

Ethernet Based Open Network
CC-Link IE Compatible Product Development Reference Manual

CC-Link **IE** **F**ield

CC-Link IE Field Network
Q80BD-J71GF11-T2/Q81BD-J71GF11-T2
Driver Development

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.

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 of 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.

Keep this manual and the relevant manuals introduced in this manual in a safe place for future reference.

[Design Precautions]

 WARNING
• Provide safety circuits external to the board to ensure that the entire system operates safely even when a fault occurs in the host where the board is mounted. Failure to do so may result in an accident due to incorrect output or malfunction. (1) Construct circuits, such as an emergency stop circuit, protection circuit, interlock circuit for reciprocal operations such as forward and reverse, and interlock circuit for positioning upper and lower limits to prevent damage to the equipment, external to the board. (2) If the station in which the board is mounted is disconnected from the data link due to a data link error, the data output from that station and written in other stations will remain the same as immediately before the error occurred in the data link. This data will be retained until the data link for that station is resumed (returned to system). Provide a mechanism to monitor the data link status and handle data link errors for each station that is connected to the data link system. • For the operating status of each station after a communication failure, refer to the CC-Link IE Field Network Interface Board User's Manual (For SW1DNC-CCIEF-B) (SH-080980ENG). Incorrect output or malfunction due to 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 operates safely. Additionally, in the case of a data communication error, determine the system corrective actions to be taken between the board and the other station. • Do not write data to memory areas used by the product (PCI configuration area, 2-port memory area, register area) that are described as "not applicable". • In a case where data is written to an area described as "not applicable", the risk arises that a host in which the board is mounted may malfunction. To prevent this, configure an interlock circuit outside the board when executing data changes and status control with respect to the board, to ensure that the entire system will always operate safely.

[Design Precautions]

 CAUTION
• Do not bunch the power supply or communication cables with the main circuit or power wires, or install them close to each other. Keep a distance of 100 mm or more between them. Failure to do so may result in malfunction due to noise.

[Security Precautions]

 CAUTION
• To maintain the security (confidentiality, integrity, and availability) of 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
• Be sure to shut off all phases of the external power supply used by the system before installing or removing the board. If all power is not turned off, power supply or board failure or malfunctioning may result. • Do not touch any connectors while power is on. Doing so may cause electric shock or malfunction.

[Installation Precautions]

CAUTION

- Use the board in an environment as described in the general specifications in the "CC-Link IE Field Network Interface Board User's Manual (For SW1DNC-CCIEF-B)". Use of the board in an environment outside the ranges described in the general specifications results in the risk of electric shock, fire, malfunction, and product damage or deterioration.
- Do not directly touch any conductive part or electronic component of the board. Doing so can cause malfunction or failure of the board.
- Do not disassemble or modify the board. Doing so can cause failure, malfunction, injury, and/or fire.
- Fasten the board securely using the board installation screws and tighten the installation screws securely within the specified torque range. If the screws are too loose, the board may fall, short circuit, or malfunction. If the screws are too tight, the screws or board may become damaged, causing the board to fall, short circuit, or malfunction.
- For the tightening torque of the board installation screws, refer to the user's manual provided with your personal computer.
- Before touching the board, be sure to touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Or, discharge the static electricity using a static electricity band or the like. Failure to do so can cause failure or malfunction of the board.
- Mount the board to a personal computer that complies with the PCI standards or the PCI Express[®] standards corresponding to the board. Failure to do so can cause malfunction or failure.
- Securely mount the board to a PCI slot or a PCI Express[®] slot in accordance with the board mounting method of the personal computer. Improper mounting can cause the board to malfunction, fail, or fall.
- When mounting the board, take care not to touch another board.
- When mounting the board, take care not to get injured by the components that are installed or surrounding members.
- Handle the board in a location where there is no static electricity. Failure to do so can cause failure or malfunction.
- The board is packed in a bag for preventing static electricity. Always place the board in this bag during storage or transport. Failure to do so may cause failure or malfunction.
- Do not drop or apply a strong impact to the board. Doing so can cause failure or malfunction.

[Wiring Precautions]

WARNING

- Be sure to shut off all phases of the external power supply used by the system before performing work such as installation and wiring. Failure to do so results in the risk of electric shock, product damage, and malfunction.
- When turning on the power and operating the module after having installed the board and doing the wiring, always attach the cover for the device module in which the board is installed. Failure to do so results in risk of electric shock.

[Wiring Precautions]

CAUTION

- Be sure to fix communication cables connected to the board by placing them in a duct or clamping them. If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the board or cables, or malfunctions due to poor cable connection.
- When disconnecting the cable connected to the board, do not pull the cable by the cable part. Pulling the connected cable may result in malfunction or damage to the board or cable.
- Prevent foreign matter such as dust or wire chips from entering the board. Such foreign matter may cause fire, failure, or malfunction.
- Do not bunch the communication cables with the main circuit or power wires, or install them close to each other. Keep a distance of 100 mm or more between them. Failure to do so may result in malfunction due to noise.
- Securely connect the communication cables with the connectors of the board. Then, check for any incomplete connection. Poor contact may cause erroneous input or output.
- Be sure to ground the host in which the board is mounted with a ground resistance of 100 ohms or less. Failure to do so results in the risk of malfunction.

[Disposal Precautions]

CAUTION

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

Notice for Safety Design

(Read before using this product.)

- Mitsubishi Electric Corporation (Mitsubishi) puts the maximum effort into making its products better and more reliable, but there is always the possibility that product failure or malfunction may occur. Failure or malfunction of Mitsubishi products may lead to personal injury, fire, and/or property damage. Remember to give due consideration to safety when making your designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material, or (iii) prevention against any malfunction or mishap.

Notes Regarding This Manual

(Read before using this product.)

- This manual is intended as a reference to assist our customers in the development of CC-Link family products best suited to the customer's application; it does not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi in relation to the technical information described herein.
- When using any or all of the information contained in this manual, including product data, technical information in diagrams and charts, programs, and algorithms, please be sure to evaluate all information not only in terms of the technical details, programs, or algorithms, but as a total system before making a final decision on the applicability of the information and products. Mitsubishi assumes no responsibility for inapplicability.
- Mitsubishi assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in this manual.
- The precautions given in this manual are concerned with this product only. For the safety precautions of the system, refer to the user's manuals for the products used.
- All information contained in this manual, including product data, diagrams, charts, programs, and algorithms, represents information on products at the time of publication of this manual; the items and specifications described herein are subject to change by Mitsubishi without notice. Please consult your local Mitsubishi Electric representative for the latest product information before purchasing a Mitsubishi product.
- The prior written approval of Mitsubishi is necessary to reprint or reproduce this manual in whole or in part.
- If you have any questions or concerns regarding the details described in this manual, consult your local Mitsubishi Electric representative.

Conditions of Use for the Product

- (1) Mitsubishi personal computer board ("the PRODUCT") shall be used in conditions;
- i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
 - ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.
- (2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries. MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
- ("Prohibited Application")
- Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
 - Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
 - Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.
- Notwithstanding the above restrictions, Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTS are required. For details, please contact the Mitsubishi representative in your region.
- (3) Mitsubishi shall have no responsibility or liability for any problems involving system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

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Related Manuals

This manual does not include CC-Link IE Field Network details such as terminology and functions.
For the details, please refer to the following manuals.

Manual name [manual number]	Description
CC-Link IE Field Network Interface Board User's Manual (For SW1DNC-CCIEF-B) [SH(NA)-080980ENG]	Specifications, procedures before operation, system configuration, settings, functions, programming, and troubleshooting of the CC-Link IE Field Network interface board
MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual [SH(NA)-080917ENG]	Overview of the CC-Link IE Field Network, and specifications, procedures before operation, system configuration, installation, wiring, settings, functions, programming, and troubleshooting of the MELSEC-Q series CC-Link IE Field Network master/local module
SLMP Reference Manual [SH(NA)-080956ENG]	Protocol (SLMP) used by external devices to read/write data from/to SLMP-compatible devices

Terms

Unless otherwise specified, this manual uses the following terms.

Term	Description
Baton pass	A token to send data over a network
Buffer memory	Memory in a CC-Link IE Field Network compatible device, where data (such as setting values and monitoring values) are stored
CC IE Field utility	A name for the utility included in the SW1DNC-CCIEF-B CC-Link IE Field Network software package
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices (RX and RY)
Device	A device (X, Y, M, D, or others) in a programmable controller CPU module, or memory in a host, where data communicated with the board are stored
Disconnection	A process of stopping data link if a data link error occurs
Driver	Software created based on this manual. The driver accesses the board from the host and performs cyclic transmission and transient transmission.
End user	A purchaser and user of CC-Link family compatible products developed by users
Error invalid station	A slave station that cannot be detected by the master station as a faulty station even when the station becomes disconnected during a data link
Host	A computer with PCI board or PCI Express board
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with the master station by cyclic transmission. Transient transmission can also be performed in the intelligent device station. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station.
Link device	A device (RX, RY, RWw, or RWr) in a module and a board on CC-Link IE Field Network
Link refresh	Data transfer between link devices of CC-Link IE Field Network board and the driver
Link scan time	Time required for all the stations on the network to send data. The link scan time depends on data volume and the number of transient transmissions.
Link special register (SW)	Word data that indicates the operating status and data link status of a module or board on CC-Link IE Field Network
Link special relay (SB)	Bit data that indicates the operating status and data link status of a module or board on CC-Link IE Field Network
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations. This station receives data, RX, RY, RWr, and RWw, of other slave stations by cyclic transmission.
Loopback	A function that disconnects the station in which an error has occurred, and continues data link with the stations that are operating normally. Stations connected after the faulty station can also continue data link.
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
Other station	A station other than the own station
Own station	A host that operates as the master station or a local station using a driver to be developed based on this manual

Term	Description
Remote device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with the master station by cyclic transmission. This station responds to a transient transmission request from another station.
Remote I/O station	A station that exchanges I/O signals (bit data) with the master station by cyclic transmission
Remote input (RX)	Bit data input from a slave station to the master station
Remote output (RY)	Bit data output from the master station to a slave station
Remote register (RW _r)	Word data input from a slave station to the master station
Remote register (RW _w)	Word data output from the master station to a slave station
Reserved station	A station reserved for future use. This station is not actually connected, but counted as a connected station.
Return	A process of restarting data link when a station recovers from an error
Slave station	Stations other than a master station: local station, intelligent device station, remote device station, and remote I/O station
Station number	An identifier for uniquely identifying a node in the network. The term, node number, is used with the same meaning.
SW1DNC-CCIEF-B	Mode name of the software package for the CC-Link IE Field Network board. It can be downloaded from the Mitsubishi Electric FA website.
Transient transmission	A function of communication with another station, which is used when requested by a user application
User	A manufacturer who develops and sells CC-Link family compatible products based on this manual. The term, vendor, is used with the same meaning.

Generic Terms and Abbreviations

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

Generic term/abbreviation	Description
Board	A generic term for a PCI board and a PCI Express board
Data link	A generic term for cyclic transmission and transient transmission
Master/local module	An abbreviation for the QJ71GF11-T2 and LJ71GF11-T2 CC-Link IE Field Network master/local module
PCI board	An abbreviation for the Q80BD-J71GF11-T2 CC-Link IE Field Network interface board
PCI Express board	An abbreviation for the Q81BD-J71GF11-T2 CC-Link IE Field Network interface board
RAS	An abbreviation for Reliability, Availability, and Serviceability. This term refers to usability of automated equipment.
SLMP	An abbreviation for Seamless Message Protocol. This is a protocol used to access an SLMP-compatible device or a programmable controller connected to an SLMP-compatible device from an external device.

Usage Precautions

- (1) The sample code described in this manual is for the Q80BD-J71GF11-T2/Q81BD-J71GF11-T2 CC-Link IE Field Network interface board developed by Mitsubishi Electric. The sample code indicates an example of use of the materials herein; its operation is not guaranteed by Mitsubishi Electric.
- (2) Before using the sample code, check the "END-USER SOFTWARE LICENSE AGREEMENT" (BCN-P5999-1690).
The document can be viewed on the Mitsubishi Electric FA website.
- (3) The intellectual property rights of the information provided on the CD-ROM belong to Mitsubishi Electric. Reprinting the information without the consent of Mitsubishi Electric and reproduction of the information for any purpose other than the development of an OS-compatible driver is prohibited. Distribution of a product (object code or the like) after sample code compilation, however, is unrestricted.

Address Notation

This manual uses byte addresses, unless otherwise specified.

Radix Notation

This manual uses the following radix notation, unless otherwise specified.

Radix	Description	Example
Binary	"b" is added at the end of the number to indicate bit.	"0b"
Decimal	Nothing is added at the end of the number.	"0"
Hexadecimal	"h" is added at the end of the number to indicate hexadecimal.	"10BAh"

CC-Link Partner Association (CLPA)

(1) Specifications

The materials related to this manual include the specifications published by the CC-Link Partner Association below. For CC-Link IE Field Network details, download and refer to the "CC-Link IE Field Network Specification" from the CC-Link Partner Association website.

Document Title	Document No.
CC-Link IE Field Network Specification (Overview)	BAP-C2005-001
CC-Link IE Field Network Specification (Physical Layer and Data Link Layer)	BAP-C2005-002
CC-Link IE Field Network Specification (Application Layer Service)	BAP-C2005-003
CC-Link IE Field Network Specification (Application Layer Protocol)	BAP-C2005-004
CC-Link IE Field Network Specification (Communication Profile)	BAP-C2005-005
CC-Link IE Field Network Specification (Implementation Rules)	BAP-C2005-006
CC-Link IE Field Network Specification (Device Profile)	BAP-C2005-007
SLMP Specification (Overview)	BAP-C2006-001
SLMP Specification (Services)	BAP-C2006-002
SLMP Specification (Protocol)	BAP-C2006-003

(2) Inquiries

To request materials published by the CC-Link Partner Association (CLPA) and for conformance test details, please contact the following:

TEL: +81-52-919-1588
FAX: +81-52-916-8655
E-mail: info@cc-link.org
Web: <http://www.cc-link.org/>

1. Overview

This manual is a reference manual that describes how to develop a driver compatible with various operating systems for Q80BD-J71GF11-T2/Q81BD-J71GF11-T2 type CC-Link IE Field Network interface board.

The main information included in this manual is as follows:

- Hardware information (Memory map such as PCI configuration area and 2-port memory area)
- Software information (Processing such as initial processing, cyclic transmission processing and transient transmission processing)

Developing a driver allows the host in which any of a variety of operating systems is mounted to perform cyclic transmission and transient transmission as a master station or local station.

The enclosed CD-ROM includes sample codes describing examples of processing required as a master station or local station.

1.1. Function Overview and Performance Specifications

(1) Function Overview

The following table lists the function availability of the driver to be developed based on this manual and the Windows driver included with the SW1DNC-CCIEF-B.

For details on each function, refer to the user's manual of the board.

Table 1.1-1 Function Availability (As of March 2021)

Function			Driver to be developed		Windows driver	
			Master station	Local station	Master station	Local station
Cyclic transmission function	Communications with other stations	Communication by RX and RY	○	○	○	○
		Communication by RWw and RWr	○	○	○	○
	Link refresh		△	△	○	○
	Mode selection for cyclic transmission		○	×	○	×
	Link scan mode setting (constant link scan only)		○	○	○	○
	Assurance of cyclic data integrity		○	○	○	○
	Input status setting for data link faulty station		○	○	○	○
	Cyclic transmission stop and restart		○	○	○	○
Transient transmission function	Communications within the same network	Communication by MELSEC data link library function	×	×	○	○
		CC-Link compatible transient or SLMP transient	○	○	×	×
	Seamless communications with different networks		×	×	○	○
RAS function	Slave station disconnection		○	○	○	○
	Automatic return		○	○	○	○
	Loopback function		○	○	○	○
	Submaster function		×	×	×	×
Diagnostic function	CC-Link IE Field Network diagnostics		○	○	○	○
	Individual board diagnostics	Bus I/F test	×	×	○	○
		Memory test	×	×	○	○
		Hardware test	○	○	○	○
		Self-loopback test	○	○	○	○
	Own network diagnostics	Loop test	○	×	○	×
		Cable test	×	×	○	○
	Other network diagnostics	Communication test	×	×	○	○
		IP communication test	×	×	×	×
Other functions	Reserved station specification		○	○	○	○
	Temporary cancel of the reserved station setting		○	○	○	○
	Error invalid station and temporary error invalid station setting		○	○	○	○
	Event notification to program		×	×	○	○
	Driver WDT monitoring		×	×	○	○
	IP packet transfer function		×	×	○	○

○ : Supported

×

△ : Support possible after implementation.

(2) Performance Specifications

The following table lists performance specifications related to CC-Link IE Field Network board.

Table 1.1-2 Performance Specifications (Overview)

Item	Specifications	
Maximum number of link points per network	RX	16384 points (2 K bytes)
	RY	16384 points (2 K bytes)
	RWr	8192 points (16 K bytes)
	RWw	8192 points (16 K bytes)
Maximum number of link points per station (Master station)	RX	16384 points (2 K bytes)
	RY	16384 points (2 K bytes)
	RWr	8192 points (16 K bytes)
	RWw	8192 points (16 K bytes)
Maximum number of link points per station (Local station)*1	RX	2048 points (256 bytes)
	RY	2048 points (256 bytes)
	RWr	1024 points (2048 bytes)*2
	RWw	1024 points (2048 bytes)*2
Communication speed	1 Gbps	
Network topology	Line, star, and ring (Coexistence of line topology and star topology is possible.)	
Connection cable	Ethernet cable that satisfies 1000BASE-T standards: Category 5e or higher (double shielded, STP), straight cable	
Maximum station-to-station distance	100 m	
Overall cable distance	Line topology: 12000 m (when cables are connected to 1 master station and 120 slave stations) Star topology: Depends on the system configuration. Ring topology: 12100 m (when cables are connected to 1 master station and 120 slave stations)	
Number of cascade connections	Up to 20	
Number of connectable stations per network	Master station: 1 Slave station: 120	
Maximum number of networks	239	
Communication method	Token passing method	

*1: This indicates the point which can be assigned for one station by master station. For local station, the data from other station can be received other than these points.

*2: For "Online (High-speed mode)", 256 points and 512 bytes.

1.2. Enclosed CD-ROM

The following describes the folder configuration and files included in the CD-ROM provided with this manual.

(1) Folder configuration of enclosed CD-ROM

The following shows the folder configuration of enclosed CD-ROM.

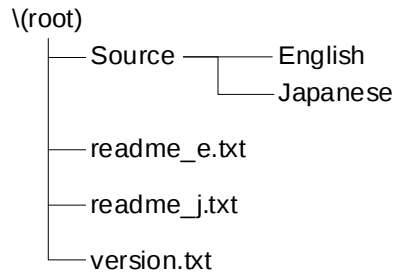


Figure 1.2-1 Enclosed CD-ROM Folder Configuration Diagram

(2) Enclosed CD-ROM file overview

The following provides an overview of the files included in the enclosed CD-ROM.

Table 1.2-1 Files in Enclosed CD-ROM

Folder	File	Description
Source	*1	Sample code (Examples of processing method such as initial processing, parameter setting, cyclic transmission, and transient transmission) Format: C language source file, C language header file
-	readme_e.txt	File describing an overview on how to modify the sample code (English version) Format: Text file
-	readme_j.txt	File describing an overview on how to modify the sample code (Japanese version) Format: Text file
-	version.txt	Version information of enclosed CD-ROM Format: Text file

*1: For details of the files, refer to Section 5.1 "File List".

1.3. Sample Code Overview

Sample code is available on the CD-ROM provided with this manual.

The following describes the precautions related to the sample code.

- (1) The sample code is provided for your reference for checking logic. Its operation is not guaranteed by Mitsubishi Electric.
- (2) The sample code descriptions allow operation as a master station and local station.
- (3) The sample code does not include OS-dependent processing. To make the sample code function, refer to Section 5.3 "Modifying the Sample Code" and add the processing required by the target OS.

1.4. System Configuration

The following figure shows an example of the driver and system configuration to be developed by the user.

The driver accesses the hardware resources of the board to use the board functions.

User application transfers data of device/buffer memory to the board via the driver, and communicates with other stations in CC-Link IE Field Network.

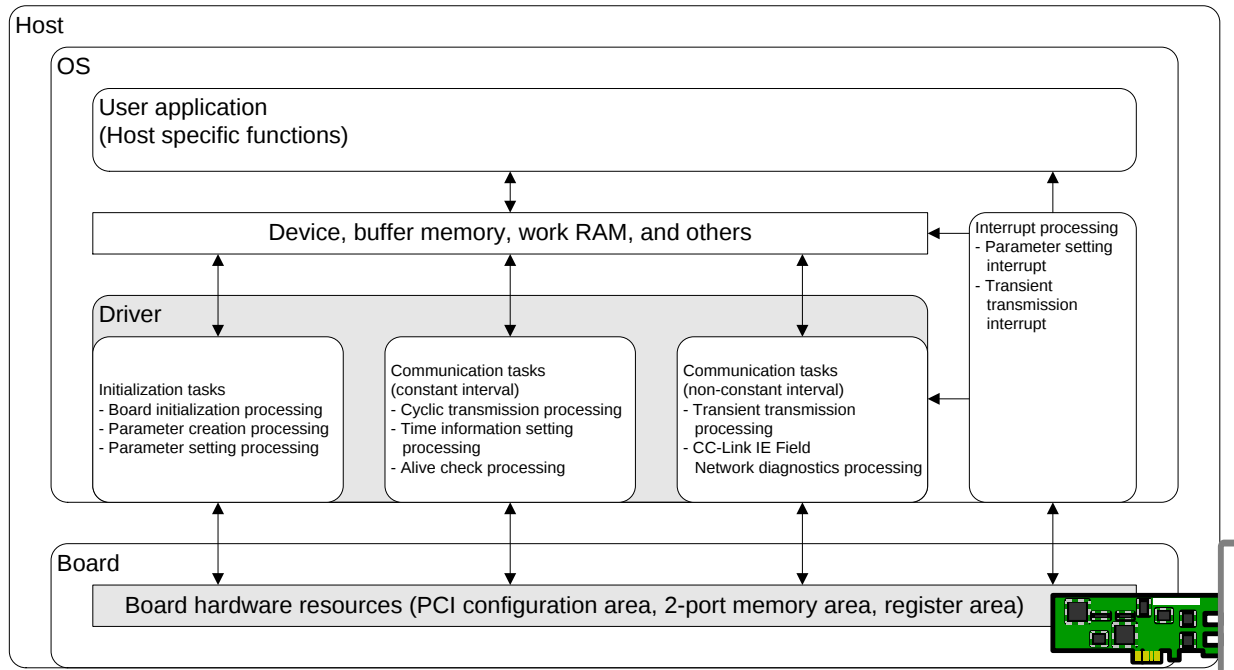


Figure 1.4-1 System Configuration Example

2. BOARD FUNCTIONS

This chapter describes the overview of board functions that can be used for driver development. For processing executed by the driver to achieve the functions, refer to Chapter 4 "DRIVER PROCESSING".

2.1. Cyclic Transmission Function

Cyclic transmission is a function that periodically exchanges data with stations on the same network. Link devices (RX, RY, RWw, RWr) are used for the data communication.

The status of each link device (RY, RWw) of the master station is outputted to a slave station, and input from a slave station is stored in the link device (RX, RWr) of the master station.

The following figure shows the cyclic data flow and the example of the link device assignment.

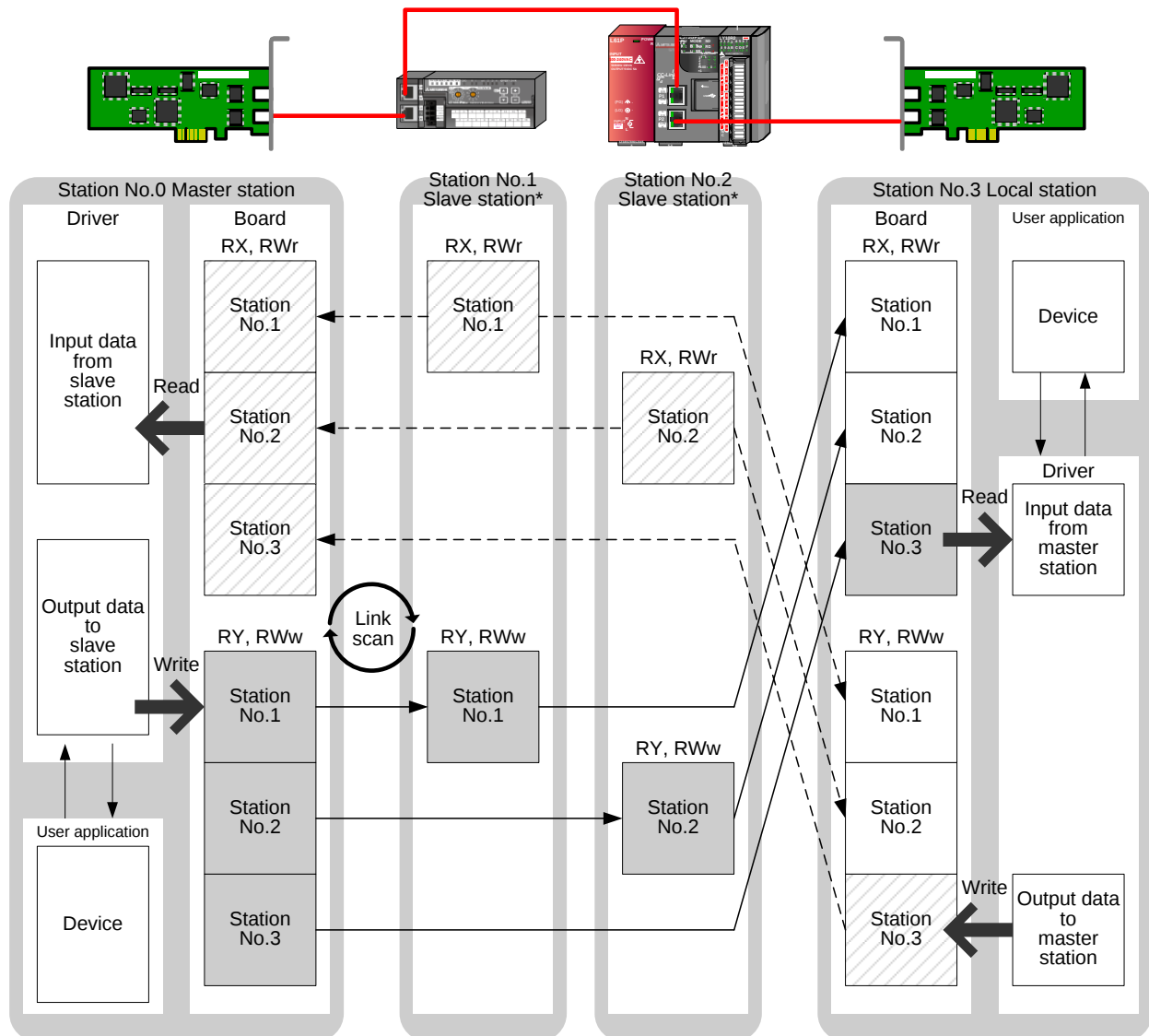


Figure 2.1-1 Flow of Cyclic Data
*: Local stations excluded.

2.1.1. Link refresh

This is the board function performed by the Windows driver included with the SW1DNC-CCIEF-B. The driver transfers data between a link device and a device automatically.

To achieve the link refresh in the driver development, the implementation should allow periodical calls for the cyclic send function and cyclic receive function of the sample code.

2.1.2. Mode selection for cyclic transmission

Mode selection is a board function used to select a mode for cyclic transmission based on the frequencies of cyclic transmission and transient transmission.

When the own station is operating as the master station, this function allows switching between "Online (standard mode)" and "Online (high-speed mode)" in the operation mode setting area (SPI/OA).

Table 2.1.2-1 Cyclic Transmission Modes

Item	Description
Online (normal mode)	This mode performs cyclic transmission and transient transmission without losing their inherent speed performance.
Online (high-speed mode)	This mode preferentially performs cyclic transmission for high-speed communications. Note that the maximum number of points assigned to RWw/RWr is 256 points per local station.

* : When the own station is operating as a local station

When "Online" is set in the operation mode setting area (SPI/OA), switching between "Online (standard mode)" and "Online (high-speed mode)" is determined by the mode of master station.

2.1.3. Constant link scan setting

Constant link scan is a board function to set a cyclic transmission interval to perform cyclic transmission at constant intervals. Setting "Constant link scan time" (0 to 200 ms) with application parameter allows the link scan at a constant interval set with this setting.

2.1.4. Assurance of cyclic data integrity

Cyclic data integrity can be assured during data reading/writing between the driver and board using the following three methods.

(1) 32-bit data assurance

This board function assures RWr and RWw data in 32-bit units when block data assurance per station is not enabled.

(2) Block data assurance per station

This board function uses handshake between the driver and the board to read/write data for assuring cyclic data per station. This function is enabled by setting "Block data assurance per station" with the application parameter.

(3) Stations interlock program

This user-created program makes interlock between the own station and other stations for data communication when block data assurance per station is not enabled.

2.1.5. Input status setting for data link faulty station

Input status setting for data link faulty station is a board function to select whether to clear or hold input data from another station where a data link error occurs.

This function is enabled by setting "Data link faulty station setting" to "Hold" or "Clear" with a specific parameter.

Table 2.1.5-1 Input Status Setting for Data Link Faulty Station

Input data	Range where the setting becomes enabled	Input status in the event of error
RX and RY	• Master station RX • Local station RX and RY (only the input data from other stations)	Clearing or holding the input data can be selected.
RWw and RWr	• Master station RWr • Local station RWw and RWr (only the input data from other stations)	The input data are held regardless of any setting.

2.1.6. Cyclic transmission stop and restart

This board function stops or starts cyclic transmission.

This function is used to change any parameter while executing cyclic transmission, or to stop communicating link device data due to debugging.

Use link special relay (SB) and link special register (SW) to stop/start cyclic transmission for all stations or a specified station. Transient transmission does not stop.

Procedures for stop and restart of cyclic transmission are as follows.

(1) Cyclic transmission stop/restart (other stations)

Stop and restart are available only when the own station is operating as the master station.

Table 2.1.6-1 Procedure for Cyclic Transmission Stop (Other Stations)

Step	Description
1	Specify the station to stop cyclic transmission in the following link special register areas (SW). • Specifying a target station: Link stop/start direction (SW0000) • Specifying a station number: Link stop/start direction (SW0001 to SW0008)
2	Turn on System link stop (SB0003).
3	When the board accepts the request, System link stop request accept status (SB0056) turns on.
4	When cyclic transmission stop is completed, System link stop completion status (SB0057) turns on.
5	Station number of the station that sent the cyclic transmission stop request is stored in Data link stop request station (SW004A).
6	If cyclic transmission is stopped with error, an error code will be stored in Data link stop status (entire system) (SW0053).
7	Turn off System link stop (SB0003).

Table 2.1.6-2 Procedure for Cyclic Transmission Restart (Other Stations)

Step	Description
1	Specify the station to restart cyclic transmission in the following link special register areas (SW). • Specifying a target station: Link startup/stop direction (SW0000) • Specifying a station number: Link startup/stop direction (SW0001 to SW0008)
2	Turn on System link start (SB0002).
3	When the board accepts the request, System link start request accept status (SB0054) turns on.
4	When cyclic transmission restart is completed, System link start completion status (SB0055) turns on.
5	If cyclic transmission is restarted with error, an error code will be stored in Data link start status (entire system) (SW0052).
6	Turn off System link start (SB0002).

(2) Cyclic transmission stop/restart (own station)

Stop and restart are available only when the own station is operating as the master station or a local station.

Table 2.1.6-3 Procedure for Cyclic Transmission Stop (Own Station)

Step	Description
1	Turn on Link stop (own station) (SB0001).
2	When the board accepts the request, Link stop request accept status (own station) (SB0052) turns on.
3	When cyclic transmission stop is completed, Link stop completion status (own station) (SB0053) turns on.
4	If cyclic transmission is stopped with error, an error code will be stored in Data link stop status (own station) (SW0051).
5	Turn off Link stop (own station) (SB0001).

Table 2.1.6-4 Procedure for Cyclic Transmission Restart (Own Station)

Step	Description
1	Turn on Link start (own station) (SB0000).
2	When the board accepts the request, Link start request accept status (own station) (SB0050) turns on.
3	When cyclic transmission restart is completed, Link start completion status (own station) (SB0051) turns on.
4	If the cyclic transmission is restarted with error, an error code will be stored in Data link start status (own station) (SW0050).
5	Turn off Link start (own station) (SB0000).

2.2. Transient Transmission Function

Transient transmission is a function to communicate with another station, which is used when requested by a user application.

The transient transmission allows direct access to a device or a buffer memory of another station. The following figure shows the flow of transient data. (Read instruction)

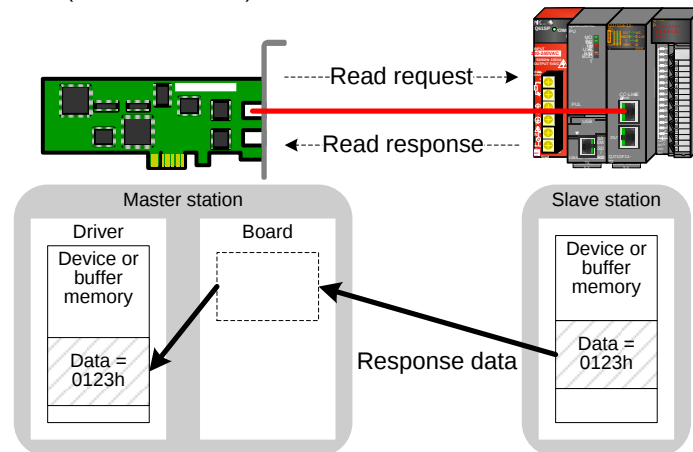


Figure 2.2-1 Flow of Transient Data

2.2.1. Client and server functions

Transient transmission includes a client function and server function.

The client function sends transient requests to stations with a server function.

The server function sends transient responses to transient requests from stations with a client function.

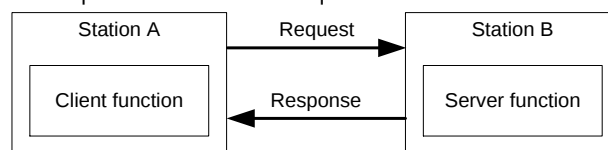


Figure 2.2.1-1 Client/Server Function

2.2.2. Transient frames

There are two types of frames for transient transmission to send/receive that can be implemented with driver development.

In this document, the transient transmission described in No.1 of the table below is referred to as "CC-Link compatible transient", and the transient transmission described in No.2 of the table below is referred to as "SLMP transient". For details of the frames, refer to Appendix 3 "Frame Format".

Table 2.2.2-1 Transient Frame List

No.	Abbreviation	Frame type (FType)		Data type (DataType)		Data sub-type	
1	CC-Link compatible transient	25h	Transient2	04h	CC-Link compatible	-	-
2	SLMP transient	22h	Transient1	05h	Network common	0002h	SLMP

2.2.3. Transient transmission access range

The access range of the transient transmission that can be implemented with driver development is limited to inside the same network.

(Route A of the following figure)

- Communication within the same network (route A of the following figure)
CC-Link compatible transient transmission enables communication with other stations inside the same network. This document describes the client functions and server functions of CC-Link compatible transient transmission.
SLMP transient transmission enables communication with SLMP compatible stations inside the same network. This document describes only the client function of SLMP transient transmission.
- Communication with different networks (routes B and C of the following figure)
CC-Link compatible transient transmission is limited to only those stations connected inside the same network.
SLMP transient transmission is limited to only SLMP compatible stations connected inside the same network.
As a result, CC-Link compatible transient transmission and SLMP transient transmission cannot communicate with other stations on routes B and C.

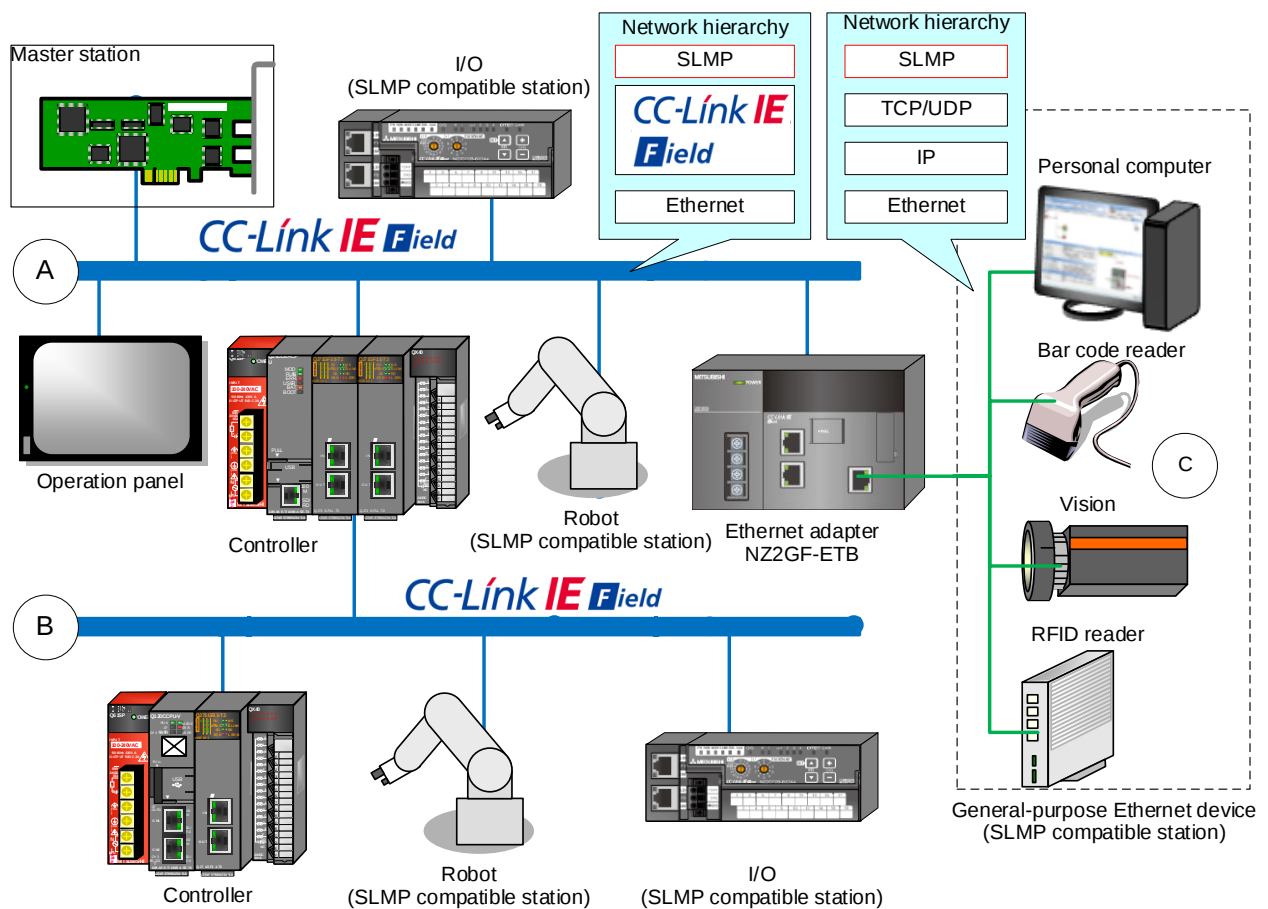


Figure 2.2.3-1 Transient Transmission Access Range

2.3. RAS Function

The following RAS functions can be used with driver development.

- Slave station disconnection
- Automatic return function
- Loopback function

2.3.1. Slave station disconnection

Slave station disconnection is a board function to disconnect only the slave stations where an error has occurred from the network and continues data link with the stations operating normally. In a line topology, all stations connected after the faulty station are disconnected.

The board automatically disconnects the faulty station. There is no processing performed by the driver.

2.3.2. Automatic return function

When a station disconnected from a network due to a data link error recovers from the error, this board function return the station to the network and restarts data link. The board automatically returns the station. There is no processing performed by the driver.

2.3.3. Loopback function

This board function disconnects the station where an error has occurred from the network and continues data link with the stations operating normally.

Stations connected after the faulty station can also continue data link if the stations are connected in a ring topology. This function is enabled by setting "Loopback function enabled" with the application parameter.

2.4. Diagnostic Function

The following diagnostic functions can be used with driver development.

- CC-Link IE Field Network diagnostics
- Hardware test
- Self-loopback test
- Loop Test

The diagnostic functions listed in the table below need to set operation mode at initial processing and create and set parameters.

Table 2.4-1 Settings Required for Tests

Diagnostic function	Station type available	Operation mode (SPI/OA)	Necessity for parameter creation and setting
Hardware test	Master station/local station	0009h: Hardware test	Parameters not required
Self-loopback test	Master station/local station	0007h: Self-loopback test	Parameters not required
Loop test	Master station	0006h: Loop test	Specific/common parameter creation and setting required

2.4.1. CC-Link IE Field Network diagnostics

The status of the CC-Link IE Field Network can be checked by CC IE Field Utility.

CC-Link IE Field Network diagnostics is conducted with the following configuration in driver development.

- (1) Prepare a personal computer with the SW1DNC-CCIEF-B installed.
- (2) Connect the Ethernet port of the personal computer to the Ethernet port of the host with an Ethernet cable.
- (3) Start CC IE Field utility of the personal computer and start the CC-Link IE Field Network diagnostics.

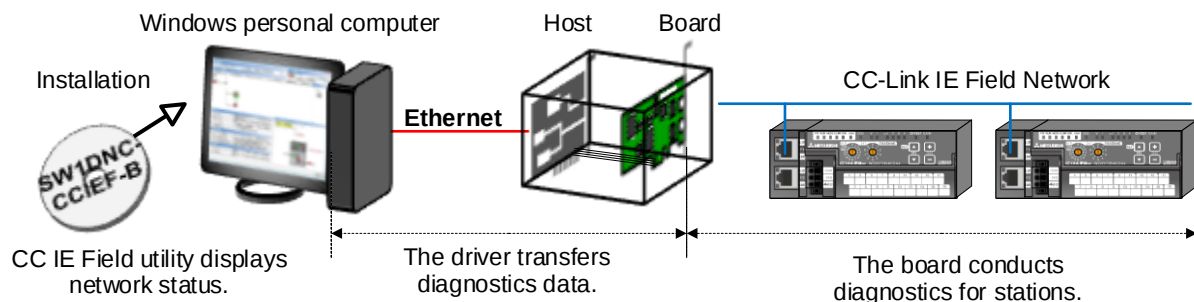


Figure 2.4.1-1 CC-Link IE Field Network Diagnostics via Ethernet

[Precautions for CC-Link IE Field Network diagnostics via Ethernet]

The following conditions are applied for CC-Link IE Field Network diagnostics via Ethernet.

- (1) The diagnostics can be executed with SW1DNC-CCIEF-B Ver.1.08J or later.
For the latest version of SW1DNC-CCIEF-B, please consult your local Mitsubishi Electric representative.
- (2) SW1DNC-CCIEF-B compatible OS: The following operating systems are supported.
 - Microsoft® Windows® 7 Home Premium (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 7 Professional (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 7 Ultimate (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 7 Enterprise (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8 (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8 Pro (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8 Enterprise (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8.1 (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8.1 Pro (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 8.1 Enterprise (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 10 Home (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 10 Pro (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 10 Enterprise (32-bit/64-bit) Operating System (Japanese/English)
 - Microsoft® Windows® 10 Education (32-bit/64-bit) Operating System (Japanese/English)

2.4.2. Operating CC IE Field utility

The CC-Link IE Field Network diagnostics via Ethernet requires an operation method partly different from normal operation for CC IE Field utility.

(Normal operation: The board is implemented in a Windows personal computer to use the CC IE Field utility.)

Operating procedures for installing, starting, and exiting the CC IE Field utility for the CC-Link IE Field Network diagnostics via Ethernet are as follows.

(1) Installing CC IE Field utility

How to install the CC IE Field utility in the Windows personal computer is the same with the normal operation. For details, refer to the user's manual of the board.

(2) Starting CC IE Field utility

How to start the CC IE Field utility is different from the normal operation.

To conduct the CC-Link IE Field Network diagnostics via Ethernet by the CC IE Field utility, select either "Run" or "Search programs and files" to enter the following command.

Command	C: ¥ MELSEC ¥ CCIEF¥UTL ¥ CCIEFUTL.exe -rd
---------	--

*: "C: ¥ MELSEC" is the default installation destination.

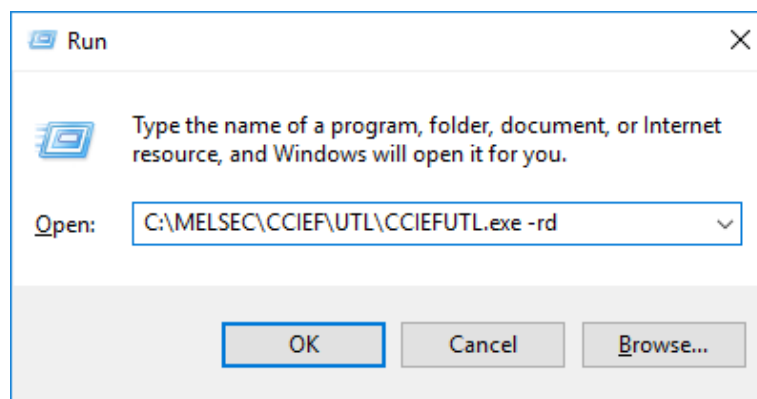


Figure 2.4.2-1 Startup Window (Run)



Figure 2.4.2-2 Startup Window (Search Programs and Files)

(3) Setting diagnostics target

Starting the CC IE Field utility displays the diagnostics destination setting window for the CC-Link IE Field Network diagnostics via Ethernet. Clicking "Detail Setting" displays the diagnostics destination detail setting window.

(a) Diagnostics destination setting

Specify IP address/host name and port number for the host.

Figure 2.4.2-3 Diagnostics Destination Setting Window

Table 2.4.2-1 Diagnostics Destination Setting

Item	Description	Initial value	Input range
IP Address/Host Name	Specify an IP address or host name.	-	-
IP Address	Specify an IP address in decimal or hexadecimal.	0.0.0.0	0.0.0.0 to 255.255.255.255 ^{*1}
IP Input Format	Specify the input type for the IP address.	DEC	DEC, HEX
Host Name	Specify a host name.	-	-
Port No. (DEC)	Specify a port number in decimal.	-	0 to 65535 ^{*1}

^{*1}: The range may not apply depending on the network environment of the host. Consult your network administrator before setting.

(b) Diagnostics destination detail setting window

Specify the timeout monitoring time, retry times, and diagnosis monitoring interval for the CC IE Field utility.

Figure 2.4.2-4 Diagnostics Destination Detail Setting Window

Table 2.4.2-2 Diagnostics Destination Detail Setting

Item	Description	Initial value	Input range
Timeout Monitoring Time (DEC)	Specify a timeout time for the case where communications between the CC IE Field utility and the host is not available. (Unit: second)	5	1 to 99
Retry Times (DEC)	Specify a number of retries for the case where communications between the CC IE Field utility and the host is not available. (Unit: times)	0	0 to 9
Diagnosis Monitoring Interval (DEC)	Specify an update interval for the CC IE Field diagnostic window. (Unit: second) *: The CC IE Field utility accesses the host at a specified interval.	5	5 to 60

(4) Starting CC-Link IE Field Network diagnostics via Ethernet

The CC IE Field diagnostic window appears.

The CC-Link IE Field Network diagnostics via Ethernet displays "Select Diagnostics Destination" of the CC IE Field diagnostic window different from normal operation.

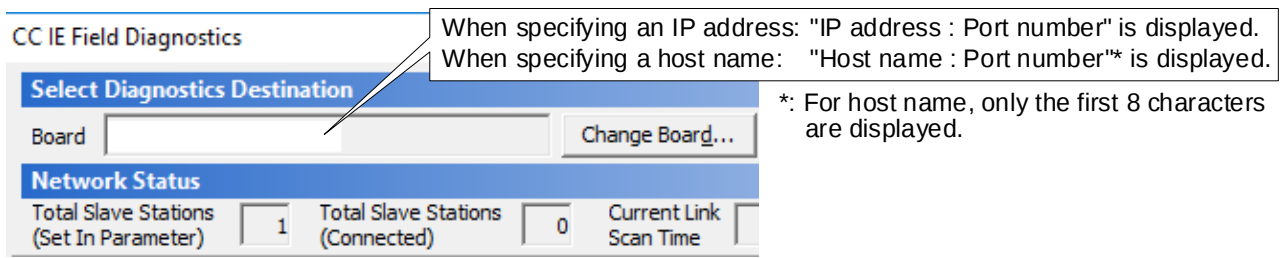


Figure 2.4.2-5 Display of "Select Diagnostics Destination"

To change the diagnostics target (host), click the "Change Board" button to display "Diagnostics Destination Setting" window (Figure 2.4.2-3 Diagnostics Destination Setting Window). Specify the IP address/host name and port number for the new target host.

Display and operation method of the CC IE Field diagnostic window other than "Select Diagnostics Destination" are the same with normal operation. For details, refer to the user's manual of the board.

(5) Exiting CC-Link IE Field Network diagnostics via Ethernet

How to exit the CC IE Field utility is different from normal operation. Click the "Close" button on the CC IE Field diagnostic window to exit.

2.4.3. Troubleshooting for CC-Link IE Field Network diagnostics via Ethernet

This section describes troubleshooting for CC-Link IE Field Network diagnostics via Ethernet.

(1) Troubleshooting check items

The following table describes troubleshooting for CC-Link IE Field Network diagnostics via Ethernet.

Check whether there is any problem with the following check items in the event of trouble.

Table 2.4.3-1 Troubleshooting Check Items

No.	Item	Action
When the CC IE Field diagnostic window does not appear		
1	Is the command specified for startup correct?	Check and correct the command specified for startup.
2	Is the SW1DNC-CCIEF-B version 1.08J or later?	For the latest version of SW1DNC-CCIEF-B, please consult your local Mitsubishi Electric representative.
When communications between the CC IE Field utility and the host is not available		
3	Are the IP address of the Windows personal computer with SW1DNC-CCIEF-B installed and the IP address of the host connected correct?	Check and correct the IP address setting.
4	Is the IP address already in use?	- Correct the IP address of the host so as not to be overlapped with the one for the Windows personal computer with SW1DNC-CCIEF-B installed. - Disconnect the host from the line and execute the Ping command to the host. If a response is received even though the host is disconnected, the IP address is already in use. Change the IP address.
5	Is the host name specification correct?	Check and correct the host name setting.
6	Is the port number correct?	Check the port number setting. Check whether the port number specified is already in use for other purpose.
7	Is any of the security setting and antivirus software of the Windows personal computer with SW1DNC-CCIEF-B installed or host blocking the communications?	Check and correct the security setting and antivirus software setting of the Windows personal computer with SW1DNC-CCIEF-B installed and host. (Example) - Is the security setting level of the antivirus software low? - Is a response to the Ping command (ICMP echo request) enabled in the firewall settings?
8	Is the switching hub between the Windows personal computer with SW1DNC-CCIEF-B installed and host working correctly?	- If an error has occurred in the switching hub, remove the error. - If communications cannot be performed although no error has occurred in the switching hub, replace the switching hub.*1
9	Has any of the devices on the line, such as the Windows personal computer with SW1DNC-CCIEF-B installed, host, or the switching hub, been replaced? (This applies only when the device has been replaced by the one having the same IP address.)	Reset the device on the line.*2

*1: When the device has been reconnected to the switching hub, or the switching hub has been replaced, it may take some time to read the MAC address. If so, retry communications from the Ethernet device again after a while or power on the switching hub again.

*2: A device on Ethernet has a table of IP addresses and their corresponding MAC address, called "ARP cache". When a device on the line is replaced by the one having the same IP address, the MAC address in the ARP cache is different from that of the replaced device; therefore, communications may not be normally performed. The ARP cache is updated by resetting the device or after a while. The time varies depending on the device.

(2) Error messages

The following table lists the error messages that appear on the CC IE Field utility. For any error messages other than the ones listed in the table below, refer to the user's manual of the board.

(For the error message indicating no communications with personal computer available, read the personal computer as the board.)

Table 2.4.3-2 Error Messages for CC-Link IE Field Network Diagnostics via Ethernet

Error code	Error message	Cause	Action
-	The specified file is neither a project file nor compressed file. Please specify a project file or compressed file.	When starting the CC IE Field utility by command specification, a character other than "-" or "/" is specified for the first character of the command.	Correct the specified command.
-	Network board error. Please note the code below and refer to the manual. Error = XXXXH	- A communication error occurred in CC-Link IE Field Network. - The specified port number is not correct, or used by the host for other communications.	- Refer to the user's manual of the host or master/local module. If the error code is not described in the user's manual, check the following. - Check whether the specified port number is correct. - Check whether the specified port number is already in use by the host for other communications.
0x01808007	Ethernet error has occurred. After checking Ethernet, please restart.	- The specified IP address is not correct. - The specified host name is not correct. - Host name resolution is not available.	- Check the specified IP address. - Check whether the specified host name is valid. - Specify an IP address and conduct the CC-Link IE Field Network diagnostics.
0x01808008	An unusable port or IP address was specified. Execute again after checking the following settings. - Port/IP address setting - IP address duplication on network	- The specified port number is different from the port number opened by the host. - The specified port number is not opened by the host. - Port number that has already been used by other connection is specified. - CC-Link IE Field Network diagnostics is conducted from more than one personal computer for the same board.	- Check the specified port number or the port number opened by the host. - Check whether the specified port number is already in use by other connection. - Check whether CC-Link IE Field Network diagnostics is conducted from more than one personal computer for the same board.
0x0180840B	Cannot communicate with Board. The following reasons may be responsible. - Communication time over (cable disconnected) - Cannot communicate correctly due to wrong IP address.	- A device with the specified IP address is not present on the network. - Path for the specified IP address is not present on Windows.	- Check the specified IP address. - Check the IP address setting of Windows.

2.4.4. Hardware test

This test checks the internal hardware of the board.

The test is conducted by setting operation mode setting area (SPI/OA) to "0009h: Hardware test" with the initial processing.

The test status and result can be checked with the link special relay (SB).

Table 2.4.4-1 Hardware Test Results

Item	Description
When completed	• Hardware test completion status (SB0090): On • Hardware test normal/abnormal end (SB0091): Off
When failed	• Hardware test completion status (SB0090): On • Hardware test normal/abnormal end (SB0091): On

2.4.5. Self-loopback test

The self-loopback test checks the hardware of the board, including the send/receive circuit of the transmission system and cables.

Connect the PORT1 and PORT2 of the board using an Ethernet cable.

The test is conducted by setting operation mode setting area (SPI/OA) to "0007h: Self-loopback test" with the initial processing.

The test status and result can be checked with the link special relay (SB).

Table 2.4.5-1 Self-loopback Test

Item	Description
When completed	• Self-loopback test completion status (SB0092): On • Self-loopback test normal/abnormal end (SB0093): Off
When failed	• Self-loopback test completion status (SB0092): On • Self-loopback test normal/abnormal end (SB0093): On

2.4.6. Loop test

The loop test checks connection status of the cables from the master station, network line status, and parameter setting status of each station. The test is conducted by setting operation mode setting area (SPI/OA) to "0006h: Loop test" when the own station is operating as the master station. To conduct the test, creation and setting of specific/common parameter are required.

The following table lists the check items of the line test.

Table 2.4.6-1 Loop Test Check List

No.	Item	Description
1	Master station duplication check	Checks if more than one master station exists on a network.
2	Station number duplication check	Checks if stations on the network are duplicated.
3	Out-of-range station No. check	Checks if the number of connected slave stations exceeds the number of slave stations set in the application parameters.
4	Reserved station specification check	Checks if the reserved stations specified in the application parameters are actually connected.
5	Consistency check of the number of connected stations	Detects a mismatch between the total number of slave stations set in the application parameters and the number of connected slave stations.
6	Station type check	Detects a mismatch between the station type of the slave station set in the application parameters and that of the connected station.
7	Loopback check	Detects whether loopback is being performed when "Loopback function" is set in the application parameters.

The test status and result can be checked with the link special relay (SB) and link special register (SW).

Table 2.4.6-2 Loop Test Status and Results

Item	Description
Accept status	• Loop test request accept status (SB009A): On
When completed	• Loop test completion status (SB0094): On • Loop test normal/abnormal end (SB0095): Off
When failed	• Loop test completion status (SB0094): On • Loop test normal/abnormal end (SB0095): On

When failed, error details can be checked using Loop test result (SW0194).

Check the station number where a loop test error has occurred using Loop test error station (SW01A0 to SW01A7).

2.5. Other Functions

The following functions can be used with driver development.

- Reserved station specification and temporary cancel of the reserved station setting
- Error invalid station and temporary error invalid station cancel function

2.5.1. Reserved station specification and temporary cancel of reserved station setting

Reserved station specification allows setting of a station that is not actually connected at present but will be connected to the network in the future (must be included in the total number of stations on the network). Reserved stations are not detected as faulty stations even though they are not actually connected. When the reserved station function is disabled, a slave station specified as a reserved station can be canceled temporarily.

(1) Reserved station specification

Use the application parameter to specify the slave station to a reserved station.

(2) Temporary cancel/restore of the reserved station setting

When the own station is operating as the master station, use link special relay (SB) and link special register (SW) to temporarily cancel or restore the reserved station. Procedure to temporarily cancel or restore the reserved station is as follows. Follow the steps.

(a) Temporary cancel of the reserved station setting

Table 2.5.1-1 Procedure to Temporarily Cancel the Reserved Station

Step	Description
1	Specify the station number to cancel reserved station setting in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2	Turn on Reserved station function disable request (SB0012).
3	Reserved station function disable request accept status (SB005C) is turned on.
4	When reserved station setting is canceled, Reserved station function disable completion status (SB005D) turns on.
5	Reserved station function disable status (SB0180) is turned on and the station number of the station in reserved station function disable status is stored in Reserved station function disable status (SW0180 to SW0187).
6	When the reserved station setting is canceled with error, an error code will be stored in Result of reserved station function disable (SW0056).
7	Turn off Reserved station function disable request (SB0012).

