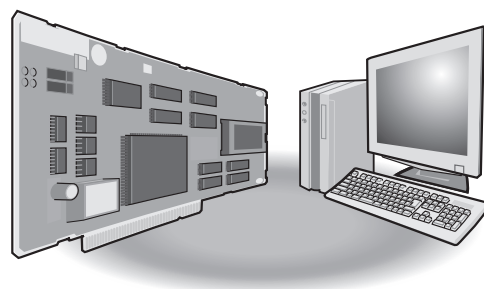


Network Interface Board

CC-Link IE Controller Network Interface Board User's Manual

-NZ81GP21-SX
-NZ81GP21S-SX
-SW1DNC-MNETG-B



SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the module used.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

 WARNING	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 minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in a personal computer. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
 - (2) The station to which the board is installed may be disconnected from the data link due to a data link error. If this occurs, the data output from the station and written to other stations before the error will be held until the station is reconnected to the network (until its data link is restarted). Provide a mechanism for data link status monitoring and error handling for each station that is connected to the data link system.
 - For the operating status of each station after a communication failure, refer to manuals for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.
 - When changing data during operation, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change), read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. Also, determine corrective actions to be taken between the personal computer and CPU module in case of a communication failure.
 - Especially, when a remote board is controlled by an external device, immediate action cannot be taken if a problem occurs in the board due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and personal computer in case of a communication failure.
 - Do not write any data to the "system area" and "write-protect area" of the buffer memory in the board. Doing so may cause malfunction of the board. For the "system area" and "write-protect area", refer to the following.
 - ☞ Page 173 Buffer Memory
 - If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident.
 - The optical transmitter and receiver use laser diodes (class 1 in accordance with IEC 60825-1: 2014, JIS C 6802: 2014). Do not look directly at a laser beam as doing so may harm your eyes.
-

CAUTION

- Do not install the communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
 - Do not power off the personal computer or reset the board while the settings are being written. Doing so will make the data in the setting values undefined and the values need to be set again. Doing so also may cause malfunction or failure of the board.
 - For the external power supply to a board, use the one evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit) or compliant with UL1310 CLASS2.
 - Supply power to a board from a personal computer from the secondary side evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit).
-

[Security Precautions]

WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.
-

[Installation Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installing/uninstalling the board to/from a personal computer. Failure to do so may result in electric shock or cause the board to fail or malfunction.
-

[Installation Precautions]

CAUTION

- Use a board in an environment mentioned in Page 34 General Specifications in this manual, otherwise an electric shock, fire, malfunction, or damage to or deterioration of the product may occur.
 - Securely fix the board with board-fixing screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or board, resulting in drop, short circuit, or malfunction.
For the specified torque range of the board-fixing screws, refer to the manual supplied with the personal computer.
 - Beware that the board could be very hot while power is on and immediately after power-off.
 - Do not directly touch any conductive parts and electronic components of the board. Doing so can cause malfunction or failure of the board.
 - Install a board in a personal computer which is compliant with the PCI Express standard ( Page 25 Operating Environment), otherwise a failure or malfunction may occur.
 - Securely install the board on a PCI Express slot according to the board installation method of the personal computer, otherwise a malfunction, failure, or drop of the board may occur.
 - When installing the board, take care not to contact with other boards.
 - When installing the board, take care not to get injured by an implemented component or a surrounding member.
 - Handle the board in a place where static electricity will not be generated, otherwise a failure or malfunction may occur.
 - The board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope, otherwise a failure or malfunction may occur.
 - Do not drop or apply a strong impact to the board as doing so may cause a failure or malfunction.
 - Do not touch any connectors while power is on. Doing so will cause electric shock or malfunction.
-

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before starting wiring. Failure to do so may result in electric shock or cause the board to fail or malfunction.
 - When turning the power ON or starting operation after the board installation and wiring is completed, attach the cover on the board, otherwise an electric shock may occur.
-

[Wiring Precautions]

CAUTION

- Always ground the personal computer to the protective ground conductor. Failure to do so may cause a malfunction.
 - Securely connect the connector to the board. Poor contact may cause malfunction.
 - Check the rated voltage and pin alignment before wiring to the board, and connect the cables correctly.
Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
 - Do not install the communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100mm or more between those cables.
 - Place the cables (communication cable and external power supply cable connected to a board) in a duct or clamp them. If not, the dangling cable may swing or inadvertently be pulled, resulting in damage to the board or cable or malfunctions due to poor contact.
 - Check the interface type and correctly connect a cable. Incorrect wiring (connecting a cable to an incorrect interface) may cause a failure.
 - When disconnecting the cable from the board, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. Pulling the cable connected to the board may result in malfunction or damage to the board.
 - Prevent foreign matter such as dust or wire chips from entering the personal computer. Such foreign matter may cause a fire, failure, or malfunction.
 - Optical fiber cables used in a system must meet the specifications described in this manual ( Page 40 Optical fiber cable), otherwise normal data transmission is not guaranteed.
 - Special skills and tools are required to connect a communication cable and a dedicated connector plug. When purchasing them, please contact your local Mitsubishi Electric sales office or representative. Incomplete connection may cause a short, fire or malfunction.
-

[Startup and Maintenance Precautions]

WARNING

- Do not connect or disconnect a communication cable while the power is ON as doing so may cause a malfunction.
 - Shut off the external power supply (all phases) used in the system before cleaning the board or retightening the board-fixing screws. Failure to do so may result in electric shock.
-

[Startup and Maintenance Precautions]

CAUTION

- When changing data during operation, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change), read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
Also, determine corrective actions to be taken between the personal computer and external device in case of a communication failure.
 - Do not disassemble or modify the board as doing so may cause a failure, malfunction, injury, or fire.
 - When using a radio communication device such as a cellular phone or PHS (Personal Handy-phone System), keep it away from the board at least 25 cm in all directions, otherwise a malfunction may occur.
 - Securely fix the board with board-fixing screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or board, resulting in drop, short circuit, or malfunction.
For the specified torque range of the board-fixing screws, refer to the manual supplied with the personal computer.
 - After the first use of a board, do not install/uninstall it on a personal computer more than 50 times (PCI Express standard compliant). Exceeding the limit may cause malfunction.
 - Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
 - Before handling the board, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Wearing a grounded antistatic wrist strap is recommended. Failure to discharge the static electricity may cause the board to fail or malfunction.
 - After unpacking, eliminate static electricity from the board to prevent electrostatic discharge from affecting the board. If an electrostatically charged board comes in contact with a grounded metal object, a sudden electrostatic discharge of the board may cause failure.
 - The board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope, otherwise a failure or malfunction may occur.
 - The microprocessor built in the board will reach a high temperature during operation. Do not touch it directly when replacing the board. Doing so may result in a failure, malfunction or injury.
 - Prevent the board from dirt. If there is dirt on the board, use an air duster etc. to blow off the dirt not to touch the board itself as much as possible.
-

[Operating Precautions]

CAUTION

- When changing data and operating status, read relevant manuals carefully and ensure the safety before operation. Incorrect change may cause system malfunction, damage to the machines, or accidents.
 - Do not power off the personal computer or reset the board while the settings are being written. Doing so will make the data in the setting values undefined and the values need to be set again. Doing so also may cause malfunction or failure of the board.
 - Do not power off the external power supply or disconnect the power cable while the power of the personal computer is on. Doing so may cause malfunction of the board.
-

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste.
-

[Transportation Precautions]

CAUTION

- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.
-

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric network interface board.

This manual describes the system configurations, specifications, functions, handling, wiring, and troubleshooting to use the modules listed below.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the Mitsubishi Electric network interface board to handle the product correctly.

When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

Note that the menu names and operating procedures may differ depending on an operating system in use and its version.

When reading this manual, replace the names and procedures with the applicable ones as necessary.

Please make sure that the end users read this manual.

Relevant products

NZ81GP21-SX

NZ81GP21S-SX

CONTENTS

SAFETY PRECAUTIONS	1
INTRODUCTION	8
RELEVANT MANUALS	14
TERMS	15
GENERIC TERMS AND ABBREVIATIONS	15
CHAPTER 1 PART NAMES	16
CHAPTER 2 PROCEDURE BEFORE OPERATION	19
CHAPTER 3 SYSTEM CONFIGURATIONS	21
3.1 Network Interface Board Configuration	21
3.2 CC-Link IE Controller Network Configuration	22
3.3 Available Software	23
Dedicated software package	23
Other software packages	23
3.4 Considerations for System Configuration	24
Considerations for combinations with other products	24
Considerations for connected devices and network configurations	24
Considerations for powering ON/OFF or restarting a personal computer	24
3.5 Operating Environment	25
CHAPTER 4 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION	28
4.1 Considerations for Installation and Uninstallation	28
4.2 Installation	29
Obtaining the software	29
Installation procedure	29
When installation is normally completed	29
When installation is terminated or failed	31
When an action displayed in the screen is not clear	31
4.3 Uninstallation	33
Uninstallation procedure	33
When uninstallation is normally completed	33
When uninstallation fails	33
CHAPTER 5 SPECIFICATIONS	34
5.1 General Specifications	34
5.2 Performance Specifications of CC-Link IE Controller Network	35
5.3 Hardware Specifications	36
CHAPTER 6 INSTALLATION AND WIRING	37
6.1 Installation Environment	37
6.2 Board Installation	37
6.3 Channel Number Setting	38
6.4 Tests before Wiring (Board communication test)	39
6.5 Wiring	40
Wiring products	40
Wiring methods	42

Wiring precautions	43
6.6 Tests after Wiring	44
CHAPTER 7 FUNCTIONS	45
7.1 Function Lists	45
Board function list	45
Software package function list.	48
7.2 Cyclic Transmission	49
Data flow and link device assignment	49
Link refresh	51
Access to link devices	53
Cyclic data assurance	54
Cyclic transmission punctuality assurance	56
Send point extension.	57
Reception status when an error occurs.	58
Cyclic transmission stop and restart	58
7.3 Transient Transmission	59
Communication within the same network	59
Communication with different networks.	60
SEND/RECV function	60
Routing function.	64
7.4 Loopback Function	65
7.5 External Power Supply Function	66
7.6 Diagnostics	68
CC-Link IE Controller Network diagnostics	68
Board communication test.	68
Communication test.	68
7.7 Board Redundancy Function	69
Concept.	69
System configuration.	70
Procedure before operation for the redundant system	71
Parameter setting for the board redundancy.	72
Cyclic transmission when using the board redundancy function.	73
Determination of control system/standby system	75
System switching.	77
System switching cause	79
Operation when the system switching occurs	81
User program error monitoring	83
User program for the board redundancy function	85
7.8 Others	86
Driver WDT function	86
Reserved station specification.	86
Firmware update	87
CHAPTER 8 CC IE Control Utility	88
8.1 Screen Configuration and Basic Operations	88
Start and end.	88
Display language switching	89
Screen configuration	90
Saving a file	91

8.2	Channel Number Setting	94
	Automatic assignment	94
	Checking method for a channel number	94
	Changing a channel number	95
8.3	Board Information	96
	Board detail information	97
8.4	Parameter Setting	98
	Operational setting	100
	Network range assignment	102
	Equal assignment	104
	Supplementary setting	105
	Driver setting	106
	Event setting (CCIEC board(Q) only)	107
	Target setting	108
	Refresh parameter	109
	Routing parameter setting	110
8.5	Diagnostics	111
	CC-Link IE Controller Network diagnostics	111
	Communication test	117
	Link start/stop	118
	Logging	121
CHAPTER 9 PROGRAMMING		123
9.1	MELSEC Data Link Library	123
9.2	Considerations for Programming	124
	Cyclic transmission programs	124
	Transient transmission programs	124
	Considerations for utilizing user programs	124
CHAPTER 10 COMMUNICATION EXAMPLES		125
10.1	Setting Examples	125
	System configuration example	125
	Setting the control station	127
	Setting normal stations	128
	Checking the network status	129
10.2	Program Examples	130
	Program example for cyclic transmission	130
	Program example to detect errors in other stations	131
CHAPTER 11 MAINTENANCE AND INSPECTION		132
11.1	Daily Inspection	132
11.2	Periodic Inspection	132
CHAPTER 12 TROUBLESHOOTING		134
12.1	Checking Method	134
	Checking installation environment	135
	Checking board installation	135
	Checking cables and wiring	135
	Checking the LED status	136
	Checking the personal computer and operating system	138

Checking the operating environment	138
Checking with Device Manager	138
Checking with Event Viewer	139
Checking channel numbers	141
Checking with errors on board detail information	141
Checking with tests	141
Checking with CC-Link IE Controller Network diagnostics	141
Checking by monitoring devices	141
12.2 Troubleshooting by Symptom	142
The personal computer does not start or shuts down	144
The utility does not start up	144
A screen or operation is abnormal	145
A screen in which the shown corrective actions are not clear is displayed	146
The personal computer operates slowly	149
The hardware failure has occurred	149
An error has occurred when resetting a board	149
An error has occurred when updating the firmware	150
The driver WDT error has occurred	152
The driver does not start	152
Communication cannot be performed occasionally while executing a user program	153
A station is disconnected	153
Communication is unstable	154
Link refresh time is increased	154
Cyclic transmission cannot be performed	155
Transient transmission cannot be performed	157
An error has occurred when using the board redundancy function	158
12.3 Information Required for Inquiries	160
12.4 Error Code List	161
APPENDIX	167
Appendix 1 External Dimensions	167
NZ81GP21-SX	167
NZ81GP21S-SX	168
Appendix 2 Checking Production Information and Firmware Version	169
Appendix 3 EMC and Low Voltage Directives	170
Measures to comply with the EMC Directive	170
Measures to comply with the Low Voltage Directive	172
Appendix 4 Buffer Memory	173
Buffer memory list	173
Buffer memory details	175
Appendix 5 Link Special Relay (SB) List	180
Appendix 6 Link Special Register (SW) List	190
Appendix 7 Network Status at Power-ON/OFF or Board Reset During Data Linking	209
Methods for resetting a board	212
Appendix 8 Processing Time	213
Transmission delay time of cyclic transmission	213
Appendix 9 Board Redundancy Function Process Flow and User Program	214
System switching due to board failure or disconnection	216
System switching due to software error detection	222
System switching through a user program at any timing	226

System switching due to reconnection	232
User program error monitoring	234
Programming examples of user program	235
System switching time	243
SB/SW used for the board redundancy function	244
Appendix 10 Windows User Account Control	246
Confirmation message	246
Methods for displaying a message	246
Appendix 11 Behavior When Entering Power Save Mode or Enabling Fast Startup	247
Behavior when entering the power save mode (hibernate, sleep)	247
Behavior when the fast startup function is enabled	247
Appendix 12 MELSEC Power Manager	248
Installing MELSEC Power Manager	248
Uninstalling MELSEC Power Manager	248
Checking MELSEC Power Manager	248
Appendix 13 Unusable Character Strings (Reserved Words)	249
Appendix 14 Added and Changed Function	250
Change of hardware function	250
Update of software package	250
Firmware update	251
Change of a board or personal computer	254
Changing a board or a user program of the board redundancy function	255

INDEX	257
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REVISIONS	259
CONDITIONS OF USE FOR THE PRODUCT	260
WARRANTY	261
INFORMATION AND SERVICES	262
TRADEMARKS	262
COPYRIGHTS	262

RELEVANT MANUALS

The following manuals are relevant to this product.

Manual name [manual number]	Description
CC-Link IE Controller Network Interface Board User's Manual [SH-082712ENG] (this manual)	System configurations, specifications, functions, handling, wiring, and troubleshooting of a CC-Link IE Controller Network interface board
MELSEC Data Link Library Reference Manual [SH-081035ENG]	Programming, accessible devices and their ranges, functions, sample programs, and error codes for the MELSEC data link library

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Both systems	Both systems A and B in a redundant system configuration
Buffer memory	Memory in an intelligent function module and network interface board to store data such as setting values and monitor values
Channel number	A number that is assigned to identify a board
Control station	Only one station that controls the network to which it is connected. Each station's send range for cyclic transmission is assigned to the control station.
Control system	A system that controls a redundant system and performs network communications in a redundant system
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices
Data link	Communications that performed by cyclic transmission and transient transmission
Device	A memory of a CPU module to store data. Devices such as X, Y, M, D, and others are provided depending on the intended use.
Disconnection	Processing that stops data link if a data link error occurs
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
Faulty station	A station that cannot perform a data link normally
I/O master station	A station that controls communications by the link devices (LX, LY). Up to two I/O master stations can be set for one network (block 1 and block 2), regardless of the status of control or normal station.
Link device	A device (LB, LW, LX, LY, SB, or SW) in a module and board on CC-Link IE Controller Network
Link scan (link scan time)	Time required for all the stations on the network to transmit data. The link scan time depends on data volume and the number of transient transmission requests.
Logical station number	A virtual station number to be set or specified to access a multiple CPU system or redundant CPU system
New control system	A system that has switched to standby system from control system after system switching
Normal station	A station that performs cyclic transmission and transient transmission with the control station and other normal stations
Own system	A system that contains the CPU module or board that takes control in a redundant system
Redundant system	A system consisting of two systems that have same configuration (CPU module, power supply module, network module, and other modules). Even after an error occurs in one of the two system, the other system takes over the control of the entire system.
Relay station	A station that relays data link to other station with mounting more than one network modules on one programmable controller
Reserved station	A station reserved for future use. This station is not actually connected, but counted as a connected station.
Return	Processing that restarts data link when a station recovers from an error
Standby system	A backup system in a redundant system configuration
System A	A system that is set as system A to distinguish two systems in a redundant system. It is used to distinguish connected two systems (system A and system B).
System B	A system that is set as system B to distinguish two systems in a redundant system. It is used to distinguish connected two systems (system A and system B).
The other system	The other system that has been connected to own system with tracking cables. When the system A is the own system, the system B is the other system, and vice versa. In a board redundancy configuration, the system of a redundancy target station that is not the own system in the same network.
Transient transmission	A function of communication with another station, which is used when requested by a MELSEC data link library or a utility

GENERIC TERMS AND ABBREVIATIONS

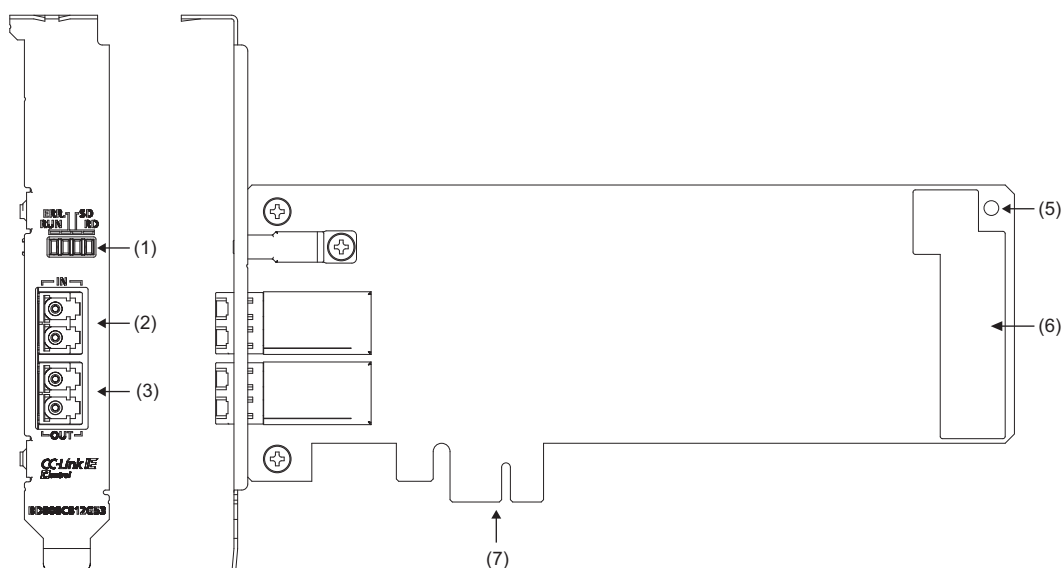
Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
CCIEC board (NZ)	NZ81GP21-SX, NZ81GP21S-SX
CCIEC board (Q)	Q81BD-J71GP21-SX, Q81BD-J71GP21S-SX, Q80BD-J71GP21-SX, Q80BD-J71GP21S-SX
Driver WDT	A watchdog timer that monitors the communication status between a network board and a personal computer, or operating status of a personal computer
Board WDT	A watchdog timer that monitors the operating status of a network interface board

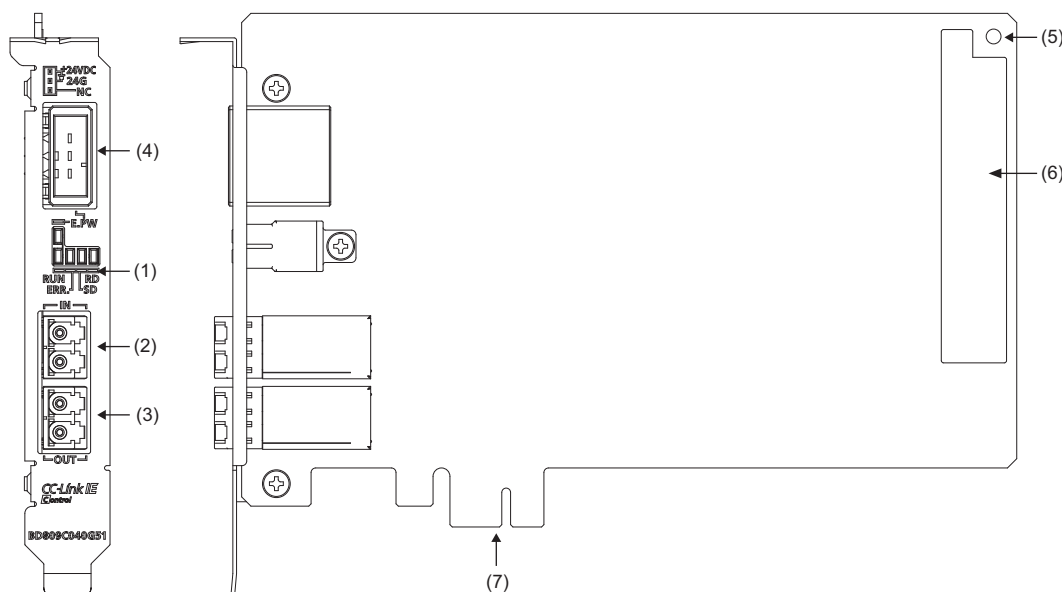
1 PART NAMES

This chapter explains the part names.

• NZ81GP21-SX



• NZ81GP21S-SX



No.	Name	Description
(1)	Operating status LED	Indicates the operating status of a board. (Page 17 Operating status LED)
(2)	Optical connector (IN connector)	A connector to connect an optical fiber cable. Connect the OUT connector of another station. (Page 42 Wiring methods)
(3)	Optical connector (OUT connector)	A connector to connect an optical fiber cable. Connect the IN connector of another station. (Page 42 Wiring methods)
(4)	Connector for external power supply	A connector to connect an external power supply cable (Page 41 External power supply cable, Page 42 Wiring methods)
(5)	Screw hole for fixing a board	A screw hole for fixing a board to a personal computer. For the tightening torque of the board-fixing screws, refer to the manual supplied with the personal computer.
(6)	Rating plate	The board type and production information are listed.
(7)	PCI Express card edge	A terminal to connect a board to the PCI Express slot of a personal computer

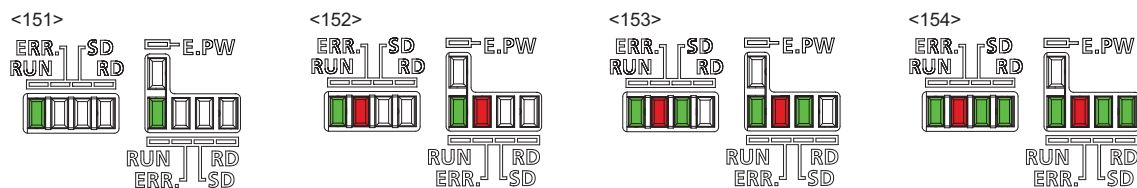
Operating status LED

This LED indicates the operating status of a board.

Name	Description
E.PW	Indicates the external power supply status. • ON: External power supplied • OFF: External power not supplied
RUN LED	Indicates the operating status of the hardware and error contents.
ERR. LED	The operating status and error contents depending on the combination of lighting statuses are as follows: ■Lightning status of RUN LED — ERR. LED • ON — OFF: Normal operation • ON — ON: Line error or communication error (minor error) • ON — Flashing: Parameter error (moderate error) • Flashing — ON: PCI Express bus error • Flashing — OFF (RD is ON): Driver WDT error • OFF — ON/Flashing: Hardware error or board WDT error (major error) • OFF — OFF (SD/RD is OFF): Hardware error, driver not yet started, or firmware being updated • OFF — OFF (SD/RD is ON): System reset of the personal computer When an error occurs, refer to the troubleshooting and take a corrective action. ☞ Page 136 Checking the LED status
SD LED	Indicates the data sending status. • ON: Data being sent • OFF: Data not sent
RD LED	Indicates the data reception status. • ON: Data being received • OFF: Data not received

■When checking a channel number

While the "Channel No. confirm" screen of the CC IE Control utility is open, the LED lights according to the current channel number are as shown below.



MEMO

2 PROCEDURE BEFORE OPERATION

This chapter explains the procedure before operation.

1. Installing the software package

Install the software package in a personal computer.

☞ Page 28 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

2. Installing a board

Install a board on a slot of the personal computer.

☞ Page 37 Board Installation

3. Setting a channel number

Set a channel number and check it by using the utility.

☞ Page 38 Channel Number Setting

4. Checking the board

Test the hardware of the installed board for errors.

☞ Page 39 Tests before Wiring (Board communication test)

5. Constructing a network

Configure a system and set parameters necessary for start-up.

- Wiring (☞ Page 40 Wiring)
- Parameter setting (☞ Page 98 Parameter Setting)

6. Diagnosing the network

Check whether cables are connected properly and a communication is normally established based on the set parameters in network diagnostic.

For details, refer to the following:

☞ Page 44 Tests after Wiring

7. Programming

Create a user program. For details, refer to the following:

☞ Page 123 PROGRAMMING

8. Executing a user program or each utility



For the procedure for changing a board or personal computer, refer to the following:

☞ Page 254 Change of a board or personal computer

MEMO

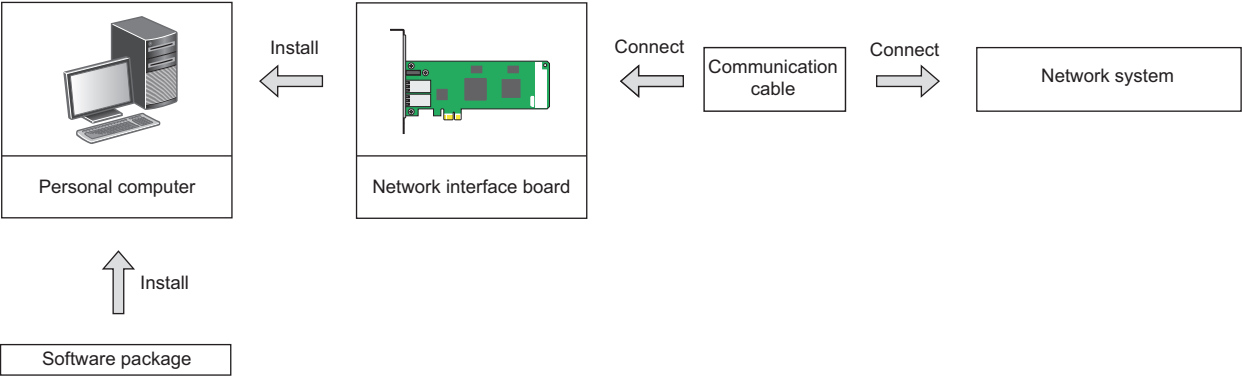
3 SYSTEM CONFIGURATIONS

This chapter shows the system configurations.

3.1 Network Interface Board Configuration

By installing a network interface board in a personal computer, a network system can be connected with the computer. In the computer, install the dedicated software package for system design, debugging, and maintenance.

3



Software package	Network interface board	Communication cable	Network system
SW1DNC-MNETG-B	NZ81GP21-SX, NZ81GP21S-SX	Optical cable	CC-Link IE Controller Network

3.2 CC-Link IE Controller Network Configuration

This section shows the system configuration for CC-Link IE Controller Network using this product.

Point

For the system configuration for CC-Link IE Controller Network as a MELSEC iQ-R series programmable controller system, refer to the following:

📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)

Station types

This product supports the following station types:

- Control station
- Normal station

Topologies

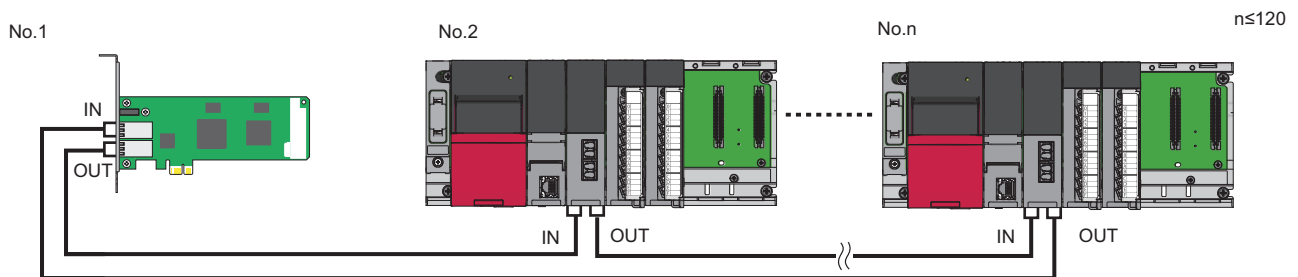
Communication with other CC-Link IE Controller Network supported devices is performed by connecting a cable to the connector of a board (IN, OUT).

- In a single network, a total of 120 stations including 1 control station and 119 normal stations can be connected.
- Any station can be set as a control station. (One control station for a single network)

Network topology

Connect network modules or boards in a loop shape (duplex loop) by using optical fiber cables.

Each number in the following figure, from No.1 to 3, represents a station number.

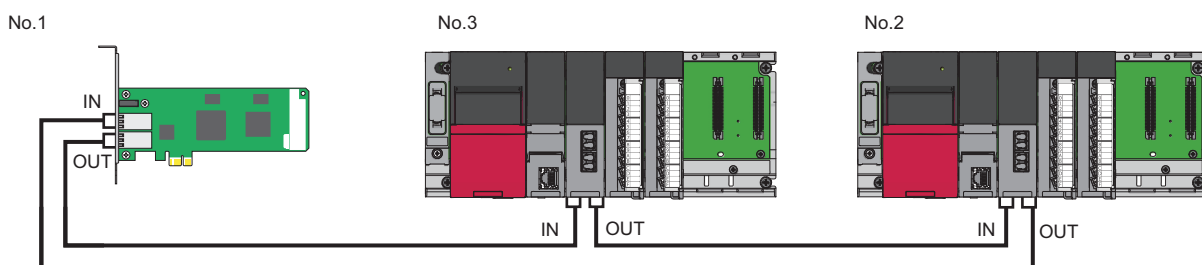


Each station has the IN and OUT connectors for connection. Connect the IN connector of the own station to the OUT connector of another station, and connect the OUT connector of the own station to the IN connector of another station.

Station number and connection position

Each station can be connected in any order regardless of the station number.

Each number in the following figure, from No.1 to 3, represents a station number.



Number of connectable networks

Multiple networks can be connected by using a MELSEC series programmable controller in which multiple network modules are mounted as a relay station.

- Up to 239 networks can be connected simultaneously.
- By using the routing function, communication can be established with a station in up to the eighth network system from the own station (number of relay stations: 7). (📖 Page 110 Routing parameter setting)
- By using a relay station in which multiple modules with different networks are mounted, other networks can also be connected.

Point

For accessible network types and target devices, refer to the following:

📖 MELSEC Data Link Library Reference Manual

Precautions

- Use network modules as boards cannot be used as relay stations.
- Network modules mounted on an RQ extension base unit cannot be used as relay stations.

3.3 Available Software

This section shows the software packages supported by this board.

Dedicated software package

The driver and utility must be installed on a personal computer with this board installed by installing a dedicated software package.

Model name	Version
SW1DNC-MNETG-B	1.33K or later

Point

For the method for obtaining the software package and installation procedure, refer to the following:

📖 Page 29 Installation

Other software packages

The following table shows the related software packages and their versions supported by this board.

If using a software package with an unsupported version for this board, the functions may not run properly.

Product name	Version	Remarks
GX Works3	1.115V or later	—
GX Works2	—	No restrictions on versions
MX Component	4.17T or later	—

3.4 Considerations for System Configuration

This section explains the considerations for configuring a system.

Considerations for combinations with other products

Combinations available in the same personal computer

This product can be installed in the same personal computer as a board that shares the MELSEC data link library.

 Page 30 Considerations for using other boards on a personal computer

For devices supporting the MELSEC data link library, refer to the following:

 MELSEC Data Link Library Reference Manual

Combination with existing software

No restrictions apply when installing and using SW1DNC-MNETG-B in the same personal computer in which other Mitsubishi Electric network interface boards and/or MELSOFT products are installed.

For the supported versions of related software packages, refer to the following:

 Page 23 Other software packages

Considerations for connected devices and network configurations

Devices connected to the same network

It is not possible to combine CC-Link IE Controller Network connected via an optical fiber cable and CC-Link IE Controller Network connected via an Ethernet cable by using a media converter (optical fiber cable $\leftrightarrow$ Ethernet cable).

Considerations for powering ON/OFF or restarting a personal computer

When powering ON/OFF or restarting a personal computer with a board installed, an error occurs in the data link.

For the network status at system startup or restart of the operating system, refer to the following:

 Page 209 Network Status at Power-ON/OFF or Board Reset During Data Linking

3.5 Operating Environment

This section shows the operating environment of boards.

Item	Description
Personal computer	A personal computer on which Microsoft® Windows® operates
CPU	System requirements of the operating system must be met.
Required memory	
PCI Express® bus specifications	Compliant with PCI Express standard Rev.1.1 (3.3 VDC, Link width 1 lane, Reference clock 100 MHz)
Free hard disk space	3.0 GB or more
Display	Resolution: 1024 × 768 dots or higher
Operating system (English version)*1	• Windows 11 (Home, Pro, Enterprise, Education, IoT Enterprise LTSC 2024) • Windows Server® 2022 (Standard) • Windows Server 2019 (Standard) • Windows Server 2016 (Standard)*2 • Windows 10 (IoT Enterprise LTSC 2021, IoT Enterprise LTSC 2019*3, IoT Enterprise LTSC 2016*3) • Windows 10 version 1607 or later (Home, Pro, Enterprise, Education)*4
Programming language*1	Visual Basic®, Visual C++®, and Visual C#® in the following Microsoft Visual Studio®: Visual Studio 2026, Visual Studio 2022, Visual Studio 2019, Visual Studio 2017
.NET Framework	Environment that supports .NET Framework 4.8 or higher
Runtime library*5	Microsoft Visual C++ 2015-2022 Redistributable (x64) Microsoft Visual C++ 2015-2022 Redistributable (x86)

*1 For a combination of an operating system and a programming language, check the system requirements of each programming language on Microsoft Docs.

*2 Apply Windows Updates (KB4132216, KB4091664, KB4465659, KB4534307).

However, if KB4480977 is already applied, there is no need to apply KB4534307. The above Windows Updates may have been discontinued. If the above Windows Updates have been discontinued, please consult Microsoft Corporation.

*3 64-bit version only

*4 Due to the end of support from Microsoft, function updates for the boards in this operating environment have been discontinued.

*5 Installed when installing a software package.

Do not uninstall these runtime libraries.

Considerations for a personal computer

■PCI Express standard

When using a board on a personal computer which is not compliant with the PCI Express standard, troubles caused by failures such as a contact failure or operation error may occur. In addition, a board may not operate on a PCI Express slot for graphics.

For details on the number of boards that can be installed, installation slots, and occupied slots, refer to the following:

📖 Page 36 Hardware Specifications

Considerations for an operating system

■User authority

Log on as a user with the administrator authority.

- Installation and uninstallation are available only for a user with the administrator authority.
- Utilities can be used only by a user with the administrator authority.

For details on User Account Control (UAC), refer to the following:

📖 Page 246 Windows User Account Control

■Exiting the operating system

Make sure to shut down the personal computer.

■.NET Framework

Select the checkbox of the following for "Turn Windows features on or off" in the control panel.

- .NET Framework 3.5 (includes .NET 2.0 and 3.0)

■Unavailable functions

When using any of the following functions, this product may not operate properly.

- Application start-up in Windows compatibility mode
- Fast user switching
- Remote desktop
- Power save mode (hibernate, sleep)
- Fast startup
- Touch function
- Virtual environment such as Client Hyper-V
- Server Core installation
- Tablet mode
- Virtual desktop
- Unified Write Filter
- Text cursor indicator

In the following cases, the screen of this product may not work properly.

- The size of the text and other items in the screen is other than 100% (96 DPI, 9 pt etc.).
- The resolution of the screen is changed in operation.
- The multi-display is set.



- When exiting the operating system, always shut down the computer.
- For the behavior in the power save mode, refer to the following:
(Page 247 Behavior When Entering Power Save Mode or Enabling Fast Startup)

■Upgrading and updating an operating system

The following upgrade and update of an operating system are not supported:

- Upgrade
- Major update (version upgrade)

Update an operating system by the procedure in the following:

Page 254 Updating an operating system



When updating an operating system, check if an update is available and update it manually.
Make sure to prevent an operating system from being updated automatically by setting and operating it as follows.

Examples:

- Set the active time.
- Do not connect a personal computer to the Internet or an intranet.

Considerations for a user program

■Supported versions of SW1DNC-MNETG-B

User program	Supported version
32-bit version user program*1	All versions
64-bit version user program*2	

*1 Can be created and executed on a 64-bit operating system.

*2 Can be created on a 32-bit operating system.

■MELSEC data link library

For the considerations when using the MELSEC data link library, refer to the following:

MELSEC Data Link Library Reference Manual

Considerations for the utility

■Characters and languages used

Use characters in the Basic Multilingual Plane.

If the characters outside the Basic Multilingual Plane are specified, a program may not run properly.

If an input language is different from the language set in the regional settings on Windows, some functions may not operate properly.

In that case, unify these languages.

Surrogate pair characters are not available.

For unusable character strings for file names and path names, refer to the following:

 Page 249 Unusable Character Strings (Reserved Words)

■Display language switching

When starting the device monitor utility from the CC IE Control utility, change the system locale in Windows according to the display language for the CC IE Control utility.

The device monitor utility can be used in the following languages depending on an operating system used.

- For a Japanese version operating system, Japanese or English is available for the display.
- For an operating system other than Japanese versions, English is available for the display.

For considerations for display language switching, refer to the following:

 Page 89 Display language switching

4 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

This chapter explains the software package installation and uninstallation.

4.1 Considerations for Installation and Uninstallation

This section explains the considerations for installation and uninstallation.

- Log on as a user with the administrator authority.
- Before installation and uninstallation, remove all applications registered in the startup then restart Windows.
- Make sure to close other applications running on Windows (including resident software such as antivirus software) before installation and uninstallation.
- The installer may not run normally if an update program for either operating system or software of other companies such as Windows Update and Java® update may start automatically. Before installing, change the setting so that the update program does not start automatically.
- Check that the display setting is correct in Windows Device Manager, then install an appropriate display driver or update Windows.
- Select the checkbox of ".NET Framework 3.5 (includes .NET 2.0 and 3.0)" for "Turn Windows features on or off" in the control panel.
- A network drive cannot be specified as the installation destination.
- When parameters have been set with the utility installed, the parameters are initialized at the installation. Save the parameters with the file saving function before the installation. In addition, board numbers and channel numbers may be changed after the installation. In this case, set them again.
- When installing the software package, enable the user account control. (📖 Page 246 Windows User Account Control)
- For Windows Server 2016, Windows Updates (KB4132216, KB4091664, KB4465659, KB4534307) must be applied.
- If only the driver is installed or updated, the consistency between the driver and utility cannot be identified, and the board may not operate properly. Do not install or update the driver other than the method described in this chapter.
- Microsoft Visual C++ Runtime Library is also installed when installing the software package. Do not uninstall it because it is required to execute the driver and service to control this product. If Microsoft Visual C++ Runtime Library is uninstalled, reinstall the software package.

4.2 Installation

This section explains the procedure for installing the software package.

Obtaining the software

Please contact your local Mitsubishi Electric sales office or representative.

Software package model name: SW1DNC-MNETG-B

Installation procedure

1. Save the obtained data for installation to the system drive, DVD, etc.
2. Start the installer.
Double-click "setup.exe" in the "Disk1" folder.
3. Select or enter the necessary information by following the on-screen instructions.
When actions displayed in the screen are not clear, refer to the following:
 Page 31 When an action displayed in the screen is not clear
4. Restart the personal computer.

When installation is normally completed

The driver and utilities for a board are registered.

When using other network interface boards on the same personal computer, refer to the following:

 Page 30 Considerations for using other boards on a personal computer

Utilities

When the installation is normally completed, the following utilities are registered in Windows Start.

Folder	Name	Description
MELSEC	CC IE Control Utility(Board)	To start the CC IE Control utility. This utility is for setting a board and displaying the status.
MELSEC*1	Device Monitor Utility(Board)	To start the device monitor utility. This utility is for monitoring devices and changing current values.
MELSOFT	e-Manual Viewer e-Manual Viewer Help	To display the manual.

*1 Not registered in the MELSEC folder if already registered in the MELSOFT folder.

If the device monitor utility or e-Manual Viewer is previously installed, it is overwritten in the same folder.

Point

- For the functions and handling methods, refer to the manual for the installed software package.
- The specifications of software package described in e-Manual, which are updated in e-Manual Viewer, may be different from the ones of installed software package.

MELSEC data link library

The MELSEC data link library is a library used to access own station link devices of a board and device memory of programmable controller CPUs of other stations using a board.

It is stored in the "Common" folder of the folder where the software package is installed.

Driver

The driver is installed automatically after the installation of the software package and the board in a personal computer is completed.

When the driver installation is normally completed, the following driver is displayed in the Device Manager screen of Windows.

Device name	Driver name
MELSEC CC-Link IE Control Device	MELSEC NZ CC-Link IE Control Controller

Service application

The following Windows service is registered:

Service name	Function	Reference
MELSECPowerManager	A service application for monitoring the Windows power option settings every 30 seconds to prevent a personal computer from entering the power save mode (hibernate, sleep) or enabling the fast startup function. Once installation is completed normally, the power option settings are changed by MELSECPowerManager to disable the power save mode (hibernate, sleep) or the fast startup function.	Page 248 MELSECPowerManager

Considerations for using other boards on a personal computer

Device monitor utility, MELSEC data link library, and MELSECPowerManager are used in common for the following software packages:

- SW1DNN-CCIETBDM-B
- SW1DNC-MNETG-B
- SW1DNC-CCIEF-B
- SW1DNC-CCBD2-B
- SW0DNC-MNETH-B

The newer software package data is validated when installing them on the same personal computer.

Point

- For the functions and handling methods of the device monitor utility and MELSEC data link library, refer to the manual that can be displayed from the menu in the device monitor utility.
- When installing this product, the icon for 'MELSEC Data Link Library Reference Manual' is deleted.

When installation is terminated or failed

When the installation is terminated or failed, check the following procedure and retry the installation.

Operating procedure

1. Check the considerations for installation and uninstallation.

☞ Page 28 Considerations for Installation and Uninstallation

2. Restart the personal computer.

3. If the software package can be uninstalled, uninstall it.

☞ Page 33 Uninstallation

Restart the personal computer after the uninstallation.

4. Reinstall the software package by following the installation procedure.

☞ Page 31 When an action displayed in the screen is not clear

5. If the personal computer does not operate normally after the reinstallation, check if the computer has any problems.

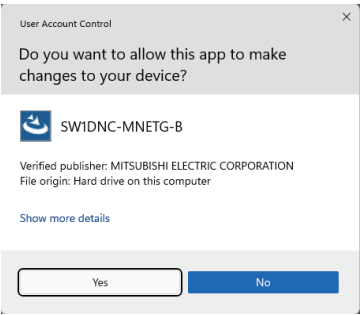
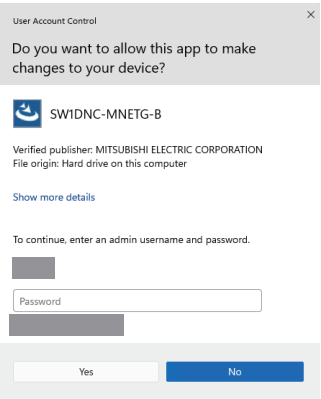
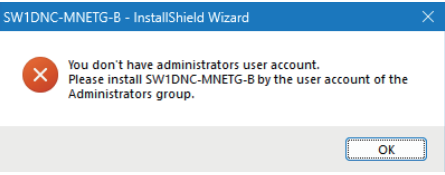
☞ Page 138 Checking the operating environment, Page 138 Checking the personal computer and operating system

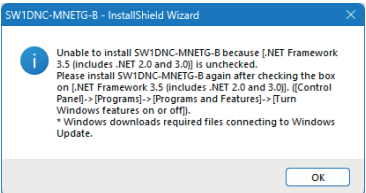
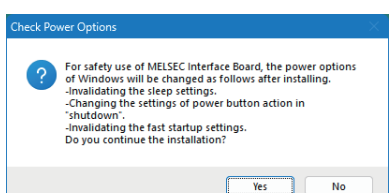
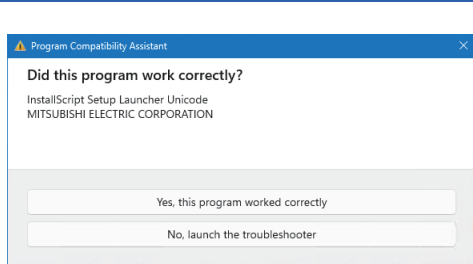
If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

When an action displayed in the screen is not clear

The following table shows the actions to be taken in each screen.

Screen	Action
	Appears when the user account control is enabled. Click the [Yes] button.
	Appears when logging on as a user without the administrator authority. Log off, and log on as a user with the administrator authority, then try again.
	Appears when the user account control is disabled and logging on as a user without the administrator authority. Check the user account control settings. (☞ Page 246 Windows User Account Control) Log off, and log on as a user with the administrator authority, then try again.

Screen	Action
	Appears when ".NET Framework 3.5 (includes .NET 2.0 and 3.0)" is disabled. Reinstall the software package after searching the control panel for "Turn Windows features on or off" and enabling the function of ".NET Framework 3.5 (includes .NET 2.0 and 3.0)." The procedure when disabling the function is the same as that of other MELSOFT products. For details on the procedure, refer to the technical bulletin FA-A-0464.
	Click the [Yes] button. MELSECPowerManager is installed and the power option setting of Windows is changed automatically. For details on MELSECPowerManager, refer to the following:  Page 248 MELSECPowerManager
	If this screen appears during or after the installation, click "Yes, this program worked correctly." If this screen appears when the installation is terminated, click the [×] button to close the screen. Do not select "No, launch the troubleshooter." An incorrect module may be installed.

4.3 Uninstallation

This section explains the procedure for uninstalling the software package.

Uninstallation procedure

Be sure to uninstall the software package in the control panel of Windows.

Point

- Save parameters as necessary before uninstallation.
- When a screen confirming the deletion of common files appears at uninstallation:
Select "No to All." If deleting common files, other applications may not run normally.
- MELSECPowerManager may not be uninstalled due to the compatibility with other installed software packages. For details on MELSECPowerManager, refer to the following:
 Page 248 MELSECPowerManager

4

When uninstallation is normally completed

When the uninstallation is normally completed, the icons registered in the Windows Start are deleted.

When uninstallation fails

When the uninstallation fails, it is necessary to reinstall the software package and uninstall it by performing the following procedure.

Operating procedure

1. Check the considerations for installation and uninstallation.
 Page 28 Considerations for Installation and Uninstallation
2. Save the data for installation to the system drive, or insert an installation media to the drive.
3. Display the "Run" screen using the Windows Start or quick access menu.
4. Append option "-A" and execute "setup.exe" in the "Disk1" folder in the installation data.
Example: C:\Temp\Disk1\setup.exe -A
5. Reinstall the software package by following the installation procedure.
6. Uninstall the software package.
7. If the software package cannot be uninstalled normally, check if the personal computer has any problems.
 Page 138 Checking the operating environment, Page 138 Checking the personal computer and operating system
If the problem persists, refer to the following:
 Page 160 Information Required for Inquiries

Point

- When specifying option '-A,' Install information (information in C:\Program Files (x86)\InstallShield Installation Information) is deleted.

5 SPECIFICATIONS

This chapter explains the general and performance specifications of a board.

5.1 General Specifications

The following table shows the common specifications of each board to use.

Item	Specification			
Ambient operating temperature	0 to 55°C			
Ambient storage temperature	-25 to 75°C			
Ambient operating humidity	5 to 95% RH, non-condensing			
Ambient storage humidity	5 to 95% RH, non-condensing			
Vibration resistance	Sweep count: 10 times each in X, Y, and Z directions	Frequency: 5 to 8.4 Hz	Constant amplitude: 3.5 mm	IEC 61131-2: 2017 and JIS B 3502: 2021
		Frequency: 8.4 to 150 Hz	Constant acceleration: 10 m/s ²	
		Shock resistance		
Operating atmosphere	No corrosive gases, flammable gases, less conductive dust			
Operating altitude ^{*1}	0 to 2000 m ^{*4}			
Installation location	Inside a control panel for indoor use			
Overvoltage category ^{*2}	II or less			
Pollution degree ^{*3}	2 or less			

*1 Do not use or store a board in an environment where the atmospheric pressure is higher than an altitude of 0 m as doing so may cause a malfunction.

When using a board in such a pressurized environment, please contact your local Mitsubishi Electric sales office or representative.

*2 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery on the premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

*3 This indicates the degree to which conductive material is generated in an environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensation must be expected occasionally.

*4 When using a board at an altitude above 2000 m, the withstand voltage performance and the upper limit of the ambient operating temperature will decrease. Please contact your local Mitsubishi Electric sales office or representative.



The general specifications for both a board and a personal computer must be satisfied after installation.

5.2 Performance Specifications of CC-Link IE Controller Network

The following table shows the performance specifications of CC-Link IE Controller Network.

Item		Specification
Maximum link points per network	LB	• 32K points (32768 points, 4 KB): When "Link points extend setting" is set to "Not to extend" • 64K points (65536 points, 8 KB): When "Link points extend setting" is set to "Extend"
	LW	• 128K points (131072 points, 256 KB): When "Link points extend setting" is set to "Not to extend" • 256K points (262144 points, 512 KB): When "Link points extend setting" is set to "Extend"
	LX	8K points (8192 points, 1 KB)
	LY	8K points (8192 points, 1 KB)
Maximum link points per station	LB	• 16K points (16384 points, 2 KB) • 32K points (32768 points, 4 KB): When the extended mode is set and "Link points extend setting" is set to "Not to extend" • 64K points (65536 points, 8 KB): When the extended mode is set and "Link points extend setting" is set to "Extend"
	LW	• 16K points (16384 points, 32 KB) • 128K points (131072 points, 256 KB): When the extended mode is set and "Link points extend setting" is set to "Not to extend" • 256K points (262144 points, 512 KB): When the extended mode is set and "Link points extend setting" is set to "Extend"
	LX	8K points (8192 points, 1 KB)
	LY	8K points (8192 points, 1 KB)
Transient transmission capacity		Up to 1920 B
Communication rate		1 Gbps
Network topology		Duplex loop
Communication cable		Optical fiber cable which satisfies 1000BASE-SX standard: Multimode optical fiber (G1)
Maximum station-to-station distance		550 m
Overall cable distance		66000 m (when 120 stations are connected)
Number of cascade connections		—
Maximum number of connectable stations		120 stations (Control station: 1, Normal station: 119)*1
Maximum number of networks		239
Maximum number of groups		32
Communication method		Token ring
Optical fiber specifications		Standard: IEC 60793-2-10 Types A1a.1 Outside diameter of the core/clad: 50 μm/125 μm Transmission loss: 3.5 dB/km or lower [λ = 850 nm] Transmission band: 500 MHz·km or higher [λ = 850 nm]
Connector specifications		Duplex LC connector Standard: IEC 61754-20 Type LC connector Connection loss: 0.3 dB or lower Polished surface: PC (Physical Contact) polishing
Laser class (IEC 60825-1: 2014, JIS C 6802: 2014)		Class 1 laser product

*1 The maximum number of connectable stations differs depending on a control station. For details, refer to the user's manual for the control station to use.

5.3 Hardware Specifications

The following table shows the hardware specifications of a board.

Item		Specification	
		NZ81GP21-SX	NZ81GP21S-SX
Number of boards that can be installed		Up to 4 ^{*1}	
Installation slot	Available slot	PCI Express [®] slot For a card edge connector supporting x1, x4, x8, x16 lanes	
	Installation size	Standard size	
Occupied slot		1 slot	
Personal computer connection I/F		PCI Express	
Personal computer transfer speed		2.5 Gbps (when connected with PCI Express 1.1)	
Number of personal computer lanes		x1	
External power supply ^{*2}	Voltage	—	24 VDC Fluctuation range: 20.4 to 31.2 VDC Ripple ratio: within 5%
	Rated current		0.28 A
	Power supply connector		Connector set ( Page 41 Connector set)
	Applicable wire size		0.50 to 1.25 mm ² (20 to 16 AWG)
	Allowable momentary power failure time		1 ms (Level PS1)
	Noise immunity		- Noise voltage: 500 Vp-p - Noise width: 1 μs By noise simulator of noise frequency at 25 to 60 Hz
Internal current consumption ^{*3}		1.30 A (3.3 VDC)	1.82 A (3.3 VDC)
External dimension	Height	Standard size: 121 mm	
	Width	18.5 mm	
	Depth	181 mm	
Weight		0.09 kg	0.13 kg

*1 The total number of Q80BD-J71GP21-SX, Q80BD-J71GP21S-SX, Q81BD-J71GP21-SX, Q81BD-J71GP21S-SX, and this product

*2 For the external power supply to a board, use the one evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit) or compliant with UL1310 CLASS2.

*3 Supply power to a board from a personal computer from the secondary side evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit).

Precautions

To comply with the UL61010-2-201/CSA-C22.2 No.61010-2-201 standards, install a board in an industrial PC.

6 INSTALLATION AND WIRING

This chapter explains the installation and wiring methods of each board, wiring products, and wiring precautions.

6.1 Installation Environment

Use a board in an environment mentioned in the general specifications; otherwise, an electric shock, fire, malfunction, or damage to or deterioration of the product may occur.

 Page 34 General Specifications

Always ground the personal computer to the protective ground conductor. Failure to do so may cause a malfunction.

For installation of a personal computer in which a board is installed, refer to the manual for the personal computer.

6.2 Board Installation

The following shows the procedure for installing a board.

1. Turning the power OFF

Turn the power of a personal computer OFF if it is ON.

2. Installing a board

Install a board on a slot of the personal computer.

3. Fixing the board

Fix the board to the personal computer with board-fixing screws.

For the tightening torque of the screws, refer to the manual for the personal computer.

4. Wiring an external power supply (NZ81GP21S-SX only)

Wire the external power supply.

 Page 43 External power supply cable

5. Turning the power ON

Turn the power of the personal computer ON.

6

Precautions

After the first use of a board, do not install/uninstall it on a personal computer more than 50 times (PCI Express standard compliant). Exceeding the limit may cause malfunction.

Point

Install four or fewer CC-Link IE Controller Network boards in the same personal computer.

Otherwise, they cannot be used due to the following conditions:

- When installing five or more CCIEC boards (Q) or CCIEC boards (NZ), the driver startup for the fifth and subsequent boards fails and the "!" mark is displayed in Windows Device Manager.
- When installing five or more boards with the combination of CCIEC boards (Q) and CCIEC boards (NZ), the CC IE Control utility cannot be started.

6.3 Channel Number Setting

The channel number is a number set for each board to identify them.

It can be set in the range from '151' to '154.'

The set channel numbers are used to specify the target boards when setting parameters or executing MELSEC data link library functions.

Precautions

When installing a CCIEC board (Q) and CCIEC board (NZ) in the same personal computer, a channel number may be duplicated due to the automatic assignment.

In this case, change the channel number.

Access to a board with the duplicate channel number or to another station via such a board may not be performed properly.

If the channel numbers of a CCIEC board (Q) and CCIEC board (NZ) are duplicated, access to another station is performed for the CCIEC board (NZ).

Setting method

Channel numbers can be set by using the utility.

 Page 94 Channel Number Setting

6.4 Tests before Wiring (Board communication test)

This section explains the board tests before network wiring.

The board communication test is for checking the hardware of a board.

When communication using a board is unstable, whether a hardware failure occurs can be checked.

The following contents are tested in the board communication test.

Item	Check point
Internal self-loopback test	Whether the board communication function runs correctly can be checked.
External self-loopback communication test	Whether a communication can correctly be performed using a cable connected between two connectors of a board can be checked.

Operating procedure

1. Connect the IN connector with the OUT connector by using a cable.

Use a cable of at least 2 m in length.

Do not perform the board communication test while connecting with another station; otherwise, the operation of the station may be regarded as abnormal.

2. Display the parameter setting screen for a board to be tested in the CC IE Control utility. ( Page 98 Parameter Setting)

3. Set "Board communication test" in the parameter.

4. Click the [End] button.

Parameters are written and the board is reset, then the test is performed.

5. Check the test result in the "Board detail information" screen of the CC IE Control utility. ( Page 97 Board detail information)

Corrective actions when an error occurs are as follows:

Error description	Corrective action
Internal self-loopback test error	Please contact your local Mitsubishi Electric sales office or representative.
External self-loopback test connection error	Check and/or replace the connection of cables and perform the test again. If the test is abnormally completed again, please contact your local Mitsubishi Electric sales office or representative.
External self-loopback test communication error	Replace optical fiber cables and perform the test again. If the test is abnormally completed again, please contact your local Mitsubishi Electric sales office or representative.

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

Point

With the mdBdModSet function of MELSEC data link library, the board communication test can be performed by using a user program.

Precautions

- Do not access buffer memory while the board communication test is being performed; otherwise, it is completed abnormally.
- Do not perform the board communication test while connecting with another station; otherwise, the operation of the station may be regarded as abnormal.

6.5 Wiring

This section explains the wiring when using CC-Link IE Controller Network.

Wiring products

The following explains the devices constituting CC-Link IE Controller Network when using an optical fiber cable.

Precautions for communication cables

- For communication cables used in a system, select ones that meet the specifications described in this section; otherwise, normal data transmission is not guaranteed.
- The bend radius of cable is limited. For details, check the specifications of a cable in use.

