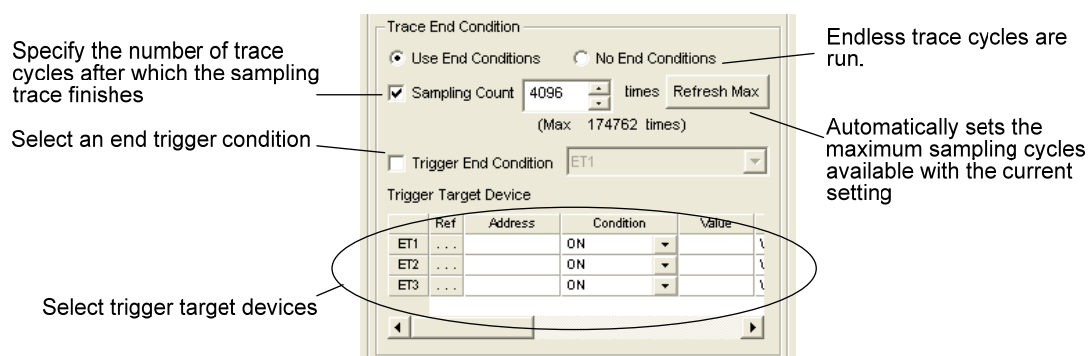
Available data types are as follows.

**Table B3.1.4.5 List of Data Types**

Data Type	Description
W-Dec	Word type (decimal)
W-Hex	Word type (hexadecimal)
L-Dec	Long-Word type (decimal)
L-Hex	Long-Word type (hexadecimal)
D-Dec	Double-Long-Word type (decimal)
D-Hex	Double-Long-Word type (hexadecimal)

## ■ Trace End Condition Group Box in the Sampling Trace Setup Dialog Box

Specify the condition for ending sampling trace.



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Figure B3.1.4.5 Trace End Condition



### CAUTION

You cannot specify macro devices as trigger targets.

## ■ Trace End Condition

The trace end condition setting has the options of "Use End Conditions" and "No End Conditions".

### ● Use End Conditions

A sampling trace ends when one of the following conditions is met:

- (1) The number of executed sampling cycles reaches the number of sampling cycles (S\_MAX).
- (2) A trigger end condition is met.
- (3) A user canceled the sampling trace.

#### (1) Sampling Count (S\_MAX)

You must specify this number. The sampling trace ends if the specified number of sampling cycles (S\_MAX) is reached.



## (2) Trigger End Condition

The states of up to three device points can be set in the trigger end condition (ET1, ET2, and ET3). The conditions for each device are checked at the end of a scan, and a trace will be finished only if the conditions are met. Therefore, even if the conditions are met in the middle of the scan, the trace will not be finished if they are not met at the end of the scan.

**Table B3.1.4.6 Trigger End Condition**

Trigger end condition	Description
ET1	Trace is ended if trigger end condition ET1 is met.
ET1 AND ET2	Trace is ended if trigger end conditions ET1 and ET2 are met.
ET1 OR ET2	Trace is ended if trigger end conditions ET1 or ET2 is met.
(ET1 AND ET2) AND ET3	Trace is ended if trigger end conditions ET1 and ET2 are met, and if ET3 is met.
(ET1 AND ET2) OR ET3	Trace is ended if trigger end conditions ET1 and ET2 are met, or if ET3 is met.
(ET1 OR ET2) AND ET3	Trace is ended if trigger end condition ET1 or ET2 is met, and if ET3 is met.
(ET1 OR ET2) OR ET3	Trace is ended if trigger end condition ET1 or ET2 is met, or if ET3 is met.

**Table B3.1.4.7 Device Condition Expression**

Data Type	Trigger predicate	Input value
Bit	ON, OFF, Rising, Falling	None
Word	=, <, >, ≥, ≤, <	Decimal: -32768 to 32767 Hexadecimal: \$0 to \$FFFF
Long-word		Decimal: -2,147,483,648 to 2,147,483,647 Hexadecimal: \$0 to \$FFFFFFFF
Double long-word		Decimal: -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 Hexadecimal: \$0 to \$FFFFFFFFFFFFFFFF

### Note

If a device for which "Rising" is specified in the trace end condition is ON before the start trigger condition is met, the end trigger condition is met when the device is switched from ON to OFF to ON again after the start trigger condition is met.

Available data types are as follows.

**Table K4.13 List of Data Types**

Data Type	Description
W-Dec	Word type (decimal)
W-Hex	Word type (hexadecimal)
L-Dec	Long-Word type (decimal)
L-Hex	Long-Word type (hexadecimal)
D-Dec	Double-Long-Word type (decimal)
D-Hex	Double-Long-Word type (hexadecimal)

**● No End Conditions**

A sampling trace ends when the following condition is met:

(1) You cancel the sampling trace using one of the following methods:

- Canceling the trace from the sampling trace tool  
(Select [Online] - [Cancel Trace] from the menu bar or select [Cancel Trace] from the toolbar.)
- Virtual directory command (TRCCNCL)
- Rotary switch (with the MODE switch set to the position "D", press and hold the SET button)

**(1) Sampling Count (S\_MAX)**

You must specify this number. When the specified sampling count (S\_MAX) is reached, the oldest data is overwritten with the subsequent obtained data, the rotary buffer operation is performed as many as the sampling count, and the trace continues.

## ■ Device Registration

This section describes how to register a device.

You can register a device by directly entering a device in the Sampling Trace Setup dialog box or by using the Register Device Dialog.

To register a trigger target device, click the [...] button of the [Ref] column to open the Register Device Dialog.

To register a trace target device, specify a device in the Register Device Dialog and click [OK] button.

### ● Register Device Dialog: Trigger Condition Dialog Box

Enter a trigger condition device.

Select the tag name definition where the device is registered. For a global device, select the tag name definition where it is registered.

When entering a local device, always select block tag name definition or macro tag name definition as reference.

Select the block or macro where the device is registered.

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**Figure B3.1.4.6 Register Device Dialog: Trigger Condition Dialog Box**



### CAUTION

- Local device addresses registered during trace setup are displayed in trace results as globally assigned addresses.
- You cannot specify macro devices as trigger targets.
- Only I/O comment 1 is displayed as a result of device registration.

## B3.5 Specifying Devices to be Traced and Registering using Tag Names

This section describes how to specify devices to be sampled. Before you can specify devices using their tag names in the sampling trace tool, you must first open a project from WideField3. Setup data can be saved to a sampling trace setup file.



### CAUTION

- Structure member names cannot be used as tag names in sampling trace.
- You cannot specify macro devices as trigger targets.

### ■ Trace Target Group Box in the Sampling Trace Setup Dialog Box

Enter devices whose values are to be sampled as trace target.

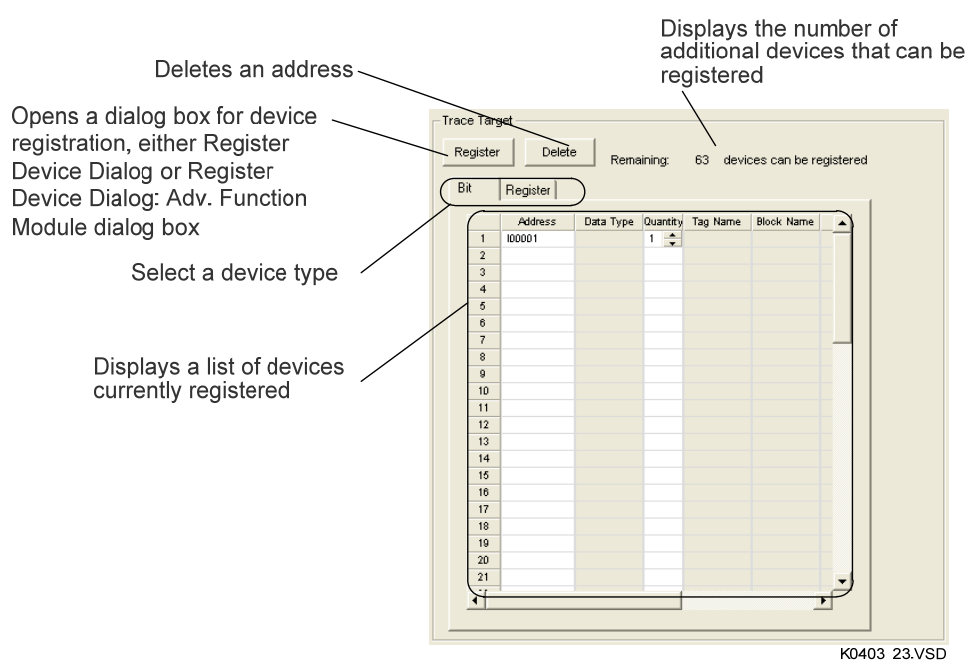


Figure B3.1.5.1 Trace Target

### Note

By specifying a number in [Quantity], you can select the specified number of consecutive devices starting with the current address as the trace target.

For example, if you specify the address "I00001" and the number "8", devices I00001 to I00008 will be traced.

When multiple devices with consecutive addresses are to be traced, refreshing the display might cause the same settings to be shown in a different way.

Example:

1: I00001, 8 devices

2: I00009, 8 devices

This setting actually means 16 devices from I00001 to I00016 are specified as trace target.

Therefore, this might be displayed as below when, for example, the setting is loaded from the CPU.

1: I00001, 16 devices

## ■ Sampling Trace Target

Up to 64 points can be specified if you specify a sampling trace target as a bit data type.  
Up to 128 words in total can be specified if you specify the sampling trace target as a word, long-word, or double-long-word data type regardless of the points specified for the bit data type.

**Table B3.1.5.1 Devices that can be Specified**

Data Type	Devices that can be Specified
Bit	Relay devices (X, Y, I, E, L, T*1, C*1, M)
Word	Word devices (D, B, R, W, V, Z, T*2, C*2, and F) 16 points in the specified start address of relay devices (X, Y, I, E, L, and M) Registers (data position numbers) of special modules
Long-word	2 points in the specified start address of word devices (D, B, R, W, V, Z, and F) 32 points in the specified start address of relay devices (X, Y, I, E, L, and M) 2 points in registers (data position numbers) of special modules
Double long-word	4 points in the specified start address of word devices (D, B, R, W, and F)

\*1: Time-out relay, end-of-count relay

\*2: Timer/counter is the current value.

When you want to obtain data from consecutive devices, you can easily sample data from those devices by specifying the first device and the number of consecutive devices to be sampled. For example, specifying D0001 as the first device and 100 as the number of devices to be sampled means that you specify the sampling device targets from D0001 to D0100.

The maximum number of devices that can be specified varies depending on the data type specified for the sampling trace target.

**Table B3.1.5.2 Maximum Number of Devices that can be Specified**

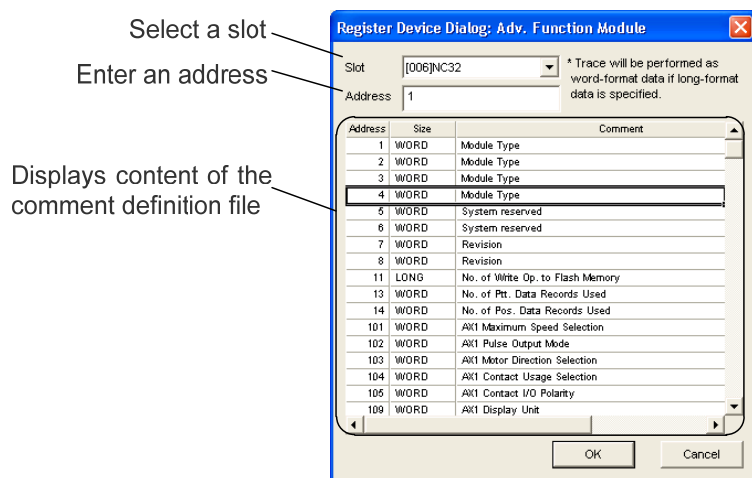
Data Type	Maximum Value
Bit	64
Word	128*
Long-word	64*
Double long-word	32*

\*: For the word, long-word, or double-long-word data type, up to 128 words in total can be specified.

## ● Register Device Dialog: Adv. Function Module Dialog Box

This dialog box is displayed when advanced function module registers are specified as trace target register devices.

To open the Register Device Dialog: Adv. Function Module dialog box, select Register as device type and click [Register]. Then, select [Adv. Function Module Register].



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Figure B3.1.5.2 Register Device Dialog: Adv. Function Module Dialog Box

### Note

- Advanced function module registers can only be registered as trace target for the CPU types F3SP71 and F3SP76.
- When there is more than one definition file, clicking the [Register] button causes the Select Module Type dialog box to be displayed. Select your desired module.
- When a connection is not established with the CPU, nothing is displayed in the comment area.
- Addresses shown in the dialog box are word-device addresses. They are automatically converted to long-word addresses when long-word-sized addresses are registered.



### CAUTION

To trace an advanced register as long-word data, you must specify its address in two-word units, as in accessing special modules that handle data in two-word units in a READ/WRITE instruction.

Example: When tracing 5th and 6th word data of the module at unit 2, slot 7

- To trace long-word type data  
Address: [207]0003 ←Third data in two-word units is the same as 5th and 6th data in word units  
  
Data Type: LONG  
Quantity: 1
- To trace word type data  
Address: [207]0005  
Data Type: WORD  
Quantity: 2

## ■ Registering a Device as Trace Target

This section describes how to specify a device to be traced.

You can register either bit or register devices.

The procedures for registering bit and register devices are almost the same.

This section shows the procedure to register a bit device.

### ◆ Procedure ◆

- (1) Confirm that the Sampling Trace Setup dialog box is open.

- (2) Click the Bit tab.

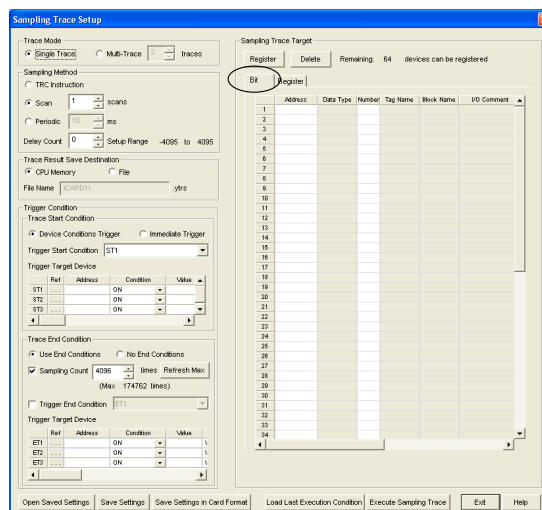
⇒ The bit device registration sheet is displayed.

#### Note

To register a register device, click the Register tab to open the register device registration sheet.

#### Note

When registering a register device for F3SP71 and F3SP76, you can select either [Register from Tag Name Definition] or [Adv. Function Module Register] by clicking the [Register] button.



Step (2)

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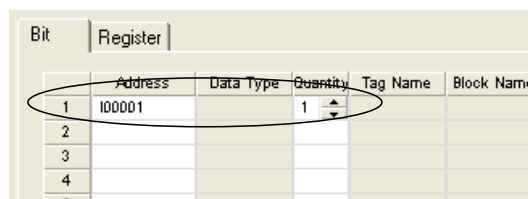
- (3) Click a text box to enter a device to be sampled.

- (4) Enter the device address.

⇒ The registered contents are displayed.

#### Note

Using the [Register] button, you can select a tag name definition to be referenced.

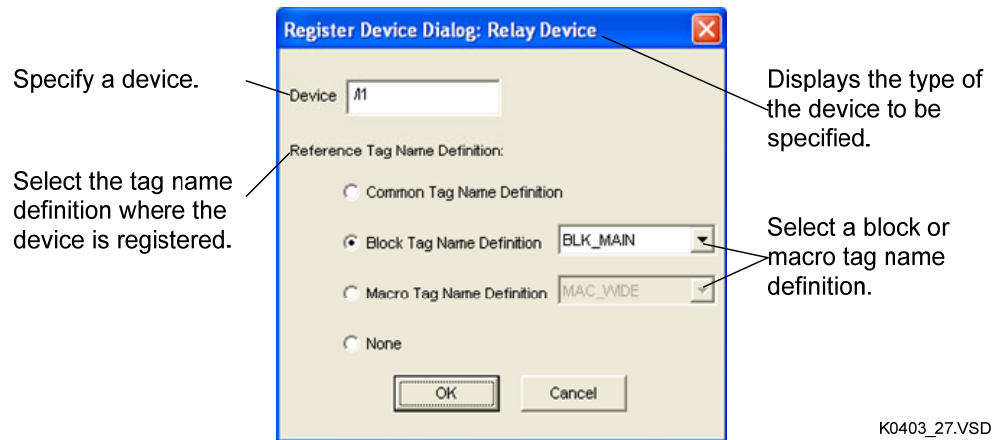


Step (4)

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## Note

You can also click a device input text box on the Sampling Trace Setup dialog box followed by the [Register] button to open the Register Device Dialog and then enter a device. To specify a device by tag name, select the tag name definition where the device is registered.



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**Figure B3.1.5.3 Register Device Dialog**

- For F3SP71 and F3SP76, you can register advanced function module registers. To do this, use the following procedure: In the Sampling Trace Setup dialog box, open the Register tab. Click [Register] button and select [Adv. Function Module Register]. Then, in the Register Device Dialog: Adv. Function Module dialog box, register a register device.
- Only I/O comment 1 is displayed for a device registered from the Register Device Dialog.



## B3.6 Setup of Location to Store Trace Results

Specify a location to store sampling trace results.

### ■ Trace Result Save Destination Group Box in the Sampling Trace Setup Dialog Box

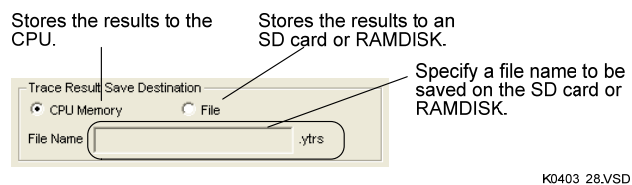


Figure B3.1.6.1 Trace Result Save Destination

### ■ Trace Result Save Destination

When a trace is finished, sampling trace results saved in the CPU memory can be output to files (in an SD card or RAM disk).

Table B3.1.6.1 Trace Result Save Destination

Saved to	File Name
CPU memory	Cannot be specified
File	Can be specified up to 127 bytes, including the extension name

You must specify the file name as an absolute path starting with "\CARD1\" for SD cards and "\RAMDISK\" for RAM disks. When creating a sampling trace results file, the CPU module automatically appends ".ytrs" to the file. You do not have to specify the extension name.

Example: If the file name "\CARD1\SMP\DATA" is specified, then the name of the file to be created will be "\CARD1\SMP\DATA.ytrs".

If the specified file already exists, the file is overwritten if not read-only.

Depending on the trace mode, the save options that can be specified are limited.

Table B3.1.6.2 Trace Mode and Save Options

Saved to	Trace Mode	
	Single Trace	Multi-trace
CPU memory	✓	×
File	✓	✓

If you select "file" as the save option for trace results, a file output error occurs when data is output to a file after trace execution. If a file-related error occurs, the CPU module will not perform any subsequent sampling traces.

Table B3.1.6.3 How to Check File Output Errors

Trace Operation	How to Check File Output Errors
WideField3 online connection	Displayed in status bar
Card batch - waiting for completion	Execution results of the card batch command
Card batch - immediate completion	× *1
Virtual directory command	× *1

\*1: You can check errors in status display by using WideField3 to connect online to the CPU module.

---

**Note**

- Only the CPU types F3SP71-4S and F3SP76-7S allow the trace result save destination to be specified. For CPU types other than F3SP71-4S and F3SP76-7S, the destination is fixed to the CPU memory.
  - You cannot select [CPU Memory] if the trace mode is multi-trace.
  - The file name should be an absolute path of less than or equal to 127 characters that starts with "\\CARD1\\" (when the save destination is an SD card) or "\\RAMDISK\\" (when the save destination is a RAMDISK).
- 

**CAUTION**

If the save destination is the CPU memory or RAM disk, sampling trace results are lost in the following timing:

- Start of sampling trace operation (save destination: CPU memory)
- Download of a ladder program (save destination: CPU memory)
- Power off (save destination: CPU memory/RAM disk)

If you want to save sampling trace results at all times, specify the SD card as the save destination. Also, if you want to save multiple sampling trace results, you must change the file name each time not to overwrite past trace results to lose them.

---

---

## B3.7 Opening a Saved Setup File

You can perform sampling trace from a sampling trace setup file.

To do so, click [Open Saved Settings] in the Sampling Trace Setup dialog box and select an existing sampling trace setup file to display its contents. Clicking [Execute Sampling Trace] in the Sampling Trace Setup dialog box starts tracing.

### Note

---

You can also view a saved trace setup file in the Project Settings/Configuration window.

---

### Note

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For details on sampling trace setup in the Project Settings/Configuration window, see Section 3.14, "Sampling Trace Setup Using the Project Settings/Configuration Window."

---

## B3.8 Saving a Setup File

To save a sampling trace setup file, click [Save Settings] in the Sampling Trace Setup dialog box.

Up to 255 characters can be used for the absolute path to a sampling trace setup file, with up to 80 characters to name a setup file itself, including its file extension. The file extension is ".ytst2" and is automatically appended when the file is saved.



### CAUTION

In WideField3R1, the file extension of a trace setup file is ".ytst". In WideField3R2, the extension has been changed to ".ytst2".

## B3.9 Saving a Setup File in Card Format

To save a sampling trace setup file in card format, click [Save Settings in Card Format] in the Sampling Trace Setup dialog box. Up to 255 characters can be used for the absolute path to a sampling trace setup file in card format, with up to 80 characters to name a setup file itself, including its file extension. The file extension is ".ytsc" and is automatically appended when the file is saved.

## B3.10 Importing the Previous Execution Conditions

To import the settings registered in the CPU, click [Load Last Execution Condition] in the Sampling Trace Setup dialog box.

Nothing is displayed when the previous settings have not been saved. Check the settings.

### Note

Trace start/end conditions are displayed in the decimal data type format.

## B3.11 Starting Sampling Trace

With setup completed, clicking [Execute Sampling Trace] in the Sampling Trace Setup dialog box starts a sampling trace.

The status bar of the tool displays the trace status.

## B3.12 Sampling Trace Status

You have two ways to check the status of a sampling trace; by using the sampling trace tool in WideField3 to check them or by checking special registers.

### ■ Checking Status on the Sampling Trace Tool

You can see the execution status of a sampling trace on the status bar of the sampling trace tool that is online. The following table shows the status information displayed on the status bar.

**Table B3.1.12.1 Status Bar Display on F3SP7□-□S, F3SPV9-7S**

Status bar display	Description
Not set	The sampling trace settings are not set.
Trace N Waiting for trigger	Although sampling trace execution has started, the CPU module is waiting until the trigger start condition is true.
Trace N m% Completed (m = 1 to 98)	The CPU module is collecting nth sampling trace data.
Trace N 99% Completed	The CPU module is outputting the last sampling trace execution results to a file.
Trace completed	Sampling trace execution has been completed.

### ■ Checking Status through a Special Register

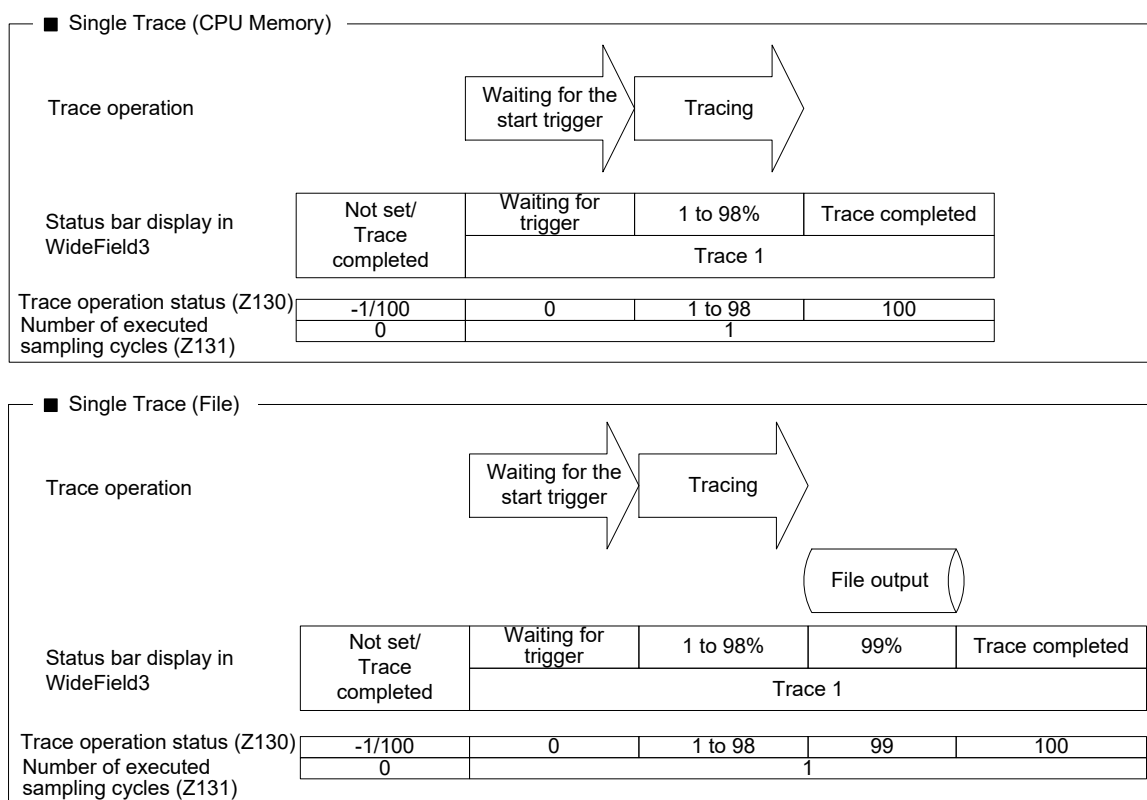
You can see the status of a sampling trace with special registers. The following table shows the behavior of each special register.

**Table B3.1.12.2 Special Register for Traces on F3SP7□-□S, F3SPV9-7S**

Number	Description	
Z0130	Operation status of the sampling trace	-1: Not set 0: Waiting for trigger 1 to 98 *1: Tracing (%) 99 *2: Writing to a file 100: Trace completed
Z0131	Number of executed sampling cycles	0 to 100: Number of cycles

\*1: Trace progress = Number of executed sampling cycles / number of sampling cycles (S\_MAX) x 100 (%)  
If no end condition is specified (endless trace), the rate always shows 98 (%) after rotary buffer operation.

\*2: The value becomes 99 only while writing to file.



**Figure B3.1.12.1 Single Trace Status for F3SP7□-□S, F3SPV9-7S**

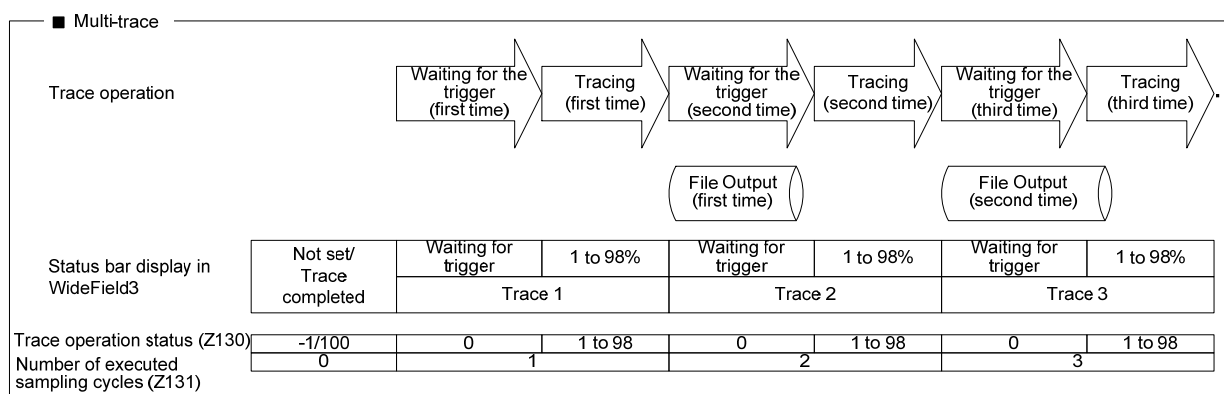


Figure B3.1.12.2 Multi-trace Status for F3SP7□-□S, F3SPV9-7S

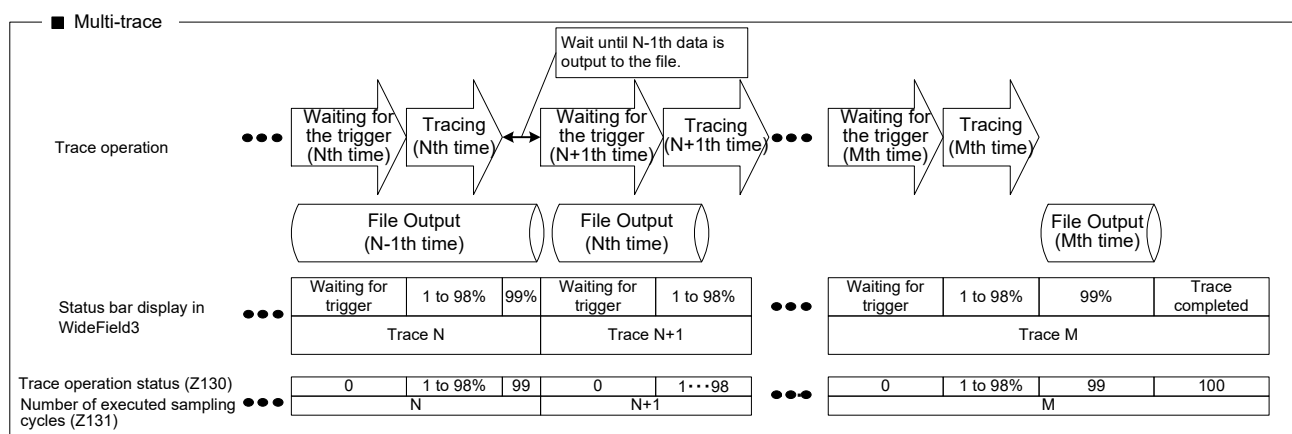


Figure B3.1.12.3 Multi-trace Status for F3SP7□-□S, F3SPV9-7S (If a File Output is Delayed)

## B3.13 Canceling Sampling Trace

You can cancel a sampling trace.

You can cancel sampling trace execution by doing any of the following operations during waiting for a trigger or executing a trace.

- Canceling the trace from the sampling trace tool  
(Select [Online] - [Cancel Trace] from the menu bar or select [Cancel Trace] from the toolbar.)
- Virtual directory command (TRCCNCL)
- Rotary switch (with the MODE switch set to the position "D", press and hold the SET button)

Trace results will contain data that is current just before tracing is canceled.

### Note

For details on canceling a sampling trace with the virtual directory command or the rotary switch, see Section B7.2, "Sampling Trace by Using the Virtual Directory Command".

## B3.14 Sampling Trace Setup Using the Project Settings/Configuration Window

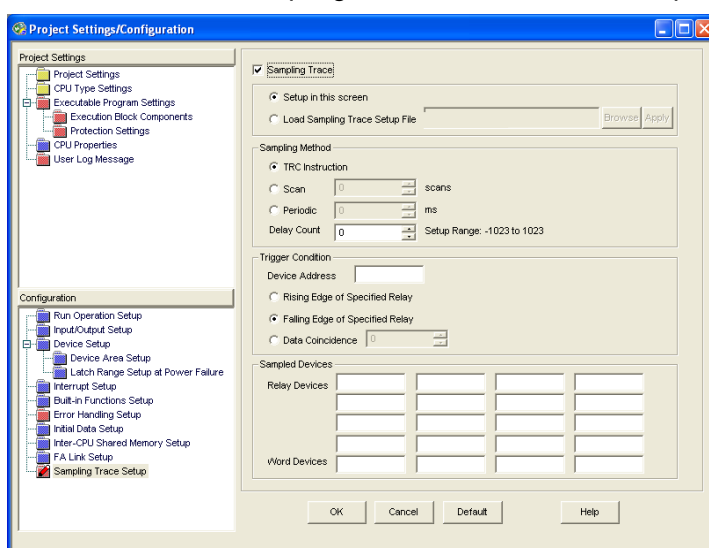
You can perform sampling trace setup using the Project Settings/Configuration window of WideField3.

Sampling trace setup using the Project Settings/Configuration window is stored and will not be affected when power is turned off. By setting up sampling trace to sample devices when a user system generates an error, you can save device status before and after an error.

Start WideField3, and select [Project Settings] in the project window to open the Project Settings/Configuration window. Any sampling trace setup performed on this dialog box becomes effective when you download a program.

Tag names cannot be used in the Project Settings/Configuration window. To use tag names, use the sampling trace tool to perform setup instead.

You can also read sampling trace results with the sampling trace tool.



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Figure B3.1.14.1 Sampling Trace Setup Screen of the Project Settings/Configuration Window



### CAUTION

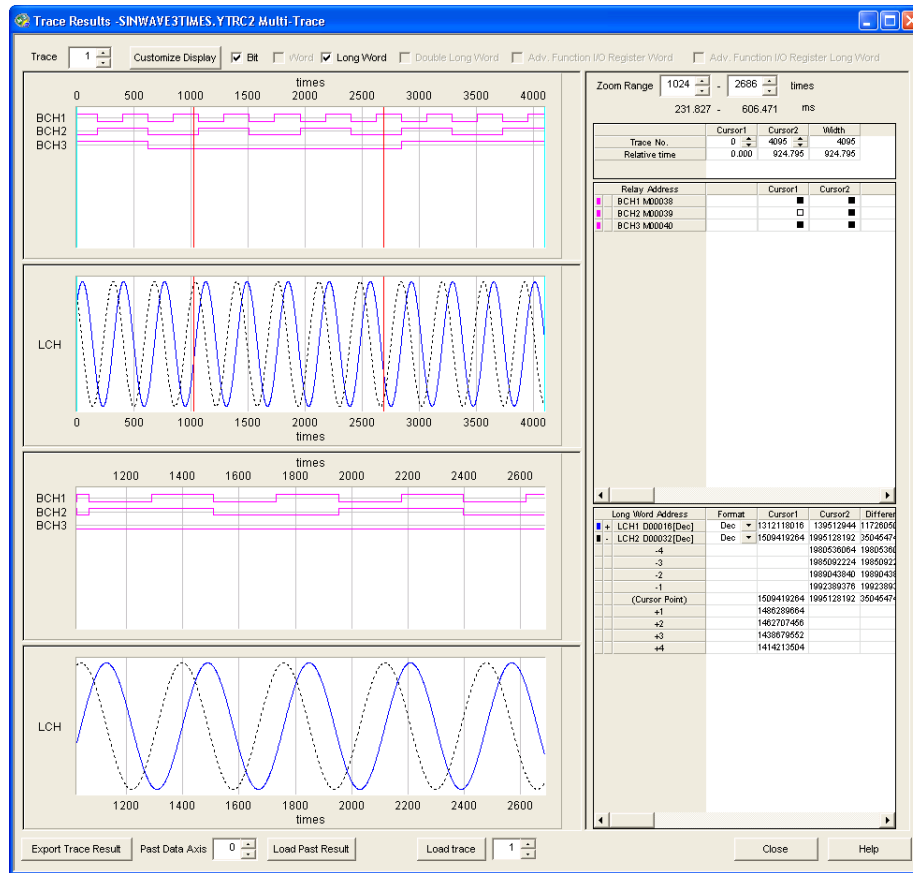
For F3SP71, F3SP76, and F3SPV9-7S, you cannot set up sampling trace in the Sampling Trace Setup screen in the Project Settings/Configuration window. To set up sampling trace, start up the sampling trace tool, or in the Project Settings/Configuration window, specify the trace setup file created in the sampling trace tool.



