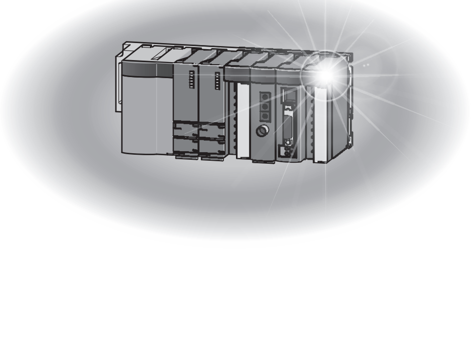
Programmable Controller

MELSEC Q series

MELSEC-Q C Controller Module User's Manual

-Q24DHCCPU-V
-Q24DHCCPU-VG
-Q24DHCCPU-LS
-Q26DHCCPU-LS
-Q12DCCPU-V(Extended mode)



●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.

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

[Design Precautions]

⚠WARNING

● Configure safety circuits external to the C Controller module to ensure that the entire system operates safely even when a fault occurs in the external power supply or the C Controller module. Failure to do so may result in an accident due to an incorrect output or malfunction.

(1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning.

(2) If the following status (a) or (b) occurs, the system will behave accordingly.

(a)When overcurrent or overvoltage protection of the power supply module is activated, the outputs (Y) from the user program and writing to the buffer memory are disabled, and all outputs are turned off.

(b)When the C Controller module detects an error such as a watchdog timer error by the selfdiagnostic function, the outputs (Y) from the user program and writing to the buffer memory are disabled. Whether to hold or turn off all outputs can be set by parameters.

All outputs may turn on when an error occurs in the part, such as I/O control part, where the C Controller module cannot detect any error.To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the C Controller module. For a fail-safe circuit example, refer to "Page 489, Appendix 11".

(3) Outputs may remain on or off due to a failure of an output module relay or transistor. Configure an external circuit for monitoring output signals that could cause a serious accident.

[Design Precautions]

⚠WARNING

- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the C Controller system is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Incorrect output or malfunction may result in an accident.
- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running C Controller module, configure up an interlock circuit in the user program to ensure that the whole system will always operate safely. Also before exercising other control (program change, operating status change (status control)) on the running C Controller module, read the manual carefully and fully confirm safety. Especially for the above control on the remote C Controller module from an external device, an immediate action may not be taken for C Controller module trouble due to a data communication fault. In addition to configuring up the interlock circuit in the user program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and CPU module.
- Do not write data into the write-protected area within the intelligent function module buffer memory. Further, do not output (ON) prohibited signals in the output signals from the CPU module to the intelligent function module. Writing data to the write-protected area or output of prohibited signals may cause malfunction of the C Controller system.
- For the write-protected area and prohibited signals, refer to the User's Manual for each intelligent function module.
- If the communication cable is disconnected, the line becomes unstable and any communication problem may occur in multiple stations of the network. Even if any network communication problem occurs in the multiple stations, configure up an interlock circuit in the user program to ensure safe operation of the system. Failure to do so may result in an accident due to an incorrect output or malfunction.
- In the refresh parameter settings, "Y" cannot be specified for link output (LY) refresh device and remote output (RY) refresh device. Therefore, the device prior to STOP remains in the event of CPU STOP.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.
- When a device such as a lamp, heater, or solenoid valve is controlled through an output module, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Take measures such as replacing the module with one having a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter setting, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- While registering various settings, do not power OFF the station with a module installed, and reset the CPU module. Powering off the station with a module installed and registering the CPU module during registration make the internal ROM setting data uncertain and re-setting and re-registration are required. Moreover, it will result in module fault and malfunction.
- When the CPU module or remote I/O module parameters are modified, be sure to reset the CPU module. Previous data remaining in the module may cause the module to fail or malfunction.

[Security Precautions]

⚠WARNING

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

[Installation Precautions]

⚠CAUTION

- Use the C Controller module in an environment that meets the general specifications in this manual. Failure to do so may result in an electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.Incorrect mounting may cause malfunction, failure or drop of the module.When using the module in an environment of frequent vibrations, fix the module with a screw.

  For any module with module fitting(s), place each module on the base unit first and then fix it with the module fitting(s).
- Tighten the screw within the specified torque range. Undertightening can cause drop of the screw, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When using an extension cable, connect it to the connector of the base unit or module securely. Check the connection for looseness. Poor contact may cause incorrect input or output.
- When using a SD memory card, fully insert it into the slot. Check that it is inserted completely. Poor contact may cause malfunction.
- When using a CompactFlash card, fully insert it into the CompactFlash card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may result in damage to the product. The system using a CPU module ready for the online module change, and the MELSECNET/H remote I/O station are exchangeable in the online state (while power is on). However, there are limited number of modules that are exchangeable in the online state (while power is on) and a replacement procedures is defined for each module. For details, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection) and the online module change section in the respective manual for each online exchangeable module.
- Do not directly touch any conductive part of the module. Doing so can cause malfunction or failure of the module.
- When using the Motion CPU module and the Motion module, be sure to check if the module combination is correct before powering up. Use of improper combination may result in damage to the product. For details, refer to the User's Manual for the module used.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply for the system in all phases before installation and wiring. Failure to do so may result in electric shock or damage to the product.
- After wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.