Optical fiber cable

Use an optical fiber cable and connector authorized by CC-Link Partner Association.

For details, refer to the CC-Link Partner Association website (www.cc-link.org).

Communication speed	Optical fiber cable		Connector	
	Type and standard	Description	Type and standard	Description
1 Gbps	IEEE802.3z 1000BASE-SX compatible GI type silica glass multimode optical fiber cable Standard: IEC 60793-2-10 A1a.1 compliant	Outside diameter of the core/clad: 50 μm /125 μm Transmission loss: 3.5 dB/km or lower [$\lambda = 850 \text{ nm}$] Transmission band: 500 MHz·km or higher [$\lambda = 850 \text{ nm}$]	Duplex LC connector Standard: IEC 61754-20 Type LC compliant	Connection loss: 0.3 dB or lower Polished surface: PC (Physical Contact) polishing

Optical fiber cables with connectors are sold by Mitsubishi Electric System & Service Co., Ltd. (Catalogs of optical fiber cables are also available.)

In addition, on-site connector polishing, terminal assembly, and fusion splicing are available. Please contact your local Mitsubishi Electric sales office or representative.

Type	Model (manufacturer)
Multimode optical fiber (GI)	QG series (Mitsubishi Electric System & Service Co., Ltd.)

External power supply cable

To create an external power supply cable, use the connector set included in the product.

The following shows the required parts and crimping tools.

■Connector set

The following parts are included in the connector set.

Type	Model name	Applicable wire size	Number of parts
Connector	1-178288-3	—	1
Contact	175218-2	AWG 20-16	3 (1 spare)

■Cable

Use a wire on the market that is compliant with the following:

Type	Model name	Applicable wire size	Number of parts
Wire	Any	AWG 20-16	2

■Tool

Make sure to use the following crimping tools as specified.

Type	Model name	Applicable wire size	Contact
Crimping tool	91558-1	AWG 20-16	TE Connectivity Ltd. www.te.com
	1762956-1		

■Creating an external power supply cable

1. Crimping a contact

Use a crimping tool to crimp a cable (1) and contact (2).

- Make sure to strip the cable to a length of 5 to 7 mm.
- Set the contact and cable in the groove of the crimping tool, and crimp them firmly by gripping the handle until it stops.

For details, refer to the manual for the crimping tool.

2. Checking for crimping

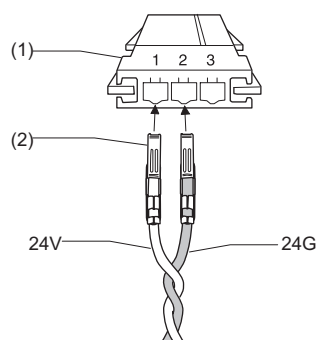
Check that the cable, including a part of the insulation, is uniformly crimped to the contact.

If only the wire is crimped without insulation, or the wire is exposed, it may cause cable disconnection or malfunction.

■Connecting to the connector of an external power supply cable

Refer to the following table, and insert the contact to the connector of the crimped cable until it clicks. Failure to do so may cause the board to fail or malfunction.

Pin No.	Description
1	24V
2	24G
3	Open



- (1) Connector
(2) Contact

Make sure to twist the 24 V power cable (24V) and GND cable (24G) of external power supply cable.

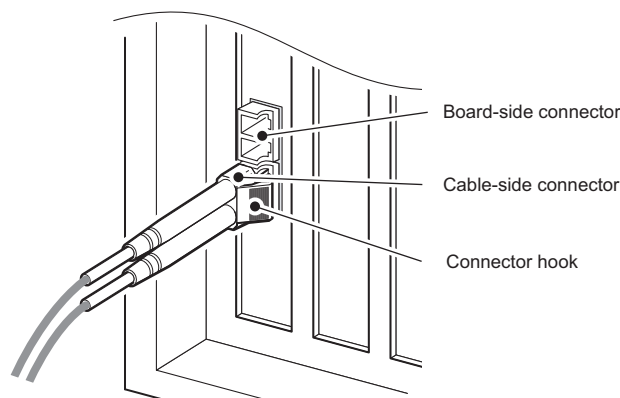
Wiring methods

Optical fiber cable

The following shows the connecting and disconnecting methods of an optical fiber cable.

■Connecting method

1. Turn the power of a personal computer OFF.
2. Check the insertion direction, and insert the connector of an optical fiber cable into the connector on a board until it clicks.
3. Lightly pull the cable to check that it is securely connected.



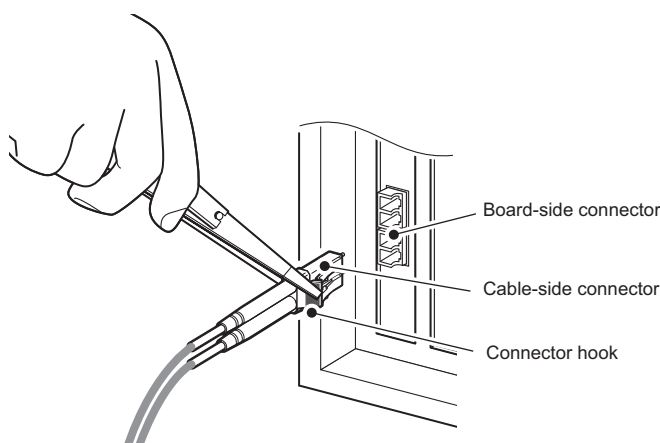
■Disconnecting method

1. Turn the power of a personal computer OFF.
2. Pull out an optical fiber cable while pinching the connector hook on the cable.

Precautions

- When connecting/disconnecting a cable to/from a board, pull or insert the cable by holding the cable connector with your hand.
- When disconnecting a cable from a board, do not pull on the cable part, otherwise a malfunction or damage of the board or cable may occur.
- When installing a board in a personal computer, secure a space of approximately 10 mm to the right and left of the optical connector. If the space cannot be secured due to an adjacent board or installation slot position, it may be difficult to connect and disconnect an optical cable.
- Depending on an adjacent board or installation slot position, it may be difficult to disconnect a cable. In that case, use the following dedicated tool.

Product name	Model name	Manufacturer
Connector detaching tool	SCT-SLM	Mitsubishi Electric System & Service Co., Ltd.



External power supply cable

The following shows the connecting and disconnecting methods of an external power supply cable.

■Preparation

Create an external power supply cable. ( Page 41 External power supply cable)

■Connecting method

1. Turn the power of a personal computer OFF.
2. Check the insertion direction, and insert the connector of an external power supply cable into the connector on a board until it clicks. Failure to do so may cause the board to fail or malfunction.
3. Lightly pull the cable to check that it is securely connected.
4. Turn the power of an external power supply ON.
5. Check whether the E.PW LED is ON.
6. Turn the power of the personal computer ON.

■Disconnecting method

1. Turn the power of a personal computer OFF.
2. Turn the power of an external power supply OFF.
3. Check whether the E.PW LED is OFF.
4. Pull out the external power supply cable by holding the connector with your hand.

Pulling the cable connected to a board may result in malfunction or damage to the board or cable.

Wiring precautions

The order of cable connections is not related to station numbers. Stations can be connected even if they are not in order of station number.

There are two types in connectors: IN connector and OUT connector. Connect the IN connector of the own station to the OUT connector of another station, and connect the OUT connector of the own station to the IN connector of the other station.

Precautions for laying communication cables

- Protect the core wire in the connector of a cable or a board to prevent touching by hand and sticking dirt or dust. If any oil from your hand, dirt or dust sticks the core wire, it may increase the transmission loss and fail a data link.

6.6 Tests after Wiring

This section explains the tests for a line and cable that should be performed after network wiring. These tests need to be performed in the actual network configuration.

Communication test

The communication test is for checking whether a transmission path from the own station to a destination is correctly set for a transient transmission.

 Page 117 Communication test

CC-Link IE Controller Network diagnostics

Network diagnostics is for checking whether cables are connected properly and a communication is performed normally based on the set parameters.

 Page 111 CC-Link IE Controller Network diagnostics

7 FUNCTIONS

This chapter shows the details on the functions.

7.1 Function Lists

Board function list

The following tables show the functions of a CC-Link IE Controller Network interface board.

Cyclic transmission

○: Available, ×: Not available

Function		Description	Availability	
			Control station	Normal station
Communication with other stations	Communication using LB and LW	To allow each station on a network to write data to its own send range of the link devices (LB and LW) and send the data to all other stations on the same network. (Page 49 Communication using LB and LW)	○	○
	Communication using LX and LY	To exchange data between the I/O master station that controls LX and LY and other stations on a 1:1 basis. (Page 50 Communication using LX and LY)	○	○
Refresh	Link refresh	To automatically transfer device data between a personal computer and a board. (Page 51 Link refresh)	○	○
	Link device access	To read/write link devices (LB/LW/LX/LY/SB/SW) of the own station by using a user program. (Page 53 Access to link devices)	○	○
Cyclic data assurance		To assure cyclic data in 32-bit units or for each station. (Page 54 Cyclic data assurance)	○	○
Cyclic transmission punctuality assurance		To keep the link scan time constant by the following methods: • Specification of the number of transient transmissions: Specify the number of transient transmissions for one link scan. • Constant link scan: Specify the link scan time. (Page 56 Cyclic transmission punctuality assurance)	○	×
Send point extension	Send point extension by the extended mode	To extend the maximum link points of the link relay (LB) and the link register (LW) per station. (Page 57 Send point extension by the extended mode)	○	○
	Send point extension by the link points extend setting	To extend the maximum link points of the link relay (LB) and the link register (LW) per network and per station. (Page 57 Send point extension by the link points extend setting)	○	○
Cyclic transmission stop and restart		To stop the cyclic transmission (data reception from other stations and data sending from the own station) during debugging or other operations, and to restart the stopped cyclic transmission. Transient transmission is not stopped. (Page 58 Cyclic transmission stop and restart)	○	○

Transient transmission

○: Available

Function	Description	Availability	
		Control station	Normal station
Communication by specifying devices and buffer memory of another station	To send/receive data to/from devices of a CPU module in another station or buffer memory of a remote station by using the MELSEC data link library. ( Page 59 Communication by specifying devices and buffer memory of another station)	○	○
Communication using utilities	To monitor other stations and send/receive data to/from other stations by using the CC IE Control utility and device monitor utility. ( Page 59 Communication using utilities)	○	○
Group transient transmission	To execute the link start/stop for all stations in a group by specifying the group number of the target stations for transient transmission. ( Page 59 Group transient transmission)	○	○
SEND/RECV function	To send/receive data to/from other stations using the MELSEC data link library function. ( Page 60 SEND/RECV function)	○	○
Routing function	To perform relay processing for transient transmission according to a routing path. A routing path is automatically collected in dynamic routing. For static routing, users can specify it. ( Page 64 Routing function)	○	○

RAS

○: Available, ×: Not available

Function	Description	Availability	
		Control station	Normal station
Automatic reconnection	To automatically reconnect a station disconnected from a network due to a data link error and restart the data link when the station recovers from the error.	○	○
Loopback function	To continue a data link with normally operating stations even if a cable is disconnected or an error occurs in a station. ( Page 65 Loopback Function)	○	○
Control station switching	To continue a data link with a normal station (sub-control station) that serves as a control station even if the control station goes down.	×	○
Normal station disconnection	To disconnect a station in which an error has occurred from a network and continue a data link with only stations operating normally. In a line topology system, stations connected after a station where an error has occurred are disconnected.	○	×
Support for external power supply	To continue network communication with an external power supply even if a personal computer is powered OFF. ( Page 66 External Power Supply Function)	○	○

Diagnostics

○: Available

Function	Description	Availability	
		Control station	Normal station
CC-Link IE Controller Network diagnostics	To check the status of CC-Link IE Controller Network. An error location, cause, and corrective action can also be checked in the CC IE Control utility. ( Page 68 CC-Link IE Controller Network diagnostics)	○	○
Board communication test	To check the hardware of a board. This function should be performed when a communication is unstable. ( Page 39 Tests before Wiring (Board communication test))	○	○
Communication test	To check whether the transmission path from the own station to a target station is correctly set for a transient transmission. ( Page 117 Communication test)	○	○

Board redundancy

○: Available, ×: Not available

Function	Description	Availability	
		Control station	Normal station
Cyclic transmission (send/receive) in a redundant system	To send cyclic data of the control system only with the cyclic transmission range that is the same among the systems A and B boards set as redundancy target stations. ( Page 73 Cyclic transmission when using the board redundancy function)	○	×
System switching	To switch the control system and the standby system so that the system operation can be continued when a failure or an error occurs in the control system. They can also be switched for debugging and maintenance. ( Page 77 System switching)	○	×
User program error monitoring	To perform the error monitoring between a user program and board, and to notify the system switching from the system. ( Page 83 User program error monitoring)	○	×

Others

○: Available, ×: Not available

Function	Description	Availability	
		Control station	Normal station
Driver WDT function	To monitor the operation of the software (operating system, driver). ( Page 86 Driver WDT function)	○	○
Reserved station specification	To reserve a station for future use. Reserved stations are not actually connected but counted as connected stations in the network and not detected as faulty stations. ( Page 86 Reserved station specification)	○	×
Firmware update	To update the firmware of a board installed in a personal computer. ( Page 87 Firmware update)	○	○

Software package function list

CC IE Control utility

The following table shows the functions of the CC IE Control utility.

Function		Description	Reference
Board information	Board information	To display parameters set for each board and the communication status.	Page 96 Board Information
	Channel number confirmation	To confirm the channel number set for each board.	Page 94 Channel Number Setting
	Board detail information	To display the detailed information on a board.	Page 97 Board detail information
Setting	Parameter setting	To set the channel number, station type, operation mode, network number, station number, etc. of a board.	Page 98 Parameter Setting
	Network range assignment	To set the cyclic transmission range of the link devices (LB, LW, LX, and LY) which can be sent from each station.	Page 102 Network range assignment
	Equal assignment	To assign the link devices (LB, LW, LX, and LY) in the same point or equally.	Page 104 Equal assignment
	Supplementary setting	To set the constant scan, block data assurance per station, punctuality assurance, and maximum number of transients in one station.	Page 105 Supplementary setting
	Driver setting	To set the timeout monitoring time for a transient transmission and the link refresh cycle.	Page 106 Driver setting
	Target setting	To set the logical station number to access a CPU module on another network.	Page 108 Target setting
	Routing parameter setting	To set parameters necessary for a transient transmission to a station on another network in multiple network system.	Page 110 Routing parameter setting
Network diagnostics	CC-Link IE Controller Network diagnostics	To display the statuses of network links and stations.	Page 111 CC-Link IE Controller Network diagnostics
	Communication test	To display the route to the specified station.	Page 117 Communication test
	Link start/stop	To start and stop a data link of the specified station.	Page 118 Link start/stop
	Logging	To log the transmission path switching of the specified station and transient transmission errors.	Page 121 Logging

Device monitor utility

For the device monitor utility, refer to the following:

 MELSEC Data Link Library Reference Manual

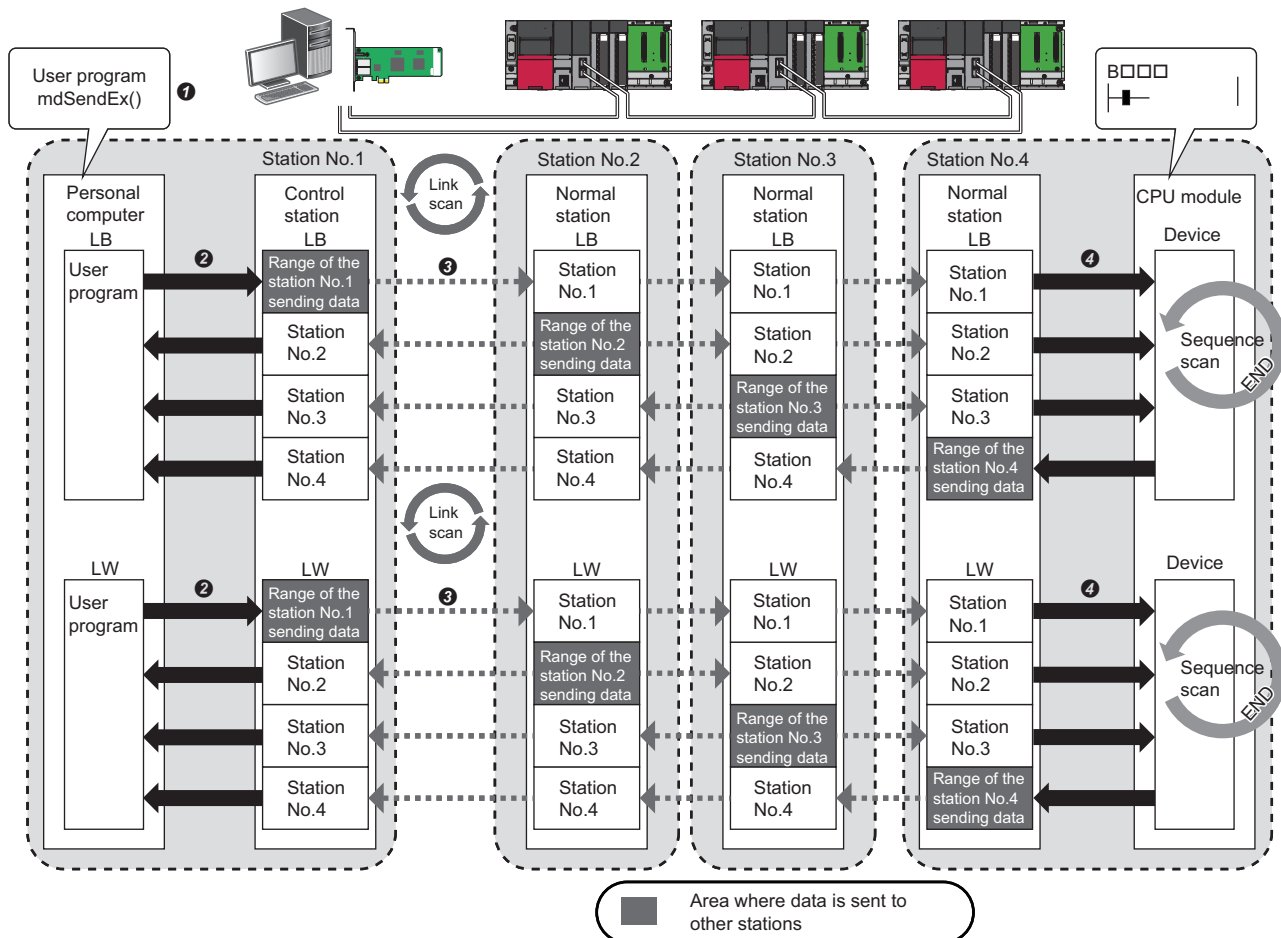
7.2 Cyclic Transmission

This section shows the function to exchange data periodically among stations on the same network using link devices (LB/LW/LX/LY) to share data between a personal computer and a CPU module.

Data flow and link device assignment

Communication using LB and LW

Data is written to the own station send range of link devices (LB and LW) and sent to all other stations on the same network by each station on the network. The status of link devices (LB, LW) of the control station are stored in link devices (LB, LW) of each normal station. The status of link devices (LB, LW) of normal stations are stored in link devices (LB, LW) of the control station and link devices (LB, LW) of other normal stations.



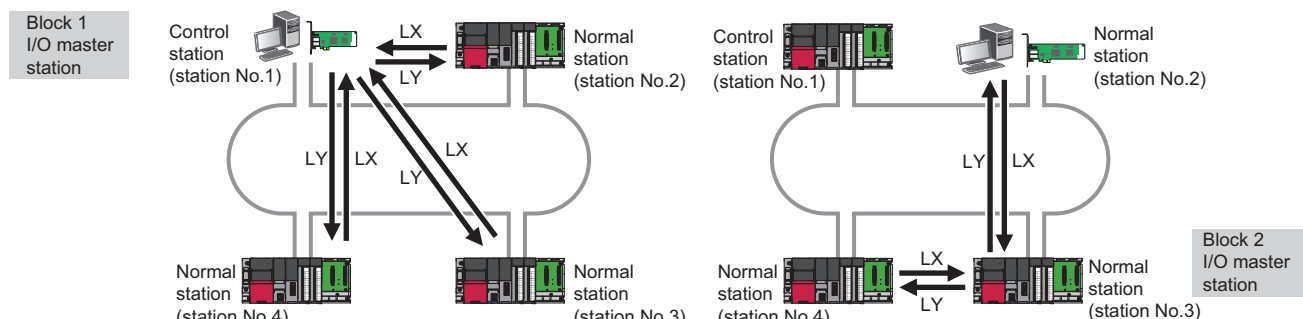
- ① Values written by using the MELSEC data link library in a user program are written to the driver buffer for link devices in a personal computer.
- ② The status of the driver buffer in the personal computer is stored in the link devices (LB and LW) in the board by link refresh.
- ③ The statuses of the link devices (LB and LW) are stored in the link devices (LB and LW) of each network module on the reception side by link scan.
- ④ The statuses of the link devices (LB and LW) are stored in each device in the CPU module on the reception side.

Communication using LX and LY

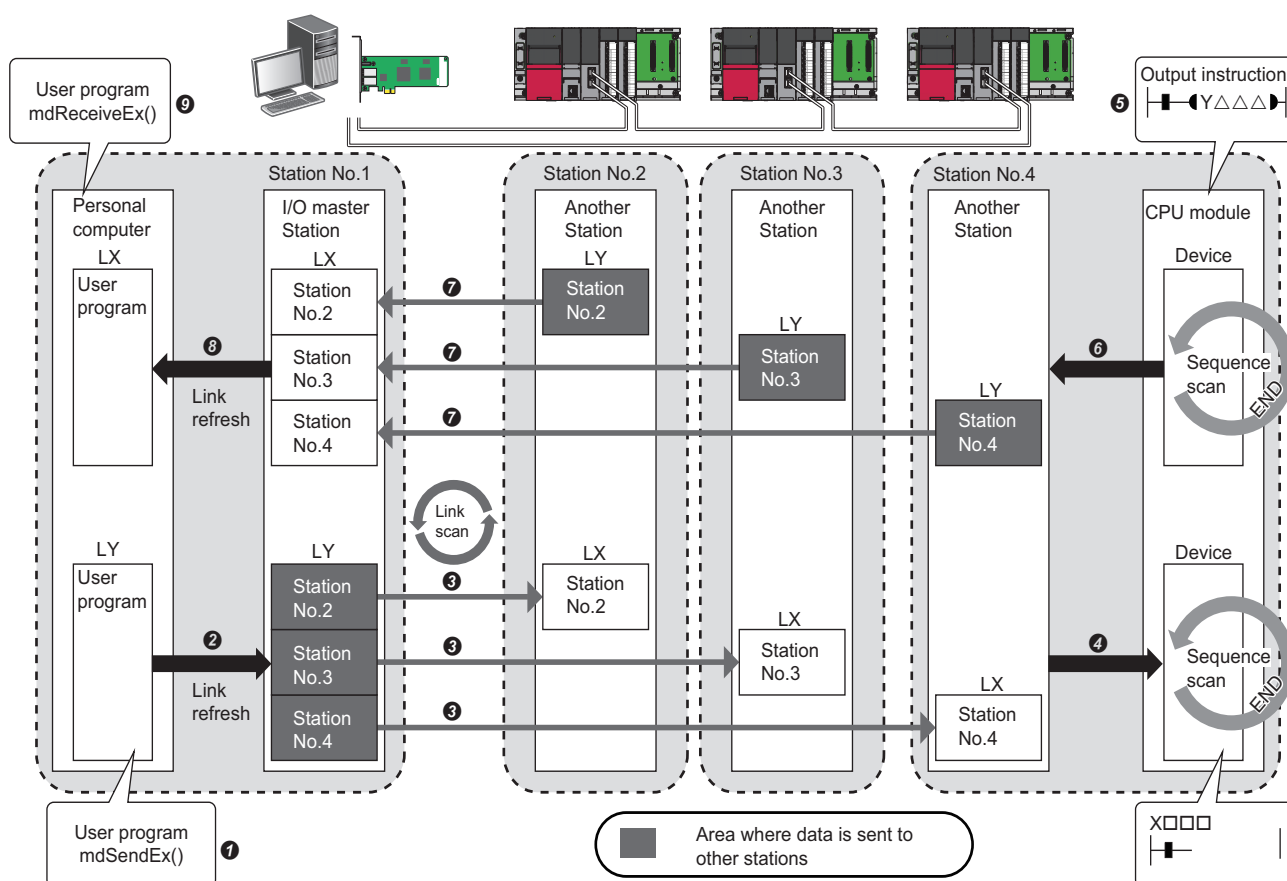
The I/O master station that controls LX and LY communicates with another station on a 1:1 basis.

Up to two I/O master stations can be set for one network (block 1 and block 2) regardless of the control station and normal stations.

'Link input' (LX) is used to receive the input information from each station in a block and 'Link output' (LY) is used to send the output information of the I/O master station.



The status of 'Link output' (LY) of the I/O master station is output to 'Link input' (LX) of another station and the status of 'Link output' (LY) of the station is stored in 'Link input' (LX) of the I/O master station.



• Output from the I/O master station

- ① Values written by using the MELSEC data link library in a user program are written to the driver buffer for link devices in a personal computer.
- ② The status of the driver buffer in the personal computer is stored in the 'Link output' (LY) of the board which is set as the I/O master station by link refresh.
- ③ The status of 'Link output' (LY) of the I/O master station is stored in 'Link input' (LX) of another station by link scan.
- ④ The status of 'Link input' (LX) of the station is stored in each device in a CPU module by link refresh.

• Input from another station

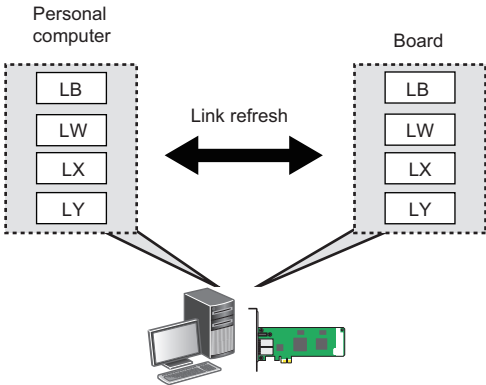
- ⑤ A device of a CPU module turns ON.
- ⑥ The status of the device in the CPU module is stored in 'Link output' (LY) of another station by link refresh.
- ⑦ The status of 'Link output' (LY) of the station is stored in 'Link input' (LX) of the I/O master station by link scan.
- ⑧ The status of 'Link input' (LX) of the I/O master station is stored in the driver buffer for link devices in a personal computer by link refresh.
- ⑨ The values of the link devices are read by using the MELSEC data link library in a user program.

Setting method

Link devices can be assigned in the "Network range assignment" screen. ( Page 102 Network range assignment)

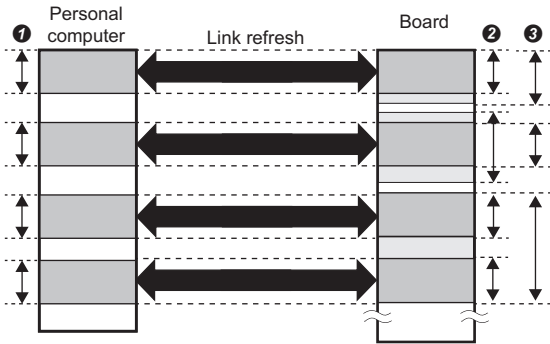
Link refresh

Link device data is automatically transferred between the driver buffer in a personal computer and a board.



Concept of the link refresh range (number of points)

Link refresh is performed in the ranges set in "Refresh parameter setting" and "Network range assignment."

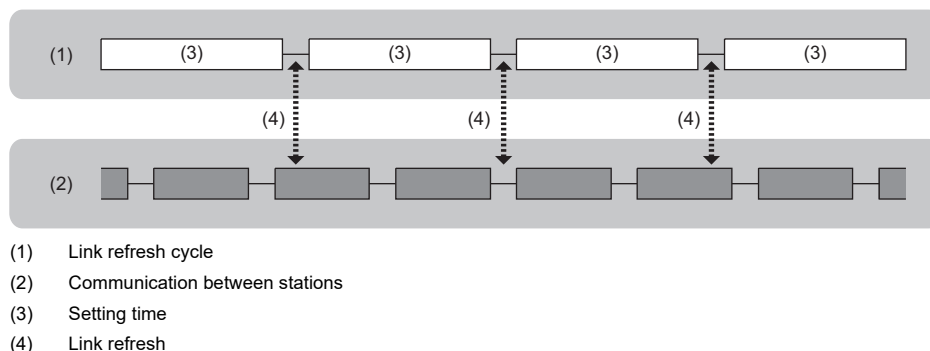


- ① Actual link refresh range
- ② Range set in "Refresh parameter setting"
- ③ Range set in "Network range assignment"

Link refresh timing

Link refreshes are performed in a link refresh cycle set in the parameter.

A link refresh and communication between stations are asynchronous.



When handling 32-bit or larger data, old and new data in 16-bit units may exist at the same time depending on the timing of link refresh.

In this case, use the function for assuring data for each station or in 32-bit units. ( Page 54 Cyclic data assurance)

Link refresh time

The time of link refresh being performed can be checked in the "Board detail information" screen. ( Page 97 Board detail information)

The processing is not canceled even if the link refresh processing time exceeds the set link refresh cycle.

A link refresh cycle set in the parameter is compared with the link refresh processing time, and the longer one is applied as the link refresh time.

Point

If the operation of a personal computer slows down due to the link refresh processing, take the following corrective actions:

- Adjust the value of link refresh cycle setting. ( Page 106 Driver setting)
- Reduce the number of link refresh points ( Page 109 Refresh parameter)

Shortening of link refresh time and transmission delay time

The link refresh time and transmission delay time can be shortened by reducing the number of link refresh points.

By setting only link devices used for a user program for the link refresh range, the number of link refresh points can be reduced.

When the link refresh processing time is increased due to the processing on Windows system or other application, refer to the following:

 Page 154 Link refresh time is increased

Point

The link refresh time may be shortened due to the update of CC IE Control utility and change of refresh parameter assignment, etc.

If the shortened link refresh time affects the operation of applications, extend the link refresh cycle.

Setting method

The link refresh range can be set in the following parameter settings:

- Network range assignment ( Page 102 Network range assignment)
- Refresh parameter setting ( Page 109 Refresh parameter)

The link refresh cycle can be set in "Driver setting" of the parameter. ( Page 106 Driver setting)

Access to link devices

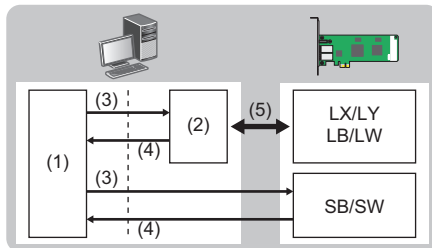
To read/write data from/to link devices of the own board in a user program, use MELSEC data link library functions.

Point

For details on the functions for accessing devices, refer to the following:

📖 MELSEC Data Link Library Reference Manual

When accessing link devices with functions, data is sent to/received from the driver buffer in a personal computer. When accessing link special relays (SB) or link special registers (SW), data is directly sent to/received from link devices in a board.



- (1) User program
- (2) Driver buffer
- (3) Writing
- (4) Reading
- (5) Link refresh

Precautions

- A value written to the driver buffer is applied to a link device of a board after link refresh.
- If a value is outside the link refresh range, it is not applied to a link device of a board even if written to the driver buffer.
- For a receive area from another station in the link refresh range, a value is overwritten by link refresh even if written to the driver buffer.

Cyclic data assurance

The cyclic data can be assured in 32-bit units or for each station.

The following table shows the three methods for assuring the cyclic data.

○: Applicable, —: Not applicable

Method		Description	Applicability	
			Link refresh	Access to buffer memory
32-bit data assurance		Data is assured in 32-bit units. It is applied automatically when the assignment condition of a link device is satisfied.	○	○
Assurance of data exceeding 32 bits	Block data assurance per station	Data is assured for each station. It is applied by enabling the block data assurance per station in the parameter setting.	○	—
	Interlock program	Data is assured when it exceeds 32 bits. It is applied by including an interlock in a program.	○	○

Point

When handling 32-bit or larger cyclic data such as those listed below, old and new data in 16-bit units may exist at the same time depending on the link refresh timing.

- Floating point data
- Current values and command speed of a positioning module

Setting method

Block data assurance per station can be set in the "Supplementary setting" screen of the parameter setting for the control station. ( Page 105 Supplementary setting)

Once this setting is enabled on the control station, the data of all stations is assured for each station.

When disabling "Block data assurance per station," data is assured in 32-bit units.

32-bit data assurance

The link relay (LB) and link register (LW) data is assured in 32-bit units.

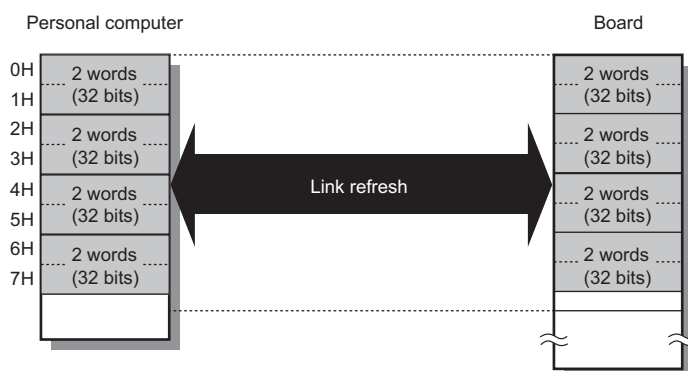
When setting LB and LW with the following four conditions satisfied, 32-bit data is automatically assured.

- The start device number of LB is a multiple of 20H.
- The number of points assigned per station in LB is a multiple of 20H.
- The start device number of LW is a multiple of 2.
- The number of points assigned per station in LW is a multiple of 2.

LB and LW can be set in the "Network range assignment" screen of the control station. ( Page 102 Network range assignment)

■Data assurance at the time of link refresh

Link-refreshing the link devices that satisfy the conditions for 32-bit data assurance will ensure the 32-bit data.

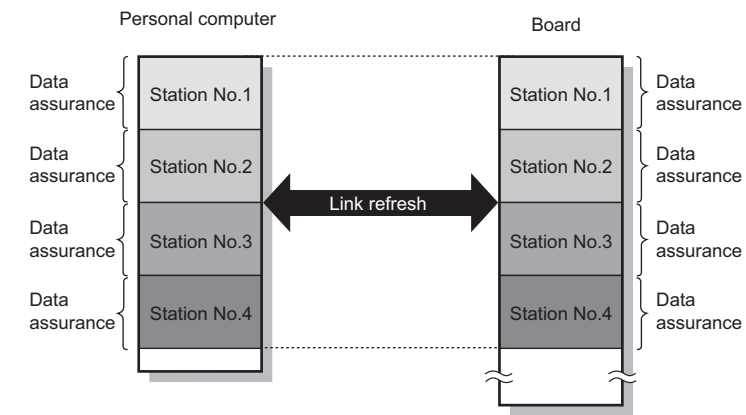


Block data assurance per station

Cyclic data is assured for each station by handshake between a personal computer and a board for a link refresh.

■Link device access

During a link refresh, data is assured for each station as shown below.



Interlock program

Data exceeding 32 bits is assured without using the block data assurance per station.

By using a target device for link refresh and configuring an interlock in a user program, cyclic data is assured.

Cyclic transmission punctuality assurance

The link scan time can be kept constant by the following methods:

Method	Description	Advantage	Disadvantage
Specification of the number of transient transmissions	Specify the number of transient transmissions during one link scan.	The link scan time can be minimized while it is kept constant.	If the network status is unstable, the link scan time may not be kept constant.
Constant link scan	Specify the link scan time.	Even If the network status is unstable or the number of transient transmissions varies, the link scan time can be kept constant.	If the actual link scan time is longer than the specified link scan time, the operation is performed based on the actual link scan time.

Point

While this function keeps the link scan time constant, the transmission delay time is not kept constant by this function.

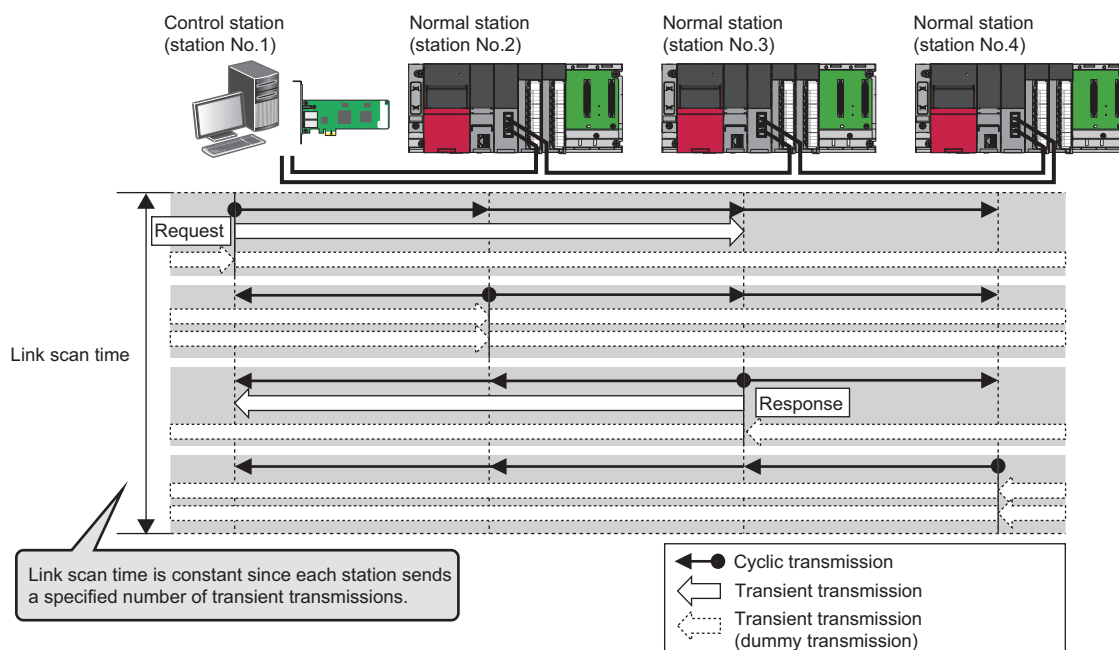
Specification of the number of transient transmissions

When the fluctuation in link scan time due to transient transmission needs to be eliminated, the time can be kept constant by performing a specified number of transient transmissions during one link scan at each station.

- When the actual number of transient transmissions is less than the specified number, dummy data is sent to cover the shortfall.
- When the actual number of transient transmissions exceeds the specified number, the transmissions are performed in several link scans.

Ex.

When the specified number is '2':



Constant link scan

When the network status is unstable and other cases, the link scan time can be kept constant by specifying the time, into which the fluctuation range is considered, on the control station.

Setting method

Cyclic transmission punctuality assurance can be set in the "Supplementary setting" screen of the parameter setting for the control station. (Page 105 Supplementary setting)

Send point extension

The send point per station is limited by the maximum link points per network and per station.

The send point can be extended by either of the following methods:

- Extended mode
- Link points extend setting

The maximum link points per network and per station are extended to the following values according to the parameter setting.

Extended mode (Station type)	Link points extend setting	Maximum link point per network		Maximum link point per station	
		LB	LW	LB	LW
Control station Normal station	Not to extend	32K points (32768 points, 4 KB)	128K points (131072 points, 256 KB)	16K points (16384 points, 2 KB)	16K points (16384 points, 32 KB)
Extended mode (Control station) Extended mode (Normal station)				32K points (32768 points, 4 KB)	128K points (131072 points, 256 KB)
Control station Normal station	Extend	64K points (65536 points, 8 KB)	256K points (262144 points, 512 KB)	16K points (16384 points, 2 KB)	16K points (16384 points, 32 KB)
Extended mode (Control station) Extended mode (Normal station)				64K points (65536 points, 8 KB)	256K points (262144 points, 512 KB)

Send point extension by the extended mode

This is for extending the maximum link points of the link relay (LB) and the link register (LW) per station.

■Setting method

The send point is extended by selecting "CC IE Control Extended mode(Control station)" or "CC IE Control Extended mode(Normal station)" for "Network type" in the "Parameter setting" screen.

■Considerations

When using the extended mode, set it for the control station and normal stations in the same network. Stations with the extended mode enabled and stations with the extended mode disabled cannot exist in the same network.

Send point extension by the link points extend setting

This is for extending the maximum link points of the link relay (LB) and the link register (LW) per network and per station.

The link refresh setting range as well as the maximum link point per network is extended.

■Setting method

The send point is extended by selecting "Extend" for "Link points extend setting" in the "Parameter setting" screen.

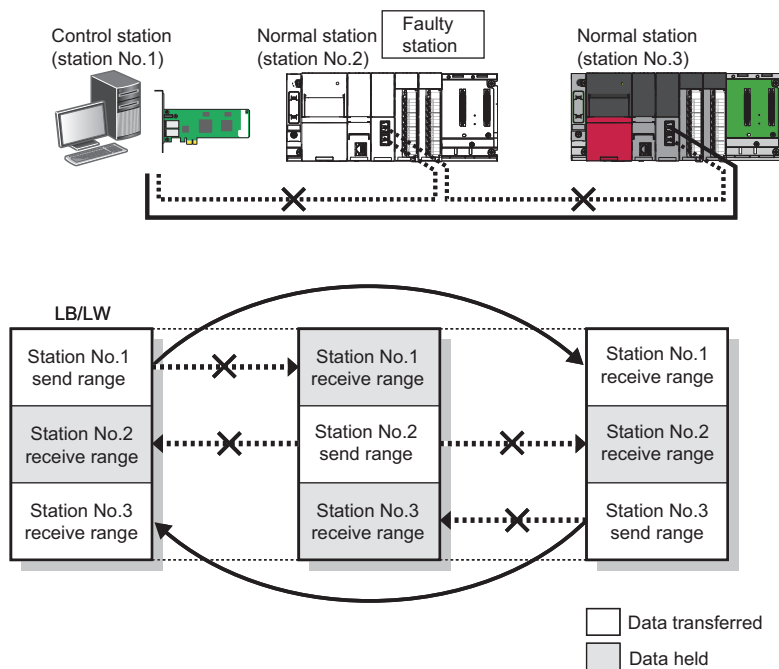
■Considerations

When using the link point extension function, set it for the control station and normal stations in the same network. Stations with the function enabled and stations with the function disabled cannot exist in the same network.

Reception status when an error occurs

When there is a data link faulty station on the CC-Link IE Controller Network, the link device statuses are as follows:

- Normally operating station: Holds the data received from the faulty station immediately before the error.
- Faulty station: Holds the data received from another station immediately before the error.



Cyclic transmission stop and restart

This function is for stopping the cyclic transmission during debugging and other operations. (Data reception from other stations and data sending from the own station are stopped.) Also, the stopped cyclic transmission can be restarted. This function does not stop or restart transient transmission.

This function can be performed in the "Link start/stop" screen for diagnostic.

(Page 118 Link start/stop)

7.3 Transient Transmission

This section shows the function to communicate with other stations at any timing. Communication can also be established with different networks.

Communication by specifying devices and buffer memory of another station

Data is read/written from/to devices of a CPU module or a board in another station by using the MELSEC data link library. Stations in a different network can also be specified.

For details on available MELSEC data link library functions, refer to the following:

📖 MELSEC Data Link Library Reference Manual

Communication using utilities

Each station can be set and monitored by using the following utilities:

- CC IE Control utility (📖 Page 88 CC IE Control Utility)
- Device monitor utility (📖 MELSEC Data Link Library Reference Manual)

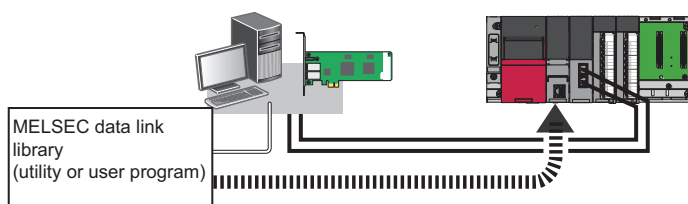
Access to other stations by using the device monitor utility is also performed in transient transmission using the MELSEC data link library.

Communication within the same network

Other stations in the same network can be accessed.

Regardless of the network configuration, communication can be established with stations in the same network.

7



Group transient transmission

The group function is for specifying transient transmission target stations as the group and transmitting data to all stations in a group with a single transient transmission.

When sending transient data to the group, specify the group number for the station number specification of the SEND function (mdSendEx function).

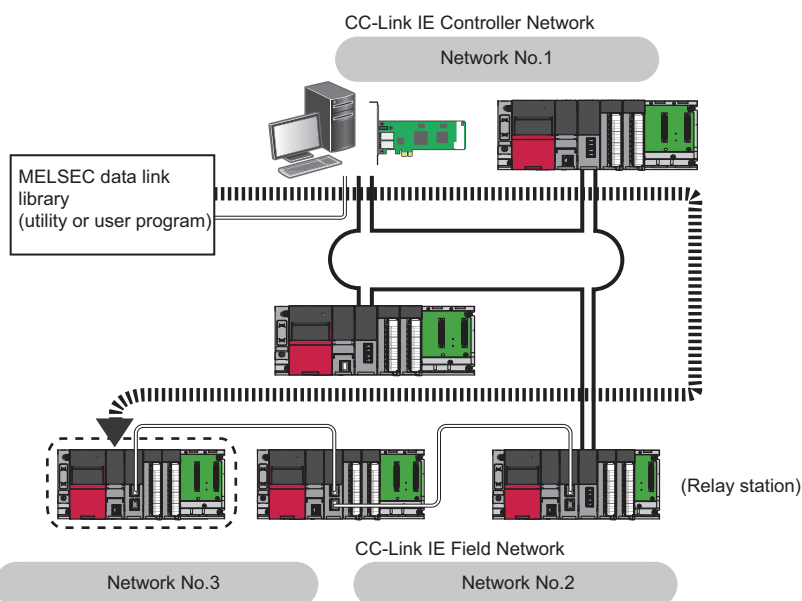
This is for executing the link start/stop for all stations in a group by specifying the group number of the target stations for transient transmission. (📖 Page 118 Link start/stop)

A network can be divided into up to 32 groups. (📖 Page 100 Operational setting)

Communication with different networks

Communication can also be established with stations in different networks by using the routing function ( Page 64 Routing function).

In addition, seamless communication with stations in different types of networks is available.



Point

Communication can be established with stations within eight networks (number of relay stations: 7).

SEND/RECV function

This function is for sending/receiving data to/from the programmable controller on another station using the MELSEC data link library function. This function supports the SEND/RECV instruction of link dedicated instruction. For details on the function, refer to the following:

 MELSEC Data Link Library Reference Manual

Channel

A channel is an area of a board where data handled by the SEND/RECV function is stored. By using multiple channels, it is possible to simultaneously access from the own station to other stations or concurrently read from and write to the same board.

■Number of channels

The number of channels that can be used for the SEND/RECV function is 8.

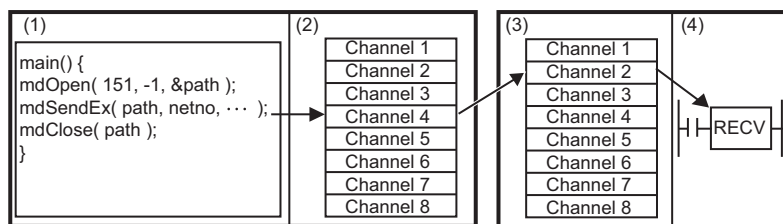
■Considerations

When executing the sending and receiving of multiple data simultaneously by the SEND/RECV function, make sure that the channels for the instructions are not duplicated. The sending and receiving for which the same channel is specified cannot be executed simultaneously. To use the same channel for multiple sending and receiving, execute one after completion of another.

SEND function

This function is for sending data from the own station to the specified channel of the specified station using the mdSend/mdSendEx function of MELSEC data link library function.

Specify a channel used by the own station and a target station channel.



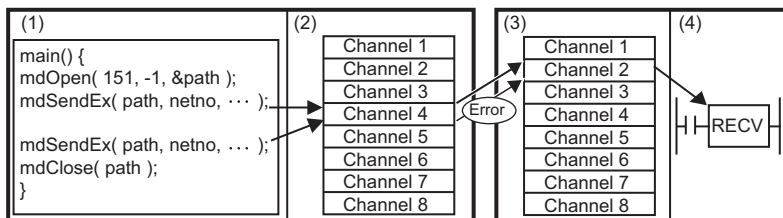
- (1) User application
- (2) Board (own station)
- (3) Network module (target station)
- (4) CPU module

■Considerations

- When sending data to the same channel of the target station

Send the data after the target station has been read the specified channel data.

An error occurs if sending the data to the same channel of the target station before reading the specified channel data.

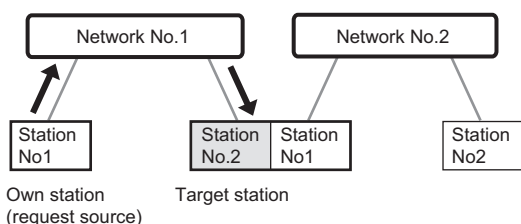


- (1) User application
- (2) Board (own station)
- (3) Network module (target station)
- (4) CPU module

- When the multiple network modules are mounted on the target station

Specify the network number and station number of the network module which receives the request from the own station.

The following example specifies the station number 2 of the network number 1. (The station number 1 of the network number 2 cannot be specified.)



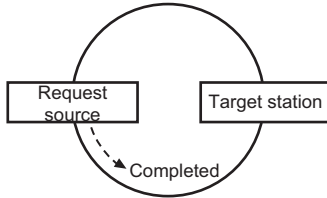
- Only the even-number byte can be specified for the transmission data size.
- A logical station number cannot be specified.

■Execution type

Two execution types, "Without arrival acknowledgment" and "With arrival acknowledgment", are available for the SEND function. When sending data with "Without arrival acknowledgment" execution type, "All stations" and "Group Number" can be specified as target stations besides the station number.

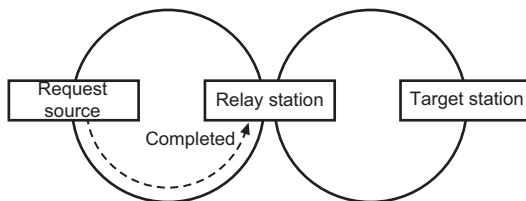
- Without arrival acknowledgment (When the target station is on the same network)

The process is completed when data is sent from the own station.



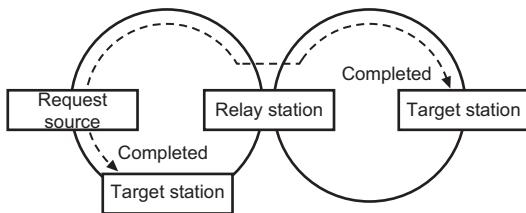
- Without arrival acknowledgment (When the target station is on another network)

The process is completed when data arrives at the relay station on the same network.



- With arrival acknowledgment

The process is completed when data is stored in the specified channel of target station.



Point

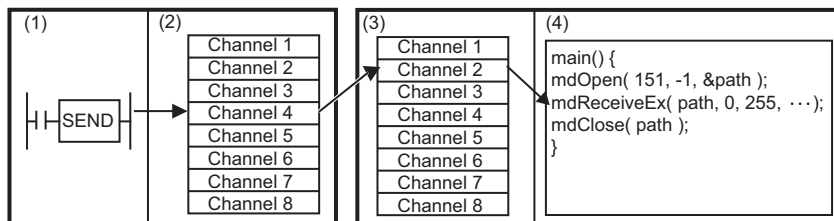
When "Without arrival acknowledgment" is specified, the result is regarded as normal on the own station even if the sending to the target station fails as follows:

- When communication ends normally even though sent data is abnormal
- When data cannot be stored in the target station, because data is sent to the same station from multiple stations

If the target station is a board, the data may not be received even if the sending set to "With arrival acknowledgment" is completed normally. For details, refer to the RECV function ( Page 63 RECV function).

RECV function

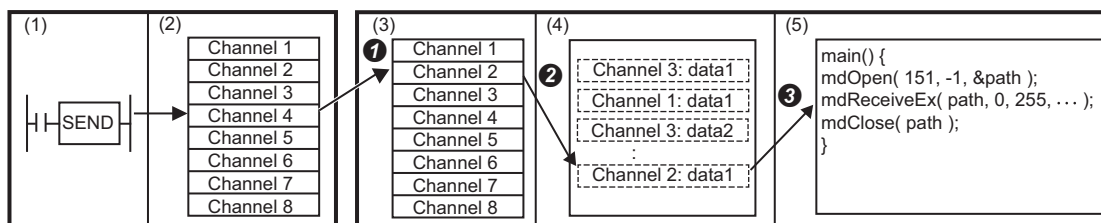
This function is for reading data received from the other station using the mdReceive/mdReceiveEx function of MELSEC data link library function.



- (1) CPU module
- (2) Network module (other station of the send source)
- (3) Board (own station)
- (4) User application

■Reception buffer

Data received from the other station is stored in the reception buffer in the driver after stored in a specified channel. A maximum of 128 reception data is stored in the reception buffer in the driver regardless of the channel number. When received data exceeds 128, the driver discards the received data automatically.



- (1) CPU module
- (2) Network module (other station of the send source)
- (3) Board (own station)
- (4) Reception buffer in the driver
- (5) User application

- ① Data received from other stations is stored in a storage channel of the target station specified in the send source.
- ② The driver stores the received data in the reception buffer from the storage channel of the target station.
- ③ By using the mdReceive/mdReceiveEx function, data of the specified channel number is read from the reception buffer in order in which it is received.

An error may occur under the following conditions:

Condition	Description	Corrective action
Data is read immediately after the send data completion at the sending station.	When executing the mdReceive/mdReceiveEx function immediately after the send data completion at the sending station, 'No reception data error' occurs because data has not yet been stored in the reception buffer of the driver.	• Retry the operation after a while.
Data is sent consecutively from the sending station.	When attempting data send consecutively, "Channel busy (dedicated instruction) error" occurs at the sending station because the channel is being used by the driver and thus the sent data cannot be received.	• Retry the operation after a while. • Change the storage channel of the target station.

■Considerations

- When 128 received data is stored in the reception buffer, the board receives data once, and then, the data is discarded. Therefore, a normal completion is established on the sending side when the data is sent with "With arrival acknowledgment."
- When receiving data to the multiple channels of the board, create a user program to read data from all channels that receive data. If a channel from which data is not read exists in the channel from which data is received, the received data of the channel from which data is not read is accumulated in the reception buffer of the driver and all areas of 128 data are occupied. In this case, the received data of other channels cannot be read because the driver automatically discards subsequent data received by the board.

Routing function

This function is for selecting a transmission path when accessing stations in different networks.

There are two types: dynamic routing in which a transmission path is automatically selected, and static routing in which any transmission path can be set.

Even if dynamic routing is enabled, the path setting for static routing is prioritized when it is available.

Precautions

This board cannot be used as a relay station for the routing function.

To use this function, set a network module as a relay station.

When the relay station is a redundant system, use dynamic routing.

To use static routing in a redundant system, specify the control system side in the routing parameter.

However, transient transmission cannot be performed by using the static routing function when the system switching occurs.

Dynamic routing

A transmission path is automatically selected.

A transmission path on which few relay stations pass through is created and updated as necessary.

Dynamic routing can be used in a network system configured with devices supporting it.

Precautions

- When enabling dynamic routing, a data link must be available. Mounted modules are treated as routing targets even if a data link is not available. The data link status can be checked by performing a communication test.
- If there are networks with the same number in a network system, an access target may not be set correctly with dynamic routing. Avoid network number duplication in the network system.
- If there is any station with static routing set in a network system, a transmission path with more than seven relay stations is created with dynamic routing and an error may occur in transient transmission. If any relay station does not support dynamic routing, set static routing for all the stations in the transmission path. ( Page 110 Routing parameter setting)

■Setting method

Check that "Dynamic Routing" under "Operational setting" is set to "Enable." ( Page 100 Operational setting)

Static routing

Any transmission path can be set.

Use this for a system in which network modules supporting dynamic routing and those not supporting it are included or when setting a transmission path clearly.

Communication can also be established with networks including stations not supporting dynamic routing.

■Setting method

Set a transmission path in the "Routing parameter setting" screen. ( Page 110 Routing parameter setting)

In order to turn to other networks, set the network/station number of passing local network (relay station) and the network number of final attainment destination (target station).

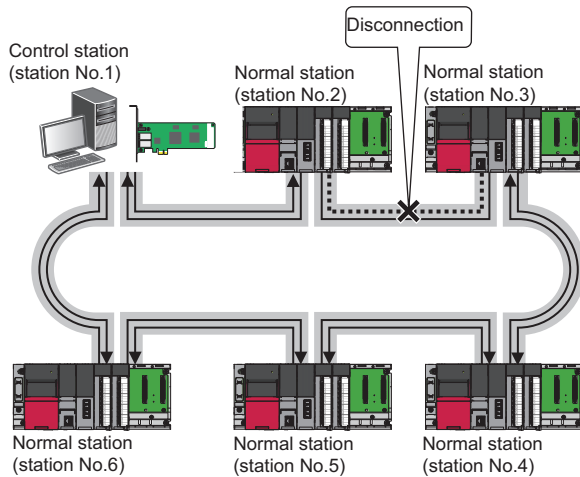
Up to 238 routing settings can be set.

7.4 Loopback Function

This section shows the function to continue the data link with normally operating stations even if a cable is disconnected or an error occurs in a station.

Cable disconnection

Even if a cable is disconnected, the system automatically performs loopback to continue the data link.

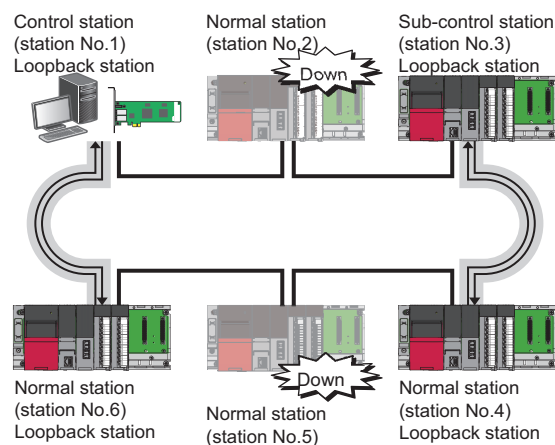


Error occurrence in a station

The system disconnects faulty stations and automatically performs loopback to continue the data link.

If an error occurs in two or more stations, a station located between them cannot perform the data link.

However, when more than one station exists between stations with an error, a normal station is changed to a sub-control station and continues the data link.



Setting method

The loopback function remains effective at all times. No parameter setting is required.

Precautions

When a board fails, loopback may not be performed depending on the failure.