# B4 Using Sampling Trace Results

You can read sampling trace results from the CPU.

When the sampling trace tool is in the "Trace completed" status, you can check trace results by selecting [Online]–[Sampling Trace Results] from the menu bar to display the Trace Results window.



K0404\_01.VSD

Figure K4.20 Trace Results window



## CAUTION

Local device addresses registered during trace setup are displayed in trace results as globally assigned addresses.

### ● Sampling Trace Results File

Up to 240 characters can be used for the absolute path to a sampling trace results file, with 80 characters to name the results file itself (including its file extension). The file extension is ".ytrc2" and is automatically appended when the file is saved.

## Note

Sampling trace results can be saved to a file with file extension ".CSV".

## Note

For details on specifying file types when saving trace results, see Section B4.6, "Saving Sampling Trace Results to a File by Specifying its Name."

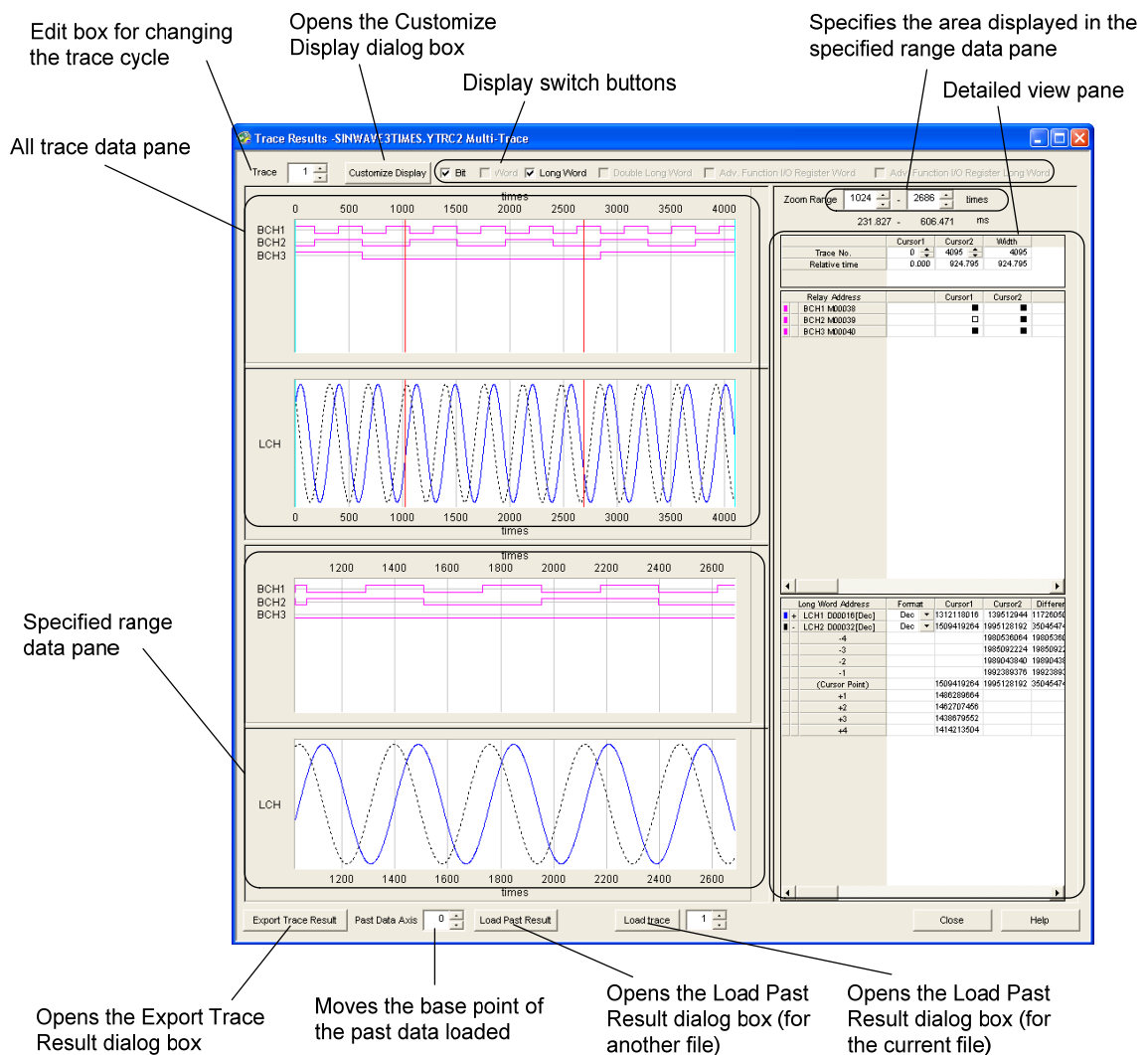
## B4.1 Sampling Trace Results Screen

This section describes the trace results screen.

The Trace Results window consists of the following three panes.

- All trace data pane
- Specified range data pane
- Detailed view pane

You can change the pane size by dragging the splitter between panes. For multi-trace, results of only a single trace cycle from up to 100 trace cycles are displayed. Specifying a specific trace cycle displays the corresponding results.



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Figure K4.22 Layout of Sampling Trace Results Screen

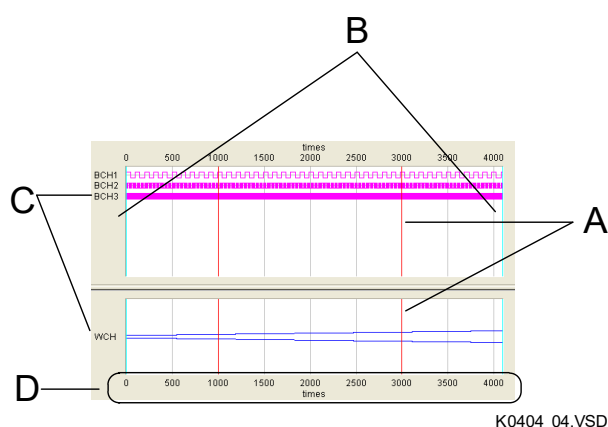
### Note

For details on overlapping past and current trace results, see Section B4.5, "Reading Past Sampling Trace Results."

## ■ All Trace Data Pane

The all trace data pane displays all the trace results. Sampling points are dotted along the horizontal axis.


This pane displays the trace results of the addresses selected with the display switch buttons.



**Figure K4.23 Trace Results Window - All Trace Data Pane**

- A Cursor to specify a zoomed area. The area enclosed by these cursors is displayed in the specified range data pane. You can adjust the distance between the cursors. A zoomed area can also be specified using the values in the [Zoom Range] spin box.
- B Data reference cursors 1 and 2. The data where these cursors are located is displayed in the detailed view pane. By default, the cursors are placed on the minimum and maximum points of sampling results. You can move data reference cursors by dragging. The detailed positions are shown in the detailed view pane.
- C Channel names (relay graph) and channel identifiers (register graph) to which sampling device are assigned.
- D Trace numbers. These numbers indicate the number of trace cycles, with the trace start point set to zero.

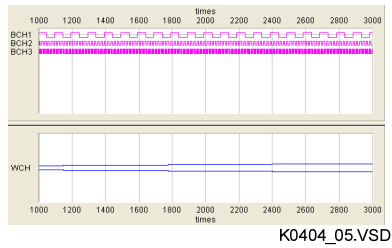
## Note

- You can use the display switch buttons to narrow displayed devices.
- You can use [Customize Display] to change the background color and other display settings of the panes.
- To switch the horizontal axis of the data pane between a time axis and a number-of-scans axis, click  on the tool bar, or select [View]-[Time Chart]/[Scan Chart] from the menu bar.

## ■ Specified Range Data Pane

The specified range data pane displays a zoomed view of the area specified with the zoom area selection cursors in the all trace data pane.

The screen layout is the same as the all trace data pane.



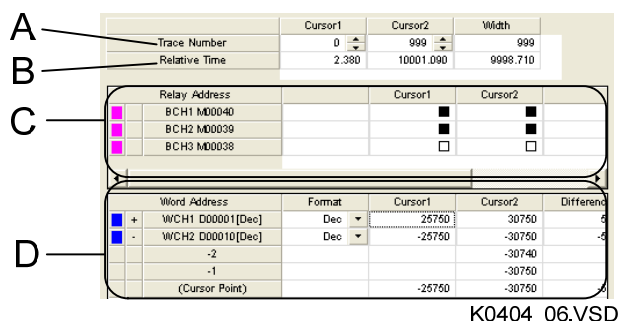
**Figure K4.24** Trace Results Window - Specified Range Data Pane

## ■ Detailed View Pane

The detailed view pane displays details of trace numbers specified with the data reference cursors in the all trace data pane.

To display or hide detailed view of each device, use the display switch buttons.

The following figure shows an example of when the [Bit] and [Word] checkboxes of the display switch buttons are selected.



**Figure K4.25 Trace Results Window - Detailed View Pane**

- A Trace numbers. These numbers indicate the data reference cursor positions and the distance between the cursors, represented in trace numbers (scan chart values).
- B Relative time values. These values indicate the data reference cursor positions and the distance between the cursors, represented in relative time (time chart values). The display is in units of milliseconds. The start point of the relative time is the point when the trigger condition becomes true.

- C Bit address detailed view area. This area shows the display color in the data pane, traced devices, channel names assigned to the devices, and device statuses at the data reference cursor positions.

The device statuses are shown as below.

■: Rising edge

□: Falling edge

- D Word device detailed view area. This area shows the display color in the data pane, traced devices, channel names assigned to the devices, and device values at the data reference cursor positions.

Click the [+] button to display trace data at the preceding and the following data reference cursor positions. Click the [-] button to hide the data.

The following information is displayed in the columns.

[Word Address]	Address to be traced
[Format]	Display format
[Cursor1]	Value to be traced at the cursor 1
[Cursor2]	Value to be traced at the cursor 2
[Difference]	Absolute differential value between word device values at the data reference cursors 1 and 2
[Max]	Maximum value of the entire trace area
[Min]	Minimum value of the entire trace area
[Average]	Average of the entire trace area
[Tag Name]	Tag name to be traced
[Block Name]	Block name where the trace target is used
[I/O Comment]	I/O comment of the trace target
[Lower]	Lower limit value to be displayed in the [Lower] graph
[Upper]	Upper limit value to be displayed in the [Upper] graph

**Note**

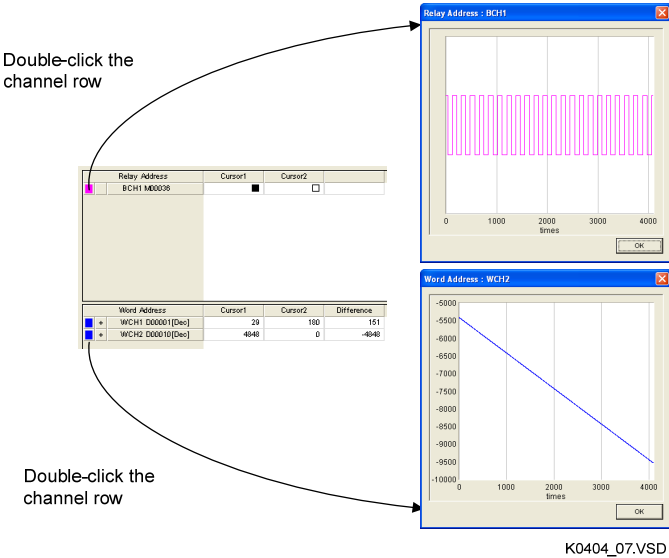
You can specify display settings to select what information and devices are displayed in the detailed view grid.

**Note**

For details on display settings of trace results, see Section B4.3, "Display Settings of Sampling Trace Results."

● **Single-Channel Data View Dialog Box**

You can open a dialog box that displays trace results of a single channel by double-clicking the corresponding channel row in the detailed view pane.  
For word, long-word or double-long-word data, scales are displayed in the vertical axis.



**Figure K4.26 Single-Channel Data View Dialog Box**

**Note**

In a single-channel data view dialog box, the horizontal axis uses the same unit as the one used in the scan chart/time chart of the Trace Results window.



## B4.3 Display Settings of Sampling Trace Results

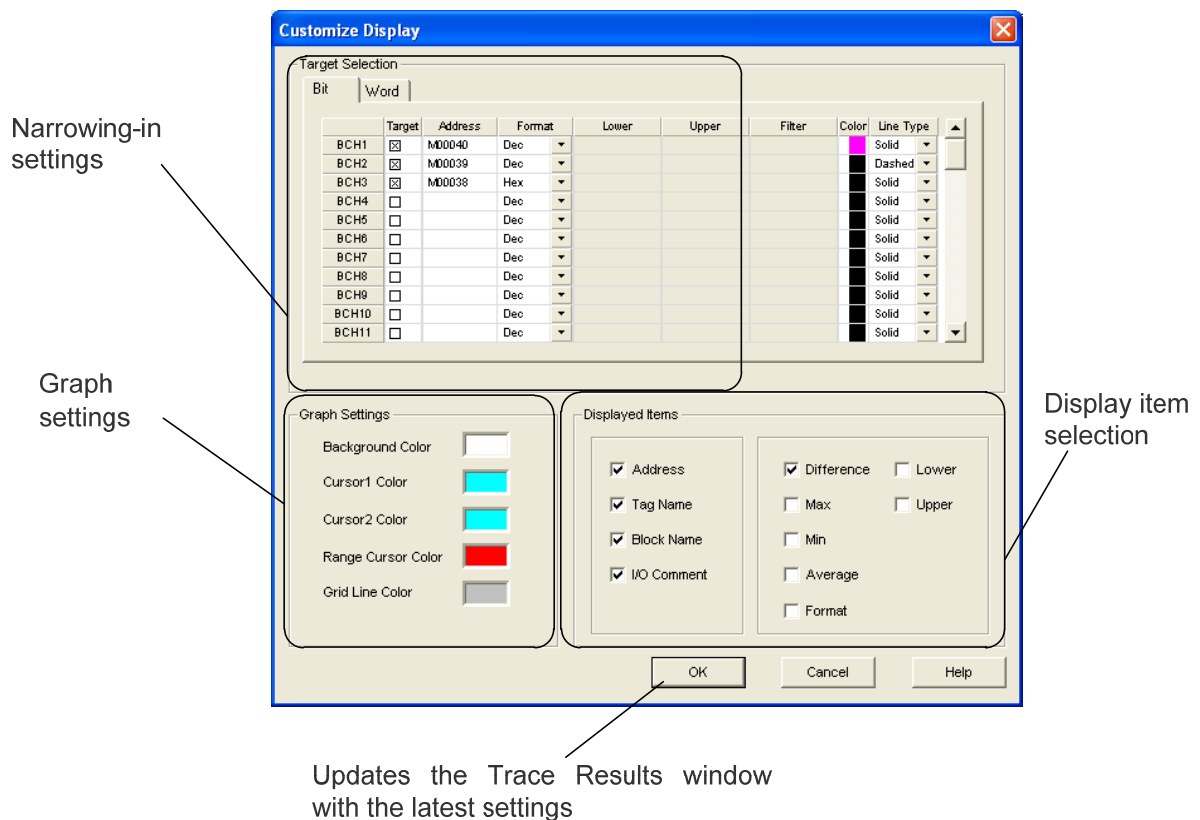
This section describes display settings of the Trace Results window.

To configure display settings of the Trace Results window, use the Customize Display dialog box.

To start the Customize Display dialog box, display the Trace Results window and select [Tools]-[Customize Display] from the menu bar, or click [Customize Display] in the Trace Results window.

In the Customize Display dialog box, you can set up the following for the bit device and each word device.

- Target Selection
- Graph Settings
- Displayed Items



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Figure K4.27 Customize Display Dialog Box



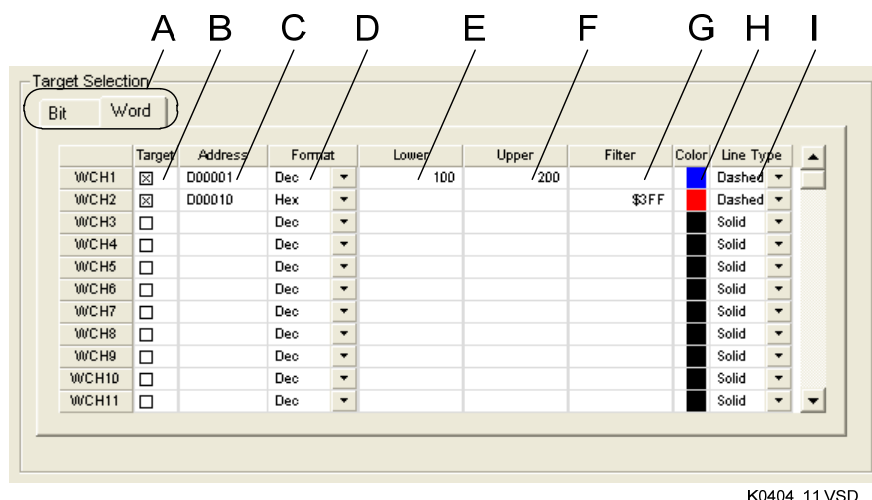
### CAUTION

Sampling trace cannot display structure member names.



## ■ Target Selection

In [Target Selection], you can select whether to display or hide each channel. You can also specify channel display formats.



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**Figure K4.28 Customize Display Dialog Box - [Target Selection]**

- A Select the corresponding tab for the device type.
- B Select whether to display or hide the trace target assigned to the channel. Turn on the checkbox to display the target.
- C Address to be traced
- D Select the format to display the trace target in. This setting is not applicable to the bit device.

[Dec]: Displays in decimal format.

[Hex]: Displays in hexadecimal format.

[Float]: Displays in floating point format. Only [Cursor 1] and [Cursor 2] are displayed in floating point format, and the others are displayed in decimal format.

- E Specify the lower limit displayed in the data pane in decimal or hexadecimal format. This setting is not applicable to the bit device
- F Specify in decimal or hexadecimal format the upper limit displayed in the data pane. This setting is not applicable to the bit device
- G When filtering trace target values, specify a filter value. This setting is not applicable to the bit device

Example) Current value: \$97FD

Filter: \$3FFF

In this case, the trace results would be filtered and displayed as "\$17FD."

### Note

To specify a hexadecimal value for the upper limit, lower limit or filter value, precede the value with "\$".

The valid range of filtering is as follows.

Word data: \$0 to \$7FFF

Long-word data: \$0 to \$FFFFFFFF

Double-long-word data: \$0 to \$FFFFFFFFFFFFFFFF

Data to be filtered is displayed in magenta font.

- H Select the color of the graph line and legend. Double-click the cell and in the displayed Color dialog box, select a color.
- I Select the type of the graph line.  
     [Solid]: Displays a solid line.  
     [Dashed]: Displays a dotted line.



### CAUTION

- When the upper/lower limits are set, floating-point values are displayed in the data pane. This might cause an error in scale values.
- For a channel for which the upper/lower limits are set, the display area in the all trace data pane and the specified range data pane shows the maximum/minimum values as the specified upper/lower limits. This causes different scales to be used for vertical axes between channels with and without upper/lower limits.
- If the difference between the upper and lower limits is extremely small, graphs might be inappropriately displayed.

### Note

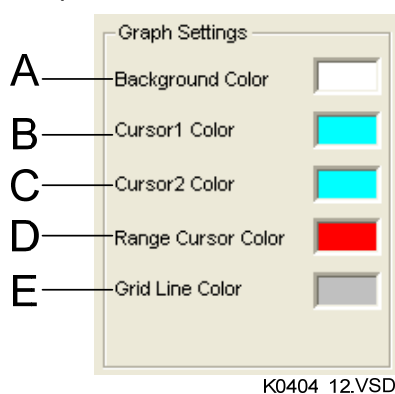
In a single-channel data view dialog box, data of each channel, including the vertical axis scale, can be individually displayed.

### Note

For details on the single-channel data view dialog box, see Section B4.1, "Sampling Trace Results Screen."

## ■ Graph Settings

In [Graph Settings], you can specify colors of graph components. To change a component color, double-click the color and select a color in the displayed Color dialog.

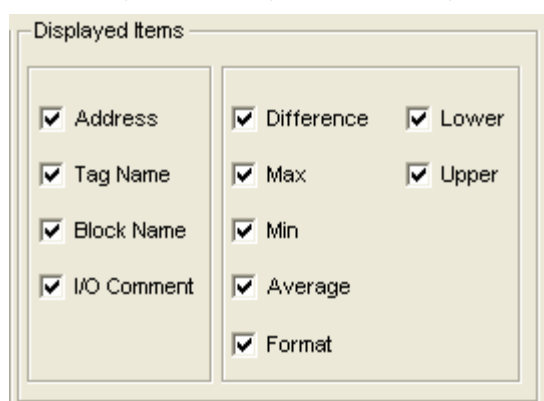


**Figure K4.29 Customize Display Dialog Box - [Graph Settings]**

- A Background color of the graph in the data pane
- B Line color of cursor 1 in the data pane
- C Line color of cursor 2 in the data pane
- D Line color of the zoom area selection cursor in the all trace range pane
- E Line color of the grid in the data pane

## ■ Displayed Items

In [Displayed Items], you can specify information displayed in the detailed view grid.



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**Figure K4.30 Customize Display Dialog Box - [Display Items]**

- When the [Address] checkbox is selected, addresses are displayed.
- When the [Tag Name] checkbox is selected, tag names are displayed.
- When the [Block Name] checkbox is selected, block names are displayed.
- When the [I/O Comment] checkbox is selected, I/O comments are displayed.
- When the [Difference] checkbox is selected, the absolute differential value between cursors 1 and 2 is displayed. This difference is not displayed for the bit device.
- When the [Max] checkbox is selected, the maximum value in the entire trace range is displayed.
- When the [Min] checkbox is selected, the minimum value in the entire trace range is displayed.
- When the [Average] checkbox is selected, the average of the entire trace range is displayed.
- When the [Format] checkbox is selected, the display format selection list is displayed.
- When the [Lower] checkbox is selected, values less than the lower limit are not displayed.
- When the [Upper] checkbox is selected, values greater than the upper limit are not displayed.

## B4.4 Opening a Sampling Trace Results File

You can open a file containing trace results and a trace results file in card format both in online and offline mode. You can also open a trace results file if the file is included in the list of eight files opened most recently.

To open a trace results file, select [File]–[Open] from the menu bar. Or, select a file from the list of recently opened files displayed in the [File] menu of the menu bar.



### CAUTION

Up to four trace results files can be opened. However, you might be able to open fewer than four files due to your computer's hardware capability and the size of the trace results files.

### Note

You can also open a trace results file in card format (.ytrs).

## B4.5 Reading Past Sampling Trace Results

You can import and display past trace results.

You can also display past and current trace results in the same data pane of the Trace Results window for comparison.

To import past sampling trace results, the Trace Results window must be open.



### CAUTION

You can load multiple past results sequentially. However, the number of past results to be loaded cannot exceed the upper limit for devices registered in sampling trace settings.

### ■ Procedure for Reading Past Results

This section describes how to load past trace results and display them in the Load Past Result dialog box. You can also import past trace results into the current trace results.

You can display past trace results in the following two ways.

- Select [Tools] - [Load Past Result] from the menu bar. In the Open File dialog box, select a past trace results file and click [Open].
- In the Trace Results window, click [Load Past Result].

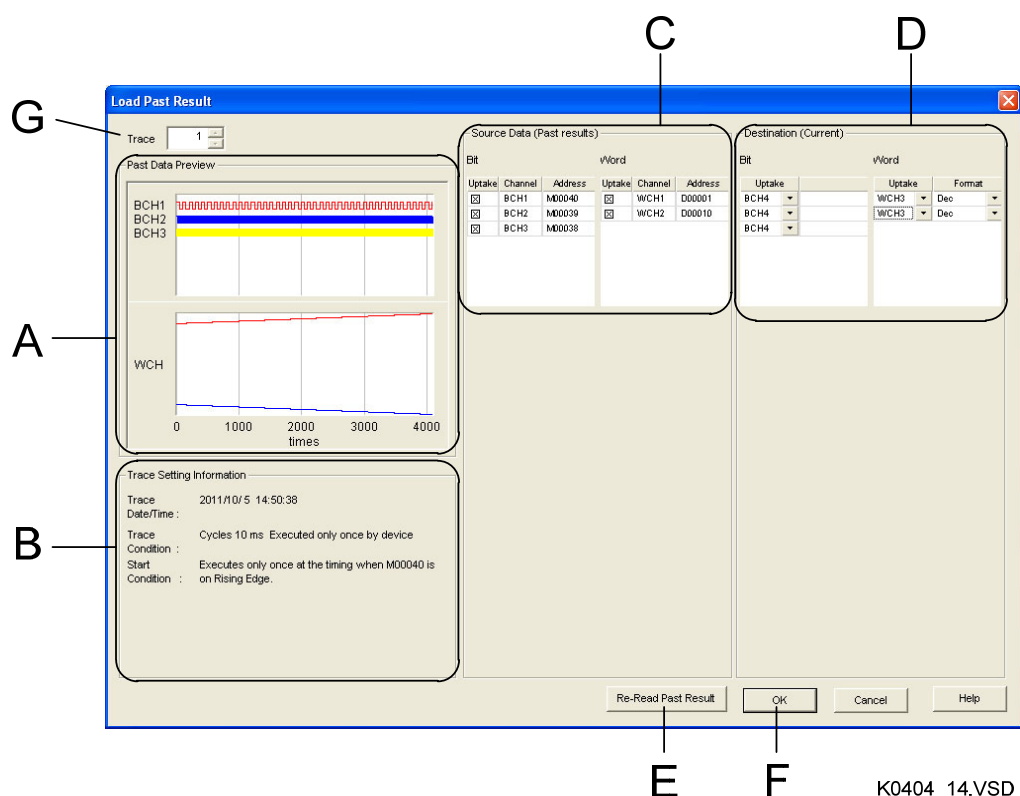
For multi-trace, you can load the trace results of another trace cycle from the currently open trace results file into the trace cycle being shown.

To do this, click [Load trace] in the Trace Results window. (Before clicking the button, a trace cycle to be loaded must be specified in the edit box to the left of the button.)

You can use the Load Past Result dialog box displayed by this procedure in the same way as in the cases shown above.

## ■ Layout of Load Past Result Dialog Box

This section describes the layout of the Load Past Result dialog box.



**Figure K4.31 Layout of Load Past Result Dialog Box**

- A Among the past results loaded, [Past Data Preview] displays the data whose checkboxes are turned on in the [Source Data (Past results)] area.
- B [Trace Setting Information] displays information of the past trace results that have been loaded.

[Trace Date/Time]: Trace date and time

[Trace Condition]: Sampling method and trigger condition

[Start Condition]: Trace start condition

[End Condition]: Trace end condition

### Note

[End Condition] is displayed in [Trace Setting Information] only for the CPU types F3SP71 and F3SP76.

- C This area lists the loaded data (past results). For each device, you can turn on or off the checkbox in the [Load] column to show or hide the relevant data in the [Past Data Preview] pane.

[Bit]: List of bit device data

[Word]: List of word device data

[Long Word]: List of long-word device data

[D-Long Word]: List of double-long-word device data

[I/O Word]: List of advanced function I/O register word device data

[I/O Long Word]: List of advanced function I/O register long-word device data

- D Displays the target (current data) into which the past data is loaded. For each device, select the target channel and display format.
  - [Bit]: List of bit device data
  - [Word]: List of word device data
  - [Long Word]: List of long-word device data
  - [D-Long Word]: List of double-long-word device data
  - [I/O Word]: List of advanced function I/O register word device data
  - [I/O Long Word]: List of advanced function I/O register long-word device data



### CAUTION

If past data is assigned to a channel that has already been assigned in the Trace Results window, the channel in the window is overwritten and updated with the past data.

- E Reads another trace results file.
- F Updates the information in the Trace Results window with the latest settings.
- G Specify a trace cycle to be loaded.



### CAUTION

If the current and past sampling counts are different, the past results are displayed in the following manner.

- If current > past: Sampling count values that are less than the current one are displayed as OFF (0).
- If past > current: Sampling count values that exceed the current one are not displayed.

## B4.6 Saving Sampling Trace Results to a File by Specifying its Name

You can save trace results to a trace results file by specifying the file name.  
To do this, the Trace Results window must be open.

### ◆ Procedure ◆

(1) Select the Trace Results window to be saved and make it active (place the window at the front).

(2) Select [File] - [Save As] from the menu bar.

⇒ The Save As dialog box is displayed.

(3) Enter a file name.

#### Note

Up to 240 characters can be used for the absolute path to a file, with up to 80 characters to name the file itself (including its file extension).

(4) Select a file type.

#### Note

You can select either .ytrc2 or .csv format.

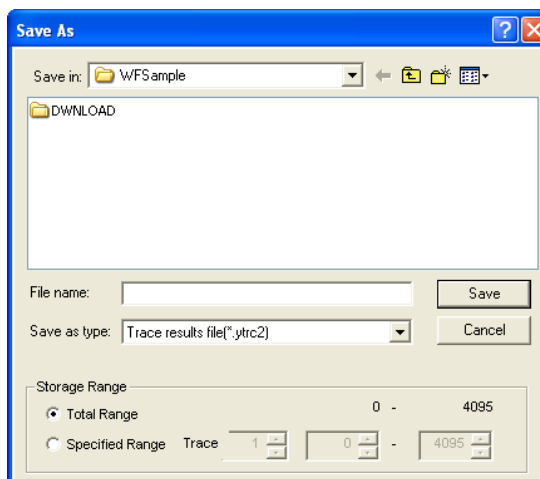
(5) Specify the range to be saved.

#### Note

You can also use trace numbers to specify the range to be saved. To specify a range, select the [Specified Range] option button and enter the start and end trace numbers of the range.

(6) Click [Save].

⇒ A trace results file is saved with the specified settings.



Step (2)

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### CAUTION

In WideField3R1, the file extension of a trace results file is ".ytrc". In WideField3R2, the extension has been changed to ".ytrc2".




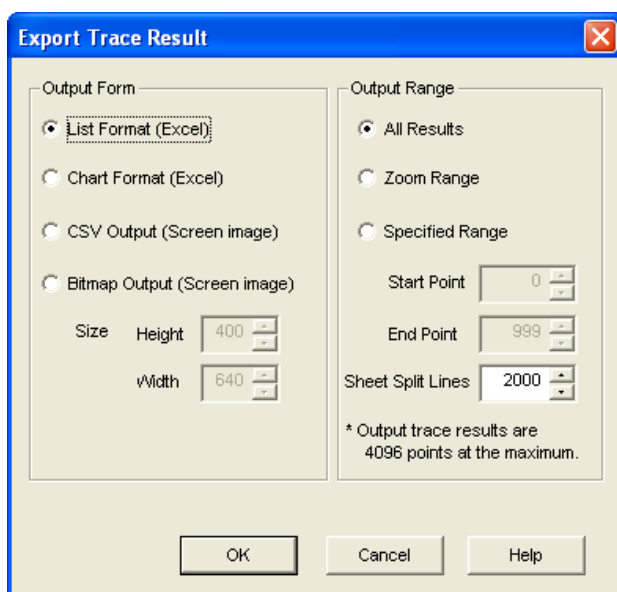


## B5 Exporting Sampling Trace Results

This section describes the trace results export function.  
To export trace results, the Trace Results window must be open.

You can export trace results using the Export Trace Result dialog box. To display the Export Trace Result dialog box, use any of the following three ways.

- Select [Tools] - [Export Trace Result] from the menu bar.
- In the Trace Results window, click [Export Trace Result].
- Click  on the toolbar.



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Figure K4.32 Export Trace Result Dialog Box

When exporting trace results, you can specify the following two settings.

- Export format
- Export range



### CAUTION

- The maximum number of trace results that can be exported is 4096 items.
- For multi-trace results, you can only export the data from the trace cycle currently shown.

### Note

Although the maximum number of trace results that can be exported is 4096 items, the number of outputted lines in a sheet is set in "Sheet Split Lines" because one item may use multiple lines depending on the export format.

## B5.1 Export Format

When exporting trace results, you can select from the following four export formats.

- List Format (Excel)
- Chart Format (Excel)
- CSV Output (Screen image)
- Bitmap Output (Screen image)

You specify the export format of the trace results in the Export Trace Result dialog box.

### ■ List Format (Excel)

Trace results are exported to an .xls file in list format.

The following figure shows an example of the export file when it is opened in Microsoft Excel.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
1	Sampling Trace Result																							
2																								
3	Program Name		Trigger Date/Time				Trigger Start Condition				Sampling Method		Delay Count		Trace Count									
4	WFSAMPLE		2011/10/05 14:50:39				Start: M00040 Rising Edge				Periodic		10ms		0times		1time							
5																								
6	Count	Time (ms)	M00040	M00039	M00038	D00001	D00010	Notes																
7			BCH1	BCH2	BCH3	WCH1	WCH2																	
8																								
9																								
10																								
11	0	9.398	1	1	0	16915	-16915																	
12	1	19.489	1	1	0	16916	-16916																	
13	2	29.572	1	1	0	16917	-16917																	
14	3	39.641	1	1	0	16918	-16918																	
15	4	49.642	1	1	0	16919	-16919																	
16	5	59.698	1	1	1	16920	-16920																	
17	6	69.754	1	1	1	16921	-16921																	
18	7	79.825	1	1	1	16922	-16922																	
19	8	89.903	1	1	1	16923	-16923																	
20	9	99.972	1	0	0	16924	-16924																	
21	10	110.045	1	0	0	16925	-16925																	
22	11	120.124	1	0	0	16926	-16926																	
23	12	130.196	1	0	0	16927	-16927																	
24	13	140.284	1	0	0	16928	-16928																	
25	14	150.355	1	0	1	16929	-16929																	
26	15	160.417	1	0	1	16930	-16930																	
27	16	170.481	1	0	1	16931	-16931																	
28	17	180.535	1	0	1	16932	-16932																	
29	18	190.620	1	0	1	16933	-16933																	
30	19	200.703	1	1	0	16934	-16934																	
31	20	210.758	1	1	0	16935	-16935																	
32	21	220.762	1	1	0	16936	-16936																	
33	22	230.839	1	1	0	16937	-16937																	
34	23	240.914	1	1	0	16938	-16938																	
35	24	250.998	1	1	1	16939	-16939																	
36	25	261.049	1	1	1	16940	-16940																	
37	26	271.107	1	1	1	16941	-16941																	
38	27	281.181	1	1	1	16942	-16942																	
39	28	291.252	1	1	1	16943	-16943																	
40	111005145038.1		/ 111005145038.2		/ 111005145038.3																			

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Figure K4.33 List Format



### CAUTION

- To open .xls files, Microsoft Excel must be installed on your computer.
- Export fails if you try to export more than 255 sheets.

### Note

You can export 1 to 32,768 lines to a sheet. The number of lines exported to a sheet can be specified in [Sheet Split Lines].

## ■ Chart Format (Excel)

Trace results are exported to an .xls file in chart format.

The following figure shows an example of the export file when it is opened in Microsoft Excel.

An empty line is inserted between different trace target device types.

