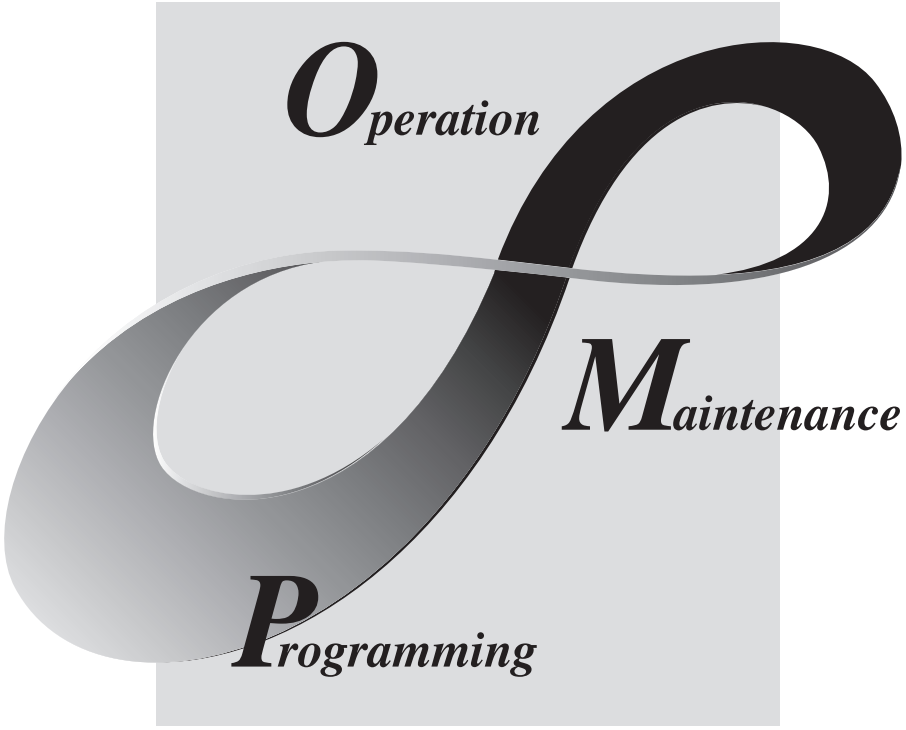
GX Configurator-SC Version 2

MITSUBISHI

Operating Manual

(Protocol FB support function)

MELSOFT



MELSOFT
Integrated FA Software

SW2D5C-QSCU-E

• SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

⚠ DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Startup/Maintenance Precautions]

⚠ CAUTION
• Before starting online operations such as a communication test, consider the operation of the connected device and fully ensure safety.

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REVISIONS

* The manual number is given on the bottom left of the back cover.

Print Date	* Manual Number	Revision
Jan., 2003	SH (NA)-080393E-A	First printing
Jun., 2003	SH (NA)-080393E-B	Partial corrections Section 6.3, Section 7.1, Section 7.2.3, Section 7.4, Section 8.2.4, Section 8.3, Section 10.3 Partial additions Section 9.2.1, Appendix 3
Feb., 2004	SH (NA)-080393E-C	Function additions Creating receive (specified length) packet, Module start I/O No. setting Partial corrections Section 1.1, Section 7.2.1, Section 7.2.3 to 7.2.4, Section 7.3.2, Section 7.4, Section 8.2.1, Appendix 1 Partial additions Appendix 4 to 5
Sep., 2004	SH (NA)-080393E-D	Partial corrections Section 3.2, Section 6.2, Section 7.2.3, Section 7.2.4 Partial additions Section 8.2.4, Section 9.3
Jul., 2005	SH (NA)-080393E-E	Partial corrections Section 6.3, Section 6.4, Section 8.2.4
Apr., 2006	SH (NA)-080393E-F	Partial corrections Section 7.2.3
Aug., 2006	SH (NA)-080393E-G	Partial corrections Section 8.2.4, Section 8.3, Appendix 5
Jan., 2008	SH (NA)-080393E-H	Partial corrections Generic Terms and Abbreviations Used in This Manual, Chapter 2
May, 2008	SH (NA)-080393E-I	Partial corrections Section 7.3

Japanese Manual Version SH-080377-J

INTRODUCTION

Thank you for choosing the Mitsubishi MELSOFT series Integrated FA software.
Read this manual and make sure you understand the functions and performance of MELSEC series sequencer thoroughly in advance to ensure correct use.
Please make this manual available to the end user.

CONTENTS

About Manuals

The following lists the manuals relevant to this software package.
These manuals are separately available if necessary.

Related Manuals

Manual Name	Manual Number (Model Code)
Q Corresponding Serial Communication Module User's Manual (Basics) Explains the outline, applicable system configuration, specifications, pre-operation procedure, basic data communication method with the other device, maintenance, inspection, and troubleshooting for use of the module. (Sold separately)	SH-080006 (13JL86)
Q Corresponding Serial Communication Module User's Manual (Application) Explains the specifications and usage of the module's special functions, the settings for use of the special functions, and the method of data communication with the other device. (Sold separately)	SH-080007 (13JL87)
Q Corresponding MELSEC Communication Protocol Reference Manual Explains how the other device performs read, write, etc. of PLC CPU data by making communication in the MC protocol using the serial communication module/Ethernet module. (Sold separately)	SH-080008 (13JF89)
GX Developer Version 8 Operating Manual (Startup) Explains the system configuration, installation method, and startup method of GX Developer. (Sold separately)	SH-080372E (13JU40)
GX Developer Version 8 Operating Manual Explains the program creation method, printout method, monitor method, debugging method, etc. using GX Developer. (Sold separately)	SH-080373E (13JU41)
GX Developer Version 8 Operating Manual (Function Block) Explains the function block creation method, printout method, etc. using GX Developer. (Sold separately)	SH-080376E (13JU46)

REMARK

The manuals are available separately in printed form as options. Please place an order with the manual number (model code) in the above table.

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The symbols used in this manual and their definitions and examples will be explained.

Symbol	Description	Example
[ ]	Menu name of the menu bar	[Project]
<< >>	Tab name of the dialog box	<<Main>>
" "	Item name of the dialog box	"Name"
☐	Command button of the dialog box	Setting Button

PURPOSE

Purpose of the operation that is explained in the corresponding chapter, section or item.

BASIC OPERATION

Operation performed until the screen for actually achieving the purpose is displayed.

DISPLAY/SETTING SCREEN

Screen used to make setting and/or provide a display for the purpose.

DISPLAY/SETTING DETAILS

Explains the display/setting screen items.

Explains the especially noted items of the explanation, functions desired to be known, etc..

REMARK

Gives information useful as the knowledge related to the explanation.

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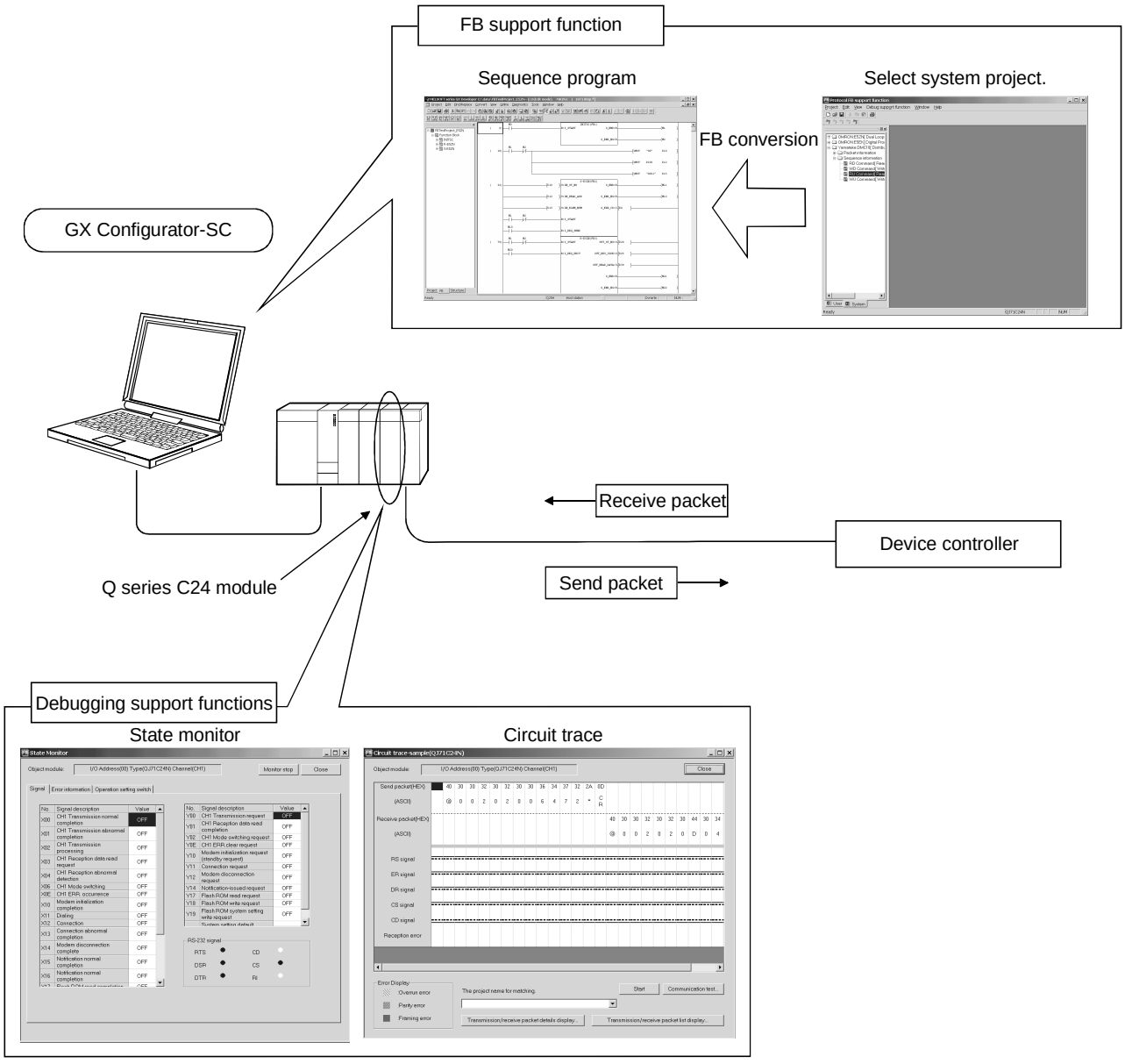
Generic Terms and Abbreviations Used in This Manual

In this manual, the following generic terms and abbreviations are used to represent the GX Configurator-SC software package and PLC CPU modules. The module/ package name is given when the target model name must be pointed out explicitly.

Generic Term/Abbreviation	Generic Term/Abbreviation
GX Configurator-SC	Generic product name of the model names SWnD5C-QSCU-E and SWnD5C-QSCU-EA. (n means Version 2 or later.)
Protocol FB support function	Means the protocol FB support function of GX Configurator-SC.
Protocol FB	Abbreviation of the communication control function block.
Q Series C24 module	Generic term of the serial communication module and modem interface module.
Serial communication module	Generic term of the QJ71C24, QJ71C24-R2, QJ71C24N, QJ71C24N-R2 and QJ71C24N-R4.
QJ71C24N module	Generic term of the QJ71C24N, QJ71C24N-R2 and QJ71C24N-R4.
Device controller	Generic term of the external devices that communicate with the Q series C24 modules.
Intelligent function module utility	Utility in GX Configurator-SC.
Communication control program	Program for communication with the device controller.
Module initialization FB	FB that performs the initial setting of the module among the protocol FBs.
Send FB	FB that sends data to the device controller among the protocol FBs.
Receive FB	FB that receives data from the device controller among the protocol FBs.
I/O variable	Label used in an FB (FB variable).
Windows Vista®	Generic term for the following: Microsoft® Windows Vista® Home Basic Operating System, Microsoft® Windows Vista® Home Premium Operating System, Microsoft® Windows Vista® Business Operating System, Microsoft® Windows Vista® Ultimate Operating System, Microsoft® Windows Vista® Enterprise Operating System
Windows® XP	Generic term for the following: Microsoft® Windows® XP Professional Operating System, Microsoft® Windows® XP Home Edition Operating System
GX Developer	Generic product name of the product model names SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV and SWnD5C-GPPW-EVA. (n means Version 8 or later.)
FB	Abbreviation of the function block.
QCPU (Q mode)	Generic term of the Q00(J)CPU, Q01CPU, Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU and Q25PHCPU.

1 OVERVIEW

GX Configurator-SC Version 2 (hereafter abbreviated to GX Configurator-SC) is the software added into GX Developer for use.
Conventionally, to perform the communication processing of the serial communication module/modem interface module (hereafter abbreviated to the Q series C24 module) with a device controller, a wide variety of complicated sequence programs, e.g. device-specific message format creation and data communication, had to be created by the user in the nonprocedural protocol.
On this software, user-created communication control programs are available as function blocks (hereafter abbreviated to FBs). The user can create a communication control program easily by making use of these FBs.
Also, since the communication debugging functions necessary for system startup are provided, operations from communication control program creation to system startup-time debugging can be performed with this software only.



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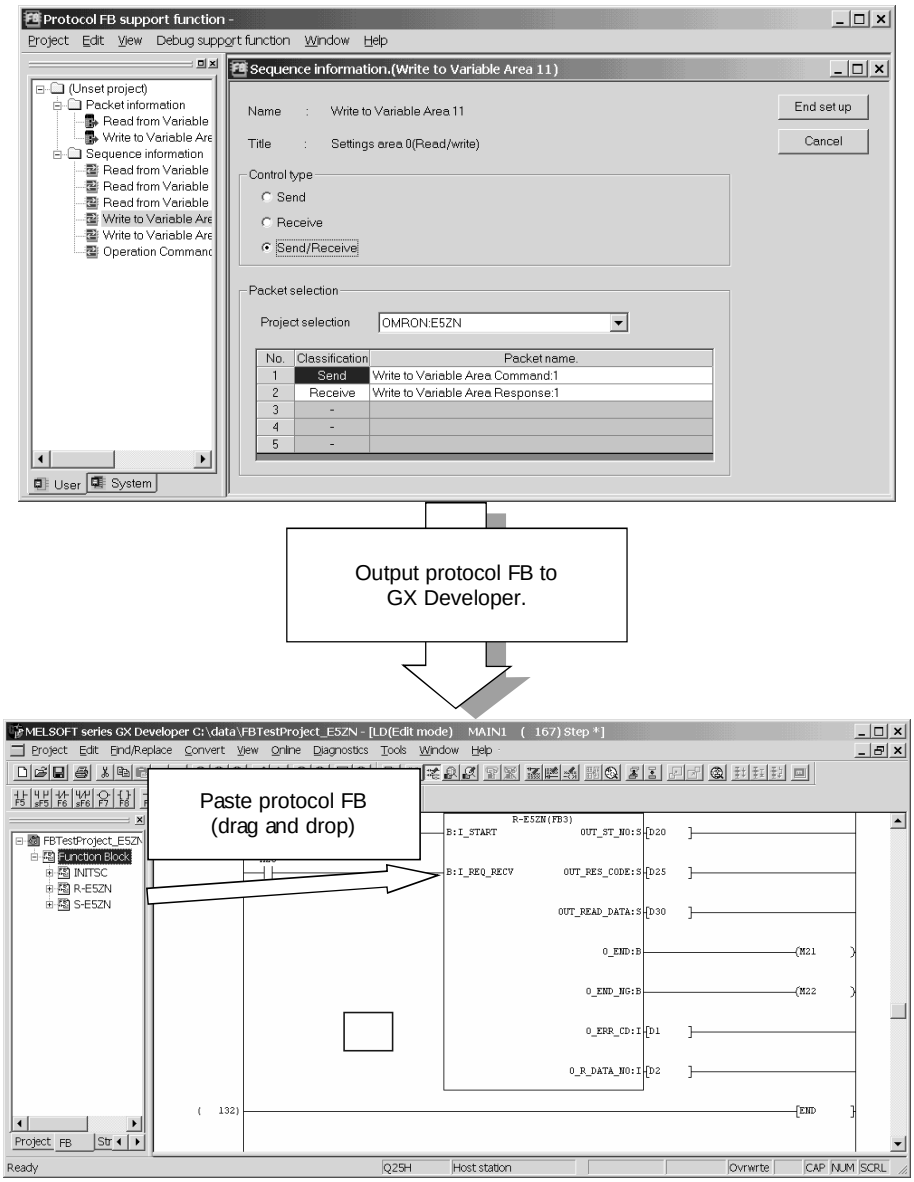
1.1 Features

1

(1) Automatic creation of communication control program (function blocks)

Reduced work for creating sequence for communication control!!

Since data for various device controllers are available, the user merely needs to perform FB conversion to create a communication control function block (hereafter abbreviated to a protocol FB).



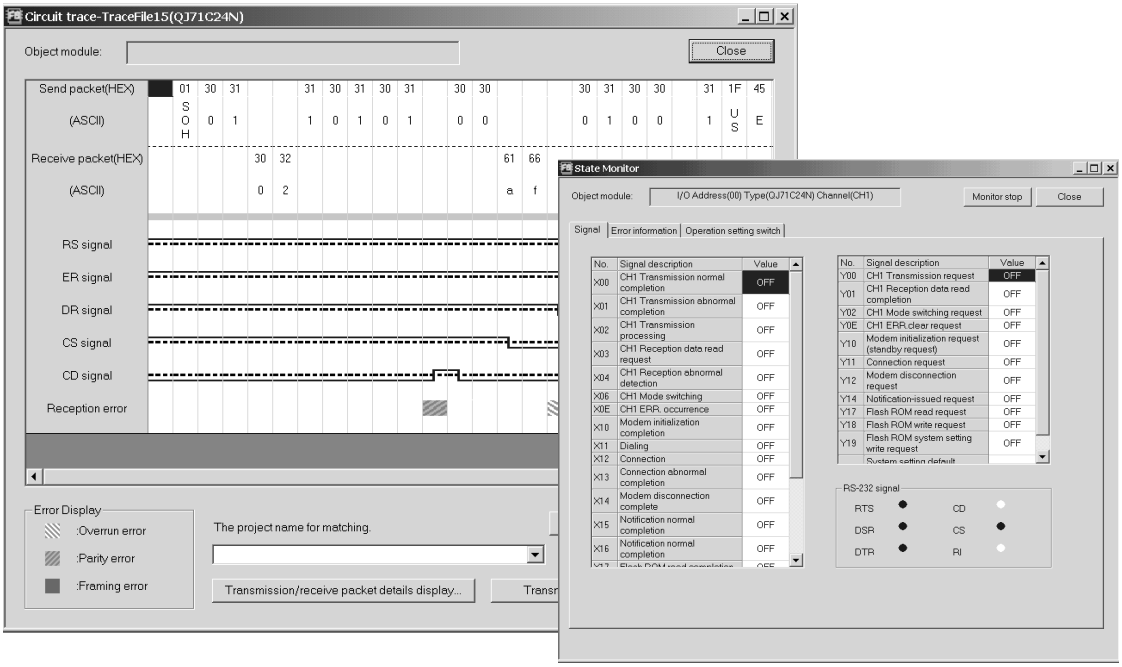
(a) No requirement of packet construction specific to device controller
The protocol FB support function has preset data for various data controllers. The user merely needs to select the device controller and its processing items to create a protocol FB automatically without being conscious of dedicated instruction.

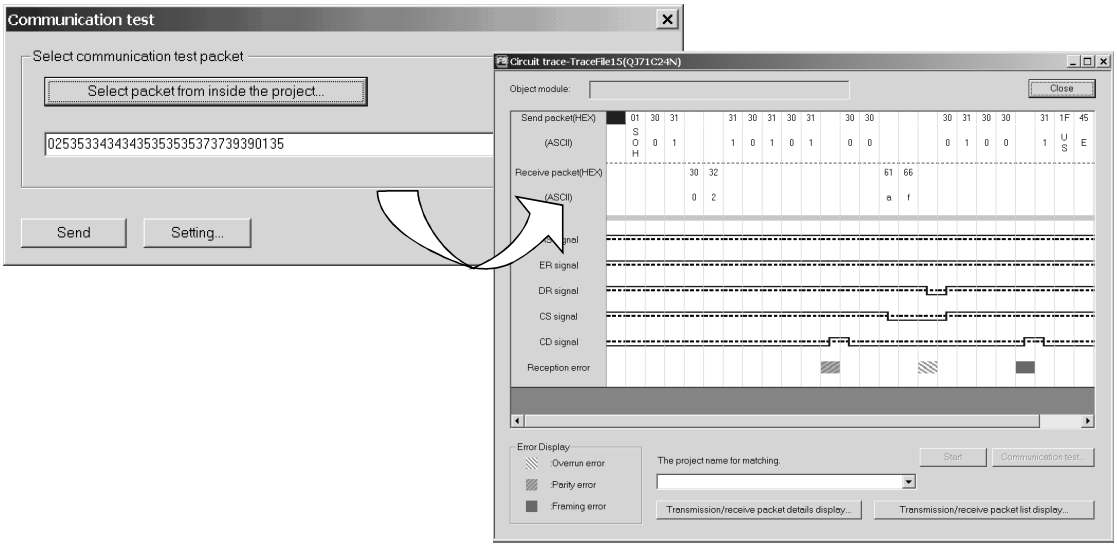
(b) Desired setting of data communication procedure
When the user constructs any packet originally, setting can be made easily for each device controller.

(2) Communication debugging support

Reduced debugging work for system startup!!

The debugging functions required for system startup for communication of the Q series C24 module with the device controller are available. Packet data on the line can be confirmed without any other tool being used.





(a) Circuit trace

The transmission/receive packet data and communication signal wire condition between the Q series C24 module and device controller can be traced.

1) Transmission/receive packet details display

The transmission/receive packet data obtained by circuit trace are displayed in detail on the basis of the packet information.

2) Transmission/receive packet list display

The transmission/receive packet data obtained by circuit trace are displayed separately in lists on a packet-by-packet basis.

(b) Communication test

Test transmission (any/set data) can be made from the Q series C24 module to the device controller.

By starting the circuit trace and the following state monitor simultaneously, the packet communication data on the line can be confirmed.

(c) State monitor

The error status, communication signal line condition, etc. of the Q series C24 module can be monitored.

(3) New functions of GX Configurator-SC

With upgrade from Version 2.03D (SW2D5C-QSCU) to Version 2.04E (SW2D5C-QSCU), following functions/setting items are newly added to GX Configurator-SC.

(a) Create receive (specified length) packet

The receive frame with fixed packet length, header and no end judgment data can be created.

(b) Module start I/O No. setting

It is possible to set start I/O No. of the Q series C24 module to which FB programs are output.

2 OPERATING ENVIRONMENT

This chapter explains the operating environment of the personal computer that uses the protocol FB support function.

Item		Peripheral device
Installation (add-in) target *1		Add-in to GX Developer Version 8 (English version) or later *2
Computer		Windows® -based personal computer
	CPU	Refer to the following table "Operating system and performance required for personal computer".
	Required memory	
Hard disk space *3	For installation	65MB or more
	For operation	20MB or more
Display		800 × 600 dots or more resolution *4
Operating system		Microsoft® Windows® 95 Operating System (English version) Microsoft® Windows® 98 Operating System (English version) Microsoft® Windows® Millennium Edition Operating System (English version) Microsoft® Windows NT® Workstation Operating System Version 4.0 (English version) Microsoft® Windows® 2000 Professional Operating System (English version) Microsoft® Windows® XP Professional Operating System (English version) Microsoft® Windows® XP Home Edition Operating System (English version) Microsoft® Windows Vista® Home Basic Operating System (English version) Microsoft® Windows Vista® Home Premium Operating System (English version) Microsoft® Windows Vista® Business Operating System (English version) Microsoft® Windows Vista® Ultimate Operating System (English version) Microsoft® Windows Vista® Enterprise Operating System (English version)

*1: Install GX Configurator-SC in GX Developer Version 8 or higher in the same language.
GX Developer (English version) and GX Configurator-SC (Japanese version) cannot be used in combination, and GX Developer (Japanese version) and GX Configurator-SC (English version) cannot be used in combination.

*2: The protocol FB support function cannot be used if it is added into GX Developer Version 7 or earlier.

*3: At least 15GB is required for Windows Vista® .

*4: Resolution of 1024 × 768 dots or more is recommended for Windows Vista® .

Operating system and performance required for personal computer

Operating system	Performance required for personal computer	
	CPU	Required memory
Windows® 95 (Service Pack 1 or later)	Pentium® 133MHz or more	32MB or more
Windows® 98	Pentium® 133MHz or more	32MB or more
Windows® Me	Pentium® 150MHz or more	32MB or more
Windows NT® 4.0 Workstation (Service Pack 3 or later)	Pentium® 133MHz or more	32MB or more
Windows® 2000 Professional	Pentium® 133MHz or more	64MB or more
Windows® XP Professional	Pentium® 300MHz or more	128MB or more
Windows® XP Home Edition	Pentium® 300MHz or more	128MB or more
Windows Vista® Home Basic	Pentium® 1GHz or more	1GB or more
Windows Vista® Home Premium	Pentium® 1GHz or more	1GB or more
Windows Vista® Business	Pentium® 1GHz or more	1GB or more
Windows Vista® Ultimate	Pentium® 1GHz or more	1GB or more
Windows Vista® Enterprise	Pentium® 1GHz or more	1GB or more

Point

The functions shown below are not available for Windows® XP and Windows Vista® .
If any of the following functions is attempted, this product may not operate normally.

- Start of application in Windows® compatible mode
- Fast user switching
- Remote desktop
- Large fonts (Details setting of Display Properties)
- Also, 64-bit version Windows® XP and Windows Vista® are not supported.

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3 FUNCTION LIST

This chapter explains the functions and menu of the protocol FB support function.

3.1 Function List

The functions of the protocol FB support function are listed below.

(1) Protocol FB support function

Function	Function outline	Reference Section
Module setting	Make the initial setting of the module used with the protocol FB support function. Used at the time of protocol FB conversion.	7.1
Packet construction information setting	Set the packet construction elements (message format) of the device controller.	7.2.3
Packet data information setting	Set detailed data to the construction elements of the packet construction information to set the data for actual communication.	7.2.4
Sequence information setting	Set the communication processing control type (send, receive, communication) and the packet data that matches that type to set the information for creation of a protocol FB.	7.3
FB conversion of sequence information	Convert the specified sequence information into a protocol FB. The created protocol FB is inserted into the <<FB>> tab of GX Developer.	7.4

(2) Debugging support functions

Function	Function outline	Reference Section
Circuit trace	Traces the transmission/receive packet data and communication signal wire condition. ・ Transmission/receive packet details display The packet information is collated with the transmission/receive data obtained by circuit trace and the details of each packet are displayed. ・ Transmission/receive packet list display The obtained transmission/receive packet data are displayed separately in lists on a packet-by-packet basis.	9.2
	・ Save/read of trace data Saves/reads the data obtained by circuit trace.	9.2.5
Communication test	Performs a communication test on any packet data from the Q series C24 module to the device controller.	9.3
State monitor	Monitors the error status, communication signal wire, etc. of the Q series C24 module.	9.4

The following table shows the modules to which the protocol FB support functions can be applied and their function ranges.

Applicable modules and function ranges

Applicable module		Protocol FB support function	Debugging Support Function		
			Circuit trace	Communication test	State monitor
Q series C24 modules	QJ71C24, QJ71C24-R2	○	×	×	○
	QJ71C24N, QJ71C24N-R2, QJ71C24N-R4	○	○	○	○

3.2 Menu List

The following table indicates a menu list of GX Configurator-SC.

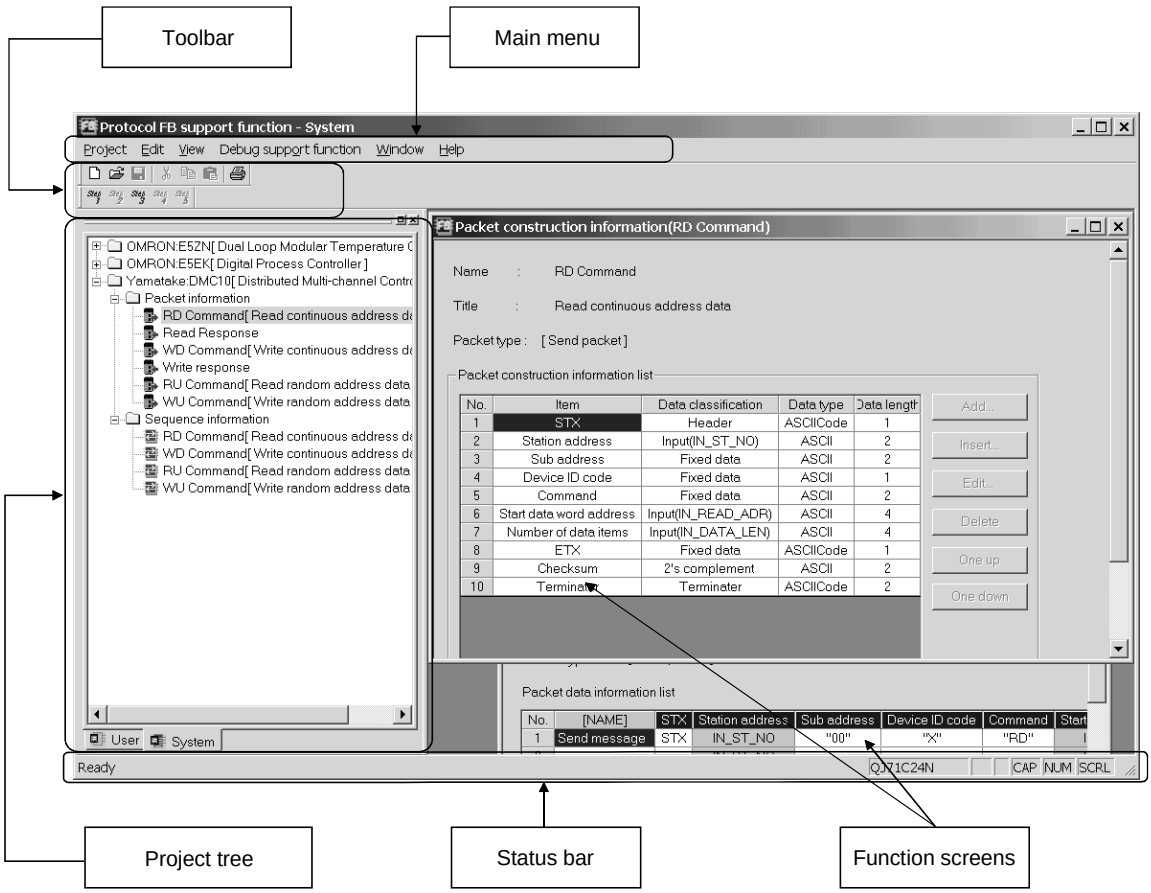
Menu			Shortcut Keys
Project	New project		Ctrl + N
	Open project		Ctrl + O
	Close project		—
	Save		Ctrl + S
	Save as		—
	Delete project		—
	Change module type		—
	Print		Ctrl + P
	Exit protocol FB support function		—
Edit	Cut		Ctrl + X
	Copy		Ctrl + C
	Past		Ctrl + V
	Module setting		—
	Packet information	New Packet information	—
		Open Packet construction information	—
		Open Packet data information	—
		Duplicate Packet information	—
		Rename Packet information	—
		Delete Packet information	—
	Sequence information	New Sequence information	—
		Open Sequence information	—
		Sequence information FB conversion	—
		Duplicate Sequence information	—
		Rename Sequence information	—
		Delete Sequence information	—
		Input and Output variable check	—
View	Toolbar		—
	Guide toolbar		—
	Status bar		—
	Project tree		—
Debugging support functions	Module selection		—
	Circuit trace	Circuit trace	—
		Open circuit trace file	—
		Save as circuit trace file	—
		Circuit trace option	—
	State monitor		—
Window	Cascade		—
	Tile horizontally		—
	Arrange icons		—
	Close all windows		—
Help	Product information		—

4 SCREEN DISPLAY

This chapter explains the screen display and names of the protocol FB support function.

4.1 Screen Display

The protocol FB support function consists of the project tree area, which shows a data configuration, and the function screen area.
The basic screen display of the protocol FB support function is shown below.



The following table indicates the names and functions.

Name	Function
Main menu	Select the menu item.
Toolbar	Click the selected button to execute the function.
Project tree	Manage various data of the system/user project.
Function Screen	Module setting, packet construction information setting, packet data information setting, sequence information setting screens, etc. are available.
Status bar	Displays various statuses.
	Move the cursor over any of the buttons to display its guidance.

4.2 Toolbar

The toolbar consists of the tool buttons and guide tool buttons.
When the cursor is moved over any of the buttons, the tool tip is displayed, and at the same time, its guidance is displayed on the status bar.
The toolbar can be displayed or hidden by choosing [View] → [Toolbar].
The following table lists the tool buttons.

Tool Button	Tool Tip	Guidance
	New project	Create a new project.
	Open project	Open the existing project.
	Save	Save the project over the old one.
	Cut	Cut the selected data.
	Copy	Copy the selected data.
	Paste	Past the selected data.
	Print	Print the project data.

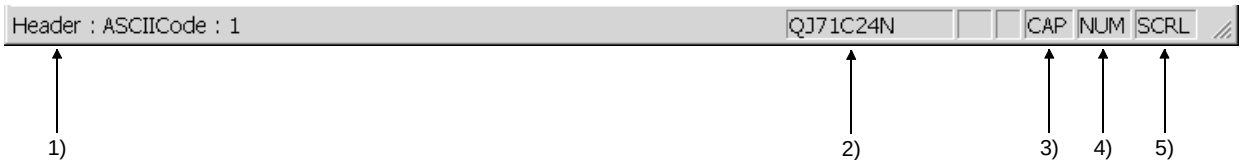
The guide tool buttons display the protocol FB creating procedure in Step 1 to Step 5.
A protocol FB can be created by making setting in order of Step 1 to Step 5.
The following table lists the guide tool buttons.

Guide Tool Button	Tool Tip	Guidance
	Open Module Setting	Open the module setting screen.
	New Packet information	Create new packet information.
	Open packet data information	Open the packet data information.
	New sequence information	Create new sequence information.
	FB conversion of sequence information	Convert the sequence information to generate the user FB.

4.3 Status Bar

The status bar displays status data.
The status bar can be displayed or hidden by choosing [View] → [Status bar].

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

No.	Display/Setting Details
1)	Displays the guidance and packet data information item setting information.
2)	Displays the model name of the Q series C24 module.
3)	Displays the Caps Lock status.
4)	Displays the Num Lock status.
5)	Displays the Scroll Lock status.

4.4 Project Tree

The project tree consists of a system project tree and user project tree.
Display screen switching is executed by clicking the tab.
The system project indicates the packet construction information, packet data information and sequence information for various device controllers entried at installation of GX Configurator-SC.

