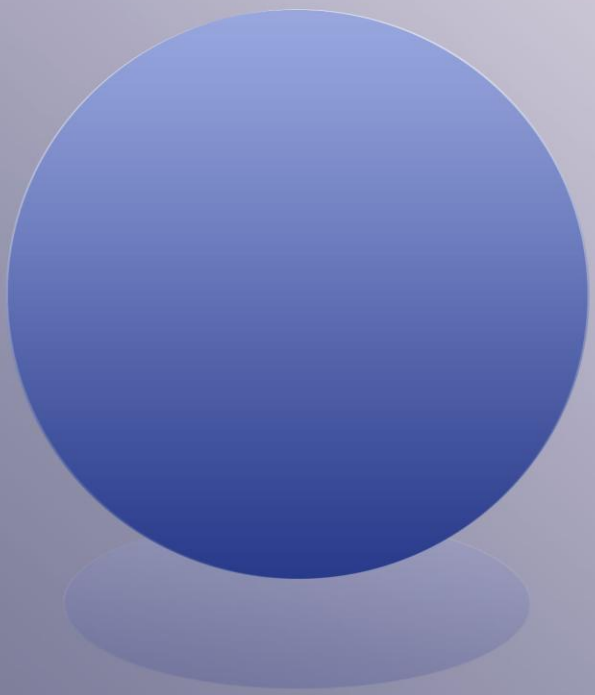
μGPCsH series

TDFlowEditor Manual: Operation



TOYODENKI

Introduction

Thank you for purchasing the Toyo Denki FA *μ*GPCsH digital controller.

This manual explains the interface of the TDFlowEditor and how to use the program. In order to use the *μ*GPCsH correctly, please read this manual first.

You should also read the related manuals below.

Title	Manual number	Content
*μ*GPCsH Series Programming Manual (Instruction Words)	QG18719	*μ*GPCsH Series memory, language, system definitions etc.
*μ*GPCsH Series User's Manual (Hardware)	QG18720	*μ*GPCsH Series system configuration, hardware specifications of each module etc.

Caution

(1) No part of this manual may be reproduced or duplicated without permission.

(2) The content of this manual is subject to change without prior notice.

(3) We have endeavored to make this manual as complete and accurate as possible. However, if you notice any errors or ambiguities, please report them to the sales office shown on the back of this manual, stating the manual number indicated on the front cover.

Safety Notice

Read the “Safety Notice” carefully before using the product and use the product accordingly. In this manual, safety-related items are divided into “Danger” and “Caution” as follows.

⚠ Danger: Mishandling may cause death or serious injury.

⚠ Caution: Mishandling may cause moderate bodily injury, minor injury or damage to property.

Note that items marked ⚠ Caution may also result in other serious consequences depending on the circumstances.

All safety notices contain important information which should be strictly observed. Matters requiring special attention are shown below, which are also indicated with the marks shown above.

⚠Danger
• Emergency stop circuits and interlock circuits should be implemented outside the PC. Malfunction of the PC may result in damage or accidents involving the machinery.

⚠Caution
• Only perform operations such as changing programs, forced output, start, stop, etc., after ensuring safety. Incorrect operation may cause the machine to function, resulting in accidents or damage to the machinery.

Revision History

* The manual number is shown at the bottom right of the cover sheet.

Date printed	* Manual number	Details of revision
2010.10	QG18721	First edition issued

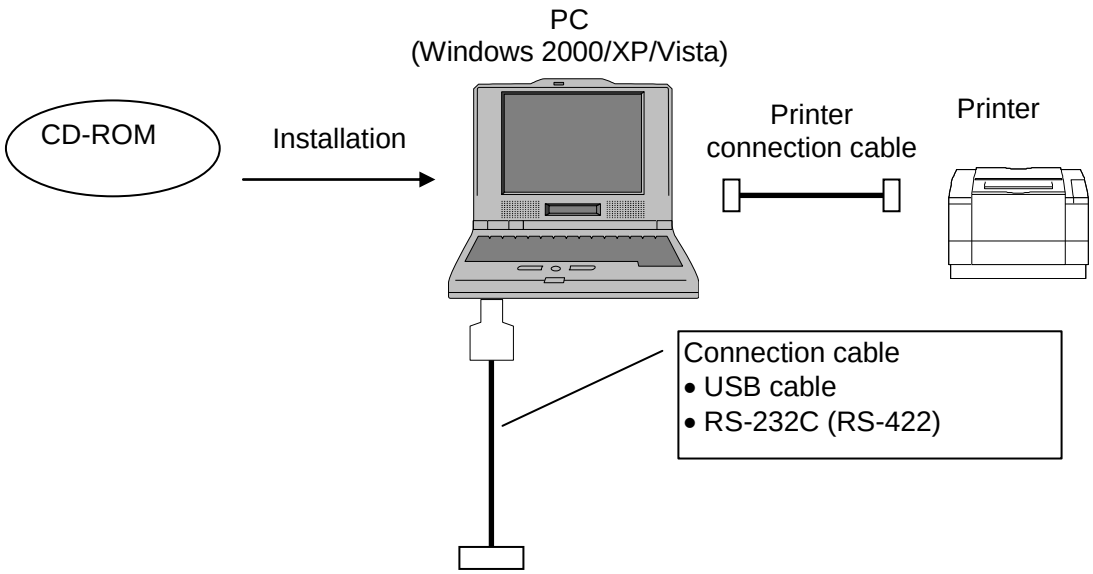
Contents

Chapter 1 Preparation and Startup of the System

1-1 Configuration of the μGPCsH Programming Tool System

1-1-1 Configuration of the μGPCsH Programming Tool System

By installing TDFlowEditor (system software) on a personal computer as shown in the figure below, it can be used as a programming tool for μGPCsH.



μGPCsH

The USB cable is a commercially available type A to mini B cable.

Recommended cable: Misumi

Type	Length
PNUC2-AM-MBM-0.9M	0.9 m
PNUC2-AM-MBM-1.8M	1.8 m

You can also connect TDFlowEditor via the Ethernet interface of the CPU module. In this case, in TDFlowEditor select “Tool” → “Environment Setup” → “ConnectCom Setup” → “Ethernet.” In “IO Allocation,” set “IP Address” and “Port Number” to the same setting as in “CPU/FL-net/Ethernet setting” → “IP Address” in the CPU module, and the same setting for PLC command port num (1) to (3).

1-2 System Requirements

1-2-1 Hardware Requirements

To run TDFlowEditor, the following hardware requirements must be met.

- An IBM-compatible personal computer or DOS/V personal computer with Intel Pentium CPU (300 MHz or more recommended).
- Windows VGA resolution 800×600 or higher (SVGA 1024×768 recommended).
- Free hard disk space of 100 MB or more.
- Memory of 32 MB or more.
- CD-ROM drive.

1-2-2 Software Requirements

To run TDFlowEditor, one of the following operating systems is required.

Microsoft Windows 2000 (English or Japanese)

Microsoft Windows XP (English or Japanese)

Microsoft Windows Vista (English or Japanese)

Pentium and Windows are registered trademarks.

1-3 Installation and Uninstallation

1-3-1 Installation

The TDFlowEditor software package is delivered on a CD-ROM. The installation disk includes an installer program that automatic installs the software.

When the installation is performed over a network, the program may not be copied and installed correctly depending on the network environment and the environment of use.

Installation

(1) Disable antivirus software, screensavers and other software that runs in the background.

(2) In Windows 2000, XP or Vista, click “Start” and select “Control Panel.”

(3) In the “Control Panel” click “Change/Remove.”

(4) Click “Install.”

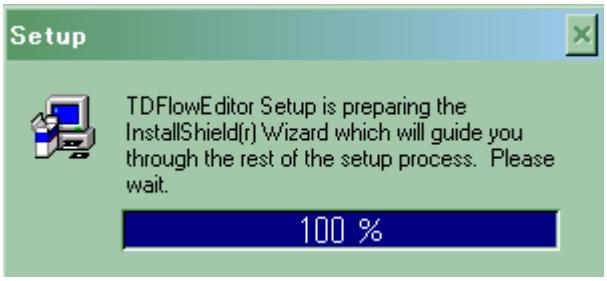
(5) Insert the CD-ROM in the CD-ROM drive.

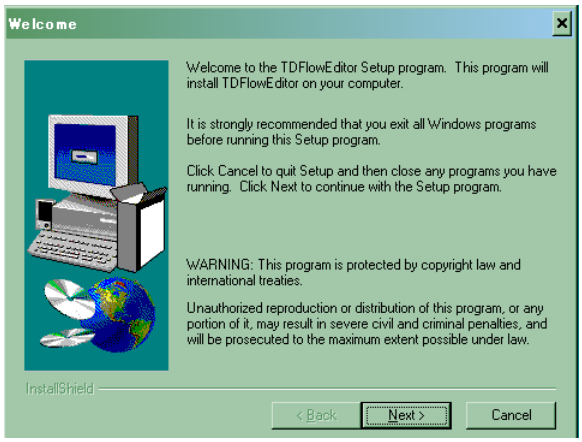
(6) Click “Next.”

(7) Check that “[CD-ROM drive name]:¥Setup.exe” is displayed in the command line text box of the installer. If it is not, click “Browse,” select the CD-ROM drive and select “Setup.exe.”

(8) The InstallShield Wizard dialog box appears.

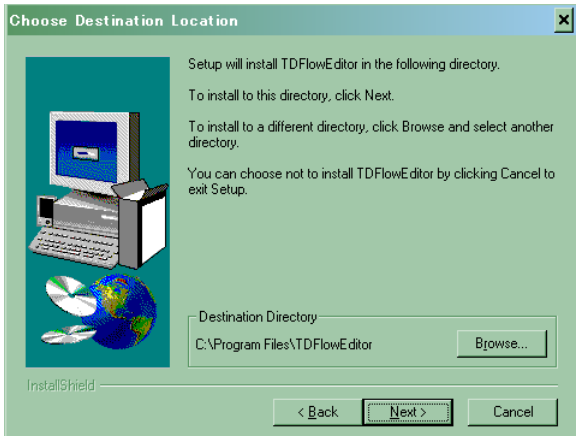
Note: The installer detects the language of the OS and if the OS is English, TDFlowEditor starts up in English.





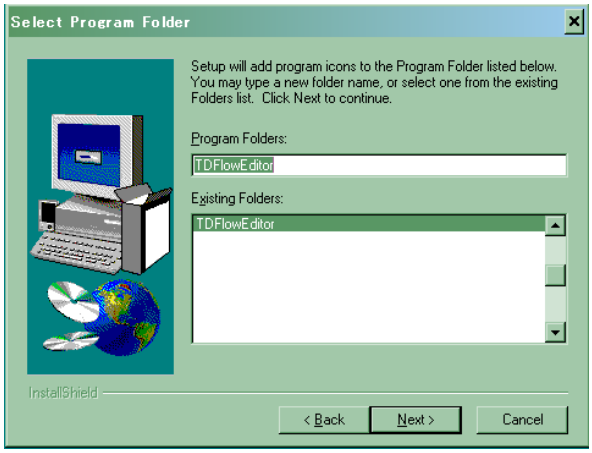
The dialog box on the left appears.

Click “Next” to start the installation. Clicking “Cancel” stops the installation.



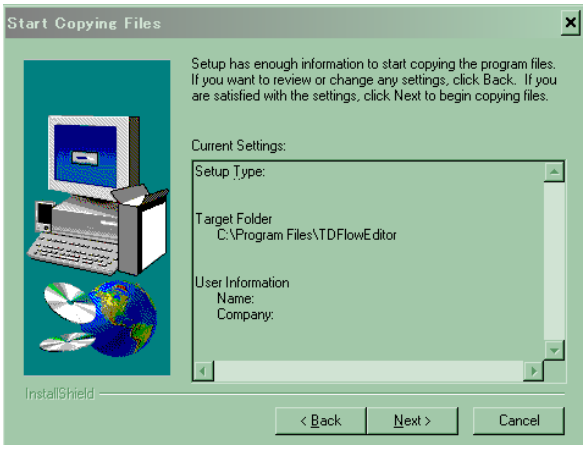
Specify a folder for the installation.

If you do not want to change the folder, click “Next.” To change the folder, click “Browse” and select a folder.



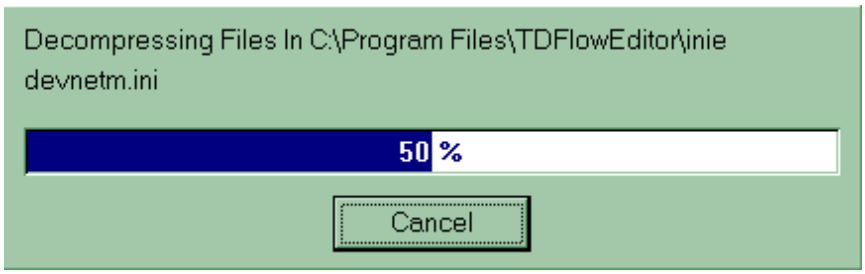
Select a group for the installation. Normally, this should not be changed.

Note: The English language font of the installer cannot display Japanese application names correctly, but this does not affect the operation of the software.

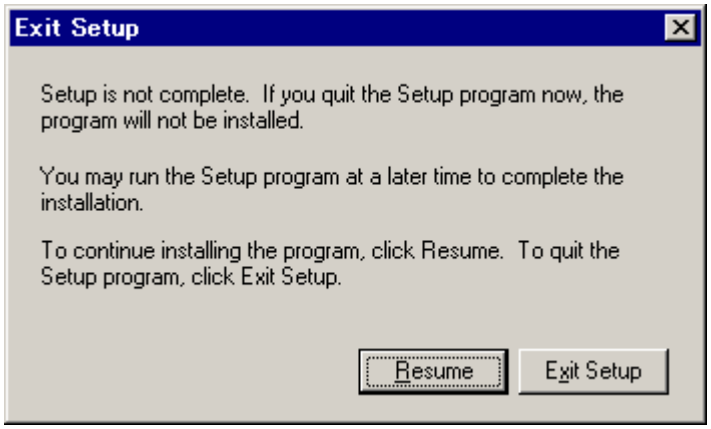


A dialog box to confirm the installation appears. If the information displayed is correct, click “Next.” The installation starts.

Clicking “Cancel” during the installation pauses the operation.



The following dialog box appears.



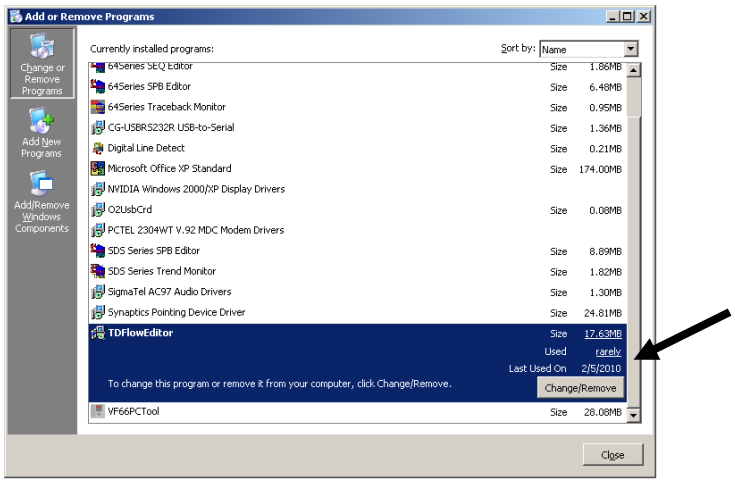
Clicking “Resume” resumes the installation. Clicking “Exit Setup” exits the installer.

1-3-2 Uninstallation

(1) In Windows 2000, XP or Vista, click “Start” and select “Control Panel.”

(2) In the “Control Panel,” click “Change/Remove.”

(3) Select TDFlowEditor and click “Add and Remove.”



The message box “Are you sure you want to completely remove the selected application and all of its components?” appears.

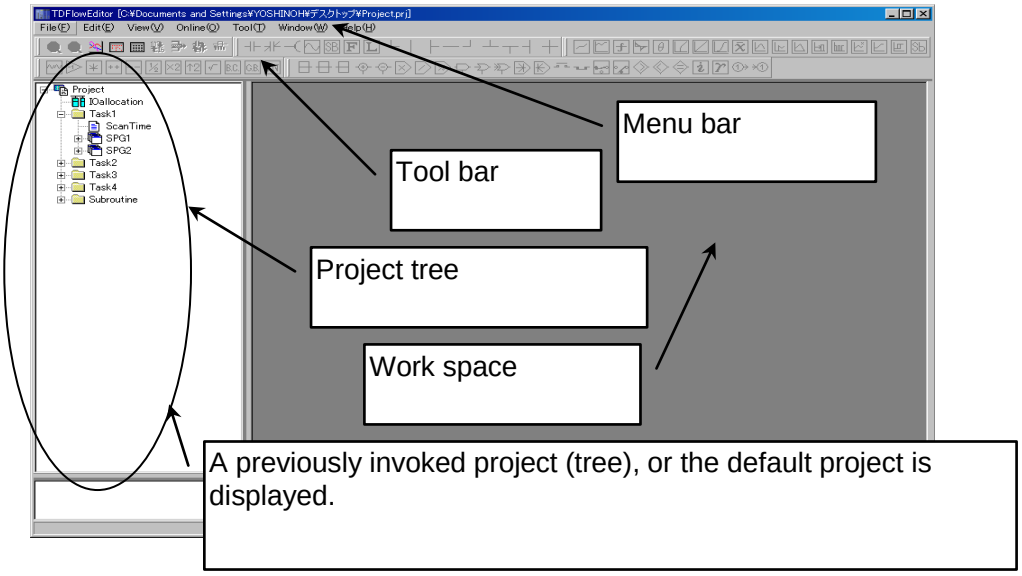
Click “Yes” to uninstall the program. Click “No” to cancel uninstallation.

Chapter 2 TDFlowEditor User Interface

2-1 TDFlowEditor Interface and Functions

2-1-1 TDFlowEditor Interface

When TDFlowEditor starts, the following window appears.



- Project tree
  The project is displayed as a tree. Double-clicking an item opens a window for editing the item.
- Work space
  Displays a window for editing items.

Menu bar	A menu of functions
File	Commands for configuring, saving, designing and printing projects.
Edit	Commands for editing the configuration of subprograms in the project.
View	Commands for displaying cross references in the project and displaying and hiding tool bars.
Online	Commands for uploading and downloading projects, controlling the μGPCsH, and displaying the status of the μGPCsH.
Tool	Environment settings for tools, and trace back settings. The environment settings for tools include the color of each window, TDFlowEditor settings, and settings for communication with the μGPCsH.
Window	Commands for changing the appearance of the window.
Help	Displays the TDFlowEditor “Version” information.

The items in the “File,” “Edit,” and “View” menus differ according to the task being performed.

2-1-2 Tool Bar

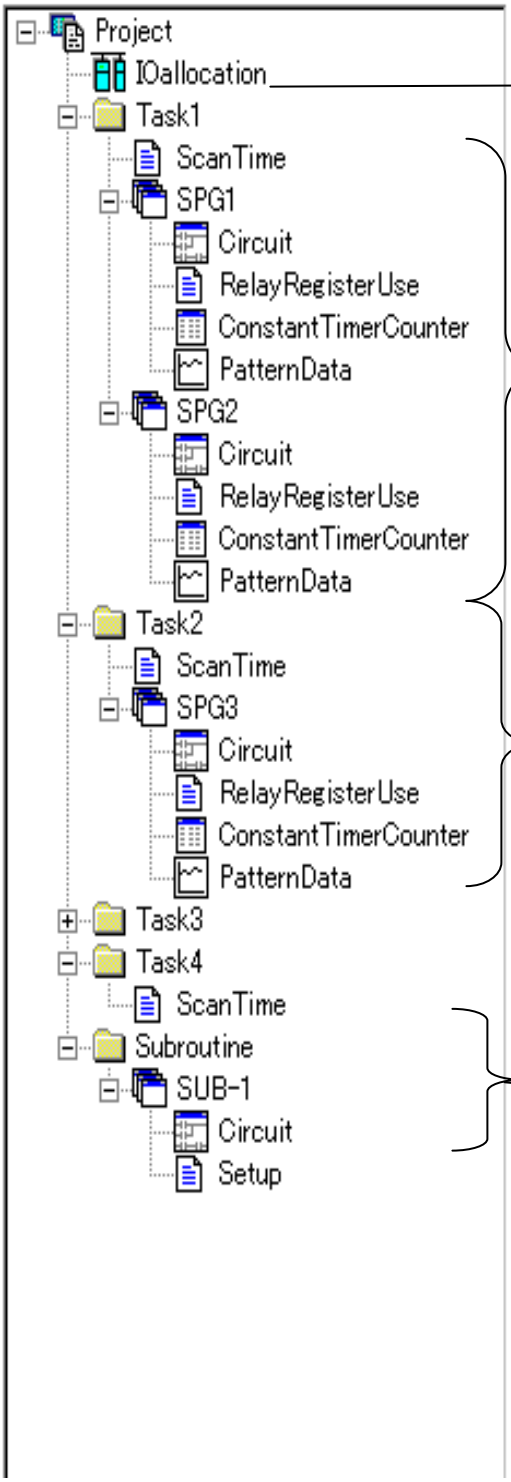
The tool bar contains buttons for operations that are used frequently, grouped together for convenience.

Chapter 3 Creating a Project

3-1 Projects

3-1-1 The TDFlowEditor Window

The project tree is a window that displays the items required for editing. The tree consists of the group “IO allocation,” “Task 1,” “Task 2,” “Task 3,” “Task 4,” and “Subroutine.”



IO allocation

Performs μGPCsH IO allocation.

Task 1

Consists of one or more programs. Each program is executed in order, starting from the top. SPG1 and SPG2 are the names of programs.

Task 2

Consists of one or more programs (in this case, one). Each program is executed in order, starting from the top.

SPG3 is the name of the program. Task 3 and Task 4 are the same.

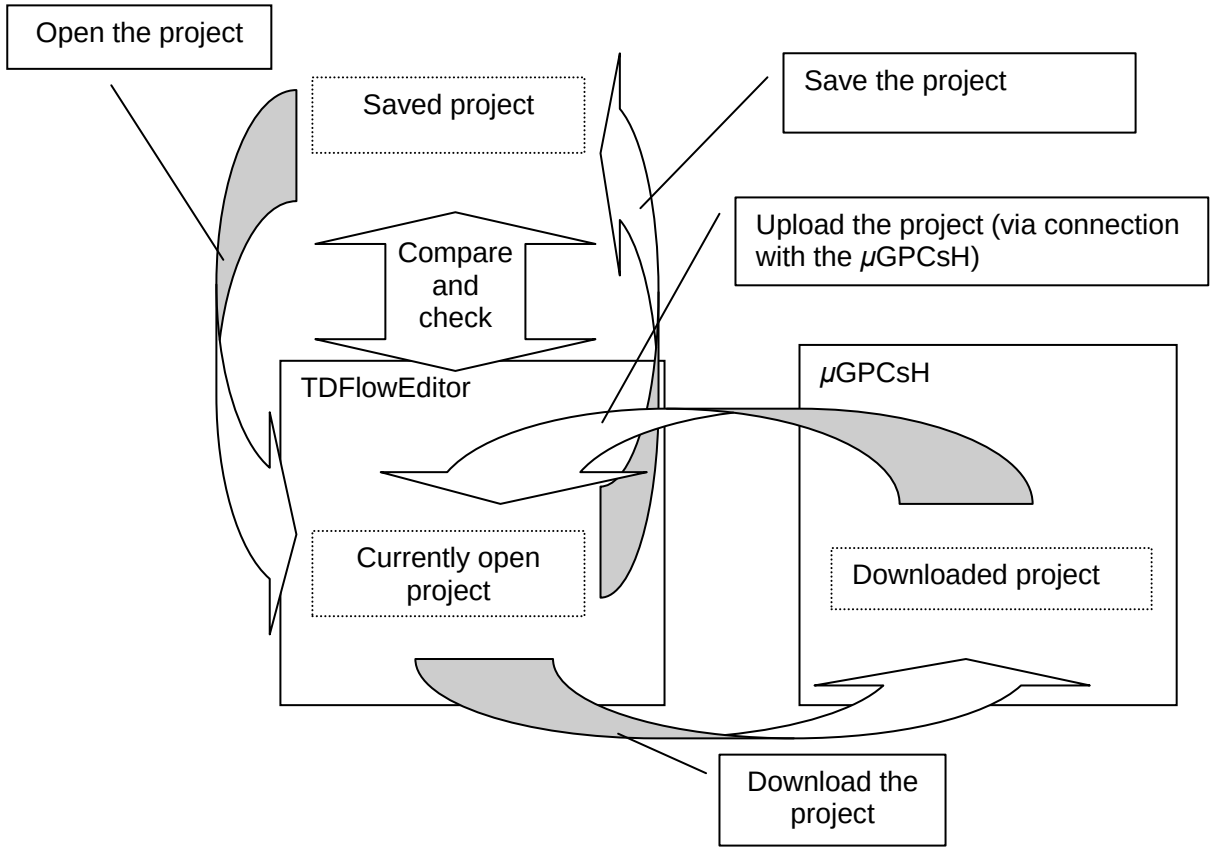
Subroutine

Consists of subroutines that can be called from a subprogram. The settings include the arguments of the subroutine and the range of use of the stack register.

3-1-2 What Is a Project?

A *μ*GPCsH application program consists of IO allocation and tasks in a single CPU. Collectively, these are called a “project.”

The relationship between TDFlowEditor and projects in the *μ*GPCsH

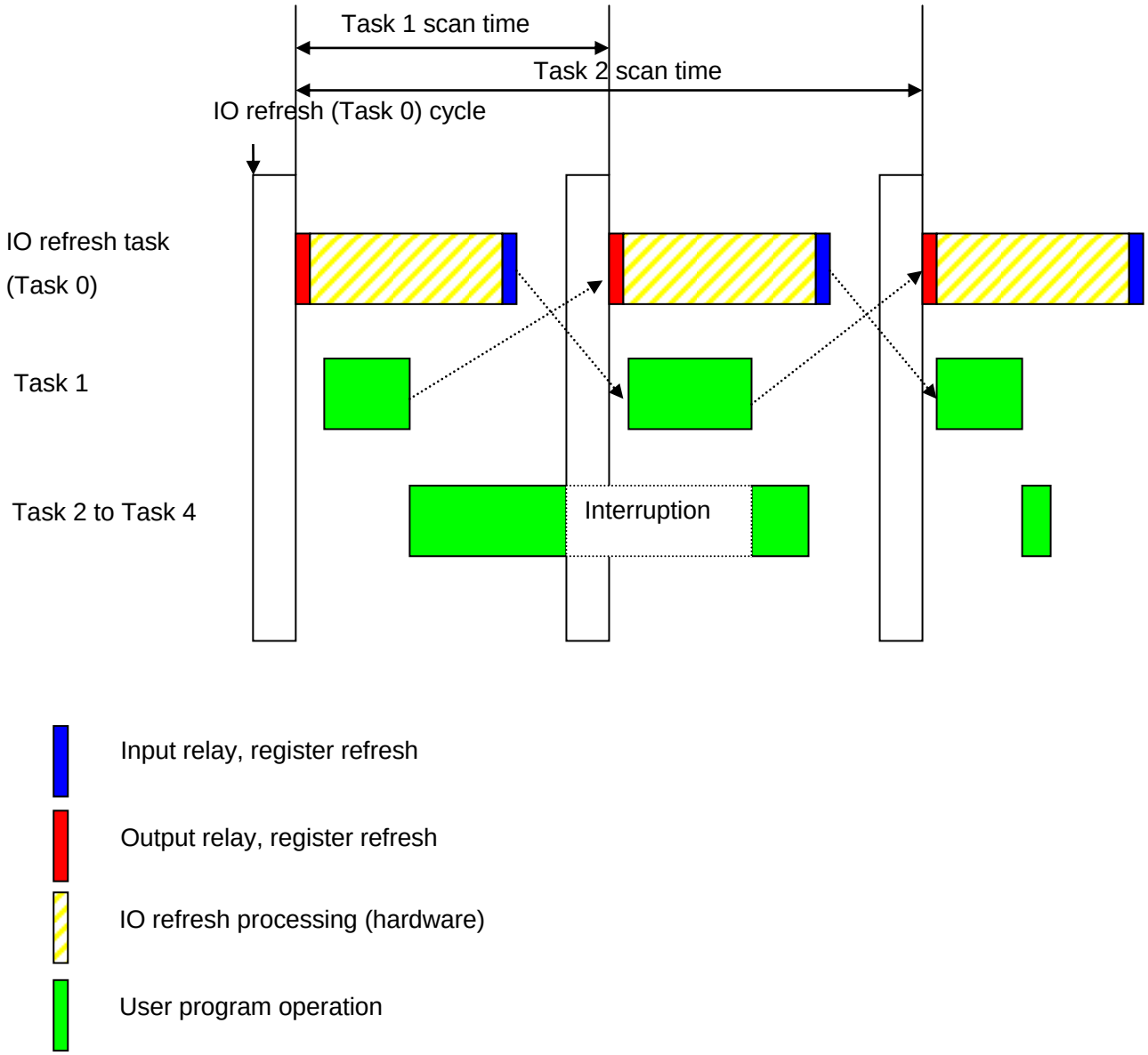


Tree item	Content
IO allocation	Edit the IO configuration of the *μ*GPCsH system.
Task 1 Task 2 Task 3 Task 4	A task determines the processing of subprograms (execution time schedule). Up to four tasks can be executed at one time. However, Task 1 has a higher priority than Task 2. Several programs exist in Task 1, Task 2, Task 3, and Task 4, and these include circuits, relay register use marks, constant data, and pattern data. You can define separate scan times for Task 1, Task 2, Task 3, and Task 4 for running *μ*GPCsH.
Subroutine	A subroutine is a circuit that can be called from a subprogram. It can be called from the multiple subprograms that exist in Task 1, Task 2, Task 3, and Task 4. (A subroutine cannot be called from another subroutine.)

3-1-3 What Are Task 1, Task 2, Task 3, and Task 4?

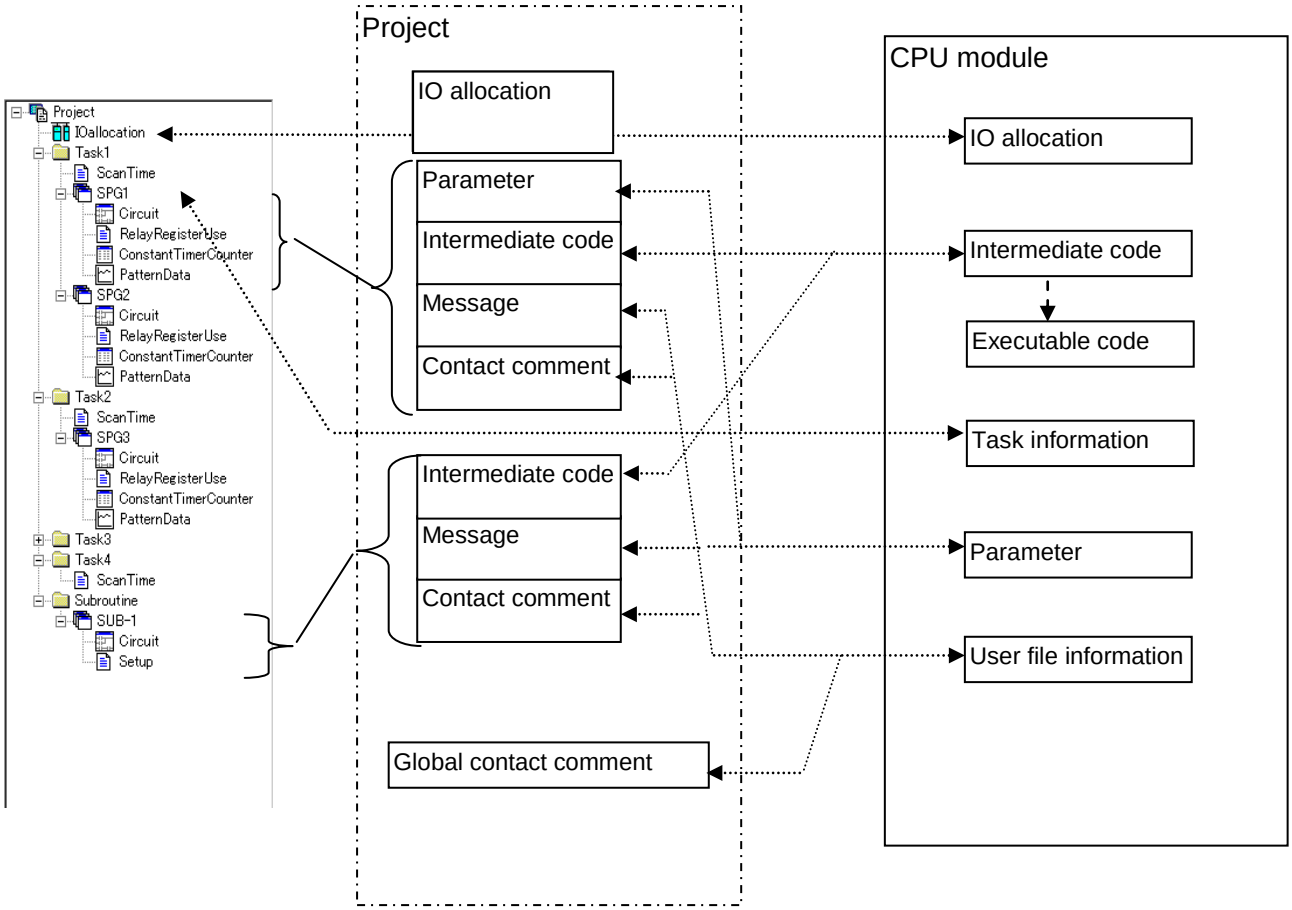
A task determines the processing of subprograms (execution time schedule) from the scan time. The *μ*GPCsH series has four types of processes, Task 1, Task 2, Task 3, and Task 4. The numbers 1, 2, 3, and 4 indicate the priority of the tasks, and 1 has the highest priority.