(b) Restore of the reserved station setting

Table 2.5.1-2 Procedure to Restore the Reserved Station

Step	Description
1	Specify the station number to restore reserved station setting in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2	Turn on Reserved station specification enable request (SB0013).
3	Reserved station specification enable request accept status (SB005E) is turned on.
4	When cancel of the reserved station specification is completed, Reserved station specification enabled status (SB005F) is turned on.
5	Use Reserved station function disable status (SW0180 to SW0187) to check whether the station returned to the reserved station. When the network no longer has a station for which reserved station function is disabled, Reserved station function disable status (SB0180) is turned off.
6	When the reserved station setting is restored with error, an error code will be stored in Result of reserved station function enable (SW0057).
7	Turn off Reserved station specification enable request (SB0013).

2.5.2. Error invalid station and temporary error invalid station setting function

When a slave station is set as an error invalid station, even if it is disconnected from the network during data link, the master station will not detect it as faulty station. This can be used when a slave station is replaced during data link, for instance.

Furthermore, by the temporary error invalid station setting function, a slave station can be temporarily set as an error invalid station. This can be used when a slave station is replaced during data link, for instance.

(1) Error invalid station setting

Use the application parameter to specify the slave station to an error invalid station.

(2) Setting/Cancel of temporary error invalid station

When the own station is operating as the master station, use link special relay (SB) and link special register (SW) to set and cancel the temporary error invalid station. The temporary error invalid station setting cannot be configured for a station for which the reserved station setting is temporarily canceled. Procedure to set and cancel the temporary error invalid station is as follows. Follow the steps.

(a) Temporary error invalid station setting

Table 2.5.2-1 Procedure to Set the Temporary Error Invalid Station

Step	Description
1	Specify the station number to set a temporary error invalid station in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2	Turn on Temporary error invalid request (SB0010).
3	Temporary error invalid request accept status (SB0058) is turned on.
4	When a temporary error invalid station is set, Temporary error invalid setting completion status (SB0059) turns on.
5	Temporary error invalid station setting status (SB00E0) turns on, and the station No. of the temporary error invalid station is stored in Temporary error invalid station setting (SW00E0 to SW00E7).
6	When the temporary error invalid station is set with error, an error code will be stored in Temporary error invalid station setting result (SW0054).
7	Turn off Temporary error invalid request (SB0010).

(b) Cancel of the temporary error invalid station setting

Table 2.5.2-2 Procedure to Cancel the Temporary Error Invalid Station

Step	Description
1	Specify the station number to cancel a temporary error invalid station in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2	Turn on Temporary error invalid setting cancel request (SB0011).
3	Temporary error invalid setting cancel request accept status (SB005A) is turned on.
4	When cancel is completed, Temporary error invalid setting cancel completion status (SB005B) turns on.
5	Use Temporary error invalid station setting (SW00E0 to SW00E7) to check if the temporary error invalid station setting is canceled. When the network no longer has a temporary error invalid station, Temporary error invalid station setting status (SB00E0) turns off.
6	When the temporary error invalid station is canceled with error, an error code will be stored in Temporary error invalid station setting cancel result (SW0055).
7	Turn off Temporary error invalid setting cancel request (SB0011).

3. BOARD HARDWARE RESOURCE

The driver achieves operation of the master and local stations of the CC-Link IE Field Network by accessing board resources.

The hardware resources of the board include the following three areas: the PCI configuration area, 2-port memory area, and register area.

The PCI configuration area stores start addresses for accessing the 2-port memory area and register area. (Section 3.1 PCI Configuration Area)

The 2-port memory area comprises the system area for setting parameters, and the user area that stores link devices and other station information. (Section 3.2 2-Port Memory Area)

The register area includes a board setting area and a hardware control register area, which are used to configure the settings required for board operation. (Section 3.3 Register Area)

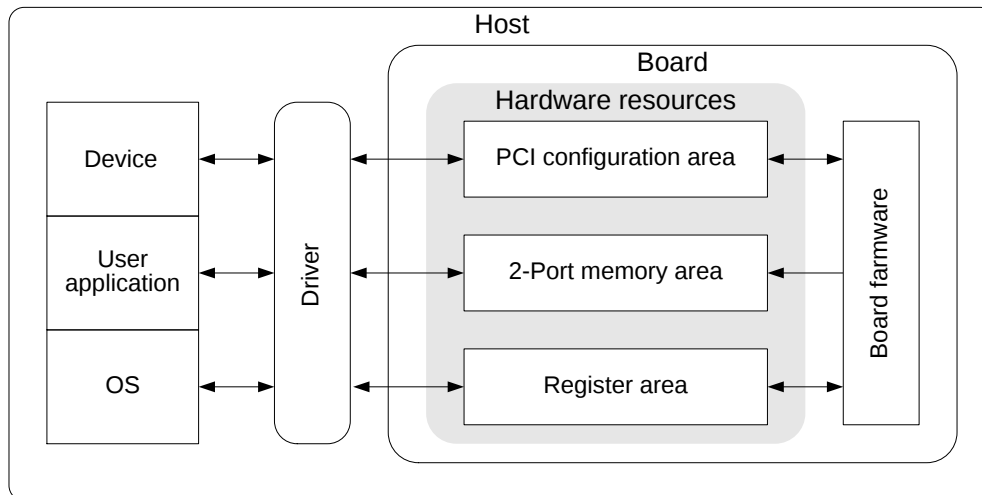


Figure 3-1 Board Hardware Resource

3.1. PCI Configuration Area

The PCI configuration area stores device ID and vendor ID as information for the driver to identify the board. After identifying the board, the driver accesses board resources using the 2-port memory area basic address and register area basic address.

The following figure shows an image of the PCI configuration area.

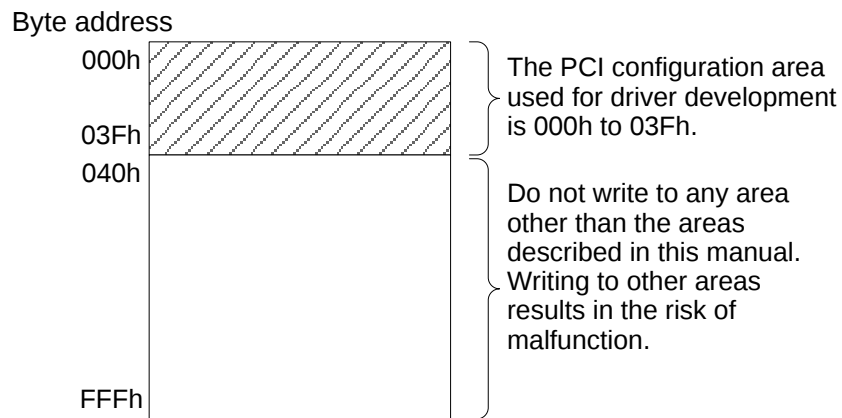


Figure 3.1-1 Image of PCI Configuration Area

3.1.1. PCI configuration area list

The following table lists the PCI configuration area required for driver development. For details, refer to the corresponding section.

Table 3.1.1-1 List of Areas in the PCI Configuration Area

Byte address	Word address	Item	Reference
000h - 001h	000h	Vendor ID	Section 3.1.2(1)
002h - 003h	001h	Device ID	Section 3.1.2(2)
004h - 00Fh	002h - 007h	Not applicable	-
010h - 013h	008h - 009h	2-port memory area basic address register	Section 3.1.2(3)
014h - 017h	00Ah - 00Bh	Not applicable	-
018h - 01Bh	00Ch - 00Dh	Register area basic address register	Section 3.1.2(4)
01Ch - 02Bh	00Eh - 015h	Not applicable	-
02Ch - 02Dh	016h	Sub-system vendor ID	Section 3.1.2(5)
02Eh - 02Fh	017h	Sub-system ID	Section 3.1.2(6)
030h - 03Fh	018h - 01Fh	Not applicable	-

3.1.2. PCI configuration area details

The following describes the details of the PCI configuration area.

The meanings of the symbols (R/W, R, W, -) used in the address table are as follows.

R/W	Capable of reading and writing
R	Dedicated to reading. Written values are ignored.
W	Dedicated to writing. Read values are undefined.
-	Not applicable. Read values are undefined. Write "0" when writing.

(1) Vendor ID

Byte address	Word address	Bit	R/W	Description	Initial value
000h - 001h	000h	15-0	R	Stores the ID code for identifying a device vendor. 10BAh: Mitsubishi Electric	10BAh

(2) Device ID

Byte address	Word address	Bit	R/W	Description	Initial value
002h - 003h	001h	15-0	R	Stores the ID code for identifying a device.	062Bh
				062Bh: Q80BD-J71GF11-T2 0621h: Q81BD-J71GF11-T2	0621h

(3) 2-port memory area basic address register

Byte address	Word address	Bit	R/W	Description	Initial value
010h - 013h	008h - 009h	31-17	R	Stores the basic address of the 2-port memory area.	0000h
		16-0	R	Fixed to 0000h	0000h

(4) Register area basic address register

Byte address	Word address	Bit	R/W	Description	Initial value
018h - 01Bh	00Ch - 00Dh	31-9	R	Stores the basic address of the register area.	00000h
		8-0	R	Fixed to 000h	000h

(5) Sub-system vendor ID

Byte address	Word address	Bit	R/W	Description	Initial value
02Ch - 02Dh	016h	15-0	R	Stores the ID for identifying the vendor of the sub-system. 10BAh: Mitsubishi Electric	10BAh

(6) Sub-system ID

Byte address	Word address	Bit	R/W	Description	Initial value
02Eh - 02Fh	017h	15-0	R	Stores the ID for identifying the sub-system. 0601h: Q80BD-J71GF11-T2/Q81BD-J71GF11-T2	0601h

3.2. 2-Port Memory Area

The 2-port memory area comprises the system area and user area.

The system area stores the "model name information area start address", "device information area start address", "parameter setting information area start address" and the like.

The user area stores link device, link device offset/size information, own/other station information, and the like.

The driver uses the 2-port memory area to perform cyclic and transient transmission after initial processing.

The following figure shows an image of the 2-port memory area.

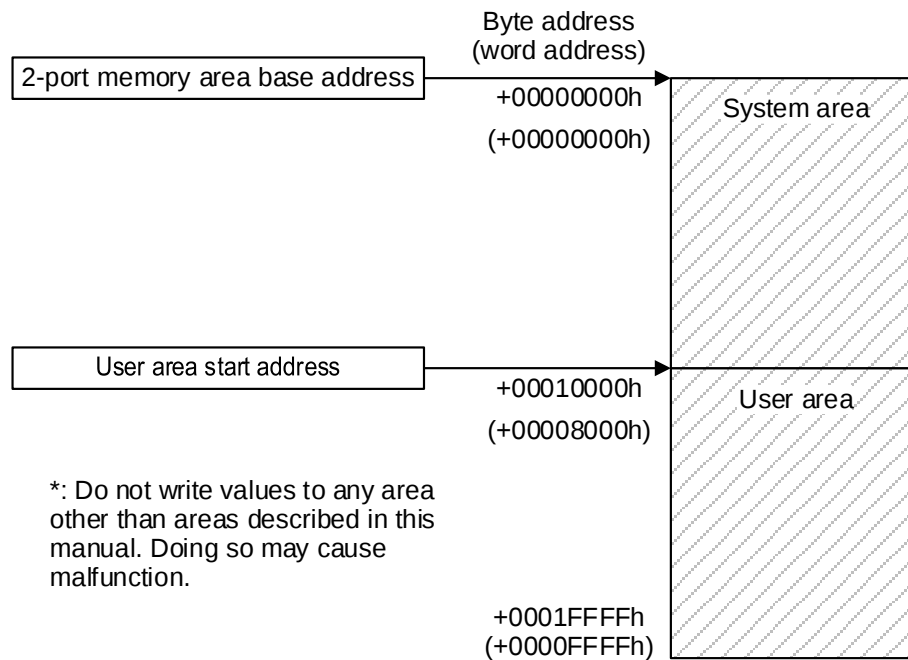


Figure 3.2-1 Image of 2-Port Memory Area

Point

- Basic address of the 2-port memory area can be acquired from the following register.
Section 3.1.2(3) "2-port memory area basic address register"
- Offset address for user area in the 2-port memory area can be acquired from the following register.
Section 3.3.3(21) "User area start address register"
- The 2-port memory area can be accessed after completing the "2-port memory area unlock" processing with initial processing.

3.2.1. 2-port memory area list

The following table lists the 2-port memory area required for driver development.

(1) System area list

The following table lists the system area. For details, refer to the corresponding section.

Table 3.2.1-1 System Area List

Byte address	Word address	Item	Reference
00h - 17h	00h - 0Bh	Not applicable	-
18h - 19h	0Ch	Model name information area start address ^{*1}	Section 3.2.2(1)
1Ah - 1Bh	0Dh	Device information area start address ^{*1}	Section 3.2.2(2)
1Ch - 1Dh	0Eh	Not applicable	-
1Eh - 1Fh	0Fh	Latest error code	Section 3.2.2(3)
20h - 21h	10h	Not applicable	-
22h - 23h	11h	Parameter setting information area start address ^{*1}	Section 3.2.2(4)
24h - 25h	12h	SLMP transient send/receive area information start address ^{*1}	Section 3.2.2(15)
26h - 2Dh	13h - 16h	Not applicable	-
2Eh - 2Fh	17h	Start address for block data assurance per station information area ^{*1}	Section 3.2.2(5)
30h - 3Fh	18h - 1Fh	Not applicable	-
40h - 41h	20h	Host operation information 1	Section 3.2.2(6)
42h - 45h	21h - 22h	Not applicable	-
46h - 47h	23h	Host operation information 2	Section 3.2.2(7)
48h - 49h	24h	Host operation information 3	Section 3.2.2(8)
4Ah - 4Bh	25h	Host operation information 4	Section 3.2.2(9)
4Ch - 5Dh	26h - 2Eh	Not applicable	-
5Eh - 5Fh	2Fh	Host operation information 5	Section 3.2.2(10)
60h - 61h	30h	Board → Driver interrupt request	Section 3.2.2(11)
62h - 7Fh	31h - 3Fh	Not applicable	-
80h - 81h	40h	Driver → Board interrupt acceptance	Section 3.2.2(12)
82h - 9Fh	41h - 4Fh	Not applicable	-
A0h - A1h	50h	Driver → Board interrupt request	Section 3.2.2(13)
A2h - BFh	51h - 5Fh	Not applicable	-
C0h - C1h	60h	Board → Driver interrupt acceptance	Section 3.2.2(14)
C2h - DFh	61h - 6Fh	Not applicable	-

^{*1}: The start address of each information area is stored. Access each information area, referring to the start address read.

(2) User area list

The following table lists the user area. For details, refer to the corresponding section.

Table 3.2.1-2 User Area List

Byte address	Word address	Item	Reference
0000h - 97FFh	0000h - 4BFFh	Link device area	Section 3.2.3(1)
9800h - 99FFh	4C00h - 4CFFh	RX offset/size information	Section 3.2.3(2)
9A00h - 9BFFh	4D00h - 4DFFh	RY offset/size information	Section 3.2.3(3)
9C00h - 9DFFh	4E00h - 4EFFh	RWw offset/size information	Section 3.2.3(4)
9E00h - 9FFFh	4F00h - 4FFFh	RWr offset/size information	Section 3.2.3(5)
A000h - A03Fh	5000h - 501Fh	Not applicable	-
A040h - A07Fh	5020h - 503Fh	Own station information	Section 3.2.3(6)
A080h - A0BFh	5040h - 505Fh	Other station information (station No.1)	Section 3.2.3(7)
A0C0h - BE7Fh	5060h - 5F3Fh	Other station information (station No.2 to 120)	Section 0
BE80h - BFDfFh	5F40h - 5FEFh	Not applicable	-
BFE0h - BFFFh	5FF0h - 5FFFh	CC-Link compatible transient handshake area	Section 3.2.3(9)
C000h - CFFFh	6000h - 67FFh	CC-Link compatible transient data area	Section 3.2.3(10)
D000h - 1FFFFh	6800h - FFFFh	Not applicable	-

3.2.2. Details of areas in the 2-port memory area (System area)

Access even addresses in the 2-port memory area using word (16-bit) or double-word (32-bit) units. Accessing an uneven address in bytes results in an error. Please refrain from doing so.

The meanings of the symbols (R/W, R, W, -) used in the address table are as follows.

R/W	Capable of reading and writing
R	Dedicated to reading. Written values are ignored.
W	Dedicated to writing. Read values are undefined.
-	Not applicable. Read values are undefined. Write "0" when writing.

(1) Model name information area

Access this area, referring to the address stored in 0Ch (Model name information area start address). (Refer to Section 3.2.1(1).)

0Ch	Model name information area start address					
→	Byte offset address	Word offset address	R/W	Item	Description	Initial value
	+00h - +09h	+00h - +04h	-	Not applicable	-	-
	+0Ah - +1Ah	+05h - +0Dh	R	Model name string	PCI board: Q80BD-J71GF11-T2 PCI Express board: Q81BD-J71GF11-T2	-

(2) Device information area

Access this area, referring to the address stored in 0Dh (Device information area start address). (Refer to Section 3.2.1(1).)

0Dh	Device information area start address					
	Byte offset address	Word offset address	R/W	Item	Description	Initial value
	+00h - +03h	+00h - +01h	-	Not applicable	-	-
	+04h - +07h	+02h - +03h	R	SB area address (write area)	SB area word offset	-
	+08h - +0Bh	+04h - +05h	R	SB area size (write area)	SB area word count	-
	+0Ch - +0Fh	+06h - +07h	R	SB area address (read area)	SB area word offset	-
	+10h - +13h	+08h - +09h	R	SB area size (read area)	SB area word count	-
	+14h - +17h	+0Ah - +0Bh	R	SW area address (write area)	SW area word offset	-
	+18h - +1Bh	+0Ch - +0Dh	R	SW area size (write area)	SW area word count	-
	+1Ch - +1Fh	+0Eh - +0Fh	R	SW area address (read area)	SW area word offset	-
	+20h - +23h	+10h - +11h	R	SW area size (read area)	SW area word count	-
	+24h - +27h	+12h - +13h	R	RX area address	RX area word offset	-
	+28h - +2Bh	+14h - +15h	R	RX area size	RX area word count	-
	+2Ch - +2Fh	+16h - +17h	R	RY area address	RY area word offset	-
	+30h - +33h	+18h - +19h	R	RY area size	RY area word count	-
	+34h - +3Bh	+1Ah - +1Dh	-	Not applicable	-	-
	+3Ch - +3Fh	+1Eh - +1Fh	R	RW (RWw, RWr) area address	RW area word offset	-
	+40h - +43h	+20h - +21h	R	RW (RWw, RWr) area size	RW area word count	-

(3) Latest error code

Byte address	Word address	Bit	R/W	Description	Initial value
1Eh - 1Fh	0Fh	15-0	R	Stores the error codes of the most recent errors that occurred on the board. For error code details, refer to Section 6.1 "Error Codes". 0000h: Normal Other than 0000h: Error code	0000h

(4) Parameter setting information area

Access this area, referring to the address stored in 11h (Parameter setting information area start address). (Refer to Section 3.2.1(1).)

11h	Parameter setting information area start address
-----	--

Byte offset address	Word offset address	R/W	Item	Description	Initial value
+00h - +0Fh	+00h - +07h	-	Not applicable	-	-
+10h - +11h	+08h	R	Parameter area start address	Stores the parameter information start area address (unit: words).	-
+12h - +13h	+09h	R	Parameter area size	Stores the parameter area size (unit: words).	-
+14h - +1Bh	+0Ah - +0Dh	-	Not applicable	-	-
+1Ch - +1Dh	+0Eh	R/W	Common parameter setting sequence (PRSQ)	Stores the sequence number that indicates the transfer status when transferring common parameter from the driver to the board.	0000h
+1Eh - +1Fh	+0Fh	-	Not applicable	-	-
+20h - +21h	+10h	R/W	Parameter block sequence (BKSQ)	Stores the sequence number that indicates the transfer status in block transfer for the common parameter from the driver to the board.	0000h
+22h - +23h	+11h	R/W	Total number of transfers	Stores the total number of parameters to be transferred.	-
+24h - +25h	+12h	R/W	Transfer number	Stores the parameter number currently being transferred.	-
+26h - +27h	+13h	R/W	Transfer size	Stores the size (unit: words) of the parameters to be transferred.	-
+28h - +29h	+14h	R/W	Specific parameter setting sequence (SPSQ)	Stores the sequence number that indicates the transfer status when transferring specific parameter from the driver to the board.	0000h
+2Ah - +33h	+15h - +19h	-	Not applicable	-	-
+34h - +35h	+1Ah	R/W	Parameter status sequence (PFSQ)	Stores the sequence number that indicates the parameter status.	0000h

(5) Block data assurance per station information area

Access this area, referring to the address stored in 17h (Start address for block data assurance per station information area). (Refer to Section 3.2.1(1).)

The block data assurance per station information area stores the valid/invalid status of the block data assurance per station and the send/receive flags. The send/receive flags are used to perform handshake processing.

17h

Start address for block data assurance per station information area

Byte offset address	Word offset address	R/W	Item	Description	Initial value
+00h - +01h	+00h	R	Area size	Stores the size (unit: words) of block data assurance per station information area.	-
+02h - +03h	+01h	R	Block data assurance per station detailed setting	Stores the valid/invalid status of the block data assurance per station. 0000h: No block data assurance per station 0001h: Block data assurance per station	0000h
+04h - +07h	+02h - +03h	-	Not applicable	-	-
+08h - +09h	+04	R/W	Send flag	A handshake flag used to make block data assurance per station from the driver to the board. 0000h: Initial/idle status 0001h: Send data found 0002h: Reading send data	0000h
+0Ah - +0Bh	+05h	R/W	Receive flag	A handshake flag used to make block data assurance per station from the board to the driver. 0000h: Initial/idle status 0001h: Receive data found 0002h: Reading receive data	0000h
+0Ch - +FBh	+06h - +7Dh	-	Not applicable	-	-

(6) Host operation information 1

Byte address	Word address	Bit	R/W	Description	Initial value
40h - 41h	20h	15-0	R/W	Set the following value during initial processing. 2043h: No block data assurance per station 2843h: Block data assurance per station	0000h

(7) Host operation information 2

Byte address	Word address	Bit	R/W	Description	Initial value
46h - 47h	23h	15-0	R/W	Set the fixed value "0001h" during initial processing.	0000h

(8) Host operation information 3

Byte address	Word address	Bit	R/W	Description	Initial value
48h - 49h	24h	15-0	R/W	Set the fixed value "2032h" during initial processing.	0000h

(9) Host operation information 4

Byte address	Word address	Bit	R/W	Description	Initial value
4Ah - 4Bh	25h	15-0	R/W	Set the following value during initial processing. 0010h: No block data assurance per station 0810h: Block data assurance per station	0000h

(10) Host operation information 5

Byte address	Word address	Bit	R/W	Description	Initial value
5Eh - 5Fh	2Fh	15-0	R/W	Set the fixed value "0000h" during initial processing.	0000h

(11) Board → Driver interrupt request

Byte address	Word address	Bit	R/W	Description	Initial value	
60h - 61h	30h	15	R	Board interrupt request flag for parameter setting (Refer to Section 4.3.5.)	0b	
		14-8	-	Not applicable	-	
		7	R	Send/Receive area 4	Board interrupt request flag for SLMP transient reception (Refer to Section 4.6.6)	0b
		6	R	Send/Receive area 3		0b
		5	R	Send/Receive area 2		0b
		4	R	Send/Receive area 1		0b
		3	R	Send/Receive area 4	Board interrupt request flag for SLMP transient sending (Refer to Section 4.6.6.)	0b
		2	R	Send/Receive area 3		0b
		1	R	Send/Receive area 2		0b
		0	R	Send/Receive area 1		0b

(12) Driver → Board interrupt acceptance

Byte address	Word address	Bit	R/W	Description	Initial value	
80h - 81h	40h	15	R/W	Board interrupt acceptance flag for parameter setting (Refer to Section 4.3.5.)	0b	
		14-8	-	Not applicable	-	
		7	R/W	Send/Receive area 4	Board interrupt acceptance flag for SLMP transient reception (Refer to Section 4.6.6.)	0b
		6	R/W	Send/Receive area 3		0b
		5	R/W	Send/Receive area 2		0b
		4	R/W	Send/Receive area 1		0b
		3	R/W	Send/Receive area 4	Board interrupt acceptance flag for SLMP transient sending (Refer to Section 4.6.6.)	0b
		2	R/W	Send/Receive area 3		0b
		1	R/W	Send/Receive area 2		0b
		0	R/W	Send/Receive area 1		0b

(13) Driver → Board interrupt request

Byte address	Word address	Bit	R/W	Description	Initial value	
A0h - A1h	50h	15	R/W	Driver interrupt request flag for parameter setting (Refer to Section 4.3.5.)	0b	
		14-8	-	Not applicable	-	
		7	R/W	Send/Receive area 4	Driver interrupt request flag for SLMP transient reception (Refer to Section 4.6.6.)	0b
		6	R/W	Send/Receive area 3		0b
		5	R/W	Send/Receive area 2		0b
		4	R/W	Send/Receive area 1		0b
		3	R/W	Send/Receive area 4	Driver interrupt request flag for SLMP transient sending (Refer to Section 4.6.6.)	0b
		2	R/W	Send/Receive area 3		0b
		1	R/W	Send/Receive area 2		0b
		0	R/W	Send/Receive area 1		0b

(14) Board → Driver interrupt acceptance

Byte address	Word address	Bit	R/W	Description		Initial value
C0h - C1h	60h	15	R	Driver interrupt acceptance flag for parameter setting (Refer to Section 4.3.5.)		0b
		14-8	-	Not applicable		-
		7	R	Send/Receive area 4	Driver interrupt acceptance flag for SLMP transient reception (Refer to Section 4.6.6.)	0b
		6	R	Send/Receive area 3		0b
		5	R	Send/Receive area 2		0b
		4	R	Send/Receive area 1		0b
		3	R	Send/Receive area 4	Driver interrupt acceptance flag for SLMP transient sending (Refer to Section 4.6.6.)	0b
		2	R	Send/Receive area 3		0b
		1	R	Send/Receive area 2		0b
		0	R	Send/Receive area 1		0b

(15) SLMP transient send/receive area information

Access this area, referring to the address stored in 12h (SLMP transient send/receive area information start address).

(Refer to Section 3.2.1(1).)

When sending/receiving SLMP transient, read the offset address stored in this area, and then access the header/data area of the SLMP transient send/receive area.

Each start address stores the header send area/data send area of the SLMP transient send/receive area.

Calculate the start address of the header receive area/data receive area receive area by adding the area size to the header start address/data start address.

12h	SLMP transient send/receive area information start address					
Byte offset address	Word offset address	R/W	Item		Description	Initial value
+00h - +03h	+00h - +01h	-	Not applicable			-
+04h - +05h	+02h	R	SLMP transient send/receive area 1 information	Header area	Start address	-
+06h - +07h	+03h	R			Area size	-
+08h - +09h	+04h	R		Data area	Start address	-
+Ah - +Bh	+05h	R			Area size	-
+Ch - +Dh	+06h	-		Not applicable		-
+Eh - +Fh	+07h	R	SLMP transient send/receive area 2 information	Header area	Start address	-
+10h - +11h	+08h	R			Area size	-
+12h - +13h	+09h	R		Data area	Start address	-
+14h - +15h	+0Ah	R			Area size	-
+16h - +17h	+0Bh	-		Not applicable		-
+18h - +19h	+0Ch	R	SLMP transient send/receive area 3 information	Header area	Start address	-
+1Ah - +1Bh	+0Dh	R			Area size	-
+1Ch - +1Dh	+0Eh	R		Data area	Start address	-
+1Eh - +1Fh	+0Fh	R			Area size	-
+20h - +21h	+10h	-		Not applicable		-
+22h - +23h	+11h	R	SLMP transient send/receive area 4 information	Header area	Start address	-
+24h - +25h	+12h	R			Area size	-
+26h - +27h	+13h	R		Data area	Start address	-
+28h - +29h	+14h	R			Area size	-
+2Ah - +2Bh	+15h	-		Not applicable		-

Point

For information on how to access the SLMP transient send/receive area, refer to Section 4.6.7 "Access to SLMP transient send/receive area".

(16) SLMP transient send/receive area

When sending/receiving SLMP transient, the header area and data area of SLMP transient frames are stored in this area.

To send data from the own station to another station, the driver is to write data to the send area.

When data is received by the own station from another station, the driver is to read the data of the receive area.

For details of send/receive processing, refer to Section 4.6 "Transient Transmission Processing".

For details of the frames, refer to Appendix 3 "Frame Format".

Byte offset address	Word offset address	R/W	Item			Description	Initial value
+0000h - +001Fh	+0000h - +000Fh	R/W	SLMP transient send/receive area 1	Header area	Send area	Store the header area (F to RSV5) of the SLMP transient frame.	-
+0020h - +003Fh	+0010h - +001Fh	R			Receive area	Stores the header area (F to RSV5) of the SLMP transient frame.	-
+0040h - +083Fh	+0020h - +041Fh	R/W		Data area	Send area	Store the data area (L to DATA) of the SLMP transient frame.	-
+0840h - +103Fh	+0420h - +081Fh	R			Receive area	Stores the data area (L to DATA) of the SLMP transient frame.	-
+1040h - +105Fh	+0820h - +082Fh	R/W	SLMP transient send/receive area 2	Header area	Send area	Same as above	-
+1060h - +107Fh	+0830h - +083Fh	R			Receive area	Same as above	-
+1080h - +187Fh	+0840h - +0C3Fh	R/W		Data area	Send area	Same as above	-
+1880h - +207Fh	+0C40h - +103Fh	R			Receive area	Same as above	-
+2080h - +209Fh	+1040h - +104Fh	R/W	SLMP transient send/receive area 3	Header area	Send area	Same as above	-
+20A0h - +20BFh	+1050h - +105Fh	R			Receive area	Same as above	-
+20C0h - +28BFh	+1060h - +145Fh	R/W		Data area	Send area	Same as above	-
+28C0h - +30BFh	+1460h - +185Fh	R			Receive area	Same as above	-
+30C0h - +30DFh	+1860h - +186Fh	R/W	SLMP transient send/receive area 4	Header area	Send area	Same as above	-
+30E0h - +30FFh	+1870h - +187Fh	R			Receive area	Same as above	-
+3100h - +38FFh	+1880h - +1C7Fh	R/W		Data area	Send area	Same as above	-
+3900h - +40FFh	+1C80h - +207Fh	R			Receive area	Same as above	-

Point

The start address of each area shown in the table is not a fixed value. Be sure to acquire the start address from the SLMP transient send/receive area information prior to accessing the area. For details, refer to Section 4.6.7 "Access to SLMP transient send/receive area".

3.2.3. Details of areas in the 2-port memory area (User area)

Access even addresses in the 2-port memory area using word (16-bit) or double-word (32-bit) units. Accessing an uneven address in bytes results in an error. Please refrain from doing so.

The meanings of the symbols (R/W, R, W, -) used in the address table are as follows.

R/W	Capable of reading and writing
R	Dedicated to reading. Written values are ignored.
W	Dedicated to writing. Read values are undefined.
-	Not applicable. Read values are undefined. Write "0" when writing.

(1) Link device area

Stores link device values.

Byte address	Word address	R/W	Description	Initial value
0000h - 07FFh	0000h - 03FFh	R	Remote input (RX) RX0000-RX3FFF	-
0800h - 0FFFh	0400h - 07FFh	R/W	Remote output (RY) RY0000-RY3FFF	-
1000h - 4FFFh	0800h - 27FFh	R/W	Remote register (RWw) RWw0000-RWw1FFF	-
5000h - 8FFFh	2800h - 47FFh	R	Remote register (RWr) RWr0000-RWr1FFF	-
9000h - 9003h	4800h - 4801h	R/W	Link special relay (SB)	SB0000-SB001F
9004h - 903Fh	4802h - 481Fh	R		SB0020-SB01FF
9040h - 907Fh	4820h - 483Fh	R/W	Link special register (SW)	SW0000-SW001F
9080h - 943Fh	4840h - 4A1Fh	R		SW0020-SW01FF
9440h - 97FFh	4A20h - 4BFFh	-	Not applicable	-

(2) RX offset/size information

Stores the RX offset and size (unit: words) for each station number.

Byte address	Word address	R/W	Description	Initial value
9800h - 9801h	4C00h	R	Station No.1 Offset (start number)	-
9802h - 9803h	4C01h	R	Station No.1 Size (number of points) (unit: words)	-
9804h - 9805h	4C02h	R	Station No.2 Offset (start number)	-
9806h - 9807h	4C03h	R	Station No.2 Size (number of points) (unit: words)	-
to	to	-	to	
99DCh - 99DDh	4CEEh	R	Station No.120 Offset (start number)	-
99DEh - 99DFh	4CEFh	R	Station No.120 Size (number of points) (unit: words)	-
99E0h - 99FFh	4CF0h - 4CFFh	-	Not applicable	-

(3) RY offset/size information

Stores the RY offset and size (unit: words) for each station number.

Byte address	Word address	R/W	Description	Initial value
9A00h - 9A01h	4D00h	R	Station No.1 Offset (start number)	-
9A02h - 9A03h	4D01h	R	Station No.1 Size (number of points) (unit: words)	-
9A04h - 9A05h	4D02h	R	Station No.2 Offset (start number)	-
9A06h - 9A07h	4D03h	R	Station No.2 Size (number of points) (unit: words)	-
to	to	-	to	
9BDCh - 9BDDh	4DEEh	R	Station No.120 Offset (start number)	-
9BDEh - 9BDFh	4DEFh	R	Station No.120 Size (number of points) (unit: words)	-
9BE0h - 9BFFh	4DF0h - 4DFFh	-	Not applicable	-

(4) RWw offset/size information

Stores the RWw offset and size (unit: words) for each station number.

Byte address	Word address	R/W	Description	Initial value
9C00h - 9C01h	4E00h	R	Station No.1 Offset (start number)	-
9C02h - 9C03h	4E01h	R	Station No.1 Size (number of points) (unit: words)	-
9C04h - 9C05h	4E02h	R	Station No.2 Offset (start number)	-
9C06h - 9C07h	4E03h	R	Station No.2 Size (number of points) (unit: words)	-
to	to	-	to	
9DDCh - 9DDDh	4EEEh	R	Station No.120 Offset (start number)	-
9DDEh - 9DDFh	4EEFh	R	Station No.120 Size (number of points) (unit: words)	-
9DE0h - 9DFFh	4EF0h - 4EFFh	-	Not applicable	-

(5) RWr offset/size information

Stores the RWr offset and size (unit: words) for each station number.

Byte address	Word address	R/W	Description		Initial value
9E00h - 9E01h	4F00h	R	Station No.1	Offset (start number)	-
9E02h - 9E03h	4F01h	R	Station No.1	Size (number of points) (unit: words)	-
9E04h - 9E05h	4F02h	R	Station No.2	Offset (start number)	-
9E06h - 9E07h	4F03h	R	Station No.2	Size (number of points) (unit: words)	-
to	to	-	to		
9FDCh - 9FDDh	4FEeh	R	Station No.120	Offset (start number)	-
9FDEh - 9FDFh	4FEFh	R	Station No.120	Size (number of points) (unit: words)	-
9FE0h - 9FFFh	4FF0h - 4FFFh	-	Not applicable		-

(6) Own station information

Stores the own station's information on the network.

Byte address	Word address	R/W	Item		Description	Initial value
A040h - A041h	5020h	R	Network card information	Manufacturer code	Stores the board information of the own station.	-
A042h - A043h	5021h	R		Model type		-
A044h - A045h	5022h	R		Model code		-
A046h - A047h	5023h	R		Version		-
A048h - A04Fh	5024h - 5027h	-	Not applicable			-
A050h - A051h	5028h	R	Controller information	Controller information valid/invalid flag	Stores whether the value stored in the controller information is valid or invalid. 0000h: Invalid 0001h: Valid	-
A052h - A053h	5029h	R		Manufacturer code	Stores the board information of the own station.	-
A054h - A055h	502Ah	R		Model type		-
A056h - A057h	502Bh	R		Model code		-
A058h - A059h	502Ch	R		Version		-
A05Ah - A06Dh	502Dh - 5036h	R		Model name string		-
A06Eh - A071h	5037h - 5038h	R		Vendor-specific device information		-
A072h - A07Fh	5039h - 503Fh	-	Not applicable			-

(7) Other station information (station No.1)

Stores another station (station No.1) information on the network.

Byte address	Word address	R/W	Item		Description	Initial value
A080h - A081h	5040h	R	Network card information	Manufacturer code	Stores another station's (station No.1) information.	-
A082h - A083h	5041h	R		Model type		-
A084h - A085h	5042h	R		Model code		-
A086h - A087h	5043h	R		Version		-
A088h - A08Fh	5044h - 5047h	-	Not applicable			-
A090h - A091h	5048h	R	Controller information	Controller information valid/invalid flag	Stores whether the value stored in the controller information is valid or invalid. 0000h: Invalid 0001h: Valid	-
A092h - A093h	5049h	R		Manufacturer code	Stores another station's (station No.1) information.	-
A094h - A095h	504Ah	R		Model type		-
A096h - A097h	504Bh	R		Model code		-
A098h - A099h	504Ch	R		Version		-
A09Ah - A0ADh	504Dh - 5056h	R		Model name string		-
A0AEh - A0B1h	5057h - 5058h	R		Vendor-specific device information		-
A0B2h - A0BFh	5059h - 505Fh	-	Not applicable			-

(8) Other station information

This area stores other stations' (station No.2 to No.120) information on the network.

Byte address	Word address	R/W	Item	Description
A0C0h - A0FFh	5060h - 507Fh	R	Other station information of the station No.2	The contents are the same as those of Station No.1.
A100h - A13Fh	5080h - 509Fh	R	Other station information of the station No.3	
BE00h - BE3Fh	5F00h - 5F1Fh	R	Other station information of station No.119	
BE40h - BE7Fh	5F20h - 5F3Fh	R	Other station information of station No.120	

(9) CC-Link compatible transient handshake area

When sending/receiving CC-Link compatible transient, this area is used to perform a handshake between the driver and the board for data communication.

For details of send/receive processing, refer to Section 4.6 "Transient Transmission Processing".

Byte address	Word address	R/W	Item	Description	Initial value
BFE0h - BFE1h	5FF0h	R/W	CC-Link compatible transient handshake area 1	Send signal 0000h: Initial status 0001h: Send request 0002h: Send start 00FFh: Sending normal completion 00FEh: Sending abnormal end	0000h
BFE2h - BFE3h	5FF1h	R		Sending error code*1 0000h: Normal Other than 0000h: Error code	0000h
BFE4h - BFE5h	5FF2h	R/W		Receive signal 0000h: Initial status 0001h: Receive request 0002h: Reception acceptance 00FFh: Reception completed	0000h
BFE6h - BFE7h	5FF3h	-		Not applicable	Fixed to 0000h
BFE8h - BFE9h	5FF4h	R/W	CC-Link compatible transient handshake area 2	Send signal	Same as above
BFEAh - BFEBh	5FF5h	R		Sending error code*1	Same as above
BFEC h - BFEDh	5FF6h	R/W		Receive signal	Same as above
BFEeh - BFEFh	5FF7h	-		Not applicable	Fixed to 0000h
BFF0h - BFFh	5FF8h - 5FFFh	-	Not applicable	Not applicable	Fixed to 0000h

*1: This area stores the error codes of errors in CC-Link compatible transient send processing. For error code details, refer to Section 6.1 "Error Codes".

(10) CC-Link compatible transient data area

When sending/receiving CC-Link compatible transient, the CC-Link compatible transient frames are stored in this area. To send data from the own station to another station, the driver is to write data to the send area.

When data is received by the own station from another station, the driver is to read the data of the receive area.

For details of send/receive processing, refer to Section 4.6 "Transient Transmission Processing".

For details of the frames, refer to Appendix 3 "Frame Format".

Byte address	Word address	R/W	Item	Description	Initial value
C000h - C3FFh	6000h - 61FFh	R/W	CC-Link compatible transient data area 1	Send area 1	Store the CC-Link compatible transient frame (L to DATA).
C400h - C7FFh	6200h - 63FFh	R		Receive area 1	Stores the CC-Link compatible transient frame (L to DATA).
C800h - CBFFh	6400h - 65FFh	R/W	CC-Link compatible transient data area 2	Send area 2	Same as above
CC00h - CFFFh	6600h - 67FFh	R		Receive area 2	Same as above

3.3. Register Area

The register area comprises the board setting area and hardware control register area.
The following figure shows an image of the register area.

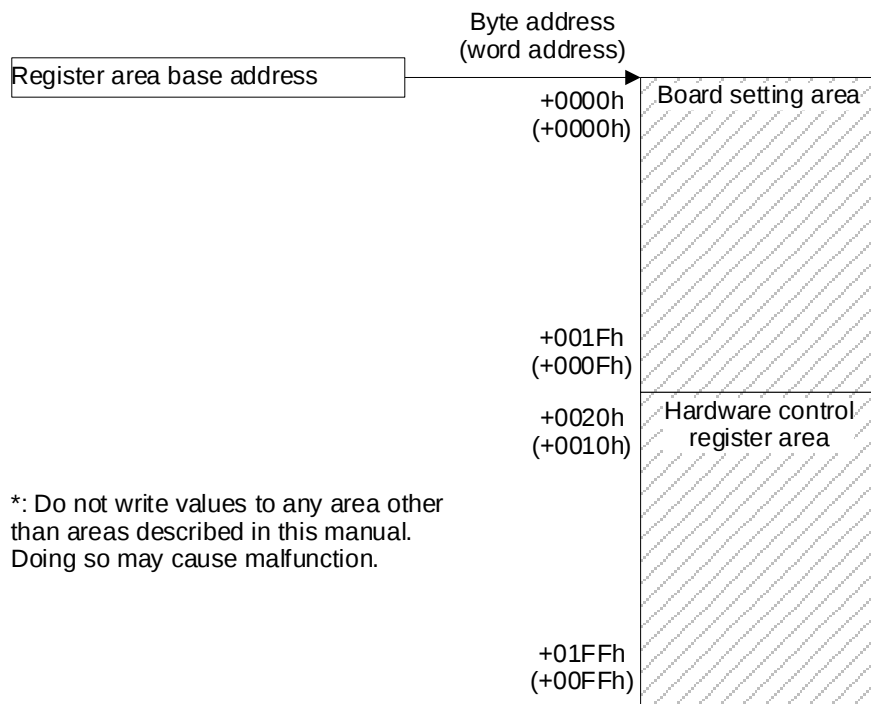


Figure 3.3-1 Image of Register Area

Point	
Basic address of the register area can be acquired from the following register. Section 3.1.2(4) "Register area basic address register"	

3.3.1. Register area list

The following table lists the register area required for driver development.

(1) Board setting area

The following table lists the board setting area. For details, refer to the corresponding section.

Table 3.3.1-1 Board Setting Area List

Byte address	Word address	Item	Reference
0000h - 0001h	0000h	Common information 0 (SPI/O0)	Section 3.3.2(1)
0002h - 0003h	0001h	Common information 1 (SPI/O1)	Section 3.3.2(2)
0004h - 0005h	0002h	Common information 2 (SPI/O2)	Section 3.3.2(3)
0006h - 0007h	0003h	Common information 3 (SPI/O3)	Section 3.3.2(4)
0008h - 0009h	0004h	Board → Host interrupt area (SPI/O4)	Section 3.3.2(5)
000Ah - 000Bh	0005h	Host → Board interrupt area (SPI/O5)	Section 3.3.2(6)
000Ch - 000Dh	0006h	Interrupt information 0 (SPI/O6)	Section 3.3.2(7)
000Eh - 000Fh	0007h	Not applicable	-
0010h - 0011h	0008h	Network number setting area (SPI/O8)	Section 3.3.2(8)
0012h - 0013h	0009h	Own station number setting area (SPI/O9)	Section 3.3.2(9)
0014h - 0015h	000Ah	Operation mode setting area (SPI/OA)	Section 3.3.2(10)
0016h - 001Fh	000Bh - 000Fh	Not applicable	-

(2) Hardware control register area

The following table lists the hardware control register area. For details, refer to the corresponding section.

Table 3.3.1-2 Hardware Control Register Area List

Byte address	Word address	Item	Reference
0020h - 002Fh	0010h - 0017h	Not applicable	-
0030h - 0031h	0018h	Initial processing complete flag	Section 3.3.3(1)
0032h - 0035h	0019h - 001Ah	Not applicable	-
0036h - 0037h	001Bh	Time information setting flag	Section 3.3.3(2)
0038h - 0039h	001Ch	Time information (month/last two digits of the year)	Section 3.3.3(3)
003Ah - 003Bh	001Dh	Time Information (hour/day)	Section 3.3.3(4)
003Ch - 003Dh	001Eh	Time Information (second/minute)	Section 3.3.3(5)
003Eh - 003Fh	001Fh	Time Information (first two digits of the year/day of the week)	Section 3.3.3(6)
0040h - 004Fh	0020h - 0027h	Not applicable	-
0050h - 0051h	0028h	Host operation information	Section 3.3.3(7)
0052h - 0053h	0029h	Error code register	Section 3.3.3(8)
0054h - 005Fh	002Ah - 002Fh	Not applicable	-
0060h - 0061h	0030h	Board LED status register	Section 3.3.3(9)
0062h - 006Dh	0031h - 0036h	Not applicable	-
006Eh - 006Fh	0037h	LED control register	Section 3.3.3(10)
0070h - 00AFh	0038h - 0057h	Not applicable	-
00B0h - 00B1h	0058h	Board status register	Section 3.3.3(11)
00B2h - 00B3h	0059h	Not applicable	-
00B4h - 00B5h	005Ah	Board status interrupt cause register	Section 3.3.3(12)
00B6h - 00B7h	005Bh	Not applicable	-
00B8h - 00B9h	005Ch	Board status interrupt mask register	Section 3.3.3(13)
00BAh - 00BBh	005Dh	Not applicable	-
00BCh - 00BDh	005Eh	Board status interrupt reset register	Section 3.3.3(14)
00BEh - 00BFh	005Fh	Not applicable	-
00C0h - 00C1h	0060h	Host error reset register	Section 3.3.3(15)
00C2h - 00C7h	0061h - 0063h	Not applicable	-
00C8h - 00C9h	0064h	Interrupt cause batch mask register	Section 3.3.3(16)
00CAh - 00D3h	0065h - 0069h	Not applicable	-
00D4h - 00D7h	006Ah - 006Bh	Alive check function setting register	Section 3.3.3(17)
00D8h - 00D9h	006Ch	Alive check function register lock register	Section 3.3.3(18)
00DAh - 00DBh	006Dh	Not applicable	-
00DCh - 00DDh	006Eh	Interval timer reset register	Section 3.3.3(19)
00DEh - 00DFh	006Fh	Not applicable	-
00E0h - 00E1h	0070h	Interval timer reset lock register	Section 3.3.3(20)
00E2h - 011Fh	0071h - 008Fh	Not applicable	-
0120h - 0123h	0090h - 0091h	User area start address register	Section 3.3.3(21)
0124h - 0127h	0092h - 0093h	User area end address register	Section 3.3.3(22)
0128h - 012Bh	0094h - 0095h	2-port memory area unlock register	Section 3.3.3(23)
012Ch - 012Dh	0096h	2-port memory area lock status register	Section 3.3.3(24)
012Eh - 01FFh	0097h - 00FFh	Not applicable	-

3.3.2. Details of areas in the register area (Board setting area)

The meanings of the symbols (R/W, R, W, -) used in the address table are as follows.

R/W	Capable of reading and writing
R	Dedicated to reading. Written values are ignored.
W	Dedicated to writing. Read values are undefined.
-	Not applicable. Read values are undefined. Write "0" when writing.

(1) Common information 0 (SPI/O0)

Byte address	Word address	Bit	R/W	Description	Initial value
00h - 01h	00h	15	R	Board mounting information 1b: Board mounted (fixed)	1b
		14	R	Fixed to 0b	0b
		13	R	Board-side register information setting completed assessment 0b: Not set 1b: Setting completed	0b
		12-0	-	Not applicable	-

(2) Common information 1 (SPI/O1)

Byte address	Word address	Bit	R/W	Description	Initial value
02h - 03h	01h	15	W	Host-side register information setting completed assessment 0b: Not completed 1b: Completed	0b
		14-9	R	Fixed to 000000b	000000b
		8	R	Fixed to 1b	1b
		7-0	-	Not applicable	-

(3) Common information 2 (SPI/O2)

Byte address	Word address	Bit	R/W	Description	Initial value
04h - 05h	02h	15	R/W	Host-side initial information setting completed assessment 0b: Not completed 1b: Completed	0b
		14-2	-	Not applicable	-
		1	R	Board information ready completed assessment 0b: Not ready 1b: Ready	0b
		0	R	Board-side initial information setting completed assessment 0b: Not completed 1b: Completed	0b

(4) Common information 3 (SPI/O3)

Byte address	Word address	Bit	R/W	Description	Initial value
06h - 07h	03h	15	R/W	Set the fixed value "0b" during initial processing.	0b
		14-3	-	Not applicable	-
		2	R/W	Operation mode enable setting 0b: Disable 1b: Enable The setting in (10) "Operation mode setting area (SPI/OA)" is enabled when this bit is set to "1b: Enable".	0b
		1	R/W	Own station number enable setting 0b: Disable 1b: Enable The setting in (9) "Own station number setting area (SPI/O9)" is enabled when this bit is set to "1b: Enable".	0b
		0	R/W	Network number enable setting 0b: Disable 1b: Enable The setting in (8) "Network number setting area (SPI/O8)" is enabled when this bit is set to "1b: Enable".	0b

(5) Board → Host interrupt area (SPI/O4)

Byte address	Word address	Bit	R/W	Description	Initial value
08h - 09h	04h	15-4	-	Not applicable	-
		3	R	Board → Driver interrupt cause 2 (Even if the interrupt is masked, the interrupt cause is readable.) 0b: No cause 1b: Cause	0b
			W	Board → Driver interrupt cause 2 reset 0b: No processing 1b: Reset cause	-
		2	R	Board → Driver interrupt cause 1 (Even if the interrupt is masked, the interrupt cause is readable.) 0b: No cause 1b: Cause	0b
			W	Board → Driver interrupt cause 1 reset 0b: No processing 1b: Reset cause	-
		1	R	Fixed to 0b	0b
			W	Board → Driver interrupt mask clear bit (When both mask setting bit and mask clear bit are set to "1b", it is handled as masked.) 0b: No processing 1b: Clear mask	-
		0	R	Fixed to 0b	0b
			W	Board → Driver interrupt mask setting bit (When both mask setting bit and mask clear bit are set to "1b", it is handled as masked.) 0b: No processing 1b: Set mask	-

Point

- The mask is set in the initial status at power-on.
- An interrupt is generated from the board to the driver at the following timing. Analyze the interrupt causes and take adequate processing for each cause.
 - At sequence transition of each parameter during parameter setting
 - At transition of control flags during SLMP transient send/receive.

(6) Host → Board interrupt area (SPI/O5)

Byte address	Word address	Bit	R/W	Description	Initial value
0Ah - 0Bh	05h	15-3	-	Not applicable	-
		2	R	Driver → Board interrupt cause 1 0b: No cause 1b: Cause	0b
			W	Driver → Board interrupt cause 1 0b: No processing 1b: Set cause	-
		1-0	-	Not applicable	-

Point

- Set the interrupt cause from the driver to the board at the following timing.
 - At setting sequence transition of each parameter during parameter setting
 - At transition of control flags during SLMP transient send/receive.

(7) Interrupt information 0 (SPI/O6)

Byte address	Word address	Bit	R/W	Description	Initial value
0Ch - 0Dh	06h	15-0	W	Interrupt information 0001h: Set mask 000Ch: Reset cause	0001h

(8) Network number setting area (SPI/O8)

Byte address	Word address	Bit	R/W	Description	Initial value
10h - 11h	08h	15-8	R/W	Set the fixed value "00h" during initial processing.	00h
		7-0	R/W	Network number 01h to EFh (1 to 239)	00h

(9) Own station number setting area (SPI/O9)

Byte address	Word address	Bit	R/W	Description	Initial value
12h - 13h	09h	15-8	R/W	When "Own station number" of bits 7-0 is 0: 00h When "Own station number" of bits 7-0 is other than 0: 31h	00h
		7-0	R/W	Own station number Master station: 00h Local station: 01h to 78h (1 to 120)	00h

(10) Operation mode setting area (SPI/OA)

Byte address	Word address	Bit	R/W	Description	Initial value
14h - 15h	0Ah	15-0	R/W	Operation mode for master station 0000h: Online (normal mode) 0001h: Online (high-speed mode) 0002h: Offline 0006h: Loop test 0007h: Self-loopback test 0009h: Hardware test	0000h
				Operation mode for local station 0000h: Online 0002h: Offline 0007h: Self-loopback test 0009h: Hardware test	

3.3.3. Details of areas in the register area (Hardware control register area)

The meanings of the symbols (R/W, R, W, -) used in the address table are as follows.

R/W	Capable of reading and writing
R	Dedicated to reading. Written values are ignored.
W	Dedicated to writing. Read values are undefined.
-	Not applicable. Read values are undefined. Write "0" when writing.

(1) Initial processing complete flag

Byte address	Word address	Bit	R/W	Description	Initial value
30h - 31h	18h	15-1	-	Not applicable	-
		0	R/W	Initial processing complete flag 0b: Not completed 1b: Completed	0b

(2) Time information setting flag

Byte address	Word address	Bit	R/W	Description	Initial value
36h - 37h	1Bh	15-8	R	Not applicable	-
		7-0	R/W	Time information setting flag 00h: Set incomplete 01h: Initialize 02h: Reset in progress FFh to 03h: Set complete (decrement)	00h

(3) Time information (month/last two digits of the year)

Byte address	Word address	Bit	R/W	Description	Initial value
38h - 39h	1Ch	15-8	R/W	Set the time information (month) in BCD.	00h
		7-0	R/W	Set the time information (last two digits of the year) in BCD.	00h

(4) Time Information (hour/day)

Byte address	Word address	Bit	R/W	Description	Initial value
3Ah - 3Bh	1Dh	15-8	R/W	Set the time information (hour) in BCD.	00h
		7-0	R/W	Set the time information (day) in BCD.	00h

(5) Time Information (second/minute)

Byte address	Word address	Bit	R/W	Description	Initial value
3Ch - 3Dh	1Eh	15-8	R/W	Set the time information (second) in BCD.	00h
		7-0	R/W	Set the time information (minute) in BCD.	00h

(6) Time Information (first two digits of the year/day of the week)

Byte address	Word address	Bit	R/W	Description	Initial value
3Eh - 3Fh	1Fh	15-8	R/W	Set the time information (first two digits of the year) in BCD.	00h
		7-0	R/W	Set the time information (day of the week) in BCD. 00h: Sunday 01h: Monday 02h: Tuesday 03h: Wednesday 04h: Thursday 05h: Friday 06h: Saturday	00h

(7) Host operation information

Byte address	Word address	Bit	R/W	Description	Initial value
50h - 51h	28h	15-8	-	Not applicable	-
		7	R/W	I/O reset 0b: Clear reset 1b: Issue reset	1b
		6	R/W	Board reset 0b: Clear reset 1b: Issue reset* ¹	1b
		5-0	R/W	Host operation information 00 0000b: Initial status 00 0001b: Normal STOP 00 0010b: Abnormal STOP (moderate/major error) 00 0100b: RUN 00 1111b: Host initial processing in progress	00 0000b

1: Hold the status of 1b for 2 ms or longer.

(8) Error code register

Byte address	Word address	Bit	R/W	Description	Initial value
52h - 53h	29h	15-0	R/W	Store the error codes of the errors that occurred in the driver side (vendor specific processing). 0000h: Normal Other than 0000h: Error code	0000h

(9) Board LED status register

Byte address	Word address	Bit	R/W	Item	Description	Initial value
60h - 61h	30h	15-12	-	-	Not applicable	-
		11	R	LINK2 LED	The LED status can be read. 0b: Off 1b: On	0b
		10	R	LINK1 LED	Same as above	0b
		9	R	LER2 LED	Same as above	0b
		8	R	LER1 LED	Same as above	0b
		7	R	MODE LED	Same as above	0b
		6	R	RD LED	Same as above	0b
		5	R	SD LED	Same as above	0b
		4	R	LERR LED	Same as above	0b
		3	R	ERR. LED	Same as above	0b
		2	R	DLINK LED	Same as above	0b
		1	R	MST LED	Same as above	0b
		0	R	RUN LED	Same as above	0b

(10) LED control register

Byte address	Word address	Bit	R/W	Description	Initial value
6Eh - 6Fh	37h	15	R/W	LED control mode switch LED control of the bits 0 to 3 of this register is enabled when this bit is set to "1b". 0b: Normal mode (default) 1b: LED control mode	0b
		14-4	-	Not applicable	-
		3	R/W	RD LED control 0b: Off 1b: On	0b
		2	R/W	SD LED control 0b: Off 1b: On	0b
		1	R/W	ERR. LED control 0b: Off 1b: On	0b
		0	R/W	RUN LED control 0b: Off 1b: On	0b

Note

LED control to indicate the status of the board or network is handled by the board.

The driver should handle the LED control only when LED indication is used for the operating status of the host specific function.

Example: The Windows driver included with the SW1DNC-CCIEF-B controls the LED (on/off) while checking the board channel number.

(11) Board status register

Byte address	Word address	Bit	R/W	Description	Initial value
B0h - B1h	58h	15-11	-	Not applicable	-
		10	R	Internal bus error 0b: No error 1b: Error	0b
		9	R	2-port memory byte access error 0b: No error 1b: Error	0b
		8	R	2-port memory parity error 0b: No error 1b: Error	0b
		7-5	-	Not applicable	-
		4	R	Alive check error 0b: No error 1b: Error	0b
		3-0	-	Not applicable	-

(12) Board status interrupt cause register

Byte address	Word address	Bit	R/W	Description	Initial value
B4h - B5h	5Ah	15-8	-	Not applicable	-
		7	R	2-port memory parity error occurrence interrupt 0b: No cause 1b: Cause	0b
		6	R	[PCI board] Fixed to 0b	0b
				[PCI Express board] Host-side PCI Express correctable error occurrence interrupt 0b: No cause 1b: Cause	
		5	R	[PCI board] Host-side PCI data parity error occurrence interrupt 0b: No cause 1b: Cause	0b
				[PCI Express board] Host-side PCI Express non-fatal error occurrence interrupt 0b: No cause 1b: Cause	
		4	-	Not applicable	-
		3	R	Alive check error occurrence interrupt 0b: No cause 1b: Cause	0b
		2	-	Not applicable	-
		1	R	Clock stop error occurrence interrupt 0b: No cause 1b: Cause	0b
		0	-	Not applicable	-

*: Even if the interrupt is masked, the interrupt cause is readable.