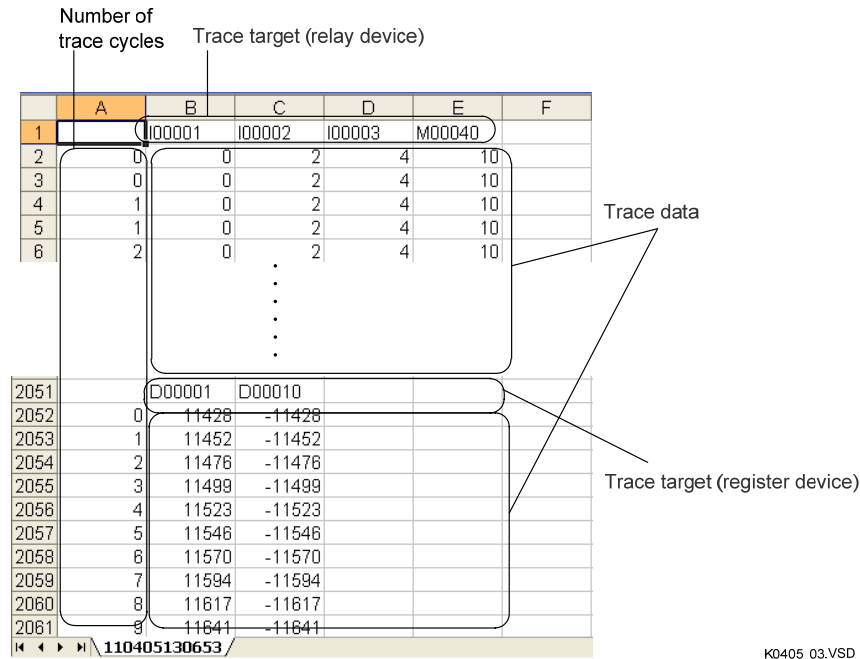


Figure K4.34 Chart Format



### CAUTION

- To open .xls files, Microsoft Excel must be installed on your computer.
- Export fails if you try to export more than 255 sheets.

### Note

You can export 1 to 32,768 lines to a sheet. The number of lines exported to a sheet can be specified in [Sheet Split Lines].

## ■ CSV Output (Screen image)

Numerical data is exported using the setup (displayed screen image) in the [Customize Display] dialog box. The setup information is also exported as numerical data.

The following figure shows an example of the export file when it is opened in Microsoft Excel.

	A	B	C	D	E	F	G	H	I	J	K	L
1	**SMPLING TRACE RESULT											
2												
3	**TRACESET											
4	SINWAVE	1	1	10240	0	1	0	1	8	0	0	SINWAVE
5	W00030	0	1				3	0			0	0
6	[DSPBITDDDEV]											
7	Y00901	0	3				3	0				
8	[DSPREGDEV]											
9	D00001	2	1				3	0				
10	D00010	2	1				3	0				
11	B00030	4	1				3	0				
12	[BITDDDEV]											
13	Y00901	0	1				3	0				
14	Y00903	0	1				3	0				
15	[WORDDDDEV]											
16	D00001	2	1				3	0				
17	[LWORDDDDEV]											
18	B00030	4	1				3	0				
19	**TRACECUST											
20	#00000000	#00FFFF00	#00FFFF00	#000000FF	#00FFFFFF	2560	7680	0	10239			
21	[BITFOCUS]	1	1	1	1	1	1	1	1	1	1	1
22												
23	Y00901	0	0	0	0	0	0	0	0	#00FF00FF	0	0
24	Y00903	0	0	0	0	0	0	0	0	#00FF00FF	0	0
25	[WORDFOCUS]											
26	D00001	0	1	999	1	1000	0	0	#00FF0000	0	0	0
27	[LWORDFOCUS]											
28	B00030	0	0	0	0	0	0	0	0	#0000FF00	0	0
29	**TRACEDATA1											
30		0	10239	100	2010/10/29 1851	2010/10/29 1851	0	1				
31	[BITDATA]	0	0	0								
32		0	0	0								
33		1	191	0	1							
34		2	340	0	1							
35		3	526	0	1							
36		4	675	1	1							
37		5	849	1	1							
38		6	995	1	1							
39		7	1178	1	1							
40		8	1326	1	1							
10272	[WORDDATA]		D00001									
10273		0	0	311								
10274		1	191	312								
10275		2	340	313								
10276		3	526	314								
10277		4	675	315								
10278		5	848	316								
10279		6	995	317								
10280		7	1178	318								
10281		8	1326	319								
10282		9	1472	320								
10283		10	1708	321								

TRACESET:  
Area where the  
trace condition is  
described

TRACECUST:  
Area where the display  
settings of trace results  
are described

TRACEDATA:  
Area where trace  
results information  
is described

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Figure K4.35 CSV Data Export

## Note

Information is exported to the trace results information area in the following order.

- [BITDATA] : Bit data
- [WORDDATA] : Word data
- [LWORDDATA] : Long-word data
- [DLWORDDATA]: Double-long-word data
- [IWORDDATA] : Advanced function I/O register word
- [ILWORDDATA] : Advanced function I/O register long-word

## ■ Bitmap Output (Screen image)

A graphic image is exported as bit maps using the setup (displayed screen image) in the [Customize Display] dialog box.

You can specify the export size (height and width) in pixels.

The following figure shows an example image of the export file.

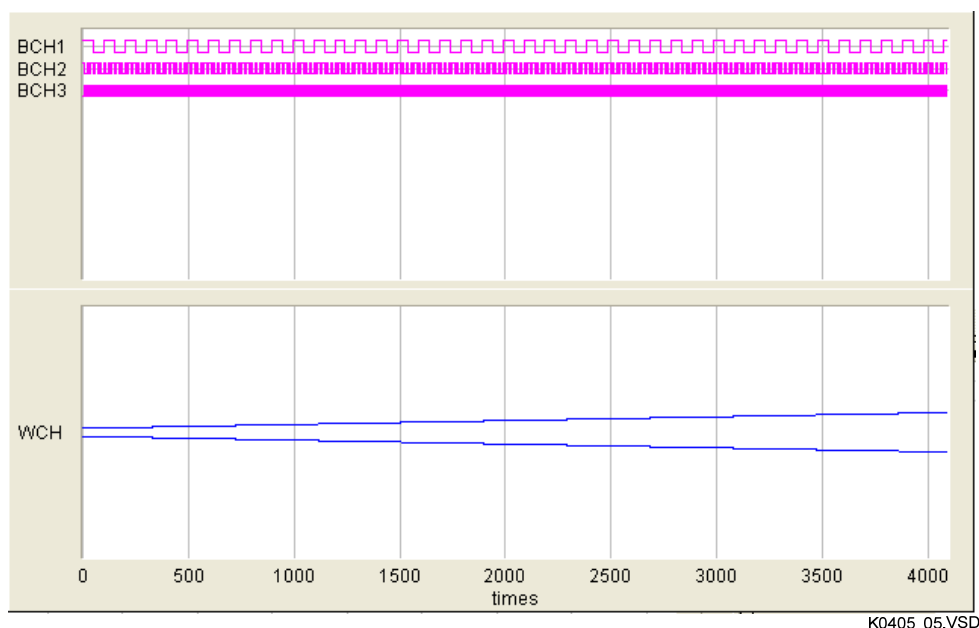


Figure K4.36 Graphic Image Export

### Note

The valid range of export size is as follows.

- Height: 320 or larger (Largest display height in your operating environment - Height of the task bar)
- Width: 480 or larger (Largest display width in your operating environment)



### CAUTION

When a graph image is exported, the graph screen might appear at the front for a moment.

## B5.2 Export Range

When exporting trace results, you can select from the following three export ranges.

- All Results
- Zoom Range
- Specified Range



### CAUTION

- Up to 4096 trace results can be exported.
- For multi-trace results, you can only export the data from the trace cycle currently shown.

To specify the export format of trace results, use the Export Trace Result dialog box.

### ■ All Results

All trace data is exported.

When data is exported in chart or list format, all the addresses registered in the Sampling Trace Setup dialog box are exported.

When data is exported in CSV data or graph image format, the settings in the Customize Display dialog box (displayed screen image) are applied to export all trace data in CSV format or as bit map image.

### ■ Zoom Range

Trace data in the range displayed in the specified range data pane is exported.

When data is exported in chart or list format, all the addresses registered in the Sampling Trace Setup dialog box are exported.

When data is exported in CSV data or graph image format, the settings in the Customize Display dialog box (displayed screen image) are applied to export all trace data in CSV format or as bit map image.

### ■ Specified Range

Trace data in the range from the start point to the end point entered is exported.

The range that can be specified is as follows.

**Table K4.14 Specification of Data Range**

CPU Type	Start Point	End Point
F3SP71/76-□S, F3SPV9-7S	0	Number of trace data

When data is exported in chart or list format, all the addresses registered in the Sampling Trace Setup dialog box are exported.

When data is exported in CSV data or graph image format, the settings in the Customize Display dialog box (displayed screen image) are applied to export all trace data in CSV format or as bit map image.

## B5.3 Procedure for Exporting

The procedure to export trace results is given below.

To export trace results, the Trace Results window must be open.

### ◆ Procedure ◆

**(1) Select [Tools] - [Export Trace Result] from the menu bar.**

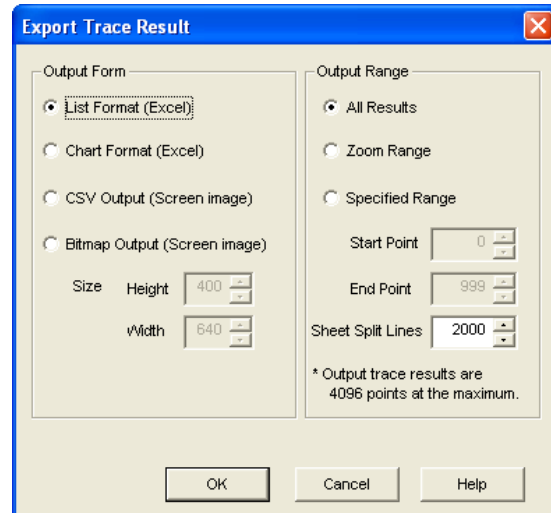
⇒ The Export Trace Result dialog box is displayed.

**(2) Specify the export format.**

**(3) Specify the export range.**

**(4) Click [OK].**

⇒ The Save As dialog box is displayed.



Step (2)

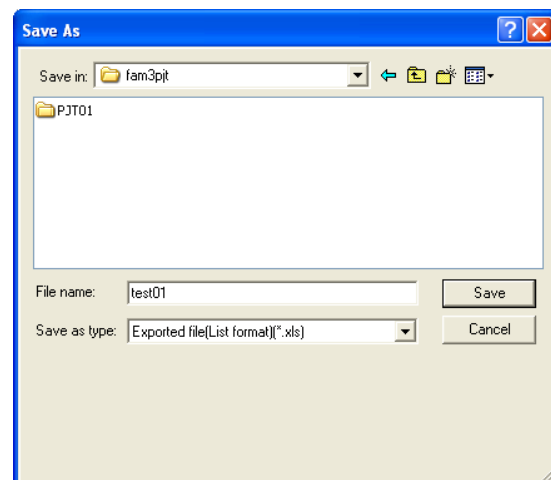
K0405\_06.VSD

**(5) Specify a file name and click [Save].**

### Note

Up to 240 characters can be used for the absolute path to a file, with up to 80 characters to name the file itself (including its file extension).

⇒ A trace results file is saved with the specified settings.



Step (5)

K0405\_07.VSD





## B6 Printing and Creating Graphs Using Microsoft Excel

You can use Microsoft Excel to print and plot trace results in graphs. To print, select [Tools]–[Export Trace Result] from the menu bar to open the Export Trace Result dialog box, and select [List Format (Excel)] to export the trace results.

To plot graphs, select [Tools]–[Export Trace Result] from the menu bar to open the Export Trace Result dialog box, and select [Chart Format (Excel)] to export the trace results.

### B6.1 Procedure for Printing

You can print sampling trace results using Microsoft Excel's print function.



#### CAUTION

Printing trace results requires that Microsoft Excel be installed on the personal computer.

To print, use the following procedure.

#### ◆ Procedure ◆

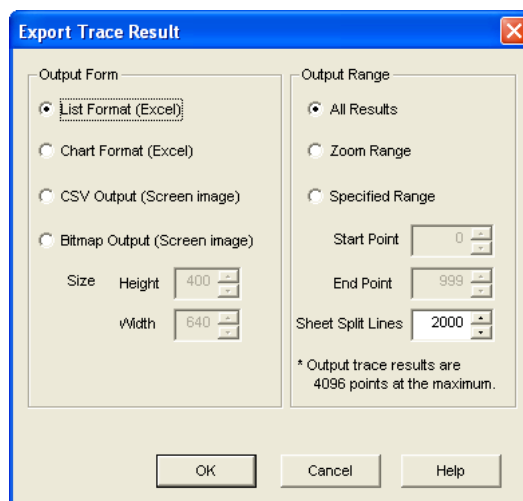
(1) Open the Trace Results window.

(2) Select [Tools]–[Export Trace Result] from the menu bar.

⇒ The Export Trace Result dialog box is displayed.

(3) Select [List Format (Excel)] for the export format and specify the export range. Click [OK].

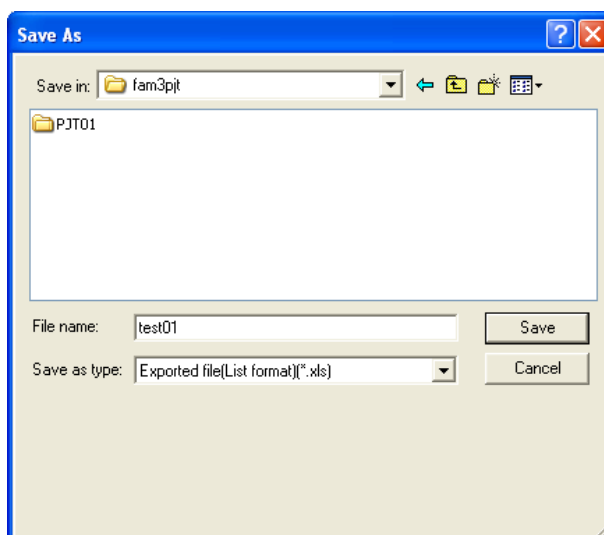
⇒ The Save As dialog box is displayed.



Step (2)

K0406\_01.VSD

- (4) Check that the Save as type drop down list box reads as "Exported file (List format)(\*.xls)," enter a file name, and save the file.



Step (4)

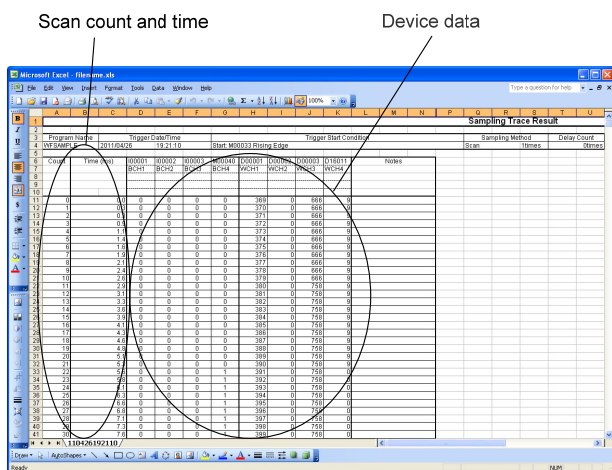
K0406\_02.VSD

- (5) Run Microsoft Excel and open the saved file.

- (6) Print the file using the Microsoft Excel print function.

### Note

To specify print range and other print settings, use Microsoft Excel. For details on how to use Microsoft Excel, see the manuals or online help for Microsoft Excel.



Step (5)

K0406\_03.VSD

## B6.2 Procedure for Creating Graphs with Microsoft Excel

You can plot sampling trace results as graphs using Microsoft Excel's graph function. To do this, use the following procedure.

### ◆ Procedure ◆

(1) Open the Trace Results window.

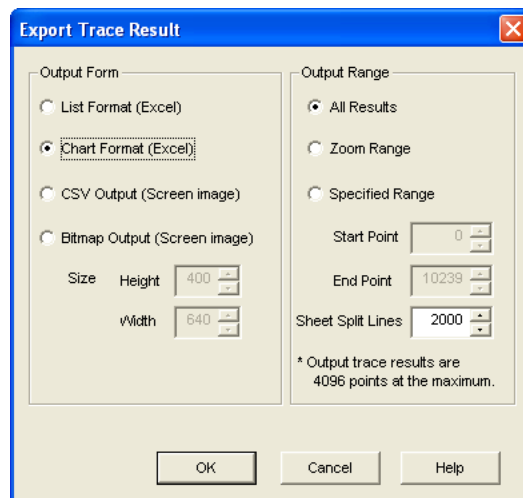


#### CAUTION

Graphs can be displayed either in time chart or scan chart format. Selecting [View]–[Time Chart] or [View]–[Scan Chart] from the menu bar toggles the display format. Select the desired display format.

(2) Select [Tools] - [Export Trace Result] from the menu bar.

⇒ The Export Trace Result dialog box is displayed.



Step (2)

K0406\_04.VSD

(3) Select [Chart Format (Excel)] for the export format and specify the export range. Click [OK].

⇒ The Save As dialog box is displayed.

(4) Check that the Save as type drop down list box reads "Exported file (Chart format)(\*.xls)," enter a file name, and save the file.

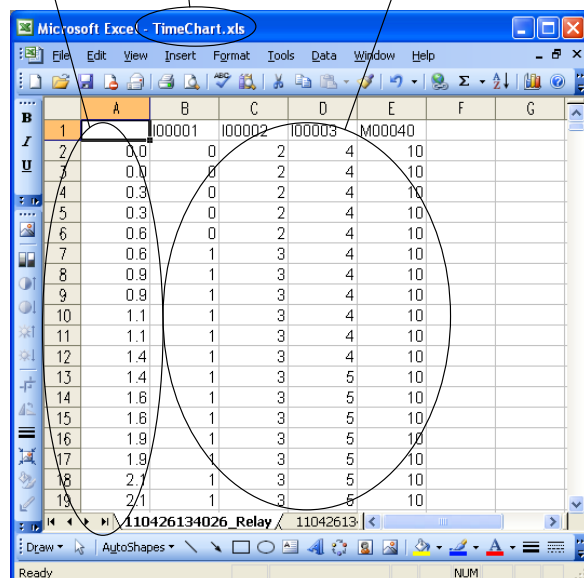
(5) Run Microsoft Excel and open the saved file.

⇒ Device data is displayed in Sheet1 of Microsoft Excel. An empty line is inserted between different trace target device types.

#### Note

For details on how to use Microsoft Excel, see the manuals or online help for Microsoft Excel.

Scan count or time values in chart format      Name of saved file      Device data



Step (5)

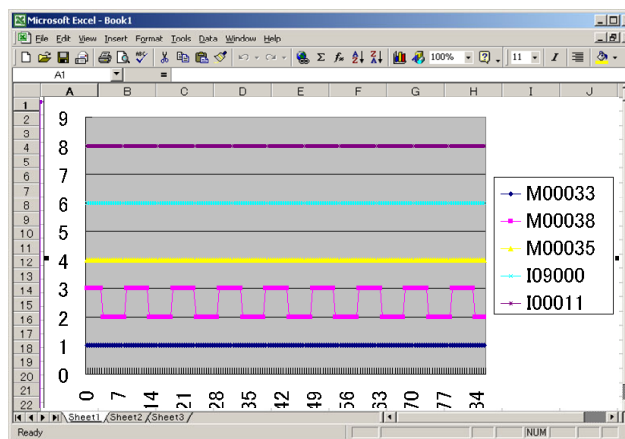
K0406\_05.VSD

## ■ Procedure for Creating an Microsoft Excel Graph

To create a relay graph from sampling trace data using Microsoft Excel's graph function, use the following procedure.

### ◆ Procedure ◆

- (1) Run Microsoft Excel and open the file saved in chart format.
- (2) Select the data to be plotted, and create a graph using Microsoft Excel's graph function.



Step (2)

K0406\_06.VSD

### Note

- The above graph is an example of a relay chart created from sampling trace tool data. A register chart can also be created.
- Relay data and register data is output to Microsoft Excel in chart format in that order.

### Note

For details on how to use Microsoft Excel's graph function, see the manuals or online help of Microsoft Excel.

## **B7      Toolless Sampling Trace**

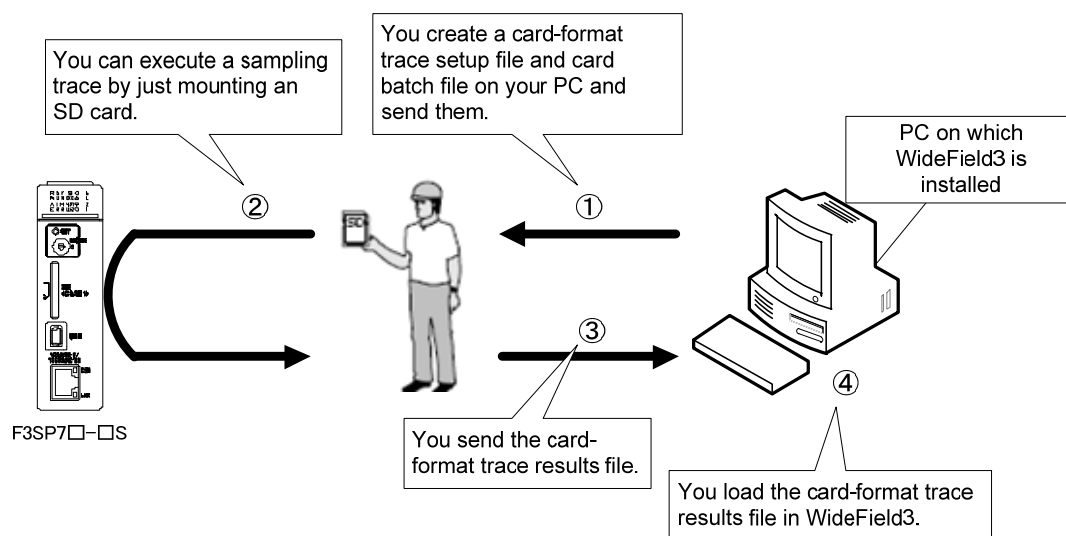
You can execute the trace with the card batch by using an SD card and with virtual directory commands. You can obtain sampling trace results via the SD card or through FTP file transfer.

After the results are stored in a personal computer, you can view them in WideField3.

## B7.1 Sampling Trace by Using Card Batches

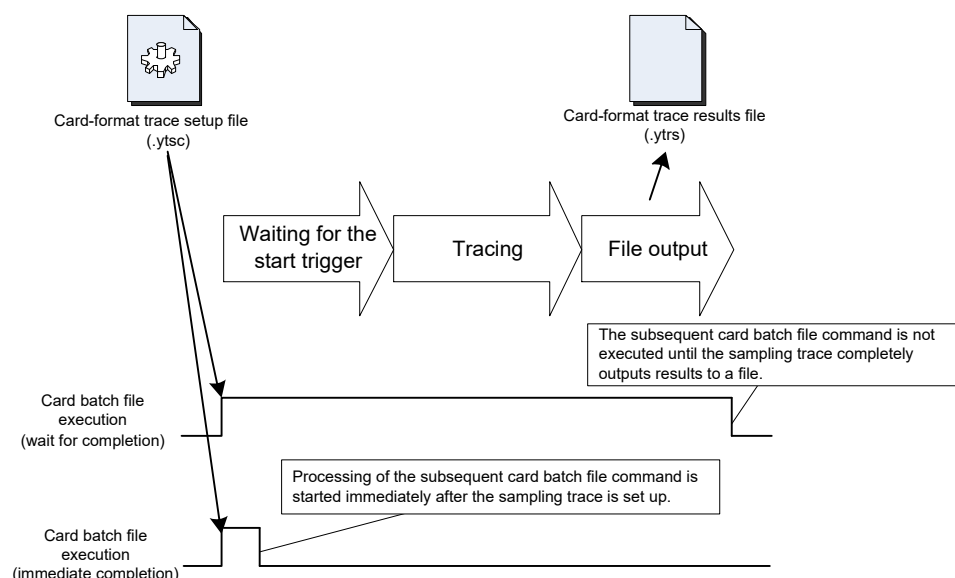
You can execute a sampling trace by storing a card-format trace setup file and card batch file, which are previously configured and saved with the sampling trace tool in WideField3, to an SD card.

You can store the results in the SD card by specifying "file" as the save destination of trace results. The sampling trace results are stored in the specified save destination as the card-format trace results file.



**Figure A6.10.19 Image of the Toolless Sampling Trace**

This card batch sampling trace can be achieved in two ways. The first one is "waiting for completion" mode in which the card batch command is not completed between trace execution and file output, and the second one is "immediate completion" mode in which the command is completed just after the command starts the trace.



**Figure A6.10.20 Image Diagram of the Card Batch Sampling Trace Operation**

In card batch operation, you cannot specify "no end conditions" (endless trace).

If you cancel the trace with WideField3 or the rotary switch during a trace started by a card batch, results up to the trace cancellation are stored and the trace is ended. If you selected "waiting for completion" for a trace started by a card batch, you cannot cancel the trace by using the virtual directory command.



---

**CAUTION**

You cannot execute any rotary switch functions during card batch trace execution except for canceling the trace and the virtual directory function.

You need to be aware of it when you select "waiting for completion."

---

## ● Execute Sampling Trace (TRCEXE)

Executes a sampling trace.

### [Syntax]

**Table A6.10.19 Command Specifications**

Command Part	Syntax
Command	TRCEXE
Parameters*1	Command completion [ 0 = Waiting for completion 1 = Immediate completion ] Trace setup file path (ASCII) [126 bytes max.]

\*1: The command itself and each parameter are separated by commas (,).

### Command Line:

Command, Parameter (1) , Parameter (2) , . . . , Parameter (n)

### [Example]

This sample command executes a sampling trace with a trace setup file (mytrc.ytsc) and waits for the command execution to be completed until data is output to a file.

```
TRCEXE, 0, \CARD1\mytrc.ytsc
```

### [Reply]

**Table A6.10.20 Reply Messages**

Reply Message	Code	Description
OK	SE00	Normal exit
Other Messages	SE01,...	Error reply message

Note: Reply message is written to the standard output file.

### Note

For details on replay messages in card batch file commands, see Section B7.4, "Checking the Status through LED Indications" ("Error Codes").

### [Function]

Reads the specified card-format trace setup file and starts the sampling trace.

You can select whether to wait for the command to be completed when data is output to a file ("waiting for completion"), or to end the command immediately after requesting the trace start ("immediate completion").

### This command is prohibited by the following triggers:

Startup event trigger

Error event trigger

Run event trigger

Stop event trigger



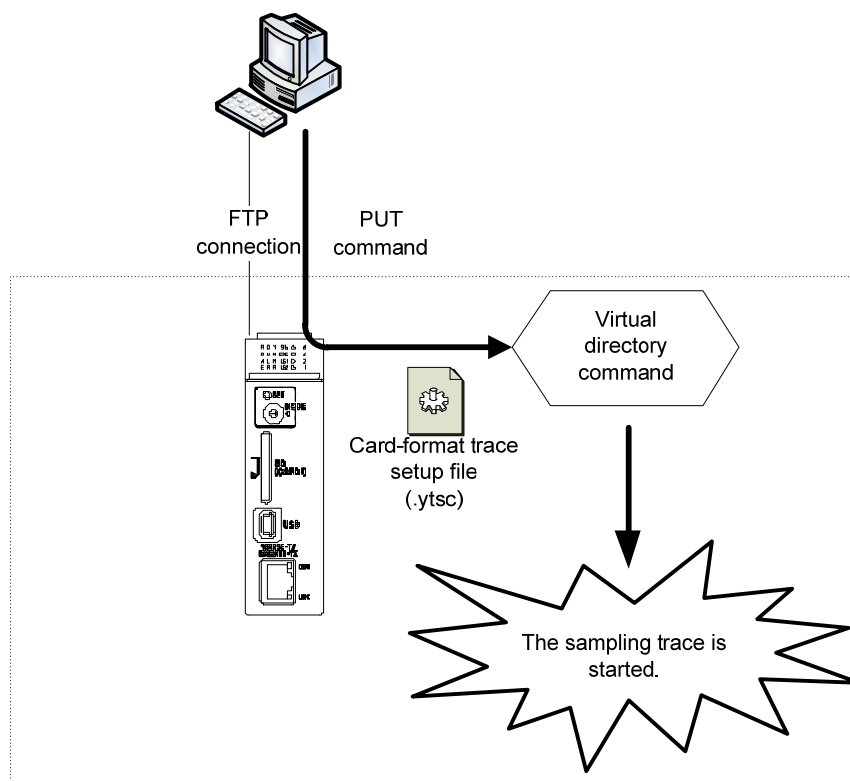
## B7.2 Sampling Trace by Using the Virtual Directory Command

You can use the virtual directory command of FTP to start a sampling trace.

To obtain sampling trace results, you simply transfer the output card-format trace results file (.ytrs) via FTP.

You can read out the sampling trace results in WideField3.

You can also cancel an ongoing sampling trace to read out results midway through the trace.



**Figure A6.10.21 Image Diagram of Sampling Trace Operation with the Virtual Directory Command**

You cannot specify "no end conditions" (endless trace) in the virtual directory command. Also, you cannot specify the "waiting for completion" mode in which the command is not finished until data is output to a file.

If you cancel the trace in WideField3, or with the rotary switch or virtual directory command, during a trace started by the virtual directory command, results up to the trace cancellation are stored and the trace is ended.



### CAUTION

You cannot execute any rotary switch functions during card batch trace execution except for canceling the trace and the virtual directory function.

## ● Execute Sampling Trace (TRCEXE)

Executes a sampling trace.

### [FTP Command Used]

put

### [Syntax]

**Table A6.10.21 Command Specifications**

Command Part	Syntax
Common	¥VIRTUAL¥CMD
Command	¥TRCEXE
Parameter	-
File	Card-format trace setup file name

### Command Line:

```
put File Common Command_Parameter
```

### [Example]

This sample command starts a trace with the card-format trace setup file name "mytrc.ytsc."

```
>put mytrc.ytsc \VIRTUAL\CMD\TRCEXE
```

This sample command shows FTP replies when an error occurs (in the command prompt).

```
200 PORT command successful.
```

```
550 Can't open virtual file[SE01 PARAMETER ERROR].
```

### [Reply]

**Table A6.10.22 Reply Messages**

Reply Message	Code	Description
OK	SE00	Normal exit
Other messages	SE01,...	Error reply message

### Note

For details on error reply messages, see Section B7.4, "Checking the Status through LED Indications" ("Error Codes").

### [Function]

Uses the specified card-format trace setup file and starts the sampling trace.

The command exits once the virtual directory command requests the start of a sampling trace. To check if the sampling trace is completed and data is output to a file, use the WRD command or other commands to read the sampling trace status (Z130) from the special register.

## ● Cancel Sampling Trace (TRCCNCL)

Stops an ongoing sampling trace.

### [FTP Command Used]

get

### [Syntax]

**Table A6.10.23 Command Specifications**

Command Part	Syntax
Common	¥VIRTUAL¥CMD
Command	¥TRCCNCL
Parameter	-
File	Dummy file name

### Command Line:

```
get Common Command_Parameter File
```

### [Example]

This sample command stops an ongoing sampling trace.

```
>get \VIRTUAL\CMD\TRCCNCL dummy.txt
```

This sample command shows FTP replies when an error occurs (in the command prompt).

```
200 PORT command successful.
```

```
550 Can't open virtual file[SE01 PARAMETER ERROR].
```

### [Reply]

**Table A6.10.24 Reply Messages**

Reply Message	Code	Description
OK	SE00	Normal exit
Other messages	SE01,...	Error reply message

## Note

For details on error reply messages, see Section B7.4, "Checking the Status through LED Indications" ("Error Codes").

### [Function]

Stops the ongoing sampling trace.

If "file" is specified for the trace result save destination, use the WRD command or other commands to see if data is completely output to the file, by reading the sampling trace status (Z130) from the special register.

This command stops a sampling trace during execution regardless of whether the trace is started in WideField3 or with a card batch.

## B7.3 Canceling a Sampling Trace by Using the Rotary Switch

You can use the rotary switch function to cancel an ongoing sampling trace.

**Table A6.10.25** MODE Switch Operation to Cancel a Sampling Trace

Current value of MODE switch	Press operation	Press & hold operation
D	-	Trace cancellation

When you turn the MODE switch to the position of "D", the front LEDs "1", "4", and "8" light up. You can cancel an ongoing sampling trace at this time by pressing and holding the SET button (for 3 seconds or longer).

### Note

Pressing (and holding) the SET button is generally disabled when the "EXE" LED is ON. However, you can cancel the trace by pressing and holding the SET button when a sampling trace is in progress.

## B7.4 Checking the Status through LED Indications

The front LED US2 lights up on during waiting for a trigger, executing a trace, and outputting data to a file only if "immediate completion" is specified for finishing the command in card batch trace execution.

After data is completely output to a file, US2 lights up/turns off or flashes according to the values of special relays M127 and M128.

Note that if US2 is lit up before sampling trace execution, you cannot check if the sampling trace is completed because you cannot determine if US2 has lit up due to sampling trace completion.

US2 will not light up if "waiting for completion" is specified for finishing the command in card batch sampling trace execution (TRCEXE), if a sampling trace is executed with the virtual directory command, or if a trace is executed in WideField3.

### ● Relationship between Toolless Sampling Trace Function and US2 LED

The table below shows how the US2 LED changes when "immediate completion" is specified for the command completion in card batch trace execution.

**Table B4.1.7** Relationship between Toolless Sampling Trace Function and US2 LED

State of Toolless Sampling Trace Function	State of US2 LED
Not executed	Follows the values of the special relays M127 and M128.
Waiting for a Start Trigger	Lit
Executing a trace	Lit
Outputting to a file	Lit
Trace Complete	Follows the values of the special relays M127 and M128.

## ■ Error Codes

Table B3.1.3 Error Codes

Reply Message	Error Code	Description
OK	SE00	Processing has completed successfully.
PARAMETER ERROR	SE01	Invalid parameter
DATA CONVERT ERROR	SE02	Input data could not be converted to the specified format.
DEVICE BOUNDARY VALUE EXCEEDED.	SE03	An attempt was made to access a write-prohibit area.
MULTI CPU ERROR	SE04	CPU number is invalid or no response was received from the target CPU.
TIMEOUT ERROR	SE05	Internal timeout has occurred.
FILE SYSTEM ERROR	SE10	Processing could not continue because a file system failure was detected or the format of the file system is not FAT16 or FAT32. Reformat the disk in a proper format, or replace the memory card.
INVALID FILE	SE11	File data is invalid or could not be interpreted.
NO FILE ERROR	SE12	File or directory was not found. Or, no match was found for the specified wildcard pattern.
FILE OPEN ERROR	SE13	An attempt was made to open a file which is already opened in Write or Append mode. In Write mode, an attempt was made to open a file which is already opened.
FILE EXIST ERROR	SE14	Specified destination file already exists. Or, a directory could not be deleted because there are files in it.
FILE PERMISSION ERROR	SE15	A write attempt to a destination was unsuccessful because: - the destination was being accessed - the destination is a directory - the destination is read-only
NOEMPTY ERROR	SE16	No free space is available on the disk. Or, the number of files or directories exceeded the system limit.
NO CARD ERROR	SE17	Processing is not allowed because no memory card is inserted.
CARD UNMOUNT ERROR	SE18	Processing is not allowed because no memory card is mounted.
CARD PROTECT ERROR	SE19	Processing is not allowed because the protection switch is ON.
CARD ERROR	SE20	Processing could not continue because a memory card failure was detected. Replace the memory card.
SECURITY ERROR	SE21	- Security password mismatch - CPU operation restriction in the operation protection settings is used to disable the function.
RUN MODE ERROR	SE22	Processing is not allowed in Run or Debug mode.
STOP MODE ERROR	SE23	Processing is not allowed in Stop mode.
CHANGE MODE ERROR	SE24	Operating mode change is not allowed. This may be because online edited changes are being written to the CPU module or because of some other reason.
PROGRAM EXECUTION MODE ERROR	SE25	Block activation is not allowed in execute-all-blocks mode.
INVALID BLOCK NAME	SE26	The specified block was not found.
FUNCTION DELETION	SE27	The function has been removed.
FTPSERVER ERROR	SE30	Processing could not continue due to an FTP server error.