Operation of the Tasks



3-1-4 Projects in the μGPCsH

Correspondence between the μGPCsH and TDFlowEditor



Processing that performs downloading only.

Processing that performs downloading and uploading.

3-2 Editing a Project

3-2-1 Creating a Project

File menu	Content
New Project	Creates a new project. When the program is started for the first time, a new project is created automatically. Once a project has been edited, the project is automatically opened from the next time you start the program.
Project/Compress Project Open	Opens an existing project or compressed project (a project saved with “Save a Project by Compression”).
Project Save	Saves the current project. When working on a new project (when the topmost item of the project tree is displayed as “Project”), enter the name of a project to overwrite.
Project Save As…	Save the project with a different name.
Project Compression Save	Saves files in a project as a single compressed file. (The name of the project and the name of the file saved by compression are different.)
Print	Prints the content of the project.
CPU Change	Changes the type of CPU.
Compare Check	Compares the currently open project and a saved project.

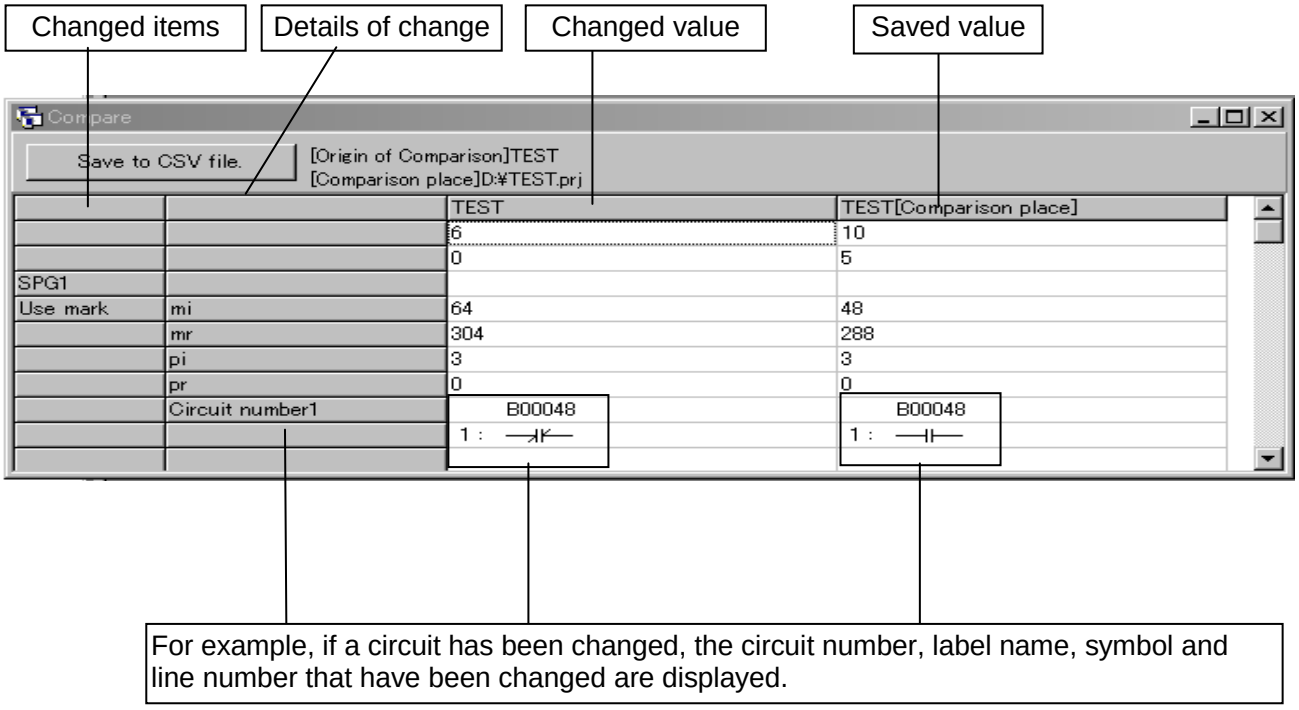
“Save a Project by Compression” is best suited for making a copy onto a floppy disk or for creating a backup file.

3-2-2 Compare and Check

Compare and check compares the currently open project and a saved project. To perform “Compare and Check” online with a project that is downloaded in the *μ*GPCsH, upload the project using “Online” and “PLC Connection” and select “Compare and Check.” If any difference is found, that part is displayed.

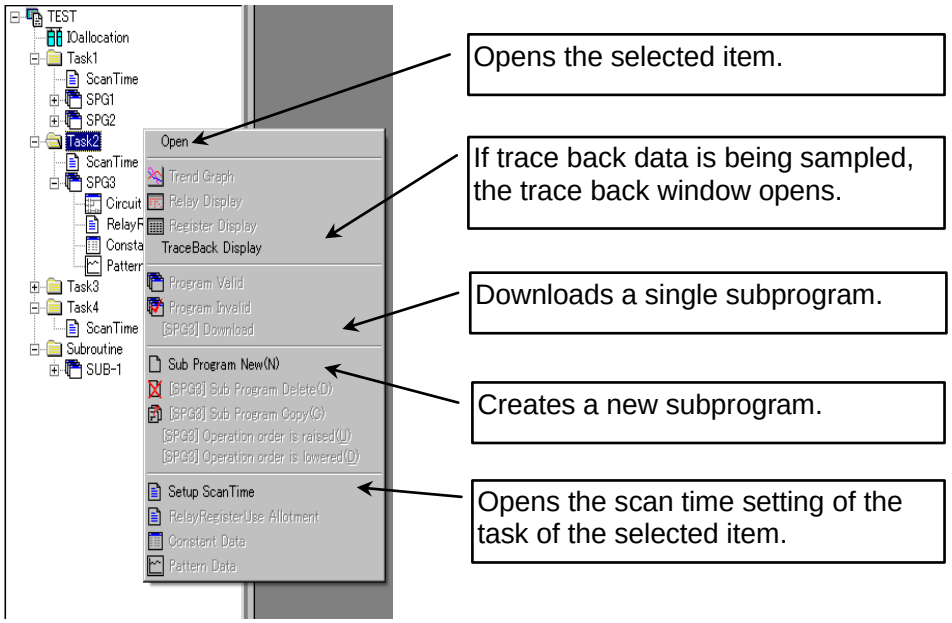
Items covered by compare and check

- System definition
- Scan time
- Trace back settings
- Circuit
- Relays and registers used
- Constant, timer and counter
- Pattern data

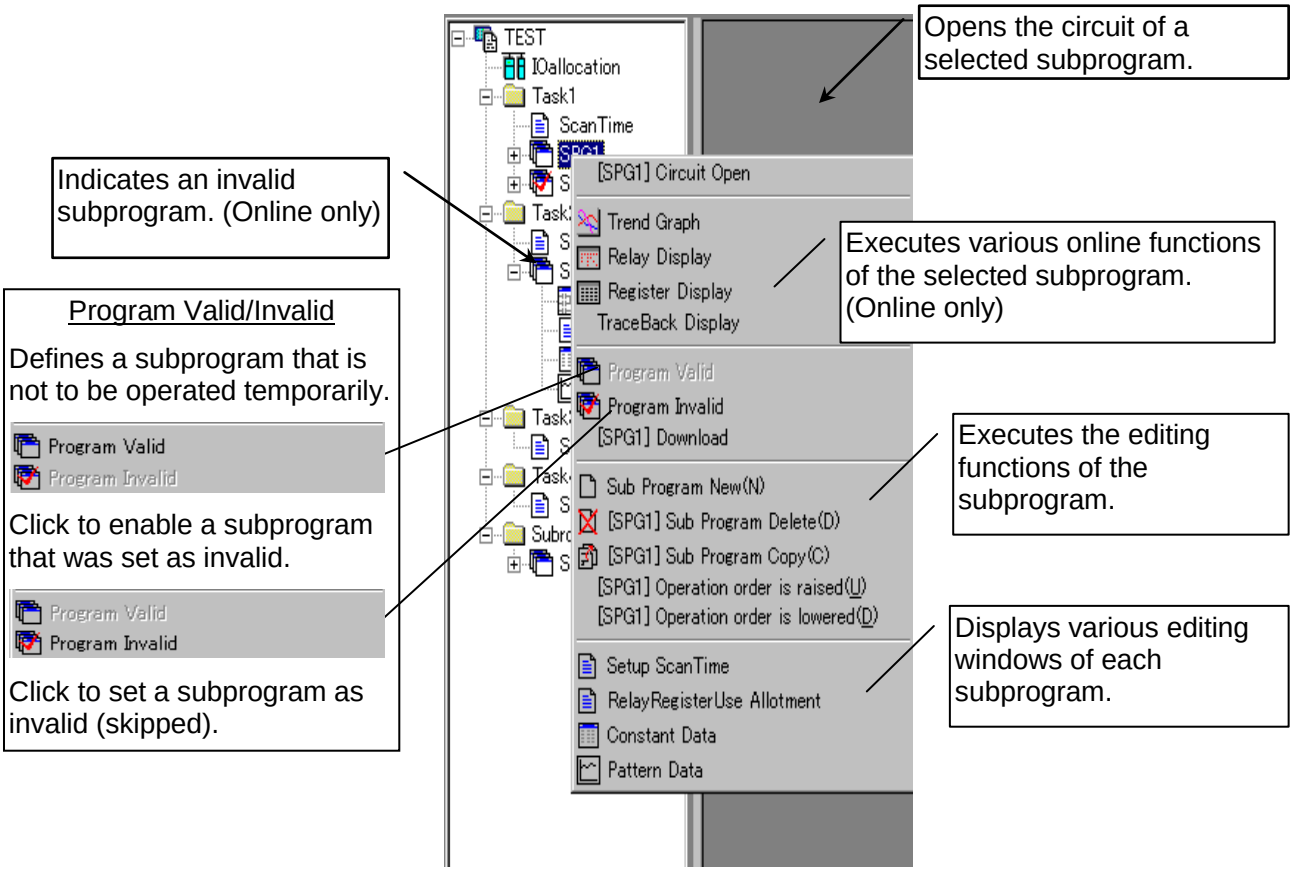


3-2-3 Tree Node Pop-Up Menus

When an item other than the name of a subprogram (tree node) is selected, the following menu is displayed.



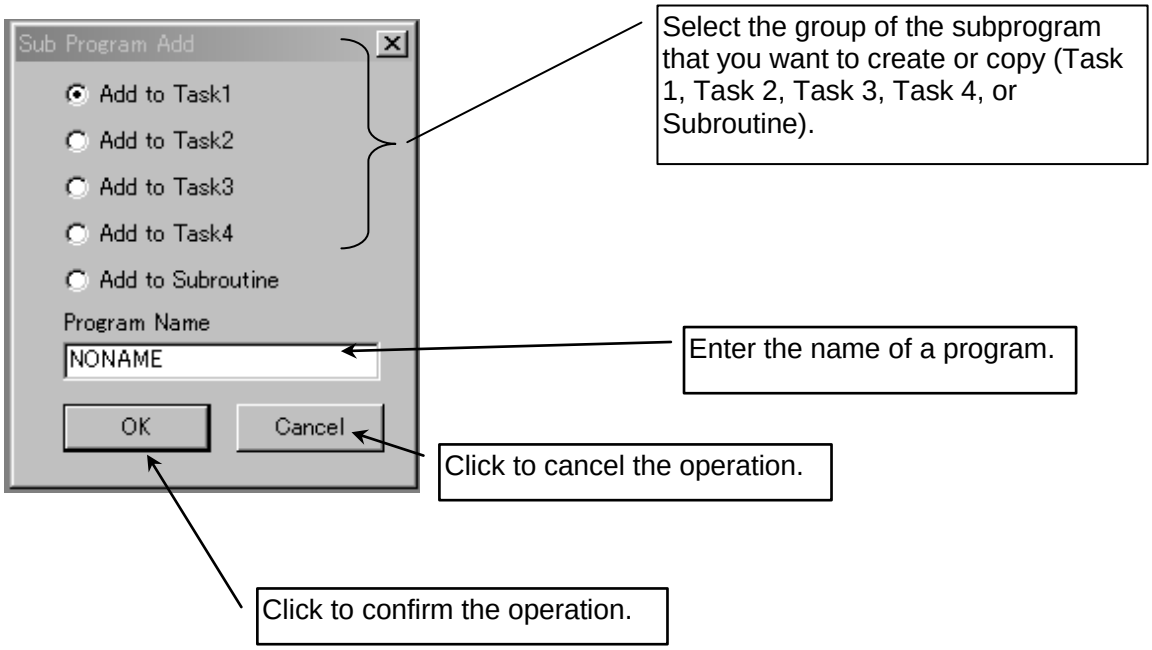
When an item of a subprogram (tree node) is selected, the following menu is displayed.



3-2-4 Editing a Project

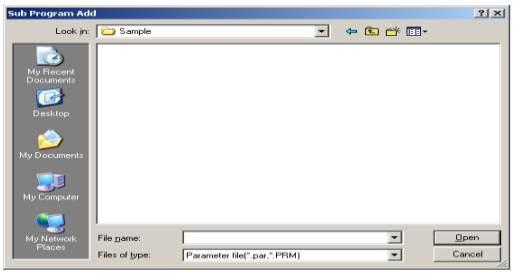
Edit Menu	Content
Operation order is raised	Raises the order of operation of the subprogram selected in a project tree.
Operation order is lowered	Lowers the order of operation of the subprogram selected in a project tree.
Change the Program Name	Allows you to change the name of a selected subprogram. To change a subprogram name, choose the subprogram in the project tree and execute this command.
Create a New Program	Creates a new subprogram.
Delete a Program	Deletes the selected subprogram.
Copy a Program	Copies the subprogram and uses it to create a new subprogram.
Addition of a Program	Adds a program.
Relay Display, Register Display, TraceBack Display	
All Program Cross Reference	Finds and displays cross references related to all subprograms in the project.

When creating a new subprogram or making a copy of a subprogram, the following dialog box is displayed.



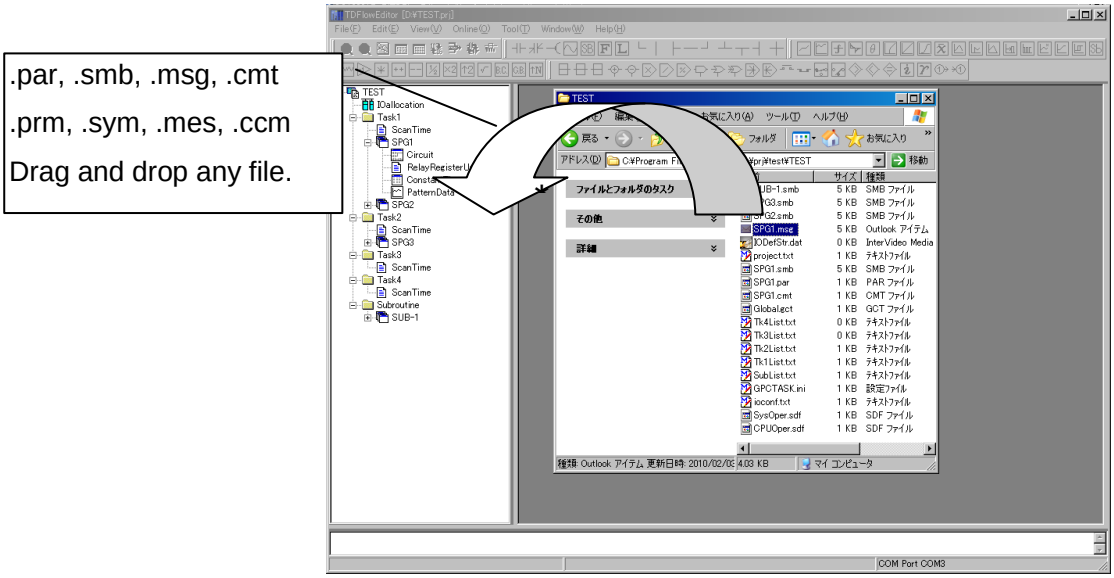
3-2-5 Addition of a Program

Adds a program. The Sub Program Add dialog box appears.

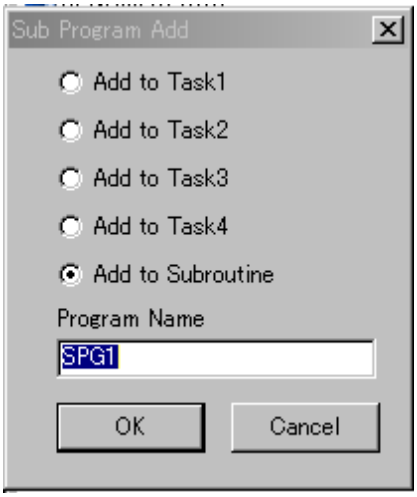


Select a file that was prepared with the *μ*-GPCH, *μ*GPCsx, or *μ*GPCsH (Extension: .par/.smb/.msg/.cmt)

Alternatively, you can add a subprogram by dragging and dropping from Windows Explorer into the project tree.



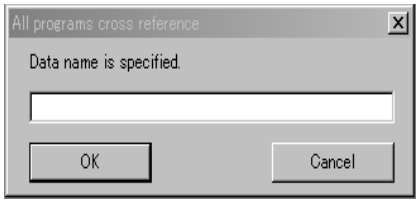
The Sub Program Add dialog box appears. Enter a program name and click “OK.”



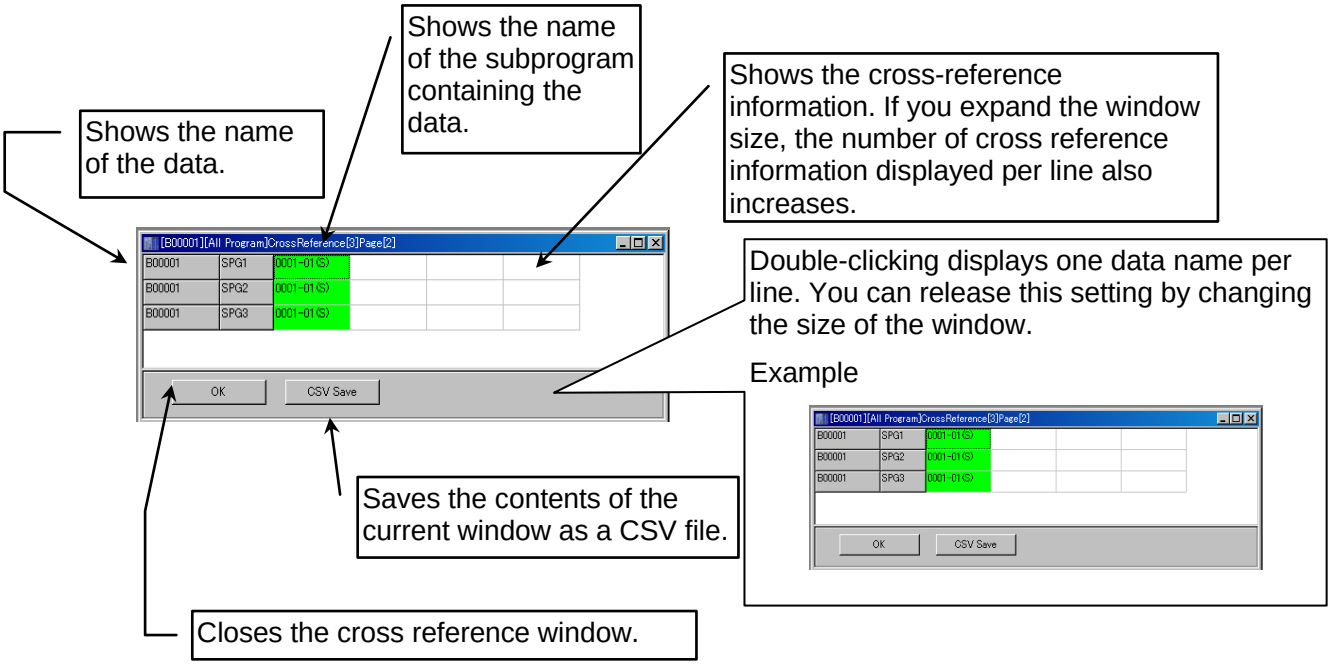
3-2-6 All Program Cross Reference

Finds cross references concerning all subprograms and subroutines in the project.

You can enter only a data attribute, for example “G0” or “mi,” or you can enter it with the offset part, as in “G00000” or “mi00000.”



Cross reference example



Cross reference information

XXXX-YY (Z)

XXXX: Circuit number

YY: Line number

Z L: Load (contact), S: Store (coil)

I: Function, subroutine argument (input)

O: Function, subroutine argument (output)

b: Unconditional execution subroutine

f: Unconditional execution function

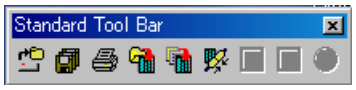
B: Conditional execution subroutine

F: Conditional execution function

You can change the colors of S, I, O in “Tool” → “Environment Setting.”

3-2-7 Tool Bars

Select whether to show or hide each tool bar.

Standard Tool Bar	
Common Tool Bar	
Ladder Tool Bar (Only available during circuit editing)	
Operation Tool Bar (Only available during circuit editing)	
Function 1 Tool Bar (Only available during circuit editing)	
Function 2 Tool Bar (Only available during circuit editing)	
Trend Tool Bar (Only available with the trend graph)	

The buttons feature icons designed to show what they are for, but you can also place the mouse pointer over any button to display a label showing the name of the tool (command name).

Chapter 4 Editing a Circuit

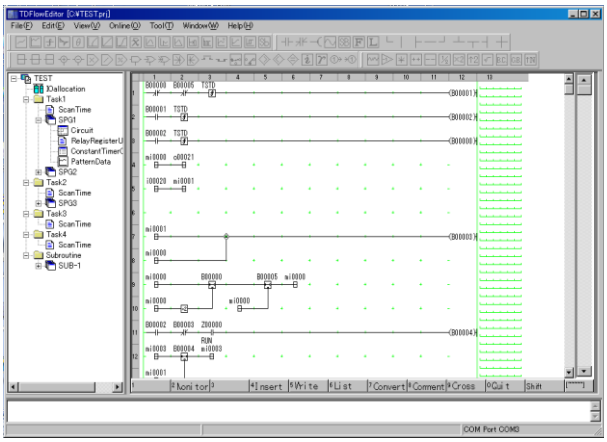
4-1 Editing the Circuit of a Subprogram or Subroutine

4-1-1 Circuit Window Modes

The circuit window has five modes.

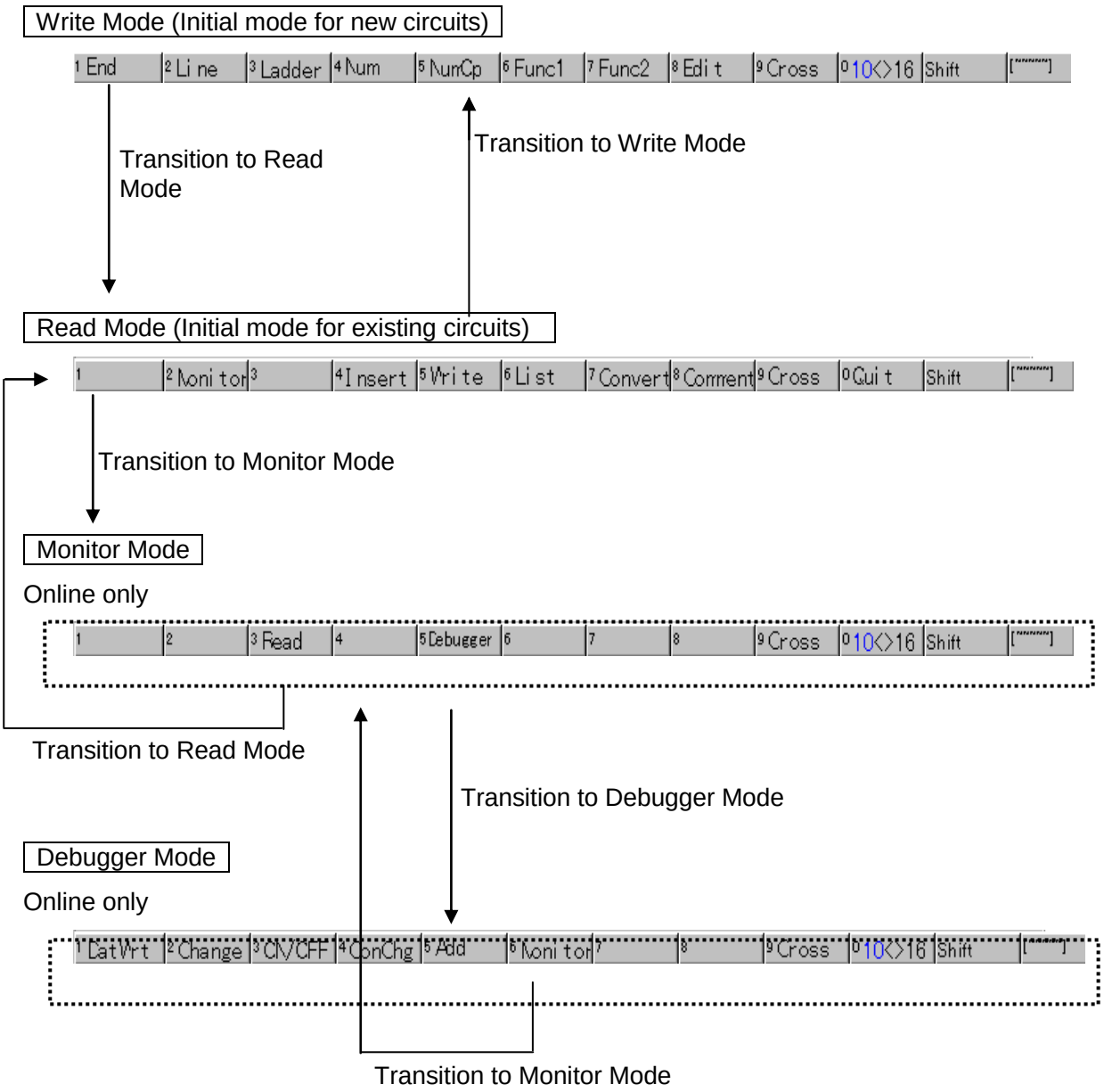
Mode	Content
Read Mode	The initial mode when an existing circuit is opened. You can only view the content of a circuit. From this mode, you can move to each of the other modes.
Write Mode	You can edit circuits in this mode.
Monitor Mode	You can monitor the operating status of the *μ*GPCsH circuit.
Debugger Mode	You can perform various debugging functions.
Circuit Listing	Displays a circuit in the form of single-page slides.

Read Mode window



4-1-2 Transition between Modes

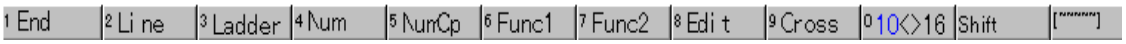
The transition between modes is shown in the diagram below.



4-2 Write Mode

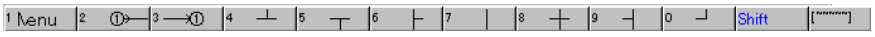
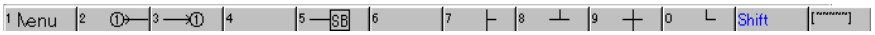
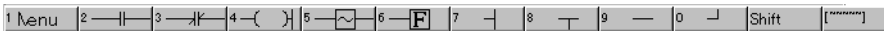
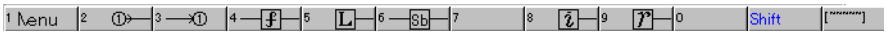
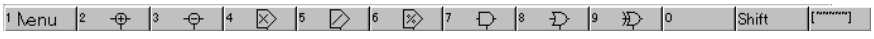
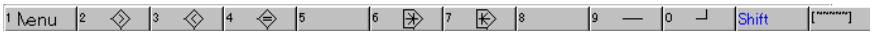
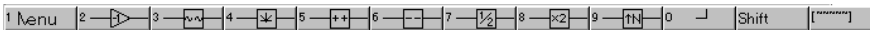
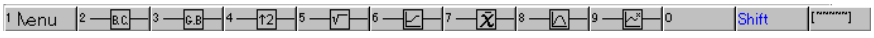
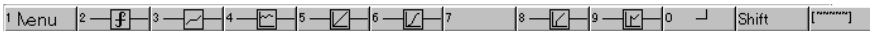
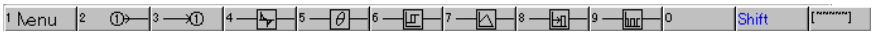
4-2-1 Basic Write Mode Operations

Function key arrangement (main menu of the Write Mode)



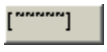
"End"
Ends the Write Mode and moves to the Read Mode.

"Control Line" "Ladder" "Numeral" "Numeric Operation" "Function 1" "Function 2"
These function keys switch to the following menus of symbols for insertion.

Control Line		
Ladder		
	Shift	
Numeral		
	Shift	
Numeric Operation		
	Shift	
Function 1		
	Shift	
Function 2		
	Shift	

Shift
Switches each function menu.

You can move the function menu to the top or bottom of the window.

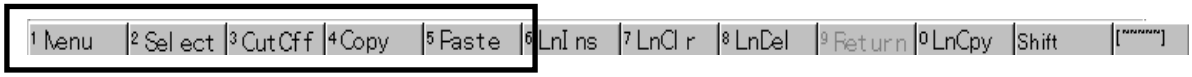
 Currently at the bottom. Click to move to the top.

 Currently at the top. Click to move to the bottom.

This setting will also be reflected next time you start the program.