4.4.1 System project tree

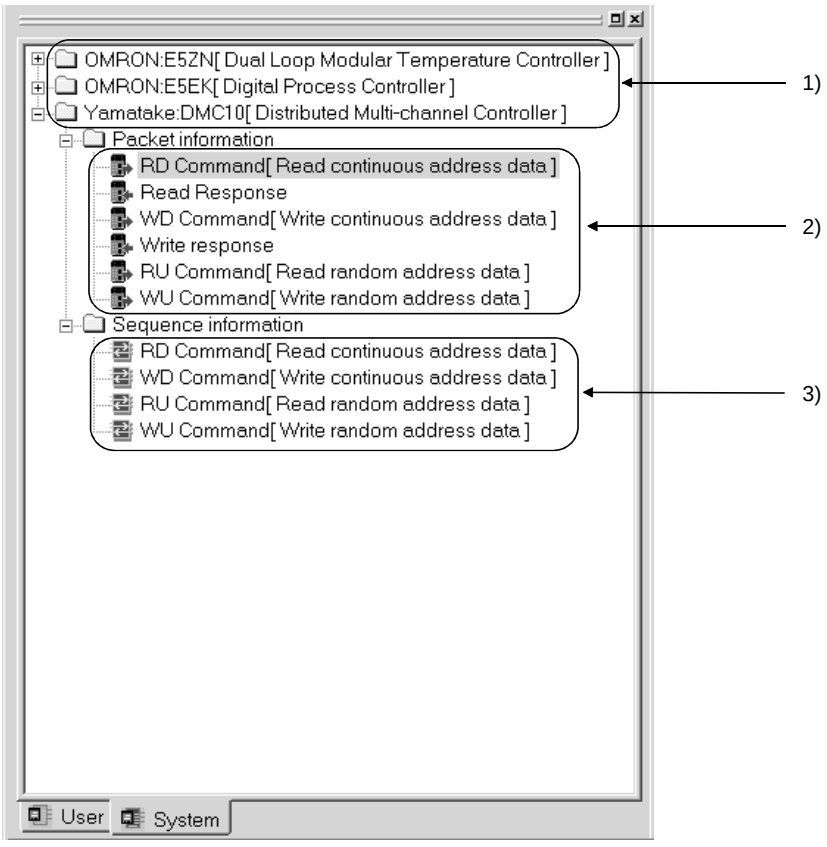
PURPOSE

The system project tree displays the packet construction information, packet data information and sequence information of various device controllers already entered.

BASIC OPERATION

1. Click the <<System>> tab in the project tree.
2. The system project tree is displayed.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

No.	Item	Display/Setting Details
1)	Device controller name	The entered device controller names are displayed.
2)	System packet information name	The system packet information names are displayed.
3)	System sequence information name	The system sequence information names are displayed.

4.4.2 User project tree

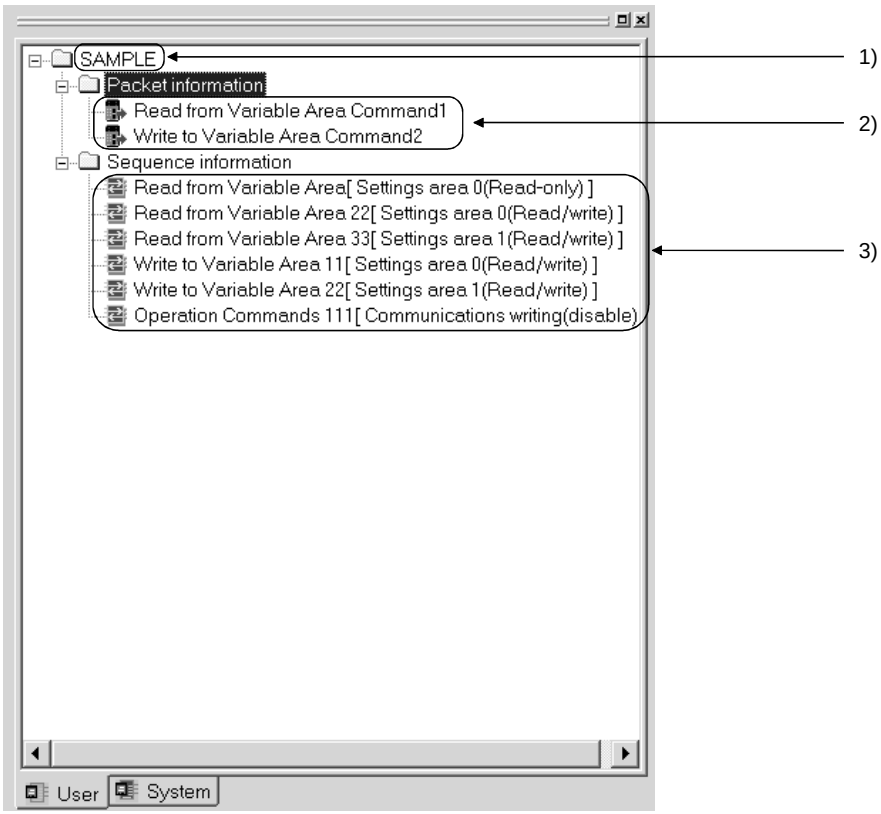
PURPOSE

The user project tree displays the packet information and sequence information of the project created by the user.

BASIC OPERATION

1. Click the <<User>> tab in the project tree.
2. The user project tree is displayed.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

No.	Item	Display/Setting Details
1)	User project name	The project names set by the user are displayed.
2)	User packet information name	The user packet information names created by the user are displayed.
3)	User sequence information name	The user sequence information names created by the user are displayed.

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5 START AND END OF PROTOCOL FB SUPPORT FUNCTION AND PROJECT CREATION

This chapter explains the methods for starting and ending the protocol FB support function and the functions required to create a project.

REMARK

Unless otherwise specified, a "project" indicates the "project of the protocol FB support function".

5.1 Starting the Protocol FB Support Function

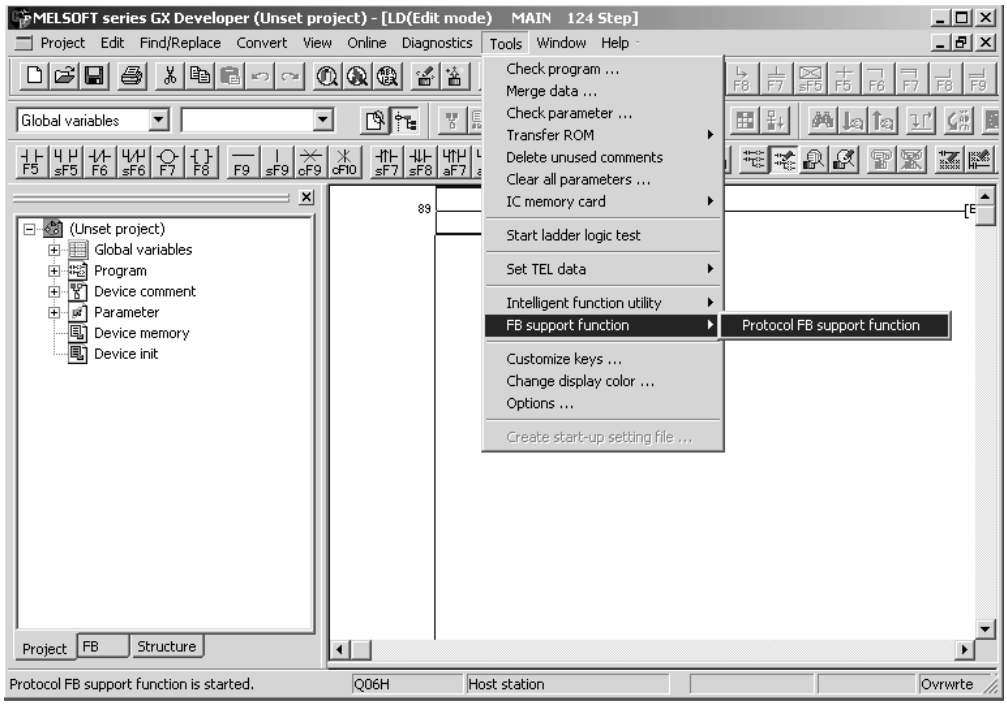
PURPOSE

Start the protocol FB support function from GX Developer.

BASIC OPERATION

1. Click the [Tools] → [FB support function] → [Protocol FB support function] menu.
2. The protocol FB support function starts.

DISPLAY/SETTING SCREEN



Point

- When creating a new project using GX Developer, select "Use label". If "Do not use label" is selected, only the debugging support functions can be used.
- The protocol FB support function can be used when the project file of GX Developer Version 8 or later is used with the QCPU (Q mode).

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5.2 Exiting the Protocol FB Support Function

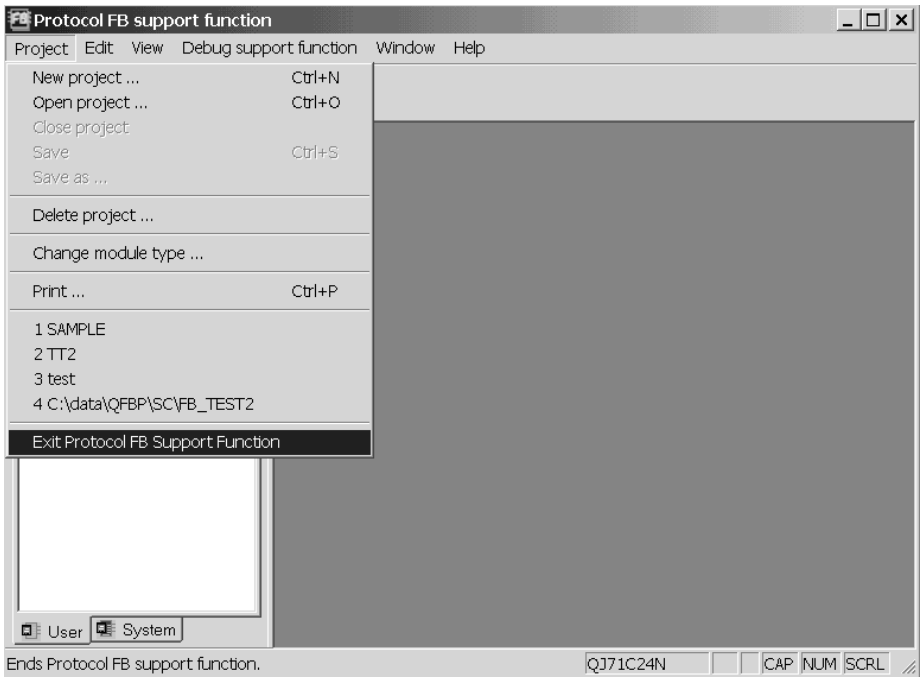
PURPOSE

End the protocol FB support function.

BASIC OPERATION

Click the [Project] → [Exit Protocol FB Support Function] menu.

DISPLAY/SETTING SCREEN



5.3 Creating a Project

The following indicates a project function list.

Function	Function outline
New project	Creates a new project.
Open project	Opens the existing project.
Close project	Closes the currently open project.
Save project	"Saves" or "Saves as" the currently edited project.
Delete project	Deletes the project.
Change module type	Changes the object module of the currently open project.

Module information, packet information and sequence information are saved into the project.

5.3.1 Creating a new project

PURPOSE

Create a new project of the protocol FB support function. The created project is inserted into the user project tree.

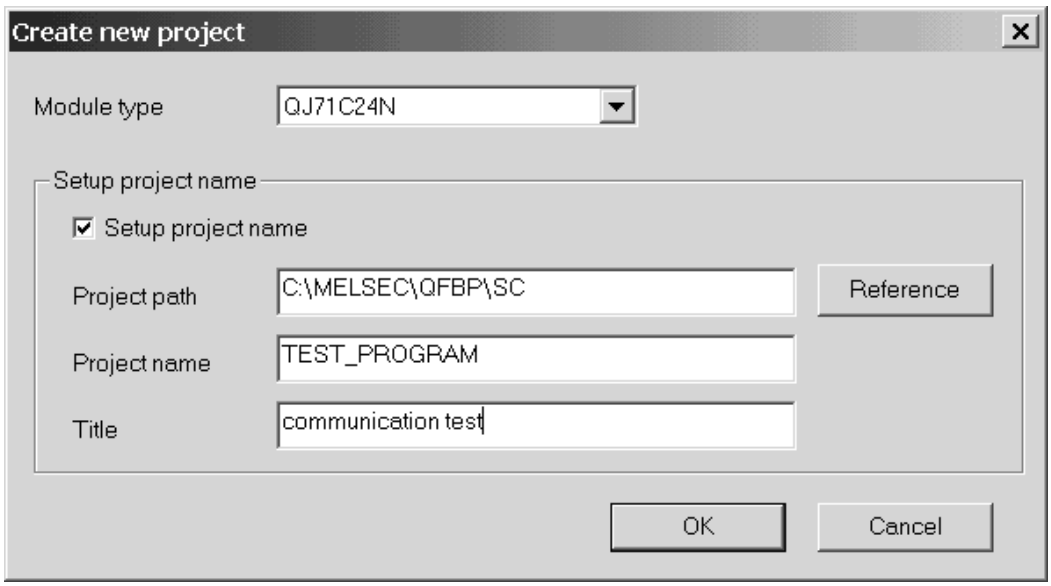
BASIC OPERATION

1. Click the [Project] → [New project] menu ().
2. Select the "Module type" on the New project screen.
3. Set the "Project path".
4. Set the "Project name".
5. Set the "Title".
6. Click the OK button.
7. A new project is created.

REMARK

"Project file name specification" can be done either before or after program creation.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Module type	Select the module type to be used in the project.
"Project name setting" check button	Checking the check button enables input to the following items.
Reference button	Displays the project reference screen.
Project path	Set the path of the new project. The usable number of characters is within 150 characters including those of the project name.
Project name	Set the name of the new project. The usable number of characters is within 32 characters. (Note that the project name cannot be set if the number of characters including that of the project path exceeds 150.)
Title	Set the title of the new project.

REMARK

Refer to Appendix 2 for the restrictions on the names (such as the project name) to be set.

5.3.2 Opening the project

PURPOSE

Read the existing project.

BASIC OPERATION

1. Click the [Project] → [Open project] menu ( ).
2. Click the project name.
3. Click the Open button.

5.3.3 Closing the project

PURPOSE

Close the open project file.

BASIC OPERATION

1. Click the [Project] → [Close project] menu.
2. If the setting has been changed, the project save confirmation screen is displayed.
   - Click the Yes button to save and close the project.
   - Click the No button to close the project without saving it.

5.3.4 Saving the project

PURPOSE

Save the currently edited project file.

BASIC OPERATION

(1) Saving the project over the old one

1. Click the [Project] → [Save] menu ( ).
2. The currently edited project file is saved over the old one.

(2) Saving the project with a name

1. Click the [Project] → [Save as] menu.
2. Set the "Project path" and "Project name".
3. Click the Save button.
4. The currently edited project file is saved with a name.

5.3.5 Deleting the project of the protocol FB support function

PURPOSE

Delete the project file.

BASIC OPERATION

1. Click the [Project] → [Delete project] menu.
2. Specify the "Drive/Path" and "Project name" to be deleted.
3. Click the Delete button.
4. As the project deletion confirmation screen is displayed, click the Yes button.
5. The project is deleted.

5.3.6 Changing the module type

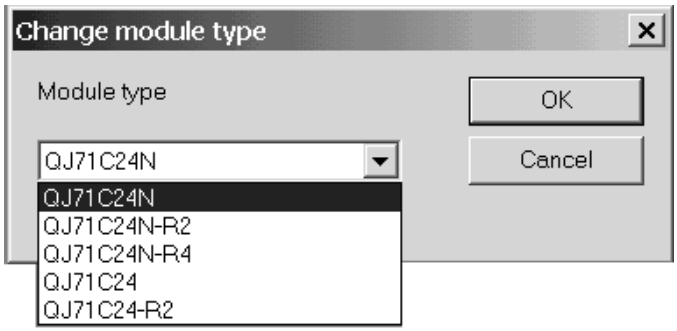
PURPOSE

Change the type of the preset Q series C24 module.

BASIC OPERATION

1. Click the [Project] → [Change module type] menu.
2. Select a new module type.
3. After the setting is completed, click the OK button.
   The module type is changed.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Module type	Select a new module type. Any of the following modules can be selected. ・QJ71C24N ・QJ71C24 ・QJ71C24N-R2 ・QJ71C24-R2 ・QJ71C24N-R4

When the module type is changed, the following data return to the default values.

・Transmission speed of module information

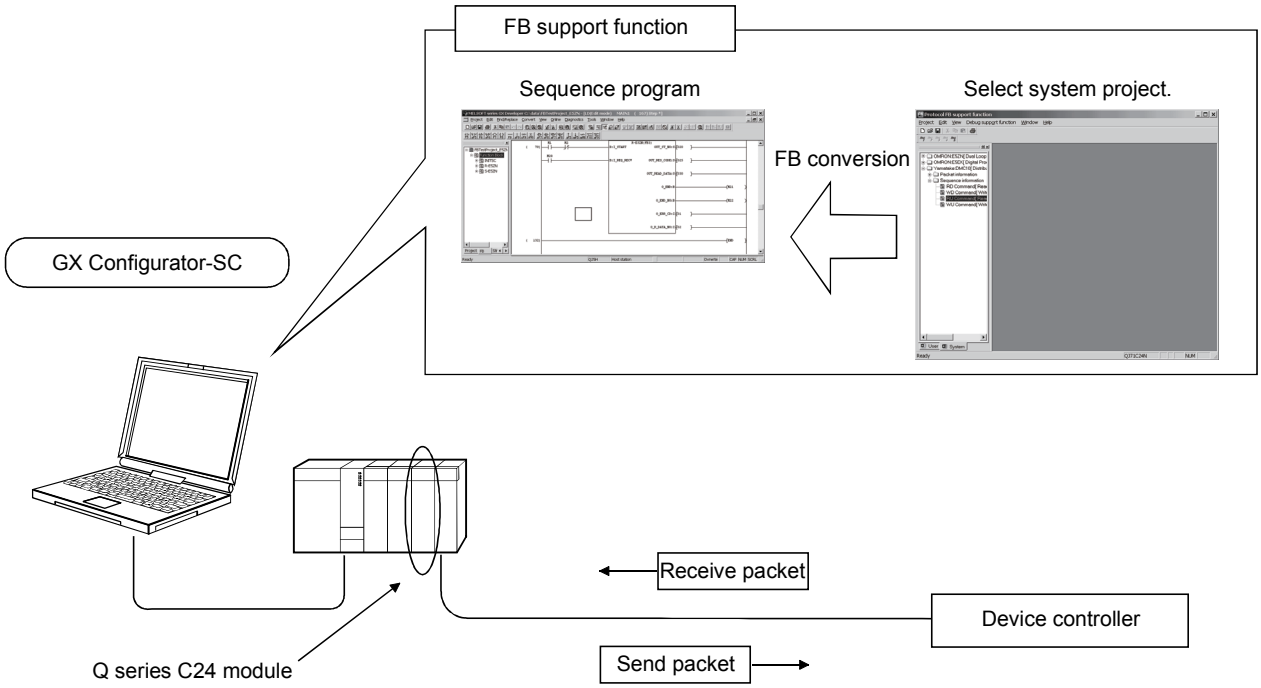
6 PROTOCOL FB CREATION OPERATING PROCEDURE

6.1 Protocol FB Construction Data

The protocol FB support function creates protocol FBs for communication with the device controller. Make the following settings to create protocol FBs.

(1) Module setting
(2) Creation of send/receive FBs
(This operation is not required when the system project is used.)

The following shows the purpose and entry procedure of each data.



(1) Module setting

Module setting

Kind	Item	CH1
Mode switching	Data bit	7bit
	Parity bit	Yes
	Odd/even parity	Odd
	Stop bit	1bit
	Sum check code	No
	Transmission speed	300bps
Transmission control	DTR/DSR control	DTR/DSR
	DC1/DC3 control	No control
	DC1 code	11h
	DC3 code	13h
	DC2/DC4 control	No control
	DC2 code	12h
	DC4 code	14h
Communication control	CD terminal check	Check
	Communication system	Full duplex
Half duplex communication control	Simultaneous transmission priority/non-priority	0 (x100ms)
	Retransmission time transmission method	Do not resend.

Set the parameters necessary for the initial setting of the Q series C24 module. The settings are reflected on the "Send/receive data" and "Module initialization FB".

For details, refer to "7.1 Module Setting".

6 - 1

(2) Creation of send/receive FBs

To create send/receive FBs, it is required to set the packet construction information, packet data information and sequence information.

(a) Packet construction information

Entry the structure (header, fixed data, terminator, etc.) of the device controller to be communicated with.

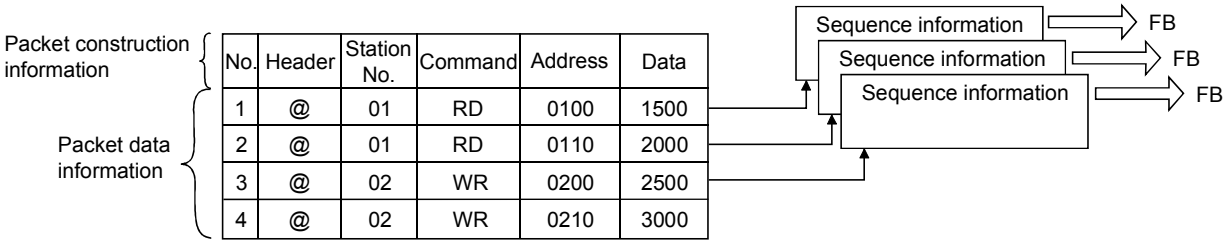
(b) Packet data information

Entry the data to be transmitted (actual message) into the packet construction information entered in (a).

(c) Sequence information

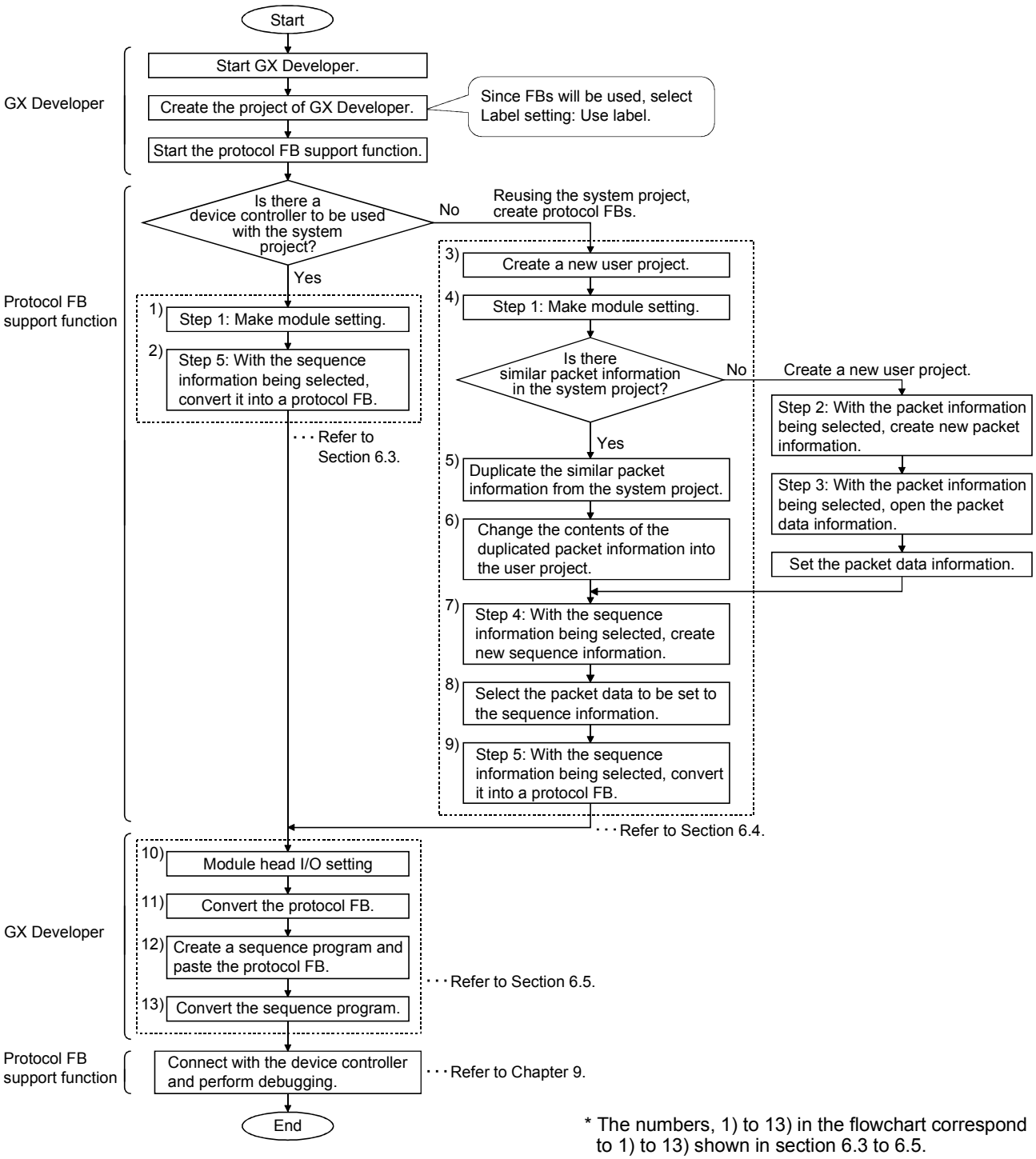
Entry the data to be transmitted. By performing the FB conversion of this sequence information, a protocol FB for communication of the entry data is created.

The following shows the set data that comprise send and receive FBs.



6.2 Communication Control Program Creating Procedure

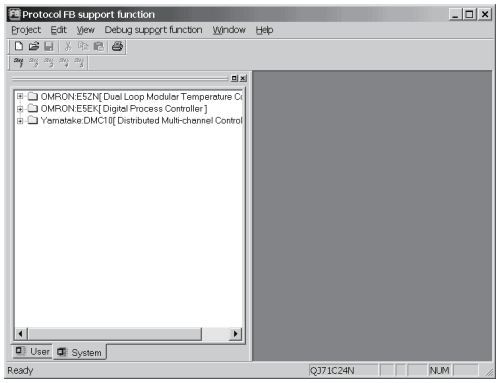
This section explains the procedure for creating a communication control program using the protocol FB support function.
When the target device controller is in the system project, use the system project. Protocol FBs can be created easily.
When the target device controller is not in the system project, protocol FBs can be created by modifying the system project or creating a new project.
The following flowchart indicates the creating procedure.



* The numbers, 1) to 13) in the flowchart correspond to 1) to 13) shown in section 6.3 to 6.5.

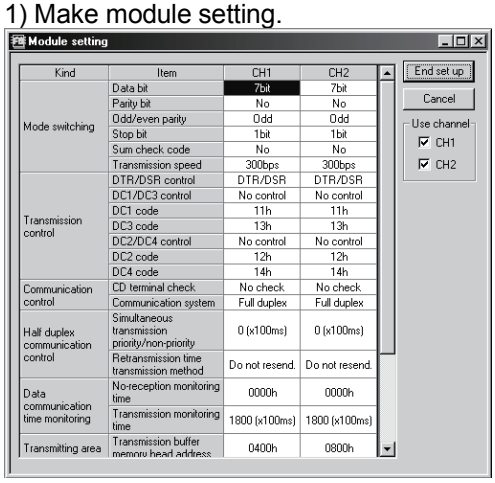
6.3 Operating Procedure for Use of System Project

The operating procedure for use of the system project will be explained using the actual screen as an example.



Starting the protocol FB support function selects the <<System project>> tab.

1) Make module setting.



Operation:

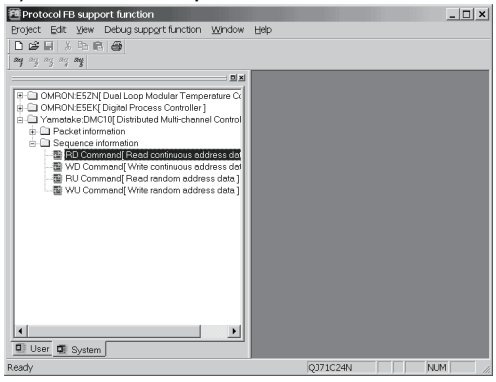
Click or choose [Edit] → [Module setting].

Make the initial setting of the Q series C24 module, and click the End set up button.

REMARK

Executing [FB conversion of sequence information] reflects the settings of the channel, which has been specified as "Channel" on the FB conversion check screen, in "Module initialization FB (INITSC)".

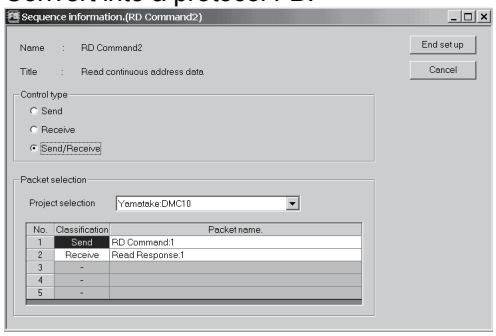
2) Select the sequence information from the system project.

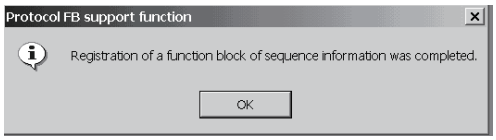


Operation:

Select the device controller to be communicated with from among the sequence information in the system project tree.

Convert into a protocol FB.





Operation:

Click  or choose [Edit] → [Sequence information] → [FB conversion of sequence information].

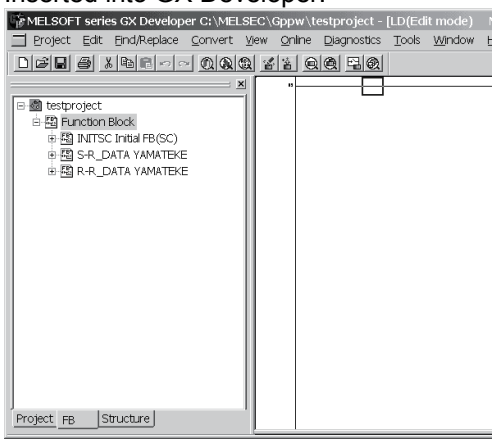
Input the FB program name, etc. and click the OK button.

REMARK

This will create an FB program for the channel specified in "Channel".

The protocol FB and module initialization FB are inserted into the <<FB>> tab of GX Developer.

Inserted into GX Developer.



Point

Precautions for creating multiple module initialization FBs

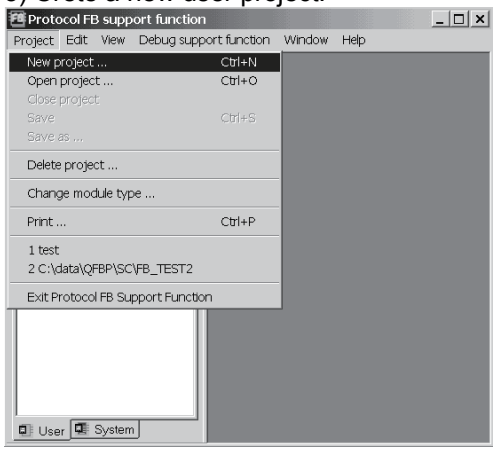
At the time of [FB conversion of sequence information], a module initialization FB is created under the FB program name of "INITSC". If the module initialization FB (INITSC) exists in a GX Developer's project, the new FB is overwritten to the existing one.

Therefore, when multiple module initialization FBs are needed for respective applications or channels, change the FB program name on GX Developer after [FB conversion of sequence information].

6.4 Operating Procedure for Use of User Project

When the system project does not have the target device controller, create a user program by reusing the system project or by creating all information such as packet information and sequence information.
This section explains the method of reusing the system project using the actual screen as an example.

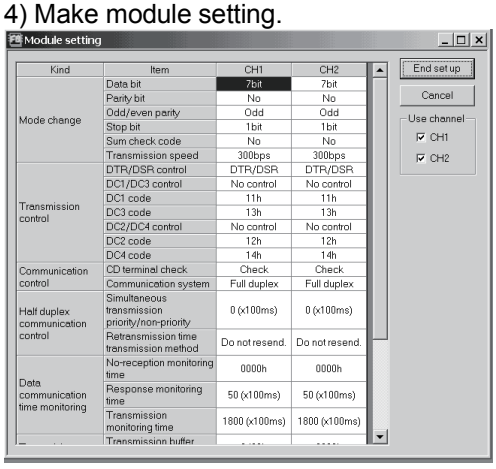
3) Crete a new user project.



Operation:
Choose [Project] → [New project].

A new user project is created.

4) Make module setting.



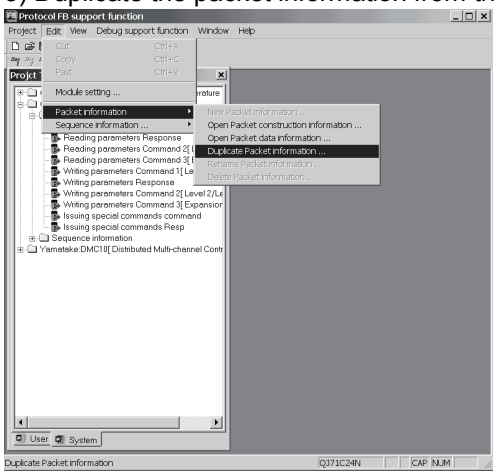
Operation:
Click  or choose [Edit] → [Module setting].

Make the initial setting of the Q series C24 module, and click the End set up button.

REMARK

Executing [FB conversion of sequence information] reflects the settings of the channel, which has been specified as "Channel" on the FB conversion check screen, in "Module initialization FB (INITSC)".

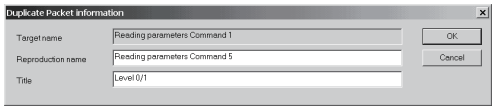
5) Duplicate the packet information from the system project.



Operation:

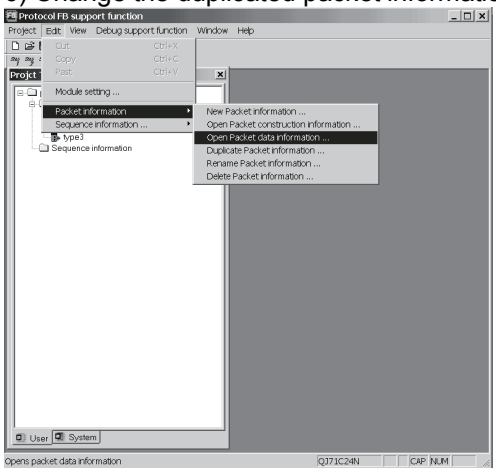
Choose [Edit] → [Packet information] → [Duplicate Packet information].