⚠CAUTION

- Ground the FG and LG terminals to the protective ground conductor dedicated to the C controller module. Failure to do so may result in electric shock or malfunction.
- Use compatible solderless terminals and tighten them to the specified torque. Use of lead-type solderless terminals may cause the terminal screws be loosened, leading to a failure.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Crimp, weld or properly solder the external connectors and co-axial cable connectors with tools specified by the manufacturer. Incomplete connections could result in short circuit, fire or malfunction.
- Do not install the control lines or the communication cables together with the main circuit lines or power cables.
  It should be at least 100 mm apart.Doing so may result in malfunction due to noise.
- Be sure to place in a duct or fix by clamps the power cords and cables connected to the module. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunctions due to poor contact.
- Tightening torque for the terminal screws should be in the specified range. Undertightening the terminal screws can cause short circuit, fire or malfunction. Overtightening can damage the terminal screw and/or module, resulting in drop, short circuit, or malfunction.

[Wiring Precautions]

⚠CAUTION

- Tightening torque for the connector mounting screws should be in the specified range. Undertightening the screws can cause short circuit, fire or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire or malfunction.
- Securely install connectors to the module. Improper installation can cause malfunction.
- When disconnecting a cable from the module, do not hold and pull the cable part.For a cable with connector, hold the connected connector by hand to disconnect the cable. For terminal block cables, loosen the terminal block terminal screws first. Pulling the cable while being connected to the module will result in malfunction or damage to the module or the cable.
- Check the type of interface to connect in advance in order to properly connect cables. Connection or wiring to wrong interface can cause a failure of the module and external device.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- To prevent foreign matters such as wire chips from entering into the module during wiring, a sealing label is attached to the top of the module. During wiring, do not remove this label. During system operation, be sure to remove this label to release the heat.
- Use the C Controller module as being installed in the control panel. Let the main power wiring through the relay terminal block to the PLC power supply unit installed in the control panel. Further, replacement and wiring of the power supply module must be performed by maintenance personnel fully trained for electric shock protection. For wiring procedures, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Doing so will cause the battery to produce heat, explode, or ignite, resulting in injury and fire.
- Shut off the external power supply for the system in all phases before cleaning the module or retightening the terminal screws or module fixing screws. Failure to do so may result in electric shock, module failure or malfunction. Undertightening the terminal screws can cause resulting in drop, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running C Controller module, configure up an interlock circuit in the user program to ensure that the whole system will always operate safely. Also before exercising other control (program change, operating status change (status control)) on the running C Controller module, read the manual carefully and fully confirm safety. Especially for the above control on the remote C Controller module from an external device, an immediate action may not be taken for C Controller module trouble due to a data communication fault. In addition to configuring up the interlock circuit in the user program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and CPU module.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm (9.85 inches) away in all directions from the C Controller module. Failure to do so may cause malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may cause the module to fail or malfunction. The system using a CPU module ready for the online module change, and the MELSECNET/H remote I/O station are exchangeable in the online state (while power is on). However, there are limited number of modules that are exchangeable in the online state (while power is on) and a replacement procedures is defined for each module. For details, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection) and the online module change section in the respective manual for each online exchangeable module.
- After the first use of the product, the number of connections/disconnections is limited to 50 times (in accordance with IEC 61131-2). Exceeding the limit may cause malfunction.
- After the first use of the SD memory card, the number of insertions/removals is limited to 500 times. Exceeding the limit may cause malfunction.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance inside the control panel must be performed by maintenance personnel fully trained for electric shock protection. Further, take measures to prevent any person other than maintenance personnel from operating the control panel, e.g. locking the control panel.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
- After first use of the product, do not install or remove the SD memory card more than 500 times. Exceeding the limit of 500 times may cause malfunction.

[Disposal Precautions]

⚠CAUTION

● When disposing of this product, treat it as industrial waste.
When disposing of batteries, separate them from other wastes according to the local regulations. (For details of battery regulations in the EU countries, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).)

[Transportation Precautions]

⚠CAUTION

● When transporting lithium batteries, follow the transportation regulations. (For details of subject models, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).)