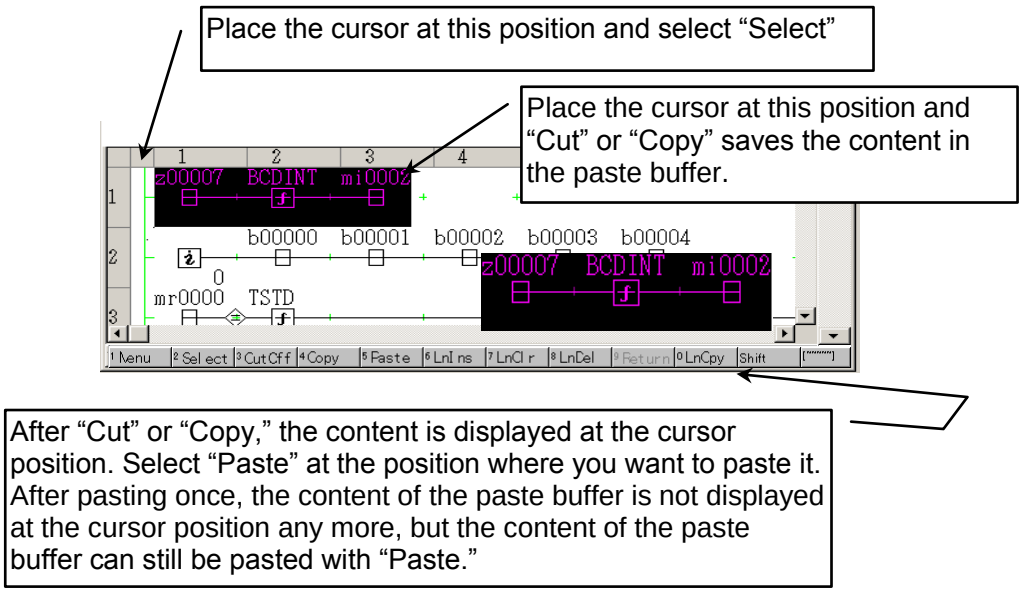
4-2-2 Edit Menu

Edit: Switches to the edit menu.

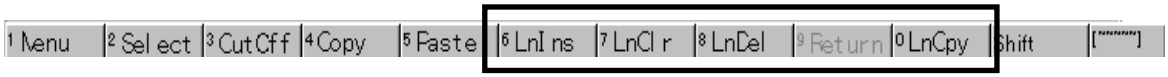


Menu	Content
Main Menu	Returns to the main menu of the Write Mode.
Select	The cursor position becomes the starting point for selecting the range for cutting or copying.
Cut	Cuts the area enclosed in the box.
Copy	Copies the area enclosed in the box.
Paste	Pastes the cut or copied content.
Cancel	The box drawn at the cursor position is canceled. (The select operation is canceled.)

Selecting with the box



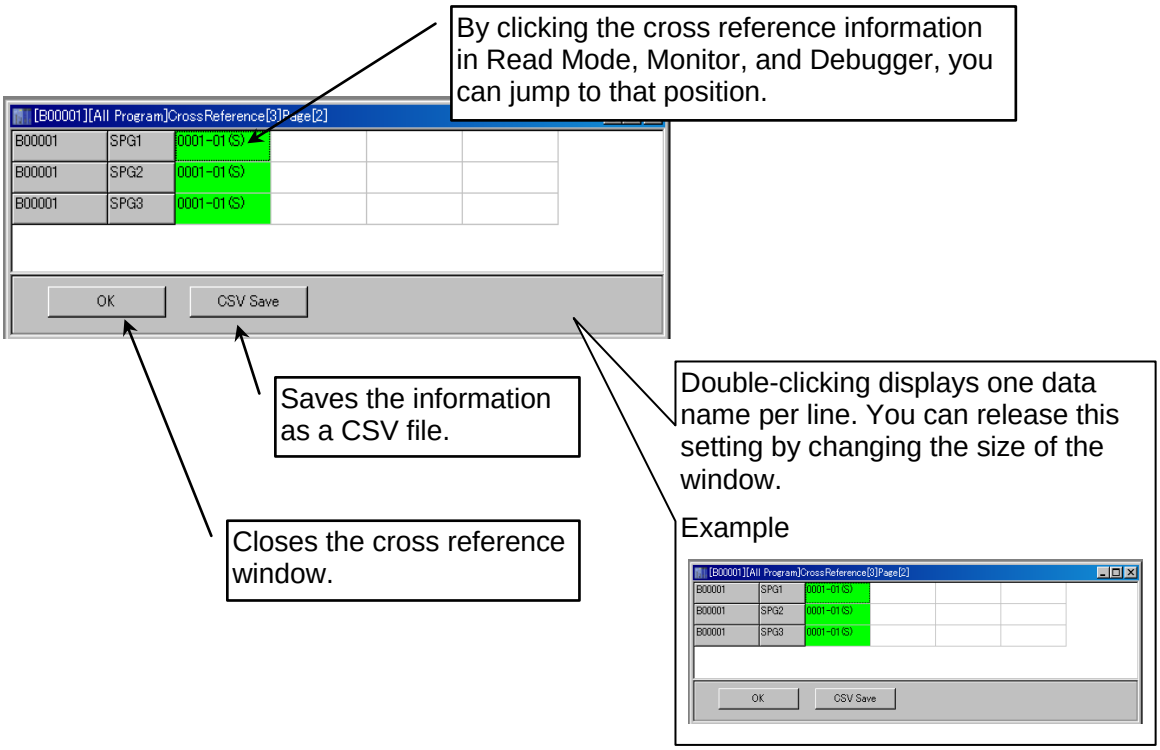
Note that you can also select “Select,” “Cut,” “Copy,” and “Paste” from the Menu Bar or by right-clicking to display the pop-up menu.



Menu	Content
Line Insert	Inserts a single line at the cursor position.
Line Clear	Clears the line at the cursor position.
Line Delete	Clears the line at the cursor position, deleting a single line.
Return	Cancels the last “Line Clear” or “Line Delete” operation once only.
Line Copy	Copies the line at the cursor position into the first space line below the cursor line.

4-2-3 Cross Reference

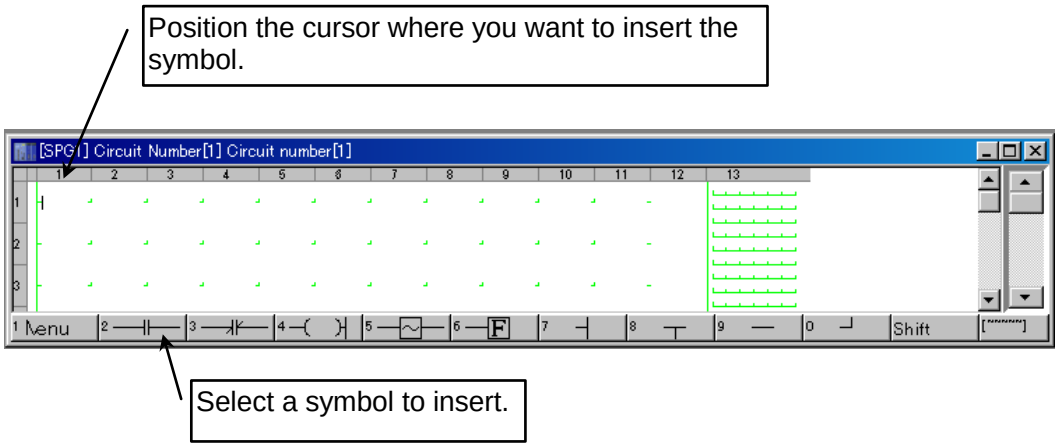
Displays cross references.

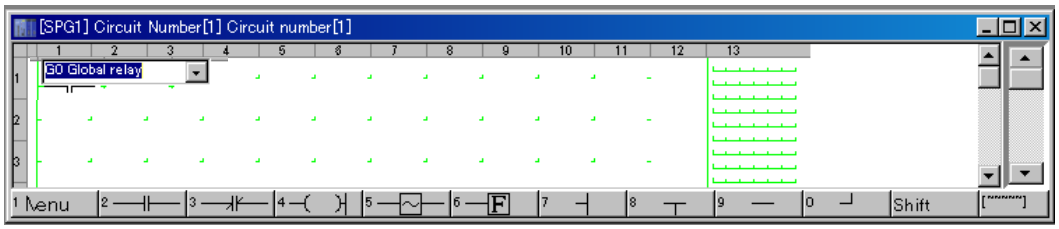


"10<>16"
Switches the integer data used in the circuit between decimal and hexadecimal. The current mode is shown in blue.

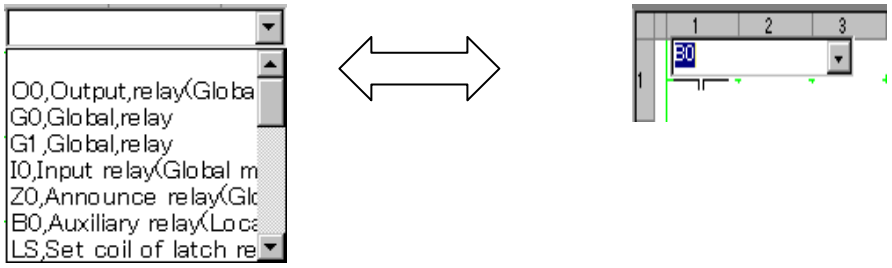
Decimal display Hexadecimal display

4-2-4 Inserting an A Contact

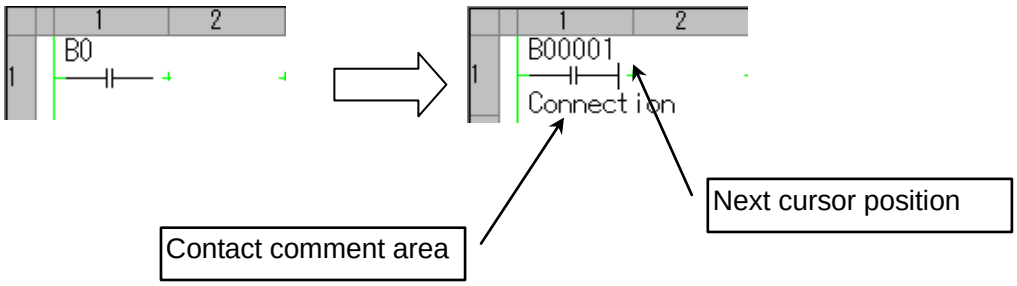




Select a relay name from the list box. You can also enter a name directly in the list box.

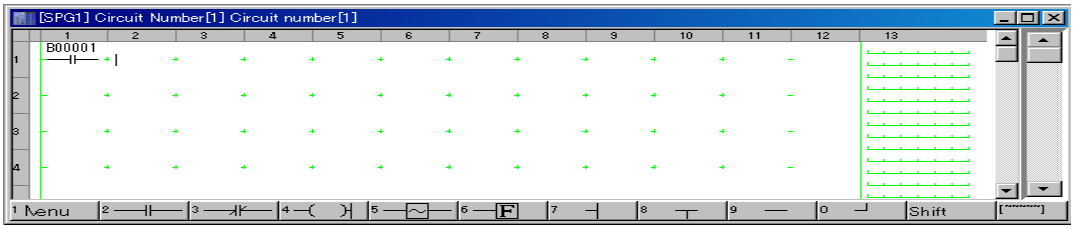


Directly enter a relay number. If necessary, enter a contact comment. Press the [Enter] key to move to the next cursor position.

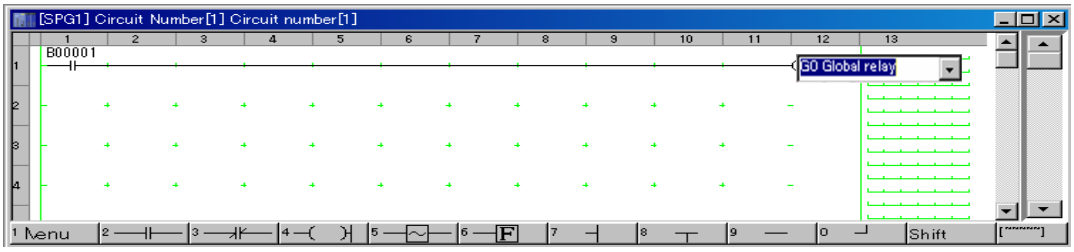


4-2-5 Inputting a Coil

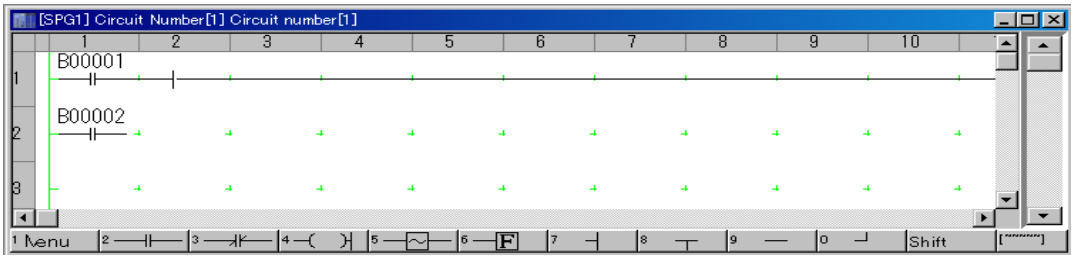
Place the cursor after the contact symbol.

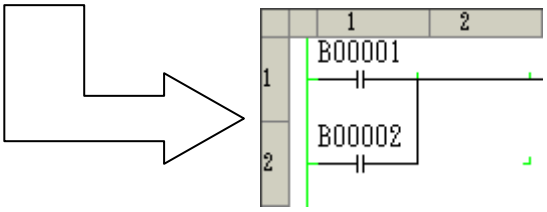


Select a coil symbol and the following ladder appears.



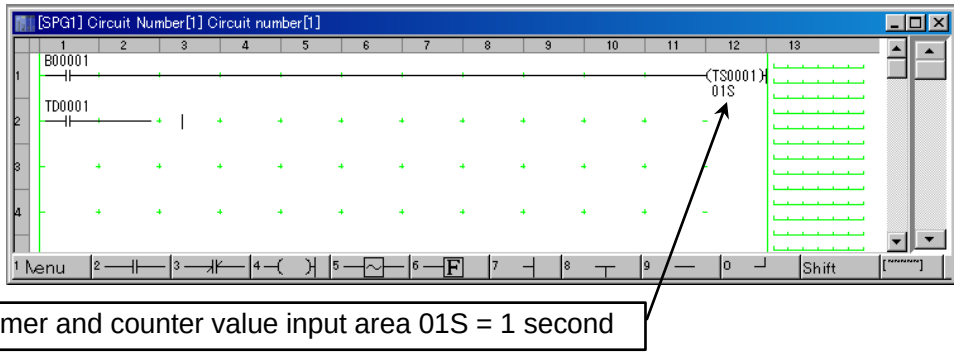
Example of entering an AND circuit: In the following situation, when you insert a control line symbol, the required line is added automatically.



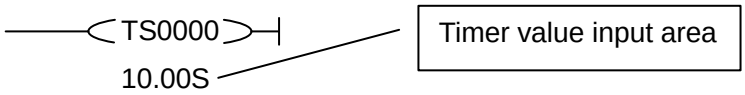


Example of setting a timer coil

Enter timer and counter values below the coil.



4-2-6 Designating a Timer



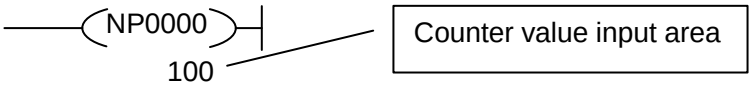
Enter a timer name and in the line below, enter a timer value. 00.00S is displayed if the timer value is zero. If you do not enter a timer value, the current value remains unchanged.

Timer value input format

Input	Content			
00H00M	Sexagesimal	H: Hour	Sexagesimal	M: Minute
00M00S	Sexagesimal	M: Minute	Sexagesimal	S: Second
00.00S	Decimal S: Second			

You can also set the timer value in the Constant Timer Counter window. If you use the same timer name with a different value, the one with a higher Line No. is valid, and if you specify a different circuit, the value of the most recently edited circuit is valid.

Designating a Counter



Enter a counter name and in the line below, enter a counter value. 000000 is displayed if the counter value is zero. If you do not enter a counter value, the current value remains unchanged.

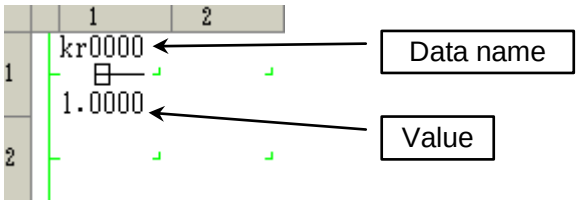
Counter value setting range

0 to 65535

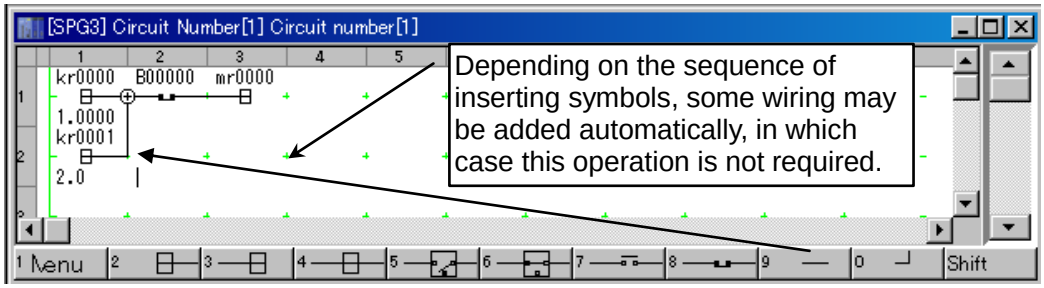
You can also set the counter value in the Parameter window. If you use the same counter name with a different value, the one with a higher Line No. is valid, and if you specify a different circuit, the value of the most recently edited circuit is valid.

4-2-7 Entering a Data Flow

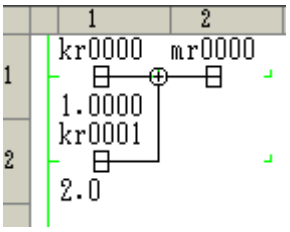
To enter constant data, insert a load instruction and enter a value under the name.



Insert the addition symbol at the cross point (+) to the right of the load instruction.

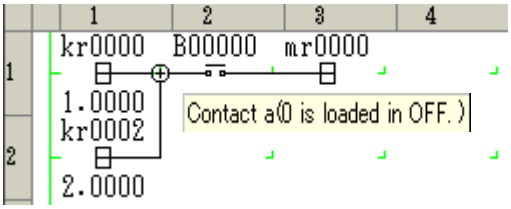


After inserting a load instruction below, add wiring.



The data flow is always terminated with a store instruction.

Insert an example of a symbol input accompanied by a data name between the cross points.



4-2-8 Constant Representation

Input a numeral in the line below the symbol.

When the constant value is zero,

Integer type (kiXXXX): 000000

Real number type (krXXXX): .00000

are displayed.

Example of a constant input

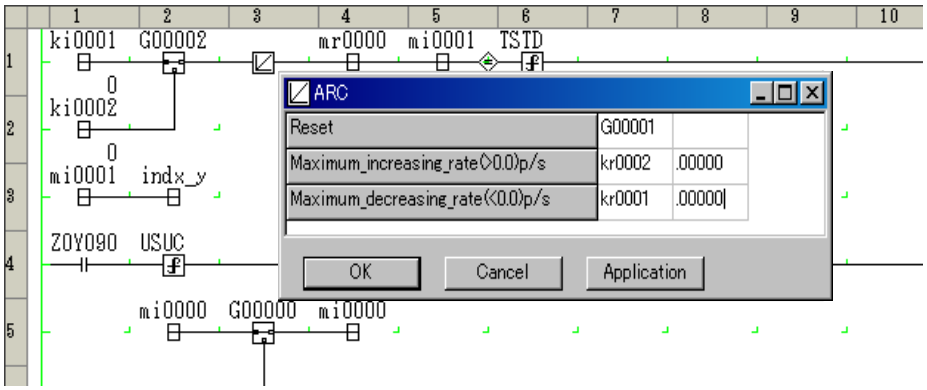
Item	Content	
Integer	123 (Decimal)	80H (Hexadecimal)
	-123 (Decimal)	8005H (Hexadecimal)
Real number	123.4	.12345
	-123.4	-.2345

For a real number less than 1, the digit of 1 is omitted.

You can also set the constant value in the Parameter window. If you enter a different value in a constant with the same constant name, the one with a higher Line No. is valid, and if you specify a different circuit, the value of the most recently edited circuit is valid.

4-2-9 Function Symbol

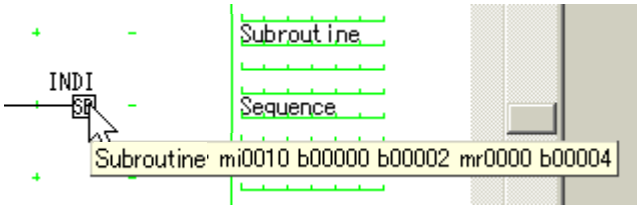
After you insert a function symbol, the argument setting window appears.



After closing the argument setting window, you can display it again by double-clicking the function symbol. For the parameters of each function, refer to the Programming Manual.

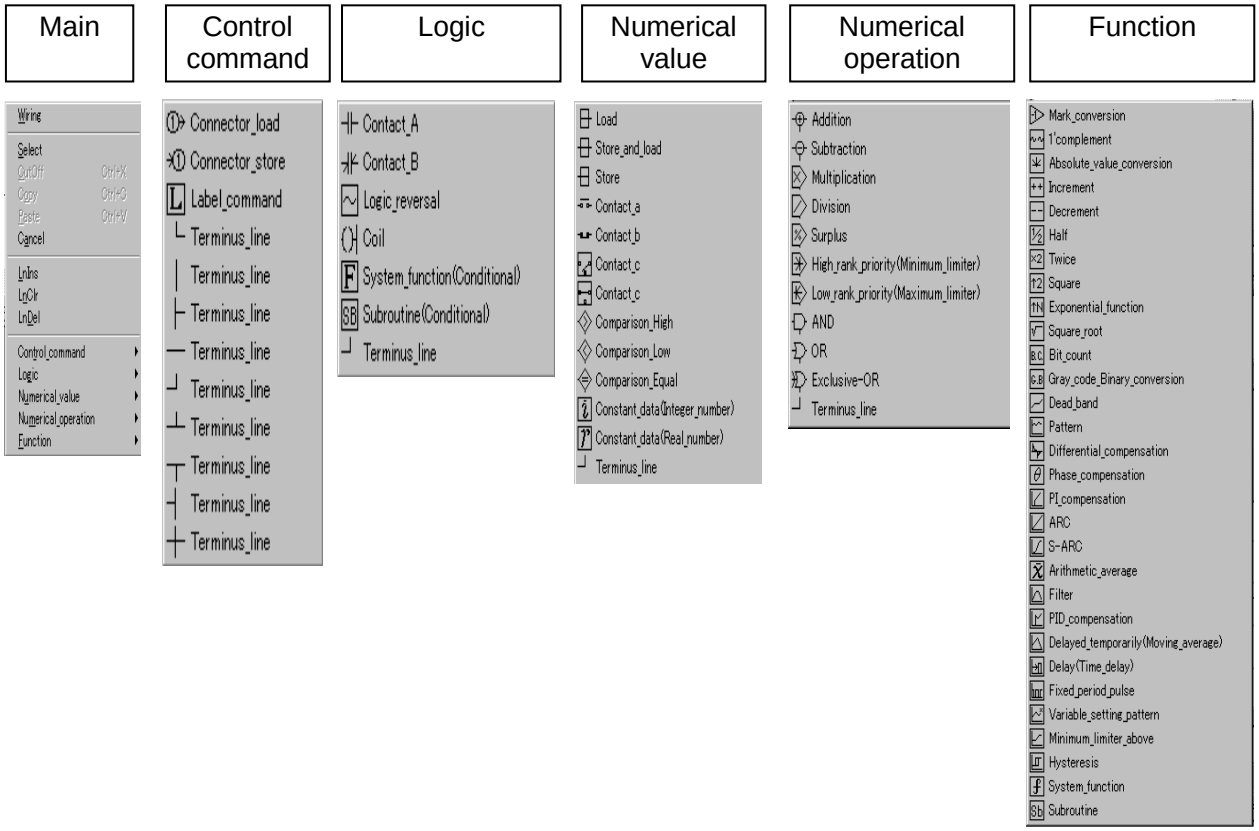
You can also input symbols by right-clicking.

The parameters of the function or subroutine are displayed when you place the mouse pointer on a function symbol or subroutine symbol.



4-2-10 Pop-Up Menus

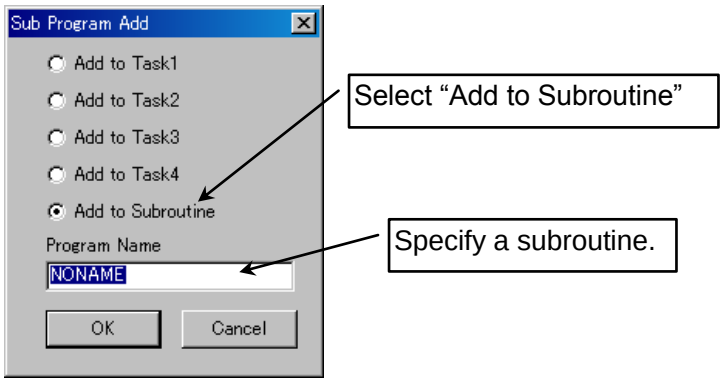
Right-click to display a pop-up menu of symbol insertion functions and editing functions. The pop-up menu has the following sub-menus.



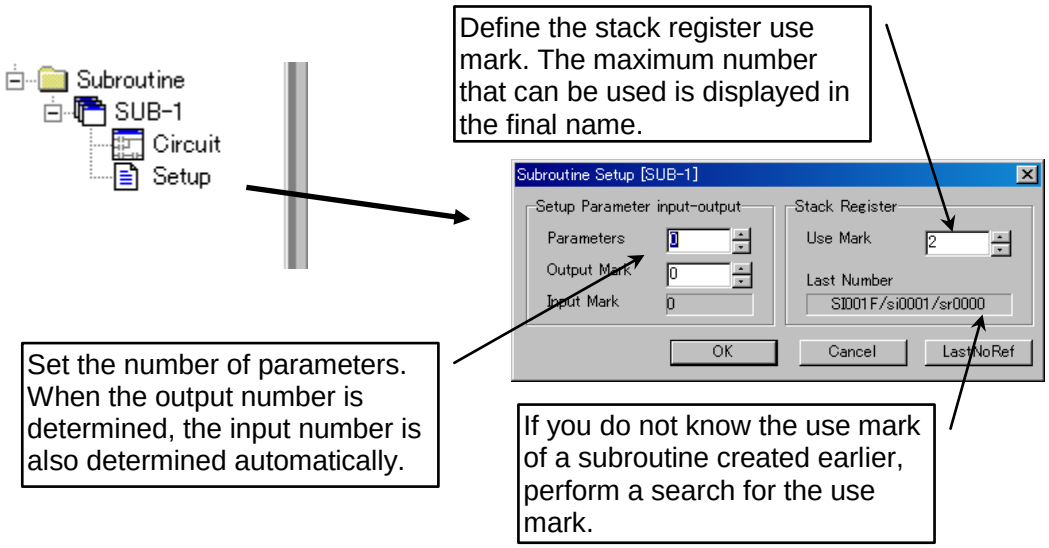
4-3 Designing a Subroutine

4-3-1 Adding a Subroutine

Create a new program in a project tree to add a subroutine.

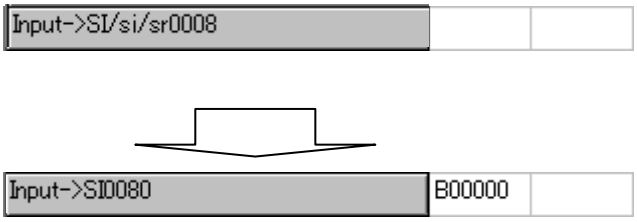


Set the subroutine.

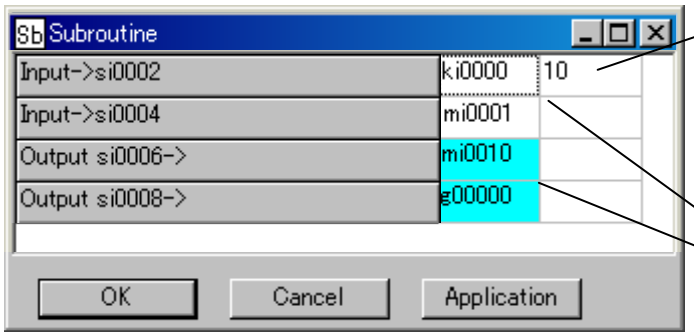


4-3-2 Editing a Subroutine

The transmission of data with a subroutine is performed using arguments. An argument means a parameter that is passed from an invoking circuit to a subroutine program, or the result of an operation that the circuit receives from the subroutine. The number of parameters (number of inputs and outputs) that are set in the subroutine setting screen on the preceding page is reflected in the argument setting screen. The input and output parts are distinguished by their color. On the left, input the label name to be passed to the subroutine for input, or a label name to be received from the subroutine for output. As an argument, you can set a relay symbol name in addition to a numerical register name.



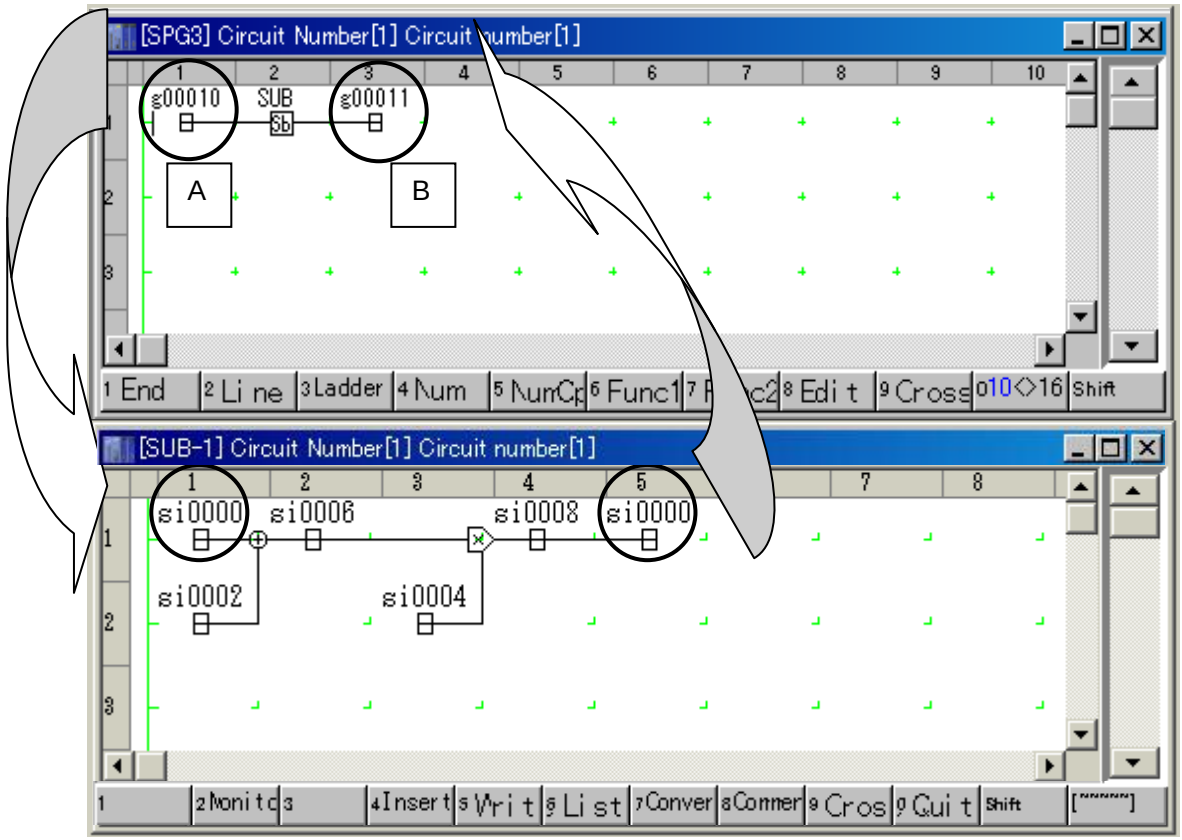
When you input a label name, the type of argument is selected automatically.



When you use a constant (ki, kr), input the label name on the left and the value on the right.

The input and output are distinguished by their color.

Example of the definitions of arguments



When you use si0000 (or sr0000 or SI0000) as a stack register as shown in the subroutine in the figure above, the data is passed as shown by the arrows. “A” on the invoking side is an input, and “B” is an output.