# C1 Live Logic Analyzer

The live logic analyzer stores the status and contents of devices designated for sampling in the trace buffer memory, as the sampling trace tool does, and immediately displays the trace results.

The live logic analyzer is available in F3SP71-4S/F3SP76-7S/F3SPV9-7S (revision 4 or later).

This analyzer can be executed as an extended tool of WideField3 and also as a standalone tool.

Trace results can be displayed in scan chart format in the live logic analyzer.

This analyzer can be executed as a standalone tool and also can be executed when Widefield3 is not online. However, when you specify a local device to be sampled or when you want to use tag names and I/O comments registered in a device specified for sampling, you must start WideField3, open the online project, and then start the live logic analyzer, or you must load the relevant project using the live logic analyzer.

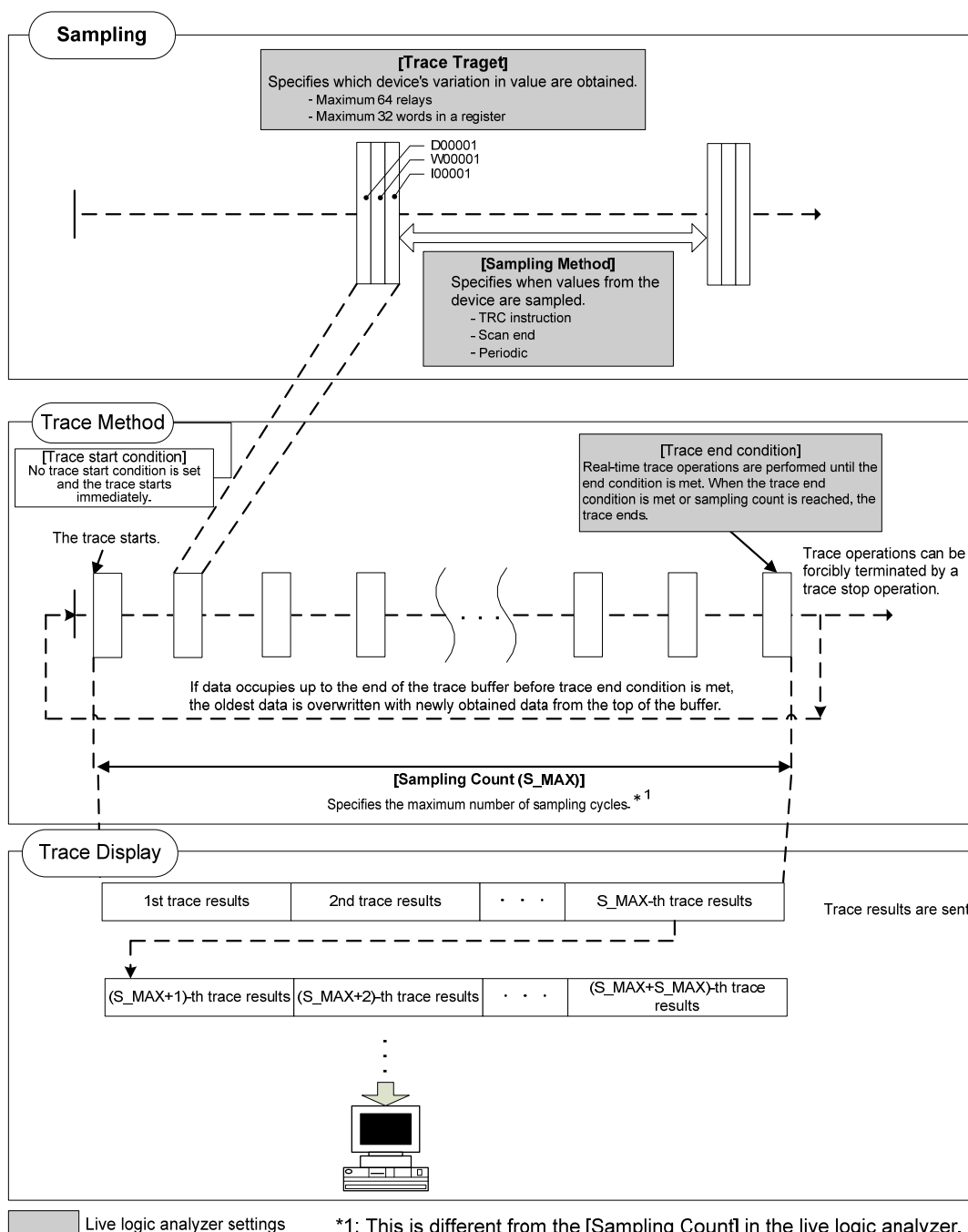


## CAUTION

The live logic analyzer can be used in the combination of WideField R3.01 and F3SP71-4S/F3SP76-7S/F3SPV9-7S (firmware version revision 4 or later).

## ■ Operation Overview

The live logic analyzer accumulates the values of the specified devices in the rotary buffer on the CPU memory based on the sampling method and sends the values to WideField3 to display them. When the results are displayed in WideField3, the X axis represents the sampling count.



**Figure C1.1 Overview of Live Logic Analyzer Operations**

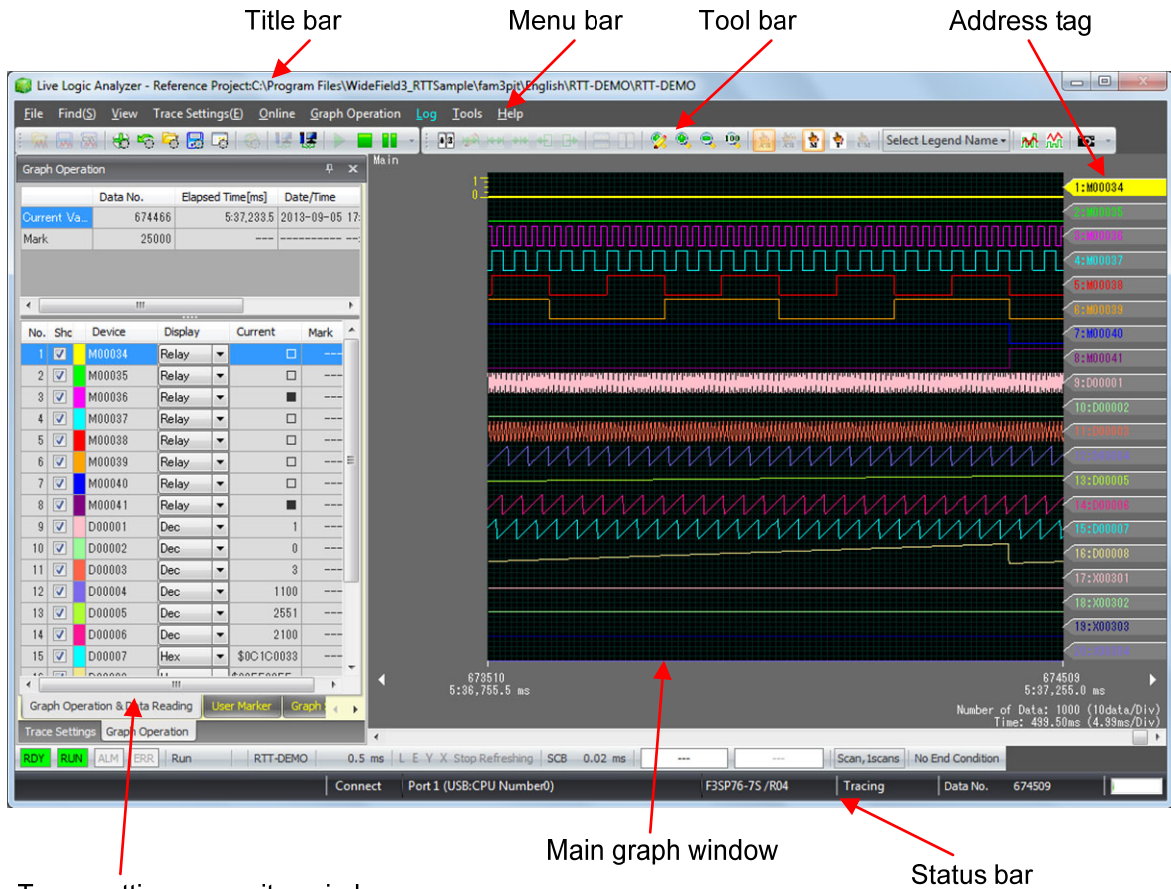
### Note

In Stop mode, live logic analyzer results are collected only when the sampling method is "periodic".



## C1.1 Live Logic Analyzer Window

The following figure illustrates the layout of the live logic analyzer window.



Trace settings - monitor window  
(Device/Trace Condition/User Marker/Graph Operation & Data Reading)

**Figure C1.1.1 Window When Opening the Live Logic Analyzer**

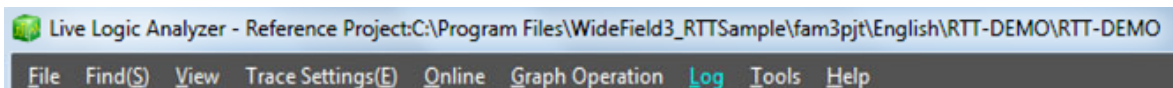
C0103\_1.VSD

### ■ Title Bar

The title bar displays the application name, and when a project is open, it also displays a reference project name.

### ■ Menu Bar

The menu bar displays the names of menus you can select within the analyzer.



**Figure C1.1.2 Title Bar and Menu Bar**

C0103\_2.VSD

## ■ Toolbar

The toolbar displays often used menu items of the menu bar as icons. Selecting [View]–[Toolbar] from the menu bar switches between showing and hiding the toolbar. Moving the mouse cursor over an icon displays its explanation in TipHelp. The status bar displays the operation status.

## ■ Status Bar

The status bar displays status information of the live logic analyzer.

Selecting [View]–[Toolbar]–[Status] from the menu bar switches between showing and hiding the status bar.

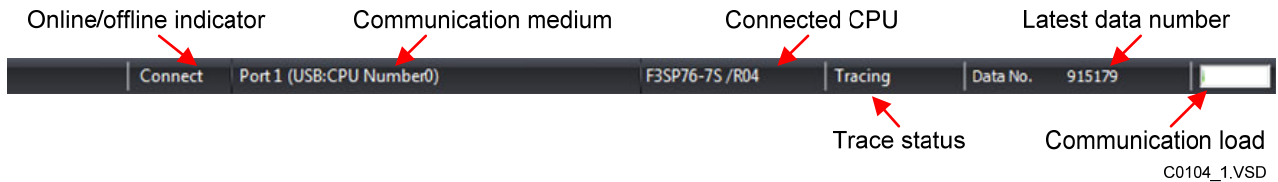


Figure C1.1.3 Status Bar

## ■ Trace Information Bar

The trace information bar displays live logic analyzer settings, the status of the connected CPU, and the project name.

Selecting [View]–[Toolbar]–[Trace Information] from the menu bar switches between showing and hiding the trace information bar.

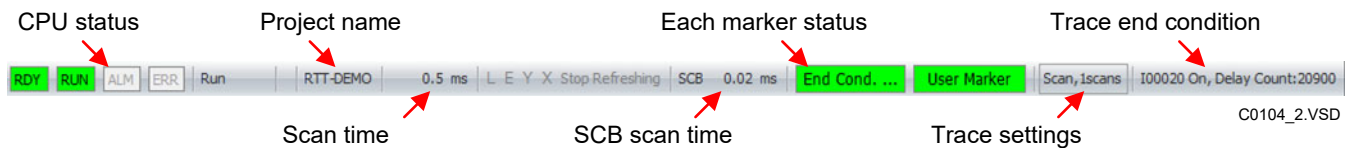


Figure C1.1.4 Trace Information Bar



### CAUTION

In the status bar, the green gauge that represents the communication load extends when the load is heavy. If the gauge constantly shows a maximum load level, some trace results may be lost.

In such a case, modify the settings to reduce the amount of data collected at a time, for example by reducing the number of devices to be traced.

## C2 Live Logic Analyzer Menus and Starting the Analyzer

This chapter describes the menu of the live logic analyzer.

### C2.1 List of Live Logic Analyzer Menu Items

Some menu items of the live logic analyzer are unavailable depending on whether a trace is being executed or not. Unavailable menu items are grayed out.

**Table C2.1.1 Menu Items**

Menu bar	Menu command	Description	Availability of the Menu Item for Each Operation Status of LLA		
			Being executed	Paused	Stopped
File	Open Trace Result File	Opens trace data saved in RTTD format.	×	×	✓
	Save Trace Result File	Saves trace data in RTTD format.	×	✓	✓
	Save File As CSV	Saves trace data in CSV format.	×	✓	✓
	Copy As Image - Entire Screen	Captures the entire LLA screen that is currently displayed.	✓	✓	✓
	Copy As Image - Main Graph	Captures the currently displayed LLA main graph.	✓	✓	✓
	Copy As Image - Zoomed-in Graph	Captures the currently displayed LLA zoomed-in graph.	✓	✓	✓
	Exit	Exits the live logic analyzer.	×	×	✓
Find	Find	Searches for a position where data meets a condition for a device.	×	✓	✓
	Advanced Find	Searches for a position that meets a condition for up to three devices.	×	✓	✓
	Find Next	Searches for the next position that meets the condition specified for Find or Advanced Find.	×	✓	✓
	Find Previous	Searches for the previous position that meets the condition specified for Find or Advanced Find.	×	✓	✓
	Jump - Cursor A	Changes the display position to the cursor A position.	×	✓	✓
	Jump - Cursor B	Changes the display position to the cursor B position.	×	✓	✓
	Jump - Mark Cursor	Changes the display position to the cursor M position.	✓	✓	✓
	Jump - Trace End Position	Changes the display position to the position where the trace end condition is met.	✓	✓	✓
	Jump - User Marker Position	Changes the display position to the user marker position.	✓	✓	✓
	Jump - Specified Data Number	Changes the display position to the position of the specified data number.	×	✓	✓

Menu bar	Menu command	Description	Availability of the Menu Item for Each Operation Status of LLA		
			Being executed	Paused	Stopped
View	Toolbar - Trace Operation	Select the visibility of the trace operation bar.	✓	✓	✓
	Toolbar - Graph Operation	Select the visibility of the graph operation bar.	✓	✓	✓
	Toolbar - Trace Information	Select the visibility of the trace information bar.	✓	✓	✓
	Toolbar - Status	Select the visibility of the status bar.	✓	✓	✓
	Trace Settings Window	Select the visibility of the trace settings window.	✓	✓	✓
	Graph Operation Window	Select the visibility of the graph operation window.	✓	✓	✓
	Set Display Condition	Opens the display setting window for displayed graphs.	✓	✓	✓
Trace Settings	New Trace Settings	Creates a new trace condition.	✓	✓	✓
	Load Last Execution Condition	Loads the last trace condition.	✓	✓	✓
	Load Trace Settings File	Loads a saved trace setup file (RTTS file).	✓	✓	✓
	Save to Trace Settings File - Save Condition for Trace Settings	Saves the trace settings.	✓	✓	✓
	Save to Trace Settings File - Save Condition for Displayed Graphs	Saves the trace settings for the currently displayed graphs.	✓	✓	✓
	Delete All Devices	Deletes the registrations of all devices specified in a trace condition.	✓	✓	✓
	Delete Device	Deletes the registrations of a device specified in a trace condition.	✓	✓	✓
	Increment Register	Performs sequential number registration for a device registered in the device settings.	✓	✓	✓
	Register by Reference to Tag Name Definitions	Opens a window for registering a device based on a common tag name definition.	✓	✓	✓*1
	Register by Reference to Modules	Opens a window for registering a device from a module configured in an FA-M3 system.	✓	✓	✓*1
	Retrieve Tag Names/Comments from WideField Project	Opens a project from which you want to obtain tag names and I/O comments.	✓	✓	✓*1
	Set WideField Project Reference	Opens a WideField project that is referred to from the LLA .	✓	✓	✓*1

Menu bar	Menu command	Description	Availability of the Menu Item for Each Operation Status of LLA		
			Being executed	Paused	Stopped
Online	Connect	Opens the Check Connection window for establishing connection to a CPU module.	×	×	✓ <sup>*2</sup>
	Disconnect	Opens a window for disconnecting connection to a currently connected CPU module.	✓	✓	✓ <sup>*1</sup>
	Start Tracing	Starts tracing.	×	×	✓
	Stop Tracing	Stops tracing.	✓	✓	×
	Pause Tracing	Pauses tracing.	✓	✓	×
	Communication Settings	Opens a window for configuring communication with a CPU module.	×	×	✓ <sup>*2</sup>
Graph Operation	Cursor View Settings - Show/Hide Cursors A & B	Select the visibility of cursors A and B.	×	✓	✓
	Cursor View Settings - Fix Width between Cursors A & B	Fixes the positions of cursors A and B.	×	✓	✓
	Cursor View Settings - Show/Hide Mark Cursor	Select the visibility of cursor M.	✓	✓	✓
	Cursor View Settings - Show/Hide Position Meeting Trace End Condition	Select the visibility of the position where the trace end condition is met.	✓	✓	✓
	Cursor View Settings - Show/Hide User Marker Positions	Select the visibility of user marker positions.	✓	✓	✓
	Cursor Movement - Move Cursor A Left	Moves cursor A to the left.	×	✓	✓
	Cursor Movement - Move Cursor A Right	Moves cursor A to the right.	×	✓	✓
	Cursor Movement - Move Cursor B Left	Moves cursor B to the left.	×	✓	✓
	Cursor Movement - Move Cursor B Right	Moves cursor B to the right.	×	✓	✓
	Cursor Movement - Move Mark Cursor Left	Moves the mark cursor to the left.	✓	✓	✓
	Cursor Movement - Move Mark Cursor Right	Moves the mark cursor to the right.	✓	✓	✓
	Zoom in X-axis	Zooms in the X-axis (horizontal direction) of the main graph. <sup>*3</sup>	✓	✓	✓
	Zoom out X-axis	Zooms out the X-axis (horizontal direction) of the main graph. <sup>*3</sup>	✓	✓	✓
	Zoom X-axis 100%	Sets the magnification of the X-axis (horizontal direction) of the main graph to 1 (no zoom-in/out).	✓	✓	✓

Menu bar	Menu command	Description	Availability of the Menu Item for Each Operation Status of LLA		
			Being executed	Paused	Stopped
Graph Operation	Specify Number of Data to Plot in Main Graph	Specify the number of data to plot for the X-axis direction in the main graph within the setting of the number of data points.	✓	✓	✓
	Display Zoomed-in Graph (Split)	Displays the main graph and the zoomed-in graph in two split windows.	✓	✓	✓
	Specify Number of Data to Plot in Zoomed-in Graph	Changes the number of data to plot for the X-axis direction in the zoomed-in graph.	✓	✓	✓
	Widen Display Frame for Zoomed-in Graph	Zooms in the X-axis (horizontal direction) of the zoomed-in graph.	✓	✓	✓
	Reduce Display Frame for Zoomed-in Graph	Zooms out the X-axis (horizontal direction) of the zoomed-in graph.	✓	✓	✓
	Move Zoomed-in Graph Right	Moves the display area in the zoomed-in graph to the right.	✓	✓	✓
	Move Zoomed-in Graph Left	Moves the display area in the zoomed-in graph to the left.	✓	✓	✓
	Tile Zoomed-in Graph Vertically	Tiles the main graph and zoomed-in graph vertically.	✓	✓	✓
	Tile Zoomed-in Graph Horizontally	Tiles the main graph and zoomed-in graph horizontally.	✓	✓	✓
	Display Graphs Overlaid	Overlays trace data plots.	✓	✓	✓
	Display Graphs In Parallel	Displays trace data plots separately.	✓	✓	✓
	Reset Range of Y-axis Auto Scaling Values	Initializes the scale based on the maximum and minimum values.	✓	✓	✓
	Select Legend Name - Address	Changes the address tag display to device addresses.	✓	✓	✓
	Select Legend Name - Tag Name	Changes the address tag display to registered tag names.	✓	✓	✓
	Select Legend Name - I/O Comment	Changes the address tag display to I/O comments.	✓	✓	✓
Log	None	Displays the log view window.	✓	✓	✓
Tools	Preferences	Specify the mark cursor display content, the ToolTip display setting, and the language.	✓	✓	✓
Help	Help	Displays the instruction manual.	✓	✓	✓
	About Live Logic Analyzer	Displays the version of the application.	✓	✓	✓

\*1: Only for online. \*2: Only for offline.

\*3: The origin for zooming-in/zooming-out for graphs has the following conditions.

<If a cursor is displayed in the main graph>

Zooming in and out is performed with the cursor at the center. If multiple cursors are displayed, they are given priority in the following order.

Cursor M > Cursor A > Cursor B > User Marker > Position Meeting Trace End Condition

<If there is no cursor displayed in the main graph>

If the main graph display position is at the left end, the left end becomes the origin for the zoom in/zoom out. If it is not at the left end, the center of the display becomes the origin for the zoom in/zoom out.



## CAUTION

- Even if tracing is paused, the tracing continues.
- To change the language, the LLA must be restarted.

## C2.2 List of Toolbar Items of the Live Logic Analyzer

The following icons represent the commands assigned to the menu bar.



- Open Trace Result File: Opens trace data saved in RTTD format.



- Save Trace Result File: Saves trace data in RTTD format. \*1



- Save File As CSV: Saves trace data in CSV format.



- New Trace Settings: Creates a new trace condition.



- Load Last Execution Condition: Loads the last trace settings.



- Load Trace Settings File: Opens a trace setup file saved in RTTS format.



- Save to Trace Settings File: Saves the current trace settings in RTTS format.



- Set Display Condition: Opens the display setting window for the trace settings or for displayed graphs.



- Communication Settings: Opens the communication setup window.



- Connect: Opens the communication confirmation window in which you can establish online connection.



- Disconnect: Opens the communication disconnection window in which you can disconnect online connection.



- Start Tracing: Starts tracing.



- Stop Tracing: Stops a trace that is currently being executed.



- Pause Tracing: Pauses tracing. \*1



- Display Zoomed-in Graph (Split): Displays the main graph and the zoomed-in graph in two split windows.



- Specify Number of Data to Plot in Zoomed-in Graph: Specify the number of data to plot for the X-axis direction in the zoomed-in graph.



- Widen Display Frame for Zoomed-in Graph: Widen the width of the zoomed-in graph when two split windows are displayed.



- Reduce Display Frame for Zoomed-in Graph: Reduce the width of the zoomed-in graph when two split windows are displayed.



- Move Zoomed-in Graph Left: Moves the display area of the zoomed-in graph to the left when two split windows are displayed.



- Move Zoomed-in Graph Right: Moves the display area of the zoomed-in graph to the right when two split windows are displayed.



- Tile Zoomed-in Graph Horizontally: Tiles the main graph and zoomed-in graph horizontally.





- Tile Zoomed-in Graph Vertically: Tiles the main graph and zoomed-in graph vertically.



- Specify Number of Data to Plot in Main Graph: Specify the number of data to plot for the X-axis direction in the main graph within the setting of the number of displayed data points.



- Zoom in X-axis: Increases the scale of the X-axis in the main graph. \*2



- Zoom out X-axis: Decreases the scale of the X-axis in the main graph. \*2



- Zoom X-axis 100%: Sets the magnification of the X-axis of the main graph to 1 (no zoom-in/out).



- Show/Hide Cursors A & B: Specify the visibility of cursors A and B, which can be displayed when tracing is stopped. When the cursors are displayed, the icon is displayed with an orange border.



- Fix Width between Cursors A & B: Fixes the positions of cursors A and B, which can be displayed when tracing is stopped. When the cursors are displayed at fixed positions, the icon is displayed with an orange border.



- Show/Hide Mark Cursor: Specify the visibility of the mark cursor, which can be displayed when tracing is stopped or being executed. When the cursor is displayed, the icon is displayed with an orange border.



- Show/Hide Position Meeting Trace End Condition: Specify the visibility of the cursor that indicates that the trace end condition is met. When the cursor is displayed, the icon is displayed with an orange border.



- Show/Hide User Marker Positions: Specify the visibility of the trigger cursor, which can be displayed when a user marker occurs. When the cursor is displayed, the icon is displayed with an orange border.

Select Legend Name ▾

- Select Legend Name: Select [Device (Address)], [Tag Name], or [I/O Comment] to change the display names of the traced devices that are displayed when tracing is stopped or being executed (note that when [Tag Name] or [I/O Comment] is selected but they are not specified in the Device tab, the names are not displayed).



- Display Graphs Overlaid: Overlays trace data plots.



- Display Graphs In Parallel: Displays trace data plots separately.



- Copy As Image: Copies the currently displayed chart screen as an image.



- Toolbar configuration: Specify the visibility of the toolbar icons.

\*1: Even if tracing is paused, the tracing continues.

\*2: The origin for zooming-in/zooming-out for graphs has the following conditions.

<If a cursor is displayed in the main graph>

Zooming in and out is performed with the cursor at the center. If multiple cursors are displayed, they are given priority in the following order.

Cursor M > Cursor A > Cursor B > User Marker > Position Meeting Trace End Condition

<If there is no cursor displayed in the main graph>

If the main graph display position is at the left end, the left end becomes the origin for the zoom in/zoom out. If it is not at the left end, the center of the display becomes the origin for the zoom in/zoom out.



## CAUTION

The data of the last trace settings is stored in the PC used for the last live logic analyzer function.

Therefore, when you connect a PC that has not been used for the last live logic analyzer function, even if you click [Load Last Execution Condition], the last settings are not displayed.

---

## C2.3 Starting the Live Logic Analyzer

To start the live logic analyzer from WideField3, use the following procedure.

### ◆ Procedure ◆

(1) Select [Tools] - [Live Logic Analyzer]

from the WideField3 menu bar.

⇒ The live logic analyzer starts.

### Note

---

You can start the live logic analyzer by double-clicking the [Live Logic Analyzer] shortcut in the "FA-M3 Application" directory, which is created on the desktop when WideField3 is installed.

---



# C3 Live Logic Analyzer Setup and Monitoring

Before executing a live logic analyzer function, configure necessary settings in the Device, Trace Condition, User Marker, and Graph Settings tabs of the Trace Settings tab.

After starting a trace, monitor the trace results in the Graph Operation & Data Reading tab and User Marker tab on the Graph Operation tab, and change the display method in the Graph Settings tab.

## C3.1 Trace Settings Tab

### ◆ Procedure ◆

- (1) Start the live logic analyzer from WideField3. Select [Tools] - [Live Logic Analyzer] from the menu bar. Alternatively, start the live logic analyzer from the [Live Logic Analyzer] shortcut in the "FA-M3 Application" folder on the desktop.

⇒ The live logic analyzer starts.

- (2) Configure necessary settings in the Device, Trace Condition, User Marker, and Graph Settings tabs of the Trace Settings tab.

### Note

If there is a problem in the settings, the relevant part is displayed in red and the trace cannot be executed.

### Note

For details of each setting, refer to the following:

"Device Tab (C3-3)"

"Trace Condition Tab (C3-13)"

"User Marker Tab (C3-16)"

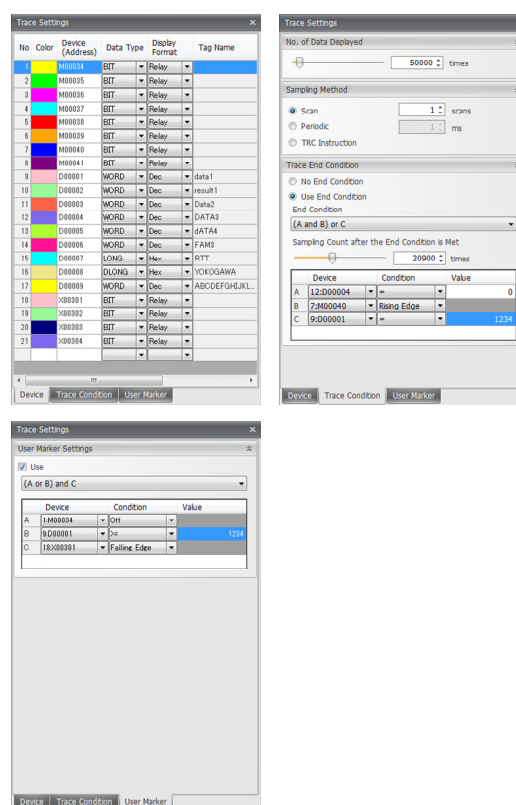
"Graph Settings Tab (C3-25)"

- (3) Click the [Start Tracing] button.

⇒ The trace starts and trace results are displayed.

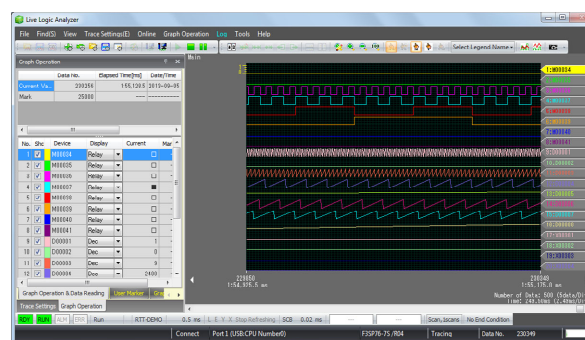
### Note

You can capture the screen that displays the trace results and also use Microsoft Excel to draw graphs.



Step (2)

C0301\_1.VSD



Step (3)

C0301\_2.VSD

## ■ Referring to a WideField3 Project from the Live Logic Analyzer

You can refer to a WideField3 project from the live logic analyzer.

When a project is referenced, the path to the reference project is displayed in the title bar of the live logic analyzer.

If a reference project in which device tag names and I/O comments have been registered is referenced, the tag names and I/O comments are automatically registered when devices are registered in the live logic analyzer.

There are two reference methods: automatic reference and manual reference.

### ● Automatic Reference of a WideField3 Project

When you open an offline project in WideField3, and then start the live logic analyzer, the online project is automatically referenced by the tool.

When the project is referenced, the path to the reference project is displayed in the title bar.

### ● Manual Reference of a WideField3 Project

- (1) Start the live logic analyzer without opening any online project in WideField3. After that, make the live logic analyzer and CPU module online.

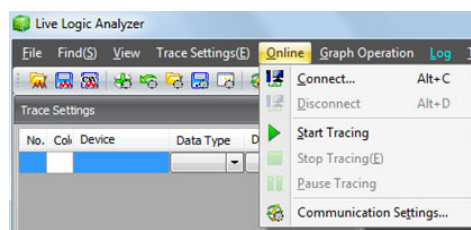
- (2) After making them online, select [Trace Settings] - [Set WideField Project Reference] from the menu bar of the live logic analyzer.

The Set Reference Project window opens. Select the project to be referenced.

- (3) After the reference project is selected, the path to the reference project is displayed in the title bar.

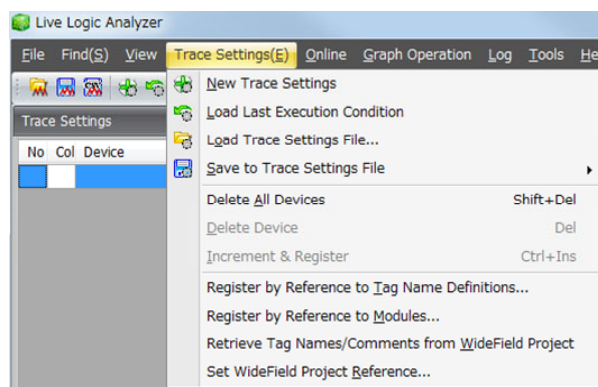
After that, whenever a device is registered in the live logic analyzer, tag names and I/O comments are automatically registered.

- (4) When you want to display the tag names and I/O comments of a device that has been registered before you specify manual reference of the project, select [Trace Settings] - [Retrieve Tag Names/Comments from WideField Project] after step (3). Then, the tag names and I/O comments are loaded from the WideField3 project and registered.



Step (1)

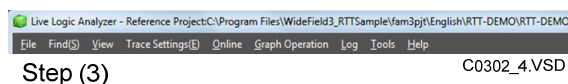
C0302\_1.VSD



C0302\_2.VSD

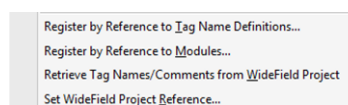
Step (2)

C0302\_3.VSD



Step (3)

C0302\_4.VSD



Step (4)

C0302\_5.VSD

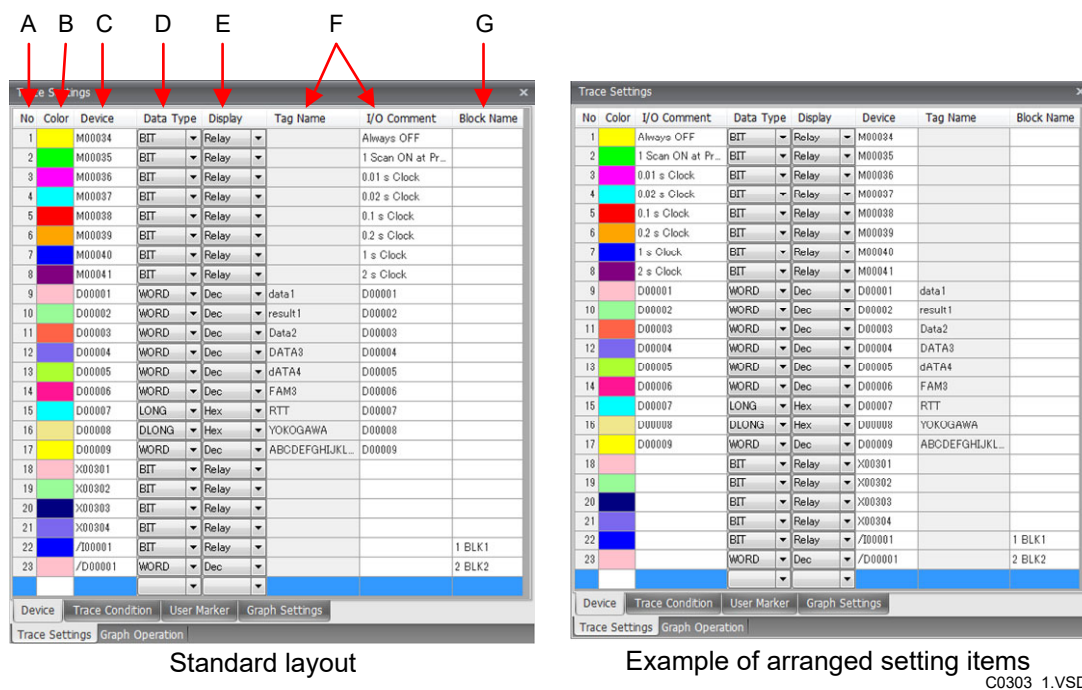
## ■ Device Tab

In the Device tab, you can register devices to be traced. You can register up to 64 points of bit devices and up to 32 points of word devices. There are three registration methods as follows:

- Registration by manual input
- Registration by reference to tag name definitions
- Registration by reference to I/O modules

In this tab, you can select the data type and display format for each registered device.

You can change the display order of the columns of the device setting items (Color/Device (Address)/Data Type/Display Format/Tag Name/I/O comment/Block Name) and also the order of registered devices (addresses) by dragging them.



**Figure C3.1.1 Device Tab**

- A) No.  
Displays the sequential numbers of registered devices.
- B) Color  
Displays the waveform colors of registered devices. To change the waveform color, double-click the relevant cell and change the color in [Display Color] on the opened Edit Device window.
- C) Device (Address)  
Displays the entered addresses of registered devices. The following devices can be registered.
- CPU internal relays: X, Y, I, E, L, T, C, M
  - CPU internal registers: D, B, R, W, V, Z, T, C, F
  - Local devices: /I, /D, /B, /F, /T, /C
  - Registers of advanced function I/O modules

When you register a register of an advanced function I/O module, for example, to monitor a register at the data position number 10 in Slot 7 on Unit 2, enter "[207]0010" for [Device (Address)] (where the number in the square brackets represents the slot number and the subsequent four-digit number represents the data position number).