●CONDITIONS OF USE FOR THE PRODUCT●

(1) Mitsubishi programmable controller ("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 of the PRODUCT trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

OPERATING PRECAUTIONS

(1) Precautions for the Wind River Systems product

The C Controller module has an embedded real-time operating system, VxWorks, made and sold by Wind River Systems, Inc. in the United States. We, Mitsubishi Electric, make no warranty for the Wind River Systems product and will not be liable for any problems and damages caused by the Wind River Systems product during use of the C Controller module.

For the problems or specifications of the Wind River Systems product, refer to the corresponding manual or consult Wind River Systems, Inc. Contact information is available on the following website.
www.windriver.com/

(2) Precautions for the partner operating system

Q24DHCCPU-LS and Q26DHCCPU-LS can be used by installing the operating system (partner operating system) provided by the partner (operating system vendor). We, Mitsubishi Electric, make no warranty for the partner (operating system vendor) product and will not be liable for any problems and damages caused by the partner (operating system vendor) product during use of Q24DHCCPU-LS and Q26DHCCPU-LS.

For the problems or specifications of the partner (operating system vendor) product, refer to the corresponding manual, or consult the partner (operating system vendor). Contact information is available on the following website.

- Lineo Solutions, Inc. www.lineo.co.jp/modules/english

(3) Precautions for the partner application

The application provided by the partner (application vendor) has been installed in Q24DHCCPU-VG. We, Mitsubishi Electric, make no warranty for the partner (application vendor) product and will not be liable for any problems and damages caused by the partner (application vendor) product during use of Q24DHCCPU-VG.

For the problems or specifications of the partner (application vendor) product, refer to the corresponding manual, or consult the partner (application vendor). Contact information is available on the following website.

- INTERNATIONAL LABORATORY CORPORATION www.ilc.co.jp

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC-Q series C Controller module.
The present document, "MELSEC-Q C Controller Module User's Manual" provides descriptions on functions, programming, maintenance and inspections, etc. required for use of the C Controller module.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the C Controller module to handle the product correctly.
When applying the program examples introduced in this manual to the actual system, ensure the applicability and confirm that it will not cause system control problems.

■Relevant CPU modules: Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS, and Q12DCCPU-V

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) C Controller system

For how to integrate the C Controller module compliant to the EMC and low voltage directives into customer' product while maintaining the compliance with the EMC and low voltage directives, refer to any of the manuals below:

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- For Your Safety (manual supplied with the CPU module or the base unit)

At that time, replace the terms as follows:

- "programmable controller CPU" → "C Controller module"
- "programmable controller system" → "C Controller system"

For Ethernet twisted pair cables, replace the following term in descriptions on cables in "QCPU Module with Integrated Ethernet Port" as follows:

- "10BASE-T/100BASE-TX connector" → "user Ethernet port or system Ethernet port"

The following shows measures particular to this product that are not stated in the above manuals.

(a) USB cable

Use a USB cable of 3m (9.84 feet) or less. Also, install the devices to connect within the control panel.

(b) PCI Express® expanded connectors

Position any device to connect to the PCI Express® expanded connectors within the control panel.
For details on PCI Express® expanded connectors, contact our local Mitsubishi representative or distributor.

(2) This product

This product complies with the EMC and low voltage directives. (The CE mark is printed on the rating plate of the module.)

CONTENTS

PART 1 OVERVIEW AND USAGE OF C CONTROLLER MODULE

PART 2 HARDWARE DESIGN, MAINTENANCE AND INSPECTION

CHAPTER 12 FUNCTIONS ACCESSED VIA ETHERNET PORTS 192

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PART 4 SOFTWARE DESIGN AND PROGRAMMING

PART 5 TROUBLESHOOTING

RELATED MANUALS

The following are the manuals relevant to this product. Refer to the following tables when ordering required manuals.

Point

- For specifications and functions related to the partner operating system embedded in Q24DHCCPU-LS and Q26DHCCPU-LS, refer to the manuals provided by the partner (operating system vendor), or consult the partner (operating system vendor).
- For specifications and functions related to the partner application installed in Q24DHCCPU-VG, refer to the manuals provided by the partner (application vendor), or consult the partner (application vendor).