Flow of the subroutine shown in the figure above

(1) The invoker value g00010 is loaded in si0000, and the value ki0000(=10) set with the argument is loaded in si0002. These two values are added in the subroutine.

(2) In si0006, the value calculated in (1) is stored, and is stored in mi0010 as set by the argument.

(3) The value of mi0001 set by the argument is loaded in si0004, and is multiplied by the result of (2).

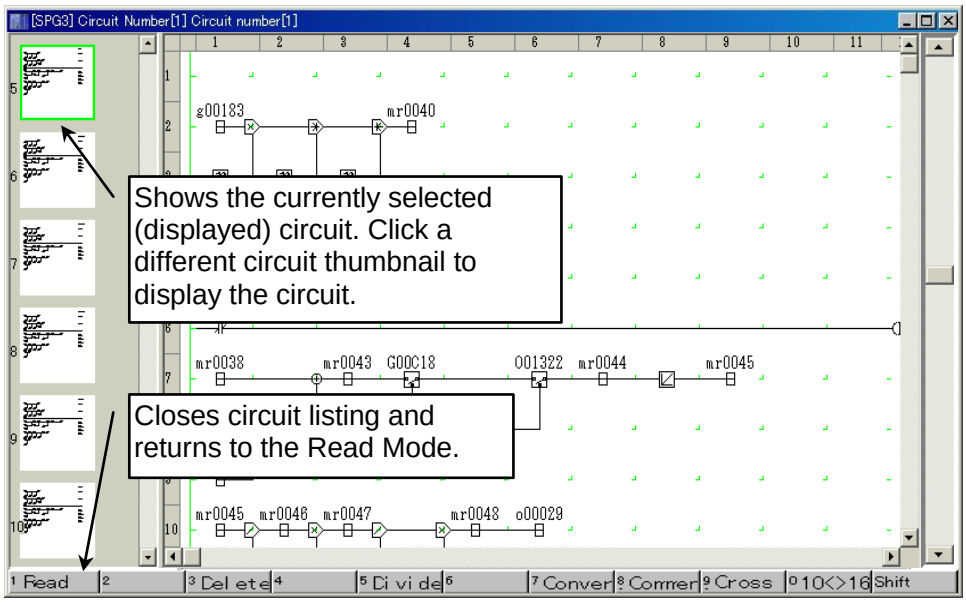
(4) In si0008, the value calculated in (3) is stored, and is stored in g00000 as set by the argument.

(5) Finally the value of (4) is loaded in si0000, and is stored in g00011 of the invoker.

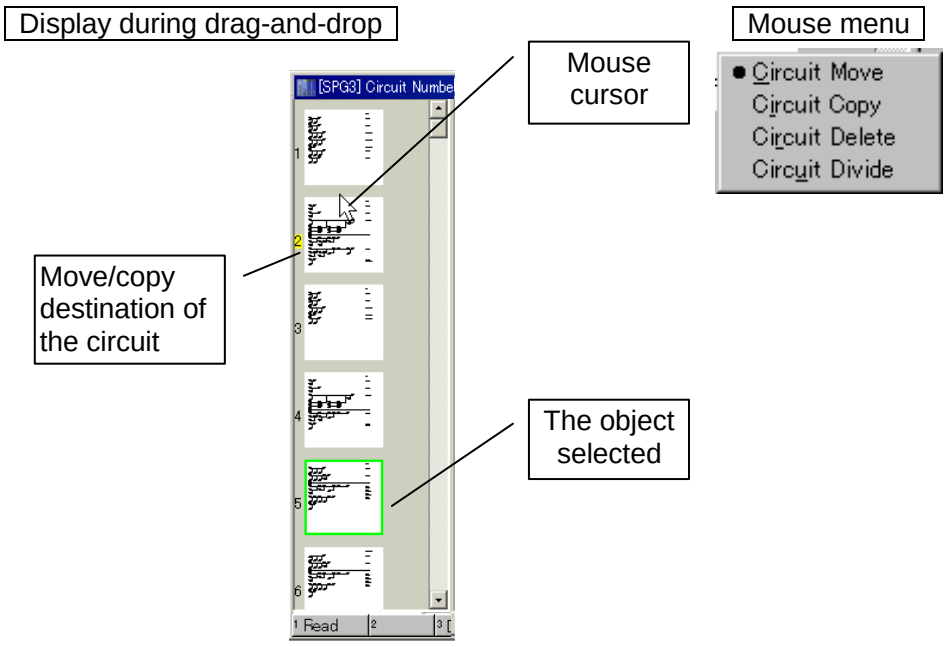
4-4 Circuit Listing

4-4-1 Circuit Listing Operations

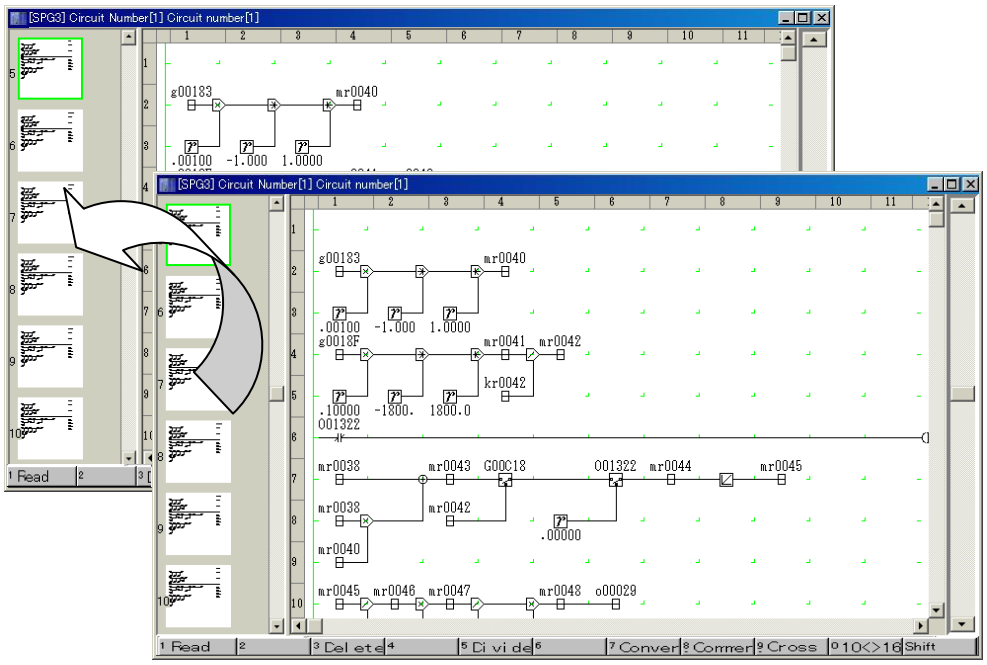
The circuit listing is used for deleting, transferring or copying pages of a circuit.



Menu	Function
Circuit Move	You can move circuits by drag-and-drop. When you drag, the mouse pointer changes to the cursor icon shown at right.
Circuit Copy	You can copy circuits by drag-and-drop. When you drag, the mouse pointer changes to the cursor icon shown at right.
Circuit Delete	Deletes the selected circuit. You can also delete circuits with the [Delete] key.
Circuit Divide	Creates a new subprogram from the selected circuit.

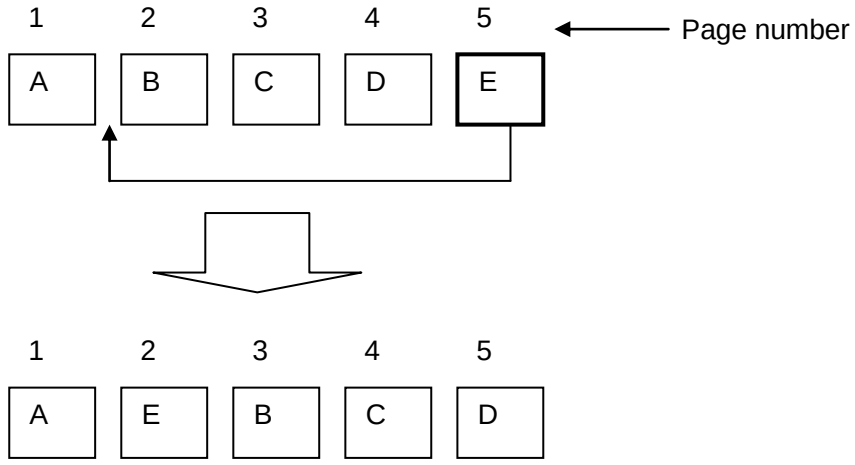


You can also copy circuits from another subprogram.



After selecting “Circuit Copy,” you can drag and drop a circuit from another subprogram to copy it.

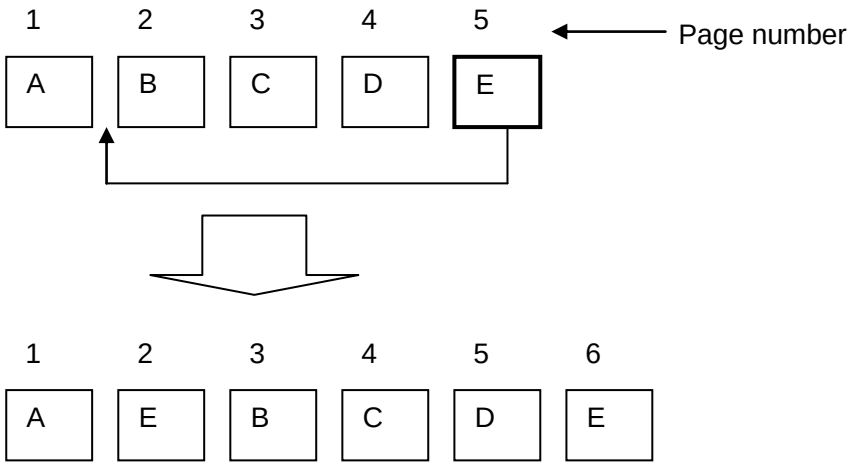
• Moving “E” on page 5 to page 2



What Is Moving?

Moving is the procedure for moving a selected page to a designated page using drag-and-drop when there are multiple pages in a single subprogram. In the figure above, by moving “E” on page 5 to page 2, the subprogram that was in the order “A” “B” “C” “D” “E” changes to the order “A” “E” “B” “C” “D.”

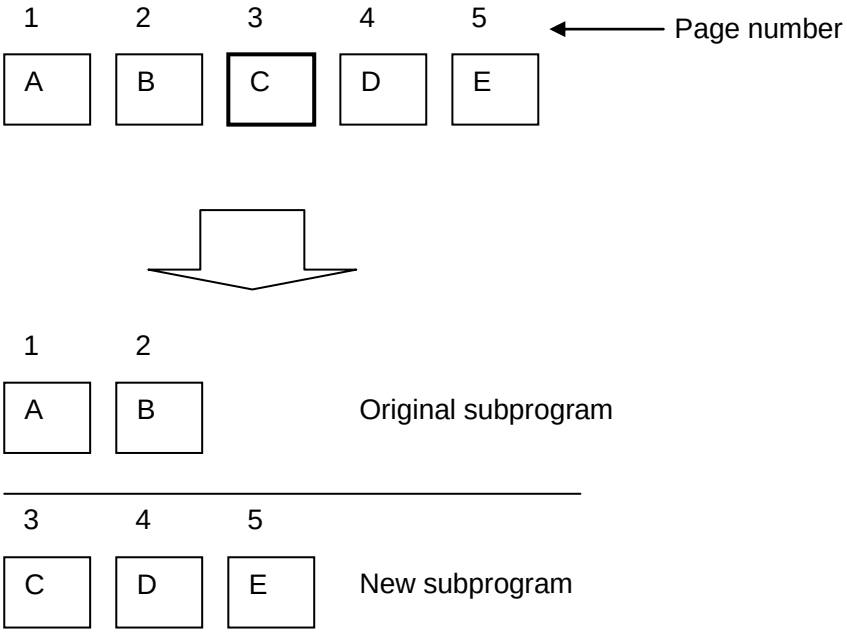
• Copying “E” on page 5 to page 2



What Is Copying?

Copying is the procedure for copying and inserting a selected page in a single subprogram to a designated page using drag-and-drop. In the figure above, by copying “E” on page 5 and inserting it in page 2, the subprogram that was in the order “A” “B” “C” “D” “E” changes to the order “A” “E” “B” “C” “D” “E.” Unlike moving a page, a copied page remains as it is, and the page number increases by one after the inserted page.

• Dividing from “C” onward on page 3



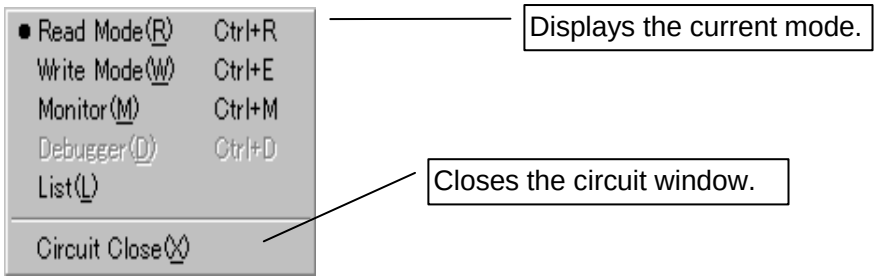
What Is Division?

Division is the procedure for cutting a selected page and the pages thereafter and adding them to a new subprogram. In the figure above, if “C” on page 3 is selected, the original program will have two pages: “A” and “B,” and the newly generated program will have three pages: “C,” “D” and “E.”

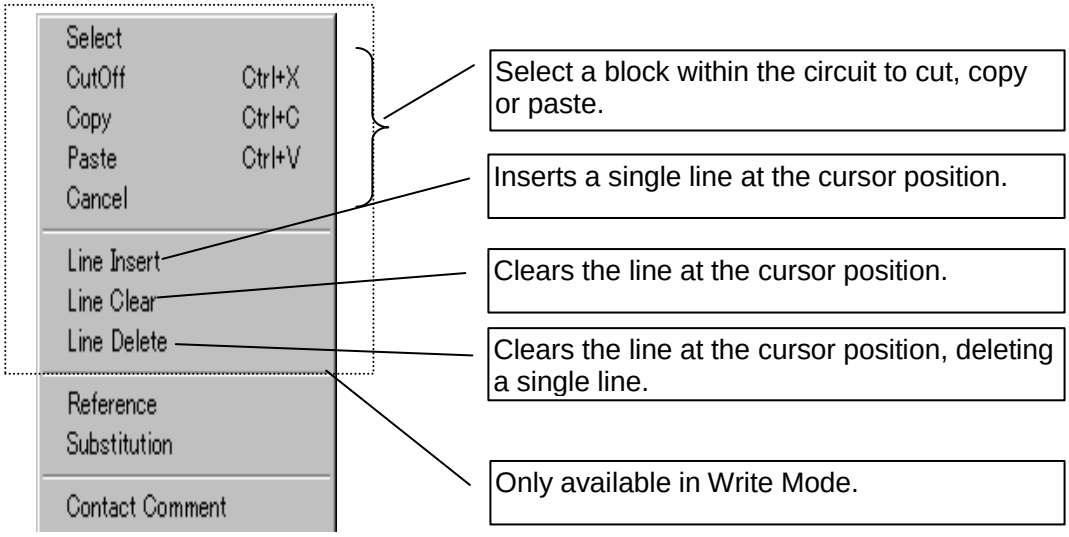
4-5 Menu Operations

4-5-1 File Menu

Move to other modes. The current mode is shown with a check mark. Modes that are unavailable are grayed out.

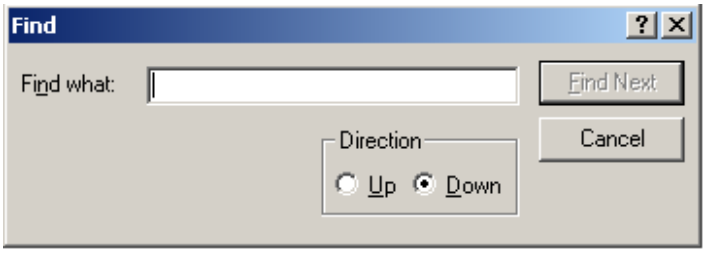


4-5-2 Edit Menu



4-5-3 Find

Searches for data with the name that you specify.



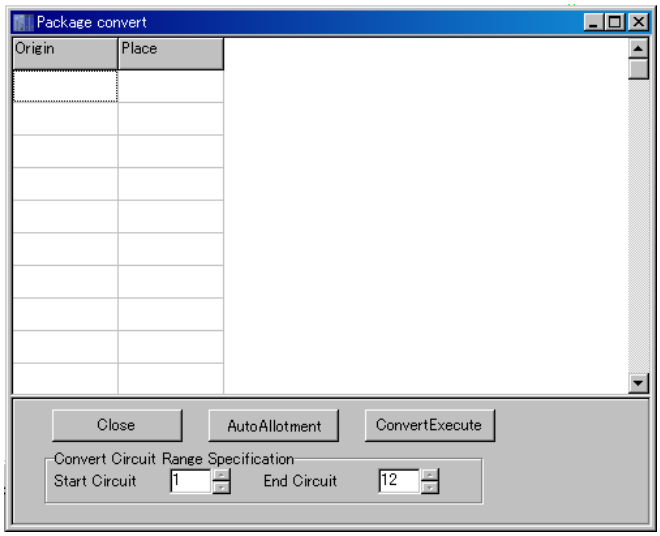
Find what: Enter the name of data to find.

Direction Up: Search for data with a Circuit Number from -1

Down: Search for data with a Circuit Number from +1

4-5-4 Replace

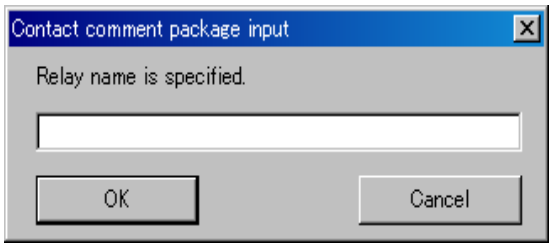
Substitutes data with the name that you specify.



Function	Content
Close	Closes the package convert window.
Auto Allotment	Automatically allocates the address of the local memory.
Convert Execute	Enter the character string after replacement and the data name after conversion.
Convert Circuit Range Specification	Designate the range of circuit to convert.

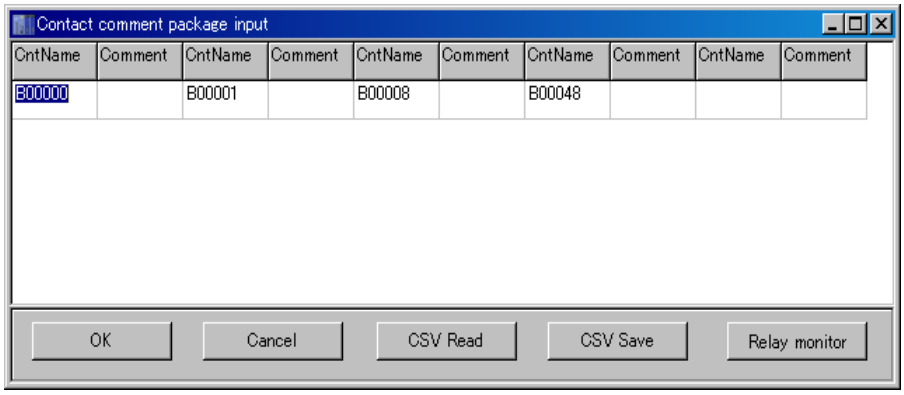
4-5-5 Contact Comment

Displays the window for setting contact comments.



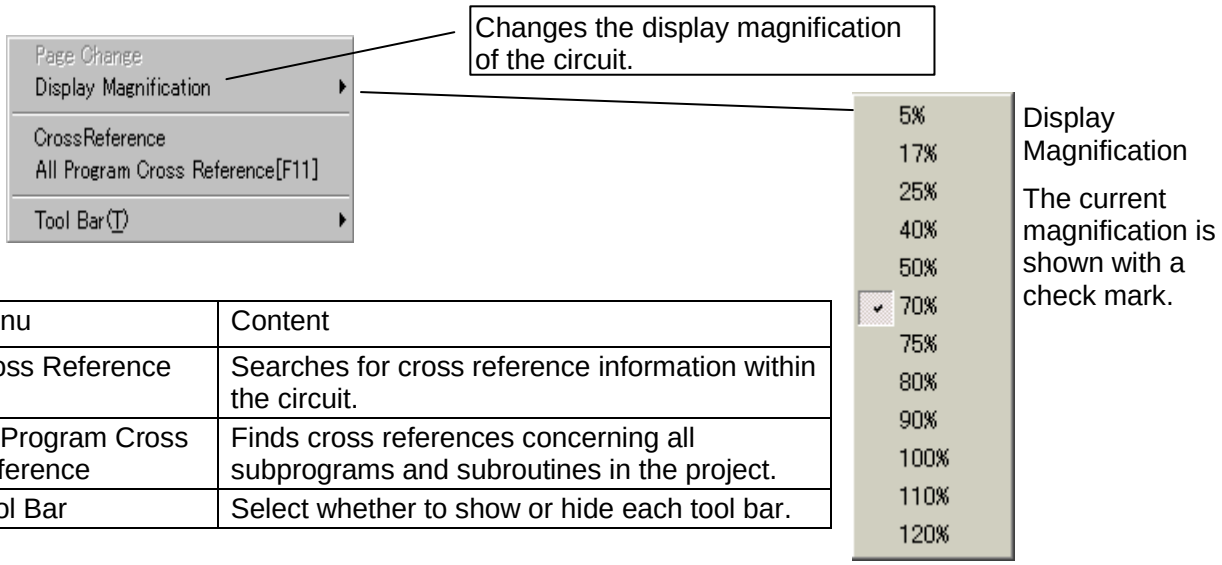
Specify a relay name with two characters (e.g. G0, B0, etc.)

This searches for the contact comments used in subprograms and displays them in a list.



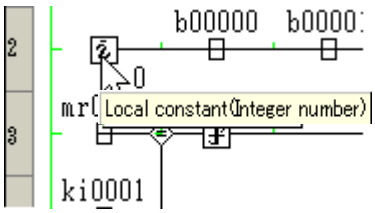
Function	Content
OK	Incorporates the content displayed in the contact comments and then closes the window.
Cancel	Closes the window without incorporating the content displayed in the contact comments.
CSV Read	Reads the contact comments saved in a CSV file.
CSV File save	Saves the contents of the window as a CSV file.
Relay monitor	Monitors the contacts when online. This can be switched on and off with a click in simulation connection.

4-5-6 Display



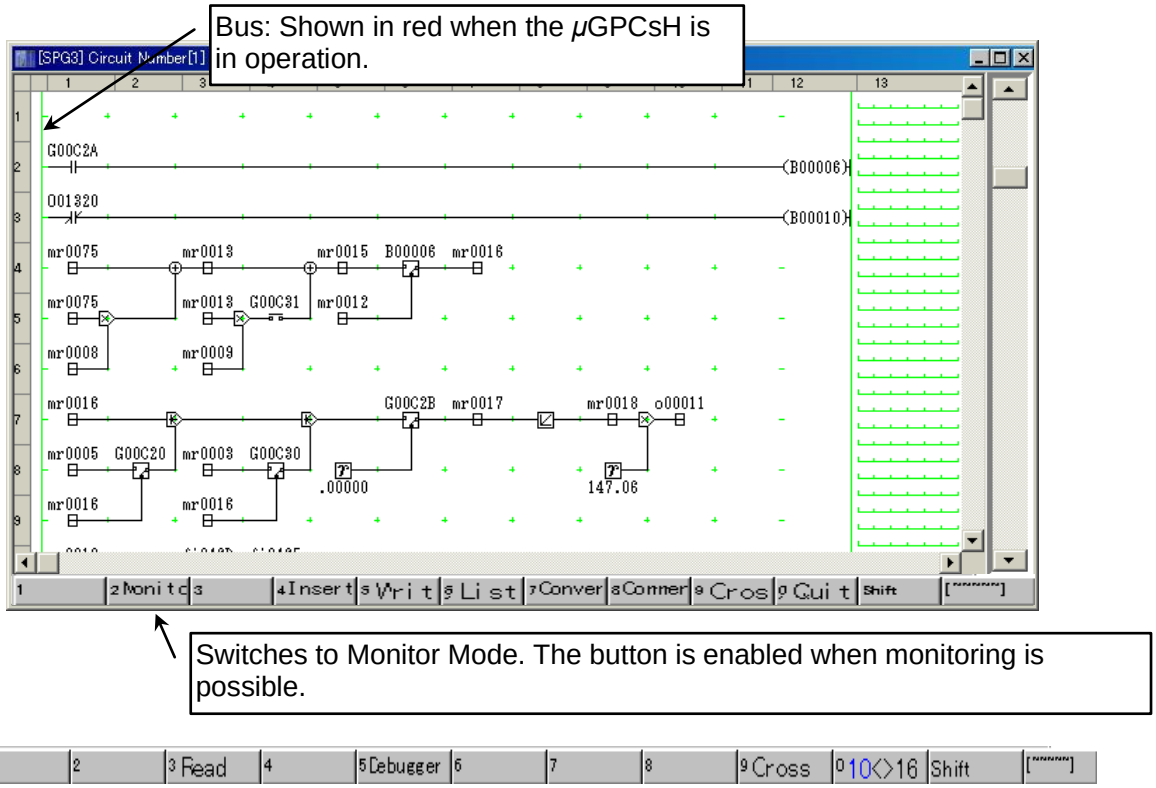
Menu	Content
Cross Reference	Searches for cross reference information within the circuit.
All Program Cross Reference	Finds cross references concerning all subprograms and subroutines in the project.
Tool Bar	Select whether to show or hide each tool bar.

If you do not know the name of a symbol or data in the circuit window, place the mouse pointer on the symbol or data name. A label showing the symbol or data name will appear shortly.



4-6 Online Circuit

4-6-1 Monitor Mode



Menu functions

Menu	Content
Read	Returns to the Read Mode.
Debugger	Switches to Debugger Mode.
Cross	Finds cross references.
10<>16	Switches the integer data between decimal and hexadecimal.

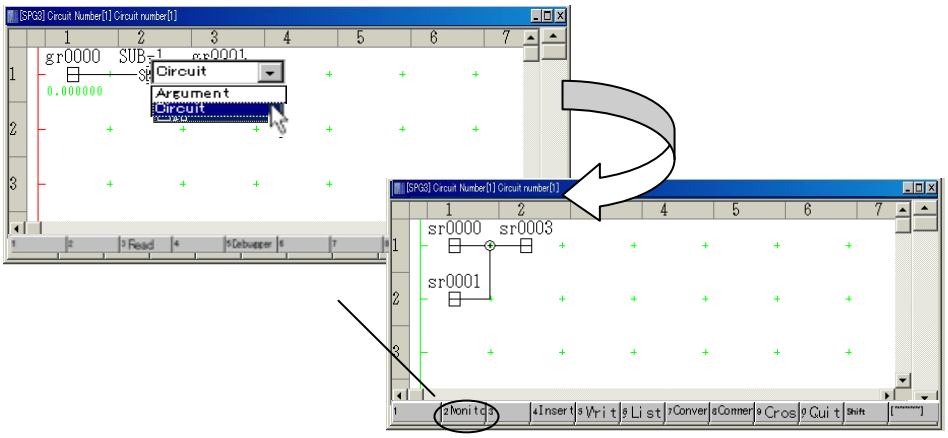
Display of circuits in Monitor Mode

Item	Content
A-contact	Text turns red when the coil is on, and white when the coil is off.
B-contact	Text turns white when the coil is on, and red when the coil is off.
NOT	Reverses the result of the logic operation input. (red → NOT → white [text color], white [text color] → NOT → red)
Coil	Colored according to the coil data irrespective of the result of the logic operation on the left side.
Ruled Line	Represents the result of the logic operation on the left side. The combined line is colored based on the OR condition.

4-6-2 Monitoring within the Subroutine

Monitor from the reading side

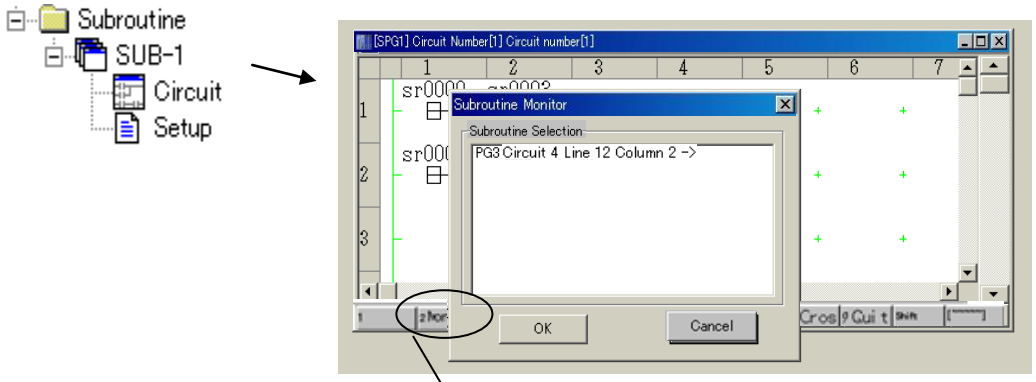
In “Read Mode” or “Monitor,” double-click the subroutine symbol and select “Circuit.” The subroutine circuit opens.



You can then perform monitoring with “Monitor.”

Selecting from the project tree

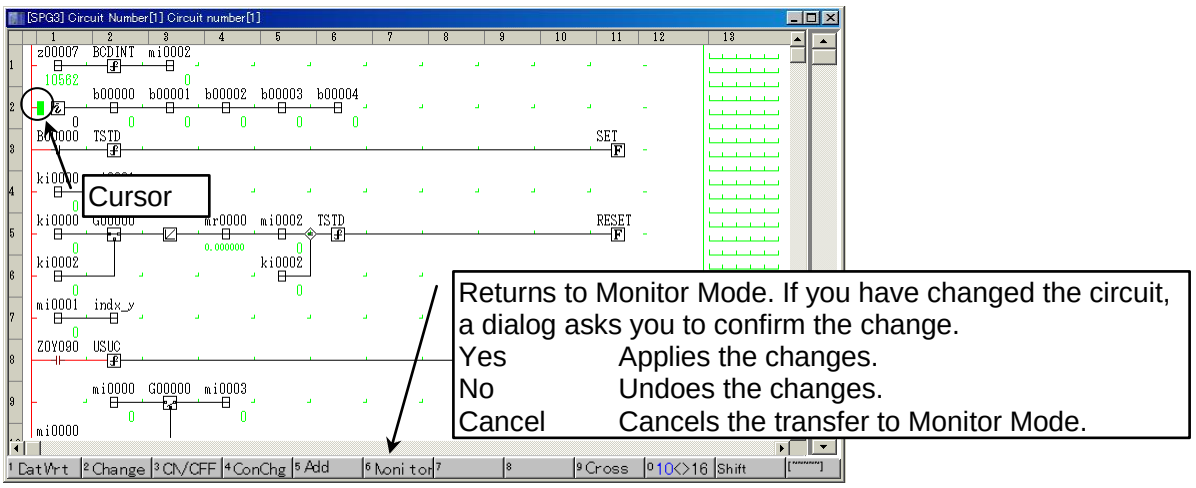
Select “Circuit” in the subroutine of the project tree, and select “Monitor.” A list appears showing positions that can be read. Select a subroutine to monitor.