(13) Board status interrupt mask register

Byte address	Word address	Bit	R/W	Description	Initial value
B8h - B9h	5Ch	15-8	R/W	Set the fixed value "E1h" during initial processing.	E1h
		7	R/W	2-port memory parity error occurrence interrupt mask 0b: No mask 1b: Mask	1b
		6	R/W	[PCI board] Fixed to 0b	0b
				[PCI Express board] Host-side PCI Express correctable error occurrence interrupt mask 0b: No mask 1b: Mask	
		5	R/W	[PCI board] Host-side PCI data parity error occurrence interrupt mask 0b: No mask 1b: Mask	1b
				[PCI Express board] Host-side PCI Express non-fatal error occurrence interrupt mask 0b: No mask 1b: Mask	
		4	R/W	Set the fixed value "1b" during initial processing.	1b
		3	R/W	Alive check error occurrence interrupt mask 0b: No mask 1b: Mask	1b
		2	R/W	Set the fixed value "1b" during initial processing.	1b
		1	R/W	Clock stop error occurrence interrupt mask 0b: No mask 1b: Mask	1b
		0	-	Not applicable	-

(14) Board status interrupt reset register

Byte address	Word address	Bit	R/W	Description	Initial value
BCh - BDh	5Eh	15-8	W	Fixed to E1h	-
		7	W	2-port memory parity error occurrence interrupt reset 0b: No processing 1b: Reset	-
		6	W	[PCI board] Fixed to 0b	-
				[PCI Express board] Host-side PCI Express correctable error occurrence interrupt reset 0b: No processing 1b: Reset	
		5	W	[PCI board] Host-side PCI data parity error occurrence interrupt reset 0b: No processing 1b: Reset	-
				[PCI Express board] Host-side PCI Express non-fatal error occurrence interrupt reset 0b: No processing 1b: Reset	
		4	W	Fixed to 1b	-
		3	W	Alive check error occurrence interrupt reset 0b: No processing 1b: Reset	-
		2	W	Fixed to 1b	-
		1	W	Clock stop error occurrence interrupt reset 0b: No processing 1b: Reset	-
		0	-	Not applicable	-

(15) Host error reset register

Byte address	Word address	Bit	R/W	Description	Initial value
C0h - C1h	60h	15-7	-	Not applicable	-
		6	W	2-port memory byte access error reset 0b: No processing 1b: Reset	-
		5	W	2-port memory parity error reset 0b: No processing 1b: Reset	-
		4-1	-	Not applicable	-
		0	W	Alive check error reset 0b: No processing 1b: Reset	-

(16) Interrupt cause batch mask register

Byte address	Word address	Bit	R/W	Description	Initial value
C8h - C9h	64h	15-1	-	Not applicable	-
		0	R/W	Interrupt cause batch mask 0b: Clear mask 1b: Set mask	0b

(17) Alive check function setting register

Byte address	Word address	Bit	R/W	Description	Initial value
D4h - D7h	6Ah - 6Bh	31-16	-	Not applicable	-
		15	W	Alive check function startup 0b: Stop alive check function 1b: Start alive check function	0b
		14-0	W	Interval timer setting Setting value range: 0001h to 7FFFh (unit: 10 ms) (An alive check error is detected after "10 ms x (setting value) - 10 μs" to "10 ms x (setting value)".)	0000h

Note

- Do not write to bits 15 and 14-0 simultaneously. First set the interval timer of bits 14-0, and then set the alive check function startup/stop of bit 15.
- Do not change the interval timer during alive check function startup. When the interval timer needs to be changed, stop the alive check function and unlock with 3.3.3(18) "Alive check function register lock register" before making any change to the setting values. (Writing a setting value to the interval timer while locked will be ignored.)
- Do not set "0000h" to the interval timer setting value. When "0000h" is set, an error occurs immediately after alive check function startup.

(18) Alive check function register lock register

Byte address	Word address	Bit	R/W	Description	Initial value
D8h - D9h	6Ch	15-8	-	Not applicable	-
		7-0	W	Lock/Unlock setting of (17) "Alive check function setting register" 55h: Unlock*1 AAh: Lock	-

*1: 3.3.3(17) "Alive check function setting register" becomes locked after board reset regardless of the stored value.

(19) Interval timer reset register

Byte address	Word address	Bit	R/W	Description	Initial value
DCh - DDh	6Eh	15-8	-	Not applicable	-
		7-0	R	Interval timer reset*1 Fixed to 00h (When this register is read, the interval timer is reset.)	00h

*1: Before resetting the interval timer, unlock the 3.3.3(20) "Interval timer reset lock register".

(20) Interval timer reset lock register

Byte address	Word address	Bit	R/W	Description	Initial value
E0h - E1h	70h	15-8	-	Not applicable	-
		7-0	W	Lock/Unlock setting of (19) "Interval timer reset register" 55h: Unlock*1 AAh: Lock	-

*1: 3.3.3(19) "Interval timer reset register" becomes locked after board reset regardless of the stored value.

(21) User area start address register

Byte address	Word address	Bit	R/W	Description	Initial value
120h - 123h	90h - 91h	31-17	-	Not applicable	-
		16-0	R	User area start address*1 Stores the offset address from the start address of the 2-port memory area.	10000h

*1: The address becomes readable after "Board-side initial information setting completed assessment" of the initial processing.

(22) User area end address register

Byte address	Word address	Bit	R/W	Description	Initial value
124h - 127h	92h - 93h	31-17	-	Not applicable	-
		16-0	R	User area end address*1 Stores the offset address from the start address of the 2-port memory area.	1FFFFh

*1: The address becomes readable after "Board-side initial information setting completed assessment" of the initial processing.

(23) 2-port memory area unlock register

Byte address	Word address	Bit	R/W	Description	Initial value
128h - 12Bh	94h - 95h	31-0	W	Write a different value (a value that differs from the previously setting value) each time in 32-bit units to unlock the 2-port memory area.*1	-

*1: The 2-port memory area cannot be accessed until after this register is set.

(24) 2-port memory area lock status register

Byte address	Word address	Bit	R/W	Description	Initial value
12Ch - 12Dh	96h	15-1	-	Not applicable	-
		0	R	2-port memory area lock/unlock status (Access the 2-port memory area or clear board reset after first verifying that this bit is "1b: Unlock".) 0b: Lock 1b: Unlock	0b

4. DRIVER PROCESSING

To enable the host to operate as the master or local station, on the driver, implement the processing such as initial processing, cyclic transmission processing, and transient transmission processing. The following table lists whether implementation of each type of driver processing is required or not.

Table 4-1 Processing Implemented on Driver

Driver processing	Implementation necessity	Reference
Initial processing	Required	Section 4.1
Parameter creation processing	Required	Section 4.2
Parameter setting processing	Required	Section 4.3
Time information setting processing	Required	Section 4.4
Cyclic transmission processing	Required	Section 4.5
Transient transmission processing	Optional	Section 4.6
Alive check processing	Optional	Section 4.7.1
CC-Link IE Field Network diagnostic processing	Optional	Section 4.7.2

The following shows outline transition examples for the types of processing to be implemented on drivers.
(Note that the figure below is just one of the examples. Schedule a task according to the specifications of the host.)

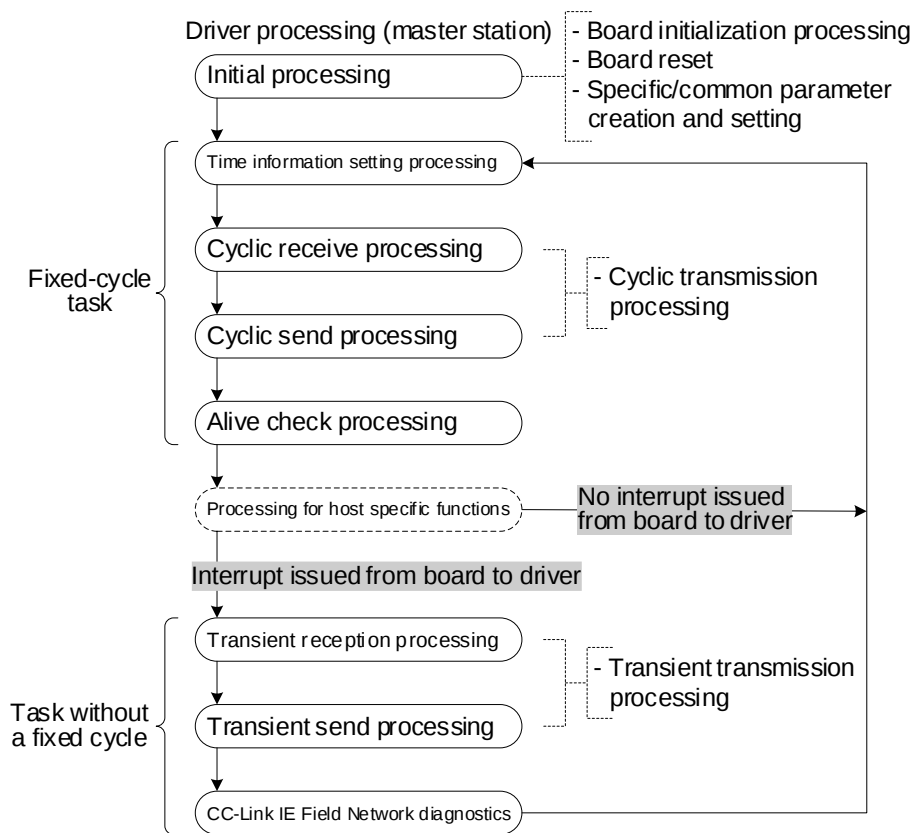


Figure 4-1 Driver Processing Transition (Master Station)

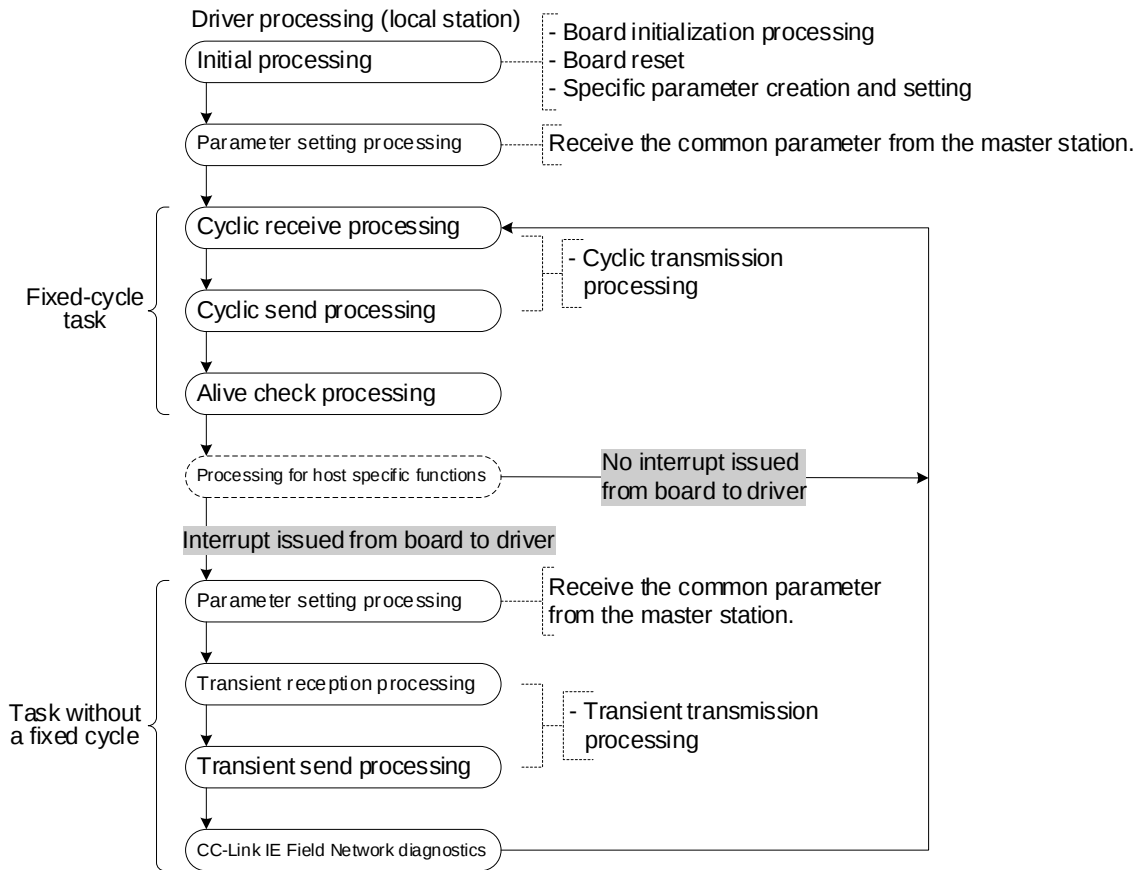


Figure 4-2 Driver Processing Transition (Local Station)

Carry out implementation in such a way that a fixed-cycle task is not dependent on (not easily affected by) a user application to assure cyclic transmission punctuality.

Carry out implementation in such a way that a task without a fixed cycle is executed when requested by a user application or when receiving a communication request from another station. (Execute processing such as transient transmission processing when an interrupt generated from the board to the driver or from the driver to the board.)

4.1. Initial Processing

In initial processing, the driver executes the types of processing below. The driver is to perform initial processing when the host is powered on and when parameters are reset.

- Board initialization
- Board reset
- Parameter creation
- Parameter setting

In initial processing, the driver performs reading and writing with the 2-port memory area and the register area. For details on the 2-port memory area, refer to Section 3.2 "2-Port Memory Area". For details on the register area, refer to Section 3.3 "Register Area".

When the initial processing is executed and completed, the board starts the data link.

The following figure shows the outline procedure of initial processing performed by the driver. The start addresses of each memory and register in the figure are expressed using a byte address.

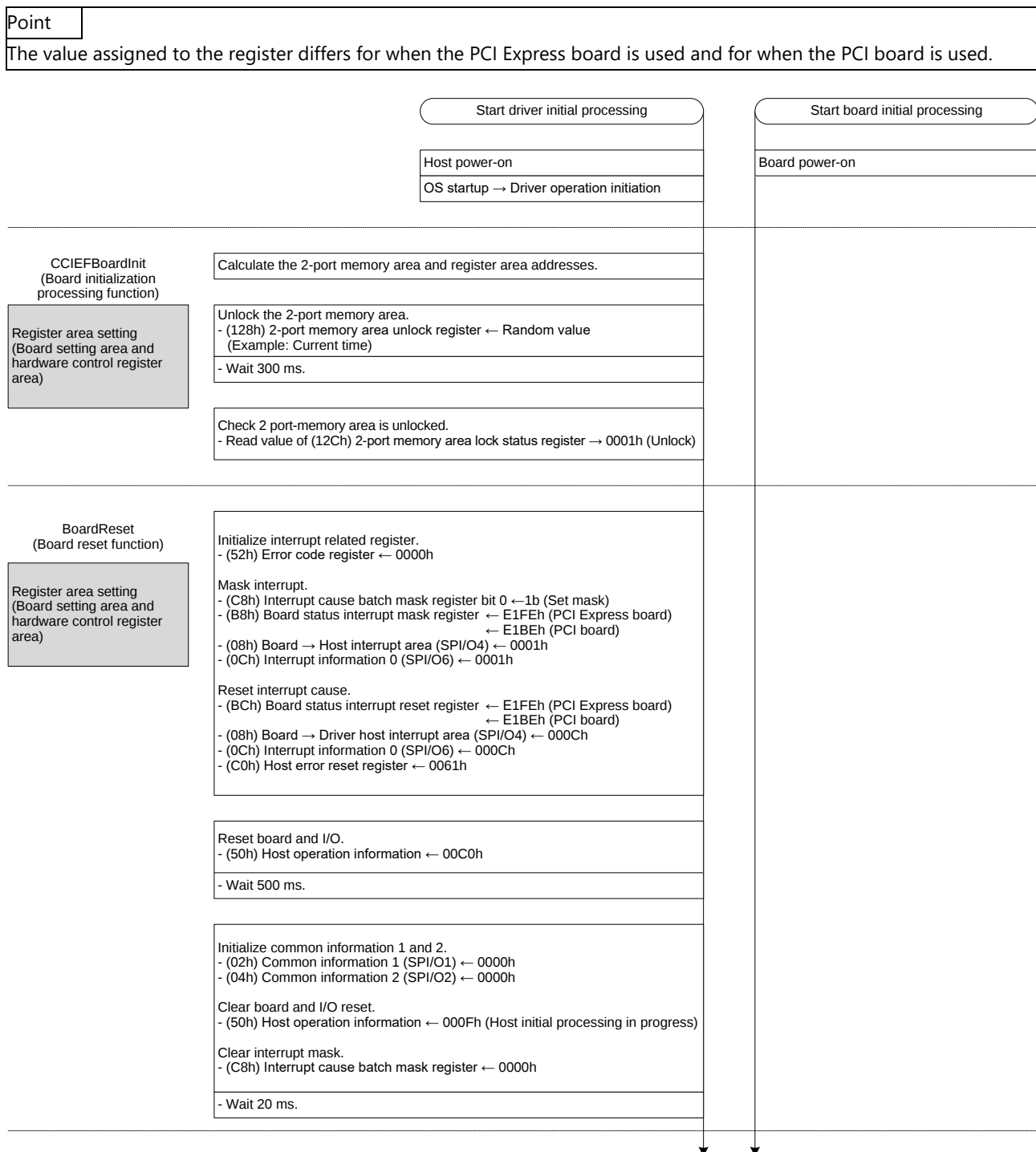


Figure 4.1-1 Initial Processing Procedure (1/3)

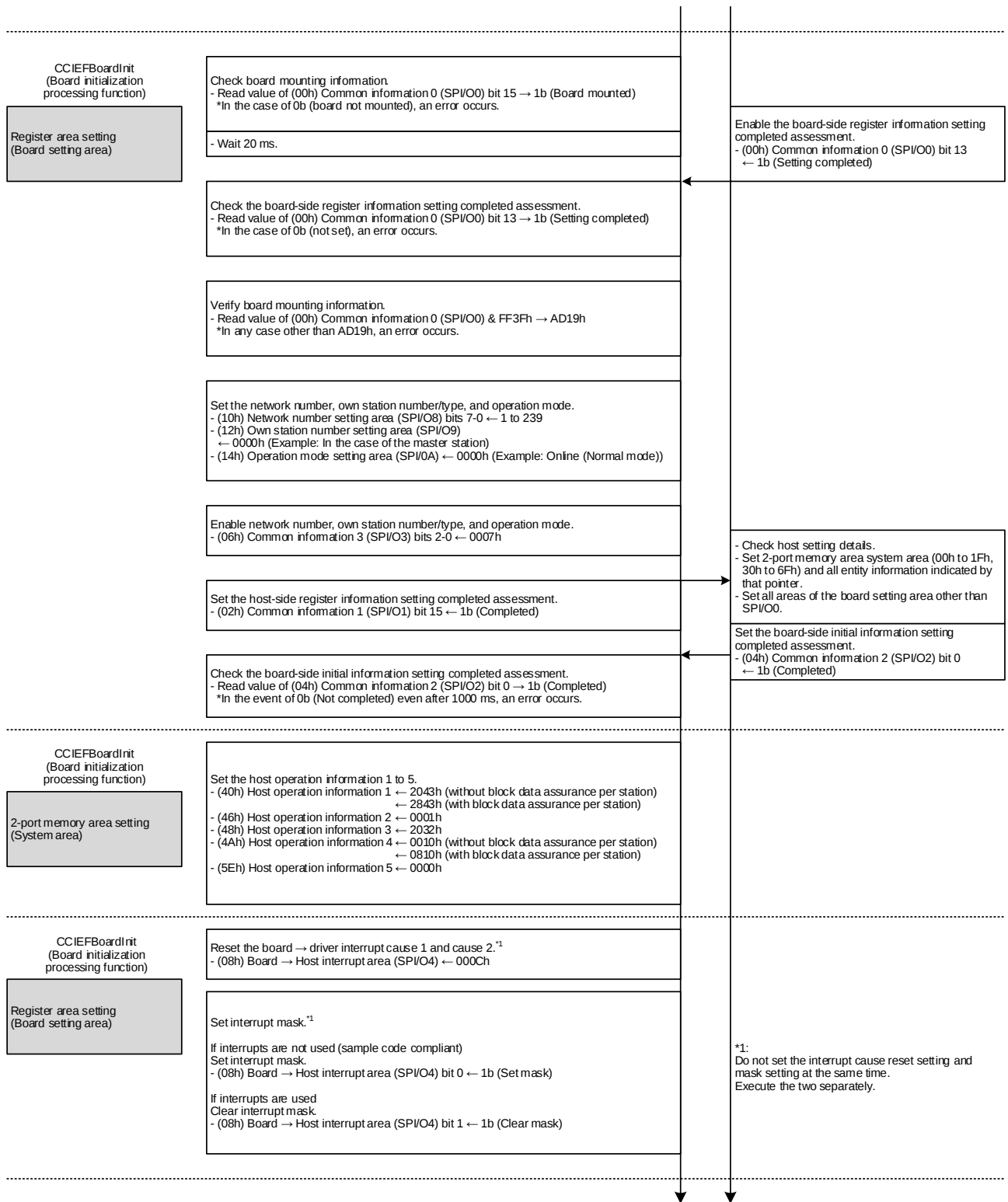


Figure 4.1-1 Initial Processing Procedure (2/3)

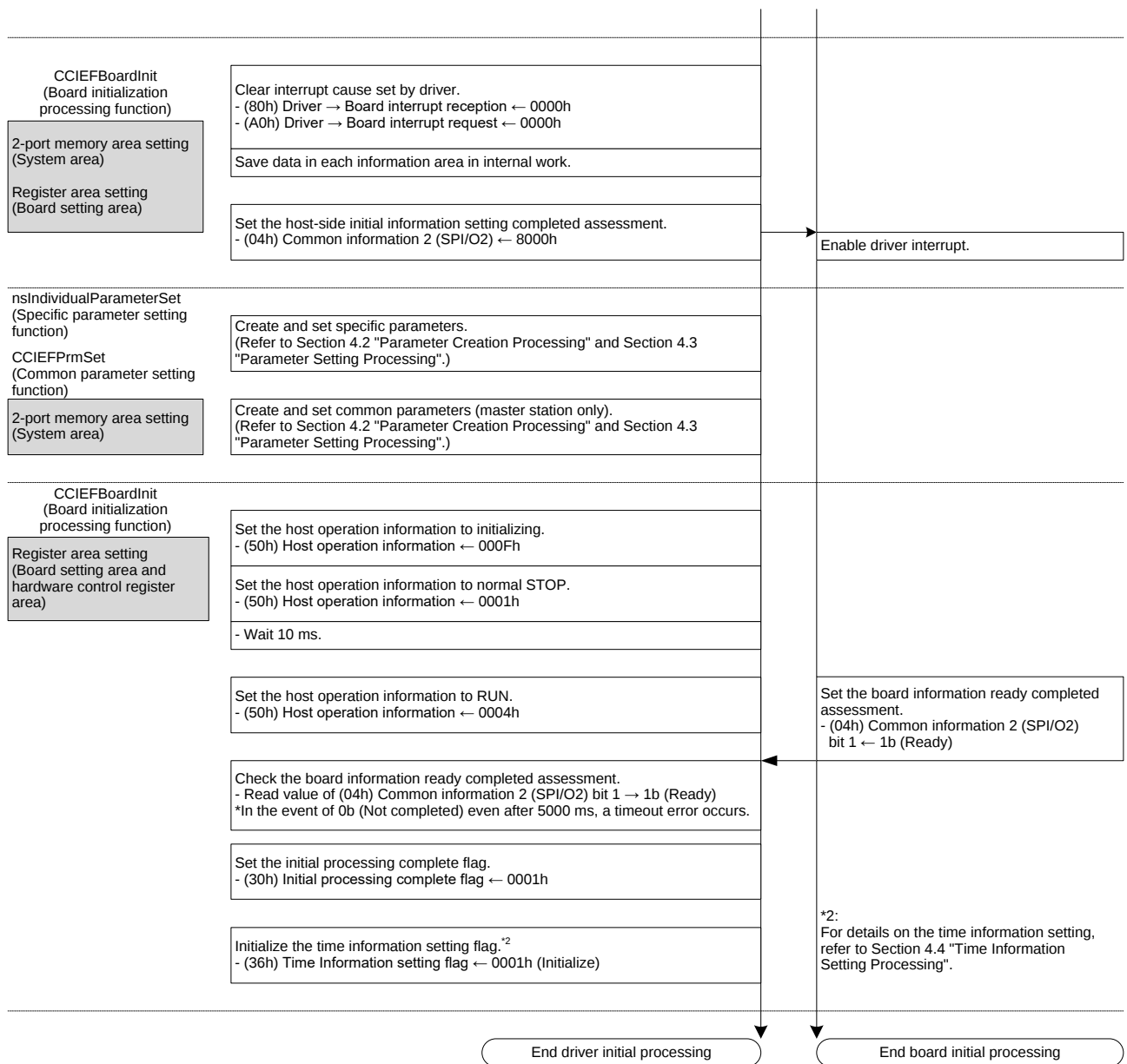


Figure 4.1-1 Initial Processing Procedure (3/3)

4.2. Parameter Creation Processing

In parameter creation processing, the driver creates specific parameters and common parameters. This section shows a parameter structure required for creating parameters.

(1) Parameter creation necessity

Specific parameter : Created by the driver in the case of both the master station and local station.

Common parameter : Created by the driver in the case of the master station only, and the parameters distributed by the master station are received by local stations.

Parameter creation necessity differs depending on the station type and operation mode. The following table shows cases of parameter creation necessity.

Table 4.2-1 Parameter Creation Necessity

Station type	Operation mode	Specific parameter	Common parameter
Master station	00h: Online (normal mode)	○	○
	01h: Online (high-speed mode)	○	○
	02h: Offline	-	-
	06h: Loop test	○	○
	07h: Self-loopback test	-	-
	09h: Hardware test	-	-
Local station	00h: Online	○	-
	02h: Offline	-	-
	07h: Self-loopback test	-	-
	09h: Hardware test	-	-

○: Created by driver

(2) Access to parameter areas

Specific parameters and common parameters are created by using parameter areas in the 2-port memory area. For details on access to parameter areas, refer to Section 3.2.2(4) "Parameter setting information area".

4.2.1. Specific parameter

Specific parameter is the parameter for setting the information specific to each station.
The following figure shows the structure of specific parameter.

(1) Specific parameter main body

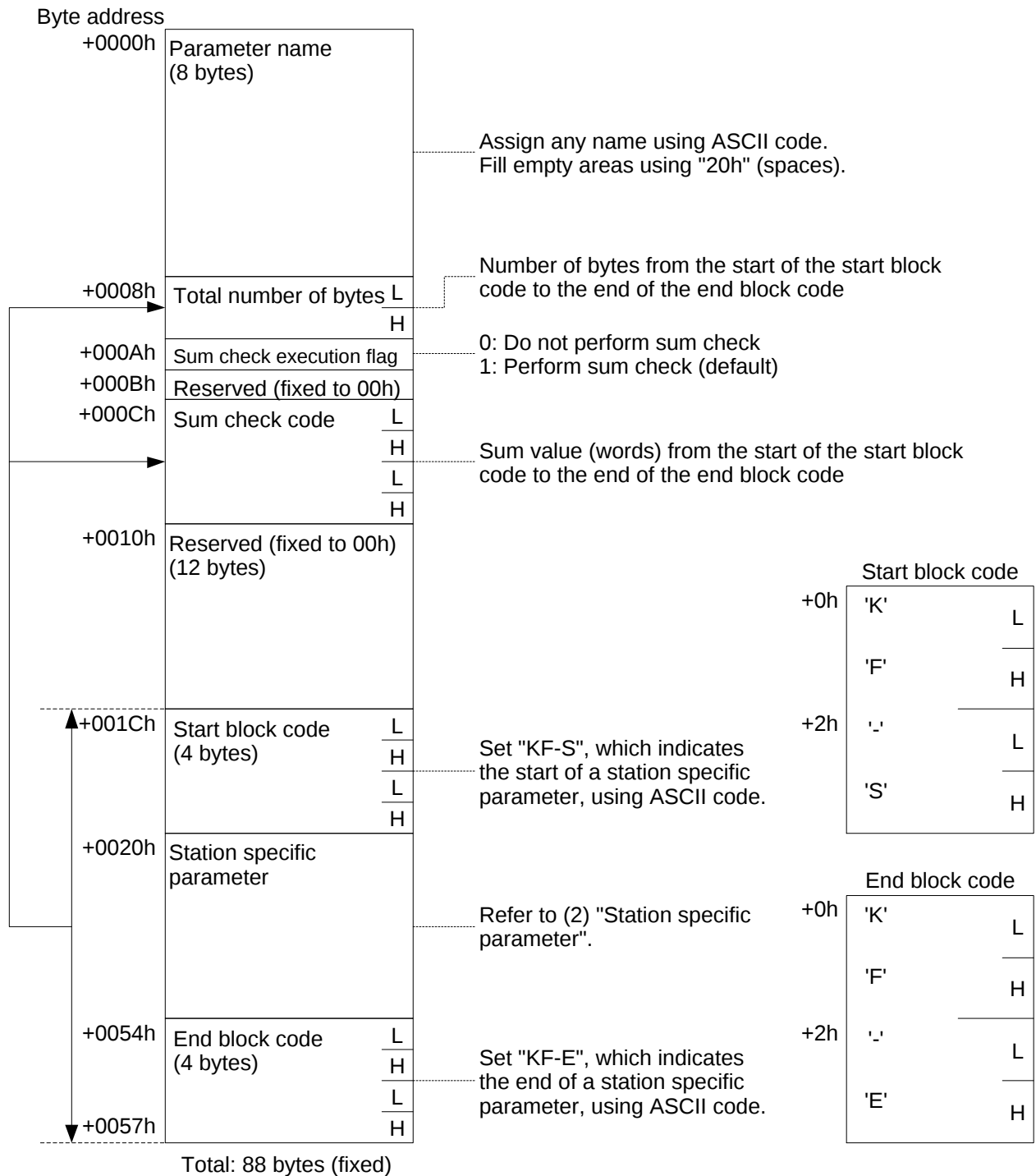


Figure 4.2.1-1 Specific Parameter Main Body

Note
(1) The specific parameter main body must be created.
(2) Always initialize reserved areas with 00h.
(3) In "Total number of bytes" (+0008h to +0009h), store the number of bytes from the start of "Start block code" (+001Ch to +001Fh) to the end of "End block code" (+0054h to +0057h).
(4) In "Sum check code" (+000Ch to +000Fh), store the sum value (unit: word) from the start of "Start block code" to the end of "End block code".

(2) Station specific parameter

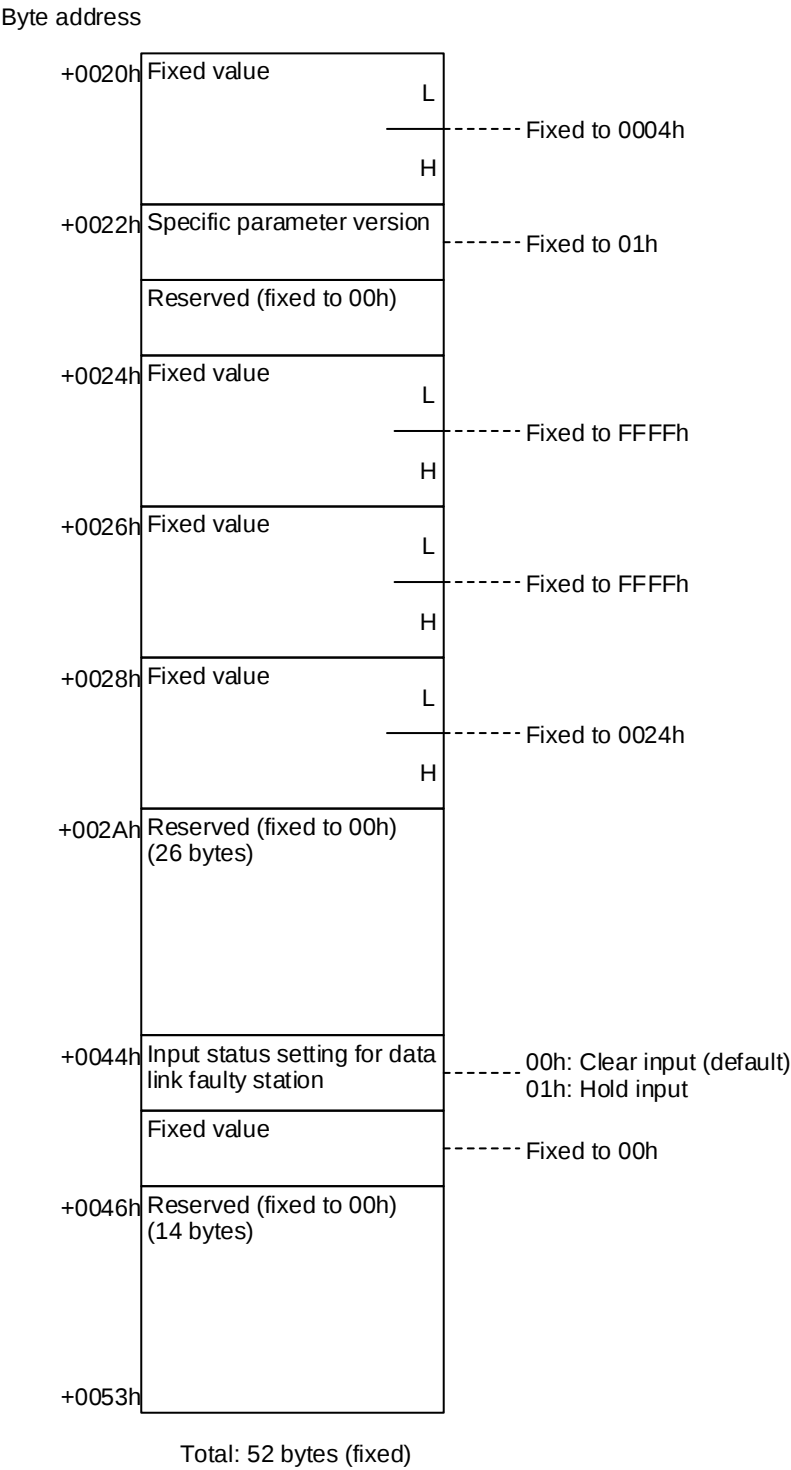


Figure 4.2.1-2 Station Specific Parameter

Note

- (1) Always initialize reserved areas with 00h.
- (2) The start address of station specific parameter is a byte address from the start of (1) "Specific parameter main body" of this section.
- (3) Be sure to secure the 52-byte area from +0020 to +0053 for station specific parameter.

4.2.2. Common parameter

Common parameter is the parameter for setting cyclic transmission operation information, the link device size, and the like.

The following figure shows the structure of common parameter.

(1) Common parameter main body

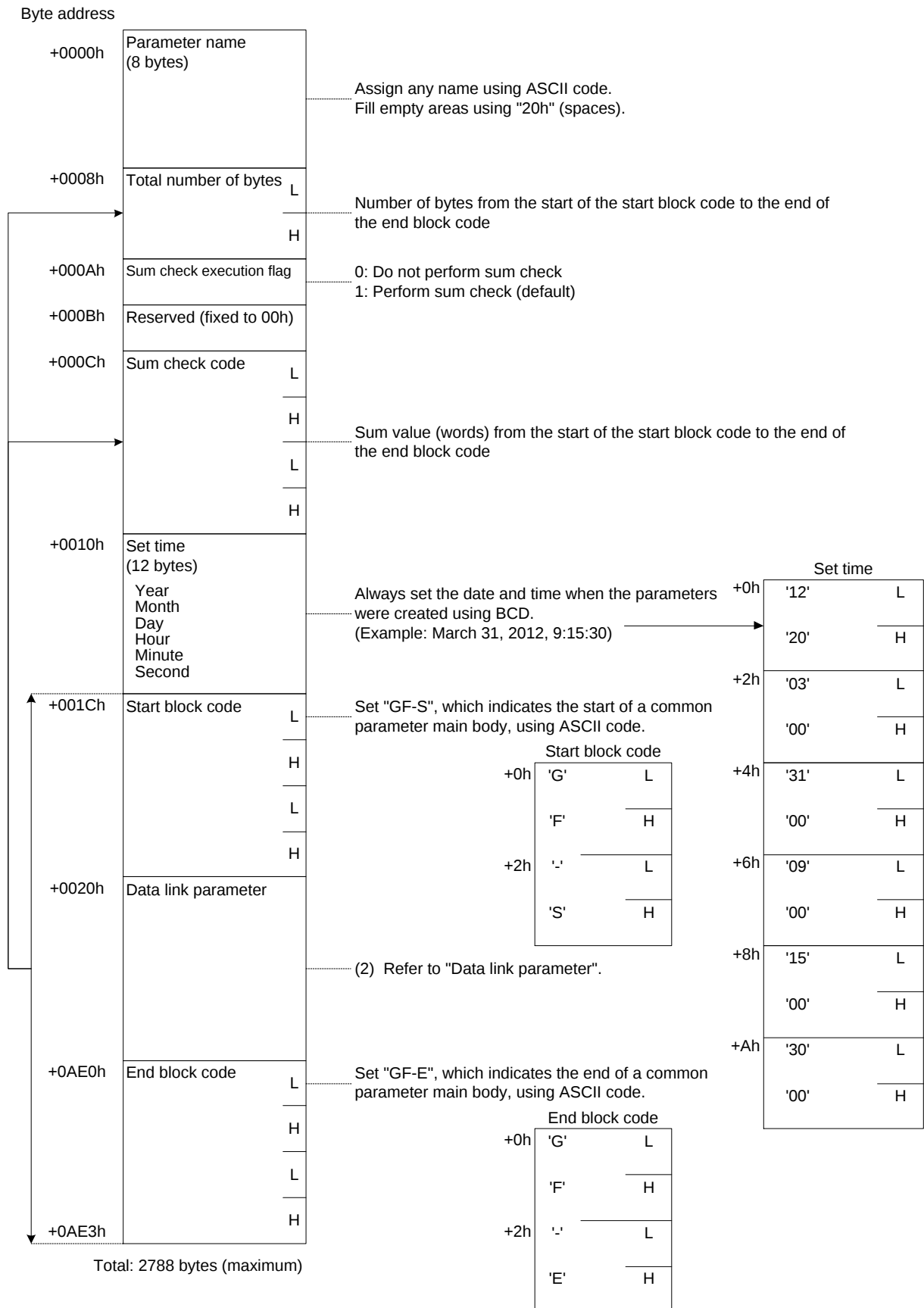


Figure 4.2.2-1 Common Parameter Main Body

Note	
(1)	Always initialize reserved areas with 00h.
(2)	Store the time and date when the parameters were created under Set time (+0010h to +001Bh).
(3)	In "Total number of bytes" (+0008h to +0009h), store the number of bytes from the start of "Start block code" (+001Ch to +001Fh) to the end of "End block code" (+0AE0h to +0AE3h).
(4)	In "Sum check code" (+000Ch to +000Fh), store the sum value (unit: word) from the start of "Start block code" to the end of "End block code".
(5)	Properly set the following because they are checked by the board.
	• Sum check code • Data link parameter
	• Start block code • End block code

(2) Data link parameter

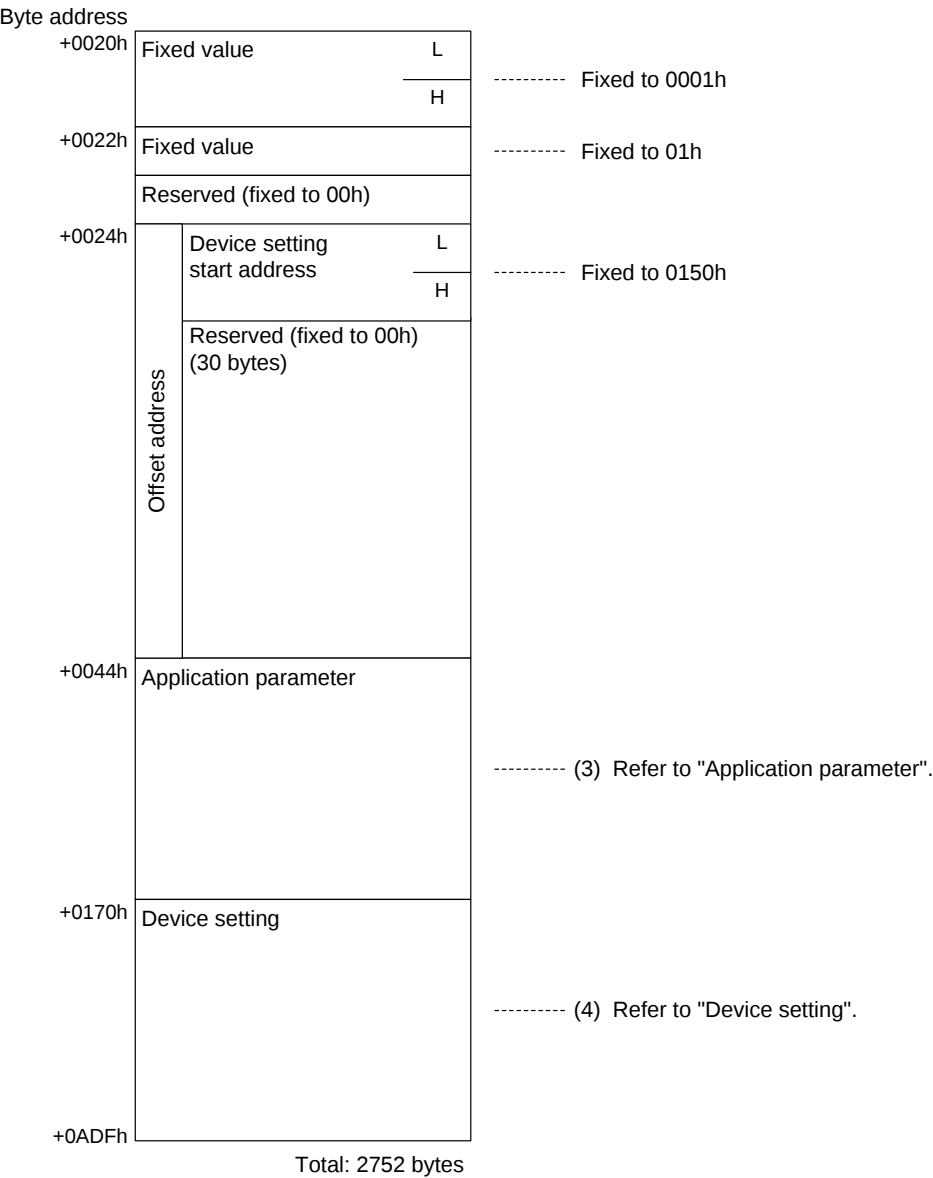


Figure 4.2.2-2 Data Link Parameter

Note	
(1)	Always initialize reserved areas with 00h.
(2)	Be sure to secure the 2752-byte area from +0020h to +0ADFh for data link parameter.
(3)	The start address of data link parameter is a byte address from the start of (1) "Common parameter main body" of this section.
(4)	The start address of device setting is a byte offset address from the start of "Data link parameter".

(3) Application parameter

Byte address

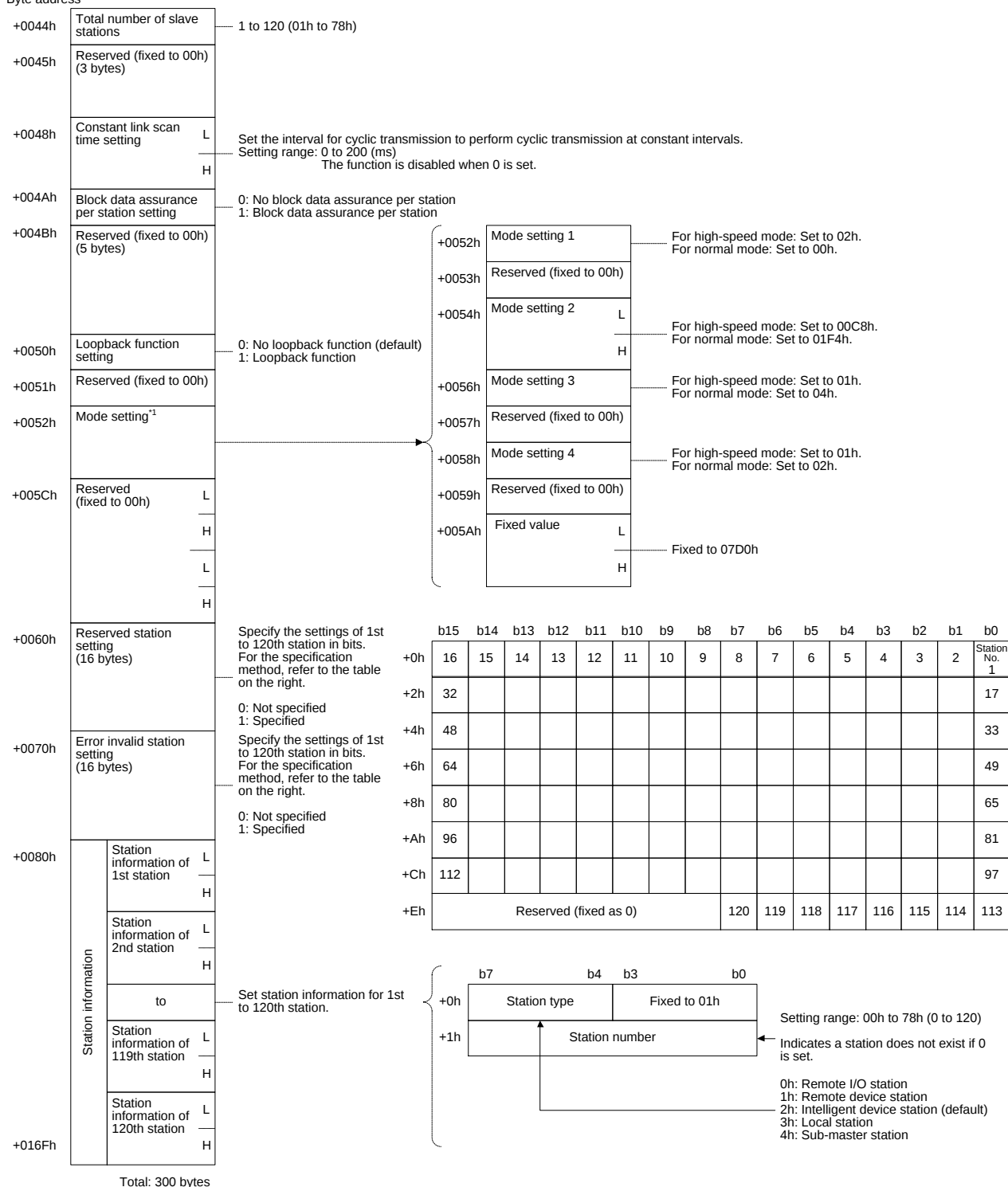


Figure 4.2.2-3 Application Parameter

*1: For details on normal mode and high-speed mode, refer to Section 3.3.2(10)"Operation mode setting area (SPI/OA)".

Note

- (1) Always initialize reserved areas with 00h.
- (2) The start address of application parameter is a byte address from the start of (1) "Common parameter main body" of this section.
- (3) Be sure to secure the 300-byte area from 0044h to +016Fh for application parameter.
- (4) In "Station information" (+0080h to +016Fh), set a free area exceeding the total number of slave stations with "0021h".

The following table shows a setting example of "Station information". (When the total number of slave stations is 3.)
Set station information for a station not connected (station number not used) with "0021h". Note that there is no need to
always set information in the order of station numbers.

Table 4.2.2-1 Setting Example of Station Information

Connected station	Station No.	Station type	Setting value	
			H	L
1st station	Station No. 3	Local station	03h	31h
2nd station	Station No. 1	Intelligent device station	01h	21h
3rd station	Station No. 2	Remote device station	02h	11h
4th station	(Not used)	-	00h	21h
5th station	(Not used)	-	00h	21h
to				
119th station	(Not used)	-	00h	21h
120th station	(Not used)	-	00h	21h

The following table and figure show a link device (RX/RY/RWw/RWr) setting example.
Set RX/RY in increments of 16 points. Set RWw/RWr in increments of 4 points.
"n" in the figure is the start address "+0170h" of (4) "Device setting" of this section.

Table 4.2.2-2 Link Device Setting Example

Station No.	RX/RY				RWw/RWr			
	Number of points (Number of words)	Start number	End number	Start relative byte address	Number of points (Number of words)	Start number	End number	Start relative byte address
1	256 points (0010h words)	0000h	00FFh	0000h	128 points (0080h words)	0000h	007Fh	0000h
2	16 points (0001h words)	0100h	010Fh	0020h	16 points (0010h words)	0080h	008Fh	0160h
3	2048 points (0080h words)	0110h	08FFh	0022h	1024 points (0400h words)	0090h	048Fh	0180h
4	0 point (0000h word)	-	-	FFFFh	0 point (0000h word)	-	-	FFFFh
to								
120	0 point (0000h word)	-	-	FFFFh	0 point (0000h word)	-	-	FFFFh

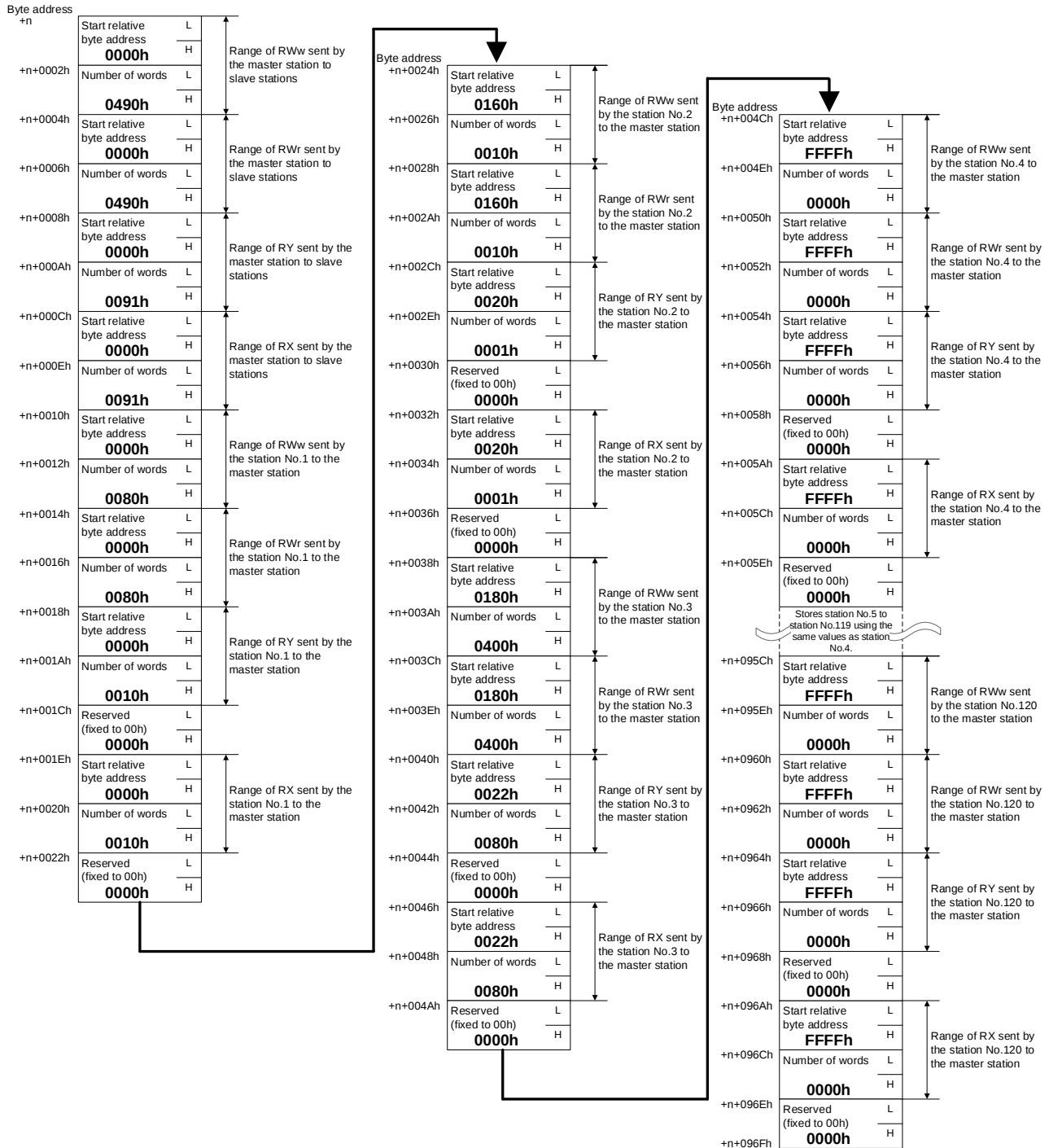


Figure 4.2.2-5 Device Setting Example

4.3. Parameter Setting Processing

In parameter setting processing, specific parameter and common parameter created by the driver are transferred to the board. Parameters are transferred while a handshake process is being performed between the driver and the board using a parameter exchange flag. This section shows a parameter setting outline procedure and parameter exchange flag transition.

(1) Parameter setting necessity

Specific parameter: Configured in the case of both the master station and local station.

Common parameter: Configured in the case of the master station only, and the parameters distributed by the master station are received by local stations.

Parameter setting necessity differs depending on the station type and operation mode. The following table shows cases of parameter setting necessity.

Table 4.3-1 Parameter Setting Necessity

Station type	Operation mode	Specific parameter	Common parameter
Master station	00h: Online (normal mode)	○	○
	01h: Online (high-speed mode)	○	○
	02h: Offline	-	-
	06h: Loop test	○	○
	07h: Self-loopback test	-	-
	09h: Hardware test	-	-
Local station	00h: Online	○	○ (Receive)
	02h: Offline	-	-
	07h: Self-loopback test	-	-
	09h: Hardware test	-	-

○: Created by driver

(2) Parameter exchange flag

Parameter exchange flags are the following four state transition flags stored in the parameter setting information area. For details on access to the parameter information area, refer to Section 3.2.2(4) "Parameter setting information area".

- Common parameter setting sequence (PRSQ)
- Parameter block sequence (BKSQ)
- Specific parameter setting sequence (SPSQ)
- Parameter status sequence (PFSQ)

4.3.1. Specific parameter setting procedure

(1) Specific parameter setting procedure

The following shows the outline procedure for setting specific parameters.

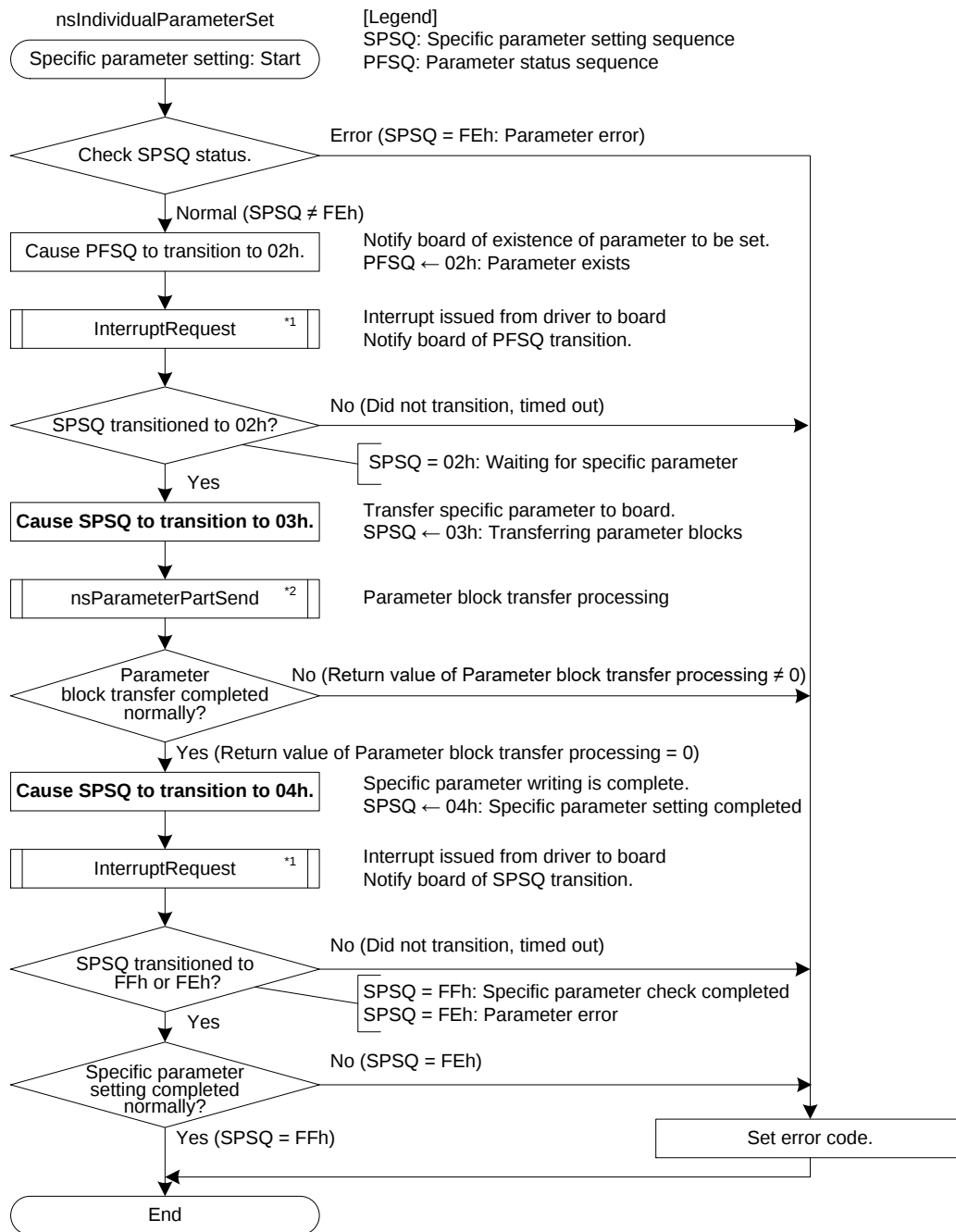


Figure 4.3.1-1 Specific Parameter Setting Procedure

*1: Refer to Section 4.3.5(2) "Driver to board interrupt procedure".