In this case, data link may be stopped. To identify the station with a failure, perform either of the following methods:

- Identify a faulty station by checking the LED indications (OFF of RUN LED, ON or flashing of ERR. LED) of all stations.
- Power OFF all stations, then power ON stations in order, starting from the control station. At that time, check that up to which station on the network the loopback is normally performed. Check whether the control station and a reconnected normal station are displayed in a loopback station in the network information display of the CC-Link IE Controller Network diagnostics.

Replace the board where a failure has been detected, and check that the data link recovers normally.

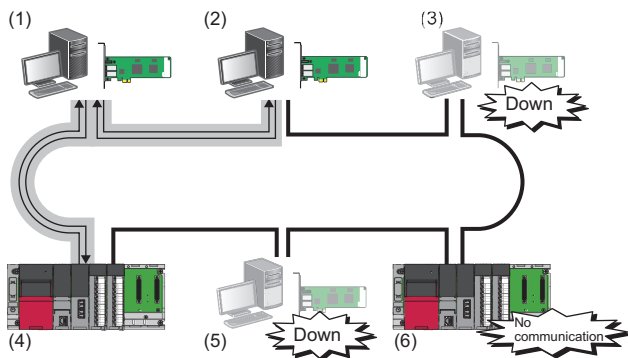
7.5 External Power Supply Function

This section shows the function to supply external power to NZ81GP21S-SX directly.

Even at the power down of a personal computer, the network is not cut off at a station with the power failure, and the data link continues in normal stations. In addition, when the power failure occurs in multiple stations, the data link continues in a station between faulty stations.

Without the external power supply function

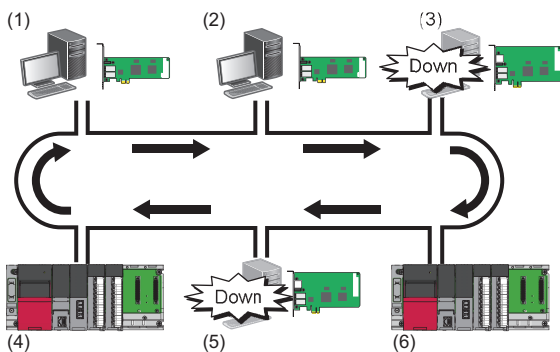
If the power failure of a personal computer occurs at the station No.3 and station No.5, loopback occurs in the station No.2 and station No.4, and the data link stops in the station No.6.



- (1) Control station (station No.1)
- (2) Normal station (station No.2): Loopback station
- (3) Normal station (station No.3)
- (4) Normal station (station No.4): Loopback station
- (5) Normal station (station No.5)
- (6) Normal station (station No.6)

With the external power supply function

Even if the power failure of a personal computer occurs at the station No.3 and station No.5, the data link continues in the station No.6. Loopback does not occur in the station No.2 and station No.4.



- (1) Control station (station No.1)
- (2) Normal station (station No.2)
- (3) Normal station (station No.3): With an external power supply
- (4) Normal station (station No.4)
- (5) Normal station (station No.5): With an external power supply
- (6) Normal station (station No.6)

Point

When restarting a personal computer with a board installed, an error occurs temporarily during the baton pass or data link even if an external power is being supplied.

For the relationship between the power status of external power supply/personal computer and the network status, refer to the following:

☞ Page 209 Network Status at Power-ON/OFF or Board Reset During Data Linking

7.6 Diagnostics

CC-Link IE Controller Network diagnostics

The status of CC-Link IE Controller Network can be checked by using the CC IE Control utility.

The connection status of a cable and whether communication can be performed normally with set parameters can be checked.

 Page 111 CC-Link IE Controller Network diagnostics

Board communication test

The board communication test is for checking the hardware of a board.

 Page 39 Tests before Wiring (Board communication test)

Communication test

The communication test is for checking whether the transmission path from the own station to a destination is correctly set for a transient transmission.

 Page 117 Communication test

7.7 Board Redundancy Function

This section explains the functions, procedure before operation, and system configuration when configuring a redundant system using boards.

Concept

The redundant system is a system consisting of two systems that have the same configurations. Even after an error occurs in one of the two systems, the other system takes over the control of the entire system.

The board redundancy function is for improving the system reliability by setting up a backup board as a normal station (standby system) in the network of the control station.

Even if an error occurs in the control system, cyclic data can be sent using the same send range by switching to a standby system; therefore, the data collection and feedback can be continued.

Terms that represent systems for the redundant system

In a redundant system, redundant boards and each system are distinguished by using the following terms.

■Control/standby system

In the redundant system, a control system that controls the system is referred to as the control system, and a system in the standby state is referred to as the standby system.

- Control system: A system for controls and network communications
- Standby system: A backup system

The control system and standby system are switched depending on the system conditions.

■System A/B

To distinguish two systems for redundancy, the one is referred to as the system A, and another is referred to as the system B. When using the board redundancy function, the system of a board is determined by whether "Control station" or "Normal station" is selected in the parameter setting at the time of system construction.

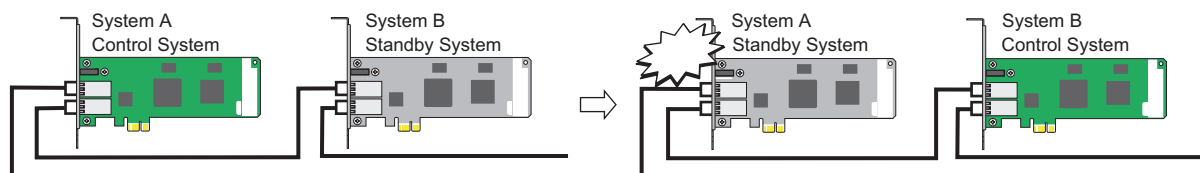
- System A board: A board set to the control station
- System B board: A board on the normal station side for the backup

When starting up both systems, the system A and system B operate as the control system and standby system, respectively. Even if the control system and the standby system are switched due to an error occurrence, whether the system of a board is the system A or the system B does not change.

System switching

In a redundant system, the control system and the standby system are switched so that the system operation can be continued when a failure or an error occurs in the control system.

They can also be switched for debugging and maintenance.



It is referred to as the system switching.

☞ Page 77 System switching

Precautions

- In the board redundancy function, there is no feature equivalent to the tracking transfer of a redundant function module. (☞ Page 73 Transfer of transmission data from the control system to the standby system)
- Depending on the status of each station and user program operation when a system switching cause occurs, there may be a case where both systems operate as the standby systems or control systems. (☞ Page 81 When both systems operate as standby systems, Page 82 When both systems operate as control systems)

Redundancy target station

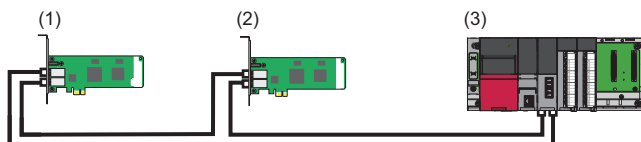
A redundancy target board refers to a board to which any of the following types is set for the network type:

- CC IE Control(Control station)(R)
- CC IE Control(Normal station)(R)
- CC IE Control Extended mode(Control station)(R)
- CC IE Control Extended mode(Normal station)(R)

System configuration

The following explains the system configuration when using the board redundancy function.

Construct a redundant system by installing boards in two personal computers and connecting them to the same network.



(1) Control station (station No.n) of the redundancy target station: Control system (system A board)

(2) Normal station (station No.n + 1) of the redundancy target station: Standby system (system B board)

(3) Normal station

For a normal station other than the system B board, any device of CC-Link IE Controller Network can be connected.



The station numbers of system A board and system B board must be consecutive numbers.
Each station can be connected in any order regardless of the station number.

Precautions

- The operation is not guaranteed if installing redundancy target stations with the same network number in the same personal computer.
- Set one control station as the system A board and one normal station as the system B board.
- The board redundancy function cannot be set with a combination of normal stations. It must be set with a combination of control station and normal station.
- In the same network, the board redundancy function and a redundant system supporting function of iQ-R series-compatible CC-Link IE Controller Network module cannot be used simultaneously.
- Set the consecutive station numbers of redundancy target stations for the control station and normal station; otherwise, an error may occur or unintended communication is performed.

Procedure before operation for the redundant system

The following shows the procedure before operation for using the board redundancy function.

For the procedure not related to the board redundancy function, follow the steps of the normal procedure.

1. Prepare two sets of personal computers and boards (described in this manual) to be used for the board redundancy function.

2. Perform the wiring in the same manner as in the standard procedure.

☞ Page 19 PROCEDURE BEFORE OPERATION

3. Set parameters.

☞ Page 72 Parameter setting for the board redundancy

4. Diagnose the network.

Check whether cables are connected properly and a communication is normally established based on the set parameters in network diagnostic.

Check that the normal station (system B board) whose station number is that of the control station (system A board) + 1 is displayed.

☞ Page 44 Tests after Wiring

5. Check the system switching operation.

☞ Page 71 Checking procedures for the system switching

6. Create a user program.

☞ Page 123 PROGRAMMING

7. Execute a user program or each utility.

Execute the user program to be used for the system switching as necessary.

☞ Page 71 Checking procedures for the system switching

Checking procedures for the system switching

Check that the system switching is performed normally by the following procedures:

■Checking with the power-ON/OFF of the system A

1. Power OFF a personal computer with the system A board installed.

2. Check that the system B board operates as the control system.

It can be checked in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility of a personal computer with the system B board installed.

☞ Page 116 When selecting a station where settings for the redundant system and the link point extension are set

3. Power ON the personal computer with the system A board installed.

4. Check that the system A board reconnects as a standby system.

■Checking with the power-ON/OFF of the system B

1. Power OFF a personal computer with the system B board installed.

2. Check that the system A board operates as the control system.

It can be checked in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility of a personal computer with the system A board installed.

☞ Page 116 When selecting a station where settings for the redundant system and the link point extension are set

3. Power ON the personal computer with the system B board installed.

4. Check that the system B board reconnects as a standby system.

Parameter setting for the board redundancy

When using the board redundancy function, set parameters of system A board and system B board as follows.

○: Necessary, △: As necessary

Item		Setting				Reference	
		Control station (system A)		Normal station (system B)			
Channel No.		○	Any	○	Any	Page 94 Channel Number Setting	
Operational setting	Network type	○	CC IE Control(Control station)(R)	○	CC IE Control(Normal station)(R)	Page 100 Operational setting	
			CC IE Control Extended mode(Control station)(R)		CC IE Control Extended mode(Normal station)(R)		
	Mode	○	Any	○	Same as the system A		
	Network No.						○
	Group No.						△
	Station No.	○	1 to 119	○	System A + 1		
	Link points extend setting	○	Any	○	Same as the system A		
	Dynamic Routing	△	Any	△	Same as the system A		
Network range assignment		△	 Page 72 Network range assignment	△	Same as the system A	Page 102 Network range assignment	
Other than above		△	Any	△	Same as the system A	Page 98 Parameter Setting	

If any setting other than that shown above is applied, a parameter or pairing setting error occurs.

Network range assignment

When not using the board redundancy function, the network range assignment setting is not required for a normal station. However, for the normal station that may be used as the system B in the board redundancy function, it is required to set the same parameters as those for the system A.

Set each send range as follows:

Item	Station number (Station No.)	Send range
LB/LW settings(1), LB/LW settings(2)	Station No. of the system A board (station No. of the control station)	Any
	Station No. of the system B board (station No. of the control station + 1)	Same as the control station
LX/LY settings(1), LX/LY settings(2)	Station No. of the system A board (station No. of the control station)	Any
	Station No. of the system B board (station No. of the control station + 1)	Different from the control station

For parameters other than above, set any parameters for the system A and the same as those of the system A for the system B.

Point

LX/LY is not the redundancy target.

- The same send range cannot be set for the system A board and the system B board.
- LY of the standby system cannot be sent to other stations.

Cyclic transmission when using the board redundancy function

The following explains the cyclic transmission (send/receive) when using the board redundancy function.

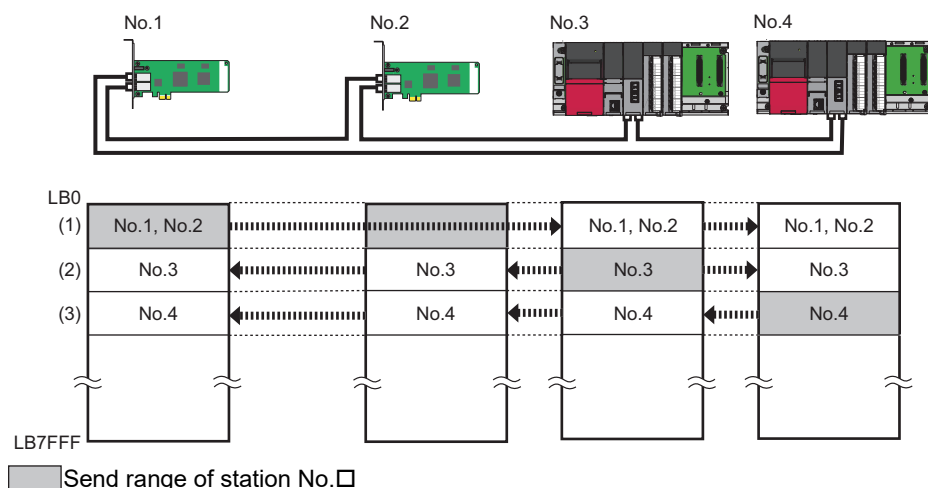
Processing of cyclic transmission (send/receive)

When using the board redundancy function, cyclic data is sent from the new control system using the send range in the same manner as the old control system when the system switching is performed.

The send range of cyclic transmission is as follows:

- The own send range of link devices (LB, LW) of both systems is the same.
- A station operating as the control system sends and receives cyclic data.
- A station operating as the standby system only receives cyclic data.

Each number in the following figure, from No.1 to 4, represents a station number.



- (1) The data in the send range of the station No.1 and No.2 is sent from the station No.1 of the control system to the station No.3 and No.4. If the system switching occurs due to an error in the station No.1, the data in the send range of the station No.1 and No.2 is sent from the station No.2 operating as the new control system.
- (2) The data in the send range of the station No.3 is sent to all stations including the station No.2 of the standby system.
- (3) The data in the send range of the station No.4 is sent to all stations including the station No.2 of the standby system.

Considerations

■Transfer of transmission data from the control system to the standby system

In the board redundancy function, there is no feature equivalent to the tracking transfer of a redundant function module.

For details on the tracking transfer, refer to the following:

📖 MELSEC iQ-R Process CPU Module User's Manual

To transfer the cyclic data from the control system to the standby system, create a user program.

The following shows considerations for creating a user program:

- Create a user program that allows the system A board and the system B board to operate independently.
- In a user program, use the data sending path that is different from that of CC-Link IE Controller Network; for example, the transient transmission using the MELSEC data link library or Ethernet communication between personal computers.
- Depending on the timing of system switching, the data written immediately before the system switching may not be sent to other stations, or old data may be sent from the new control system to other stations.
- Do not specify the link special relays (SB0020 to SB01FF) turned ON/OFF by system and the link special registers (SW0020 to SW01FF) where data is stored by system as the data to be sent from the control system to the standby system.
- There may be a case where both systems A and B operate as control systems or standby systems; therefore, check 'Redundant system state of each station' (SW01F0 to SW01F7) and consider other system states when implementing the data sending process.

■Output of cyclic data during the system switching

While both systems operate as standby systems before the control system is switched to a standby system and the other standby system is switched to the new control system, the last data sent from the old control system is retained as the output of cyclic data.

Determination of control system/standby system

The following explains the method for determining the control system and the standby system.

When starting up the system

After the system startup is completed and all stations are started, the system A board operates as the control system, and the system B board operates as the standby system.

■Determination of control system/standby system based on the startup order of each station

Until all stations are started, whether the system A board and system B board operate as the control system or standby system is determined by the startup order of each station.

The following shows the statuses of the system A board and the system B board based on the startup order of each station.

—: Not started, ○: Control system, △: Standby system

Pattern	Startup order		Device status		Sending status
			System A board (control station)	System B board (normal station)	Data link
1	1	System A board (control station)	△	—	N/A
	2	System B board (normal station)	○	△	Start
	3	Other devices (normal stations)	○	△	Normal
2	1	System A board (control station)	△	—	N/A
	2	Other devices (normal stations)	○	—	Start
	3	System B board (normal station)	○	△	Normal
3	1	System B board (normal station)	—	△	N/A
	2	System A board (control station)	○	△	Start
	3	Other devices (normal stations)	○	△	Normal
4	1	System B board (normal station)	—	△	N/A
	2	Other devices (normal stations)	—	△	Start between system B board and other devices
	3	System A board (control station)	○	△	Normal
5	1	Other devices (normal stations)	—	—	N/A
	2	System A board (control station)	○	—	Start
	3	System B board (normal station)	○	△	Normal
6	1	Other devices (normal stations)	—	—	N/A
	2	System B board (normal station)	—	△	Start between system B board and other devices
	3	System A board (control station)	○	△	Normal

7

Point

When the system A board and other devices are started, the data link and cyclic data send are started regardless of the startup status of the system B board.

When resetting a board or restarting a personal computer

The following shows the states of the system A board and the system B board, whether they operate as the control system or the standby system, when a board is reset or a personal computer is restarted for only one of systems (A or B) after the system startup completion.

○: Control system, △: Standby system, ↓: Retained, ⇅: System switching, ×: Reset/restarted, —: None

Pattern	Reset/restart	System A board	System B board	Remarks
1 A: Control system Resetting A	1. Before operation	○	△	When the system A board is reconnected before 'Data link stop monitoring time for control system' (SW0016) set for the system B has elapsed
	2. Operation	×	↓	
	3. After operation	○	△	
2 A: Control system Resetting A	1. Before operation	○	△	When the system A board is reconnected after 'Data link stop monitoring time for control system' (SW0016) set for the system B has elapsed
	2. Operation	×	⇅ System switching	
	3. After operation	△	○	
3 A: Control system Resetting B	1. Before operation	○	△	—
	2. Operation	↓	×	
	3. After operation	○	△	
4 B: Control system Resetting A	1. Before operation	△	○	—
	2. Operation	×	↓	
	3. After operation	△	○	
5 B: Control system Resetting B	1. Before operation	△	○	When the system B board is reconnected before 'Data link stop monitoring time for control system' (SW0016) set for the system A has elapsed. Both systems are switched to standby systems.
	2. Operation	↓	×	
	3. After operation	△	△	
6 B: Control system Resetting B	1. Before operation	△	○	When the system B board is reconnected after 'Data link stop monitoring time for control system' (SW0016) set for the system A has elapsed
	2. Operation	⇅ System switching	×	
	3. After operation	○	△	
7 Both standby systems Resetting A	1. Before operation	△	△	When the system A board is reconnected before 'Data link stop monitoring time for control system' (SW0016) set for the system B has elapsed
	2. Operation	×	↓	
	3. After operation	○	△	
8 Both standby systems Resetting A	1. Before operation	△	△	When the system A board is reconnected after 'Data link stop monitoring time for control system' (SW0016) set for the system B has elapsed
	2. Operation	×	⇅ System switching	
	3. After operation	△	○	
9 Both standby systems Resetting B	1. Before operation	△	△	When the system B board is reconnected before 'Data link stop monitoring time for control system' (SW0016) set for the system A has elapsed. Both systems remain operating as standby systems.
	2. Operation	↓	×	
	3. After operation	△	△	
10 Both standby systems Resetting B	1. Before operation	△	△	When the system B board is reconnected after 'Data link stop monitoring time for control system' (SW0016) set for the system A has elapsed
	2. Operation	⇅ System switching	×	
	3. After operation	○	△	

System switching

The control system and the standby system are switched so that the system operation can be continued when a failure or an error occurs in the control system.

They can also be switched for debugging and maintenance.

System switching cause

■System switching due to error detection

The system switching is performed when a board in the control system detects following errors:

- Stop error (moderate/major error and hardware failure), data link error (disconnection)
- Driver WDT error, user program error

☞ Page 79 Automatic error detection by system, Page 79 Error detection for software

■System switching through a user program at any timing

The system switching request can be instructed to a board through a user program at any timing.

☞ Page 80 System switching through a user program

System switching operation

There are two types of system switching due to error detection: automatic system switching performed by system automatically, and manual system switching performed after a user program responds to the notification from the system.

Type	Description	Usage	Consideration
Automatic system switching	When a system switching cause is detected, the system is switched automatically. The system switching is not notified to a user program from a board.	To shorten the time to complete the system switching, thereby reducing the period during which the control system is unavailable	The system switching occurs while the transmission data is being prepared, and unintended data may be sent.
Manual system switching	When a system switching cause is detected, it is notified to a user program. The system is switched by the response from a user program.	To switch the system after the preprocessing by a user program is completed	The processing time of a user program is required; therefore, the time taken to complete the system switching is longer than when using the automatic system switching.

■Selection method of the automatic/manual system switching

The automatic system switching is set as default.

When selecting the manual system switching, set '1' for 'Automatic/manual system switching specification' (SW0017).

Set 'Automatic/manual system switching specification' (SW0017) for both systems.

If settings for the system A board and the system B board are different, the system switching operation is performed by each system according to the settings.

System switching prohibition

In cases such as when system maintenance is required or an error is detected by a user program for the standby system, unintended system switching can be prevented by prohibiting the system switching by system.

■Setting method

To prohibit the system switching due to error detection, turn ON 'System switching prohibition specification' (SB000F).

If an error that can be the cause of system switching occurs in the system where the system switching is prohibited, it is not performed and 'System switching prohibition of the own system board' (1) is stored in 'Cause of system switching error completion' (SW01DB).

Precautions

- Set 'System switching prohibition specification' (SB000F) for both systems.
If the system switching prohibition is set only for the control system, the standby system is switched to the new control system when the control system is disconnected.
- When a board is reset or a personal computer is restarted, set 'System switching prohibition specification' (SB000F) again since it is turned OFF.
- For the cause of system switching not performed due to the system switching prohibition, the system switching is not performed even if the prohibition is cleared.

If the cause is still active and its error is detected after the prohibition is cleared, the system switching is performed.

Point

The following system switching is not prohibited even if 'System switching prohibition specification' (SB000F) is turned ON.

- System switching due to the system switching request from a user program
- System switching due to reconnection

System switching cause

The following shows the conditions under which the system switching occurs in the board redundancy function.

Automatic error detection by system

In the board redundancy function, the system switching due to an error detected by system automatically is performed with default settings.

Symptom example	Description	System switching result	Reference
A data link error occurs. • Cable disconnection • Unstable communication • Hardware failure such as connector malfunctions	When communication on CC-Link IE Controller Network is not performed correctly in the control system board, the standby system board starts operating as the new control system.	• Control system: Disconnected or retained • Standby system: Switched to the control system	Page 216 Data link error
A board or personal computer of the control system stops. • Power-OFF of a personal computer of the control system • Hardware failure of the control system • Moderate/major error of the control system • Reset of a board, restart of a personal computer	When a stop error is detected in the control system board, the standby system board starts operating as the new control system.	• Control system: Disconnected • Standby system: Switched to the control system	Page 218 Stop error
	If a personal computer of the control system with an external power supplied is powered OFF, the driver of the control system stops; therefore, the standby system board starts operating as the new control system.	• Control system: Switched to the standby system (Cyclic transmission stopped) • Standby system: Switched to the control system	Page 220 When a personal computer of control system with external power is powered OFF

When a personal computer of the standby system with an external power supplied is powered OFF, 'Other system switching disable status' (SB01E9) of the control system is turned ON.

Error detection for software

■When detecting a driver WDT error

If the driver WDT function is enabled in the parameter setting, the system switching can be performed by detecting a driver WDT error.

📖 Page 86 Driver WDT function

Symptom example	Description	System switching result	Reference
Driver of the control system or an operating system stops. • Access error between the driver and board • Driver operation delay due to high load conditions • OS operation error	When a driver WDT error is detected in the control system board, the standby system board starts operating as the new control system.	• Control system: Disconnected • Standby system: Switched to the control system	Page 222 When a driver WDT error is detected

When a driver WDT error is detected in the standby system board, 'Other system switching disable status' (SB01E9) of the control system is turned ON.

■When detecting an error using the user program error monitoring function

By using the user program error monitoring function, the system switching can be performed even when a user program error has occurred or when a personal computer or its operating system has failed while boards operate normally.

📖 Page 224 When an error is detected using the user program error monitoring function

Symptom example	Description	System switching result	Reference
An error occurs in a personal computer with the control system board installed. • User program stop • Access error between a user program and board • Access error between the driver and board • OS operation error	When an error is detected in the control system board through the user program error monitoring, the standby system board starts operating as the new control system.	• Control system: Switched to the standby system • Standby system: Switched to the control system	Page 224 When an error is detected using the user program error monitoring function

When a user program error is detected in the standby system board, 'Other system switching disable status' (SB01E9) of the control system is turned ON.

Precautions

Even if the input using a mouse or keyboard and the output to a monitor are unavailable due to the failure of a personal computer, the system switching by error detection does not start if the driver or user program is operating normally. To start the system switching, perform it through a user program of the other system.

System switching through a user program

The system switching can be requested at any time through either program of the control system or the standby system.

System switching request source	Own system operation specification (b15 of SW000D)	Description	System switching result	Reference
Control system user program	Standby system (0) is specified.	Regardless of whether the own system is the control system or the standby system, the system can be switched to that specified by a user program.	- Control system: Switched to the standby system - Standby system: Switched to the control system	Page 227 When the system switching is requested from a user program of the control system
Standby system user program	Control system (1) is specified.			Page 228 When the system switching is requested from a user program of the standby system

Abnormal completion of the system switching

When the system switching fails, it does not occur or both systems are switched to standby systems.

If the system switching is completed abnormally due to the following causes, that for the standby system does not occur and the current system is retained:

- System switching prohibition
- System switching being performed
- Incorrect own system operation specification for the system switching request cause

■Recovery from the state where both systems are standby systems

When both systems operate as standby systems, one of the systems can be switched to the control system by clearing the error cause.

For example, the system A can be switched to the control system automatically upon recovery from disconnection. Otherwise, the system switching can be performed through a user program.

 Page 81 When both systems operate as standby systems

■Recovery from the state where both systems are control systems

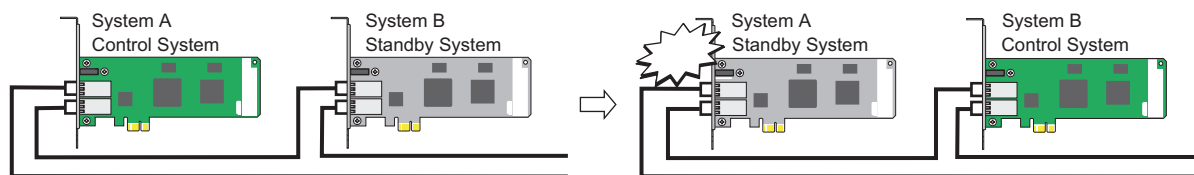
When the network is disconnected at two points, causing the system A board and the system B board to be isolated, both systems may operate as control systems.

If an error is cleared and the system B board reconnects to the network of the system A board, the system B board is switched to the standby system automatically.

 Page 82 When both systems operate as control systems

Operation when the system switching occurs

The following shows the system switching operation when a communication error occurs in the control system.



1. An error occurs in the system A (control system).
2. The system A board detects the error and the system is switched from the control system to the standby system.
3. The system B (standby system) board detects the error.

The system switching request is notified to the system B board from the system A board the system of which has been switched.

If the notification cannot be issued from the system A board due to the power-OFF or disconnection, the system B detects the data link stop via CC-Link IE Controller Network.

4. For the manual system switching, the preprocessing for the system switching of control system is performed in a user program.
5. The system B is switched to the new control system, and the control of network is continued.

Point

- When the system switching is performed due to the cause where a communication error does not occur, the control station switching is not performed.
- When the system switching is prohibited by 'System switching prohibition specification' (SB000F), the system switching is not performed.
- For details and processing time of the system switching operation, refer to the following:

☞ Page 214 Board Redundancy Function Process Flow and User Program

7

When both systems operate as standby systems

Both systems operate as standby systems in the following cases:

Overview	Description
An error occurred in both systems.	Any of the following errors occurred. • Stop error (moderate/major error and hardware failure) • User program error • Driver WDT error • Power-OFF of a personal computer where a board with an external power supplied is installed
The system switching of the standby system was completed abnormally.	During the following system switching, switching from the standby system to the control system failed after the control system had already been switched to the standby system. • System switching by system • System switching through a user program (control system)
A response time timeout of the manual system switching occurred.	When performing the manual system switching with the system switching request from a user program, the system switching notification response from the user program was not received within 'System switching response monitoring time for user program' (SW0014) set for each board.
The system B board (control system) was reset or a personal computer was restarted.	When resetting the system B board operating as the control system or restarting a personal computer of the system B, the system B board was reconnected within 'Data link stop monitoring time for control system' (SW0016) set for the system A board.

Method for switching to the control system

When both systems operate as standby systems, the systems can be switched to the control system by performing the following corrective actions:

- Performing the manual system switching with the system switching request from a user program
- Resetting the system A board

If the problem persists, refer to the following:

☞ Page 158 An error has occurred when using the board redundancy function

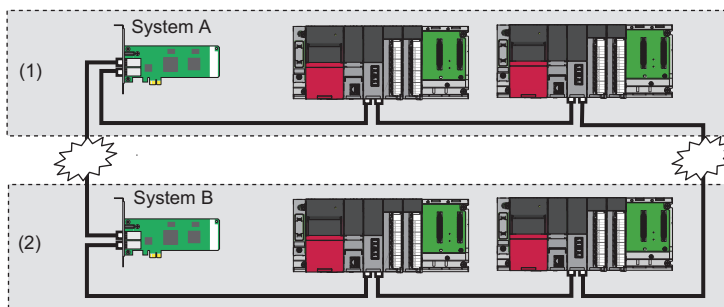
■Considerations for data transmission/reception between the systems A and B

When sending or receiving data between the systems A and B, do not create a user program with the assumption that the control system is the sending side and the standby system is the receiving side. Otherwise, there may be a case where data reception fails because both systems operate as standby systems and no data is sent.

For the data transmission/reception with the other system, ensure that it does not depend on the current system state.

When both systems operate as control systems

When the system A board and the system B board are isolated due to the network disconnection at two points, and also when communication with more than one normal station can be performed for each system, both systems operate as control systems.



(1) Control range of the system A as the control system

(2) Control range of the system B as the control system

1. The network disconnection occurs at two points.
2. The system A board retains its system as the control system, and cyclic data is sent to normal stations in the network.
3. The data link stop is detected due to disconnection of the system B board (standby system).
4. The system B is switched to the new control system, and cyclic data is sent to normal stations within the same network. Since both systems operate as control systems, cyclic data is sent by both of the system A board and the system B board as control stations.

Cyclic data sent from the system A board and the system B board is received by normal stations in the networks managed by the respective boards.

■System switching at reconnection

By resolving the disconnection between the system A board and the system B board, the system B board is reconnected so that it is switched to the standby system.

After the system is switched due to reconnection, the system A board operates as the control system, and cyclic data sent from the system A board is received by normal stations.

1. The network disconnection is resolved.
2. The system B (control system) board detects that both systems are control systems.
3. The system of the system B board is switched from the control system to the standby system.

For details on the system switching due to reconnection, refer to the following:

📖 Page 232 System switching due to reconnection

User program error monitoring

This function is for issuing a system switching notification when a user program error is detected by a board.
The system switching can be performed even when a personal computer has failed while boards operate normally.

Setting method

■Initial setting method

Perform the following processing in a user program.

1. Turn OFF 'Operation notification from user program to board' (SB0018).
2. Set the function to "Enabled" in 'Error monitoring setting between user program and board' (SW0018), and set the timeout time.

■Operation notification method

The link special relay (SB) is checked alternately by a board and a user program to ensure that they are operating normally.

 Page 83 Operation monitoring processing

■Stopping method

Set the function to "Disabled" in 'Error monitoring setting between user program and board' (SW0018) in the user program.

■Recovery method

When a user program error is detected, the recovery can be performed by either of the following methods:

- Stopping the user program error monitoring in the system with the user program error detected
- Performing the user program operation notification in the system with the user program error detected

The system switching disable status is resolved upon the recovery.

Operations when an error is detected

When an error is detected by the control system board, the system switching is performed.

When an error is detected by the standby system board, the control system will be in the other system switching disable status.

 Page 234 System switching when a user program is detected

Operation monitoring processing

Link special relays (SB) for the operation notification is monitored by a board and a user program for each other, and the ON/OFF state of each relay is switched to ensure that they are operating normally.

■Overview of processing

The following processing is performed in a user program and the system of a board.

1. The error monitoring setting is checked by a board every 100 ms.
When the function is "Disabled" in 'Error monitoring setting between user program and board' (SW0018), further processing is not performed by the board.
2. When the function is "Enabled," the operation notification of the board (SB0018 ≠ SB0118) is performed.
Thus, the state of 'Operation notification from board to user program' (SB0118) will be different from that of 'Operation notification from user program to board' (SB0018).
3. In the user program, the operation notification of the user program (SB0018 = SB0118) is performed within the timeout time.

The state of 'Operation notification from user program to board' (SB0018) will be the same as that of 'Operation notification from board to user program' (SB0118).

4. If the operation notification of the user program is checked by the board and that is not performed even after the timeout time set in advance has elapsed, it is considered that an error has occurred.

For details when the function of user program error monitoring is enabled, refer to the following:

 Page 234 User program error monitoring

Precautions

- The user program error monitoring is disabled at the startup of this product and after resetting the board. Therefore, an error cannot be detected when an error occurs in a user program before starting the user program error monitoring. When using the user program error monitoring, construct and configure the system so that the processing to start the user program error monitoring operates when starting up this product and resetting the board.
- The timeout time of 'Error monitoring setting between user program and board' (SW0018) is based on the value at the timing when the operation specification is set to "Enabled." To change the timeout time, the operation specification needs to be set to "Disabled" once for at least 100 ms.
- If 'Operation notification from user program to board' (SB0018) is not changed or stopped within the timeout time after 'Operation notification from board to user program' (SB0118) is changed by system, a user program error is detected.

User program for the board redundancy function

The following shows considerations for a user program required when using the board redundancy function and for its programming.

Creating a user program

Access the link special relay (SB) and link special register (SW) with the MELSEC data link library function from a user program to check the operation information of each system and control the operation of the board redundancy function.

☞ Page 123 PROGRAMMING

☞ Page 244 SB/SW used for the board redundancy function

For details on the processing, refer to the following:

☞ Page 214 Board Redundancy Function Process Flow and User Program

Refer to the following programming examples as necessary:

☞ Page 235 Programming examples of user program

Consideration for programming

- A user program and MELSEC data link library can be executed regardless of the current system state (control system/standby system). There are no restrictions on the use of MELSEC data link library. To perform the processing according to the current system state, use SB/SW through a user program to check the current system.
- When specifying the own station (network number 0, station number 255) for a board redundancy station and accessing a link device, a link device of the own system is accessed. If the own system is operating as the standby system, link devices of the other system (control system) cannot be accessed.
- When accessing a board redundancy station using the MELSEC data link library, specify the station number regardless of the current system state; specify the station number set for the system A board when accessing the system A board, and specify the station number set for the system B board (station number of the system A + 1) when accessing the system B board. Even if specifying the station number with that of the control station (0(0H), 125(7DH)), the system A board is accessed.
- Do not specify a board redundancy station as the access target in the target setting (logical station number).

7.8 Others

Driver WDT function

This function is for monitoring the operation of the software (operating system, driver) using the timer function on a board. When the driver cannot reset the timer of the board within the specified driver WDT monitoring time, a board detects a driver WDT error. The driver WDT function detects driver operation delay due to the access error from the driver to the board or system high load.

Setting method

Set the driver WDT function in "Driver WDT monitoring time" under "Driver setting." ( Page 106 Driver setting)

Point

It is set to disabled by default.

If a driver WDT error occurs

When the driver WDT times out, a driver WDT error occurs.

Operations when a driver WDT error occurs are as follows:

- The driver stops accessing the board to avoid an incorrect output to the network.
- The RUN LED flashes and RD LED turns ON.
- When accessing a board from the CC IE Control utility, device monitor utility, or an application program including MELSEC data link library functions, "-28158(9202H) driver WDT error" occurs.

Considerations

When multiple application programs using the MELSEC data link library are running, a driver WDT error is returned to all the programs; however, only the board on which a driver WDT error has occurred is recognized as an error station on the network. When using the driver WDT function, set the monitoring time considering the margin of the personal computer load.

For the troubleshooting, refer to the following:

 Page 152 The driver WDT error has occurred

Reserved station specification

A reserved station is a normal station included in the number of stations on a network and set in the parameter for future use.

It is not actually connected to the network, and not detected as an error station. ( Page 102 Network range assignment)

By setting a reserved station, link device assignment will not change even if a normal station is connected (the reservation is canceled). Therefore, modification of a program is not required.

Firmware update

This function is for updating the firmware of a board installed in a personal computer.

Usage methods

This function is used by starting Firmware Update Tool from the CC IE Control utility.

For details on the firmware update function, refer to the following:

 Page 251 Firmware update

Considerations

- Obtain a firmware update file corresponding to a model to be updated in advance. If the firmware update file does not match the target model, the firmware cannot be updated.
- Do not change the file name of a firmware update file.
- Stop user programs and separate a board from the system by disconnecting cables not to affect the system. Then, perform the firmware update again.
- Stop access to a target device the firmware of which is to be updated with the CC IE Control utility, device monitor utility, or MELSEC data link library function. '-26334 (9922H) reset execution error/firmware update execution error' is returned when accessing the target device during a firmware update file is being transferred.
- Update the software package to the latest version when updating the firmware. ( Page 250 Update of software package)
- Check the system operation before and after the update. When there is any error for the system operation after the update, revert the firmware to a previous version. If the software package is also updated, revert it to a previous version.
- Do not forcibly terminate Firmware Update Tool while the firmware is being updated. Otherwise, the firmware update may be interrupted and the board may not operate properly. In this case, reset the board and perform the firmware update again. If resetting the board fails, retry the operation after a while.
- When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.
 - Turning OFF the power of a personal computer
 - Restarting an operating system
 - Resetting a board
 - Installing/uninstalling a board

If the firmware version of the target device remains the same as before the update, perform the firmware update again.

Perform the update carefully; otherwise, the board may not start up or the firmware update may not be performed again.

When an error occurs, refer to the following:

 Page 150 An error has occurred when updating the firmware

8 CC IE Control Utility

The CC IE Control utility is for setting parameters and diagnosing the operating statuses of a board and network. For using this utility, install a dedicated software package on a personal computer where a CC-Link IE Controller Network interface board is used. For the installation method, refer to the following:

☞ Page 28 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

For the first startup procedure for a board, refer to the following:

☞ Page 19 PROCEDURE BEFORE OPERATION

8.1 Screen Configuration and Basic Operations

This section explains the screen configuration and basic operations of the CC IE Control utility.

Start and end

The following explains the operating method to start/end the utility.

Starting the CC IE Control utility

Operating procedure

Select [MELSEC] ⇒ [CC IE Control Utility(Board)] from Windows Start.



Multiple pieces of the CC IE Control utility cannot be started at the same time.



When the utility starts while User Account Control (UAC) is enable, a warning message appears. For details on User Account Control (UAC), refer to the following:

☞ Page 246 Windows User Account Control

Ending the CC IE Control utility

Operating procedure

Click the [Close] button in a board information screen (startup screen).

Display language switching

SW1DNC-MNETG-B supports multiple languages, and therefore the display language such as one on the menu can be switched on a personal computer.

Operating procedure

1. Select the system menu (right-click the icon in the upper left corner of the screen) ⇒ [Switch Display Language].
2. Select a language to display.
3. End the CC IE Control utility.
4. The selected language is applied from the next startup.

Precautions

- If the display language differs from the one for the operating system, texts may not displayed properly in the screen.
(Displayed texts may get cut.)
- In addition, buttons in messages, etc. may be displayed in the language for the operating system.
- When switching the display language, supplemental fonts of the target language are required. The fonts can be added by the following operation:
Select [Apps] ⇒ [Apps & features] ⇒ [Optional features] ⇒ [Add a feature] in Windows settings.

Point

- When reinstalling the utility after uninstallation, the previously set language is applied.
- When starting the device monitor utility from the CC IE Control utility, it is also displayed in a display language selected in the CC IE Control utility.
- When starting the device monitor utility from the Windows menu or execution file, the current Windows display language is applied. If it is other than Japanese, English is applied.

Screen configuration

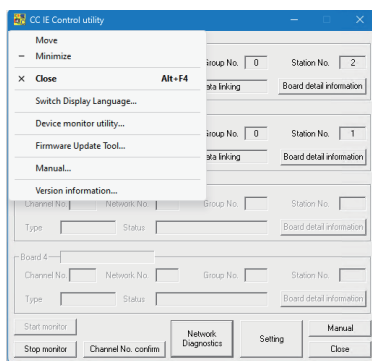
The following shows the main screens displayed in the CC IE Control utility.

Each screen is displayed by clicking the button in the screen which appears when starting the utility.

Screen		Reference
Board information screen	—	Page 96 Board Information
	"Channel No. confirm" screen	Page 94 Channel Number Setting
	"Board detail information" screen	Page 96 Board Information
	"Parameter setting" screen	—
		Page 98 Parameter Setting
		"Network range assignment" screen
		Page 102 Network range assignment
		"Driver setting" screen
		Page 106 Driver setting
		"Target setting" screen
		Page 108 Target setting
		"Routing parameter setting" screen
		Page 110 Routing parameter setting
"CC-Link IE Controller Network diagnostics result" screen	—	Page 111 CC-Link IE Controller Network diagnostics
	"Communication Test" screen	Page 117 Communication test
	"Link start/stop" screen	Page 118 Link start/stop
	"Logging" screen	Page 121 Logging

System menu

The system menu is displayed by clicking the upper left corner of a board information screen (startup screen).



The following functions can be performed from the system menu.

Menu item	Function	Reference
Move	To move the screen by keyboard operation. Use an arrow key to move the screen to any position. It can also be used when displaying the system menu from other than a board information screen.	—
Minimize	To minimize the screen.	—
Close	To close the screen and end the utility. It can also be used when displaying the system menu from other than a board information screen.	—
Switch Display Language	To switch the display language for the utility.	Page 89 Display language switching
Device monitor utility	To start the device monitor utility.	MELSEC Data Link Library Reference Manual
Firmware Update Tool	To update the firmware of a board installed in a personal computer by using Firmware Update Tool.	Page 251 Firmware update
Manual	To display this manual.	Page 90 Manual
Version information	To display the version information of SW1DNC-MNETG-B.	—

Manual

Use the manual to learn about operations and functions, and check error codes.

By clicking [Manual] in the system menu or the [Manual] button in a board information screen (startup screen), e-Manual Viewer starts and the manual appears.

Saving a file

The following data can be saved in a file by using the CC IE Control utility.

Type	Description	File format
SB/SW	Device values of link special relay (SB) and link special register (SW)	CSV file (*.csv)
Parameter	Parameters being edited in the CC IE Control utility	Parameter file (*.mng)
Verification result	The verification result between parameters being edited and ones set for a board	Text file (*.txt)
Error log	Histories of transmission path switching and transient transmission error	CSV file (*.csv)

The following shows the operation procedures to save data to a file and contents to be saved.

SB/SW

Current device values of all link special relays (SB) and all link special registers (SW) can be saved in CSV file format.

Operating procedure

Click the [Save SB/SW] button in the "Board detail information" screen.

■Available characters

For unusable characters for file names and folder names, refer to the following:

☞ Page 249 Unusable Character Strings (Reserved Words)

■Contents to be saved

The following items are saved:

- Board type
- Production information
- Parameters of a board displayed in the "Board detail information" screen

Channel No.	Network No.	Group No.	Station No.	Network	Type	Link points extend setting
151 to 154	1 to 239	0 to 32	1 to 120	CC IE Control	• Normal station • Control station	• Extend • Not to extend

- SB/SW information: device values of SB0000 to SB01FF and SW0000 to SW01FF

Ex.

The following shows an output example of a file.

```
SB/SW
NZ81GP21-SX, 0000000000000000-A
Channel No.,Network No.,Group No.,Station No.,Network,Type,Link points extend setting
151, 1, 0, 1,CC-Link IE Controller Network,Normal station,Not to extend
```

```
SB/SW information
Device,Value,,Device,Value
SB0000,0, ,SW0000,0000
SB0001,0, ,SW0001,0000
```

A comma (ASCII code: 0x2C) is added between columns, and the line feed codes (ASCII code: 0x0D, 0x0A) of CR and LF are added in the end of each row.

Parameter

Parameters being edited in the CC IE Control utility can be saved in a file.

The saved parameter file can be read out and its setting can be utilized for other boards.

Point

By using a parameter file of the existing board, its setting can be utilized for this board.

A parameter file saved in SW1DNC-MNETG-B with version 1.32J or earlier can also be read.

For a parameter that cannot be set in the earlier version, the default status is set.

A parameter file saved in version 1.33K or later cannot be read in version 1.32J or earlier.

■Saving a file

Operating procedure

Click the [Save file] button in the "Parameter setting" screen.

Parameters of the board the type of which is set in "Target board specification" of the "Parameter setting" screen are saved in a file.

■Loading a file

Operating procedure

1. Click the [Load file] button in the "Parameter setting" screen.

Parameters saved in a file are read out.

2. Click the [End] button.

The parameters in the "Parameter setting" screen are applied to the board.

Point

The [End] button cannot be clicked if the read selection status of "Target board specification" and the actual installation status of the board do not match. After reading from the file, change the parameters to match the selection status of "Target board specification" to the actual installation status. Alternatively, change the settings of the channel numbers (151 to 154) and board 1 to 4 for the installed boards to match with the contents of the file.

■Available characters

For unusable characters for file names and folder names, refer to the following:

 Page 249 Unusable Character Strings (Reserved Words)

■Contents to be saved

The following items are saved:

- Target board specification
- Routing parameter
- Parameters of a board the type of which is set in "Target board specification"

Verification result

A verification result of parameters can be saved in text format.

The verification function can compare parameters being set in the CC IE Control utility and ones set for a board.

Operating procedure

1. Click the [Verify] button in the "Parameter setting" screen.

The verification is performed.

If the verification result is mismatched, a message recommending to save the file is displayed.

2. Click the [Yes] button in the message which is displayed when the verification result is mismatched.

■Available characters

For unusable characters for file names and folder names, refer to the following:

 Page 249 Unusable Character Strings (Reserved Words)

■Contents to be saved

The following items are saved:

- Utility name: CC IE Control utility
- Verification result

Ex.

The following shows an output example of a file.

```
CC IE Control utility
Collation result
Mismatch in network type of Board 1.
```

Error log

Histories of transmission path switching and transient transmission error can be saved in CSV file format.

Operating procedure

Click the [Save error log] button in the [Monitor detail] tab of the "Logging" screen.

■Available characters

For unusable characters for file names and folder names, refer to the following:

 Page 249 Unusable Character Strings (Reserved Words)

■Contents to be saved

The following items are saved: ( Page 121 Logging)

- Transmission path switching history

Loop status	Loopback station IN	Loopback station OUT	Date
• Normal • Loopback • All station error	1 to 120	1 to 120	YYYY/MM/DD hh:mm:ss

- History of transient transmission error

Error code	Target net	Target station	Date
0001 to FFFF	1 to 239	1 to 120	YYYY/MM/DD hh:mm:ss

Ex.

The following shows an output example of a file.

```
Loop status, Loopback station IN, Loopback station OUT, Date
Loopback,1,2,2025/5/14 15:16:20
Loopback,1,2,2025/5/14 15:16:19
```

```
Error code, Target net, Target station No., Date
D504,1,2,2025/5/8 23:20:55
```

8.2 Channel Number Setting

The channel number is a number set for each board to identify them.
It can be set in the range from '151' to '154.'

Automatic assignment

A channel number is automatically assigned to an installed board.

Condition		Channel No.
Default	When starting a personal computer in which a board is installed after installing the software package	151 to 154 are assigned in the order of installation slot. For the order of slot numbers, refer to the manual for a personal computer used.
When adding a board	When starting a personal computer in which another board is additionally installed	An unused number is assigned.

Parameters of an added board will be in unset states. (☞ Page 99 Parameter unset state)
Check and set the parameters in the CC IE Control utility.

Precautions

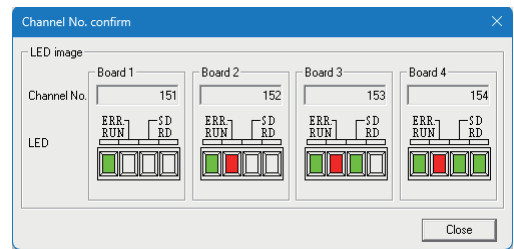
When installing a CCIEC board (Q) and CCIEC board (NZ) in the same personal computer, a channel number may be duplicated due to the automatic assignment.
In this case, change the channel number. (☞ Page 95 Changing a channel number)
Access to a board with the duplicate channel number or to another station via such a board may not be performed properly.
If the channel numbers of a CCIEC board (Q) and CCIEC board (NZ) are duplicated, access to another station is directed to the CCIEC board (NZ).

Checking method for a channel number

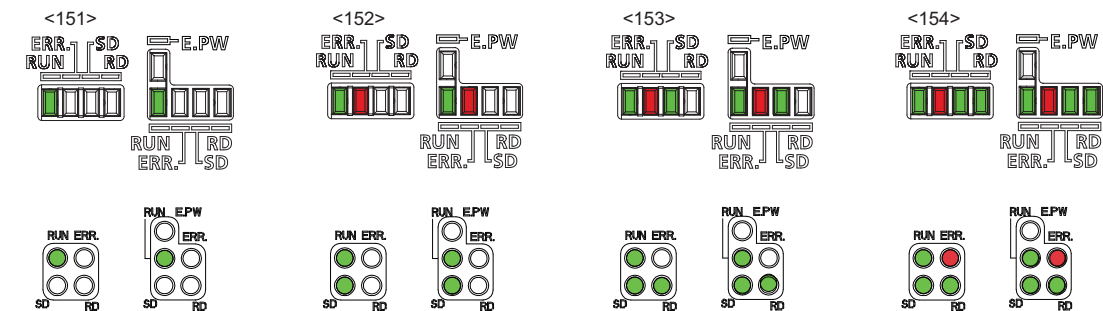
A channel number can be checked in a board information screen (startup screen) of the utility and the "Channel No. confirm" screen.

Operating procedure

1. Start the CC IE Control utility.
The channel number of the installed board is displayed in a board information screen (startup screen).
2. Click the [Channel No. confirm] button.
The "Channel No. confirm" screen appears.



While the "Channel No. confirm" screen is displayed, the LED status of the installed board becomes as shown below according to its channel number.



Changing a channel number

The following shows the procedure to change a channel number.

Operating procedure

- 1.** Start the CC IE Control utility.
- 2.** Click the [Setting] button in a board information screen (startup screen).
The "Parameter setting" screen appears.
- 3.** Select the type of a board of which the channel number is to be changed in "Target board specification."
- 4.** Select the target board in "Board."
- 5.** Select "Channel No."
- 6.** Click the [Check] button.

The same channel number cannot be set for multiple boards.

If there are boards with the same channel number, correct the setting so as not to overlap their numbers.

- 7.** Click the [End] button.

The set channel number is applied to the installed board, and then the "Parameter setting" screen closes.

A board with its parameter changed is reset.

- 8.** Restart the personal computer.

8.3 Board Information

This section explains the screen to check a status of CC-Link IE Controller Network interface board installed in a personal computer.

Window

Start the CC IE Control utility.

Displayed items

Item		Description	Display range
Board 1 to 4	Board type	The type of a board assigned to board 1 to 4 is displayed. • CCIEC board(NZ): NZ81GP21-SX or NZ81GP21S-SX • CCIEC board(Q): Q81BD-J71GP21-SX, Q81BD-J71GP21S-SX, Q80BD-J71GP21-SX, or Q80BD-J71GP21S-SX	• CCIEC board(NZ) • CCIEC board(Q)
	Channel No.	Displays the parameters which are set for the installed CC-Link IE Controller Network interface boards and their communication statuses.	151 to 154
	Network No.		1 to 239
	Group No.		0 to 32
	Station No.		1 to 120, 255
	Type		• Control station • Normal station
	Status		• Start data linking • Stop data linking • Relay of data packet • No relay of data packet • Executing Offline test • Offline
[Board detail information] button		Click this to display the "Board detail information" screen. (Page 97 Board detail information) Disabled when a board is not installed.	—
[Start monitor] button [Stop monitor] button		Click this to start or stop monitoring of board 1 to 4.	—
[Channel No. confirm] button		Click this to display the "Channel No. confirm" screen. (Page 94 Checking method for a channel number)	—
[Network Diagnostics] button		Click this to display the "CC-Link IE Controller Network diagnostics result" screen. (Page 111 CC-Link IE Controller Network diagnostics)	—
[Setting] button		Click this to display the "Parameter setting" screen. (Page 98 Parameter Setting)	—
[Manual] button		Click this to display this manual.	—
[Close] button		Click this to exit the CC IE Control utility.	—

Board 1 to 4 are the numbers to identify each board in the utility.

The numbers are assigned according to the channel numbers set for each board when starting a personal computer.

(Board 1 for 151, board 2 for 152, board 3 for 153, and board 4 for 154 are automatically assigned.)

At the first startup, the numbers are assigned in the order of installation slot numbers.

The numbers of board 1 to 4 corresponding to the installed boards are not reassigned by only changing the channel numbers in the utility. They will be reassigned according to the channel numbers by restarting the personal computer.

Board detail information

The following items are displayed in the "Board detail information" screen.

Displayed items

Item	Description
Board type	Displays the model name of a board. For a board to which the board redundancy function is set, '(R)' is added to the end of the model name.
Production information	Displays the production information (serial number and function version) of a CC-Link IE Controller Network interface board.
Present Error	Displays the latest error code.
Firmware version	Displays the firmware version.
Link refresh	Displays the maximum, minimum, and current link refresh time in ms units.
Test result	Displays the test result selected in the "Parameter setting" screen.
[Save SB/SW] button	Click this to display the "Save SB/SW" screen. (☞ Page 91 SB/SW)
[Reset] button	Click this to reset a board.
[Memory Test] button*1	Click this to display the "Memory Test" screen. (☞ Page 97 Memory test (CCIEC board(Q) only))

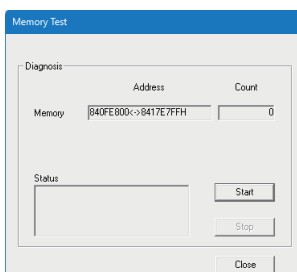
*1 Enabled only when selecting "CCIEC board(Q)."

Memory test (CCIEC board(Q) only)

Perform the diagnostics between a board and a personal computer.

Operating procedure

1. Disconnect the communication cable from a board.
2. Set the mode to "Offline." (☞ Page 98 Parameter Setting)
3. Click the [Memory Test] button in the "Board detail information" screen.
The "Memory Test" screen is displayed.



The range of two-port memory occupied by the board is displayed.

4. Click the [Start] button.

The memory test status and the number of diagnoses are displayed.

5. Click the [Stop] button.

When switching the screen while the diagnostics is being performed, click the [Stop] button to stop the processing in advance.

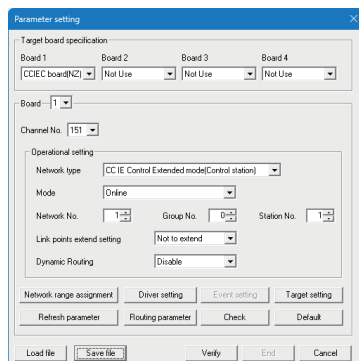
8.4 Parameter Setting

This section explains the parameter setting which is required in order to communicate with other stations using CC-Link IE Controller Network interface board.

Operating procedure

1. Click the [Setting] button in a board information screen (startup screen).

The "Parameter setting" screen appears.



2. Select the checkbox of a board in "Target board specification" to set its parameters.

- CCIEC board(NZ): For NZ81GP21-SX, NZ81GP21S-SX
- CCIEC board(Q): For Q80BD-J71GP21-SX, Q80BD-J71GP21S-SX, Q81BD-J71GP21-SX, Q81BD-J71GP21S-SX

3. Select the board of which parameters are to be set in "Board."

4. Set parameters of the selected board.

○: Necessary, △: As necessary, —: Not necessary

Item		Availability		Reference
		Control station	Normal station	
Channel No.		○	○	Page 94 Channel Number Setting
Operational setting	Network type	○	○	Page 100 Operational setting
	Mode	○	○	
	Network No.	○	○	
	Group No.	△	△	
	Station No.	○	○	
	Link points extend setting	○	○	
	Dynamic Routing	△	△	
Network range assignment		△	—/△*1	Page 102 Network range assignment
Driver setting		△	△	Page 106 Driver setting
Event setting		△*2	△*2	Page 107 Event setting (CCIEC board(Q) only)
Target setting		△	△	Page 108 Target setting
Refresh parameter		△	△	Page 109 Refresh parameter
Routing parameter		△	△	Page 110 Routing parameter setting

*1 For the system B using the board redundancy function, set the same setting as that of the system A. When not using the board redundancy function, the setting is not required.

*2 Enabled only when selecting "CCIEC board(Q)."

5. Click the [Check] button.

All parameter settings of the target board are checked. Correction is required if there is an error.

6. Click the [End] button.

The set parameters are applied to the installed board, and then the "Parameter setting" screen closes.

The [End] button cannot be clicked if the selection status of "Target board specification" and the actual installation status of the board do not match.

A board with its parameter changed is reset.

■Loading/saving a file

The parameters being set can be saved in a file. ( Page 92 Parameter)

The saved parameter file can be read out and its setting can be utilized for other boards.

Parameters of a board which is not installed can be edited and also saved.

■Verification

The parameters being set can be verified with the data of the ones set for a board.

By verifying the parameters, the consistency and changes can be checked.

Mismatched verification result can be saved in a file. ( Page 93 Verification result)

Parameter unset state

The following explains the status when parameters are not set.

The parameters of this product will be unset at the following timings:

- When adding a CC-Link IE Controller Network interface board
- When the set parameter corruption is detected

Point

When installing SW1DNC-MNETG-B, parameters are initialized and set as the normal station in offline mode with the network No.1 and station No.1.

 Page 28 Considerations for Installation and Uninstallation

■Operation when the parameter is not set

The operation is as follows:

- The board operates as a normal station with the network No.1 and station No.255 (station number not set).
- Cyclic transmission and transient transmission cannot be performed.
- The CC-Link IE Controller Network diagnostics cannot be performed.
- A parameter error is notified when the parameter corruption is detected.

Item	Description
Event Viewer	The event ID 287 is registered.
Return value of the MELSEC data link library function	A parameter error (0085H) is returned.
"Present Error" in the "Board detail information" screen	An error code corresponding to the error description is displayed.