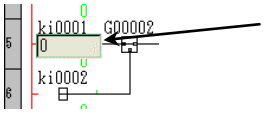
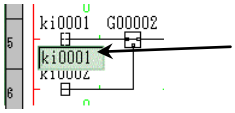
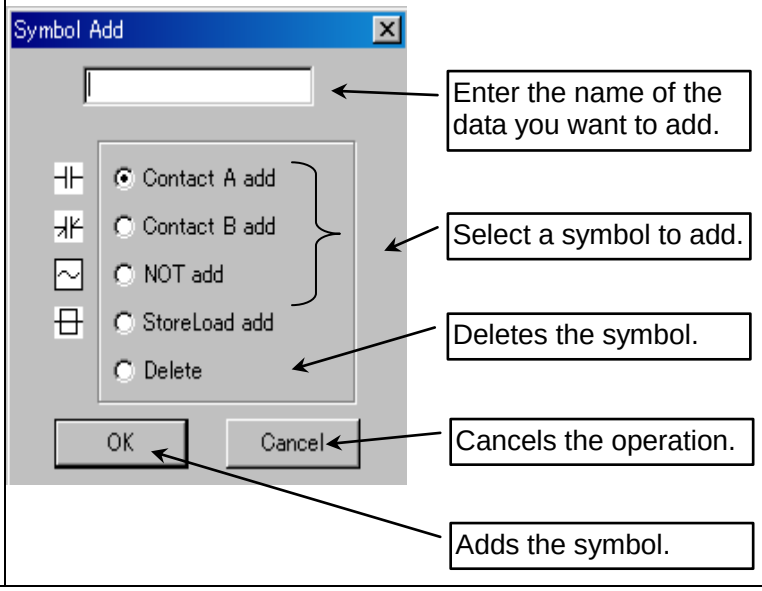
When “Monitor” is selected, a subroutine monitor dialog box appears. Click “OK” to enable monitoring.

4-6-3 Debug

You can apply the debugging function to the symbol where the cursor is positioned. When debugging is completed, you can cancel the changes if you wish.

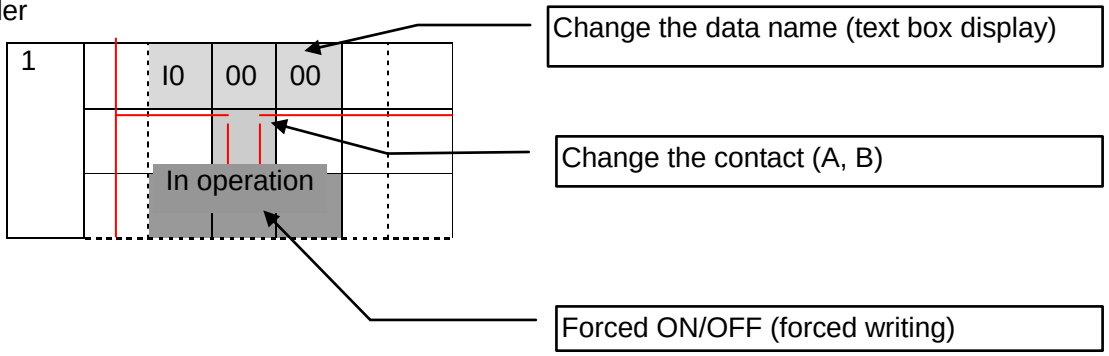


About the debugging function

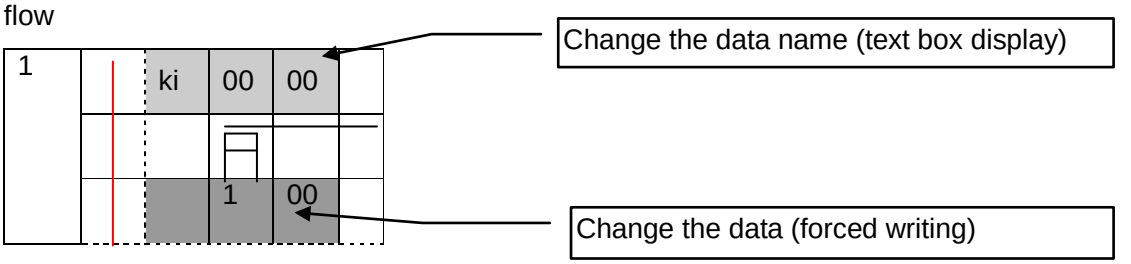
Function	Content
DatWrt	Writes the data.  Enter the data you want to change. Press [Enter] to confirm the data, or [ESC] to cancel it.
Change	Changes the name of the data.  Enter the name of the data you want to change. Press [Enter] to confirm the data, or [ESC] to cancel it.
Contact ON/OFF	Switches the contact relay ON/OFF.
ConChg	Changes the contact. (A, a-contact B, b-contact, c-contact)
Add	Adds a symbol at the cursor position.  Enter the name of the data you want to add. Select a symbol to add. Deletes the symbol. Cancels the operation. Adds the symbol.

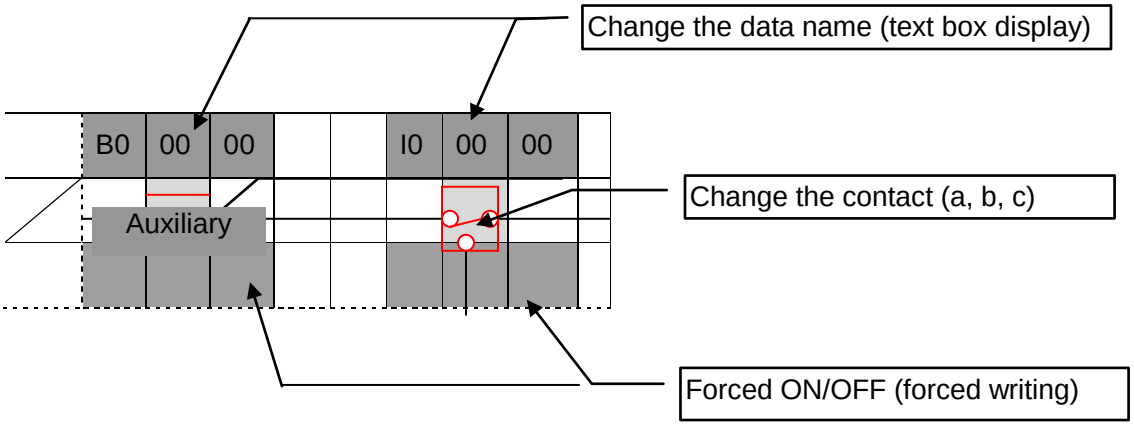
Applying the debugger function by double-clicking

Ladder



Data flow

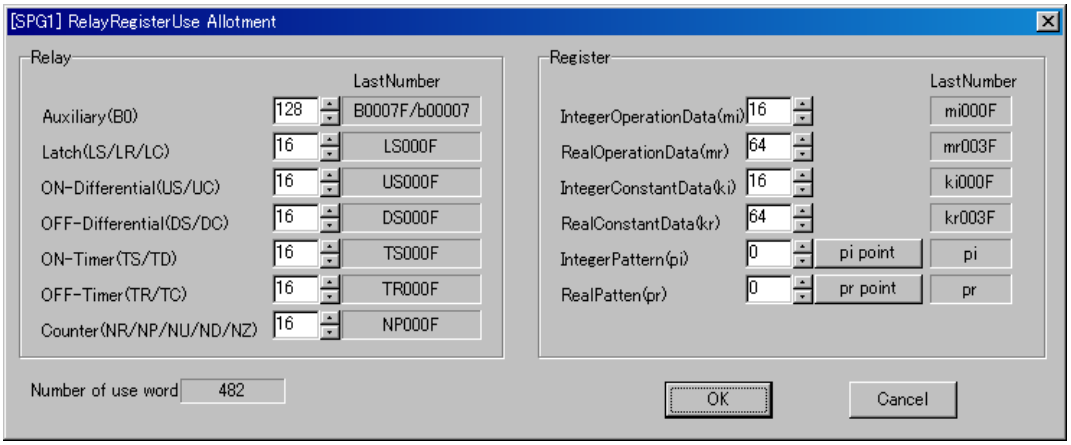




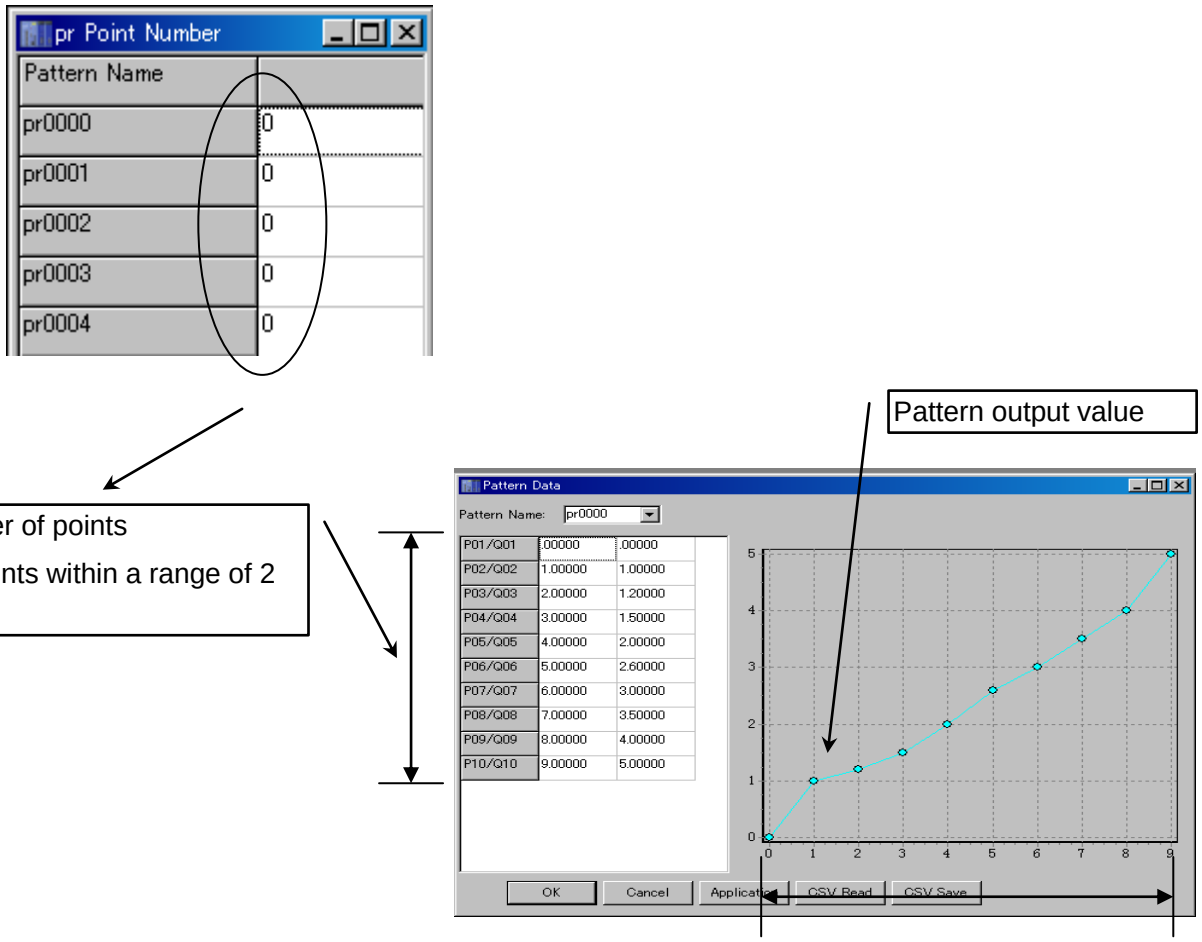
Chapter 5 Editing Other Items

5-1 Allocation of the Number of Relays and Registers Used

Sets the amount of local memory used in a subprogram.



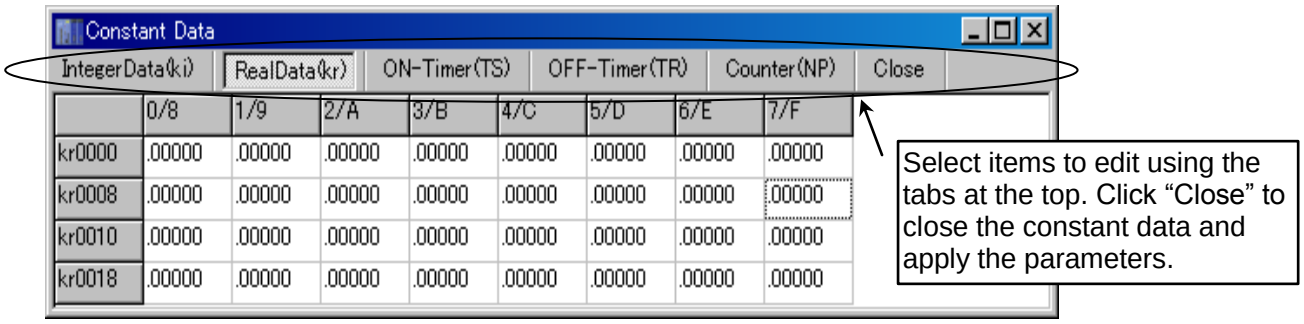
By defining the numbers of integer patterns and real number patterns, you can define the number of points.



5-2 Constant Data

Defines the integer constant data (ki), real number constant data (kr), on timer value (TS), off timer value (TR), and counter value (NP) to be used within a circuit. Select items to edit using the tabs at the top.

5-2-1 Integer Data (ki), Real Number Data (kr)



Points to note when setting the constant value

When the constant value is zero, the following is displayed

Integer type (kixxxx): 000000

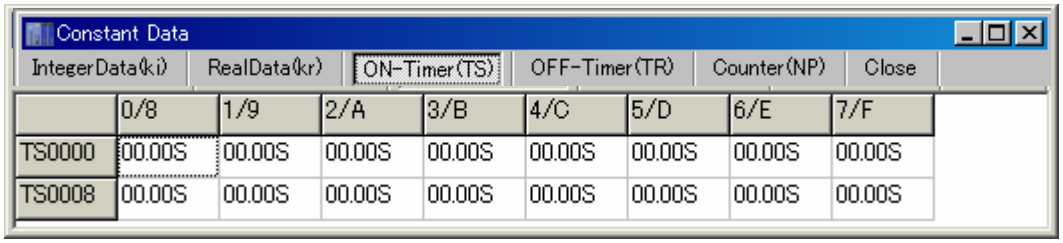
Real number type (krxxxx): .00000

Example of a constant input

Type	Content	
Integer	123 (Decimal)	80H (Hexadecimal)
	-123 (Decimal)	8005H (Hexadecimal)
Real number	123.4 -123.4	.12345 -.12345

In order to increase the number of digits that can be input, the zero of 0.xxxx is omitted.

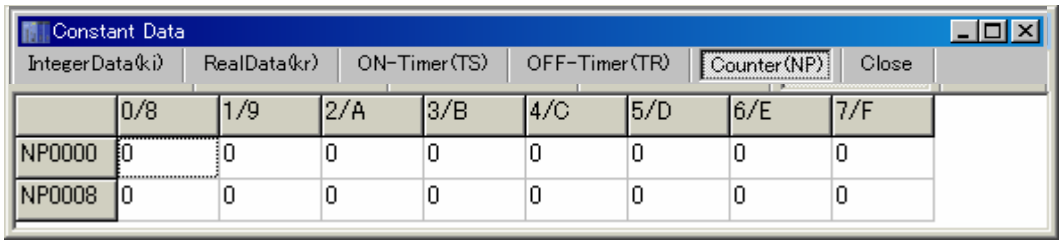
5-2-2 On Timer (TS), Off Timer (TR)



Timer value input format

Input format	Content			
00H00M	Sexagesimal	H: Hour	Sexagesimal	M: Minute
00M00S	Sexagesimal	M: Minute	Sexagesimal	S: Second
00.00S	Decimal S: Second			

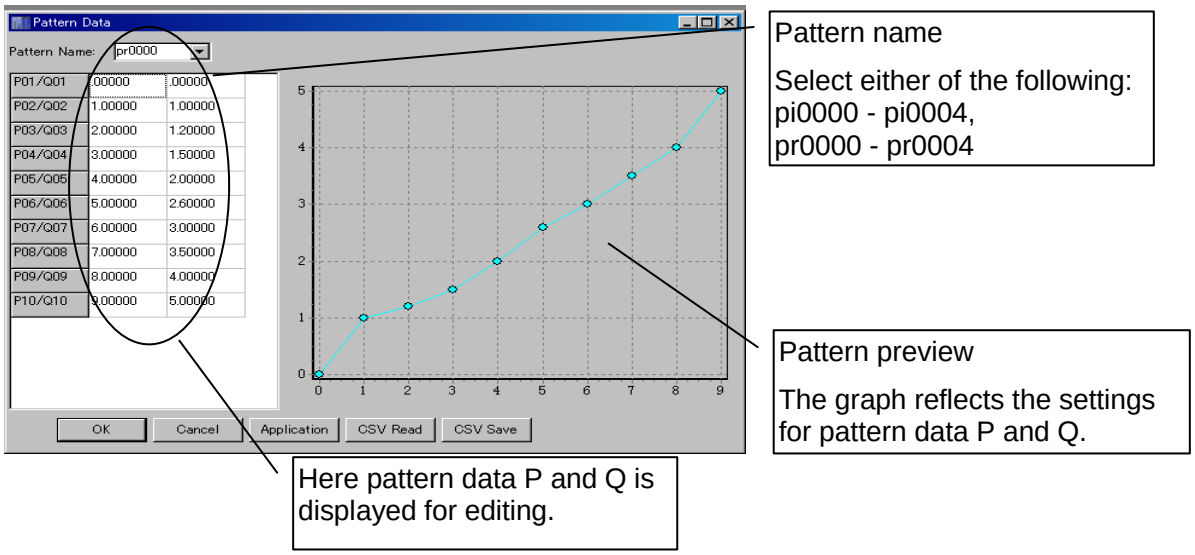
5-2-3 Counter (NP)



Counter value setting range

0 to 65535

5-3 Pattern Data



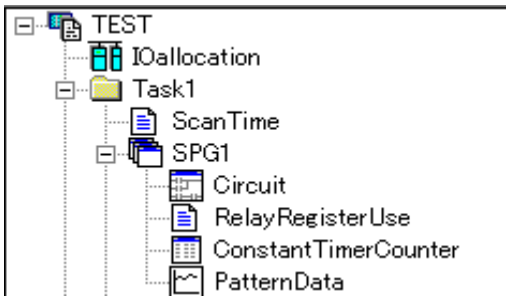
Button functions

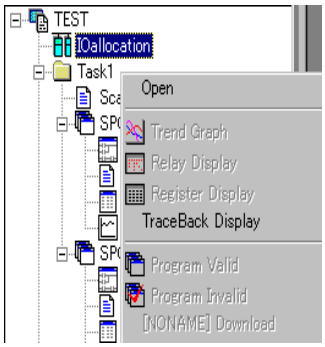
Button	Content
OK	Updates the pattern data and closes the window.
Cancel	Closes the circuit window without applying any changes.
CSV Read	Enters pattern data from a CSV file in the P and Q fields of the pattern data. The “Open a File” dialog box appears. Select the file name.
CSV Save	Saves the P and Q pattern data as a CSV file. The “Store a File” dialog box appears. Enter a file name.

Chapter 6 IO Allocation

6-1 IO Allocation

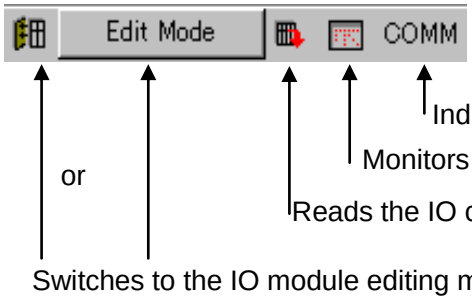
IO allocation sets the configuration of the modules for building and operating an FA system using μGPCsH series. To edit the IO allocation, double-click on the tree node, or right-click and select "Open."

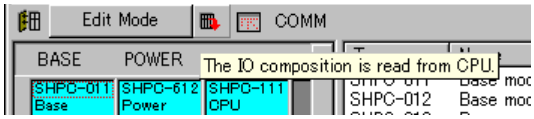




6-2 Editing IO Allocation

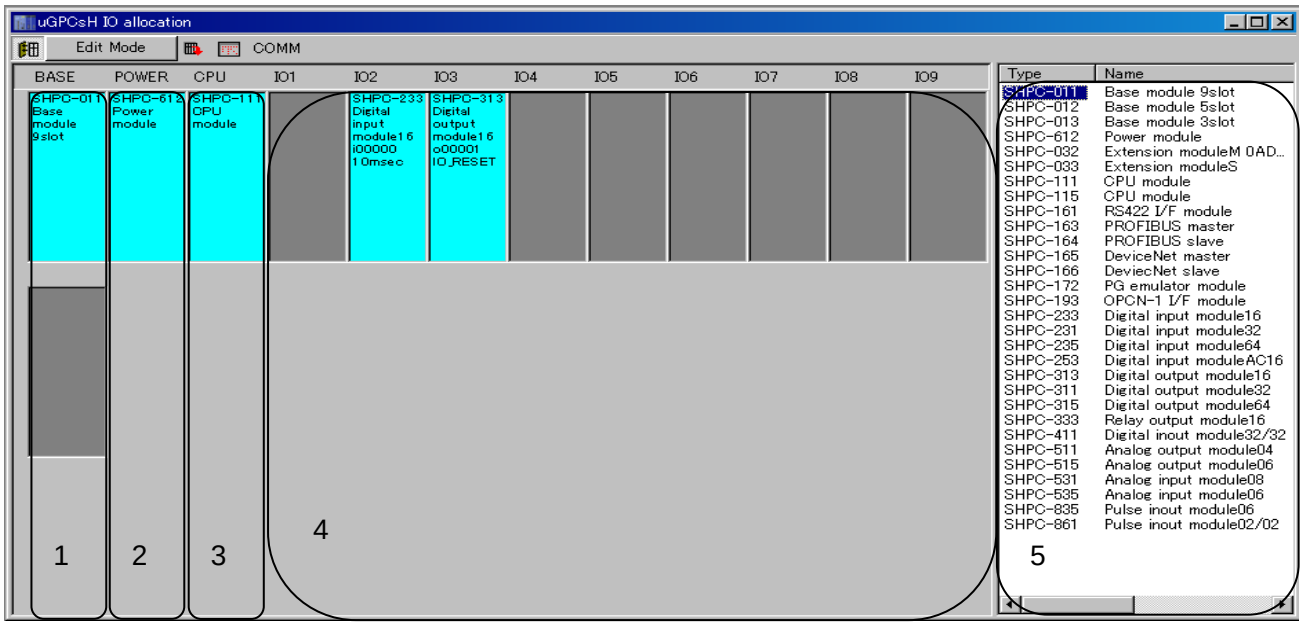
6-2-1 Tool Bar Button





Reads the IO configuration from the μGPCsH when it is online. The IO configuration cannot be read when the μGPCsH is encountering a serious failure.

6-2-2 IO Allocation Screen

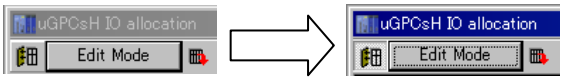


1. Base module setting area
   Set only the base module. The IO setting area changes according to the number of base module slots.
2. Power module setting area
   Set only the power module.
3. CPU module setting area
   Set only the CPU module and extension I/F slave.
4. IO setting area
   Sets the IO module and extension I/F master.
5. Module selection area
   Select modules to mount with the mouse.

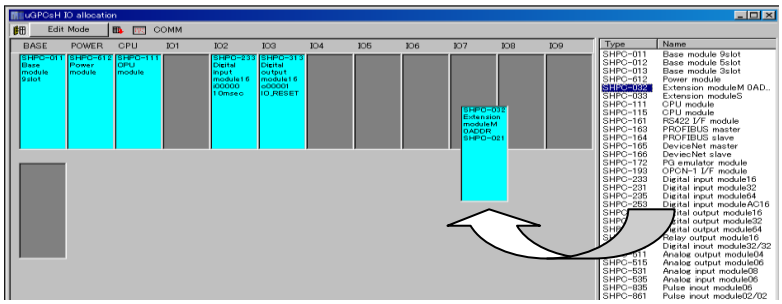
6-2-3 Editing IO Modules

- To mount IO modules, switch to Edit Mode and select IO Module Edit Mode.

IO Module Edit Mode



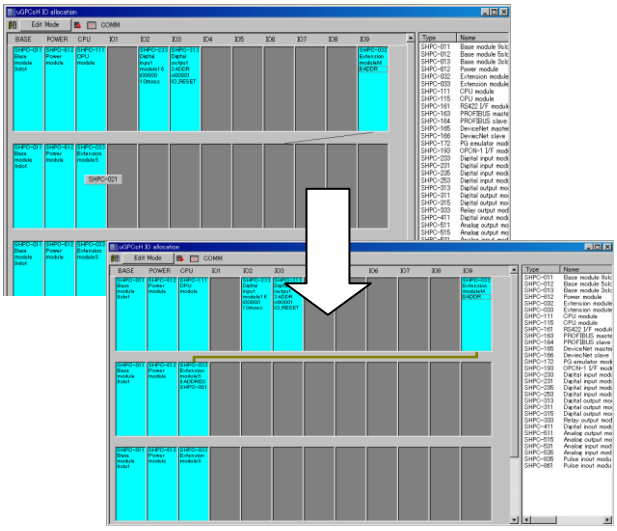
- Drag and drop modules to edit the module configuration.



- Editing IO extensions

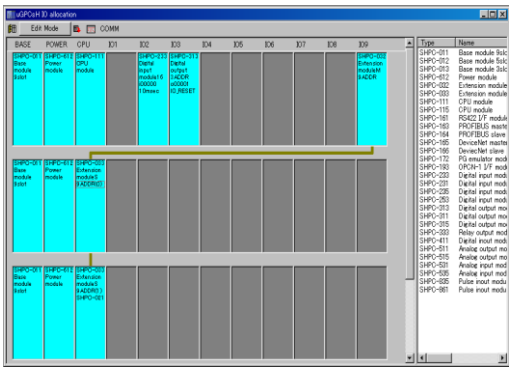
First, configure the extension I/F master (SHPC-032) and extension I/F slave (SHPC-033).

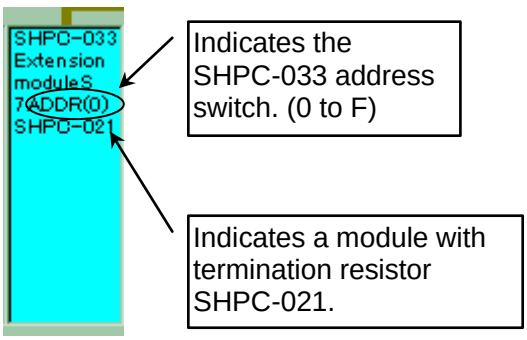
SHPC-032 has a termination resistor (SHPC-021), so drag and drop it to connect it to an extension I/F slave (SHPC-033).



Then you can set the wiring of the extension module.

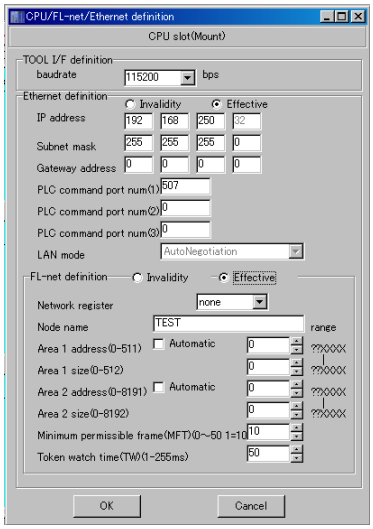
Wire in no more termination resistors (SHPC-021) than the number of extension I/F slaves (SHPC-033).





6-2-4 CPU/FL-net/Ethernet Definition

Defines the CPU module



• Ethernet and FL-net definition

Item	Content
IP address	Sets the IP address. The default is 192.168.250.32.
Subnet mask	Sets the subnet mask. The default is 255.255.255.0.
Gateway address	Sets the gateway address.
PLC commandport num (1) PLC commandport num (2) PLC commandport num (3)	Sets the PLC command port number.
Network register	Sets the network register. Select one of the following in accordance with the specification. None, fi, fr, ei, er
Node name	Specifies the local node name. (By default the program name is set.)
Area setting: Sets the transmission area of the local node for cyclic data transfer.	
Area 1 address (0-511)	Specifies the start address of the local node transmission area of Area 1.
Area 1 size (0-512)	Sets the number of words transmitted by the local node for Area 1.
Area 2 address (0-8191)	Specifies the start address of the local node transmission area of Area 2.
Area 2 size (0-8192)	Sets the number of words transmitted by the local node for Area 2.
Minimum permissible frame (MFT)(0 to 50 1=100us)	The frame interval is the time taken from receipt of a token from another node until the local node outputs a frame. The minimum frame interval is the time that must elapse until each node outputs the minimum frames. The default is 10 × 100 μs and the setting range is 0 to 50. The unit is 100 μs. If you set 0, there is no interval, resulting in maximum operating speed.
Token watch time (TW) (1 to 255 ms)	Sets the time for monitoring the cyclic transmission time using the common memory area. The default is 50 ms and the setting range is 1 to 255 ms.

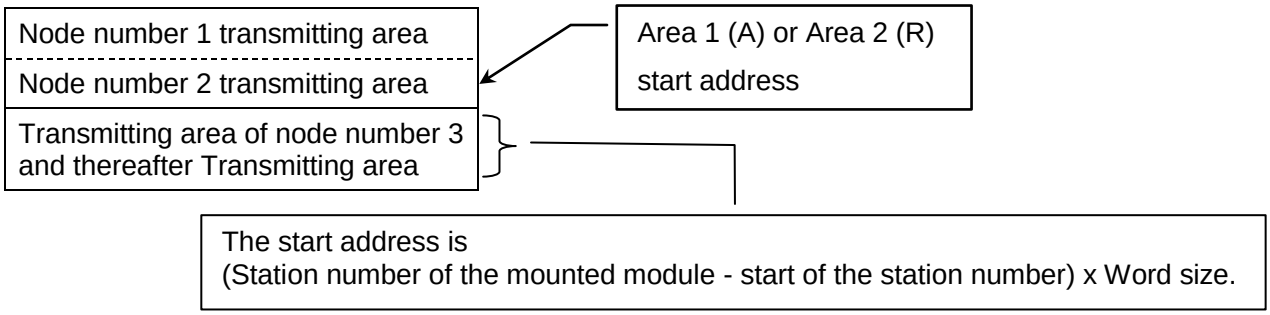
Automatic Area 1 address and Area 2 address setting

By specifying the starting station number, the node number of the FL-net module that was mounted during download is read, and “Area 1 address,” “Area 2 address” and the start address of the node after the starting station number are calculated automatically. The settings for Automatic Area 1 address and Area 2 address setting as shown below have different meanings.

Note: This only applies when the CPU module is operating normally, or after initialization of the system.

FL-net cyclic data area

Example with 3 as the start of the station number



Item	Content
Area 1 address	Specifies the Area 1 address to calculate automatically.
Area 1 word size	Specifies the number of words transmitted by the local node in common with Area 1 following the start of the station number N.
Area 2 address	Specifies the Area 2 address to calculate automatically.
Area 2 word size	Specifies the number of words transmitted by the local node in common with Area 2 following the start of the station number N.

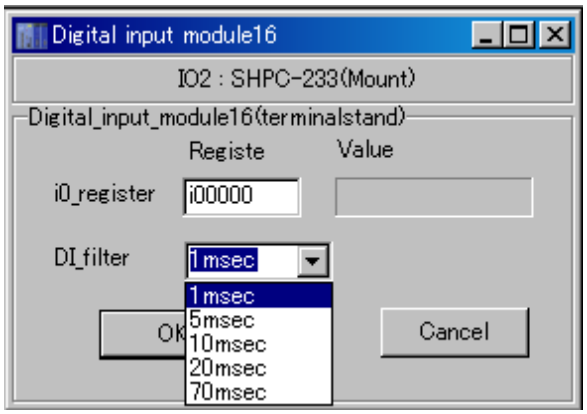
Example of automatic calculation: When the number of the download destination node is 2

Area 1 start address: 0 + (2 - 1) × 32 = 32

Area 2 start address: 0 + (2 - 1) × 64 = 64

6-2-5 Module Parameters

• DI filter settings

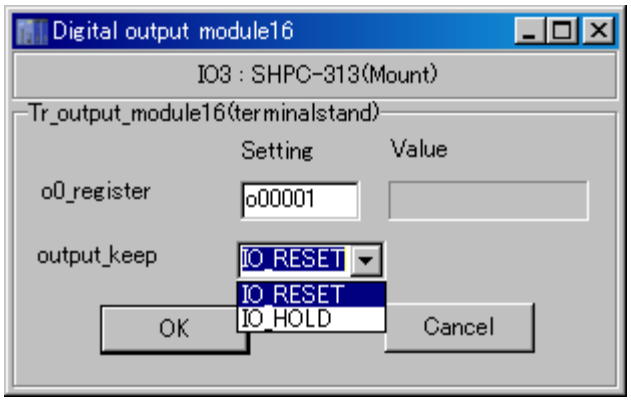


DI filter

Sets the filtering time for the DC input module and AC input module.1 msec, 5 msec, 10 msec, 20 msec, and 70 msec can be set (SHPC-253: 10 msec, 20 msec, 70 msec). The setting applies to the following modules.