From the system project, select the packet information similar to the protocol of the target device controller and duplicate it in the user project.



Set the packet information name of the duplication destination.

6) Change the duplicated packet information into the user project.

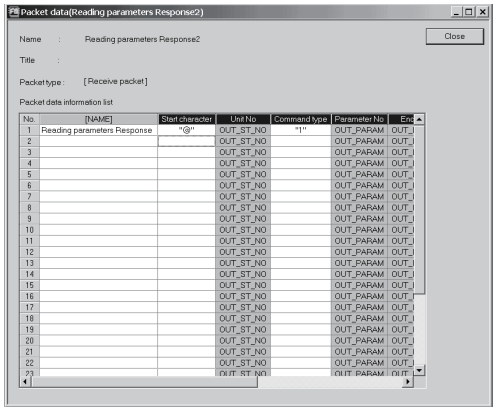


Operation:

Choose [Edit] → [Packet information] → [Open packet data information].

The packet data information opens.

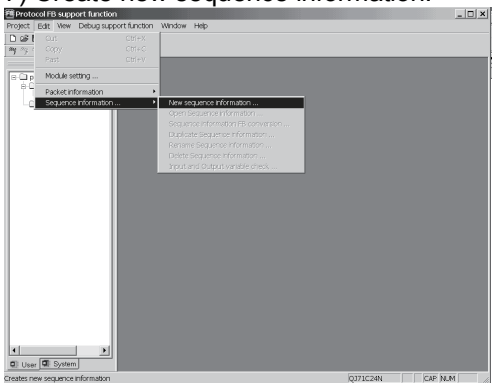
6 - 7



Set the packet data.

For details, refer to "7.2 Packet Information".

7) Create new sequence information.

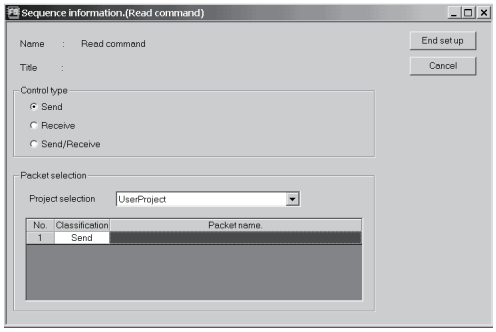


Operation:

Click  or choose [Edit] → [Sequence information] → [New sequence information].

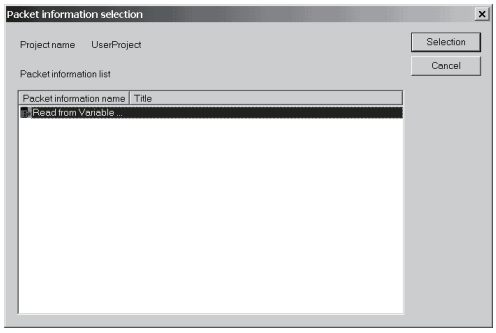
New sequence information is created.

8) Set the packet data to the sequence information.



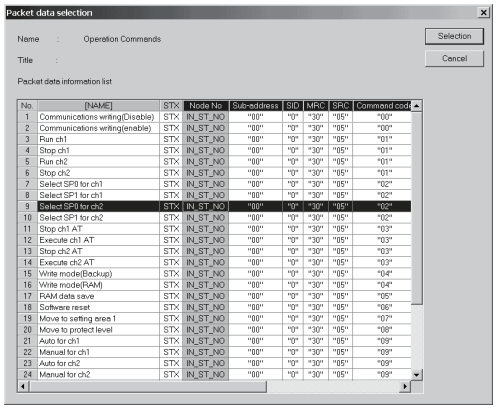
Double-click "Packet name".

The packet information screen opens.



Select the packet information.

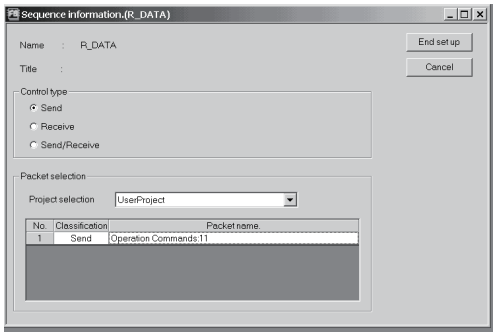
Select the packet to create a protocol FB.



Operation:

Select the packet data information.

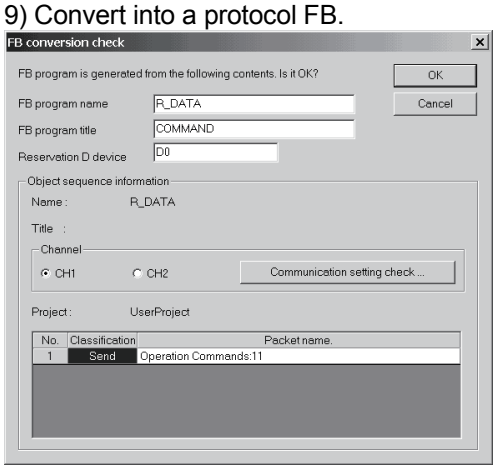
The packet data selected here is created as a protocol FB.

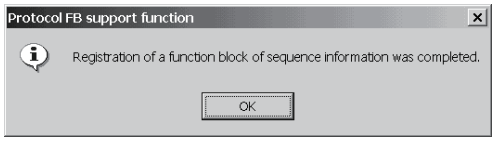


The packet data is set to the sequence information.

6 - 9

9) Convert into a protocol FB.





Operation:

Click  or choose [Edit] → [Sequence information] → [FB conversion of sequence information].

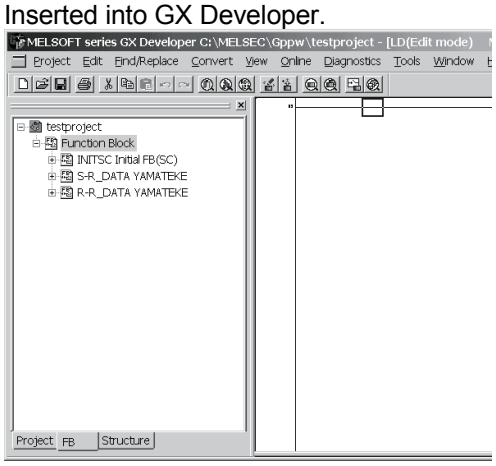
Input the FB program name, etc. and click the OK button.

REMARK

This will create an FB program for the channel specified in "Channel".

The protocol FB and module initialization FB are inserted into the <<FB>> tab of GX Developer.

Inserted into GX Developer.



Point

Precautions for creating multiple module initialization FBs

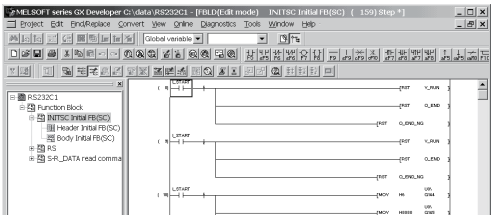
At the time of [FB conversion of sequence information], a module initialization FB is created under the FB program name of "INITSC". If the module initialization FB (INITSC) exists in a GX Developer's project, the new FB is overwritten to the existing one.

Therefore, when multiple module initialization FBs are needed for respective applications or channels, change the FB program name on GX Developer after [FB conversion of sequence information].

6 - 10

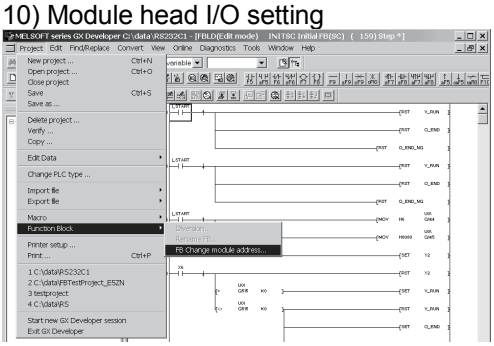
6.5 Operating Procedure for Utilization of Converted FB on GX Developer

The procedure for pasting the protocol FB to a sequence program to create a communication control program will be explained using the actual screen as an example.



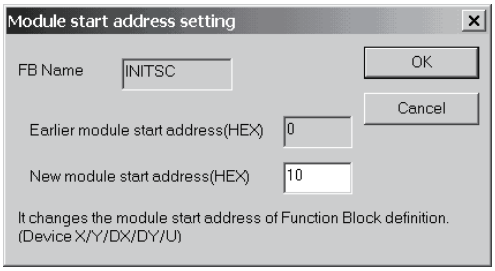
The protocol FB is inserted into the <<FB>> tab.
The inserted FB names are the FB name specified in "FB conversion of sequence information" and INITSC (initialization FB).

10) Module head I/O setting



Operation:
Choose [Project] → [Function block] → [FB Change module address].

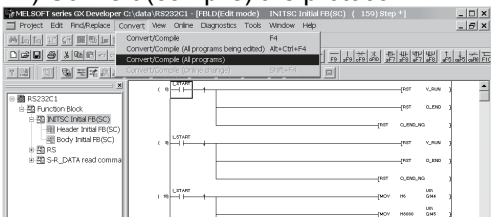
The protocol FB has been created with the Q series C24 module installed on Slot 0. If it is not installed on Slot 0, change the module head I/O.



Operation:
Input the module head I/O where the Q series C24 module is installed.

The example assumes that the module is installed on Slot 1.

11) Convert (compile) the protocol FB.

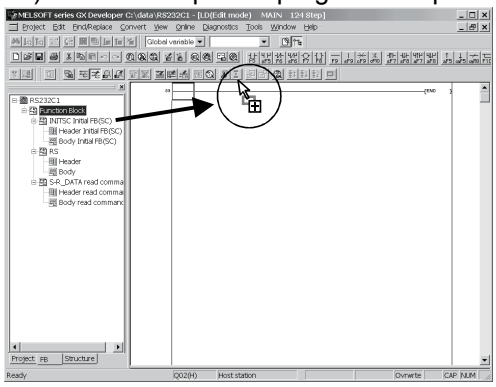


Operation:
[Convert] →
[Convert/Compile (All programs)].

Since the protocol FB has not yet been convert (not yet been compiled), convert (compile) it before use.

6 - 11

12) Create a sequence program and paste the protocol FB.



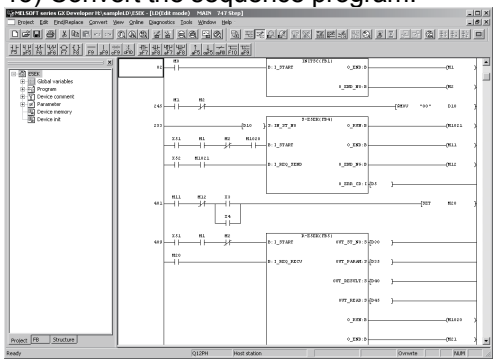
Operation:

(1) Put the sequence program in the edit condition.

(2) Open the <<FB>> tab and drag the desired program FB to the sequence program.

(3) Create the I/O area of the pasted protocol FB to complete the communication control program.

13) Convert the sequence program.



The protocol FB is pasted to the sequence program.

Operation:

[Convert] → [Convert/Compile].

Since the sequence program has not yet been convert (not yet been compiled), convert (compile) it before use.

7 SETTING OF PROTOCOL FB DATA

7.1 Module Setting

PURPOSE

Set various parameters necessary for the initial setting of the Q series C24 module. The settings are reflected on the "Module initialization FB" and "Protocol FB" at the FB conversion of sequence information.
Various parameters are as indicated below.

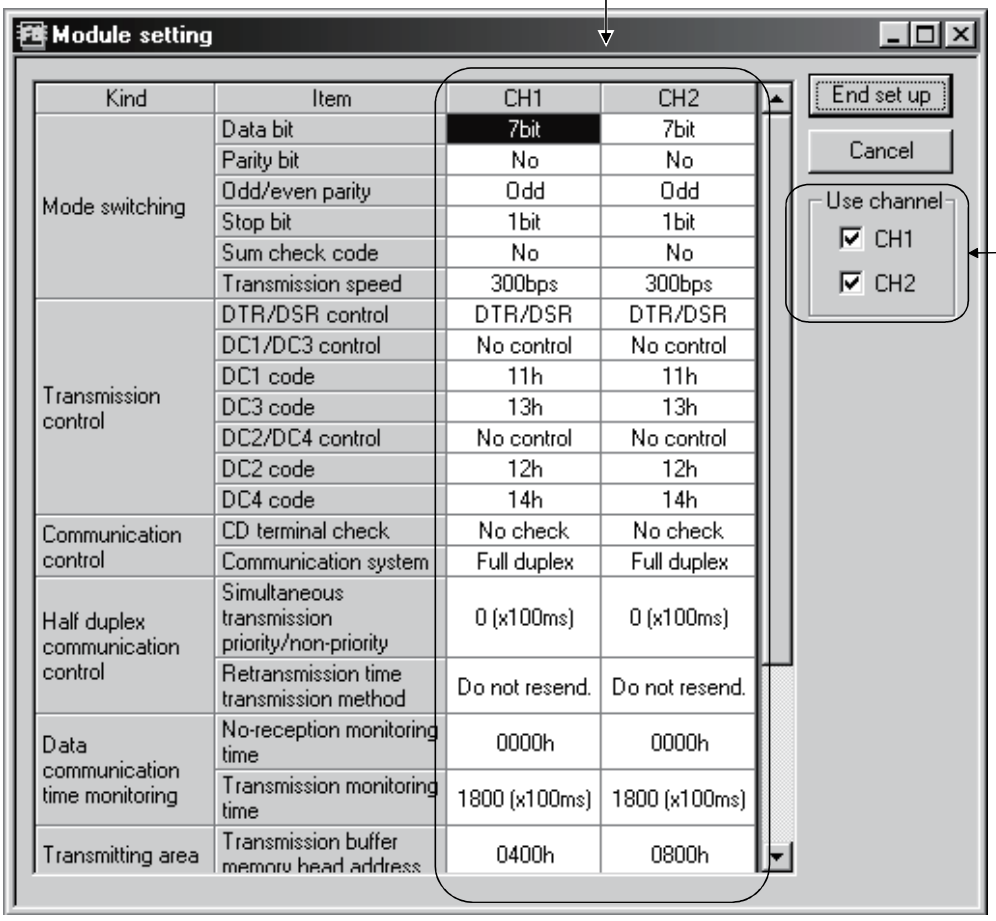
- Mode change
- Transmission control
- Communication control
- Half duplex communication control
- Data communication time monitoring
- Transmitting area
- Data reception
- Reception area

BASIC OPERATION

1. Click the [Edit] → [Module setting] menu ( ).
2. Set various parameters and used channels on the Module setting screen.
3. Click the End set up button.
4. The module information is set.

DISPLAY/SETTING SCREEN

1)



Kind	Item	CH1	CH2
Mode switching	Data bit	7bit	7bit
	Parity bit	No	No
	Odd/even parity	Odd	Odd
	Stop bit	1bit	1bit
	Sum check code	No	No
	Transmission speed	300bps	300bps
Transmission control	DTR/DSR control	DTR/DSR	DTR/DSR
	DC1/DC3 control	No control	No control
	DC1 code	11h	11h
	DC3 code	13h	13h
	DC2/DC4 control	No control	No control
	DC2 code	12h	12h
	DC4 code	14h	14h
Communication control	CD terminal check	No check	No check
	Communication system	Full duplex	Full duplex
Half duplex communication control	Simultaneous transmission priority/non-priority	0 (x100ms)	0 (x100ms)
	Retransmission time transmission method	Do not resend.	Do not resend.
Data communication time monitoring	No-reception monitoring time	0000h	0000h
	Transmission monitoring time	1800 (x100ms)	1800 (x100ms)
Transmitting area	Transmission buffer memory head address	0400h	0800h

DISPLAY/SETTING DETAILS

No	Item	Display/Setting Details
1)	Module setting items	Set the setting items of the module. The input methods are as follows. ・Decimal : 0 to 9 ・Hexadecimal : 0 to 9, A to F, a to f
2)	Use channel	Set the used channels in the check boxes.

Point

・The module can be initialized using either of the "module initialization FB" and "module initialization by intelligent function utility" (hereafter abbreviated to the "module initialization by utility"). Note the following points since the initialization timing differs.

"Module initialization FB"
Initializes the module when the module initialization FB is executed. Use this FB to initialize the module during program execution.

"Module initialization by utility"
Initializes the module when the CPU is reset.
Since matching with the protocol FB may be lost, do not use this FB when using the protocol FB.

・If the module is not initialized with the "module initialization FB", always make module setting.

7 - 2

7.2 Packet Information

Set the packet construction information (message format) and packet data (message) for communication with the device controller.

7.2.1 Creating new packet information

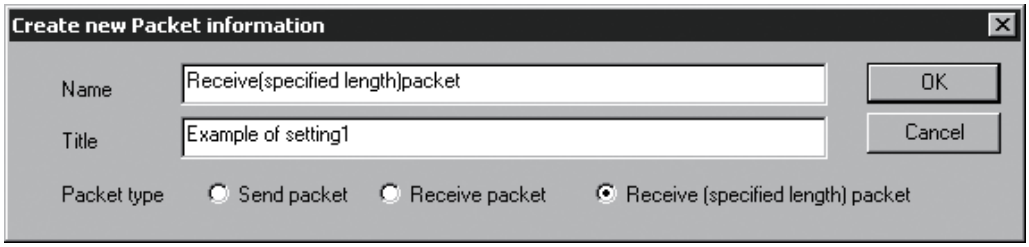
PURPOSE

Used to create new packet construction.
New packet construction cannot be created in the system project. Execute this function in the user project.

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [New Packet information] menu ( ).
2. The Create new packet information screen is displayed.
3. Set the "Name", "Title" and "Packet type", and click the OK button.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Name	Set the name of packet information. The number of usable characters is within 32. For restrictions on name, refer to Appendix 2.
Title	Set the title of packet information. The number of usable characters is within 32. For restrictions on name, refer to Appendix 2.
Packet type	Select the packet type from the following. Send packet/Receive packet/Receive (specified length) packet. The packet type cannot be changed after packet information creation.

Point

Specifying Receive packet/Receive (specified length) packet

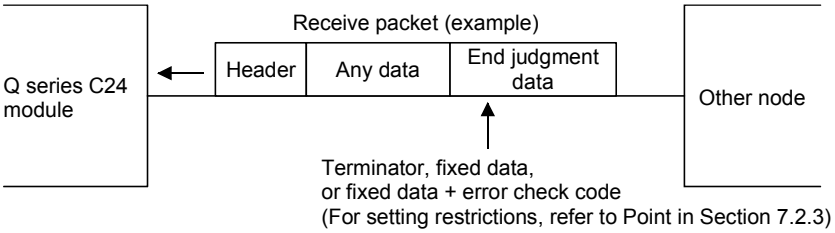
Specify either of the following types according to the packet construction or final data to be received.

(1) Receive packet

Specify this type to create a receive frame that includes header, any data and end judgment data.

The following shows the construction of the receive packet supported by GX Configurator-SC.

• Header + Any data[*1] + End judgment data[*2]

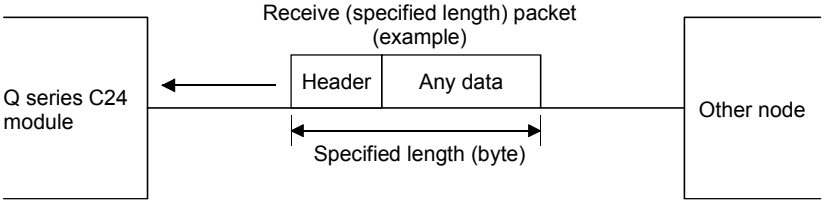


(2) Receive (specified length) packet

Specify this type to create a receive frame with fixed packet length, header and no end judgment data.

The following shows the construction of the receive (specified length) packet supported by GX Configurator-SC.

• Header + Any data [*1]



*1: Any data indicates the data located behind header of the packet sent from other node, or between the header and end judgment data. This data can be omitted. Fixed data and output variables are used as any data when receiving data.

*2: End judgment data is used to identify the final data of each packet when the Q series C24 module receives and processes the packet (data array) sent from other node.

The following shows the combination of end judgment data.

• Terminator only
• Fixed data only
• Fixed data + error check code

For example, CR (code: ODH) and ETX (code: 03H) data can be used as end judgment data.

7.2.2 Opening the packet construction information

PURPOSE

Read the packet construction information already set. Used to change the contents of the packet construction information.
The packet construction information of the system project cannot be changed. When it is desired to reuse it, make a duplicate.
For details, refer to "7.2.5 Duplicating the packet information".

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [Open Packet construction information] menu ( ).
2. The Packet construction information screen is displayed.

7.2.3 Setting the packet construction information

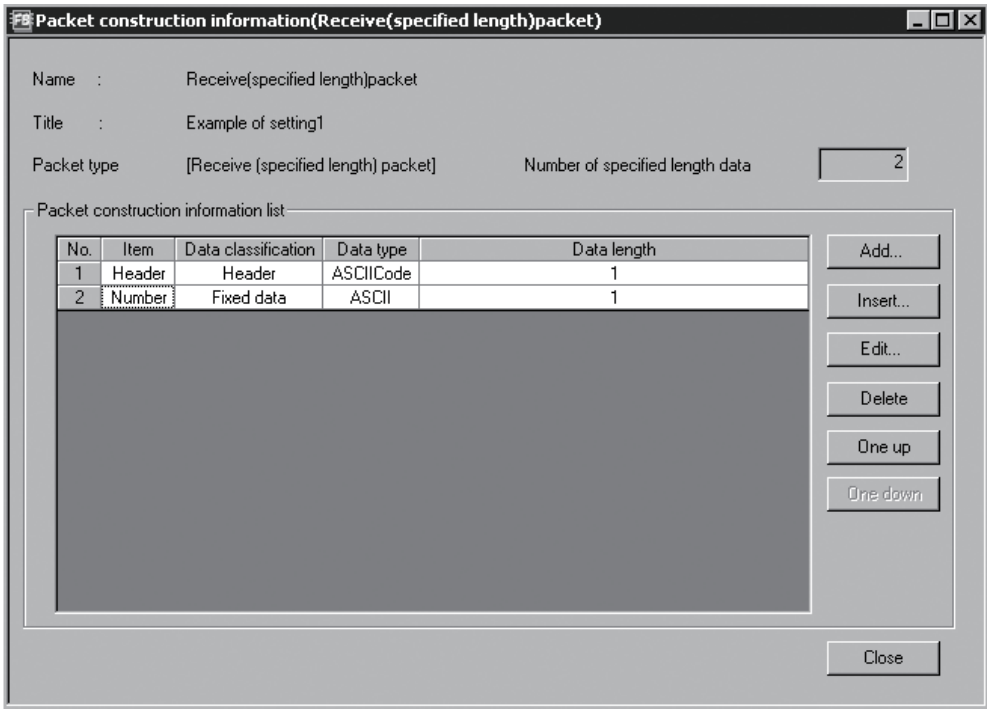
PURPOSE

In the packet construction information, set each item of the packet construction (message format). The protocol FB support function sets the packet on the basis of this information.
The setting items are the item name, data classification, data type and data length.

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [Open Packet construction information] menu ( ).
2. The Packet construction information screen is displayed.
3. Click the Add or Insert button to display the Packet construction information setting screen.
4. After the setting of the Packet construction information setting screen is completed, click the Setting button.
5. The data are set to the Packet construction information screen.
6. Click the Close button on the Packet construction information screen.

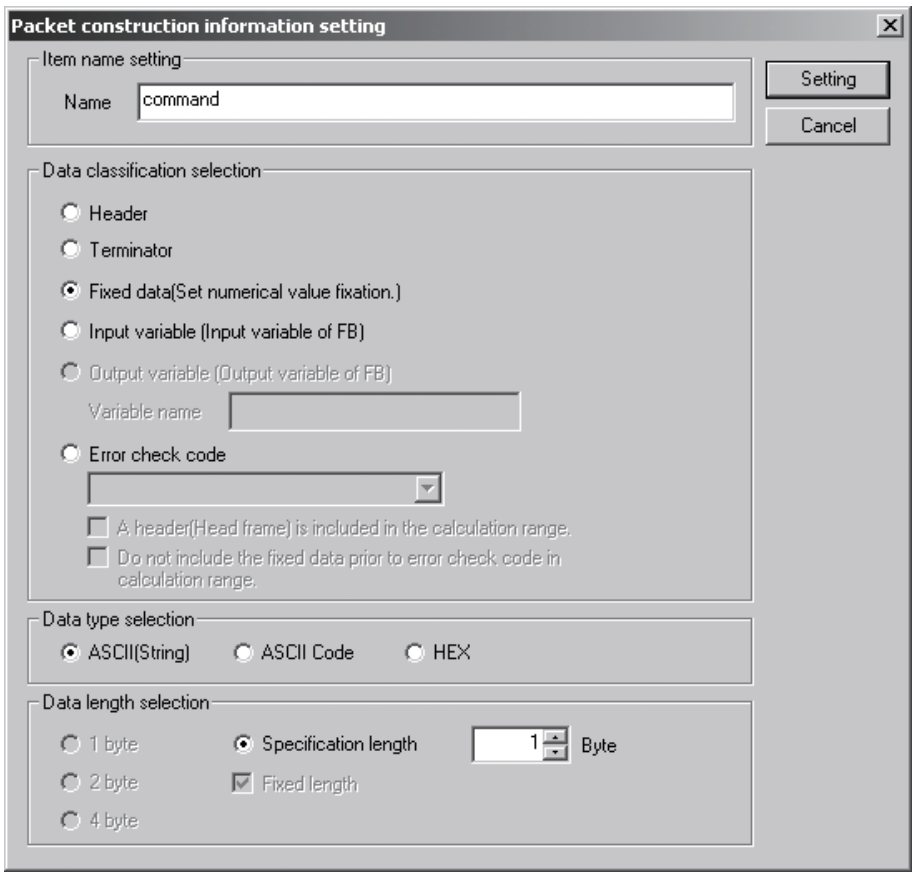
DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Name	The name of the packet information is displayed.
Title	The title of the packet information is displayed.
Packet type	The packet type of the packet information is displayed.
Number of specified length data	Displays the data length set in the packet construction information setting only when the packet type is Receive (specified length) packet.
Packet construction information list	The packet construction elements set in the packet construction information setting are displayed.
Add button	Adds the item of the packet construction. Displays the Packet construction information setting screen and sets the packet construction information. Data are inserted into the position one line lower than the cell containing the focus.
Insert button	Inserts the item of the packet construction. Displays the Packet construction information setting screen and sets the packet construction information. Data are inserted into the position one line higher than the cell containing the focus.
Edit button	Edits the item of the packet construction information already set.
Delete button	Deletes the specified item.
One up button	Moves the set packet construction information item one place up.
One down button	Moves the set packet construction information item one place down.

DISPLAY/SETTING SCREEN

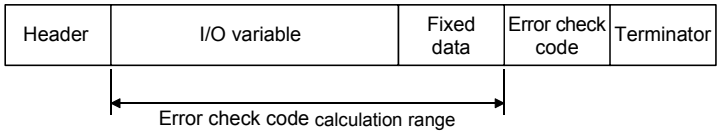
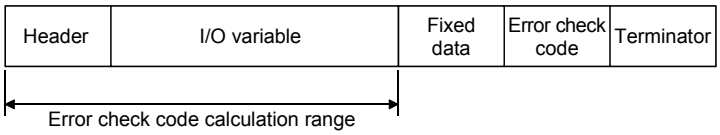
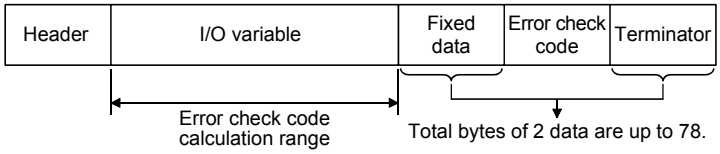
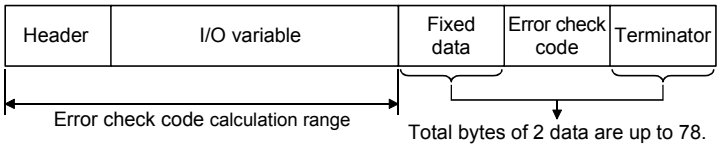


DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Item name setting	Set the name of the item to be added or changed. The usable number of characters is within 32 characters.
Data classification selection	Select the data classification to be added or changed with the radio button. <In the case of Send/Receive packet> (1) Header (2) Terminator (3) Fixed data (4) I/O variable Set the variable name corresponding to the I/O label of the protocol FB after FB conversion (compile). (5) Error check code Set the error check code type and calculation range. a) Error check code type ・Horizontal parity (2 bytes) ASCII ・Horizontal parity (1 byte) BIN *1 ・2's complement (2 bytes) ASCII ・SUM (1 byte) BIN ・SUM (2 bytes) BIN ・SUM (1 byte) ASCII ・SUM (2 bytes) ASCII b) Calculation range *2 ・A header (Head frame) is included in the calculation range. ・Do not include the fixed data prior to error check code in calculation range.*3 <In the case of Receive (specified length) packet> (1) Header (2) Fixed data (3) Output variable Set the variable name that corresponds to the protocol FB output label after FB conversion (compile).
Data type selection	Select the data type of the item to be added or changed. Selection is disabled when the error check code is selected.
Data length selection	Select the data length of the item to be added or changed. ・Selection is disabled when the error check code is selected. ・When ASCII (character string) or ASCII Code is selected in Data type selection, the data length can be set to 1 to 50 bytes. However, when the input variable or output variable is selected in Data type selection, the data length than can be set is 1 to 49 bytes. ・Check Fixed length to achieve the data length set in Specified length after selection of the input variable or output variable. When it is not checked, the data length will be the variable length within the range set in Specified length. However, variable length setting is not available when Receive (specified length) packet is selected.

*1: "Horizontal parity (1 byte) BIN" can be set when using the following module:
QJ71C24, QJ71C24N-R2 or QJ71C24N-R4

*2: The following table explains calculation ranges for the error check code in the basic packet structure.
Note that "Do not include the fixed data prior to error check code in calculation range" can be set only when "SUM (2 bytes) ASCII" is set for the error check code.

	Calculation range setting		Basic packet structure and error check code calculation range
	A header (Head frame) is included in the calculation range	Do not include the fixed data prior to error check code in calculation range	
1	☐ Not checked	☐ Not checked	
2	☑ Checked	☐ Not checked	
3	☐ Not checked	☑ Checked	
4	☑ Checked	☑ Checked	

*3: "Do not include the fixed data prior to error check code in calculation range" can be check-marked when using the following module (software version E or later):
QJ71C24, QJ71C24N-R2 or QJ71C24N-R4
When a module other than the above is used, messages will not be sent or received properly even if "Do not include the fixed data prior to error check code in calculation range" is checked.

Point

- Restrictions on the packet construction items at the time of packet construction information setting
  - The maximum used items are 32 items.
  - The number of items usable for input variables is up to 8 items.
  - The number of items usable for output variables is up to 19 items. When multiple output variables are to be set, the output variable that can be set to a variable length is only the last output variable.
- Restrictions on the packet construction when FB conversion is performed from sequence information

  <In the case of send packet>

  The maximum size of the send packet is 255 bytes.
  The number of registrations (number of bytes) of each item is within the following ranges.

  A = number of bytes of items other than the input variable × 3
  B = number of items for input variables (label variables) × 30
  The packet cannot be created if A + B exceeds 270.

  <In the case of receive packet>

  The packet data requires the header, the error check code or terminator.
  When multiple output variables are to be set, the output variable that can be set to a variable length is only the last output variable.
  The maximum size of the receive packet is 255 bytes.
  The number of registrations (number of bytes) of each item is within the following ranges.

  A = number of bytes of items other than the output variable × 3
  B = number of items for output variables (label variables) × 17
  The packet cannot be created if A + B exceeds 340.
  * Add all packet information set to the sequence information.
- Restrictions on the order of packet construction information on a data classification basis

  <Header>

  Always set the header at the beginning of the packet data.
  No other data can be inserted before the header.

  <Terminator>

  Always set the terminator at the end of the packet data.
  No other data can be added after the terminator.

  <I/O variable>

  Set it between a header and error check code.
  - For a receive packet, I/O variable cannot be set at the top or end of packet data.
  - For a receive (specified length) packet, I/O variable cannot be set at the top of packet data.

  <Fixed data>

  Set it between a header and terminator.

  <Error check code>

  When a terminator exists, set an error check code before the terminator.
  When setting an error check code at the end of packet data, set fixed data immediately before the error check code.
- Restrictions on the variable name of the input variable/output variable
  Refer to Appendix 3 for details.

7.2.4 Setting the packet data information

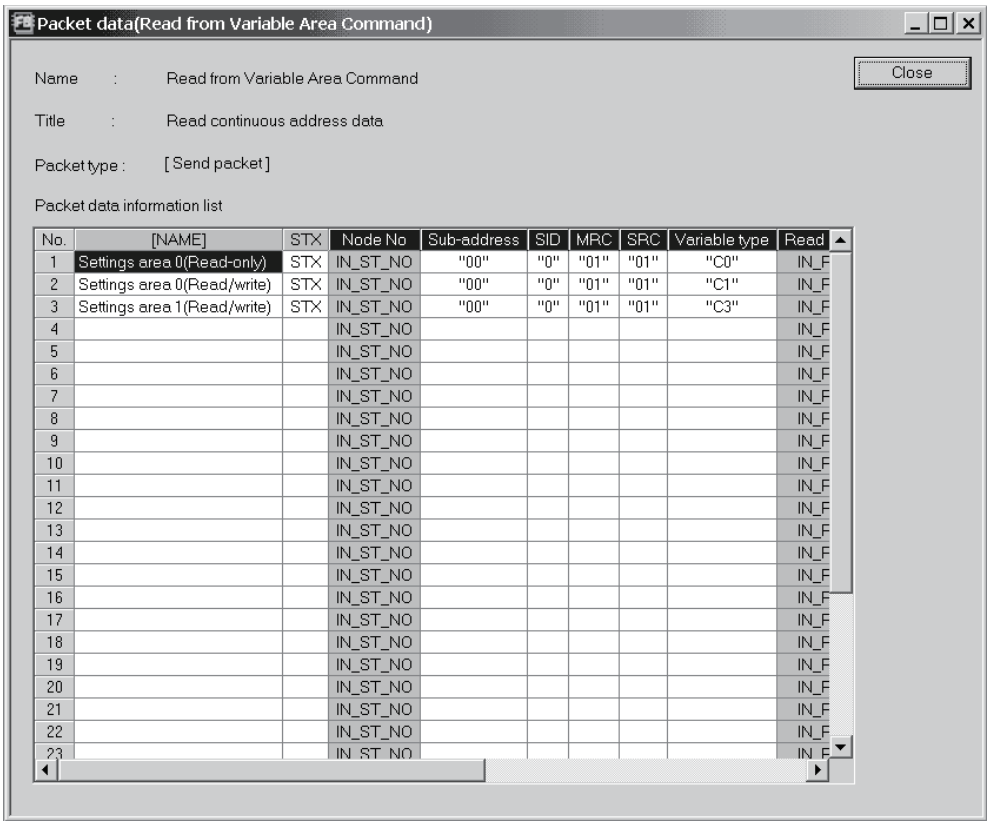
PURPOSE

According to the packet construction information, set detailed data to the construction elements of the packet construction information to set the actually transmitted data.