*2: Refer to Section 4.3.4 "Parameter block transfer".

(2) Specific parameter setting sequence (SPSQ) state transition diagram

The following figure shows the transition of the "Specific parameter setting sequence (SPSQ)" when specific parameters are set.

For details on interrupt, refer to Section 4.3.5 "Parameter setting interrupts".

For details on block transfer, refer to Section 4.3.4 "Parameter block transfer".

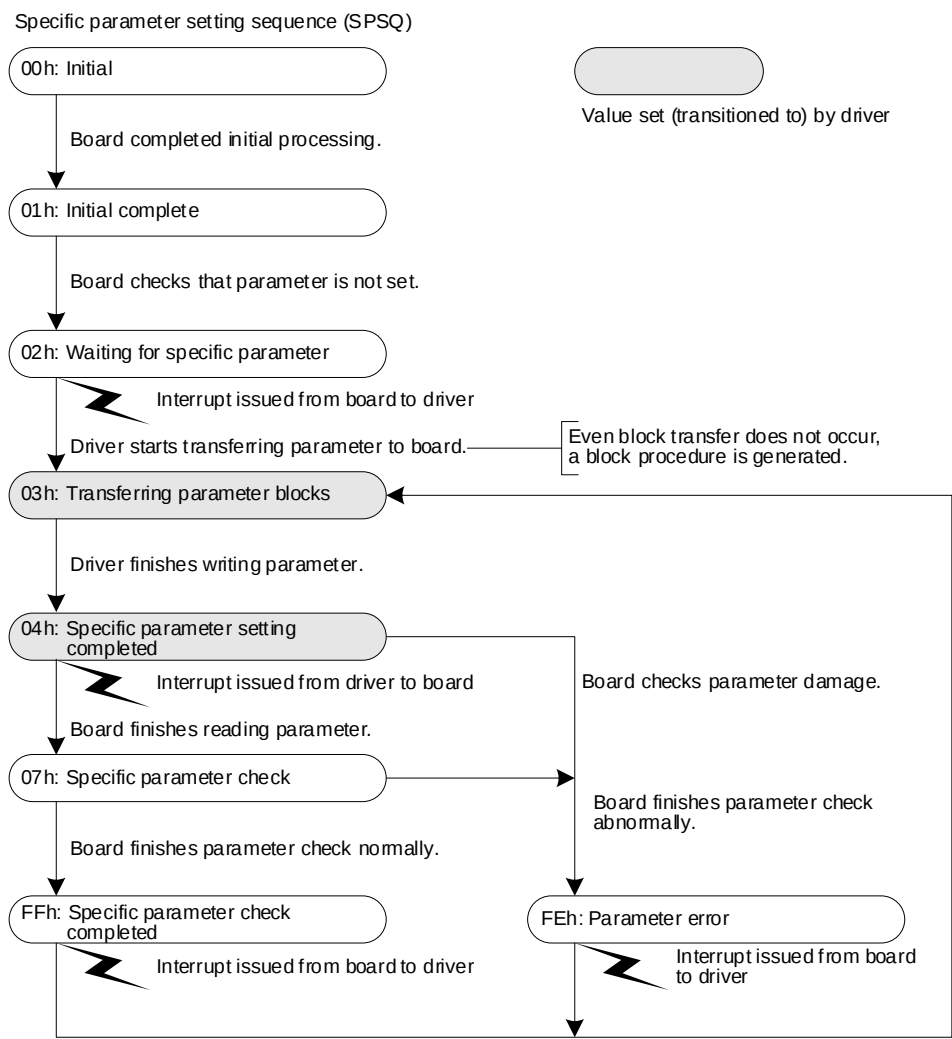


Figure 4.3.1-2 Specific Parameter Setting Sequence (SPSQ) State Transition Diagram

Point	
Before setting common parameter, verify that the "Specific parameter setting sequence (SPSQ)" is FFh and that specific parameter setting is completed.	

4.3.2. Common parameter setting procedure (master station)

(1) Common parameter setting procedure (master station)

The following figure shows an outline procedure for common parameter setting when the own station is operating as the master station.

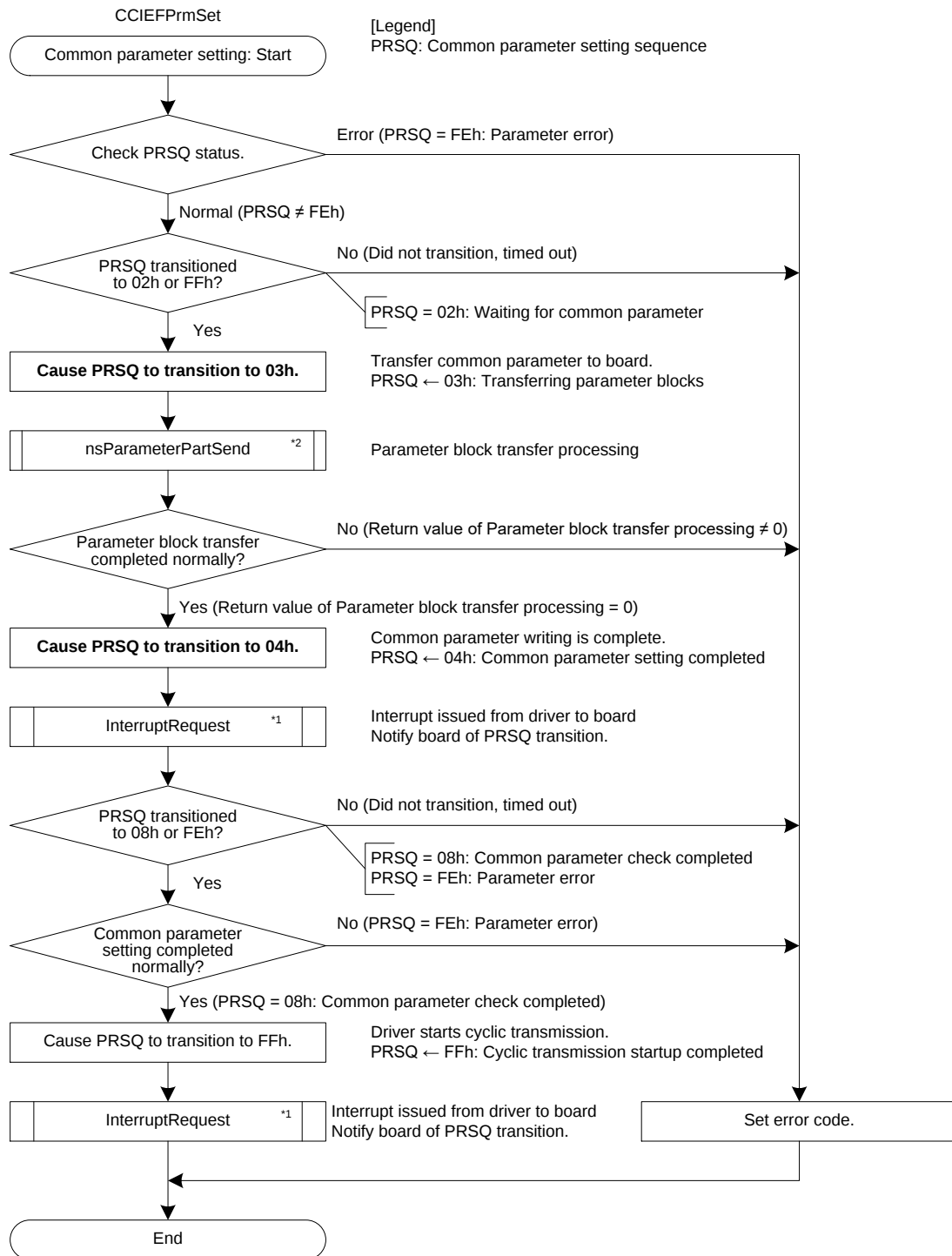


Figure 4.3.2-1 Common Parameter Setting Procedure (Master Station)

*1: Refer to Section 4.3.5(2) "Driver to board interrupt procedure".

*2: Refer to Section 4.3.4 "Parameter block transfer".

(2) Common parameter setting sequence (PRSQ) state transition diagram (master station)
 The following figure shows the transition of the "Common parameter setting sequence (PRSQ)" when common parameters are set.
 For details on interrupt, refer to Section 4.3.5 "Parameter setting interrupts".
 For details on block transfer, refer to Section 4.3.4 "Parameter block transfer".

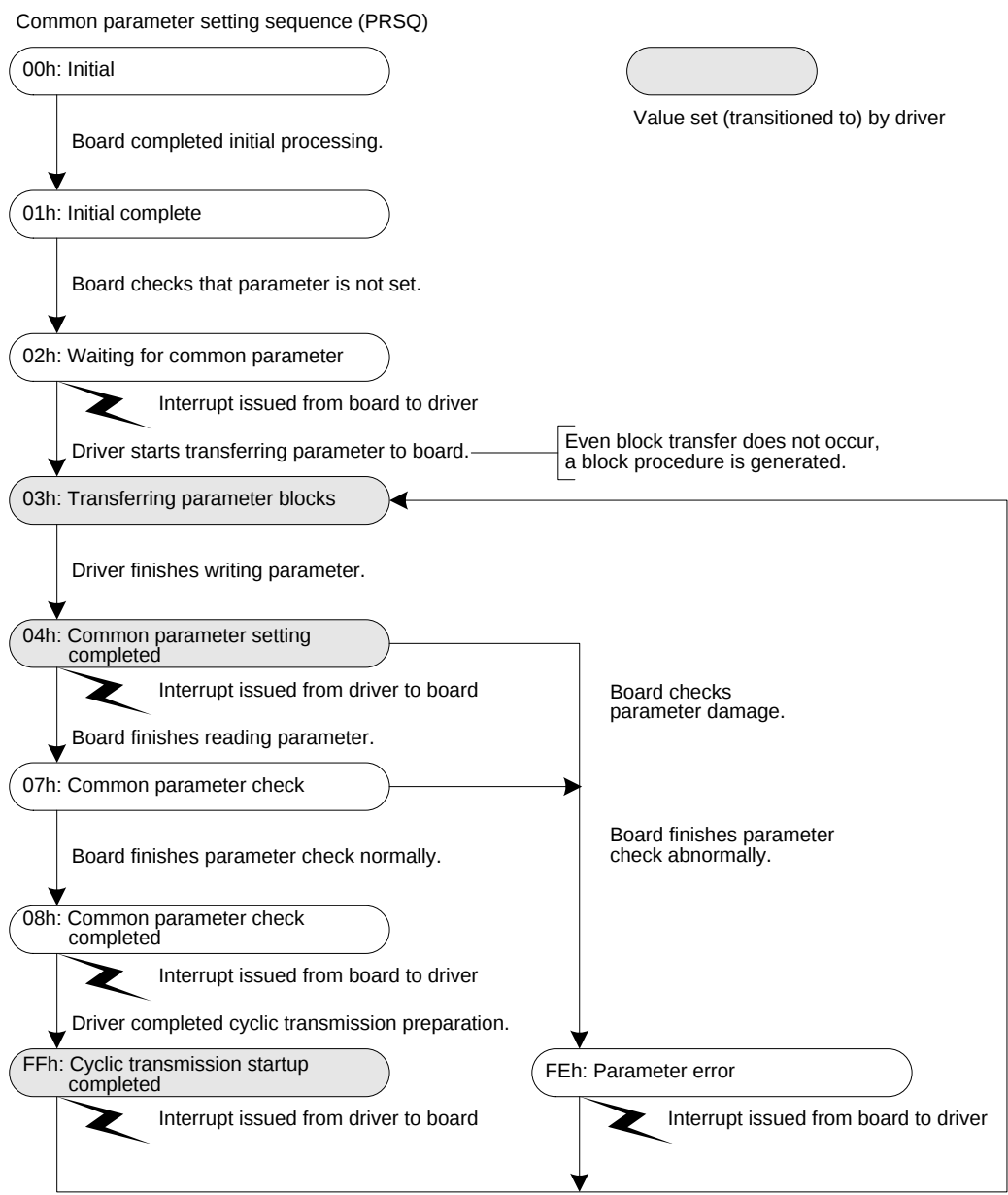


Figure 4.3.2-2 Common Parameter Setting Sequence (PRSQ) State Transition Diagram (Master Station)

Point	
Before setting common parameter, verify that the "Specific parameter setting sequence (SPSQ)" is FFh and that specific parameter setting is completed.	

4.3.3. Common parameter setting procedure (local station)

(1) Common parameter setting procedure (local station)

The following figure shows an outline procedure for common parameter setting when the own station is operating as a local station.

A local station receives common parameters distributed by the master station. An interrupt occurs when the board receives parameters after initial processing completed. The driver is to accept that interrupt.

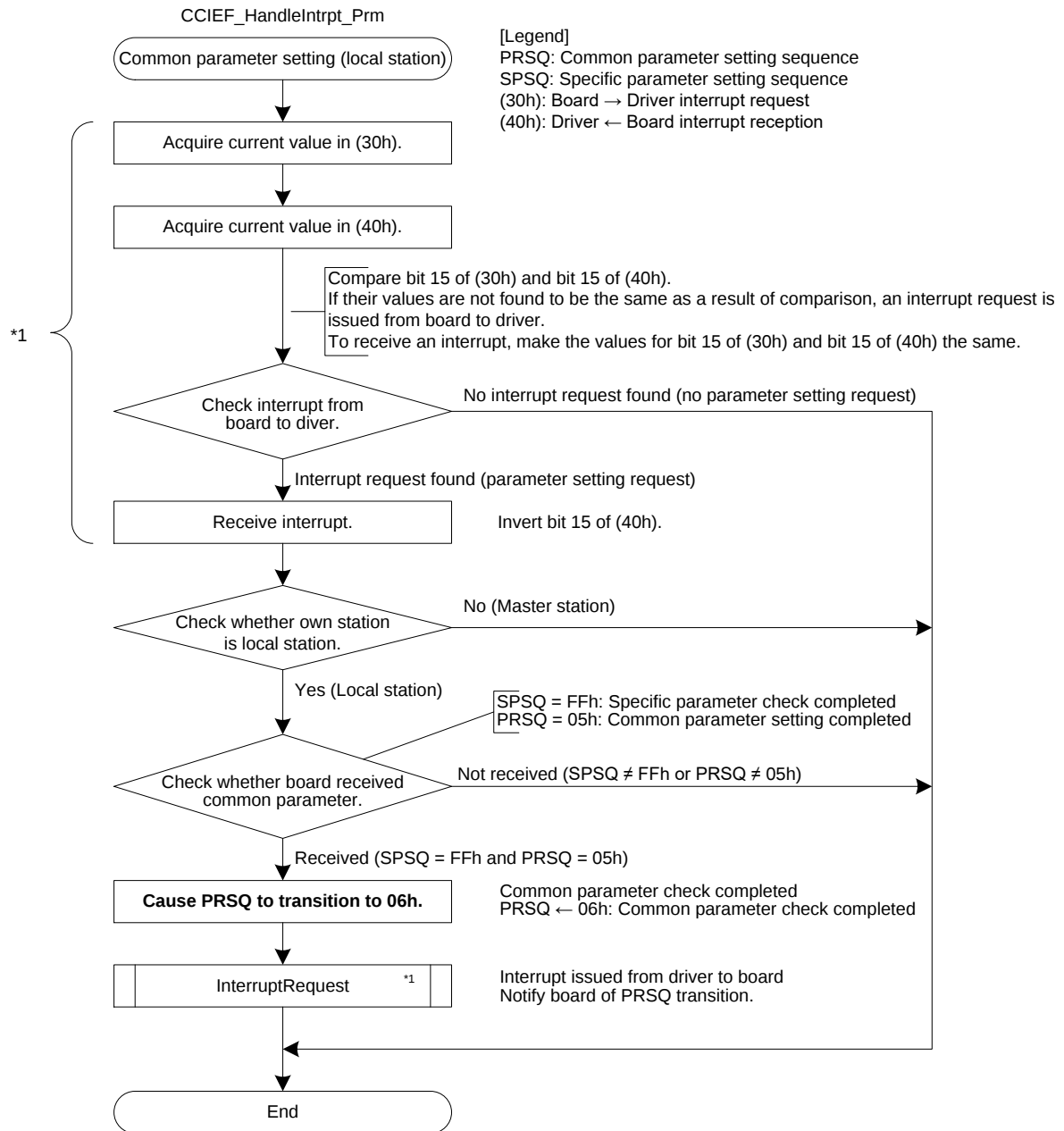


Figure 4.3.3-1 Common Parameter Setting Procedure (Local Station)

*1: Refer to Section 4.3.5(2) "Driver to board interrupt procedure".

(2) Common parameter setting sequence (PRSQ) state transition diagram (local station)
 The following figure shows the transition of the "Common parameter sequence (PRSQ)" when common parameters are set.
 For details on interrupt, refer to Section 4.3.5 "Parameter setting interrupts".

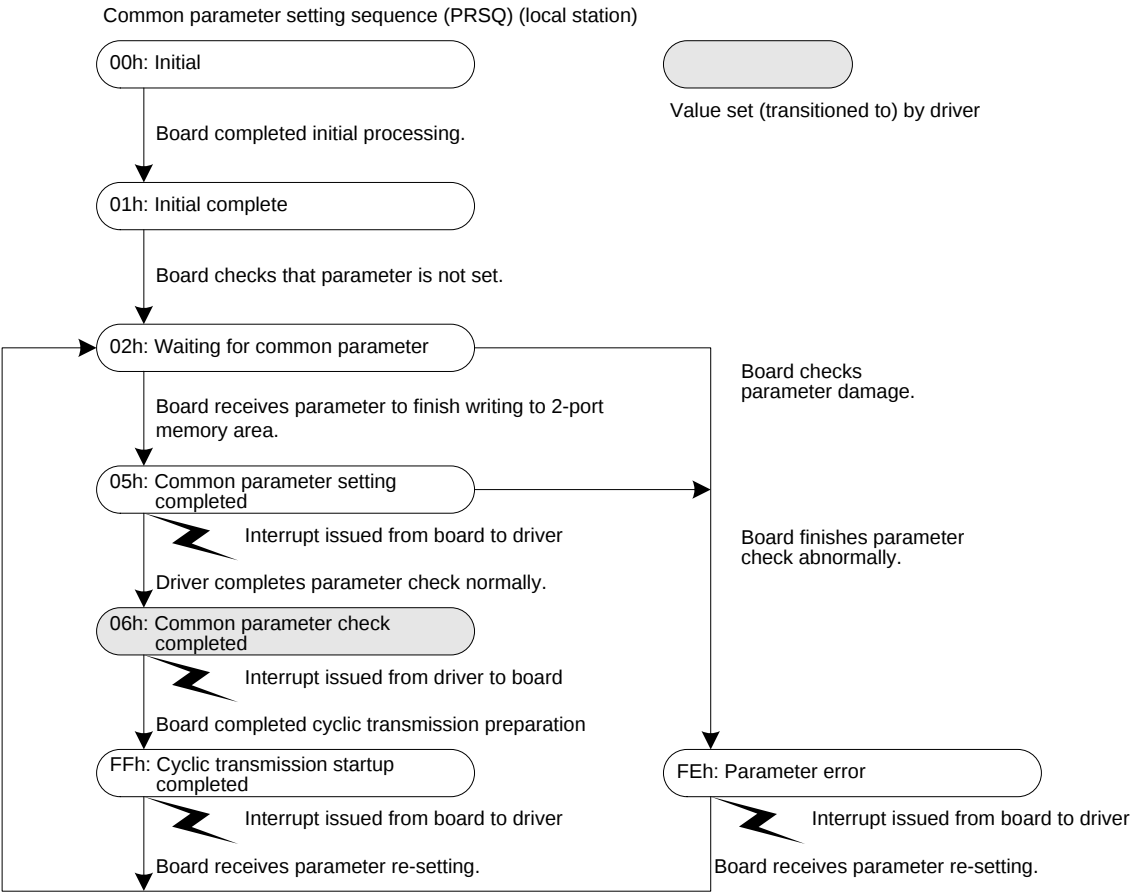


Figure 4.3.3-2 Common Parameter Setting Sequence (PRSQ) State Transition Diagram (Local Station)

Point	
Before setting common parameter, verify that the "Specific parameter setting sequence (SPSQ)" is FFh and that specific parameter setting is completed.	

4.3.4. Parameter block transfer

Both specific parameters and common parameters are transferred from the driver to the board using parameter areas. (Refer to Section 3.2.2(4)"Parameter setting information area".)

When parameters that exceed the size of the parameter area are transferred to the board, the parameters need to be transferred in blocks.

(1) Parameter block transfer image

When the parameter size exceeds 0C00h (3072 bytes), the parameters are transferred in blocks in units of 0C00h (3072 bytes). Block transfer is repeated until the size is 0C00h (3072 bytes) or less, and then the remaining parameters of 0C00h (3072 bytes) or less are transferred in the final block transfer.

If the parameter size is 1748h (5960 bytes), the 1748h bytes are transferred by transferring 0C00h (3072 bytes) in the first block and 0B48h (2888 bytes) in the second block.

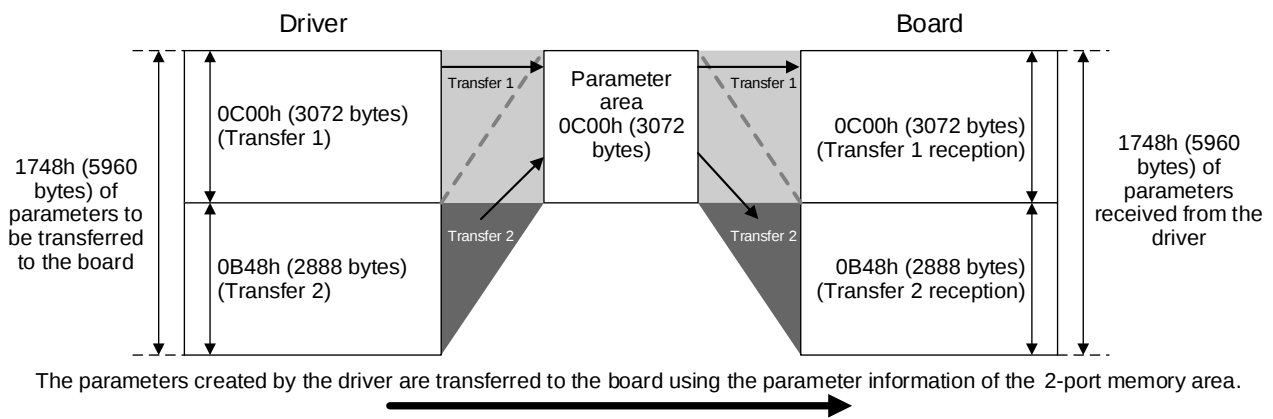


Figure 4.3.4-1 Example of Parameter Block Transfer

(2) Parameter block transfer procedure

Parameters are transferred in blocks using the "Total number of transfers", "Transfer number", "Transfer size", and "Parameter block sequence (BKSQ)" specified by the offset address of the "Parameter setting information area start address".

The following figure shows the procedure of a case where parameters are transferred in blocks.

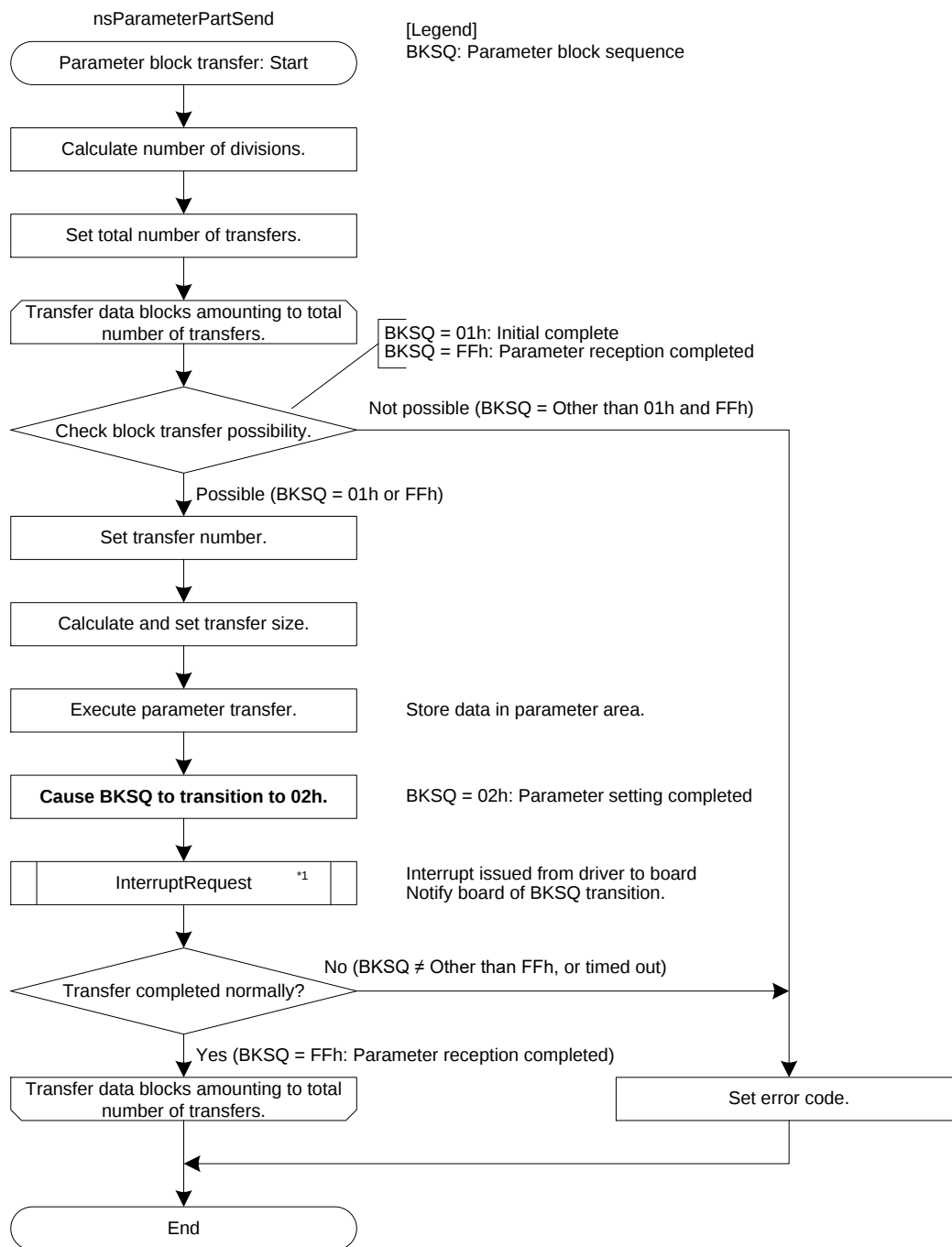


Figure 4.3.4-2 Parameter Block Transfer Procedure

*1: Refer to Section 4.3.5(2) "Driver to board interrupt procedure".

(3) Parameter block sequence (BKSQ) state transition diagram

The following figure shows the transition of the "Parameter block sequence (BKSQ)" when parameters are transferred in blocks.

For details on interrupt, refer to Section 4.3.5 "Parameter setting interrupts".

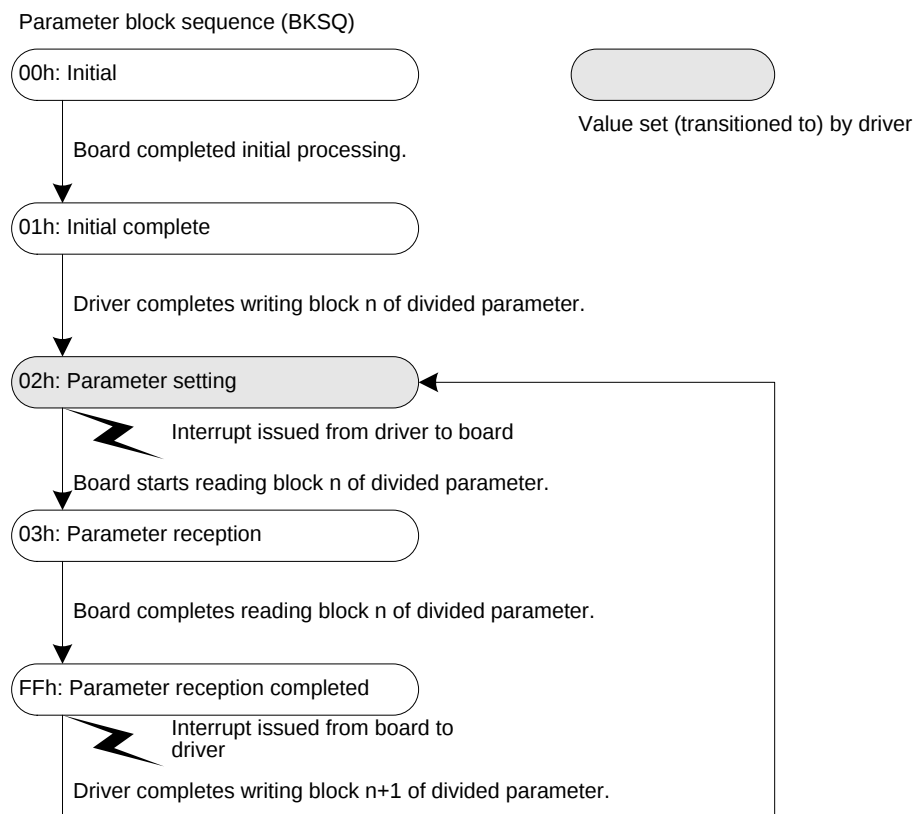


Figure 4.3.4-3 Parameter Block Sequence (BKSQ) State Transition Diagram

4.3.5. Parameter setting interrupts

When transitioning the parameter exchange flag, the driver and board notify each other of the parameter exchange flag transition using an interrupt (software interrupt).

(1) Processing overview

To use an interrupt, the following two-stage processing is required.

1) Interrupt cause notification/verification

For the driver to issue a notification that there is an interrupt cause 1 (parameter exchange flag transition) to the board, the host → board interrupt area (SPI/O5) is used.

For the driver to check an interrupt cause 1 (parameter exchange flag transition) from the board, the board → host interrupt area (SPI/O4) is used.

For details, refer to the following.

Word address	Name	Bit	Reference
04h	Board → Host interrupt area (SPI/O4)	2	Section 3.3.2(5)
05h	Host → Board interrupt area (SPI/O5)	2	Section 3.3.2(6)

2) Interrupt cause request/acceptance status

For the driver or board to indicate the state of requesting for parameter exchange flag transition, a driver → board interrupt request or a board → driver interrupt request is used.

On the other hand, for the driver or board to indicate the state of accepting a request for parameter exchange flag transition, a driver → board interrupt acceptance or a board → driver interrupt acceptance is used.

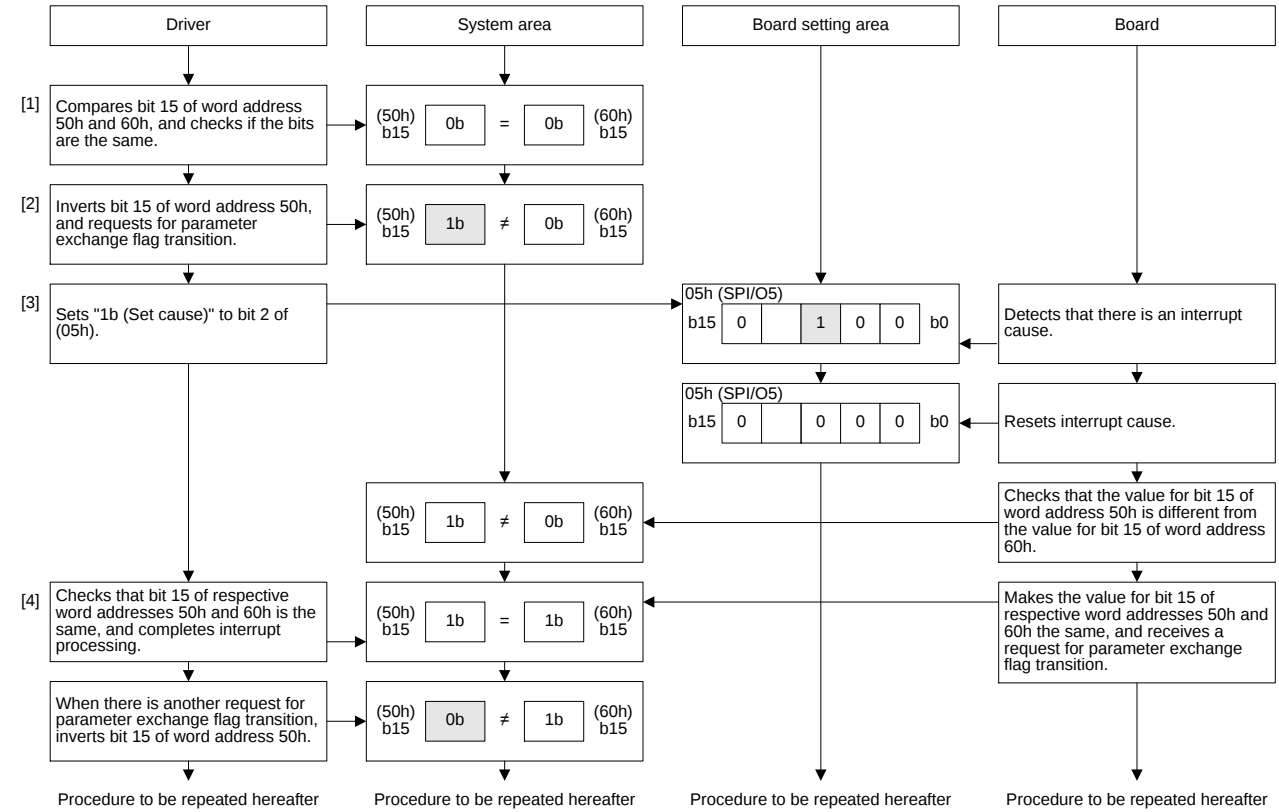
For details, refer to the following.

Word address	Name	Bit	Reference
30h	Board → Driver interrupt request	15	Section 3.2.2(11)
40h	Driver → Board interrupt acceptance	15	Section 3.2.2(12)
50h	Driver → Board interrupt request	15	Section 3.2.2(13)
60h	Board → Driver interrupt acceptance	15	Section 3.2.2(14)

(2) Driver to board interrupt procedure

If an interrupt notification is issued from the driver to the board, the driver accesses the driver → board interrupt acceptance (50h), board → driver interrupt reception (60h), and host → board interrupt area (SPI/O5) (05h).

The following figure shows the procedure used when the driver issues an interrupt notice to the board.



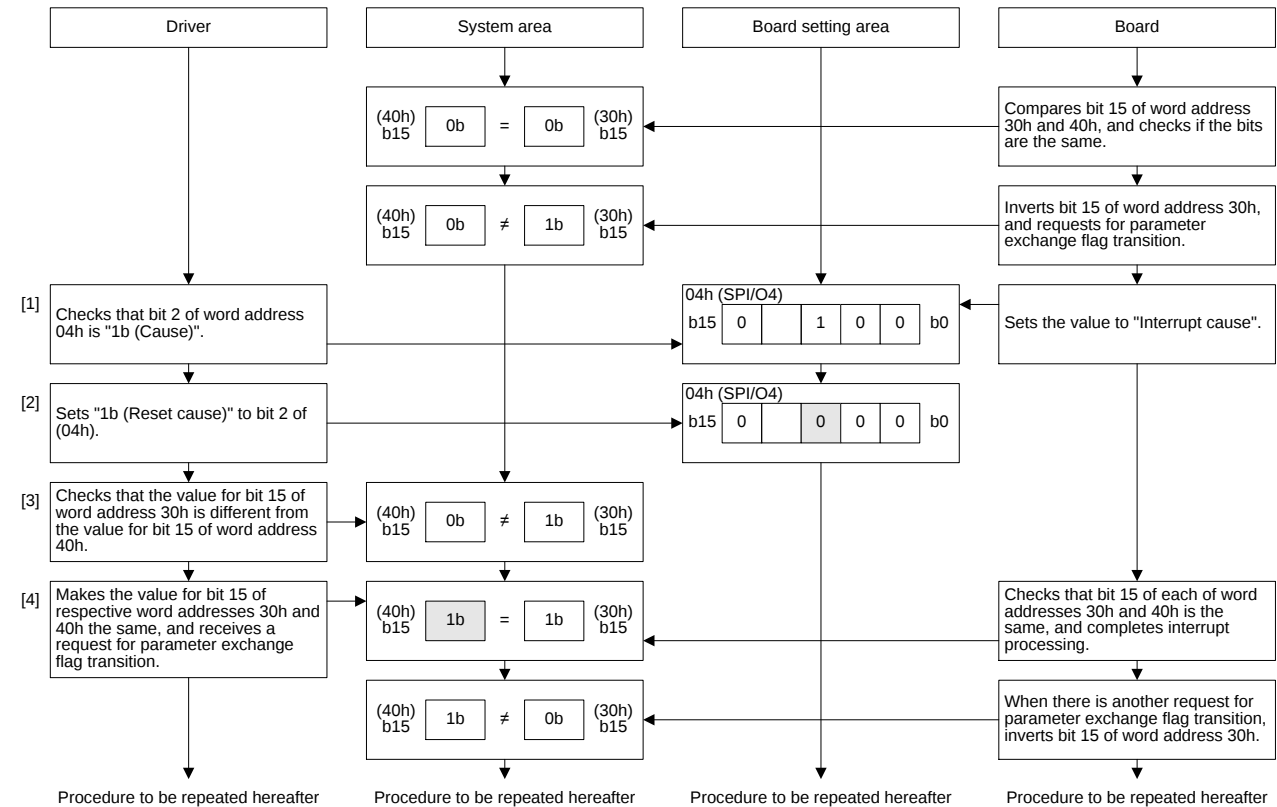
Step	Description
[1]	The driver compares bit 15 of the driver → board interrupt request (50h) and the board → driver interrupt acceptance (60h) and verifies that the values are the same.
[2]	The driver inverts bit 15 of the driver → board interrupt request (50h) to issue an interrupt notification. (A request is made for parameter exchange flag transition.)
[3]	The driver sets "1b: Set cause" in bit 2 (driver → board interrupt cause 1) of the host → board interrupt area (SPI/O5) (05h).
[4]	The driver verifies that bit 15 of the driver → board interrupt request (50h) and board → driver interrupt acceptance (60h) are the same, and then ends interrupt processing.

Figure 4.3.5-1 Driver to Board Interrupt Procedure

(3) Board to driver interrupt procedure

If the driver accepts an interrupt notification from the board, the driver accesses the board → driver interrupt request (30h), driver → board interrupt acceptance (40h), and board → host interrupt area (SPI/O4) (04h).

The following figure shows the procedure used when the driver accepts an interrupt notice from the board.



Step	Description
[1]	The driver verifies that bit 2 (board → driver interrupt cause 1) of the board → host interrupt area (SPI/O4) (04h) is "1b: Cause".
[2]	The driver sets bit 2 (board → driver interrupt cause 1 reset) of the board → host interrupt area (SPI/O4) (04h) to "1b: Reset cause".
[3]	The driver compares bit 15 of the board → driver interrupt request (30h) and bit 15 of driver → board interrupt reception (40h), and accepts the interrupt request if the values are different.
[4]	The driver makes bit 15 of the driver → board interrupt reception (40h) and bit 15 of the board → driver interrupt request (30h) the same, thereby notifying the board that it accepted the interrupt (parameter exchange flag transition request).

Figure 4.3.5-2 Board to Driver Interrupt Procedure

4.4. Time Information Setting Processing

Time information setting processing sets time information to the board upon the information being acquired by the driver. Have the driver set time information when the own station is operating as a master station.

Through this processing, when the own station is operating as a master station, the board periodically sends time information set by the driver to CC-Link IE Field Network, thereby synchronizing time information between the master station and the slave stations.

The following describes an overview of time information setting processing.

After completing initial processing in which the time information setting flag is initialized, have the driver write time information in a cycle of one second or less and complete setting of time information setting flag.

For details on the register area related to time information, refer to Section 3.3.3(2) "Time information setting flag" to 3.3.3(6) "Time Information (first two digits of the year/day of the week)".

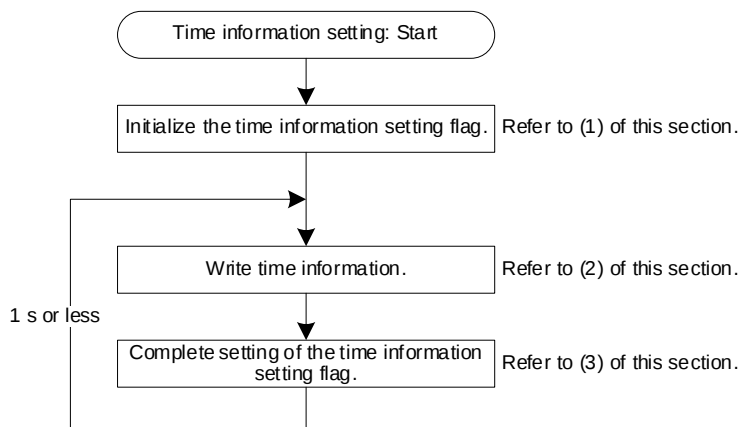


Figure 4.4-1 Overview of Time Information Setting Processing

(1) Time information setting flag initialization

To initialize time information, have the time information setting flag (byte address: 36h) transitioned to 01h (initialization). Note that in the sample code, the time information setting flag is initialized inside the CCIEFBoardInit function.

(2) Time information writing

Before writing time information, have the time information setting flag (byte address: 36h) transitioned to 02h (setting in progress).

Then, write the time information acquired from the host (such as the OS) into the register areas below in BCD (binary-coded decimal).

Table 4.4-1 Time Information Register List

No.	Byte address	Time information	Remarks
1	38h	Last two digits of the year: 00h to 99h	15h for 2015
2	39h	Month: 01h to 12h	-
3	3Ah	Day: 01h to 31h	-
4	3Bh	Hour: 00h to 23h	-
5	3Ch	Minute: 00h to 59h	-
6	3Dh	Second: 00h to 59h	-
7	3Eh	Day of the week: 00h (Sunday) to 06h (Saturday)	-
8	3Fh	First two digits of the year: 00h to 99h	20h for 2015

(3) Time information setting flag setting complete

When time information writing operation is completed, have the time information setting flag (byte address: 36h) transitioned to a value indicating the end of setting operation (FFh to 03h). (Decrement the flag in steps in the following order: FFh→FEh→...04h→03h→FFh→FEh...)

(4) Time information setting example
The following figure shows an example of setting time information.

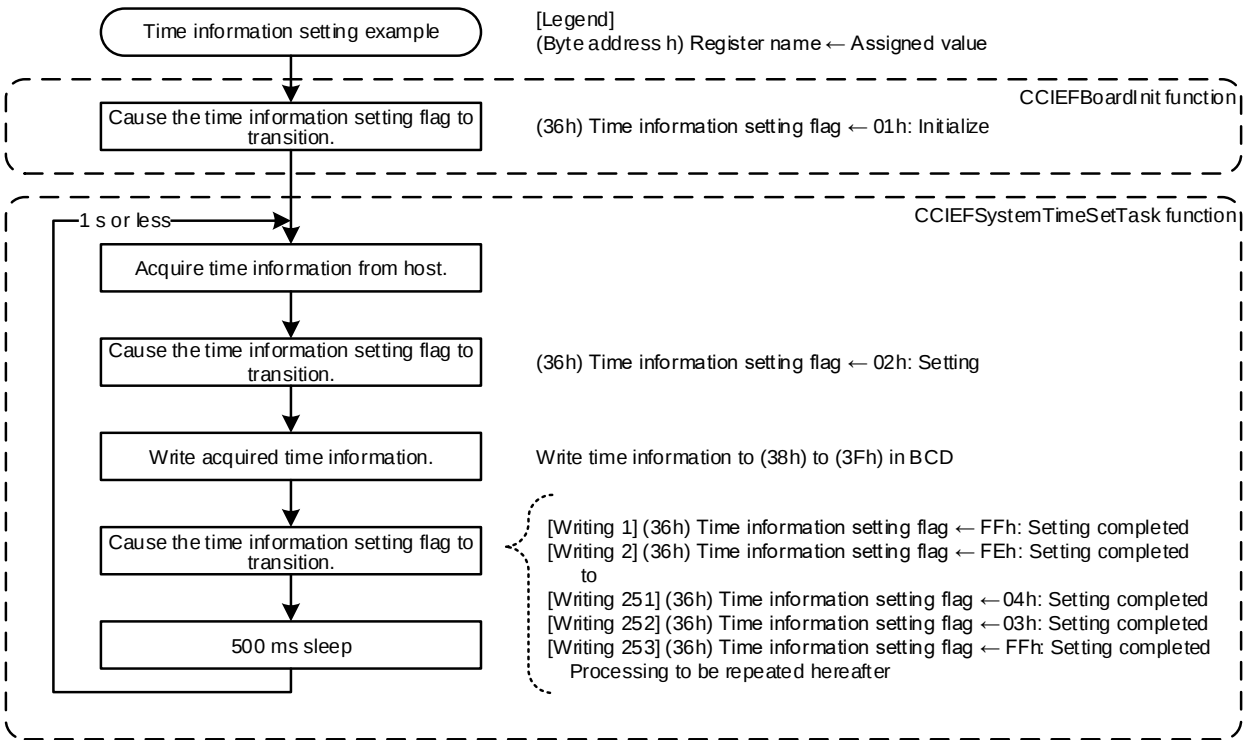


Figure 4.4-2 Example of Time Information Setting Processing

4.5. Cyclic Transmission Processing

Cyclic transmission is a function that periodically exchanges data with stations on the same network.
Link devices (RX, RY, RWw, RWr) are used for the data communication.

4.5.1. Overview of cyclic transmission processing

The driver periodically sends and receives data with other stations by updating the link device areas RX, RY, RWr, and RWw of the 2-port memory area.

(1) Overview of receive processing

Since the board writes receive data to the link device areas RX and RWr of the 2-port memory area, the driver is to read the receive data of the link device area.

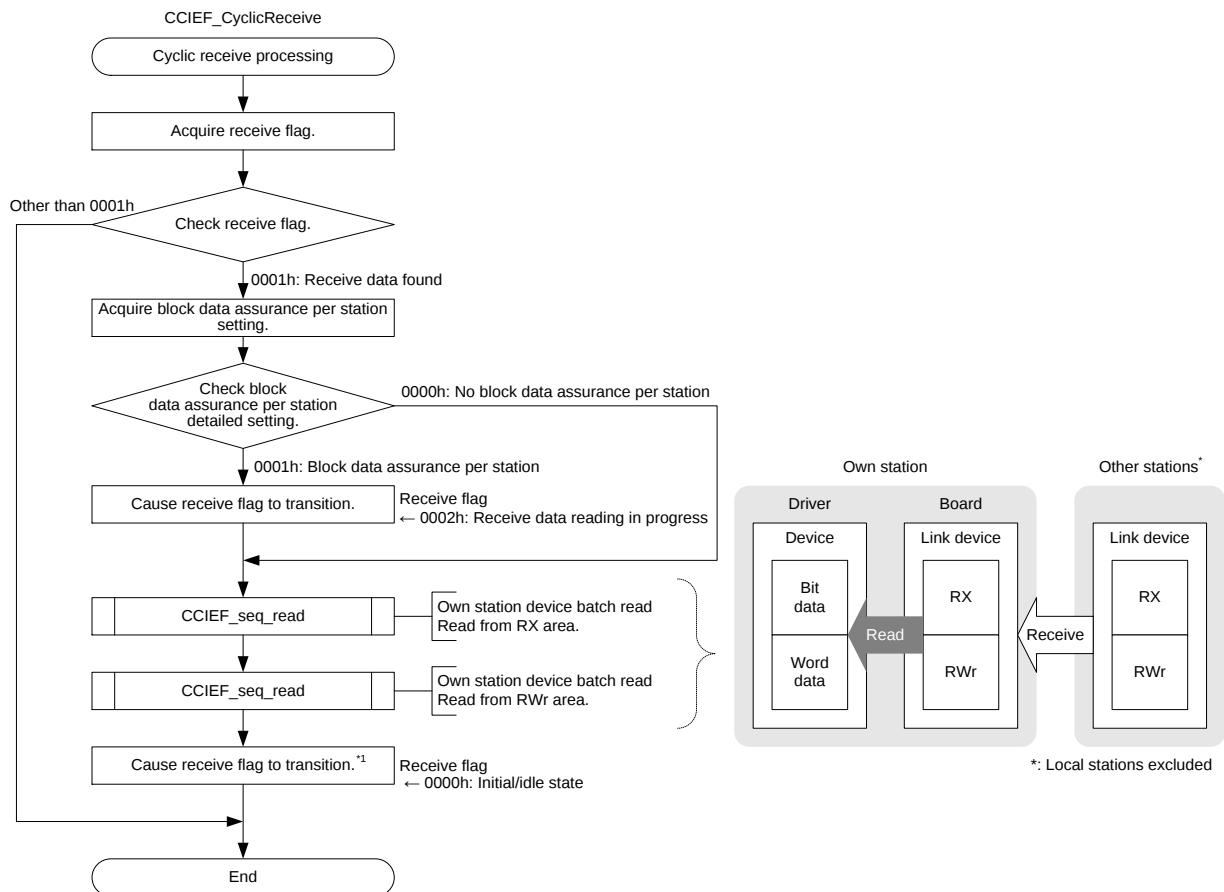


Figure 4.5.1-1 Overview of Receive Processing

*1: To ensure that RX and RWr are read even without block data assurance per station, have the receive flag transitioned to "0000h: Initial/idle state".

(2) Overview of send processing

When the driver writes send data to the link device areas RY and RWw of the 2-port memory area, the board reads the send data stored in the link device area and sends it to another station.

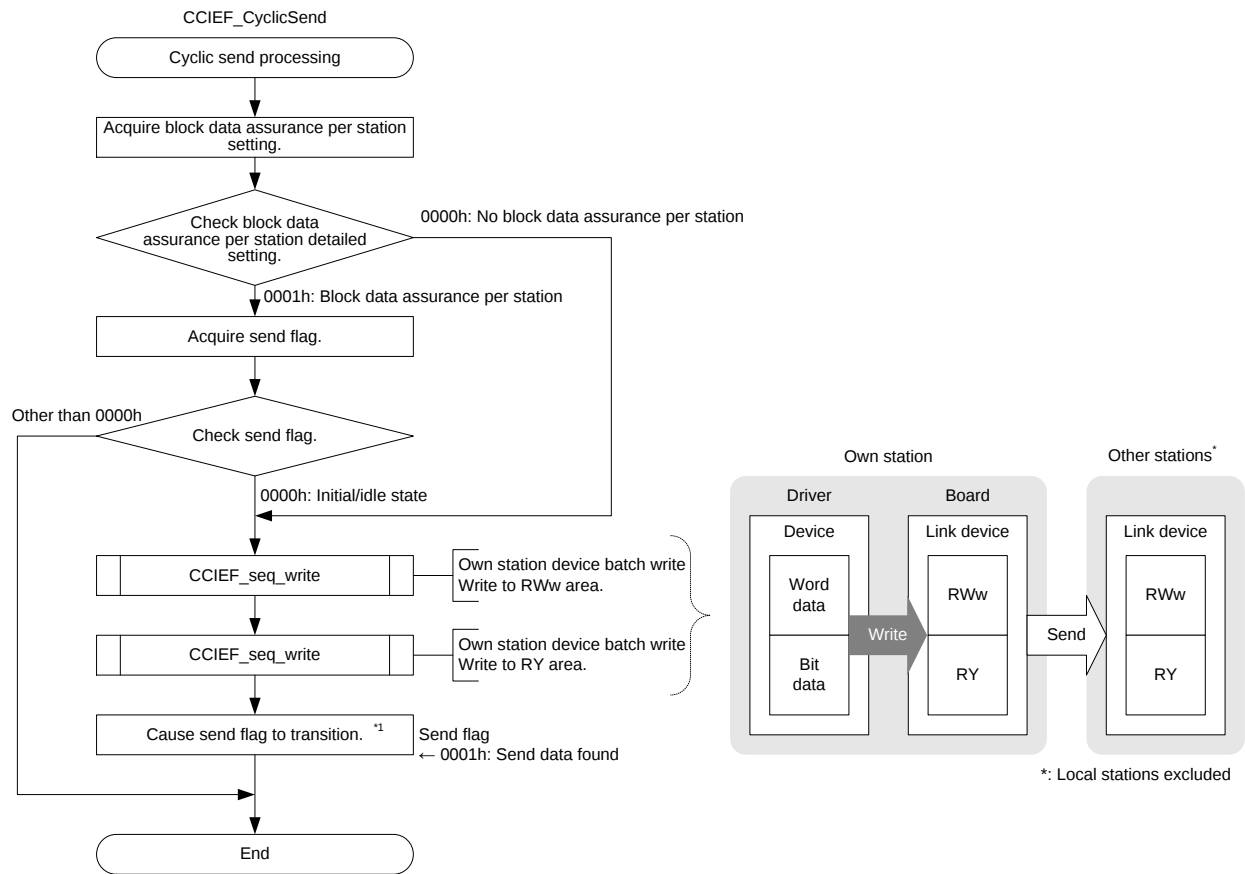


Figure 4.5.1-2 Overview of Send Processing

*1: To ensure that RY and RWw are written even without block data assurance per station, have the send flag transitioned to "0001h: Send data found".

Point
To guarantee RWr and RWw data simultaneity during link devices reading and writing, follow the sequence shown in Figure 4.5.1-1 and Figure 4.5.1-2. For details on the block data assurance per station receive/send flag, refer to Section 4.5.2 "Assurance of cyclic data integrity".

4.5.2. Assurance of cyclic data integrity

Cyclic data integrity can be assured during data reading/writing between the driver and board using the following three methods.

(1) Block data assurance per station

This function is enabled by setting "Block data assurance per station" with the application parameter. In data reading/writing operation between the driver and the board, the driver reads/writes data while performing a handshake with the board, thereby assuring cyclic data integrity for each station. The following figures show the transitions of the send and receive flags used for a handshake.

(a) Transitions of the receive flag

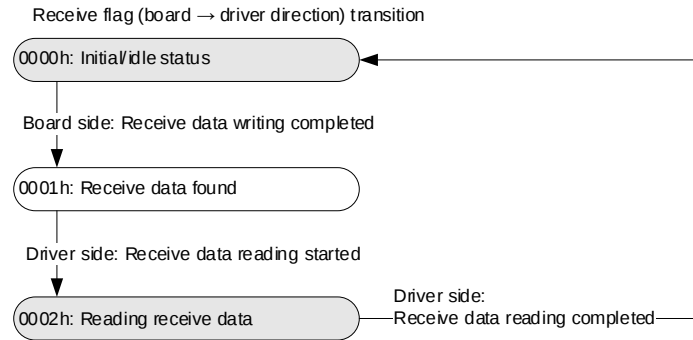


Figure 4.5.2-1 Transitions of the Receive Flag

Table 4.5.2-1 Details of Transitions of the Receive Flag

State	State name	Status	Driver/Board processing
0000h	Initial/idle state	The driver has finished reading receive data from the 2-port memory area, and the board can write receive data into the 2-port memory area.	Upon completion of writing receive data, the board causes the flag to transition to 1.
0001h	Received data found	The board has finished writing receive data into the 2-port memory area, and the driver can read receive data from the 2-port memory area.	When receive data starts being read, the driver causes the flag to transition to 2.
0002h	Receive data reading in progress	The driver is reading receive data from the 2-port memory area.	Upon completion of reading receive data, the driver causes the flag to transition to 0.

(b) Transitions of the send flag

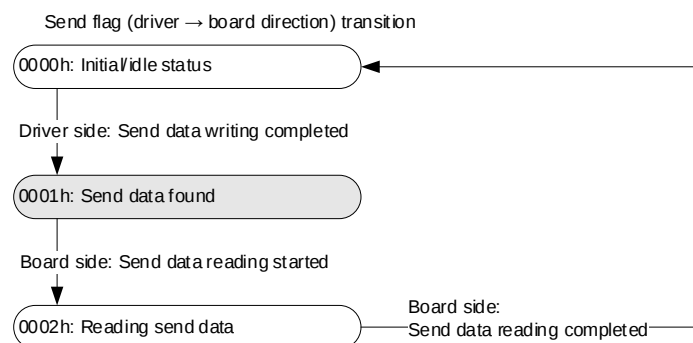


Figure 4.5.2-2 Transitions of the Send Flag

Table 4.5.2-2 Details of Transitions of the Send Flag

State	State name	Status	Driver/Board processing
0000h	Initial/idle state	The board has finished reading send data from the 2-port memory area and the driver can write send data into the 2-port memory area.	Upon completion for writing receive data, the driver causes the flag to transition to 1.
0001h	Send data found	The driver has finished writing send data into the 2-port memory area and the board can read send data from the 2-port memory area.	When send data starts being read, the board causes the flag to transition to 2.
0002h	Send data reading in progress	The board is reading send data from the 2-port memory area.	Upon completion of reading send data, the board causes the flag to transition to 0.

(2) 32-bit data assurance

When reading/writing data between the driver and the board without block data assurance per station, the board assures RWr/RWw data integrity as long as the driver satisfies the following conditions.

- The driver performs reading and writing with the RWr/RWw area of the link device area in units of 32 bits.
- The RWr/RWw start address for reading/writing is an even number.

(3) Stations interlock program

The interlock program is created by the user to send and receive data by interlocking the own station with another station without block data assurance per station. Integrity is assured by creating an interlock program in one of the following conditions.

- Data is greater than 32 bits.
- The RWr/RWw start address for reading/writing is an odd number.