SHPC-233, SHPC-231, SHPC-235, SHPC-253

• Output keep mode settings



Output keep mode

IO_HOLD

When a system malfunction occurs, this mode maintains the output status immediately before the malfunction if the CPU module stops, or maintains the output status immediately before the stoppage while the CPU is shut down.

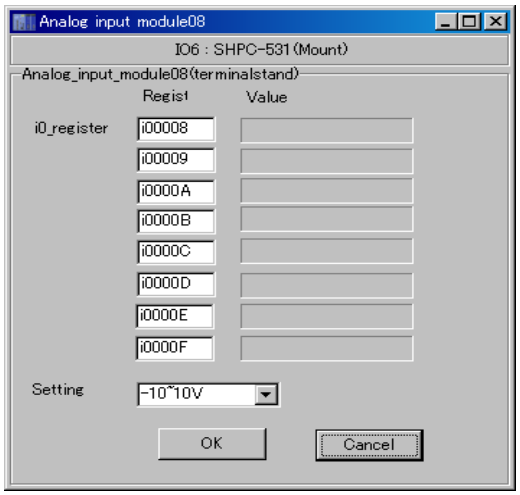
IO_Reset

Resets output status when the CPU module stops.

The setting applies to the following modules.

SHPC-313, SHPC-311, SHPC-315, SHPC-333, SHPC-511

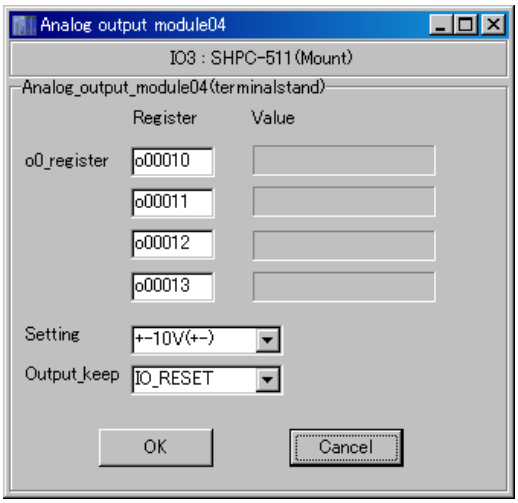
• Analog input module input setting



Sets the input for the analog input module.

Setting
Voltage input: ±10V, 0-10V, 5V, 0-5V, 1-5V±
Current input: 0-20mA, 4-20mA

• Analog output module output setting

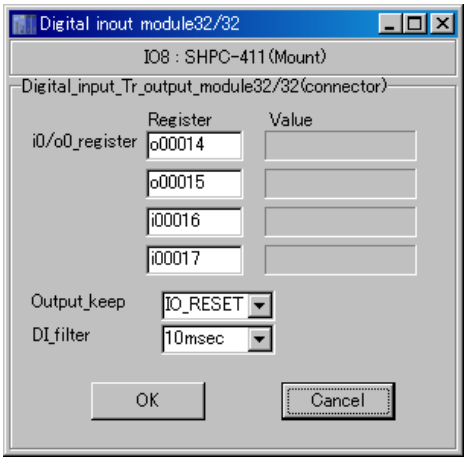


Sets the output for the analog output module.

Setting
Voltage output: 10V, 0-10V, 5V, 0-5V, 1-5V±±
Current output: 0-20mA, 4-20mA

• Mixed module definition

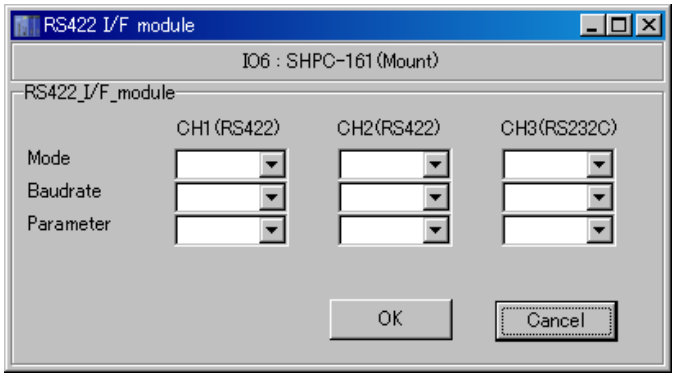
Sets the DI filter and output keep mode settings for mixed modules.



The setting applies to the following modules.

SHPC-411

• RS422 I/F module



CH1: RS422/485 Communication port 1

CH2: RS422/485 Communication port 2

CH3: RS232C port

Mode

Set the mode to one of the following.

Mode	Content
POD	Select with the Fuji Electric touchscreen connected.
AIP	Select with the Koyo Electronics Industries (formerly Komatsu) touchscreen connected.
Non	Select when using a function (C_FREE).

Baudrate

Set the baud rate (transmission rate) to one of the following.

1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (bps)

Parameter

Set the communication parameter to one of the following.

8-E-1, 8-E-2, 8-O-1, 8-O-2, 8-N-1, 8-N-2

7-E-1, 7-E-2, 7-O-1, 7-O-2, 7-N-1, 8-N-2

Parameter represents (Data bits) - (Parity) - (Stop bits).

Data bits	8: 8 bits 7: 7 bits
Parity	E: Even O: Odd N: None
Stop bits	1: 1 stop bit 2: 2 stop bits

Chapter 7 **Online Functions**

Online functions are performed either from the project tree or from the “Online” menu.

• Functions performed from the project tree

1. Trend Graph
2. Relay Display
3. Register Display

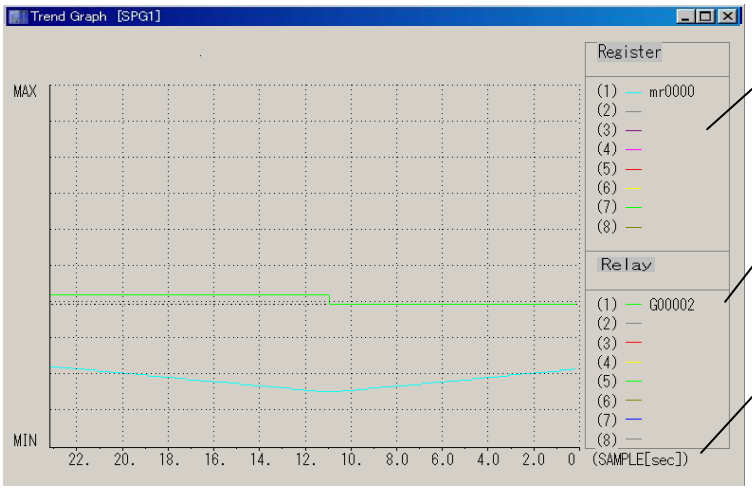
• Functions performed from the “Online” menu

4. Download
5. Parameter/Program Download (Loading While μGPCsH Is Running)
6. System Definition Download (IO Allocation)
7. Task Information (Scan Time) Download
8. PLC Connection (Upload)
9. PLC Reset
10. PLC Start
11. PLC Stop
12. Redundancy Running/Standby Switch
13. System Initialization
14. PC Card Driver Download
15. Compact Flash Storage
16. PLC Memory Save/Load
17. PLC RAS Information Display
18. PLC Clock Setup
19. Resource Information

7-1 Trend Graph

7-1-1 Trend Graph

When the trend graph is selected from the tool bar or by right-clicking the project tree, the trend window shown below appears, showing the selected register and the trend graph of relays in real time.



Shows the selected register name.

Shows the selected relay name.

The time axis is represented by elapsed time that assumes the closest sample time to be 0 seconds.

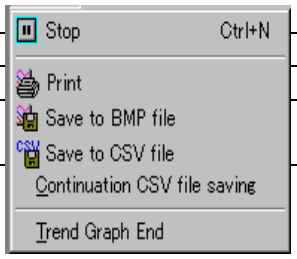
Right-clicking in the trend window displays the following menu.

Menu	Content
Stop Ctrl+N	Pauses the trend graph.
Ruled line display	Draws ruled lines in the trend graph.
Edit of register display item	Changes the register sampled.
Edit of relay display item	Changes the relay sampled.
Trend Graph End	Quits the trend graph.

7-1-2 Trend Menu

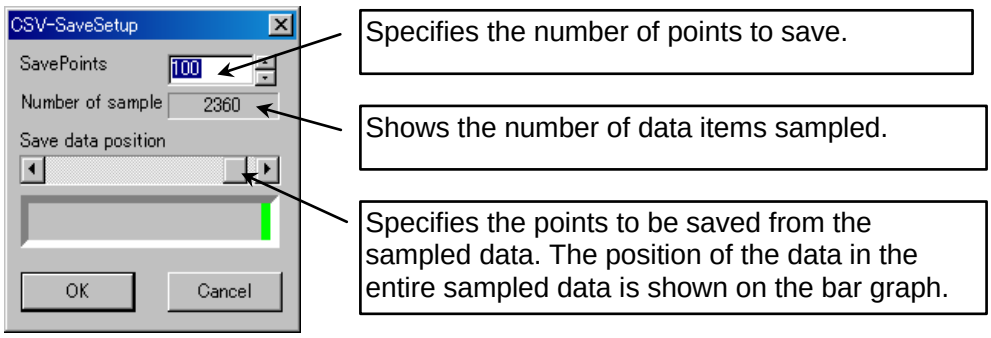
The following functions can be accessed from the trend menu (tool bar).

Trend function “File” menu

File menu	Item	Content
	Stop	Stops the trend graph.
	Print	Prints the trend graph.
	Save to BMP file	Saves the trend graph as a bitmap file.
	Save to CSV file	Saves the data sampled for the trend graph in a CSV file.
	Continuation CSV file saving	While the trend graph is in operation, CSV files are generated continuously for each number of samples specified.
	Trend Graph End	Quits the trend graph.

Saving to a CSV file

After specifying a file name, the following dialog box appears. Set the parameters required and save the sampled data in a CSV file.



Continuously saving CSV files

While the trend graph is in operation, CSV files are generated continuously for each number of samples specified.

File name: (Specified filename) 1.CSV, (specified filename) 2.CSV etc.

Trend function “Edit” menu

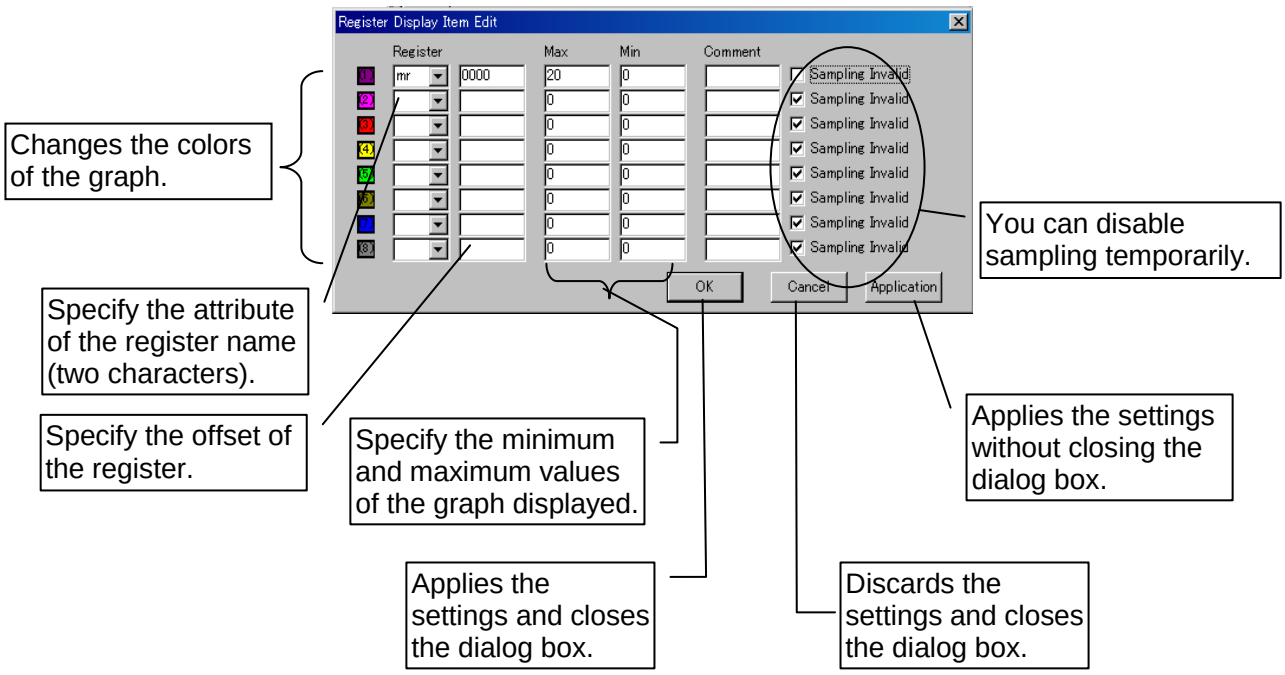
Edit Menu	Content
Edit of register display item	Changes the settings of the register sampled by the trend graph.
Edit of relay display item	Changes the settings of the relay sampled by the trend graph.
Editing the sampling time	Specifies the time for trend graph sampling. It can also be set with the tool bar below.  The setting range is 100 ms to 10000 ms (10s).

Trend function “View” menu

View menu	Content
Ruled line display	Displays ruled lines in the trend graph. Also displayed by clicking  on the tool bar

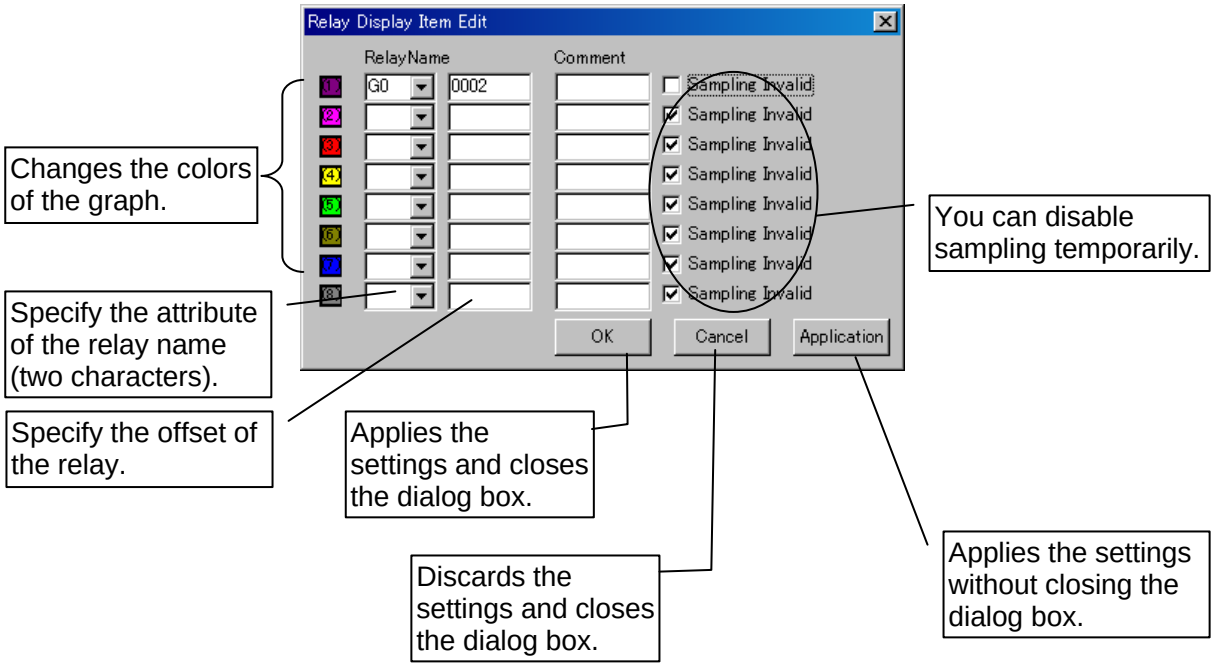
7-1-3 Register Display Item Edit

Changes the settings of the register sampled by the trend graph.

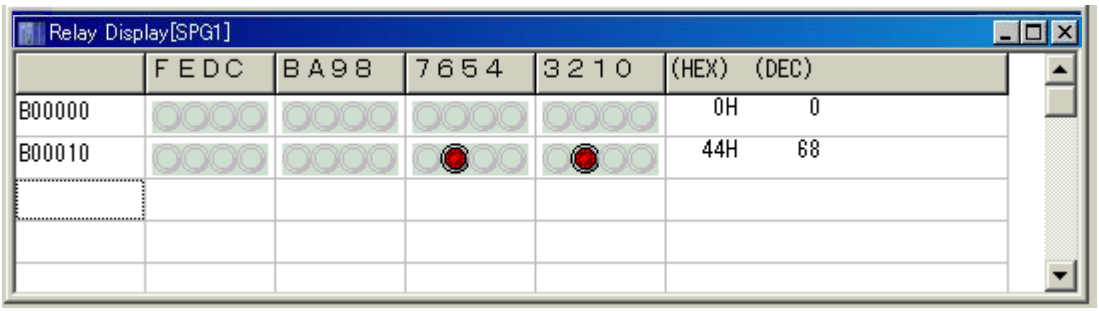


7-1-4 Relay Display Item Edit

Changes the settings of the relay sampled by the trend graph.



7-2 Relay Display



Enter the relay name in the input field (leftmost grid). Press the [Enter] key and a relay name +16 is automatically set in the next line. Relay names are displayed in 16 point units, therefore the last digit cannot be set. To change the relay name, press the [F2] key.

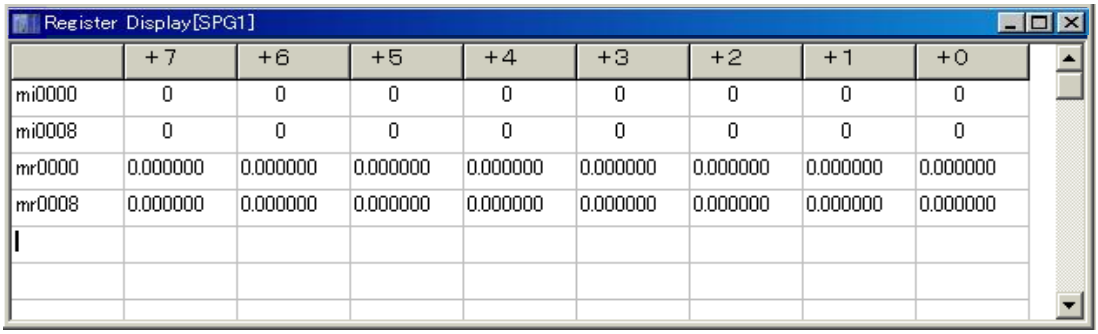
(Red) indicates that the relay is on.

(White) indicates that the relay is off.

Note: Refreshing the display takes longer as the amount of data displayed increases.

Menu bar	Submenu	Content
File	Relay display completed	Closes the relay display.
Edit	Delete 1 line in the relay display	Deletes 1 line in the relay display. The settings of the cursor line are cleared and the lines below that line are moved up. If it is the last line, only the settings of the line are cleared.
	Contact ON/OFF	Switches the contact on and off. When this is checked, the contact can be switched on and off by clicking the relevant data. Blue shows that a relay for changing from off to on is selected. Green shows that a relay for changing from on to off is selected.

7-3 Register Display



Enter the register name in the input field (leftmost grid). Press the [Enter] key and a register name +8 is automatically set in the next line, but you can change this freely. Eight data items are displayed per line. To change the register name, press the [F2] key.

Note: Refreshing the display takes longer as the amount of data displayed increases.

Menu bar	Submenu	Content
File	Hexadecimal display	Switches the integer data between decimal and hexadecimal. When the menu displays a check, the display is hexadecimal.
	Register display completed	Closes register display.
Edit	Delete 1 line in the register display	Deletes 1 line in the register display. The settings of the cursor line are cleared and the lines below that line are moved up. If it is the last line, only the settings of the line are cleared.
	Data change	When this is checked, the register value at a position where you right-click is changed and sent to the μGPCsH.

7-4 Download

Downloads all currently open projects to the *μ*GPCsH. During the download, the *μ*GPCsH is stopped and reset when downloading finishes.

7-5 Parameter/Program Download (Loading While *μ*GPCsH Is Running)

Downloads all currently open projects to the *μ*GPCsH. This is also possible if the *μ*GPCsH is operating.

Caution is required for parameter/program download (loading while *μ*GPCsH is running) when the time series function is operating. Refer to 7-20.

7-6 System Definition Download (IO Allocation)

Downloads the system definition (IO allocation). When downloading finishes, the *μ*GPCsH is reset.

7-7 Task Information (Scan Time) Download

Downloads only the scan time. When downloading finishes, the *μ*GPCsH is reset.

7-8 PLC Connection (Upload)

Upload a project from the *μ*GPCsH.

7-9 PLC Reset

Resets the *μ*GPCsH.

7-10 PLC Start

Starts the *μ*GPCsH.

7-11 PLC Stop

Stops the *μ*GPCsH. (It can be stopped even when the switch on the front is set to “RUN.”)

7-12 Redundancy Running/Standby Switch

This function is only available with the *μ*GPCsx.

7-13 System Initialization

Clears the memory in the *μ*GPCsH. This clears the user memory, removing all applications completely. Therefore you should be very careful when performing this operation.

7-14 PC Card Driver Download

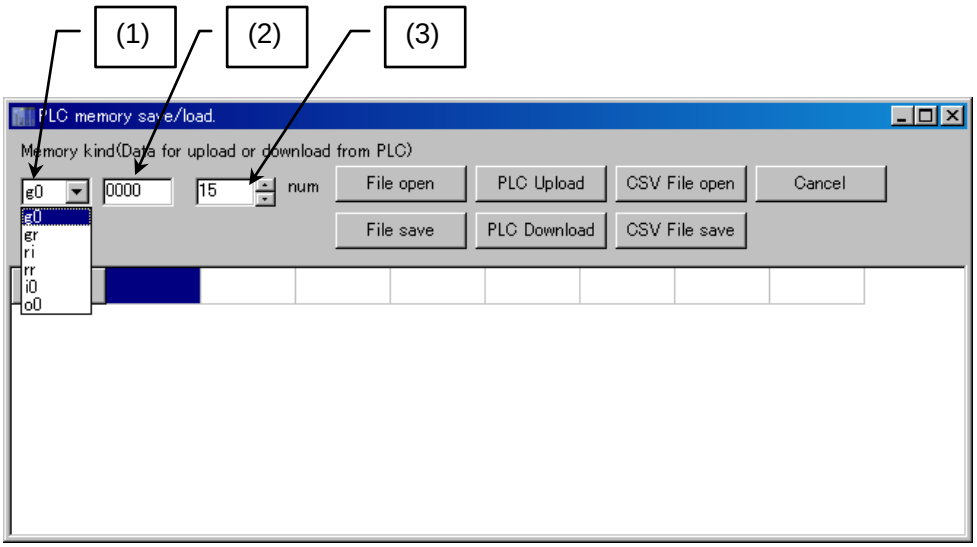
This function is only available with the *μ*GPCsx.

7-15 Compact Flash Storage

You can copy a project image onto CompactFlash storage and by inserting the CompactFlash in the CPU module, you can load the project in the *μ*GPCsH. This is an alternative to downloading projects from the tool interface.

7-16 PLC Memory Save/Load

You can read data from the memory in the PLC and save them as files, and read files and save them in the memory in the PLC.



7-16-1 Memory Type

(1) Specifies g0, gr, ri, rr, i0, o0.

(2) Specifies the start offset of the relevant memory.

(3) Specifies the number of the relevant memory.

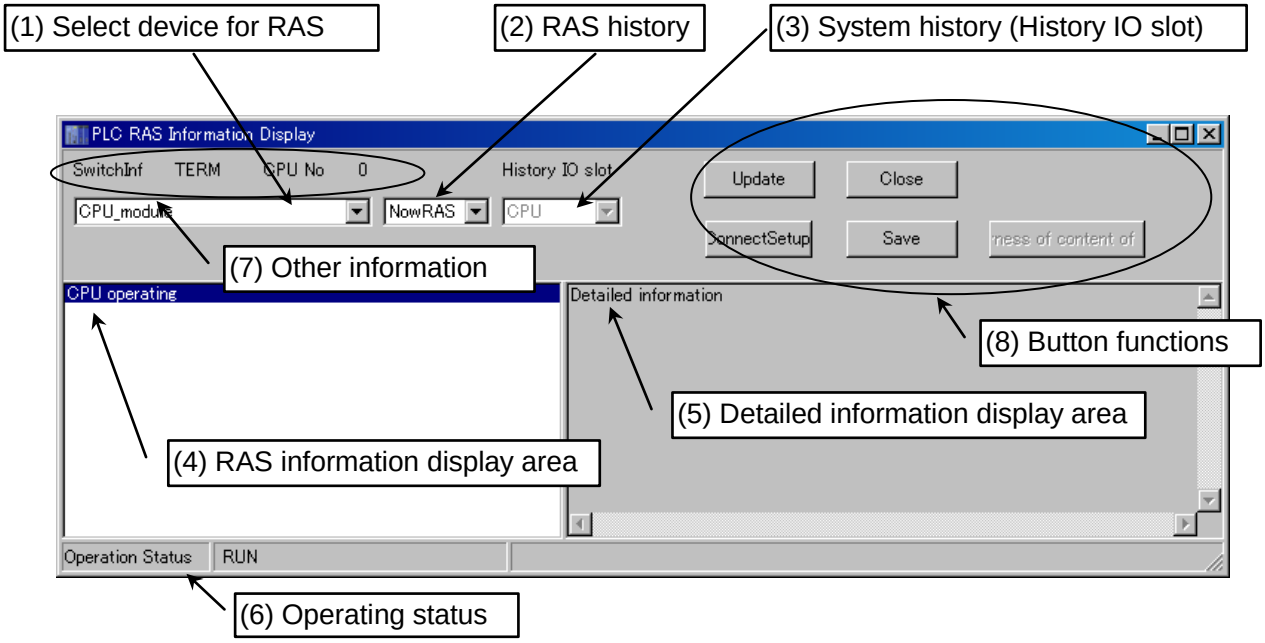
7-16-2 Button Functions

Button	Function
File Read	Opens binary files saved with “File save.”
File Save	Saves data displayed in the window as a binary file.
PLC Upload	Reads the memory specified with “Memory type” from the PLC.
PLC Download	Writes memory data displayed in the window to the PLC.
CSV Read	Opens CSV files saved with “CSV File save.”
CSV File Save	Saves data displayed in the window as a CSV file.
Cancel	Closes the window.

7-17 PLC RAS Information Display

Retrieves and saves PLC maintenance information.

7-17-1 RAS Information Display Window



(1) Select the target for RAS
Select the target for RAS

(2) RAS history
Information for the μGPCsx.

(3) System history History IO slot
If “System history” is selected for RAS, select the relevant CPU or IO slot.

(4) RAS information display area
Displays RAS information.

(5) Detailed information display area
Displays detailed RAS information.

(6) Operation status
Displays the CPU status (RUN/STOP).

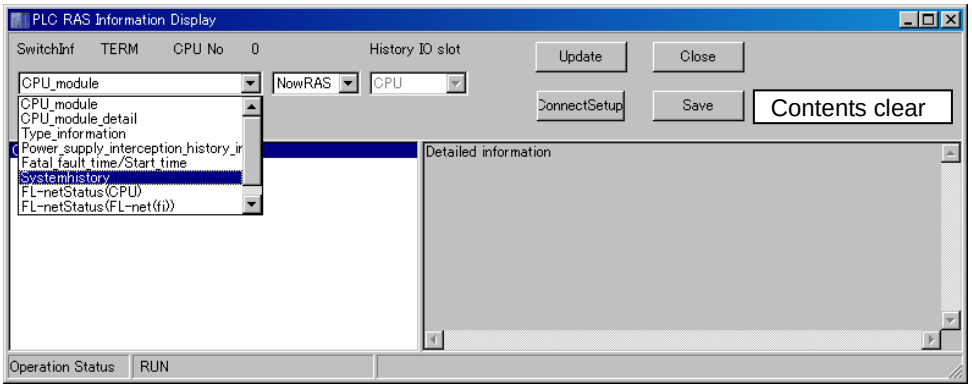
(7) Other information

Switch information and CPU
Information for the μGPCsx. TERM is always displayed when the μGPCsH is connected.

(8) Button functions

Button	Function
Update	Updates the RAS information.
Close	Closes the RAS information display.
Connect Setup	Sets the connection path.
Save	Saves the RAS information.
Contents clear	Clears the history the main unit when “System history” is selected for RAS.

7-17-2 RAS Target

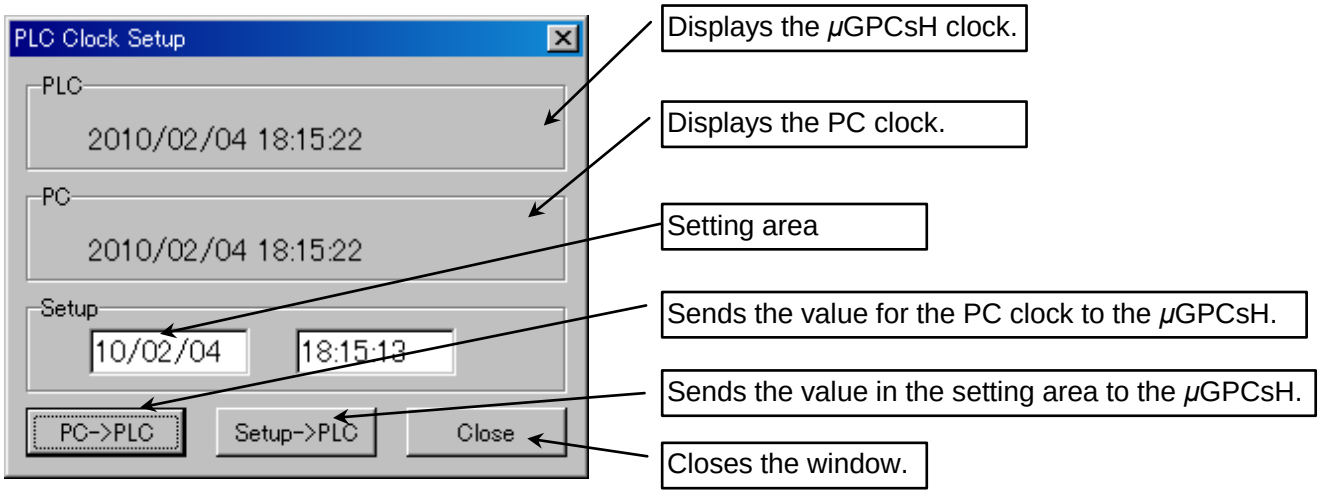


The following types of RAS target can be selected.

Item	RAS target	Content
1	CPU module	Displays the current status of the CPU module.
2	CPU module detail	Displays detailed RAS information for the CPU module.
3	Type information	Displays type and version information for the CPU module.
4	Power supply interception history information	Displays the last sixteen occurrences of CPU activation time and power discontinuity time. (Cleared by downloading.)
5	Fatal fault time/Start time	The fatal fault time is displayed, or when no serious failure has occurred, the system activation time.
6	System history	Displays system operations and error history. The system history in the CPU module is erased with the “Contents clear” button or by right-clicking and selecting “Contents clear”
7	FL-net Status	Displays FL-net status information. (Specified with the register name set.)