## CAUTION

- You cannot register macro devices (H, A).
- You cannot specify structure member names for tag names.
- If there are a large number of registered points, some trace results may not be displayed.

### D) Data Type

You can select [BIT], [WORD], [LONG], or [DLONG] for the type of obtained data.

### E) Display Format

You can select one of the following scale display formats suitable for the data type of obtained data.

**Table C3.1.1 Data Type and Display Format by Device**

Device	Data Type	Available Display Formats
Bit device	BIT	Relay
	WORD	Dec/U-Dec/Hex/U-Hex/ Bit0 ~15
	LONG	Dec/U-Dec/Hex/U-Hex/ Float/Bit0~31
Word device	WORD	Dec/U-Dec/Hex/U-Hex/ Bit0~15
	LONG	Dec/U-Dec/Hex/U-Hex/ Float/Bit0~31
	DLONG	Dec/U-Dec/Hex/U-Hex/Double

### (F) Tag Name, I/O Comment

You can enter I/O comments using the keyboard.

When tag names and I/O comments have already been registered in a project referenced by the live logic analyzer, if you register devices by dragging and dropping or copying and pasting the devices from the ladder monitor or by copying and pasting the devices from tag name definitions in WideField3, the tag names and I/O comments are also registered at the same time.

### (G) Block Name

Displays the blocks of registered local devices.

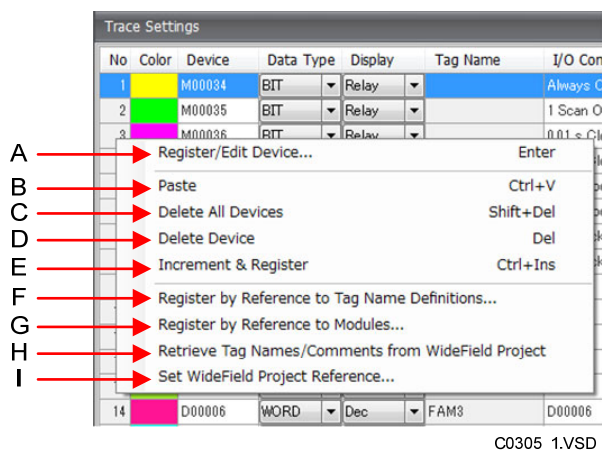


## CAUTION

- Changes in device settings that are made during a trace are not reflected in the settings of the trace.
- To automatically register tag names and I/O comments by dragging and dropping or copying and pasting operations, you must start WideField3 and open the project offline or refer to the project using the live logic analyzer.
- If I/O comments are described in both common tag name definitions and block tag name definitions, the I/O comments specified in the reference tag name definitions in the local device properties are displayed preferentially. Also, when multiple I/O comments are registered, only the I/O comments that you set to active by selecting [Display I/O Comment] are displayed.
- When you specify any one of [Bit:0] to [Bit:31] for [Display Format], you can specify the specific bit of a register device as a trace target.



When you point and right-click on the Device tab with the mouse, the following right-click menu is displayed.



**Figure C3.1.2 Right-click Menu on the Device Tab**

- A) Register/Edit Device  
Opens the Edit Device window. For details on the Edit Device window, see "Registration Using the Edit Device Window" in this section.
- B) Paste  
Pastes the item copied to the clipboard into the Device (Address) column.
- C) Delete All Devices  
Deletes all registered devices to be traced.
- D) Delete Device  
Deletes the selected device to be traced.
- E) Increment & Register  
Performs sequential number registration for the selected device.
- F) Register by Reference to Tag Name Definitions  
Opens the Register by Reference to Tag Name Definitions window. For details on the Register by Reference to Tag Name Definitions window, see "Input Procedure by Reference to Tag Name Definitions" in this section.
- G) Register by Reference to Modules  
Opens the Register by Reference to Modules window. For details on the Register by Reference to Modules window, see "Input Procedure by Reference to I/O Modules" in this section.
- H) Retrieve Tag Names/Comments from WideField Project  
When a project is referenced from the live logic analyzer, tag names and I/O comments are obtained from the reference project.
- I) Set WideField Project Reference  
Set the project you want to reference from the live logic analyzer.

## ◆ Manual Input Procedure ◆

### ■ Registration from the Keyboard

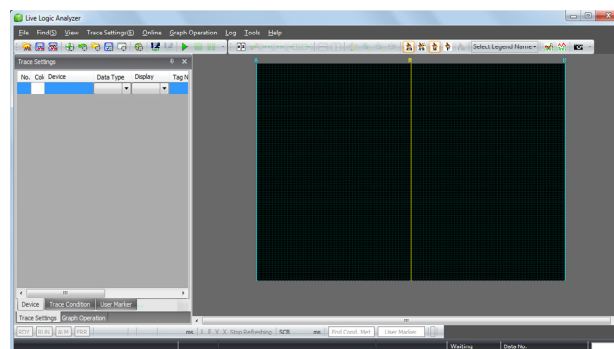
(1) Open the Device tab from the Trace Settings tab.

(2) In the [Device (Address)] column, click a text box you want to enter a device.

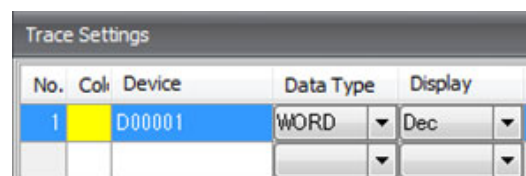
(3) Enter the device to be traced using the keyboard.

⇒ The data type and display format of the registered device are entered.

(4) Modify the data acquisition type (Data Type) and the display format (Display Format) of the values of the registered device, as needed.

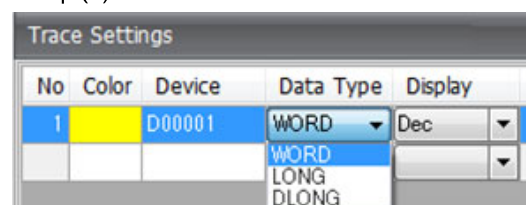


C0306\_1.VSD

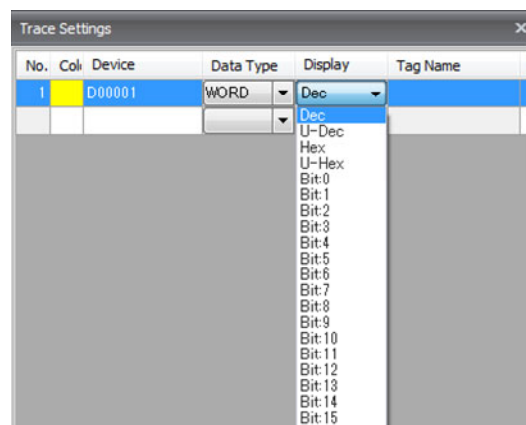


Step (3)

C0306\_2.VSD



C0306\_3.VSD



Step (4)

C0306\_4.VSD

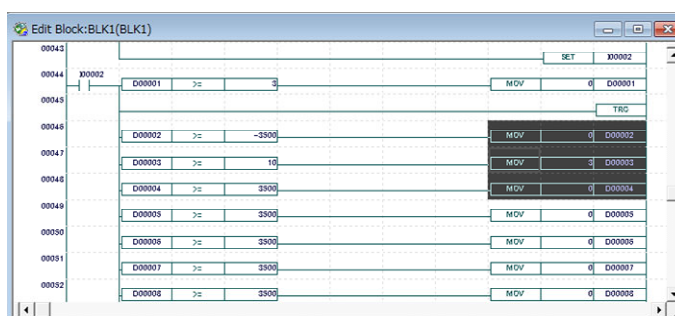
## ■ Registration by Dragging and Dropping or Copying and Pasting Operations

Registration by dragging and dropping operations can be performed only from ladder blocks in a WideField3 project.

Registration by copying and pasting operations can be performed from ladder blocks and common tag name definitions/block tag name definitions in a WideField3 project.

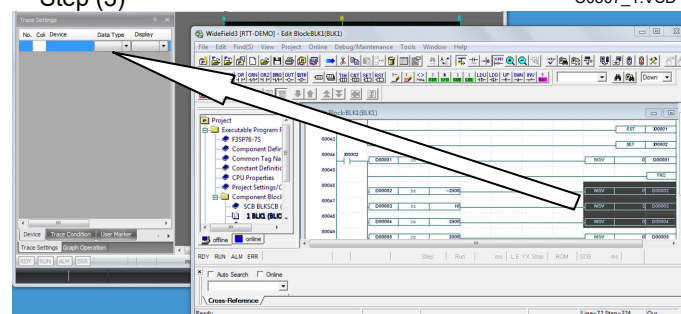
### - Registration by Dragging and Dropping Operations

- (1) Start WideField3 and the live logic analyzer.
- (2) In WideField3, open a project stored in the CPU module.  
Then, open a block in which the devices you want to register are used.
- (3) Select an instruction segment that contains the devices you want to register.
- (4) While holding down the [Alt] key on the key board, move the mouse cursor to the selected segment, and click the left mouse button. Then, you can drag the selected segment.
- (5) Drag and drop the selected segment to [Device (Address)] on the Device tab in the Trace Settings tab of the live logic analyzer.
- (6) The devices in the dragged and dropped segment are registered as the target devices of the live logic analyzer.



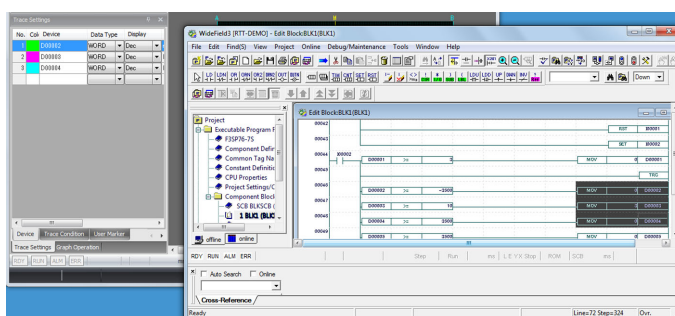
Step (3)

C0307\_1.VSD



Steps (4) and (5)

C0307\_2.VSD



Step (6)

C0307\_3.VSD



### CAUTION

Even if you drag and drop to register items from a block tag name definitions, the block name is not registered. If you want to register the block name, register the device from the Edit Device window.

## - Registration by Copying and Pasting Operations

- (1) Start WideField3 and the live logic analyzer.
- (2) When you register devices from a block, in WideField3, from a project stored in the CPU module, open a block in which the devices you want to register are used.

When you register devices from a common tag name definition or block tag name definition, open a common tag name definition or block tag name definition.

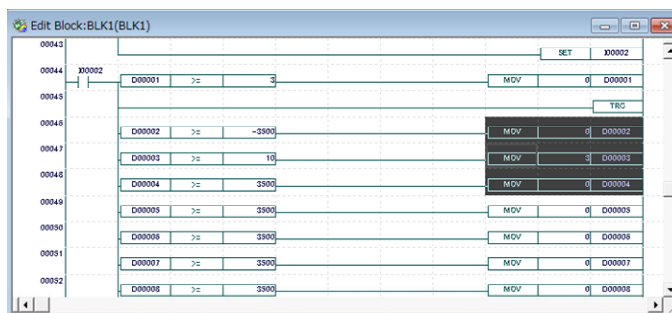
- (3) To register devices from a block, select an instruction segment that contains the devices you want to register.

To register devices from a common tag name definition or block tag name definition, select a segment that contains the names of the devices you want to register.

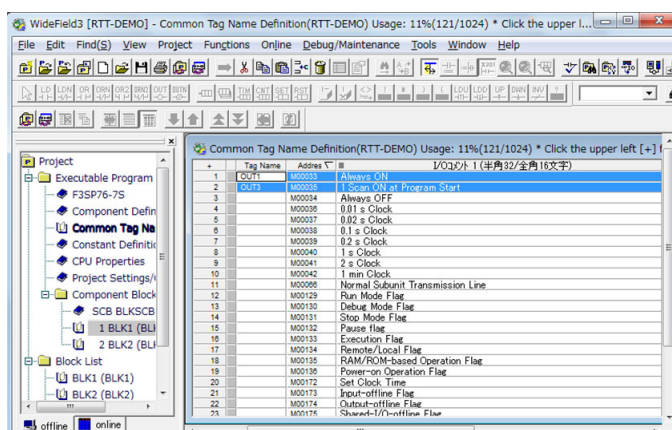
After selecting the segment, press the [Ctrl] + [C] keys on the keyboard to copy the selected segment.

- (4) Select [Device (Address)] on the Device tab in the Trace Settings tab of the live logic analyzer, and press the [Ctrl] + [V] keys on the keyboard.

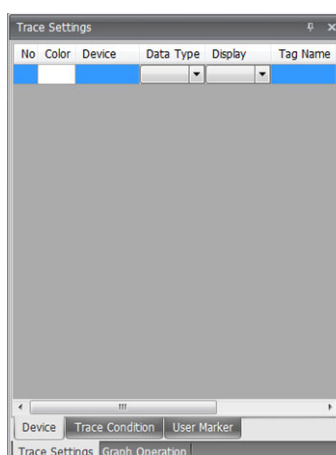
- (5) The devices in the copied segment are registered as the target devices of the live logic analyzer.



C0308\_1.VSD

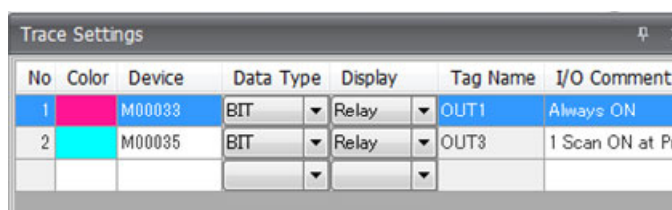


C0308\_2.VSD



Step (3)

C0308\_3.VSD



Step (4)

C0308\_4.VSD



### CAUTION

Even if you copy and paste to register items from a block tag name definitions, the block name is not registered. If you want to register the block name, register the device from the Edit Device window.

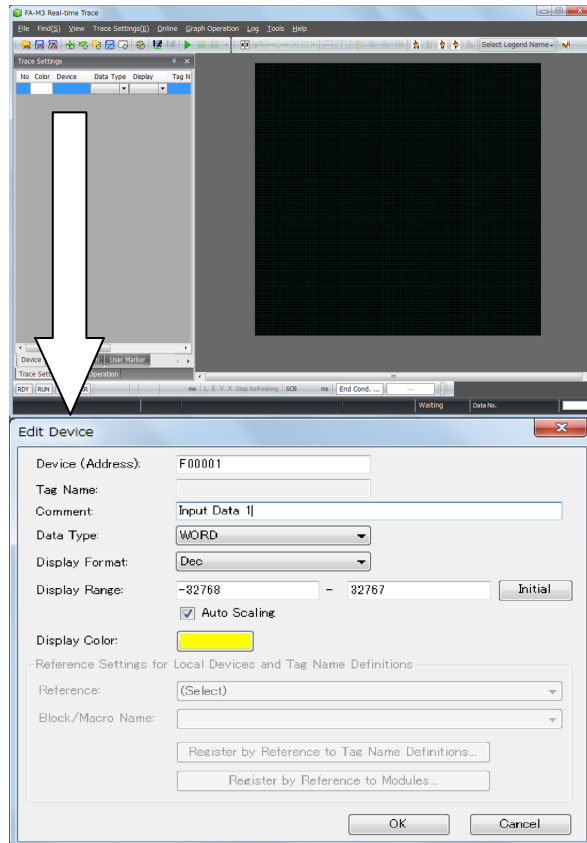
## ■ Registration Using the Edit Device Window

- (1) Make the live logic analyzer and CPU module online, and in the Device tab, double-click a row in which no device is registered. The Edit Device window opens.
- (2) Enter the address you want to trace in [Device (Address)] on the Edit Device window using the keyboard or select devices from [Register by Reference to Tag Name Definitions] or [Register by Reference to Modules].

### Note

For details on device registration from [Register by Reference to Tag Name Definitions] or [Register by Reference to Modules], see "Input Procedure by Reference to Tag Name Definitions (C3-10)" and "Input Procedure by Reference to I/O Modules(C3-12)."

- (3) After specifying the devices you want to monitor and I/O comments, and configuring display settings, click [OK] to apply the settings to the Device tab.



Step (1)

C0309\_1.VSD

Trace Settings						
No	Color	Device	Data Type	Display	Tag Name	I/O Comment
1		F00001	WORD	Dec		Input Data 1

Step (3)

C0309\_2.VSD

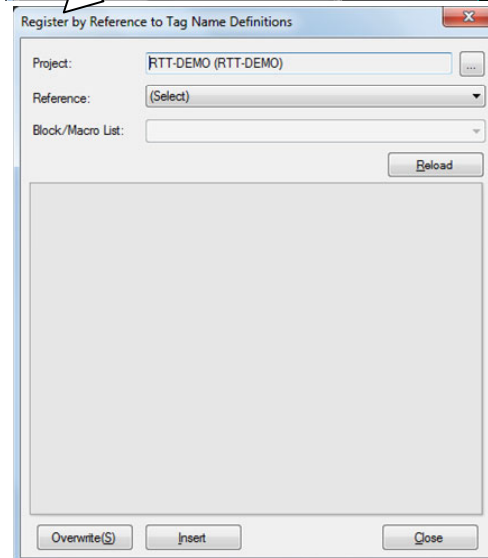
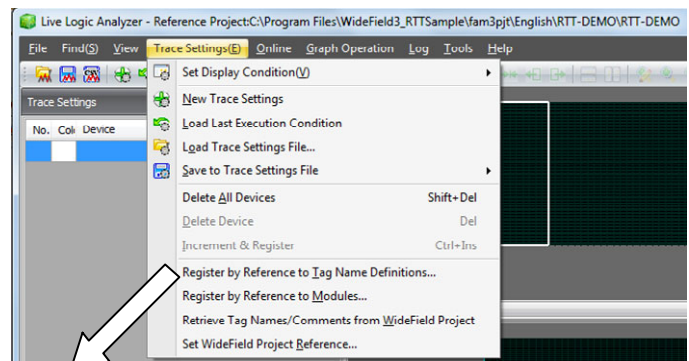
## ◆ Input Procedure by Reference to Tag Name Definitions ◆

### - Procedure When a Project Is Opened in WideField3

- (1) Open the project to be used in WideField3.
- (2) Make the live logic analyzer and CPU module online. After making them online, the name of the project opened in step (1) is displayed as the reference project in the title bar of the live logic analyzer.
- (3) Select [Register by Reference to Tag Name Definitions], which is now available in the [Trace Settings] menu on the menu bar. Then, the [Register by Reference to Tag Name Definitions] window is displayed.
- (4) From the [Reference] drop-down list, select [Common Tag Name Definition], [Block (Block Tag Name Definition)], or [Macro (Macro Tag Name Definition)] as the type of the tag name definitions in which the tag names of the devices you want to trace are registered. Then, the tag name definitions are displayed in a list. When you select [Block (Block Tag Name Definition)] or [Macro (Macro Tag Name Definition)], select a block or macro in which the devices you want to register are used, from [Block/Macro List].
- (5) After selecting a device you want to register, click [Overwrite] or [Insert] to register it. Multiple devices can be selected and registered at once.

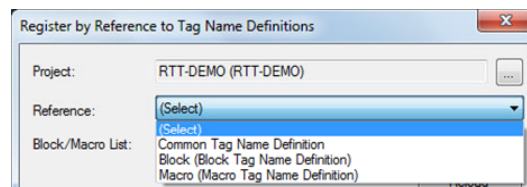
### Note

Clicking the [Overwrite] button overwrites the device selected in the Device tab with the selected device. Clicking the [Insert] button adds the selected device below the device selected in the Device tab.



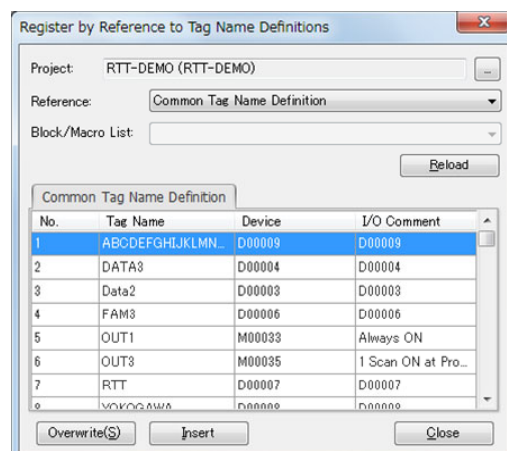
Step (3)

C0310\_1.VSD



Step (4)

C0310\_2.VSD



Step (5)

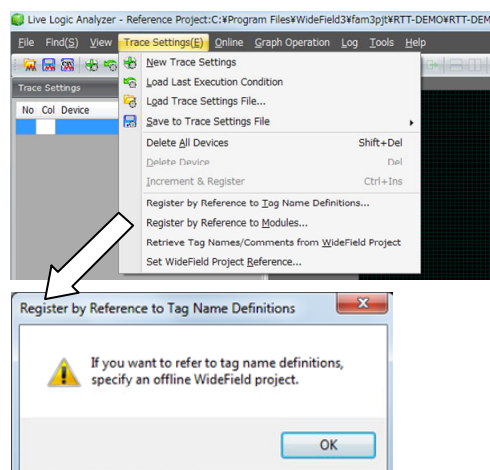
C0310\_3.VSD



## - Procedure When a Project Is Not Opened in WideField3

- (1) Make the live logic analyzer and CPU module online.

After making them online, select [Register by Reference to Tag Name Definitions], which is now available in the [Trace Settings] menu on the menu bar. Then, the [Register by Reference to Tag Name Definitions] window is displayed. At this time, a warning message appears to prompt you to open a project, and click [OK].

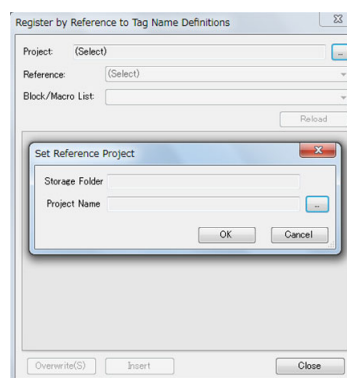


Step (1)

C0311\_1.VSD

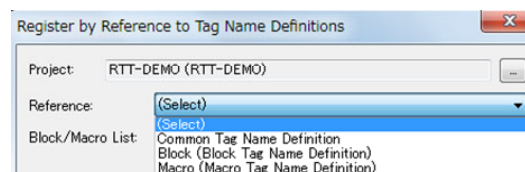
- (2) Select a project to be referenced, by clicking the reference button for [Project].

After that, from the [Reference] drop-down list, select [Common Tag Name Definition], [Block (Tag Name Definition)], or [Macro (Macro Tag Name Definition)] as the type of the tag name definitions in which the tag names of the devices you want to trace are registered. Then, the tag name definitions are displayed in a list. When you select [Block (Block Tag Name Definition)] or [Macro (Macro Tag Name Definition)], select a block or macro in which the devices you want to register are used, from [Block/Macro List].



C0311\_2.VSD

- (3) After selecting a device you want to register, click [Overwrite] or [Insert] to register it.

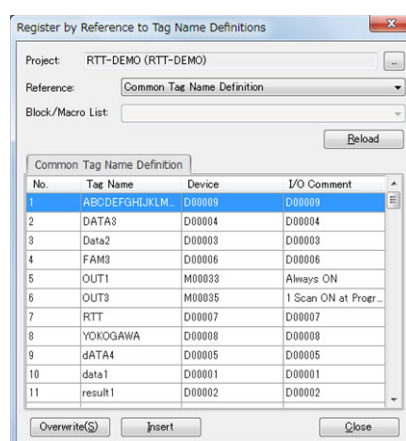


Step(2)

C0311\_3.VSD

## Note

Clicking the [Overwrite] button overwrites the device selected in the Device tab with the selected device. Clicking the [Insert] button adds the selected device below the device selected in the Device tab.



Step (3)

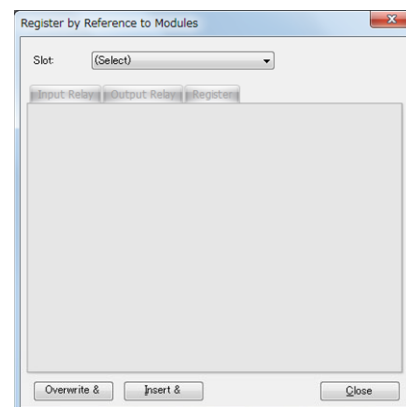
C0311\_4.VSD

## ◆ Input Procedure by Reference to I/O Modules ◆

- (1) Make the live logic analyzer and CPU module online
- (2) Select [Register by Reference to Modules], which is now available in the [Trace Settings] menu on the menu bar. Then, the [Register by Reference to Modules] window is displayed.
- (3) Open the [Slot] list box, which lists I/O modules that are connected and used in the FA-M3 system configuration.
- (4) Select the module that contains the tag names of the devices to be traced. Then, a list of devices is displayed.
- (5) After selecting a device you want to register, click [Overwrite] or [Insert] to register it.

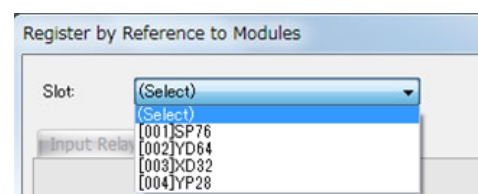
### Note

Clicking the [Overwrite] button overwrites the device selected in the Device tab with the selected device. Clicking the [Insert] button adds the selected device below the device selected in the Device tab.



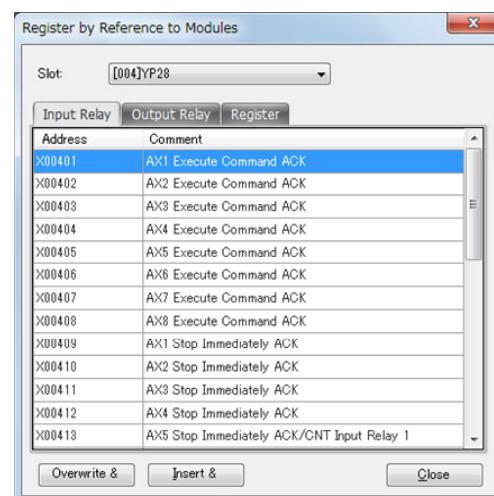
Step (2)

C0312\_1.VSD



Step (3)

C0312\_2.VSD



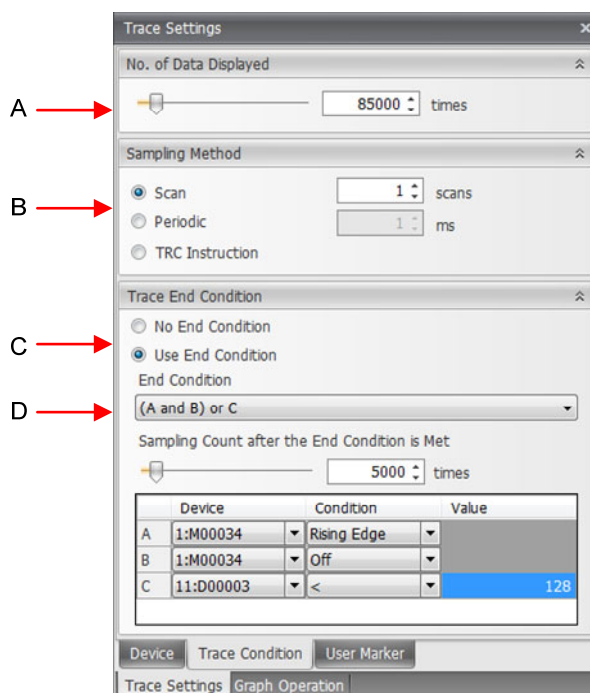
Step (4)

C0312\_3.VSD



## Trace Condition Tab

You can specify the trace data sampling method, the number of collected data points to be displayed, and the trace end condition.



C0313\_1.VSD

Figure C3.1.3 Trace Condition Tab

### A) No. of Data Displayed

Specify the number of collected trace data points displayed in the main graph. You can specify it by directly entering the value or by operating the slider.

The live logic analyzer can hold old data (including the last obtained data) as many as the value specified for [No. of Data Displayed].

### B) Sampling Method

You can select one of the following:

- Scan: Every 1 to 1,000 scans  
Data is collected at the scan end after the specified number of scans.  
Data collection is stopped when the CPU operating mode is Stop mode.
- Periodic: 1ms to 2,000ms (in 1ms increments)  
Data is collected at the scan end after the specified time passes.  
When this sampling method is used, data collection continues even if the CPU operating mode is Stop mode.
- TRC Instruction  
Data is collected when a TRC instruction is executed during execution of a ladder program.  
TRC instructions can be used also in sensor control blocks (SCBs).  
Data collection is stopped when the CPU operating mode is Stop mode.

## Note

The behavior of each sampling method is the same as of sampling trace. For details on operation timing, see Section B3.3, "Setup of Sampling Method."



## CAUTION

- Changes in the trace condition that are made during a trace are not reflected in the settings of the trace.
- In a sampling trace, when you select [Periodic] for the sampling method, even if the CPU module is stopped, data collection continues.
- When you execute LLA with TRC instructions, the number that can be used varies depending on your PC environment and program size. If executing LLA with the maximum number of TRC instructions, use one TRC instruction per approx. 0.1ms of scan time.
- If tracing the register of a direct module through the advanced I/O or FA path, scan time of I/O access is calculated per trace number.

### C) Use End Condition/No End Condition

When you select [No End Condition], tracing continues until you stop it.  
When you select [Use End Condition], you can specify [End Condition].

### D) End Condition

Specify a trace end condition based on the statuses of registered devices.  
The following tables show the end conditions and the conditions to be met on devices.

**Table C3.1.2 List of End Condition**

End Condition	Description
Stop after acquiring enough for no. of data displayed	Data is collected as many times as specified for [No. of Data Displayed] and tracing ends.
A Only	Tracing ends when the end condition A is met.
A and B	Tracing ends when the end conditions A and B are met.
A or B	Tracing ends when the end condition A or B is met.
A and B and C	Tracing ends when the end conditions A, B, and C are met.
(A and B) or C	Tracing ends when both the end conditions A and B are met or when the end condition C is met.
(A or B) and C	Tracing ends when the end condition A or B is met and the end condition C is met.
A or B or C	Tracing ends when the end condition A, B, or C is met.

Condition	Description
ON/OFF	The condition is met when a target device (relay device) for the end condition is ON or OFF.
Rising Edge/ Falling Edge	The condition is met when a target device (relay device) for the end condition is at rising edge or falling edge.
=	The condition is met when a target device (register device) for the end condition has the same value as the value specified for [Value].
!=	The condition is met when a target device (register device) for the end condition has a value different from the value specified for [Value].
>	The condition is met when a target device (register device) for the end condition has a value greater than the value specified for [Value].
>=	The condition is met when a target device (register device) for the end condition has a value greater than or equal to the value specified for [Value].
<	The condition is met when a target device (register device) for the end condition has a value less than the value specified for [Value].
<=	The condition is met when a target device (register device) for the end condition has a value less than or equal to the value specified for [Value].

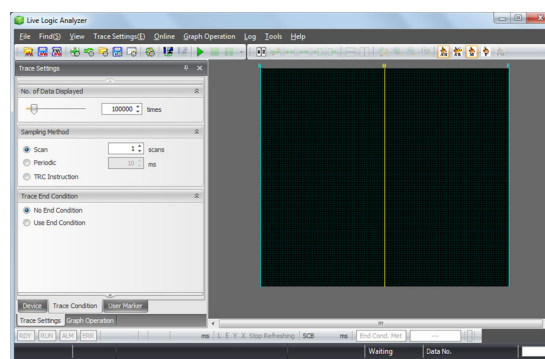
### - Sampling Count after the End Condition is Met

After the trace end condition is met, sampling is performed the specified number of times and tracing ends.

You can specify the number of times by directly entering the value or by operating the slider. The maximum value is the number of data points to be displayed.

## ◆ Procedure ◆

- (1) Open the Trace Condition tab from the Trace Settings tab.
- (2) Specify [No. of Data Displayed].
- (3) Select [Scan], [Periodic], or [TRC Instruction] for [Sampling Method].
- (4) Specify [Trace End Condition] as needed.



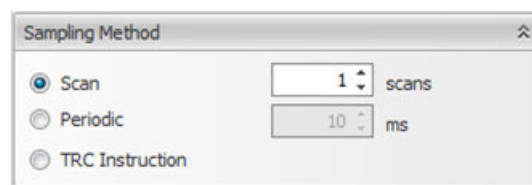
Step (1)

C0315\_1.VSD



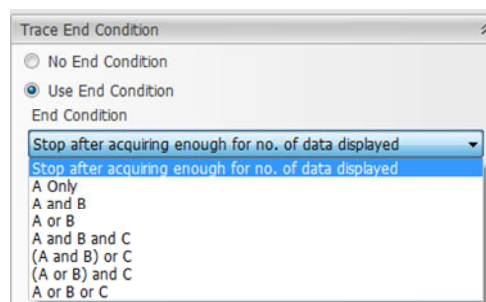
Step (2)

C0315\_2.VSD

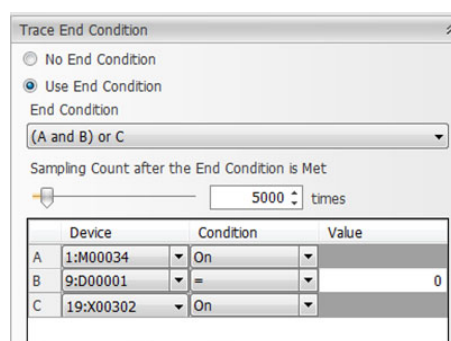


Step (3)

C0315\_3.VSD



C0315\_4.VSD

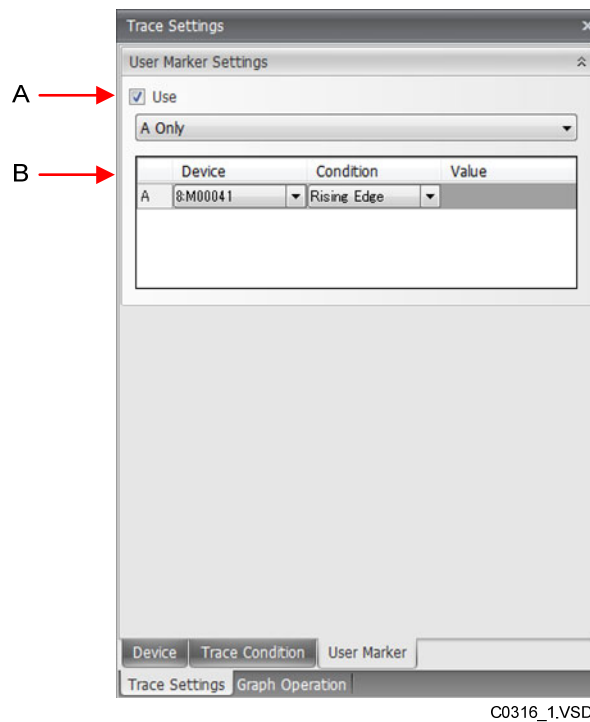


Step (4)

C0315\_5.VSD

## ■ User Marker Tab

You can specify the user marker settings in this screen. When a specified device status occurs during a trace, a marking is displayed on the main graph or zoomed-in graph to indicate the position where the status occurs.