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [Open packet data information] menu ( ).
2. The Packet data information screen is displayed.
3. Input a name into the [NAME] field of the packet data information list.
4. Set the detailed data of the construction elements set in the packet construction information.
   - When the data type is "ASCII Code", the "ASCII Code input" dialog is displayed.
   - The grayed areas need not be set since the data of the input/output variables (input/output variables of FB) set in the packet construction information setting are inserted.
5. Click the Close button to entry the data.

DISPLAY/SETTING SCREEN

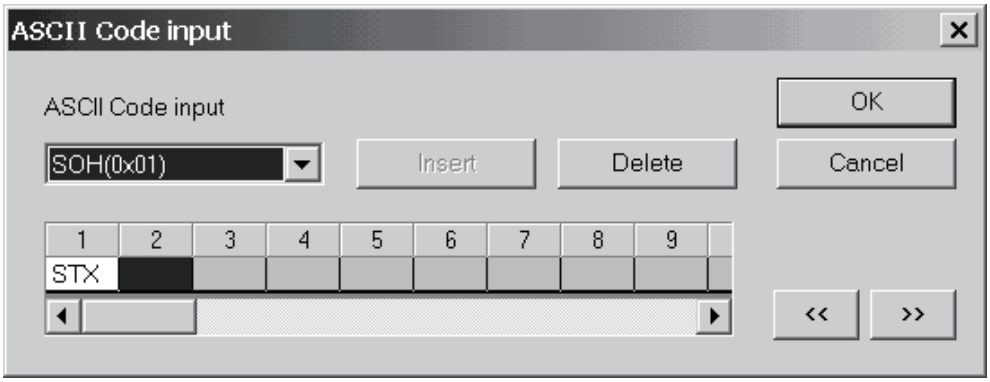


No.	[NAME]	STX	Node No	Sub-address	SID	MRC	SRC	Variable type	Read
1	Settings area 0(Read-only)	STX	IN_ST_NO	"00"	"0"	"01"	"01"	"C0"	IN_F
2	Settings area 0(Read/write)	STX	IN_ST_NO	"00"	"0"	"01"	"01"	"C1"	IN_F
3	Settings area 1(Read/write)	STX	IN_ST_NO	"00"	"0"	"01"	"01"	"C3"	IN_F
4			IN_ST_NO						IN_F
5			IN_ST_NO						IN_F
6			IN_ST_NO						IN_F
7			IN_ST_NO						IN_F
8			IN_ST_NO						IN_F
9			IN_ST_NO						IN_F
10			IN_ST_NO						IN_F
11			IN_ST_NO						IN_F
12			IN_ST_NO						IN_F
13			IN_ST_NO						IN_F
14			IN_ST_NO						IN_F
15			IN_ST_NO						IN_F
16			IN_ST_NO						IN_F
17			IN_ST_NO						IN_F
18			IN_ST_NO						IN_F
19			IN_ST_NO						IN_F
20			IN_ST_NO						IN_F
21			IN_ST_NO						IN_F
22			IN_ST_NO						IN_F
23			IN_ST_NO						IN_F

DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Name	The name set in the creation of new packet information is displayed.
Title	The title set in the creation of new packet information is displayed.
Packet type	The packet type set in the creation of new packet information is displayed.
Packet data information list [NAME]	Set the [NAME] field to differentiate between packet data. The usable number of characters is within 32 characters.
Packet data information list	Set data on a construction element basis. Set these data according to the data of the packet construction information. Up to 32 patterns of data can be set to one packet construction. The item whose first line is blue is in the calculation range of the "error check code".

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
ASCII Code input	Select the ASCII code from the list box. 33 different ASCII codes have been entered. ・NUL (0x00) to US (0x1F)　　・DEL (0x7F)
Insert button	Inputs the selected ASCII code into the cursor position.
Delete button	Deletes the ASCII code in the cursor position.
<< ・ >> button	Moves the cursor position left to right in the already input ASCII code list.

7.2.5 Duplicating the packet information

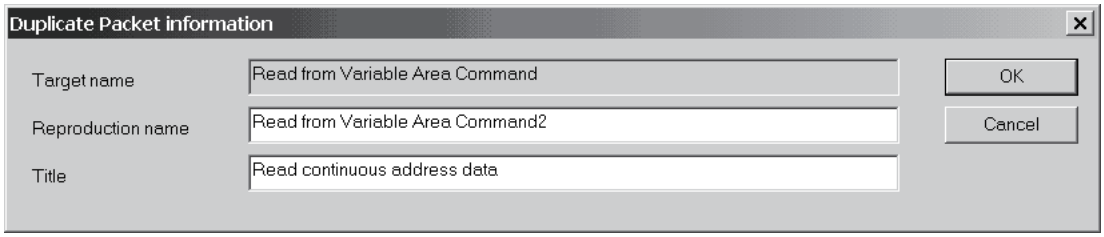
PURPOSE

Duplicate the packet information. Use this function when reusing the already set packet information. When reusing the system project, execute this function after creating a user project. When this function is executed on the system project side, the packet information is inserted into the user project.

BASIC OPERATION

1. Put the packet information to be duplicated in a selected condition, and click the [Edit] → [Packet information] → [Duplicate packet information] menu.
2. Set the "Reproduction name" and "Title" and click the OK button.
   The packet information is duplicated.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Target name	Displays the name of the target packet.
Reproduction name	Set the name of the reproduction packet. The usable number of characters is within 32 characters.
Title	Set the title. The usable number of characters is within 32 characters.

7.2.6 Renaming the packet information

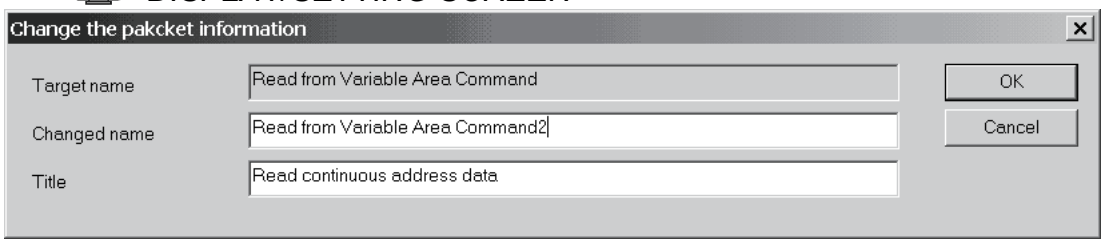
PURPOSE

Rename the packet information.

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [Rename packet information] menu.
2. Set the "Changed name" and "Title" and click the OK button.
   The packet information is renamed.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Target name	Displays the target name.
Changed name	Set a new name. The usable number of characters is within 32 characters.
Title	Set the title. The usable number of characters is within 32 characters.

7.2.7 Deleting the packet information

PURPOSE

Delete the packet information. When the packet information to be deleted is used in the sequence information, the data entered in the sequence information is deleted. Execute this function after changing the data of the sequence information.

BASIC OPERATION

1. Click the [Edit] → [Packet information] → [Delete packet information] menu.
2. A confirmation message is displayed before the deletion of the packet information is executed.
   Click the Yes button to delete the packet information.

7.3 Sequence Information

In the sequence information, set the communication processing control type (send, receive, send/receive) and the packet data that matches the control type to set the information for creating a protocol FB.

7.3.1 Creating new sequence information

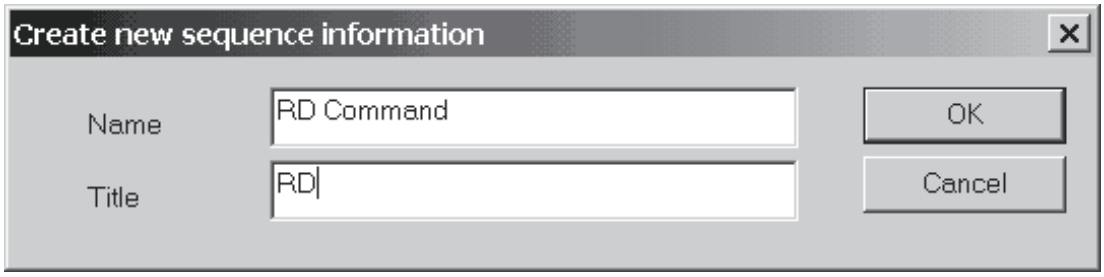
PURPOSE

Create new sequence information.
New sequence information cannot be created in the system project. Execute this function in the user project.

BASIC OPERATION

1. Select "Sequence information" in the project tree, and click the [Edit] → [Sequence information] → [Create new sequence information] menu ( ).
2. The New sequence information screen is displayed.
   Set the "Name" and "Title" and click the OK button.
3. New sequence information is created.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Name	Set the name of the sequence information. The usable number of characters is within 32 characters.
Title	Set the title for the sequence information. The usable number of characters is within 32 characters.

REMARK

Refer to Appendix 2 for the restrictions on the set names, etc.

7.3.2 Setting the sequence information

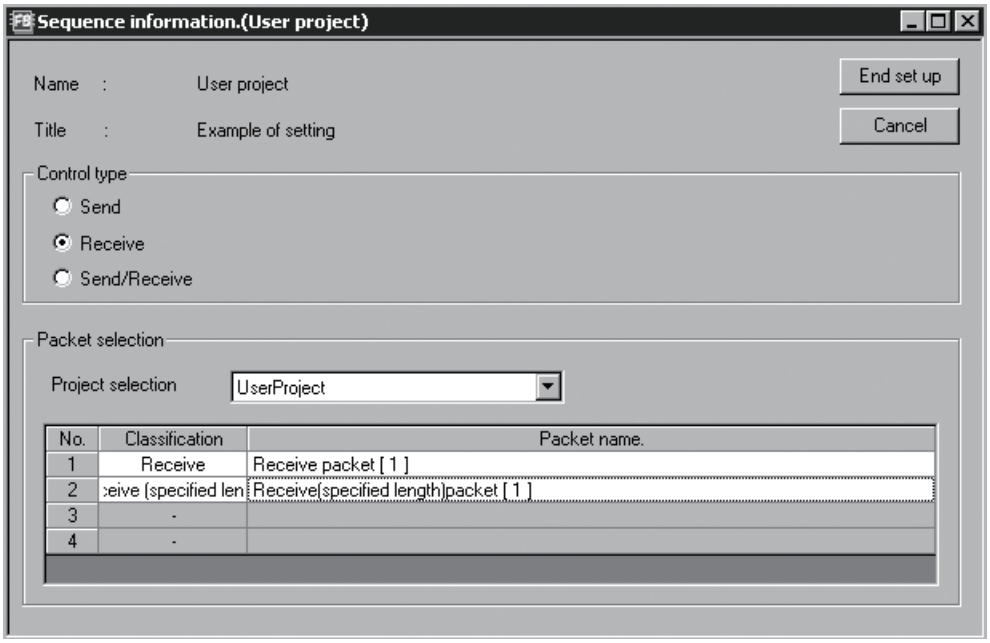
PURPOSE

In the sequence information, set the communication processing control type (send, receive, send/receive) and the packet data that matches the control type to set the information for creating a protocol FB.

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [Open sequence information] menu.
2. The Sequence information screen is displayed.
3. Set the "Control type", "Project selection" and "Classification".
4. Double-click the "Packet name" cell to display the Packet information selection screen.
5. Make setting and click the End set up button.
6. The settings are entried.

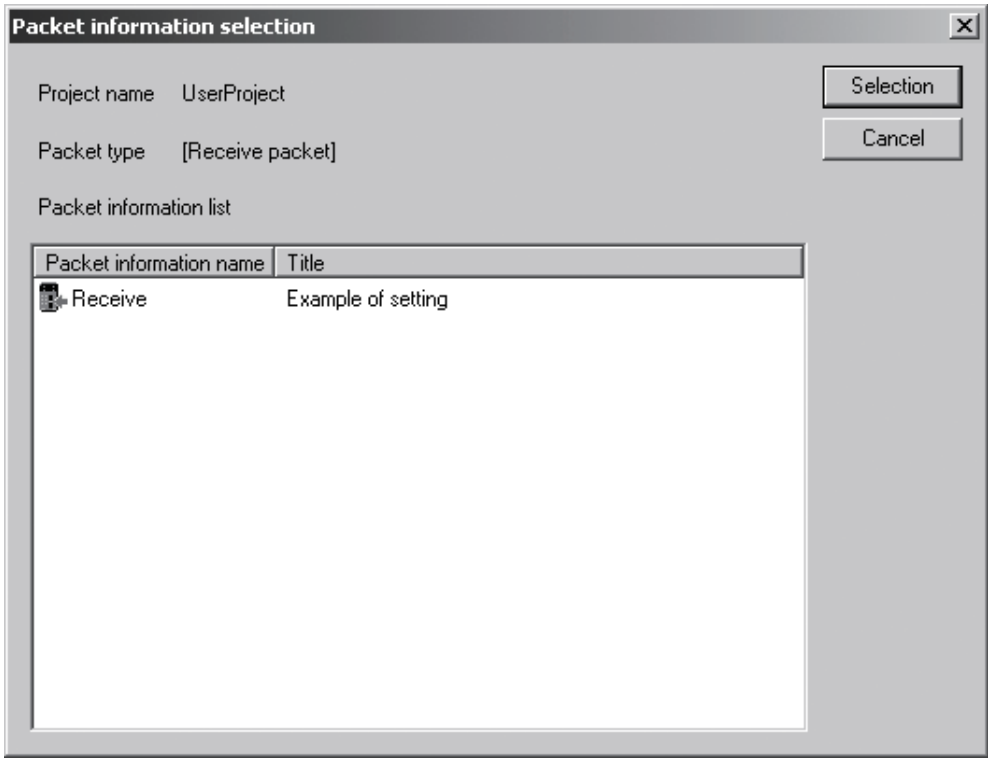
DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Name	Displays the name set in the creation of the sequence information.
Title	Displays the title set in the creation of the sequence information.
Control type	Select the control type.
Project selection	Select the project for selection of the packet information.
Classification	Select the classification that can be set by making control type selection. Click the Classification cell and make selection from the combo box.
Packet name.	After moving the focus to the specified cell, double-click. 1) The Packet information selection screen is displayed. Select the packet information. 2) The Packet data selection screen is displayed. Select the packet data.

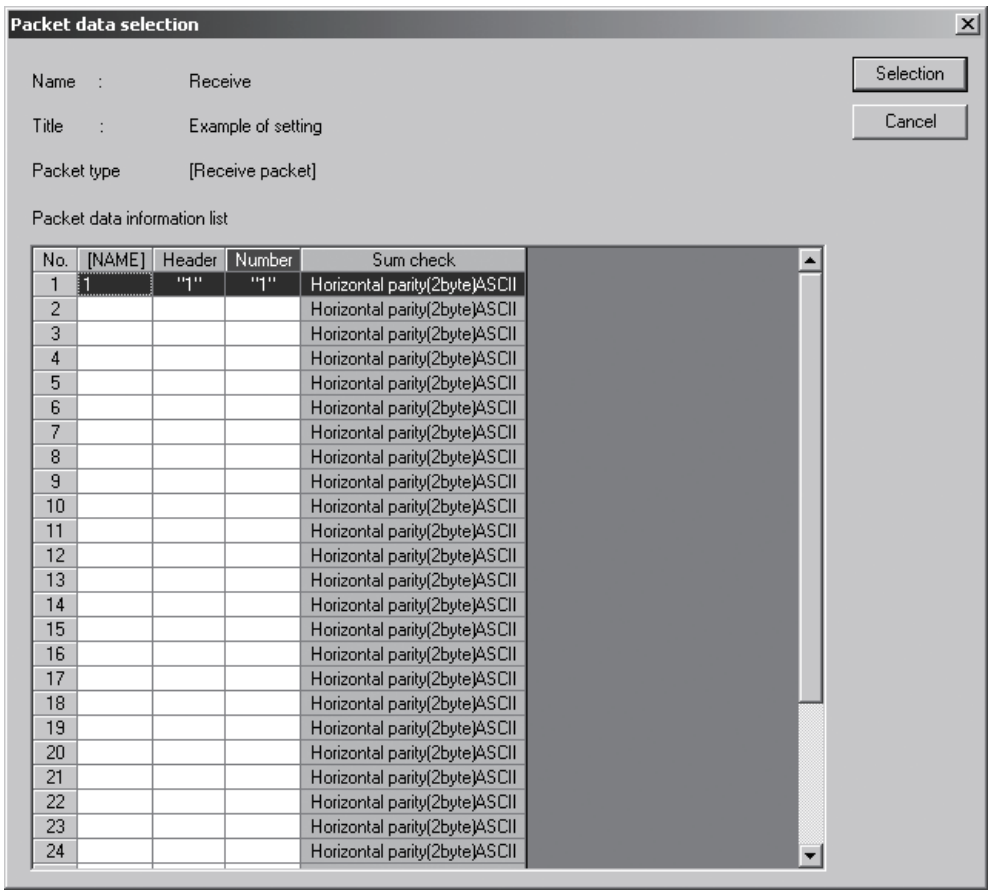
DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Packet information list	Displays the packet information that can be selected. After making selection with the cursor, click the Selection button.
Selection button	Displays the packet information selected with the cursor. Displays the Packet data selection screen.
Cancel button	Cancels the setting and closes the screen.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Packet data information list	Displays the packet information that can be selected. After making selection with the cursor, click the Selection button. The item whose first line is blue is in the calculation range of the "error check code".
Selection button	Sets to the sequence information the packet data information selected with the cursor. Returns to the Sequence information screen.
Cancel button	Cancels the setting and closes the screen.

7.3.3 Duplicating the sequence information

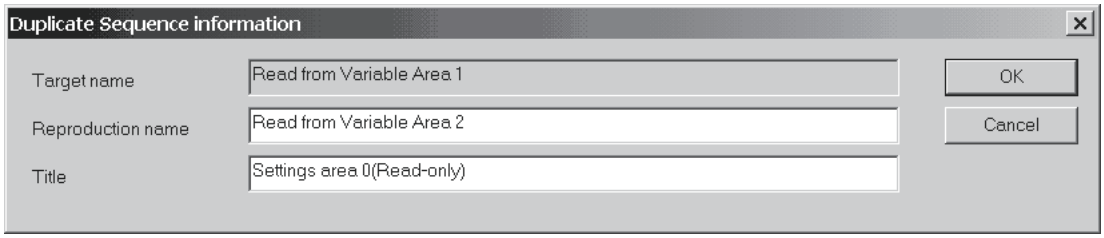
PURPOSE

Duplicate the sequence information. Use this function when reusing the already set sequence information. When reusing the system project, execute this function after creating a user project. When this function is executed on the system project side, the sequence information is inserted into the user project.

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [Duplicate sequence information] menu.
2. Set the "Reproduction name" and "Title" and click the OK button.
   The sequence information is duplicated.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Target name	Displays the target name.
Reproduction name	Set the reproduction name. The usable number of characters is within 32 characters.
Title	Set the title. The usable number of characters is within 32 characters.

7.3.4 Renaming the sequence information

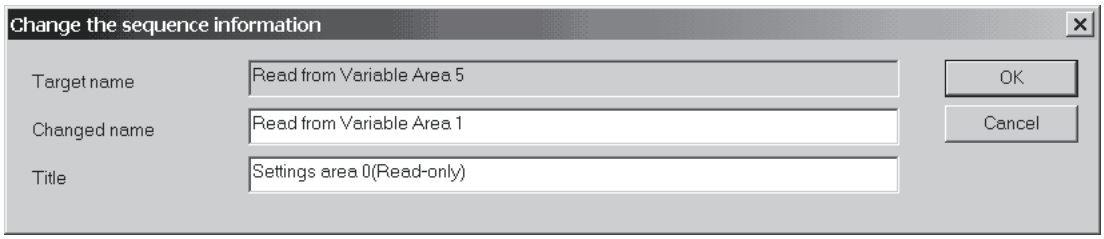
PURPOSE

Rename the sequence information.

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [Rename sequence information] menu.
2. Set the "Changed name" and "Title" and click the OK button.
   The sequence information is renamed.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Target name	Displays the target name.
Changed name	Set a new name. The usable number of characters is within 32 characters.
Title	Set the title. The usable number of characters is within 32 characters.

7.3.5 Deleting the sequence information

PURPOSE

Delete the sequence information.

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [Delete sequence information] menu.
2. A confirmation message is displayed before the deletion of the sequence information is executed.
   Click the Yes button to delete the sequence information.

7.3.6 Confirming the I/O variables

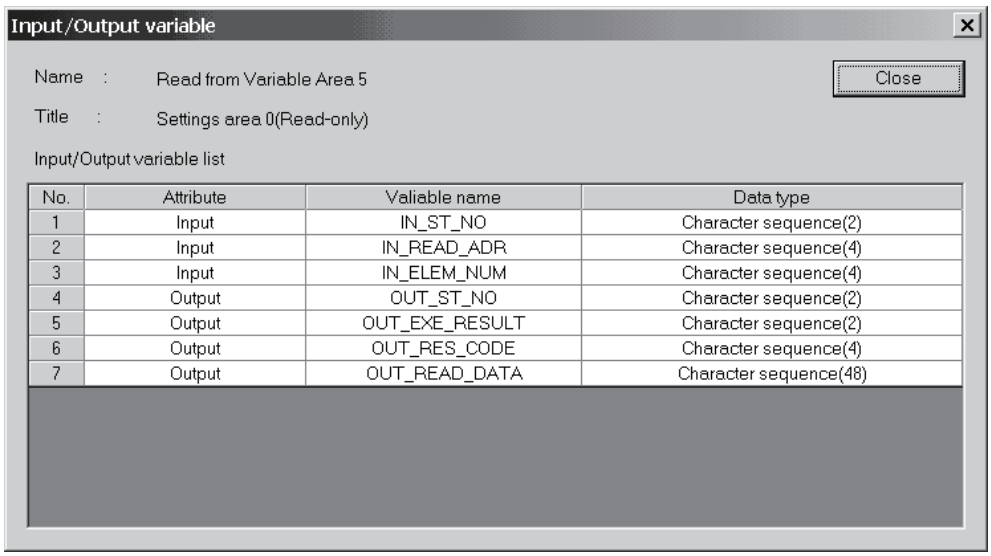
PURPOSE

Display a list of the input/output variables used in the packet information selected in the sequence information. The input/output variables displayed here are defined as the sequence FB variables of a protocol FB.

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [Input/Output variable] menu.
2. The Input/Output variable screen is displayed.
3. The data set in the packet construction information setting are displayed in the Input/Output variable list.

DISPLAY/SETTING SCREEN



7.4 FB Conversion of Sequence Information

PURPOSE

Convert the sequence information into an FB program. There are three different FB program types: initialization FB, send FB*[1] and receive FB*[2].

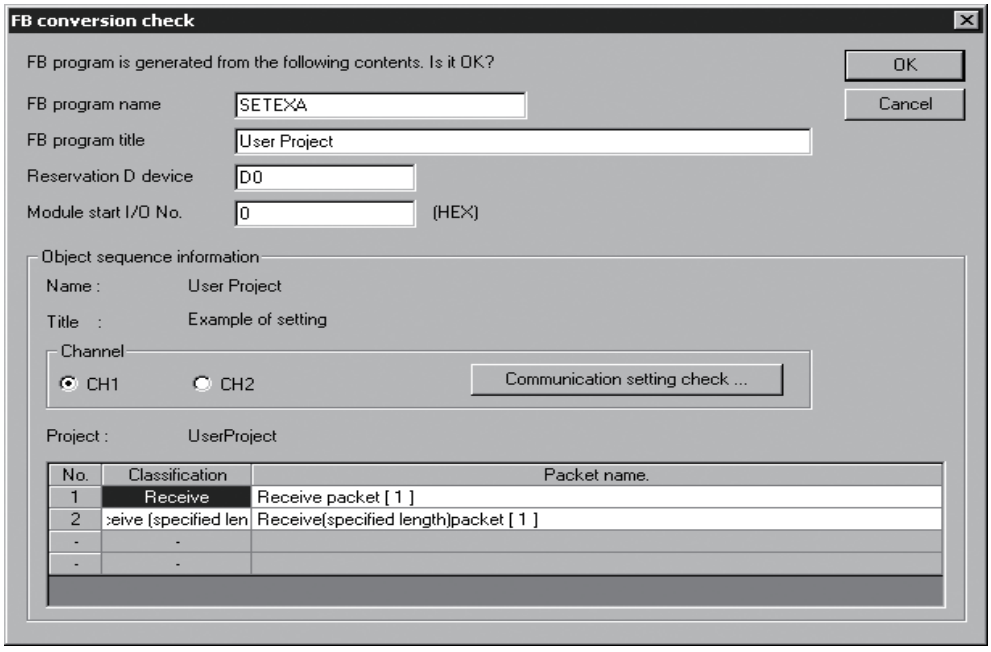
*1: Send FB: When Send or Send/Receive is selected as the control type in the sequence information

*2: Receive FB: When Receive or Send/Receive is selected as the control type in the sequence information

BASIC OPERATION

1. Click the [Edit] → [Sequence information] → [FB conversion of sequence information] menu (Step 5).
2. The FB conversion screen is displayed.
3. Set the "FB program name", "FB program title", "Reservation D device" and "Module start I/O No.".
4. Select the channel used for the target sequence information.
5. Click the Communication setting check button and confirm the data of the object module.
6. Click the OK button.
7. The protocol FB is created and inserted into the <<FB>> tab of GX Developer.

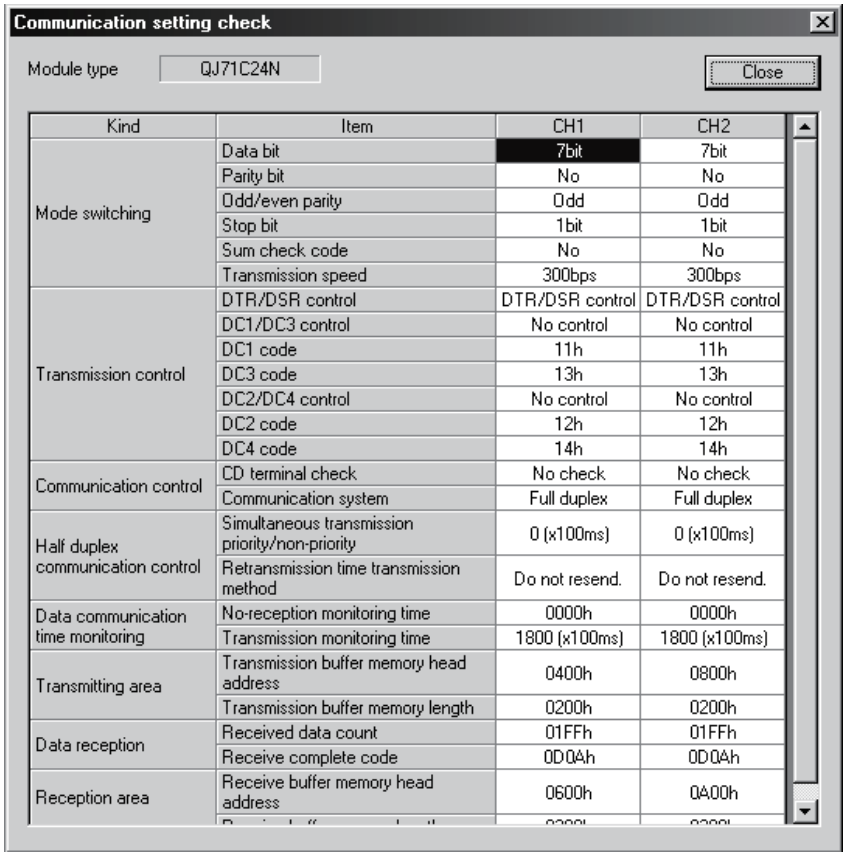
DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
FB program name	Set the name to the protocol FB. The name set here is used as the FB name. The usable number of characters is within 6 characters. The FBs are displayed on GX Developer as indicated below. ・Send FB: S-＊＊＊＊＊＊ ・Receive FB: R-＊＊＊＊＊＊
FB program title	Set the title to the protocol FB. The title set here is used as the FB title. The usable number of characters is within 32 characters.
Reservation D device	Set the D device to be used in the protocol FB to be output. Since the specified D device (2 words) is used in the FB, it cannot be used in the sequence program. Make the settings within the following range : D0 to D12287
Module start I/O No.	Set the head address of the module used in the FB program to be output. The FB program will be generated depending on the head address set here. The setting range varies with the PLC CPU used. Therefore, make the settings within the following range. Q00JCPU : 0 to E0 Q00CPU/Q01CPU : 0 to 3E0 Q02UCPU : 0 to 7E0 Other QCPU (Q mode) : 0 to FE0
Channel	Specify the target channel of the sequence information (protocol FB).
Communication setting check button	Displays the communication settings. The display data are the settings made on the Module setting screen.
Classification	Displays the data of the sequence information.
Packet name	Displays the data of the sequence information.

DISPLAY/SETTING SCREEN



8 HOW TO USE PROTOCOL FB

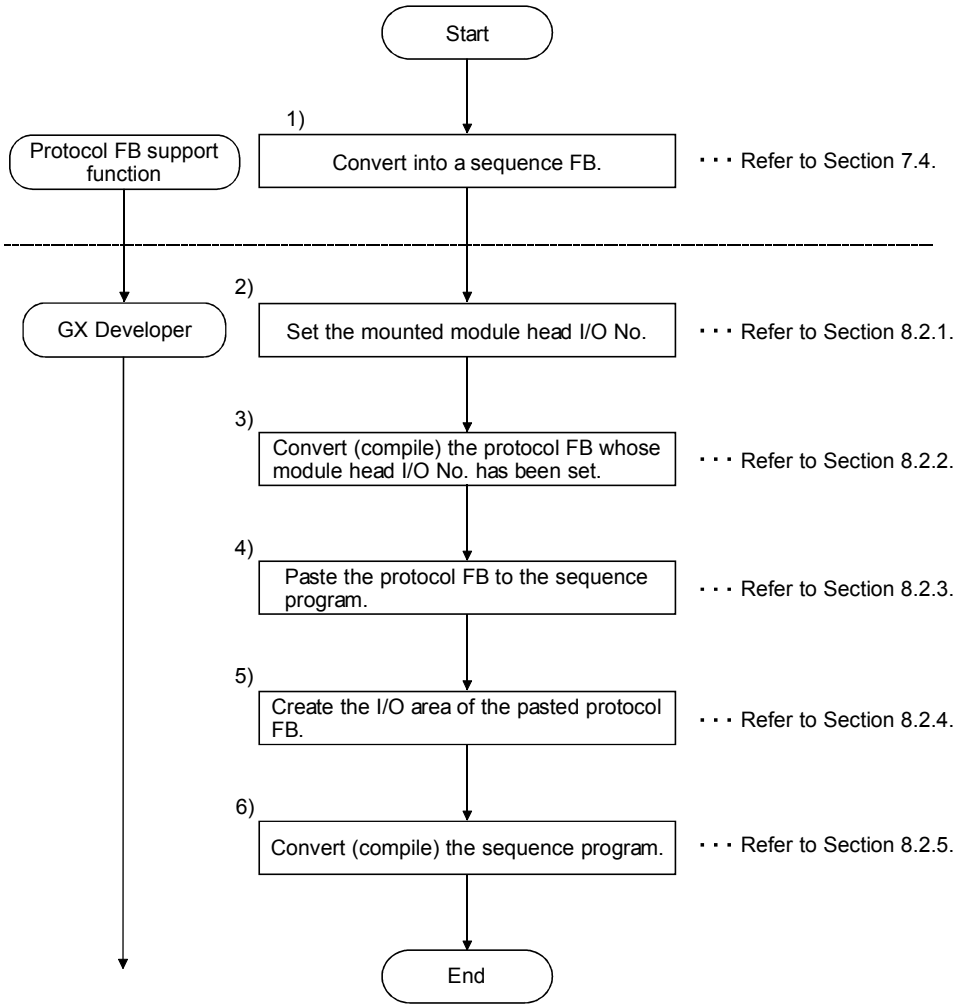
This chapter explains the procedure to use protocl FB with GX Developer.

8.1 Outline

The procedure to create and use protocol FBs is described below.

1) Convert the sequence information into a sequence FB.
2) Set the module head I/O No. of the protocol FB created by sequence FB conversion.
3) Convert (compile) the protocol FB whose module start I/O No. has been set.
4) Paste the protocol FB to the sequence program.
5) Create the I/O area of the pasted protocol FB.
6) Convert (compile) the sequence program.

The procedure of steps 1) to 6) will now be represented in a flowchart. The details of 1) to 6) will be explained in the next section.



8.2 How to Use Protocol FBs on GX Developer

When sequence information is converted into sequence information FBs, the following three different protocol FBs are inserted into GX Developer.

1) Module initialization FB: INITSC
2) Send FB: S-＊＊＊＊＊＊
3) Receive FB: R-＊＊＊＊＊＊
＊＊＊＊＊＊ is the name of the protocol FB set at the time of sequence information FB conversion.

A communication control program can be created by creating the I/O areas of the protocol FBs inserted into GX Developer. The procedure will now be explained.

8.2.1 Module start I/O No. setting

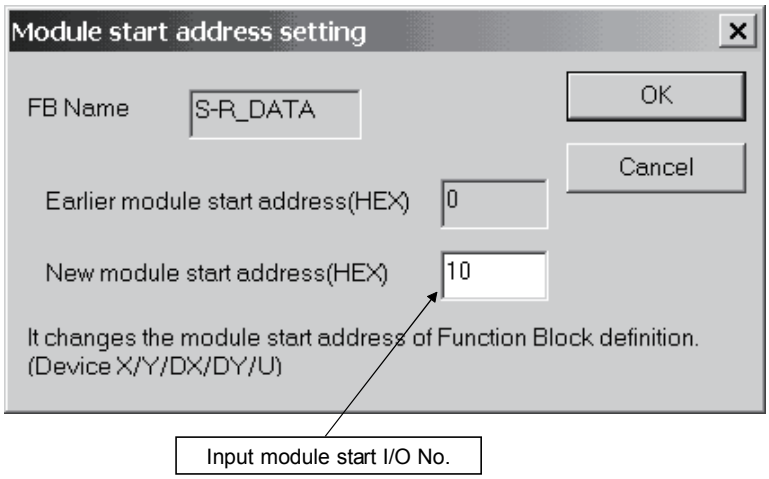
Since the created protocol FB has the module start I/O No. of 0, change the module start I/O No. according to the mounting position of the module.