Precautions

Depending on the parameter corruption status, the board may operate with the network No. and station No. that are set in the CC IE Control utility.

■Clearing the parameter unset state

Set parameters in the CC IE Control utility.

Precautions

Depending on the parameter corruption status, parameters cannot be reset.

In this case, restart the personal computer and set the parameters.

Operational setting

Configure the station type, mode, etc.

Setting data

Item	Description	Setting range
Network type	Select which to use the network as either a control station or a normal station. Only one control station can be set in a single network. If an extended mode is selected, the maximum link points per station of LB and LW are extended. (☞ Page 35 Performance Specifications of CC-Link IE Controller Network) When using the board redundancy function, select an item with '(R)' added to the end. Match the extended mode selection status for the redundant systems A and B.	■For standard use • CC IE Control(Control station) • CC IE Control(Normal station) • CC IE Control Extended mode(Control station) • CC IE Control Extended mode(Normal station) ■For the board redundancy function • CC IE Control(Control station)(R) • CC IE Control(Normal station)(R) • CC IE Control Extended mode(Control station)(R) • CC IE Control Extended mode(Normal station)(R)
Mode	Select the mode with which a board operates. • Online: To perform a data link with another station. • Offline: Not to perform a data link with another station. • Board communication test: To check the hardware of the board.	• Online • Offline • Board communication test
Network No.	Set a network number for the board.	1 to 239
Group No.	Set the group number to perform transient transmissions in accordance with the group specification. Data can be transmitted in single transient transmission to stations whose group numbers are set to the same.	• 0: No specification • 1 to 32: Group No.
Station No.	Set the station number of a board. The station number must be different from those used in the same network. Set the station number of the redundant system B to be that of the redundant system A + 1.	1 to 120
Link points extend setting	When "Extend" is selected, the maximum link points per network of LB and LW are extended. If an extended mode is selected in Network type, the maximum link points per station are further extended. (☞ Page 35 Performance Specifications of CC-Link IE Controller Network)	• Not to extend • Extend
Dynamic Routing	Set whether to enable or disable automatic generation of a communication route by dynamic routing (the dynamic routing function). (☞ Page 64 Routing function) When setting static routing, it is prioritized. (☞ Page 110 Routing parameter setting)	• Disable • Enable

CCIEC board(Q)

Setting data

Item	Description	Setting range
Network type	Select which to use the network as either a control station or a normal station. Only one control station can be set in a single network. If an extended mode is selected, the maximum link points per station of LB and LW are extended. (☞ Page 35 Performance Specifications of CC-Link IE Controller Network)	• CC IE Control(Control station) • CC IE Control(Normal station) • CC IE Control Extended mode(Control station) • CC IE Control Extended mode(Normal station)
Mode	Select the mode with which a board operates. • Online: To perform a data link with another station. • Offline: Not to perform a data link with another station. • Bus I/F test: To check the hardware for the bus I/F function of the board. • H/W test: To check the hardware in the board. • Self-loopback test: To check the hardware including communication circuits and connection cables of the transmission system by the board itself. • Circuit test: To check the network cable connection status, line status, and parameter setting status of each station from the control station. • Test between station: To check the status of cables connected between two stations (OUT of the executing station to IN of the target station).	• Online • Offline • Bus I/F test • H/W test • Self-loopback test • Circuit test • Test between station
Network No.	Set the network number for a board.	1 to 239
Group No.	Set the group number to perform transient transmissions in accordance with the group specification. Data can be transmitted in single transient transmission to stations whose group numbers are set to the same.	• 0: No specification • 1 to 32: Group No.
Station No.	Set the station number of a board. The station number must be different from those used in the same network.	1 to 120

Network range assignment

Set parameters of normal stations (the number of points and assignment of link devices) in the control station.



The network range assignment is set in the control station only. Normal stations perform cyclic transmission according to the range assigned at the control station.

Operating procedure

1. Click the [Network range assignment] button in the "Parameter setting" screen.
The "Network range assignment" screen appears.

2. Set each item.

Item	Description	Setting range
Total stations	Set the total number of stations including the control station in the target network. • When setting a reserved station, include the number of reserved stations. • When skipping a station number, specify the number to be skipped as "Reserved station."	2 to 120
Assignment method	Select a method to set the device range. • Start/End: Set the start and end numbers of link devices. • Points/Start: Set the points and start numbers of link devices.	• Points/Start • Start/End
Switch screens	Select an LB/LW setting screen or LX/LY setting screen to be displayed.	• LB/LW setting(1) • LB/LW setting(2) • LX/LY settings(1) • LX/LY settings(2)
LB/LW settings(1) LB/LW settings(2)	Assign LB/LW points. (☞ Page 49 Communication using LB and LW) Normally, only "LB/LW settings(1)" is required to be set for LB/LW communication. Set "LB/LW settings(2)" in the following cases: • When extending the send range of each station without changing existing assignment • When dividing the send range of each station into two By setting with the following four conditions satisfied, 32-bit data is automatically assured. (☞ Page 54 Cyclic data assurance) • The start device number of LB is a multiple of 20H. • The number of points assigned per station in LB is a multiple of 20H. • The start device number of LW is a multiple of 2. • The number of points assigned per station in LW is a multiple of 2.	☞ Page 103 Setting range for a device
LX/LY settings(1) LX/LY settings(2)	Assign LX/LY points. (☞ Page 50 Communication using LX and LY) Set "LX/LY settings(1)" as block 1 and "LX/LY settings(2)" as block 2. Avoid overlap of the LX/LY settings for each station in "LX/LY settings(1)" and "LX/LY settings(2)."	
Monitoring time	Set a value for monitoring time of link scan time.	5 to 2000
Specify I/O master station	Each time the [Specify I/O master station] button is clicked with a row selected, its status switches between set and unset. Set an I/O master station for each block to perform communication using LX/LY. Up to two I/O master stations can be set for one network (block 1 and block 2), regardless of the status of control or normal station. Enabled only when selecting an LB/LW setting screen.	—
Specify reserved station	Each time the [Specify reserved station] button is clicked with a row selected, its status switches between set and unset. Set this item when reserving a normal station in parameters for future extensibility. By reserving a normal station, link device assignment will not change even if the normal station is added or the reservation is cancelled. Therefore, the program needs not to be modified. Physical connection of the normal station is not required.	—

Item	Description	Setting range
Equal assignment	Specify the start station and end station, and equally assign link devices to stations.	☞ Page 104 Equal assignment
Supplementary setting	Set the constant scan, block data assurance per station, punctuality assurance, and maximum number of transients in one station.	☞ Page 105 Supplementary setting

3. Click the [Check] button.

The parameter settings are checked. Correction is required if there is an error.

4. Click the [End] button.

The set content is applied to the parameter being edited, and then the screen closes.

Setting range for a device

When "Extend" is selected in the link points extend setting, the maximum link points per network are extended. It results in the available range for "Start" and "End" of LB and LW.

When "Extended mode" is selected as the network type, the maximum link points per station are increased. It results in increase of the available "Points" of LB and LW.

Operational setting		LB			LW			LX/LY					
Link points extend setting	Network type* ¹	Points* ²	Start* ³	End* ⁴	Points* ⁵	Start* ⁶	End* ⁶	Points* ²	Start* ³	End* ⁴			
Not to extend	CC IE Control(Control station)	16 to 16384	0000H to 7FF0H	000FH to 7FFFH	1 to 16384	0000H to 1FFFFH	0000H to 1FFFFH	16 to 8192	0000H to 1FF0H	000FH to 1FFFH			
	CC IE Control Extended mode(Control station)	16 to 32768			1 to 131072								
Extend	CC IE Control(Control station)	16 to 16384	0000H to FFF0H	000FH to FFFFH	1 to 16384	0000H to 3FFFFH	0000H to 3FFFFH						
	CC IE Control Extended mode(Control station)	16 to 65536			1 to 262144								

*1 Including the network types for the board redundancy function with '(R)' added to the end.

*2 Decimal (16-point units)

*3 Hexadecimal (Multiple of 16)

*4 Hexadecimal (Multiple of 16 - 1)

*5 Decimal (1-point units)

*6 Hexadecimal

Equal assignment

When setting the network range assignment to a control station, the same points of link devices can be assigned to each normal station.

Operating procedure

1. Click the [Network range assignment] button in the "Parameter setting" screen.

2. Click the [Equal assignment] button in the "Network range assignment" screen.

The "Equal assignment" screen corresponding to the setting configured in the "Network range assignment" screen appears.

LB/LW settings(1) and LB/LW settings(2)

LX/LY settings(1) and LX/LY settings(2)

Assign the range to LY in "M station → L station equal assignment", and to LX in "M station ← L station equal assignment."

3. Select "Identical point assignment" or "Equal assignment."

- Identical point assignment: select when assigning the set identical points to each station.
- Equal assignment: select when dividing the set points equally and assigning them to each station.

4. Set each item.

Item		Description	Setting range
Identical point assignment		Set the points to be assigned to each station in 16-point units. Assign the identical points to LB and LW.	• LB/LW (When the extended mode is set and "Extend" is set for "Link points extend setting"): 16 to 32768 • LB/LW (other than above): 16 to 16384 • LX/LY: 16 to 4096
Equal assignment	Start station	Set the station numbers of stations for which points are assigned.	1 to 120
	End station		
	Start No.	Set the start device number to be assigned.	Page 103 Setting range for a device
	Total points assigned	Set the total points of link devices to be assigned to each station.	

5. Click the [OK] button.

The set content is applied to the parameter being edited, and then the screen closes.

Supplementary setting

Configure functions related to data assurance.
Set the constant scan, block data assurance per station, punctuality assurance, and maximum number of transients in one station.

Operating procedure

1. Click the [Network range assignment] button in the "Parameter setting" screen.
 2. Click the [Supplementary setting] button in the "Network range assignment" screen.
- The "Supplementary setting" screen appears.

3. Set each item.

Item		Description	Setting range
Constant scan ^{*1}		A function to keep the link scan time constant. (Page 56 Cyclic transmission punctuality assurance) Set this item not to fluctuate the link scan time. Specify the link scan time (unit: milliseconds).	Blank (no setting) 1 to 500
Block data assurance per station	Block data assurance per station is available.	Select whether to assure data on a station basis in link refresh. (Page 54 Cyclic data assurance) When the checkbox is selected or unselected, the data is assured on a station basis or in 32-bit units, respectively.	• Selected • Unselected
Transient setting	Punctuality is guaranteed.	Set whether to assure the punctuality of cyclic transmissions. By selecting the checkbox, each station performs transient transmissions for the number of times specified in "Maximum No. of transients in one station." during one link scan, which keeps the link scan time constant. (Page 56 Specification of the number of transient transmissions)	• Selected • Unselected
	Maximum No. of transients in one station.	Set the number of transient transmissions that one station can perform during one link scan.	1 to 10

^{*1} If a longer constant scan time is set, an error may be detected on 'Baton pass status of each station' (SW00A0 to SW00A7) and 'Data link status of each station' (SW00B0 to SW00B7) of all stations for approximately 300 ms + 1 link scan time when the personal computer is restarted or board is reset.

4. Click the [End] button.

The set content is applied to the parameter being edited, and then the screen closes.

Link scan operation depending on the punctuality assurance

The following table shows the link scan operation with or without punctuality assurance.

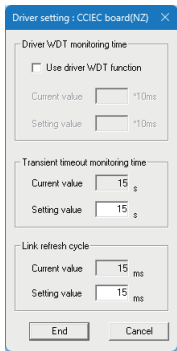
Punctuality assurance	Link scan operation
Punctuality is guaranteed.	• The constant link scan time is kept constant. • The link scan time takes longer than when its punctuality is not guaranteed. • The larger the number set for "Maximum No. of transients in one station," the longer the link scan time takes.
Punctuality is not guaranteed.	• The link scan time fluctuates when a transient transmission is requested. • The larger the number set for "Maximum No. of transients in one station," the greater the fluctuation in link scan time becomes when a transient transmission is requested.

Driver setting

Set the driver WDT monitoring time, transient timeout monitoring time, and link refresh cycle.

1. Click the [Driver setting] button in the "Parameter setting" screen.

The "Driver setting" screen appears.



2. Check the current value displayed in each item, and then set the setting value.

Item	Description	Setting range
Driver WDT monitoring time	The function is enabled when selecting the checkbox, and the driver WDT monitoring time (unit: 10 milliseconds) can be set. (Recommended value: 200)	1 to 32767
Transient timeout monitoring time	Set the timeout time (unit: seconds) for the case that transmission is not completed after sending transient data.	1 to 360
Link refresh cycle	Set period for one cycle (unit: 10 milliseconds) of link refresh.	1 to 1000



The value being set is displayed in "Current value" of this screen.
The current value for monitoring link refresh time can be checked in the "Board detail information" screen.

3. Click the [End] button.

The set content is applied to the parameter being edited, and then the screen closes.

Event setting (CCIEC board(Q) only)

Set conditions for a board for monitoring changes in link devices to notify events to a user program.

1. Click the [Event setting] button in the "Parameter setting" screen.

The "Event setting" screen is displayed.

2. Set a device to be monitored for its change.

By selecting a device code, fields that need to be set can be input.

Item	Description	Setting range
Device code	Select the link device type.	LB, LX, SB, LW, SW
Device No.	Set the device number.	• LB: 0000 to 7FFF • LX: 0000 to 1FFF • SB: 0000 to 01FF • LW: 00000 to 1FFFF • SW: 0000 to 01FF
Device size	When the device code is a bit device, set the number of points from the device number. Set the device number and device points -1 not to exceed the range of device number.	1 to 64

3. Set the detection method and event condition.

Select each condition according to the timing of event occurrence to be notified.

—: Not necessary

Event occurrence timing		Setting range		
		Detection method	Event condition	Word device setting value
Bit device (LB, LX, SB)	ON	Level detection	ON	—
	OFF		OFF	
	Rising	Edge detection	ON	
	Falling		OFF	
Word device (LW, SW)	Setting value matched	Level detection	Equal	0 to 65535 Whether to input the word device setting value in decimal or hexadecimal can be selected in "Input format."
	Setting value mismatched	Edge detection	Not equal	
	Setting value matched (first time only)		Equal	
	Setting value mismatched (first time only)		Not equal	
	Previous value mismatched	—	Value change	

4. Set the event number in the range from '0' to '63.'

When multiple events occur at the same time, the one with smaller setting number is prioritized.

5. Click the [Check] button.

The parameter settings are checked. Correction is required if there is an error.

6. Click the [End] button.

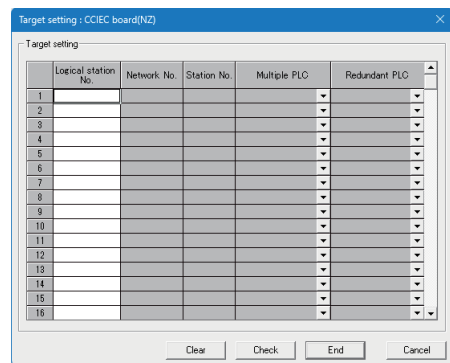
The set content is applied to the parameter being edited, and then the screen closes.

Target setting

Set logical station numbers for accessing the multiple CPU system.
Logical station number is a logical number that is set to "Station No." in the device monitor utility and user program (MELSEC data link library). Logical station number is used when accessing from the target board (channel number) to the other station CPU (other CPU modules of multiple CPU system). When directly accessing the CPU module that controls other stations on the network and their network module, setting logical numbers is not required. Use the station number of the network.

Operating procedure

1. Click the [Target setting] button in the "Parameter setting" screen.
The "Target setting" screen appears.



2. Set each item.

Item	Description	Setting range
Logical station No.	Enter a logical station number to be set or changed.	0 to 239
Network No.	Set a network number for an access target.	1 to 239
Station No.	Set a station number for an access target network module.	0 to 120
Multiple PLC	Set a CPU number in the multiple CPU system of an access target CPU.	• No specification • CPU No.1 to No.4
Redundant PLC	Specify a system for the redundant system of an access target CPU.	• No specification • Control system • Standby system • System A • System B

3. Click the [Check] button.
The parameter settings are checked. Correction is required if there is an error.
4. Click the [End] button.
The set content is applied to the parameter being edited, and then the screen closes.

Refresh parameter

Set the range of link refresh between the driver buffer for link devices in a personal computer and a board.
The refresh range can be set for up to 256 combinations of link-side link devices and driver buffers.

Operating procedure

1. Click the [Refresh parameter] button in the "Parameter setting" screen.
The "Refresh parameter setting" screen appears.

2. Set each item.

When inputting a value on the link side, the same value is automatically set on the personal computer side.

Item	Description	Setting range
Assignment method	Select items to enter numerical values.	• Points/Start • Start/End
Device name	Select names of devices for which a refresh is executed.	• LX • LY • LB • LW
Points	Enter the number of points of devices for which a refresh is executed.	Page 109 Setting range for a device
Start	Enter the start number of devices for which a refresh is executed.	
End	Enter the end number of devices for which a refresh is executed.	

3. Click the [Check] button.

The parameter settings are checked. Correction is required if there is an error.

4. Click the [End] button.

The set content is applied to the parameter being edited, and then the screen closes.

Setting range for a device

When "Extend" is selected in the link points extend setting, the maximum link points per network are extended. It results in the available range for "Start" and "End" of LB and LW.

Operational setting	LB			LW			LX/LY		
Link points extend setting	Points* ¹	Start* ²	End* ³	Points* ⁴	Start* ⁵	End* ⁵	Points* ¹	Start* ²	End* ³
Not to extend	16 to 32768	0000H to 7FF0H	000FH to 7FFFH	1 to 131072	0000H to 1FFFFH	0000H to 1FFFFH	16 to 8192	0000H to 1FF0H	000FH to 1FFFH
Extend	16 to 65536	0000H to FFF0H	000FH to FFFFH	1 to 262144	0000H to 3FFFFH	0000H to 3FFFFH			

*1 Decimal (16-point units)

*2 Hexadecimal (Multiple of 16)

*3 Hexadecimal (Multiple of 16 - 1)

*4 Decimal (1-point units)

*5 Hexadecimal

Routing parameter setting

Set transmission path for transient transmission between a station in the own network and stations in other networks.

Operating procedure

1. Click the [Routing parameter] button in the "Parameter setting" screen.

The "Routing parameter setting" screen appears.

Application range of routing setting:
 CCIEC board(Q): The range entered from 1 to 64 is valid.
 CCIEC board(N): The range entered from 1 to 239 is valid.
 *The input contents is set excluding blank rows.
 Settings from the 65th after (indicated by "1") are only applied to the CCIEC board(N) and not to the CCIEC board(Q).

	Target network No.	Relay network No.	Relay station No.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Maximum size of transient transmission when relaying other networks:
 Channel No. 151: ☐ 960 Words ☒ 480 Words
 Channel No. 152: ☐ 960 Words ☒ 480 Words
 Channel No. 153: ☐ 960 Words ☒ 480 Words
 Channel No. 154: ☐ 960 Words ☒ 480 Words

*960 words setting can be set only the relay station and target station which of transient transmission relays other network No. not exist MELSECNET/10 network.

Clear Check End Cancel

2. Set routing parameters to be required for the request source.

The routing parameters are commonly used with channel No.151 to 154. They cannot be set for each channel number.

Up to 238 routine parameters can be set.

Note that only the first 64 settings excluding that left blank are applied for the CCIEC board (Q).

Item	Description	Setting range
Target network No.	Set a network number for the access target (final destination) network.	1 to 239
Relay network No.	Set a network number for own network.	1 to 239
Relay station No.	Set a station number of the relay station on own network which is passed through for accessing another network.	0 to 120
Maximum size of transient transmission when relaying other networks.	Select a maximum size of transient transmission for each channel number.	• 960 Words • 480 Words

3. Click the [Check] button.

The parameter settings are checked. Correction is required if there is an error.

4. Click the [End] button.

The set content is applied to the parameter being edited, and then the screen closes.

Routing setting for a relay station

A board can not be used as a relay station. For a relay station, use the network module which CPU controls.

The routing function can perform transient transmission via up to seven relay stations.

If there are two or more relay stations in the route, set routing parameters to each relay station.

MELSEC iQ-R series	MELSEC-Q series	Description
Target station	Network No.	Target network No. Route when sending a request: Set a network number for the access target (final destination) network. Route when sending a response: Set a network number for the request source.
Relay station	Network No.	Relay network No. Set a network number of own network including the next relay station.
	Station No.	Relay station No. Set the station number of the next relay station.

When a relay station is a MELSEC iQ-R series module, the dynamic routing function can be used. (Page 100 Operational setting)

For details on the routing setting for a relay station, refer to the following:

- MELSEC iQ-R Programmable Controller CPU Module User's Manual
- MELSEC-Q CC-Link IE Controller Network Reference Manual

8.5 Diagnostics

This section explains the methods to check statuses of network links and stations.

CC-Link IE Controller Network diagnostics

The following explains diagnostics of CC-Link IE Controller Network.

Operating procedure

1. Start the CC IE Control utility on a personal computer in which a CC-Link IE Controller Network interface board is installed.
2. Click the [Network Diagnostics] button in a board information screen (startup screen).
The "CC-Link IE Controller Network diagnostics result" screen appears.

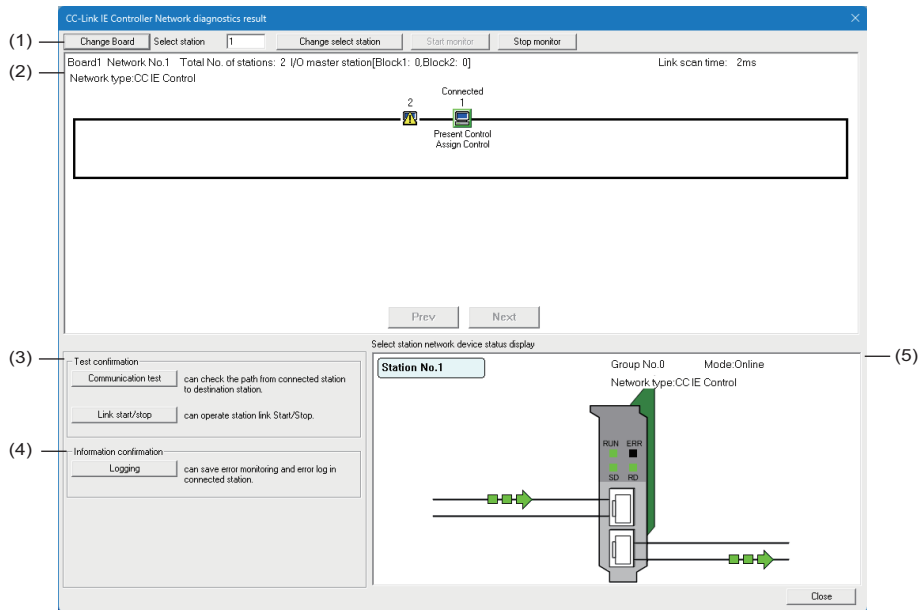
Point

When two or more CC-Link IE Controller Network interface boards are installed in a personal computer, the "Select diagnostics destination" screen is displayed before the "CC-Link IE Controller Network diagnostics result" screen appears.

Select a target to be diagnosed in the screen.

3. Check the statuses of network links and stations in "Network information display." (☞ Page 113 Network information display)
 - The icon indicating an error is displayed for the station where an error occurs.
 - The icon indicating a disconnected station is displayed for a station disconnected after a data link is performed once.
 - The icon indicating communication error is displayed on the cable where a communication error occurs. To check the details of the communication error, click the neighboring stations of the icon.
4. Select a station to be checked in detail by any of the following operations:
 - Enter the station number in "Select station," and click the [Change select station] button.
 - Click the station icon in "Network information display."
 - Move the focus of the selected station in "Network information display" with the right and left arrow keys, and then press the  key.
5. Check the status of the selected station in "Select station network device status display." (☞ Page 115 Select station network device status display)
If an error occurs, a button indicating the error is displayed in "Select station network device status display." Click the button to check the error details and corrective actions.
6. Each test and operation can be performed by clicking "Test confirmation" or "Information confirmation."

Window



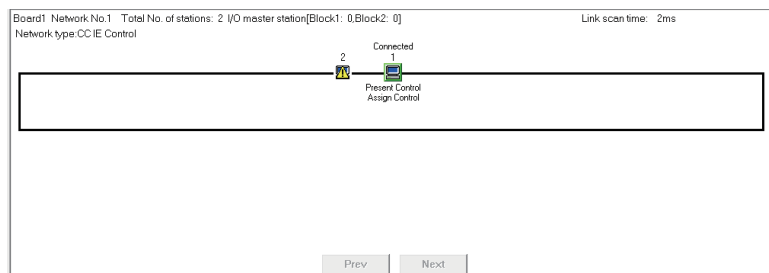
Displayed items

Item		Description
(1)	[Change Board] button	Click this to display the "Select diagnostics destination" screen when two or more CC-Link IE Controller Network boards are installed in the personal computer. Select a target to be diagnosed in the screen.
	Select station	Set a station to be displayed in the "Select station network device status display" field. By entering its station number and clicking the [Change select station] button, the status of the station is displayed.
	[Change select station] button	Click this to display the status of the station, of which the number is entered in the "Select station" field, in the "Select station network device status display" field.
	[Start monitor] button [Stop monitor] button	Click this to start or stop monitoring.
(2)	Network information display	The statuses of network links and stations are displayed. (Page 113 Network information display)
(3)	Test confirmation	[Communication test] button Click this to perform a communication test. (Page 117 Communication test)
		[Link start/stop] button Click this to start or stop cyclic transmission. (Page 118 Link start/stop)
(4)	Information confirmation	[Logging] button Click this to monitor the transmission path switching information and transient transmission error, and to clear the error information. (Page 121 Logging)
(5)	Select station network device status display	The detailed information of a selected station is displayed. (Page 115 Select station network device status display)

Network information display

The statuses of network links and stations are displayed.

Window



Displayed items

Item	Description
Board	The board number of the network being diagnosed is displayed. The number corresponds to board 1 to 4 in a board information screen (startup screen). When two or more boards are installed, the board selected in the "Select diagnostics destination" screen is displayed.
Network No.	The network number of the network being diagnosed is displayed.
Total No. of stations	The total number of connected stations and reserved stations is displayed.
I/O master station	The station numbers of block 1 and block 2 of I/O master station on the network being diagnosed are displayed.
Link scan time	The link scan time of the displayed network is displayed.
Network type	The network type is displayed. (Page 114 Network type)
Icon	The network configuration and the status of each station are displayed. (Page 114 Icon)
[Prev] button	Click this to display the prior screen of "Network information display" when the total number of stations is 61 or more.
[Next] button	Click this to display the next screen of "Network information display" when the total number of stations is 61 or more.

■Display position of a disconnected station

- When normal connection information has been obtained

A disconnected station is displayed in the position where it was connected normally.

- When normal connection information has not been obtained

A disconnected station is displayed on the IN side of a connected station.

■Acquisition of normal connection information

The normal connection information is network configuration data that a board on the connected station stores in its memory when all stations are normal.

When all of the following conditions are met, the normal connection information can be obtained. Also, after any of the conditions became unsatisfied, if all of them are met again, the normal connection information will be updated.

- Data link status is all stations normal. ('Data link error status of each station' (SB00B0) is OFF.)
- No loopback station ('Loopback status' (SB0065) is OFF.)
- No station has a parameter error. ('Parameter error status of each station' (SB00E0) is OFF.)
- The number of actually connected stations is the same as the total number of stations set for the control station (except for reserved stations).

Point

After acquisition of the normal connection information, if the network configuration is changed with a cable or station disconnected, the changed network configuration cannot be displayed correctly.

Update the normal connection information by the following operations. (If the network has an error, the normal connection information cannot be obtained. Therefore, the screen display is as in the case where the normal connection information has not been obtained.)

- Power OFF and ON or reset a connected station.
- Take corrective actions to set all stations into normal state.

■Network type

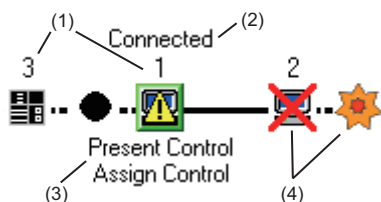
The screen displays and the corresponding network types set in the operational setting are as follows:

"CC-Link IE Controller Network diagnostics result" screen display	Parameter setting (operational setting)	
	Normal	When using the board redundancy function
CC IE Control	• CC IE Control(Control station) • CC IE Control(Normal station)	• CC IE Control(Control station)(R) • CC IE Control(Normal station)(R)
CC IE Control Extended mode	• CC IE Control Extended mode(Control station) • CC IE Control Extended mode(Normal station)	• CC IE Control Extended mode(Control station)(R) • CC IE Control Extended mode(Normal station)(R)

■Icon

The statuses of each station and between stations are displayed.

If the status is not displayed, check that there is only one control station in the system and no station number is duplicated.

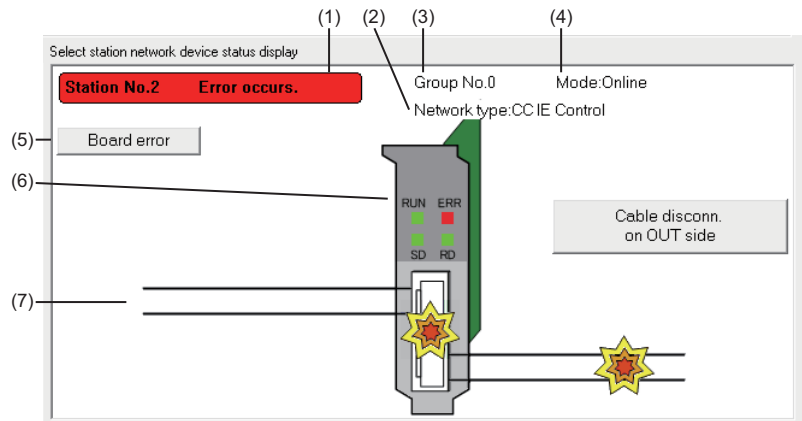


No.	Item		Description
(1)	Station No.	1 to 120	The station number is displayed.
		CTRL SBY	Displayed to indicate the system of a station for the redundant system.
		A B	The type of system is not displayed for a non-redundant system.
		Undef.	Displayed for a station for which parameters have not been set or station No. is not assigned.
(2)	Connected		Displayed for a connected station (own station).
(3)	Present Control		Displayed for a station that is actually operating as the control station.
	Assign Control		Displayed for a station set as the control station by parameters.
(4)	Icon		Normally operating station
			Faulty station (A fault has occurred on a board, module, and cable while cyclic transmission is performed.) Even when an error is cleared by turning ON the following link special relays in a faulty station, the icon indicating the faulty station remains if a station where the error information has not been cleared is set as a connected station. • 'Clear IN-side transmission error count' (SB0007) • 'Clear OUT-side transmission error count' (SB0008) If the error information is cleared in the connected station, the icon on the station where the error has been cleared switches to the one indicating the normally operating station.
			Faulty station (Cyclic transmission is stopped.)
			Disconnected station (black)
			Reserved station (gray)
			Selected station (station icon edged with green) • This can be selected by clicking a station icon or moving a focus and pressing the Space key. • The station status is displayed in "Select station network device status display." • A disconnected station and reserved station cannot be selected.
			Focusing (station icon edged with dotted line) • This can be selected by pressing the Space key. • A disconnected station and reserved station cannot be selected.
			Communication error If a station adjacent to the one where a communication error occurs is selected, the station status is displayed in "Select station network device status display."

Select station network device status display

The status of a station selected in "Network information display" is displayed.

■When selecting a station where an error has occurred

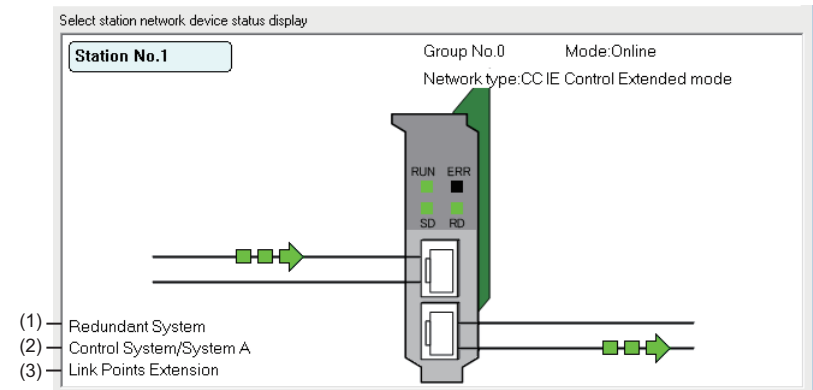


No.	Description
(1)	The operating status is displayed. • Station No.□: Normal operation • Station No.□ Error occurs. (yellow): Error (Data link is continued.) • Station No.□ Error occurs. (red): Error (Data link is stopped.)
(2)	The network type is displayed. (Page 114 Network type)
(3)	The group number of a selected station is displayed.
(4)	A mode is displayed.
(5)	Click this button to check error details. Take a corrective action following the description displayed in "Error factor" and "Troubleshooting."
(6)	The LED status of a module and board is displayed. When ERR. LED of the board is flashing, its status is displayed as ON in this screen.
(7)	The communication status is displayed. • Normal • Error (cable disconnection) • Error (other than cable disconnection) • Module error (CC-Link IE Controller Network parameter setting error)

Point

When a transient transmission error occurs, check the error description in error code and take a corrective action.

■When selecting a station where settings for the redundant system and the link point extension are set



No.	Description
(1)	A station where the setting for the redundant system is set
(2)	The selected station status in the redundant system (control system/standby system and system A/system B) is displayed. If a stop error has occurred in CPU modules of both systems, "Standby System" is displayed.
(3)	A station where the setting for the link point extension is set

Communication test

This function is for displaying a path from the own station to specified communication target and checking if the transient transmission can be routed correctly.

Operating procedure

1. Click the [Communication test] button in the "CC-Link IE Controller Network diagnostics result" screen.
The "Communication Test" screen appears.

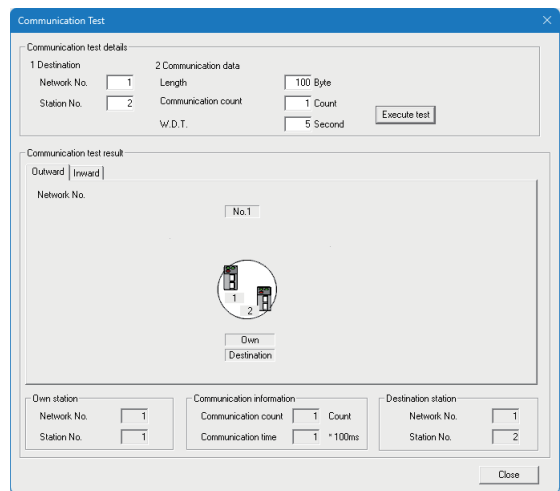
2. Set each item in "Destination" and "Communication data."

Item		Description	Setting range
Destination	Network No.	Set a network number of the communication target.	1 to 239
	Station No.	Set a station number of the communication target. "Communication test" cannot be performed for the own station and relay sending stations.	0 to 120
Communication data	Length	Set the data length of the communication data.	1 to 900
	Communication count	Set the number of communications.	1 to 100
	W.D.T	Set timeout time of the communication test.	1 to 100

3. Click the [Execute test] button.

A path from the own station to specified communication target, check result, and other items are displayed in "Communication test result."

If an error occurs, follow the error message to take corrective action.

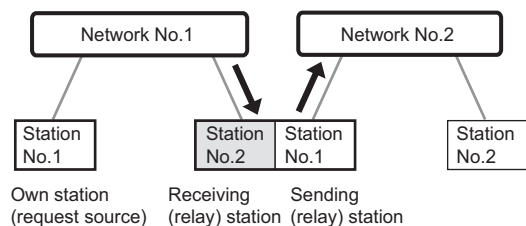


Item	Description
[Outward] tab [Inward] tab	The network number and station number routed on the outward from own station (connected station) to the specified station and its inward are displayed.
Own station	The network number and station number of the own station (connected station) are displayed.
Communication information	The number of communications and communication time (unit: 100 milliseconds) are displayed.
Destination station	The network number and station number of a communication target are displayed.

4. Click the [Close] button.

Precautions

- When a relay sending station is set in "Destination," only an error code appears without an error message. Set a relay receiving station in "Destination."



Link start/stop

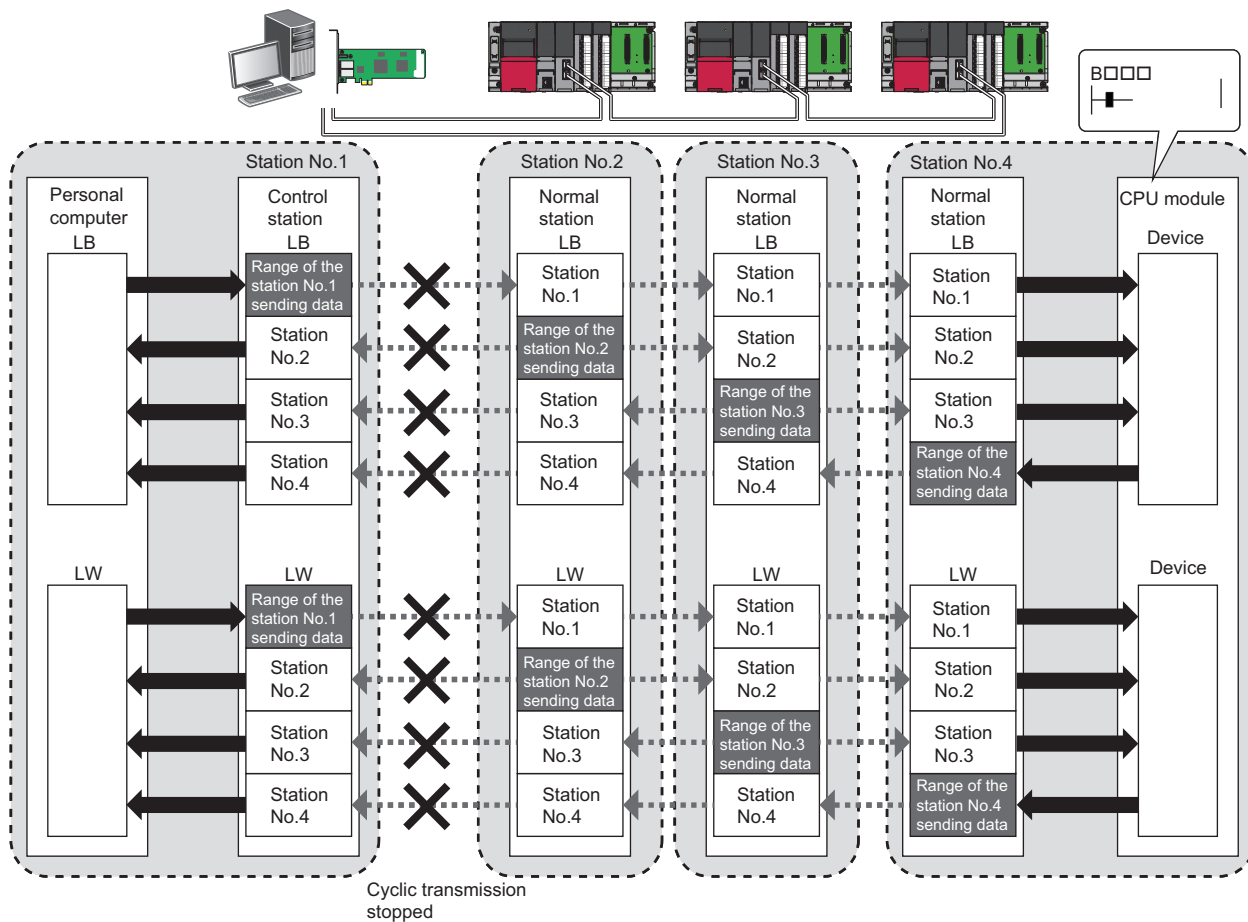
This function is for stopping the cyclic transmission during debugging and other operations. (Data reception from other stations and data sending from the own station are stopped.)

Also, the stopped cyclic transmission can be restarted. This function does not stop or restart transient transmission.



Cyclic transmission can be started and stopped using link special relay (SB) and link special register (SW).

(Page 180 Link Special Relay (SB) List, Page 190 Link Special Register (SW) List)



Operating procedure

Selective status	Station No.	Link status	Group	Type
☒	1	Linking	0	Control Station
☒	2	Stopping	0	Normal Station
☐				
☐				
☐				
☐				
☐				
☐				
☐				

1. Click the [Link start/stop] button in the "CC-Link IE Controller Network diagnostics result" screen.

The "Link start/stop" screen appears.

2. Select the checkbox of a target station for starting or stopping cyclic transmission in "Selective status."

When the connected station is a normal station, only the own station can be selected. The connected station can be checked in "Network information display."

3. Select whether to start or stop cyclic transmission in "Link start/stop."

By selecting "Force link start," cyclic transmission can be forcibly started even for a station where cyclic transmission was stopped from another station or link special relay (SB)/link special register (SW).

4. Click the [Execute] button.

The execution status of cyclic transmission can be checked in "Link status."

■When specifying target stations in a batch

- Group specification: Right-click on the line where the target group is displayed," and select "Select group."
- All stations specification: Right-click on the "All station status" area, and select "Select all." Note that all selections are canceled by selecting "Cancel Select all."

When resetting or powering OFF and ON

Even if cyclic transmission has been stopped by selecting "Link stop," it is restarted by reset or power-OFF and ON.

- Board: Resetting a board or powering OFF and ON a personal computer with a board installed
- Module: Resetting or powering OFF and ON a CPU module

Stations for which the link start cannot be performed

The link start cannot be performed for the following stations:

- Station where the link start/link stop is in progress^{*1}

Condition

During the execution of the link start/stop in the same station, another link start/stop is performed.

The link start/stop is executed in the station where any of the following link special relays (SB) is ON:

- 'Link startup of own station' (SB0000)
- 'Link stop of own station' (SB0001)
- 'System link startup' (SB0002)
- 'System link stop' (SB0003)

- Station where cyclic transmission was stopped due to an error^{*1}
- Station where link was stopped by a command from another station
- Station where link was stopped by link special relay (SB) or link special register (SW)

^{*1} Even with the forced link start used, the link cannot be started.

Considerations

When "Link start" is executed, the cyclic transmission is not restarted and the error definition is not stored in 'System link startup result' (SW0051) in the following cases. Check if the data link is being performed normally using the diagnostics and 'Data link status of each station' (SW00B0 to SW00B7) after the cyclic transmission is restarted by executing the force link start, reset, or power-OFF and ON.

- When executing "Link start/stop" from another station to the station, where cyclic transmission was stopped by executing "Link start" in the own station or 'Link stop of own station' (SB0001)
- When executing "Link start" from other station C for the station A, where "Link stop" was executed from other station B (including when "Link start" for the own station and the station A is executed by specifying multiple stations)

Logging

This function is for monitoring the transmission path switching of the connected stations and transient transmission error history. In addition, error information can be cleared.

Window

Click the [Logging] button in the "CC-Link IE Controller Network diagnostics result" screen.

Displayed items

Item		Description	Corresponding buffer memory
Display Station		The network number, group number, and station number of a connected station (own station) are displayed.	—
Switch transmission path	Loop Status	The transmission path information of the whole network is displayed when a transmission path is changed. • Normal • Loopback • All station error	2786 (AE2H)
	Loopback station IN	The station number, in which an IN-side loopback occurred at loopback of the transmission path, is displayed.	2788 (AE4H)
	Loopback station OUT	The station number, in which an OUT-side loopback occurred at loopback of the transmission path, is displayed.	2789 (AE5H)
	Date	The time when the transmission path was changed is displayed.	2792 to 2795 (AE8H to AEBH)
Transient transmission error	Error Code	An error code is displayed when a transient transmission error occurs.	2594 (A22H)
	Target Net	The network number of transient request target is displayed when a transient transmission error occurs.	2596 (A24H)
	Target Station	The station number of transient request target is displayed when a transient transmission error occurs. • 1 to 120 • Assign Control Station (125) • Present Control Station (126) • Group No.1 to 32 (129 to 160) • Broadcast Together (255)	2597 (A25H)
	Date	The time when the transient error occurred is displayed.	2600 to 2603 (A28H to A2BH)
[Save error log] button		Click this to save data of "Monitor detail" in the CSV file. (Page 93 Error log)	—
[Start monitor] button		Click this to start or stop monitoring.	—
[Stop monitor] button			

Point

- Up to 100 logs can be displayed. Older logs are deleted if the number exceeds 100.
- Only 16 logs are retained and the rests are deleted when the screen is closed. To save 17 or more displayed logs, click the "Save error log" button to save them in a file.

■Error clear

The following shows the procedure to clear error information.

Operating procedure

1. Select the [Error clear] tab in the "Logging" screen.
2. Select a target to be cleared in "Clear type."

Item	Description	Corresponding SB/SW
Clear Communication Error Counter	The cumulative number of communication errors is cleared.	—
Clear IN side Transmission Error Counter	An error detection result on the IN side is cleared.	SB0007 (SB006E, SB0140, SW0068, SW0069, SW0074, SW0140 to SW0147)
Clear OUT side Transmission Error Counter	An error detection result on the OUT side is cleared.	SB0008 (SB006F, SB0150, SW006A, SW006B, SW0084, SW0150 to SW0157)
Clear Loop Switch Counter	A change history of transmission path is cleared.	SB0009 (SB008E, SB0160, SW006E, SW0160 to SW0167)
Clear Transient Transmission Error	The detection result of a transient transmission error is cleared.	SB000A (SB008F, SB0170, SW006F, SW0170 to SW0177)

3. Click the [Clear Error info.] button.

The selected information is cleared.

This chapter shows the MELSEC data link library functions used in a user program to access a board.

For available operating systems and programming languages, refer to the following:

 Page 25 Operating Environment

9.1 MELSEC Data Link Library

This section explains the features of the functions provided by the library.

These functions are used when creating a user program to communicate with another station or a CPU module.

With these functions, communications can be performed without being aware of hardware types or communication protocols on the target.

The following table shows the list of functions provided with the software package.

Function name	Description	Remarks
mdOpen	Opens a communication line.	—
mdClose	Closes a communication line.	—
mdSendEx	Writes devices in a batch.	Extended function ^{*1}
	Sends data. (SEND function)	
mdReceiveEx	Reads devices in a batch.	
	Receives data. (RECV function)	
mdRandWEx	Writes devices randomly.	
mdRandREx	Reads devices randomly.	
mdDevSetEx	Sets a bit device.	
mdDevRstEx	Resets a bit device.	
mdTypeRead	Reads the type of a programmable controller CPU.	
mdControl	Performs a remote operation (RUN/STOP/PAUSE) for a programmable controller CPU.	
mdBdRst	Resets a board.	—
mdBdModSet	Sets the mode of a board.	—
mdBdModRead	Reads the mode of a board.	—
mdBdLedRead	Reads the LED information of a board.	—
mdBdSwRead	Reads the switch status of a board.	—
mdBdVerRead	Reads the version information of a board.	—
mdInit	Initializes the programmable controller information table.	—
mdSend	Writes devices in a batch.	Conventional compatible function ^{*2}
	Sends data. (SEND function)	
mdReceive	Reads devices in a batch.	
	Receives data. (RECV function)	
mdRandW	Writes devices randomly.	
mdRandR	Reads devices randomly.	
mdDevSet	Sets a bit device.	
mdDevRst	Resets a bit device.	

*1 A function in which the access range is extended according to the extension of the device points at the access target. It is accessible to all device numbers.

Use extended functions when creating a new program.

*2 Conventional compatible functions are functions used for programs created conventionally.

When using the conventional compatible functions, the accessible device numbers are from 0 to 32767.



For details on the MELSEC data link library functions, refer to the following:

 MELSEC Data Link Library Reference Manual

9.2 Considerations for Programming

This section explains the considerations for creating programs.

Cyclic transmission programs

For cyclic transmission programs, interlock with the following link special relay (SB) and link special register (SW).

- 'Data link error status of own station' (SB0049) ( Page 180 Link Special Relay (SB) List)
- 'Data link status of each station' (SW00B0 to SW00B7) ( Page 190 Link Special Register (SW) List)

Transient transmission programs

For transient transmission programs, interlock with the following link special relay (SB) and link special register (SW).

- 'Data link error status of own station' (SB0049) ( Page 180 Link Special Relay (SB) List)
- 'Data link status of each station' (SW00B0 to SW00B7) ( Page 190 Link Special Register (SW) List)

Considerations for utilizing user programs

When utilizing a user program for the following boards with the mdWaitBdEvent function used, change the processing so that link devices are polled using the mdReceiveEx function.

- Q81BD-J71GP21-SX, Q81BD-J71GP21S-SX, Q80BD-J71GP21-SX, Q80BD-J71GP21S-SX

10 COMMUNICATION EXAMPLES

This chapter shows program examples for a board.

10.1 Setting Examples

10

This section shows an example of communication between the control station (board) and normal stations (network modules).

System configuration example

The following system configuration is used for the explanation.

System configuration

■Control station (station No.1)

- Board: NZ81GP21-SX (channel No.151)

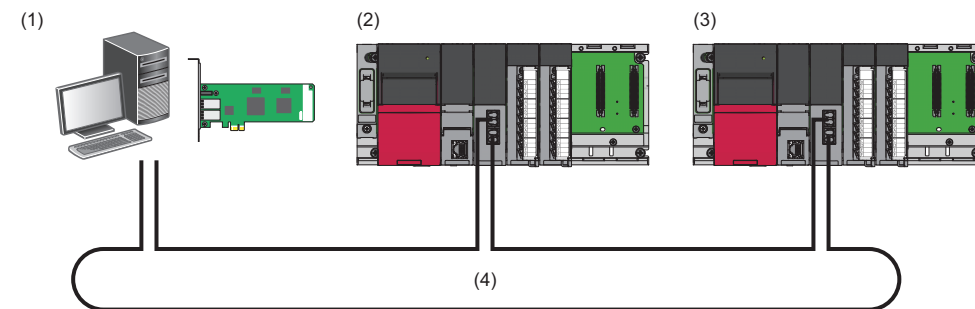
Install a board on a PCI Express slot of the personal computer (Windows) on which the software package of this product is installed.



In this section, examples using NZ81GP21-SX are shown; however, NZ81GP21S-SX can also be used in the same way.

■Normal station (station No.2, No.3)

- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE Controller Network-equipped module: RJ71GP21-SX (I/O number: 0000H to 001FH)
- Input module: RX10 (I/O number: 0020H to 002FH)
- Output module: RY10R2 (I/O number: 0030H to 003FH)



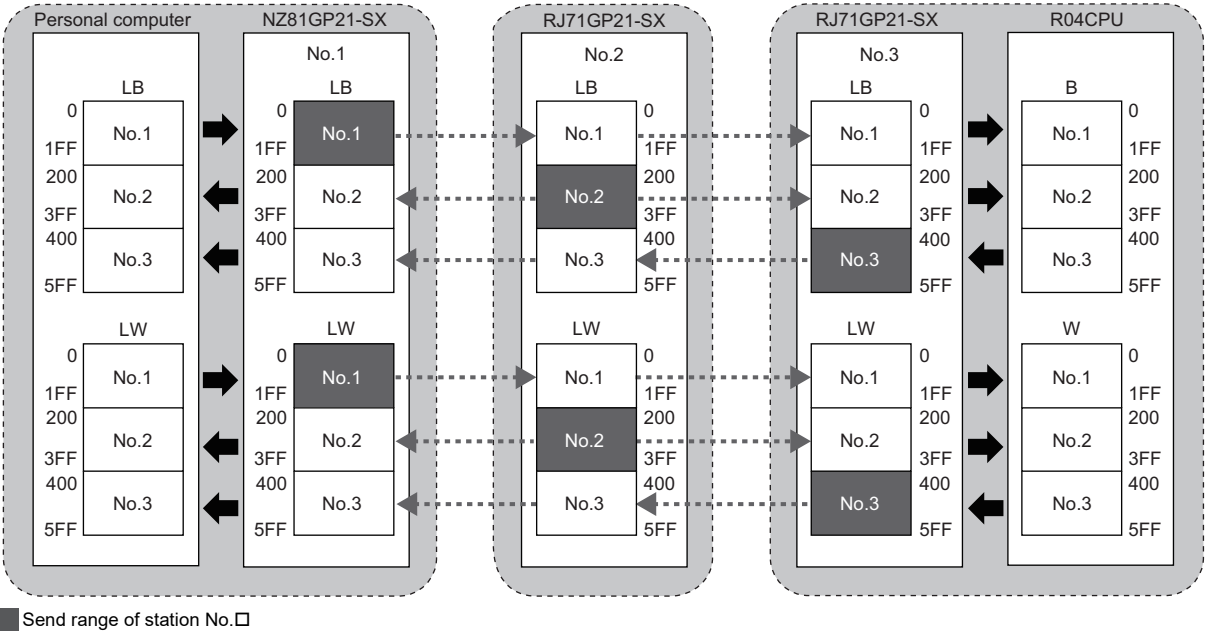
- (1) Control station (station No.1)
- (2) Normal station (station No.2)
- (3) Normal station (station No.3)
- (4) Network No.1

Link device assignment

512 points are assigned to each station.

LB and LW assignment

Each number in the following figure, from No.1 to 3, represents a station number.
No.1 is the control station (board), and No.2 and No.3 are normal stations.

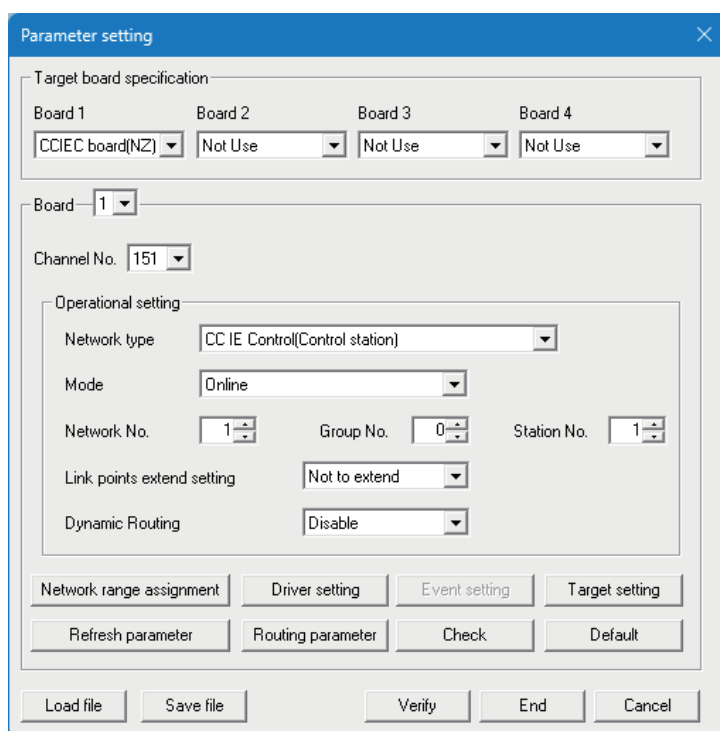


Setting the control station

Start the CC IE Control utility on the personal computer where a board is installed, and set parameters.

1. Set the network number and station number as follows:

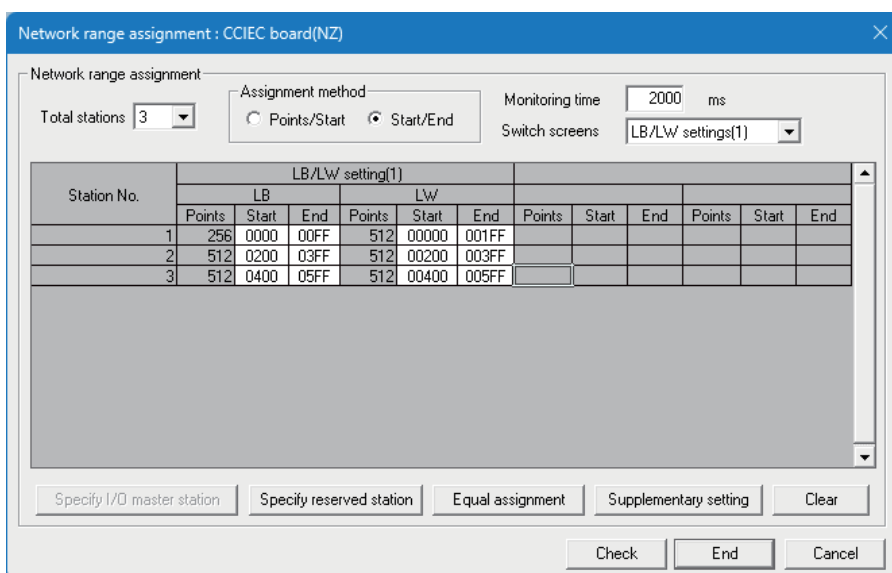
[Parameter setting]



The 'Parameter setting' dialog box is shown. It has a 'Target board specification' section with four boards: Board 1 (CCIEC board(NZ)), Board 2 (Not Use), Board 3 (Not Use), and Board 4 (Not Use). Below this is a 'Board' dropdown set to '1' and a 'Channel No.' dropdown set to '151'. The 'Operational setting' section includes 'Network type' (CC IE Control(Control station)), 'Mode' (Online), 'Network No.' (1), 'Group No.' (0), 'Station No.' (1), 'Link points extend setting' (Not to extend), and 'Dynamic Routing' (Disable). At the bottom are buttons for 'Network range assignment', 'Driver setting', 'Event setting', 'Target setting', 'Refresh parameter', 'Routing parameter', 'Check', 'Default', 'Load file', 'Save file', 'Verify', 'End', and 'Cancel'.

2. Set the network range assignment as follows:

[Parameter setting] ⇒ [Network range assignment]



The 'Network range assignment : CCIEC board(NZ)' dialog box is shown. It has a 'Network range assignment' section with 'Total stations' set to '3'. The 'Assignment method' section has 'Points/Start' and 'Start/End' radio buttons, with 'Start/End' selected. 'Monitoring time' is set to '2000 ms' and 'Switch screens' is set to 'LB/LW settings(1)'. Below this is a table for 'LB/LW setting(1)'.

Station No.	LB/LW setting(1)											
	LB			LW								
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	256	0000	00FF	512	0000	001FF						
2	512	0200	03FF	512	00200	003FF						
3	512	0400	05FF	512	00400	005FF						

At the bottom are buttons for 'Specify I/O master station', 'Specify reserved station', 'Equal assignment', 'Supplementary setting', 'Clear', 'Check', 'End', and 'Cancel'.

3. Write the set parameters to the board on the control station, then reset the board or power OFF and ON the personal computer.

[Parameter setting] ⇒ [End]

Point

In this example, default values are used for parameters that are not shown above.