C0316\_1.VSD

**Figure C3.1.4 User Marker Tab**

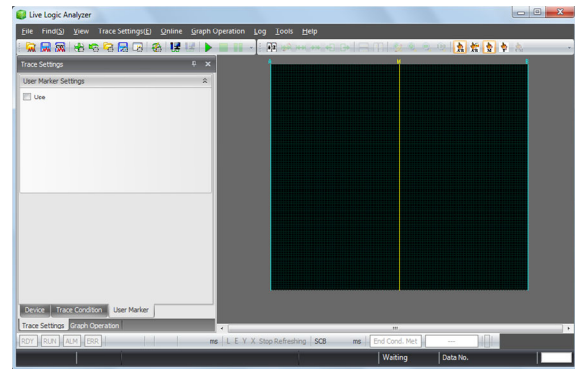
- A) Use  
Turn on the checkbox when you specify the user marker.
- B) User marker display condition  
Specify the device statuses you want to detect by combining the statuses of registered devices.  
After tracing starts, when the specified condition is met, a "U" mark is displayed at the top of the chart to indicate the relevant position in the main graph or zoomed-in graph.

## ◆ Procedure ◆

- (1) Open the User Marker tab from the Trace Settings tab.
- (2) Turn on the [Use] checkbox.
- (3) Specify the user marker display condition.

### Note

For details on the behavior of the user marker, see Section C4.6, "User Marker Function."

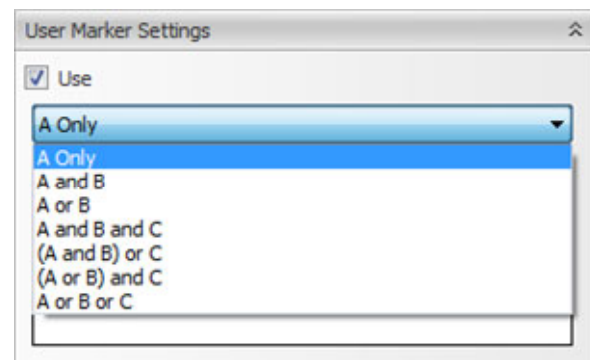


C0317\_1.VSD

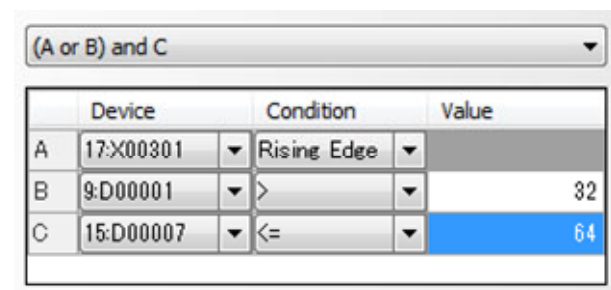


C0317\_2.VSD

Step (2)



C0317\_3.VSD



Step (2)

C0317\_4.VSD

## C3.2 Graph Operation Tab

### ◆ Procedure ◆

(1) Configure the settings for the live logic analyzer function in the Trace Settings tab, start tracing, and select the Graph Operation tab.

(2) Monitor the trace status in the Graph Operation & Data Reading tab and the User Marker tab. Change the display settings in the Graph Settings tab.

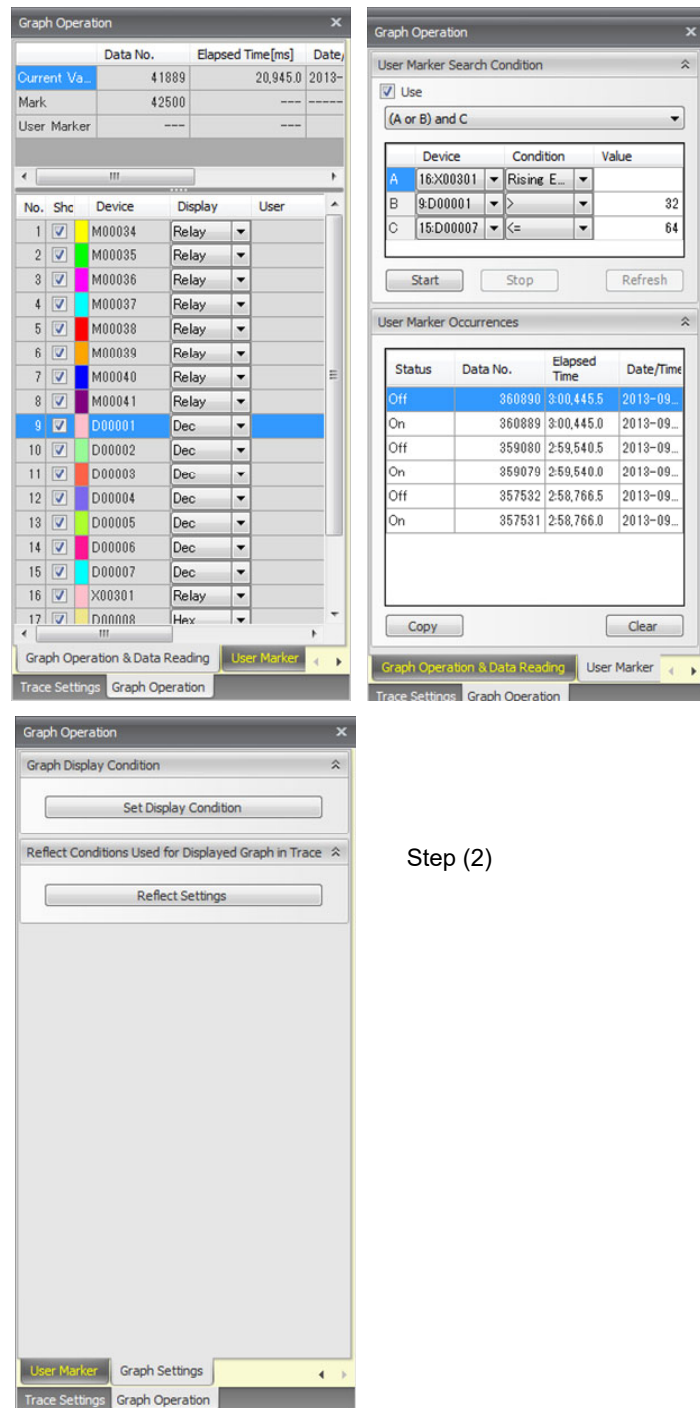
### Note

For details of each setting, refer to the following in this section:

"Graph Operation & Data Reading Tab"

"User Marker Tab"

"Graph Settings Tab"



Step (2)

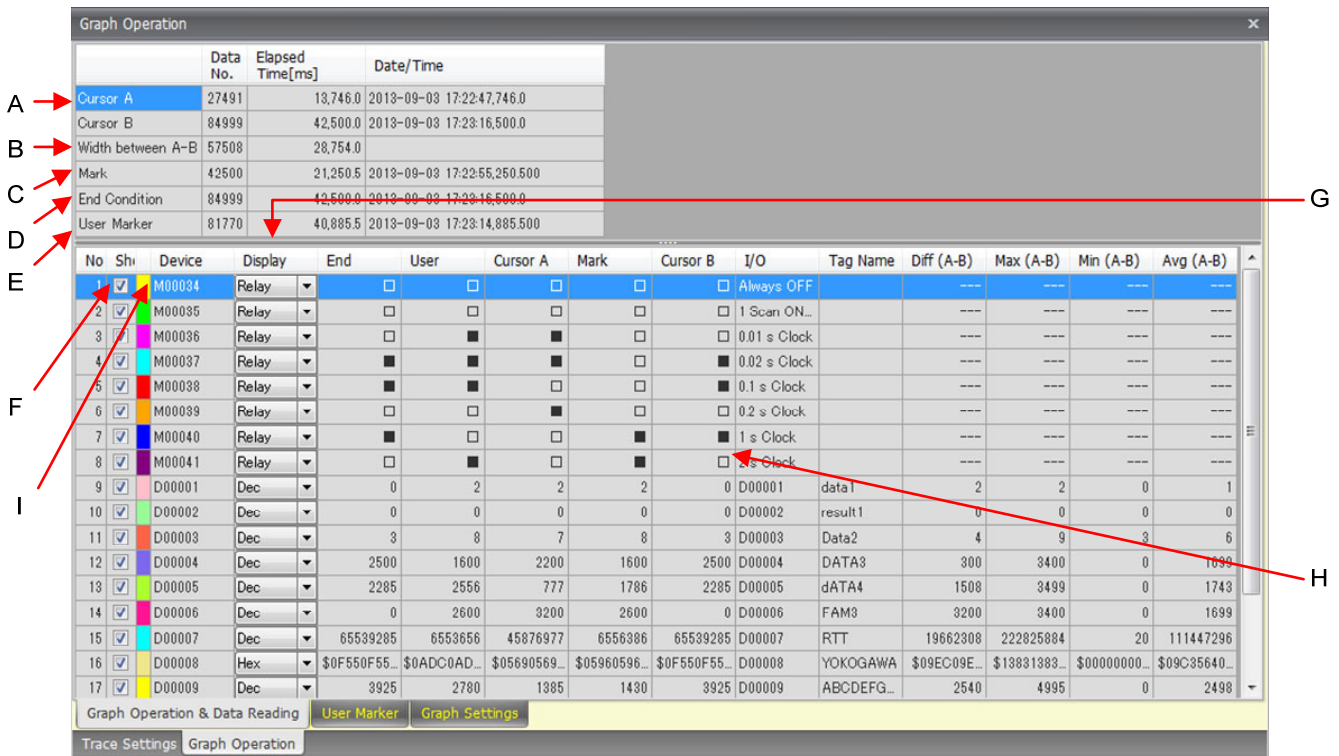
C0318\_1.VSD

## ■ Graph Operation & Data Reading Tab

You can monitor the status of each target device that is being traced, and change the data display format.

The displayed contents vary depending on whether tracing is being executed or stopped.

### - Graph Operation & Data Reading Tab When Tracing Is Stopped



C0319\_1.VSD

Figure C3.2.1 Graph Operation & Data Reading Tab When Tracing Is Stopped

#### A) Cursors A/B

Displays the data number, the elapsed time after tracing started, and the date and time at the position of cursor A or B in the main graph and zoomed-in graph.

#### B) Width between A-B

Displays the number of data and the elapsed time between cursors A and B in the main graph and zoomed-in graph.

#### C) Mark

Displays the data number, the elapsed time after tracing started, and the date and time at the position of cursor M in the main graph and zoomed-in graph.

#### D) End Condition

Displays the data number, the elapsed time after tracing started, and the date and time at the time when cursor T occurs (that is, the trace end condition is met) in the main graph and zoomed-in graph.

#### E) User Marker

Displays the data number, the elapsed time after tracing started, and the date and time at the time when cursor U occurs (that is, the user marker condition is met) in the main graph and zoomed-in graph.

- 
- F) Show  
Turn on the checkbox to display the waveform in the main graph and zoomed-in graph. Turn off the checkbox to hide the waveform.
  - G) Display Format  
Select the display format of the display data. For details on the display format, refer to the display settings of the Device tab ("Display Format").
  - H) Device data display area  
Displays the data of each registered device at the positions of cursors A, B, M, the position where the end condition is met, and the position of the user marker for the registered device.  
The difference, maximum value, minimum value, and average between cursors A and B are also displayed.
  - I) Color  
Double-click to display the [Color] window, which you can use to change the color of the displayed waveform.

## Note

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The position of each display item in the table can be changed by dragging and dropping the item.

---



- Graph Operation & Data Reading Tab When Tracing Is Being Executed

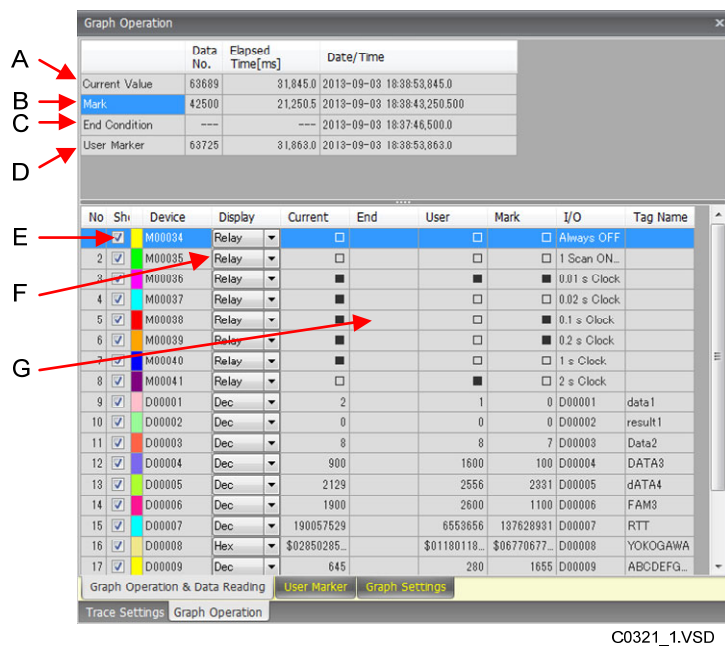


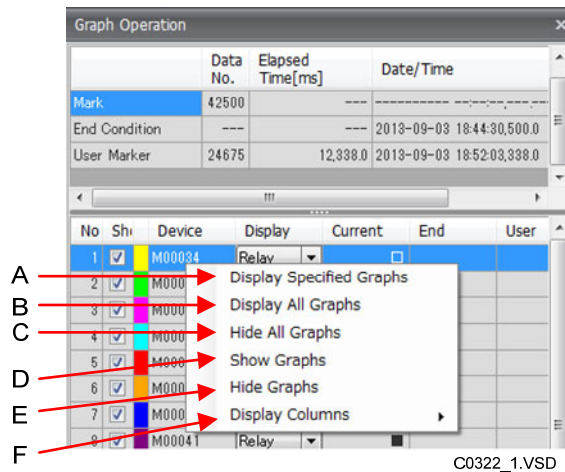
Figure C3.2.2 Graph Operation & Data Reading Tab When Tracing Is Being Executed

- A) Current Value  
Displays the data number, the elapsed time after tracing started, and the date and time of the latest data displayed in the main graph.
- B) Mark  
Displays the data number, the elapsed time after tracing started, and the date and time at the position of cursor M in the main graph and zoomed-in graph.
- C) End Condition  
Displays the data number, the elapsed time after tracing started, and the date and time at the time when cursor T occurs (that is, the trace end condition is met) in the main graph and zoomed-in graph.
- D) User Marker  
Displays the data number, the elapsed time after tracing started, and the date and time at the time when cursor U occurs (that is, the user marker condition is met) in the main graph and zoomed-in graph.
- E) Checkbox  
When the checkbox on the left of a device name is turned off, the waveform of the device is not displayed in the main graph and zoomed-in graph.
- F) Display Format  
Select the display format of the display data. For details on the display format, refer to the display settings of the Device tab ("Display Format").
- G) Device data display area  
Displays the data of each registered device at the positions of cursor M, the position where the end condition is met, and the position of the user marker for the registered device.

## Note

The position of each display item in the table can be changed by dragging and dropping the item.

When you point and right-click on the Device tab with the mouse, the following right-click menu is displayed.



**Figure C3.2.3 Right-click Menu on the Graph Operation & Data Reading Tab**

- A) Display Specified Graphs  
Displays only the waveforms of specified devices.
- B) Display All Graphs  
Displays all waveforms of registered devices.
- C) Hide All Graphs  
Hide all the displayed waveforms of devices.
- D) Show Graphs  
Additionally displays the waveforms of specified devices.
- E) Hide Graphs  
Hides the waveforms of specified devices.
- F) Display Columns  
Specify the visibility of the [Device (Address)], [Tag Name], and [I/O Comment] columns.

## ■ User Marker Tab

When a specified event occurs during a trace, you can display a marking on the main graph and zoomed-in graph to indicate the position where the event occurs.

Changes in the user marker condition on this tab can be reflected to the trace that is being executed.

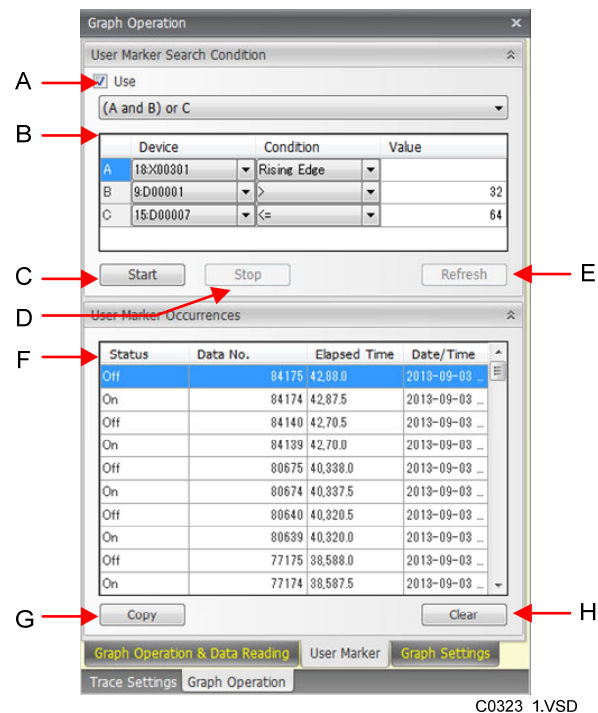


Figure C3.2.4 User Marker Tab

- A) Use  
Turn on the checkbox when you use the user marker.
- B) User Marker Search Condition  
Specify an event you want to detect by combining the statuses of registered devices (the setting items are the same as of the trace end condition). When the condition is met, a "U" mark is displayed at the relevant position in the main graph and zoomed-in graph.
- C) Start  
Starts the user marker. Click this button to start the user marker again after you stop the user marker by clicking the [Stop] button. The user marker condition specified before you click [Start] is enabled.
- D) Stop  
Stops the user marker. This also stops displaying the user marker and recording user marker occurrences.
- E) Refresh  
Updates the user marker display condition with the specified condition.

## F) User Marker Occurrences

When the specified user marker condition is met, [On] is displayed for [Status], and the data number, the elapsed time after the live logic analyzer started, and the date and time at the time when the condition is met are displayed. After the specified user marker condition is met, when the condition is cleared, [Off] is displayed for [Status], and the data number, the elapsed time after the user marker started, and the date and time at the time when the condition is cleared are displayed. When you click [On] or [Off] in the [User Marker Occurrences] table, the display center of each of the main graph and zoomed-in graph is moved to the data position where the relevant event occurred.

## G) Copy

Copies the information logged in the [User Marker Occurrences] table to the clipboard.

## H) Clear

Clear the information logged in the [User Marker Occurrences] table.

**CAUTION**

- The number of old data that the live logic analyzer can hold is [No. of Data Displayed]. Some data in the [User Marker Occurrences] table do not remain in the analyzer and even if you click [On] or [Off] for such data, you cannot jump to the data position in the main graph and zoomed-in graph.
- If [On] and [Off] for the user marker occur 10 times successively within 100ms, the user marker function stops and the trace is paused. In this case, the following message is displayed in the dialog box opened when you select [Log] from the menu bar, and also the menu text color of the [Log] menu changes to red.

	Date	Time	ID	Message
	2013-02-05	11:23:31 PM	14001	User markers are occurring frequently. Suspended the trace and stop...
	2013-02-05	11:23:08 PM	10001	Tracing started.

C0324\_1.VSD

## ■ Graph Settings Tab

You can change the settings of the graphs currently displayed and also reflect the trace condition of the trace currently being executed to the trace settings.

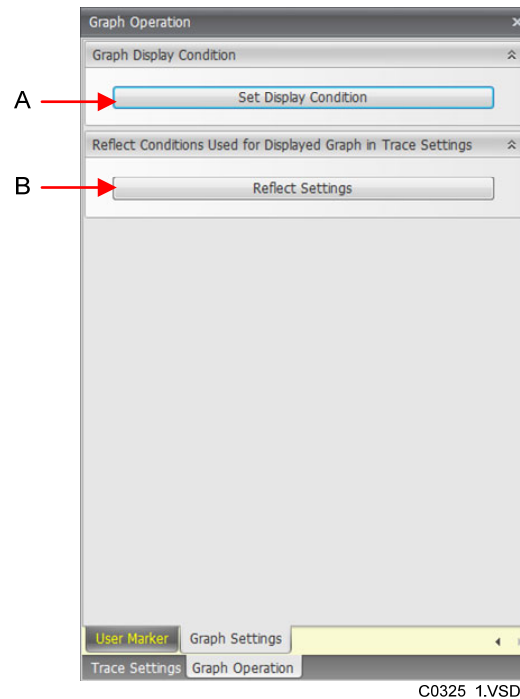


Figure C3.2.5 Graph Settings Tab

### A) Set Display Condition

When you click [Set Display Condition], the Set Display Condition window is displayed. In this window, you can configure the settings of the waveforms displayed in the main graph and zoomed-in graph. The Set Display Condition window is the same as the one that is displayed by selecting [View] - [Set Display Condition] from the menu bar. For details on the settings, see "Set Display Condition Window" in this section.

### B) Reflect Settings

Reflects changes you made in the trace settings and the display settings for the waveforms displayed in the main graph and zoomed-in graph to the settings for the next trace execution (in the Trace Condition and Graph Settings tabs on the Trace Settings tab).



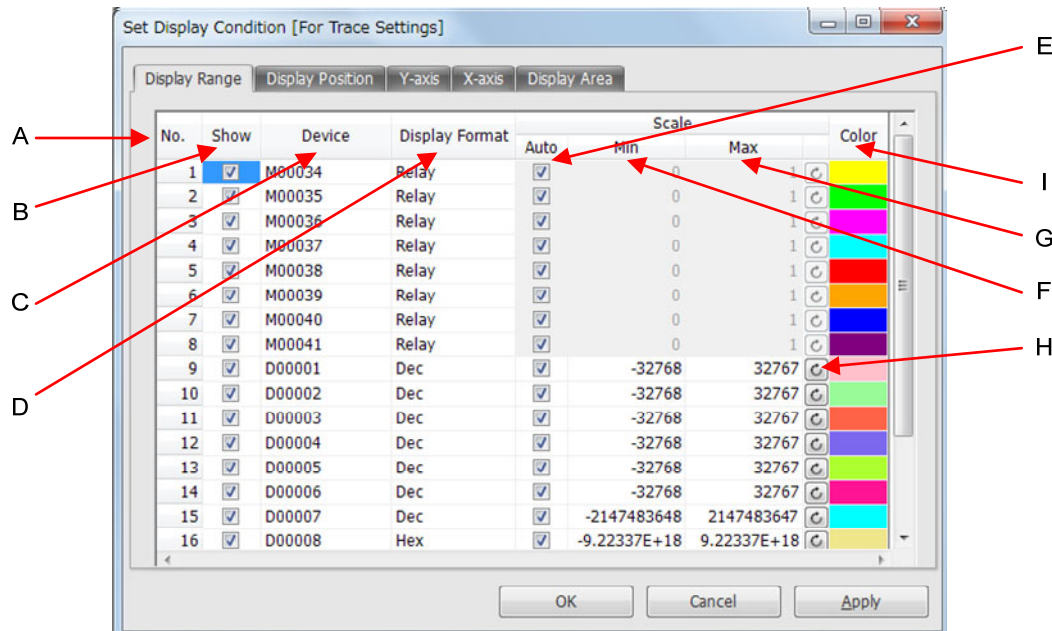
## CAUTION

- After you changes various settings of the waveforms displayed in the main graph and zoomed-in graph during a trace, if you stop the trace and start it again, the settings you made are overwritten by the settings in the Set Display Condition window opened from the Graph Settings tab in the Trace Settings tab. To reflect the settings you have changed, be sure to click [Reflect Settings].

## ■ Set Display Condition Window


### - Display Range Tab

You can specify the visibility, display format, display scale, and display color of each waveform.



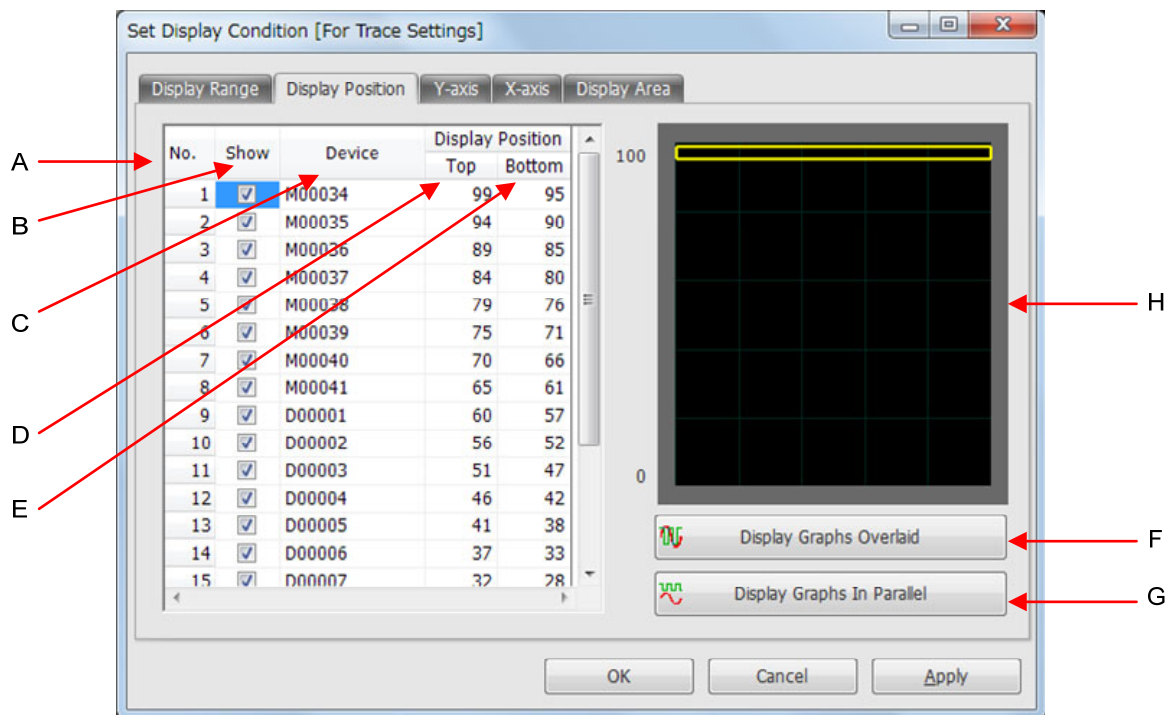
C0326\_1.VSD

Figure C3.2.6 Display Range Tab

- A) No.: Displays the sequential numbers of trace target devices.
- B) Show: Turn on the checkbox to display the waveform in the main graph and zoomed-in graph. Turn off the checkbox to hide the waveform.
- C) Device: Displays the names of the trace target devices in the order of registration. The order of registered devices cannot be changed in this tab.
- D) Display Format: Select the display format of the display data. For details on the display format, refer to the display settings of the Device tab.
- E) Scale - Auto: Automatically specifies the scale of the displayed waveform. The waveform is scaled based on the minimum and maximum values of the data obtained during the trace.
- F) Scale - Min: Specify the minimum value for scaling when auto scaling is not used.
- G) Scale - Max: Specify the maximum value for scaling when auto scaling is not used.
- H) : Click this button to initialize the scale values. When the values are initialized, the maximum and minimum values for scaling are set to the maximum and minimum values of the data type specified in the Device tab.
- I) Color: Select the color of the waveform.

## - Display Position Tab

You can specify the visibility and display position of each waveform.



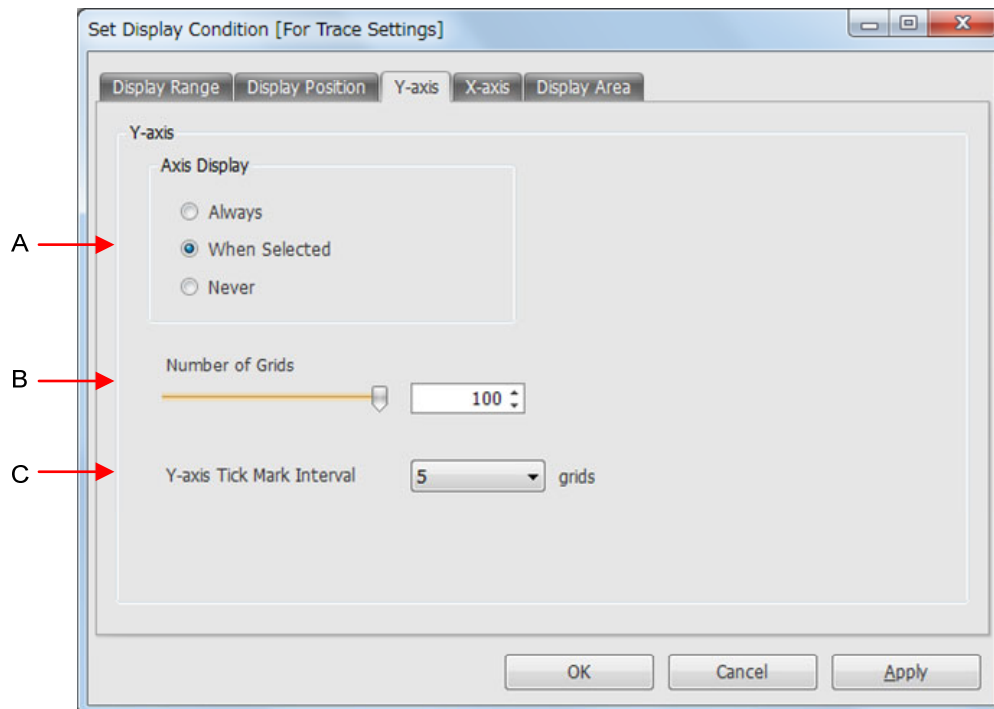
**Figure C3.2.7 Display Position Tab**

C0327\_1.VSD

- A) No.: Displays the sequential numbers of trace target devices.
- B) Show: Turn on the checkbox to display the waveform in the main graph and zoomed-in graph. Turn off the checkbox to hide the waveform.
- C) Device: Displays the names of the trace target devices in the order of registration. The order of registered devices cannot be changed in this tab.
- D) Display Position - Top: Specify a value for the position of the waveform. The greater the value is, the higher the display position is in the screen.  
Specify a value greater than the value for [Bottom] of [Display Position].
- E) Display Position - Bottom: Specify a value for the position of the waveform. The greater the value is, the higher the display position is in the screen.  
Specify a value less than the value for [Top] of [Display Position].
- F) Display Graphs Overlaid: Overlays trace data plots.
- G) Display Graphs In Parallel: Displays trace data plots in parallel.
- H) Display Location Image: Displays an image of the display position for the waveform of the selected device.

## - Y-axis Tab

You can specify the settings of the Y-axis in the main graph and the zoomed-in graph.



C0328\_1.VSD

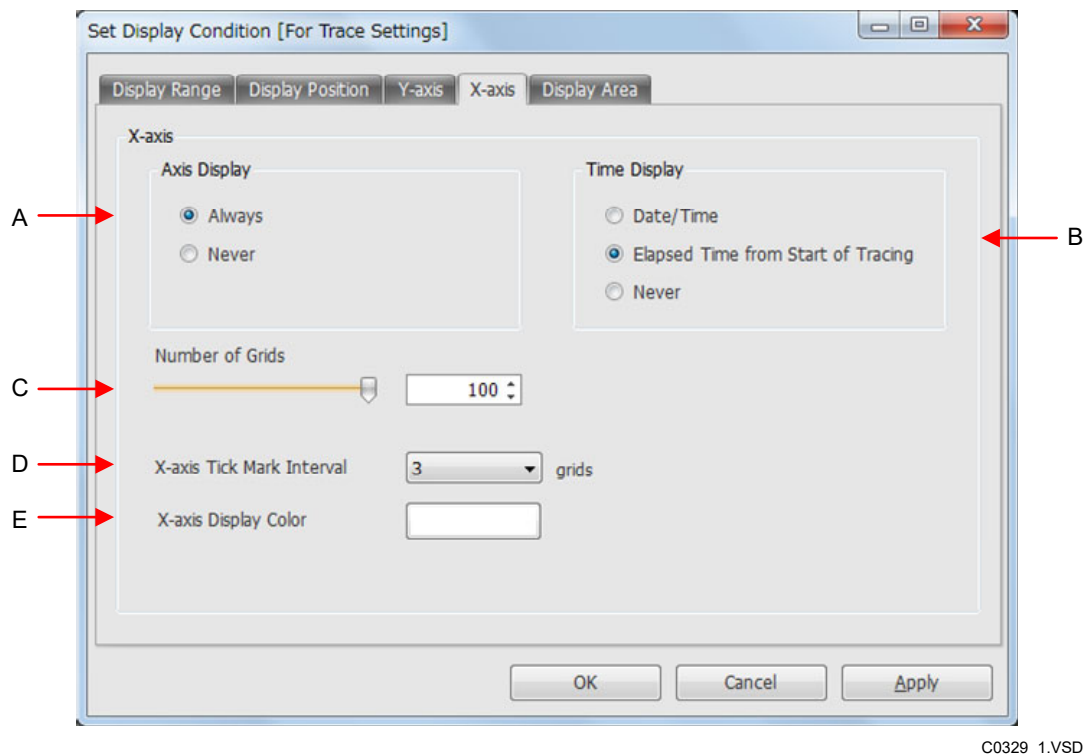
**Figure C3.2.8 Y-axis Tab**

- A) Axis Display: Specify whether or not to display the scale from the minimum value to the maximum value of each device.  
Select [Always], [When Selected], or [Never].
- B) Number of Grids: Specify the number of Y-axis grids by inputting a number or using the sliding bar.
- C) Y-axis Tick Mark Interval: Specify the tick mark interval of the Y-axis.



## - X-axis Tab

You can specify the settings of the X-axis in the main graph and the zoomed-in graph.



C0329\_1.VSD

**Figure C3.2.9 X-axis Tab**

- A) Axis Display: Select [Always] or [Never] for the scale of the X axis.
- B) Time Display: Select [Date/Time], [Elapsed Time from Start of Tracing], or [Never].
- C) Number of Grids: Specify the number of grids in the X-axis.
- D) X-axis Tick Mark Interval: Specify the number of grids for tick marks on the X-axis by inputting a number or using the sliding bar.
- E) X-axis Display Color: Specify the color of tick marks in the X-axis.

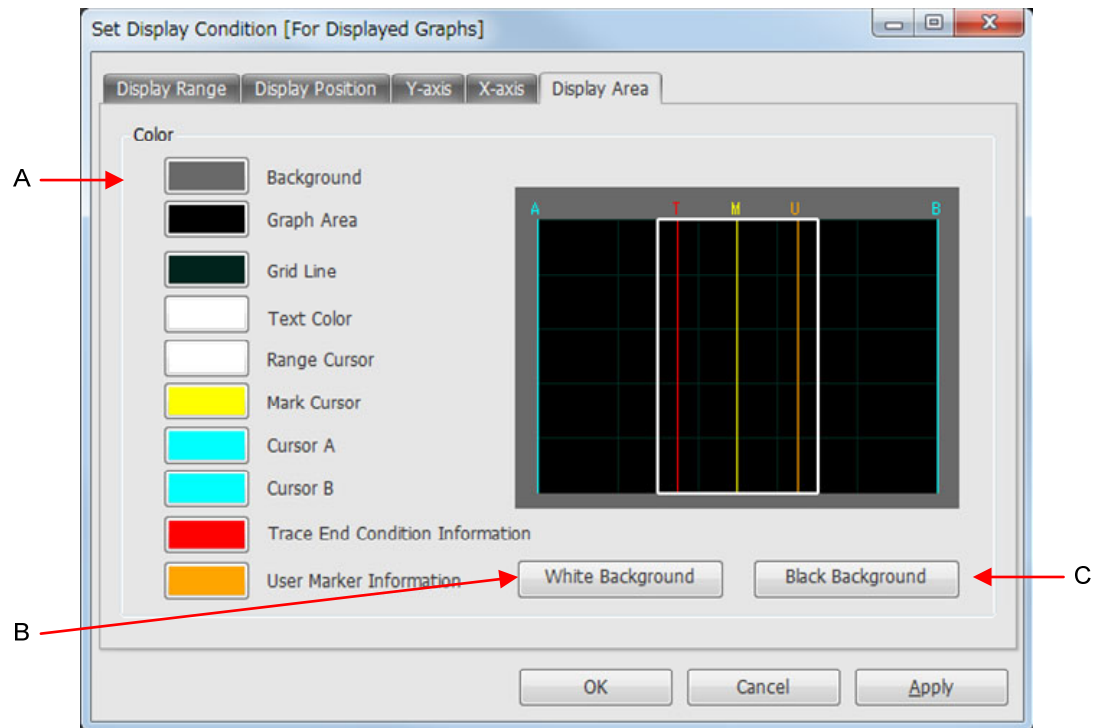


### CAUTION

- When [Date/Time] is selected, the time when data was obtained is displayed on the X-axis. Note however that the unit of the X-axis remains the number of scans and is not normalized by time.
- The date and time displayed when [Date/Time] is selected are the ones specified in the CPU module.