PURPOSE

Set the module start I/O No. of the protocol FB.

BASIC OPERATION

1. Open the target FB program on GX Developer.
2. Change to the write mode.
3. Click the [Project] → [Function block] → [Module start I/O No. setting] menu.
4. Input the new module start I/O No. on the Module start I/O No. setting screen.



Point

With GX Configurator-SC Version 2.04E (SW2D5C-QSCU) or latter, the module start I/O No. can be set when sequence information are converted into FB program. For details of setting method, refer to Section 7.4.

8.2.2 Converting (compiling) the protocol FB whose module start I/O No. was set

PURPOSE

Convert (compile) the protocol FB, whose module start I/O No. was set, so that it can be used on GX Developer.

BASIC OPERATION

Click the [Convert] → [Convert/Compile] menu of GX Developer.
For details, refer to the "GX Developer Operating Manual (Function Block)".

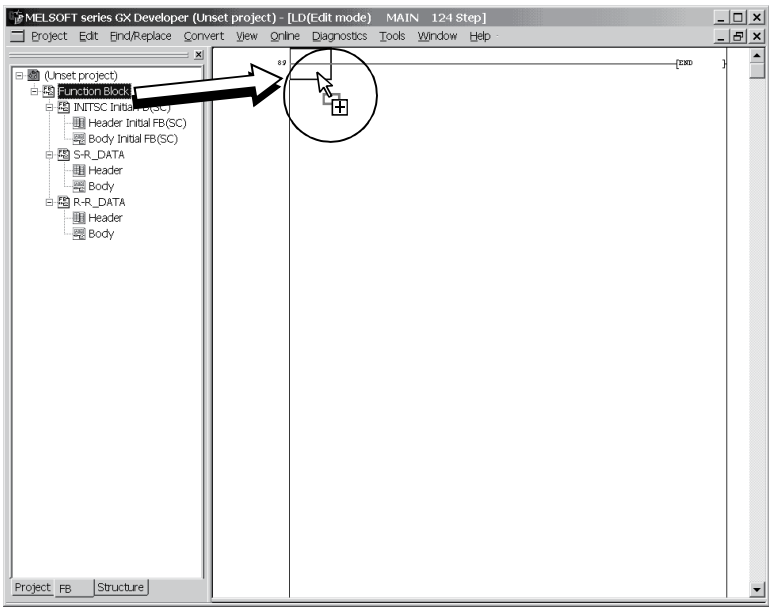
8.2.3 Pasting the protocol FB to the sequence program

PURPOSE

Paste the protocol FB to the sequence program for use in it.

BASIC OPERATION

Switch from the <<Project>> tab to the <<FB>> tab of GX Developer, and drag and drop the protocol FB to be used onto the sequence program.
For details, refer to the "GX Developer Operating Manual (Function Block)".



8.2.4 Creating the I/O areas of the pasted protocol FBs

There are the following two different I/O variable types for protocol FBs. Using these I/O variables, create a communication control program.

1) I/O variables created by the protocol FB support function
2) I/O variables used by the user in the sequence information

Point

- For the I/O variables of the protocol FBs created from the system project, refer to "11 SEQUENCE INFORMATION AND LABEL VARIABLES OF SYSTEM PROJECT".
- The I/O variables used in the sequence information can be confirmed on the Input/Output variable screen. For details, refer to "7.3.6 Confirming the I/O variables".

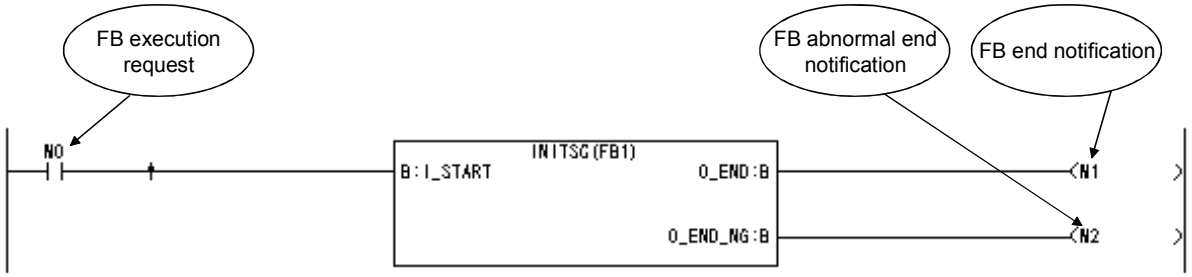
How to use the I/O variables of the module initialization FB, send FB and receive FB will now be explained.

(1) Module initialization FB

The module initialization FB has the following I/O variables. Using these I/O variables, make the initial setting of the Q series C24 module.

No.	I/O variable	Description	Input/Output
1	I_START	FB execution request: Turn ON to start the module initialization processing.	Input
2	O_END	FB end notification: Turns ON at completion of the initialization processing. Also turns ON at abnormal completion.	Output
3	O_END_NG	FB abnormal end notification: Turns ON at abnormal completion only.	Output

The sequence program example that uses the module initialization FB is shown below.



Point

- The module initialization FB is the FB that initializes the module. Always execute it before using the send or receive FB.
- When the module is initialized directly by the sequence program, the module need not be initialized using the module initialization FB.

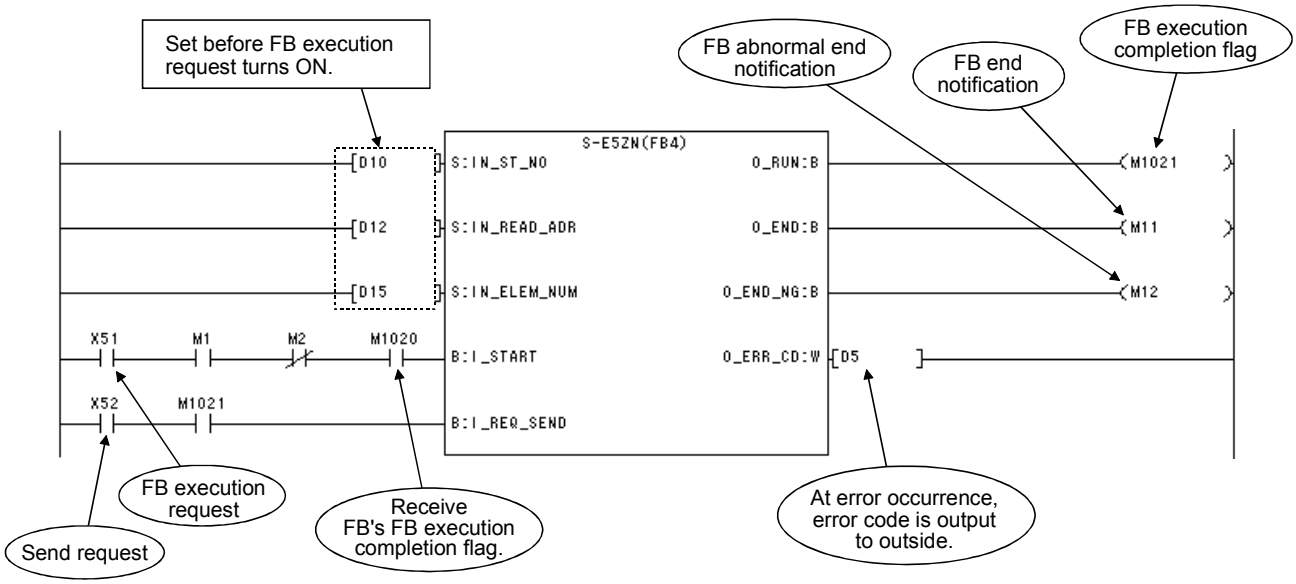
(2) Send FB

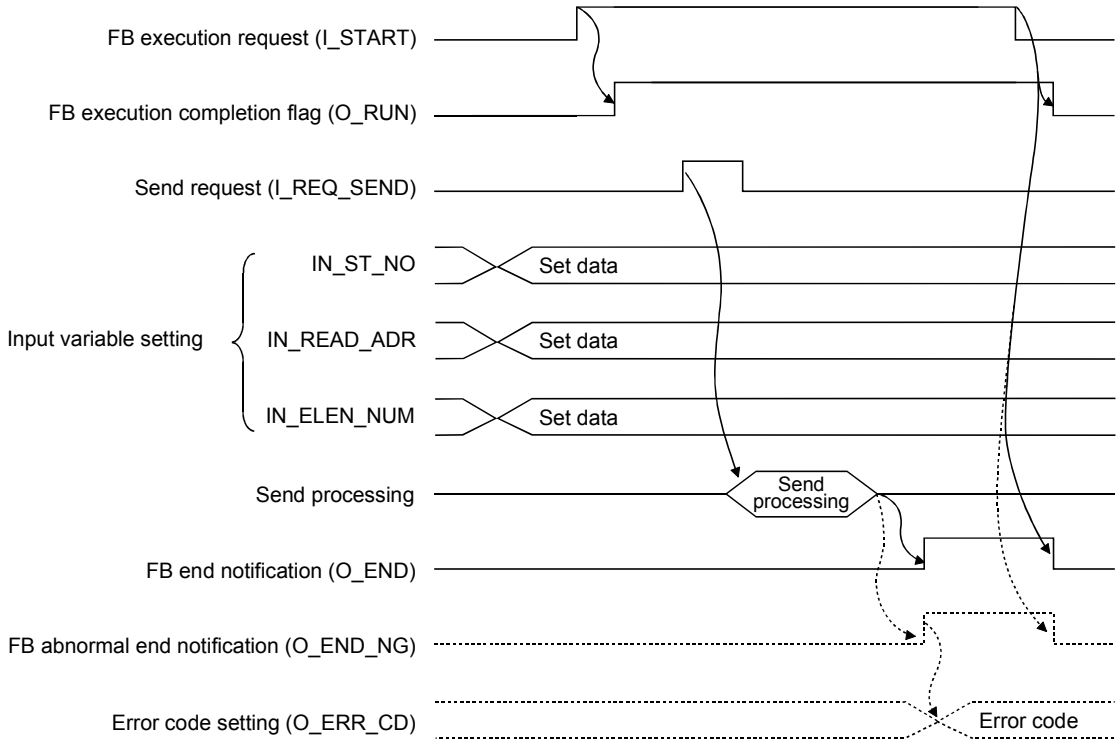
The send FB has the following I/O variables. Data can be sent using these I/O variables and the input variables set in the sequence information.

No.	I/O variable	Description	Input/Output
1	I_START	FB execution request: Turn ON to start the FB.	Input
2	I_REQ_SEND	Send request: Turn ON to execute send.	Input
3	O_RUN	FB execution completion flag: Turns on at completion of send preparation. *1	Output
4	O_END	FB end notification: Turns ON at completion of send. Also turns ON at abnormal completion.	Output
5	O_END_NG	FB abnormal end notification: Turns ON at abnormal completion only.	Output
6	O_ERR_CD	Error code: The error code at abnormal completion is stored. For details of the error codes, refer to the "Q Corresponding Serial Communication Module User's Manual (Basics)".	Output

*1: FB execution completion flag (O_RUN) is an output variable for interlock. It is added from SW2D5C-QSCU-E, Version 2.14Q.

The sequence program example that uses the send FB and its timing chart are shown below.





(3) Receive FB

The receive FB has the following I/O variables. Data can be received using these I/O variables and the output variables set in the sequence information.

No.	I/O variable	Description	Input/Output
1	I_START	FB execution request: Turn ON to start the FB.	Input
2	I_REQ_RECV	Receive request: Turn ON to enable receive.	Input
3	O_RUN	FB execution completion flag: Turns on at completion of receive preparation. *2	Output
4	O_END	FB end notification: Turns ON at completion of receive. Also turns ON at abnormal completion.	Output
5	O_END_NG	FB abnormal end notification: Turns ON at an abnormal end only. When it has turned ON, refer to the error code (O_ERR_CD).	Output
6	O_ERR_CD	When O_END_NG is ON, either of the following error codes is stored. O_ERR_CD = 0 : Receive packet size error The received packet size is outside the range of the set packet construction size. O_ERR_CD ≠ 0 : Module detection error Refer to the "Q Corresponding Serial Communication Module User's Manual (Basics)".	Output
7	O_R_DATA_NO	Receive data No.: When the receive packet entried on the Sequence information screen matches the receive data, that packet No. (1 to 4) is stored. On a mismatch, "0" is stored.	Output

*2: FB execution completion flag (O_RUN) is an output variable for interlock. It is added from SW2D5C-QSCU-E, Version 2.14Q.

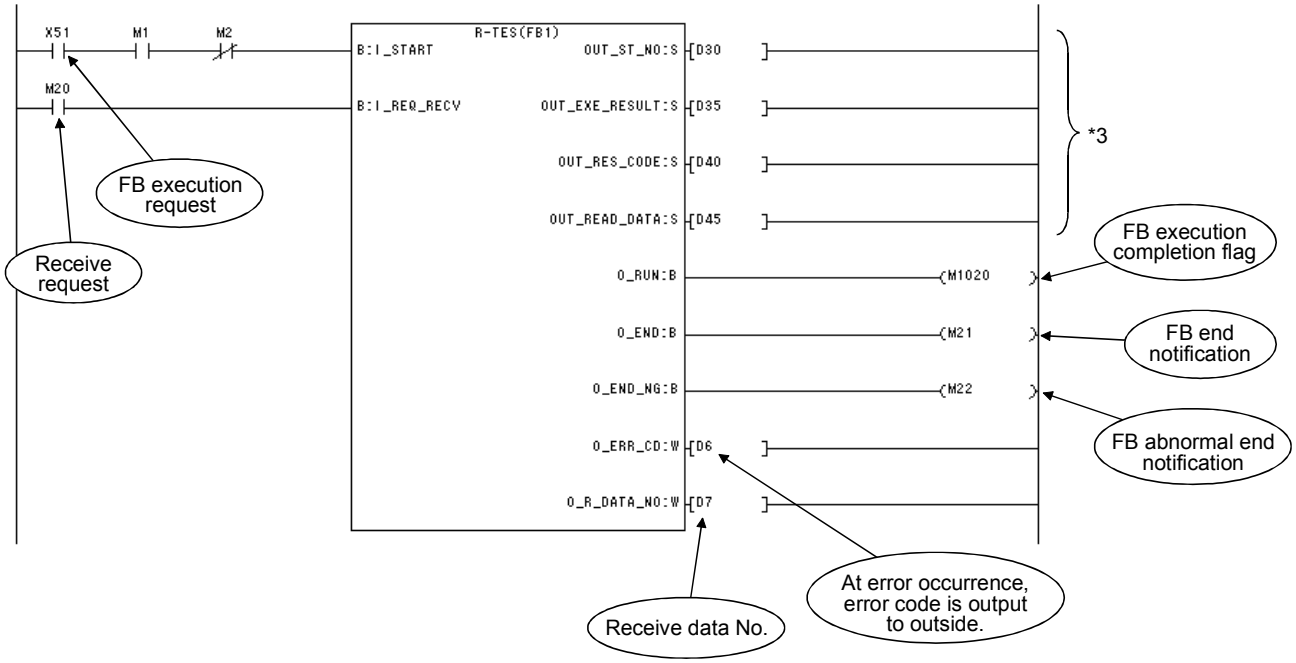
Point

(1) When using the receive FB and send FB in the sequence program, create a program in which the input variable, I_START of the receive FB turns on earlier than or at the same time as I_START of the send FB.

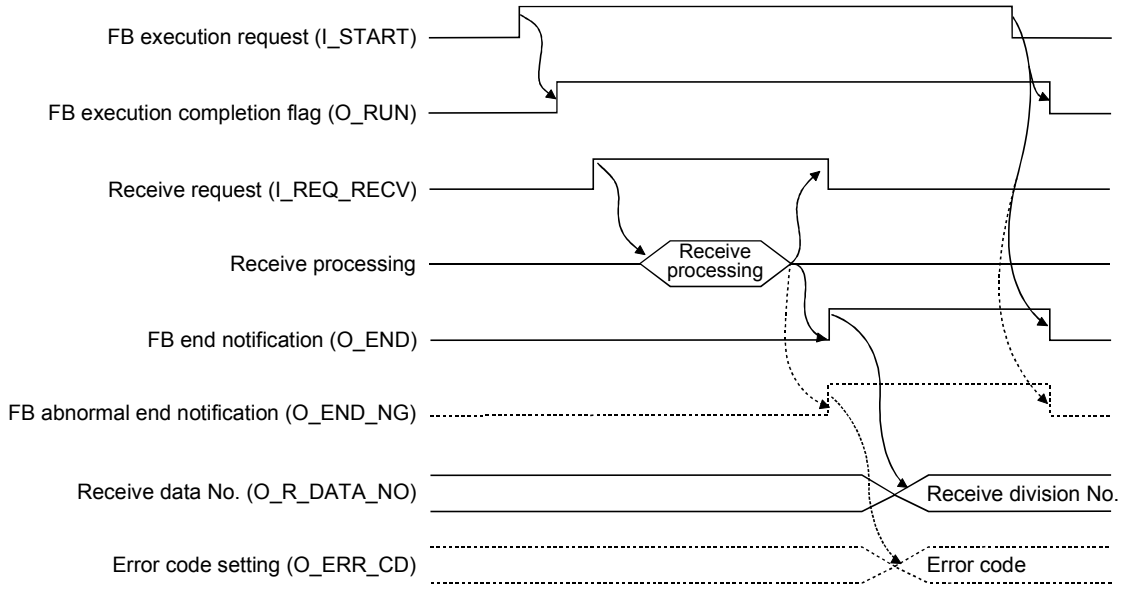
(2) When multiple send FBs exist, do not execute 2 or more send FBs concurrently. (Do not create a program in which more than one I_START of send FBs will turn ON at the same time.)
Also, when multiple receive FBs exist, do not execute 2 or more receive FBs concurrently. (Do not create a program in which more than one I_START of receive FBs will turn ON at the same time.)
Doing so will result in abnormal operation and only the processing based on the send/receive FB executed at the last will be executed.

(3) When executing receive FB and send FB concurrently, execute the send processing after FB execution completion flag (O_RUN) of receive FB turns on. Executing the send processing before FB execution completion flag of receive FB turns on causes the error in the module. (Error code: 7FF5H)

The sequence program example that uses the receive FB and its timing chart are shown below.



*3: Variables used when output variables are specified by the user in the packet construction information



Point

About echo data

Since a two-wire transmission path receives send data by itself, the first receive data must be ignored. This processing is not performed in the protocol FBs. Therefore, perform programming so that echo data is ignored in the sequence program.
Specifically, receive data can be ignored by turning ON Receive read completed (Yn1) on the first leading edge of Receive read request (Xn3) or Receive error detection (Xn4) of the Q series C214 module I/O signal.
However, when the packet construction of the send data differs from that of the receive data (head differs), no special measures are not required since the receive of the echo data can be ignored on the Q series C24 module side.
For details of Receive read request, Receive error detection and Receive read completed, refer to the "Q Corresponding Serial Communication Module User's Manual (Basics)".

8.2.5 Converting (compiling) the sequence program

PURPOSE

Convert (compile) the sequence program, where protocol FBs have been pasted, to make it executable.

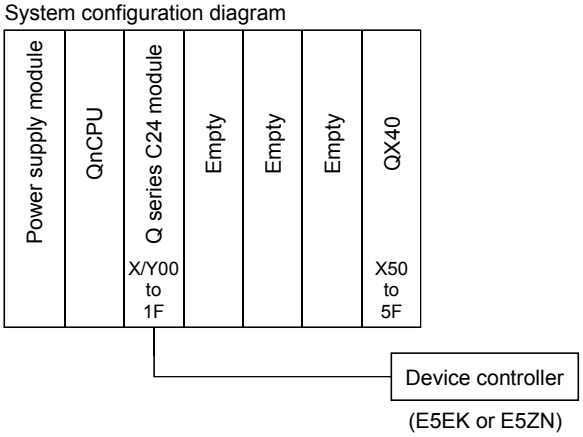
BASIC OPERATION

Click the [Convert] → [Convert/Compile] menu of GX Developer.

8.3 Sequence Program Example Using Protocol FBs

This section provides the program examples including protocol FBs and the timing charts by use of the following system configuration and devices.

System configuration diagram



Used device list

Device name		Device	Description	Device name	Device	Description
Input/ output of C24	Input	X3	CH1 read detection	External input	X50	Initial start command
		X4	CH1 receive error detection		X51	Send/receive FB start command
	Output	Y1	CH1 read completion		X52	Send request
Data register		D5	Send FB error code	Internal relay	M0	Initialization FB start
		D6	Receive error code		M1	Initialization FB end
		D7	Receive data No.		M2	Initialization FB abnormal end
		D10	Module No.		M11	Send FB end
		D12	Read address		M12	Send FB abnormal end
		D15	Number of elements		M20	Receive request
		D30	Receive module No.		M21	Receive FB end
		D35	Receive parameter No./receive end code		M22	Receive FB abnormal end
		D40	Receive end code/receive response code		M1020	Receive FB execution completion flag
		D45	Read data		M1021	Send FB execution completion flag

Point

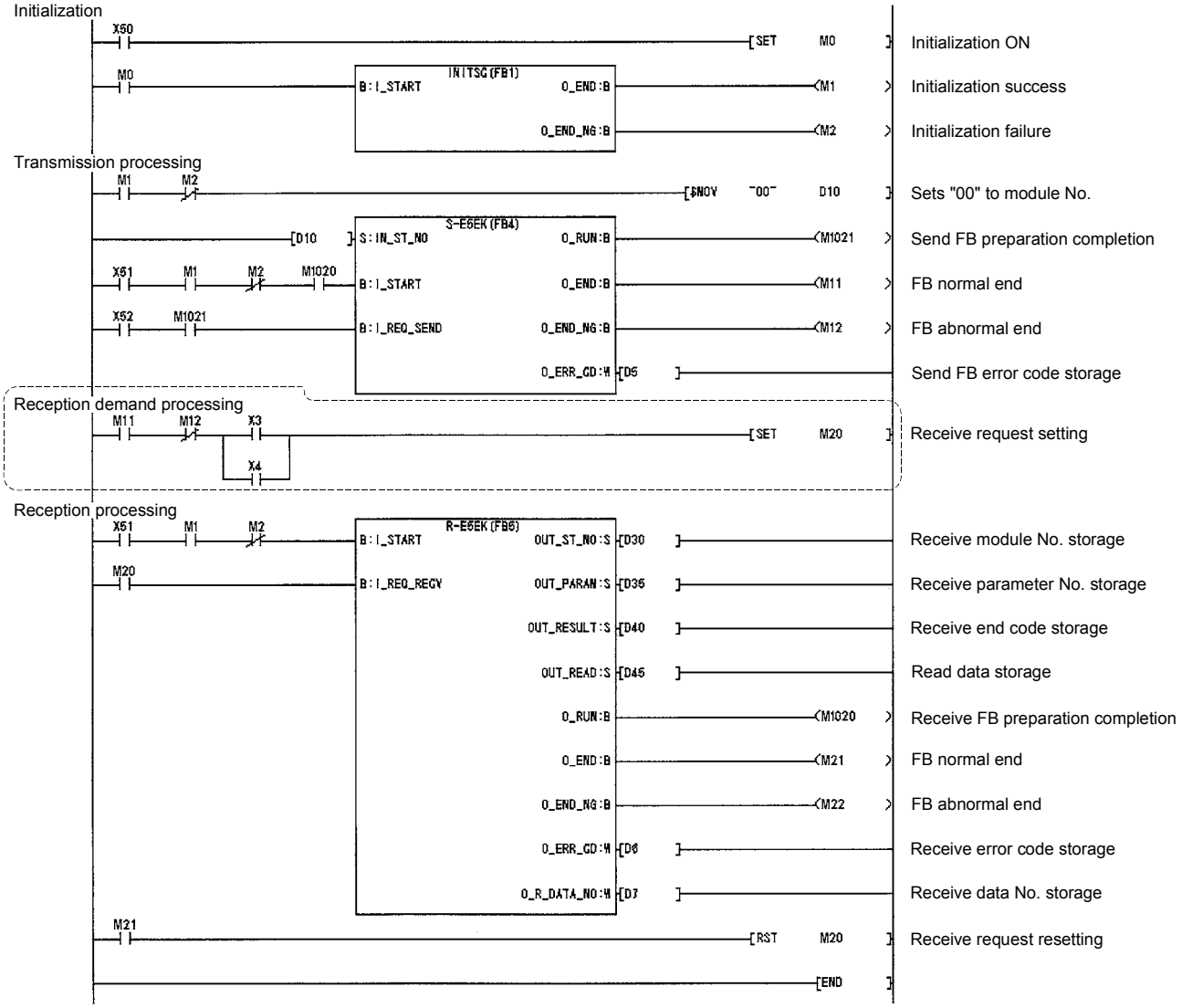
(1) When using the receive FB and send FB in the sequence program, create a program in which the input variable, I_START of the receive FB turns on earlier than or at the same time as I_START of the send FB.

(2) When multiple send FBs exist, do not execute 2 or more send FBs concurrently. (Do not create a program in which more than one I_START of send FBs will turn ON at the same time.)
Also, when multiple receive FBs exist, do not execute 2 or more receive FBs concurrently. (Do not create a program in which more than one I_START of receive FBs will turn ON at the same time.)
Doing so will result in abnormal operation and only the processing based on the send/receive FB executed at the last will be executed.

(3) When executing receive FB and send FB concurrently, execute the send processing after FB execution completion flag (O_RUN) of receive FB turns on. Executing the send processing before FB execution completion flag of receive FB turns on causes the error in the module. (Error code: 7FF5H)

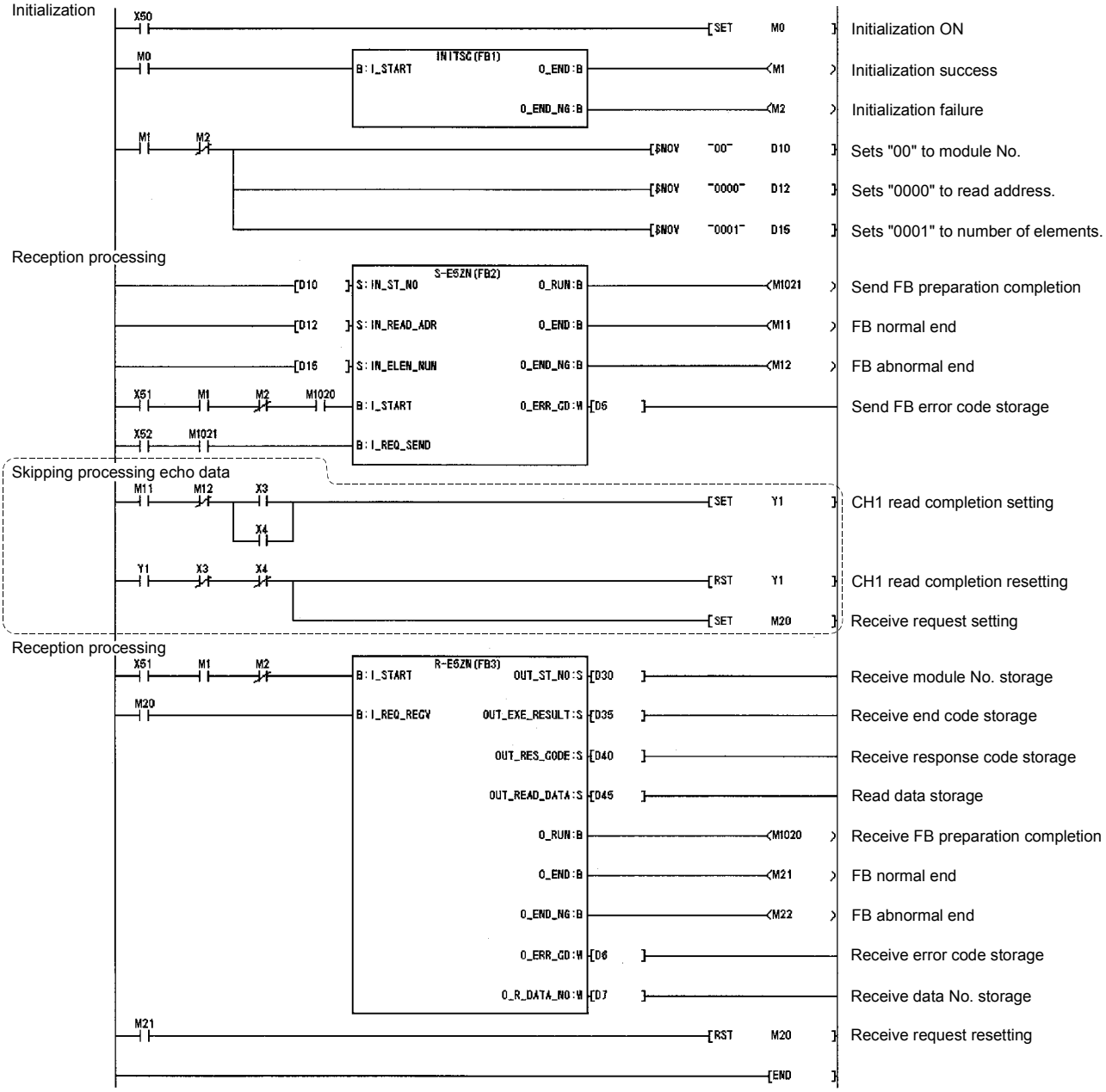
(1) When there is no echo data skip processing

Use the sequence information "parameter read 12" of OMRON's E5EK.



(2) When there is echo data skip processing

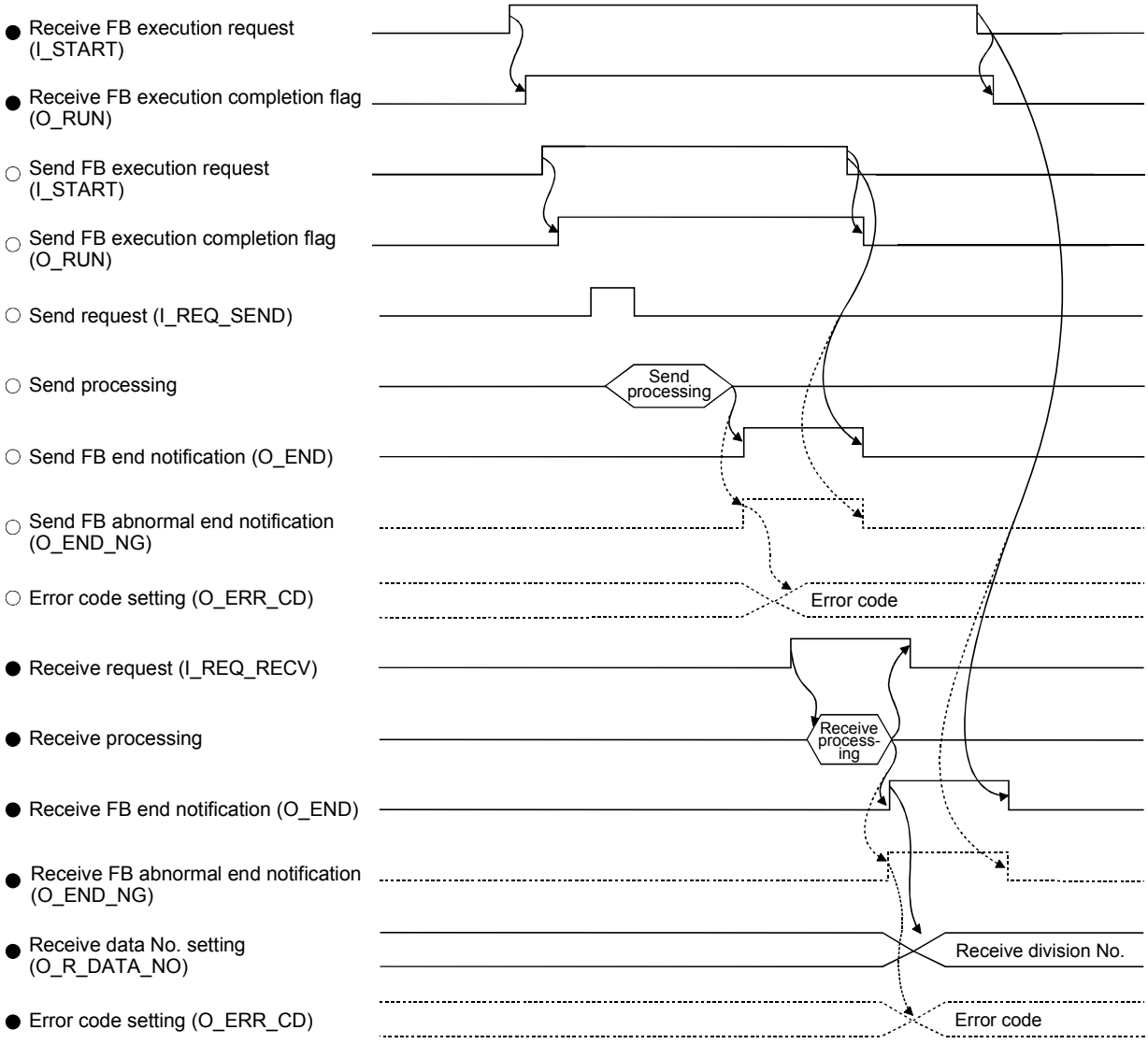
Use the sequence information "variable area read information 3" of OMRON's .



Point

Refer to Section 8.2.4 for details of the protocol FBs used in the above sequence program examples.