For parameters, refer to the following:

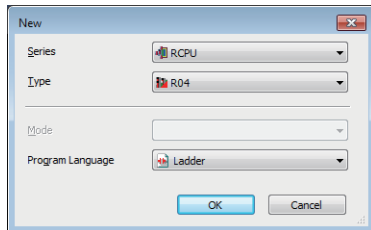
📖 Page 98 Parameter Setting

Setting normal stations

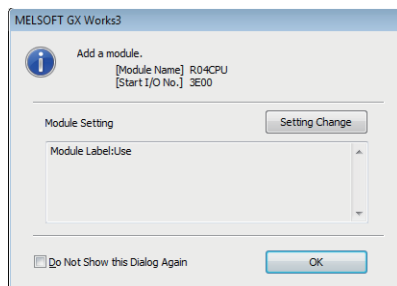
Connect an engineering tool to the CPU module on the normal station and set the parameters. Apply the same settings to the station No.2 and No.3.

1. Set the CPU module, and add its module labels.

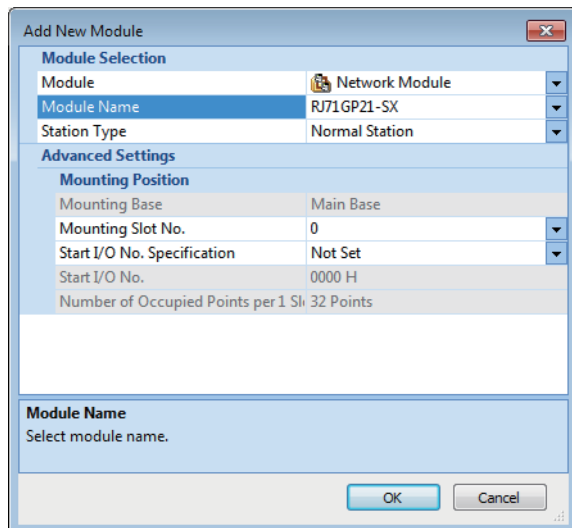
[Project] ⇒ [New]



2. Click the [Setting Change] button to set to use module labels.



3. Click the [OK] button, and add module labels of the CPU module.
4. Configure the CC-Link IE Controller Network-equipped module as follows:
[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ right-click ⇒ [Add New Module]



5. Add module labels of the CC-Link IE Controller Network-equipped module.
6. Set the items in "Required Settings" as follows. For the station No.3, set '3' to "Station No."
[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GP21-SX] ⇒ [Required Settings]

Setting Item	
Item	Setting
Station Type	
Station Type	Normal Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	2

7. Set the refresh settings as follows. Apply the same refresh settings to the station No.2 and No.3 of the normal stations.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GP21-SX] ⇒ [Basic Settings] ⇒ [Refresh Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	↔	Module Label				
-	SW	512	00000	001FF	↔	Module Label				
1	LB	1536	00000	005FF	↔	Specify Device	B	1536	00000	005FF
2	LW	1536	00000	005FF	↔	Specify Device	W	1536	00000	005FF

8. Write the set parameters to the CPU modules on the normal stations, then reset the CPU modules or power OFF and ON.

[Online] ⇒ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above.

For parameters, refer to the following:

IMELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)

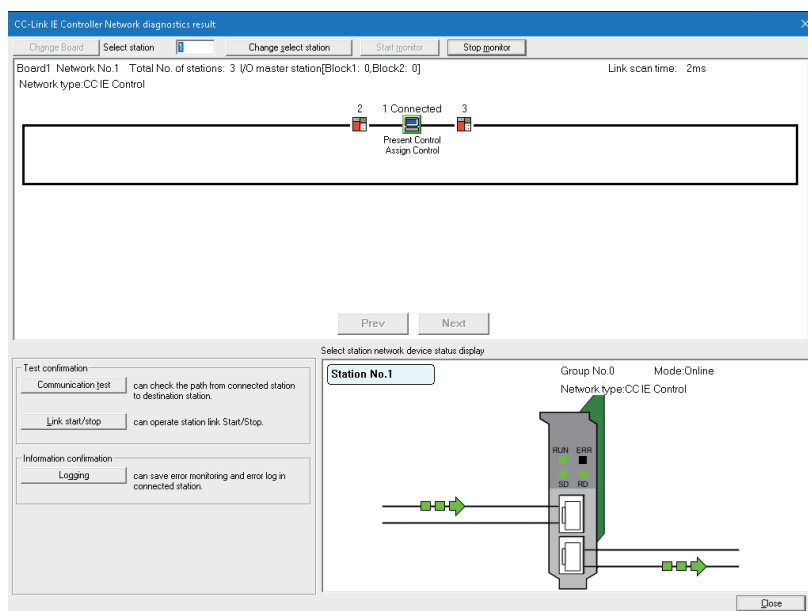
Checking the network status

After setting the parameters for the control station and normal stations, check if data properly links among them using the CC-Link IE Controller Network diagnostics function of the CC IE Control utility.

1. Start the CC IE Control utility on the personal computer where a board is installed.
2. Click the [Network Diagnostics] button in a board information screen (startup screen).

The status in the following screen indicates normal data link.

- In "Network information display," the control station (station No.1) and normal stations (station No.2 and No.3) are displayed in the normal status.
- In "Select station network device status display," an error has not occurred in the control station (station No.1).



When an icon indicating an error is displayed in "Network information display" of the "CC-Link IE Controller Network diagnostics result" screen, identify the cause of the error and take corrective action. (Page 111 CC-Link IE Controller Network diagnostics)

10.2 Program Examples

This section shows program examples.

Program example for cyclic transmission

The following shows a program example for cyclic transmission.

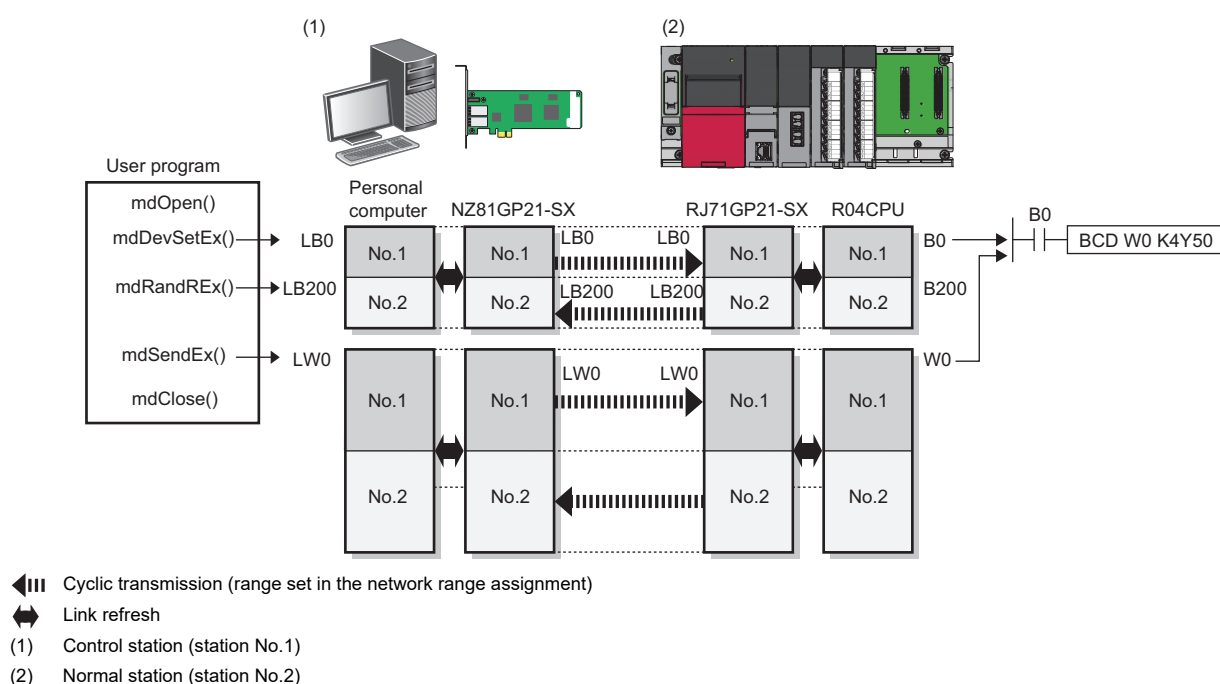
Overview of the program example

LW0 of the control station (station No.1) is sent to Y50 to Y5F of the normal station (station No.2) in cyclic transmission.

In this program example, an interlock is configured with link relay (LB) and cyclic data is sent.

Each number in the following figure, No.1 and No.2, represents a station number.

No.1 is the control station and No.2 is the normal station.



Program example

When creating a cyclic transmission program, configure an interlock using 'Data link error status of own station' (SB0049) and 'Data link status of each station' (SW00B0 to SW00B7).

■Control station (station No.1)

1. The bit 1 (station No.2) of 'Data link error status of own station' (SB0049) and 'Data link status of each station' (SW00B0) is checked, and if the data link is normal, the subsequent processing is performed.
2. The transmission data is stored in 'Cyclic transmission data' (LW0).
3. 'Handshake (station No.1)' (LB0) is turned ON.

The link relay (LB) is sent after the link register (LW) in cyclic transmission.

4. A handshake is performed using 'Handshake (station No.1)' (LB0) and 'Handshake (station No.2)' (LB200).

- Only 'Handshake (station No.1)' (LB0) is ON: Waiting until 'Handshake (station No.2)' (LB200) is turned ON
- 'Handshake (station No.2)' (LB200) is ON: Turning OFF LB0
- Both of 'Handshake (station No.1)' (LB0) and 'Handshake (station No.2)' (LB200) are ON: Transmission completion

■Normal station (station No.2)

Refer to 'Communication Examples of CC-Link IE Controller Network' of the following manual:

📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)

Program example to detect errors in other stations

The following shows a program example to detect errors in other stations.

Overview of the program example

In this program example, the baton pass status and data link status of each station is monitored and network errors in other stations are detected.

10

Point

- When disconnection or reconnection of stations is detected, the CC-Link IE Controller Network executes the line control in all stations to reconstruct the loop.
- During the line control processing, the 'Baton pass status of each station' (SW00A0 to SW00A7) and 'Data link status of each station' (SW00B0 to SW00B7) are turned ON in all stations for up to 100 ms. (Normally for up to 50 ms.) Therefore, set a value of error monitoring cycle to more than 100 ms and within the allowable range of your system.

Program example

1. 'Baton pass error status of own station' (SB0047) and 'Data link error status of own station' (SB0049) are checked, and only when the own station status is normal, the subsequent processing is performed.
2. 'Baton pass status of each station' (SW00A0) and 'Data link status of each station' (SW00B0) are acquired, and the baton pass error and data link error are checked for the station No.1 to No.3.

If an error is detected for the same station number consecutively (at intervals of 100 ms or longer), it is detected as an error station.

3. When an error station is detected, the processing for the error detection is performed.
4. The above processing is repeated at 100 ms intervals.

11 MAINTENANCE AND INSPECTION

This chapter explains items that should be maintained or inspected daily or periodically to properly use a board in optimal condition at all times.

11.1 Daily Inspection

This section explains items that should be inspected daily.

Item	Inspection item		Inspection method	Judgment criteria	Corrective action
1	Installation status	Looseness and rattling	Touch the board to check if there is rattling caused by loose screws.	The board must be fixed securely.	Securely fix the board in order to prevent looseness and rattling.
2	Connection status	Connector looseness	Check for looseness of the cable connector.	The connector must not be loose.	Connect the connector with no loosening securely.
3	LED status	RUN LED	Check the lighting status.	ON	If the LEDs indicate the statuses other than the ones described in the judgment criteria, refer to the following and take corrective action.  Page 136 Checking the LED status
		ERR. LED	Check the lighting status.	OFF	

11.2 Periodic Inspection

This section explains items that should be inspected once or twice every six months to a year.

Periodic inspection is required when the equipment has been relocated or modified, or wiring layout has been changed.

Item	Inspection item		Inspection method	Judgment criteria	Corrective action
1	Ambient environment ^{*1}	Ambient temperature	Measure the temperature with a thermometer.	0 to 55°C	Create the environment that satisfies the judgment criteria.
		Ambient humidity	Measure the humidity with a hygrometer.	5 to 95 %RH	
		Atmosphere	Measure corrosive gases, flammable gases, and conductive dust.	No corrosive gases, flammable gases, less conductive dust.	
2	Installation status	Looseness and rattling	Touch the board to check if there is rattling caused by loose screws.	The board must be fixed securely.	Securely fix the board in order to prevent looseness and rattling.
		Attachment of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be attached.	Remove any dirt or foreign matter, or clean the board.
3	Connection status	Connector looseness	Check for looseness of the cable connector.	The connector must not be loose.	Connect the connector with no loosening securely.

^{*1} The environment within the control panel in which the board is installed

12 TROUBLESHOOTING

This chapter explains the identification of the causes and corrective actions when an error occurs.
Perform the troubleshooting in the following order in case of trouble.

Basic checking procedure

Check if there is a corresponding error symptom written in "Troubleshooting by Symptom" ( Page 142 Troubleshooting by Symptom).

If the corresponding error is not found, check the cause by following the procedure shown below.

Operating procedure

1. Check if all boards installed on a personal computer are displayed in the utility.

-  Page 141 Checking channel numbers

2. Check the LED display of the board.

-  Page 136 Checking the LED status

3. Check the error occurring in the utility.

-  Page 141 Checking with errors on board detail information
-  Page 141 Checking with tests
-  Page 141 Checking with CC-Link IE Controller Network diagnostics

4. Check the access target device.

Check whether the system is performing as set on the parameters and programs by checking the performance of link device communication, or transient transmission/reception in the device monitor utility.

-  Page 141 Checking by monitoring devices

5. Check the user program.

- To check the arguments of the MELSEC data link library:  MELSEC Data Link Library Reference Manual
- To check the return values of the MELSEC data link library:  Page 161 Error Code List

6. Check the operating environment.

-  Page 138 Checking the personal computer and operating system
-  Page 138 Checking the operating environment

When the problem persists

If the problem is not solved by the corrective actions described in this manual, refer to the following:

 Page 160 Information Required for Inquiries

12.1 Checking Method

The checking methods are as follows:

Item	Description	Reference
Checking the installation environment and the board	Check if the installation and wiring are performed within the range of the specification.	Page 135 Checking installation environment Page 135 Checking board installation Page 135 Checking cables and wiring
	The board status and network status can be checked by LED.	Page 136 Checking the LED status
Checking with a personal computer and operating system	The driver operation status can be checked with Device Manager or Event Viewer.	Page 138 Checking the operating environment Page 138 Checking the personal computer and operating system Page 138 Checking with Device Manager Page 139 Checking with Event Viewer
Checking with the utility	The statuses of the board and network can be checked with the utility.	Page 141 Checking channel numbers Page 141 Checking with errors on board detail information Page 141 Checking with tests Page 141 Checking with CC-Link IE Controller Network diagnostics Page 141 Checking by monitoring devices

Checking installation environment

Check if the installation environment is within the general specification or clear from noise.

Check item	Corrective action
Is the ambient temperature within the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.
Is there any noise influence?	Check the wire and cable lengths and grounding condition of each device, and take measures against noise.

Checking board installation

Check if there is any problem for the board installation.

Check item	Corrective action
Is the board installed properly?	• Uninstall the board and reinstall it. • Change the installation location of the board. • Fix the board firmly with screws.
Is the applicable number of boards installed?	Uninstall the board which exceeds the maximum number of applicable boards.

12

Checking cables and wiring

Check if there is an error in cables, disconnected connectors, or improper wiring.

Check item	Corrective action
Is a cable compliant with the specifications used?	Replace the cable with a cable which is compliant with the specifications.
Is the station-to-station distance 550 m or less?	Change the station-to-station distance to 550 m or less.
Does the cabling condition (bend radius) meet the specification?	Refer to the manual for the cable, and correct the bend radius.
Is any cable disconnected?	Replace the cable.

Checking the LED status

The LED status can also be checked on the LED display in the "CC-Link IE Controller Network diagnostics result" screen, other than checking the board visually.

 Page 115 Select station network device status display

Check the LED status and take the corresponding corrective actions.

Lighting status				Description	Reference
RUN	ERR.	SD	RD		
ON	OFF	ON	—	The board is operating normally. (Data is being sent.)	No corrective action required
ON	OFF	—	ON	The board is operating normally. (Data is being received.)	
ON	ON	—	—	The line error has occurred. - Received data is faulty (receive frame error).^{*1} - Loopback is performed in the own station. - Cable disconnection - Cable insertion error	Page 137 ERR. LED is ON or flashing
				A communication error has occurred. (Minor error)	
ON	Flashing	—	—	A parameter error has occurred. (Moderate error)	Page 149 The hardware failure has occurred
Flashing	ON	—	—	A PCI Express bus error has occurred.	
Flashing	—	—	ON	The driver WDT error has occurred.	Page 152 The driver WDT error has occurred
OFF	ON	—	—	A hardware failure or board WDT error has occurred. (Major error)	Page 149 The hardware failure has occurred
OFF	Flashing	—	—		
OFF	OFF	OFF	OFF	A hardware failure has occurred.	Page 149 The hardware failure has occurred
				The driver is not started.	Page 152 The driver does not start
				The firmware update is being performed.	An error occurs Page 150 An error has occurred when updating the firmware
OFF	OFF	ON	—	A failure has occurred in a personal computer and the system has been reset.	The personal computer does not restart. Page 144 The personal computer does not start or shuts down
OFF	OFF	—	ON		
					The LED status does not change after the restart. Page 152 The driver does not start

*1 'IN-side error frame detection of own station' (SB006E) or 'OUT-side error frame detection of own station' (SB006F) is ON.

If the LED does not turn ON in synchronization with the utility display or the execution status of a function, LED failure may occur. In this case, replace the board.

If the board operates normally on another personal computer, there may be a problem with the computer used before the replacement. In this case, repair or replace the computer. If the board does not operate normally on another personal computer, replace the board.

ERR. LED when the receive frame error is detected

Once the receive frame error is detected, the ERR. LED remains ON.

The detection status of receive frame errors can be checked when either or both of the following link special relays are ON:

- IN-side error frame detection of own station (SB006E)
- OUT-side error frame detection of own station (SB006F)

The following shows the procedure for turning OFF the ERR. LED.

1. Refer to the troubleshooting to take corrective action.

 Page 137 ERR. LED is ON or flashing

2. Turn ON 'Clear IN-side transmission error count' (SB0007) or 'Clear OUT-side transmission error count' (SB0008).

The detection status of receive frame errors is cleared.

Point

The error information can be cleared in the "Logging" screen of the CC IE Control utility.

 Page 122 Error clear

ERR. LED is ON or flashing

When the ERR. LED is ON or flashing while the RUN LED is ON, any of the following errors has occurred.

- Stations with same station number exist on the network.
- Parameters are corrupted.
- Parameters do not match the installation status. (Reserved station setting, number of connected stations, network number, etc.)
- Loopback is performed in the own station.
- A cable is disconnected or inserted incorrectly.
- A communication error or hardware failure has occurred in a network board.

Check the following:

Check item	Corrective action
Can the network error be monitored in the utility? Are other stations connected to the board normal?	Check the network status in CC-Link IE Controller Network diagnostics. ( Page 111 CC-Link IE Controller Network diagnostics)
Is the parameter set according to the actual board installation status?	Check the parameter settings. ( Page 98 Parameter Setting)
Are the communication cables normal?	Check the cables and wiring. ( Page 135 Checking cables and wiring)
Is "Mode" (or "Module Operation Mode" for a module) in "Operational Setting" of the control station set to "Online"?	Set "Mode" or "Module Operation Mode" of the control station to "Online." ( Page 100 Operational setting)
Has a board error occurred?	Check the board detail information. ( Page 141 Checking with errors on board detail information)
Is the board hardware operating normally?	Perform the board tests. ( Page 141 Checking with tests)

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

Checking the personal computer and operating system

Check if the personal computer or operating system has any problem.

Check item	Corrective action
Is the power supply ensured?	Check the power outlet and power cable of the personal computer.
Does the board operate normally if the other optional boards are uninstalled?	• Change the installation location of the board. • Check the resource acquisition status of other boards and change the resource in the BIOS setting screen or Device Manager. • Reinstall the drivers of the other optional boards. • Replace the other optional boards.
Does the board operate normally on another personal computer?	• After formatting the hard disk, install the operating system again. • Repair or replace the personal computer.

For problems of a personal computer or operating system, contact the manufacturer of the personal computer or operating system.

Checking the operating environment

Check the operating environment if the supported operating system and functions are used.

 Page 25 Operating Environment

Check item	Corrective action
Is a personal computer which satisfies the specifications written in 'Operating Environment' used?	• Expand the memory in the personal computer. • Check the bus specifications of a slot where a board is installed.
Is the operating system written in 'Operating Environment' used?	Use a personal computer on which the supported operating system is installed.
Is a programming language written in 'Operating Environment' used for a user program containing the MELSEC data link library?	• Create a user program using a supported programming language. • For considerations when using the MELSEC data link library, refer to the following:  MELSEC Data Link Library Reference Manual
Are the functions written in 'Unavailable functions' in 'Operating Environment' set?	Change the settings for the unavailable functions.
Is the administrator authority used for logging on to a personal computer?	Log on as a user with the administrator authority.

Checking with Device Manager

Check if the board is normally recognized in Windows Device Manager.

Check item	Corrective action
Is the driver name of the board not displayed in the Device Manager screen?	The board or driver is not installed. • If the board is not installed, install the board. If the board is already installed, check the board installation status and reinstall the board. • Reinstall the software package. • If the board operates normally on another personal computer, there may be a problem with the computer used before the replacement. In this case, repair or replace the computer. • If the board does not operate normally on another personal computer, replace the board.
Is '!' displayed next to the icon in the Device Manager screen?	The driver installation failed, or the driver did not start normally. • Reinstall the software package. • Check the board installation status and reinstall the board. • When five or more boards are installed in the same personal computer, reduce the number of them to four or less. • If the board operates normally on another personal computer, there may be a problem with the computer used before the replacement. In this case, repair or replace the computer. • If the board does not operate normally on another personal computer, replace the board.

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

Point

- Do not uninstall or disable the driver of the board in Device Manager when the board is normally recognized. If it is uninstalled or disabled, the operating system may shut down (blue screen).
- '?' is displayed next to the icon, however, the board is recognized normally.

Checking with Event Viewer

Check the operations of the board with Windows Event Viewer.

Errors that occurred in the driver are displayed in "System" in Windows logs of Event Viewer.

Errors related to this board are displayed as "NZCciec" in the source field of Event Viewer.

Error event

The following explains error messages and their corrective actions.



When multiple errors occur, check the occurrence order (occurrence time) in the screen of Event Viewer and take corrective actions in order from the first error.

12

Event ID	Error message	Corrective action
256 (0100H)	Because the error had occurred in the during starting of the device, the device was not able to be executed.	• Reinstall the software package. • Check the board installation status. (☞ Page 135 Checking board installation) • Change the installation location of the board. • If the board operates normally on another personal computer, there may be a problem with the computer used before the replacement. In this case, repair or replace the computer. • If the board does not operate normally on another personal computer, replace the board. • Reinstall the operating system.
257 (0101H)	The I/F board was not found.	Check the board installation status. (☞ Page 135 Checking board installation)
258 (0102H)	There is no response from the hardware.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
259 (0103H)	The board more than the maximum number of sheets which was able to be installed was detected.	Uninstall the board which exceeds the maximum number of applicable boards.
262 (0106H)	Failed to link the device name.	Reinstall the operating system.
264 (0108H)	Failed to connect the Interrupt.	
268 (010CH)	An error occurred during the receive process.	Check both the personal computer which is commanding the process and programs in the programmable controller.
279 (0117H)	An error occurred when Registry Database wrote out.	• Restart the personal computer after installing the software package, and check if the error does not occur. • Increase the system memory and disk capacity. • When the error has occurred at updating the operating system with the software package installed, reinstall the software package.
280 (0118H)	Own station received the transient data which was not processable from another station.	Check both the board which is commanding the process and programs in the programmable controller.
282 (011AH)	Failed to map the I/O port.	The I/O port is duplicated with that of another resource. Uninstall other option boards.
285 (011DH)	Warning!! The I/F board detected an abnormal temperature.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
286 (011EH)	Failed to allocate the Memory Area.	Expand the memory in the personal computer.
287 (011FH)	The parameters are nothing or has abnormal data.	Set parameters correctly.
288 (0120H)	The Driver WDT error had occurred.	Refer to the troubleshooting when the driver WDT error occurred. (☞ Page 152 The driver WDT error has occurred)
289 (0121H)	Failed to handshake the Dual Port Memory.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
290 (0122H)	The board number of the I/F board conflicts.	Uninstall other option boards.
291 (0123H)	Failed to map the Dual Port Memory.	• Uninstall other option boards. • Change the I/O port address of another option board in the BIOS setting.

Event ID	Error message	Corrective action
292 (0124H)	Failed to map the System ROM Area.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
293 (0125H)	Failed to connect the Interrupt.	
294 (0126H)	The I/O port of the I/F board conflicts with the other hardware's one.	• Uninstall other option boards. • Change the I/O port address of another option board in the BIOS setting.
295 (0127H)	The Board WDT error had occurred.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
296 (0128H)	The Clock Stop error had occurred.	
297 (0129H)	The Target Abort error had occurred on the PCI bus.	
304 (0130H)	The Data Parity error had occurred on the PCI bus.	
305 (0131H)	Shift to the sleep, the hibernate, or the fast startup was detected. Because the board supports neither the sleep nor the hibernate nor the fast startup, it does not operate normally.	Change the power option not to entering the sleep mode, hibernation mode, or enabling fast startup and restart the personal computer.
306 (0132H)	Detect "surprise removal". Please make sure of the installation of the interface board and the state of computer.	• Check the board installation status. (☞ Page 135 Checking board installation) • Repair or replace the personal computer.
307 (0133H)	The link refresh error had occurred.	• Reset the board. • The memory may be insufficient. Please close other applications running. • Restart the personal computer. • Check the free space of the memory. • Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
308 (0134H)	Failed to initialize the RECV function.	• Reset the board. • The memory may be insufficient. Please close other applications running. • Restart the personal computer. • Check the free space of the memory.
512 (0200H)	The bus error had occurred.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)
539 (021BH)	The breakdown of hardware was detected.	• When using the external power supply function, check the wiring of the power supply and restart the personal computer. • Change the power option not to entering the sleep mode, hibernation mode, or enabling fast startup and restart the personal computer. • Shut down the operating system, and power OFF and ON the personal computer. • Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred)

Information event

The following information event logs other than errors are displayed in the system log of Event Viewer. The corrective actions are not required for the following events.

Event ID	Description	Output timing
1024 (0400H)	Driver started normally.	At driver startup
1025 (0401H)	Board reset was executed.	At board reset (Except for board reset at driver startup)
1026 (0402H)	Network parameters were updated.	At common parameter transmission by the control station
1027 (0403H)	Discarded an I/O request that was not processable.	At reception of an I/O request that cannot be processed in the driver
1028 (0404H)	Firmware update using the CC IE Control utility was performed and completed successfully.	On success of the firmware update
1029 (0405H)	Firmware update using the CC IE Control utility was performed and was not completed successfully.	On failure of the firmware update

Checking channel numbers

Check if the channel numbers are properly assigned to the boards.

 Page 94 Checking method for a channel number

Check item	Corrective action
Are all installed boards displayed?	• Check the Device Manager screen. ( Page 138 Checking with Device Manager) • Check the Event Viewer screen. ( Page 139 Checking with Event Viewer)
Are channel numbers duplicated?	Set channel numbers so that they are not duplicated.

Checking with errors on board detail information

Check "Present Error" in the "Board detail information" screen of the CC IE Control utility.

Check item	Corrective action
Has a board error occurred?	Check the error code and take the corrective actions described in the error code list. ( Page 161 Error Code List)

12

Checking with tests

Check if an error occurs or not by performing a test in the CC IE Control utility.

Item	Description	Reference
Board communication test	To check internal circuits including a data exchange circuit of the network function and the cables.	Page 39 Tests before Wiring (Board communication test)
Communication test	To check whether the transmission path from the own station to a target station is correctly set for a transient transmission.	Page 117 Communication test

Checking with CC-Link IE Controller Network diagnostics

Check the network status in the "CC-Link IE Controller Network diagnostics result" screen.

 Page 111 CC-Link IE Controller Network diagnostics

Checking by monitoring devices

Monitor the link device and access target device in the device monitor utility.

Check whether the system is performing as set on the parameters and programs by checking the performance of link device communication, or transient transmission/reception.

Check item	Corrective action
Is an error message displayed?	• Take corrective actions according to the message. • Check the error code and take the corrective actions described in the error code list. ( Page 161 Error Code List)
Is an unexpected value set to the link device?	Take the corrective actions for when an unexpected value is set to the link device. ( Page 155 An unexpected value is set to the specific link device)
Is the device able to be written by using the device monitor utility?	Check the user program when the access can be performed normally by using the device monitor utility.

For the operation methods of the device monitor utility, refer to the following:

 MELSEC Data Link Library Reference Manual

12.2 Troubleshooting by Symptom

The following tables show examples of the major errors under the specific conditions.
When a corresponding error occurs, refer to the troubleshooting of each error.

Installation of the software package

Error	Description	Reference
Installation of the software package has failed.	The installation is terminated	Page 31 When installation is terminated or failed
	The software package cannot be installed.	
	A screen in which the shown corrective actions are not clear is displayed.	Page 31 When an action displayed in the screen is not clear
	" ! " is displayed next to the icon of the driver name of board in the Device Manager screen of Windows.	Page 138 Checking with Device Manager
Uninstallation of the software package has failed.	The software package is not uninstalled even though the "uninstallation completed" message has been displayed.	Page 33 When uninstallation fails

Personal computer and utility

Error	Description	Reference
The personal computer does not start.	A personal computer with a board installed does not start.	Page 144 The personal computer does not start or shuts down
The personal computer shuts down.	The operating system down or system reset occurred when the system is in operation.	
The utility does not start up.	- There is no icon in the start menu of the operating system. - The utility does not start up by clicking the icon.	Page 144 The utility does not start up
The screen or operation is abnormal.	- The utility screen is not displayed normally. - The utility cannot be operated. - A file cannot be saved in the utility. - The setting cannot be ended in a screen for setting parameters.	Page 145 A screen or operation is abnormal
A screen in which the shown corrective actions are not clear is displayed.	- An unexpected screen is displayed. - A screen in which the shown corrective actions are not clear is displayed.	Page 146 A screen in which the shown corrective actions are not clear is displayed
The personal computer operates slowly.	- The operation of the mouse or keyboard is slow. - The operation of other applications is slow. - The CPU utilization of the personal computer is high. - The operation of the sound function is unstable.	Page 149 The personal computer operates slowly

Board and driver

Error	Description	Reference
All LEDs are OFF.	A hardware failure occurred.	Page 149 The hardware failure has occurred
	The driver does not start.	Page 152 The driver does not start
	An error occurred when updating the firmware.	Page 150 An error has occurred when updating the firmware
The RUN LED is OFF.	The ERR. LED is ON or flashing.	Page 149 The hardware failure has occurred
The RUN LED is flashing.	The ERR. LED is ON.	Page 149 The hardware failure has occurred
	RD is ON.	Page 152 The driver WDT error has occurred
The RUN LED is ON.	The ERR.LED is ON or flashing.	Page 137 ERR. LED is ON or flashing

Network access

Error	Description	Reference
An error occurred in the network data link.	The RUN LED and ERR.LED are ON.	Page 137 ERR. LED is ON or flashing
	Communication cannot be performed occasionally while executing a user program.	Page 153 Communication cannot be performed occasionally while executing a user program
	A station is disconnected. • A connected station is disconnected unexpectedly. • Data cannot be read from/written to the access target station. • Communication with the access target station occasionally fails. • A relevant station repeats network connection and disconnection.	Page 153 A station is disconnected
	Communication is unstable. • The link scan time and transmission delay time is abnormally longer. • A timeout occurs during transient transmission.	Page 154 Communication is unstable
	Link refresh time is increased.	Page 154 Link refresh time is increased
An error occurred while accessing a device via a network.	Cyclic transmission cannot be performed. • The output of the own station does not reach the access target station. • The change of the input sent from the access target station does not reach the own station. • An unexpected value is set to a link device.	Page 155 Cyclic transmission cannot be performed
	Transient transmission cannot be performed. • Data cannot be written to the access target station. • Data cannot be read from the access target station. • Data cannot be monitored in the utility. • Data cannot be read or written while accessing a device by using the MELSEC data link library function in a user program.	Page 157 Transient transmission cannot be performed

The personal computer does not start or shuts down

When a personal computer on which a board is installed does not start, or the system shuts down or is reset, check it according to the following procedure.

Point

Do not uninstall or disable the driver of the board in Windows Device Manager when the board is normally recognized. If it is uninstalled or disabled, the operating system may shut down (blue screen).

Operating procedure

1. Uninstall the board and check if the personal computer can be restarted.

 Page 138 Checking the personal computer and operating system

2. When the restart is successful, check if there is any error.

 Page 139 Checking with Event Viewer

3. Install the latest software package.

 Page 250 Update of software package

4. Install the board and restart the personal computer.

 Page 135 Checking board installation

 Page 138 Checking with Device Manager

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

When the restart of the personal computer with a board installed is successful, follow the basic checking procedure below.

 Page 134 Basic checking procedure

The utility does not start up

When the utility does not start up normally, check the following:

Check item	Corrective action
Is an error message displayed?	Take corrective actions according to the message. ( Page 146 A screen in which the shown corrective actions are not clear is displayed)
Is the icon of the utility displayed in the menu of the operating system? Does the utility start by clicking the icon?	The installation is not completed normally. Install the software package. ( Page 31 When installation is terminated or failed)

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

The device monitor utility does not start up

When the device monitor utility does not start up normally, check the following:

Check item	Corrective action
Is an error message displayed?	Take corrective actions according to the message. ( Page 146 A screen in which the shown corrective actions are not clear is displayed)

A screen or operation is abnormal

When the screen is not displayed normally or the software cannot be operated normally, check the following:

Check item	Corrective action
Is an error message displayed?	Take corrective actions according to the message. (☞ Page 146 A screen in which the shown corrective actions are not clear is displayed)
Is the display setting correct?	• Check if the display setting is correct in Device Manager and install the appropriate display driver. • Set the size of the text and other items in the screen to 100% (96 DPI, 9 pt etc.). • Update Windows. • Change the hardware acceleration setting in the display setting.
Are other applications being executed?	Close the screens of all other applications.
Is there any error in the personal computer?	• Check the operating environment. (☞ Page 138 Checking the operating environment) • Check the personal computer and operating system. (☞ Page 138 Checking the personal computer and operating system)

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

A file cannot be saved/read in the utility

When a file cannot be saved or the saved file cannot be opened in the utility, check if a character other than the available characters is used for the file name and the save destination folder name.

☞ Page 249 Unusable Character Strings (Reserved Words)

A manual cannot be displayed from the CC IE Control utility

When a manual cannot be displayed in e-Manual Viewer, end all e-Manual Viewer running and retry the operation.

☞ Page 90 Manual

The setting cannot be ended in a screen for setting parameters

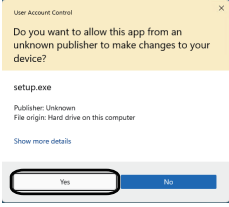
When the parameters cannot be set in the utility, check the following:

Check item	Corrective action
Is the administrator authority used for logging on to a personal computer?	Log on as a user with the administrator authority. For the user account control of Windows, refer to the following: ☞ Page 246 Windows User Account Control
Do the selection status of "Target board specification" and the actual installation status of the board match?	Match the selection status of "Target board specification" to the actual installation status of the board. To change the installation status of the board corresponding to the selection status, save the set parameters in a file, and then read the file after changing the installation status.

A screen in which the shown corrective actions are not clear is displayed

When an unexpected screen is displayed or the corrective action displayed on the screen is not clear, check the following items.

The following table shows the actions to be taken in each screen.

Screen	Corrective action
	This screen appears when the user account control is enabled. Click the [Yes] button. For the user account control of Windows, refer to the following: ☞ Page 246 Windows User Account Control
The user account control screen in which the password is required to be entered	This screen is displayed when the user who is logging on does not have the administrator authority. Log on as a user with the administrator authority.

For error codes, refer to the following:

☞ Page 161 Error Code List

For screens displayed when installing the software package, refer to the following:

☞ Page 31 When an action displayed in the screen is not clear

For corrective actions related to the screens of the operating system, contact the operating system manufacturer.

For corrective actions related to the screens displayed by a user program, check the user program.

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

Error message in which the shown corrective actions are not clear

The following table shows the corrective actions to take when an error message is displayed in the utility.

For error messages which are not listed in the following table, take corrective actions according to the displayed contents.

■Board information

Error message	Corrective action
An error occurred in communication with the CC-Link IE Controller Network board of board X. Error code: XX (XXXXH)	Refer to the error code in MELSEC Data Link Library Reference Manual and take the corrective actions.
Driver is not started.	☞ Page 152 The driver does not start
A CC-Link IE Control Network board is not mounted. Mount a board then start utility.	Check the board installation status and start the utility. ☞ Page 135 Checking board installation
Failed to start up the Device monitor utility.	Reinstall the software package.
Failed to read the version information.	
It failed in the acquisition of SB/SW. It is not possible to preserve it in the file.	
Read-only save target. Please confirm save target and execute it again.	• Check if the specified file is opened in other application. • Check the media of the save destination.
Resetting window creation failed.	Reinstall the software package.
The error occurred by board reset.	• Restart the utility. • Reinstall the software package.
Disk space of destination is not enough. Please specify other destination.	• Secure free space on the disk of the writing destination. • Check the media of the save destination.
e-Manual Viewer has not been installed.	Reinstall the software package.
Failed to start up the Firmware Update Tool.	

■Parameter setting

Error message	Corrective action
Failed to read parameters. The probable causes are: - Parameters have not been set. - The memory is insufficient or the system may be unstable.	- Set parameters correctly. - Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred) - Close other applications, and retry the operation. - Restart the utility. - Restart the personal computer.
Failed to read parameters. The probable causes are: - Parameters have not been set. - The parameter is corrupted. - The memory is insufficient or the system may be unstable.	- Set parameters correctly. - Close other applications, and retry the operation. - Restart the utility. - Restart the personal computer.
There is a board for which parameters have not been set or parameters have failed to be read. Change to default parameters and display.	Set parameters correctly.
Unable to open the specified file.	- Check the specified file, file location, and file name. - Ensure that the total number of characters in the file location path and file name is 255 or less.
The specified file is not a CC IE Control utility parameter file.	Check the specified file.
The specified file cannot be read. The utility version is different from the CC IE Control utility version.	Install the CC IE Control utility with the same version as that of the utility used for creating the file.
Unable to execute the operation because memory is insufficient or system is unstable. Please execute again after closing other applications.	- Close other applications, and retry the operation. - Restart the utility. - Restart the personal computer.
Failed to save the parameter file. Confirm the destination to save.	- Check the free space of the save destination. - Check the media of the save destination.
Failed to save the file. Confirm the destination to save.	Ensure that the total number of characters in the save destination path and file name is 255 or less.
Target board specifications are different from the arrangements of boards. Parameters cannot be written by End button.	Set parameters according to the board installation status. Save the set parameters to a file and change the board installation status according to the parameters, then read them from the saved file. (☞ Page 254 Change of a board or personal computer)
Failed to write parameters. The probable causes are: The memory is insufficient or the system may be unstable.	- Refer to the troubleshooting when the hardware error occurred. (☞ Page 149 The hardware failure has occurred) - Save the set parameters to a parameter file, and write the parameter file after restarting the personal computer. - Close all applications other than the CC IE Control utility, and retry the operation. - Restart the CC IE Control utility.
An error occurred in CC-Link IE Controller Network board during reset. Error code: XXXX The probable causes are: - CC-Link IE Controller Network board is not mounted properly. - CC IE Control utility is not installed properly.	- Check the board installation status and start the utility. ☞ Page 135 Checking board installation - Reinstall the software package.
Setting window creation failed.	- Restart the utility. - Reinstall the software package.

■CC-Link IE Controller Network diagnostics

Error message	Corrective action
Retrieving window creation failed. Network diagnostics will now end.	- Restart the utility. - Reinstall the software package.
Network information screen creation failed. Network diagnostics will now end.	
Creation of network information display failed. Network diagnostics will now end.	
There is no CC-Link IE Controller Network board which can be diagnosed. Diagnostics will now end.	

■Communication test

Error message	Corrective action
Communication test was not normally done.	Check if the routing parameter is correctly set.
Cannot be communicated to specified destination station No.	
As relay station information to specified destination station is incorrect, the result cannot be shown.	
As the number of networks to specified destination station exceeds 8, the result cannot be shown.	Set the number of networks to the specified destination station within the range. Communication can be established with stations within eight networks (number of relay stations: 7).

■Link start/stop

Error message	Corrective action
Network type cannot be retrieved.	• Set parameters correctly. • Restart the utility. • Reinstall the software package.
Station information retrieval failed.	
Retrieval of station No. and group No. of the connecting station failed.	
Retrieval of link status of the connecting station failed.	
Retrieval of station type of the connecting station failed.	
Retrieval of link status after executing link operation START/STOP failed.	

■Logging

Error message	Corrective action
Unexpected error occurred. Cannot monitor.	• Set parameters correctly. • Restart the utility. • Reinstall the software package.
Logging screen cannot be displayed correctly. Return to CC-Link IE Controller Network diagnostics result screen.	
Data to display includes incorrect value. Monitoring is stopped.	

■Device monitor utility

Error message	Corrective action
It cannot communicate XX:YY Error code: ZZ (signed, decimal)	For the corrective action corresponding to the error code, refer to the following:  MELSEC Data Link Library Reference Manual
Channel information is not register.	• Set parameters correctly. • Restart the personal computer. • Reinstall the software package.
It is fail to get the channel information.	
Device No. is out of the range.	• Check and set the device number. • Check the block number (device type) of the specified device. • Check if the specified device and block number are enabled in the specified target.

The personal computer operates slowly

The following explains the troubleshooting when the following symptoms have occurred and the operating speed of the personal computer becomes slow.

- The operation of the mouse or keyboard is slow.
- The operation of other applications is slow.
- The CPU utilization of the personal computer is high.
- The operation of the sound function is unstable.

When the operating speed of the personal computer becomes slow, check the following:

Check item	Corrective action
Is the CPU utilization of another application high?	• Start Windows Task Manager, and specify the application with high CPU utilization in the [Processes] or [Performance] tab. • Reduce the execution frequency of the application with high CPU utilization.
Is the link refresh time longer than the value of link refresh cycle setting?	• Increase the value of link refresh cycle setting. ( Page 106 Driver setting) • Reduce the number of link refresh points ( Page 109 Refresh parameter)
Is the transient transmission processing time longer?	Correct the number of transient transmissions.

Replace the personal computer if its processing capability is lower for the desired processing.

The hardware failure has occurred

When a hardware failure, the board WDT error, or the PCI Express bus error occurs, restart the personal computer or reset the board. If the same error occurs again, check the following:

Check item	Corrective action
Is the board installed properly?	Check the board installation status. ( Page 135 Checking board installation)
Does the board operate normally on another personal computer?	• After formatting the hard disk, install the operating system again. • Repair or replace the personal computer.

If the problem persists, refer to the following:

 Page 160 Information Required for Inquiries

An error has occurred when resetting a board

When a board cannot be reset properly, refer to the following:

Check item	Corrective action
Is the parameter set according to the actual board installation status?	Correct the parameter, then write parameters to the board again.
Is the board reset during the firmware update?	 Page 151 An error has occurred when terminating the process during the firmware update

For considerations for resetting, refer to the following:

 Page 209 Network Status at Power-ON/OFF or Board Reset During Data Linking

An error has occurred when updating the firmware

For the operation of Firmware Update Tool, refer to the following:

 Page 251 Firmware update

When an error occurs during the firmware update, check the following:

Firmware Update Tool cannot be started

Check item	Corrective action
Is a board installed?	Check the board installation status. ( Page 135 Checking board installation)
Is the channel number duplicated?	Set channel numbers so that they are not duplicated. ( Page 135 Checking board installation)
Is Firmware Update Tool already started?	Multiple pieces of Firmware Update Tool cannot be started at the same time. Use the screen opened.
Is the software package with the latest version installed?	Install the latest software package. ( Page 250 Update of software package)

A board is not displayed in Firmware Update Tool

Check item	Corrective action
Has the [Check Board Status] button been clicked?	The board is displayed by selecting a firmware update file and clicking the [Check Board Status] button.
Has Firmware Update Tool been forcibly terminated while the firmware is being updated?	If so, reset the board and click the [Check Board Status] button.
Has the board been reset while the firmware is being updated?	Turn the power of the personal computer OFF and restart it, then click the [Check Board Status] button.

Firmware update cannot be performed with Firmware Update Tool

Check item	Corrective action
Is "Failure" displayed in the "Result" field?	When the firmware update fails, take corrective action corresponding to an error code displayed. ( Page 150 An error code is displayed in Firmware Update Tool)
Is "Firmware Update is cancelled" displayed in the "Result" field?	If so, reset the board and check the board status, then perform the firmware update again. When the board cannot be reset, retry the operation after a while.

An error code is displayed in Firmware Update Tool

Error code	Error details and cause	Corrective action
10100H	Access to the flash ROM of a board failed.	Reset the board and perform the firmware update again. If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. ( Page 160 Information Required for Inquiries)
10201H	An error of a firmware update file is detected.	Check if the specified file is corrupted or incorrect, and perform the firmware update again.
10300H	An error of a firmware update file is detected during the firmware update.	Reset the board and check the specified file, and then perform the firmware update again.
10500H	Access to a board failed.	• Close other applications running and reset the board, then perform the firmware update again. • Turn the power of the personal computer OFF and restart it, then perform the firmware update again. • Reinstall the software package, then perform the firmware update again. • Check the channel number setting, then perform the firmware update again. ( Page 135 Checking board installation) • Set parameters correctly, then perform the firmware update again. ( Page 98 Parameter Setting) If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. ( Page 160 Information Required for Inquiries)
10501H	An error is detected during the firmware update.	Reset the board and perform the firmware update again. If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. ( Page 160 Information Required for Inquiries)
10502H	Insufficient memory error	• Close other applications running and reset the board, then perform the firmware update again. • Check if the specified file is incorrect, then perform the firmware update again.

Error code	Error details and cause	Corrective action
10503H	Parameter setting error	Set "Target board specification" to "CCIEC board(NZ)" in the parameter, then perform the firmware update again. (☞ Page 98 Parameter Setting)

An error has occurred when terminating the process during the firmware update

When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.

- Turning OFF the power of a personal computer
- Restarting an operating system
- Resetting a board
- Installing/uninstalling a board

When an error occurs, check the following:

Check item	Corrective action
Is the board displayed in the CC IE Control utility?	Turn the power of the personal computer OFF and restart it.
Can the board be reset?	Turn the power of the personal computer OFF and restart it.
Is the target board displayed in Firmware Update Tool?	• Reset the board, then click the [Check Board Status] button. • Turn the power of the personal computer OFF and restart it.
Does the firmware version of the target device, which is displayed in Firmware Update Tool, remain the same as before the update?	Perform the firmware update again.

If resetting a board fails after Firmware Update Tool is forcibly terminated, retry the operation after a while.

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

A board does not operate after firmware update

In this case, perform the firmware update again.

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

Precautions

When there is any error for the system operation after the update, revert the firmware to a previous version.

If the software package is also updated, revert it to a previous version.

The driver WDT error has occurred

When the driver WDT error occurs, check the following:

Check item	Corrective action
Has the system temporarily overloaded due to the following causes? • Windows start processing at the personal computer startup • Operation of a device driver such as a graphic board • Operation of other software applications	• Reset the board. • Restart the personal computer.
Has the same symptom occurred repeatedly? (Is the system overloaded constantly?)	• Remove the factor of system overload. • Extend the driver WDT monitoring time. (🔗 Page 106 Driver setting) • Set the driver WDT setting to "Not Use." (🔗 Page 106 Driver setting)

If the problem persists, refer to the following:

🔗 Page 160 Information Required for Inquiries

The driver does not start

When the driver does not start normally, check the following:

Check item	Corrective action
Is the board installed properly?	Check the board installation status. (🔗 Page 135 Checking board installation)
Is the software package installed?	Reinstall the software package.
Does the personal computer recognize the board?	Check if the board is normally recognized in Windows Device Manager. (🔗 Page 138 Checking with Device Manager)

If the problem persists, refer to the following:

🔗 Page 160 Information Required for Inquiries

Communication cannot be performed occasionally while executing a user program

When communication cannot be performed occasionally while executing a user program, check the following:

Check item	Corrective action
Is the error code returned to the user program?	Check the return value of the MELSEC data link library. (☞ Page 161 Error Code List)
Can the network error be monitored in the utility?	Check the network status in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Does the error occur when adding stations to the system sequentially?	Check if the error occurs by adding stations sequentially in the system which is configured with the control station and the own station only. If the error occurs, check the added station. ☞ Page 135 Checking installation environment ☞ Page 135 Checking cables and wiring ☞ Page 141 Checking with tests

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

A station is disconnected

The following explains the troubleshooting when the following symptoms have occurred and a station is disconnected.

- A connected station is disconnected unexpectedly.
- Data cannot be read from/written to the access target station.
- Communication with the access target station occasionally fails.
- A relevant station repeats network connection and disconnection.

When the station is disconnected, check the following:

Check item	Corrective action
Is there any influence of ambient temperature or noise?	Check the installation environment. (☞ Page 135 Checking installation environment)
Is there an error in cables? Is the wiring correct?	Check the cables and wiring. (☞ Page 135 Checking cables and wiring)

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

Communication is unstable

When the link scan time and transmission delay time is abnormally longer or a timeout occurs during transient transmission, check the following:

Check item	Corrective action
Is the ERR.LED ON?	Check the LED. (☞ Page 136 Checking the LED status)
Is there any influence of ambient temperature or noise?	Check the installation environment. (☞ Page 135 Checking installation environment)
Is there an error in cables? Is the wiring correct?	Check the cables and wiring. (☞ Page 135 Checking cables and wiring)
Can the network error be monitored in the utility?	Check the network status in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Is the L ERR LED of a module on the control or normal station ON?	Refer to the troubleshooting when L ERR LED is turned ON. (MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application))
Is the board hardware operating normally?	Perform the board tests. (☞ Page 141 Checking with tests)

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

Link refresh time is increased

Link refresh processing time may be increased if the processing is interrupted by Windows system or other application since Windows does not have a function which guarantees to complete the processing within a certain time.

By reducing the number of processings on Windows system or other application, link refresh processing time may be decreased.

The following shows check item and corrective action examples to reduce the number of processing on Windows system or other application.

When increase in link refresh processing time occurs, check the following items:

Check item	Corrective action
Is the CPU utilization or disk utilization by other application high?	Start Windows Task Manager, and specify the application occupying high CPU utilization or disk utilization in the [Processes] or [Performance] tab. Example: Antivirus software, security measure software, backup software, etc. Reduce the execution frequency of the application with high CPU utilization.
Is a service of Windows running?	In Windows logs of Event Viewer, specify the running service of Windows, and stop the service if possible.
Is System Protection (System Restore) of Windows enabled?	Disable System Protection (System Restore) of Windows.
Is the setting to save power configured in the power option setting of Windows?	Disable the setting to save power (by setting it to 'off', 'not set', etc.) in the power option setting of Windows. Example: In the power plan settings of Windows, set "Never" for "Turn off the display."

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

Cyclic transmission cannot be performed

The following explains the troubleshooting when the following symptoms have occurred and cyclic transmission cannot be performed.

- The output of the own station does not reach the access target station.
- The change of the input sent from the access target station does not reach the own station.
- An unexpected value is set to a link device.

When cyclic data does not reach the control station or normal station, check the following:

Check item	Corrective action
Is "Status" in the board information screen of the CC IE Control utility "Start data linking"?	■ "Stop data linking" or "No relay of data packet" Refer to the troubleshooting when cyclic transmission or baton pass communication is stopped. (☞ Page 156 Cyclic transmission or baton pass communication is stopped) ■ "Offline" or "Executing Offline test" Set the mode to "Online" in the operational setting of parameters. (☞ Page 100 Operational setting)
Is the group number of the own station different from that of the target station?	Correct the group number so that the group number of the own station and target station are the same. (☞ Page 100 Operational setting)
Is a target station specified as a reserved station in "Network range assignment" of the control station?	Cancel the reserved station setting of the target station. (☞ Page 102 Network range assignment)
Are the items in "Network range assignment" of the control station set?	Set the items in "Network range assignment" of the control station. (☞ Page 102 Network range assignment)
Is there a station to which the station number exceeding the total number of stations set in "Network range assignment" of the control station is assigned?	Correct the station number. (☞ Page 102 Network range assignment)
Is the station number duplicated with any of other stations?	Change the duplicated station number. (☞ Page 100 Operational setting)
Is the monitoring time which is set for link scan time shorter than the actual link scan time?	Increase the value of monitoring time. (☞ Page 102 Network range assignment)
Is the refresh parameter range set correctly?	Correct the refresh parameter range. (☞ Page 109 Refresh parameter)
Is the board hardware operating normally?	Perform the board tests. (☞ Page 141 Checking with tests)

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

For the troubleshooting for the specific symptoms, refer to the following:

An unexpected value is set to the specific link device

Check the following:

Check item	Corrective action
Is there a data link faulty station?	Check the network status in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Is the parameter assignment range correct?	Set the items in "Network range assignment" of the control station. (☞ Page 102 Network range assignment)
Is the link device accessed using a user program? Is the arguments of the MELSEC data link library correct? • Is the network number of the target station correct? • Is the target station number correct? • Are the device, number of points, and size of the access target correct?	Check the arguments of the MELSEC data link library. (☞ MELSEC Data Link Library Reference Manual)
Is the link device accessed from a programmable controller in the network?	Check the device range used in programs.

Cyclic transmission or baton pass communication is stopped

Check the following:

Check item	Corrective action
Is the control station operating normally?	Check if the other stations are performing data link in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Is the control station connected to the network?	
Are the communication cables normal?	Check the cables and wiring. (☞ Page 135 Checking cables and wiring)
Are other stations connected to the board normal?	Check the network status in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Is the station number '255' (station number not set)?	Set the station number. (☞ Page 100 Operational setting)
Is the station number duplicated?	Change the duplicated station number.
Are 120 or more normal stations connected?	Change the number of connected normal stations to 119 or less.
Are the extend settings for all normal stations and the control station matched? • Normal stations are in the extended mode, however, the control station is in the normal mode, and vice versa. • "Extend" is set for normal stations in "Link points extend setting," however, "Not to extend" is set for the control station, and vice versa.	• Set all normal stations and the control station to the same mode. • Set the same settings for all normal stations and the control station in "Link points extend setting." • Check that the stations for which the extend setting is set are devices supporting the link point extension.

Transient transmission cannot be performed

The following explains the troubleshooting when the following symptoms have occurred and transient transmission cannot be performed.

- Data cannot be written to the target station.
- Data cannot be read from the target station.
- Data cannot be monitored in the utility.
- Data cannot be read or written while accessing to a device using the MELSEC data link library in a user program.

When transient transmission to a target station cannot be performed or data cannot be monitored in the device monitor utility, check the following items:

Check item	Corrective action
Is the transmission status "Start data linking" in the board information screen of the CC IE Control utility?	■ "Stop data linking" or "No relay of data packet" Refer to the troubleshooting when cyclic transmission or baton pass communication is stopped. (☞ Page 156 Cyclic transmission or baton pass communication is stopped) ■ "Offline" or "Executing Offline test" Set the mode to "Online" in the operational setting of parameters. (☞ Page 100 Operational setting)
Is the D LINK LED of modules on the control or normal station turned OFF or flashing?	Perform troubleshooting for when the D LINK LED is turned OFF or flashing. (☞ MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application))
Are the station number settings of target stations correct?	Correct station numbers. (☞ Page 100 Operational setting)
Is the baton pass status of the target station normal?	Check the network status in CC-Link IE Controller Network diagnostics. (☞ Page 111 CC-Link IE Controller Network diagnostics)
Is the arguments of the MELSEC data link library correct? • Is the network number of the target station correct? • Is the target station number correct?	Check the arguments of the MELSEC data link library. (☞ MELSEC Data Link Library Reference Manual)
Is the network number duplicated on the network?	Correct the duplicated network number.
Is the transmission path by the dynamic routing function determined?	• Power ON the system, then start transient transmission after a while. • When "Disable" is set in the dynamic routing setting for a station on the transmission path, set "Enable."
Is the routing parameter for the sending source of transient transmission correct?	Correct the items in "Routing parameter setting" or "Routing setting." (☞ Page 110 Routing parameter setting)
Have the routing parameters of the relay station correctly been set?	Correct the parameter setting of a CPU module.
Is the dynamic routing function supported in a relay station passed through?	If not, set "Routing setting" for all stations on the transmission path.
Are multiple MELSEC data link library functions with the same channel setting executed simultaneously?	• Set a different channel for each function. • Shift the execution timing of the MELSEC data link library functions.
Is the board hardware operating normally?	Perform the board tests. (☞ Page 141 Checking with tests)
Is the communication test result normal?	If an error occurs, follow the error message to take corrective action. (☞ Page 117 Communication test)

If the problem persists, refer to the following:

☞ Page 160 Information Required for Inquiries

An error has occurred when using the board redundancy function

The following shows the troubleshooting when using the board redundancy function.

System switching cannot be performed

Check the following:

Check item	Corrective action
Is a board in the standby system normal?	Take corrective action for the board in the standby system.
Is there an error in cables? Is the wiring correct?	Check the cables and wiring. (☞ Page 135 Checking cables and wiring)
Is 'System switching prohibition specification' (SB000F) ON?	Turn OFF 'System switching prohibition specification' (SB000F).
Is 'Cause of system switching error completion' (SW01DB) other than '0'?	Check the cause corresponding to each value of 'Cause of system switching error completion' (SW01DB), and take corrective action. (☞ Page 158 Error cause is stored in 'Cause of system switching error completion' (SW01DB))
Is the processing for system switching performed correctly?	Review the processing for system switching of the user program.

Error cause is stored in 'Cause of system switching error completion' (SW01DB)

The following table shows the cause corresponding to each value and corrective actions.