## - Display Area Tab

You can specify the color settings of the display areas in the main graph and the zoomed-in graph.



C0330\_1.VSD

**Figure C3.2.10 Display Area Tab**

- A) Color: Specify the display colors of [Background], [Graph Area], [Grid Line], [Text Color], [Range Cursor], [Cursor A], [Cursor B], [Mark Cursor], [Trace End Condition Information], and [User Marker Information].
- B) White Background: Changes the background color to white and also changes the colors of the other items at the same time.
- C) Black Background: Changes the background color to black and also changes the colors of the other items at the same time.

## ■ Preferences Window

When you select [Tools] - [Preferences] from the menu bar, the Preferences window is displayed.

- Graph Settings Tab

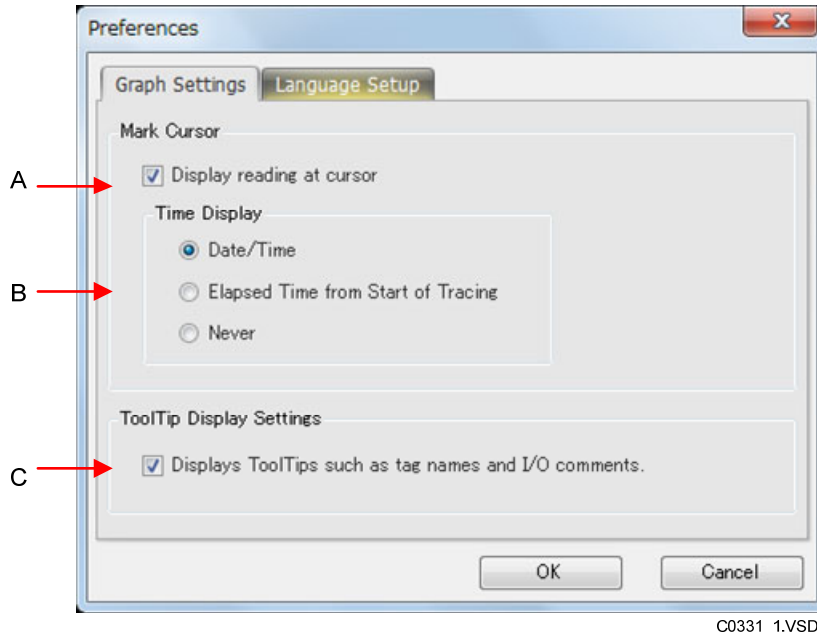


Figure C3.2.11 Graph Settings Tab

- A) Mark Cursor  
Display reading at cursor: Specify the visibility of the value of each waveform at the mark cursor.
- B) Time Display  
Select [Date/Time], [Elapsed Time from Start of Tracing], or [Never] for the time display for the position at the mark cursor.
- C) ToolTip Display Settings  
Specify the visibility of ToolTips for tag names and I/O comments.



### CAUTION

- The date and time displayed when [Date/Time] is selected for [Time Display] are the ones specified in the CPU module.

## - Language Setup Tab

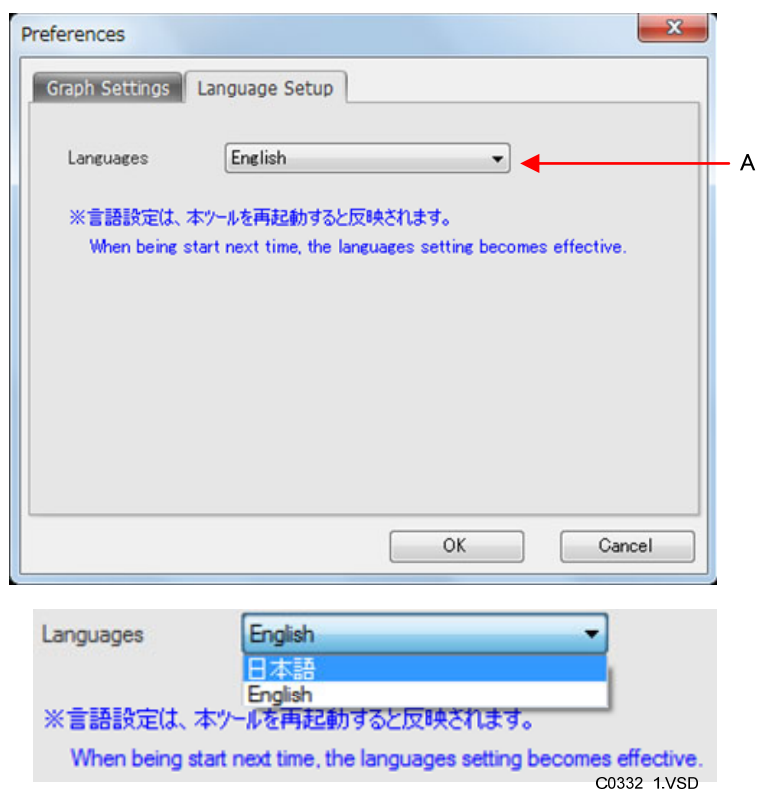


Figure C3.2.12 Language Setup Tab

### A) Languages

Select [Japanese] or [English] for the display language of the live logic analyzer. To change the display language to the selected language, you must restart the live logic analyzer.

---

## C3.3 Saving Settings or Results to a File

### ■ Saving a Setup File

To save a live logic analyzer setup file, select [Trace Settings] - [Save to Trace Settings File] from the menu bar or select [Save to Trace Settings File] from the toolbar.

The file extension ".rtts" is automatically appended to the file name when the file is saved.



#### CAUTION

- 
- The file format of a live logic analyzer setup file is not compatible with the format of a sampling trace setup file.
- 

### ■ Saving a Trace Data File

To save a live logic analyzer results file, select [File] - [Save Trace Result File] from the menu bar or select [Save Trace Result File] from the toolbar.

The file extension ".rttd" is automatically appended to the file name when the file is saved.



#### CAUTION

- 
- The file format of a live logic analyzer data file is not compatible with the format of a sampling trace results file.
- 

### ■ Saving Trace Data as a CSV File

To save live logic analyzer results as a CSV file, select [File] - [Save File As CSV] from the menu bar or select [Save File As CSV] from the toolbar.

The file extension ".csv" is automatically appended to the file name when the file is saved.

#### Note

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For details on saving trace data and the trace settings, see Chapter C5, "Saving Trace Data and Settings."

---

---

## C3.4 Opening a File

### ■ Opening a Setup File

To open a live logic analyzer setup file, select [Trace Settings] - [Load Trace Settings File] from the menu bar or select [Load Trace Settings File] from the toolbar.

The file extension of a live logic analyzer setup file is ".rtts".

### ■ Opening a Trace Data File

To open a live logic analyzer results file, select [File] - [Open Trace Result File] from the menu bar or select [Open Trace Result File] from the toolbar.

The file extension of a live logic analyzer results file is ".rttd".

### ■ Importing the Previous Execution Conditions

To import the last execution condition of live logic analyzer, select [Trace Settings] - [Load Last Execution Condition] from the menu bar or select [Load Last Execution Condition] from the toolbar. Then, the settings registered in the CPU module are imported. Nothing is displayed when the previous settings have not been saved. Check the settings.

#### **Note**

---

End conditions are displayed in the decimal data type format.

---

## C3.5 Starting Live Logic Analyzer

After configuring the trace settings, select [Online] - [Start Tracing] from the menu bar or select [Start Tracing] from the toolbar. When you start tracing without changing the online settings, connection to the CPU module is established based on the settings used for the last connection.

When you want to change connection settings before you start tracing, change the connection settings before selecting [Start Tracing] and check if the connection can be established.

## C3.6 Pausing Live Logic Analyzer

After you start tracing, select [Online] - [Pause Tracing] from the menu bar or select [Pause] from the toolbar. Even if you pause the tracing, the tracing operation continues, and when you cancel the pause, the data obtained during the pause are displayed at once.

## C3.7 Stopping Live Logic Analyzer

After you start tracing, select [Online] - [Stop Tracing] from the menu bar or select [Stop Tracing] from the toolbar.

## C3.8 Live Logic Analyzer Status

You can check the status of the live logic analyzer by using the live logic analyzer for WideField3.

### ■ Checking Status on the Live Logic Analyzer

You can see the execution status of the live logic analyzer on the status bar of the live logic analyzer that is online.

**Table C3.8.1 Status Bar Display**

Status Bar Display	Description
Waiting	No live logic analyzer function is being executed or tracing has ended.
Tracing	A live logic analyzer function is being executed.

### ■ Checking Status on the Sampling Trace Tool

You can see the execution status of the live logic analyzer on the status bar of the sampling trace tool that is online.

**Table C3.8.2 Status Bar Display**

Status Bar Display	Description
Not set	No live logic analyzer function is being executed.
Trace 1 m% Completed (m = 1 to 98)	A live logic analyzer function is being executed.
Trace completed	A live logic analyzer function has been completed.





# C4 Trace Data Analysis Functions

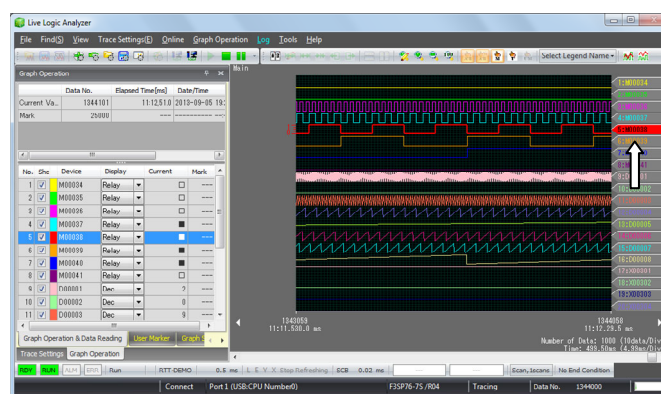
## C4.1 Expanding, Contracting, and Moving Waveforms

You can expand or contract a waveform by selecting the waveform and dragging the displayed scale. You can also move a waveform by dragging the address tag of the waveform.

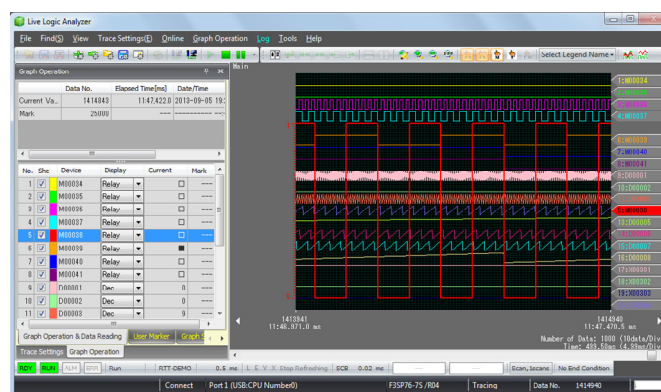
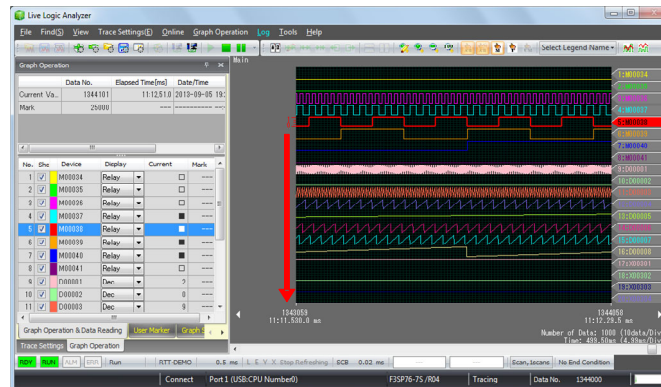
### ■ Expanding or Contracting a Waveform

#### ◆ Procedure ◆

- (1) Select the waveform you want to expand or contract by clicking the address tag of the displayed waveform.  
The color of the address tag of the selected waveform changes to the color of the waveform and also the line style of the waveform changes to bold.



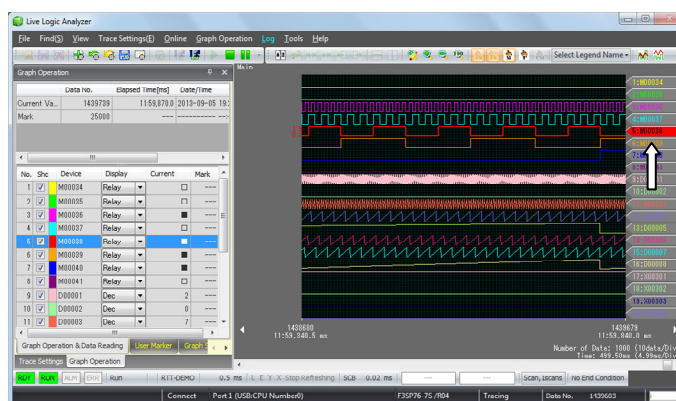
- (2) Drag the scale of the selected waveform.
- (3) The width of the dragged waveform is expanded or contracted.



## ■ Moving a Waveform

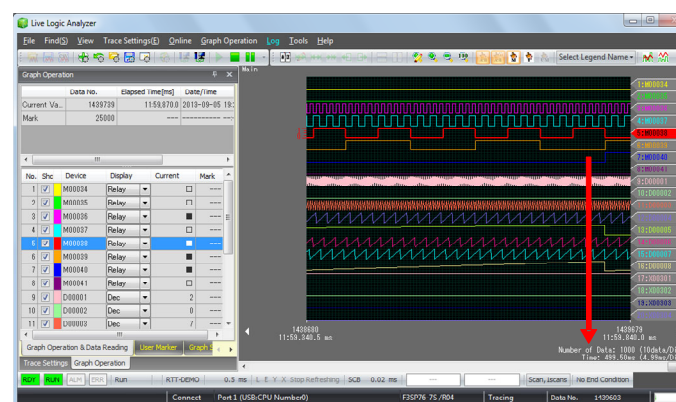
### ◆ Procedure ◆

- (1) Select the waveform you want to move by clicking the address tag of the displayed waveform.
- (2) Drag the selected address tag.
- (3) The display position of the dragged waveform is changed.



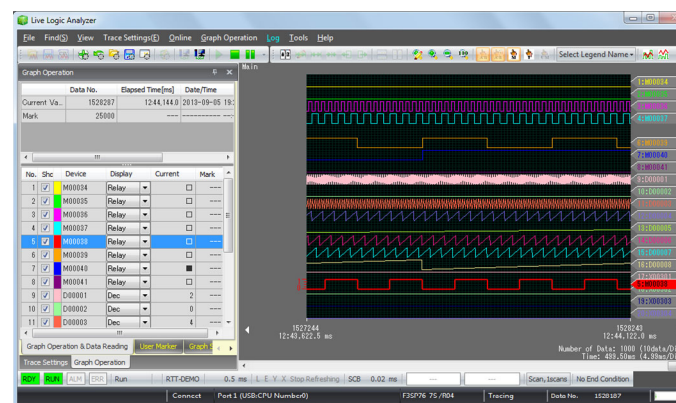
Step (1)

C0402\_1.VSD



Step (2)

C0402\_2.VSD



Step (3)

C0402\_3.VSD



### CAUTION

- The width and position of a waveform you expanded, contracted, or moved are saved in a setup file. The width and position of the waveform are held if you do not change the device settings. If you change the device settings, the waveforms are rearranged in the order of registration.
- Even if you change the display position of a waveform, the order of registration in the Device Registration tab is unchanged.

## C4.2 Display Zoomed-in Graph (Split)

When you click [Display Zoomed-in Graph (Split)] to zoom in the main graph, the main graph and the zoomed-in graph are displayed in two split screens as shown below. When you click it again, the zoomed-in graph disappears and only the main graph is displayed.

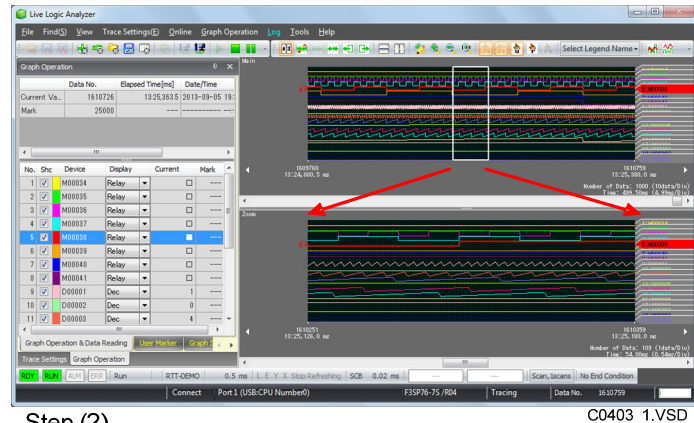
When the main graph and the zoomed-in graph are displayed, the upper chart displays the entire main graph and the lower chart displays the zoomed-in graph of the white frame part of the main graph.

### ◆ Procedure ◆

Select [Graph Operation] - [Display Zoomed-in Graph (Split)] from the menu bar or select [Display Zoomed-in Graph (Split)] from the toolbar.

(1) The upper and lower screens appear.

You can move the zoom-in frame in the main graph and also expand or contract the zoom-in range by using the mouse, menu bar, and toolbar operations.

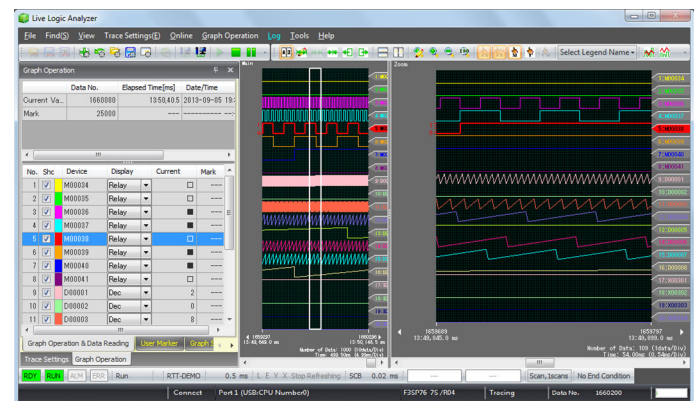


Step (2)

C0403\_1.VSD

(2) You can change the upper and lower split screen mode to the right and left split screen mode.

Select [Graph Operation] - [Tile Zoomed-in Graph Vertically] from the menu bar or select [Tile Zoomed-in Graph Vertically] from the toolbar. Then, the upper and lower split screen mode changes to the right and left split screen mode.



Step (3)

C0403\_2.VSD

(3) You can move the zoom-in frame (white frame) by using the toolbar or mouse. When you use the mouse, you can move the zoom-in frame (white frame) by dragging the frame while holding the upper or lower part of the frame with the mouse or while holding down the [Ctrl] key.



## C4.3 Cursor Display

In the live logic analyzer, there are three cursors: cursor A, cursor B, and mark cursor.

### ■ Cursors A/B

To use cursors A and B, click the [Show/Hide Cursors A & B] icon to change the icon frame color to orange (enabled state).

While tracing is stopped, when you left-click in the main graph or zoomed-in graph, cursor A is displayed.

When you right-click in the main graph or zoomed-in graph, cursor B is displayed.

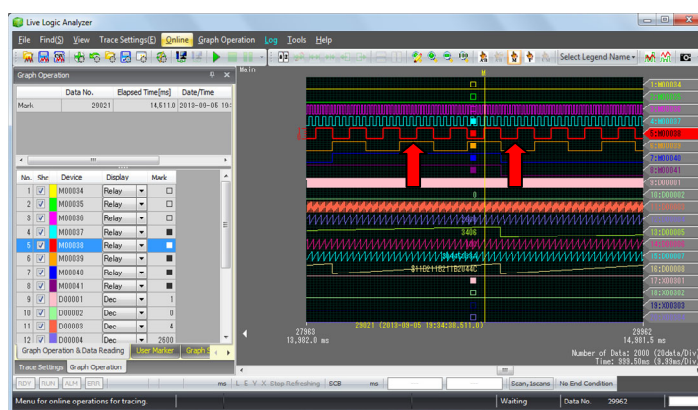
### ◆ Procedure for Operating Cursors A and B ◆

(1) Click the [Show/Hide Cursors A & B] icon to change the icon frame color from white (disabled state) to orange (enabled state).

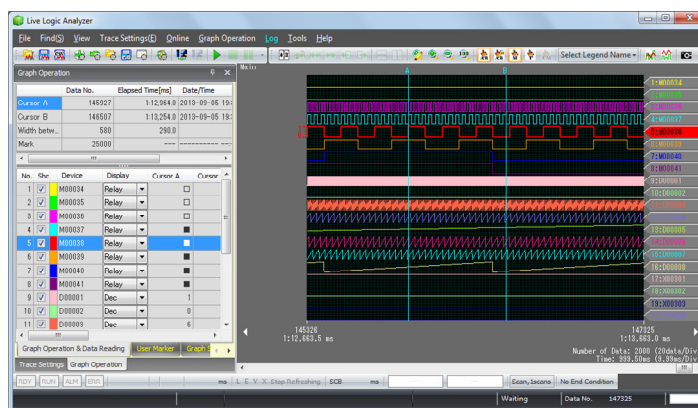
(2) Stop or pause the live logic analyzer operation. Move the mouse cursor to the position you want to display cursor A or B in the graph, and left-click to display cursor A or right-click to display cursor B.

You can move cursor A or B by dragging it while holding down the left button or wheel of the mouse.

After the cursor is moved, the data of each device and the time data at the new position of the cursor are immediately reflected to the Graph Operation & Data Reading tab in the Graph Operation tab.



C0404\_1.VSD



Step (2)

C0404\_2.VSD

## ■ Cursor M

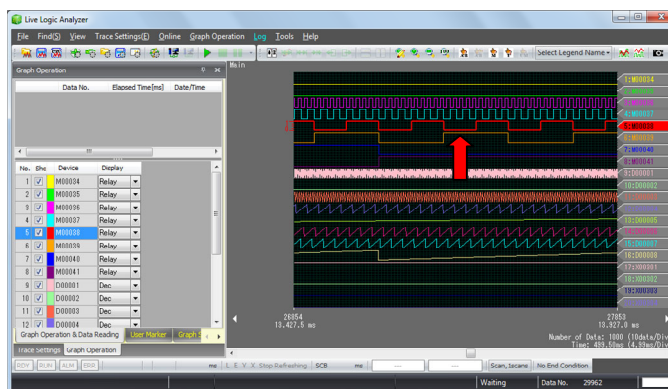
To use cursor M, click the [Show/Hide Mark Cursor] icon to change the icon frame color to orange (enabled state).

You can display Cursor M in the monitor window when tracing is being executed or stopped.

Cursor M is not displayed automatically. To display cursor M, click the position where you want to display it with the mouse while holding down the [Ctrl] key or click the wheel at the position.

## ◆ Procedure for Operating Cursor M ◆

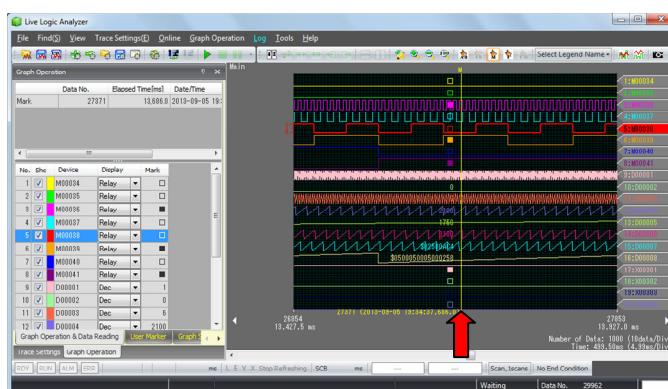
- (1) Click the [Show/Hide Mark Cursor] icon to change the icon frame color from white (disabled state) to orange (enabled state).



C0405\_1.VSD

- (2) Right-click or left-click the position you want to display the mark cursor in the main graph or zoomed-in graph with the mouse while holding down the [Ctrl] key of the keyboard or click the wheel at the position. Then, cursor M is displayed at the position, and the data of each device at the position is displayed on cursor M and in the Graph Operation & Data Reading tab.

You can move cursor M by dragging it while holding down the left button or wheel of the mouse.



Step (2)

C0405\_2.VSD

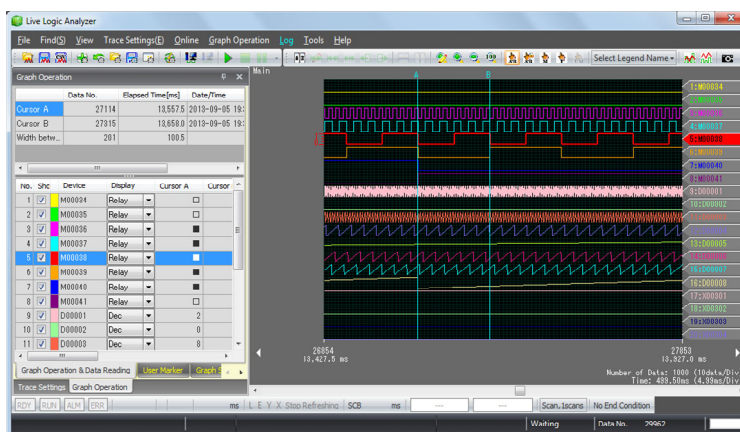
## C4.4 Cursors A and B Fixing Function

The cursors A and B fixing function fixes the width between cursors A and B and allows you to move the marking positions of cursors A and B together. This function is useful when you check the width of periodic sampling.

To use this function, click the [Show/Hide Cursors A & B] and [Fix Width between Cursors A & B] icons to change the frame color of both icons to orange (enabled state).

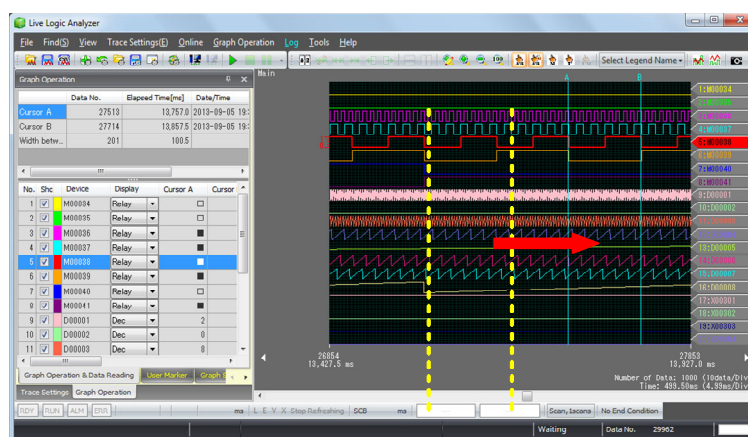
### ◆ Procedure for Fixing Cursors A and B ◆

- (1) Click the [Show/Hide Cursors A & B] icon to change the icon frame color from white (disabled state) to orange (enabled state).
- (2) Display cursors A and B in the main graph or zoomed-in graph. Adjust the width between cursors A and B to obtain a desired width. Click the [Fix Width between Cursors A & B] icon to change the icon frame color from white (disabled state) to orange (enabled state).
- (3) When you move cursor A or B by dragging it, cursors A and B move together without changing the width between them fixed in step (2).



Step (2)

C0406\_1.VSD



Step (3)

C0406\_2.VSD

## C4.5 Trace End Function

The trace end function ends a trace based on the status of the trace target device.

When you select [No End Condition] in the Trace Condition tab, tracing continues until you stop it.

When you select [Use End Condition], the trace continues until the end condition, and then the trace stops.

When you specify [Sampling Count after the End Condition is Met], after the specified end condition is met, data is collected the specified number of times, and then tracing is stopped.

When you select [Use End Condition] and [Stop after acquiring enough for no. of data displayed], data is collected as many times as [No. of Data Displayed] and then tracing ends automatically.

For details on the settings, see "Trace Condition Tab" in Section C3.1 "Trace Settings tab".

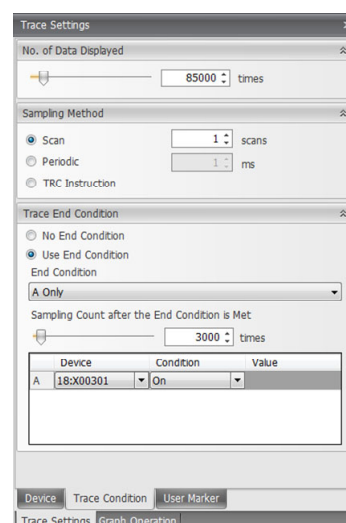
### ◆ Procedure for Specifying a Trace End Condition ◆

- (1) Specify a trace end condition in the Trace Condition tab.

#### Note

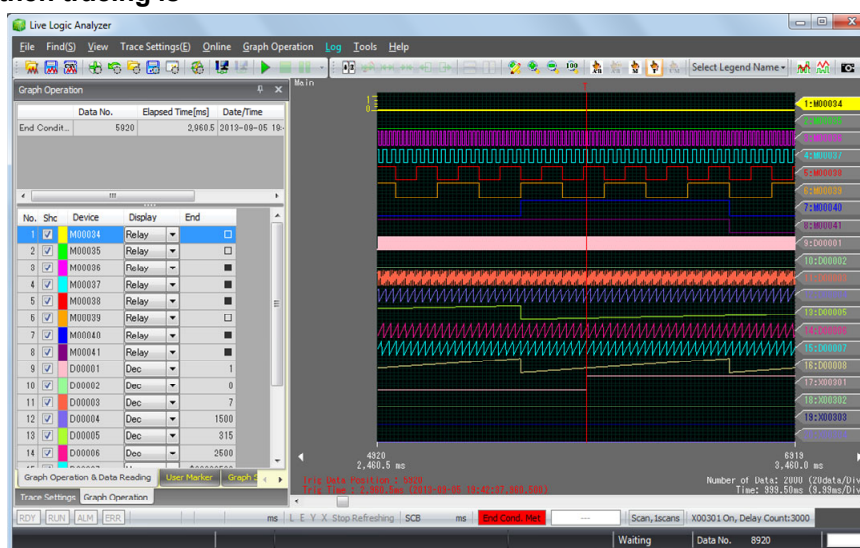
In this example, the "ON" state of "X301" is specified as a trace end condition and [Sampling Count after the End Condition is Met] is set to "3000".

- (2) When the trace end condition is met, cursor T is displayed at the position where the end condition is met, and also the data number, the relative time after tracing started, and the absolute time for the position where the end condition is met are displayed in the main graph or zoomed-in graph.
- After the end condition is met, data is collected 3,000 times and then tracing is stopped automatically.



Step (1)

C0407\_1.VSD



Step (2)

C0407\_2.VSD



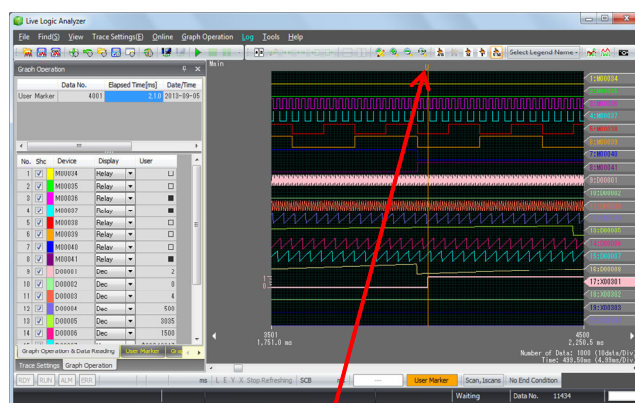
## C4.6 User Marker Function

The user marker function displays a "U" mark at the position where the specified device status occurs in the main graph or zoomed-in graph. This function is useful when it is difficult to find a desired device status, for example, when there are a lot of trace points or when the period of the target waveform is remarkably different from other waveforms.

The user marker function can be used also when a trace results file is open offline.

### ◆ Procedure for Operating the User Marker ◆

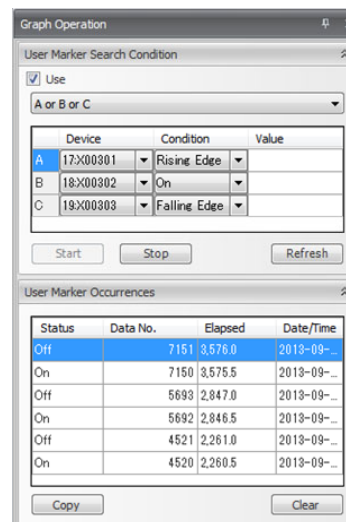
- (1) Turn on the [Use] checkbox in the User Marker tab.
- (2) When the user marker display condition is met, cursor U is displayed at the position where the condition is met. After that, when the user marker display condition is met at another position, cursor U is moved to the new position.
- (3) When the user marker condition is met or cleared, the event is logged in [User Marker Occurrences]. When you click [On] or [Off] in the [User Marker Occurrences] table, the display position of the main graph/zoomed-in graph is changed to the position where the relevant event occurred.



Step (2)

C0408\_1.VSD

Position where the user marker condition is met



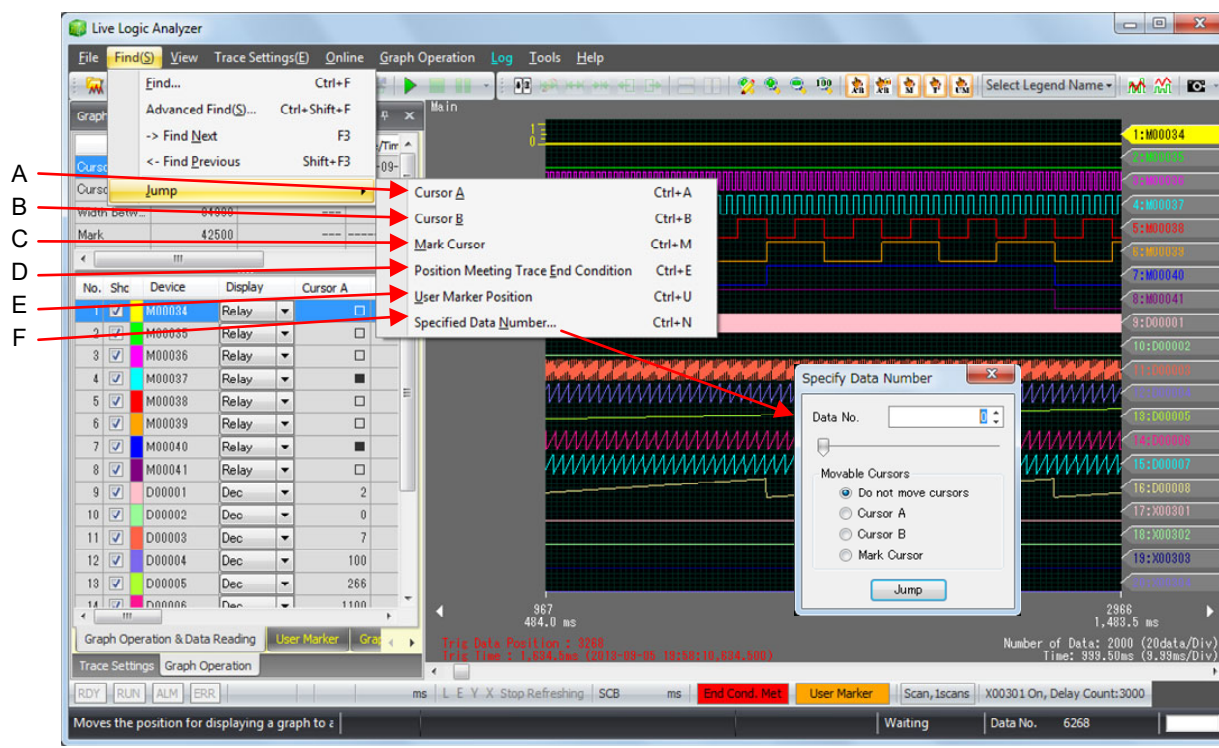
Step (3)

C0408\_2.VSD



## C4.7 Data Jump Function

The data jump function allows you to change the display center of the main graph/zoomed-in graph to a specific data position after tracing is paused or stopped. The data jump function can be used also when a trace results file is open online.