The following figure is an example of interlock program between stations. (It is an example of using RX/RX as the send/receive flags.)

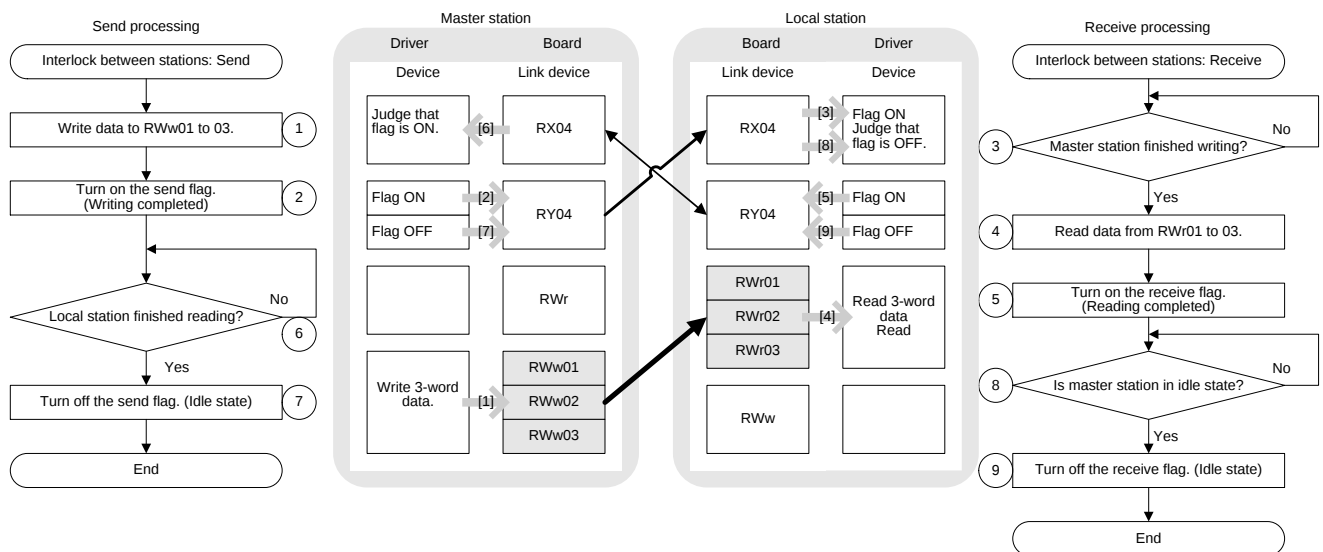


Figure 4.5.2-3 Example of Interlock Program Between Stations
(Between the Master Station and a Local Station)

4.5.3. Accessing a link device

Access a link device by reading each area address and area size in the device information area and calculating the offset address of the link device in the 2-port memory area.

For details on the device information area, refer to Section 3.2.2(2) "Device information area".

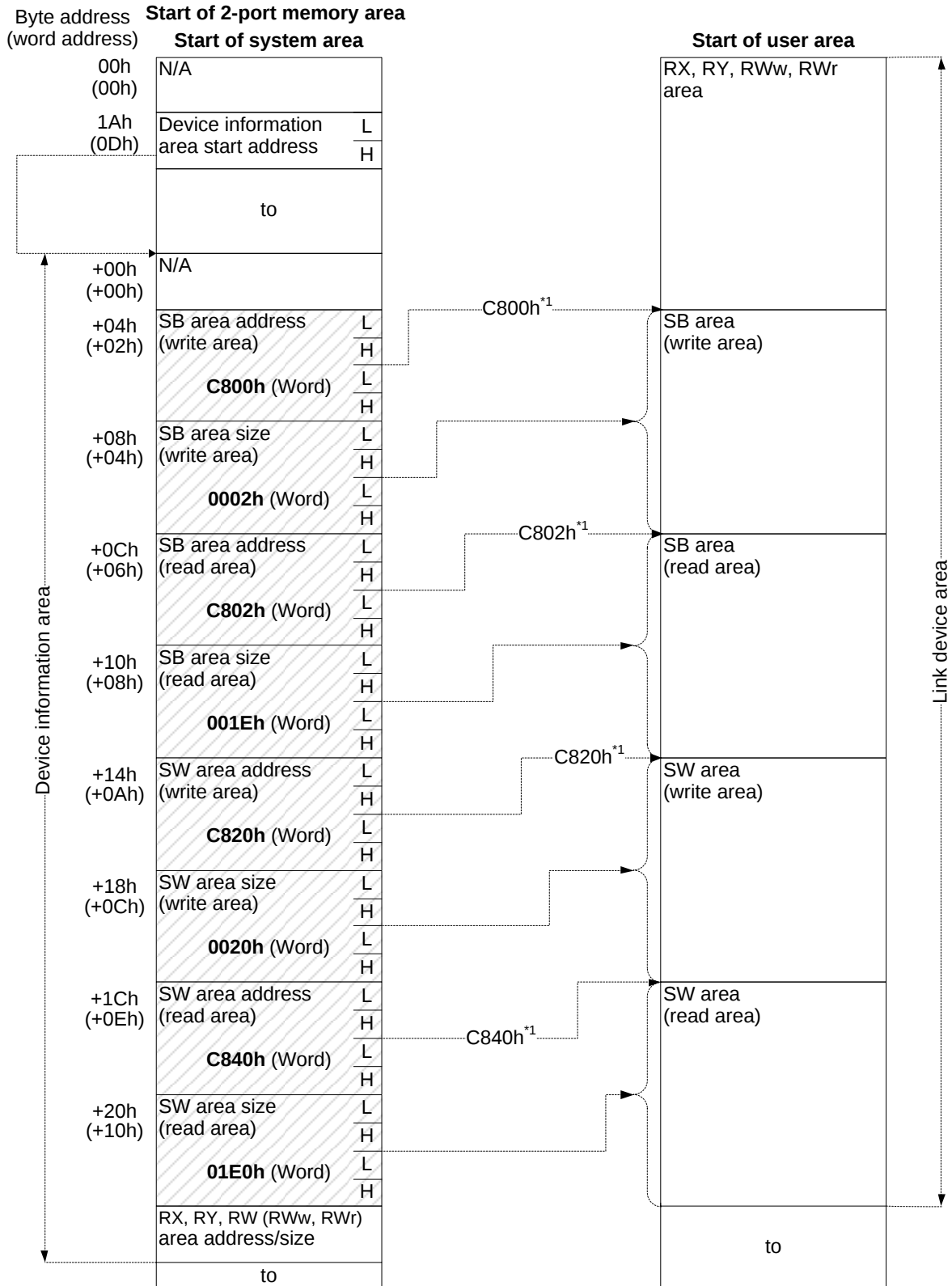


Figure 4.5.3-1 Image of Link Device Access (SB and SW)

*1: This value indicates the word offset address from the start of the 2-port memory area.

Read RX, RY, RWr, and RWw offsets (start numbers) and sizes (numbers of points) per station number from the offset and size information for the each station.

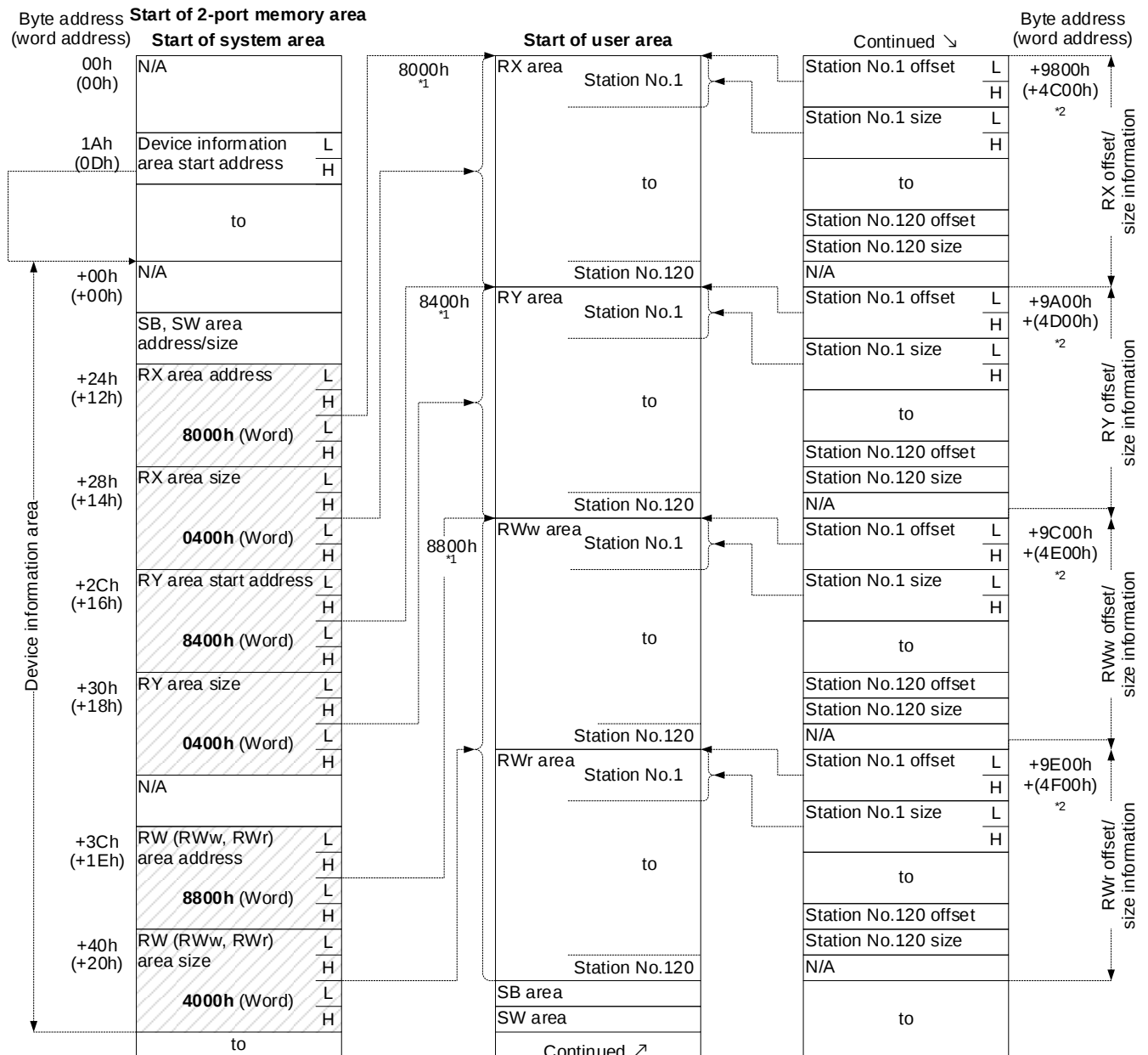


Figure 4.5.3-2 Image of Link Device Access (RX, RY, RWr, and RWw)

*1: This value indicates the word offset address from the start of the 2-port memory area.

*2: This value indicates the offset address from the start of the user area of the 2-port memory area.

Point	
The address and size of each area shown in the figure are not fixed values. Be sure to acquire the values from the device information area.	

4.6. Transient Transmission Processing

Transient transmission is a function to communicate with another station, which is used when requested by a user application.

Communication with another station is performed in such a way that the driver reads or writes transient frames in the 2-port memory area.

In transient transmission processing, send/receive processing varies depending on the type of transient frame to be sent or received.

For an overview of send/receive processing common to two types of transient frame, refer to Section 4.6.1.

For CC-Link compatible transient send/receive processing, refer to Sections 4.6.2 and some related sections thereafter.

For SLMP transient send/receive processing, refer to Sections 4.6.4 and some related sections thereafter.

4.6.1. Overview of transient transmission processing

(1) When the own station is a client

When request data is sent to the server, the driver is to write the request data to the 2-port memory area. The board reads the request data of the 2-port memory area, and sends the data to other stations.

When response data is received from the server, the board writes the response data to the 2-port memory area. The driver is to read the response data from the 2-port memory area.

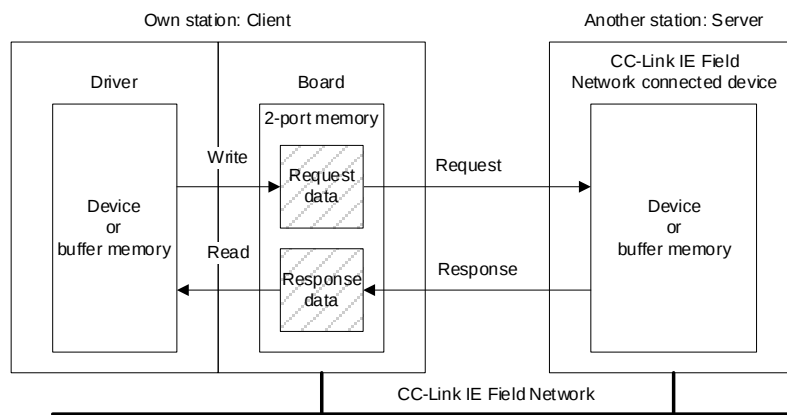


Figure 4.6.1-1 Flow of Data when Own Station is Client

(2) When the own station is a server

When request data is received from the client, the board writes the request data to the 2-port memory area. The driver is to read the request data from the 2-port memory area.

When response data is sent to the client, the driver is to write the response data to the 2-port memory area. The board reads the response data of the 2-port memory data and sends the data to other stations.

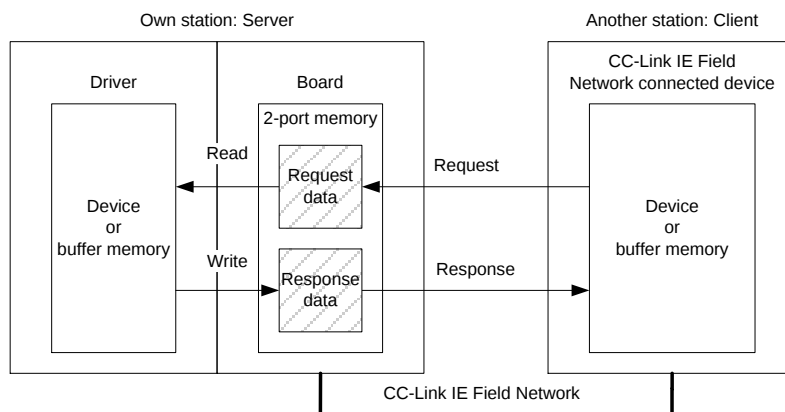


Figure 4.6.1-2 Flow of Data when Own Station is Server

4.6.2. Send/Receive procedure of CC-Link compatible transient transmission

CC-Link compatible transient transmission uses the CC-Link compatible transient handshake area and the CC-Link IE TSN compatible transient data area of the user area of the 2-port memory area to read/write data between the driver and the board.

For details, refer to the following.

- Section 3.2.3(9) "CC-Link compatible transient handshake area"
- Section 3.2.3(10) "CC-Link compatible transient data area"

(1) Overview of processing

1) Reading from and writing to the data area

When request/response data is sent to another station, the driver is to write the request/response data to the send area of the CC-Link compatible transient data area. The board reads the request/response data of the send area and sends the data to other stations.

When request/response data is received from another station, the board writes the request/response data to the receive area of the CC-Link compatible transient data area. The driver is to read the request/response data from the receive area.

2) Handshake between send signals and receive signals

For data reading/writing processing between the driver and the board, "send signals" and "receive signals" in CC-Link compatible transient handshake areas are used to manage the read/write statuses.

The data read/write processing needs to be performed while transitioning the send signal and receive signal and performing a handshake.

3) Relationships between send signals/receive signals and send areas/receive areas

There are two CC-Link compatible transient data areas and two CC-Link compatible transient handshake areas.

•To send data, write data to a send area for a send signal with "Initial status" (00h).

•To receive data, read data from a receive area for a receive signal with "Receive request" (01h).

The following figure shows an image of areas regarding handshake areas and data areas in the user area.

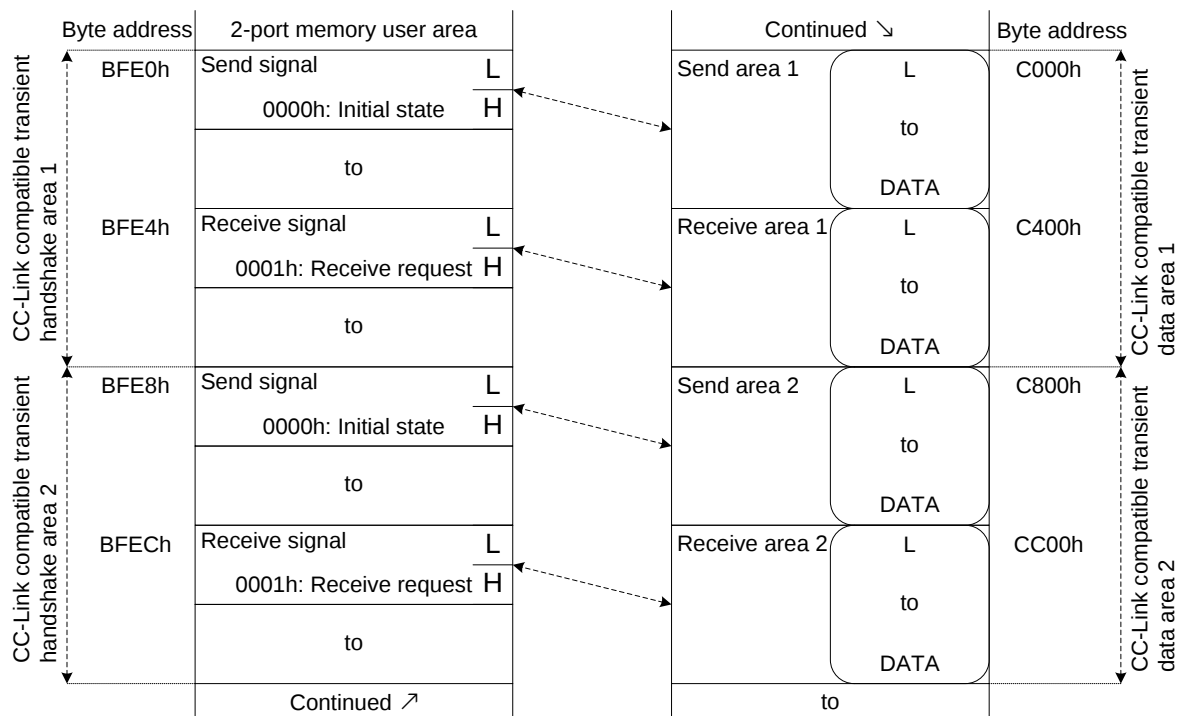


Figure 4.6.2-1 Image of Data Areas and Handshake Areas

(2) CC-Link compatible transient request send / response receive procedure (when own station is client)
 The following figure shows the procedure of sending a request and receiving a response for CC-Link compatible transient transmission.

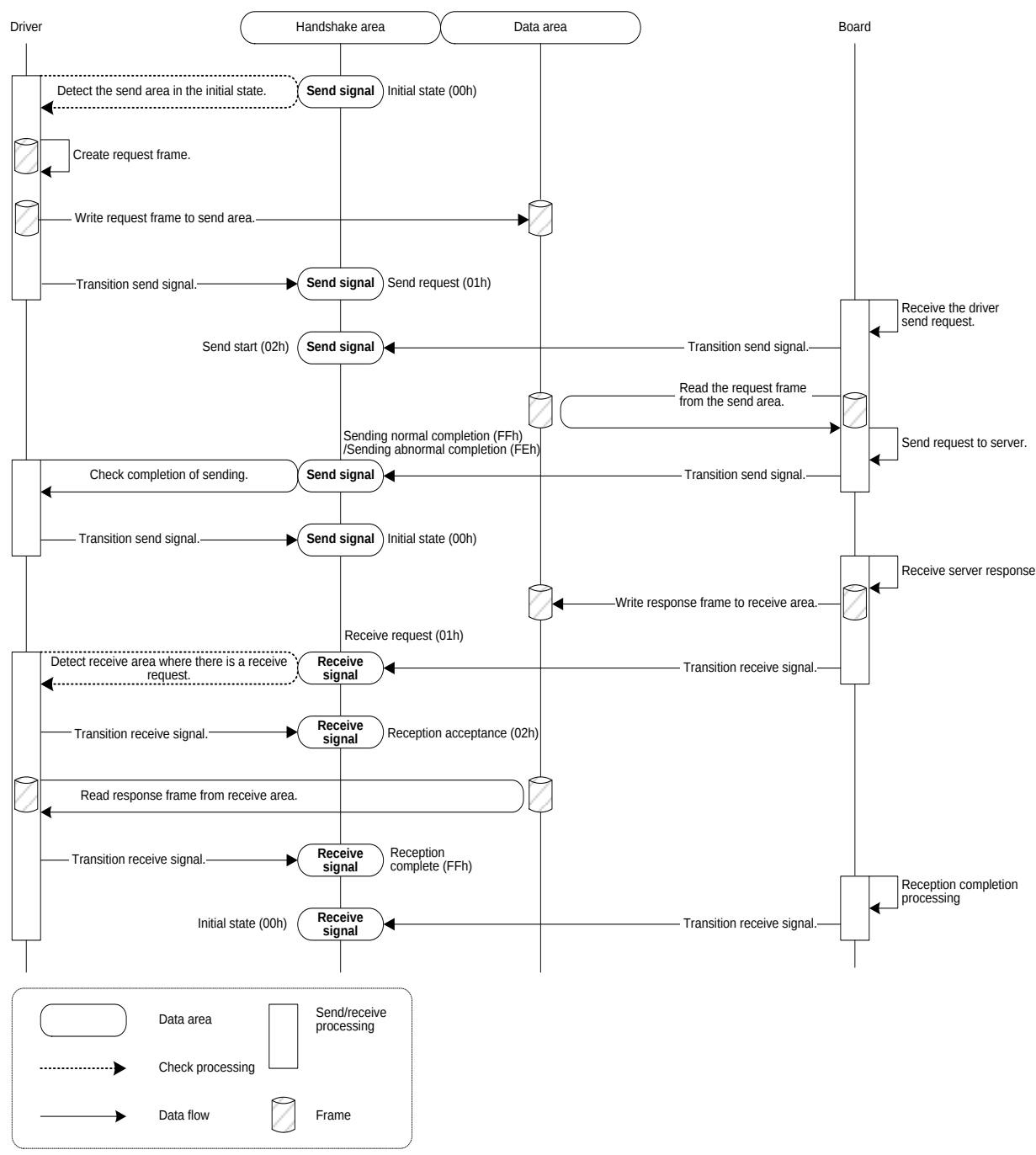


Figure 4.6.2-2 CC-Link Compatible Transient Request Send and Response Receive Procedure

(3) CC-Link compatible transient request receive / response send procedure (when own station is server)

The following figure shows the procedure of receiving a request and sending a response for CC-Link compatible transient transmission.

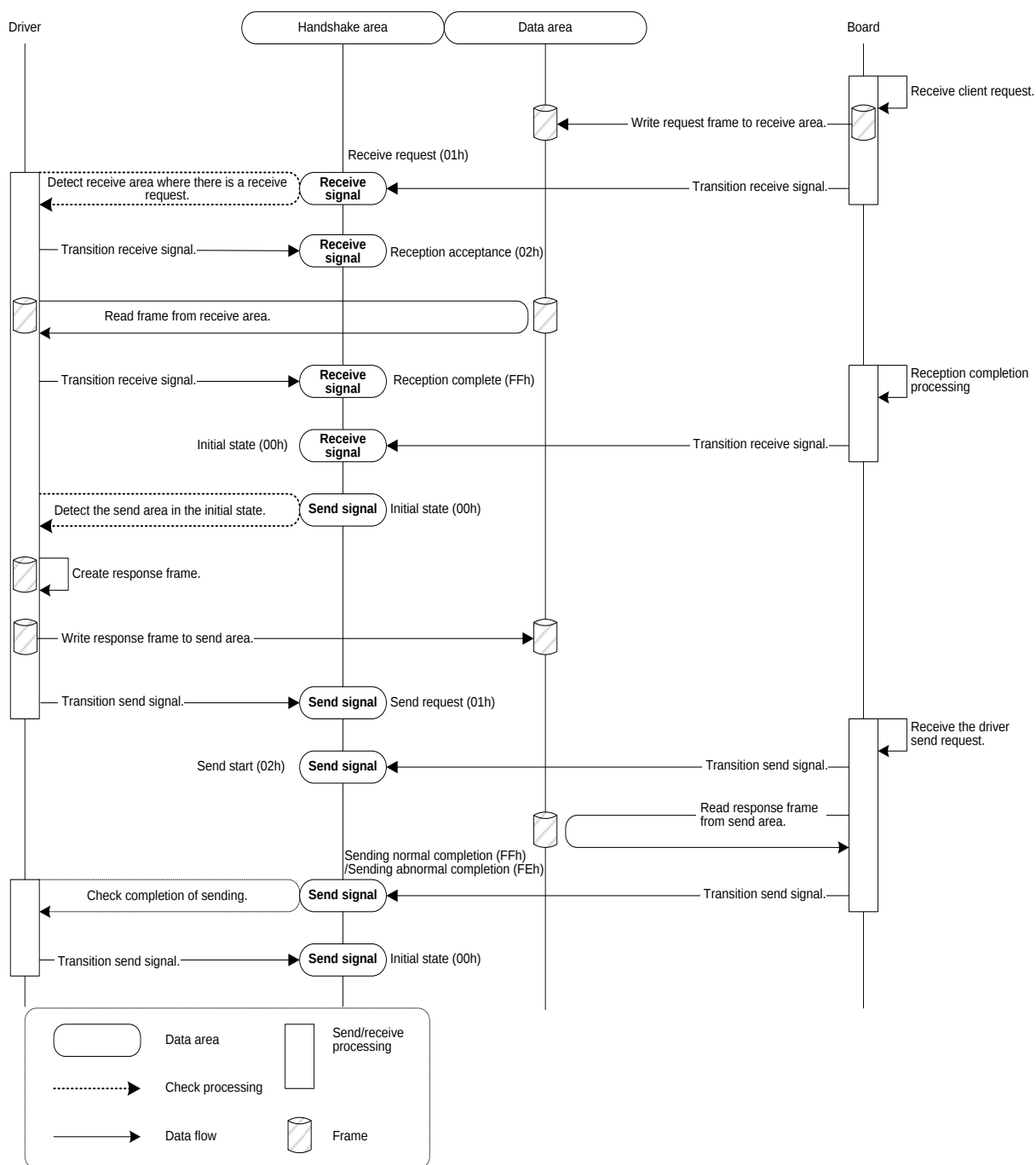


Figure 4.6.2-3 CC-Link Compatible Transient Request Receive and Response Send Procedure

4.6.3. CC-Link compatible transient handshake procedure

For data reading/writing processing between the driver and the board, send signals and receive signals are used to manage the read/write statuses. The data read/write processing needs to be performed while transitioning the send signal and receive signal and performing a handshake.

(1) Transitions of CC-Link compatible transient send signal

The following figure shows the transitions of the send signal.

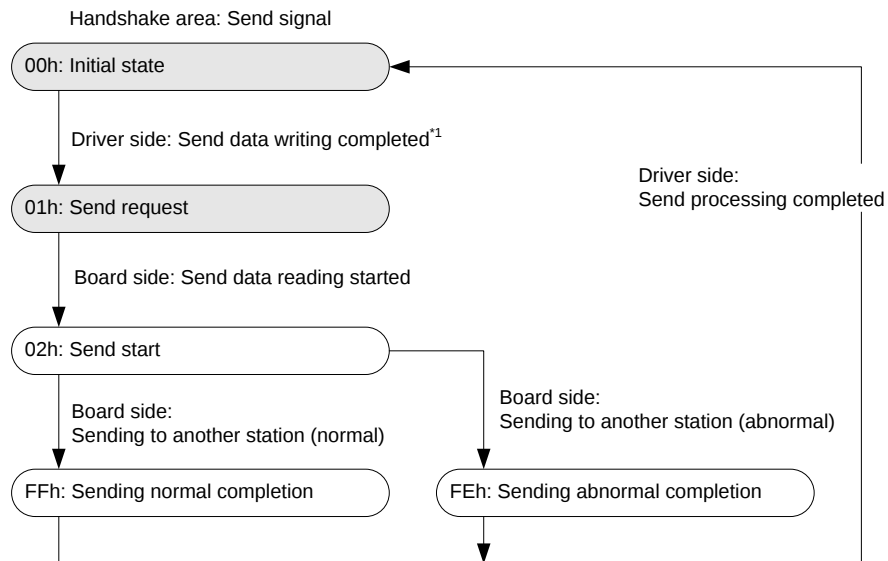


Figure 4.6.3-1 Transitions of CC-Link Compatible Transient Send Signal

*1: For details on send data, refer to Appendix 3 "Frame Format".

The following table lists the states of the send signal.

Table 4.6.3-1 Send Signal of CC-Link Compatible Transient Transmission

State	State name	Description
00h	Initial state	• The board has completed initial processing (at power-on). • The driver can send data.
01h	Send request	The driver has completed the processing of writing send data and is requesting the board to send the data.
02h	Send start	The board has accepted the send request, read the send data, and is sending the data to other stations.
FFh	Sending normal completion	The board has completed data sending normally.
FEh	Sending abnormal completion	The board has completed data sending abnormally.

(2) Transitions of CC-Link compatible transient receive signal
The following figure shows the transitions of receive signal.

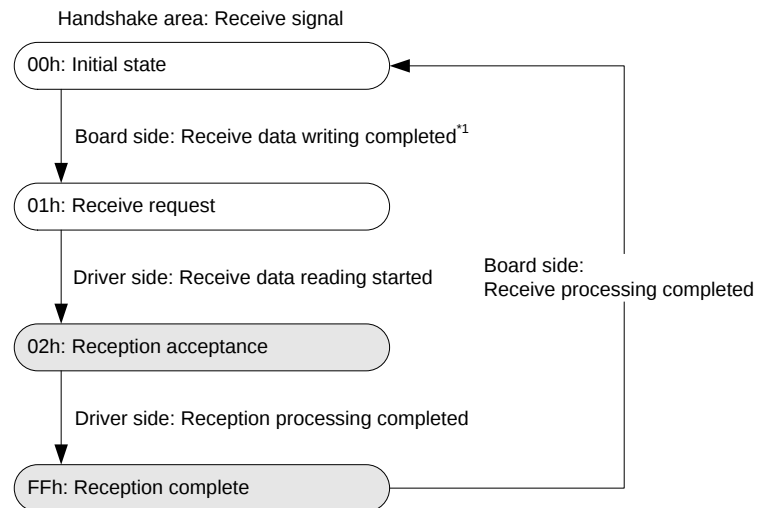


Figure 4.6.3-2Transitions of CC-Link Compatible Transient Receive Signal
*1: For details on receive data, refer to Appendix 3 "Frame Format".

The following table lists the states of the receive signal.

Table 4.6.3-2 Receive Signal of CC-Link Compatible Transient Transmission

State	State name	Description
00h	Initial state	- The board has completed initial processing (at power-on). - The board can receive data.
01h	Receive request	The board has completed the processing of writing receive data to the data area and is requesting the driver to receive the data.
02h	Reception acceptance	The driver has accepted the receive request and is reading the receive data.
FFh	Reception completion	The driver has completed reading the received data.

4.6.4. Send/Receive procedure of SLMP transient transmission

SLMP transient transmission performs data reading/writing between the driver and the board by using SLMP transient send/receive areas in the 2-port memory area.

For details, refer to the following.

- Section 3.2.2(16) "SLMP transient send/receive area"

(1) Overview of processing

1) Reading from and writing to send/receive areas

When a request is sent to another station, the driver is to write the request data to a send area of the header area and a send area of the data area in the SLMP transient send/receive area. The board reads the request data in the send areas of the header and data areas, and sends the data to another station.

When a response is received from another station, the board writes the response data in a receive area of the header area and a receive area of the data area in the SLMP transient send/receive area. The driver is to read the receive data from the receive areas of the header and data areas.

2) SLMP transient control flag handshake

For data reading/writing operation between the driver and the board, "SLMP transient control flag" is used to manage the read/write statuses. The data read/write processing needs to be performed while transitioning the SLMP transient control flag and performing a handshake.

When the SLMP transient control flag is to be transitioned, access the start "F" of the SLMP transient request/response frame.

3) Interrupt

When the SLMP transient control flag is to be transitioned, the driver and board notify each other of the control flag transition using an interrupt.

For details on interrupt, refer to Section 4.6.6 "SLMP transient transmission interrupts".

4) Relationship between send/receive areas and SLMP transient control flag

There are four SLMP transient send/receive areas.

The SLMP transient control flag exists at the top of a send area and receive area of the header area.

•To send data, write data to a send area with the SLMP transient control flag being "Initial status" (00h).

•To receive data, read data from a receive area with the SLMP transient control flag being "Receive request" (01h).

The following figure shows an image of SLMP transient send/receive areas in the system area.

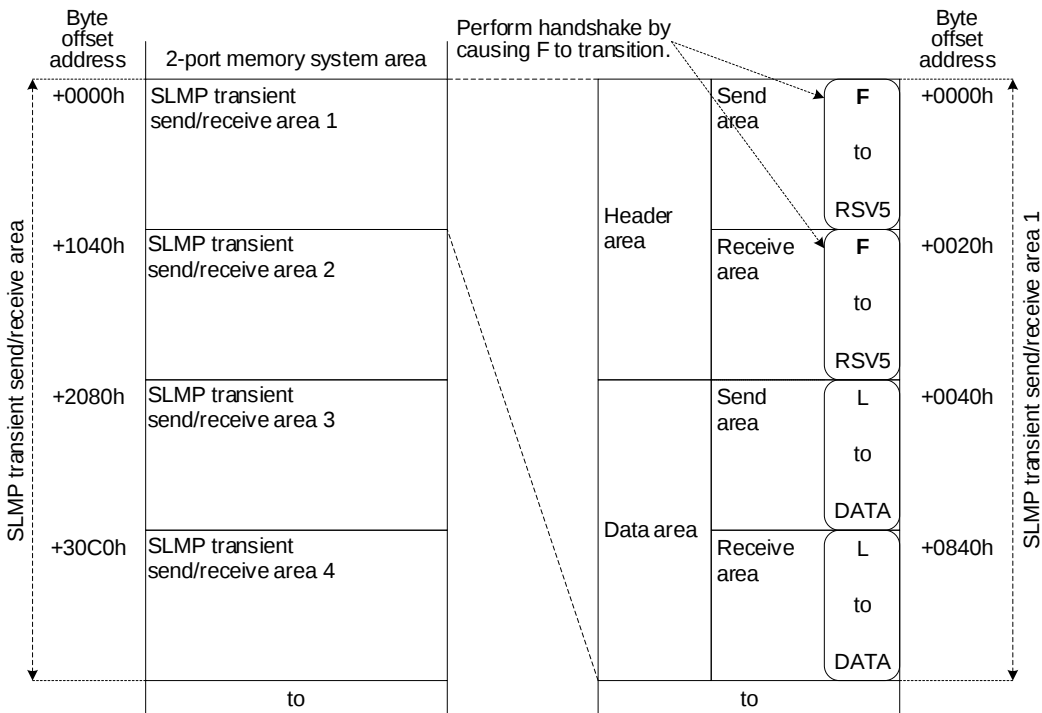


Figure 4.6.4-1 SLMP Transient Send/Receive Area Image

(2) Request send processing of SLMP transient transmission

The following figure shows an overview of the request send processing of SLMP transient transmission.

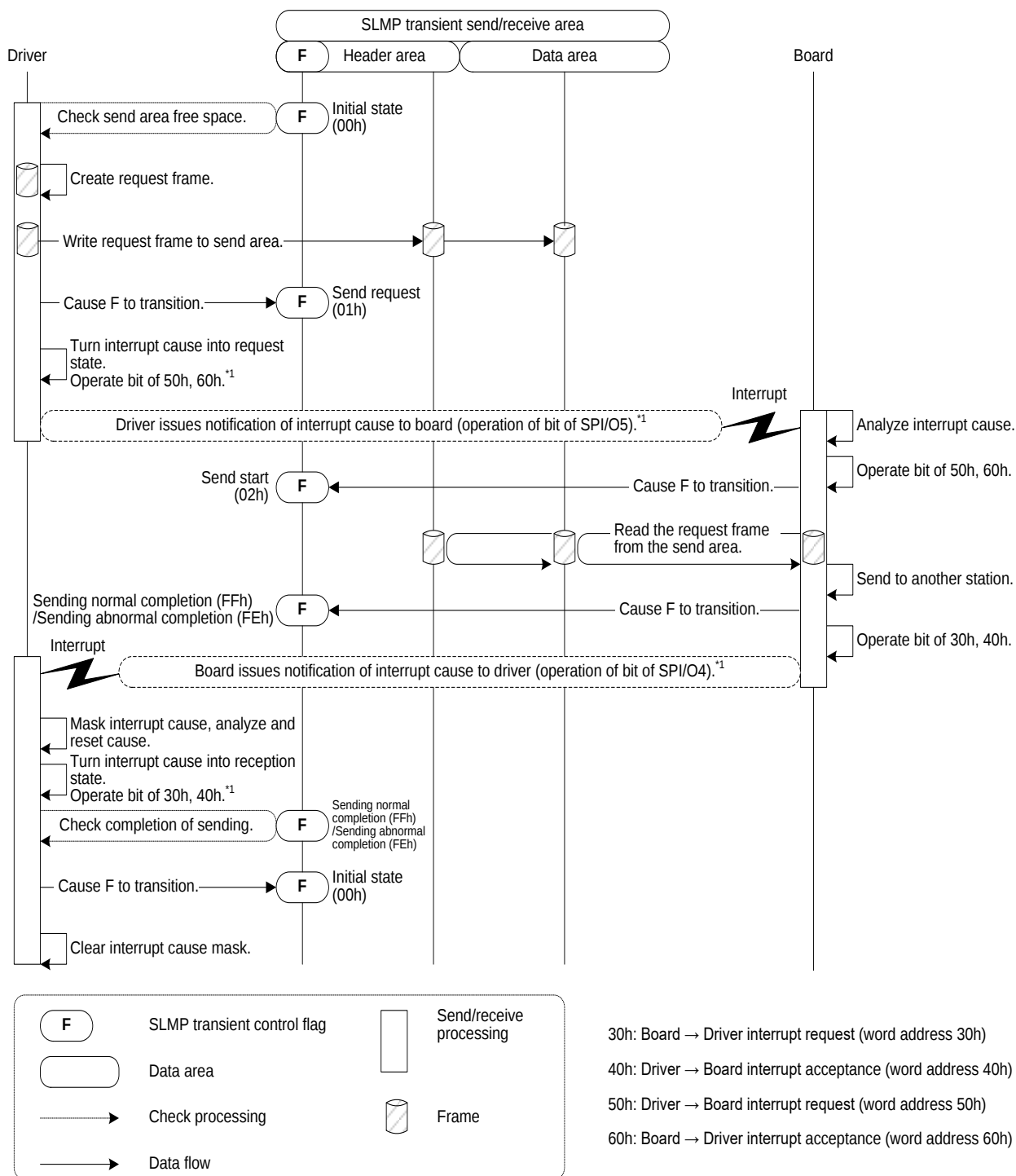


Figure 4.6.4-2 Overview of Request Send Processing of SLMP Transient Transmission

*1: For details on interrupt, refer to Section 4.6.6 "SLMP transient transmission interrupts".

(3) Response receive processing of SLMP transient transmission

The following figure shows an overview of the response receive processing of SLMP transient transmission.

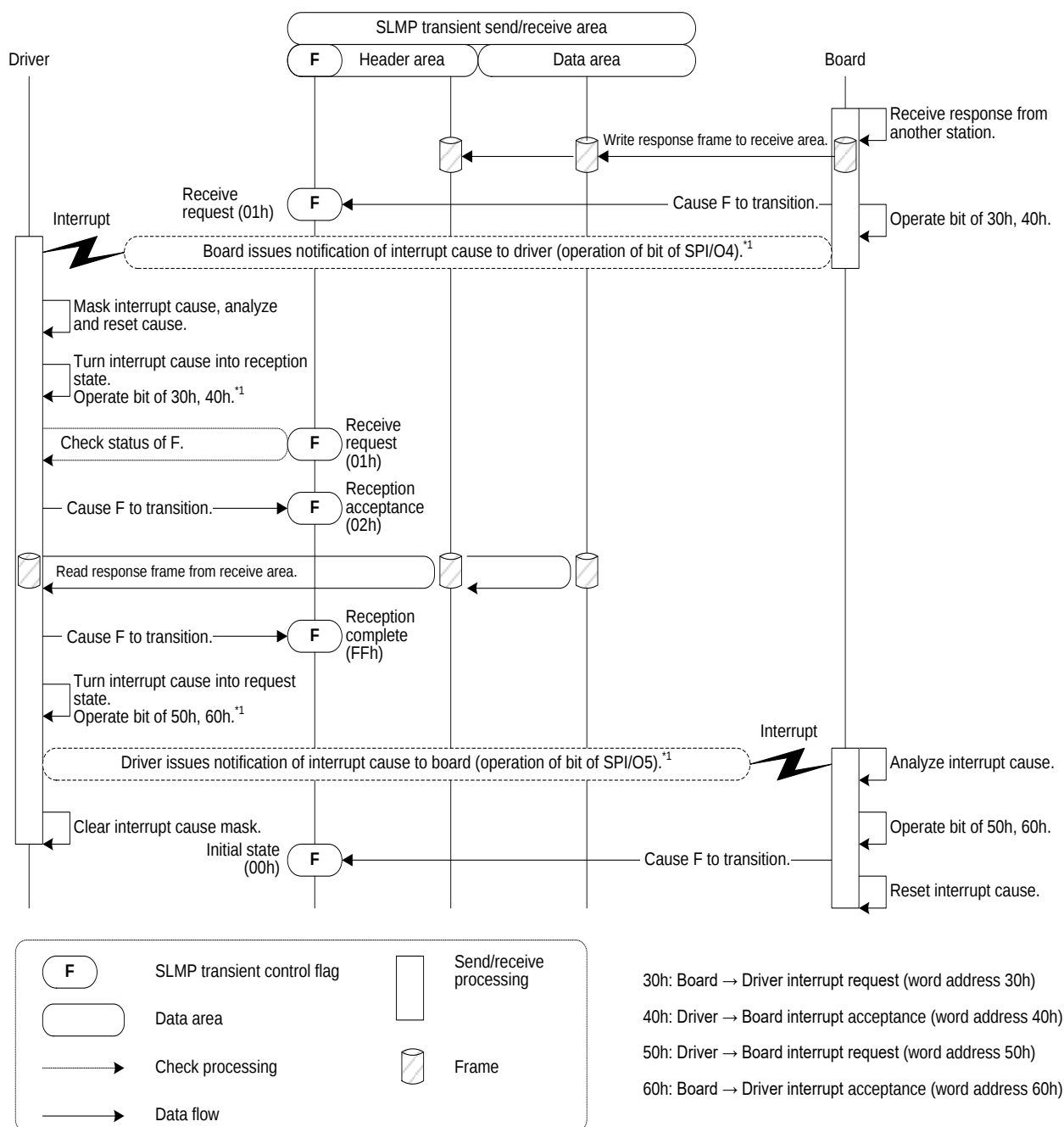


Figure 4.6.4-3 Overview of Response Receive Processing of SLMP Transient Transmission

*1: For details on interrupt, refer to Section 4.6.6 "SLMP transient transmission interrupts".

4.6.5. SLMP transient control flag procedure

For data reading/writing processing between the driver and the board, SLMP transient control flag is used to manage the read/write statuses. The data read/write processing needs to be performed while transitioning the SLMP transient control flag and performing a handshake.

- (1) Transitions of the SLMP transient control flag during sending
The following figure shows the transitions during send operation.

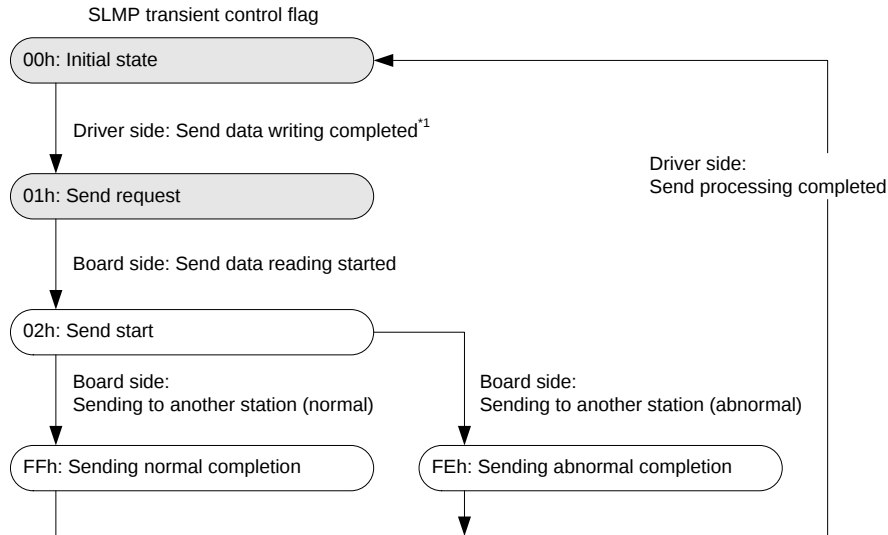


Figure 4.6.5-1 Transitions of the SLMP Transient Control Flag During Sending

*1: For details on receive data, refer to Appendix 3 "Frame Format".

Table 4.6.5-1 SLMP Transient Control Flag During Sending

State	State name	Description
00h	Initial state	• The board has completed initial processing (at power-on). • The driver can send data.
01h	Send request	The driver has completed the processing of writing send data and is requesting the board to send the data.
02h	Send start	The board has accepted the send request, read the send data, and is sending the data to other stations.
FFh	Sending normal completion	The board has completed data sending normally.
FEh	Sending abnormal completion	The board has completed data sending abnormally.

(2) Transitions of the SLMP transient control flag during receiving
The following figure shows the transitions during receive operation.

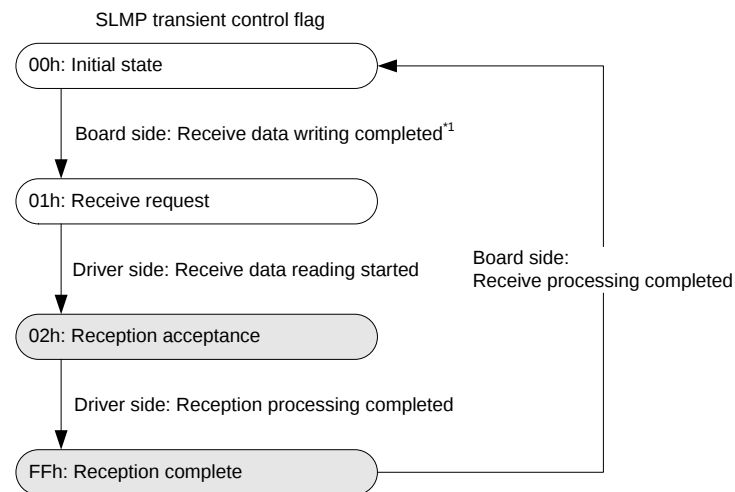


Figure 4.6.5-2 Transitions of the SLMP Transient Control Flag During Receiving
*1: For details on receive data, refer to Appendix 3 "Frame Format".

State	State name	Description
00h	Initial state	• The board has completed initial processing (at power-on). • The board can receive data.
01h	Receive request	The board has completed the processing of writing receive data to the data area and is requesting the driver to receive the data.
02h	Reception acceptance	The driver has accepted the receive request and is reading the receive data.
FFh	Reception completion	The driver has completed reading the received data.

4.6.6. SLMP transient transmission interrupts

When the SLMP transient control flag is transitioned, the driver and board notify each other of the transition using an interrupt (software interrupt).

(1) Overview of processing

To use an interrupt, the following two-stage processing is required.

1) Interrupt cause notification/verification

For the driver to issue a notification that there is an interrupt cause 1 (SLMP transient control flag transition) to the board, the host → board interrupt area (SPI/O5) is used.

For the driver to check an interrupt cause 1 (SLMP transient control flag transition) from the board, the board → host interrupt area (SPI/O4) is used.

For details, refer to the following.

Word address	Name	Bit	Reference
04h	Board → Host interrupt area (SPI/O4)	2	Section 3.3.2(5)
05h	Host → Board interrupt area (SPI/O5)	2	Section 3.3.2(6)

2) Interrupt cause request/acceptance status

For the driver or board to indicate the state of requesting for SLMP transient control flag transition, a driver → board interrupt request or a board → driver interrupt request is used.

On the other hand, for the driver or board to indicate the state of accepting a request for SLMP transient control flag transition, a driver → board interrupt acceptance or a board → driver interrupt acceptance is used.

Note that an interrupt request and interrupt acceptance need to use bits corresponding to SLMP transient send/receive areas 1 to 4.

The relationship between areas and bits is shown using the board → driver interrupt request (word address: 30h) as an example.

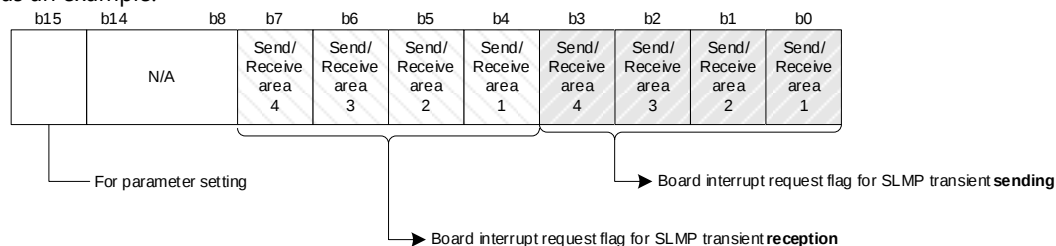


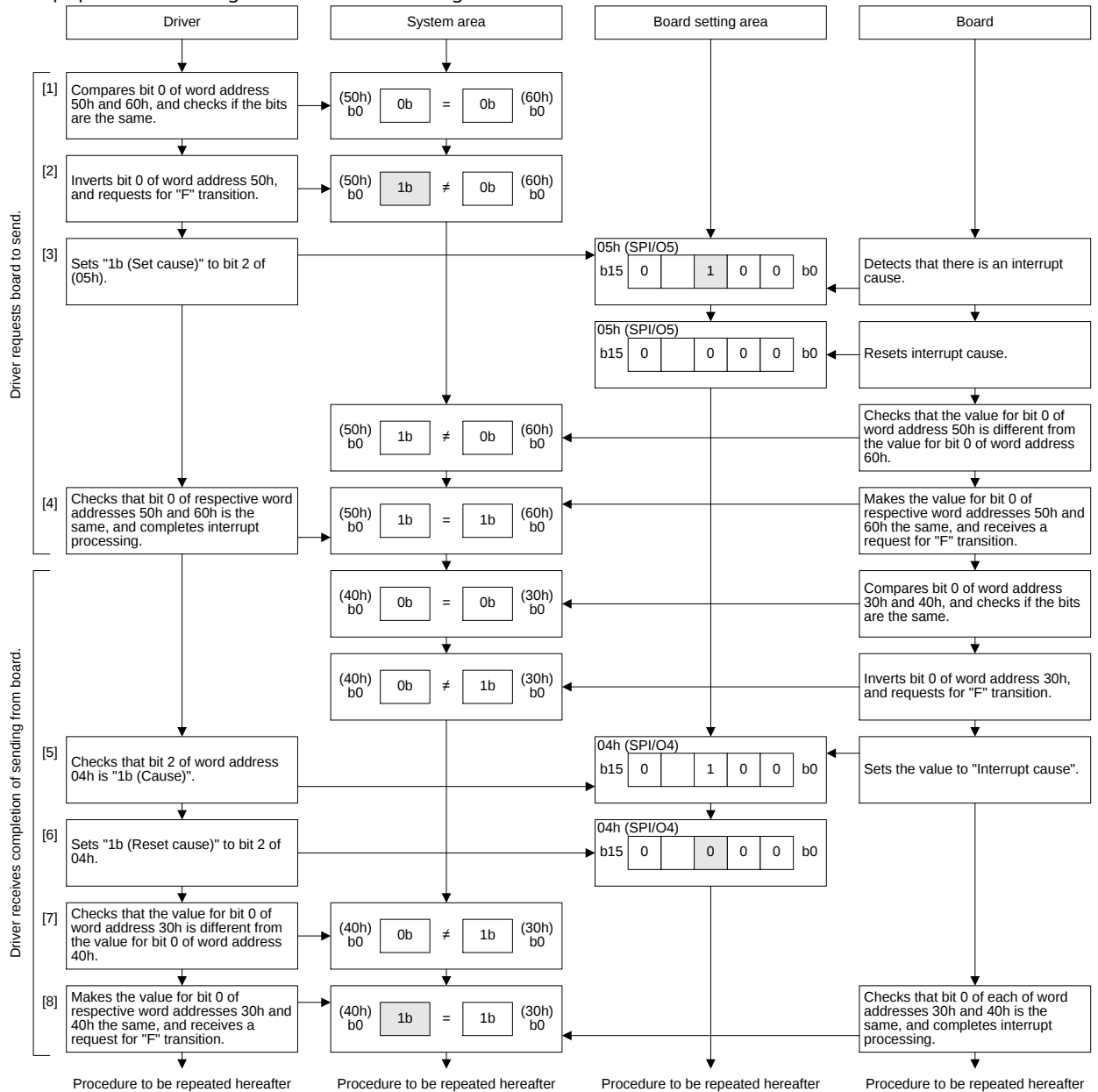
Figure 4.6.6-1 Area and Bit Image of Interrupt Request / Interrupt Acceptance

For details, refer to the following.

Word address	Name	Bit	Reference
30h	Board → Driver interrupt request	7 to 0	Section 3.2.2(11)
40h	Driver → Board interrupt acceptance	7 to 0	Section 3.2.2(12)
50h	Driver → Board interrupt request	7 to 0	Section 3.2.2(13)
60h	Board → Driver interrupt acceptance	7 to 0	Section 3.2.2(14)

The following figures show the interrupt procedures during SLMP transient sending and receiving. Note that the interrupt procedures shown in this document are examples of a case where SLMP transient send/receive area 1 is used.

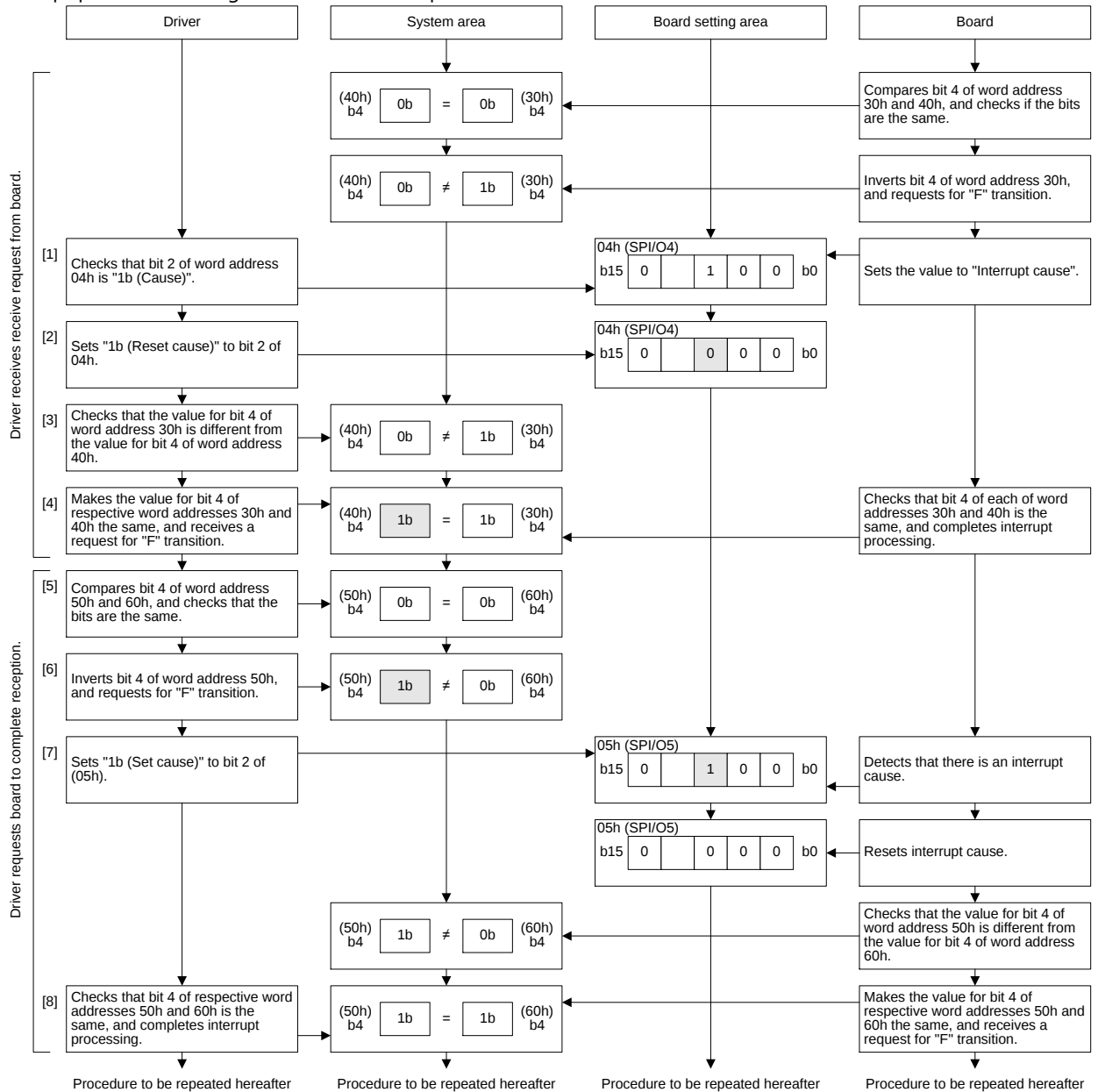
(2) Interrupt procedure during SLMP transient sending



Step	Description
Driver to board interrupt procedure	[1] The driver compares bit 0 of the driver → board interrupt request (50h) and the board → driver interrupt acceptance (60h) and verifies that the values are the same.
	[2] The driver inverts bit 0 of the driver → board interrupt request (50h) to request the interrupt (SLMP transient control flag "F" transition).
When transitioned to "Send request" (01h)	[3] The driver sets "1b: Set cause" in bit 2 (driver → board interrupt cause 1) of the host → board interrupt area (SPI/O5) (05h).
	[4] The driver verifies that bit 0 of the driver → board interrupt request (50h) and board → driver interrupt acceptance (60h) are the same, and then ends interrupt processing.
Board to driver interrupt procedure	[5] The driver verifies that bit 2 (board → driver interrupt cause 1) of the board → host interrupt area (SPI/O4) (04h) is "1b: Cause".
	[6] The driver sets bit 2 (board → driver interrupt cause 1 reset) of the board → host interrupt area (SPI/O4) (04h) to "1b: Reset cause".
When transitioned to "Sending normal completion" (FFh) or "Sending abnormal completion" (FEh)	[7] The driver compares bit 0 of the board → driver interrupt request (30h) and bit 0 of driver → board interrupt reception (40h), and accepts the interrupt request if the values are different.
	[8] The driver makes bit 0 of the driver → board interrupt reception (40h) and bit 0 of the board → driver interrupt request (30h) the same to notify the board that the driver accepted the interrupt (SLMP transient control flag "F" transition request).