SW01DB	Abnormal completion cause	Description	Corrective action
0001H	System switching prohibition of the own system board	- The system switching occurred when 'System switching prohibition specification' (SB000F) was ON. 'System switching prohibition specification' (SB000F) was turned ON during the system switching.	- Turn OFF 'System switching prohibition specification' (SB000F) to permit the system switching. - When requesting the system switching while it is prohibited, set '01H' (user instruction) to the cause (b0 to b7) of 'System switching request cause' (SW000D).
0002H	Stop error of the own system board	A stop error (moderate/major error and hardware failure) occurred during the system switching.	Check the error code of board detail information in the CC IE Control utility, and take corrective action.
0003H	Abnormal response for the system switching notification from the own system user program	The system switching failed due to abnormal response from the own system user program.	Check the cause of abnormal response by referring to the value of 'System switching notification response details' (SW000E), and take corrective action.
0004H	Response timeout for the system switching notification from the own user program	After 'System switching notification' (SB01D9) was turned from OFF to ON, 'System switching notification response' (SB000E) was not turned from OFF to ON within 'System switching response monitoring time for user program' (SW0014).	- When 'System switching notification' (SB01D9) from a board is turned from OFF to ON, turn 'System switching notification response' (SB000E) from OFF to ON within the system switching response monitoring time for user program. - Increase the value of 'System switching response monitoring time for user program' (SW0014).
0005H	System switching completion for the own system only due to unavailable communication with the other system board	Communication cannot be established with the other system board when the system switching is performed.	Check the network status in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility.
0006H	Abnormal response for the system switching request from the other system board	For the system switching request to the other system board, an abnormal response was received from the other system board.	Check 'Cause of system switching error completion' (SW01DB) of the other system board, and take corrective action.
0007H	Response timeout for the system switching request from the other system board	After the system switching request was sent to the other system board, the response was not returned within 'System switching response monitoring time for the other system' (SW0015).	- Check the operation of the other system board. - Check the operation of the other system user program. - Check the network status in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility. - Increase the value of 'System switching response monitoring time for the other system' (SW0015).

SW01DB	Abnormal completion cause	Description	Corrective action
0008H	System switching being performed	A system switching cause occurred while the system switching was being performed.	- When 'System switching notification' (SB01D9) of the board in the own system or the other system is ON, complete the system switching being performed by turning 'System switching notification response' (SB000E) from OFF to ON. - Perform the system switching request again.
0009H	Incorrect own system operation specification for the system switching request cause	- When the own system is the control system, and when the other system is the standby system, 'Operation specification for the own system' was set to 'Control system' and 'System switching request' (SB000D) was turned from OFF to ON. - When the own system is the standby system, and when the other system is the control system, 'Operation specification for the own system' was set to 'Standby system' and 'System switching request' (SB000D) was turned from OFF to ON.	Set the operation specification for the own system (b15) of 'System switching request cause' (SW000D) correctly.
000AH	Error detected through the own system user program error monitoring	A system switching cause occurred while the error was being detected through the own system user program error monitoring.	- When using the user program error monitoring, perform the operation notification correctly. - When not using the user program error monitoring, set the operation specification (b15) of 'Error monitoring setting between user program and board' (SW0018) to 'Disabled' (0).
000BH	Incorrect system state	Incorrect system state was detected during the system switching.	- Check that the other system board is not reset or powered OFF and ON during the system switching of own system board. - Check that the system switching of the other system board does not occur during the system switching of own system board. - When an error occurs in the other system board, check the error code and take corrective action.
000CH	Driver WDT error occurrence of the own system board (standby system)	A system switching cause occurred while the driver WDT error was being detected.	☞ Page 152 The driver WDT error has occurred
000DH	Power-OFF of a personal computer of the own system board (standby system) with an external power supplied	A system switching cause occurred while the power of a personal computer, where this product with the external power supplied is installed, is OFF.	Turn ON the power of the personal computer with this product installed.

Both systems start up as standby systems

When starting up the systems or powering ON, and when both systems (system A, system B) start up as standby systems, check the following:

Check item	Corrective action
Is the monitoring time which is set for link scan time shorter than the actual link scan time?	Switch the system A to the control system in a user program. ☞ Page 230 Switching the own system to the control system when both systems are standby systems ☞ Page 231 Switching the other system to the control system when both systems are standby systems Increase the value of monitoring time. (☞ Page 102 Network range assignment)

12.3 Information Required for Inquiries

When the troubleshooting cannot solve a problem, please contact your local Mitsubishi Electric sales office or representative. Inform us the following conditions and situations when making inquiries:

Product information

Item		Condition/situation
Product version	Board	Model: NZ81GP21-SX SERIAL field: _____-_ Production information: _____-__
	Utility	Model: SW1DNC-MNETG-B Version: __. __. __
Personal computer	Personal computer name	Manufacturer: Personal computer name:
	CPU	(Example: Intel® Core™2 Duo Processor 3 GHz)
	Memory size	(Example: Implemented RAM 16 GB)
	OS	(Example: Windows 11 Professional)
Installation slot position		(Example: Second slot)
Other option boards	Existence	If other option boards exist, inform us of the information such as the type, manufacturer, memory and I/O addresses (start address and occupied size), IRQ number, and DMA number for each board.
	Situation when checking with other option boards uninstalled	

Descriptions of the issue

Item	Condition/situation
Symptom	(Example: The RUN LED of the board does not turn ON even though the personal computer is started.)
Occurrence frequency	
Occurrence condition	If the symptom occurs only under specific conditions, inform us of the known conditions.
Troubleshooting result	Inform us of the following descriptions: Result of performed troubleshooting. Situation when checking with other boards or personal computers. (Example: The message "The Board WDT error had occurred." for event ID 295 is displayed on Event Viewer when the personal computer is started up. It also occurs when the board is installed in another personal computer but does not occur when another board is installed in the same computer.)

12.4 Error Code List

This section explains the error codes, error details and causes, and corrective actions for the errors that occur during the processing.

The following error codes can be checked in the "Board detail information" screen of the CC IE Control utility.

Error code	Error details and cause	Corrective action
1080H	The number of writing to the flash ROM has exceeded 100000.	Replace the board.
1800H	A connection failure was detected in the network.	Correct the wiring.
1811H	An error was detected in the driver.	Check the system log of Event Viewer. Take corrective actions according to the descriptions of registered events. (Page 139 Checking with Event Viewer)
1830H	The number of reception requests of transient transmission (SEND/RCV function ^{*1}) exceeded the upper limit of simultaneously processable requests.	Execute the instruction again after lowering the transient transmission usage frequency.
1845H	Transient transmission (SEND/RCV function ^{*1}) cannot be performed due to the large amount of processing.	Correct the number of transient transmission (SEND/RCV function ^{*1}) execution.
1860H	Baton pass stops due to an error of communication line or a board.	Check the network status in CC-Link IE Controller Network diagnostics.
20E0H	Communication cannot be established with the board.	Refer to the troubleshooting when the hardware failure occurred. (Page 149 The hardware failure has occurred)
2220H	The parameter setting is corrupted.	Set parameters correctly. If the same error occurs again, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (Page 149 The hardware failure has occurred)
2221H	- The network number set for the own station is different from that of the control station. - The own station is in the extended mode, however, the control station is in the normal mode, and vice versa. "Extend" is set for the own station in "Link points extend setting," however, "Not to extend" is set for the control station, and vice versa. - The set value is out of the range.	- Set the same network number for the own station and control station. - Set the own station and control station to the same mode. - Set the same settings for the own station and control station in "Link points extend setting." - Set parameters correctly.
3001H	- A station with the same station number was found in the same network. - Multiple control stations were detected in the same network.	Change the station number or station type of the station where the error was detected. After taking the above action, turn the power OFF and ON or reset all stations where the error was detected.
3007H	The pairing setting is set for a non-redundant system station.	■When the control station is a module Check the pairing setting in "Network Range Assignment" in "Required Settings" of the control station. ■When using the board redundancy function Check the network type of the own station, and set either of the following: - CC IE Control(Normal station)(R) - CC IE Control mode(Normal station)(R) ■When not using the board redundancy function Check the network type of the control station, and set either of the following: - CC IE Control(Control station) - CC IE Control Extended mode(Control station)
3024H	- Parameters of the systems A and B do not match in the board redundant system. - Extended settings of the systems A and B do not match in the board redundant system.	Check the network type of the systems A and B, and set any of the following: - CC IE Control(Control station)(R) - CC IE Control(Normal station)(R) - CC IE Control Extended mode(Control station)(R) - CC IE Control Extended mode(Normal station)(R) Match the extended mode selection status for the systems A and B. Match the following parameter settings for the systems A and B. - Network range assignment - Group No.
3040H	Response data of the SEND/RCV function ^{*1} cannot be created.	- Increase the request interval. - Decrease the number of request nodes. - Wait for a response to the previous request before sending the next request. - Correct the timeout value.

Error code	Error details and cause	Corrective action
3C00H to 3C03H	The hardware error was detected.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
3C0FH		
3C10H		
3C11H		
3C14H		
3C2FH	An error was detected in the memory.	
3E00H	An error was detected in a board.	
3E01H	The network type of the own station is unexpected setting.	
		Set parameters correctly. If the same error occurs again, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)

*1 The following functions of the SEND/RECV function correspond to link dedicated instructions of a network module:

mdSendEx (SEND function)
mdReceiveEx (RECV function)
mdSend (SEND function)
mdReceive (RECV function)

If a related error occurs in a system in which both a network module and a board are included, replace these functions with dedicated instructions to take corrective action depending on the situation.

The error codes are stored as the error response from the link special register or the communication target.
For the corrective actions for the error response from a communication target, refer to the manual of the target device.

Error code	Error details and cause	Corrective action
4000H to 4FFFH	Errors detected in the CPU module	Refer to the user's manual for the CPU module used in a communication target station.
E006H	The receive queue is full.	• Pause the transient transmission temporarily, and retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency.
E102H	The own station is set as a reserved station.	Cancel the reserved station setting in "Network range assignment" of the control station or change the number of the own station to one that is not specified for a reserved station.
E103H	The own station is set outside the range of the total number of connection devices.	Increase the total number of connection devices in "Network range assignment" of the control station or change the number of the own station to one within the range.
E152H	The link startup was executed from a station different from the one that stopped cyclic transmission.	• Execute the link start from the station that stopped the cyclic transmission. • Execute the forced link start.
E160H	'Link startup/stop direction' (SW0000) is not set properly.	Check the setting and stop or restart cyclic transmission.
E162H	Re-execution of link start or stop was attempted during the processing of cyclic transmission stop or restart.	Retry the operation after the processing of cyclic transmission stop or restart is completed.
E163H		
E164H		
E165H	'Link startup/stop station specification' (SW0001 to SW0008) is not set properly.	Check the setting and stop or restart cyclic transmission.
E166H	'Link startup/stop group specification' (SW0012 to SW0013) is not set properly.	
E170H to E172H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E173H	During execution of the communication test, the test was retried.	After completion of the communication test, retry the operation.
E174H	The maximum number of transmission completion signal retries was reached.	• Check the network status in CC-Link IE Controller Network diagnostics. • Check if the routing parameter is correctly set.
E175H	No response has been returned within the communication monitoring time.	
E176H	Timeout has occurred before transmission completion.	
E177H to E179H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E17AH	The response data have been received two times or more.	Check the network status in CC-Link IE Controller Network diagnostics.
E17BH	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E17CH	The target station specified for the communication test is incorrect.	• Correct the setting in "Destination" of communication test. • The communication test cannot be performed for the own station and relay sending stations.
E17FH	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E183H	Transient transmission failed.	• Execute the instruction again after lowering the transient transmission usage frequency. • Check if the cables are connected properly.
E184H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E185H		
E201H	The same transient data have been received two times or more.	Check the network status in CC-Link IE Controller Network diagnostics.
E203H	The send buffer is full.	• Pause the transient transmission temporarily, and retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency.
E204H	The specified number of resends has been reached.	Check the network status in CC-Link IE Controller Network diagnostics.
E205H	The receive buffer is full.	• Pause the transient transmission temporarily, and retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency.
E206H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E207H	Although the target station of transient transmission is connected in the same network, different network number is set.	Correct the setting contents in "Network No." When it is not set, the network number is set to 1 (default). Correct the network number of the target station.

Error code	Error details and cause	Corrective action
E208H	The target station number specified for transient transmission is outside the range.	• Correct the target station number in the own station, and retry the operation. • When the own station is the control station, the specified control station on own network cannot be specified as a target station. Correct the network number and station number of the target station, and retry the operation.
E20AH	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E20BH	In transient transmission, the number of relays to other networks exceeded 7.	• Change the system configuration so that the number of relays is 7 or less. • Check if the routing parameter is correctly set.
E211H	There is no control station even though the specified control station is specified for a target station of transient transmission using protocols such as SLMP.	Correct the target station number, and retry the operation.
E213H	In transient transmission, timeout occurred before transmission completion.	Check the network status in CC-Link IE Controller Network diagnostics.
E215H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E216H		
E218H		
E21CH		
E21EH		
E21FH		
E221H to E223H		
E226H		
E228H	• The request command of transient transmission is incorrect. • CC-Link IE Controller Network diagnostics was used for the network to which the relay receiving station belongs.	• Correct the request command at the request source, and retry the operation. • Review the connection destination so that CC-Link IE Controller Network diagnostics is used for the network to which the relay sending station belongs.
E229H	The control station does not exist.	Add the control station to the network.
E22BH	Baton pass has not been performed.	Check the communication status.
E241H to E244H	The hardware of the target network module or board for the SEND/RECV function*1 has failed.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E24FH	When a function of the SEND/RECV function*1 is executed, the target station number setting is outside the specified range.	Correct the target station number, and retry the operation.
E251H	The same transient data for the SEND/RECV function*1 have been received two times or more.	Check the network status in CC-Link IE Controller Network diagnostics.
E258H	The network number specified for a function of the SEND/RECV function*1 is outside the specified range.	Correct the target station network number, and retry the operation.
E259H	The channel used in the SEND/RECV function*1 is incorrect.	• Set 1 to 8 for the target channel number when using the SEND function. • Correct the number of the channel used by own station, and retry the operation.
E262H	When the target station specified for a function of the SEND/RECV function*1 is "Group Number" or "All stations," "With arrival acknowledgment" is specified for execution type.	Change the execution type to "Without arrival acknowledgment" and retry the operation.
E265H	No response was received after execution of a function of the SEND/RECV function*1, and timeout has occurred.	• Check the network status in CC-Link IE Controller Network diagnostics. • When using the dynamic routing function, check the 'Transmission path determination status' (address 12080 to 12095 (2F30H to 2F30H)) of the buffer memory and check if communication to the target network number is possible.
E266H	The SEND instruction*1 was received from other network.	Change the target station at the station that sent the SEND instruction.
E267H	The own station number was set as the target station number.	Correct the target station number, and retry the operation.
E26AH	When there was no control station on the network, a function of the SEND/RECV function*1 was executed specifying the specified control station.	• Correct the target station number, and retry the operation.

Error code	Error details and cause	Corrective action
E26CH	The channel specified is being used.	• Retry the operation after a while. • Change the channels used by own station or the target station storage channel.
E274H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E277H		
E278H	The requested data size for transient transmission is outside the specified range.	• Correct the request command at the request source, and retry the operation.
E286H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E2A0H	The receive buffer for the CC-Link dedicated instruction is full.	Unsupported transient requests have been received from CC-Link IE Controller Network devices. Change the target station in the CC-Link IE Controller Network devices.
E2A2H	The hardware of the network module or board has failed.	• Check the network status in CC-Link IE Controller Network diagnostics. • Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E2A3H	The frame length (L) in the transient transmission frame is incorrect.	An invalid transient frame was received from a CC-Link IE Controller Network device. Correct the contents of the transient frame on the target device side. For details, please consult the manufacturer of the CC-Link IE Controller Network device.
E2A4H	The gate count (GCNT) in the transient transmission frame is incorrect.	
E2A5H	The destination station number (DA) in the transient transmission frame is incorrect.	
E2A6H	The source station number (SA) in the transient transmission frame is incorrect.	
E2A7H	The destination application type (DAT) in the transient transmission frame is incorrect.	
E2A8H	The source application type (SAT) in the transient transmission frame is incorrect.	
E2A9H	The destination network number (DNA) in the transient transmission frame is incorrect.	
E2AAH	The destination station number (DS) in the transient transmission frame is incorrect.	
E2ABH	The source network number (SNA) in the transient transmission frame is incorrect.	
E2ACH	The source station number (SS) in the transient transmission frame is incorrect.	
E2ADH	The data length (L1) in the transient transmission frame is incorrect.	
E2AEH	Data is received of which the destination station number (DA) in the transient transmission frame matches the own station, but the destination network number (DNA) or the destination station number (DS) does not match the own station.	
E2B0H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E501H to E503H		
E504H	Transient transmission (function of the SEND/RECV function ^{*1} , utility connection) was executed while the own station did not perform baton pass.	• Execute a function of the SEND/RECV function^{*1} interlocking with 'Baton pass error status of own station' (SB0047) and 'Baton pass status of each station' (SW00A0 to SW00A7). • Check the 'Cause of baton pass interruption' (SW0048) in the own station and restart baton pass before executing the transient transmission. • If E504H error occurs, execute the function again.
E505H	Transient transmission (function of the SEND/RECV function ^{*1} , utility connection) was executed with the own station number duplicated.	Remove the duplication of the own station numbers before executing the transient transmission.
E521H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 149 The hardware failure has occurred)
E5F0H	Transient transmission was executed while the target station or relay station did not perform baton pass.	• Reconnect the target station or relay station. • Check the 'Cause of baton pass interruption' (SW0048) at the target station and restart baton pass before executing the transient transmission.
E5F1H	The target station number of transient transmission is already in use.	Change the target station number.

Error code	Error details and cause	Corrective action
E840H	The number of transient requests exceeded the upper limit of simultaneously processable requests.	• Pause the transient transmission temporarily, and retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency.
E841H	The requested data size for memory read/write command is outside the range.	Correct the read or write size specification at the transient request source, and retry the operation.
E842H	• Routing information to the destination network number is not registered. • In transient transmission, the number of relays to other networks exceeded 7.	• Correct the target network number at the request source, and retry the operation. • Correct the transmission path from the transient request source to the destination, and retry the operation. • Check if the routing parameter is correctly set. • Change the system configuration so that the number of relays is 7 or less.
E843H	The board operation mode is set to a mode in which transient transmission cannot be executed.	After completion of the board communication test, retry the operation.
E844H	Incorrect frame was received. • Unsupported pre-conversion protocol • Unsupported frame type • Application header variable part • Application header HDS • Application header RTP • Read command not requiring response	Correct the request data at the transient request source, and retry the operation.
EA00H	An error was detected in a network module or board.	Refer to the troubleshooting when the hardware failure occurred. (📖 Page 149 The hardware failure has occurred)
EA01H		
EB00	The response to a request could not be received.	• When the target station or relay station is in the process of online module change, execute the request again after the completion of the online module change. • When an error is detected in the target station or relay station, check the error cause and take corrective action.

*1 The following functions of the SEND/RECV function correspond to link dedicated instructions of a network module:

mdSendEx (SEND function)
mdReceiveEx (RECV function)
mdSend (SEND function)
mdReceive (RECV function)

If a related error occurs in a system in which both a network module and a board are included, replace these functions with dedicated instructions to take corrective action depending on the situation.

Point

When errors which are not shown in the list occur, refer to the following:

📖 MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)

📖 MELSEC iQ-R Programmable Controller CPU Module User's Manual

📖 MELSEC Data Link Library Reference Manual

If the problem persists, refer to the following:

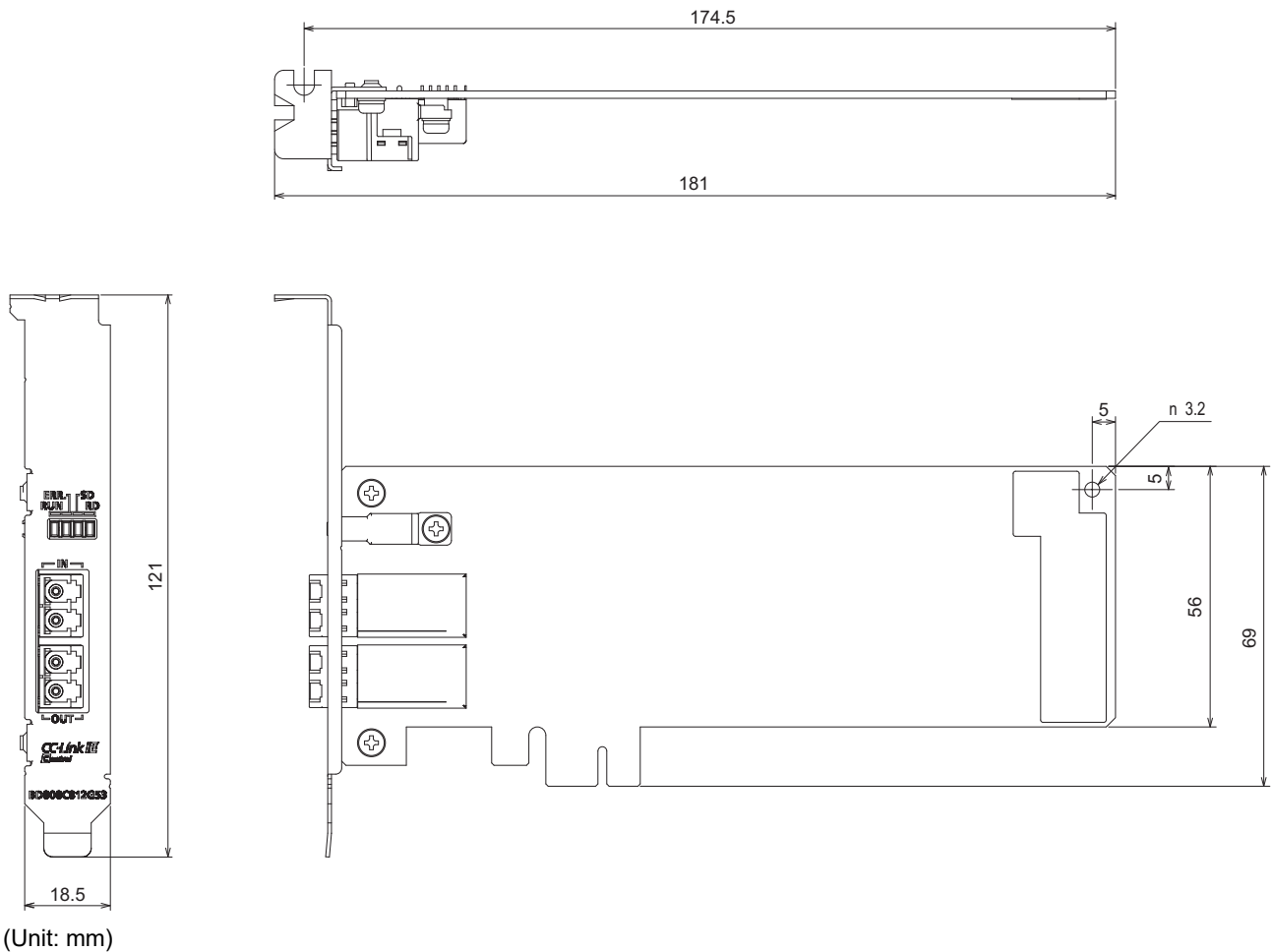
📖 Page 160 Information Required for Inquiries

APPENDIX

Appendix 1 External Dimensions

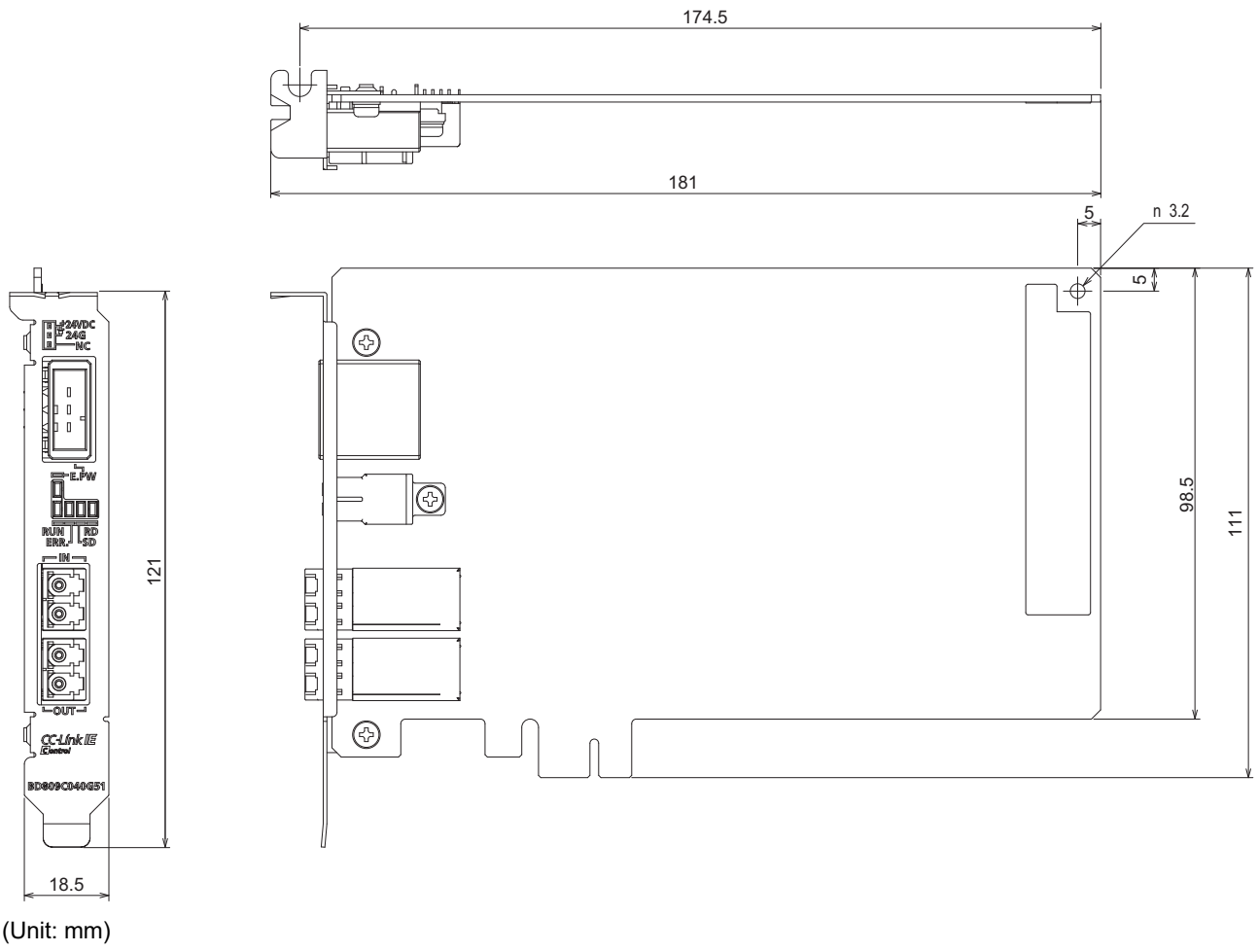
The following figures show the external dimensions of each board.

NZ81GP21-SX



A

NZ81GP21S-SX



Appendix 2 Checking Production Information and Firmware Version

This section explains the methods for checking the production information and firmware version.

Checking in the rating plate

The production information (serial number and function version) can be checked on the SERIAL field of rating plate.

Checking in the utility

The production information and firmware version are displayed in the following screen of the CC IE Control utility.

- "Board detail information" screen ( Page 97 Board detail information)



The firmware version can be changed in the CC IE Control utility.

 Page 251 Firmware update

Appendix 3 EMC and Low Voltage Directives

In each country, laws and regulations concerning electromagnetic compatibility (EMC) and electrical safety are enacted. For the products sold in the European countries, compliance with the EU's EMC Directive has been a legal obligation as EMC regulation since 1996, as well as the EU's Low Voltage Directive as electrical safety regulation since 1997.

Manufacturers who recognize their products are compliant with the EMC and Low Voltage Directives are required to attach a "CE marking" on their products in European countries.

In some other countries and regions, manufacturers are required to make their products compliant with applicable laws or regulations and attach a certification mark on the products as well (such as UK Conformity Assessed (UKCA) marking in the UK, and Korea Certification (KC) marking in South Korea).

Each country works to make their regulatory requirements consistent across countries based on international standards. When the requirements are consistent, measures to comply with the EMC and electrical safety regulations become common across countries.

The UK and South Korea have enacted EMC regulations whose requirements are consistent with those of the EMC Directive. The UK has also enacted electrical safety regulations whose requirements are consistent with those of the Low Voltage Directive. In this section, the requirements of the EMC and Low Voltage Directives are described as examples of those of the EMC and electrical safety regulations.

Measures to comply with the EMC Directive

The EMC Directive sets requirements for emission (conducted and radiated electromagnetic interference emitted by a product) and immunity (the ability of a product not to be influenced by externally generated electromagnetic interference). This section describes the precautions for machinery constructed with this product to comply with the EMC Directive. These precautions are based on the requirements of the EMC Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

EMC Directive related standards

All tests were conducted with this product installed in a personal computer with a CE mark.

■Emission requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard ^{*1}
CISPR16-2-3 Radiated emission	The electromagnetic wave emitted by the product to the external space is measured.	• 30 to 230 MHz, QP: 40 dB μ V/m (measured at 10 m distance) • 230 to 1000 MHz, QP: 47 dB μ V/m (measured at 10 m distance)
CISPR16-2-1, CISPR16-1-2 Conducted emission	The noise level which the product emits to the power line is measured.	• 0.15 to 0.5 MHz, QP: 79 dB, Mean: 66 dB • 0.5 to 30 MHz, QP: 73 dB, Mean: 60 dB

*1 QP: Quasi-Peak value, Mean: Average value

■Immunity requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
EN61000-4-2 Electrostatic discharge immunity	An electrostatic discharge is applied to the enclosure of the equipment.	• 8 kV Air discharge • 4 kV Contact discharge
EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity	An electric field is radiated to the product.	80% AM modulation @1 kHz • 80 to 1000 MHz: 10 V/m • 1.4 to 2.0 GHz: 3 V/m • 2.0 to 2.7 GHz: 1 V/m
EN61000-4-4 Fast transient/burst immunity	Burst noise is applied to power lines and signal lines.	• AC/DC power, I/O power, and AC I/O (unshielded) lines: 2 kV • DC I/O, analog, and communication lines: 1 kV
EN61000-4-5 Surge immunity	Lightning surge is applied to power lines and signal lines.	• AC power, AC I/O power, and AC I/O (unshielded) lines: 2 kV CM, 1 kV DM • DC power and DC I/O power lines: 0.5 kV CM, DM • DC I/O, AC I/O (shielded), analog, and communication lines: 1 kV CM

Test item	Test description	Value specified in standard
EN61000-4-6 Conducted RF immunity	High-frequency noise is applied to power lines and signal lines.	0.15 to 80 MHz 80% AM modulation @1 kHz, 10 Vrms
EN61000-4-8 Power-frequency magnetic field immunity	The product is immersed in the magnetic field of an induction coil.	50Hz/60Hz, 30A/m
EN61000-4-11 Voltage dips and interruptions immunity	Power voltage is momentarily interrupted.	• 0%, 0.5 periods, starting at zerocrossing • 0%, 250/300 periods (50/60 Hz) • 40%, 10/12 periods (50/60 Hz) • 70%, 25/30 periods (50/60 Hz)

Installation in a control panel

This ensures safety as well as effective shielding of electromagnetic noise emitted from a personal computer.

■Control panel

- Use a conductive control panel.
- Mask off an area used for grounding when securing the top or bottom plate to the control panel using bolts.
- To ensure electrical contact between inner plates and the control panel, mask off the bolt installation areas of each inner plate so that conductivity can be ensured in the largest area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes on the control panel to 10cm or less. If the diameter is larger than 10cm, electromagnetic wave may leak. In addition, because electromagnetic wave leaks through a clearance between the control panel and its door, reduce the clearance as much as possible. Use of EMI gaskets (sealing the clearance) can suppress undesired radiated emissions.

■Power cable and ground cable

Do not use the ground cable of a power cable and the ground point for a personal computer simultaneously.

When using the ground point for a personal computer, perform the grounding as follows:

- Provide a ground point to the control panel near the power of a personal computer. Ground the FG terminal of the personal computer to the ground point with the thickest and shortest ground cable possible (a thickness at least 2 mm², a length of 30 cm or shorter).
- Twist the ground cable extended from the ground point with the power cable so that larger amount of noise generated from the power cable is absorbed to the ground. Note that if a noise filter is attached to the power cable, twisting may not be required.

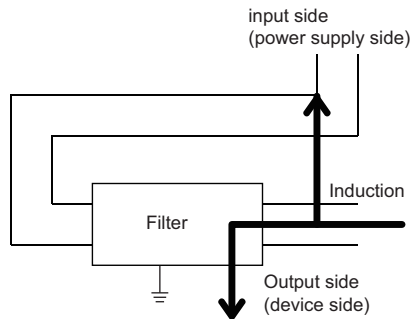
A

■Noise filter (power supply line filter)

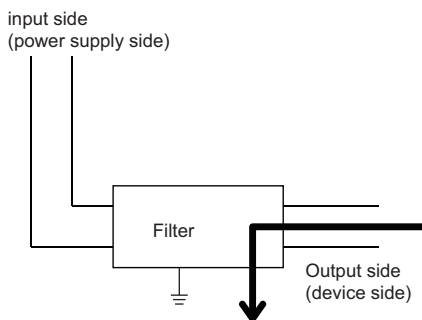
A noise filter is effective for reducing conducted noise in the 10 MHz or less frequency band. (Use of a noise filter can suppress noise.)

The following are the installation precautions.

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the noise on the output side is induced into the filtered cable on the input side.



- Problematic example
Noise is induced when the input and output cables are bundled.



- Modification example
Install the input and output cables separately.

- Ground the ground terminal of the noise filter to the ground point of the control panel with the shortest cable possible (approximately 10 cm).

External power supply

For an external power supply, use the CE-marked power supply that has reinforced or double insulation. Make sure to ground the FG terminal.

External power supply used for the tests conducted by Mitsubishi Electric:

- PS5R-VF24 (IDEC CORPORATION)

For NZ81GP21S-SX

- The length of the power cable connected to the terminal of an external power supply should be 30 m or shorter.
- Connect the external power supply and a board in the shortest distance by finely twisting the DC power cable.

Measures to comply with the Low Voltage Directive

This board is out of the requirement for conformance to the Low Voltage Directive, since it does not use the power supply in the range of 50 to 1000 VAC and 75 to 1500 VDC.

Appendix 4 Buffer Memory

The buffer memory is used to exchange data between a board and a personal computer. The values in the buffer memory return to the default when resetting the board or powering OFF.

Buffer memory list

The following shows the buffer memory list.



- Do not write data to 'System area.' Doing so may cause malfunction of the programmable controller system.
- If the value in an area of one word in size becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

Address		Name		Initial value	Read, write	
Decimal	Hexadecimal					
0 to 2591	0000H to 0A1FH	System area				
2592	0A20H	Transient transmission error log information area	Transient transmission error count		0	Read
2593	0A21H		Error log pointer			
2594	0A22H		Error log block 1	Error code		
2595	0A23H			System area		
2596	0A24H			Target station network No.	0	Read
2597	0A25H			Target Station		
2598	0A26H			Own station network No.		
2599	0A27H			Own station No.		
2600 to 2603	0A28H to 0A2BH			Time of error occurrence		
2604 to 2613	0A2CH to 0A35H		Error log block 2	Same as in 'Error log block 1'		
2614 to 2623	0A36H to 0A3FH		Error log block 3	Same as in 'Error log block 1'		
2624 to 2633	0A40H to 0A49H		Error log block 4	Same as in 'Error log block 1'		
2634 to 2643	0A4AH to 0A53H		Error log block 5	Same as in 'Error log block 1'		
2644 to 2653	0A54H to 0A5DH		Error log block 6	Same as in 'Error log block 1'		
2654 to 2663	0A5EH to 0A67H		Error log block 7	Same as in 'Error log block 1'		
2664 to 2673	0A68H to 0A71H		Error log block 8	Same as in 'Error log block 1'		
2674 to 2683	0A72H to 0A7BH		Error log block 9	Same as in 'Error log block 1'		
2684 to 2693	0A7CH to 0A85H		Error log block 10	Same as in 'Error log block 1'		
2694 to 2703	0A86H to 0A8FH		Error log block 11	Same as in 'Error log block 1'		
2704 to 2713	0A90H to 0A99H		Error log block 12	Same as in 'Error log block 1'		
2714 to 2723	0A9AH to 0AA3H		Error log block 13	Same as in 'Error log block 1'		
2724 to 2733	0AA4H to 0AADH		Error log block 14	Same as in 'Error log block 1'		
2734 to 2743	0AAEH to 0AB7H		Error log block 15	Same as in 'Error log block 1'		
2744 to 2753	0AB8H to 0AC1H		Error log block 16	Same as in 'Error log block 1'		
2754 to 2783	0AC2H to 0ADFH	System area				

Address		Name		Initial value	Read, write	
Decimal	Hexadecimal					
2784	0AE0H	Transmission path switching history	Transmission path switching count		0	Read
2785	0AE1H		Transmission path switching history pointer			
2786	0AE2H		History 1	Post-switching status		
2787	0AE3H			Number of connected stations		
2788	0AE4H			IN-side loopback station No.		
2789	0AE5H			OUT-side loopback station No.		
2790 to 2791	0AE6H to 0AE7H		System area			
2792 to 2795	0AE8H to 0AEBH		Time of occurrence	0	Read	
2796 to 2805	0AECB to 0AF5H		History 2	Same as in 'History 1'		
2806 to 2815	0AF6H to 0AFFH		History 3	Same as in 'History 1'		
2816 to 2825	0B00H to 0B09H		History 4	Same as in 'History 1'		
2826 to 2835	0B0AH to 0B13H		History 5	Same as in 'History 1'		
2836 to 2845	0B14H to 0B1DH		History 6	Same as in 'History 1'		
2846 to 2855	0B1EH to 0B27H		History 7	Same as in 'History 1'		
2856 to 2865	0B28H to 0B31H		History 8	Same as in 'History 1'		
2866 to 2875	0B32H to 0B3BH		History 9	Same as in 'History 1'		
2876 to 2885	0B3CH to 0B45H		History 10	Same as in 'History 1'		
2886 to 2895	0B46H to 0B4FH		History 11	Same as in 'History 1'		
2896 to 2905	0B50H to 0B59H		History 12	Same as in 'History 1'		
2906 to 2915	0B5AH to 0B63H		History 13	Same as in 'History 1'		
2916 to 2925	0B64H to 0B6DH		History 14	Same as in 'History 1'		
2926 to 2935	0B6EH to 0B77H		History 15	Same as in 'History 1'		
2936 to 2945	0B78H to 0B81H		History 16	Same as in 'History 1'		
2946 to 8191	0B82H to 1FFFFH	System area				

Address		Name			Initial value	Read, write
Decimal	Hexadecimal					
8192	2000H	System configuration information	Own station (network card) information	Manufacturer code	0	Read
8193	2001H			Model type		
8194	2002H			Model code		
8195	2003H			Version		
8196 to 8199	2004H to 2007H			System area		
8200	2008H		Own station (controller) information	Controller information valid/invalid flag	0	Read, write
8201	2009H			Manufacturer code		
8202	200AH			Model type		
8203	200BH			Model code		
8204	200CH			Version		
8205 to 8214	200DH to 2016H			Model name string		
8215 to 8216	2017H to 2018H			Vendor-specific device information		
8217 to 8223	2019H to 201FH			System area		
8224	2020H		Other station (station No.1) (network card) information	Manufacturer code	0	Read
8225	2021H			Model type		
8226	2022H			Model code		
8227	2023H			Version		
8228 to 8231	2024H to 2027H			System area		
8232	2028H		Other station (station No.1) (controller) information	Controller information valid/invalid flag	0	Read
8233	2029H			Manufacturer code		
8234	202AH			Model type		
8235	202BH			Model code		
8236	202CH			Version		
8237 to 8246	202DH to 2036H			Model name string		
8247 to 8248	2037H to 2038H			Vendor-specific device information		
8249 to 8255	2039H to 203FH			System area		
8256 to 12063	2040H to 2F1FH		Other station information (station No.2 to 120)	Same as 'Other station (station No.1) information'		
12064 to 12079	2F20H to 2F2FH	System area				
12080	2F30H	Routing function transmission path determination information	Transmission path determination status	Network No.1 to 16	0	Read
12081 to 12095	2F31H to 2F3FH			Network No.17 to 239		
12096 to 65535	2F40H to FFFFH	System area				

Buffer memory details

Transient transmission error log

■Transient transmission error count (address 2592 (0A20H))

The cumulative number of errors saved in the error log blocks is stored.

■Error log pointer (address 2593 (0A21H))

The error log block number of the latest error log is stored.

- 0: No error (No error log data)
- 1 or more: Error log block number of the latest error log

Ex.

When the pointer value is '16,' the latest error log is registered to 'Error log block 16.'

The 17th and subsequent errors will be registered to the error logs starting from 'Error log block 1' again.

■Error log block 1 to 16 (address 2594 to 2753 (0A22H to 0AC1H))

Transient transmission error logs are stored.

The error log blocks (1 to 16) are composed of data in the same arrangement.

- Error code: An error code is stored. ( Page 161 Error Code List)
- Target station network No./Target station No.: The network and station numbers of an error-detected station are stored.
- Own station network No./Own station No.: The network and station numbers of the own station are stored.
- Time of error occurrence: The time of a transient transmission error occurred is stored in the BCD code.

Name	Address		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
	Decimal	Hexadecimal																
Error log block 1	2594	0A22H	Error code															
	2595	0A23H	System area															
	2596	0A24H	Target station network No.															
	2597	0A25H	Target station															
	2598	0A26H	Own station network No.															
	2599	0A27H	Own station No.															
	2600	0A28H	Month (01H to 12H) ^{*1}										Year (00H to 99H), last two digits ^{*1}					
	2601	0A29H	Hour (00H to 23H) ^{*1}										Day (01H to 31H) ^{*1}					
	2602	0A2AH	Second (00H to 59H) ^{*1}										Minute (00H to 59H) ^{*1}					
	2603	0A2BH	Year (00H to 99H), first two digits ^{*1}										Day of week (0H: Sunday to 6H: Saturday) ^{*1}					
Error log block 2 to 16	2604 to 2753	0A2CH to 0AC1H	Information is stored in each address (Error log block 2 to 16) in the same order as in 'Error log block 1.'															

*1 Indicates the time of error occurrence.



Transient transmission error logs can be cleared by either of the following operations:

- Turn ON 'Clear transient transmission error count' (SB000A). ( Page 180 Link Special Relay (SB) List)
- Turn the power OFF and ON, or reset the CPU module.

If a transient transmission error is detected at the startup of a board, the time of error occurrence may be left blank.

Transmission path switching history

The transmission path switching history data is cleared at the time the station is first placed in the loop status after power-ON.

■Transmission path switching count (address 2784 (0AE0H))

The cumulative number of transmission path switching saved in 'Transmission path switching history' is stored.

■Transmission path switching history pointer (address 2785 (0AE1H))

The history number of the latest history is stored.

- 0: No history (No history data)
- 1 or more: History number of the latest history

Ex.

When the pointer value is '16,' the latest history is registered to 'History 16.'

The 17th and subsequent switching will be registered to the histories starting from 'History 1' again.

■History 1 to 16 (address 2786 to 2945 (0AE2H to 0B81H))

Transmission path switching history data is stored.

The histories (1 to 16) are composed of data in the same arrangement.

- Post-switching status: The loop status after transmission path switching is stored. (0: Normal, 1: Loopback, 2: Error on all the stations)
- Number of connected stations: The number of stations connected to a network is stored.
- IN-side loopback station No.: The number of the station where loopback has occurred on its IN side is stored.
- OUT-side loopback station No.: The number of the station where loopback has occurred on its OUT side is stored.
- Time of occurrence: The time of transmission path switching is stored in the BCD code.

Name	Address		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
	Decimal	Hexadecimal																
History 1	2786	0AE2H	Post-switching status															
	2787	0AE3H	Number of connected stations															
	2788	0AE4H	IN-side loopback station No.															
	2789	0AE5H	OUT-side loopback station No.															
	2790 to 2791	0AE6H to 0AE7H	System area															
	2792	0AE8H	Month (01H to 12H) ^{*1}									Year (00H to 99H), last two digits ^{*1}						
	2793	0AE9H	Hour (00H to 23H) ^{*1}									Day (01H to 31H) ^{*1}						
	2794	0AEA H	Second (00H to 59H) ^{*1}									Minute (00H to 59H) ^{*1}						
	2795	0AEBH	Year (00H to 99H), first two digits ^{*1}									Day of week (0H: Sunday to 6H: Saturday) ^{*1}						
History 2 to 16	2796 to 2945	0AEC H to 0B81H	Information is stored in each address (History 2 to 16) in the same order as in 'History 1.'															

*1 Indicates the time of transmission path switching.

A

Point

Transmission path switching history data can be cleared by either of the following operations:

- Turn ON 'Clear loop switching count' (SB0009). ( Page 180 Link Special Relay (SB) List)
- Turn the power OFF and ON, or reset the CPU module.

System configuration information

The information of the own station and other stations on the network is stored. The other station information areas can be used in a control station only.

■Own station (network card) information (address 8192 to 8195 (2000H to 2003H))

Address		Name	Description
Decimal	Hexadecimal		
8192	2000H	Manufacturer code	The information of the own station is stored.
8193	2001H	Model type	
8194	2002H	Model code	
8195	2003H	Version	

■Own station (controller) information (address 8200 to 8216 (2008H to 2018H))

Address		Name	Description
Decimal	Hexadecimal		
8200	2008H	Controller information valid/invalid flag	Whether the value stored in 'Own station (controller) information' is valid or invalid is stored. 0: Invalid 1: Valid
8201	2009H	Manufacturer code	The information of the own station is stored.
8202	200AH	Model type	
8203	200BH	Model code	
8204	200CH	Version	
8205 to 8214	200DH to 2016H	Model name string	
8215 to 8216	2017H to 2018H	Vendor-specific device information	

■Other station (station No.1) (network card) information (address 8224 to 8231 (2020H to 2027H))

Address		Name	Description
Decimal	Hexadecimal		
8224	2020H	Manufacturer code	The information of the other station (station No.1) is stored.
8225	2021H	Model type	
8226	2022H	Model code	
8227	2023H	Version	
8228 to 8231	2024H to 2027H	System area	

■Other station (station No.1) (controller) information (address 8232 to 8255 (2028H to 203FH))

Address		Name	Description
Decimal	Hexadecimal		
8232	2028H	Controller information valid/invalid flag	Whether the value stored in 'Other station (station No.1) (controller) information' is valid or invalid is stored. 0: Invalid 1: Valid
8233	2029H	Manufacturer code	The information of the other station is stored.
8234	202AH	Model type	
8235	202BH	Model code	
8236	202CH	Version	
8237 to 8246	202DH to 2036H	Model name string	
8247 to 8248	2037H to 2038H	Vendor-specific device information	
8249 to 8255	2039H to 203FH	System area	

■Other station (station No.2 to 120) information (address 8256 to 12063 (2040H to 2F1FH))

Information is stored in each address (Station No. 2 to 120) in the same order as in 'Other station (station No.1) (network card) information' and 'Other station (station No.1) (controller) information.'

Routing function transmission path determination information

The transmission path determination status for each network number of target station is stored.

- 0: Not determined
- 1: Determined

■Transmission path determination status (network No.1 to 239) (address 12080 to 12095 (2F30H to 2F3FH))

Address		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Decimal	Hexadecimal																
12080	2F30H	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
12081	2F31H	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
:																	
12094	2F3EH	Empty	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
12095	2F3FH	Empty															

Each number in the table represents a network number.

Appendix 5 Link Special Relay (SB) List

The link special relay (SB) is turned ON or OFF depending on various factors during data link. Any error status of the data link can be confirmed by using or monitoring it in a program.

Ranges of devices turned ON/OFF by users and by the system

The following ranges correspond to when the link special relay (SB) areas are assigned from SB0000 to SB01FF.

- Range of devices turned ON/OFF by users: SB0000 to SB001F
- Range of devices turned ON/OFF by the system: SB0020 to SB01FF

Link special relay (SB) list



Do not turn ON or OFF any device that is not on the link special relay (SB) list or that is turned ON or OFF by the system. Doing so may cause malfunction of the programmable controller system.