C0409\_1.VSD

**Figure C4.7 Data Jump Menu**

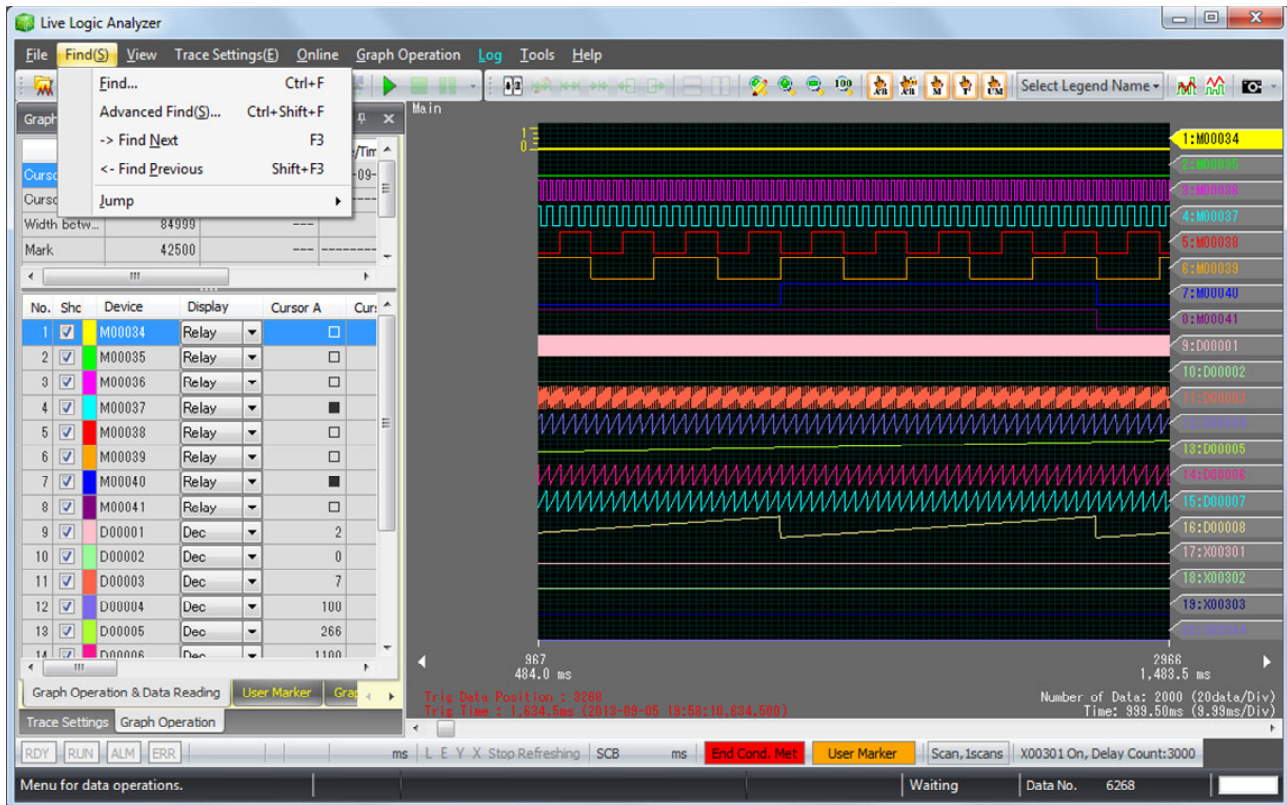
- A) Cursor A: Displays the position of cursor A at the center of the main graph/zoomed-in graph.
- B) Cursor B: Displays the position of cursor B at the center of the main graph/zoomed-in graph.
- C) Mark Cursor: Displays the position of the mark cursor at the center of the main graph/zoomed-in graph.
- D) Position Meeting Trace End Condition: Displays the position where the trace end condition is met, at the center of the main graph/zoomed-in graph.
- E) User Marker Position: Displays the user marker position at the center of the main graph/zoomed-in graph.
- F) Specified Data Number: Select to open the [Specify Data Number] window. The data number you input or data position you input using the sliding bar is displayed on the center of the main graph or zoomed-in graph. When the designated location is displayed in the center, you can arrange the display locations for cursor A, B, and the mark cursor.

## C4.8 Data Search Function

The data search function allows you to search traced data after tracing is paused or stopped.

This function supports two search methods: [Find] for searching for the status of a device and [Advanced Find] for searching with a combination of up to three device conditions.

The data search function can be used also when a trace results file is open offline.

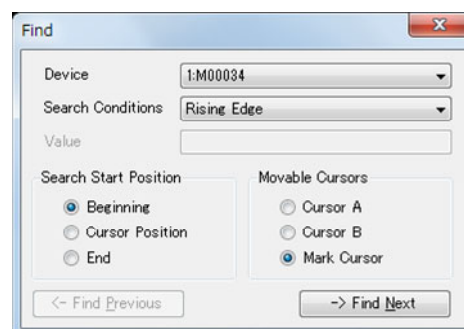


C0410\_1.VSD

Figure C4.8 Data Search Menu

## ◆ Procedure for Using Find ◆

- (1) Select [Find] from the menu bar, and the Find window is displayed.
- (2) Select the device you want to search from the [Device] list and select one of the following search conditions. When you search for a register device, enter a setting value in [Value].



Step (1)

C0411\_1.VSD

Table C4.8.1 List of Search Conditions

Device	Search Conditions	Description
Relay device	Rising Edge	Searches for the rising edge of the specified device.
	Falling Edge	Searches for the falling edge of the specified device.
Register device	=	Searches for a position where the specified device has the same value as the value specified for [Value].
	!=	Searches for a position where the specified device has a value different from the value specified for [Value].
	>	Searches for a position where the specified device has a value greater than the value specified for [Value].
	>=	Searches for a position where the specified device has a value greater than or equal to the value specified for [Value].
	<	Searches for a position where the specified device has a value less than the value specified for [Value].
	<=	Searches for a position where the specified device has a value less than or equal to the value specified for [Value].
	Maximum	Searches for the position where the specified device has a maximum value.
	Minimum	Searches for the position where the specified device has a minimum value.
	Maximal	Searches for the position where the specified device has a maximal value.
	Minimal	Searches for the position where the specified device has a minimal value.

- (3) Specify the starting position for search.  
Select [Beginning] to start searching from the top of the trace data. Select [Cursor Position] to start searching from the mark cursor position. Select [End] to start searching from the end of the trace data.
- (4) Set the movable cursors.  
Select the cursor to display in the position that meets the search conditions, when such a position is found.
- (5) Start searching.  
To search trace data older than the starting position for search, select [<- Find Previous].  
To search trace data newer than the starting position for search, select [-> Find Next].

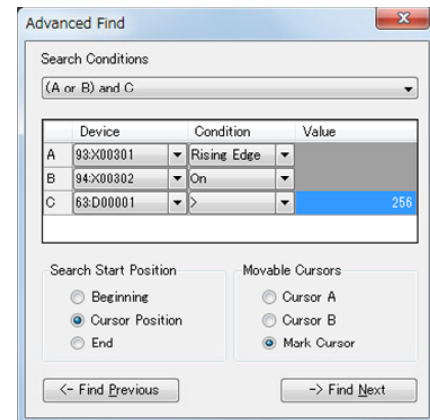
## ◆ Procedure for Using Advanced Find ◆

(1) Select [Find] from the menu bar, and the Find window is displayed.

(2) Select search target devices and a search condition.

Select a search condition first. You can combine up to three device conditions for the search condition. You can select one of the following search patterns.

After selecting a search condition, select search target devices for the search condition.



C0412\_1.VSD

Table 4.8.2 List of Search Conditions

Search Conditions	Description
A Only	Searches for the position where the condition A is met.
A and B	Searches for the position where the conditions A and B are met.
A or B	Searches for the position where the condition A or B is met.
A and B and C	Searches for the position where the conditions A, B, and C are met.
(A and B) or C	Searches for the position where the conditions A and B are met or the condition C is met.
(A or B) and C	Searches for the position where the condition A or B is met and the condition C is met.
A or B or C	Searches for the position where the condition A, B, or C is met.

(3) Specify devices to be searched and a search condition for each device.

The setting contents vary depending on whether the selected device is a relay device or register device as follows.

When you search for a register device, enter a setting value in [Value].

Table 4.8.3 List of Search Conditions

Search Conditions	Description	Search Conditions
Relay device	Rising Edge	Searches for the rising edge of the specified device.
	Falling Edge	Searches for the falling edge of the specified device.
	ON	Searches for the ON status of the specified device.
	OFF	Searches for the OFF status of the specified device.
Register device	=	Searches for a position where the specified device has the same value as the value specified for [Value].
	!=	Searches for a position where the specified device has a value different from the value specified for [Value].
	>	Searches for a position where the specified device has a value greater than the value specified for [Value].
	>=	Searches for a position where the specified device has a value greater than or equal to the value specified for [Value].
	<	Searches for a position where the specified device has a value less than the value specified for [Value].
	<=	Searches for a position where the specified device has a value less than or equal to the value specified for [Value].

- (4) Specify the starting position for search and a cursor to be displayed at the position where the search condition is met.**

Select **[Beginning]** to start searching from the top of the trace data. Select **[Cursor Position]** to start searching from the mark cursor position. Select **[End]** to start searching from the end of the trace data.

Select **[Cursor A]**, **[Cursor B]**, or **[Mark Cursor]** for **[Movable Cursors]** as the cursor for indicating the position where the search condition is met.

- (5) Start searching.**

To search trace data older than the starting position for search, select **[<- Find Previous]**.

To search trace data newer than the starting position for search, select **[-> Find Next]**.

## C4.9 LLA Log Function

The LLA log function displays a log of various operations and behaviors during a trace.

When you select [Log] from the menu bar, the following window is displayed. If there are any notification messages, the messages are displayed sequentially in the window.

The menu text ("Log") of the [Log] menu on the menu bar is displayed white when the analyzer is started. If a message is added, the menu text color changes to cyan. If a warning or error occurs, it changes to orange or red, respectively.

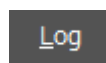
A warning indicates the occurrence of a minor problem and an error indicates the occurrence of a problem that causes the LLA function to stop.

## ◆ Procedure for Displaying a Log ◆

- (1) Select [Log] from the menu bar.**

**Then, a log window opens.**

- (2) The log displays the date, time, and details of each log item. The color of the menu text of the [Log] menu on the menu bar changes depending on whether or not there is any log item.**



- : When no log item exists (white)



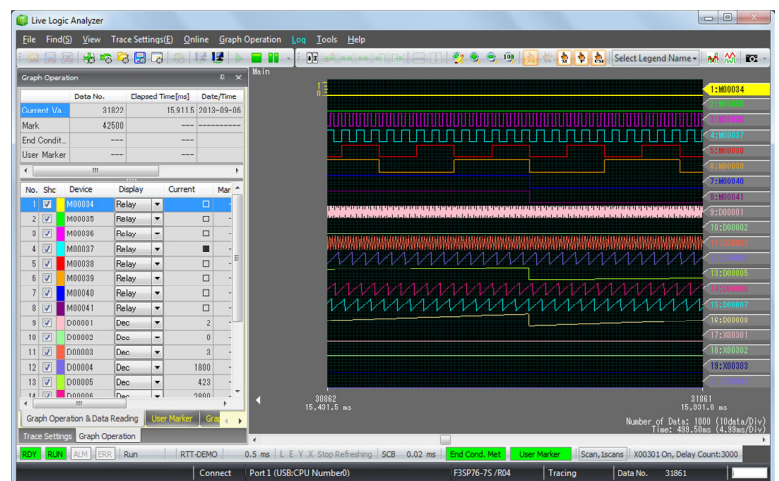
: When any log item exists  
(blue)



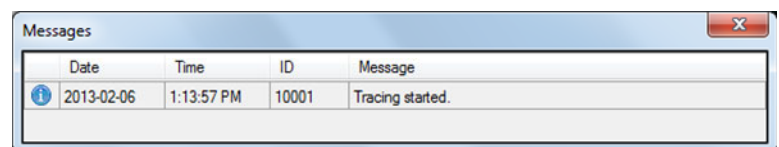
- : When any warning exists (orange)



: When any error exists (red)

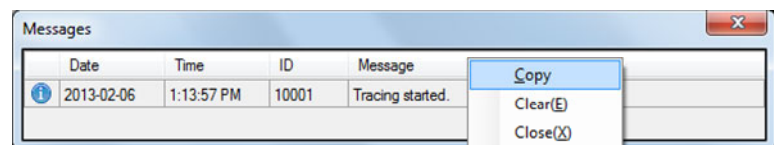


C0413\_1.VSD



C0413 2.VSD

### Step (1)



C0413 3.VSD

### Step (3)

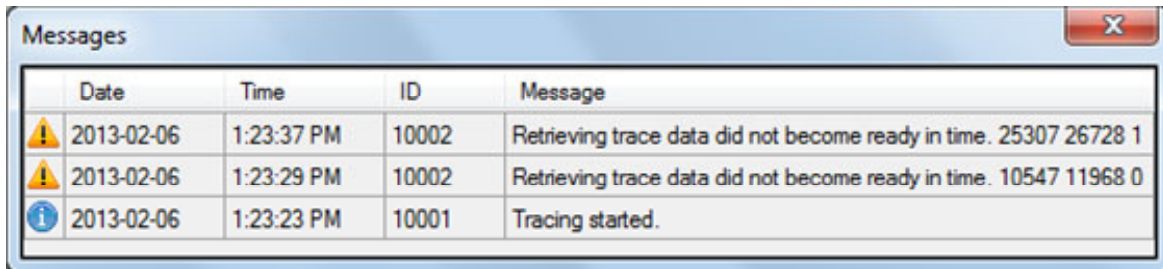


- (3) When you right-click with the mouse on this window, a menu appears. If you select [Clear], all log items are deleted. In this case, the menu text color of the [Log] menu changes from orange to white, which represents that there is no log item. If you select [Copy], all log messages are copied to the clipboard. When you want to save a log, start a text editor, paste the copied log, and save it.

## ■ Example of the Occurrence of a Warning

When the analyzer cannot collect trace data at a specified time, the menu text color changes from cyan to orange.

Click [Log] on the menu bar to open the message.



The screenshot shows a 'Messages' dialog box with a table of log entries. The table has four columns: Date, Time, ID, and Message. There are three rows of data. The first two rows show warning messages (yellow exclamation mark icon) about retrieving trace data, and the third row shows an information message (blue 'i' icon) about tracing starting.

	Date	Time	ID	Message
!	2013-02-06	1:23:37 PM	10002	Retrieving trace data did not become ready in time. 25307 26728 1
!	2013-02-06	1:23:29 PM	10002	Retrieving trace data did not become ready in time. 10547 11968 0
i	2013-02-06	1:23:23 PM	10001	Tracing started.

C0414\_1.VSD

When the analyzer cannot collect trace data, the warning message "Retrieving trace data did not become ready in time." is displayed followed by the start data number, the end data number, and the number of occurrences.



### CAUTION

The time displayed on the LLA function is the time of the PC which has the LLA installed. Other times are the time set in the CPU module.



## C4.10 Copy as Image Function

The copy as image function allows you to copy an image of trace waveforms displayed when tracing is being executed, stopped, or paused.

This function copies the entire screen of the analyzer or only the main graph. The copy as image function is available also when the main graph and the zoomed-in graph are displayed. In this case, you can select to copy the entire screen of the analyzer, the main graph, or the zoomed-in graph.

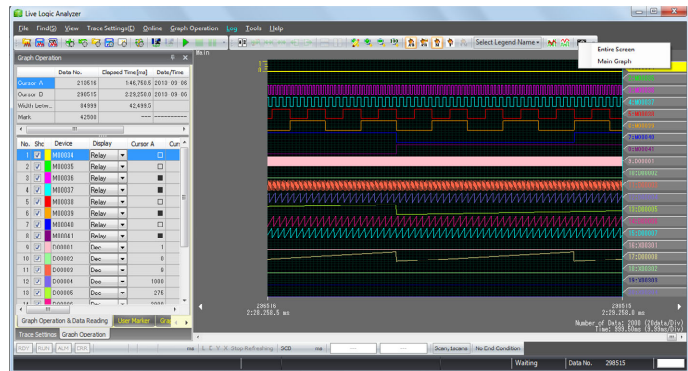
### ◆ Procedure for Copying the Screen as an Image When the Zoomed-in Graph Is Not Displayed ◆

(1) Select [Copy As Image] from the menu bar. Then, select [Entire Screen] or [Main Graph].

(2) If you select [Entire Screen], the entire screen of the live logic analyzer is copied as an image, in the same way as the screen capture function that is invoked by pressing the [Alt] + [Print Screen] keys.

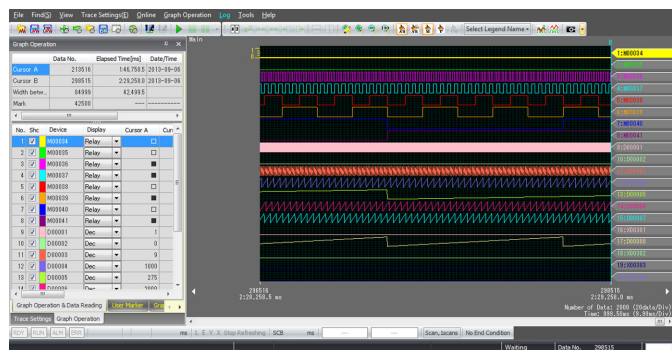
If you select [Main Graph], only the main graph is captured.

After capturing an image, open graphics software such as Paint and paste the image to it.



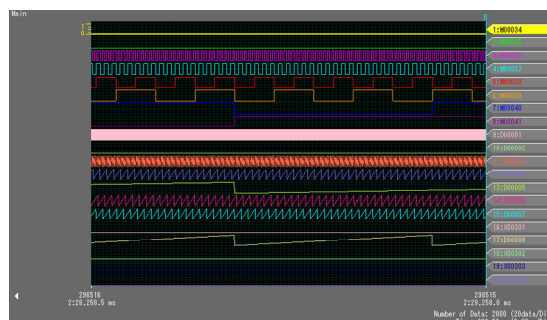
Step (1)

C0415\_1.VSD



Step (2) When [Entire Screen] Is Selected

C0415.2.VSD



Step (2) When [Main Graph] Is Selected

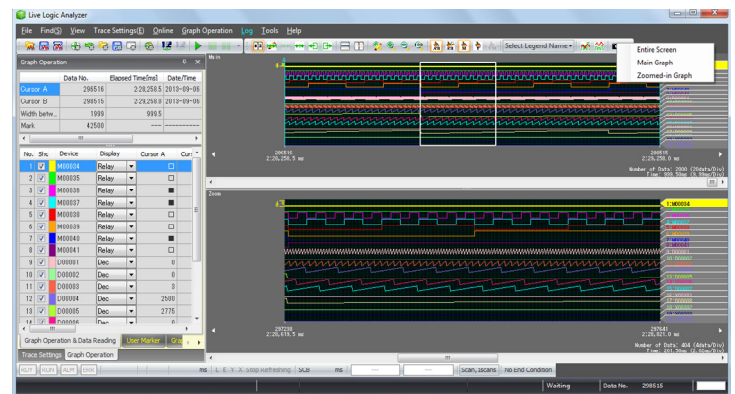
C0415\_3.VSD

## ◆ Procedure for Copying the Screen as an Image When the Zoomed-in Graph Is Displayed ◆

(1) Select [Copy As Image] from the menu bar. Then, select [Entire Screen] or [Main Graph].

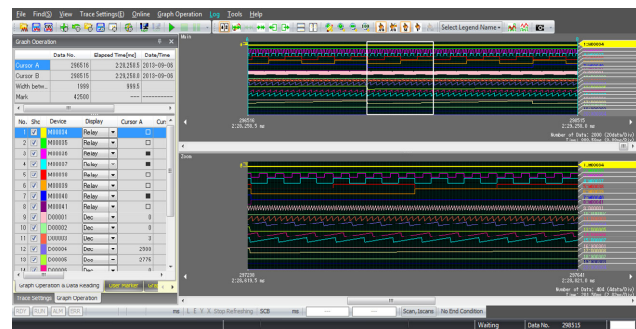
(2) If you select [Entire Screen], the entire screen of the live logic analyzer is copied as an image, in the same way as the screen capture function that is invoked by pressing the [Alt] + [Print Screen] keys.

If you select [Main Graph], only the main graph (upper) is captured. If you select [Zoomed-in Graph], only the zoomed-in graph (lower) is captured. After capturing an image, open graphics software such as Paint and paste the image to it.



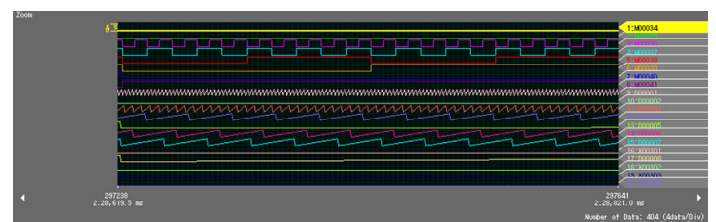
Step (1)

C0416\_1.VSD



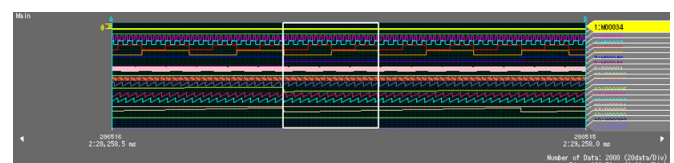
Step (2) When [Entire Screen] Is Selected

C0416\_2.VSD



Step (2) When [Zoomed-in Graph] Is Selected

C0416\_3.VSD



Step (2) When [Main Graph] Is Selected

C0416\_4.VSD

## C5 Saving Trace Data and Settings

You can save obtained trace data in CSV or RTTD format and trace settings in RTTS format.

### C5.1 Saving Trace Settings

To save trace settings, select [Trace Condition] - [Save to Trace Settings File] from the menu bar or select [Save to Trace Settings File] from the toolbar.

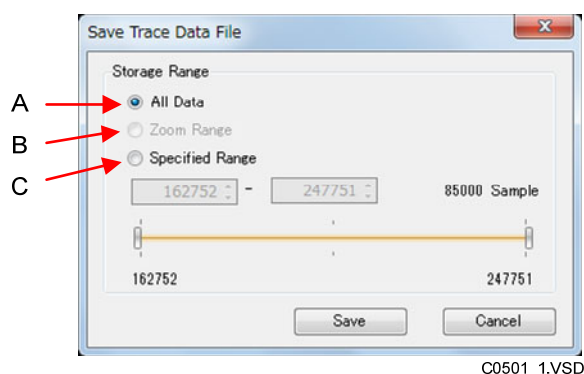
The following items are saved.

- All settings of the Device tab
- All settings of the Trace Condition tab
- All settings of the User Marker tab
- All settings of the Graph Settings tab

### C5.2 Saving Trace Data

To save trace data, select [File] - [Save Trace Result File] from the menu bar or select [Save Trace Result File] from the toolbar.

After that, the following window appears for specifying [Storage Range].



C0501\_1.VSD

**Figure C5.2 Save Trace Result File Window**

<Storage Range>

**A) All Data**

Saves all obtained data when the number of the obtained data is less than or equal to [No. of Data Displayed] specified in the Trace Condition tab. If the number of sampled data is greater than [No. of Data Displayed], only the latest data are saved as many as [No. of Data Displayed].

**B) Zoom Range**

Saves trace data within the range of the zoom-in frame when the main graph and zoomed-in graph are displayed.

The maximum number of sampled data you can save is [No. of Data Displayed] specified in the Trace Condition tab.

**C) Specified Range**

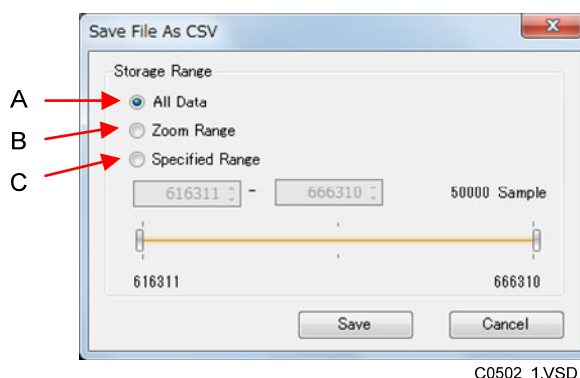
Saves only the data within a specified range.

The maximum number of sampled data you can save is [No. of Data Displayed] specified in the Trace Condition tab.

After specifying [Storage Range], click [Save], enter a file name, and select a save destination. Then, the data are saved.

## C5.3 Saving Trace Data as a CSV File

To save trace data (results) in CSV format, select [File] - [Save File As CSV] from the menu bar or select [Save File As CSV] from the toolbar. Then, the following Save File As CSV window is displayed.



C0502\_1.VSD

**Figure C5.3 Save File As CSV Window**

<Storage Range>

A) All Data

Saves all obtained data when the number of data is less than or equal to [No. of Data Displayed] specified in the Trace Condition tab. If the number of sampled data is greater than [No. of Data Displayed], only the latest data are saved as many as [No. of Data Displayed].

B) Zoom Range

Saves trace data within the range of the zoom-in frame when the main graph and zoomed-in graph are displayed.  
The maximum number of sampled data you can save is [No. of Data Displayed] specified in the Trace Condition tab.

C) Specified Range

Saves only the data within a specified range.  
The maximum number of sampled data you can save is [No. of Data Displayed] specified in the Trace Condition tab.

After specifying [Storage Range], click [Save], enter a file name, and select a save destination. Then, the data are saved.

### ● Format of Saved Data

The following shows the format used when trace data is saved as a CSV file.

- A CSV File Opened in Excel

START TIME	2013/9/4 17:45	626.5																	
TRIGGER DATA NO	1251																		
TRIGGER TIME	2013/9/4 17:45	626.5	500																
DATA SIZE			BIT RELAY	BIT RELAY OUT3	BIT RELAY	BIT RELAY	BIT RELAY	BIT RELAY	BIT RELAY	BIT RELAY	WORD DEC data1	WORD DEC result1	WORD DEC Data2	WORD DEC DAT A3	WORD DEC dAT A4				
FORMAT			Always	OFI1	Scan ON	0.01 s Clock	0.02 s Clock	0.1 s Clock	0.2 s Clock	1 s Clock	2 s Clock	D00001	D00002	D00003	D00004	D00005			
TAG NAME			M00034	M00035	M00036	M00037	M00038	M00039	M00040	M00041	D00001	D00002	D00003	D00004	D00005				
COMMENT																			
DATA NO	TIME[ms]	INTERVAL	M00034	M00035	M00036	M00037	M00038	M00039	M00040	M00041	D00001	D00002	D00003	D00004	D00005				
	1252	626.5	500	0	0	0	0	0	0	0	1	0	0	5	2700	502			
	1253	627	500	0	0	0	0	0	0	0	1	1	0	6	2800	503			
	1254	627.5	500	0	0	0	0	0	0	0	1	2	0	7	2900	504			
	1255	628	500	0	0	0	0	0	0	0	1	0	0	8	3000	505			
	1256	628.5	500	0	0	0	0	0	0	0	1	1	0	9	3100	506			
	1257	629	500	0	0	0	0	0	0	0	1	2	0	3	3200	507			
	1258	629.5	500	0	0	0	0	0	0	0	1	0	0	4	3300	508			
	1259	630	500	0	0	0	0	0	0	0	1	1	0	5	3400	509			
	1260	630.5	500	0	0	0	0	0	0	0	1	2	0	6	0	510			
	1261	631	500	0	0	1	0	0	0	0	1	0	0	7	100	511			
	1262	631.5	500	0	0	1	0	0	0	0	1	1	0	8	200	512			
	1263	632	500	0	0	1	0	0	0	0	1	2	0	9	300	513			
	1264	632.5	500	0	0	1	0	0	0	0	1	0	0	3	400	514			
	1265	633	500	0	0	1	0	0	0	0	1	1	0	4	500	515			
	1266	633.5	500	0	0	1	0	0	0	0	1	2	0	5	600	516			
	1267	634	500	0	0	1	0	0	0	0	1	0	0	6	700	517			
	1268	634.5	500	0	0	1	0	0	0	0	1	1	0	7	800	518			
	1269	635	500	0	0	1	0	0	0	0	1	2	0	8	900	519			

C0503 1.VSD

- 1) START TIME: Date and time when tracing started
- 2) Trigger Data No: Data number for which the end condition was met
- 3) Trigger Time: Date and time when the end condition was met
- 4) DATA SIZE: Data type of trace data
- 5) FORMAT: Display format of trace data
- 6) TAG NAME: Address tag string
- 7) COMMENT: I/O comment
- 8) DATA NO: Trace data number (sequential number)
- 9) TIME[ms]: Relative time (elapsed time) after tracing started
- 10) INTERVAL[μs]: Trace data collection time interval

- A CSV File Opened in a Text Editor

[illegible]

C0503 2.VSD



# D1 Notes on Using the Trace Tools

This chapter describes notes on using the sampling trace tool and live logic analyzer.

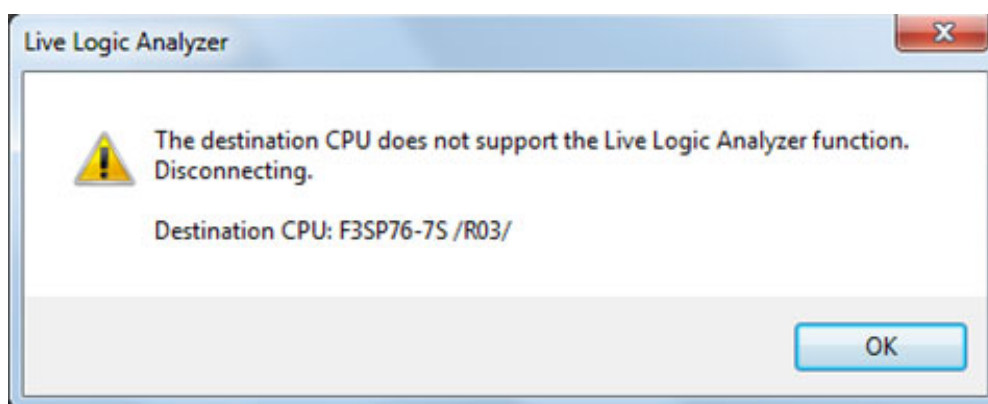
## D1.1 WideField3 and CPU Modules That Support Live Logic Analyzer

To use the live logic analyzer, you need the following versions of WideField3 and CPU modules.

- WideField3: R3.01 or later
- Sequence CPU module: F3SP71-4S, F3SP76-7S (revision 4 or later)
- Instrumentation CPU Module: F3SPV9-7S (revision 4 or later)

If the version of WideField3 is older than R3.01 and the version of the CPU module is older than revision 4, although you cannot use the live logic analyzer functions, you can use other functions.

If the version of WideField3 is R3.01 or later and the version of the CPU module is older than revision 4, when you try to make the live logic analyzer online to use it, a message appears indicating that live logic analyzer functions cannot be used for the CPU module.

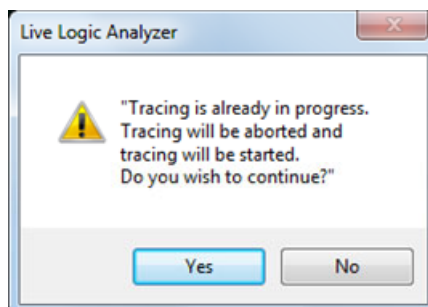


D0101\_1.VSD



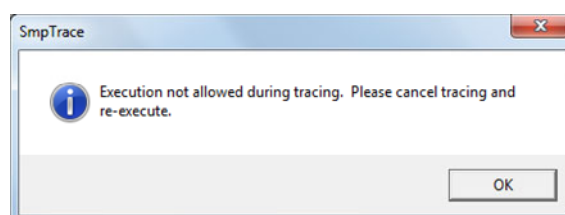
## D1.2 Using Both Live Logic Analyzer and Sampling Trace

- 1) When you start the sampling trace tool and then start the live logic analyzer, if you start executing a sampling trace from the sampling trace tool or through the configuration settings or by executing the "TRCEXE" card batch command or the "TRCEXE" virtual directory command, and then you try to execute a live logic analyzer function during the sampling trace, the following message is displayed and you cannot execute the live logic analyzer function unless you stop the sampling trace. Also, when you execute a sampling trace after a live logic analyzer function is completed, configure the sampling trace condition again before starting the sampling trace.



D0102\_1.VSD

- 2) When you execute a live logic analyzer function and then start the sampling trace tool, if you try to execute a sampling trace from the sampling trace tool, the following error message appears and you cannot execute the sampling trace.



D0102\_2.VSD

In this situation, if you try to execute a sampling trace by executing the "TRCEXE" card batch command or the "TRCEXE" virtual directory command, an error response message is returned.

- 3) When you execute the "TRCNCL" virtual directory command while a live logic analyzer function is being executed  
When an LLA is being executed, if you execute the "TRCNCL" virtual directory command, which cancels sampling trace, the live logic analyzer stops the trace operation. Also, when you select the [Cancel Trace] function in the sampling trace tool or when you press and hold the SET button with the MODE switch set to the position "D", the live logic analyzer stops the trace operation.



## D1.3 When Some Trace Data Cannot Be Obtained during an LLA

During a live logic analyzer function, if some trace data cannot be obtained and a part of a waveform is not displayed or if an LLA log item notifies that some trace data could not be obtained, there are some possible causes of it, and use the following methods to resolve the problem.

**Table D1.3 Situations with Missing Data and Appropriate Measures**

Situation	Measure
When tracing a lot of data of an advanced function I/O module	Reduce the number of device points of the advanced function I/O module to be traced.
When using TRC instructions as the tracing method	If you use multiple TRC instructions, reduce the number of TRC instructions used for tracing.
When collecting data for each scan at a high scan speed	Reduce the number of device points to be traced. Alternatively, increase the number of scans for which data is collected.
Other than above	Execute the trace on a PC not connected to a network.
	Directly connect to the CPU module without using a hub and execute the trace.
	When you use a USB connection, remove unnecessary USB devices connected to USB ports that are not connected to the live logic analyzer running on the PC.
	Execute the trace on a PC with higher specs.

## D1.4 Project Download and CPU Reset during an LLA

If you download a project or reset the CPU module during an LLA, the LLA stops.

## D1.5 Online Edit during an LLA

Even if you modify a ladder program using online editing in WideField3 during an LLA, the modification does not affect the LLA. When you made a modification related to live logic analyzer targets, the modification is immediately reflected to the display of the live logic analyzer results.

## D1.6 Communication Cable Disconnection during an LLA

If disconnection of a communication cable occurs during an LLA, for example because the cable is unplugged, although the monitoring by the live logic analyzer is stopped, the trace operation on the CPU module still continues.

To stop the data collection on the CPU module, set the MODE switch (rotary switch) on the CPU module to the position "D", and press and hold the SET switch. Then, the trace being executed will be stopped.



# FA-M3V Environment Tool

## Trace Function

IM 34M06Q50-21E

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