(3) Input/output timing of the send/receive FB



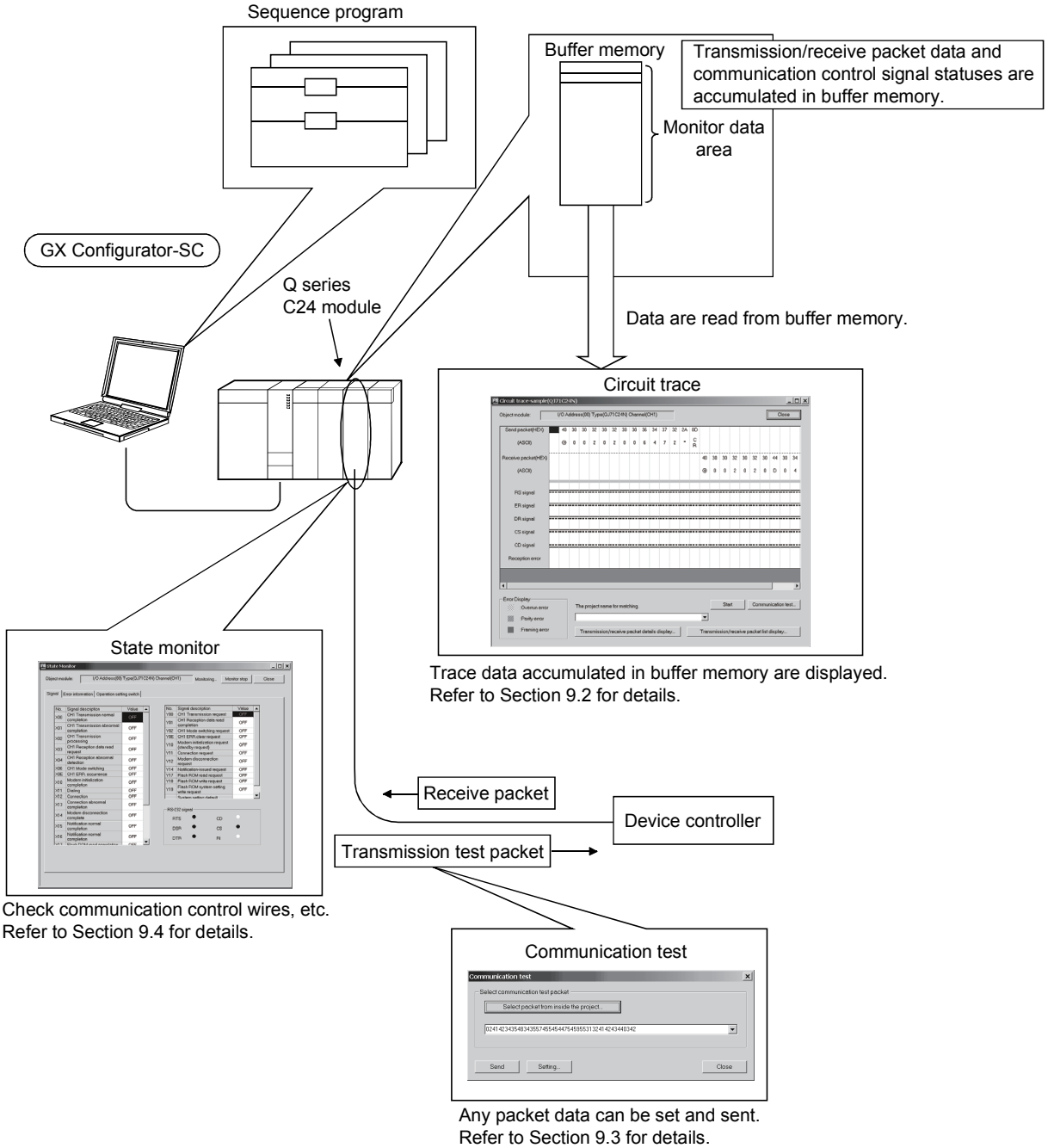
○: Send FB processing ●: Receive FB processing

9 DEBUGGING SUPPORT FUNCTIONS

The debugging support functions are designed to support the debugging of communication processing between the Q series C24 module and device controller. The following functions are available to ease system startup work.

- Circuit trace
- Communication test
- State monitor

The following outlines the debugging support functions.



9.1 Module Selection

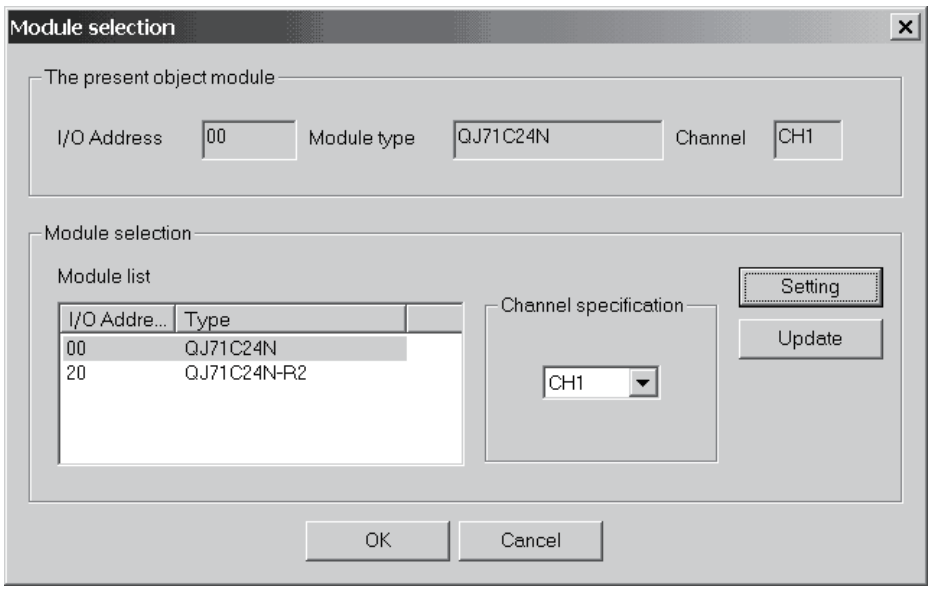
PURPOSE

Select the Q series C24 module to be debugged.
Execute circuit trace, communication test and/or state monitor for the module selected here.

BASIC OPERATION

1. Click the [Debugging support function] → [Module selection] menu.
2. Select the I/O address and channel of the module to be debugged, and click the Setting button.
3. Clicking the OK button sets the module information.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/ Setting Details
The present object module	Displays the information of the selected module.
Module list	Displays the list of the Q series C24 modules mounted on the same base.
Channel specification	Select the channel of the module.
Setting button	Sets the selected module and channel to the Object module.
Update button	Displays the latest module list.
OK button	Sets the data displayed in "The present object module" as the object module data.
Cancel button	Cancels the setting.

9.2 Circuit Trace

PURPOSE

Trace the communication data and communication control signals between the QJ71C24N, QJ71C24N-R2 or QJ71C24N-R4 module (hereafter abbreviated to the QJ71C24N module) and device controller.

REMARK

The circuit trace function displays the data accumulated in the monitor buffer of the QJ71C24N module.

9.2.1 Starting the circuit trace

PURPOSE

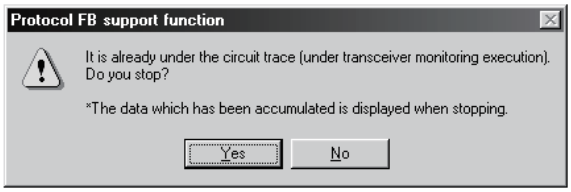
To trace the communication data and communication control signal statuses, store the trace data into the monitor buffer.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu.
2. Click the Start button to start trace.
3. When the monitor buffer becomes full or the Stop button is clicked, the trace data are displayed.
4. Confirm the transmission and receive packets and communication control signals from the displayed trace result.

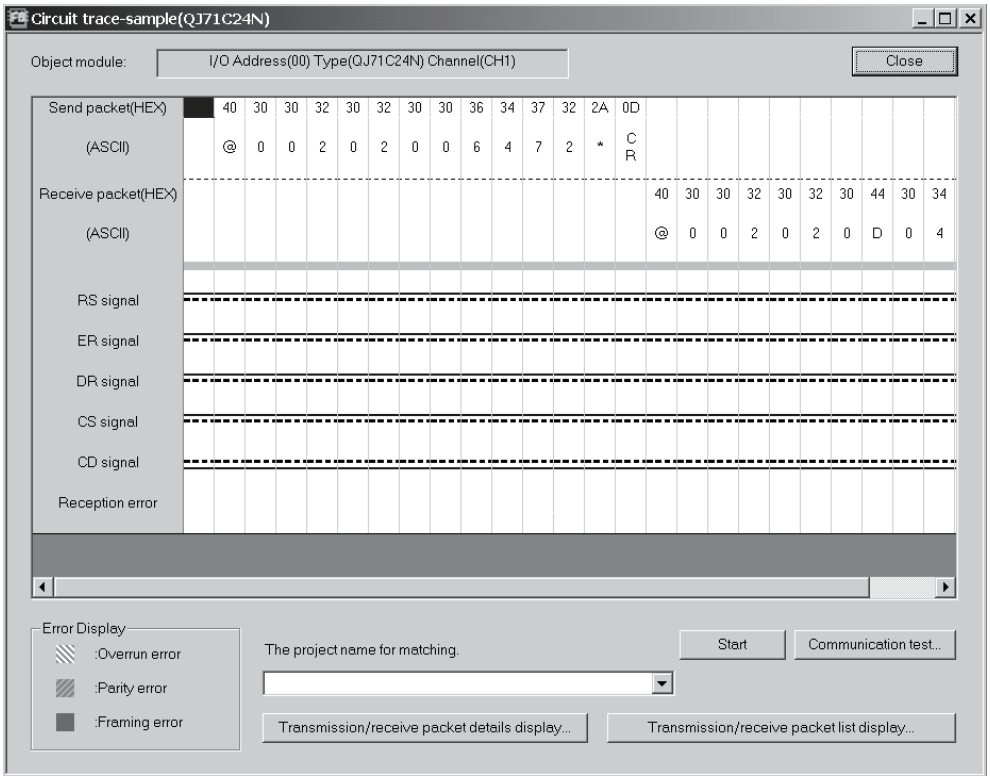
Point

When the circuit trace or communication data monitoring function has already been executed, the following confirmation message is displayed. For details of the communication data monitoring function, refer to the "Q Corresponding Serial Communication Module User's Manual (Applications)".



Item	Display/setting
Yes button	The circuit trace is stopped and the data already accumulated are read and displayed.
No button	The dialog box closes. However, the trace is in the as-executed status.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Circuit trace screen

Item	Display/Setting Details
Object module	Displays the information of the module for which circuit trace will be performed.
Transmission / receive packets	Send data and receive data are displayed, respectively. As the data display format, the ASCII code or hexadecimal can be selected.
Communication control signals	The RS, ER, DR, CS and CD signal statuses and receive error are displayed as described below. ● RS, ER, DR, CS and CD signals All signals are displayed with blue lines -. When signal is ON : ⌐ When signal is OFF: ¬ When the obtained data does not have signal information, the signal is displayed in an OFF status. ● Receive error Three different errors of overrun error, parity error and framing error are displayed. Overrun error: (Green) Parity error : (Light blue) Framing error: (Purple)
Start button	Starts trace.
Communication test button	Sends the specified packet from the QJ71C24N module. For details, refer to "9.3 Communication Test".

Item	Display/Setting Details
Stop button	Stops trace. After a stop, the trace data accumulated in the monitor buffer are displayed.
The project name for matching	Select the project to be matched when the transmission/receive packet details display or transmission/receive packet list display is provided. For details, refer to "9.2.3 Transmission/receive packet list".
Transmission/receive packet list display button	Matches the packets displayed in Transmission and receive packets with the packet information of the currently open project and displays the details of the matched packets. For details, refer to "9.2.3 Transmission/receive packet list".
Transmission/receive packet details display button	Displays the list of packets displayed in Transmission and receive packets on a packet basis. For details, refer to "9.2.3 Transmission/receive packet list".
Close button	Closes the Circuit trace screen.

9.2.2 Circuit trace option

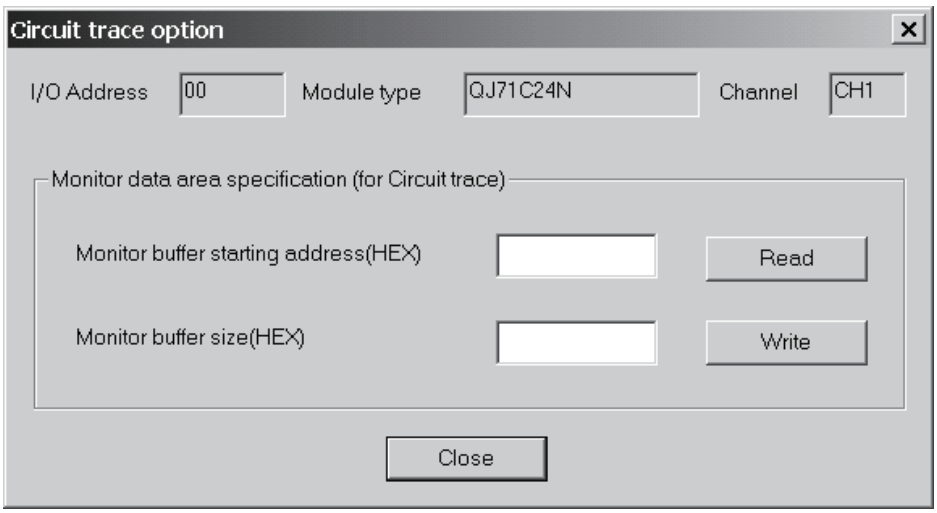
PURPOSE

Set the monitor buffer area starting address and size of the QJ71C24N module that will store the circuit trace data.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace screen.
2. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace option screen.
3. Set the "Monitor buffer starting address" and "Monitor buffer size", and click the Write button.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Monitor buffer starting address setting	Set the starting address of the monitor buffer area that will store the trace data. Input the setting in hexadecimal. ● Input range CH1: 2600H to 32FDH CH2: 3300H to 3FFDH When the user-specified area is used, set any of C00H to 1AFDH to CH1 or CH2.
Monitor buffer size setting	Set the size of the monitor buffer area that will store the trace data. Input the setting in hexadecimal. ● Input range CH1, CH2: 3 to 1A00 words ・When the user-specified area is used, the valid range is the same. ・The value range changes depending on the setting of the "Monitor buffer starting address".
Read button	Reads the monitor buffer starting address and size from the selected module.
Write button	Writes the settings of the "Monitor buffer starting address" and Monitor buffer size" to the selected module.

9.2.3 Transmission/receive packet list

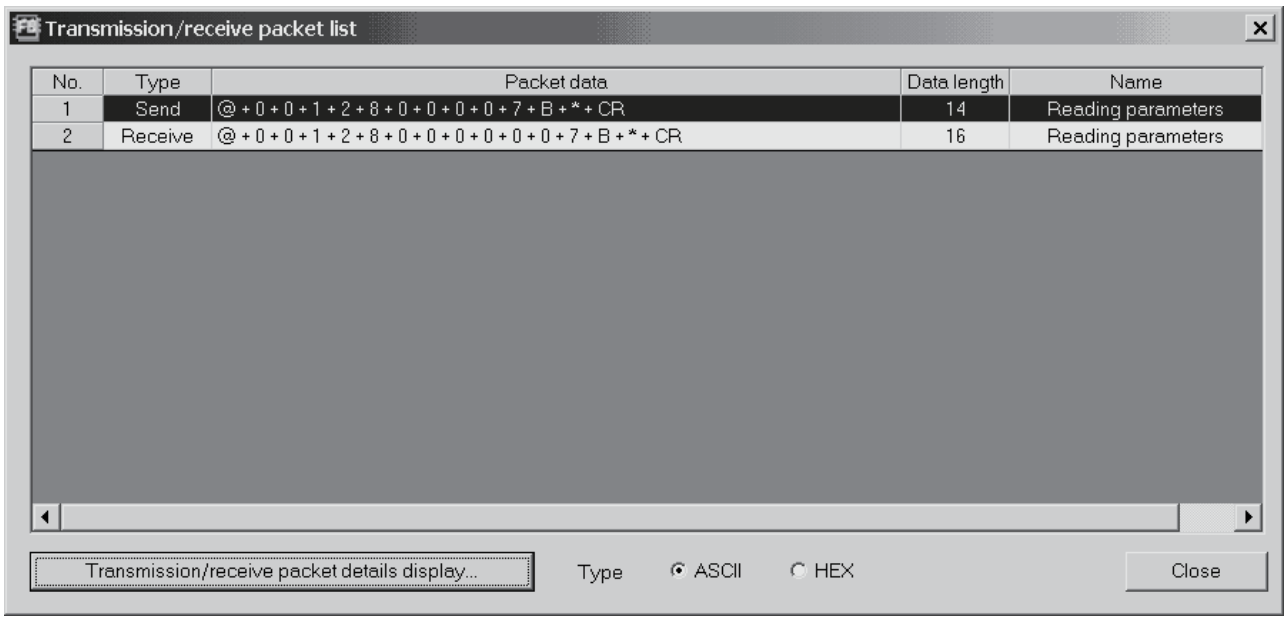
PURPOSE

To analyze the transmission and receive packets obtained by circuit trace, display the list of transmission and receive packets.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace screen.
2. Select the corresponding project of the device controller debugged in "Project name for matching".
3. Click the Transmit/receive packet list button on the Circuit trace screen.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Classification	Displays whether the packet is a transmission packet or receive packet.
Packet data	Displays the transmission/receive packet data.
Data length	Displays the data length (byte) of the transmission/receive packet data.
Name	Displays the packet names of the packet construction information that matches the corresponding packets. ● Display 1) When there is only one packet that matches: The packet name that matched is displayed. 2) When there are more than one packet that matches: "Match with several packets" is displayed. 3) When there are no packets that match: "No matching packets" is displayed.
Transmission/receive packet details display button	Displays the details of the selected transmission/receive packet configuration.
Display form	Either "ASCII" or "HEX" can be selected as the display format.
Close button	Closes the Transmit/receive packet list screen.

Point

- Packet data matching is performed in the following order.
  1) The data length of the packet data is obtained (the variable area has the maximum data length), and whether the full data length is equal to the object packet data length or not is checked.
  2) The object packet data is divided in terms of the data length of each item, and whether it is equal to the preset packet data or not is checked.
- The following communication data configurations cannot match.
  1) The data is configured by error check codes only.
  2) The data starts with an error check code.

REMARK

With the click of the mouse right button, the display data of the Transmission/receive packet list display screen can be copied.

9.2.4 Opening the circuit trace data

PURPOSE

Read and display the trace data saved in the personal computer.

BASIC OPERATION

Click the [Debugging support function] → [Open circuit trace data] menu.

9.2.5 Saving the circuit trace data

PURPOSE

Save the trace data obtained by circuit trace into the personal computer.

BASIC OPERATION

Click the [Debugging support function] → [Save circuit trace] menu.

9.3 Communication Test

Send any data or preset data from the QJ71C24N module to the device controller to confirm the operation. The communication data result of the communication test can be confirmed on the Circuit trace screen.
The packet data to be sent can be created either by inputting send data directly or by selecting the packet data entered in the project.

Point

Before performing the communication test, set "0" to the following items on the tested channel in "CH□ Non procedure system setting" of the intelligent function module utility.*1
If any other than "0" is set, the communication test will not be performed normally.
• Output head pointer designation
• Output count designation

*1: The setting can be written into the buffer memory from the sequence program. Write "0" into the following 2 areas in the buffer memory.
• Output head pointer designation (buffer memory address 184 (B8H), 344 (158H))
• Output count designation (buffer memory address 185 (B9H), 345 (159H))

9.3.1 Communication test after direct input

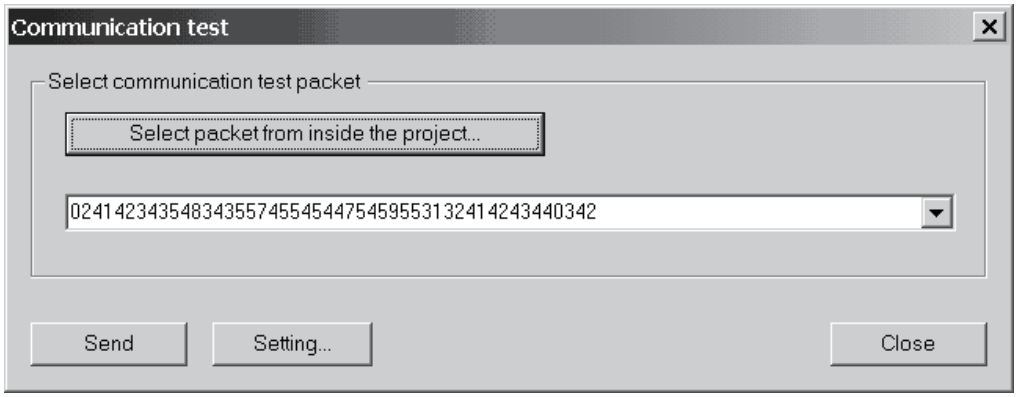
PURPOSE

Send any data to the device controller.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace screen.
2. Click the Communication test button on the Circuit trace screen to display the Communication test screen.
3. Input data directly to the combo box of the Communication test screen in hexadecimal.
4. Click the Send button.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Select packet from inside the project button	Displays the Packet data selection screen.
Send data	Displays the packet data to be sent.
Send button	Sends the input packet data.
Setting button	Displays the Communication test setting screen. (Refer to Section 9.3.3.)
Close button	Closes the Communication test screen.

9.3.2 Communication test after selection of packet data

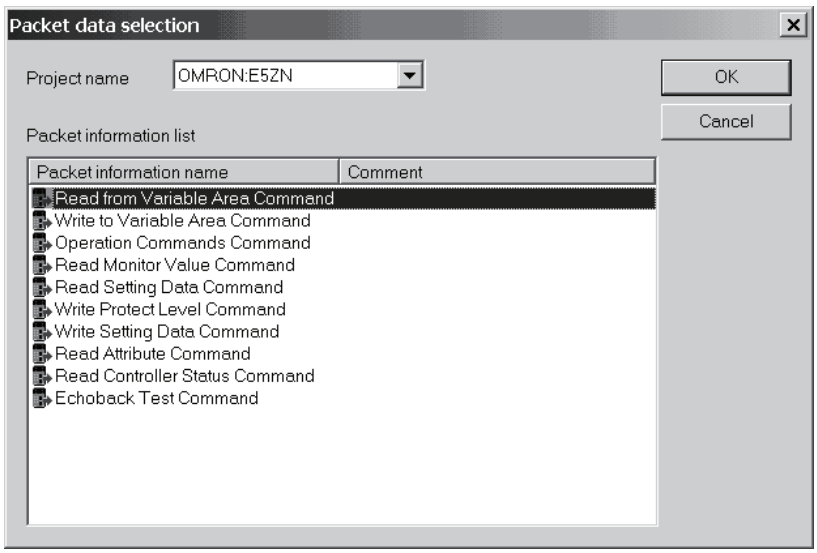
PURPOSE

Select the packet data entered in the project and send them to the device controller.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace screen.
2. Click the Communication test button on the Circuit trace screen.
3. Click the Select packet from inside the project button on the Communication test screen to display the Packet data selection screen.
4. After selecting the project from the Packet data selection screen, select the packet to be sent, and click the OK button. The Communication test data input screen is displayed.
5. Input data from the Communication test data input screen, and click the OK button.
6. Click the Send button on the Communication test screen.

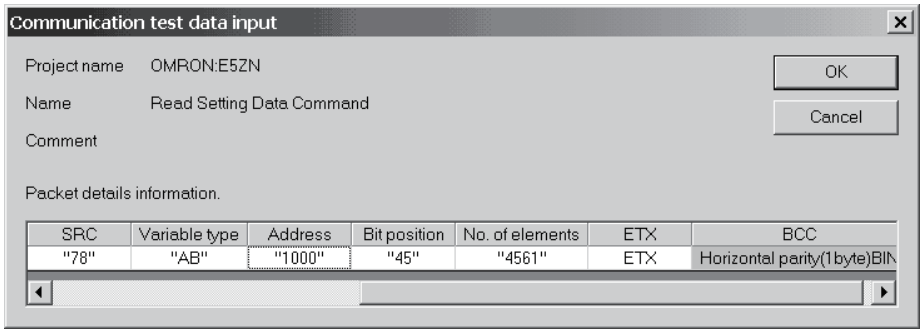
DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Project name	Select the project name.
Packet information list	Displays the packet information.
OK button	Selects the send packet and closes the screen.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Project name	Displays the selected project name.
Packet details information	Set the packet details information.
OK button	Determines the setting and closes the screen.

9.3.3 Transmission monitoring time designation

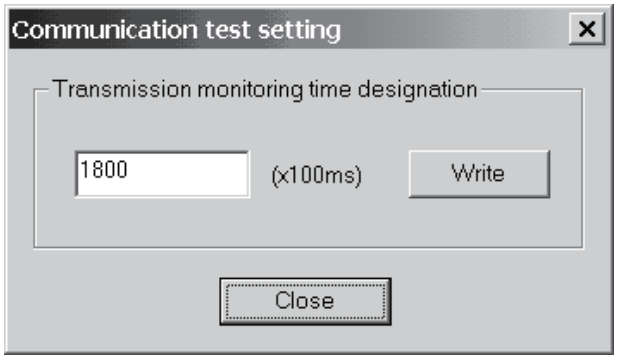
PURPOSE

Set the transmission monitoring time to the QJ71C24N module. If receive is not completed within the set time, a send or receive error occurs.

BASIC OPERATION

1. Click the [Debugging support function] → [Circuit trace] → [Circuit trace] menu to display the Circuit trace screen.
2. Click the Setting button on the Communication test screen.
   The Communication test setting screen is displayed.
   The currently set transmission monitoring time is displayed.
3. Input the transmission monitoring time from the Communication test setting screen, click the Write button, and then click the Close button.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Transmission monitoring time	The displayed time is the transmission monitoring time set to the module. Input the transmission monitoring time in units of 100ms. The setting range is 0 to 3000 (×100ms).
Write button	Sets the specified transmission monitoring time to the module.
Close button	Closes the screen.

9.4 State Monitor

PURPOSE

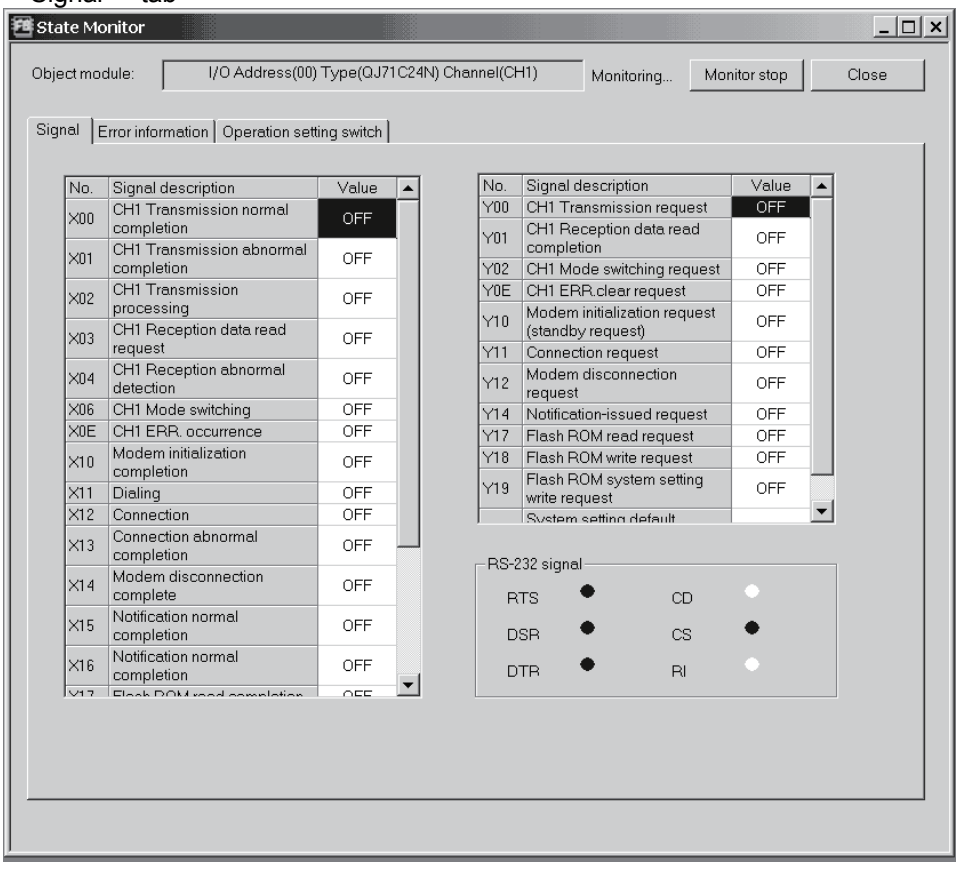
Monitor the signals, communication error information and operation setting switches of the Q series C24 module.

BASIC OPERATION

1. Click the [Debugging support function] → [State monitor] menu.
2. Click the Monitor start button.
3. Click the <<Signal>> tab and confirm the signal statuses.
4. Click the <<Error information>> tab and confirm the error information.
5. Click the <<Operation setting switch>> tab and confirm the operation setting switch setting statuses.

DISPLAY/SETTING SCREEN

<<Signal>> tab



DISPLAY/SETTING DETAILS

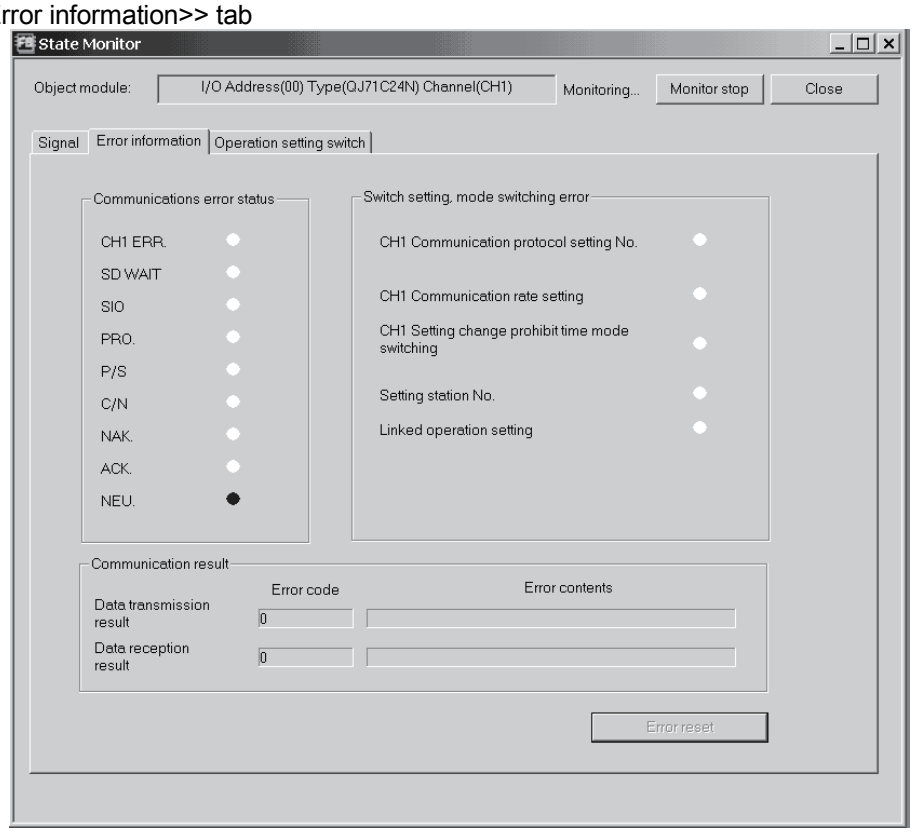
<<Signal>> tab

Item	Display/Setting Details
X signal state monitor	Displays the ON/OFF statuses of the X signals.
Y signal state monitor	Displays the ON/OFF statuses of the Y signals.
RS-232 signal monitor	Displays the ON/OFF statuses of the RS-232 control signals.

For details, refer to the user's manual of the target Q series C24 module.

DISPLAY/SETTING SCREEN

<<Error information>> tab



DISPLAY/SETTING DETAILS

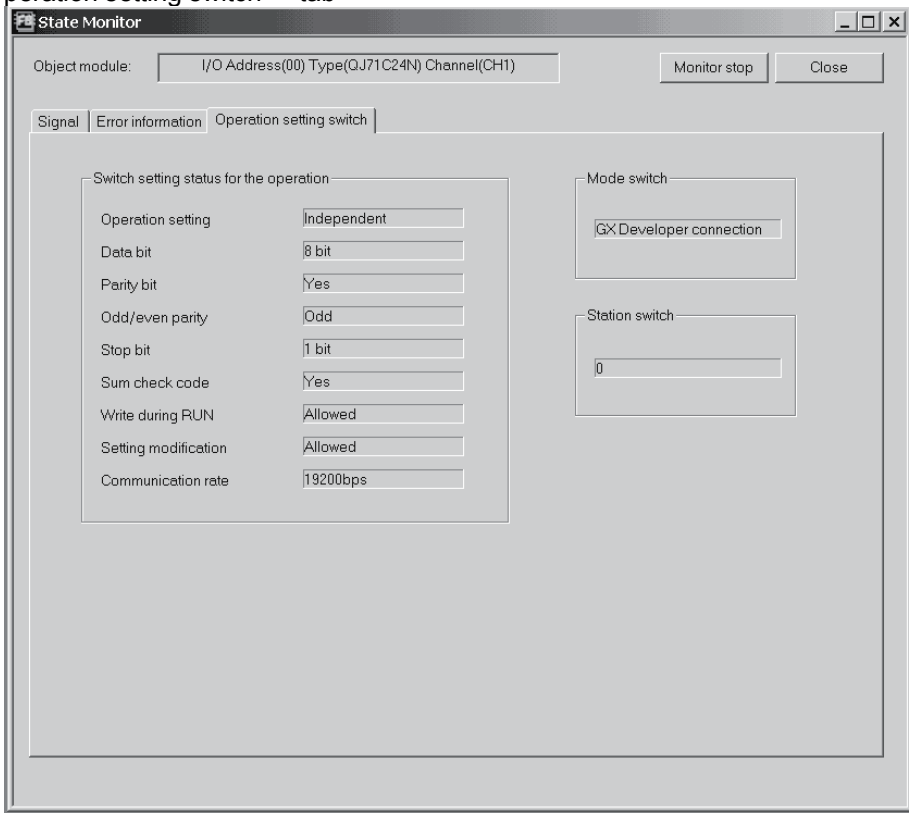
<<Error information>> tab

Item	Display/Setting Details
Communication error status	Displays the communication error status.
Switch setting, mode selection error	Displays the switch setting and/or mode selection error status.
Communication result	Displays the error status of the communication result.
Error reset button	Resets the error information when XnE on CH1 or XnF on CH2 is ON. Masked in any other cases.

For details, refer to the user's manual of the target Q series C24 module.

DISPLAY/SETTING SCREEN

<<Operation setting switch>> tab



DISPLAY/SETTING DETAILS

<<Operation setting switch>> tab

Item	Display/ Setting Details
Operation setting switch	Displays the operation switch setting statuses.
Mode switch	Displays the communication protocol setting.
Station switch	Displays the station number setting.

For details, refer to the user's manual of the target Q series C24 module.

10 PRINT

10.1 Start

PURPOSE

Print the system project, user project or trace data.

BASIC OPERATION

Click the [Project] → [Print] menu ( ).