○: Available, ×: Not available

No.	Name	Description	Availability	
			Control station	Normal station
SB0000	Link startup of own station	Starts data link (cyclic transmission) of the own station. OFF: Startup not requested ON: Startup requested (valid at rising edge) The ON status is retained even after the completion of the startup request. Turn OFF SB0000 after turning ON 'Link startup completion status of own station' (SB004D). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. • For SB0000 to SB0003, only one of the areas can be turned ON.	○	○
SB0001	Link stop of own station	Stops data link (cyclic transmission) of the own station. OFF: Stop not requested ON: Stop requested (valid at rising edge) The ON status is retained even after the completion of the stop request. Turn OFF SB0001 after turning ON 'Link stop completion status of own station' (SB004F). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. • For SB0000 to SB0003, only one of the areas can be turned ON.	○	○
SB0002	System link startup	Starts data link (cyclic transmission) of the entire system. The station where data link is started is specified in 'Link startup/stop direction' (SW0000) and 'Link startup/stop station specification' (SW0001 to SW0008). OFF: Startup not requested ON: Startup requested (valid at rising edge) The ON status is retained even after the completion of the startup request. Turn OFF SB0002 after turning ON 'System link startup completion status' (SB0051). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. • For SB0000 to SB0003, only one of the areas can be turned ON.	○	○
SB0003	System link stop	Stops data link (cyclic transmission) of the entire system. The station where data link is stopped is specified in 'Link startup/stop direction' (SW0000) and 'Link startup/stop station specification' (SW0001 to SW0008). OFF: Stop not requested ON: Stop requested (valid at rising edge) The ON status is retained even after the completion of the stop request. Turn OFF SB0003 after turning ON 'System link stop completion status' (SB0053). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. • For SB0000 to SB0003, only one of the areas can be turned ON.	○	○
SB0007	Clear IN-side transmission error count	Clears the IN-side line error detection area (SB006E, SB0140, SW0068, SW0069, SW0074, SW0140 to SW0147) to 0. OFF: Clear not requested ON: Clear requested (valid while ON)	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0008	Clear OUT-side transmission error count	Clears the OUT-side line error detection area (SB006F, SB0150, SW006A, SW006B, SW0084, SW0150 to SW0157) to 0. OFF: Clear not requested ON: Clear requested (valid while ON)	○	○
SB0009	Clear loop switching count	Clears the path switching detection area of the own station (SB008E, SB0160, SW006E, SW0160 to SW0167) and 'Transmission path switching history' (address 2784 to 2945 (0AE0H?0B81H)) of the buffer memory to 0. OFF: Clear not requested ON: Clear requested (valid while ON)	○	○
SB000A	Clear transient transmission error count	Clears the transient transmission error area of the own station (SB008F, SB0170, SW006F, SW0170 to SW0177) and 'Transient transmission error log' (address 2592 to 2753 (0A20H?0AC1H)) of the buffer memory to 0. OFF: Clear not requested ON: Clear requested (valid while ON)	○	○
SB000D	System switching request	Requests the system switching to a board. OFF: System switching not requested ON: System switching requested (valid at rising edge) Set the cause to 'System switching request cause' (SW000D) before turning the link special relay ON. When requesting the system switching from a user program on the control system board side, switch the system to the standby system and stop the update of transmission data.	○	○
SB000E	System switching notification response	Responds to the system switching notification for the processing completion. OFF: System switching not completed ON: System switching completed (valid at rising edge) Set the cause to 'System switching notification response details' (SW000E) before turning the link special relay ON. When switching the system to the control system, update the transmission data. When switching the system to the standby system, stop the update of transmission data.	○	○
SB000F	System switching prohibition specification	Specifies the system switching prohibition for own system board. OFF: System switching permitted ON: System switching prohibited When it is turned ON, the system switching of own system board is performed only by the system switching request (user instruction) from the own system user program or the other system board.	○	○
SB0018	Operation notification from user program to board	A bit for the operation notification from a user program to a board for user program error monitoring. An operation notification is sent by matching the ON/OFF state of 'SB0018' with that of 'Operation notification from board to user program' (SB0118) on the user program side.	○	○
SB0040	Network type of own station	Stores the network type of the own station. OFF: Controller Network	○	○
SB0041	Redundant function information of own station	Stores the redundant system supporting information of the own station. OFF: Redundant system not supported ON: Redundant system supported	○	○
SB0042	Power status of own station	Stores the external power supply status of a board of the own station. OFF: External power not supplied (E.PW LED is OFF.) ON: External power supplied (E.PW LED is ON.) This relay is always OFF for a board that does not have the external power supply function.	○	○
SB0043	Operation mode of own station	Stores the operation mode of the own station. OFF: Online ON: Other than online	○	○
SB0044	Station setting of own station	Stores the station type (control or normal station) of the own station. OFF: Normal station ON: Control station	○	○
SB0047	Baton pass error status of own station	Stores the baton pass status (transient transmission availability) of the own station. OFF: Normal ON: Error When this relay is turned ON, the cause of the error can be checked with 'Baton pass status of own station' (SW0047) and 'Cause of baton pass interruption' (SW0048). Depending on the link refresh timing, the update of 'Baton pass status of own station' (SW0047) and 'Cause of baton pass interruption' (SW0048) may be offset by one link refresh cycle.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0048	Station status of own station	Stores the station type (control or normal station) of the own station. OFF: Normal station ON: Control station (when SB0044 is turned ON)/sub-control station (when SB0044 is turned OFF) (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0049	Data link error status of own station	Stores the data link status of the own station. OFF: Normal ON: Error When this relay is turned ON, the cause of the error can be checked with 'Cause of data link stop' (SW0049). Depending on the link refresh timing, the update of 'Cause of data link stop' (SW0049) may be offset by one link refresh cycle.	○	○
SB004A	Minor error status of own station	Stores the communication error occurrence status of a board of the own station. OFF: No communication error ON: Communication error	○	○
SB004B	Moderate/major error status of own station	Stores the error occurrence status of a board of the own station. OFF: No bus error, no hardware failure, or no board WDT error ON: Bus error, hardware error, or board WDT error	○	○
SB004C	Link startup request accept status of own station	Stores the acceptance status of 'Link startup of own station' (SB0000). OFF: Not accepted (SB0000 is OFF.) ON: Accepted (SB0000 is ON.)	○	○
SB004D	Link startup completion status of own station	Stores the status of link startup processing requested with 'Link startup of own station' (SB0000). OFF: Link startup not completed (SB0000 and SB0050 are OFF.) ON: Link startup completed (SB0000 and SB0050 are ON.)	○	○
SB004E	Link stop request accept status of own station	Stores the acceptance status of 'Link stop of own station' (SB0001). OFF: Not accepted (SB0001 is OFF.) ON: Accepted (SB0001 is ON.)	○	○
SB004F	Link stop completion status of own station	Stores the link stop processing status requested with 'Link stop of own station' (SB0001). OFF: Not completed (SB0001 and SB0052 are OFF.) ON: Completed (SB0001 and SB0052 are ON.)	○	○
SB0050	System link startup request accept status	Stores the acceptance status of 'System link startup' (SB0002). OFF: Not accepted (SB0002 is OFF.) ON: Accepted (SB0002 is ON.) (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0051	System link startup completion status	Stores the status of link startup processing requested with 'System link startup' (SB0002). OFF: Not completed (SB0002 and SB0054 are OFF.) ON: Completed (SB0002 and SB0054 are ON.) (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0052	System link stop request accept status	Stores the acceptance status of 'System link stop' (SB0003). OFF: Not accepted (SB0003 is OFF.) ON: Accepted (SB0003 is ON.) (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0053	System link stop completion status	Stores the status of link stop processing requested with 'System link stop' (SB0003). OFF: Not completed (SB0003 and SB0056 are OFF.) ON: Completed (SB0003 and SB0056 are ON.) (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0054	Parameter reception status	Stores the status of parameter reception. For the control station, this relay stores the status of parameter reception of the own station. For the normal station, this relay stores the status of parameter reception from the control station. OFF: Reception completed ON: Reception not completed	○	○
SB0055	Received parameter error	Stores the status of received parameter. (Own parameter status is stored for the control station.) OFF: Parameters normal ON: Parameter error	○	○
SB0056	Communication status	Stores the transient transmission status. OFF: Transient transmission by the control station ON: Transient transmission by the sub-control station (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB005A	Station type of control station	Stores the station type (mode) of the control station. OFF: Control station ON: Extended mode (control station)	○	○
SB005B	Operating status of own station	Stores the operating status of the own station. OFF: Normal ON: Error	○	○
SB005C	Block 1 I/O master station	Stores the I/O master station specification status of block 1 (LX/LY setting (1)). OFF: Not set ON: Set When this relay is turned ON, the station number is stored in 'Block 1 I/O master station' (SW005C). (Condition) • This relay is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SB005D	Block 2 I/O master station	Stores the I/O master station specification status of block 2 (LX/LY setting (2)). OFF: Not set ON: Set When this relay is turned ON, the station number is stored in 'Block 2 I/O master station' (SW005D). (Condition) • This relay is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SB0060	Constant link scan status	Stores the constant link scan status. OFF: Not set ON: Set (Condition) • This relay is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SB0061	Cyclic transmission punctuality assurance	Stores the status of cyclic transmission punctuality assurance. OFF: Not assured ON: Assured (Condition) • This relay is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SB0063	Link points extend setting	Indicates the setting status of the link points extend setting. OFF: Not extended ON: Extended	○	○
SB0064	Loop status of own station	Stores the transmission path status of the own station. When this relay is turned ON, the error definition can be checked with 'Loop status of own station' (SW0064). OFF: Normal ON: Error (Condition) This relay is turned ON when 'Loop status of own station' (SW0064) is not '0.'	○	○
SB0065	Loopback status	Stores the loopback status for the loopback function. The station number of the loopback station can be checked with 'IN-side loopback station number' (SW0070) and 'OUT-side loopback station number' (SW0080). OFF: Normal (no loopback stations) ON: Loopback being performed (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0066	IN-side link-up status of own station	Stores the IN-side link-up status of the own station. OFF: Link-up ON: Link-down	○	○
SB0067	OUT-side link-up status of own station	Stores the OUT-side link-up status of the own station. OFF: Link-up ON: Link-down	○	○
SB0068	IN-side link establishing status of own station	Stores the IN-side link establishing status of the own station. OFF: Link establishment completed ON: Link establishing	○	○
SB0069	OUT-side link establishing status of own station	Stores the OUT-side link establishing status of the own station. OFF: Link establishment completed ON: Link establishing	○	○
SB006A	IN-side cabling status of own station	Stores the IN-side cabling status of the own station. OFF: Normal ON: Inserted incorrectly	○	○
SB006B	OUT-side cabling status of own station	Stores the OUT-side cabling status of the own station. OFF: Normal ON: Inserted incorrectly	○	○
SB006C	IN-side current error frame reception status of own station	Stores whether the error frame is currently received at the IN side of the own station. OFF: Not received ON: Currently receiving	○	○
SB006D	OUT-side current error frame reception status of own station	Stores whether the error frame is currently received at the OUT side of the own station. OFF: Not received ON: Currently receiving	○	○
SB006E	IN-side error frame detection of own station	Stores whether the error frame was received at the IN side of the own station from power-ON to the present. OFF: Not received ON: Received When 'Clear IN-side transmission error count' (SB0007) is turned ON, the stored value is cleared.	○	○
SB006F	OUT-side error frame detection of own station	Stores whether the error frame was received at the OUT side of the own station from power-ON to the present. OFF: Not received ON: Received When 'Clear OUT-side transmission error count' (SB0008) is turned ON, the stored value is cleared.	○	○
SB0070	Station number setting status of own station	Stores the station number setting status. OFF: Station number set ON: Station number not set When the station number is set by the parameters, this relay is always OFF.	×	○
SB008E	Path switching detection flag	Stores the path switching detection status. OFF: Path switching not detected ON: Path switching detected When 'Clear loop switching count' (SB0009) is turned ON, the stored value is cleared.	○	○
SB008F	Transient error	Stores the transient transmission error detection status. OFF: Error not detected ON: Error detected When this relay is turned ON, the number of errors can be checked with 'Transient transmission error count' (SW006F).	○	○
SB00A0	Baton pass error status of each station	Stores the baton pass status of each station. OFF: All stations normal ON: Faulty station exists When this relay is turned ON, the status of each station can be checked with 'Baton pass status of each station' (SW00A0 to SW00A7). Depending on the link refresh timing, the update of 'Baton pass status of each station' (SW00A0 to SW00A7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB00B0	Data link error status of each station	Stores the data link status of each station. OFF: All stations normal ON: Faulty station exists When this relay is turned ON, the status of each station can be checked with 'Data link status of each station' (SW00B0 to SW00B7). Depending on the link refresh timing, the update of 'Data link status of each station' (SW00B0 to SW00B7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.	○	○
SB00C0	Reserved station setting status	Stores whether a reserved station is set. OFF: Not set ON: Set When this relay is turned ON, the status of each station can be checked with 'Reserved station setting status' (SW00C0 to SW00C7). Depending on the link refresh timing, the update of 'Reserved station setting status' (SW00C0 to SW00C7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SB00D0	Parameter communication status of each station	Stores the parameter communication status of each station. OFF: Parameter communication is completed or not executed in all stations ON: Station where parameter communication is in execution exists When this relay is turned ON, the status of each station can be checked with 'Parameter communication status of each station' (SW00D0 to SW00D7). Depending on the link refresh timing, the update of 'Parameter communication status of each station' (SW00D0 to SW00D7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.	○	×
SB00E0	Parameter error status of each station	Stores the parameter error status of each station. OFF: All stations normal ON: Faulty station exists When this relay is turned ON, the status of each station can be checked with 'Parameter error status of each station' (SW00E0 to SW00E7). Depending on the link refresh timing, the update of 'Parameter error status of each station' (SW00E0 to SW00E7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	×
SB00F0	CPU operating status of each station	Stores the operating status of each station (including the own station). When a module is set as the target station, the status of the control CPU is stored. OFF: Normal on all stations • CPU module: All stations are in RUN or STEP-RUN state • Board: Normal on all stations ON: Faulty station exists • CPU module: Station which is in STOP or PAUSE state, or station with a moderate/major error exists. • Board: Bus error, hardware failure, or board WDT error in a station When this relay is turned ON (error), the status of each station can be checked with 'CPU operating status of each station' (SW00F0 to SW00F7). Depending on the refresh timing, the update of 'CPU operating status of each station' (SW00F0 to SW00F7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) • This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0100	CPU moderate/major error status of each station	Stores the moderate/major error occurrence status of each station. When a module is set as the target station, the status of the control CPU is stored. OFF: No moderate/major error (bus error, hardware failure, or board WDT error) in a station ON: Moderate/major error (bus error, hardware failure, or board WDT error) in a station When this relay is turned ON (error), the status of each station can be checked with 'CPU moderate/major error status of each station' (SW0100 to SW0107). Depending on the refresh timing, the update of 'CPU moderate/major error status of each station' (SW0100 to SW0107) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0110	CPU minor error status of each station	Stores the minor error occurrence status of a CPU module and a board on each station. When a module is set as the target station, the status of the control CPU is stored. OFF: All stations normal, or moderate/major error (bus error, hardware failure, or board WDT error) in a station. ON: Station with a minor error (communication error) in a station. When this relay is turned ON (error), the status of each station can be checked with 'CPU minor error status of each station' (SW0110 to SW0117). Depending on the refresh timing, the update of 'CPU minor error status of each station' (SW0110 to SW0117) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0118	Operation notification from board to user program	A bit for the operation notification from a board to a user program for user program error monitoring. An operation notification is sent by inverting the ON/OFF state of 'SB0118' based on that of 'Operation notification from user program to board' (SB0018) on the board side.	○	○
SB0120	IN-side current error frame reception status of each station	Stores whether the error frame is currently received at the IN side of each station. OFF: Not received at all stations ON: Error frame being received at one or more stations When this relay is turned ON, the status of each station can be checked with 'IN-side current error frame reception status of each station' (SW0120 to SW0127). Depending on the link refresh timing, the update of 'IN-side current error frame reception status of each station' (SW0120 to SW0127) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0130	OUT-side current error frame reception status of each station	Stores whether the error frame is currently received at the OUT side of each station. OFF: Not received at all stations ON: Error frame being received at one or more stations When this relay is turned ON, the status of each station can be checked with 'OUT-side current error frame reception status of each station' (SW0130 to SW0137). Depending on the link refresh timing, the update of 'OUT-side current error frame reception status of each station' (SW0130 to SW0137) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0140	IN-side error frame detection status of each station	Stores the status that has received an error frame from power-ON until the present at the IN side of each station. OFF: Not received at all stations ON: Received at one or more stations When this relay is turned ON, the status of each station can be checked with 'IN-side error frame detection status of each station' (SW0140 to SW0147). Depending on the link refresh timing, the update of 'IN-side error frame detection status of each station' (SW0140 to SW0147) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB0150	OUT-side error frame detection status of each station	Stores the status that has received an error frame from power-ON until the present at the OUT side of each station. OFF: Not received at all stations ON: Received at one or more stations When this relay is turned ON, the status of each station can be checked with 'OUT-side error frame detection status of each station' (SW0150 to SW0157). Depending on the link refresh timing, the update of 'OUT-side error frame detection status of each station' (SW0150 to SW0157) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0160	Path switching detection flag of each station	Stores the detection status of path switching of each station (including the own station). OFF: Path switching not detected ON: Path switching detected When this relay is turned ON, the status of each station can be checked with 'Path switching detection status of each station' (SW0160 to SW0167). Depending on the link refresh timing, the update of 'Path switching detection status of each station' (SW0160 to SW0167) may be offset by one sequence scan (one link refresh cycle for a board). The path switching detection status is cleared when 'Clear loop switching count' (SB0009) is turned ON. The stored value is cleared when 'Clear loop switching count' (SB0009) is turned ON in each station and the path switching detection status for all stations is cleared. (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0170	Transient error of each station	Stores the transient transmission error detection status of each station (including the own station). OFF: Error not detected ON: Error detected When this relay is turned ON, the status of each station can be checked with 'Transient error detection status of each station' (SW0170 to SW0177). Depending on the link refresh timing, the update of 'Transient error detection status of each station' (SW0170 to SW0177) may be offset by one sequence scan (one link refresh cycle for a board). The transient error detection status of the own station is cleared when 'Clear transient transmission error count' (SB000A) is turned ON. The stored value is cleared when 'Clear transient transmission error count' (SB000A) is turned ON in each station and the transient error detection status for all stations is cleared. (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0180	External power supply information of each station	Stores the external power supply status of each station (including the own station). OFF: No external power supplied to any station ON: External power supplied to station(s) When this relay is turned ON, the status of each station can be checked with 'External power supply status of each station' (SW0180 to SW0187). Depending on the link refresh timing, the update of 'External power supply status of each station' (SW0180 to SW0187) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB0190	External power supply error information of each station	Stores the external power supply error status of each station (including the own station). OFF: All stations normal or no stations providing external power supply ON: Faulty station exists When this relay is turned ON, the status of each station can be checked with 'External power supply error status of each station' (SW0190 to SW0197). Depending on the link refresh timing, the update of 'External power supply error status of each station' (SW0190 to SW0197) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB01B0	CPU type information of each station	Stores the CPU type information of each station. OFF: No basic model QCPU or safety CPU ON: Basic model QCPU or safety CPU exists A board is treated as a station that is neither a basic model QCPU nor a safety CPU. When this relay is turned ON, the status of each station can be checked with 'CPU type information of each station' (SW01B0 to SW01B7). Depending on the link refresh timing, the update of 'CPU type information of each station' (SW01B0 to SW01B7) may be offset by one sequence scan (one link refresh cycle for a board).	○	○
SB01C0	Redundant system information	Stores the redundant system information of each station (including the own station). OFF: No redundant system station ON: Redundant system station exists When this relay is turned ON, the status of each station can be checked with 'Redundant function information of each station' (SW01C0 to SW01C7). Depending on the link refresh timing, the update of 'Redundant function information of each station' (SW01C0 to SW01C7) may be offset by one sequence scan (one link refresh cycle for a board).	○	○
SB01D0	Redundant system separate mode status	Stores the CPU operation mode status of each station. OFF: No separate mode station ON: Separate mode station exists This relay is turned OFF for a station other than a redundant system station. A board is treated as a station that is not in the separate mode. When this relay is turned ON, the status of each station can be checked with 'Redundant system separate mode status of each station' (SW01D0 to SW01D7). Depending on the link refresh timing, the update of 'Redundant system separate mode status of each station' (SW01D0 to SW01D7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB01D8	System switching request response	Stores the processing completion status for the system switching request from a user program. OFF: System switching not completed ON: System switching completed Details can be checked with 'System switching cause' (SW01DA) and 'Cause of system switching error completion' (SW01DB).	○	○
SB01D9	System switching notification	The system switching is notified from a board to a user program before the system switching of own system is performed. OFF: System switching notification not issued ON: System switching notification issued The cause can be checked with 'System switching notification cause' (SW01D9).	○	○
SB01E0	Setting status of board redundancy/redundant system pairing	Stores the setting status of board redundancy setting or pairing setting of each station (including the own station). OFF: No station where the board redundancy setting or pairing setting is set ON: Station where the board redundancy setting or pairing setting is set exists When this relay is turned ON, the status of each station can be checked with 'Setting status of board redundancy/redundant system pairing for each station' (SW01E0 to SW01E7). Depending on the link refresh timing, the update of 'Redundant system pairing setting status of each station' (SW01E0 to SW01E7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SB01E8	Own system switching prohibited status	Stores the system switching prohibited status of own system board. OFF: System switching permitted ON: System switching prohibited	○	○
SB01E9	Other system switching disable status	Stores the system switching disable status of the other system board. OFF: System switching available ON: System switching disabled (system switching prohibited, error detected through user program error monitoring, driver WDT error detected, power-OFF of a personal computer where a board with an external power supplied is installed)	○	○
SB01EA	System A judgment flag	Stores the system setting information of own system board (system A). OFF: System B or not operating in a redundant system ON: System A	○	○
SB01EB	System B judgment flag	Stores the system setting information of own system board (system B). OFF: System A or not operating in a redundant system ON: System B	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SB01EC	Control system judgment flag	Stores the system operating status of own system board (control system). OFF: Standby system or not operating in a redundant system ON: Control system	○	○
SB01ED	Standby system judgment flag	Stores the system operating status of own system board (standby system). OFF: Control system or not operating in a redundant system ON: Standby system	○	○
SB01EE	Redundant system judgment flag	Stores the redundant system operating status of own system board. OFF: Not operating in a redundant system ON: Operating in a redundant system	○	○
SB01F0	Standby system state of redundant system	Stores the redundant system state (control system/standby system) of each station (including the own station). OFF: No standby system station ON: Standby system station exists This relay is turned OFF for a station other than a redundant system station. When this relay is turned ON, the state of each station can be checked with 'Redundant system state of each station' (SW01F0 to SW01F7). Depending on the link refresh timing, the update of 'Redundant system state of each station' (SW01F0 to SW01F7) may be offset by one sequence scan (one link refresh cycle for a board). (Condition) This relay is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○

Appendix 6 Link Special Register (SW) List

Link special registers (SW) store information during data link as numerical values. Error locations and causes can be checked by using and monitoring link special registers (SW) in programs.

Ranges where data is stored by users and the system

The following ranges correspond to when the link special register (SW) areas are assigned from SW0000 to SW01FF.

- Range where data is stored by users: SW0000 to SW001F
- Range where data is stored by the system: SW0020 to SW01FF

Link special register (SW) list



Do not write data to any device that is not on the link special register (SW) list or in which data is stored by the system. Doing so may cause malfunction of the programmable controller system.

○: Available, ×: Not available

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0000	Link startup/stop direction	Sets the content of data link startup/stop directions. 00H: Own station 01H: All stations 02H: Specified stations 03H: Specified group 80H: Own station enforced (enabled only for data link startup) 81H: All stations enforced (enabled only for data link startup) 82H: Specified stations enforced (enabled only for data link startup) 83H: Specified group enforced (enabled only for data link startup) • Data link startup and data link stop are performed by 'System link startup' (SB0002) and 'System link stop' (SB0003), respectively.	○	○																																																																																																																																																									
SW0001 to SW0008	Link startup/stop station specification	Sets a station to start or stop data link when '02H' or '82H' is set in 'Link startup/stop direction' (SW0000). 0: Startup or stop not requested 1: Startup or stop requested <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0001</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0002</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0003</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0004</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0005</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0006</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0007</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0008</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.'		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0001	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0002	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0003	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0004	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0005	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0006	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0007	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0008	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0001	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0002	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0003	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0004	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0005	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0006	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0007	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0008	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

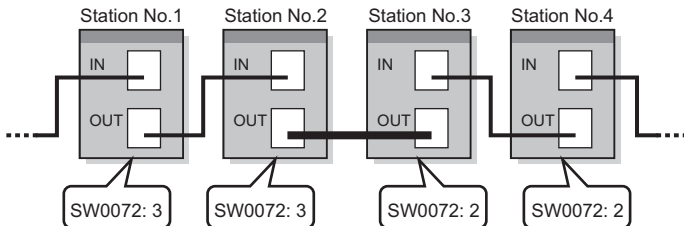
No.	Name	Description	Availability																																																				
			Control station	Normal station																																																			
SW000D	System switching request cause	Specifies the own system operation after the system switching, and sets the cause when the system switching is requested from a user program. When 'User instruction' or other cause is specified, it is applied to 'System switching cause' (SW01DA) of the own system board and the other system board. If the own system operation specification is incorrect, the system switching is abnormally completed, and 'Incorrect own system operation specification for the system switching request cause' (9) is stored in 'Cause of system switching error completion' (SW01DB). SW000D <table><tr><td>b15</td><td>b14</td><td>...</td><td>b8</td><td>b7</td><td>...</td><td>b0</td></tr><tr><td></td><td>0</td><td>...</td><td>0</td><td></td><td>...</td><td></td></tr></table> ■b0 to b7: Cause 00H: Initial value/other cause 01H: User instruction 02H to FFH: Not used ■b15: Operation specification for the own system 0: Standby system 1: Control system	b15	b14	...	b8	b7	...	b0		0	...	0		...		○	○																																					
b15	b14	...	b8	b7	...	b0																																																	
	0	...	0		...																																																		
SW000E	System switching notification response details	Stores the processing result when the processing for the system switching notification from a board is completed. 0: Normal completion Other than 0: Abnormal completion For the abnormal completion, the system switching of the board is not performed and error response is sent to the request source if requested from the other system.	○	○																																																			
SW0012 to SW0013	Link startup/stop group specification	Sets the transient transmission group number to start or stop data link when '03H' or '83H' is set in 'Link stop/startup direction' (SW0000). 0: Startup or stop not requested 1: Startup or stop requested <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0012</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0013</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr></table> Each number in the table represents a transient transmission group number.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0012	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0013	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																							
SW0012	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																							
SW0013	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																							
SW0014	System switching response monitoring time for user program	Sets the monitoring time from when the system switching is notified to a user program until the response is returned. (Unit: 100 ms) The latest setting value is acquired and used by a board every 100 ms. 0: 15000 ms (default) 1 to 65535 (unit: 100 ms): 100 to 6553500 ms	○	○																																																			
SW0015	System switching response monitoring time for the other system	Sets the monitoring time from when the system switching is requested to the other system board until the response is returned. (Unit: 100 ms) The latest setting value is acquired and used by a board every 100 ms. 0: 15500 ms (default) 1 to 65535 (unit: 100 ms): 100 to 6553500 ms	○	○																																																			
SW0016	Data link stop monitoring time for control system	When the own system is the standby system, the time from when the data link stop of the control system board is detected until the system switching is performed is set. (Unit: 10 ms) - Automatic system switching ('Automatic/manual system switching specification' (SW0017) ≠ 1) The time from when the data link stop is detected until the system of own system board is switched to the control system is set. - Manual system switching ('Automatic/manual system switching specification' (SW0017) = 1) The time from when the data link stop is detected until the system switching is notified to the own system user program is set. The latest setting value is acquired and used by a board at the start of monitoring. 0: 2000 ms (default) 1 to 65535 (unit: 10 ms): 10 to 655350 ms	○	○																																																			

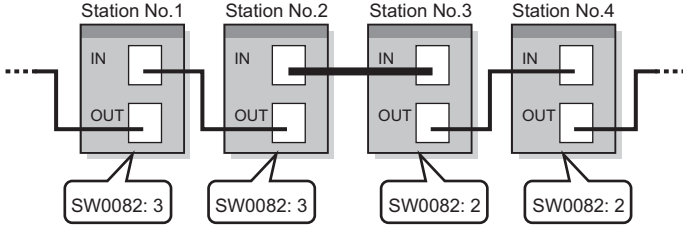
No.	Name	Description	Availability	
			Control station	Normal station
SW0017	Automatic/manual system switching specification	Specifies the operation for the system switching by system. The system switching requested from a user program is not included. - Other than '1' (default): Automatic system switching When the system switching by system occurs, the automatic system switching is performed. The system switching is not notified to a user program from a board. 1: Manual system switching When the system switching by system occurs, the manual system switching is performed. The system switching is notified to a user program from a board. If the automatic system switching is performed, the board side is switched to the control system even if the transmission data is not prepared on the user program side, and unintended data may be sent. To solve this problem, Specify 'Manual system switching' (1) in SW0017.	○	○
SW0018	Error monitoring setting between user program and board	Sets whether to enable or disable the user program error monitoring, and sets the timeout time (unit: 10 ms). ■b0 to b14: Timeout time 0: 500 ms (default) 1 to 9: 100 ms (minimum value) 10 to 32767 (Unit: 10 ms): 100 to 327670 ms ■b15: Enable/disable specification 0: Disabled 1: Enabled	○	○
SW0040	Network number	Stores the network number of the own station. Range: 1 to 239	○	○
SW0041	Transient transmission group number	Stores the transient transmission group number of the own station. 0: No group specification 1 to 32: Transient transmission group number	○	○
SW0042	Station number	Stores the station number of the own station. 1 to 120: Station number of own station ('Station number setting status of own station' (SB0070) is OFF) 255: Station number not determined ('Station number setting status of own station' (SB0070) is ON)	○	○
SW0043	Mode status of own station	Stores the operation mode setting of the own station. 0: Online mode 2: Offline mode B: Board communication test mode	○	○
SW0044	Station setting	Stores the setting status of the own station. ■b0 to b1: Network type 01: CC-Link IE Controller Network ■b2: Station type 0: Normal station 1: Control station ■b6: Station type (mode) 0: Control station, normal station 1: Extended mode (control station, normal station) ■b15: CPU type 0: Board	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SW0046	Board type	Stores the hardware status of the own station. b15b14b13b12b11 ... b8 b7 b6 b5 b4 b3 b2 b1 b0 SW0046 0 0 0 1 0 ... 0 1 0 0 0 0 0 0 ■b0 to b1: Transmission path information 1 00: Optical ■b3: Topology 0: Loop type ■b4: Cable type 0: SX compatible ■b5: External power supply function 0: Not available 0: Available ■b6 to b8: Model type 010: Board ■b11 to b12: Bus type 00: PCI 10: PCI Express	○	○
SW0047	Baton pass status of own station	Stores the baton pass status (transient transmission availability) of the own station. 0: Data link in progress 1: Data link stop 2: Baton pass in progress 3: Baton pass being terminated 4: Test in progress 5: Offline	○	○
SW0048	Cause of baton pass interruption	Stores the cause of interruption in the communication (baton pass) of the own station. 00H: Normal communication 30H: At cable disconnection or power-ON 31H: Cable insertion error 32H: Cable IN-OUT checking 33H: Disconnection or reconnection in progress 40H: Offline mode 50H: Self-diagnostics in execution	○	○
SW0049	Cause of data link stop	Stores the cause which stopped the data link of the own station. 00H: Normal communication 01H: Stop direction 02H: Monitoring time timeout 10H: Parameter unreceived 11H: Station number of the own station out of the range 12H: Own station reserved 13H: Own station number duplication 14H: Control station duplication 15H: Control station duplication and own station number duplication 16H: Station number not set 17H: Network number irregularity 18H: Parameter error 19H: Parameter communication in progress 20H: Bus error, hardware failure, or board WDT error 21H: Personal computer power stop error The personal computer stop error (21H) can be detected by NZ81GP21S-SX. It is detected when turning the power of a personal computer ON and OFF.	○	○
SW004A	Data link stop request station	Stores the station number of the station that performed the data link stop request for the own station. Range: 1 to 120 The data link stop request is performed by 'System link stop' (SB0003). (Condition) This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW004B	Status of the board of the own station	Stores the status of a board driver of the own station. 01H: Shutdown/uninstallation in progress 02H: Error 04H: Normal 0FH: Initial processing	○	○

No.	Name	Description	Availability											
			Control station	Normal station										
SW004D	Link startup result of own station	Stores the results when data link is started by 'Link startup of own station' (SB0000). 0: Normal 1 or greater: Error (An error code is stored.) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○										
SW004F	Link stop result of own station	Stores the results when data link is stopped by 'Link stop of own station' (SB0001). 0: Normal 1 or greater: Error (An error code is stored.) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○										
SW0051	System link startup result	Stores the results when data link is started by 'System link startup' (SB0002). 0: Normal 1 or greater: Error definition in own station (An error code is stored.) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○										
SW0053	System link stop result	Stores the results when data link is stopped by 'System link stop' (SB0003). 0: Normal 1 or greater: Error definition in own station (An error code is stored.) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○										
SW0054	Parameter information	Stores parameter information. SW0054 <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 10%;">b15</td><td style="width: 40%;">...</td><td style="width: 10%;">b2</td><td style="width: 10%;">b1</td><td style="width: 10%;">b0</td></tr> <tr> <td>0</td><td>...</td><td>0</td><td style="background-color: #cccccc;"></td><td style="background-color: #cccccc;"></td></tr> </table> ■b0: Parameter reception status (Parameters are received from the driver/control station for the control station/normal station, respectively.) 0: Not received 1: Received ■b1: Parameter reception status (Parameters are received from the driver.) 0: Not received 1: Received (Condition) • This register is enabled when 'Received parameter error' (SB0055) is OFF.	b15	...	b2	b1	b0	0	...	0			○	○
b15	...	b2	b1	b0										
0	...	0												
SW0055	Parameter setting status	Stores the parameter status. 0: Normal 1 or greater: Error (An error code is stored.) (Condition) • This register is enabled when 'Received parameter error' (SB0055) is ON.	○	○										
SW0056	Current control station number	Stores the station number of the station which is actually operating as a control station (including a sub-control station). Range: 1 to 120	○	○										
SW0057	Specified control station number	Stores the control station number which is set in a parameter. 0: Control station or sub-control station does not exist in a network. 1 to 120: Station number of the control station	○	○										
SW0059	Total number of link stations	Stores the total number of stations which is set in a parameter. Range: 2 to 120	○	○										
SW005A	Maximum baton pass station number	Stores the maximum station number of the stations where the baton pass is normally performed. Range: 2 to 120 (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○										

No.	Name	Description	Availability	
			Control station	Normal station
SW005B	Maximum data link station number	Stores the maximum station number of the stations where the data link is normally performed. Range: 1 to 120 (Condition) • This register is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SW005C	Block 1 I/O master station	Stores the I/O master station number of block 1 (LX/LY setting (1)). 0: No I/O master station 1 to 120: Station number (Condition) • This register is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SW005D	Block 2 I/O master station	Stores the I/O master station number of block 2 (LX/LY setting (2)). 0: No I/O master station 1 to 120: Station number (Condition) • This register is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SW0060	Maximum link scan time	Stores the maximum value of the link scan time during cyclic transmission. (Unit: ms) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW0061	Minimum link scan time	Stores the minimum value of the link scan time during cyclic transmission. (Unit: ms) (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW0062	Link scan time	Stores the current value of the link scan time during cyclic transmission. (Unit: ms) The stored value contains a maximum error of 1 ms. (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW0063	Constant link scan time setting value	Stores the setting value of the constant link scan which is set in a parameter. 0: No setting 1 to 500: Setting value of constant link scan (Unit: ms) (Condition) • This register is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	○
SW0064	Loop status of own station	Stores the transmission path status of the own station. 00H: Normal ■Loopback 12H: IN-side loopback (OUT-side cable disconnection) 13H: IN-side loopback (OUT-side cable insertion error) 14H: IN-side loopback (OUT-side line establishing) 21H: OUT-side loopback (IN-side cable disconnection) 31H: OUT-side loopback (IN-side cable insertion error) 41H: OUT-side loopback (IN-side line establishing) ■Disconnected 22H: Disconnecting (IN-side or OUT-side cable disconnection) 23H: Disconnecting (IN-side cable disconnection, OUT-side cable insertion error) 24H: Disconnecting (IN-side cable disconnection, OUT-side line establishing) 32H: Disconnecting (IN-side cable insertion error, OUT-side cable disconnection) 33H: Disconnecting (IN-side or OUT-side cable insertion error) 34H: Disconnecting (IN-side cable insertion error, OUT-side line establishing) 42H: Disconnecting (IN-side line establishing, OUT-side cable disconnection) 43H: Disconnecting (IN-side line establishing, OUT-side cable insertion error) 44H: Disconnecting (IN-side or OUT-side line establishing)	○	○
SW0065	Loopback information	Stores the network loop status. 0: Normal 1: Loopback 2: Errors on all stations	○	○
SW0068	IN-side line error occurrence rate maximum value	Stores the occurrence rate (maximum value) of received error frames at the IN side of the own station. (Unit: %) When 'Clear IN-side transmission error count' (SB0007) is turned ON, the cumulative value of the error is cleared.	○	○

No.	Name	Description	Availability	
			Control station	Normal station
SW0069	IN-side line error occurrence rate present value	Stores the occurrence rate (present value) of received error frames at the IN side of the own station. (Unit: %) When 'Clear IN-side transmission error count' (SB0007) is turned ON, the cumulative value of the error is cleared.	○	○
SW006A	OUT-side line error occurrence rate maximum value	Stores the occurrence rate (maximum value) of received error frames at the OUT side of the own station. (Unit: %) When 'Clear OUT-side transmission error count' (SB0008) is turned ON, the cumulative value of the error is cleared.	○	○
SW006B	OUT-side line error occurrence rate present value	Stores the occurrence rate (present value) of received error frames at the OUT side of the own station. (Unit: %) When 'Clear OUT-side transmission error count' (SB0008) is turned ON, the cumulative value of the error is cleared.	○	○
SW006E	Number of loop switches	Stores the number of switches (cumulative) of the transmission path. When 'Clear loop switching count' (SB0009) is turned ON, the stored value is cleared. When the maximum value 65535 (FFFFH) is counted, counting stops.	○	○
SW006F	Transient transmission error count	Stores the count (cumulative) of transient transmission errors. When 'Clear transient transmission error count' (SB000A) is turned ON, the stored value is cleared. Range: 0 to 16 If count reaches the maximum value 16, the count stops.	○	○
SW0070	IN-side loopback station number	Stores the number of the station where loopback is being performed on the IN side. 0: No loopback stations 1 to 120: Station number 255: Station number not set (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW0071	IN-side loopback factor	Stores the cause of loopback on the IN side. 00H: No loopback stations 02H: OUT-side cable disconnection 03H: OUT-side cable insertion error 04H: OUT-side line establishing (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○
SW0072	OUT-side mis-cabling station number	Stores the station number of the station where the OUT-side cable is incorrectly inserted. The station number stored is the number for the other station the cable is connected to.  0: No station connects cable incorrectly 1 to 120: Station number (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled when 'IN-side loopback factor' (SW0071) is 03H (OUT-side cable insertion error).	○	○
SW0074	IN-side cable disconnection detection count	Stores the detection count (cumulative) for cable disconnections on the IN side. When 'Clear IN-side transmission error count' (SB0007) is turned ON, the detection count is cleared. When the maximum value 65535 (FFFFH) is counted, counting stops.	○	○

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0080	OUT-side loopback station number	Stores the number of the station where loopback is being performed on the OUT side. 0: No loopback stations 1 to 120: Station number 255: Station number not set (Condition) This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○																																																																																																																																																									
SW0081	OUT-side loopback factor	Stores the cause of loopback on the OUT side. 00H: No loopback stations 20H: IN-side cable disconnection 30H: IN-side cable insertion error 40H: IN-side line establishing (Condition) This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.	○	○																																																																																																																																																									
SW0082	IN-side mis-cabling station number	Stores the station number of the station where the IN-side cable is incorrectly inserted. The station number stored is the number for the other station the cable is connected to.  0: No station connects cable incorrectly 1 to 120: Station number (Condition) - This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. - This register is enabled when 'OUT-side loopback factor' (SW0081) is 30H (IN-side cable insertion error).	○	○																																																																																																																																																									
SW0084	OUT-side cable disconnection detection count	Stores the detection count (cumulative) for cable disconnections on the OUT side. When 'Clear OUT-side transmission error count' (SB0008) is turned ON, the detection count is cleared. When the maximum value 65535 (FFFFH) is counted, counting stops.	○	○																																																																																																																																																									
SW00A0 to SW00A7	Baton pass status of each station	Stores the baton pass status of each station. 0: Baton pass normal station 1: Baton pass faulty station <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00A0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00A1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00A2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00A3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00A4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00A5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00A6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00A7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) - This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. - Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00A0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00A1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00A2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00A3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00A4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00A5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00A6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00A7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW00B3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW00B4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW00B5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW00B6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW00B7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW00C0 to SW00C7	Reserved station setting status	Stores the reserved station setting status for each station. 0: A station other than a reserved station 1: Reserved station <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00C0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00C1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00C2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00C3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00C4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00C5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00C6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00C7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Data link error status of own station' (SB0049) is OFF. • Stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00C0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00C1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00C2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00C3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00C4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00C5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00C6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00C7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW00C0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
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SW00C6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
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No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW00D0 to SW00D7	Parameter communication status of each station	Stores the parameter communication status of each station. 0: Parameter communication completed or not executed 1: Parameter communication in progress <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00D0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00D1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00D2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00D3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00D4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00D5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00D6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00D7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00D0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00D1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00D2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00D3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00D4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00D5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00D6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00D7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	×
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
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SW00E0 to SW00E7	Parameter error status of each station	Stores the parameter error status of each station. 0: No error 1: Error <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00E0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00E1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00E2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00E3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00E4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00E5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00E6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00E7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00E0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00E1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00E2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00E3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00E4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00E5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00E6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00E7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	×
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
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No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW00F0 to SW00F7	CPU operating status of each station	Stores the operating status of each station (including the own station). When a module is set as the target station, the status of the control CPU is stored. • CPU module: 0: RUN, STEP-RUN 1: STOP, PAUSE, or a moderate or major error occurring • Board: 0: Operating normally 1: Bus error, hardware failure, or board WDT error occurring <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00F0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00F1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00F2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00F3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00F4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00F5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00F6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00F7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00F0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00F1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00F2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00F3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00F4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00F5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00F6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW00F0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW00F1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW00F2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW00F3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW00F4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW00F5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW00F6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW00F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0100 to SW0107	CPU moderate/major error status of each station	Stores the moderate/major error status of each station (including the own station). When a module is set as the target station, the status of the control CPU is stored. 0: No moderate/major error (bus error, hardware failure, or board WDT error) 1: Moderate/major error (bus error, hardware failure, or board WDT error) occurring <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0100</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0101</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0102</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0103</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0104</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0105</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0106</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0107</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0100	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0101	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0102	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0103	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0104	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0105	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0106	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0107	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0100	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0101	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0102	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0103	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0104	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0105	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0106	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0107	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0110 to SW0117	CPU minor error status of each station	Stores the minor error occurrence status of each station (including the own station). When a module is set as the target station, the status of the control CPU is stored. 0: Normal, or a moderate/major error (bus error, hardware failure, or board WDT error) occurring 1: Minor error (communication error) occurring <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0110</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0111</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0112</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0113</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0114</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0115</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0116</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0117</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0110	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0111	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0112	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0113	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0114	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0115	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0116	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0117	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0110	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0111	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0112	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0113	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0114	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0115	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0116	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0117	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0120 to SW0127	IN-side current error frame reception status of each station	Stores whether the error frame is currently received at the IN side of each station. 0: Not received 1: Currently receiving <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0120</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0121</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0122</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0123</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0124</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0125</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0126</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0127</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0120	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0121	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0122	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0123	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0124	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0125	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0126	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0127	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0120	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0121	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0122	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0123	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0124	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0125	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0126	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0127	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0130 to SW0137	OUT-side current error frame reception status of each station	Stores whether the error frame is currently received at the OUT side of each station. 0: Not received 1: Currently receiving <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0130</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0131</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0132</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0133</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0134</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0135</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0136</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0137</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0130	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0131	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0132	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0133	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0134	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0135	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0136	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0137	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0130	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0131	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0132	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0133	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0134	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0135	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0136	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0137	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0140 to SW0147	IN-side error frame detection status of each station	Stores the status that has received an error frame from power-ON until the present at the IN side of each station. 0: Not received 1: Received When 'Clear IN-side transmission error count' (SB0007) is turned ON, the stored value is cleared. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0140</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0141</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0142</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0143</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0144</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0145</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0146</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0147</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0140	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0141	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0142	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0143	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0144	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0145	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0146	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0147	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0140	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0141	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0142	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0143	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0144	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0145	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0146	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0147	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0150 to SW0157	OUT-side error frame detection status of each station	Stores the status that has received an error frame from power-ON until the present at the OUT side of each station. 0: Not received 1: Received When 'Clear OUT-side transmission error count' (SB0008) is turned ON, the stored value is cleared. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0150</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0151</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0152</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0153</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0154</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0155</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0156</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0157</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0150	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0151	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0152	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0153	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0154	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0155	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0156	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0157	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0150	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0151	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0152	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0153	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0154	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0155	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0156	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0157	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0160 to SW0167	Path switching detection status of each station	Stores the path switching detection status of each station from power-ON to the present. 0: Not detected 1: Detected The path switching detection status of the own station is cleared when 'Clear loop switching count' (SB0009) is turned ON on the own station. When clearing the path switching detection status of other stations, turn ON 'Clear loop switching count' (SB0009) on other stations. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0160</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0161</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0162</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0163</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0164</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0165</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0166</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0167</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0160	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0161	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0162	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0163	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0164	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0165	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0166	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0167	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0160	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0161	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0162	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0163	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0164	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0165	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0166	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0167	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0170 to SW0177	Transient error detection status of each station	Stores the transient transmission error detection status of each station from power-ON to the present. 0: Not detected 1: Detected The transient error detection status of the own station is cleared when 'Clear transient transmission error count' (SB000A) is turned ON on the own station. When clearing the transient error detection status of other stations, turn ON 'Clear transient transmission error count' (SB000A) on other stations. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0170</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0171</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0172</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0173</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0174</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0175</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0176</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0177</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0170	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0171	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0172	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0173	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0174	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0175	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0176	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0177	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0170	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0171	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0172	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0173	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0174	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0175	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0176	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0177	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0180 to SW0187	External power supply status of each station	Stores the power supply status to the external power supply of each station (including the own station). 0: Not supplied 1: Supplied '0' is stored for a CC-Link IE Controller Network module and a board that do not have the external power supply function. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0180</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0181</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0182</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0183</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0184</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0185</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0186</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0187</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0180	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0181	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0182	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0183	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0184	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0185	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0186	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0187	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0180	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0181	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0182	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0183	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0184	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0185	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0186	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0187	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW0190 to SW0197	External power supply error status of each station	Stores the power supply error status of an external power supply on each station (including the own station). 0: Normal 1: Error '0' is stored for a CC-Link IE Controller Network module and a board that do not have the external power supply function. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW0190</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0191</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0192</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0193</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0194</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0195</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0196</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0197</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0190	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0191	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0192	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0193	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0194	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0195	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0196	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0197	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0190	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0191	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0192	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0193	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0194	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0195	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0196	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0197	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW01B0 to SW01B7	CPU type information of each station	Stores the CPU type information of each station 0: CPU module other than basic model QCPU or safety CPU 1: Basic model QCPU or safety CPU '0' is stored for a station of the board. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW01B0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01B1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01B2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01B3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01B4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01B5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01B6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01B7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW01B0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW01B1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW01B2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW01B3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW01B4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW01B5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW01B6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW01B7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW01B0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW01B1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW01B2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW01B3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
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			Control station	Normal station																																																																																																																																																									
SW01C0 to SW01C7	Redundant function information of each station	Stores the redundant system supporting information of each station (including the own station). 0: Redundant system not supported 1: Redundant system supported <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW01C0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01C1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01C2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01C3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01C4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01C5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01C6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01C7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW01C0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW01C1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW01C2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW01C3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW01C4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW01C5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW01C6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW01C7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW01C7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW01D0 to SW01D7	Redundant system separate mode status of each station	Stores the redundant system CPU operating mode of each station. 0: Backup mode 1: Separate mode '0' is stored for a station of the board. '0' is stored for a station other than a redundant system station. <table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW01D0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01D1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01D2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01D3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01D4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01D5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01D6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01D7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW01D0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW01D1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW01D2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW01D3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW01D4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW01D5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW01D6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW01D7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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No.	Name	Description	Availability	
			Control station	Normal station
SW01D9	System switching notification cause	Stores the specification of the own system operation after the system switching and the cause when the system switching is notified from a board. b15b14...b8b7...b0 SW01D9 0 ... 0 ... ■b0 to b7: Cause 0: Initial value 1: System switching request from the own system user program (user instruction) 2: System switching request from the own system user program (other than user instruction) 3: System switching request from the other system board (user instruction) 4: System switching request from the other system board (other than user instruction) 5: Error detection through the own system user program error monitoring 6: Stop error of the own system board 7: Data link error of the own system board (control system) 8: Disconnection detection of the other system board (control system) 9: Both systems A and B are control systems at the reconnection. 10: Driver WDT error occurrence of the own system board (control system) 11: Power-OFF of a personal computer of the own system board (control system) with an external power supplied ■b15: Operation specification for the own system 0: Standby system 1: Control system	○	○
SW01DA	System switching cause	Stores the cause of system switching that has occurred in the own system board. 0: Initial value/system switching has never occurred. 1: System switching request from the own system user program (user instruction) 2: System switching request from the own system user program (other than user instruction) 3: System switching request from the other system board (user instruction) 4: System switching request from the other system board (other than user instruction) 5: Error detection through the own system user program error monitoring 6: Stop error of the own system board 7: Data link error of the own system board (control system) 8: Disconnection detection of the other system board (control system) 9: Both systems A and B are control systems at the reconnection. 10: Driver WDT error occurrence of the own system board (control system) 11: Power-OFF of a personal computer of the own system board (control system) with an external power supplied	○	○
SW01DB	Cause of system switching error completion	Stores the cause of abnormal completion of the system switching when it is performed. 0: Initial value/system switching normal completion 1: System switching prohibition of the own system board 2: Stop error of the own system board 3: Abnormal response for the system switching notification from the own system user program 4: Response timeout for the system switching notification from the own system user program 5: System switching completion for the own system only due to unavailable communication with the other system board 6: Abnormal response for the system switching request from the other system board 7: Response timeout for the system switching request from the other system board 8: System switching being performed 9: Incorrect own system operation specification for the system switching request cause 10: Error detected through the own system user program error monitoring 11: Incorrect system state 12: Driver WDT error occurrence of the own system board (standby system) 13: Power-OFF of a personal computer of the own system board (control system) with an external power supplied	○	○

No.	Name	Description	Availability																																																																																																																																																										
			Control station	Normal station																																																																																																																																																									
SW01E0 to SW01E7	Setting status of board redundancy/redundant system pairing for each station	Stores the setting status of board redundancy setting or pairing setting of each station (including the own station). 0: Board redundancy setting or pairing setting not set 1: Board redundancy setting or pairing setting set When this register is ON, the corresponding bit of system B station is turned ON. '0' is stored for a station other than a redundant system station.																																																																																																																																																											
		<table><thead><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr></thead><tbody><tr><td>SW01E0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01E1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01E2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01E3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01E4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01E5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01E6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01E7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></tbody></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW01E0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW01E1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW01E2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW01E3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW01E4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW01E5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW01E6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW01E7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113		
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SW01E7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW01F0 to SW01F7	Redundant system state of each station	Stores the redundant system state (control system/standby system) of each station (including the own station). 0: Control system (including a single system) 1: Standby system '0' is stored for a station other than a redundant system station.																																																																																																																																																											
		<table><thead><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr></thead><tbody><tr><td>SW01F0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01F1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01F2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01F3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01F4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01F5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01F6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01F7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></tbody></table> Each number in the table represents a station number. — is fixed to '0.' (Condition) • This register is enabled when 'Baton pass error status of own station' (SB0047) is OFF. When 'Baton pass error status of own station' (SB0047) is turned ON (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW01F0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW01F1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW01F2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW01F3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW01F4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW01F5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW01F6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW01F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113		
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SW01F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

Appendix 7 Network Status at Power-ON/OFF or Board Reset During Data Linking

This section shows the network status when powering ON/OFF or restarting a personal computer, or resetting a board. An error occurs during data linking and a network is disconnected in the following cases:

- Personal computer power-OFF
- Immediately after personal computer power-ON (during board driver startup)
- During personal computer restart (for Windows restart)
- During board reset

Details of network status

■Without an external power supply

Condition		Time frame	PC power	Network status			
				Loop Status	Communication status (Baton pass status)	Data link status (Cyclic transmission status)	
						Own station	Other than own station
Power-ON/OFF	System startup	From personal computer power-OFF to board driver startup	ON	Loopback	Error	Error	Normal
		During board driver startup					Normal ^{*1}
		After board driver startup	ON	Normal	Normal	Normal	Normal
	System shut down	Personal computer power-OFF	OFF	Loopback	Error	Error	Normal
Personal computer restart (for Windows)		From personal computer shutdown to driver completion	ON	Normal	Normal	Normal	Normal
		From driver completion to personal computer restart					
		From personal computer restart to board driver startup	ON	Loopback	Error	Error	Normal
		During board driver startup					Normal ^{*1}
		After board driver startup	ON	Normal	Normal	Normal	Normal
Board reset ^{*3}		Before board reset	ON	Normal	Normal	Normal	Normal
		During board reset		Normal ^{*2}	Normal ^{*2}	Normal ^{*2}	Normal ^{*1}
		After board reset		Normal	Normal	Normal	Normal

*1 When a board is reconnected to or disconnected from a network, the all station error may occur for the circuit control period (normal value: 50 ms, worst value: 100 ms). If the all station error occurs, an error is detected in the communication status (baton pass status) and the data link status (cyclic transmission status) of all stations.

The circuit control period is a period to reconstruct the data link when a board is reconnected or disconnected (such as when a cable is disconnected or the power is turned OFF and ON).

*2 Since a board is reset during the driver startup, a brief loopback occurs. An error is also detected in the communication status (baton pass status) and the data link status (cyclic transmission status).

*3 In cases where a board is reset by using the utility or the mdBdRst or mdBdModSet function in the MELSEC data link library.

■With an external power supply

When powering ON a personal computer after external power-ON, the operation is as follows:

Condition		Time frame	External power	PC power	Network status			
					Loop Status	Communication status (Baton pass status)	Data link status (Cyclic transmission status)	
							Own station	Other than own station
Power-ON/ OFF	System startup	From external power-ON to board driver startup	OFF	OFF	Loopback	Error	Error	Normal
			ON					
			ON	ON				
		During board driver startup	ON	ON	Loopback	Error	Error	Normal ^{*1}
		After board driver startup	ON	ON	Normal	Normal	Normal	Normal
	System shut down	External power-ON, personal computer power-OFF	ON	OFF	Normal	Normal	Error	Normal
		External power-OFF	OFF	OFF	Loopback	Error		
Personal computer restart (for Windows)		From personal computer shutdown to driver completion	ON	ON	Normal	Normal	Normal	Normal
		From driver completion to personal computer restart						
		From personal computer restart to board driver startup	ON	ON	Normal	Error	Error	Normal
		During board driver startup			Normal ^{*2}			Normal ^{*1}
		After board driver startup	ON	ON	Normal	Normal	Normal	Normal
Board reset		📄 Page 209 Without an external power supply						

- *1 When a board is reconnected to or disconnected from a network, the all station error may occur for the circuit control period (normal value: 50 ms, worst value: 100 ms). If the all station error occurs, an error is detected in the communication status (baton pass status) and the data link status (cyclic transmission status) of all stations.
The circuit control period is a period to reconstruct the data link when a board is reconnected or disconnected (such as when a cable is disconnected or the power is turned OFF and ON).
- *2 Since a board is reset during the driver startup, a brief loopback occurs. An error is also detected in the communication status (baton pass status) and the data link status (cyclic transmission status).

Point

When an external power is not supplied, the operation is the same as when the external power supply function is not used.

When powering OFF and ON a personal computer while an external power is ON, the operation is as follows:

Condition		Time frame	External power	PC power	Network status			
					Loop status	Communication status (Baton pass status)	Data link status (Cyclic transmission status)	
							Own station	Other than own station
Power-ON/OFF		External power-ON, personal computer power-OFF	ON	OFF	Normal	Normal	Error	Normal
		From personal computer power-OFF to board driver startup		ON	Normal	Error	Error	Normal
		During board driver startup			Normal ^{*2}			
		After board driver startup		ON	Normal	Normal	Normal	Normal

- *1 When a board is reconnected to or disconnected from a network, the all station error may occur for the circuit control period (normal value: 50 ms, worst value: 100 ms). If the all station error occurs, an error is detected in the communication status (baton pass status) and the data link status (cyclic transmission status) of all stations.
The circuit control period is a period to reconstruct the data link when a board is reconnected or disconnected (such as when a cable is disconnected or the power is turned OFF and ON).
- *2 Since a board is reset during the driver startup, a brief loopback occurs. An error is also detected in the communication status (baton pass status) and the data link status (cyclic transmission status).

Checking method for the network status

Each network status can be checked in the screens and devices listed in the following table.

Network status	Screen and device to check		
	CC IE Control utility	Engineering tool connected to a programmable controller on another station	Special register (SW)
Loop status	[Monitor detail] tab in the "Logging" screen	Network diagnostics	Loopback information (SW0065)
Communication status (baton pass status)	Board information screen		Baton pass status of each station (SW00A0 to SW00A7)
Data link status (cyclic transmission status)	"CC-Link IE Controller Network diagnostics result" screen		Data link status of each station (SW00B0 to SW00B7)

Methods for resetting a board

A board can be reset by the following methods:

- Utility: "Board detail information" screen ⇒ [Reset] button
- User program: mdBdRst function in the MELSEC data link library

Point

A board is also reset automatically in the following cases:

- Restarting Windows
- Writing parameters to a board in the utility: [Parameter setting] ⇒ [End]
- Setting the board mode in a user program: mdBdModSet function in the MELSEC data link library
- Firmware update in the utility:  Page 251 Firmware update

Precautions

- While a board is being reset, each function may stop or an error may occur. Check the effect on the system before resetting the board.
- When executing the mdBdRst or mdBdModSet function in a user program, board reset processing by each function is completed when a value is returned. Create a program to always check the return value.

Appendix 8 Processing Time

This section shows the transmission delay time of cyclic transmission using this board.

For the processing time when using devices other than this board, refer to the manual for each device.

Transmission delay time of cyclic transmission

Transmission delay time (of cyclic transmission) refers to the time taken until changed data is transmitted to a target station.

The transmission delay time in CC-Link IE Controller Network consists of the time components below.

- Board: Link refresh time on the sending side + Link scan time + Link refresh time on the receiving side
- Module: Sequence scan time on the sending side + Link scan time + Sequence scan time on the receiving side

It refers to the time between when writing data to a device on the sending side is completed and when the data is applied to a device on the receiving side; therefore, processing delay time caused by a user program is not included.

The following table shows the calculation formulas for the cyclic transmission delay times.

Condition				Calculation formula
When $S_T > LS$	Block data assurance per station available	Other than the extended mode	Normal value	$TD1 = (S_T + \alpha_T) \times 1.5 + LS \times 0.5 + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD1max = (S_T + \alpha_T) \times 2 + LS + (S_R + \alpha_R) \times 2$
		Extended mode	Normal value	$TD1 = (S_T + \alpha_T) \times 1.5 + LS \times 0.5 + (S_R + \alpha_R) \times 2.5$
			Maximum value	$TD1max = (S_T + \alpha_T) \times 2 + LS + (S_R + \alpha_R) \times 3$
	Block data assurance per station unavailable	Other than the extended mode	Normal value	$TD2 = (S_T + \alpha_T) + LS \times 0.5 + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD2max = (S_T + \alpha_T) + LS + (S_R + \alpha_R) \times 2$
		Extended mode	Normal value	$TD2 = (S_T + \alpha_T) + LS \times 0.5 + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD2max = (S_T + \alpha_T) + LS + (S_R + \alpha_R) \times 2$
When $S_T < LS$	Block data assurance per station available	Other than the extended mode	Normal value	$TD3 = (S_T + \alpha_T) + LS + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD3max = (S_T + \alpha_T) + LS \times 2 + (S_R + \alpha_R) \times 2$
		Extended mode	Normal value	$TD3 = (S_T + \alpha_T) + LS \times 2 + (S_R + \alpha_R) \times 2.5$
			Maximum value	$TD3max = (S_T + \alpha_T) + LS \times 3 + (S_R + \alpha_R) \times 3$
	Block data assurance per station unavailable	Other than the extended mode	Normal value	$TD4 = (S_T + \alpha_T) + LS \times 0.5 + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD4max = (S_T + \alpha_T) + LS + (S_R + \alpha_R) \times 2$
		Extended mode	Normal value	$TD4 = (S_T + \alpha_T) + LS + (S_R + \alpha_R) \times 1.5$
			Maximum value	$TD4max = (S_T + \alpha_T) + LS \times 2 + (S_R + \alpha_R) \times 2$

The following table shows the variables used in each calculation formula.

Variable	Board	Module
TD1 to TD4	Transmission delay time (normal value)	
TD1max to TD4max	Transmission delay time (maximum value)	
S_T	Link refresh time on the sending side ^{*1}	Sequence scan time on the sending side (excluding the link refresh time)
α_T	0	Link refresh time on the sending side (total for the number of network modules installed)
S_R	Link refresh time on the receiving side ^{*1}	Sequence scan time on the receiving side (excluding the link refresh time)
α_R	0	Link refresh time on the receiving side (total for the number of network modules installed)
LS	Link scan time	

^{*1} The link refresh processing time is compared with "Link refresh cycle" set in the parameter, and the longer one is applied as the link refresh time.
The time of link refresh being performed can be checked in the "Board detail information" screen. (Page 97 Board detail information)

Appendix 9 Board Redundancy Function Process Flow and User Program

This section explains the details on the process of the board redundancy function and the programming of a user program. For details, refer to the following:

System switching cause		Reference	Related sample program ^{*1}	
			System A	System B
System switching due to board failure or disconnection (Automatic error detection by system)	Data link error	Page 216 Automatic system switching (SW0017 ≠ 1)	(1)	(1)
		Page 217 Manual system switching (SW0017 = 1)	(2)	(2)
	Stop error	Page 218 Automatic system switching (SW0017 ≠ 1)	(1)	(1)
		Page 219 Manual system switching (SW0017 = 1)	(2)	(2)
	Personal computer of the control system with an external power supplied is powered OFF	Page 220 Automatic system switching (SW0017 ≠ 1)	(1)	(1)
		Page 220 Manual system switching (SW0017 = 1)	(2)	(2)
System switching due to software error detection	Driver WDT error is detected	Page 222 Automatic system switching (SW0017 ≠ 1)	(1)	(1)
		Page 223 Manual system switching (SW0017 = 1)	(2)	(2)
	Error is detected by the user program error monitoring function	Page 224 Automatic system switching (SW0017 ≠ 1)	(1), (3)	(1)
		Page 225 Manual system switching (SW0017 = 1)	(2), (3)	(2)
System switching through a user program	System switching is requested from a user program of the control system	Page 227 When the system switching is requested from a user program of the control system	(4)	(2)
	System switching is requested from a user program of the standby system	Page 228 System A is the control system, and system B is the standby system	(2)	(2), (4)
		Page 230 Switching the own system to the control system when both systems are standby systems	(2), (4)	—
		Page 231 Switching the other system to the control system when both systems are standby systems	(4)	(2)
System switching due to reconnection	Both systems are reconnected from error status of the control system	Page 232 Automatic system switching (SW0017 ≠ 1)	—	(1)
		Page 233 Manual system switching (SW0017 = 1)	—	(2)

^{*1} Refer to the following sample programs to create necessary user programs.
Sample programs are stored in the following folder in the folder where the utility is installed.
\MNETG\SAMPLES\CCIEC_NZ\Eng\VC\REDUNDANT

No.	Reference	Folder name
(1)	Page 236 Program for executing user functions according to the system state	redundant_system_sample
(2)	Page 240 Program for responding to the notification from a board	redundant_system_switch_response
(3)	Page 241 Program for user program error monitoring	redundant_system_user_program_error_monitoring
(4)	Page 242 Program for requesting the system switching through a user program	redundant_system_switch_request

Automatic/manual system switching

Automatic system switching is an operation to switch the system automatically without performing notification from a board that has detected the system switching cause to a user program.

Manual switching is an operation to switch the system after a board that has detected the system switching cause notifies a user program of the system switching and the response from the user program is detected. ( Page 77 System switching operation)

The notification and response for the manual system switching is performed in the following link special relays (SB) and link special registers (SW):

- Notification: System switching notification cause (SB01D9), System switching notification cause (SW01D9)
- Response: 'System switching notification response' (SB000E), 'System switching notification response details' (SW000E)

Precautions

- For the manual system switching, program the user program to respond to the system switching notification within the time set in 'System switching response monitoring time for user program' (SW0014). If the set time is exceeded, the system switching is completed abnormally.
- Even if the manual system switching (SW0017=1) is set, the system is switched from the control system to the standby system without waiting for response of the system switching notification when the system switching by system occurs.

When an error is detected in the standby system

When any of the following errors is detected in the standby system, the control system is retained.

The system switching disable status is notified from the standby station to the control station, and 'Other system switching disable status' (SB01E9) of the control system is turned ON.

- A personal computer of the control system with an external power supplied is powered OFF.
- A driver WDT error is detected in the standby system board.
- A user program error is detected in the standby system board.

A

System switching due to board failure or disconnection

The following explains the processing when the board failure or disconnection of the control system is detected by system automatically and the system is switched.

Point

The system switching does not occur due to the data link stop by the following operations of link start/stop.

- "Link start/stop" operation of CC-Link IE Controller Network diagnostics
- Operation of link special relays (SB0000 to SB0003) and link special registers (SW0000 to SW0008)

Data link error

The following shows the process in which the control system (system A board) stops the communication with CC-Link IE Controller Network due to the disconnection or failure, resulting in a data link error of own station; the data link error is detected in the control system (system A board) and the standby system (system B board) starts operating as the new control system.

For the two seconds after a board operates as the control system, the system switching does not occur even if a data link error is detected by system.

If a data link error is detected after two seconds have elapsed, the system switching occurs.

Precautions

When a board of the control system is disconnected due to the board reset, and when the time of disconnection is shorter than the value set for 'Data link stop monitoring time for control system' (SW0016) of the standby system, the system switching does not start.

Set 'Data link stop monitoring time for control system' (SW0016) properly.

■Automatic system switching (SW0017 ≠ 1)

When a data link error is detected, the system is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ①:

Processing procedure

System A			System B		
User program	Board		Board	User program	
○ —	○ ① A data link error of own station is detected.		△ —	△ —	
↓ ③-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF	○ ⇅ △ ② System switching to the standby system The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)		↓ ④-1 Data link stop is detected due to timeout of the following: • Data link stop monitoring time for control system (SW0016)	↓ —	
○ ⇅ △ ③-2 The operation is changed from that of control system to that of standby system (stopping the update of transmission data).	↓ —		△ ⇅ ○ ④-2 System switching to the control system The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ⑤-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON	
△ —	△ —		○ —	△ ⇅ ○ ⑤-2 The operation is changed from that of standby system to that of control system (starting the update of transmission data).	

■Manual system switching (SW0017 = 1)

When a data link error is detected, it is notified to a user program.

The control system where an error has been detected is switched to the standby system without waiting for the user program processing.

The system of standby system is switched by the response from a user program.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ❶:

Processing procedure

System A			System B		
User program ^{*1}	Board		Board		User program ^{*1}
○ —	○ ❶ A data link error of own station is detected.		△ —		△ —
↓ ❸-1 ^{*2} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	○ ⇅ ❷ △ System switching to the standby system The following relay and registers are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9) • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)		↓ ❹-1 Data link stop is detected due to timeout of the following: • Data link stop monitoring time for control system (SW0016)		↓ —
○ ❸-2 ^{*2} ⇅ The operation is changed from that of control system to that of standby system (stopping the update of transmission data). △	↓ —		↓ ❹-2 The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)		↓ ❺-1 ^{*3} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
↓ ❸-3 ^{*2} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	↓ ❹ The following relay is reset: • System switching notification (SB01D9): OFF		↓ —		↓ ❺-2 ^{*3} As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations
↓ ❺ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF					△ ⇅ ○ ❺-3 ^{*3} The operation is changed from that of standby system to that of control system (starting the update of transmission data).
↓ —	↓ —		△ ⇅ ○ ❹-1 System switching to the control system		↓ ❺-4 ^{*3} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
△ —	△ —		○ ❹-2 The following relay is reset: • System switching notification (SB01D9): OFF		○ ❹ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

📄 Page 240 Program for responding to the notification from a board

*2 When not performing this processing, the system switching is not performed normally until 'System switching notification response'

(SB000E) of the control system is turned ON.