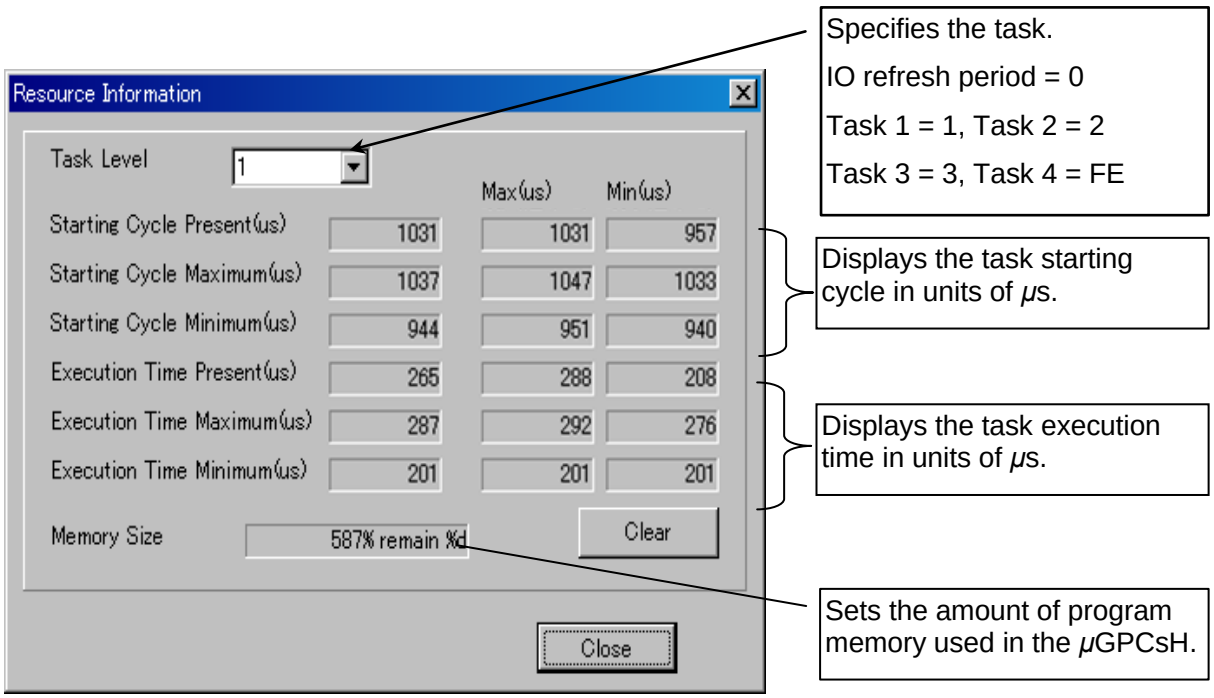
7-18 PLC Clock Setup

Performs maintenance of the clock in the μGPCsH.



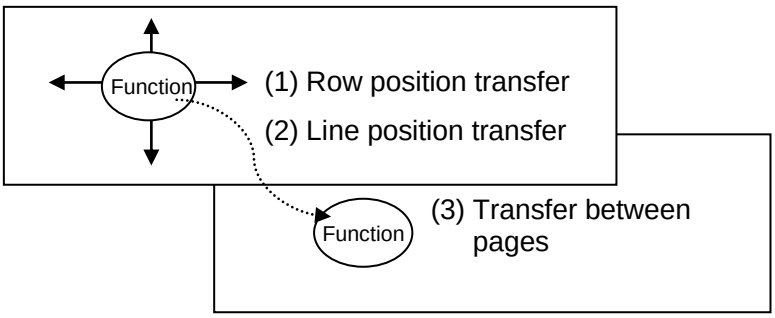
7-19 Resource Information

Displays task execution information in the μGPCsH and the amount of memory used.



7-20 Cautions for Parameter/Program Download (Loading While *μ*GPCsH Is Running)

The time series function operation buffer is identified by the number (the number counted from the top of the tree), row position and column position of the subprogram containing the function. If the page number, row position or column position has changed significantly, the time series function restarts from 0. The following transfers are recognized automatically so that operation is normal.



(1) **Only transfer of the row position** in the same column, on the same page.

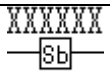
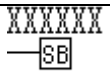
(2) **Only transfer of the column position** in the same row, on the same page.

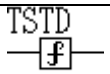
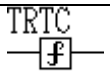
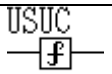
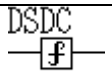
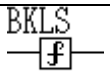
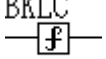
(3) **Only transfer of the page** with the same column and the same row.

With changes in the time series function other than above, it restarts from 0.

When adding and removing subprograms, the local memory changes, therefore **you should not perform loading while *μ*GPCsH is running**.

Reference: Time series function list

Differential compensation	Phase compensation	PI compensation	ARC	S-ARC	Filter
					
PID compensation	Temporary delay	Delay	Constant frequency pulse	Hysteresis	
					
Unconditional subroutine	Conditional subroutine				
					

On timer	Off timer	On differential	Off differential	Backlash	Backlash compensation
					

Chapter 8 Printing

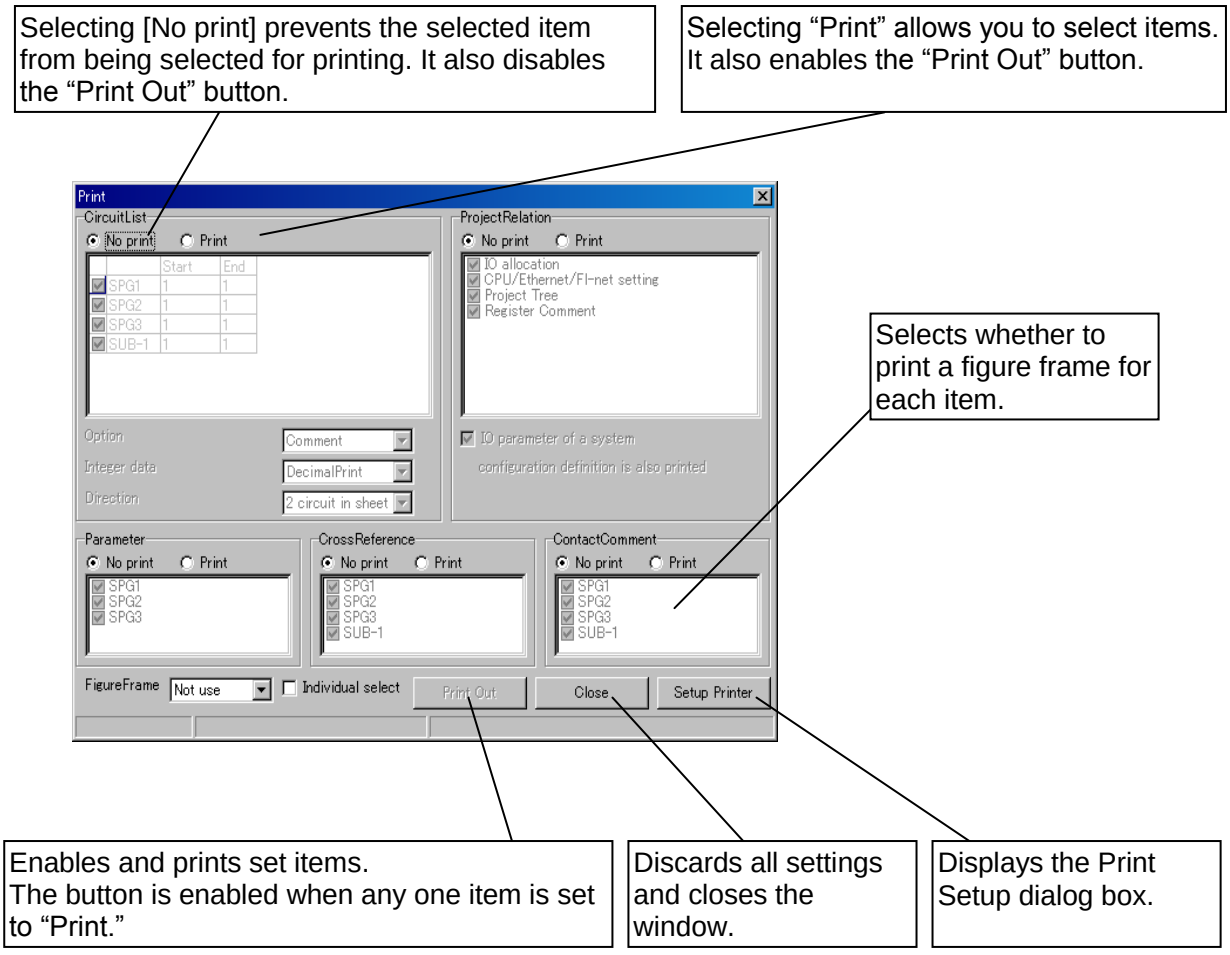
8-1 Overview of Printing

The printing functions of TDFlowEditor are shown below.

- Printing circuit lists
- Printing parameters
- Printing project relations
- Printing cross references
- Printing contact comments

8-1-1 Operating Procedure

Select “Print” from the File menu of TDFlowEditor to display the following detailed printing screen.

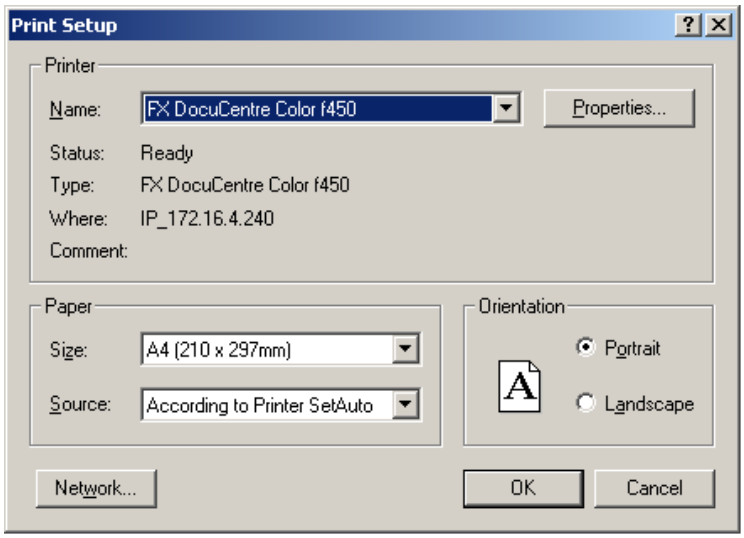


8-1-2 Checking and Changing Printer Settings

Selects the default printer to use.

Procedure for selecting a printer

On the print setting screen, click “Print Setup” to display the Print Setup dialog box.



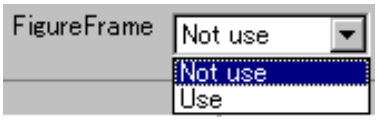
Printer Name: Select a printer from the list box.

Set “Paper,” “Orientation,” “Properties” as necessary and click “OK.”

8-1-3 Figure Frame Settings

Selects whether to print a figure frame when printing items selected with “Print” (circuit list, system configuration definition, parameters, cross reference, contact comment, project relations [project tree, memory transfer definition and trace back]).

Clicking “Figure Frame” displays the following items.



Item	Content
Not use	No figure frame is printed.
Use	A figure frame is printed.

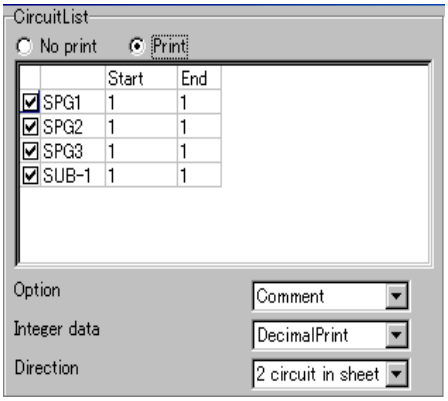
8-2 Individual Printing

You can select individual items such as circuit lists and system definitions to print.

8-2-1 Circuit List Printing

Prints the circuits of selected programs.

Each program created in the project (Task 1, Task 2, Task 3, Task 4, Subroutine) is displayed.



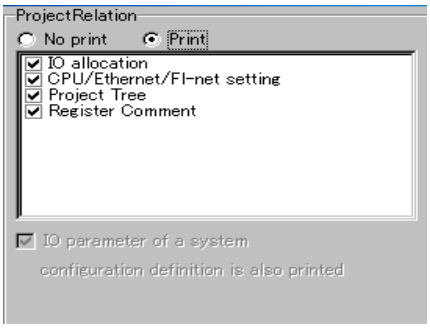
The following functions are added when printing circuits.

Item	Content	
Option	Comment	Prints the circuit list without modification.
	Cross Reference	Prints the cross reference of coils stored under contacts.
	Space	Nothing is printed under contacts.
Integer data	Decimal Print	Prints the integer data in the circuit in decimal format.
	Hexadecimal number printing	Prints the integer data in the circuit in hexadecimal format.
Direction	1 circuit in sheet	Prints one circuit with a landscape orientation.
	2 circuit in sheet	Prints two circuits with a portrait orientation.

Note: Figure Frame can only be used with landscape printing.

8-2-2 Project Relation Printing

Prints the IO allocation, project tree, etc.

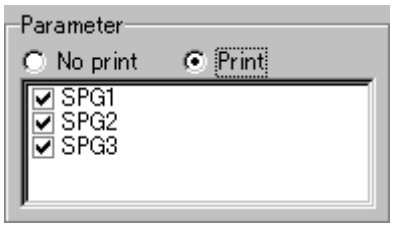


Item	Content
IO allocation	Prints the content of the configuration set with IO allocation.
CPU/Ethernet/Fl-net setting	Prints the content set with CPU/FL-net/Ethernet Definition.
Project tree	Prints the project tree.
Register Comment	Prints register comments.

8-2-3 Parameter Printing

Prints the number of programs used and values of parameters.

Each program created in the project (Task 1, Task 2, Task 3, Task 4, Subroutine) is displayed.

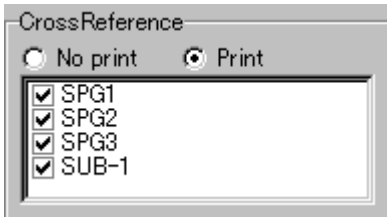


Item	Content
Number of parameters used	Prints the number of parameters used in the programs used.
Values of parameters	Prints the values of parameters (ki, kr, TS, TD, NP) used in a program.

8-2-4 Cross Reference Printing

Prints the cross references of selected programs.

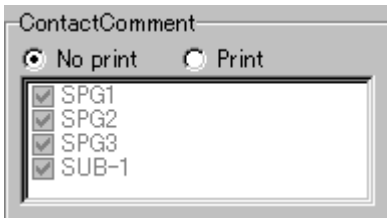
Each program created in the project (Task 1, Task 2, Task 3, Task 4, and Subroutine) is displayed.



8-2-5 Contact Comment Printing

Prints the contact comments of selected programs.

Each program created in the project (Task 1, Task 2, Task 3, Task 4, and Subroutine) is displayed.

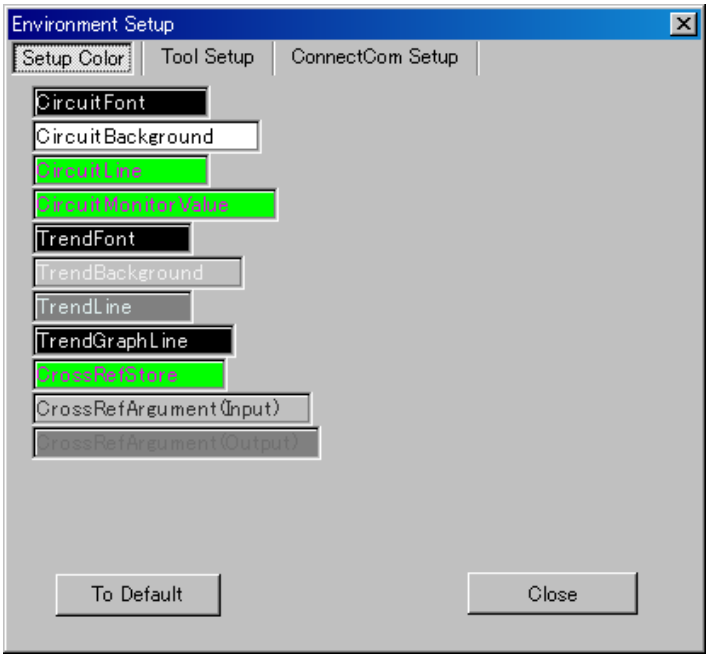


Chapter 9 Tools Menu

9-1 Environment Setup

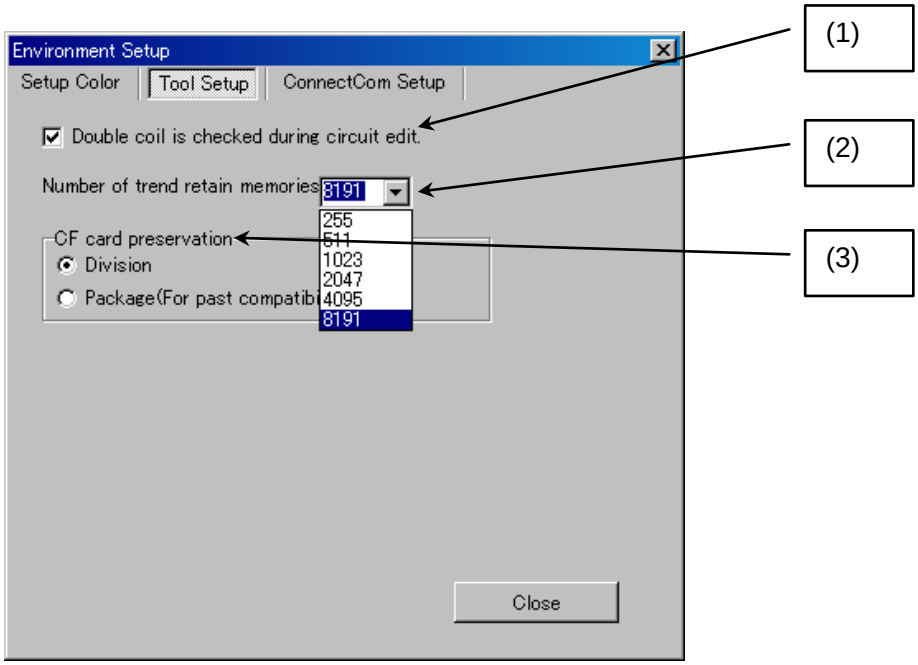
9-1-1 Setup Color

Changes the colors used on the screen. Right-click items to display the Setup Color dialog box where you can select colors.



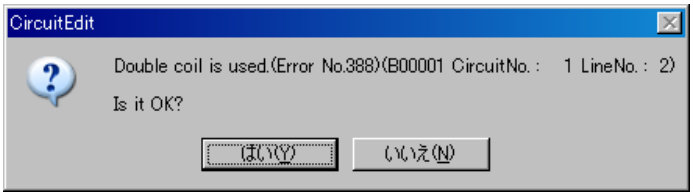
9-1-2 Tool Setup

Makes various settings used in TDFlowEditor.



(1) Double coil is checked during circuit edit.

If there is a double coil, the following dialog box appears.



(2) Sets the number of trend retain memories.

Increasing the size increases the sampling capacity which in turn increases the capacity that can be saved in a CSV file.

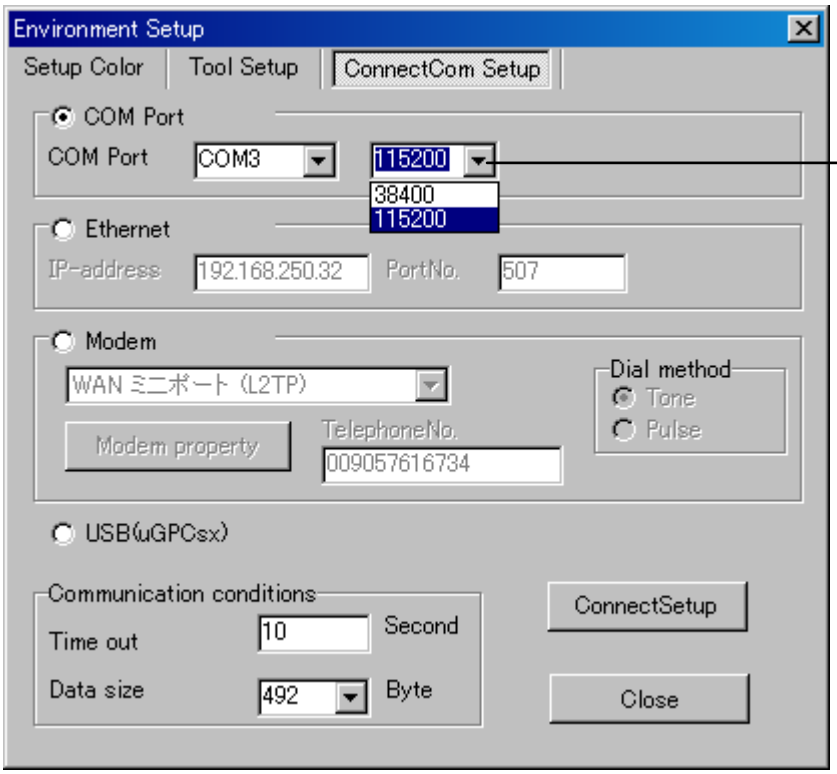
(3) Selects the method of saving to a CompactFlash (CF) card. (This setting is only for the μGPCsx.)

- Division
- Package (For past compatibility)

9-1-3 Communication Settings with the Connected Device

Determines the method of connecting the *μ*GPCsH and TDFlowEditor.

- COM Port
  Used when connecting the *μ*GPCsH with the COM port (serial port) of the PC.
  This setting should also be used when connecting the *μ*GPCsH with USB.
- Ethernet
  You can also use TDFlowEditor with Ethernet by inserting a cable in the LAN terminal of the *μ*GPCsH CPU module. Set the IP address and port No. of the *μ*GPCsH.
- Modem
  Used when connecting the *μ*GPCsx with a modem.
- USB
  Used when connecting the *μ*GPCsx through the USB port.



*μ*GPCsx: 38400

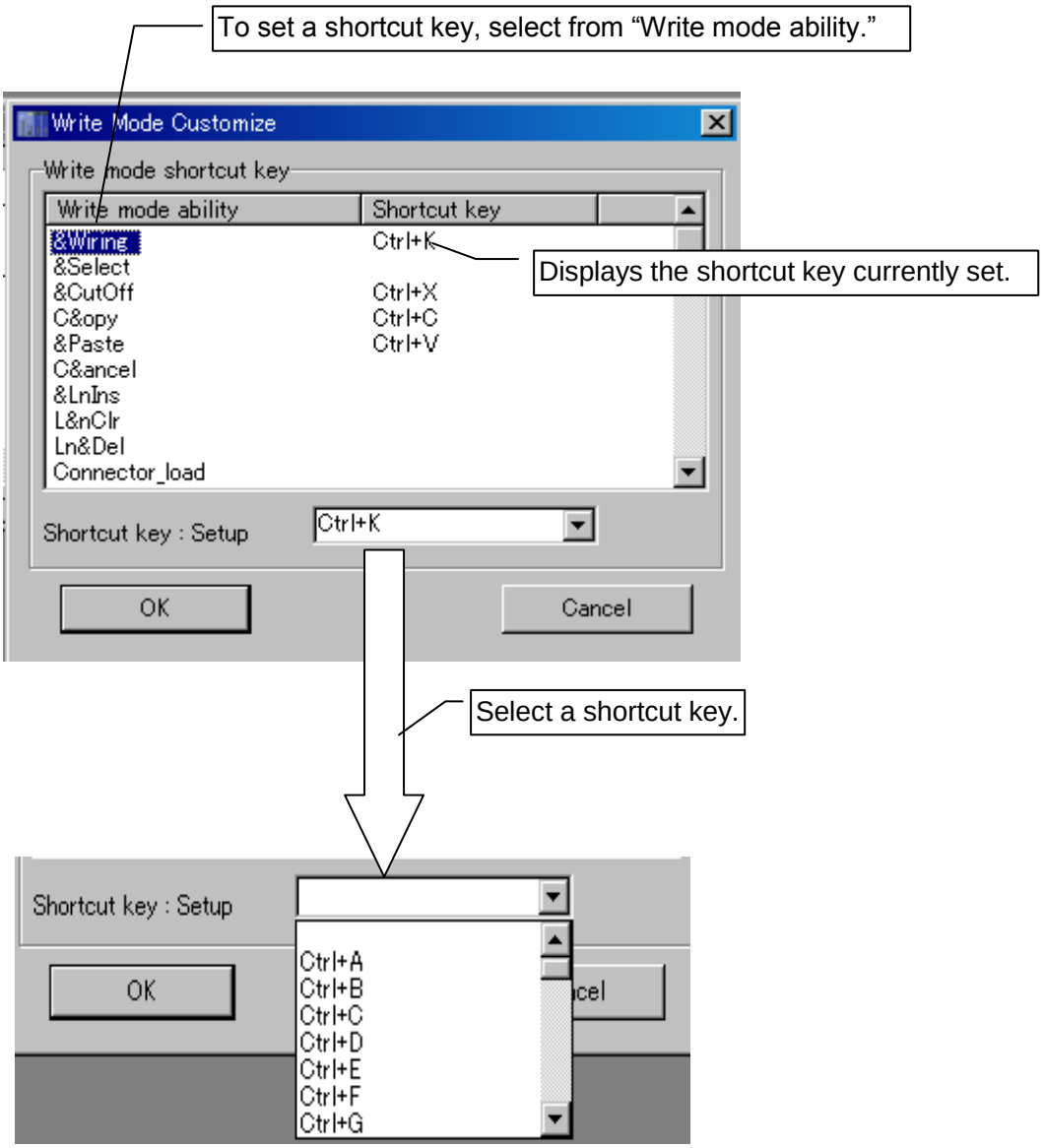
*μ*GPCsH: 115200 or 38400

(With the *μ*GPCsH, this setting is made automatically.)

- Communication conditions
  Timeout: Specifies the time before resending after a transmission error with the *μ*GPCsH.
  Data size: Set to 492 bytes with the *μ*GPCsH.

9-2 Write Mode Customize

With write mode customization you can specify shortcut keys (accelerator keys) for the Write Mode of the circuit window. Select a shortcut key from “Write mode ability” to set and select a shortcut key in “Shortcut key: Setup.”



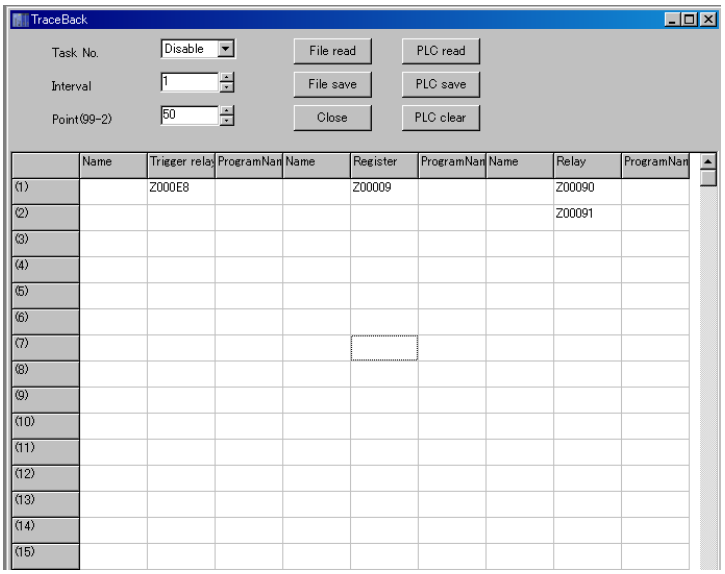
9-3 Trace Back

Using the trace back function allows you to perform detailed analysis of partial sections of continuous data. First set any of the trigger relays you specified earlier to on. Then only 100 data points prior to and after turning on the trigger register are retained. You can then load and analyze the sample data values.

Main features

- The sample data can include 16 relays and 15 registers.
- You can specify a maximum of 16 trigger relays.
- You can save a maximum of 16 trace back data items.
- You can specify an interval (interval trace).
- You can specify points to determine the number of samples before and after the trigger.

9-3-1 Trace Back Settings



Operating procedure and setting items

Item	Content
Task No.	Specifies the task for performing trace back sampling. Setting to “Disable” disables trace back sampling.
Interval	Specifies interval tracing (sample). (One sample per n iterations of the task.)
Point	Sets the point to determine the number of samples after the trigger. (With 50, the trigger point is in the middle. The valid range is 99 to 2.)
File read	Reads trace back settings saved with “File save.”
File save	Saves the displayed trace back settings in a file.
PLC read	Reads trace back settings from the PLC.
PLC save	Saves displayed trace back settings in the PLC.
PLC clear	Clears PLC trace back settings.
Close	Closes the window.
Name	You can enter an arbitrary character string for the trigger relay.
Trigger relay	Switching this relay from off to on initiates a trigger.
Program Name	Sets the name of the program used for the trigger relay. This setting only applies to local data.
Name	You can enter an arbitrary character string for the register.
Register	Sets the name of the register sampled.
Program Name	Sets the name of the program used for the sampled register. This setting only applies to local data.
Name	You can enter an arbitrary character string for the relay.
Relay	Sets the name of the relay sampled.
Program Name	Sets the name of the program used for the sampled register. This setting only applies to local data.

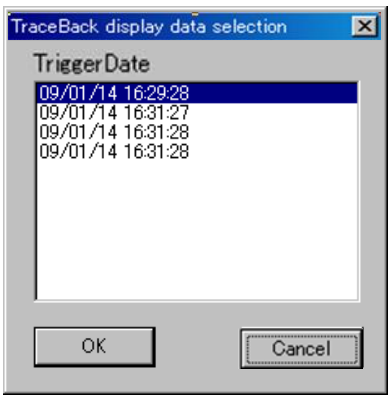
9-3-2 Trace Back

1. Trace Back display data selection (Trigger Date)

   Selecting “Trace Back Display” with trace back data sampled in the CPU module displays the following window. Select a trigger date to display.

   Click “OK” to display the window for selecting the data to display.

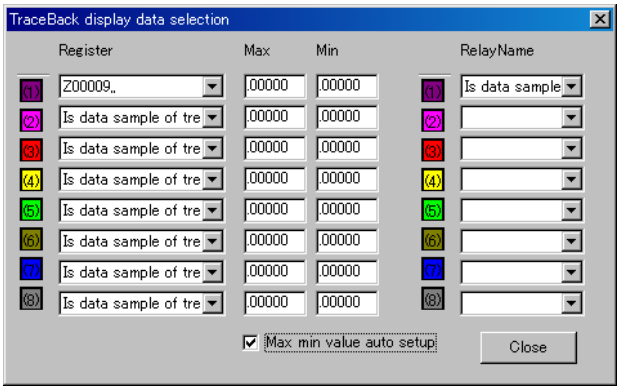
   Click “Cancel” to cancel trace back display.