[Setting details of each tab]

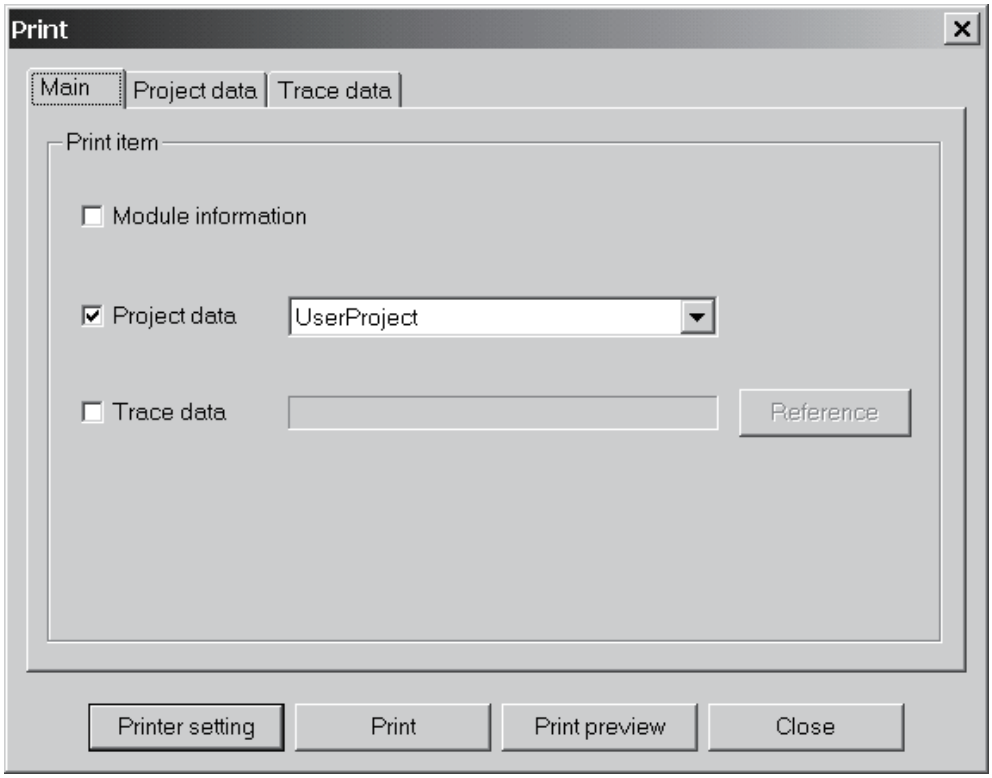
<<Main>>	Select the item to be printed from among the module information, project data and trace data.
<<Project data>>	Select the details printing option when the project data is selected as the print item.
<<Trace data>>	Select the details printing option when the trace data is selected as the print item.

[Setting details of each tab]

Except the header and footer, the printed data are the same as those of each function screen.

DISPLAY/SETTING SCREEN

(1) Main screen



DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Print item	Select the item to be printed with the check button. Module information: The data set in the module setting are printed. Project data: The information of the specified project is printed. Set the print item on the Project screen. Trace data: The saved trace data are printed. Set the print item on the Trace screen. Select the project data to be printed from the pull-down list.
Project data	The projects displayed in the pull-down list are the currently open user project and the system project. (Unopened projects are not the targets.)
Trace data	Specify the file name of the trace data to be printed. Click the Reference button and select the trace data file.
Reference button	Select the file name of the trace data to be printed. Click this button to display the dialog.
Printer setting button	Displays the Windows-standard printer setting dialog.
Print button	Executes printing.
Printer preview button	Displays the print preview.
Close button	Closes the Print dialog.

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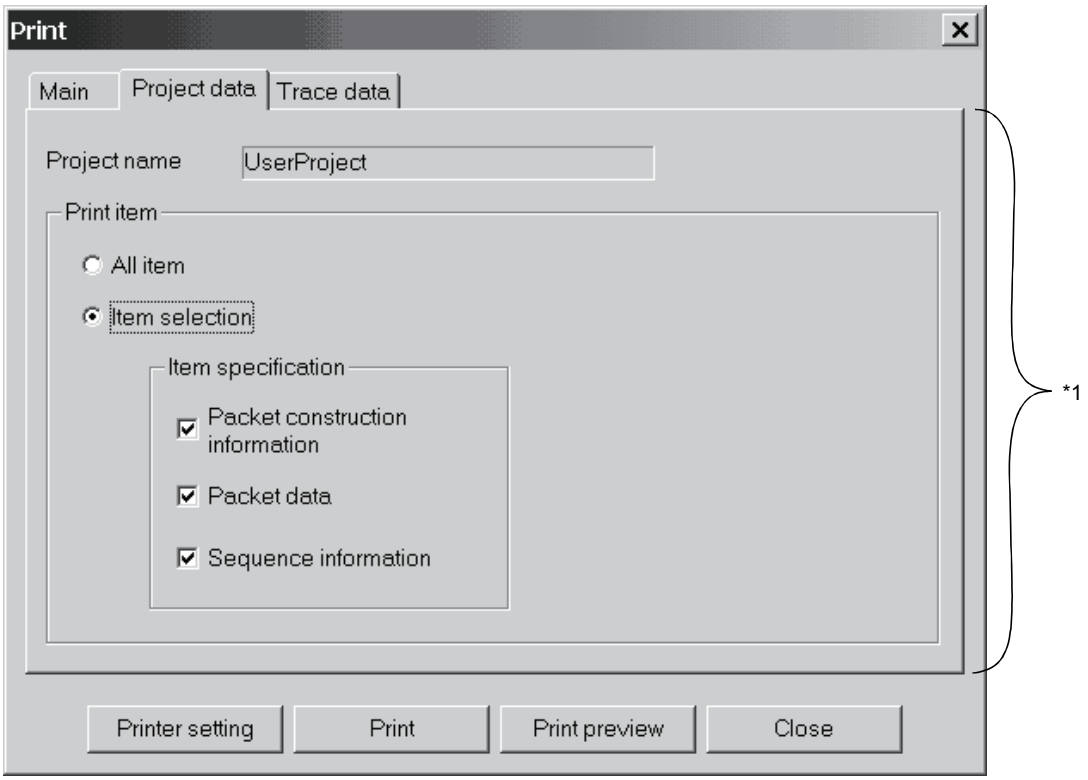
DISPLAY/SETTING SCREEN

(2) Project data screen



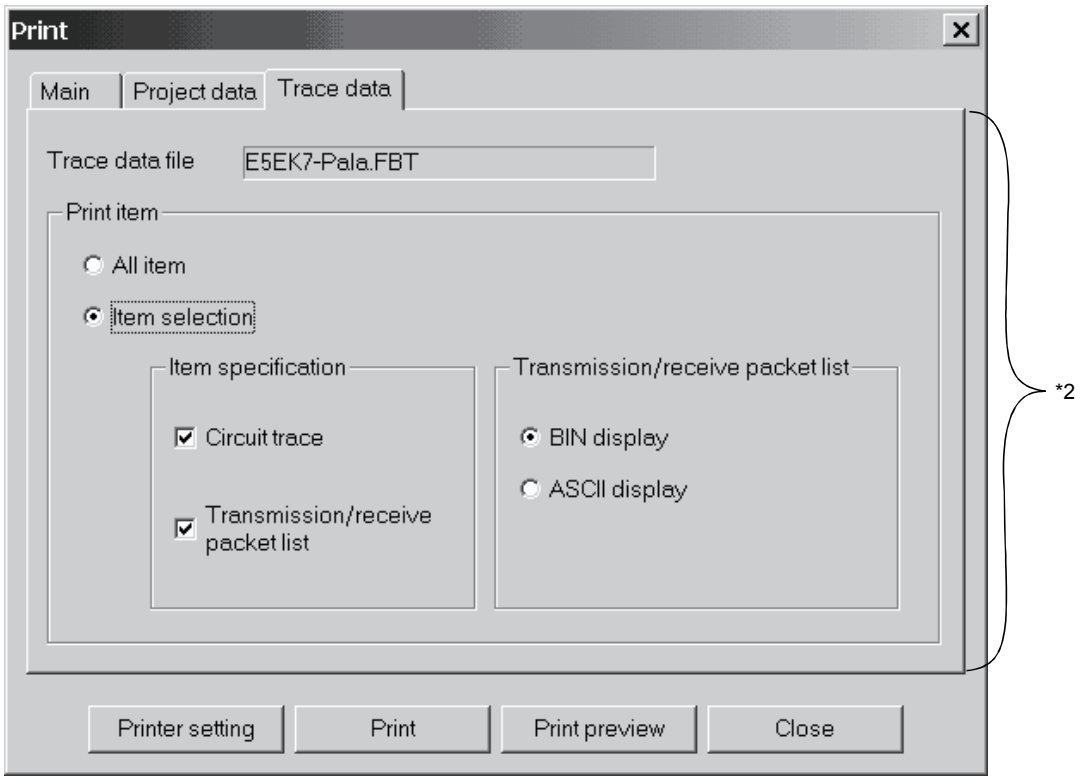
*1: When "Project data" has not been selected in the <<Main>> tab, this area is dimmed.

DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Project name	Displays the project name specified as the project data in the <<Main>>tab.
Print item	Select All items or Item selection.
Item specification	When Item selection has been selected, select which item will be printed with the check button.

DISPLAY/SETTING SCREEN

(3) Trace data screen

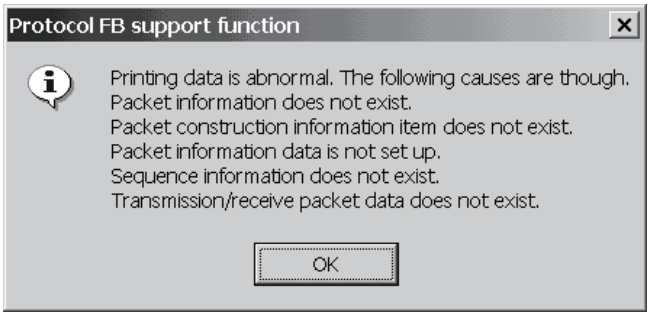


*2: When "Trace data" has not been selected in the <<Main>> tab, this area is dimmed.

DISPLAY/SETTING DETAILS

Item	Display/Setting Details
Trace data file	Displays the file name specified as the trace data in the <<Main>>tab.
Print item	Select All items or Item selection.
Item specification	When Item selection has been selected, select which item will be printed with the check button. Circuit trace: The circuit trace image is printed. Transmit/receive packet list: The transmit/receive packet list is printed.
Transmission/receive packet list	When printing the transmit/receive packets, specify either the BIN or ASCII print format. Valid only when "Transmit/receive packet list" is selected.

Error dialog

Displayed dialog	
	
Error cause	Corrective action
• After "Project data" was selected, the Print/Print preview button was clicked with no packet information existing.	• Deselect the project data or create packet information.
• When the packet construction information is selected, the packet construction information exists but the construction information items do not exist.	• Deselect the packet construction information or create packet construction information items.
• When the packet construction information is selected, there are no contents of packet data information.	• Deselect the packet data information or create packet data information.
• When the sequence information is selected, sequence information does not exist.	• Deselect the sequence information or create sequence information.
• The selected trace data file does not have transmission/receive packet data.	• Deselect the transmission/receive packet list or create transmission/receive packet data.

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10.2 Operations Common to Screens

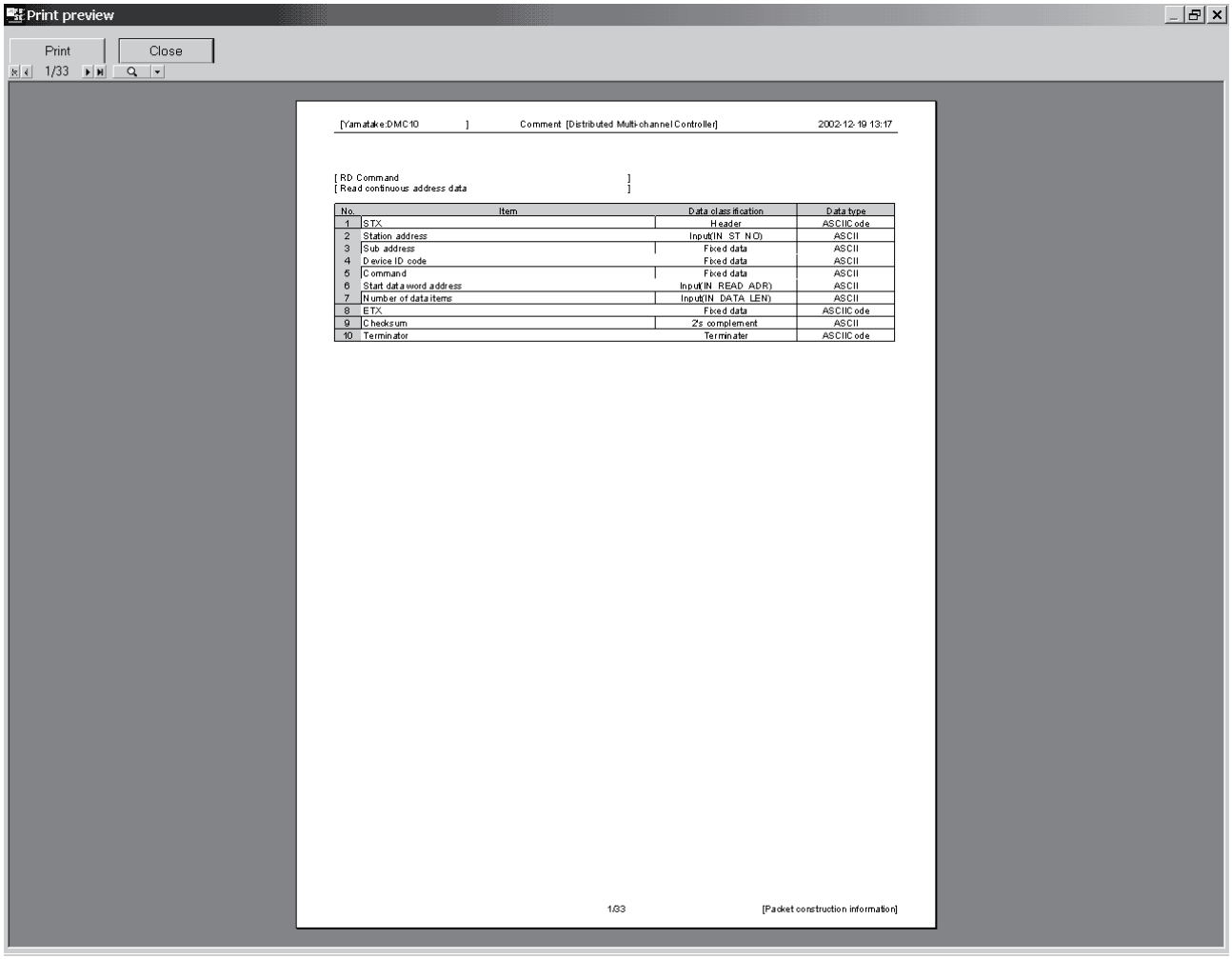
PURPOSE

Display the print preview.

BASIC OPERATION

Click the Print preview button in the Print dialog.

DISPLAY/SETTING SCREEN



DISPLAY/SETTING DETAILS

	Item	Display/Setting Details
	Page scrolling (first page)	Jumps to the first page.
	Page scrolling (previous page)	Scrolls to the previous page.
	Page	Displays the previewed page.
	Page scrolling (next page)	Scrolls to the next page.
	Page scrolling (last page)	Jumps to the last page.
	Enlarge/reduce	Displays the enlarged/reduced preview screen.
	Display switching	Switches to the whole page, page width, 2 pages, thumbnail, 150%, 100%, 75%, 50% or 25%.
Print	Print button	Clicking the Print button ends the print preview and displays the Windows-standard print dialog.
Close	Close button	Closes the print preview and displays the Print dialog.

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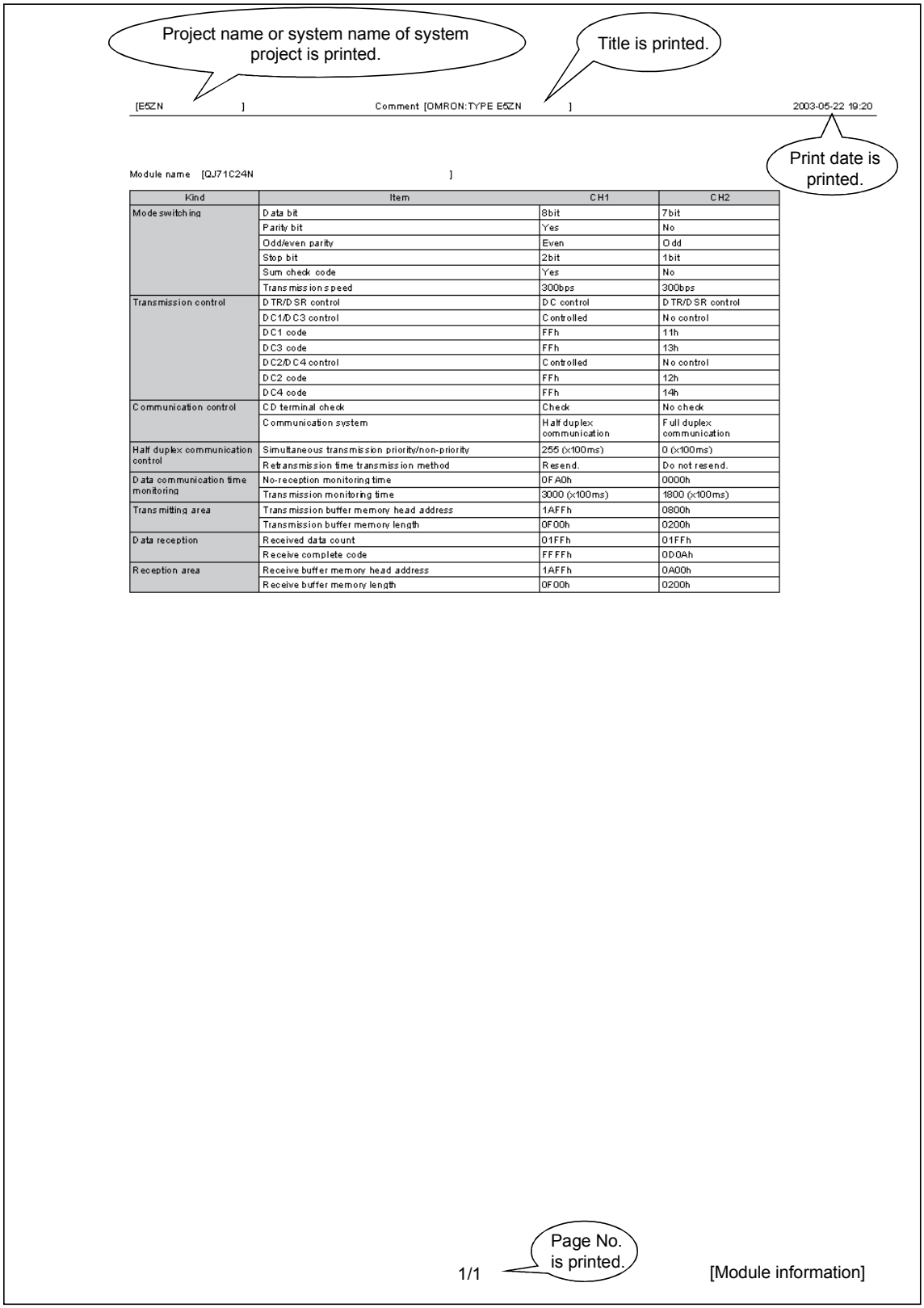
10.3 Print Examples

(1) Module information

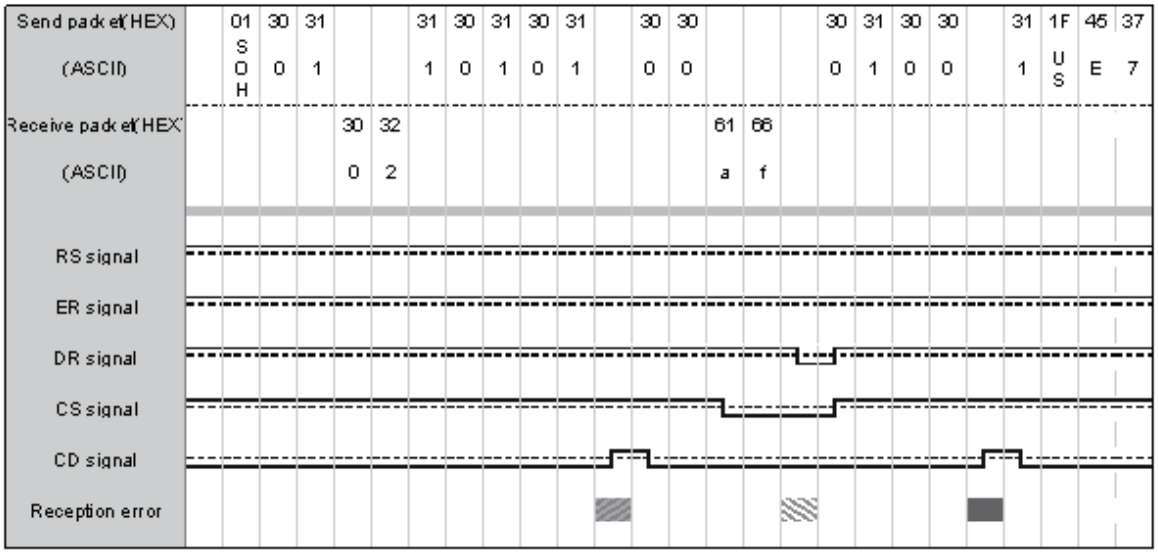


Kind	Item	CH1	CH2
Mode switching	Data bit	8bit	7bit
	Parity bit	Yes	No
	Odd/even parity	Even	Odd
	Stop bit	2bit	1bit
	Sum check code	Yes	No
	Transmission speed	300bps	300bps
Transmission control	DTR/DSR control	DC control	DTR/DSR control
	DC1/DC3 control	Controlled	No control
	DC1 code	FFh	11h
	DC3 code	FFh	13h
	DC2/DC4 control	Controlled	No control
	DC2 code	FFh	12h
	DC4 code	FFh	14h
Communication control	CD terminal check	Check	No check
	Communication system	Half duplex communication	Full duplex communication
Half duplex communication control	Simultaneous transmission priority/non-priority	255 (x100ms)	0 (x100ms)
	Retransmission time transmission method	Resend.	Do not resend.
Data communication time monitoring	No-reception monitoring time	0FA0h	0000h
	Transmission monitoring time	3000 (x100ms)	1800 (x100ms)
Transmitting area	Transmission buffer memory head address	1AFFh	0800h
	Transmission buffer memory length	0F00h	0200h
Data reception	Received data count	01FFh	01FFh
	Receive complete code	FFFFh	0D0Ah
Reception area	Receive buffer memory head address	1AFFh	0A00h
	Receive buffer memory length	0F00h	0200h

(2) Trace data (horizontal)

[TraceFile15.FBT] Trace data file name is printed. 2002-12-19 13:14

: Overrun error : Parity error : Framing error



1/3 Page No. is printed. [Circuit trace]

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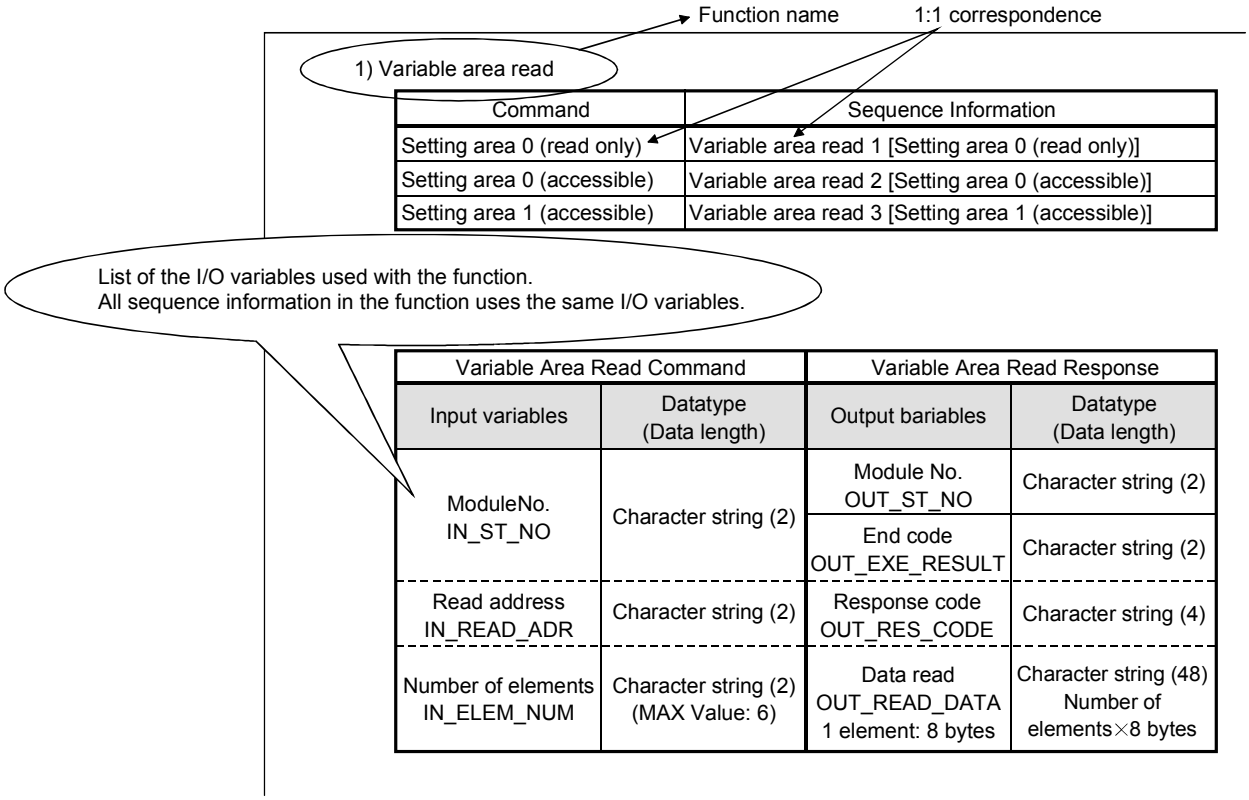
11 SEQUENCE INFORMATION AND LABEL VARIABLES OF SYSTEM PROJECT

This chapter explains the sequence information compatible with the third party commands supported by the system project and the I/O variables after FB conversion of sequence information.

11.1 System Project Classified by Supported Device Controllers

The system project defines the supported device controller-compatible communication frames (packet construction information, packet data information) and their transmission procedures (sequence information). In the sequence information, the data compatible with the commands of the supported models have been set. Also, the label variables necessary for achieving various commands in FBs have been set. When a communication control program is created on the GX Developer side, the values that match the application and purpose must be set to the label variables.
The next section gives the supported model list, the tables that indicate correspondences between the supported model commands and sequence information, and the label variable lists.

The following denotes how to use the lists in the next section.



Command	Sequence Information
Setting area 0 (read only)	Variable area read 1 [Setting area 0 (read only)]
Setting area 0 (accessible)	Variable area read 2 [Setting area 0 (accessible)]
Setting area 1 (accessible)	Variable area read 3 [Setting area 1 (accessible)]

Variable Area Read Command		Variable Area Read Response	
Input variables	Datatype (Data length)	Output bariables	Datatype (Data length)
ModuleNo. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
Read address IN_READ_ADR	Character string (2)	Response code OUT_RES_CODE	Character string (4)
Number of elements IN_ELEM_NUM	Character string (2) (MAX Value: 6)	Data read OUT_READ_DATA 1 element: 8 bytes	Character string (48) Number of elements×8 bytes

11.2 Supported Device Controller List

The following table lists the supported device controllers.

Maker	Classification	Model name
OMRON	Modular temperature controller	In-panel NEO (Model E5ZN)
	Digital controller	Thermack K (Model E5 ☐ K-AA201 ☐)
		Thermack K (Model E5 ☐ K-AA202 ☐)
		Thermack K (Model E5 ☐ K-AA203 ☐)
YAMATAKE	Modular controller	DMC10

11.2.1 OMRON make

(1) Model E5ZN series

1) Variable area read

・Command correspondence list

Command	Sequence Information
Setting area 0 (read only)	Variable area read 1 [Setting area 0 (read only)]
Setting area 0 (accessible)	Variable area read 2 [Setting area 0 (accessible)]
Setting area 1 (accessible)	Variable area read 3 [Setting area 1 (accessible)]

・Label variable list

Variable Area Read Command		Variable Area Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
Read address IN_READ_ADR	Character string (4)	Response code OUT_RES_CODE	Character string (4)
Number of elements IN_ELEM_NUM	Character string (4) (MAX Value: 6)	Data read OUT_READ_DATA 1 element: 8 bytes	Character string (48) Number of elements×8 bytes

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2) Variable area write

・Command correspondence list

Command	Sequence Information
Setting area 0 (accessible)	Variable area write 1 [Setting area 0 (accessible)]
Setting area 1 (accessible)	Variable area write 2 [Setting area 1 (accessible)]

・Label variable list

Variable Area Write Command		Variable Area Write Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
Write address IN_RED_ADR	Character string (4)	End code OUT_EXE_RESULT	Character string (2)
Number of elements IN_ELEM_NUM	Character string (4) (MAX Value: 6)	Response code OUT_RES_CODE	Character string (4)
Write data IN_WRITE_DATA 1 element: 8 bytes	Character string (48) Number of elements×8 bytes		

3) Operation commands

・Command correspondence list

Command	Sequence Information
Communication write prohibited	Operation command 1 [Communication write prohibited]
Communication write allowed	Operation command 2 [Communication write allowed]
CH1 run	Operation command 3 [CH1 run]
CH1 stop	Operation command 4 [CH1 stop]
CH2 run	Operation command 5 [CH2 run]
CH2 stop	Operation command 6 [CH2 stop]
CH1 target value 0 selection	Operation command 7 [CH1 target value 0 selection]
CH1 target value 1 selection	Operation command 8 [CH1 target value 1 selection]
CH2 target value 0 selection	Operation command 9 [CH2 target value 0 selection]
CH3 target value 1 selection	Operation command 10 [CH3 target value 1 selection]
CH1 AT stop	Operation command 11 [CH1 AT stop]
CH1 AT execution	Operation command 12 [CH1 AT execution]
CH2 AT stop	Operation command 13 [CH2 AT stop]
CH2 AT execution	Operation command 14 [CH2 AT execution]

Command	Sequence Information
Write mode backup	Operation command 15 [Write mode backup]
Write mode RAM	Operation command 16 [Write mode RAM]
RAM data storage	Operation command 17 [RAM data storage]
Soft reset	Operation command 18 [Soft reset]
Setting area 1 shift	Operation command 19 [Setting area 1 shift]
Protection level shift	Operation command 20 [Protection level shift]
CH1 auto	Operation command 21 [CH1 auto]
CH1 manual	Operation command 22 [CH1 manual]
CH2 auto	Operation command 23 [CH2 auto]
CH2 manual	Operation command 24 [CH2 manual]
PV hold value	Operation command 25 [PV hold value]
Set value initialization	Operation command 26 [Set value initialization]

・Label variable list

Operation Command		Operation Command Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
		Response code OUT_RES_CODE	Character string (4)

4) Monitor value read

・Command correspondence list

Command	Sequence Information
CH1 present value	Monitor value read 1 [CH1 present value]
CH1 status	Monitor value read 2 [CH1 status]
CH1 inside target value	Monitor value read 3 [CH1 inside target value]
CH1 heater current value monitor	Monitor value read 4 [CH1 heater current value monitor]
CH1 manipulated value monitor (Heating)	Monitor value read 5 [CH1 manipulated value monitor (heating)]
CH1 manipulated value monitor (Cooling)	Monitor value read 6 [CH1 manipulated value monitor (cooling)]
CH1 PV hold value	Monitor value read 7 [CH1 PV hold value]
CH2 present value	Monitor value read 8 [CH2 present value]
CH2 status	Monitor value read 9 [CH2 status]
CH2 inside target value	Monitor value read 10 [CH2 inside target value]

Command	Sequence Information
CH2 heater current value monitor	Monitor value read 11 [CH2 heater current value monitor]
CH2 manipulated value monitor (Heating)	Monitor value read 12 [CH2 manipulated value monitor (heating)]
CH2 manipulated value monitor (Cooling)	Monitor value read 13 [CH2 manipulated value monitor (cooling)]
CH2 PV hold value	Monitor value read 14 [CH2 PV hold value]

・Label variable list

Monitor Value Read Command		Monitor Value Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
		Response code OUT_RES_CODE	Character string (4)
		Monitor Value OUT_MONITOR_DATA	Character string (8)

5) Set data read commands

・Command correspondence list

Command	Sequence Information
CH1 setting area 0	Set data read 1 [CH1 setting area 0]
CH1 setting area 1	Set data read 1 [CH1 setting area 1]
CH2 setting area 0	Set data read 1 [CH2 setting area 0]
CH2 setting area 1	Set data read 1 [CH2 setting area 1]

・Label variable list

Set Data Read Command		Set Data Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
Address IN_READ_ADR	Character string (4)	End code OUT_EXE_RESULT	Character string (2)
		Response code OUT_RES_CODE	Character string (4)
		Set data OUT_SET_DATA	Character string (8)

6) Protection level

・Command correspondence list

Command	Sequence Information
CH1 operation/adjustment	Protection level setting 1 [CH1 operation/adjustment]
CH1 initial/communication	Protection level setting 2 [CH1 initial/communication]
CH1 setting change	Protection level setting 3 [CH1 setting change]
CH2 operation/adjustment	Protection level setting 4 [CH2 operation/adjustment]
CH2 initial time/communication	Protection level setting 5 [CH2 initial time/communication]
CH2 setting change	Protection level setting 6 [CH2 setting change]

・Label variable list

Protection Level Command		Protection Level Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
Protection level set data IN_PROT_LEVEL	Character string (8)	Response code OUT_RES_CODE	Character string (4)

7) Set data write

・Command correspondence list

Command	Sequence Information
CH1 setting area 0	Set data write 1 [CH1 setting area 0]
CH1 setting area 1	Set data write 2 [CH1 setting area 1]
CH2 setting area 0	Set data write 3 [CH2 setting area 0]
CH2 setting area 1	Set data write 4 [CH2 setting area 1]

・Label variable list

Set Data Write Command		Set Data Write Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
Address IN_READ_ADR	Character string (4)	End code OUT_EXE_RESULT	Character string (2)
Number of elements IN_ELEM_NUM	Character string (4) (MAX Value :6)	Response code OUT_RES_CODE	Character string (4)
Set data IN_WRITE_DATA 1 element: 8 bytes	Character string (48) Number of elements×8 bytes		

8) Others

・Command correspondence list

Command	Sequence Information
Body attribute read	Body attribute read [Format and communication buffer size]
Controller status read	Controller status [Operating condition read]
Echo back test	Echo back test

・Label variable list

Body Attribute Read Command		Body Attribute Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
		Response code OUT_RES_CODE	Character string (4)
		Format OUT_ATTRIBUTE	Character string (2)
		Buffer size OUT_BUFF_SIZE	Character string (2)