Figure 4.6.6-2 Interrupt Procedure During SLMP Transient Sending

(3) Interrupt procedure during SLMP transient reception



Step	Description
Board to driver interrupt procedure	[1] The driver verifies that bit 2 (board → driver interrupt cause 1) of the board → host interrupt area (SPI/O4) (04h) is "1b: Cause".
	[2] The driver sets bit 2 (board → driver interrupt cause 1 reset) of the board → host interrupt area (SPI/O4) (04h) to "1b: Reset cause".
When transitioned to "Receive request" (01h)	[3] The driver compares bit 0 of the driver → board interrupt request (30h) and bit 0 of board → driver interrupt reception (40h), and accepts the interrupt request if the values are different.
	[4] The driver makes bit 0 of the driver → board interrupt reception (40h) and bit 0 of the board → driver interrupt request (30h) the same to notify the board that the driver accepted the interrupt (SLMP transient control flag "F" transition request).
Driver to board interrupt procedure	[5] The driver compares bit 4 of the driver → board interrupt request (50h) and the board → driver interrupt acceptance (60h) and verifies that the values are the same.
	[6] The driver inverts bit 4 of the driver → board interrupt request (50h) to request the interrupt (SLMP transient control flag "F" transition).
When transitioned to "Reception completion" (FFh)	[7] The driver sets "1b: Set cause" in bit 2 (driver → board interrupt cause 1) of the host → board interrupt area (SPI/O5) (05h).
	[8] The driver checks that bit 4 of the driver → board interrupt request (50h) and bit 4 of the board → driver interrupt acceptance (60h) are the same, and then ends reception completion interrupt processing.

Figure 4.6.6-3 Interrupt Procedure During SLMP Transient Reception

4.6.7. Access to SLMP transient send/receive area

Access an SLMP transient send/receive area by reading each area address and area size in the SLMP transient send/receive area information and calculating the offset address of the above SLMP transient send/receive area in the 2-port memory area.

For SLMP transient send/receive area details, refer to Section 3.2.2(15) "SLMP transient send/receive area information".

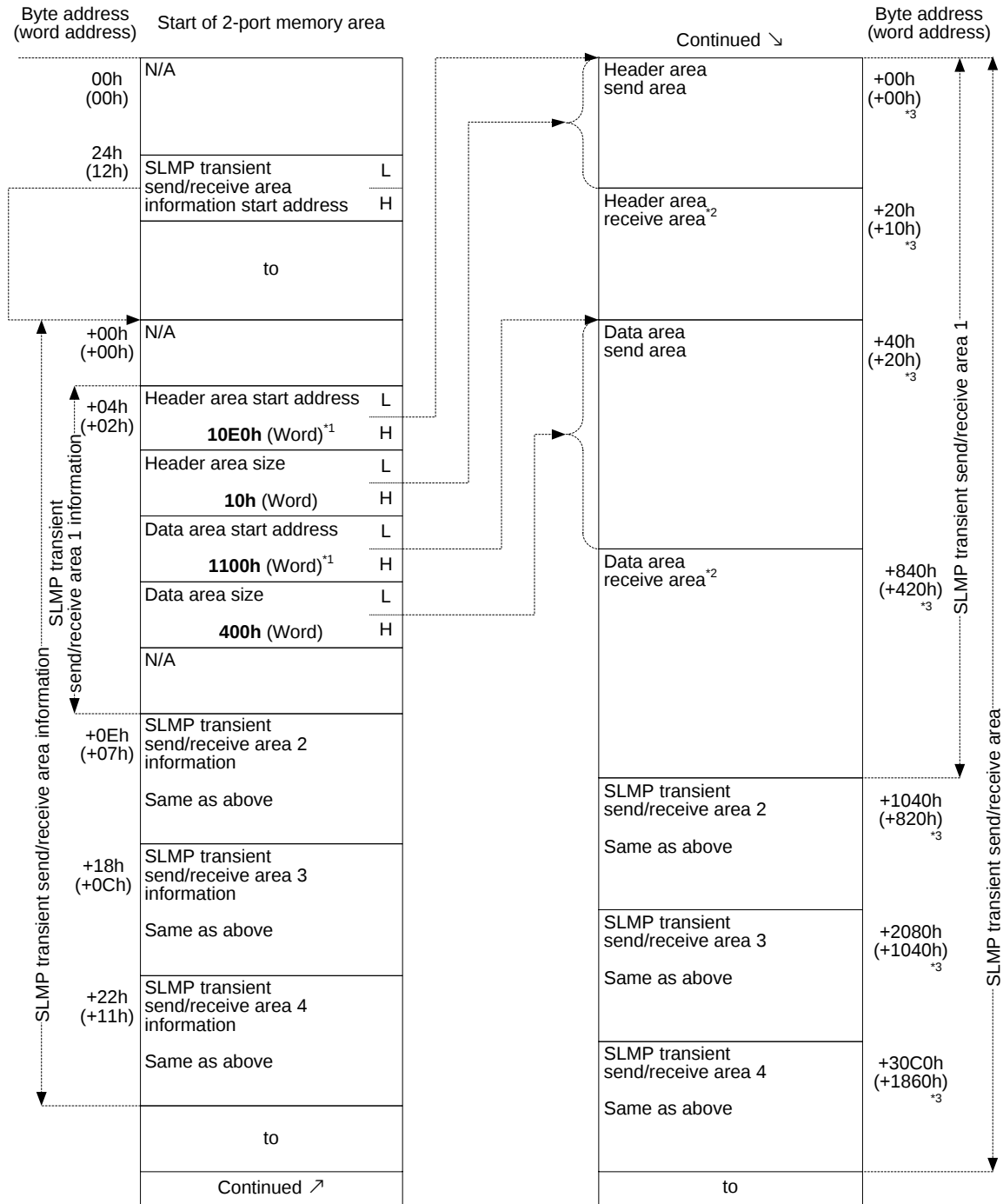


Figure 4.6.7-1 SLMP Transient Send/Receive Area Access Image

- *1: This value indicates the word offset address from the start of the 2-port memory area.
*2: For the start address of a receive area, add a send area size to the start area of a send area.
*3: This value indicates the offset address from the start of the SLMP transient send/receive area.

Point

The address and size of each area shown in the figure are not fixed values. Be sure to acquire the values from the SLMP transient send/receive area information.

4.7. Other Functions

The driver's processing is shown for each of the functions below.

Add a processing type to the driver in accordance with host specifications.

- Alive check function
- CC-Link IE Field Network diagnostics function

4.7.1. Alive check processing

The alive check function monitors the operation of the host's software (operating system, driver) using the timer on the board.

This function detects driver operation delay due to the access error from the driver to board or host system high load.

If the timer on the board cannot be reset within the interval timer (monitoring time), an "Alive check error occurrence interrupt" is generated from the board to the driver. Also, since the board outputs an error of the own station to SB and SW, the abnormal state of the driver in the own station can be checked from another station.

The following figure shows how to enable the alive check function. For details on the register areas related to the alive check function, refer to Section 3.3.3(17) "Alive check function setting register" to 3.3.3(20) "Interval timer reset lock register".

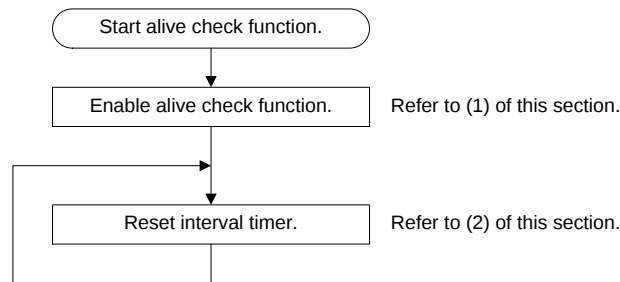


Figure 4.7.1-1 Alive Check Function Overview

(1) Procedure for enabling the alive check function

The following figure shows the procedure for enabling the alive check function.

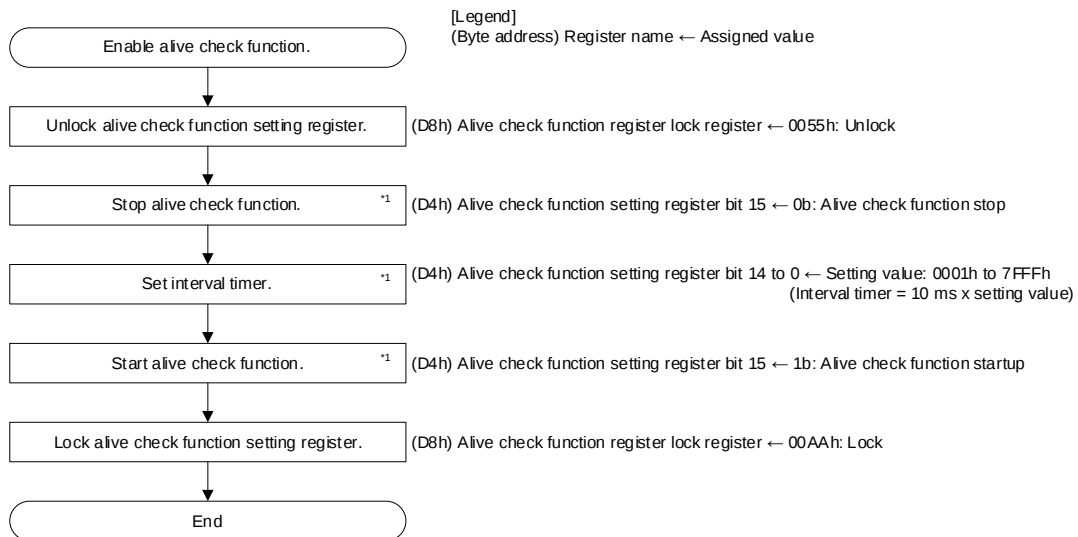


Figure 4.7.1-2 Procedure for Enabling Alive Check Function

*1: Access the alive check function setting register in units of 32 bits.

Note

- Do not write to both 15 bit and 14-0 bits of the alive check function setting register (byte address: D4h) at the same time. First set the interval timer of bits 14-0, and then set the alive check function startup/stop of bit 15.
- Do not change the interval timer during alive check function startup. To change the interval timer, stop the alive check function, unlock the alive check function setting register by using the alive check function register lock register (byte address: D8h), and then change the set value. (Writing a setting value to the interval timer while locked will be ignored.)
- Do not set "0000h" to the interval timer setting value. When "0000h" is set, an error occurs immediately after alive check function startup.

(2) Interval timer reset procedure

After starting the alive check function, read the interval timer reset register until the set time of the interval timer has elapsed, and then reset the interval timer. The following figure shows the procedure for resetting the interval timer.

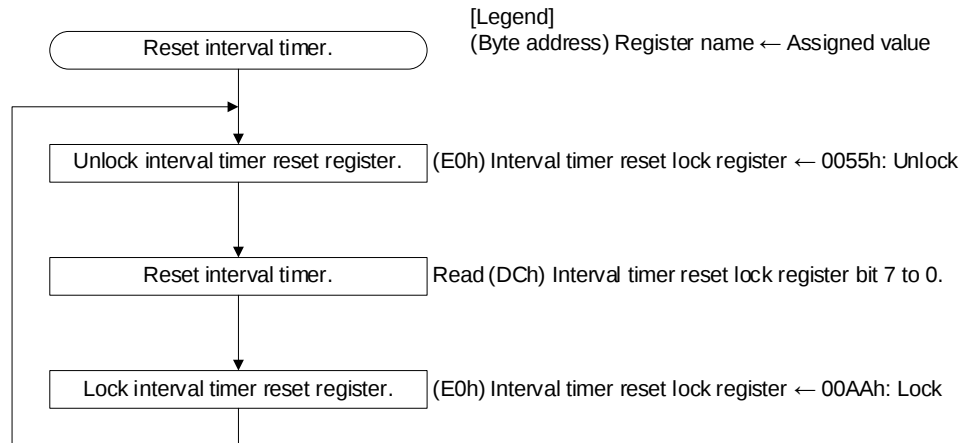


Figure 4.7.1-3 Interval Timer Reset Procedure

(3) Operation in the event of an alive check error

If the setting time of the interval timer elapses when the alive check function is enabled, the following (a) and (b) are performed. 1), 2), and 3) below are the operations of the board if the time elapses.

- (a) An interrupt is generated from the board to the driver, and bit 3 (alive check error occurrence interrupt) of the board status interrupt cause register changes to "1b: Cause".
(Refer to Section 3.3.3(12) Board status interrupt cause register.)
 - (b) The driver sets bits 0 to 5 (host operation information) of host operation information to "000010b: Abnormal stop".
(Refer to Section 3.3.3(7) Host operation information.)
- 1) The board stops cyclic transmission and does not send link device data of the own station.
 - 2) The board continues to perform baton pass and sends a token for sending data to another station.
 - 3) The corresponding bits of SW0100 to SW0107 (Operation status (each station) is set to "1b" (Stop error). The stop error status can be checked from other stations.

4.7.2. CC-Link IE Field Network diagnostic processing

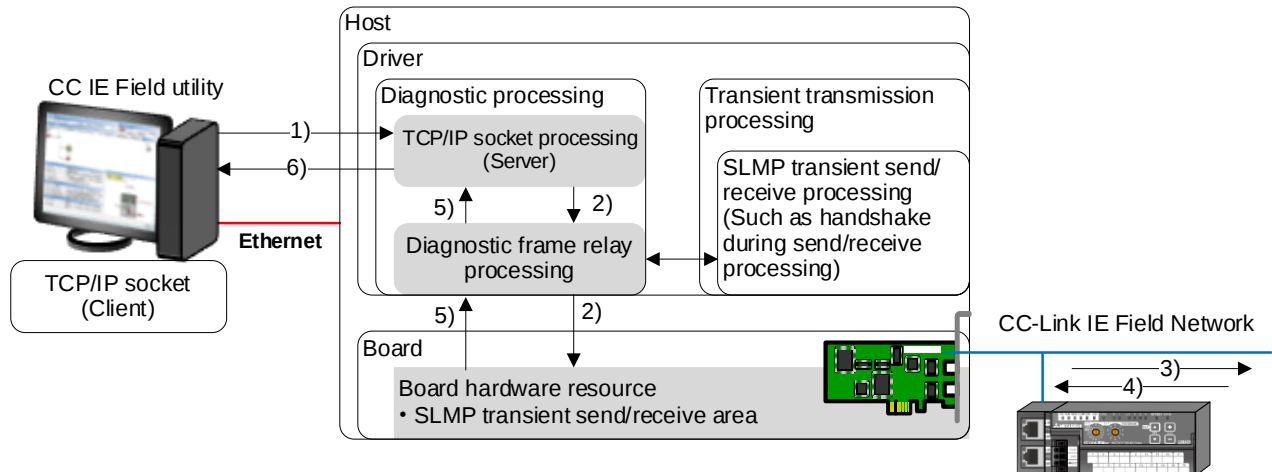
The status of CC-Link IE Field Network can be checked using the CC IE Field utility.

By using the CC-Link IE Field Network diagnostic function, a faulty area in the network, error cause, action, and event history can be checked.

(1) Overview of driver/board diagnostic processing

When the diagnostic function is executed, diagnostic data between the board and each station is sent/received using transient transmission.

The following shows an overview of driver/board processing when the diagnostic function is executed.



Processing	Description
1)	The driver receives diagnostics request frames (Ethernet) from CC IE Field utility. (TCP/IP socket processing)
2)	The driver writes the diagnostics request frames (Ethernet) received to the SLMP transient send/receive area. (Diagnostic frame relay processing)
3)	The board reads the diagnostics request data from the SLMP transient send/receive area and sends diagnostics request frames (Transient) to each station. (The board collects the status and information of each station.)
4)	The board receives diagnostics response frames (Transient) from each station and writes them to the SLMP transient send/receive area.
5)	The driver reads diagnostics response frames (Transient) from the SLMP transient send/receive area. (Diagnostic frame relay processing)
6)	The driver sends the diagnostics response data read to CC IE Field utility with the diagnostics response frames (Ethernet). (TCP/IP socket processing)

Figure 4.7.2-1 Processing Image of Diagnostic Function

(2) TCP/IP socket processing

The following figure shows an general flow of TCP/IP socket processing.

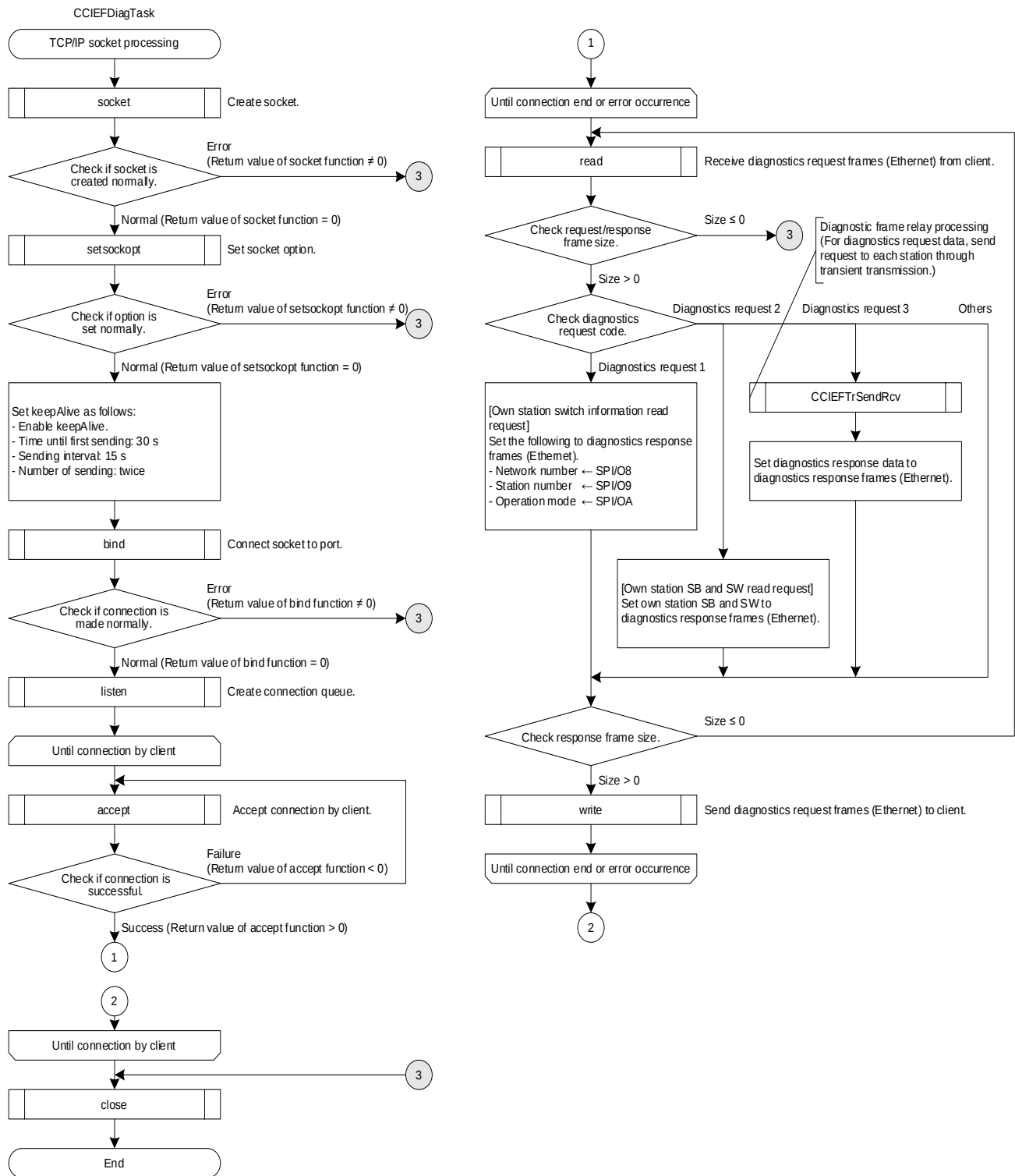


Figure 4.7.2-2 General Flow of TCP/IP Socket Processing

(3) Diagnostic frame relay processing

The following figure shows an general flow of diagnostic frame relay processing

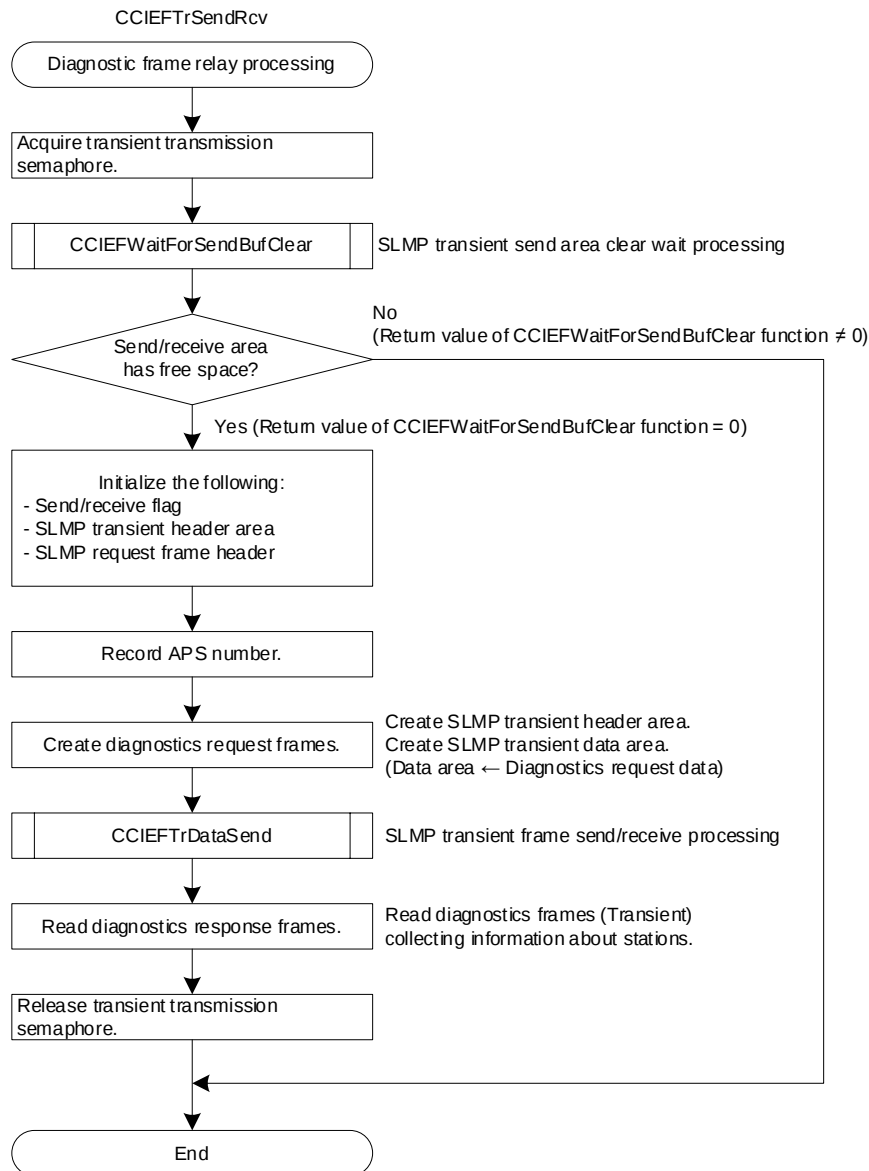


Figure 4.7.2-3 General Flow of Diagnostic Frame Relay Processing

5. FUNCTION SPECIFICATIONS

This chapter describes the function specifications of the sample code (C language) stored in the CD-ROM provided with this manual.

(1) Sample code operating environment

The sample code assumes operation in the following environment:

- Byte addressing-type 32-bit processor
- Little endian

(2) Sample code functions

The sample code describes the processing below.

- Initial processing
- Parameter setting
- Cyclic transmission
- Transient transmission

(3) Station type achievable by sample code

The sample code is created for operation as the master station or local station.

Note

- The sample code is for your reference for checking logic. Its operation is not guaranteed by Mitsubishi Electric.
- The sample code does not include OS-dependent processing. To add OS-dependent processing, refer to Section 5.3 "Modifying the Sample Code".
- The sample code contains parameter structure definitions. Change the values set in the structure in accordance with the system used by referring to Chapter 4.2 "Parameter Creation Processing".

5.1. File List

The following table lists the sample code source and header files.

Table 5.1-1 File List

Folder configuration		File name	Function
Source	English	CCIEFInit.c	Board initialization
		CCIEFDUMMYAcs.c	Hardware access dummy function
		CCIEFDevAcs.c	Cyclic transmission
		CCIEFSImpAcs.c	SLMP transient
		CCIEFCCTran.c	CC-Link compatible transient
		CCIEFDiag.c	CC-Link IE Field Network diagnostics
		Driver.h	Header of the above source file
	Japanese	Same with English version	

5.2. Function List

The following table lists the functions of the sample code.

Table 5.2-1 Function List

File name	Function name	Type	Function
CCIEFInit.c	CCIEFDevCreate	long	Board device creation processing (dummy)
	BoardReset	void	Board reset processing
	CCIEFBoardInit	long	Board initialization processing
	InterruptRequest	void	Interrupt request processing (interrupt request to board)
	nsParameterPartSend	long	Parameter block transfer processing
	CCIEFPrmSet	long	Common parameter setting processing
	nsIndividualParameterSet	long	Specific parameter setting processing
	CCIEFIsrTask	void	Interrupt processing task
	CCIEFSystemTimeSetTask	void	Time information setting processing task
	CCIEF_HandleIntrpt_Prm	void	Parameter setting interrupt processing
	CCIEFStatusCheckTask	void	Data link status monitoring task
CCIEFDevAcs.c	CCIEFSeqAcsDevChk	short	Acquisition processing of address for device access
	CCIEF_seq_read	short	Own station device batch read processing
	CCIEF_seq_write	short	Own station device batch write processing
	CCIEFBitAcsDevChk	short	Acquisition processing of address for bit device access
	CCIEF_bit_set	short	Own station bit device set processing
	CCIEF_bit_reset	short	Own station bit device reset processing
	CCIEF_CyclicReceive	short	Cyclic receive processing
	CCIEF_CyclicSend	short	Cyclic send processing
CCIEFDUMMYAcs.c	CCIEFGetMem	void	2-port memory area read processing (dummy)
	CCIEFSetMem	void	2-port memory area write processing (dummy)
	CCIEFGetWord	unsigned short	2-port memory area word data read processing (dummy)
	CCIEFSetWord	void	2-port memory area word data write processing (dummy)
	CCIEFIOReadDWord	unsigned long	Register area double word data read processing (dummy)
	CCIEFIOWriteDWord	void	Register area double word data write processing (dummy)
CCIEFSlmpAcs.c	CCIEFDrvTrBufInfoRead	void	Acquisition processing of SLMP transient send/receive area information
	setSLMP_HeaderFrame	void	SLMP transient header area initialization processing
	setSLMP_ReqHeaderFrame	void	SLMP request frame header initialization processing
	CCIEFWaitForSendBufClear	short	SLMP transient send area clear wait processing
	CCIEFTrDataSend	short	SLMP transient request send processing
	CCIEF_tr_slmp	short	SLMP transient main processing
	CCIEF_SlmpReq_DPMemRead	short	SLMP dual port memory batch read
	CCIEF_SlmpReq_DPMemWrite	short	SLMP dual port memory batch write
	CCIEF_HandleIntrpt_Slmp	void	SLMP transient interrupt processing
CCIEFCCTran.c	setReqFrame	void	CC-Link compatible transient request frame initialization processing
	send_set	short	CC-Link compatible transient request send processing
	receive_ans	short	CC-Link compatible transient response receive processing
	CCIEF_tr_seq_read	short	CC-Link compatible transient memory read
	CCIEF_tr_seq_write	short	CC-Link compatible transient memory write
	CCIEF_tr_ctrl_run	short	CC-Link compatible transient remote RUN
	CCIEF_tr_ctrl_stop	short	CC-Link compatible transient remote STOP
	CCIEF_tr_mem_acs	short	CC-Link compatible transient memory access information acquisition
	CCIEF_HandleIntrpt_CCTran	void	CC-Link compatible transient interrupt processing
CCIEFDiag.c	CCIEFTrSendRcv	short	Diagnostic frame relay processing
	CCIEFDiagTask	void	TCP/IP socket processing

5.3. Modifying the Sample Code

This sample illustrates the processing method of initial processing, parameter setting, cyclic transmission, and transient transmission.

- (1) Board initialization processing is started by the "CCIEFDevCreate()" function of the file "CCIEFInit.c".
Add processing based on the following steps to all functions related to "CCIEFDevCreate()".

Table 5.3-1 Adding Processing

Step	Description
a	Add a detection processing for the board mounted to the host.
b	Read the start addresses of the 2-port memory area and register area from the PCI configuration area of the detected board, and set the start addresses in structures.
c	The processing for creating parameters and the processing for setting the parameters for transferring the created parameters to the board are performed. The parameters include specific parameters and the common parameters created by the master station only.
d	Register the driver in the OS after board initialization is completed.

- (2) Cyclic transmission processing is performed using the functions included in the file "CCIEFDevAcs.c".
The link device, link special relay, and link special register area are accessed using the structures set in Step b of the "Table 5.3".
About transient transmission processing, CC-Link compatible transient transmission processing is performed using the functions included in the file "CCIEFCCTran.c" and SLMP transient transmission processing is performed using the functions included in the file "CCIEFSImpAcs.c".
- (3) Access the 2-port memory area and register area using the functions inside the "CCIEFDUMMYAcs.c" file. Add OS-dependent processing to all functions inside the "CCIEFDUMMYAcs.c" file.
- (4) To use PCI board, comment out the lines of #define Q81BD_GF11-T2 which is defined in Driver.h files.

5.4. Function Specifications

This section describes the function specifications used in the sample code.
Implement functions in accordance with the features required by the host.

5.4.1. CCIEFInit.c

(1) CCIEFDevCreate

Function	Board device creation processing		
Description	Initializes the board and registers the board in the device driver OS.		
Call format	long CCIEFDevCreate ()		
Arguments	None		
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	long	CCIEFBoardInit	Board initialization processing

(2) BoardReset

Function	Board reset processing		
Description	Resets the software of the board.		
Call format	void BoardReset (QB_BOARD_INFO *reg1, QB_BOARD_INFO2 *reg2)		
Arguments	Argument type	Argument name	Description
	QB_BOARD_INFO	reg1	Board setting area start address
	QB_BOARD_INFO2	reg2	Hardware control register area start address
Return value	None		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(3) CCIEFBoardInit

Function	Board initialization processing		
Description	Initializes the board to a data linkable state.		
Call format	long CCIEFBoardInit (CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	BoardReset	Board reset processing
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFIOWriteDWord	Register area double word data write processing
	void	CCIEFDrvTrBufInfoRead	Acquisition processing of SLMP transient send/receive area information

(4) InterruptRequest

Function	Interrupt request processing		
Description	Notifies the board of interrupts.		
Call format	void InterruptRequest (CCIEFDEV *pstPCIData, UINT nFactor)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
	UINT	nFactor	Interrupt cause
Return value	None		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(5) nsParameterPartSend

Function	Parameter block transfer processing		
Description	Divides parameters of sizes greater than the parameter area into blocks and transfers the blocks.		
Call format	long nsParameterPartSend (CCIEFDEV *pstPCIData, void *pParameter, unsigned long ulBytes)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
	void	*pParameter	Parameters to be sent
	unsigned long	ulBytes	Number of bytes to be sent
Return value	Normal end: 0		
	Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	InterruptRequest	Interrupt request processing
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFSetMem	2-port memory area write processing

(6) CCIEFPrmSet

Function	Common parameter setting processing		
Description	Transfers common parameters to the board using the parameter area.		
Call format	long CCIEFPrmSet(CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	Normal end: 0		
	Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	InterruptRequest	Interrupt request processing
	long	nsParameterPartSend	Parameter block transfer
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(7) nsIndividualParameterSet

Function	Specific parameter setting processing		
Description	Transfers specific parameters to the board using the parameter area.		
Call format	long nsIndividualParameterSet(CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	Normal end: 0		
	Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	InterruptRequest	Interrupt request processing
	long	nsParameterPartSend	Parameter block transfer processing
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(8) CCIEFIsrTask

Function	Interrupt processing task		
Description	Monitors the interrupt cause and processes interrupt notifications from the board.		
Call format	void CCIEFIsrTask(CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	void	InterruptRequest	Interrupt request processing
	void	CCIEFGetMem	2-port memory area read processing
	void	CCIEFSetMem	2-port memory area write processing
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEF_HandleIntrpt_Slmp	SLMP transient interrupt processing
	void	CCIEF_HandleIntrpt_Prm	Parameter setting interrupt processing
	void	CCIEF_HandleIntrpt_CCTran	CC-Link compatible transient interrupt processing

(9) CCIEFSystemTimeSetTask

Function	Time information setting processing task		
Description	Sets time information in the time information setting area at 500 ms interval.		
Call format	void CCIEFSystemTimeSetTask (CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	void	CCIEFSetMem	2-port memory area write processing
	void	CCIEFSetWord	2-port memory area word data write processing

(10) CCIEF_HandleIntrpt_Prm

Function	Parameter setting interrupt processing		
Description	Processes interrupts from the board while setting parameters.		
Call format	void CCIEF_HandleIntrpt_Prm (CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	InterruptRequest	Interrupt request processing

(11) CCIEFStatusCheckTask

Function	Data link status monitoring task		
Description	Transitions block data assurance per station send/receive flag when the own station data link status (SB0049) is changed.		
Call format	void CCIEFStatusCheckTask (CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	short	CCIEF_seq_read	Own station device batch read processing

5.4.2. CCIEFDevAcs.c

(1) CCIEFSeqAcsDevChk

Function	Acquisition processing of address for device access		
Description	Acquires the start address for accessing devices of the specified range.		
Call format	short CCIEFSeqAcsDevChk(QB_DEV_TAG *pDevTbl, short sDevType, unsigned long ulDevNo, unsigned long ulSize, unsigned long *offset)		
Arguments	Argument type	Argument name	Description
	QB_DEV_TAG	*pDevTbl	Device information
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	ulSize	Device size (unit: words)
	unsigned long	*offset	Device memory address
Return value	Normal end: 0 Abnormal end: Error code		
Call function	None		

(2) CCIEF_seq_read

Function	Own station device batch read processing		
Description	Reads data from the devices of the specified range.		
Call format	short CCIEF_seq_read (PCCIEFDEV pDev, short sDevType, unsigned long ulDevNo, unsigned long ulSize, short *pBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	ulSize	Read size (unit: words)
	short	*pBuf	Read data storage buffer
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEFSeqAcsDevChk	Acquisition processing of address for device access
	void	CCIEFGetMem	2-port memory area read processing

(3) CCIEF_seq_write

Function	Own station device batch write processing		
Description	Writes data to the devices in the specified range.		
Call format	short CCIEF_seq_write (PCCIEFDEV pDev, short sDevType, unsigned long ulDevNo, unsigned long ulSize, short *pBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	ulSize	Write size (unit: words)
	short	*pBuf	Write data storage buffer
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEFSeqAcsDevChk	Acquisition processing of address for device access
	void	CCIEFSetMem	2-port memory area write processing

(4) CCIEFBitAcsDevChk

Function	Acquisition processing of address for bit device access		
Description	Acquires the address for accessing the specified device.		
Call format	short CCIEFBitAcsDevChk (QB_DEV_TAG *pDevTbl, short sDevType, unsigned long ulDevNo, unsigned long *offset)		
Arguments	Argument type	Argument name	Description
	QB_DEV_TAG	*pDevTbl	Device information
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	*offset	Device memory address
Return value	Normal end: 0 Abnormal end: Error code		
Call function	None		

(5) CCIEF_bit_set

Function	Own station bit device set processing		
Description	Sets the specified bit device.		
Call format	short CCIEF_bit_set (PCCIEFDEV pDev, short sDevType, unsigned long ulDevNo)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEFBitAcsDevChk	Acquisition processing of address for bit device access
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(6) CCIEF_bit_reset

Function	Own station bit device reset processing		
Description	Resets the specified bit device.		
Call format	short CCIEF_bit_reset (PCCIEFDEV pDev, short sDevType, unsigned long ulDevNo)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEFBitAcsDevChk	Acquisition processing of address for bit device access
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing

(7) CCIEF_CyclicReceive

Function	Cyclic receive processing		
Description	Reads RX and RWr data to a work area with block data assurance per station.		
Call format	short CCIEF_CyclicReceive (PCCIEFDEV pDev)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
Return value	Normal end: 0 (Data is read from device.) Abnormal end: -1 (Data is not read from device.)		
Call function	Function type	Function name	Description
	short	CCIEF_seq_read	Own station device batch read processing

(8) CCIEF_CyclicSend

Function	Cyclic send processing		
Description	Writes data in the work area to RY and RW with block data assurance per station.		
Call format	short CCIEF_CyclicSend (PCCIEFDEV pDev)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
Return value	Normal end: 0 (Data is written to device.) Abnormal end: -1 (Data is not written to device.)		
Call function	Function type	Function name	Description
	short	CCIEF_seq_write	Own station device batch write processing

5.4.3. CCIEFDUMMYAcc.c

(1) CCIEFGetMem

Function	2-port memory area read processing		
Description	Reads the data of the specified number of words from the 2-port memory area.		
Call format	void CCIEFGetMem (unsigned long ulMemAdr, unsigned long ulCount, unsigned short usData[])		
Arguments	Argument type	Argument name	Description
	unsigned long	ulMemAdr	2-port memory area address
	unsigned long	ulCount	Read size (number of words)
	unsigned short	usData[]	Read data
Return value	None		
Call function	None		

(2) CCIEFSetMem

Function	2-port memory area write processing		
Description	Writes the specified number of words to the 2-port memory area.		
Call format	void CCIEFSetMem (unsigned long ulMemAdr, unsigned long ulCount, unsigned short usData[])		
Arguments	Argument type	Argument name	Description
	unsigned long	ulMemAdr,	2-port memory area address
	unsigned long	ulCount	Write size (number of words)
	unsigned short	usData[]	Write data
Return value	None		
Call function	None		

(3) CCIEFGetWord

Function	2-port memory area word data read processing		
Description	Reads the data of one word from the 2-port memory area.		
Call format	unsigned short CCIEFGetWord(unsigned long ulMemAdr)		
Arguments	Argument type	Argument name	Description
	unsigned long	ulMemAdr	2-port memory area address
Return value	Data read		
Call function	None		

(4) CCIEFSetWord

Function	2-port memory area word data write processing		
Description	Writes data of one word to the 2-port memory area.		
Call format	void CCIEFSetWord (unsigned long ulMemAdr, unsigned short usData)		
Arguments	Argument type	Argument name	Description
	unsigned long	ulMemAdr	2-port memory area address
	unsigned short	usData	Write data
Return value	None		
Call function	None		

(5) CCIEFIORedDWord

Function	Register area double word data read processing		
Description	Reads the data of double word from the register area.		
Call format	unsigned long CCIEFIORedDWord(unsigned long ulloAdr)		
Arguments	Argument type	Argument name	Description
	unsigned long	ulloAdr	Register area address
Return value	Data read		
Call function	None		

(6) CCIEFIOWriteDWord

Function	Register area double word data write processing		
Description	Writes data of double word to the register area.		
Call format	void CCIEFIOWriteDWord (unsigned long ulloAdr, unsigned long ulData)		
Arguments	Argument type	Argument name	Description
	unsigned long	ulloAdr	Register area address
	unsigned long	ulData	Write data
Return value	None		
Call function	None		

5.4.4. CCIEFSImpAcs.c

(1) CCIEFDrvTrBufInfoRead

Function	Acquisition processing of SLMP transient send/receive area information		
Description	Acquires the address and size of the SLMP transient send/receive area.		
Call format	void CCIEFDrvTrBufInfoRead (CCIEFDEV *pDev)		
Arguments	Argument type	Argument name	Description
	CCIEFDEV	*pDev	Device descriptor
Return value	None		
Call function	None		

(2) setSLMP_HeaderFrame

Function	SLMP transient header area initialization processing		
Description	Initializes the SLMP transient header area.		
Call format	void setSLMP_HeaderFrame (PTR_RQ_HEAD pstReq, unsigned char ucOtherNetNo)		
Arguments	Argument type	Argument name	Description
	PTR_RQ_HEAD	pstReq	Request frame
	unsigned char	ucOtherNetNo	Destination network number
Return value	None		
Call function	None		

(3) setSLMP_ReqHeaderFrame

Function	SLMP request frame header initialization processing		
Description	Initializes SLMP request frame header.		
Call format	void setSLMP_ReqHeaderFrame (PTR_RQ_DATA pstReqHeader, unsigned short usReqSize)		
Arguments	Argument type	Argument name	Description
	PTR_RQ_DATA	pstReqHeader	SLMP request frame header
	unsigned short	usReqSize	Data length from subheader to end of request frame data
Return value	None		
Call function	None		

(4) CCIEFWaitForSendBufClear

Function	SLMP transient send area clear wait processing		
Description	Waits until the SLMP transient send area becomes empty.		
Call format	short CCIEFWaitForSendBufClear (PCCIEFDEV pDev)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
Return value	Normal end: 0 Abnormal end: Error code		
Call function	None		

(5) CCIEFTrDataSend

Function	SLMP transient request send processing		
Description	Sends SLMP transient request frame and monitors SLMP transient control flag.		
Call format	short CCIEFTrDataSend (PCCIEFDEV pDev, int bAnsFlag)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	int	bAnsFlag	Response type flag (0: Type0, 1: Type1)
Return value	Normal end: 0 Abnormal end: Error code		
Call function	None		

(6) CCIEF_tr_slmp

Function	SLMP transient main processing		
Description	Creates request frames, sends requests, and receives responses for the SLMP transient.		
Call format	short CCIEF_tr_slmp(PCCIEFDEV pDev, void *pSLMP)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	void	*pSLMP	SLMP frame
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEFWaitForSendBufClear	SLMP transient send area clear wait processing
	void	setSLMP_HeaderFrame	SLMP transient header area initialization processing
	void	setSLMP_ReqHeaderFrame	SLMP transient request frame header area initialization processing
	void	CCIEFSetMem	2-port memory area write processing
	short	CCIEFTrDataSend	SLMP transient request send processing

(7) CCIEF_SlmpReq_DPMemRead

Function	SLMP dual port memory batch read		
Description	Sends requests for SLMP dual port memory batch read.		
Call format	short CCIEF_SlmpReq_DPMemRead(PCCIEFDEV pDev, unsigned char ucNetNo, unsigned char ucStNo, unsigned long ulAddr, unsigned short usSize, short *psBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned char	ucNetNo	Network number
	unsigned char	ucStNo	Station number
	unsigned long	ulAddr	Read address
	unsigned short	usSize	Read size
	short	*psBuf	Read data storage work area
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEF_tr_slmp	SLMP transient main processing

(8) CCIEF_SlmpReq_DPMemWrite

Function	SLMP dual port memory batch write		
Description	Sends requests for SLMP dual port memory batch write.		
Call format	short CCIEF_SlmpReq_DPMemWrite(PCCIEFDEV pDev, unsigned char ucNetNo, unsigned char ucStNo, unsigned long ulAddr, unsigned short usSize, short *psBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned char	ucNetNo	Network number
	unsigned char	ucStNo	Station number
	unsigned long	ulAddr	Write address
	unsigned short	usSize	Write size
	short	*psBuf	Write data
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	short	CCIEF_tr_slmp	SLMP transient main processing

(9) CCIEF_HandleIntrpt_Slmp

Function	SLMP transient interrupt processing		
Description	Processes interrupts from the board during SLMP transient send/receive.		
Call format	void CCIEF_HandleIntrpt_Slmp(CCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFGetMem	2-port memory area read processing
	void	InterruptRequest	Interrupt request processing

5.4.5. CCIEFCCTran.c

(1) setReqFrame

Function	CC-Link compatible transient request frame initialization processing		
Description	Initializes the header of transient request frame.		
Call format	void setReqFrame (PCCIEFDEV pDev, MEMREADREQ *readReq, unsigned short usNetNo, unsigned short usStNo)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	MEMREADREQ	*readReq	Request frame
	unsigned short	usNetNo	Destination station network number
	unsigned short	usStNo	Destination station number
Return value	None		
Call function	None		

(2) send_set

Function	CC-Link compatible transient request send processing		
Description	Sends CC-Link compatible transient request frame to another station.		
Call format	short send_set (PCCIEFDEV pDev, unsigned long ulSize, unsigned short *pReq)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned long	ulSize	Request frame size
	unsigned short	*pReq	Request frame
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFSetMem	2-port memory area write processing

(3) receive_ans

Function	CC-Link compatible transient response receive processing		
Description	Receives response frames for the request frame sent by the own station.		
Call format	short receive_ans (PCCIEFDEV pDev, unsigned short chan, unsigned long ulSize, unsigned short *pAns, unsigned short usSendReq)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	chan	Receive signal
	unsigned long	ulSize	Response frame size
	unsigned short	*pAns	The area to store response reception frame
	unsigned short	usSendReq	Application number during request sending
Return value	Response data: 1 No response data: 0		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFGetMem	2-port memory area read processing

(4) CCIEF_tr_seq_read

Function	CC-Link compatible transient memory read		
Description	Reads the data from the specified device of another station.		
Call format	short CCIEF_tr_seq_read (PCCIEFDEV pDev, unsigned short usNetNo, unsigned short usStNo, short sDevType, unsigned long ulDevNo, unsigned long ulSize, short *pBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	usNetNo	Network number
	unsigned short	usStNo	Station number
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	ulSize	Read size (unit: words)
	short	*pBuf	Read data storage buffer
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	setReqFrame	CC-Link compatible transient request frame initialization processing
	short	send_set	CC-Link compatible transient request send processing
	short	receive_ans	CC-Link compatible transient response receive processing

(5) CCIEF_tr_seq_write

Function	CC-Link compatible transient memory write		
Description	Writes data to the specified device of another station.		
Call format	short CCIEF_tr_seq_write (PCCIEFDEV pDev, unsigned short usNetNo, unsigned short usStNo, short sDevType, unsigned long ulDevNo, unsigned long ulSize, short *pBuf)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	usNetNo	Network number
	unsigned short	usStNo	Station number
	short	sDevType	Device type
	unsigned long	ulDevNo	Device number
	unsigned long	ulSize	Write size (unit: words)
	short	*pBuf	Write data storage buffer
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	setReqFrame	CC-Link compatible transient request frame initialization processing
	short	send_set	CC-Link compatible transient request send processing
	short	receive_ans	CC-Link compatible transient response receive processing

(6) CCIEF_tr_ctrl_run

Function	CC-Link compatible transient remote RUN		
Description	Sets the status of another station to a RUN state.		
Call format	short CCIEF_tr_ctrl_run (PCCIEFDEV pDev, unsigned short usNetNo, unsigned short usStNo, unsigned short usMode, unsigned char ucCmode, unsigned char ucSmode)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	usNetNo	Network number
	unsigned short	usStNo	Station number
	unsigned short	usMode	Mode
	unsigned char	ucCmode	Clear mode
	unsigned char	ucSmode	Signal flow mode
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	setReqFrame	CC-Link compatible transient request frame initialization processing
	short	send_set	CC-Link compatible transient request send processing
	short	receive_ans	CC-Link compatible transient response receive processing

(7) CCIEF_tr_ctrl_stop

Function	CC-Link compatible transient remote STOP		
Description	Sets the status of another station to a STOP state.		
Call format	short CCIEF_tr_ctrl_stop (PCCIEFDEV pDev, unsigned short usNetNo, unsigned short usStNo, unsigned short usMode)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	usNetNo	Network number
	unsigned short	usStNo	Station number
Return value	unsigned short	usMode	Mode
	Normal end: 0		
	Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	setReqFrame	CC-Link compatible transient request frame initialization processing
	short	send_set	CC-Link compatible transient request send processing
	short	receive_ans	CC-Link compatible transient response receive processing

(8) CCIEF_tr_mem_acs

Function	CC-Link compatible transient memory access information acquisition		
Description	Acquires information such as availability of memory access from a device of another station.		
Call format	short CCIEF_tr_mem_acs (PCCIEFDEV pDev, unsigned short usNetNo, unsigned short usStNo, unsigned short *pusSize, short sDevice[])		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned short	usNetNo	Network number
	unsigned short	usStNo	Station number
Return value	unsigned short	*pusSize	Acquisition size
	short	sDevice[]	Memory access information storage buffer
	Normal end: 0		
	Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	setReqFrame	CC-Link compatible transient request frame initialization processing
	short	send_set	CC-Link compatible transient request send processing
	short	receive_ans	CC-Link compatible transient response receive processing

(9) CCIEF_HandleIntrpt_CCTran

Function	CC-Link compatible transient interrupt processing		
Description	Processes interrupts from the board when receiving CC-Link compatible transient.		
Call format	void CCIEF_HandleIntrpt_CCTran (PCCIEFDEV *pstPCIData)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	*pstPCIData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	unsigned short	CCIEFGetWord	2-port memory area word data read processing
	void	CCIEFSetWord	2-port memory area word data write processing
	void	CCIEFGetMem	2-port memory area read processing
Return value	void	CCIEFSetMem	2-port memory area write processing

5.4.6. CCIEFDiag.c

(1) CCIEFTrSendRcv

Function	Diagnostic frame relay processing		
Description	Relays diagnostics frame between the CC IE Field utility and other stations.		
Call format	short CCIEFTrSendRcv (PCCIEFDEV pDev, unsigned char *pSendData, unsigned char *pRcvData, int bAnsFlag)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pDev	Device descriptor
	unsigned char	*pSendData	SLMP transient send frame
	unsigned char	*pRcvData	SLMP transient receive frame
	Int	bAnsFlag	Response type flag (0: Type0, 1: Type1)
Return value	Normal end: 0 Abnormal end: Error code		
Call function	Function type	Function name	Description
	void	CCIEFSetMem	2-port memory area write processing
	short	CCIEFTrDataSend	SLMP transient request send processing

(2) CCIEFDiagTask

Function	TCP/IP socket processing		
Description	Responds to various diagnostics request frames sent from the CC IE Field utility.		
Call format	void CCIEFDiagTask (PCCIEFDEV pstDevData)		
Arguments	Argument type	Argument name	Description
	PCCIEFDEV	pstDevData	Device descriptor
Return value	None		
Call function	Function type	Function name	Description
	short	CCIEFTrSendRcv	Diagnostic frame relay processing
	void	CCIEFGetMem	2-port memory area read processing

6. TROUBLESHOOTING

Error codes are stored in the areas of the table below.

Table 6-1 Error Code Storage Area

Area				Byte address	Word address	R/W	Description	Reference
Register area - Hardware control register area								
Error code register				52h - 53h	29h	R/W	*1	Section 3.3.3(8)
2-port memory area - System area								
Latest error code				1Eh - 1Fh	0Fh	R	*2	Section 3.2.2(3)
SLMP transient send/receive area	SLMP transient send/receive area 1 to 4	Data area receive area	RSTS (return code) and END CODE (end code)	-	-	R	*3	Appendix 3.2
2-port memory area - User area								
CC-Link compatible transient handshake area	CC-Link compatible transient handshake area 1	Send error code	BFE2h - BFE3h	5FF1h	R	*4		Section 3.2.3(9)
	CC-Link compatible transient handshake area 2	Send error code	BFEAh - BFEBh	5FF5h	R			
CC-Link compatible transient data area	CC-Link compatible transient data area 1, 2	Send area	RSTS (return code)	-	-	R/W	*5	Appendix 3.1
		Receive area				R		

*1: Store the error codes of the errors that occurred in the driver side (vendor specific processing).

*2: This area stores the error codes of the most recent errors that occurred on the board.

(Network errors, parameter errors, transient transmission errors, and others)

*3: When receiving the response frame, the error code of an error detected in the request frame sent by the own station is stored in RSTS and End Code of the receive area.

*4: This area stores the error codes of errors in CC-Link compatible transient send processing.

*5: The server sets the error code in the RSTS of the response frame to be sent to the request frame sent from the client.

[When the own station is a client]

When receiving the response frame, the error code of an error detected in the request frame sent by the own station is stored in RSTS of the receive area.

[When the own station is a server]

When sending the response frame, store the error code of an error detected in the request frame sent by the client in RSTS of the send area.

6.1. Error Codes

The following describes the details of the error codes.

Note
Items that are shaded are areas not disclosed to end users.
When listing error codes of the area not disclosed for end users in the manual of the device being developed and related products, list errors of applicable area described in the board user's manual.

Table 6.1-1 Error Code List

Error code	Error details	Action
D000h to D00Fh	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D010h	Parameter error (RX size over)	Correct the points assigned to the RX devices.
D011h	Parameter error (RY size over)	Correct the points assigned to the RY devices.
D012h	Parameter error (RWw size over)	Correct the points assigned to the RWw devices.
D013h	Parameter error (RWr size over)	Correct the points assigned to the RWr devices.
D014h to D016h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D018h	Parameter error (Constant link scan time error)	Correct the constant link scan time.
D019h to D020h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D030h to D035h	Connection failure	Correct the wiring condition.
D036h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D037h	Connection failure	Check the number of connected modules.
D040h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D041h	Connection failure	Check the number of connected modules.
D080h to D084h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D0A0h	Transient data transmission response wait timeout	- If the own station, target station, or relay station is disconnected from the network, identify the cause of the disconnection and take action. - When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. - When the target station is overloaded and cannot receive transient data, reduce the frequency of transient transmission and retry the operation.
D0A1h	Transient data transmission completion wait timeout	- Check if the cables and switching hub are connected properly. - Exchange the cables between PORT1 and PORT2 and retry the operation. - Reduce the frequency of transient transmission and then retry the operation. - Perform hardware and self-loopback tests.
D0A2h	Transient data transmission processing wait timeout	- Reduce the frequency of transient transmission and then retry the operation. - Check if the cables and switching hub of the request source are connected properly.

Error code	Error details	Action
D0A3h	Transient data transmission error	- If the own station or target station is disconnected from the network, identify the cause of the disconnection and take action. - Correct the target station number of the transient data, and retry the operation. - If the target station of the transient data resides in another network, check if the routing parameters for respective stations are correctly set, and take corrective action.
D0A4h to D0A6h	Transient transmission failed	- Check if the cables and switching hub are connected properly. - Exchange the cables between PORT1 and PORT2 and retry the operation. - Reduce the frequency of transient transmission and then retry the operation. - Perform hardware and self-loopback tests.
D0A7h	Transient reception failed	
D0C0h	Reserved station specification failed (another process in progress)	Wait for a while, and reserve the station again.
D0C1h	Reserved station cancellation failed (another process in progress)	Wait for a while, and cancel the reserved station setting again.
D0C2h	Data link stop failed (another process in progress)	Wait for a while, and instruct the data link stop again.
D0C3h	Data link start failed (another process in progress)	Wait for a while, and instruct the data link start again.
D0C4h	Temporary error invalid station setting failed (another process in progress)	Wait for a while, and set the temporary error invalid station again.
D0C5h	Temporary error invalid station cancellation failed (another process in progress)	Wait for a while, and cancel the temporary error invalid station setting again.
D0C6h	Another station number setting change failed (another process in progress)	Wait for a while, and set the station number of another station again.
D0D0h	Another station number setting failed (another process in progress)	Wait for a while, and set the station number of another station again.
D0E0h	Station type mismatch	In the network configuration settings of the master station, change the station type to that of the own station.
D0E1h	Own station specified as reserved	- In the network configuration settings of the master station, cancel the reserved station setting. - Change the station number of the own station to a station number that is not reserved.
D0E2h	Station No. duplication (own station)	- Change the station number so that it will not be duplicated with any other station number. - After taking the above action, power off and then on all the stations that detected the station number duplication error, or reset them.
D0E3h	Own station No. out of range	Add information of the own station to network configuration settings of the master station.
D0E4h	Multiple master stations (including own station)	- Check if the cables and switching hub are connected properly. - After taking the above action, power off and then on all the stations that detected this error, or reset them.
D0F0h to D101h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D110h	Parameter error (RX size error)	- Size exceeds 2048 bits or is not a multiple of 16. Correct the parameter and write to the board again. - Size exceeds 1024 words or is not a multiple of 4. Correct the parameter and write to the board again.
D111h	Parameter error (RY size error)	
D112h	Parameter error (RWw size error)	
D113h	Parameter error (RWr size error)	
D200h	Transient data received twice	- Check if the cables and switching hub are connected properly. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action.
D201h	Header information error in transient data	Correct the header information at the request source, and retry the operation.
D202h	Send buffer full	- Reduce the frequency of transient transmission and then retry the operation. - When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. - Check if the cables and switching hub are connected properly.
D203h	Read/write address error in transient data	Correct the read/write address at the request source, and retry the operation.
D204h	Network No. error in transient data	- Correct the network number at the request source, and retry the operation. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action.