2. Trace Back display data selection

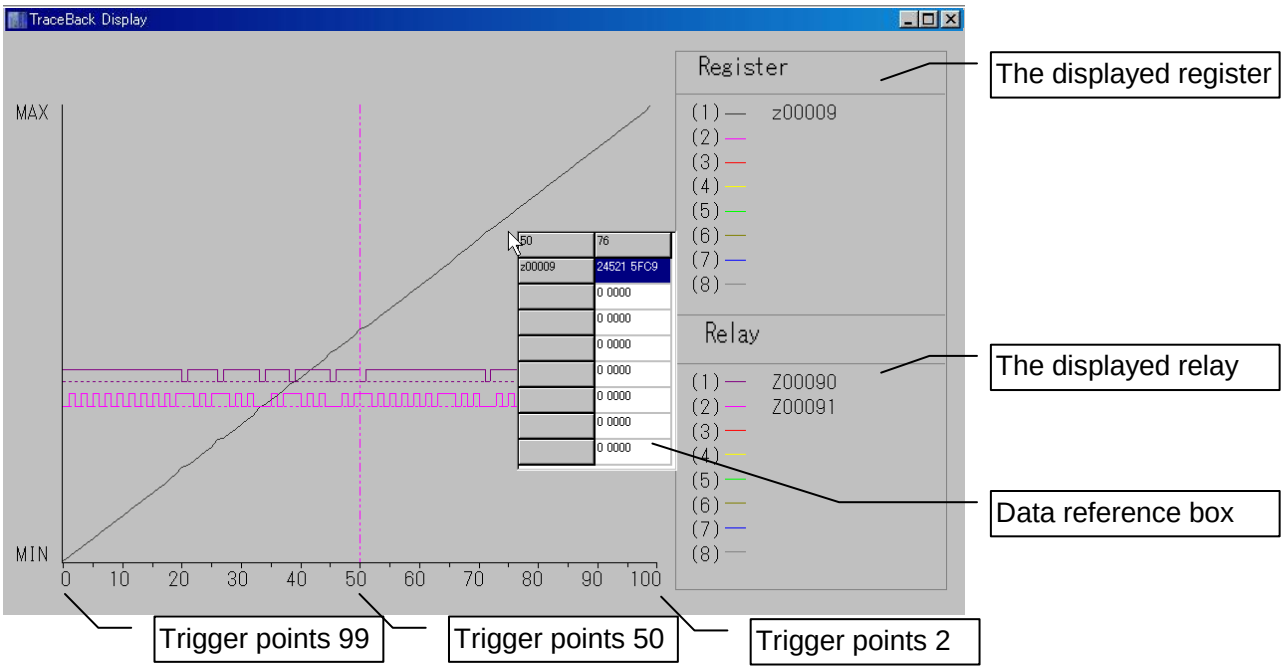
   You can select a maximum of 8 registers and a maximum of 8 relays to display. You can change the colors of the graph by clicking 1 to 8 at the right. If you do not know the display data value and cannot decide the maximum and minimum values, check “Max. min. value data setup” to calculate the maximum and minimum register values automatically. To hide the graph, select “Hide.”

   Click “Close” to go to the trace back display window.



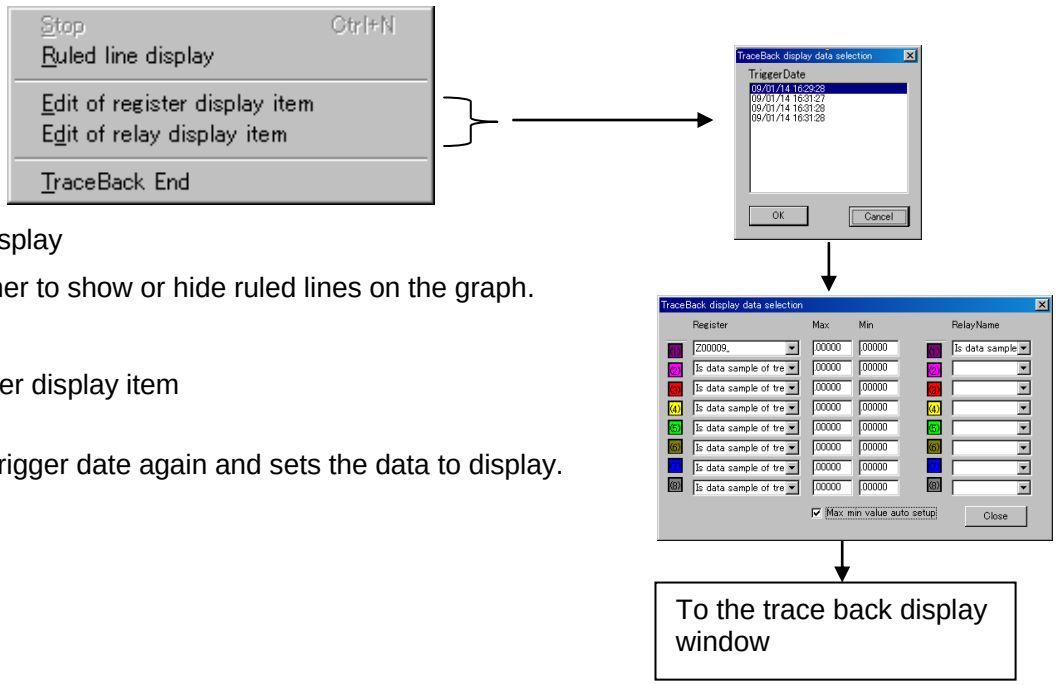
3. Trace Back display

An example of the trace back display window is shown below.



Double-clicking on the graph displays the data reference box. The trigger point and register value at the point of mouse curser are shown.

Right-clicking displays the following menu.



Ruled line display

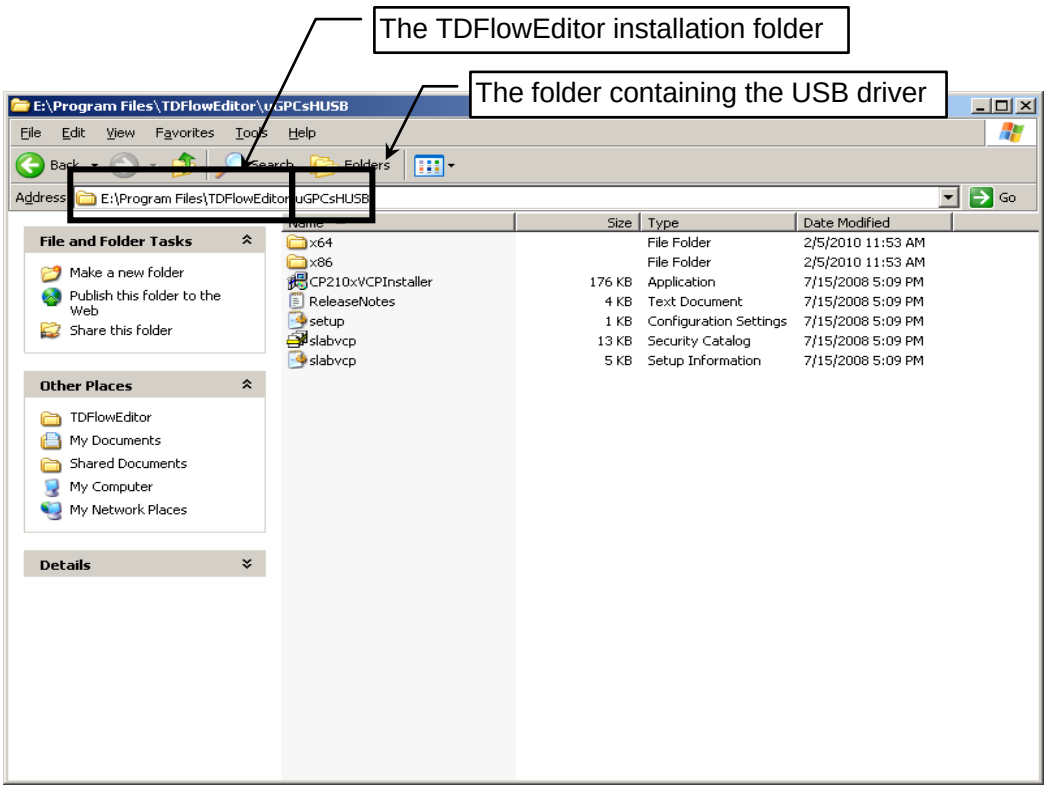
Select whether to show or hide ruled lines on the graph.

Edit of register display item

Selects the trigger date again and sets the data to display.

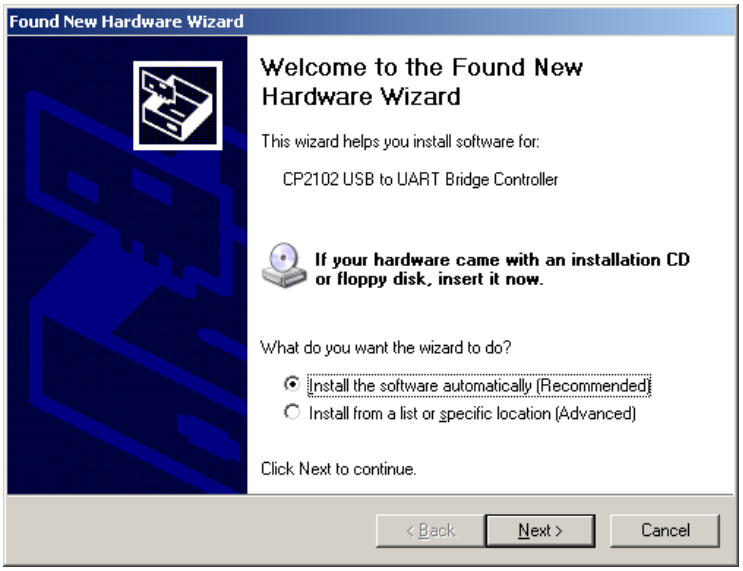
9-4 USB Driver Setup

To connect TDFlowEditor and the μGPCsH with a USB cable, the USB driver must be set up. When you connect the μGPCsH to the PC with a USB cable, the Windows driver installation window appears. Specify the folder below.

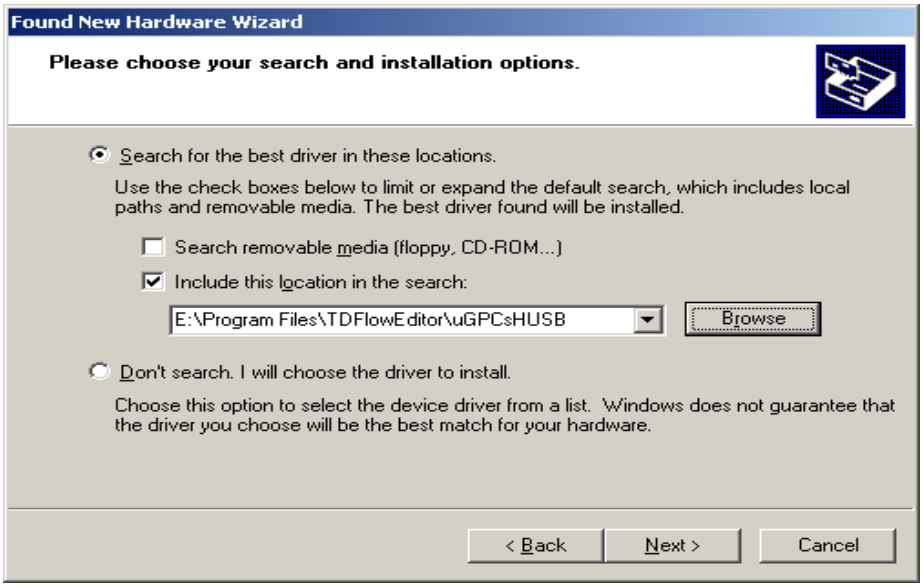


• Installing the USB Driver

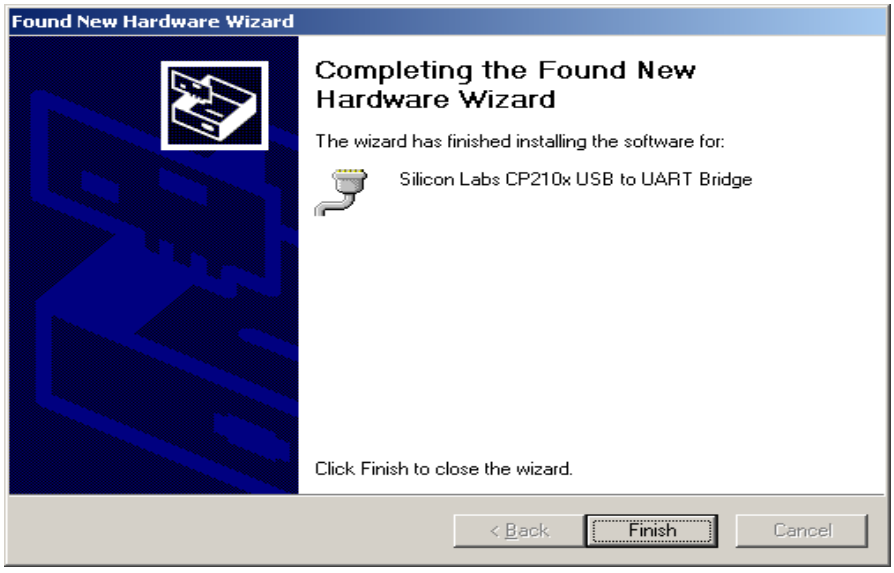
(1) When you connect the CPU module of the μGPCsH to the PC with a USB cable, the “Found New Hardware Wizard” opens. Select “Install from a list or specific location” and click “Next.”



(2) Select “Search for the best driver in these locations.” and “Include this location in the search.” Click “Browse” and select the folder named uGPCsHUSB.

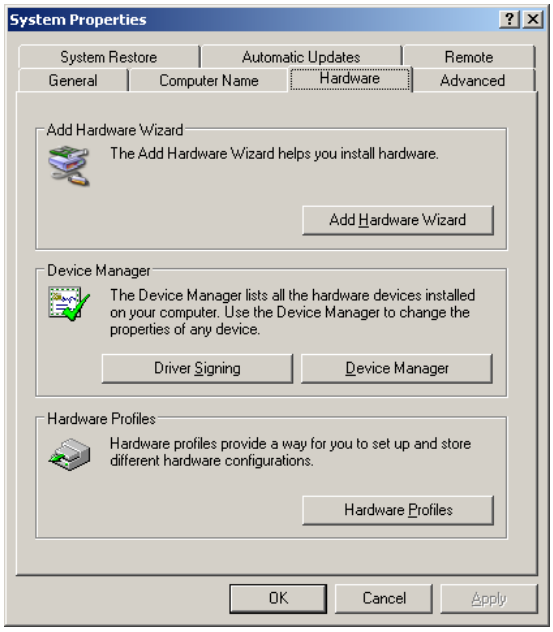


(3) When the installation is complete, the “Completing the Found New Hardware Wizard” window appears. This completes installation of the USB Driver. Click “Finish” to close the “Found New Hardware Wizard.”

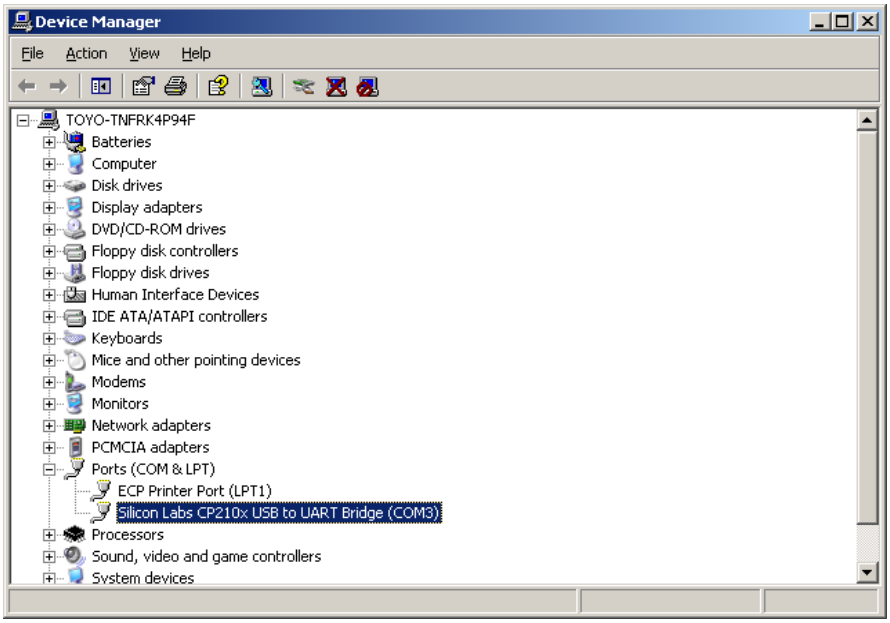


• Checking and changing the COM Port

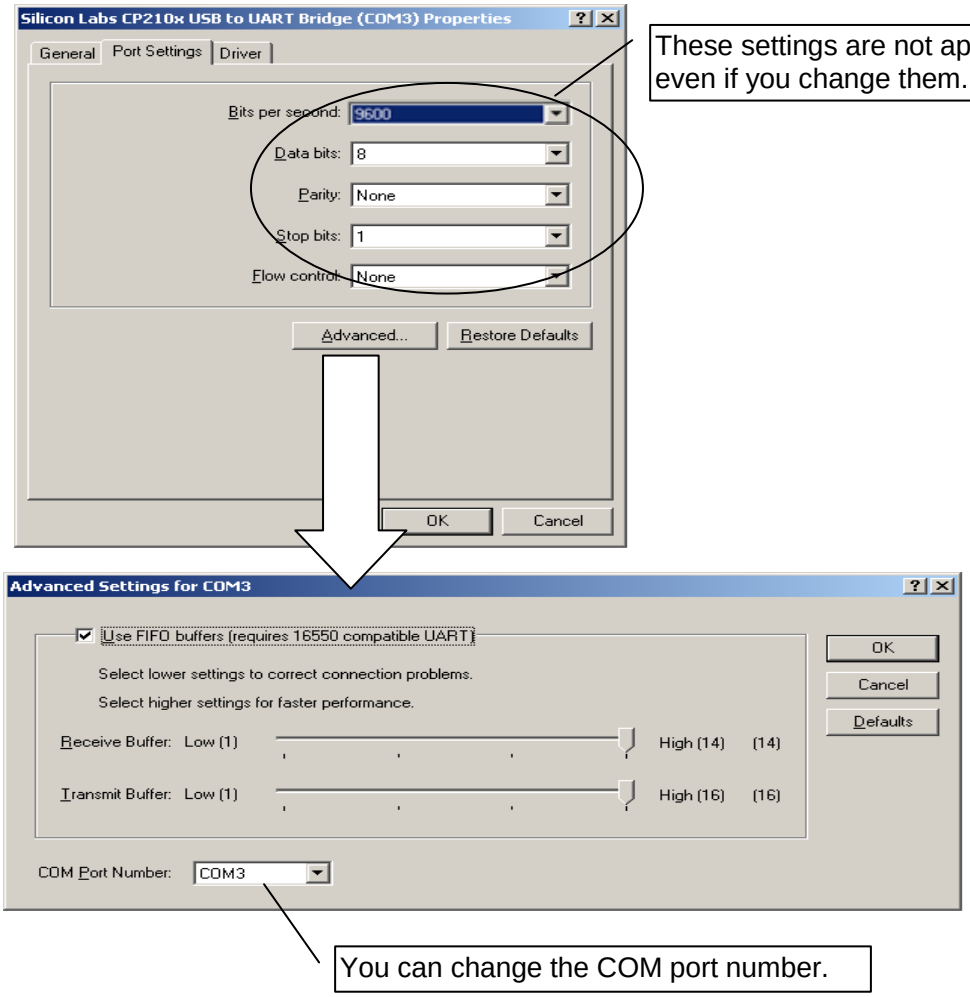
(1) Select “Control Panel” → “System” → “Device Manager.”



(2) In “Ports (COM & LPT),” check the item shown in brackets after “Silicon Labs CP210x USB to UART Bridge Controller.” In this example, COM3 is used.



(3) Double-click “Silicon Labs CP210x USB to UART Bridge Controller (COM3)” and click “Port Settings” to display the following window. In “Advanced…,” you can change the COM port number.



Chapter 10 Simulation Function

TDFlowEditor has a simulation function for performing various validations on application programs on the PC.

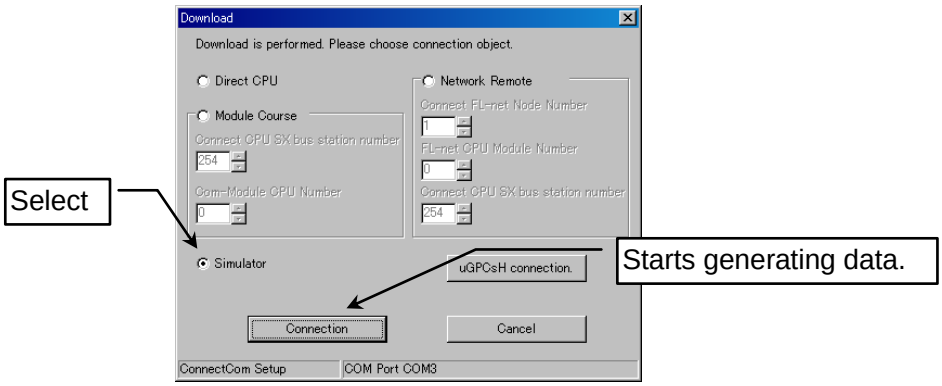
10-1 What the Simulation Function Can Do

The simulation function performs the tasks shown below.

1. Validation of application programs on the PC
2. Validation using the PC serial port
   (1) Validation of application programs with the PC connected to a POD or AIP touchscreen
   (2) Validation of the C_FREE function with the PC connected to external equipment
3. Validation using the PC Ethernet port
   (1) Validation of application programs with the PC connected to a POD or AIP touchscreen
   (2) Validation of the M_OPEN, M_SEND, and M_RECV functions with the PC connected to external equipment
4. Validation of multiple applications by running multiple TDFlowEditor programs and running the respective FL-net registers as the same memory.

10-2 Simulation Procedure

In “Online” → “Download,” select “Simulator” to create application validation data on the PC. Then Circuit Monitor, Debugger, Relay Display, Register Display, Trend Graph, etc., are enabled.

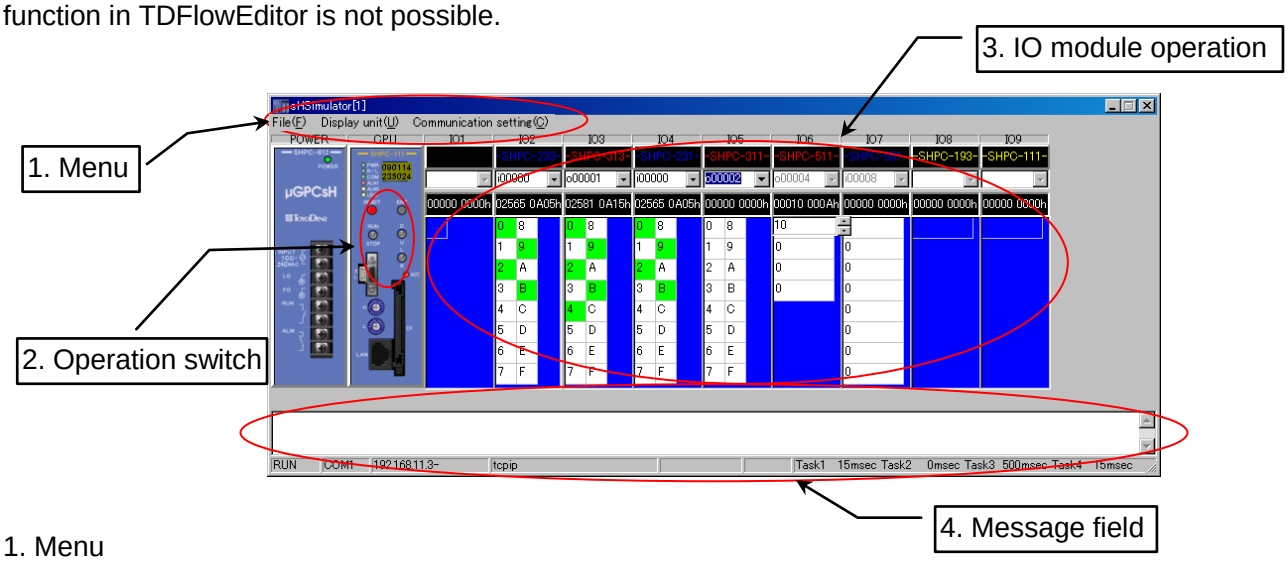


With “Online” → “Upload,” projects where simulation was used earlier are simulated again.

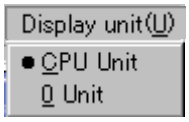
10-3 Simulation Function Window

The window below is a virtual execution module for validating application programs.

Application programs are validated using Circuit Monitor, Debugger, Relay Display, Register Display, Trend Graph, etc., in TDFlowEditor. When the window shown below is closed, monitoring the simulation function in TDFlowEditor is not possible.

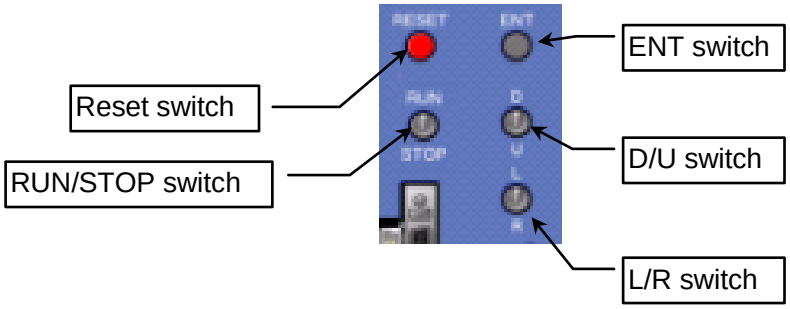


1. Menu

File menu	Content
Read IO Data	Reads IO register values saved earlier.
Store IO Data	Saves IO register values.
Exit	Exits the virtual execution module. (Normally, the virtual execution module exits when you quit TDFlowEditor.)
Display unit	Switches the display to the unit extended with the IO extension module. Menu example 

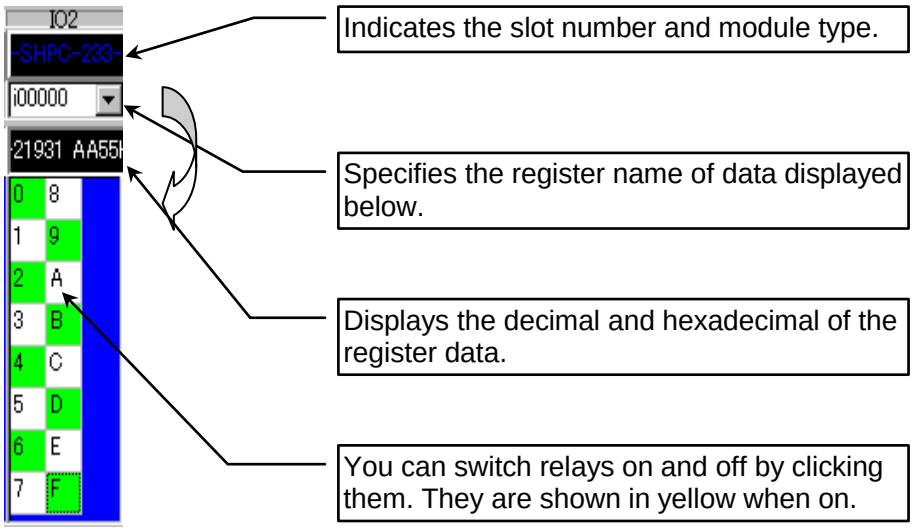
2. Operation switch

Clicking on the part shown below applies the on/off status to the application program control and z0 register.

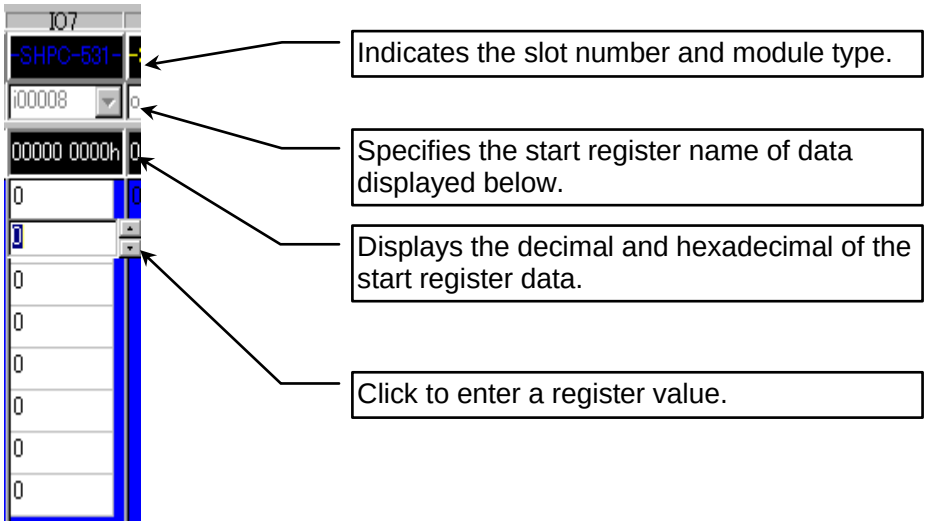


3. IO module operation

• DIO module



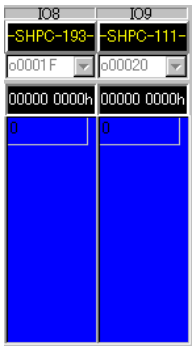
• Multiple word modules such as analog modules etc.



• Communication module

Communication data is displayed in a window.

Example



4. Message field

The message window displays simulation function errors and transmission errors.

- Status bar

(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Indicates the status of the simulation function.

Item	Content
RUN* RUN	Indicates that the application program is running normally.
STOP	Indicates that the application program has stopped.
XCHG	Indicates that the application program is being switched.

(2) Indicates the serial port communication status.

Item	Content
COM?	Displays the currently set serial port name.
COM? * COM?	Indicates that the serial port is communicating.
COM? -	Indicates a serial port timeout error.

(3) Indicates the Ethernet communication status.

Item	Content
???.???.???.???	Displays the IP address set.
???.???.???.???*	Indicates that Ethernet is connected.

(4) Displays the project name of the application program being validated.

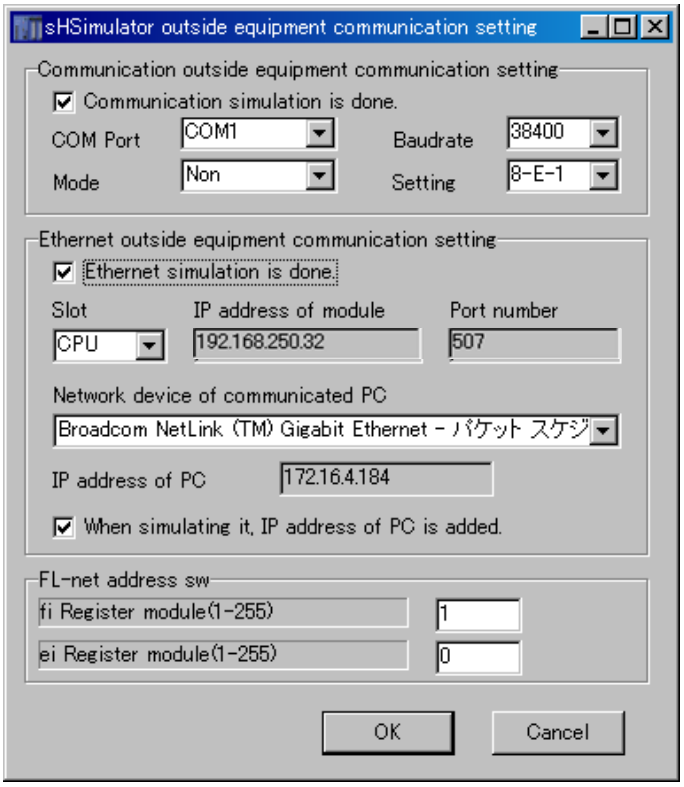
(5) The multiple word module IO register name at the mouse position is displayed.

(6) “Moni” flashes when transferring monitor data with TDFlowEditor.

(7) Displays the scan time of each task

10-4 Simulation Function Communication Settings

Sets the PC resources used for communication when validating transmission.



Simulator outside equipment communication setting	Item	Content
General communication (Using the PC serial port.) Use the settings for the versatile communications module.	Communication simulation is done.	Check to obtain PC resources (COM port) and enable communication.
	COM Port	Specifies the name of the serial port.
	Baud rate	Specifies the communication speed.
	Mode	Specifies the mode (protocol).
	Setting	Set the communication parameter.
Ethernet Normally, the PC IP address and IP address of the module do not match, and so for simulation, set the PC IP address to that of the module or select “When simulating it, IP address of PC is added...”	Ethernet simulation is done.	Check to enable Ethernet communication.
	Slot	Specifies the slot of the module of the function being validated.
	Module IP address	Displays the IP address of the module set in IO allocation.
	Port number	Displays the port number of the module set in IO allocation.
	Network device of communicated PC	Specifies the Ethernet port of the PC (board etc.)
	IP address of PC	Displays the IP address of the PC.
	When simulating it, IP address of PC is added.	Adds the module IP address to the OS protocol of the PC.
Reset switchFL-net address sw	fi Register module	Set the value of the switch of the CPU module used for the relevant register.
	ei Register module	

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