*3 Perform the processing in ⑦ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

Stop error

The following shows the process in which a stop error is detected in the control system (system A board), and the standby system (system B board) starts operating as the new control system.

Precautions

When a board of the control system is disconnected due to the board reset, and when the time of disconnection is shorter than the value set for 'Data link stop monitoring time for control system' (SW0016) of the standby system, the system switching does not start.

Set 'Data link stop monitoring time for control system' (SW0016) properly.

■Automatic system switching (SW0017 ≠ 1)

When a stop error is detected, the system is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ⑦: Processing procedure

System A			System B		
User program	Board		Board	User program	
○ —	○	① A stop error is detected.	△ —	△	—
↓ ③-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF	○ ⇅ △	② System switching to the standby system The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ④-1 Data link stop is detected due to timeout of the following: • Data link stop monitoring time for control system (SW0016)	↓	—
○ ⇅ △ ③-2 The operation is changed from that of control system to that of standby system (stopping the update of transmission data).	×	—	△ ⇅ ○ ④-2 System switching to the control system The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓	⑤-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON
△ —	×	—	○ —	△ ⇅ ○	⑤-2 The operation is changed from that of standby system to that of control system (starting the update of transmission data).

■Manual system switching (SW0017 = 1)

When a stop error is detected, it is notified to a user program.

The control system where a stop error has been detected is switched to the standby system without waiting for the user program processing.

The system of standby system is switched by the response from a user program.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ①: Processing procedure

System A			System B		
User program*1	Board		Board	User program*1	
○ —	○ ① A stop error is detected.	△ —	△ —	△ —	△ —
↓ ③-1 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	○ ⇅ ② System switching to the standby system The following relay and registers are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9) • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ④-1 Data link stop is detected due to timeout of the following: • Data link stop monitoring time for control system (SW0016)	↓ —	↓ —	↓ —
○ ③-2 ⇅ The operation is changed from that of control system to that of standby system (stopping the update of transmission data). △	× —	↓ ④-2 The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓ ⑤-1*2 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	↓ ⑤-2*2 As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations	△ ⑤-3*2 ⇅ The operation is changed from that of standby system to that of control system (starting the update of transmission data). ○
↓ ③-3 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	↓ Response is ignored due to the stop error in the board. Resetting is required for the recovery.	↓ —	↓ —	↓ ⑤-4*2 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	↓ —
↓ —	↓ —	△ ⇅ ○ ⑥-1 System switching to the control system	△ ⑥-2 The following relay is reset: • System switching notification (SB01D9): OFF	○ ⑦ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF	○ —

*1 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*2 Perform the processing in ⑤ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

When a personal computer of control system with external power is powered OFF

The following shows the process in which a personal computer of the control system (system A board) with an external power supplied is powered OFF, and the standby system (system B board) starts operating as the new control system.

■Automatic system switching (SW0017 ≠ 1)

When an error is detected, the system is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A		System B	
User program	Board	Board	User program
○ ⇅ × A personal computer is powered OFF.	○ ❶ The power-OFF of the personal computer is detected.	△ —	△ —
× —	○ ❷ ⇅ System switching to the standby system △ The system switching request is issued to the system B board.	△ ❸ ⇅ System switching to the control system ○ The system switching request response is issued to the system A board. The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❹-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON
	△ —	○ —	△ ❹-2 ⇅ The operation is changed from that of standby system to that of control system (starting the update of transmission data). ○

■Manual system switching (SW0017 = 1)

When an error is detected, it is notified to a user program.

The control system where an error has been detected is switched to the standby system without waiting for the user program processing.

The system of standby system is switched by the response from a user program.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A		System B	
User program*1	Board	Board	User program*1
○ ⇅ × A personal computer is powered OFF.	○ ❶ The power-OFF of the personal computer is detected.	△ —	△ —

System A			System B		
User program ^{*1}	Board		Board	User program ^{*1}	
× —	○	2	↓	3	↓ 4-1^{*2} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
	↓	System switching to the standby system			
	△	The system switching request is issued to the system B board.			
	↓	—	↓	—	↓ 4-2^{*2} As necessary, preprocessing is performed to operate as the control system. • Setting data to be sent to other stations
					△ 4-3^{*2} ↓ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).
			△	5-1	↓ 4-4^{*2}
			↓	System switching to the control system	The following relay and register are set:
			○	The system switching request response is issued to the system A board.	• System switching notification response details (SW000E) • System switching notification response (SB000E): ON
	△	—	○	5-2	○ 6
				The following relay is reset:	A notification is detected.
				• System switching notification (SB01D9): OFF	• System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*2 Perform the processing in **4** within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

A

System switching due to software error detection

The following explains the processing when a driver or user program error is detected and the system is switched.

When a driver WDT error is detected

The following shows the process in which a driver WDT error is detected in the control system (system A board), and the standby system (system B board) starts operating as the new control system.

■Automatic system switching (SW0017 ≠ 1)

When a driver WDT error is detected, the system is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed,
From ❶: Processing procedure

System A			System B		
User program*1		Board	Board	User program	
○	The driver WDT function is enabled.	○ —	△ —	△	—
○	The operating system or driver is stopped.	↓ ❶ A driver WDT error is detected.			
⇅		❷ System switching to the standby system The system switching request is issued to the system B board.			
×	User program recovery	○ —	△ ❸-1 System switching to the control system The system switching request response is issued to the system A board.		
↓		⇅ —	○ —		
○	❹ The following flag is detected: • Control system judgment flag (SB01EC) When the driver WDT error (-28158(9202H)) is returned for using the MELSEC data link library function, the operation is changed from that of control system to that of standby system (stopping the update of transmission data).	↓ —	↓ ❹-2 The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❶-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON	
△		△ —	○ —	△ ❷-2 The operation is changed from that of standby system to that of control system (starting the update of transmission data).	

*1 Refer to the following sample program to create a necessary user program:

📄 Page 241 Program for user program error monitoring

■Manual system switching (SW0017 = 1)

When a driver WDT error is detected, it is notified to a user program.

The control system where a driver WDT error has been detected is switched to the standby system without waiting for the user program processing.

The system of standby system is switched by the response from a user program.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ①: Processing procedure

System A			System B		
User program*1		Board	Board		User program*1
○	The driver WDT function is enabled.	○ —	△ —	△ —	△ —
○ ⇅ ×	The operating system or driver is stopped.	○ ① A driver WDT error is detected.	△ —	△ —	△ —
×	User program recovery	○ ② ⇅ System switching to the standby system △ The system switching request is issued to the system B board.	↓ ③ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓ ④-1*2 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	↓ ④-1*2 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
↓	—	↓ —	↓ —	↓ —	↓ ④-2*2 As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations
				△ ④-3*2 ⇅ The operation is changed from that of standby system to that of control system (starting the update of transmission data). ○	△ ④-3*2 ⇅ The operation is changed from that of standby system to that of control system (starting the update of transmission data). ○
			△ ⑤-1 ⇅ System switching to the control system ○ The system switching request response is issued to the system A board.	↓ ④-4*2 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	↓ ④-4*2 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
○ ⇅ △	⑦ The following flag is detected: • System switching notification (SB01D9) When the driver WDT error (-28158(9202H)) is returned for using the MELSEC data link library function, the operation is changed from that of control system to that of standby system (stopping the update of transmission data).	△ —	○ ⑤-2 The following relay is reset: • System switching notification (SB01D9): OFF	○ ⑥-2 A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF	○ ⑥-2 A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

📄 Page 240 Program for responding to the notification from a board

*2 Perform the processing in ④ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

When an error is detected using the user program error monitoring function

The following shows the process in which an error is detected through the user program error monitoring in the control system (system A board), and the standby system (system B board) starts operating as the new control system.

■Automatic system switching (SW0017 ≠ 1)

When an error is detected through the user program error monitoring, the system is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A		System B	
User program*1	Board	Board	User program
○ The user program error monitoring function is enabled.	○ —	△ —	△ —
○ The user program or driver is stopped. ⇅ ×	↓ ❶ An error is detected.		
↓ —	○ ❷ ⇅ △ System switching to the standby system The system switching request is issued to the system B board.		
× ⇅ ○	↓ —	△ ❸-1 ⇅ ○ System switching to the control system The system switching request is issued to the system A board.	
↓ ❹-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF	↓ ❺ The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❸-2 The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❹-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON
○ ❻-2 ⇅ △ The operation is changed from that of control system to that of standby system (stopping the update of transmission data).	△ —	○ —	△ ❹-2 ⇅ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).

*1 Refer to the following sample program to create a necessary user program:

📄 Page 241 Program for user program error monitoring

■Manual system switching (SW0017 = 1)

When an error is detected through the user program error monitoring, it is notified to a user program.

The control system where an error has been detected through the user program error monitoring is switched to the standby system without waiting for the user program processing.

The system of standby system is switched by the response from a user program.

○: Control system operation, △: Standby system operation, ×: Stopped, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A			System B		
User program ^{*1*2}		Board	Board	User program ^{*1}	
○	The user program error monitoring function is enabled.	○	△ —	△	—
○ ⇅ ×	The user program or driver is stopped.	↓ ❶ An error is detected.	↓ —	↓	—
×	User program restart	○ ❷ ⇅ △ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9) System switching to the standby system The system switching request is issued to the system B board.	↓ ❸ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓ ❹-1 ^{*3} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	
↓	❷-1 ^{*4} A notification is detected. • System switching notification (SB01D9): ON As necessary, check the following: • System switching notification cause (SW01D9)	↓ —	↓ —	↓ ❹-2 ^{*3} As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations	
○ ⇅ △	❷-2 ^{*4} The operation is changed from that of control system to that of standby system (stopping the update of transmission data).			△ ❹-3 ^{*3} ⇅ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).	
↓	The following relay and register are set: ❷-3 ^{*4} • System switching notification response details (SW000E) • System switching notification response (SB000E): ON		△ ❺-1 ⇅ ○ System switching to the control system The system switching request response is issued to the system A board.	↓ ❹-4 ^{*3} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	
↓	❷-4 ^{*4} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)		↓ ❺-2 The following relay is reset: • System switching notification (SB01D9): OFF	↓ ❻ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF	
△	❸ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF	△ ❽ The following relay is reset: • System switching notification (SB01D9): OFF	○ —	○ —	

*1 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*2 Refer to the following sample program to create a necessary user program:

☞ Page 241 Program for user program error monitoring

*3 Perform the processing in ❹ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

*4 No action is required when 'System switching notification' (SB01D9) is already OFF.

System switching through a user program at any timing

The following explains the processing when the system is switched through a user program for debugging and maintenance at any timing.

Point

When requesting the system switching from a user program, the automatic system switching is not performed even if SW0017 ≠ 1 is set.

Precautions

To perform the system switching, a user program to request the system switching and that to respond to the notification.

If a program to respond to the notification is not operating, 'Abnormal response for the system switching request from the other system board' (6) or 'Response timeout for the system switching request from the other system board' (7) is stored in 'Cause of system switching error completion' (SW01DB) and both systems operate as standby systems.

When the system switching is requested from a user program of the control system

The following shows the process in which the system switching is requested from a user program of the control system to the system A board, and the standby system (system B board) starts operating as the new control system.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A			System B		
User program ^{*1}	Board		Board		User program ^{*2}
○ ❶-1 ⇅ △ The operation is changed from that of control system to that of standby system (stopping the update of transmission data).	○ —		△ —		△ —
↓ ❶-2 The following relay and register are set: • System switching request cause (SW000D) • System switching request (SB000D): ON	○ ❷ ⇅ △ System switching to the standby system The system switching request is issued to the system B board.		↓ ❸ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓	❷-1 ^{*3} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
↓ —	↓ —		↓ —	↓	❷-2 ^{*3} As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations
				△ ⇅ ○	❷-3 ^{*3} The operation is changed from that of standby system to that of control system (starting the update of transmission data).
↓ ❷-1 A response is detected. • System switching request response (SB01D8): OFF → ON As necessary, check the following: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❸-1 The following relay and registers are set: • System switching request response (SB01D8): ON • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)		△ ⇅ ○ ❸-1 System switching to the control system The system switching request response is issued to the system A board.	↓	❷-4 ^{*3} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
△ ❷-2 The following relay is reset: • System switching request (SB000D): OFF	△ ❸ The following relay is reset: • System switching request response (SB01D8): OFF		○ ❸-2 The following relay is reset: • System switching notification (SB01D9): OFF	○	❸-2 A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

☞ Page 242 Program for requesting the system switching through a user program

*2 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*3 Perform the processing in ❹ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

· (System A) 'System switching response monitoring time for the other system' (SW0015): When a timeout occurs, the system switching is abnormally completed in the system A board.

When the system switching is requested from a user program of the standby system

The following shows the process in which the system switching is requested from a user program of the standby system, and the own system starts operating as the new control system.

■System A is the control system, and system B is the standby system

The following shows the process in which the system switching is requested from a user program of the standby system to the system B board, and the standby system (system B board) starts operating as the new control system.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ①: Processing procedure

System A		System B	
User program*1	Board	Board	User program*1*2
○ ④-1*3 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)	○ ③ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	△ ② The system switching request is issued to the system A board.	△ ① The following relay and register are set: • System switching request cause (SW000D) • System switching request (SB000D): ON
○ ④-2*3 ⇅ △ The operation is changed from that of control system to that of standby system (stopping the update of transmission data).	↓ —	↓ —	↓ —
↓ ④-3*3 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	○ ⑤-1 ⇅ △ System switching to the standby system The system switching request response is issued to the system B board.	↓ ⑥-1 The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓ ⑦-1*4 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9) As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations
↓ ⑥-2 A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF	↓ ⑤-2 The following relay is reset: System switching notification (SB01D9): OFF	↓ —	△ ⑦-2*4 ⇅ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).

System A		System B	
User program ^{*1}	Board	Board	User program ^{*1*2}
△ —	△ —	△ ⑧-1 ↓ ○ System switching to the control system The following relay is reset: • System switching notification (SB01D9): OFF	↓ ⑦-3 ^{*4} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
		↓ ⑧-2 The following relay and register are set: • System switching request response (SB01D8): ON • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ⑨-1 A response is detected. • System switching request response (SB01D8): OFF → ON As necessary, check the following: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)
		○ ⑩ The following relay is reset: • System switching request response (SB01D8): OFF	○ ⑨-2 The following relays are reset: • System switching notification response (SB000E): OFF • System switching request (SB000D): OFF

*1 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*2 Refer to the following sample program to create a necessary user program:

☞ Page 242 Program for requesting the system switching through a user program

*3 Perform the processing in ④ within the following response monitoring time that is set.

· (System A) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

· (System B) 'System switching response monitoring time for the other system' (SW0015): When a timeout occurs, the system switching is abnormally completed in the system A board.

*4 Perform the processing in ⑦ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

A

■Switching the own system to the control system when both systems are standby systems

The following shows the process in which the system switching is requested from a user program of the system A to the own system board, and the system A starts operating as the control system when both systems are standby systems.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ①: Processing procedure

System A			System B		
User program ^{*1}		Board	Board		User program
△	① The following relay and register are set: • System switching request cause (SW000D) • System switching request (SB000D): ON	△	② The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	△	—
↓	③-1 ^{*2} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)				
↓	③-2 ^{*2} As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations	↓	—		
△	③-3 ^{*2} ⇅ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).				
↓	③-4 ^{*2} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON	△	④-1 ⇅ ○ System switching to the control system The following relay is reset: • System switching notification (SB01D9): OFF		
↓	⑤-1 A response is detected. • System switching request response (SB01D8): OFF → ON As necessary, check the following: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓	④-2 The following relay and registers are set: • System switching request response (SB01D8): ON • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)		
○	⑤-2 A notification is detected. • System switching request response (SB01D8): OFF → ON The following relays are reset: • System switching notification response (SB000E): OFF • System switching request (SB000D): OFF	○	⑥ The following relay is reset: • System switching request response (SB01D8): OFF		

*1 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

☞ Page 242 Program for requesting the system switching through a user program

*2 Perform the processing in ③ within the following response monitoring time that is set.

· (System A) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, the system switching is abnormally completed in the system A board.

■Switching the other system to the control system when both systems are standby systems

The following shows the process in which the system switching is requested from a user program of the system A to the other system board, and the system B starts operating as the control system when both systems are standby systems.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ①: Processing procedure

System A		System B	
User program ^{*1}	Board	Board	User program ^{*2}
△ ① The following relay and register are set: • System switching request cause (SW000D) • System switching request (SB000D): ON	△ ② The system switching request is issued to the system B board.	△ ③ The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	△ ④-1 ^{*3} A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
↓ —	↓ —	↓ —	↓ ④-2 ^{*3} As necessary, preprocessing is performed to operate as the control system. • Receiving data from the system A user program. • Setting data to be sent to other stations
			△ ④-3 ^{*3} ⇅ ○ The operation is changed from that of standby system to that of control system (starting the update of transmission data).
↓ ⑦-1 A response is detected. • System switching request response (SB01D8): OFF → ON As necessary, check the following: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ⑥-1 The following relay and registers are set: • System switching request response (SB01D8): ON • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	△ ⇅ ○ ⑤-1 System switching to the control system The system switching request response is issued to the system A board.	↓ ④-4 ^{*3} The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
△ ⑦-2 The following relay is reset: • System switching request (SB000D): OFF	△ ⑥ The following relay is reset: • System switching request response (SB01D8): OFF	○ ⑤-2 The following relay is reset: • System switching notification (SB01D9): OFF	○ ⑥-2 A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

☞ Page 242 Program for requesting the system switching through a user program

*2 Refer to the following sample program to create a necessary user program:

☞ Page 240 Program for responding to the notification from a board

*3 Perform the processing in ④ within the following response monitoring time that is set.

· (System B) 'System switching response monitoring time for user program' (SW0014): When a timeout occurs, both systems are switched to the standby systems.

· (System A) 'System switching response monitoring time for the other system' (SW0015): When a timeout occurs, the system switching is abnormally completed in the system A board.

System switching due to reconnection

The following explains the processing of the system switching when reconnected from error status.

When both systems are reconnected from error status of the control system

The following shows the process in which the system B starts operating as the standby system after reconnection when both systems operate as control systems due to the network disconnection at two points.

■Automatic system switching (SW0017 ≠ 1)

When both systems are detected as control systems at reconnection, the system of system B is switched automatically.

The system switching is not notified to a user program from a board.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇓: System switching, —: Not changed, From ❶:

Processing procedure

System A		System B	
User program	Board	Board	User program
○ —	○ —	○ ❶ Both systems are detected as control systems at reconnection.	○ —
		○ ❷-1 ⇓ System switching to the standby system △ There is no error completion for the system switching due to reconnection.	↓ —
		↓ ❷-2 The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	↓ ❸-1 The following flag is detected: • Control system judgment flag (SB01EC): OFF → ON
		△ —	○ ❸-2 ⇓ The operation is changed from that of control system to that of standby system (stopping the update of transmission data). △

■Manual system switching (SW0017 = 1)

When both systems are detected as control systems at reconnection, the system B is switched to the standby system without waiting for the user program processing.

The system switching is performed in advance, and then the system switching notification and system switching cause are stored.

○: Control system operation, △: Standby system operation, ↓: Retained, ⇅: System switching, —: Not changed, From ❶: Processing procedure

System A		System B	
User program	Board	Board	User program*1
○ —	○ —	○ ❶ Both systems are detected as control systems at reconnection.	○ —
		⇅ ❷-1 System switching to the standby system	↓ —
		↓ ❷-2 The following relay and register are set: • System switching notification (SB01D9): ON • System switching notification cause (SW01D9)	↓ ❸-1*2 A notification is detected. • System switching notification (SB01D9): OFF → ON As necessary, check the following: • System switching notification cause (SW01D9)
		↓ ❷-3 The following registers are set: • System switching cause (SW01DA) • Cause of system switching error completion (SW01DB)	○ ❸-2*2 ⇅ The operation is changed from that of control system to that of standby system (stopping the update of transmission data). △
		↓ —	↓ ❸-3*2 The following relay and register are set: • System switching notification response details (SW000E) • System switching notification response (SB000E): ON
		△ ❹ The following relay is reset: • System switching notification (SB01D9): OFF	△ ❹ A notification is detected. • System switching notification (SB01D9): OFF The following relay is reset: • System switching notification response (SB000E): OFF

*1 Refer to the following sample program to create a necessary user program:

📄 Page 240 Program for responding to the notification from a board

*2 When not performing this processing, the system switching is not performed normally until 'System switching notification response' (SB000E) of the control system is turned ON.

User program error monitoring

The following shows the process flow and link special relay (SB) status when the function of user program error monitoring is enabled.

—: No Processing

No.	Processing procedure	User program	Operation notification from user program to board (SB0018)	Operation notification from board to user program (SB0118)	Board
1	Initial setting	Operation notification initialization	OFF	OFF	—
2	The operation notification of the user program is checked by the board every 100 ms.	—	OFF	OFF	Checking SB0018 Comparing SB0018 with SB0118 (SB0018 = SB0118)
3	The operation notification of the board is performed when the operation notification of the user program is detected.	—	OFF	ON	Turning ON SB0118 (SB0018 ≠ SB0118)
4	The operation notification of the board is checked by the user program.	Checking SB0118 Comparing SB0118 with SB0018 (SB0018 ≠ SB0118)	OFF	ON	—
5	The operation notification of the user program is performed within the timeout time.	Turning ON SB0018 (SB0018 = SB0118)	ON	ON	—
6	The operation notification of the user program is checked by the board every 100 ms, and the processing No. 2 to 5 are repeated.	—	ON	ON	Checking SB0018 Comparing SB0018 with SB0118 (SB0018 = SB0118)
		—	ON	OFF	Turning OFF SB0118 (SB0018 ≠ SB0118)
7	When an error occurs in the user program, the operation notification of the user program is not performed.	—	ON	OFF	Checking SB0018 Comparing SB0018 with SB0118 (SB0018 ≠ SB0118)

The board will be in a standby state during the timeout time, and if there is no operation notification of the user program after the timeout time has elapsed, it is considered as an error.

If the error monitoring is stopped or the operation notification of the user program is detected, it is considered as the normal condition.

System switching when a user program is detected

The following shows the overview of processing related to the system switching of both systems when a user program error is detected by the operation notification.

Error detection source	Control system		Standby system		Reference
	User program	Board	Board	User program	
Control system board	Operation stop	System switching to the standby system The system switching request is issued to the standby system board.	■Automatic system switching System switching to the control system	'Control system judgment flag' (SB01EC) is monitored, and the operation is switched.	Page 224 Automatic system switching (SW0017 ≠ 1)
			■Manual system switching The system switching notification is turned ON. The system is switched to the control system after the user program response.	'System switching notification' (SB01D9) is monitored, and the operation is switched.	Page 225 Manual system switching (SW0017 = 1)
Standby system board	Operating as the control system	'Other system switching disable status' (SB01E9) is turned ON.	The system switching disable notification is issued to the control system board.	Operation stop	—

Programming examples of user program

The following explains sample programs for the system switching, which are included in the software package.

Sample programs are stored in the following folder in the folder where the utility is installed.

\\MNETG\\SAMPLES\\CCIEC_NZ\\Eng\\VC\\REDUNDANT

Name	Description	Folder name	Reference
Sample program that executes user functions according to the system state	Types of the control system and standby system are judged and functions are executed according to the types.	redundant_system_sample	Page 236 Program for executing user functions according to the system state
Response of system switching notification	Processing for the system switching is performed by receiving the system switching notification from a board in the following cases: • Manual system switching when an error is detected • System switching due to request from a user program	redundant_system_switch_response	Page 240 Program for responding to the notification from a board
User program error monitoring	The user program error monitoring is enabled and the operation notification to a board is performed.	redundant_system_user_program_error_monitoring	Page 241 Program for user program error monitoring
Request of system switching from user program	The system switching request is performed at any timing.	redundant_system_switch_request	Page 242 Program for requesting the system switching through a user program



Sample programs are provided as a reference for creating user application programs.
Use the sample programs with your responsibility.

Usage of a sample program

To use a sample program, create an execution file in Visual Studio.

■Creating an execution file

This program is created as a console application.

1. Open a project file (*.vcxproj) stored in the sample program folder in Visual Studio.
2. Set settings to use the MELSEC data link library with Visual C++.

MELSEC Data Link Library Reference Manual

3. Build the sample program, and create the execution file.

■Executing a program

1. Execute the sample program, and enter data such as channel numbers according to the displayed contents.
2. Check the displayed execution result.

For details on input data and results, refer to the description of each sample program.

Program for executing user functions according to the system state

Types of the control system and standby system are judged and functions are executed according to the types.

Item	Description
Name	Sample program that executes user functions according to the system state
Folder name	redundant_system_sample
Overview of processing	The own station information and current system state are output to the console. SB/SW related to the board redundancy is acquired. When the system switching occurs, the system switching result and current system state are displayed. User functions for the control system or standby system are executed according to the system state.

Point

This program is a sample program that supports automatic system switching by system performed when an error such as the failure or disconnection of a board is detected.

When using manual system switching or the user program error monitoring function, refer to other sample programs for implementation.

■Procedure

1. Execute the sample program in personal computers of both systems.

2. Enter the channel number.

The own station information is displayed.

After the own system information is displayed, the user function according to the system state is executed.

When the system switching occurs, the system switching result and system information are displayed.

Point

Even if the system switching occurs during the user function execution, the system information output to the console and the user function switching according to the system state are not performed.

3. The program ends by entering the 'q' key.

Execution result	Description	Display example
Normal	A completion message is displayed.	'q' key input was detected. Terminating the program.
Error	When specifying a board where 'Redundant system judgment flag' (SB01EE) is OFF, an error message is displayed.	This board state is not redundant system.
	A name of the function with an error and its error code are displayed.	mdOpen error [ffffff8]

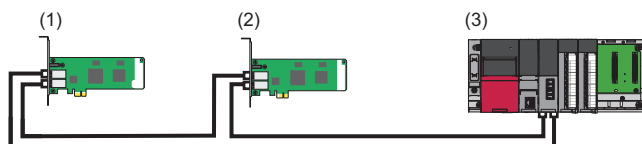
Point

When the system is switched, link device values may be sent to other stations before executing a user function for the control system on the new control system side. To avoid this issue, set the manual system switching, add the processing to a program to respond to notifications from this product, and update the link device values before the system switching.

■System configuration

The following figure shows the system configuration for user functions in this sample program.

Replace it with the actual system configuration for use as necessary.



(1) Control station (station No.1) of the redundancy target station: NZ81GP21-SX (system A board)

(2) Normal station (station No.2) of the redundancy target station: NZ81GP21-SX (system B board)

(3) Normal station (station No.3): RJ71GP21-SX

■Parameter settings

The following shows the parameter settings for user programs in this sample program.

Replace them with actual system for use as necessary.

Item			Setting	
			Control station (system A)	Normal station (system B)
Channel No.			151	151
Operational setting	Network type		CC IE Control(Control station)(R)	CC IE Control(Normal station)(R)
	Network No.		1	1
	Station No.		1	2
Network range assignment	Total stations		3	Same as the system A
	LB/LW settings(1)	Station No. 1	Start "00000" to End "001FF"	
		Station No. 2	Start "00000" to End "001FF"	
		Station No. 3	Start "00200" to End "003FF"	

For the normal station (station No.3), connect the engineering tool to a CPU module and set the following parameters.

Item			Setting	
Required Settings	Station Type	Station Type	Normal station	
	Network No.	Network No.	1	
	Station No.	Station No.	3	
Basic Settings	Refresh Settings	No. 1	■Link Side • LW • Start "00000" to End "003FF"	■CPU Side • Device • W • Start "00000"



For parameters other than above, use default settings.

For details on the parameter setting, refer to the following:

📖 Page 98 Parameter Setting

📖 MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)

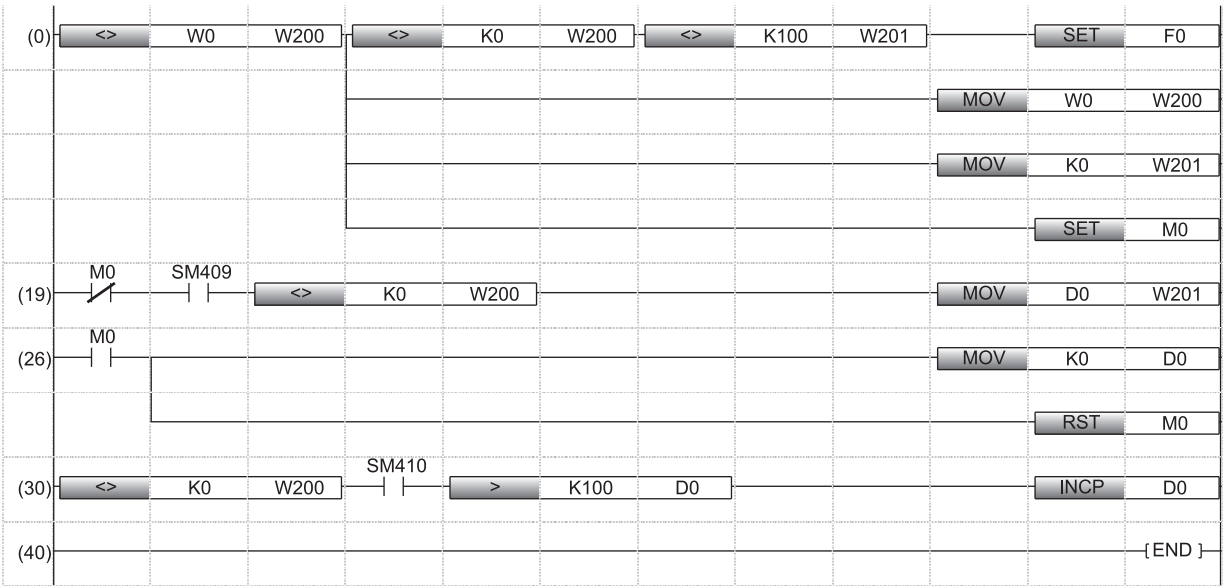
■Ladder program example

The following shows an example of the ladder program written to the CPU module of normal station (station No.3).

• Devices to be used

Device name	Device	Use
Special relay	SM409	10-millisecond clock
	SM410	100-millisecond clock
Link register	W0	Operation number
	W200	Operation number of processing in progress
	W201	Progress information
Data register	D0	Operation progress
Annunciator	F0	Occur operation number in progress is switched
Internal relay	M0	Operation number update flag

• Ladder program example



- (0) The operation number sent from the control system and that of processing in progress are monitored. If they are mismatched, the progress information is initialized.
- (19) The progress information is updated every 20 ms.
- (26) to (30) Processing is performed according to the operation number.
- (30) In this example, the progress information is incremented every 200 ms regardless of the operation number.

■User functions

The use of each link device for user programs in this sample program is as follows:

Link device	Use
LW0	Operation number
LW200	Operation number of processing in progress
LW201	Progress information

The following shows the overview of processing for each user function.

- User function for the control system

The following processing is performed using cyclic transmission between a user function for the control system and a ladder program of the normal station (station No.3).

—: Not changed by processing

Processing	Control system			Cyclic transmission	Normal station (station No.3)		
	LW0	LW200	LW201		LW0	LW200	LW201
1. The operation number of processing in progress (LW200) is read with a user function for the control system.	—	0	—	←	—	0	—
2. The operation number (LW0) is written with the user function for the control system.	0 → 1	—	—	→	1	—	—
3. The operation number of processing in progress (LW200) is updated by the CPU module of the normal station, and the processing starts.	—	1	—	←	—	0 → 1	—
4. The progress information (LW201) is updated by the CPU module of the normal station every 20 ms.	—	—	100	←	—	—	0 → 100
5. The next value to the operation number (LW0) is written with the user function for the control system when the progress information (LW201) is '100.'	1 → 2	—	—	→	2	—	—
6. The progress information (LW201) is returned to '0' and the operation number of processing in progress is updated by the CPU module of the normal station.	—	2	0	←	—	1 → 2	100 → 0
7. 4 to 6 are repeated. When the operation number of the processing completed reaches '10,' it is returned to '1.'							

- User function for the standby system

Only the processing to update the operation number (LW0) according to the operation number of processing in progress (LW200) is performed with a user function for the standby system.

—: Not changed by processing, ×: Not sent from the standby system

Processing	Standby system			Cyclic transmission	Normal station (station No.3)		
	LW0	LW200	LW201		LW0	LW200	LW201
1. The operation number of processing in progress (LW200) is read with a user function for the standby system.	—	2	—	←	—	2	—
2. The operation number (LW0) is updated with the user function for the standby system. LW0 is not sent to other stations since the system is operating as the standby system.	1 → 2	—	—	→ ×	—	—	—

A

Program for responding to the notification from a board

Processing for the system switching is performed by receiving the system switching notification from a board in the following cases:

- Manual system switching when an error is detected
- System switching due to request from a user program

Item	Description
Name	Response of system switching notification
Folder name	redundant_system_switch_response
Overview of processing	After the own system information is displayed, the waiting state is retained until 'System switching notification' (SB01D9) is turned ON. When the system switching notification is turned ON, 'System switching notification cause' (SW01D9) is displayed. Then, 'System switching notification response details' (SW000E) is set according to the user input and 'System switching notification response' (SB000E) is turned ON.

■Procedure

1. Execute a sample program.

2. Enter the channel number.

The own station information is displayed.

After the own system information is displayed, the waiting state is retained until 'System switching notification' (SB01D9) is turned ON.

3. When 'System switching notification' (SB01D9) is turned ON, follow the display and input the value of 'System switching notification response details' (SW000E).

The system switching notification response is performed according to the input.

4. The result is displayed.

Execution result	Description	Display example
Normal	A completion message is displayed.	System switching notification response completed.
Error	A name of the function with an error and its error code are displayed.	mdOpen error [ffffff8]

Program for user program error monitoring

The user program error monitoring is enabled and the operation notification to a board is performed.

Item	Description
Name	User program error monitoring
Folder name	redundant_system_user_program_error_monitoring
Overview of processing	The user program error monitoring is started or stopped.

■Procedure

1. Execute a sample program.
2. Enter the channel number.
3. Select the number of a test to be executed.

No.	Test name	Description
1	RsysUsrProgErrMon_Start	'Error monitoring setting between user program and board' (SW0018) is set and the user program error monitoring starts. The following processing is repeated: 1. 'Operation notification from user program to board' (SB0018) and 'Operation notification from board to user program' (SB0118) are checked. 2. If the ON/OFF states are different, that of 'Operation notification from user program to board' (SB0018) is changed. ■Considerations The loop process continues until the user program error monitoring is stopped by 'Error monitoring setting between user program and board' (SW0018). When the processing is forcibly terminated, a user program error is detected in a board.
2	RsysUsrProgErrMon_Stop	'Error monitoring setting between user program and board' (SW0018) is set and the user program error monitoring stops.

4. The result is displayed.

Execution result	Description	Display example
Normal	The start/stop of user program error monitoring is displayed. In the case of the start, it is displayed at the start, not when the test is completed.	• Start user program error monitoring. • Stop user program error monitoring.
Error	A name of the function with an error and its error code are displayed.	mdOpen error [ffffff8]

A

Program for requesting the system switching through a user program

The system switching request is performed at any timing.

Item	Description
Name	Request of system switching from user program
Folder name	redundant_system_switch_request
Overview of processing	After the own system information is displayed, 'System switching request' (SB000D) is turned ON by user input. Then, the program waits until 'System switching request response' (SB01D8) is issued.

■Procedure

1. Execute a sample program.

2. Enter the channel number.

The own station information is displayed.

3. Check whether the own station is the control system or the standby system in the own system information, and enter the system to be switched.

The system switching request is executed according to the input.

4. In the user program, turn ON 'System switching request response' (SB01D8).

Point

To perform the system switching requested through this program, a user program to return the response is required.

Refer to the following sample program:

 Page 240 Program for responding to the notification from a board

5. The result is displayed.

Execution result	Description	Display example
Normal	The values of "switching success" and 'System switching cause' (SW01DA) are displayed.	switching success [0000]
Error	■When an error occurs in a function A name of the function with an error and its error code are displayed. ■When the system switching fails The values of "switching error" and 'Cause of system switching error completion' (SW01DB) are displayed.	switching error [0006]

Point

When the own system is operating as the control system normally, and if an error occurs by executing this program, both systems operate as standby systems.

After checking the abnormal completion cause, execute this program again and switch the own system to the control system.

For details on corrective action when both systems are operating as standby systems, refer to the following:

 Page 80 Recovery from the state where both systems are standby systems

System switching time

System switching time refers to the time taken from when a system switching cause is detected until the new control system board starts operating as the control system.

Use the system switching time obtained from a calculation formula as a reference for the startup, and check the system switching time on the actual system.

The calculation formulas of the system switching processing time (maximum value) for the automatic system switching are as follows:

Cause	Calculation formula of system switching processing time
Disconnection of a board in the control system ☞ Page 216 Data link error	'Data link stop monitoring time for control system' (SW0016) of the standby system board + Link scan time + 100 ms
Stop error of a board in the control system ☞ Page 218 Stop error	
Power-OFF of a personal computer of the control system with an external power supplied*1 ☞ Page 220 When a personal computer of control system with external power is powered OFF	Link scan time × 4
Driver WDT error in the control system ☞ Page 222 When a driver WDT error is detected	Driver WDT monitoring time setting of the control system board + Link scan time × 4
User program error in the control system ☞ Page 224 When an error is detected using the user program error monitoring function	'Error monitoring setting between user program and board' (SW0018) of the control system board + Link scan time × 4

*1 The time until the personal computer is powered OFF, such as the time required for the Windows operating system to shut down, is not included.

SB/SW used for the board redundancy function

The following shows the SB/SW related to the board redundancy function.

For details on each SB/SW, refer to the following:

☞ Page 180 Link Special Relay (SB) List

☞ Page 190 Link Special Register (SW) List

SB/SW used for the system switching

■Controlling the system switching

Use	Device	Name	Description
System switching operation selection ^{*1}	SW0017	Automatic/manual system switching specification	The operation for the system switching by system is specified.
System switching prohibition ^{*1}	SB000F	System switching prohibition specification	The system switching prohibition for own system board is specified.
System switching notification	SB01D9	System switching notification	The system switching is notified to a user program when this device is turned from OFF to ON.
	SW01D9	System switching notification cause	The specification of the own system operation after the system switching and the cause are stored.
System switching notification response	SB000E	System switching notification response	This device is turned from OFF to ON when the processing for the system switching notification is completed.
	SW000E	System switching notification response details	The processing result for the system switching notification is stored.
System switching cause	SW01DA	System switching cause	The cause of system switching that has occurred in the own system board is stored.
	SW01DB	Cause of system switching error completion	The cause of abnormal completion of the system switching is stored when it is performed due to the system switching cause occurrence.
System switching through a user program	SB000D	System switching request	The system switching request to a board is performed when this device is turned from OFF to ON.
	SW000D	System switching request cause	Whether the own system operates as the standby system or the control system after the system switching is specified, and the system switching cause is stored.
	SB01D8	System switching request response	This device is turned from OFF to ON when the processing for the system switching request from a user program is completed.
Monitoring time setting ^{*1}	SW0014	System switching response monitoring time for user program	The monitoring time from when the system switching is notified to a user program until the response is returned is set.
	SW0015	System switching response monitoring time for the other system	The monitoring time from when the system switching is requested to the other system board until the response is returned is set.
	SW0016	Data link stop monitoring time for control system	When the own system is the standby system, the time from when the data link stop of the control system is detected until the system switching is performed is set.

^{*1} Enabled for the set board only. Set it for both systems.

■Checking the operating status

Use	Device	Name	Description
Redundant function information	SB01C0	Redundant system information	This device is turned ON when there is a redundant system station.
	SW01C0 to SW01C7	Redundant function information of each station	The redundant system supporting information of each station is stored.
Board redundancy setting Pairing setting	SB01E0	Setting status of board redundancy/redundant system pairing	This device is turned ON when a station where the board redundancy setting or pairing setting is set exists.
	SW01E0 to SW01E7	Setting status of board redundancy/redundant system pairing for each station	The setting status of board redundancy setting or pairing setting of each station is stored.
System switching prohibition System switching disablement	SB01E8	Own system switching prohibited status	This device is turned ON when the system switching of own system board is prohibited.
	SB01E9	Other system switching disable status	This device is turned ON when the system switching of the other system board is disabled.
System judgment	SB01EA	System A judgment flag	This device is turned ON when the own system board is the system A.
	SB01EB	System B judgment flag	This device is turned ON when the own system board is the system B.
	SB01EC	Control system judgment flag	This device is turned ON when the own system board is the control system.
	SB01ED	Standby system judgment flag	This device is turned ON when the own system board is the standby system.
	SB01EE	Redundant system judgment flag	This device is turned ON when the own system board is the redundant system.
	SB01F0	Standby system state of redundant system	This device is turned ON when there is a standby system station.
	SW01F0 to SW01F7	Redundant system state of each station	The system state of each station (control system/standby system) is stored.

SB/SW used for the user program error monitoring

Use	Device	Name	Description
User program error monitoring	SW0018	Error monitoring setting between user program and board	Whether to enable or disable the user program error monitoring and the timeout time are set.
	SB0018	Operation notification from user program to board	A bit for the operation notification from a user program to a board for user program error monitoring. An operation notification is sent by matching the ON/OFF state of 'SB0018' with that of 'SB0118' on the user program side.
	SB0118	Operation notification from board to user program	A bit for the operation notification from a board to a user program for user program error monitoring. An operation notification is sent by inverting the ON/OFF state of 'SB0118' based on that of 'SB0018' on the board side.

A

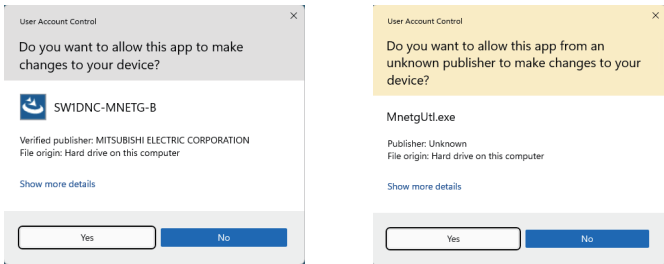
Appendix 10Windows User Account Control

The user account control (UAC) is provided to protect the system from being destroyed (e.g. prevention of start-up of a program which will execute an unintended operation).

Confirmation message

When enabling the user account control function, a message for the user account control appears at the following timings:

- Installing/uninstalling a software package
- Starting the CC IE Control utility



When a message appears, click the [Yes] button.

Methods for displaying a message

If a software package cannot be installed or if a message for the user account control does not appear when starting the CC IE Control utility, enable the user account control setting by the following procedures.

Method for enabling the user account control function

1. Open the "Local Security Policy" screen on Windows.
It appears by entering 'secpol.msc' in the "Run" screen that appears by pressing the Windows key + [R].
2. Set the slide bar to an item other than "Never notify" and click the [OK] button.

Method for setting the local security policy

1. Select [System and Security] ⇒ [Windows Tools] ⇒ [Local Security Policy] in the control panel of Windows.
2. Select [Local Policies] ⇒ [Security Options] in the "Local Security Policy" screen.
3. Set the following policies:

Policy	Security setting
User Account Control: Detect application installations and prompt for elevation	Enabled
User Account Control: Run all administrators in Admin Approval Mode	Enabled
User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode	Prompt for consent for non-Windows binaries

Appendix 11 Behavior When Entering Power Save Mode or Enabling Fast Startup

This board does not support the power save mode (hibernate, sleep) and the fast startup. This section explains the behavior of a board on each function.

Behavior when entering the power save mode (hibernate, sleep)

Behavior when entering the hibernation/sleep mode

The following explains the behavior of a board when a personal computer enters the power save mode (hibernate, sleep).

- The board stops its operation and is disconnected from the network.
- The board is not reconnected even after the personal computer returns from the power save mode (hibernate, sleep).
- After the return from the power save mode (hibernate, sleep), "-28141(9213H) System sleep error" occurs when accessing the board from the utility or an application program, which includes MELSEC data link library function.

Corrective action

When the personal computer is set to enter the power save mode (hibernate, sleep), the setting is changed by MELSECPowerManager.

For details on MELSECPowerManager, refer to the following:

 Page 248 MELSECPowerManager

Behavior when the fast startup function is enabled

Behavior when enabling the fast startup

The following explains the behavior of a board when the fast startup is enabled.

- The board is not reconnected even after the fast startup.
- After the fast startup, "-28141(9213H) System sleep error" occurs when accessing the board from the utility or an application program, which includes MELSEC data link library function.

Corrective action

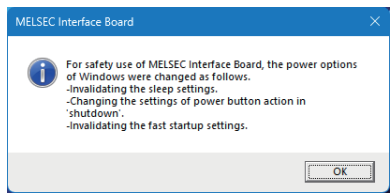
When the fast startup function is enabled, the setting is changed by MELSECPowerManager.

For details on MELSECPowerManager, refer to the following:

 Page 248 MELSECPowerManager

Appendix 12MELSECPowerManager

MELSECPowerManager is a service application which monitors the Windows Power Options settings every 30 seconds to prevent a personal computer from entering the power save mode (hibernate, sleep) or enabling the fast startup function. When a personal computer is set to enter the power save mode (hibernate, sleep) or the fast startup function is enabled, the following message appears and the setting is changed by MELSECPowerManager.



Installing MELSECPowerManager

MELSECPowerManager is installed automatically when installing the software package. The operation starts after restarting the operating system.

Uninstalling MELSECPowerManager

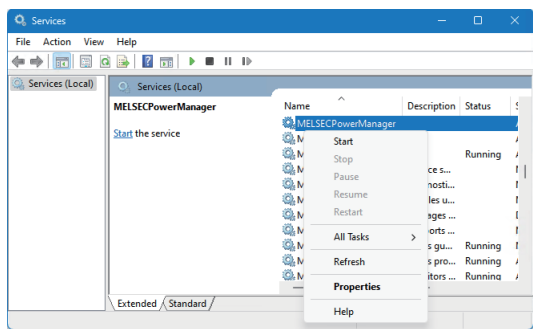
MELSECPowerManager is uninstalled automatically when uninstalling the software package. However, MELSECPowerManager cannot be uninstalled when other Mitsubishi Electric network interface boards are installed in a personal computer. Uninstall all the software packages on the personal computer to uninstall it.

Checking MELSECPowerManager

MELSECPowerManager can be checked by selecting [Windows Tools] ⇒ [Services] in Windows. Check that "MELSECPowerManager" is displayed and "Running" is displayed under "Status."



- When MELSECPowerManager is disabled, the personal computer may enter the power save mode (hibernate, sleep) automatically depending on its settings. Do not disable MELSECPowerManager because a board does not operate properly if the personal computer enters the power save mode (hibernate, sleep). For the behavior of the board when the personal computer enters the power save mode (hibernate, sleep) or the fast startup is enabled, refer to the following:
☞ Page 247 Behavior When Entering Power Save Mode or Enabling Fast Startup
- If MELSECPowerManager is disabled accidentally, select and right-click "MELSECPowerManager" in the "Services" screen, then select [Start] from the shortcut menu.



Appendix 13Unusable Character Strings (Reserved Words)

This section shows the characters and character strings that cannot be used due to the specifications of an operating system or the utility of this product.

For Windows reserved words, there may be other case that they cannot be used as names depending on an operating system version.

Precautions

Reserved words are not case-sensitive.
In addition, they cannot be used regardless of the language of an operating system.

Unusable character strings for file names and path names

Category		Character string
Invalid character	Symbol	", *, /, :, <, >, ?, \, , environment dependent characters
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0 to U+00BF, U+FFFE, U+FFFF
Windows reserved word		COM0, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT0, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL

- File names with spaces only cannot be used.
- A period (.) cannot be used at the end of a file name.

Appendix 14 Added and Changed Function

This section explains the function change and update method.

For the method for checking the version, refer to the following:

 Page 169 Checking Production Information and Firmware Version

Change of hardware function

There is no change on functions of this board.

Update of software package

For details of the updated version of software and the functions which are added or changed, please contact your local Mitsubishi Electric sales office or representative.

Firmware update

The firmware of a board installed in a personal computer can be updated by using Firmware Update Tool.
Obtain a firmware update file corresponding to a model to be updated in advance, store it in a folder on a personal computer.

Precautions

Check the system operation before and after the update.

When there is any error for the system operation after the update, revert the firmware to a previous version.

If the software package is also updated, revert it to a previous version.

Target models

- NZ81GP21-SX
- NZ81GP21S-SX

Obtaining a firmware update file

Please contact your local Mitsubishi Electric sales office or representative.

Unzip an obtained firmware update information (ZIP file).

The file name of a firmware update file is mmmm_vv.SYF.

'mmm' and 'vv' indicate a model name and a firmware version, respectively.

Precautions

- Check the file name so that the firmware update file matches the target model. If they do not match, the firmware cannot be updated.
- Do not change the file name of a decompressed firmware update file.

Update method

■Preparation

1. Store a firmware update file in a folder on a personal computer.

Make sure that the total number of characters for the path name and file name of the firmware update file is 259 or less.

2. Update the software package to the latest version.

☞ Page 250 Update of software package

3. Install a board on a slot of the personal computer.

4. Set a channel number and check it by using the utility.

5. Set the board in "Target board specification" of the parameter.

6. Stop a user program.

Precautions

- Stop user programs and separate a board from the system by disconnecting cables not to affect the system. Then, perform the firmware update again.
- Stop access to a target device the firmware of which is to be updated with the CC IE Control utility, device monitor utility, or MELSEC data link library function. '-26334 (9922H) reset execution error/firmware update execution error' is returned when accessing the target device during a firmware update file is being transferred.

■Starting Firmware Update Tool

1. Select [Firmware Update Tool] from the system menu in the CC IE Control utility.

Firmware Update Tool starts.

No.	Select	Module Name	Channel No.	File Transfer Progress	Firmware Update Progress	Firmware Version	Result	Error Code
1	☒		151	0%	0%			
2	☐		152	0%	0%			
3	☐		153	0%	0%			
4	☐		154	0%	0%			

*The target boards are reset after the firmware update is completed. Please check that they start normally.

Check Board Status Start Update

Precautions

- If the channel number is duplicated, Firmware Update Tool does not start.
- Multiple pieces of Firmware Update Tool cannot be started.

■Performing firmware update

1. Click the [Firmware Update File] button.

Enter or select an obtained firmware update file.

2. Click the [Check Board Status] button.

For a board that can be accessed to update its firmware, "Firmware Update is available." is displayed in "Result."

It is also displayed for a board the version of which cannot be changed with the set file.

3. Select the checkbox of "Select" for a board to be updated.

Select a board after checking the following:

- Compare "Firmware Update File Ver." and "Firmware Version" of each board, and check if they need to be changed.
- Make sure that the model name of the file name of the firmware update file and "Module Name" of the board match.

4. Click the [Start Update] button.

■Behavior during firmware update

The following processing is performed when starting the firmware update.

It is processed for each board with the checkbox selected in order of "No."

1. A target board enters the offline mode.

During the firmware update, the target board is set to offline mode regardless of the parameter setting.

All LEDs of a board being updated are turned OFF.

2. The firmware update is performed.

File Transfer Progress	Firmware Update Progress	Firmware Version	Result
0%	0%		Failure
100%	40%		

- The firmware update file is transferred to the board.

The progress rate is displayed in "File Transfer Progress."

- The firmware update is performed.

The progress rate is displayed in "Firmware Update Progress."

When the firmware update is completed normally, "Success" is displayed in "Result."

If an error occurs during the firmware update, "Failure" is displayed in "Result."

Even if the update fails, the one for the next board will be processed.

The result is also registered in the system log of Event Viewer as the information event log. ( Page 140 Information event)

3. After the processing for all boards is completed, a board updated normally is automatically reset and enters the mode before the firmware update.

Precautions

- Do not forcibly terminate Firmware Update Tool while the firmware is being updated. Otherwise, the firmware update may be interrupted and the board may not operate properly. In this case, reset the board and perform the firmware update again.
- When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.
 - Turning OFF the power of a personal computer
 - Restarting an operating system
 - Resetting a board
 - Installing/uninstalling a board

When an error occurs, refer to the following:

 Page 151 An error has occurred when terminating the process during the firmware update

■When firmware update fails

Check the error code and perform the firmware update again.

For details on error codes, refer to the following:

 Page 150 An error has occurred when updating the firmware

Change of a board or personal computer

The following shows the procedures for changing a board or personal computer.

The parameter setting before change can be used by saving it to a file then writing it to a board after change.

Saving the setting before change

1. Start the CC IE Control utility. (☞ Page 88 Starting the CC IE Control utility)
2. Display the "Parameter setting" screen. (☞ Page 98 Parameter Setting)
3. Save the parameters to a file. (☞ Page 92 Saving a file)
4. Check and take note of the channel number of each board. (☞ Page 94 Checking method for a channel number)
5. End the CC IE Control utility. (☞ Page 88 Ending the CC IE Control utility)

Removing a board

When replacing a board, uninstall the board.

1. Power OFF.

Turn the power of a personal computer OFF.

If an external power is supplied, turn the external power OFF and remove the wiring. (☞ Page 43 External power supply cable)

2. Remove the board-fixing screws.
3. Uninstall the board from a slot of the personal computer.

Changing a board or personal computer

■Updating an operating system

1. Uninstall the software package (SW1DNC-MNETG-B). (☞ Page 33 Uninstallation procedure)
2. Upgrade or update the operating system.
3. Install the software package (SW1DNC-MNETG-B) with the version supporting the changed operating system. (☞ Page 29 Installation procedure)

Be sure to check the operation after the installation.

■Replacing a board with another one

1. Install a board. (☞ Page 37 Board Installation)
2. Start the CC IE Control utility. (☞ Page 88 Starting the CC IE Control utility)
3. Set a channel number. (☞ Page 94 Channel Number Setting)
4. Test the installed board for any errors. (☞ Page 39 Tests before Wiring (Board communication test))

■Installing a board in another personal computer

1. Install the software package (SW1DNC-MNETG-B). (☞ Page 29 Installation procedure)
2. Install a board. (☞ Page 37 Board Installation)
3. Start the CC IE Control utility. (☞ Page 88 Starting the CC IE Control utility)

Writing the setting before change

1. Start the CC IE Control utility. (☞ Page 88 Starting the CC IE Control utility)
2. Set a channel number. (☞ Page 94 Channel Number Setting)

The channel number may be changed due to the automatic assignment.

Set the same channel number to each board as when parameters are saved to a file.

3. Display the "Parameter setting" screen. (☞ Page 98 Parameter Setting)
4. Read the parameters from a file, and write them to the board. (☞ Page 92 Loading a file)

Changing a board or a user program of the board redundancy function

The following shows the procedures for replacing a board or a user program while operating a system using the board redundancy function.

For the procedure not related to the board redundancy function, follow the steps of the normal procedure.

Replacing a board

The following shows the procedure for replacing a board while operating the control system.

1. Check the system state of a board to be replaced.

It can be checked in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility of a personal computer with the board installed.

 Page 116 When selecting a station where settings for the redundant system and the link point extension are set

2. If the board is operating as the control system, switch it to the standby system by the system switching from a user program.

 Page 80 System switching through a user program

3. Stop the following user programs and each utility.

- A program executed on a personal computer with the board to be replaced
- A program accessing (performing transient transmission with) the board to be replaced

4. Remove the wiring of the board to be replaced.

 Page 42 Wiring methods

5. Replace the board.

 Page 254 Change of a board or personal computer

6. Wire cables between the replaced board and each station.

7. Diagnose the board and network.

Check that there is no error in the "Board detail information" screen of the CC IE Control utility.

 Page 97 Board detail information

Check whether cables are connected properly and a communication is normally established based on the set parameters in network diagnostic.

 Page 111 CC-Link IE Controller Network diagnostics

8. Execute the user programs and each utility which are stopped.

Replacing a user program

The following shows the procedure for replacing a user program while operating the control system.

Precautions

As the standby system does not send cyclic data to other stations during its operation, the operation involving other stations cannot be checked with the procedure in this section.

Make sure to stop the board redundant system and check the operation in the control system when writing link devices, changing the data to be written, and checking the operation of the user program involving other stations.

Point

It is recommended to set the system switching prohibition in order to prevent the user program from starting to operate as the control system at an unintended timing due to the system switching performed by the system when an error occurs in the control system board.

- Turn ON 'System switching prohibition specification' (SB000F) of both systems before performing the procedure.
- If the board is reset during the procedure, turn ON 'System switching prohibition specification' (SB000F) again after the reset.
- Turn OFF 'System switching prohibition specification' (SB000F) of both systems after performing the procedure.

The system switching from a user program can be performed even if the system switching prohibition is set.

1. Check the system state of each board.

It can be checked in the "CC-Link IE Controller Network diagnostics result" screen of the CC IE Control utility of a personal computer with the board installed.

 Page 116 When selecting a station where settings for the redundant system and the link point extension are set

2. Replace a user program in the standby system.

Check the operation of the replaced user program.

3. Switch a standby system board to the control system.

Prepare the system switching in user programs of both systems.

Perform the system switching from a user program.

 Page 226 System switching through a user program at any timing

4. Check that the control of the system is started by the replaced user program.

5. Replace a user program in the standby system after the system switching.

Check the operation of the replaced user program.

6. As necessary, restore the control system/standby system to its original state.

Prepare the system switching in user programs of both systems.

Perform the system switching from a user program.

7. Diagnose the board and network.

Check that there is no error in the "Board detail information" screen of the CC IE Control utility.

 Page 97 Board detail information

Check whether cables are connected properly and a communication is normally established based on the set parameters in network diagnostic.

 Page 111 CC-Link IE Controller Network diagnostics

INDEX

0 to 9

32-bit data assurance 54

B

Block data assurance per station 54,105
Board 1 to 4 97
Board detail information 97
Board information screen 90

C

Channel number 17,38,94
Communication status 96,183
Communication test 117
Communication using LB and LW 49
Communication using LX and LY 50
Connector detaching tool 42
Connector specifications 35
Constant link scan 56,105

D

Device Manager 138

E

Error clear 122
Error code 97,161
Error log 93,121
Event Viewer 139
Extended mode 57
External dimension 36,167
External power supply function 66

F

Firmware version 97
Forced link start 119

G

Group specification 100,101,119

I

Information event log 140
Internal current consumption 36

L

LB/LW setting 102
LED 17,136
Link points extend setting 57,100
Link refresh 51
Link refresh time 97
LX/LY setting 102

M

Maximum link points per network 35

Maximum link points per station 35
Maximum number of transients in one station . . . 105

N

Network type 100,101
Noise filter 172

O

Operating environment 25
Optical fiber cable 40
Optical fiber specifications 35

P

Punctuality assurance 105

S

Saving file 91
Specification of the number of transient transmissions
56

V

Version 90

MEMO

REVISIONS

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

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 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
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TRANSLATION OF THE ORIGINAL INSTRUCTIONS

SH(NA)-082712ENG-C(2605)

MODEL: CCIECBD-U-E

mitsubishi electric corporation

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NAGOYA WORKS: 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA 461-8670, JAPAN

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