Error code	Error details	Action
D205h	Target station No. error in transient data	Correct the target station number at the request source, and retry the operation.
D206h	Network No. error in transient data	- Correct the network number at the request source, and retry the operation. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action.
D207h	Incorrect number of relays specified in transient data	- Correct the system configuration to reduce the number of relay stations to seven or less. - Check if the routing parameters are correctly set, and take corrective action.
D208h	Network No. error in transient data	- Correct the network number at the request source, and retry the operation. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action.
D209h D20Ah	Target station No. error in transient data	Correct the target station number at the request source, and retry the operation.
D20Bh	Specified master station No. error in transient data	
D20Ch	Current master station No. error in transient data	
D20Dh	Transient data transmission completion wait timeout	- When the own station or target station detected an error, identify the cause of the error and take action. - Reduce the frequency of transient transmission and then retry the operation. - When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. - Check if the cables and switching hub of the request source are connected properly.
D20Eh	Header information error in transient data	Correct the header information at the request source, and retry the operation.
D20Fh	Target station No. error in transient data	Check if the command can be requested to all or a group of stations at the request source, and retry the operation.
D210h	Target station No. error in transient data	Correct the header information at the request source, and retry the operation.
D212h	Transient transmission failed	- Check if the cables and switching hub of the request source are connected properly. - Exchange the cables between PORT1 and PORT2 of the request source and retry the operation. - Reduce the frequency of transient transmission and then retry the operation.
D213h	Command error in transient data	Correct the request command at the request source, and retry the operation.
D214h	Transient data length error	Correct the data length at the request source, and retry the operation.
D215h	Transient data request error	Change the mode to Online, and retry the operation.
D216h to D217h	Command error in transient data	Correct the request command at the request source, and retry the operation.
D218h	Incorrect number of read/write transient data	Correct the number of memory read/write data at the request source, and retry the operation.
D219h	Attribute code error in transient data	Correct the attribute code at the request source, and retry the operation.
D21Ah	Access code error in transient data	Correct the access code at the request source, and retry the operation.
D21Bh to D21Ch	Transient data request error	- The transient data issued by the driver is damaged. Retry the operation. - If this error persists, correct the transient data.
D21Eh	Target station No. error in transient data	Transient data of the application type that is not executable for the own station were received. Correct the application type or target station number at the request source, and retry the operation.
D220h	No master station	Add a master station to the network.
D222h	Command error in transient data	Correct the request command at the request source, and retry the operation.
D223h	Transient error	- Check if the cables and switching hub are connected properly. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action. - If this error persists, please consult your local Mitsubishi Electric representative.
D234h	No baton pass	Check the communication status.
D235h	Transient error	- Check if the cables and switching hub are connected properly. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action. - If this error persists, please consult your local Mitsubishi Electric representative.
D244h	Incorrect transient data	Correct the transient data at the request source, and retry the operation.

Error code	Error details	Action
D246h	Incorrect transient data	Correct the transient data at the request source, and retry the operation.
D247h	Dedicated instruction received twice	- Check if the cables and switching hub of the request source are connected properly. - If the request source resides in another network, check if the routing parameters are correctly set, and take corrective action.
D248h	Incorrect transient data	Correct the transient data at the request source, and retry the operation.
D250h	Flash ROM failure	- The flash ROM may be faulty. - A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D25Dh	Incorrect transient data	Check the transient data at the request source, and retry the operation.
D280h	Transient data request error	Correct the request command at the request source, and retry the operation.
D281h	Transient reception failed	When the target station is overloaded and cannot receive transient data, send the data to the target station after the load on the station is reduced.
D282h	Receive queue full	- Temporarily stop the transient transmission, and then retry the operation. - Reduce the frequency of transient transmission and then retry the operation. - Execute transient transmission receive processing.
D283h	Transient transmission failed	- Exchange the cables between PORT1 and PORT2 of the request source and retry the operation. - Reduce the frequency of transient transmission and then retry the operation.
D2A0h	Receive buffer full	When the target station is overloaded and cannot receive transient data, send the data to the target station after the load on the station is reduced.
D2A1h	Send buffer full	- Reduce the frequency of transient transmission and then retry the operation. - Check if the cables and switching hub of the request source are connected properly.
D2A2h	Transmission completion wait timer timeout	- Reduce the frequency of transient transmission and then retry the operation. - When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. - Check if the cables and switching hub of the request source are connected properly.
D2A3h	Frame length (L) error in transient data	Correct the frame length (L) at the request source, and retry the operation.
D2A4h	Reserve (RSV) error in transient data	Correct the reserve (RSV) setting at the request source, and retry the operation.
D2A5h	Destination station number (DA) error in transient data	Correct the destination station number (DA) at the request source, and retry the operation.
D2A6h	Source station number (SA) error in transient data	Correct the request source number (SA) at the request source, and retry the operation.
D2A7h	Destination application type (DAT) error in transient data	Correct the destination application type (DAT) at the request source, and retry the operation.
D2A8h	Source application type (SAT) error in transient data	Correct the source application type (SAT) at the request source, and retry the operation.
D2A9h	Destination network number (DNA) error in transient data	Correct the destination network number (DNA) at the request source, and retry the operation.
D2AAh	Destination station number (DS) error in transient data	Correct the destination station number (DS) at the request source, and retry the operation.
D2ABh	Source network number (SNA) error in transient data	Correct the source network number (SNA) at the request source, and retry the operation.
D2ACh	Source station number (SS) error in transient data	Correct the request source number (SS) at the request source, and retry the operation.
D2ADh	Data length (L1) error in transient data	Correct the data length (L1) at the request source, and retry the operation.
D2AEh	Target station No. error in transient data	- The own station received transient data that is addressed to another station on the route. Check and correct the network and target station numbers, and retry the operation. - Check if the routing parameters are correctly set, and take corrective action.
D2AFh	Target station No. error in transient data	- Transient data transmission addressed to the own station was requested. Check the network number and target station number, and retry the operation. - Check if the routing parameters are correctly set, and take corrective action.

Error code	Error details	Action
D2B0h	Transient transmission failed	- Check if the cables and switching hub of the request source are connected properly. - Exchange the cables between PORT1 and PORT2 of the request source and retry the operation. - Reduce the frequency of transient transmission and then retry the operation.
D602h	Parameter error (Common parameter: Sum check code error)	Correct the parameter and write to the board again.
D603h	Parameter error (Common parameter: Start block code error)	Correct the parameter and write to the board again.
D604h	Parameter error (Common parameter: End block code error)	Correct the parameter and write to the board again.
D605h	Parameter error (Specific parameter: Sum check code error)	Correct the parameter and write to the board again.
D606h	Parameter error (Specific parameter: Start block code error)	Correct the parameter and write to the board again.
D607h	Parameter error (Specific parameter: End block code error)	Correct the parameter and write to the board again.
D608h	Parameter error (Common parameter: Parameter version error)	Correct the parameter and write to the board again.
D609h	Parameter error (Specific parameter: Parameter version error)	Correct the parameter and write to the board again.
D60Ah	Parameter error (Application parameter: Constant link scan time setting error)	Cancel the constant link scan time setting.
D60Dh	Parameter error (Device setting error)	Correct the parameter and write to the board again.
D60Eh	Parameter error (Device setting: Start relative address error)	Correct the parameter and write to the board again.
D60Fh	Parameter error (Specific parameter error)	Correct the parameter and write to the board again.
D610h	Parameter error (Specific parameter error)	Correct the parameter and write to the board again.
D611h	Parameter error (Device range assignment error: RWw)	Correct the size of the link device in the slave station(s), and write to the board again.
D612h	Parameter error (Device range assignment error: RWw)	Correct the offset address of the link device in the slave station(s), and write to the board again.
D613h	Parameter error (Device range assignment error: RWr)	Correct the size of the link device in the slave station(s), and write to the board again.
D614h	Parameter error (Device range assignment error: RWr)	Correct the offset address of the link device in the slave station(s), and write to the board again.
D615h	Parameter error (Device range assignment error: RY)	Correct the size of the link device in the slave station(s), and write to the board again.
D616h	Parameter error (Device range assignment error: RY)	Correct the offset address of the link device in the slave station(s), and write to the board again.
D617h	Parameter error (Device range assignment error: RX)	Correct the size of the link device in the slave station(s), and write to the board again.
D618h	Parameter error (Device range assignment error: RX)	Correct the offset address of the link device in the slave station(s), and write to the board again.
D619h	Parameter error (Master station device address error: RY)	Correct the offset address of the link device, and write to the board again.
D61Ah	Parameter error (Master station device address error: RX)	Correct the offset address of the link device, and write to the board again.
D61Bh	Parameter error (Overlapping of the device: RWw)	Correct the offset address or size of the link device in the slave station(s), and write to the board again.
D61Ch	Parameter error (Overlapping of the device: RWr)	Correct the offset address or size of the link device in the slave station(s), and write to the board again.
D61Dh	Parameter error (Overlapping of the device: RY)	Correct the offset address or size of the link device in the slave station(s), and write to the board again.
D61Eh	Parameter error (Overlapping of the device: RX)	Correct the offset address or size of the link device in the slave station(s), and write to the board again.
D620h	Incorrect transient data	Check the transient data at the request source, and retry the operation.
D621h	Parameter error (Common parameter error)	Correct the parameter and write to the board again.
D622h	Parameter error (Number of total slave stations error)	Correct the parameter and write to the board again.
D624h	Parameter error (Constant link scan time setting error)	Correct the constant link scan time and write to the board again.

Error code	Error details	Action
D625h	Parameter error (Block data assurance per station setting error)	Correct the block data assurance per station setting and write to the board again.
D626h	Parameter error (Loopback function setting error)	Correct the loopback function setting and write to the board again.
D628h	Parameter error (Station type error)	Correct the station type and write to the board again.
D629h	Parameter error (Station No. range error)	Change the station number in the setting data to any of 1 to 120 and write to the board again.
D62Ah	Parameter error (Data link faulty station setting error)	Correct the data link faulty station setting and write to the board again.
D62Dh	Failed to start data link	- The system failed to start data link due to any of the following causes. Remove the cause of the problem, and retry the operation. - No station number setting - Own station error - Master station duplication - Station type mismatch - No master station - Invalid station number of the own station - Duplication of the own station number - Own station specified as reserved station - Parameter error - Parameters being sent - Parameters not received (Only the master station, and no slave stations exist.) - Link stop instruction
D63Dh	Parameter error (Reserved station setting error)	- Correct the reserved station setting and write to the board again. - Cancel the reserved station setting configured for the submaster station in the reserved station setting. - If this error persists, please consult your local Mitsubishi Electric representative.
D63Eh	Parameter error (Error invalid station setting error)	- Correct the error invalid station setting and write to the board again. - Cancel the error invalid station setting configured for the submaster station in the error invalid station setting - If this error persists, please consult your local Mitsubishi Electric representative.
D701h	No station specified for Reserved station function disable/temporary error invalid station setting	Specify relevant station(s) in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017), and retry the operation.
D706h	Request error of temporary error invalid station setting/cancel or reserved station function disable/enable (when the own station is a local station)	For a local station, temporary error invalid station setting/cancel and reserved station function disable/enable cannot be executed. Retry it on the master station.
D70Bh	Request error of temporary error invalid station setting/cancel or reserved station function disable/enable (when concurrently requested to multiple stations)	- Temporary error invalid station setting/cancel by SB0010 and SB0011 and reserved station function disable/enable by SB0012 and SB0013 cannot be executed at the same time. - Turn off all bits in SB0010 to SB0013, and turn on only one bit of them in the relay.
D720h	Data link start/stop instruction out of range	Check the setting, and then stop or start data link.
D721h	Data link start/stop retry error (another station)	Retry the operation after the stop or restart of data link is completed.
D722h	Data link start/stop retry error (own station)	
D723h	Data link start/stop retry error (entire system)	
D724h	Data link start/stop station error	Check the setting, and then stop or start data link.
D725h	Station type error (station executing data link start/stop to the entire system)	A local station cannot start or stop data link of all or multiple stations. Execute data link start/stop of all or multiple stations from the master station
D726h	Command error in transient data	Correct the request command at the request source, and retry the operation.
D727h	Data link start/stop instructing station error	- Data link start was instructed from a station different from the one that had instructed the data link stop. Instruct data link start and data link stop from the same station. - The method of the data link start (data link start instruction in CC-Link IE Field Network diagnostics or by using the link special relay (SB) or link special register (SW) in the program) is different from that of the data link stop. Instruct the data link start by the same method as the data link stop. - Data link start failed. Forcibly restart the data link.

Error code	Error details	Action
D728h	Data link start/stop instructing station error	Data link start was instructed during execution of data link. Instruct data link stop then data link start.
D740h	Transient transmission failed	- If a slave station is disconnected from the network, identify the cause of the disconnection and take action. - When data link is stopped in the slave station, identify the cause of the data link stop and take action. - Retry the operation after a slave station is replaced and new one is added.
D741h	Station type error (execution station)	- Execute the operation after data link of the master operating station is started - The instruction cannot be executed on a local station and submaster station. Execute it on the master operating station.
D742h	Transient transmission failed	Retry the operation after transient transmission is completed.
D743h	Station type error (execution station)	The instruction cannot be executed on a local station. Execute it on the master station and submaster station.
D744h	Failed to clear flash ROM	- The flash ROM may be faulty. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Perform hardware and self-loopback tests. If a failure occurs again, the hardware may be faulty. Please consult your local Mitsubishi Electric representative.
D781h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D783h to D784h	Transient data request error	Check the read request data at the request source station, and retry the operation.
D785h	Flash ROM failure	The maximum number of writes to the flash ROM is exceeded. Replace the board.
D786h	Flash ROM failure	The flash ROM may be faulty. Perform hardware and self-loopback tests.
D800h to D805h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D806h	Receive queue full	- Reduce the frequency of transient transmission and then retry the operation. - Check if the cables and switching hub are connected properly. - Execute transient transmission receive processing.
D807h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.
D80Ah	Parameter error (Number of blocks exceeded error)	- The number of parameter block transfers has been exceeded. - Correct the parameter and write to the board again.
D80Bh	Parameter error (Transfer number error)	- The transfer numbers cannot be read in the correct order. - Correct the parameter and write to the board again.
D80Ch	Parameter error (Block transfer specific parameter size error)	- The specific parameter size was exceeded during block transfer. - Correct the parameter and write to the board again.
D80Dh	Parameter error (Block transfer common parameter size error)	- The common parameter size was exceeded during block transfer. - Correct the parameter and write to the board again.
D80Eh	Parameter error (Specific parameter sequence error)	- An error occurred during the specific parameter setting process (other than 7h). - Correct the parameter and write to the board again.
D80Fh	Parameter error (Common parameter check result flag error)	- Board parameter check processing ended in error with the local station (other than 0h, 1h, 2h). - Correct the parameter and write to the board again.
D812h	Parameter check result error (Specific parameter check result error)	- An error occurred during board specific parameter check processing (FEh) - Correct the parameter and write to the board again.
D813h	Parameter check result error (Common parameter check result error)	- An error occurred during board common parameter check processing (FEh) - Correct the parameter and write to the board again.
D814h	Time information setting not completed	Set the time information.
D815h to D819h	Hardware error	- A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. - Hardware may be faulty. Perform hardware and self-loopback tests.

Error code	Error details	Action
D81Ah	Board driver stop error	The driver alive check failed. • Reset the board. • Restart the host. • Remove factors that caused host OS overload. • Extend the interval timer set in the alive check function setting register.
D81Bh	Power failure	• The host power is off. Turn it on.
D826h	Flash ROM failure	• The maximum number of writes to the flash ROM is exceeded. This error code cannot be cleared by reset, etc. To clear the error code, please consult your local Mitsubishi Electric representative.
D827h	Communication RAM failure	• A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.
D902h	Incorrect loop test data	• Correct the data at the station that started the loop test, and retry the operation.
D909h	Header information error in transient data	• Correct the header information at the request source, and retry the operation.
D90Bh	Incorrect number of stations	• If the number of slave stations per network is more than 120, reduce it to 120 or less.
DA00h to DAE7h	Hardware error	• A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.
DAF1h	Hardware error	• A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.
DAF2h	Failed to write to flash ROM	• The flash ROM may be faulty. • A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.
DAF3h	MAC address read error	
DAF5h to DAF7h	Hardware error	• A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.
DAF8h to DAF9h	Flash ROM failure	• The flash ROM may be faulty. • A malfunction may have occurred due to noise. Check the wire and cable lengths and grounding condition of each device, and take measures against noise. • Hardware may be faulty. Perform hardware and self-loopback tests.

Appendix 1 Link Special Relay (SB)

A link special relay (SB) is turned on/off depending on various factors at data link.

Any error status of the data link can be confirmed by using and monitoring it in the program.

Table A1 Link Special Relay (SB) List

No.	Name	Description	Availability	
			Master station	Local station
SB0000	Link start (own station)	The own station's cyclic transmission is restarted. OFF: No start direction ON: Start direction (enabled during start-up) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • For SB0000 to SB0003, this is enabled when only one of them is turned on.	○	○
SB0001	Link stop (own station)	The own station's cyclic transmission is stopped. OFF: No stop direction ON: Stop direction (enabled during start-up) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • For SB0000 to SB0003, this is enabled when only one of them is turned on.	○	○
SB0002	System link start	Cyclic transmission of the entire system is restarted. The station where cyclic transmission is restarted is specified by Link stop/start direction (SW0000 to SW0008). OFF: No start direction ON: Start direction (enabled during start-up) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • For SB0000 to SB0003, this is enabled when only one of them is turned on.	○	×
SB0003	System link stop	Cyclic transmission of the entire system is stopped. The station where cyclic transmission is stopped is specified by Link stop/start direction (SW0000 to SW0008). OFF: No stop direction ON: Stop direction (enabled during start-up) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • For SB0000 to SB0003, this is enabled when only one of them is turned on.	○	×
SB0006	Clear communication error count	Clears the link special registers for the communication error (SW0068 to SW006B, SW0074 to SW0077, SW007C to SW007F, SW0120 to SW015F). OFF: No clear direction ON: Clear direction	○	○
SB0010	Temporary error invalid request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are set as temporary error invalid stations. OFF: No request ON: Request issued	○	×
SB0011	Temporary error invalid setting cancel request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are canceled from temporary error invalid stations. OFF: No request ON: Request issued	○	×
SB0012	Reserved station function disable request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are temporarily canceled from reserved stations. OFF: No request ON: Request issued	○	×
SB0013	Reserved station specification enable request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are returned to reserved stations. Only stations that were temporarily canceled can be returned to reserved stations. OFF: No request ON: Request issued	○	×
SB0040	Network type (own station)	Stores the network type of own station. ON: Field Network	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB0043	Mode (own station)	Stores the mode of own station. OFF: Online ON: Not online	○	○
SB0044	Station setting (own station) (1)	Stores if the own station is a master station or not. OFF: Not master station ON: Master station	○	○
SB0045	Station setting (own station) (2)	Stores if the own station is a local station or not when the own station is not a master station. OFF: Not local station ON: Local station (Conditions) • This is enabled when Station setting (own station) (1) (SB0044) is off.	×	○
SB0047	Baton pass status (own station)	Stores the baton pass status for the own station (transient transmission possible). OFF: Normal ON: Error If an error occurs, the cause of the error can be checked by Baton pass status (own station) (SW0047) and Cause of baton pass interruption (SW0048).	○	○
SB0049	Data link status (own station)	Stores the own station's data link status. OFF: Normal ON: Error If an error occurs, the cause of the error can be checked by Cause of data link stop (SW0049). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB004A	Own station controller status (1)	Stores the continuation error status of the own station. OFF: Normal ON: Continuation error	○	○
SB004B	Own station controller status (2)	Stores the stop error status of the own station. OFF: Normal ON: Stop error	○	○
SB004C	Own station controller RUN status	Stores the RUN status of the own station. OFF: Normal ON: Reset status, driver stop by hardware error	○	○
SB004D	Received parameter error	Stores the status of the received parameter. (own parameter status during master station) OFF: Parameter normal ON: Parameter error	○	○
SB0050	Link start request accept status (own station)	Turns on when a cyclic transmission start request by Link start (own station) (SB0000) is accepted. OFF: Not accepted (SB0000 is off.) ON: Start accepted (SB0000 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0051	Link start completion status (own station)	Turns on when Link start request accept status (own station) (SB0050) turns on, and cyclic transmission start is completed. OFF: Start not completed (SB0000 is off.) ON: Start completed (SB0000 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0052	Link stop request accept status (own station)	Turns on when a cyclic transmission stop request by Link stop (own station) (SB0001) is accepted. OFF: Not accepted (SB0001 is off.) ON: Stop accepted (SB0001 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0053	Link stop completion status (own station)	Turns on when Link stop request accept status (own station) (SB0052) turns on, and cyclic transmission stop is completed. OFF: Stop not completed (SB0001 is off.) ON: Stop completed (SB0001 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB0054	System link start request accept status	Turns on when a cyclic transmission start request by System link start (SB0002) is accepted. OFF: Not accepted (SB0002 is off.) ON: Start accepted (SB0002 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0055	System link start completion status	Turns on when System link start request accept status (SB0054) turns on, and cyclic transmission start is completed. OFF: Start not completed (SB0002 is off.) ON: Start completed (SB0002 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0056	System link stop request accept status	Turns on when a cyclic transmission stop request by System link stop (SB0003) is accepted. OFF: Not accepted (SB0003 is off.) ON: Stop accepted (SB0003 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0057	System link stop completion status	Turns on when System link stop accept status (SB0056) turns on, and cyclic transmission stop is completed. OFF: Stop not completed (SB0003 is off.) ON: Stop completed (SB0003 is on.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0058	Temporary error invalid request accept status	Turns on when Temporary error invalid request (SB0010) is accepted. OFF: Not accepted (SB0010 is off.) ON: Invalid accepted (SB0010 is on.)	○	×
SB0059	Temporary error invalid setting completion status	Turns on when Temporary error invalid request accept status (SB0058) is turned on and the temporary error invalid processing is completed. OFF: Not completed ON: Completed or error completion	○	×
SB005A	Temporary error invalid setting cancel request accept status	Turns on when Temporary error invalid setting cancel request (SB0011) is accepted. OFF: Not accepted ON: Cancel accepted	○	×
SB005B	Temporary error invalid setting cancel completion status	Turns on when Temporary error invalid setting cancel request accept status (SB005A) is turned on and the temporary error cancellation is completed. OFF: Not completed ON: Completed or error completion	○	×
SB005C	Reserved station function disable request accept status	Turns on when Reserved station function disable request (SB0012) is accepted. OFF: Not accepted ON: Cancel accepted	○	×
SB005D	Reserved station function disable completion status	Turns on when Reserved station function disable request accept status (SB005C) is turned on and disabling the reserved station function is completed. OFF: Not completed ON: Completed or error completion	○	×
SB005E	Reserved station specification enable request accept status	Turns on when Reserved station specification enable request (SB0013) is accepted. OFF: Not accepted ON: Enable accepted	○	×
SB005F	Reserved station specification enabled status	Turns on when Reserved station specification enable request accept status (SB005E) is turned on and the reserved station specification enable processing is completed. OFF: Not completed ON: Completed or error completion	○	×
SB0060	Constant link scan status	Stores the constant link scan status. OFF: Constant link scan is disabled ON: Constant link scan is enabled (Conditions) • This is enabled when Data link status (own station) (SB0049) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB0065	Loopback status	Stores loopback execution status. The loopback station numbers can be checked by Loopback station number 1 (SW0070) and Loopback station number 2 (SW0071). OFF: Normal (no loopback stations) ON: Error (loopback being performed) (Loopback stations exist.) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off and Loopback function setting status (SB0078) is on.	○	×
SB006A	PORT1 linkup status (own station)	Stores the linkup status of PORT1 (own station). OFF: Linkup in progress ON: Linkdown in progress The time that the linkup starts after power-on or Ethernet cable connection may vary. Normally, it takes a few seconds. Depending on device status on the line, a linkup process is repeated, resulting in the increase in the time.	○	○
SB006B	PORT2 linkup status (own station)	Stores the linkup status of PORT2 (own station). OFF: Linkup in progress ON: Linkdown in progress The time that the linkup starts after power-on or Ethernet cable connection may vary. Normally, it takes a few seconds. Depending on device status on the line, a linkup process is repeated, resulting in the increase in the time.	○	○
SB006C	PORT1 error frame reception status (own station) (1)	Stores if a receive frame error line status caution level has occurred in the own station's PORT1. OFF: A receive frame error line status caution level has not yet been occurred. ON: A receive frame error line status caution level has been occurred.	○	○
SB006D	PORT2 error frame reception status (own station) (1)	Stores if a receive frame error line status caution level has occurred in the own station's PORT2. OFF: A receive frame error line status caution level has not yet been occurred. ON: A receive frame error line status caution level has been occurred.	○	○
SB006E	PORT1 error frame reception detection status (own station) (latch) (1)	Stores if a receive frame error line status caution level has occurred in the own station's PORT1 from power-on until the present. OFF: A receive frame error line status caution level has not yet been occurred. ON: A receive frame error line status caution level has been occurred.	○	○
SB006F	PORT2 error frame reception detection status (own station) (latch) (1)	Stores if a receive frame error line status caution level has occurred in the own station's PORT2 from power-on until the present. OFF: A receive frame error line status caution level has not yet been occurred. ON: A receive frame error line status caution level has been occurred.	○	○
SB0072	Scan mode setting information	Stores the scan mode setting status. OFF: Asynchronous mode ON: Synchronous mode	○	○
SB0074	Reserved station specification status	Stores the reserved station specification status due to parameters. The station number set for a reserved station can be checked by Reserved station specification (SW00C0 to SW00C7). OFF: Not specified ON: Specified	○	○
SB0075	Error invalid station setting status	Stores the error invalid station setting status due to parameters. The station number set for the error invalid station can be checked by Error invalid station setting (SW00D0 to SW00D7). OFF: Not specified ON: Specified	○	○
SB0077	Parameter reception status	Stores the parameter reception status from the master station. OFF: Reception completed ON: Reception not completed	×	○
SB0078	Loopback function setting status	Stores the setting status of the loopback function configured by the parameter. OFF: Not used ON: Used	○	×
SB007B	Input data status of data link faulty station	Stores the own station's setting status for "Data Link Faulty Station Setting". OFF: OFF or cleared to 0 ON: Hold	○	○
SB007D	Hold/Clear specification status at controller STOP	Stores the setting status of "Output setting at controller STOP" of the own station. OFF: Hold ON: Clear (ALL OFF)	○	○
SB008C	PORT1 error frame reception status (own station) (2)	Stores if a receive frame error line status warning level has occurred in the own station's PORT1. OFF: A receive frame error line status warning level has not yet been occurred. ON: A receive frame error line status warning level has been occurred.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB008D	PORT2 error frame reception status (own station) (2)	Stores if a receive frame error line status warning level has occurred in the own station's PORT2. OFF: A receive frame error line status warning level has not yet been occurred. ON: A receive frame error line status warning level has been occurred.	○	○
SB008E	PORT1 error frame reception detection status (own station) (latch) (2)	Stores if a receive frame error line status warning level has occurred in the own station's PORT1 from power-on until the present. OFF: A receive frame error line status warning level has not yet been occurred. ON: A receive frame error line status warning level has been occurred.	○	○
SB008F	PORT2 error frame reception detection status (own station) (latch) (2)	Stores if a receive frame error line status warning level has occurred in the own station's PORT2 from power-on until the present. OFF: A receive frame error line status warning level has not yet been occurred. ON: A receive frame error line status warning level has been occurred.	○	○
SB0090	Hardware test completion status	Stores the hardware test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Hardware test normal/abnormal end (SB0091).	○	○
SB0091	Hardware test normal/abnormal end	Stores the hardware test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Conditions) • This is enabled when Hardware test completion status (SB0090) is on.	○	○
SB0092	Self-loopback test completion status	Stores the self-loopback test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Self-loopback test normal/abnormal end (SB0093).	○	○
SB0093	Self-loopback test normal/abnormal end	Stores the self-loopback test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Conditions) • This is enabled when Self-loopback test completion status (SB0092) is on.	○	○
SB0094	Loop test completion status	Stores the loop test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Loop test normal/abnormal end (SB0095).	○	×
SB0095	Loop test normal/abnormal end	Stores the loop test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Conditions) • This is enabled when Loop test completion status (SB0094) is on.	○	×
SB0098	Network configuration mismatch occurrence status	Stores the match or mismatch status of the actual network configuration and the network map of the CC-Link IE Field Network diagnostics. OFF: Match ON: Mismatch After return or addition of the slave station, this register may be turned on regardless of the actual match/mismatch status.	○	×
SB0099	Number of connected modules over occurrence status	Stores whether the number of slave stations (including a submaster station) connected is 120 or less, or 121 or more. OFF: 120 or less ON: 121 or more Number of connected modules is the total of the slave stations (including a submaster station) which are currently connected and the disconnected stations (slave stations which were previously connected).	○	×
SB009A	Loop test request accept status	Stores the loop test request accept status. OFF: Loop test not accepted ON: Loop test accepted For the master station, this relay turns on during loop test mode. For slave stations, this relay turns on during a loop test and turns off upon completion of the test.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB00A0	Baton pass status (each station)	Stores the baton pass status for each station. OFF: All stations normal ON: Faulty station found If a faulty station is found, the status of each station can be checked by Baton pass status (each station) (SW00A0 to SW00A7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB00A1	Baton pass status (master station)	Stores the baton pass status for master station. OFF: Normal ON: Error (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00B0	Data link status (each station)	Stores the cyclic transmission status for each station. OFF: Cyclic transmission for all stations in progress ON: Cyclic transmission not executed for some stations If cyclic transmission are not executed for some stations, the status of each station can be checked by Data link status (each station) (SW00B0 to SW00B7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB00B1	Data link status (master station)	Stores the cyclic transmission status for the master station. OFF: Normal ON: Error (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00B8	Network connection status (each station)	Stores if any network connection station is found. OFF: No network connection station ON: Network connection station found If a network connection station is found, the status of each station can be checked using Network connection status (SW00B8 to SW00BF).	○	○
SB00C0	Reserved station specification	Stores if there are any reserved stations. OFF: No reserved stations ON: Reserved stations found If a reserved station is found, the status of each station can be checked by Reserved station specification (SW00C0 to SW00C7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00D0	Error invalid station setting	Stores if there are any error invalid stations. OFF: No error invalid stations ON: Error invalid station found If an error invalid station is found, the status of each station can be checked by Error invalid station setting (SW00D0 to SW00D7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00E0	Temporary error invalid station status	Stores if there are any temporary error invalid stations. OFF: No temporary error invalid stations ON: Temporary error invalid station found If a temporary error invalid station is found, the status of each station can be checked by Temporary error invalid station setting (SW00E0 to SW00E7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00E8	Station type match status (each station)	Stores the station type match status of each station. • OFF: Station type match in all stations • ON: Station type mismatch station found If a station type mismatch station is found, the status of each station can be checked using Station type match status (SW00E8 to SW00EF).	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB00F0	Controller RUN status (each station)	Stores the RUN status of the controller module of each station. OFF: All stations are in a RUN or STEP-RUN state ON: Station in STOP or PAUSE state found If a station in STOP or PAUSE state is found, the status of each station can be checked by Controller RUN status (each station) (SW00F0 to SW00F7). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00F1	Controller RUN status (master station)	Stores the RUN status of the controller module of the master station. OFF: RUN or STEP-RUN state ON: STOP or PAUSE state (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00F8	Network number match status	Stores the network number match status of each station. OFF: Network number match in all stations ON: Network number mismatch station found If a network number mismatch station is found, the status of each station can be checked using Network number match status (SW00F8 to SW00FF).	○	○
SB0100	Operation status (each station) (1)	Stores the moderate/major error or stop error status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. OFF: No moderate/major error (stop error) ON: Station with a moderate/major error (stop error) exists If a station with a moderate/major error (stop error) is found, the status of each station can be checked by Operation status (each station) (1) (SW0100 to SW0107). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0108	Station number duplication occurrence status	Stores the station number duplication occurrence status of each station. OFF: No duplication of station number ON: Station number duplicated If a station number is duplicated, the status of each station can be checked using Station number duplication occurrence status (SW0108 to SW010F).	○	○
SB0101	Controller operation status (master station) (1)	Stores the stop error status of the controller module of the master station. OFF: Normal ON: Stop error occurred (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0110	Operation status (each station) (2)	Stores the minor error or continuation error status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. OFF: All stations normal or station with a moderate/major error(stop error) exists ON: Station with a minor error (continuation error) exists If a station with a minor error (continuation error) is found, the status of each station can be checked by Operation status (each station) (2) (SW0110 to SW0117). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0111	Controller operation status (master station) (2)	Stores the continuation error status of the controller module of the master station. OFF: Normal ON: Continuation error occurred (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0120	PORT1 current error frame reception status (1)	Stores if a receive frame error line status caution level has occurred in each station's PORT1. OFF: A receive frame error line status caution level has not yet been occurred in any stations. ON: A receive frame error line status caution level has been occurred in one or more stations. If a receive frame error line status caution level has been occurred, the status of each station can be checked by PORT1 current error frame reception status (each station) (1) (SW0120 to SW0127). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB0121	PORT1 error frame reception status (master station)	Stores if an error frame is received at the master station's PORT1. OFF: An error frame has not yet been received ON: An error frame has been received (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0128	PORT1 current error frame reception status (2)	Stores if a receive frame error line status warning level has occurred in each station's PORT1. OFF: A receive frame error line status warning level has not yet been occurred in any stations. ON: A receive frame error line status warning level has been occurred in one or more stations. If a receive frame error line status warning level has been occurred, the status of each station can be checked by PORT1 current error frame reception status (each station) (2) (SW0128 to SW012F). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0130	PORT2 current error frame reception status (1)	Stores if a receive frame error line status caution level has occurred in each station's PORT2. OFF: A receive frame error line status caution level has not yet been occurred in any stations. ON: A receive frame error line status caution level has been occurred in one or more stations. If a receive frame error line status caution level has been occurred, the status of each station can be checked by PORT2 current error frame reception status (each station) (1) (SW0130 to SW0137). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0131	PORT2 error frame reception status (master station)	Stores if an error frame is received at the master station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0138	PORT2 current error frame reception status (2)	Stores if a receive frame error line status warning level has occurred in each station's PORT2. OFF: A receive frame error line status warning level has not yet been occurred in any stations. ON: A receive frame error line status warning level has been occurred in one or more stations. If a receive frame error line status warning level has been occurred, the status of each station can be checked by PORT2 current error frame reception status (each station) (2) (SW0138 to SW013F). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0140	PORT1 error frame reception detection status (1)	Stores if a receive frame error line status caution level has occurred in each station's PORT1 from power-on until the present. OFF: A receive frame error line status caution level has not yet been occurred in any stations. ON: A receive frame error line status caution level has been occurred in one or more stations. If a receive frame error line status caution level has been occurred, the status of each station can be checked by PORT1 error frame reception detection status (1) (SW0140 to SW0147). (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0141	PORT1 error frame detection (master station)	Stores if an error frame was received from power-on until the present at the master station's PORT1. OFF: An error frame has not yet been received ON: An error frame has been received at least once (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SB0148	PORT1 error frame reception detection status (2)	Stores if a receive frame error line status warning level has occurred in each station's PORT1 from power-on until the present. OFF: A receive frame error line status warning level has not yet been occurred in any stations. ON: A receive frame error line status warning level has been occurred in one or more stations. If a receive frame error line status warning level has been occurred, the status of each station can be checked by PORT1 error frame reception detection status (2) (SW0148 to SW014F). (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0150	PORT2 error frame reception detection status (1)	Stores if a receive frame error line status caution level has occurred in each station's PORT2 from power-on until the present. OFF: A receive frame error line status caution level has not yet been occurred in any stations. ON: A receive frame error line status caution level has been occurred in one or more stations. If a receive frame error line status caution level has been occurred, the status of each station can be checked by PORT2 error frame reception detection status (1) (SW0150 to SW0157). (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0151	PORT2 error frame detection (master station)	Stores if an error frame was received from power-on until the present at the master station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received at least once (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0158	PORT2 error frame reception detection status (2)	Stores if a receive frame error line status warning level has occurred in each station's PORT2 from power-on until the present. OFF: A receive frame error line status warning level has not yet been occurred in any stations. ON: A receive frame error line status warning level has been occurred in one or more stations. If a receive frame error line status warning level has been occurred, the status of each station can be checked by PORT2 error frame reception detection status (2) (SW0158 to SW015F). (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0170	Parameter error status (each station)	Stores the parameter status for each station. OFF: No parameter errors for any stations ON: Parameter error detected at one or more stations If a parameter error occurs, the status of each station can be checked by Parameter error status (each station) (SW0170 to SW0177). (Conditions) - This is enabled when Baton pass status (own station) (SB0047) is off. - Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB0180	Reserved station function disable status	Stores if a reserved station function is disabled. OFF: No disabled reserved station function ON: Disabled reserved station function found If a reserved station function is disabled, the status of each station can be checked by Reserved station function disable status (SW0180 to SW0187). (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

Appendix 2 Link Special Register (SW)

The link special register (SW) stores the information during data link as a numerical value.

Error locations and causes can be checked by using and monitoring the link special register (SW) in programs.

Table A2 Link Special Register (SW) List

No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW0000		Sets the station where cyclic transmission is stopped or started. 00h: Own station 01h: All stations 02h: Specified station 80h: Own station (Forced link start) 81h: All stations (Forced link start) 82h: Specified station (Forced link start) • Stopping/starting of cyclic transmission is performed by System link start (SB0002) or System link stop (SB0003). • When Specified station (02h or 82h) is selected, the own station is not included.	○	×																																																																																																																																																									
SW0001 to SW0008	Link stop/start direction	When setting 02h or 82h by Link stop/start direction (SW0000), this sets the station number that stops or starts cyclic transmission. 0: No direction issued for stop or start 1: Direction issued for stop or start <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 station No.		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																																																																																																																																													
SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting	Specifies the slave stations where reserved station function disable or temporary error invalid station setting/cancel is performed. 0: Not specified 1: Specified <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>SW0010</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>SW0011</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>SW0012</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>SW0013</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>SW0014</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>SW0015</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>SW0016</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>SW0017</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 station No. (Conditions) • The reserved station status cannot be temporarily cleared for station set as a temporary error invalid station. • Stations and sub-master stations set to reserved station temporary clear cannot be set as temporary error invalid stations. • Stations higher than the maximum station number are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0010	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0011	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0012	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0013	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0014	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0015	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0016	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0017	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113	○	×
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0010	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0011	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0012	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0013	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0014	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0015	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0016	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0017	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
SW0040	Network number	Stores the network number of own station. Range: 1 to 239	○	○																																																																																																																																																									
SW0042	Station number	Stores the station number of own station. Range: 1 to 120 (master station: 125)	○	○																																																																																																																																																									
SW0043	Mode status	Stores the mode of own station. 0: Online (Normal mode) (Local station: Online) 1: Online (High speed mode) 2: Offline 6: Loop test 7: Self-loopback test 9: Hardware test	○	○																																																																																																																																																									

No.	Name	Description	Availability	
			Master station	Local station
SW0046	Module type	Stores the own station's hardware status. b15 to b2 b1 b0 SW0046 0 to 0 Module type 00: Module 01: Board 10: HMI	○	○
SW0047	Baton pass status (own station)	Stores the baton pass status for the own station (transient transmission possible). 0: Data link in progress 2: Baton pass in progress 3: Baton pass stopped 4: Test in progress 5: Offline	○	○
SW0048	Cause of baton pass interruption	Stores the cause of interruption in the communication (baton pass) of own station. 00h: At normal communication or power-on 30h: Cable disconnection 33h: Disconnection or reconnection in progress 40h: Offline mode 41h: Hardware test 42h: Self-loopback test	○	○
SW0049	Cause of data link stop	Stores the cause which stopped the data link of own station. 00h: At normal communication or power-on 01h: Stop command issued 02h: Monitoring timeout 05h: No slave stations (master station only) 10h: Parameter not received (local stations only) 11h: Own station number out of range 12h: Own station specified as reserved 13h: Station number duplication (own station) 14h: Master station duplication 16h: Station number not set 18h: Parameter error 19h: Parameter communication in progress 1Ah: Station type mismatch 20h: Controller module stop error 60h: Incorrect ring topology configuration (master station only)	○	○
SW004A	Data link stop request station	Stores the station number of the station that performed the cyclic transmission stop request for the own station. Range: 125 (master station), 1 to 120 (local station) The cyclic transmission stop request is performed by System link stop (SB0003). (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW004B	Own station controller status	Stores the own station's status. 00h: No module mounted 01h: STOP (Normal) 02h: STOP (Stop error occurring) 03h: STOP (Continuation error occurring) 04h: RUN (Normal) 05h: RUN (Continuation error occurring) 06h: STEP-RUN 07h: PAUSE 0Eh: Reset in progress 0Fh: Initial processing	○	○
SW004C	Parameter setting status	Stores the parameter status. 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) (Conditions) This is enabled when Received parameter error (SB004D) is on.	○	○
SW0050	Data link start status (own station)	Stores the results when cyclic transmission is started by Link start (own station) (SB0000). 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Link start (own station) (SB0000) is turned off, the stored error definition is cleared. (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SW0051	Data link stop status (own station)	Stores the results when cyclic transmission is stopped by Link stop (own station) (SB0001). 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Link stop (own station) (SB0001) is turned off, the stored error definition is cleared. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0052	Data link start status (entire system)	Stores the results when cyclic transmission is started by System link start (SB0002). 0: Normal 1 or higher: Error definition in own station (Refer to Section 6.1 "Error Codes".) When System link start (SB0002) is turned off, the stored error definition is cleared. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SW0053	Data link stop status (entire system)	Stores the results when cyclic transmission is stopped by System link stop (SB0003). 0: Normal 1 or higher: Error definition in own station (Refer to Section 6.1 "Error Codes".) When System link stop (SB0003) is turned off, the stored error definition is cleared. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SW0054	Temporary error invalid station setting result	Stores the results when executing the temporary error invalid station setting. 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Temporary error invalid request (SB0010) is turned off, the stored error definition is cleared.	○	×
SW0055	Temporary error invalid station setting cancel result	Stores the results when canceling the temporary error invalid station setting. 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Temporary error invalid setting cancel request (SB0011) is turned off, the stored error definition is cleared.	○	×
SW0056	Result of reserved station function disable	Stores the result when disabling reserved station function. 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Reserved station function disable request (SB0012) is turned off, the stored error definition is cleared.	○	×
SW0057	Result of reserved station function enable	Stores the result when reserved station function disable is undone. 0: Normal 1 or higher: Abnormal (Refer to Section 6.1 "Error Codes".) When Reserved station specification enable request (SB0013) is turned off, the stored error definition is cleared.	○	×
SW0058	Number of total slave stations (setting)	Stores the number of total slave stations that are set by the parameters. Range: 1 to 120	○	○
SW0059	Number of total slave stations (current value)	Stores the number of total slave stations that are actually connected by data link in CC-Link IE Field Network. Range: 1 to 120 (0 when own station is disconnected)	○	○
SW005A	Maximum baton pass station	Stores the maximum station number of the stations where the baton pass is performed. Range: 1 to 120 (0 when own station is disconnected) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW005B	Maximum cyclic transmission station	Stores the maximum station number of the station where the cyclic transmission is performed. Range: 1 to 120 (0 when own station is disconnected) (Conditions) • This is enabled when Data link status (own station) (SB0049) is off.	○	○
SW0060	Maximum link scan time	Stores the maximum value of the link scan time during cyclic transmission. (Unit: ms) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

No.	Name	Description	Availability	
			Master station	Local station
SW0061	Minimum link scan time	Stores the minimum value of the link scan time during cyclic transmission. (Unit: ms) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0062	Current link scan time	Stores the current value of the link scan time during cyclic transmission. The stored value contains a maximum error of 1 ms. (Unit: ms) (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0063	Constant link scan set value	Stores the setting value of the contact link scan that is set in the common parameter. 0: No setting 1 to 200: Setting value of contact link scan time (Unit: ms) (Conditions) • This is enabled when Data link status (own station) (SB0049) is off.	○	○
SW0064	Connection status (own station)	Stores the connection status of own station. 00h: Normal (communication in progress on PORT1 and PORT2) 01h: Normal (communication in progress on PORT1, cable disconnected on PORT2) 04h: Normal (loopback communication in progress on PORT1, cable disconnected on PORT2) 10h: Normal (cable disconnected on PORT1, communication in progress on PORT2) 11h: Disconnecting (cable disconnected on PORT1 and PORT2) 12h: Disconnecting (cable disconnected on PORT1, establishing line on PORT2) 21h: Disconnecting (establishing line on PORT1, cable disconnected on PORT2) 22h: Disconnecting (establishing line on PORT1 and PORT2) 40h: Normal (cable disconnected on PORT1, loopback communication in progress on PORT2)	○	○
SW0066	Actual link scan time (lower 1 word)	Stores the link scan time during cyclic transmission. (Unit: μs)	○	○
SW0067	Actual link scan time (upper 1 word)			
SW0068	PORT1 receive error occurrence rate (own station) (max.)	Stores the occurrence rate (maximum value) of received error frames at the own station's PORT1. (Unit: %) When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.	○	○
SW0069	PORT1 receive error occurrence rate (own station) (present)	Stores the occurrence rate (current value) of received error frames at the own station's PORT1. (Unit: %) When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.	○	○
SW006A	PORT2 receive error occurrence rate (own station) (max.)	Stores the occurrence rate (maximum value) of received error frames at the own station's PORT2. (Unit: %) When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.	○	○
SW006B	PORT2 receive error occurrence rate (own station) (present)	Stores the occurrence rate (current value) of received error frames at the own station's PORT2. (Unit: %) When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.	○	○
SW0070	Loopback station number 1	Stores the number of the station where loopback is being performed. The other loopback station number can be checked by Loopback station number 2 (SW0071). 0: No loopback stations 1 to 120: Slave station 125: Master station 255: Station number not set If a station whose station number duplicates is performing loopback, this register stores the duplicated number. (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off and Network configuration mismatch occurrence status (SB0098) is off.	○	×

No.	Name	Description	Availability	
			Master station	Local station
SW0071	Loopback station number 2	Stores the number of the station where loopback is being performed. The other loopback station number can be checked by Loopback station number 1 (SW0070). 0: No loopback stations 1 to 120: Slave station 125: Master station 255: Station number not set If a station whose station number duplicates is performing loopback, this register stores the duplicated number. (Conditions) This is enabled when Baton pass status (own station) (SB0047) is off and Network configuration mismatch occurrence status (SB0098) is off.	○	×
SW0074	PORT1 cable disconnection detection count	Stores the (cumulative) count that was detected for cable disconnections at the PORT1. When Clear communication error count (SB0006) is turned on, the stored count is cleared.	○	○
SW0075	PORT1 receive error detection count	Stores the (cumulative) count that error data was received at the PORT1. The count stores only error data that is not transmitted to all stations. When Clear communication error count (SB0006) is turned on, the stored count is cleared. (Conditions) This is enabled when the Mode status (SW0043) is 0 or 1. (during online)	○	○
SW0076	PORT1 total number of received data (lower 1 word)	Stores the (cumulative) count that error data was received at the PORT1. When Clear communication error count (SB0006) is turned on, the stored count is cleared. (Conditions) This is enabled when the Mode status (SW0043) is 0 or 1. (during online)	○	○
SW0077	PORT1 total number of received data (upper 1 word)			
SW007C	PORT2 cable disconnection detection count	Stores the (cumulative) count that was detected for cable disconnections at the PORT2. When Clear communication error count (SB0006) is turned on, the stored count is cleared.	○	×
SW007D	PORT2 receive error detection count	Stores the (cumulative) count that error data was received at the PORT2. The count stores only error data that is not transmitted to all stations. When Clear communication error count (SB0006) is turned on, the stored count is cleared. (Conditions) This is enabled when the Mode status (SW0043) is 0 or 1. (during online)	○	×
SW007E	PORT2 total number of received data (lower 1 word)	Stores the (cumulative) count that error data was received at the PORT2. When Clear communication error count (SB0006) is turned on, the stored count is cleared. (Conditions) This is enabled when the Mode status (SW0043) is 0 or 1. (during online)	○	×
SW007F	PORT2 total number of received data (upper 1 word)			

No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW00A0 to SW00A7	Baton pass status (each station)	Stores the baton pass status for each station. 0: Baton pass normal station 1: Baton pass faulty station	○	○																																																																																																																																																									
		- If multiple stations change from faulty to normal, because they are reconnected to the network one by one per link scan, the time until the status changes to "0: Baton pass normal station" may vary by several seconds. - If cables are connected/disconnected or the module is reset in line and ring topologies, the token may be lost or a reconstruction may occur, causing the baton pass status to detect an error in the first link scan.																																																																																																																																																											
		<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>				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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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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SW00B0 to SW00B7	Data link status (each station)	Stores the cyclic transmission status for each station. 0: Cyclic transmission normal station 1: Cyclic transmission faulty station	○	○																																																																																																																																																									
		- If multiple stations change from faulty to normal, because they are reconnected to the network one by one per link scan, the time until the status changes to "0: Cyclic transmission normal station" may vary by several seconds. - If no response is received for several link scans, the station is determined to be a cyclic transmission 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>SW00B0</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>SW00B1</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>SW00B2</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>SW00B3</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>SW00B4</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>SW00B5</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>SW00B6</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>SW00B7</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>				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00B0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00B1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00B2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	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
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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																																																																																																																																													
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SW00B8 to SW00BF	Network connection status	Stores the connection status to the network. 0: Station not connected to the network 1: Station connected to the network	○	○																																																																																																																																																									
		<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>SW00B8</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>SW00B9</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>SW00BA</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>SW00BB</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>SW00BC</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>SW00BD</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>SW00BE</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>SW00BF</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>				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00B8	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00B9	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00BA	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00BB	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00BC	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00BD	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00BE	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00BF	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113
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SW00BF	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
Each number in the table represents station No. - is fixed to 0b. (Conditions) - This is not affected by Baton pass status (each station) (SW00A0 to SW00A7) and Data link status (each station) (SB00B0, SW00B0 to SW00B7). - This is enabled only for the station which has same network number as that of the master operating station.																																																																																																																																																													

No.	Name	Description	Availability	
			Master station	Local station
SW00C0 to SW00C7	Reserved station specification	Stores the setting status of the reserved station. 0: Other than reserved station (also includes stations specified as reserved station disable status) 1: Reserved station	○	○
SW00C8 to SW00CF	Parameter setting status	Stores the parameter setting status. 0: Station not set in the parameter 1: Station set in the parameter	○	○
SW00D0 to SW00D7	Error invalid station setting	Stores the setting status of error invalid stations. 0: Other than error invalid station 1: Error invalid station	○	○

No.	Name	Description	Availability	
			Master station	Local station
SW00E0 to SW00E7	Temporary error invalid station setting	Stores the setting status of the temporary error invalid station. 0: Other than temporary error invalid station 1: Temporary error invalid station	○	○
SW00E8 to SW00EF	Station type match status	Stores the match status between the station type set in the master station and that of the slave station. 0: Station type match 1: Station type mismatch	○	○
SW00F0 to SW00F7	Controller RUN status (each station)	Stores the RUN status of each station. 0: RUN, STEP-RUN 1: STOP, PAUSE, stop error	○	○

No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW00F8 to SW00FF	Network number match status	Stores the match status between the network number of the master station and that of the slave station. 0: Network number match 1: Network number mismatch	○	○																																																																																																																																																									
		<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>SW00F8</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>SW00F9</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>SW00FA</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>SW00FB</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>SW00FC</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>SW00FD</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>SW00FE</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>SW00FF</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>				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00F8	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00F9	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00FA	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00FB	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00FC	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00FD	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00FE	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00FF	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113
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Each number in the table represents station No. - is fixed to 0b.																																																																																																																																																													
SW0100 to SW0107	Controller operation status (each station) (1)	Stores the moderate/major error or stop error status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. 0: No moderate/major error (stop error) 1: Moderate/major error (stop 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>				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
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SW0108 to SW010F	Station number duplication occurrence status	Stores the occurrence status of station number duplication. 0: No duplication of station number 1: Station number duplicated	○	○																																																																																																																																																									
		<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>SW0108</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>SW0109</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>SW010A</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>SW010B</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>SW010C</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>SW010D</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>SW010E</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>SW010F</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>				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0108	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0109	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW010A	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW010B	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW010C	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW010D	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW010E	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW010F	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113
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No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW0110 to SW0117	Controller operation status (each station) (2)	Stores the minor error or continuation error status of each station. 0: Normal operation, or a moderate/major error (stop error) occurring 1: Minor error (continuation error) occurring <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>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></tbody></table> Each number in the table represents station No. - is fixed to 0b. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). • Reserved stations and stations higher 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	○	○
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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																																																																																																																																													
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SW0121	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
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SW0137	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
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		SW013D			96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																									
		SW013E			112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																									
SW013F	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
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SW0140 to SW0147	PORT1 error frame reception detection status (1)	Stores the station number where a receive frame error line status caution level has occurred in each station's PORT1 from power-on until the present. 0: A receive frame error line status caution level has not yet been occurred in each station's PORT1. 1: A receive frame error line status caution level has been occurred in each station's PORT1. When Clear communication error count (SB0006) is turned on, the stored status is cleared.	○	○																																																																																																																																																									
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SW0147	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
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No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW0148 to SW014F	PORT1 error frame reception detection status (2)	Stores the station number where a receive frame error line status warning level has occurred in each station's PORT1 from power-on until the present. 0: A receive frame error line status warning level has not yet been occurred in each station's PORT1. 1: A receive frame error line status warning level has been occurred in each station's PORT1. When Clear communication error count (SB0006) is turned on, the stored status is cleared.	○	○																																																																																																																																																									
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		SW0149			32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																									
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SW0150 to SW0157	PORT2 error frame reception detection status (1)	Stores the station number where a receive frame error line status caution level has occurred in each station's PORT2 from power-on until the present. 0: A receive frame error line status caution level has not yet been occurred in each station's PORT2. 1: A receive frame error line status caution level has been occurred in each station's PORT2. When Clear communication error count (SB0006) is turned on, the stored status is cleared.	○	○																																																																																																																																																									
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SW0157	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
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SW0158 to SW015F	PORT2 error frame reception detection status (2)	Stores the station number where a receive frame error line status warning level has occurred in each station's PORT2 from power-on until the present. 0: A receive frame error line status warning level has not yet been occurred in each station's PORT2. 1: A receive frame error line status warning level has been occurred in each station's PORT2. When Clear communication error count (SB0006) is turned on, the stored status 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>SW0158</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>SW0159</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>SW015A</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>SW015B</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>SW015C</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>SW015D</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>SW015E</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>SW015F</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>				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0158	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0159	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW015A	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW015B	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW015C	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW015D	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW015E	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW015F	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113
					b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																									
		SW0158			16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																									
		SW0159			32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																									
		SW015A			48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																									
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		SW015E			112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																									
SW015F	-	-	-	-	-	-	-	-	120	119	118	117	116	115	114	113																																																																																																																																													
Each number in the table represents station No. - is fixed to 0b. (Conditions) - This is enabled when Baton pass status (own station) (SB0047) is off. - Holds the data immediately before the error. - This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7).																																																																																																																																																													

No.	Name	Description	Availability																																																																																																																																																										
			Master station	Local station																																																																																																																																																									
SW0170 to SW0177	Parameter error status (each station)	Stores the parameter status for each station. 0: No parameter error 1: Parameter error found	○	○																																																																																																																																																									
		<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>				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
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		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																																																																																																																																													
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SW0180 to SW0187	Reserved station function disable status	Stores the station that is currently in reserved station function disable status. 0: No reserved station function disable is specified 1: Reserved station function disable 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>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>				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																																																																																																																																													
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SW0194	Loop test result	Stores a loop test result. 0: Normal completion Other than 0: Abnormal end (Refer to the figure below.)	○	×																																																																																																																																																									
		<table><tr><td></td><td>b15</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>SW0194</td><td>Fixed to 0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>				b15	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0194	Fixed to 0																																																																																																																																												
					b15	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																															
		SW0194			Fixed to 0																																																																																																																																																								
		b0: Master station duplicated/submaster station duplicated b1: Station number duplicated b2: Invalid station No. b3: Reserved station specification error (A station that exists on the network is set as a reserved station in the master station.) b4: All stations faulty b5: Inconsistent total number of slave stations b6: Station type setting error b7: Loopback stations exist.																																																																																																																																																											

No.	Name	Description	Availability	
			Master station	Local station
SW01A0 to SW01A7	Loop test error station	Stores the execution result of a loop test. 0: Normal 1: Error	○	×
Each number in the table represents station No. - is fixed to 0b.				

Appendix 3 Frame Format

The following table lists frames that are created during sending or analyzed during receiving by the driver. This section describes the formats of frames for your reference to create and analyze frames.

Table A3-1 List of Frames Created/Analyzed by Driver

No.	Abbreviation	Frame type (FType)		Data type (DataType)		Data sub-type	
1	CC-Link compatible transient	25h	Transient2	04h	CC-Link compatible	-	-
2	SLMP transient	22h	Transient1	05h	Network common	0002h	SLMP

Appendix 3.1 CC-Link compatible transient frame

The following shows the basic format of a CC-Link compatible transient frame.