・Label variable list

Controller Status Read Command		Controller Status Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
		Response code OUT_RES_CODE	Character string (4)
		Operating condition (status) OUT_OPE_STATUS	Character string (2)
		Related information OUT_INFORMATION	Character string (2)

・Label variable list

Echo Back Test Command		Echo Back Test Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
Test data IN-TEST_DATA	Character string (23) (0 to 23 bytes)	Response code OUT_RES_CODE	Character string (4)
		Test data OUT_TEST_DATA	Character string (23) (0 to 23 bytes)

(2) Model E5 □ K series

1) Parameter read

・Command correspondence list

Command	Sequence Information
Present value monitor	Parameter read 1 [Present value monitor]
Lamp target value monitor	Parameter read 2 [Lamp target value monitor]
Manipulated value (heating) monitor	Parameter read 3 [Manipulated value (heating) monitor]
Manipulated value (cooling) monitor	Parameter read 4 [Manipulated value (cooling) monitor]
Remote SP monitor	Parameter read 5 [Remote SP monitor]
Valve opening monitor	Parameter read 6 [Valve opening monitor]
Target value	Parameter read 7 [Target value]
Target value 0	Parameter read 8 [Target value 0]
Target value 1	Parameter read 9 [Target value 1]
Target value 2	Parameter read 10 [Target value 2]
Target value 3	Parameter read 11 [Target value 3]
Alarm value 1	Parameter read 12 [Alarm value 1]
Alarm value 2	Parameter read 13 [Alarm value 2]
Alarm value 3	Parameter read 14 [Alarm value 3]
Proportional band	Parameter read 15 [Proportional band]
Integral time	Parameter read 16 [Integral time]
Derivative time	Parameter read 17 [Derivative time]
Cooling coefficient	Parameter read 18 [Cooling coefficient]
Dead band	Parameter read 19 [Dead band]
Position-proportional dead band	Parameter read 20 [Position-proportional dead band]
Manual reset value	Parameter read 21 [Manual reset value]
Adjustment sensitivity (heating)	Parameter read 22 [Adjustment sensitivity (heating)]
Adjustment sensitivity (cooling)	Parameter read 23 [Adjustment sensitivity (cooling)]
Control period (heating)	Parameter read 24 [Control period (heating)]
Control period (cooling)	Parameter read 25 [Control period (cooling)]
Heater current value monitor	Parameter read 26 [Heater current value monitor]
Heater off detection	Parameter read 27 [Heater off detection]
SP lamp time unit	Parameter read 28 [SP lamp time unit]
SP lamp set value	Parameter read 29 [SP lamp set value]
LBA detection time	Parameter read 30 [LBA detection time]
Stop-time manipulated value	Parameter read 31 [Stop-time manipulated value]
Error-time manipulated value	Parameter read 32 [Error-time manipulated value]
Manipulated value upper limit value	Parameter read 33 [Manipulated value upper limit value]
Manipulated value lower limit value	Parameter read 34 [Manipulated value lower limit value]
Operation change ratio limit value	Parameter read 35 [Operation change ratio limit value]

Command	Sequence Information
Input digital filter	Parameter read 36 [Input digital filter]
Switching hysteresis	Parameter read 37 [Switching hysteresis]
Alarm 1 hysteresis	Parameter read 38 [Alarm 1 hysteresis]
Alarm 2 hysteresis	Parameter read 39 [Alarm 2 hysteresis]
Alarm 3 hysteresis	Parameter read 40 [Alarm 3 hysteresis]
Upper limit temperature input compensation value	Parameter read 41 [Upper limit temperature input compensation value]
Lower limit temperature input compensation value	Parameter read 42 [Lower limit temperature input compensation value]
Input classification	Parameter read 43 [Input classification]
Scaling upper limit value	Parameter read 44 [Scaling upper limit value]
Scaling lower limit value	Parameter read 45 [Scaling lower limit value]
Decimal point position	Parameter read 46 [Decimal point position]
Temperature unit	Parameter read 47 [Temperature unit]
Control output 1 assignment	Parameter read 48 [Control output 1 assignment]
Control output 2 assignment	Parameter read 49 [Control output 2 assignment]
Auxiliary output 1 assignment	Parameter read 50 [Auxiliary output 1 assignment]
Auxiliary output 2 assignment	Parameter read 51 [Auxiliary output 2 assignment]
Alarm 1 classification	Parameter read 52 [Alarm 1 classification]
Alarm 1 non-excitation	Parameter read 53 [Alarm 1 non-excitation]
Alarm 2 classification	Parameter read 54 [Alarm 2 classification]
Alarm 2 non-excitation	Parameter read 55 [Alarm 2 non-excitation]
Alarm 3 classification	Parameter read 56 [Alarm 3 classification]
Alarm 3 non-excitation	Parameter read 57 [Alarm 3 non-excitation]
Forward/reverse action	Parameter read 58 [Forward/reverse action]
Target upper limit value	Parameter read 59 [Target upper limit value]
Target lower limit value	Parameter read 60 [Target lower limit value]
PID ON/OFF	Parameter read 61 [PID ON/OFF]
ST	Parameter read 62 [ST]
ST settling band width	Parameter read 63 [ST settling band width]
α	Parameter read 64 [α]
At calculation gain	Parameter read 65 [At calculation gain]
Standby sequence restart	Parameter read 66 [Standby sequence restart]
Display automatic return time	Parameter read 67 [Display automatic return time]
AT hysteresis	Parameter read 68 [AT hysteresis]
LBA detection width	Parameter read 69 [LBA detection width]
Heater off latch	Parameter read 70 [Heater off latch]
Travel time	Parameter read 71 [Travel time]
PV dead band	Parameter read 72 [PV dead band]
Remote SP valid	Parameter read 73 [Remote SP valid]
Remote SP upper limit value	Parameter read 74 [Remote SP upper limit value]
Remote SP lower limit value	Parameter read 75 [Remote SP lower limit value]
SP tracking	Parameter read 76 [SP tracking]

・Label variable list

Parameter Read Command		Parameter Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		Parameter No. OUT_PARAM	Character string (2)
		End code OUT_EXE_RESULT	Character string (2)
		Read data OUT_READ	Character string (4)

2) Parameter write

・Command correspondence list

Command	Sequence Information
Target value	Parameter write 1 [Target value]
Target value 0	Parameter write 2 [Target value 0]
Target value 1	Parameter write 3 [Target value 1]
Target value 2	Parameter write 4 [Target value 2]
Target value 3	Parameter write 5 [Target value 3]
Alarm value 1	Parameter write 6 [Alarm value 1]
Alarm value 2	Parameter write 7 [Alarm value 2]
Alarm value 3	Parameter write 8 [Alarm value 3]
Proportional band	Parameter write 9 [Proportional band]
Integral time	Parameter write 10 [Integral time]
Derivative time	Parameter write 11 [Derivative time]
Cooling coefficient	Parameter write 12 [Cooling coefficient]
Dead band	Parameter write 13 [Dead band]
Position-proportional dead band	Parameter write 14 [Position-proportional dead band]
Manual reset value	Parameter write 15 [Manual reset value]
Adjustment sensitivity (heating)	Parameter write 16 [Adjustment sensitivity (heating)]
Adjustment sensitivity (cooling)	Parameter write 17 [Adjustment sensitivity (cooling)]
Control period (heating)	Parameter write 18 [Control period (heating)]
Control period (cooling)	Parameter write 19 [Control period (cooling)]
Heater off detection	Parameter write 20 [Heater off detection]
SP lamp time unit	Parameter write 21 [SP lamp time unit]
SP lamp set value	Parameter write 22 [SP lamp set value]
LBA detection time	Parameter write 23 [LBA detection time]
Stop-time manipulated value	Parameter write 24 [Stop-time manipulated value]
Error-time manipulated value	Parameter write 25 [Error-time manipulated value]

Command	Sequence Information
Manipulated value upper limit value	Parameter write 26 [Manipulated value upper limit value]
Manipulated value lower limit value	Parameter write 27 [Manipulated value lower limit value]
Operation change ratio limit value	Parameter write 28 [Operation change ratio limit value]
Input digital filter	Parameter write 29 [Input digital filter]
Switching hysteresis	Parameter write 30 [Switching hysteresis]
Alarm 1 hysteresis	Parameter write 31 [Alarm 1 hysteresis]
Alarm 2 hysteresis	Parameter write 32 [Alarm 2 hysteresis]
Alarm 3 hysteresis	Parameter write 33 [Alarm 3 hysteresis]
Upper limit temperature input compensation value	Parameter write 34 [Upper limit temperature input compensation value]
Lower limit temperature input compensation value	Parameter write 35 [Lower limit temperature input compensation value]
Input classification	Parameter write 36 [Input classification]
Scaling upper limit value	Parameter write 37 [Scaling upper limit value]
Scaling lower limit value	Parameter write 38 [Scaling lower limit value]
Decimal point position	Parameter write 39 [Decimal point position]
Temperature unit	Parameter write 40 [Temperature unit]
Control output 1 assignment	Parameter write 41 [Control output 1 assignment]
Control output 2 assignment	Parameter write 42 [Control output 2 assignment]
Auxiliary output 1 assignment	Parameter write 43 [Auxiliary output 1 assignment]
Auxiliary output 2 assignment	Parameter write 44 [Auxiliary output 2 assignment]
Alarm 1 classification	Parameter write 45 [Alarm 1 classification]
Alarm 1 non-excitation	Parameter write 46 [Alarm 1 non-excitation]
Alarm 2 classification	Parameter write 47 [Alarm 2 classification]
Alarm 2 non-excitation	Parameter write 48 [Alarm 2 non-excitation]
Alarm 3 classification	Parameter write 49 [Alarm 3 classification]
Alarm 3 non-excitation	Parameter write 50 [Alarm 3 non-excitation]
Forward/reverse action	Parameter write 51 [Forward/reverse action]
Target upper limit value	Parameter write 52 [Target upper limit value]
Target lower limit value	Parameter write 53 [Target lower limit value]
PID ON/OFF	Parameter write 54 [PID ON/OFF]
ST	Parameter write 55 [ST]
ST settling band width	Parameter write 56 [ST settling band width]
α	Parameter write 57 [α]
At calculation gain	Parameter write 58 [At calculation gain]
Standby sequence restart	Parameter write 59 [Standby sequence restart]
Display automatic return time	Parameter write 60 [Display automatic return time]
AT hysteresis	Parameter write 61 [AT hysteresis]
LBA detection width	Parameter write 62 [LBA detection width]
Heater off latch	Parameter write 63 [Heater off latch]
Travel time	Parameter write 64 [Travel time]

Command	Sequence Information
PV dead band	Parameter write 65 [PV dead band]
Remote SP valid	Parameter write 66 [Remote SP valid]
Remote SP upper limit value	Parameter write 67 [Remote SP upper limit value]
Remote SP lower limit value	Parameter write 68 [Remote SP lower limit value]
SP tracking	Parameter write 69 [SP tracking]

・Label variable list

Parameter Write Command		Parameter Write Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		Parameter No. OUT_PARAM	Character string (2)
Write data IN_WRITE_DATA	Character string (4)	End code OUT_EXE_RESULT	Character string (2)
		Write data OUT_WRITE_DATA	Character string (4)

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3) Special commands

・Command correspondence list

Command	Sequence Information
Run/stop	Special command 1 [Run/stop]
Remote/local	Special command 2 [Remote/local]
RAM write mode	Special command 3 [RAM write mode]
RAM data storage	Special command 4 [RAM data storage]
AT execution/stop	Special command 5 [AT execution/stop]
SP mode	Special command 6 [SP mode]
Setting level 1 shift	Special command 7 [Setting level 1 shift]
Soft reset	Special command 8 [Soft reset]
Status	Special command 9 [Status]

・Label variable list

Special Command		Special Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Module No. IN_ST_NO	Character string (2)	Module No. OUT_ST_NO	Character string (2)
		Parameter No. OUT_COMMAND	Character string (2)
Command code IN_COMMAND_CODE	Character string (4)	End code OUT_EXE_RESULT	Character string (2)
		Command code OUT_COMMAND_CODE	Character string (4)

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11.2.2 YAMATAKE make

(1) DMC10 series

・Command correspondence list

Command	Sequence Information
Fixed-length continuous data read command (RD command)	Fixed-length continuous data read [RD command]
Fixed-length continuous data write command (WD command)	Fixed-length continuous data write [WD command]
Fixed-length random data read command (RU command)	Fixed-length random data read [RU command]
Fixed-length random data write command (WU command)	Fixed-length random data write [WU command]

・Label variable list

Fixed-length Continuous Data Read Command		Data Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Device address IN_ST_NO	Character string (2)	Device address OUT_ST_NO	Character string (2)
Head data Word address IN_READ_ADR	Character string (4)	End code OUT_RESULT_CODE	Character string (2)
Number of data IN_DATA_LEN	Character string (4) (MAX: 12 data)	Read data OUT_READ_DATA 1 data: 4 bytes	Character string (48) Number of data×4 bytes

・Label variable list

Fixed-length Continuous Data Write Command		Data Write Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Device address IN_ST_ADR	Character string (2)	Device address OUT_ST_NO	Character string (2)
Head data Word address IN_WRITE_ADR	Character string (4)	End code OUT_RESULT_CODE	Character string (2)
Write data IN_WRITE_DATA	Character string (48) (MAX: 12 data) 1 data: 4 bytes		

・Label variable list

Fixed-length Random Read Command		Data Read Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Device address IN_ST_NO	Character string (2)	Device address OUT_ST_NO	Character string (2)
Data address IN_READ_ADR	Character string (48) (MAX: 12 data) Number of data×4 bytes	End code OUT_RESULT_CODE	Character string (2)
		Read data OUT_READ_DATA	Character string (48) Number of data×4 bytes

・Label variable list

Fixed-length Random Data Write Command		Data Write Response	
Input variables	Data type (Data length)	Output variables	Data type (Data length)
Device address IN_ST_NO	Character string (2)	Device address OUT_ST_NO	Character string (2)
Write data IN_WRITE_DATA	Character string (48) MAX: 12 data Number of data×4 bytes	End code OUT_RESULT_CODE	Character string (2)

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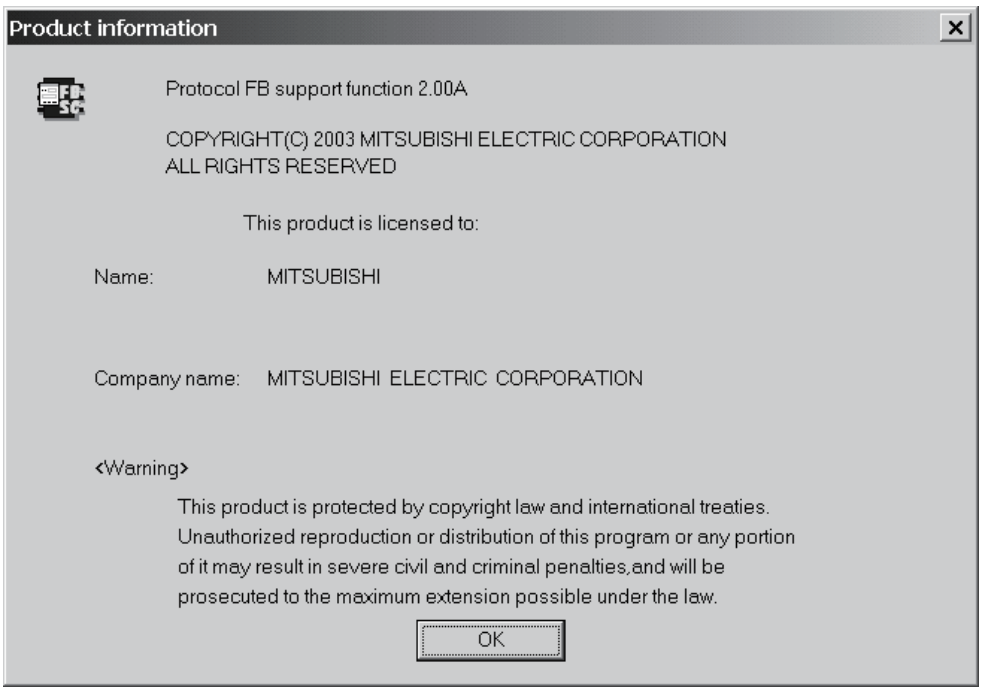
APPENDICES

Appendix 1 Help Function

The help function displays the product information.

BASIC OPERATION

Click the [Help] → [Product information] menu.



Name	Description
Version	Displays the version of the protocol FB support function.*1
Name	Displays the name set at the time of installation.
Company name	Displays the company name set at the time of installation.

*1: Since the version is the product information of the protocol FB support function, it does not match the version of GX Configurator-SC.

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Appendix 2 Project Name Specifications

The following table indicates the restrictions on the set names (such as the project name).

Item	Display/setting
Project name	Maximum number of characters: 32 characters (If the project name is created within 32 characters, setting is disabled when the total number of characters including those of the project path exceeds 150 characters.) The space after the project name is deleted automatically. A "." (period) cannot be used at the end of the project name. Special characters*1 and words*2 cannot be used.
Project comment	Maximum number of characters: 32 characters
Project path	Maximum number of characters: Within 150 characters including those of the project name Path: The project name already existing in the path cannot be specified. The space after the project name is deleted automatically. Special characters*1 and words*2 cannot be used.
Packet information name	Maximum number of characters: 32 characters The same name cannot be set within the same project. (Case independent.) The spaces before and after the name are deleted automatically.
Sequence information	Maximum number of characters: 32 characters The same name cannot be set within the same project. (Case independent.) The spaces before and after the information are deleted automatically.

*1: Special characters The following characters cannot be used.
/ : ; * ? " < > | ,

*2: Special words The following words cannot be used.
COM1 to COM9 LPT1 to LPT9 AUX PRN CON NUL CLOCK$

Appendix 3 Character Strings That Cannot Be Used as Input Variables and Output Variables

When the protocol FB support function is used, the following character strings cannot be used as input and output variables.
The following character strings are used by the protocol FB function in the system. The following character strings are set as labels when FBs are created with the protocol FB function and read to GX Developer.

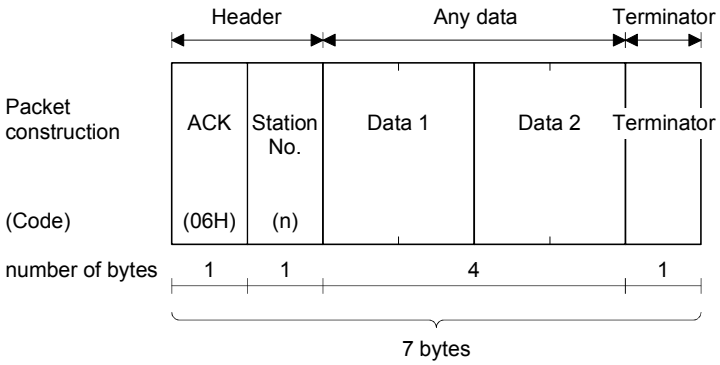
[Unusable character strings]

I_REQ_RECV, I_REQ_SEND, I_START, O_END, O_ERR_CD, O_END_NG, O_R_DATA_NO, V_COMP, V_CTRL_DATA, V_LEN_MAX, V_P1, V_P2, V_R_RESULT, V_RUN, V_S_RESULT, V_WK_B_DATA, V_WK_DATA, V_WK_RECV, V_WK_LEN, V_WK_RECV_B, V_WK_R_O_LEN, V_WK_SEND, V_WK_W_LEN, V_WK_PTR, V_LEN_IDATA, V_PLEN, V_PLEN_END, V_FOR_COUNT, V_DUMMY, V_I_RESULT

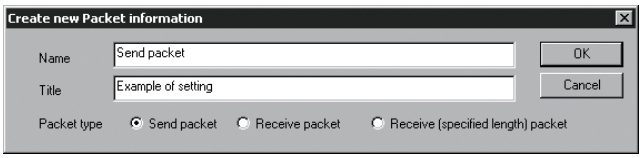
Appendix 4 Packet setting example

This section provides the GX Configurator-SC setting screens that correspond to packet examples when sending/receiving data between Q series C24 module and other node.

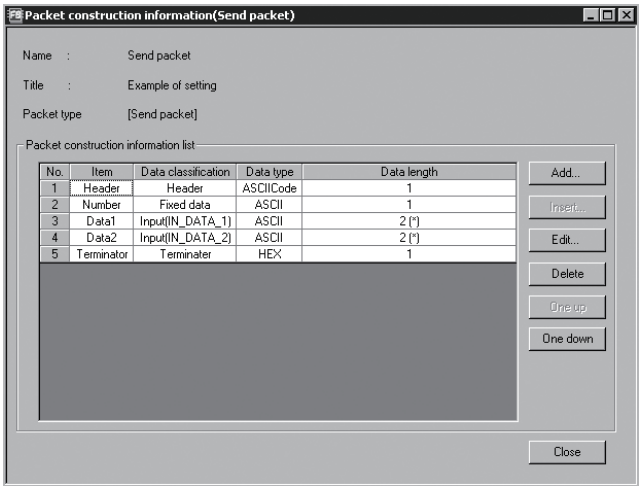
(1) Send packet setting example



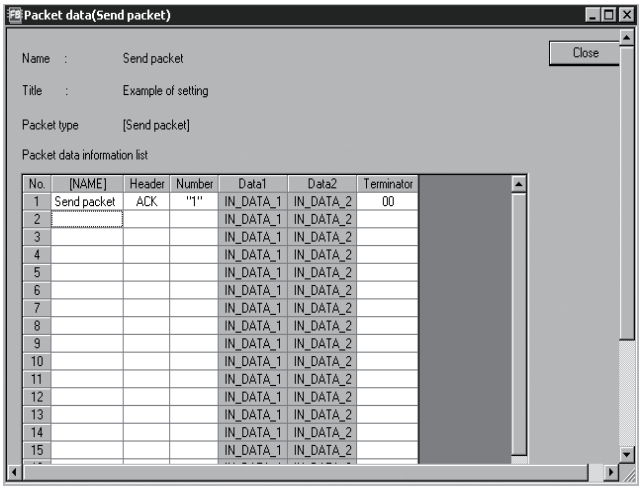
Create new Packet information screen



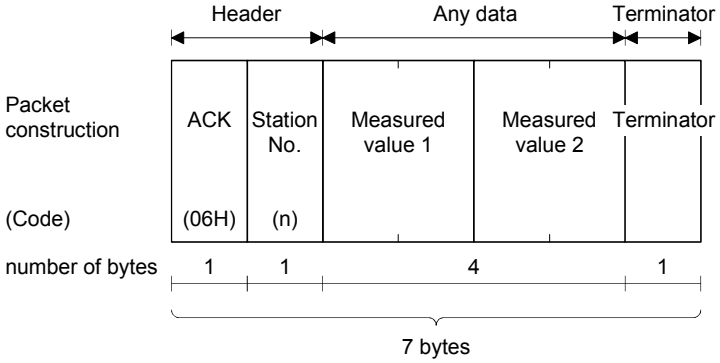
Packet construction information screen



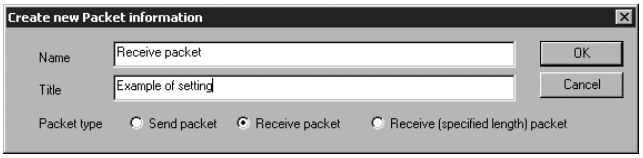
Packet data screen



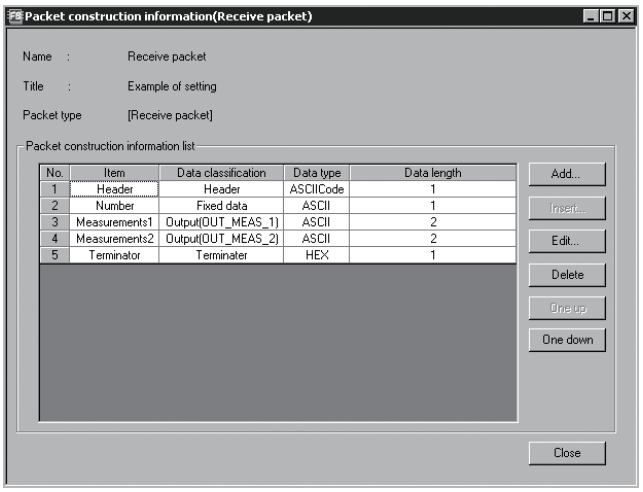
(2) Receive packet setting example



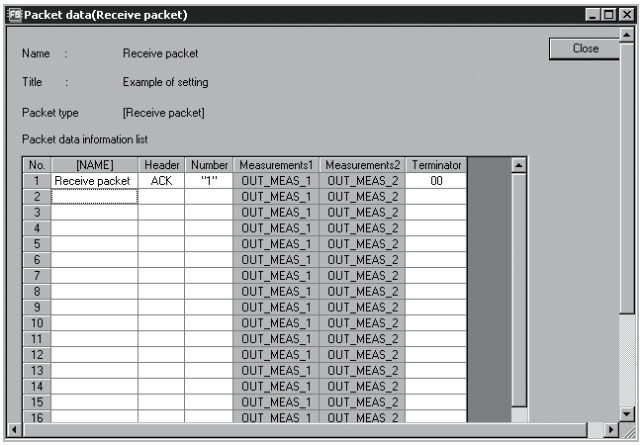
Create new Packet information screen



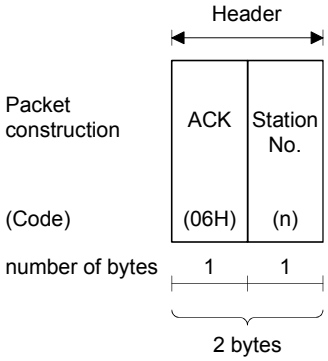
Packet construction information screen



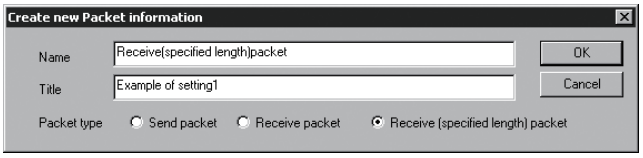
Packet data screen



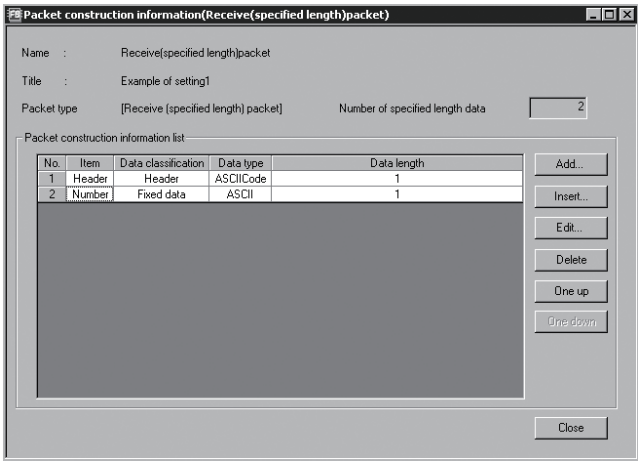
(3) Receive (specified length) packet setting example (Fixed data)



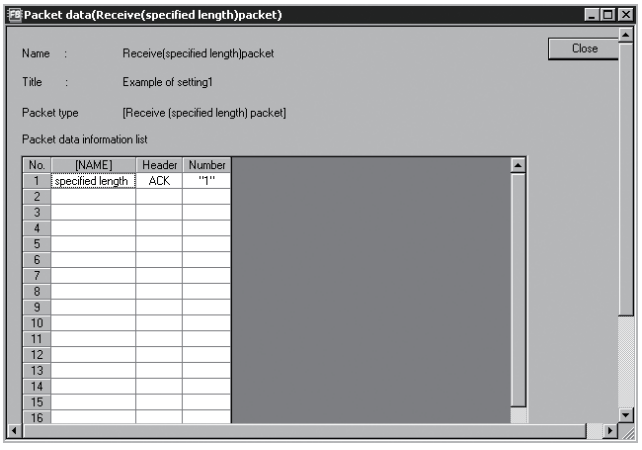
Create new Packet information screen



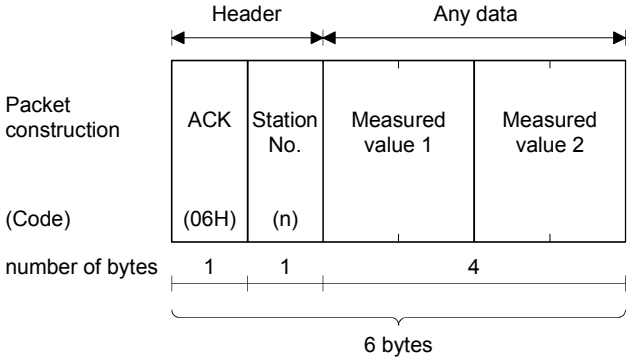
Packet construction information screen



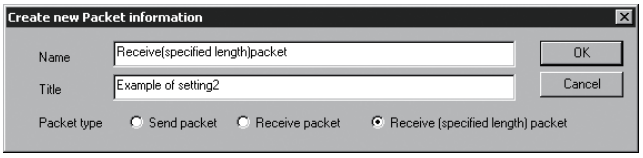
Packet data screen



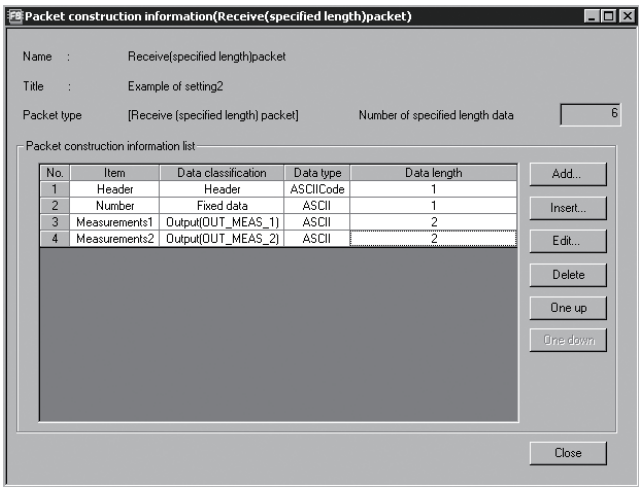
(4) Receive (specified length) packet setting example (Variable data)



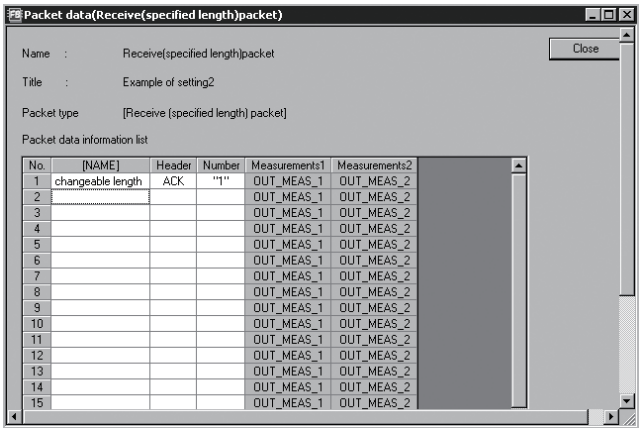
Create new Packet information screen



Packet construction information screen



Packet data screen



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Appendix 5 Newly added functions

(1) Newly added functions

(a) Added functions in Version 2.04E

With upgrade from Version 2.03D (SW2D5C-QSCU) to Version 2.04E (SW2D5C-QSCU), following functions/setting items are newly added to GX Configurator-SC.

Function/Setting item	Details	Reference section
Create receive (specified length) packet	The receive frame with fixed packet length, header and no end judgment data can be created.	Section 7.2
Module start I/O No. setting	With this new function, module start I/O No. can be set at the time of FB program conversion, whereas module start I/O No. was set using GX Developer after FB program is generated.	Section 7.4

Point

With GX Configurator-SC, packet construction information can be set according to the Q series C24 module receive method, as shown below.

Receive method*1	Header (Head frame)	Any data section	Terminator (Final frame)
Method 0	○	○	○
	○	-	○
Method 1	○	○	-
	○	-	-

○: Setting available - : Setting not available

*1: The following outlines the receive method 0, 1.
Method 0: Method for receiving data of variable length using either/both of head frame or/and final frame.
Method 1: Method for receiving data of fixed length using head frame.
For details, refer to the Q corresponding communication module user's manual (application).

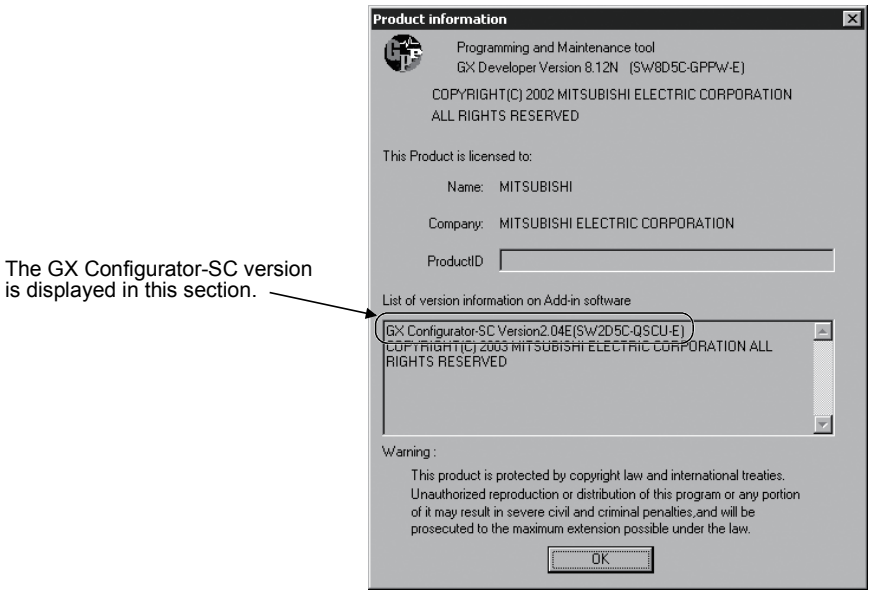
(b) Added functions in Version 2.14Q

With upgrade from Version 2.13P (SW2D5C-QSCU) to Version 2.14Q (SW2D5C-QSCU), following functions are newly added to GX Configurator-SC.

Function	Details	Reference section
Output variable is added to send FB	Output variable (O_RUN) for interlock which prevents the send execution before completing the send preparation is added.	Section 8.2.4
Output variable is added to receive FB	Output variable (O_RUN) for interlock which prevents the send execution before completing the receive preparation is added.	Section 8.2.4

(2) Checking the GX Configurator-SC software version

Check the version within the GX Developer product information.
([Help] → [Product information])



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SH (NA)-080393E-I

GX Configurator-SC Version 2

Operating Manual (Protocol FB support function)

MODEL	GXCON-SC-O-FB-E
MODEL CODE	13JU46
SH(NA)-080393E-I(0805)MEE	

MITSUBISHI ELECTRIC CORPORATION

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