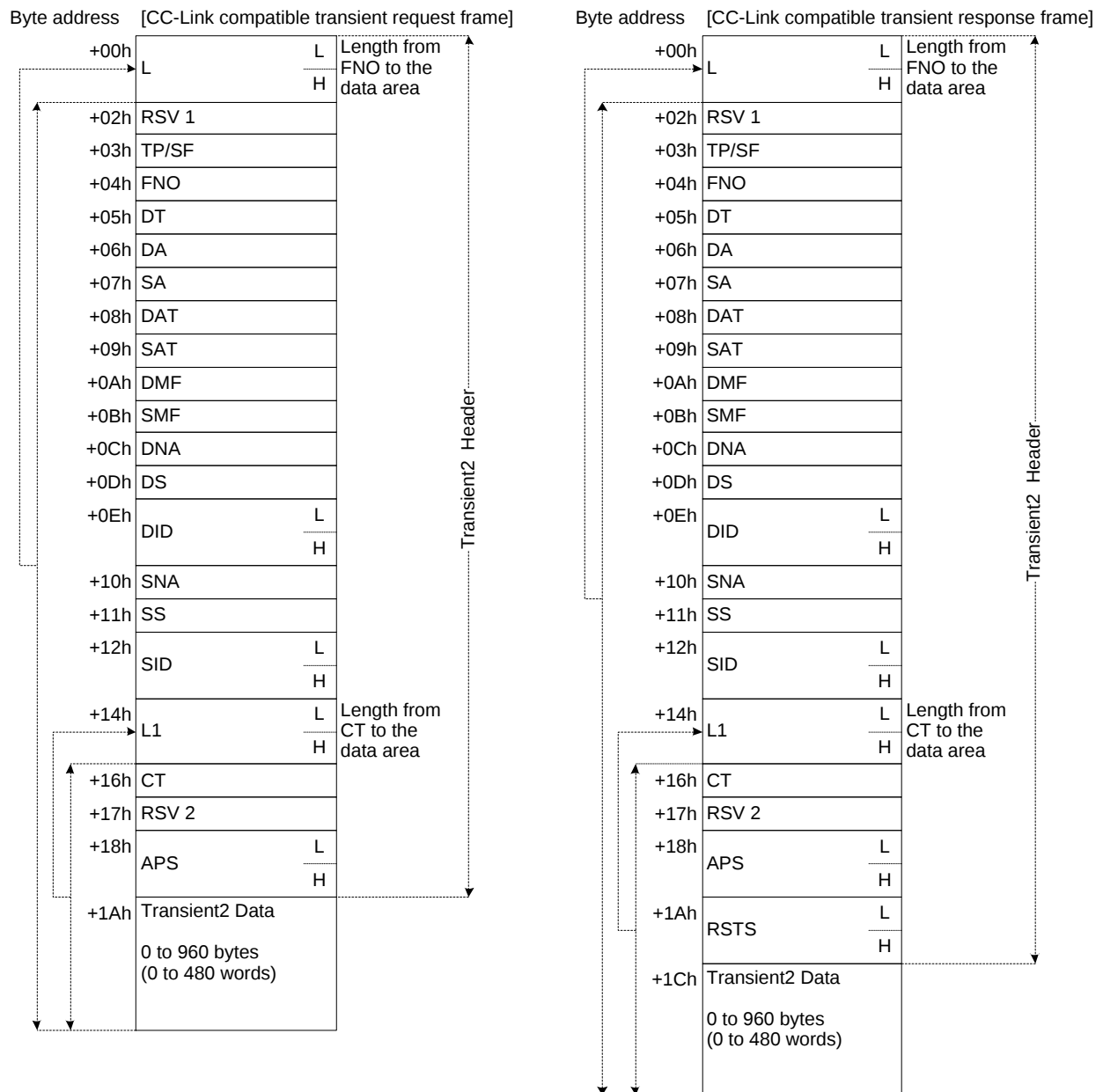


Figure A3.1-1 overview of CC-Link Compatible Transient Frame Basic Format

(1) Details of the CC-Link compatible transient frame

The following table describes the details of items defined in the CC-Link transient frame basic format.

Table A3.1-1 Details of CC-Link Compatible Transient Frame Basic Format

Item	Description	Value	Remarks
L	Frame length	-	Set the data length after FNO in bytes.
RSV	Reserved	Fixed to 00h	-
TP/SF	Type/Sequence number	Fixed to 00h	-
FNO	Start frame identification number / Divided frame number	Fixed to 00h	-
DT	Priority/Response frame necessity	Fixed to 00h	-
DA	Destination station number	01h to 78h (1 to 120): Station number 7Dh: Master station	Set the station number of the destination station. (Same value as DS.)
SA	Source station number	01h to 78h (1 to 120): Station number 7Dh: Master station	Set the station number of the execution station. (Same value as SS.)
DAT	Destination application type	Fixed to 22h	-
SAT	Source application type	Fixed to 22h	-
DMF	Execution module destination flag	00h: Processed inside board 01h: Processed inside controller	-
SMF	Execution module source flag	00h: Processed inside board 01h: Processed inside controller	-
DNA	Destination station network number	01h to EFh (1 to 239)	Set the network number of the destination station.
DS	Destination station number 02	01h to 78h (1 to 120): Station number 7Dh: Master station	Set the destination station number. (Same value as DA.)
DID	System specification area / Destination identification number	Fixed to 03FFh	-
SNA	Source network number	01h to EFh (1 to 239)	Set the network number of the
SS	Source station number 02	01h to 78h (1 to 120): Station number 7Dh: Master station	Set the station number of the execution station. (Same value as SA.)
SID	System specification area / Source identification number	Fixed to 03FFh	-
L1	Data length	-	Set the data length after CT in bytes.
CT	Command type	-	For details of the command type, refer to (2) Command type of CC-Link compatible transient in this section.
RSV 2	Reserved	Fixed to 00h	-
APS	Application number	bit 15-8: Fixed to 00h	Set a number to identify the frame when the source station sends a request.
		bit 7-0: 00h to FFh	
RSTS	Return code	0000h: Normal end Other than 0000h: Error code	For details of the return code, refer to (3) Return code of CC-Link compatible transient in this section.

The following shows the data structure of the command type (CT).

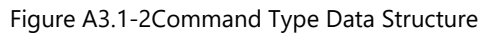


Table A3.1-2 CC-Link Compatible Transient Command List

Table A3.1-3 Examples of Error Codes Stored in Return Code

Point	
	Sample codes do not describe any processing that analyzes received CC-Link compatible transient frame in detail. Add a processing to the driver, as necessary, to determine whether a received frame is normal or abnormal. If there is any error in the frame, store the error code shown above in RSTS of the response frame.

Appendix 3.1.1 Memory access information acquisition

Executing the memory access information acquisition command (CT=04h) allows you to acquire applicable devices of the destination controller and access codes. The following shows the format of memory access information acquisition frame.

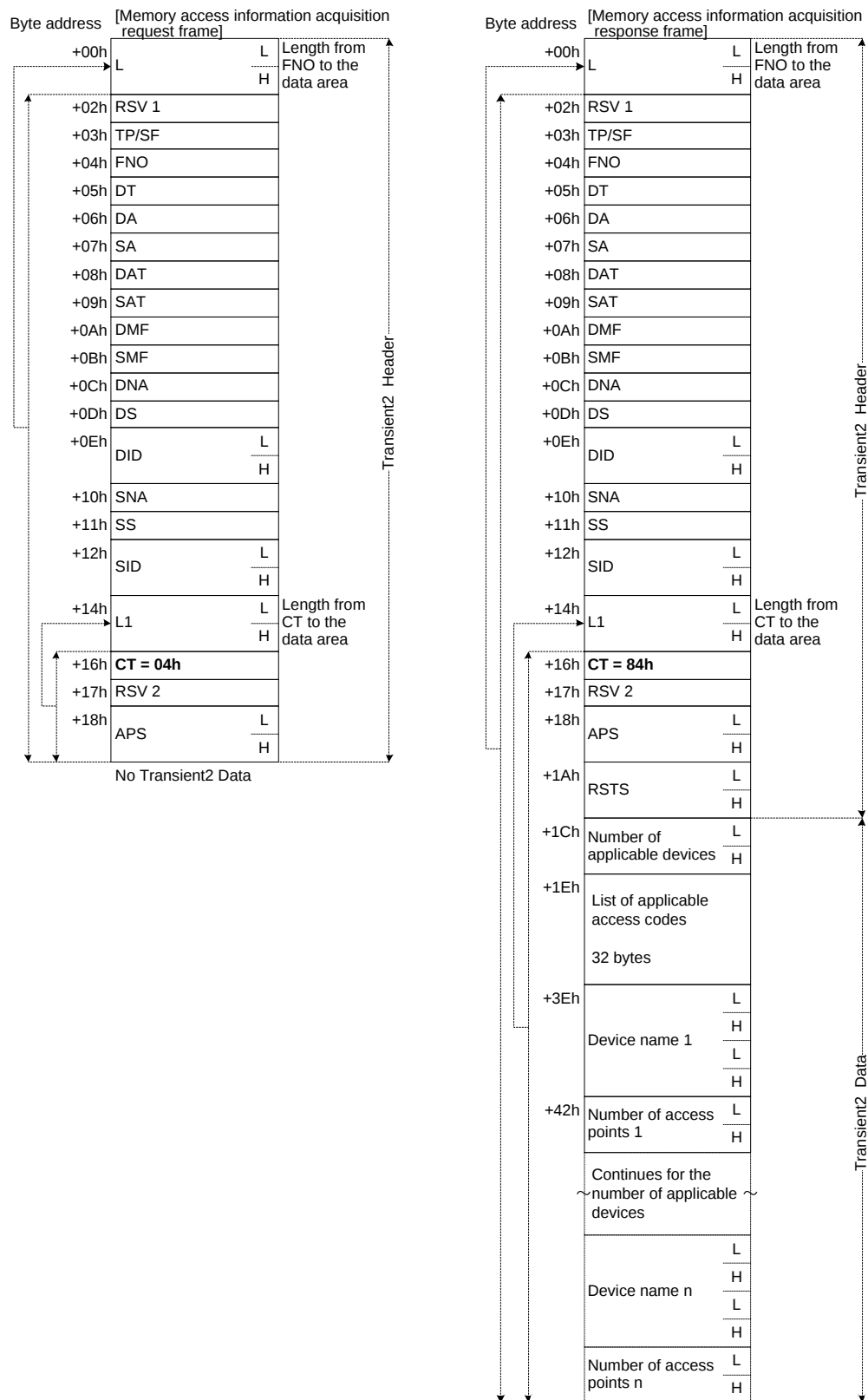


Figure A3.1.1-1 Overview of Memory Access Information Acquisition Frame Format

The following table describes the details of items defined in the memory access information acquisition frame format.

Table A3.1.1-1 Details of Memory Access Information Acquisition Frame Format

Byte address	Item	Description																
+1Ch - +1Dh	Number of applicable devices	Stores the number of applicable devices that can be used by the memory read/write commands.																
+1Eh - +3Dh	List of applicable access codes	Stores whether or not a device of the destination station controller of the memory read/write commands can be accessed in the following bit pattern.																
		The devices are indicated by 00h to FFh access codes.																
		b15															b0	
		+1Eh	0Fh	0Eh	0Dh	0Ch	0Bh	0Ah	09h	08h	07h	06h	05h	04h	03h	02h	01h	00h
			1Fh															10h
			2Fh															20h
			3Fh															30h
			4Fh															40h
			5Fh															50h
			6Fh															60h
			7Fh															70h
			8Fh															80h
			9Fh															90h
			AFh															A0h
			BFh															B0h
			CFh															C0h
			DFh															D0h
			EFh															E0h
		+3Dh	FFh															F0h
				0b: Inapplicable 1b: Applicable														
+3Eh - +41h	Device name 1	Stores the device name using ASCII code, four characters maximum.																
+42h - +43h	Number of access points 1	Stores the access size of the device of the destination controller in words.																
...	...	Repeated for the number of applicable devices.																
*1	Device name n*1	Stores the device name using ASCII code, four characters maximum.																
*1	Number of access points n*1	Stores the access size of the device of the destination controller in words.																

*1: The start address of the device name n and the number of access points n can be obtained using the following formulas.

Device name n: +3Eh + (06h × n)

Number of access points n: +3Eh + (06h × n) + 04h

Appendix 3.1.2 Remote RUN

Executing the remote RUN command (CT=08h) allows you to change the operating status of another station controller to RUN. The following shows the format of remote RUN frame.

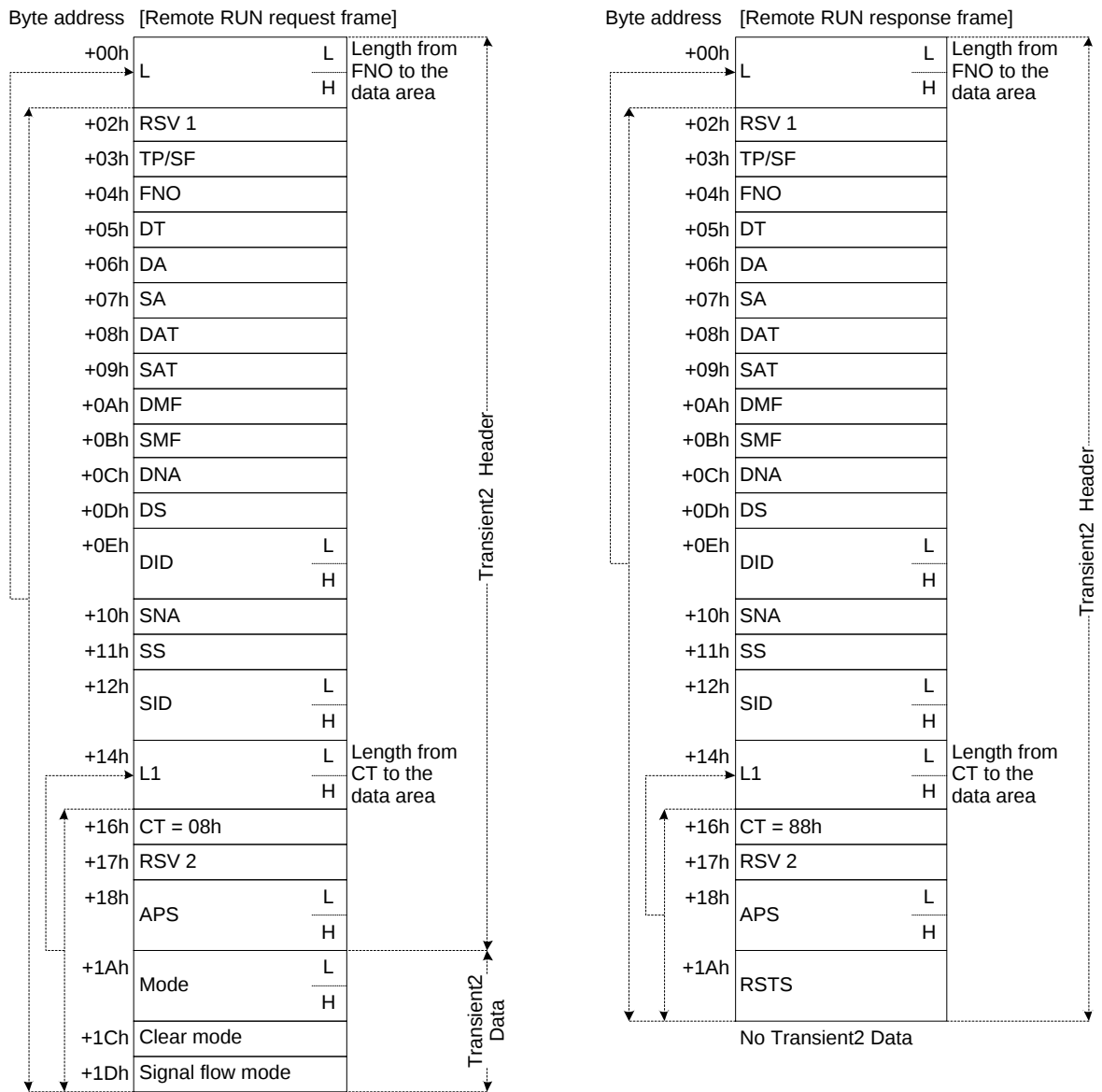


Figure A3.1.2-1 Overview of Remote RUN Frame Format

The following table describes the details of items defined in the remote RUN frame format.

Table A3.1.2-1 Details of Remote RUN Frame Format

Byte address	Item	Description	Value
+1Ch	Mode	Set whether or not to forcibly set another station controller that is in a STOP state to a RUN state.	1: Forced RUN 3: Normal RUN
+1Dh	Clear mode	Set whether or not to initialize the devices of the controller during remote RUN execution.	0: Do not initialize 1: Initialize devices other than latch devices 2: Initialize all devices
+1Ah - +1Bh	Signal flow mode	Specify the method of initialization set under "Clear mode".	0: Hold status before command execution 1: All 0 (off) 2: All 1 (on)

Executing the remote STOP command (CT=09h) allows you to change the operating status of another station controller to STOP. The following shows the format of remote STOP frame.

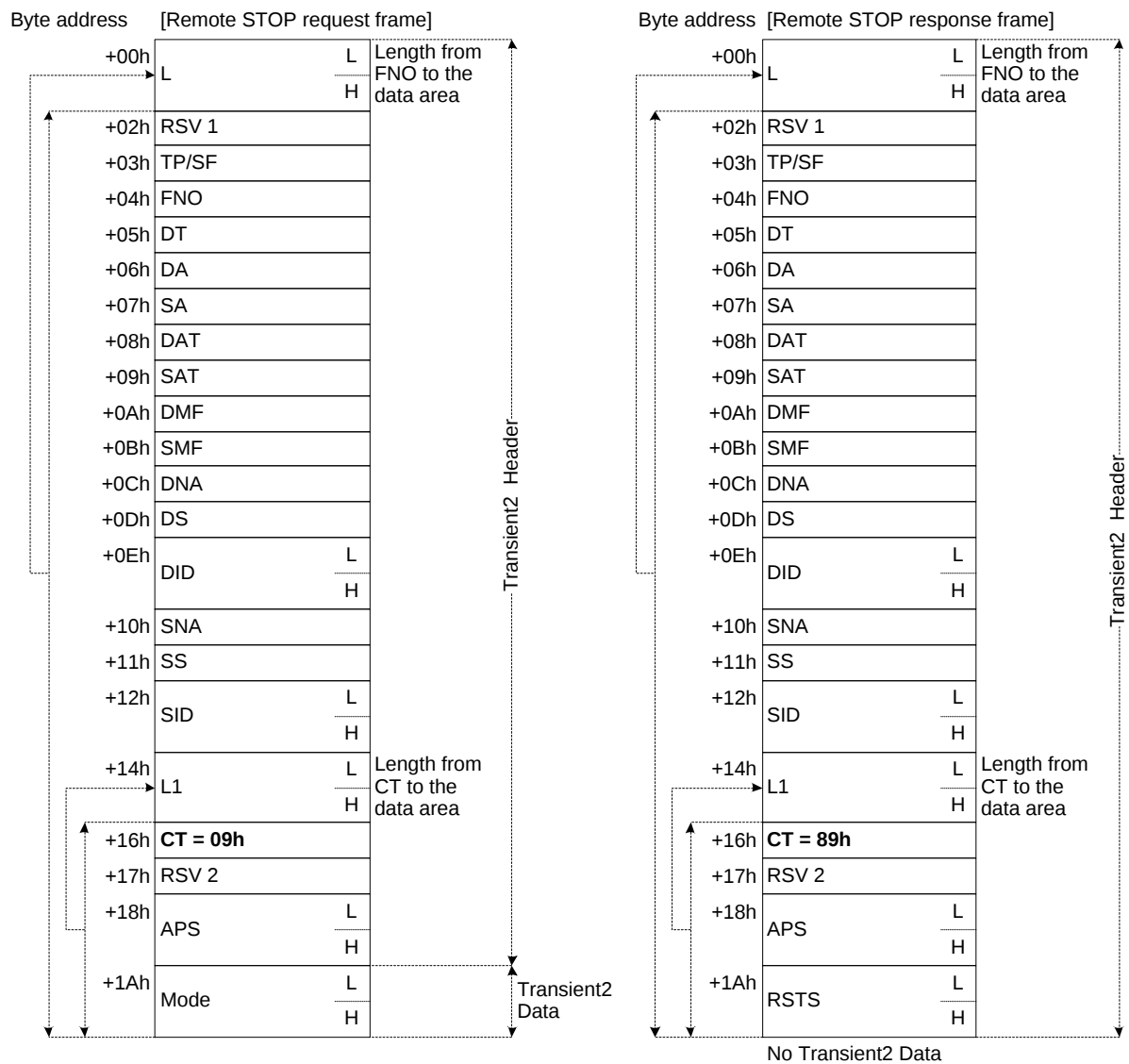


Figure A3.1.3-1 Overview of Remote STOP Frame Format

The following table describes the details of items defined in the remote STOP frame format.

Table A3.1.3-1 Details of Remote STOP Frame Format

Byte address	Item	Description	Value
+1Ah - +1Bh	Mode	Set whether or not to forcibly set another station controller that is in a RUN state to a STOP state.	1: Forced STOP 3: Normal STOP

Appendix 3.1.4 Memory read

Executing the memory read command (CT=10h) allows you to retrieve data from devices of another station controller. The following shows the format of memory read frame.

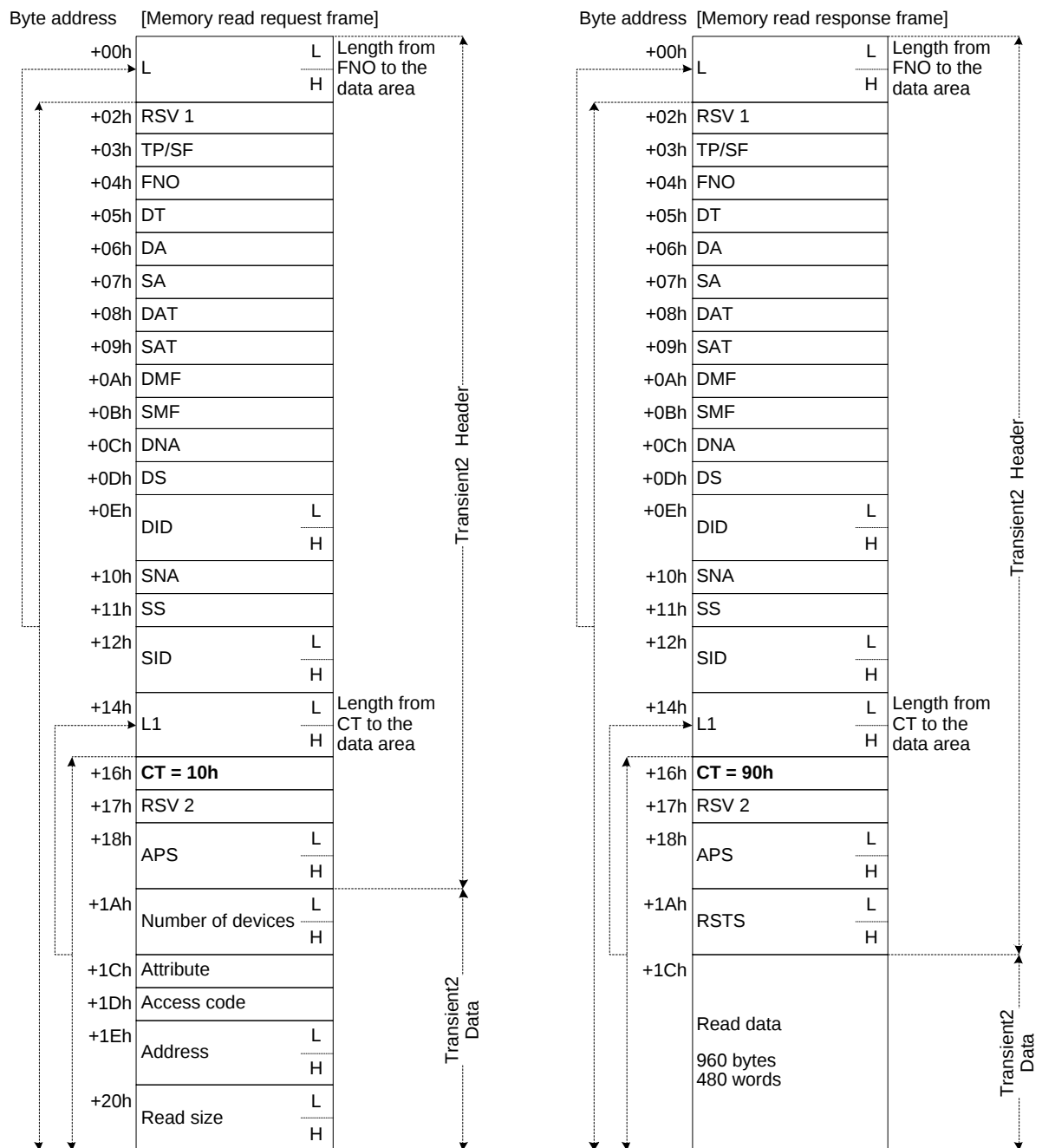


Figure A3.1.4-1 Overview of Memory Read Frame Format

The following table describes the details of items defined in the memory read frame format.

Table A3.1.4-1 Details of Memory Read Frame Format

Byte address	Item	Description	Value
+1Ah - +1Bh	Number of devices	Set the number of devices to be read.	Fixed to 0001h
+1Ch	Attribute	Set the attribute of the target device of the request destination.	*1
+1Dh	Access code	Set the access code of the target device of the request destination.	*1
+1Eh - +1Fh	Address	Set the start address of the device to be read. Set the address within the access range.*2	Any offset value
+20h - +21h	Read size	Set the size of the data to be read (in words).	1 to 480 words (1 to 960 bytes)

*1: For details, refer to Appendix 3.1.6 "Access codes and attributes".

*2: Specify the address of a bit device with 0 or multiples of 16, and specify the address of a byte device with 0 or multiples of 2.

Appendix 3.1.5 Memory write

Executing the memory write command (CT=12h) allows you to write data to devices of another station controller. The following shows the format of memory write frame.

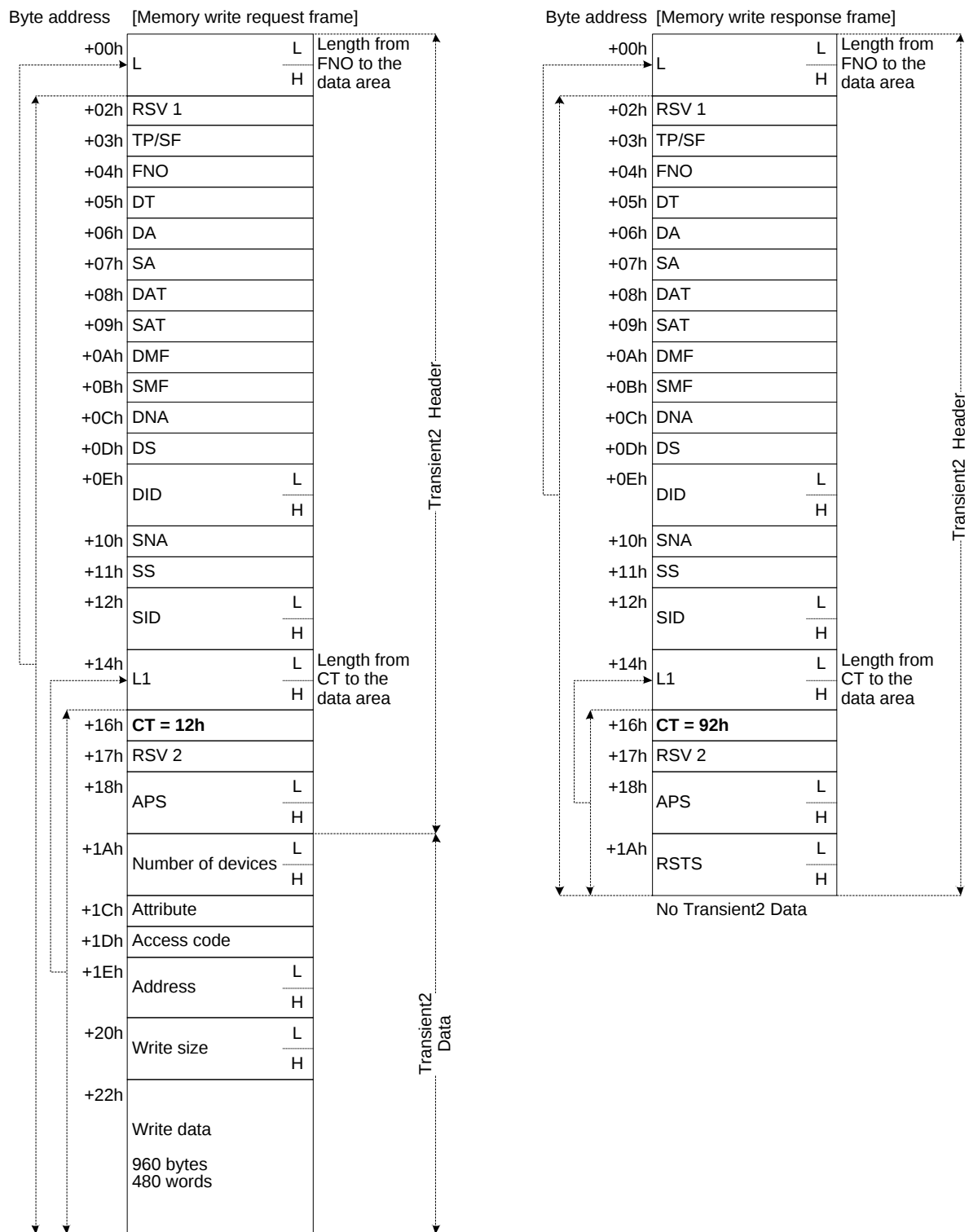


Figure A3.1.5-1 Overview of Memory Write Frame Format

The following table describes the details of items defined in the memory write frame format.

Table A3.1.5-1 Details of Memory Write Frame Format

Byte address	Item	Description	Value
+1Ah - +1Bh	Number of devices	Set the number of devices to be written.	Fixed to 0001h
+1Ch	Attribute	Set the attribute of the target device of the request destination.	*1
+1Dh	Access code	Set the access code of the target device of the request destination.	*1
+1Eh - +1Fh	Address	Set the start address of the device to be written. Set the address within the access range.*2	Any offset value
+20h - +21h	Write size	Set the size of the data to be written (in words).	1 to 480 words (1 to 960 bytes)
+22h - +3E2h	Write data	Set the data to be written.	Any value to be written

*1: For details, refer to Appendix 3.1.6 "Access codes and attributes".

*2: Specify the address of a bit device with 0 or multiples of 16, and specify the address of a byte device with 0 or multiples of 2.

Appendix 3.1.6 Access codes and attributes

The following shows the definitions of an access code and an attribute.

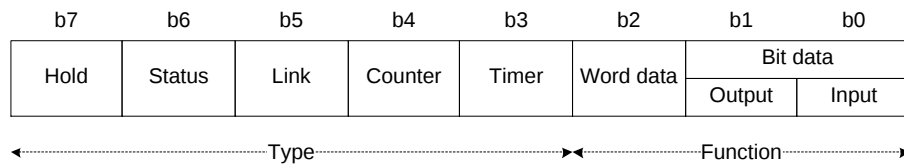


Figure A3.1.6-1 Access Code Definition

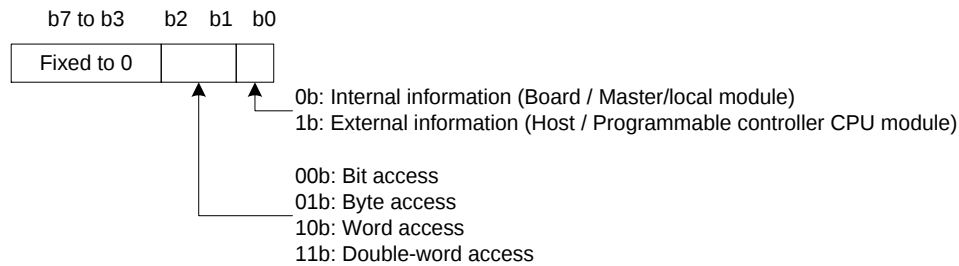


Figure A3.1.6-2 Attribute Definition

[When the own station is the server]

Set the access code and attribute of its own so that another station can access the own station by using the device read command and the device write command.

[When the own station is a client]

To access another station, which is a product manufactured by Mitsubishi Electric (MELSEC product), by using the device read command and the device write command, refer to the following table. Note that the device size (number of points) varies depending on the programmable controller used. For the device access range, refer to the user's manuals for the programmable controller used.

Table A3.1.6-1 MELSEC Product Access Code/Attribute List

Device	Symbol	Device type		Device radix	Access code*1	Attribute*1
		Bit	Word			
Input	X	○	-	Hexadecimal	01h	05h
Output	Y	○	-	Hexadecimal	02h	
Internal relay	M	○	-	Decimal	03h	
Latch relay	L	○	-	Decimal	83h	
Link relay	B	○	-	Hexadecimal	23h	
Timer (contact)	T	○	-	Decimal	09h	
Timer (coil)	T	○	-	Decimal	0Ah	
Timer (current value)	T	-	○	Decimal	0Ch	
Retentive timer (contact)	ST	○	-	Decimal	89h	
Retentive timer (coil)	ST	○	-	Decimal	8Ah	
Retentive timer (current value)	ST	-	○	Decimal	8Ch	
Counter (contact)	C	○	-	Decimal	11h	
Counter (coil)	C	○	-	Decimal	12h	
Counter (current value)	C	-	○	Decimal	14h	
Data register*2	D	-	○	Decimal	04h	
Link register*2	W	-	○	Hexadecimal	24h	
File register	R	-	○	Decimal	84h	
Link special relay	SB	○	-	Hexadecimal	63h	
Link special register	SW	-	○	Hexadecimal	64h	
Special relay	SM	○	-	Decimal	43h	
Special register	SD	-	○	Decimal	44h	

*1: If the target station is a station other than the master/local module, refer to the user's manual of the target station.

*2: The extended data register (D65536 and later) and the extended link register (W10000 and later) cannot be specified.

The following shows the basic format of a SLMP transient frame.

(1) Request frame

Byte address [SLMP transient request frame]

+00h	F	
+01h	RSV1	Fixed to 00h
+02h	RSV2	L H Fixed to 0000h
+04h	Fixed value 01	Fixed to FDh
+05h	RSV3	Fixed to 00h
+06h	Fixed value 02	Fixed to FFh
+07h	Fixed value 03	Fixed to FFh
+08h	Fixed value 04	Fixed to 00h
+09h	Fixed value 05	Fixed to 00h
+0Ah	Fixed value 06	Fixed to 23h
+0Bh	Fixed value 07	Fixed to 23h
+0Ch	Fixed value 08	Fixed to FFh
+0Dh	RSV4	Fixed to 00h
+0Eh	DNA	
+0Fh	Fixed value 09	Fixed to 7Eh
+10h	Fixed value 10	L H Fixed to 03FFh
+12h	Fixed value 11	Fixed to 00h
+13h	Fixed value 12	Fixed to 00h
+14h	Fixed value 13	L H Fixed to 03FFh
+16h	Fixed value 14	Fixed to 00h
+17h	RSV5 (9 bytes)	Fixed to 00h
	Continued ↗	

SLMP transient header area

Byte address	Continued ↘	
+00h	L H	
+02h	Fixed value 01	Fixed to 1Ch
+03h	Fixed value 02	Fixed to 00h
+04h	Fixed value 03	Fixed to 0Ah
+05h	Fixed value 04	Fixed to 08h
+06h	Fixed value 05	L H Fixed to 0000h
+08h	Fixed value 06	Fixed to 00h
+09h	Fixed value 07	Fixed to 00h
+0Ah	Fixed value 08	L H Fixed to 0000h
+0Ch	Fixed value 09	Fixed to 00h
+0Dh	Fixed value 10	Fixed to 00h
+0Eh	Fixed value 11	Fixed to 0Eh
+0Fh	Fixed value 12	Fixed to 20h
+10h	APS	L H
+12h	Fixed value 13	L H Fixed to 0000h
+14h	REQ FRAME L	L H
+00h	F TYPE	L H
+02h	SERIAL No.	L H
+04h	RSV 01	L H Fixed to 0000h
+06h	NETWORK No.	
+07h	STATION No	
+08h	UNIT I/O No	L H
+0Ah	RSV 02	Fixed to 00h
+0Bh	REQ DATA L	L H
+0Dh	TIMER	L H
+0Fh	COMMAND	L H
+11h	SUB COMMAND	L H
+13h	SLMP DATA	

SLMP request frame header

SLMP transient data area

SLMP request frame subheader

SLMP request frame data

Figure A3.2-1 Overview of SLMP Transient Frame Format (Request)

(2) Response frame (normal response)

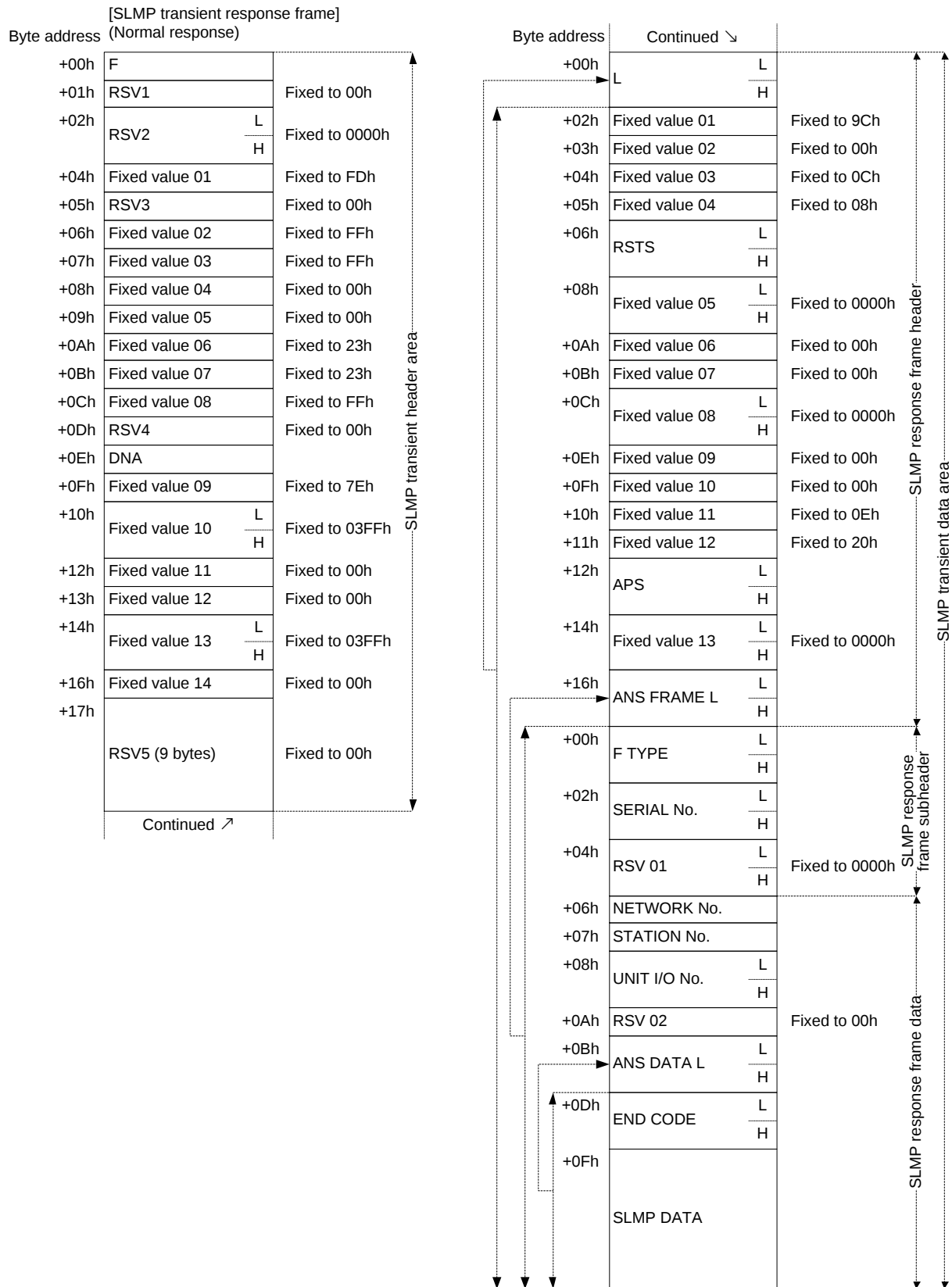


Figure A3.2-2 Overview of SLMP Transient Frame Format (Normal Response)

(3) Response frame (error response)

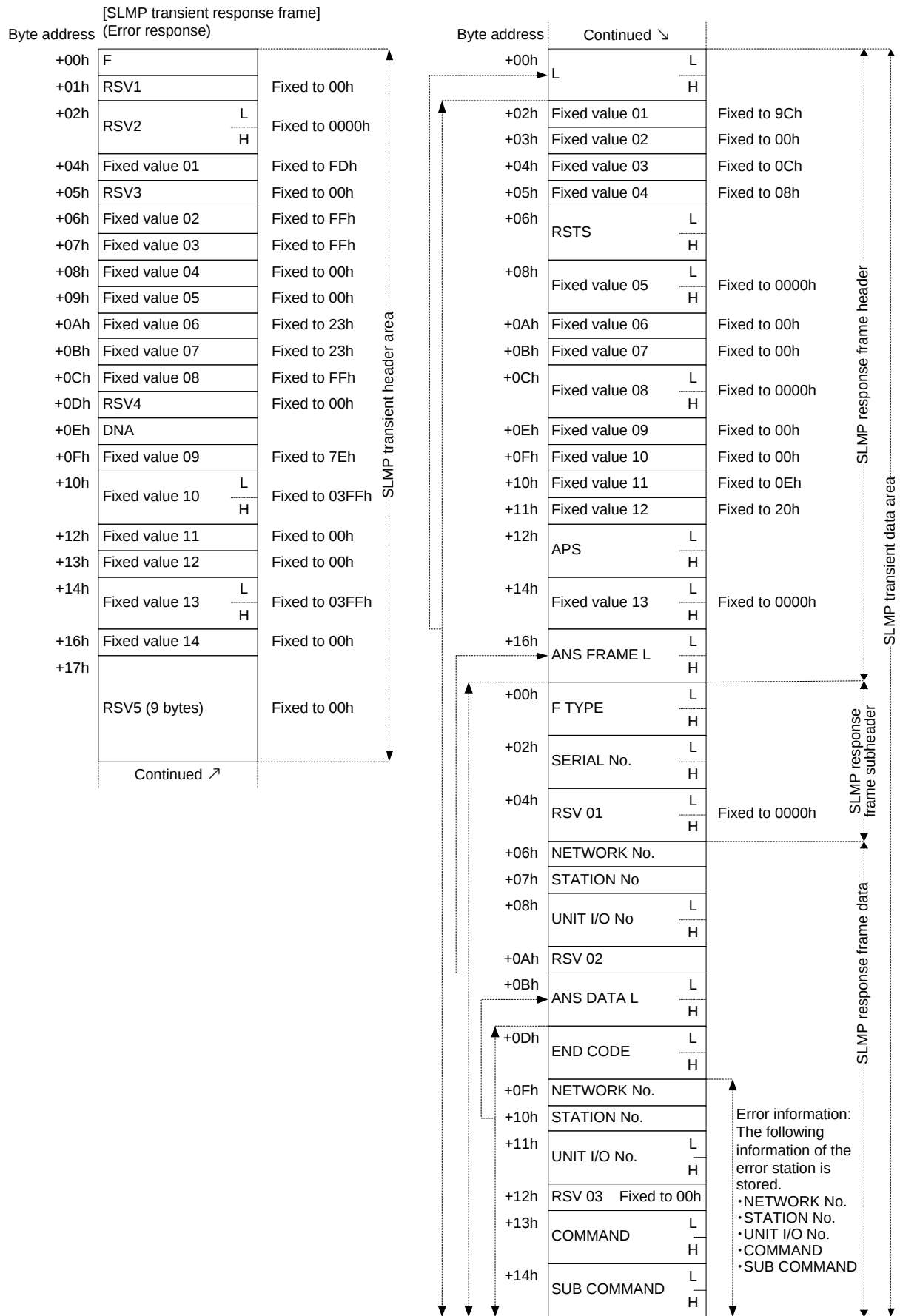


Figure A3.2-3 Overview of SLMP Transient Frame Format (Error Response)

The following table describes the details of each item defined in the SLMP transient header area.

Table A3.2-1 Details of SLMP Transient Header Area

Item	Description	Value	Remarks
F	SLMP transient control flag	00h to FFh	This flag indicates the status of data transfer when data is transferred between the driver and board. The flag is used for performing a handshake and transferring data between the driver and board. For details, refer to Section 4.6.5 "SLMP transient control flag procedure flag procedure".
DNA	Destination station network number	01h to EFh (1 to 239)	Set the network number of the destination station.

The following table describes the details of each item defined in the SLMP transient data area.

Table A3.2-2 SLMP Transient Data Area Details

Item	Description	Value	Remarks
L	Frame length	-	Set the data length after L of the SLMP transient data area in bytes.
RSTS	Return code	0000h: Normal end Other than 0000h: Error code	Response frame only. When receiving the response frame, the error code of an error detected in the request frame sent by the own station is stored.
APS	Application number	bit 15-4: Fixed to 00h bit 7-0: 00h to FFh	Set a number to identify the frame when the source station sends a request.
REQ FRAME L	Request frame length	-	Request frame only. Set the data length after SLMP request frame subheader in bytes.
ANS FRAME L	Response frame length	-	Response frame only. Set the data length after SLMP response frame subheader in bytes.
F TYPE	Frame type	0054h: Request 00D4h: Response	-
SERIAL No.	Serial number	0000h to FFFFh	Set a number to identify the frame. Set the same value for a request frame and the corresponding response frame.
NETWORK No.	Destination station network number	00h: Own station 01h to EFh (1 to 239): Other station	Set the network number of the destination station.
STATION No.	Destination station number	01h to 78h (1 to 120): Station number 7Dh: Specified control station /master station 7Eh: Current control station /master station FFh: Own station*1	Set the destination station number. *1: Effective only when the network No. is set to 00h.
UNIT I/O No.	Destination module I/O number	03FFh: Fixed	Set the access destination CPU module.
REQ DATA L	Request data length	-	Request frame only. Set the size, from TIMER to the end of the data area, in bytes.
ANS DATA L	Response data length	-	Response frame only. Set the size, from END CODE to the end of the data area, in bytes.
TIMER	Monitoring timer	0000h: Unlimited 0001h to FFFFh	Request frame only. Set the wait time (increments of 250 ms) for the client to receive a response from the server. Recommended values: Own station: 0001h to 0028h (0.25 to 10 s) Other stations: 0002h to 00F0h (0.5 to 60 s)
END CODE	End code	0000h: Normal end 0001h to FFFFh: Error code	Response frame only. When receiving the response frame, the error code of an error detected in the request frame sent by the own station is stored.
COMMAND	Command	-	Set the SLMP transient command. For details, refer to (4) Command types of SLMP transient in this section.
SUB COMMAND	Subcommand	-	Set the SLMP transient sub-command. For details, refer to (4) Command types of SLMP transient in this section.

(4) Command types of SLMP transient

In this document, the SLMP commands described in the "SLMP Specification (Overview)" use the frame format of the commands listed in the table below as an example.

To implement commands other than those described in this manual, refer to the "SLMP Specification (Overview)" and the "SLMP Reference Manual".

Table A3.2-3 Command Types of SLMP Transient

Item		Command	Subcommand	Description
Type	Operation			
Dual port memory	Batch read	0613h	0000h	Reads the buffer memory data of SLMP-compatible device.
	Batch write	1613h	0000h	Writes the data in the buffer memory of SLMP-compatible device.

Appendix 3.2.1 Dual port memory batch read

Executing the dual port memory batch read command allows you to read data from the buffer memory of a SLMP-compatible device.

The following shows the format of dual port memory batch read frame.

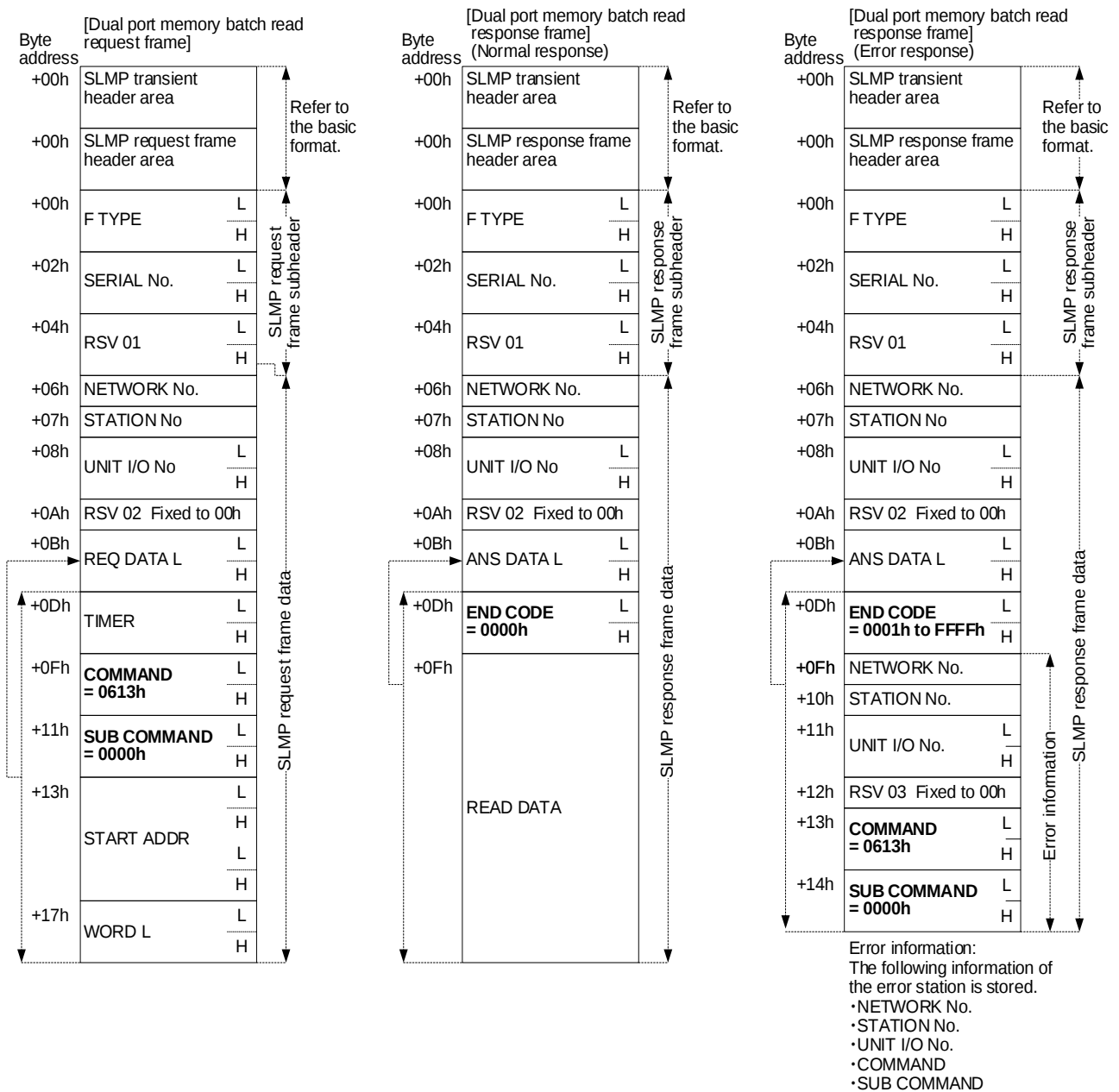


Figure A3.2.1-1 Overview of Dual Port Memory Batch Read Frame Format

The following table describes the details of items defined in the dual port memory batch read frame format.

Table A3.2.1-1 Details of Dual Port Memory Batch Read Frame Format

Byte address	Item	Description	Value	Remarks
+0Fh - +10h	COMMAND	Command	Fixed to 0613h	-
+11h - +12h	SUB COMMAND	Subcommand	Fixed to 0000h	-
+13h - +16h	START ADDR	Start address	-	Specify the start address of the buffer memory to be read.
+17h - +18h	WORD L	Word length	1h to 1E0h (1 to 480)	Specify the buffer memory size to be read (in words).

Appendix 3.2.2 Dual port memory batch write

Executing the dual port memory batch write command allows you to write data to the buffer memory of a SLMP-compatible device.

The following shows the format of dual port memory batch write frame.

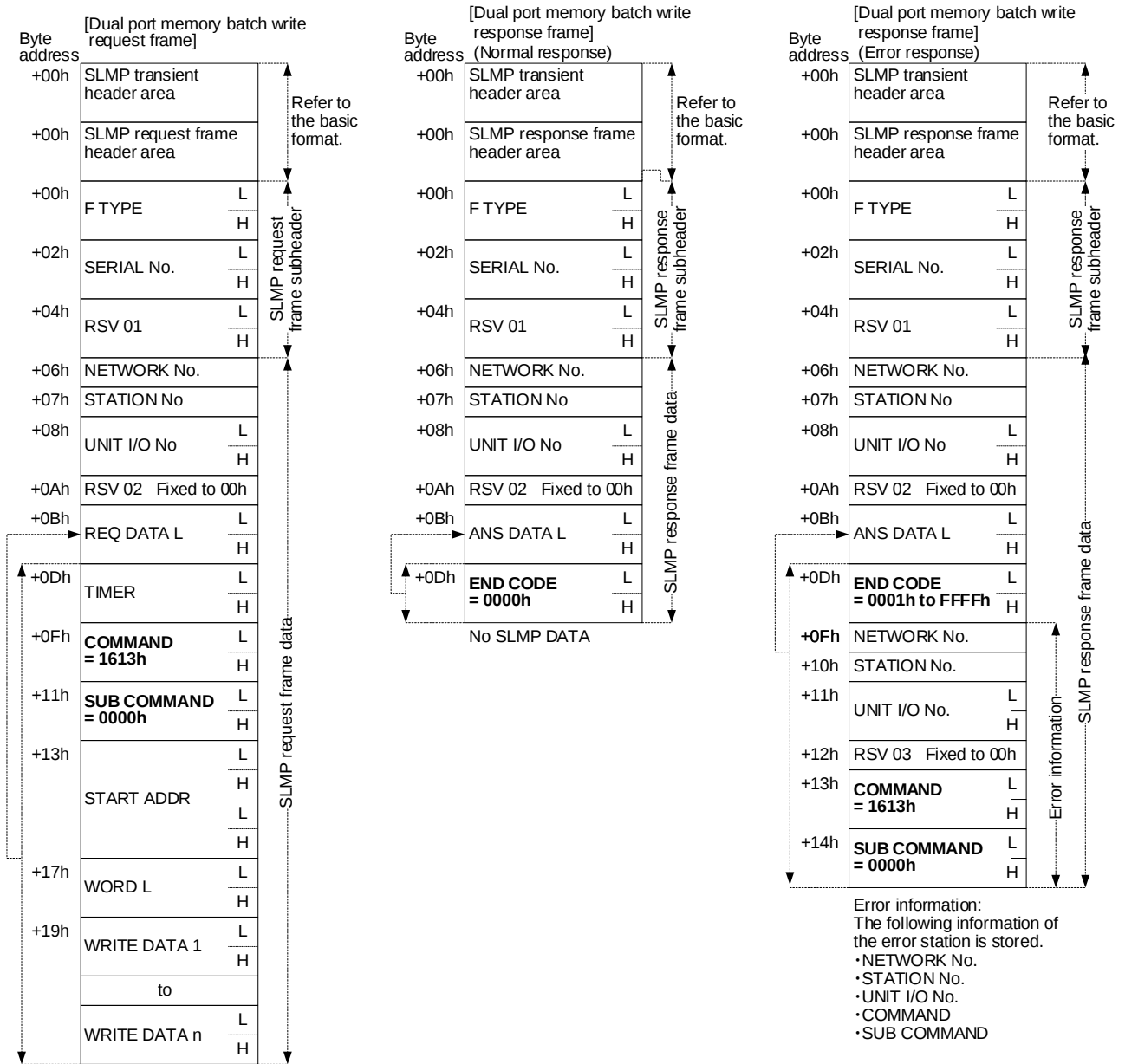


Figure A3.2.2-1 Overview of Dual Port Memory Batch Write Frame Format

The following table describes the details of items defined in the dual port memory batch write frame format.

Table A3.2.2-1 Details of Dual Port Memory Batch Write Frame Format

Byte address	Item	Description	Value	Remarks
+0Fh - +10h	COMMAND	Command	Fixed to 1613h	-
+11h - +12h	SUB COMMAND	Subcommand	Fixed to 0000h	-
+13h - +16h	START ADDR	Start address	-	Specify the start address of the buffer memory to be written.
+17h - +18h	WORD L	Word length	1h to 1E0h (1 to 480)	Specify the buffer memory size to be written (in words).

Revisions

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

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February 2015	SH(NA)-081155ENG-A	First Edition
May 2017	SH(NA)-081155ENG-B	Modified Chapter 1, Section 1.1, Section 1.2, Chapter 4, Section 4.1, Section 4.2, Section 4.2.1, Section 4.2.2, Section 4.3, Section 4.3.1, Section 4.3.2, Section 4.4, Section 4.4.1, Section 4.4.2, Section 4.4.3, Section 4.4.4, Section 4.4.5, Section 4.5, Section 4.5.1, Section 4.5.2, Section 4.5.3, Section 4.6, Section 4.6.1, Section 4.6.2, Section 4.6.3, Section 4.6.5, Section 4.6.6, Section 4.6.7, Section 4.6.8, Section 4.6.10, Section 4.6.11, Section 4.7, Section 4.7.1, Section 4.7.2, Section 5.1, Section 5.2, Section 5.3, Section 5.4, Section 5.4.1, Section 5.4.2, Section 5.4.3, Section 5.4.4 Change of chapter arrangement Chapter 2 is changed to Chapter 3. Chapter 3 is changed to Chapter 6. Section 4.6.4 and Section 4.6.9 are moved to Appendix 3. Added Section 1.3, Section 1.4, Chapter 2, Section 3.2.2 (5), Section 5.4.5, Section 5.4.6, Appendix 3
March 2021	SH(NA)-081155ENG-C	Modified Safety Precautions, Notice for Safety Design, Notes Regarding This Manual, Conditions of Use for the Product, Related Manuals, Terms, Generic Terms and Abbreviations, Usage Precautions, Radix Notation, CC-Link Partner Association (CLPA), Section 1.1, 2.1.1, 2.1.6, 2.2.3, 2.3.3, 2.4, 2.4.1, 2.5, 2.5.1, 2.5.2, 3.1.1, 3.2, 3.2.1 to 3.2.3, 3.3, 3.3.2, 3.3.3, 4.1, 4.2.1, 4.2.2, 4.3.4, 4.3.5, 4.5.1, 4.5.2, 4.6.2 to 4.6.6, 4.7.1, 4.7.2, 6.1, Appendix 1 to Appendix 3, WARRANTY, Trademarks Deleted Copyrights
September 2023	SH(NA)-081155ENG-D	Modified Safety Precautions, Conditions of Use for the Product, Usage Precautions

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 - [3] When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 - [4] Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
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 - [6] Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

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Ethernet Based Open Network
CC-Link IE Compatible Product Development Reference Manual

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MODEL	Q81BD-GF11-T2-DRV-E
MODEL CODE	13JV29
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