Manual name <manual number (model code)>	Description
Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual <SH-081131ENG(13JU76)>	The manual describes the system configuration and operation method of Setting/monitoring tools for the C Controller module.
C Controller Module User's Manual (Hardware Design, Function Explanation) <SH-080766ENG(13JZ17)>	The manual describes the system configuration, specifications, functions, handling methods, wiring, and troubleshooting of Q12DCCPU-V (Basic mode) and Q06CCPU-V.
C Controller Module User's Manual (Utility Operation, Programming) <SH-080767ENG(13JZ18)>	The manual describes the installation/uninstallation, utility operation, instructions, and programming of SW3PVC-CCPU.
CW Workbench Operating Manual <SH-080982ENG(13JU71)>	The manual describes the system configuration, specifications, functions, and troubleshooting of CW Workbench.
CW-Sim Operating Manual <SH-081159ENG(13JU77)>	The manual describes the system configuration, specifications, functions, and troubleshooting of CW-Sim.
QCPU User's Manual (Hardware Design, Maintenance and Inspection) <SH-080483ENG(13JR73)>	The manual describes the specifications of the CPU module, the power supply module, the base unit, the extension cable, the memory card, etc.
QnUCPU User's Manual (Function Explanation, Program Fundamentals) <SH-080807ENG(13JZ27)>	The manual describes functions, programming procedures and devices required for creating programs of the universal model QCPU are described.
QCPU User's Manual (Multiple CPU System) <SH-080485ENG(13JR75)>	The manual describes overview, system configuration, I/O number,communication between CPU modules, and ommunication with I/O module/intelligent function module of multiple CPU system.
MELSEC-Q CC-Link IE Controller Network Reference Manual <SH-080668ENG(13JV16)>	The manual describes the system configurations, performance specifications, functions, handling instructions, wiring, and troubleshooting for the CC-Link IE Controller Network system.
Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network) <SH-080049(13JF92)>	The manual describes the PLC-to-PLC network specifications, preparatory procedures and settings, parameter etting, programming, and troubleshooting for the MELSECNET/H network system.
MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual <SH-080917ENG(13JZ47)>	The manual describes the system configurations, performance specifications, functions, handling instructions, wiring, and troubleshooting for the CC-Link IE Field Network system.
MELSEC-Q CC-Link System Master/Local Module User's Manual <SH-080394E(13JR64)>	The manual describes the system configurations, performance specifications, functions, handling instructions, wiring, and troubleshooting for the CC-Link modules.
MELSEC Communication Protocol Reference Manual <SH-080008(13JF89)>	The manual describes the specifications of MELSEC communication protocol (MC protocol), settings and procedures for the data communication function, and precautions.

Reference manuals for respective applications are listed below. Use this manual referring to the following materials.

(1) Overview and basic usage of C Controller system

Listed below are reference manuals for basic information of the C Controller system and specifications of modules to configure.

Purpose	Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
		Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
To learn overview and basic usage of C Controller system.	●	–	–	–	–	–	–	–
To learn specifications of the C Controller module.	●	–	–	–	–	–	–	–
To learn specifications of the power supply module, base unit and battery.	●	●	–	–	–	–	–	–
To learn specifications of the I/O module and intelligent function module, etc.	●	–	–	–	–	–	–	●
To learn types and versions of compatible software package.	●	–	–	–	–	–	–	–

(2) Hardware design, maintenance and inspection

Listed below are reference manuals for system configuration, installation and wiring procedures, and maintenance and inspections of the C Controller system.

Purpose		Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
			Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
System configuration	To learn the basic configuration (single CPU system configuration).	●	–	–	–	–	–	–	–
	To learn about the power supply module and base unit.	●	●	–	–	–	–	–	–
	To learn about the I/O module and intelligent function module, etc.	●	–	–	–	–	–	–	●
Multiple CPU system configuration	To learn about basic concepts.	●	–	●	–	–	–	–	–
	To learn about the situation where the C Controller module is No.1.	●	–	–	–	–	–	–	–
	To learn about the situation where the CPU modules other than this product are No.1.	–	–	●	–	–	–	–	●

Purpose		Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
			Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
Installation and wiring procedures	To learn the installation environment and installation position.	–	●	–	–	–	–	–	–
	To learn about the C Controller module.	●	–	–	–	–	–	–	–
	To learn about modules other than the C Controller module.	–	●	–	–	–	–	–	●
To learn the maintenance and inspection procedures for the C Controller module.		●	●	–	–	–	–	–	–

(3) Function

Listed below are reference manuals for functions of the C Controller module.

Purpose	Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
		Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
To learn functions of the C Controller module.	●	–	–	–	–	–	–	–
To learn about access via the network.	●	–	–	–	–	–	–	●
To learn functions and operation procedures of Setting/monitoring tools for the C Controller module.	–	–	–	–	–	●	–	–
To learn functions and operation procedures of CW Workbench.	–	–	–	–	–	–	●	–

(4) Software design and programming

Listed below are reference manuals for software design and programming procedures of the C Controller module.

Purpose	Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
		Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
To learn items common to the Q series programmable controller CPU.	–	–	–	●	–	–	–	–
To learn about operation processing and memory of the C Controller module.	●	–	–	–	–	–	–	–
To learn the parameters.	●	–	–	–	–	●	–	–

Purpose	Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
		Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
To learn the user programs.	●	–	–	–	–	–	●	–
To learn about the dedicated function library.	●	–	–	–	●	–	–	–

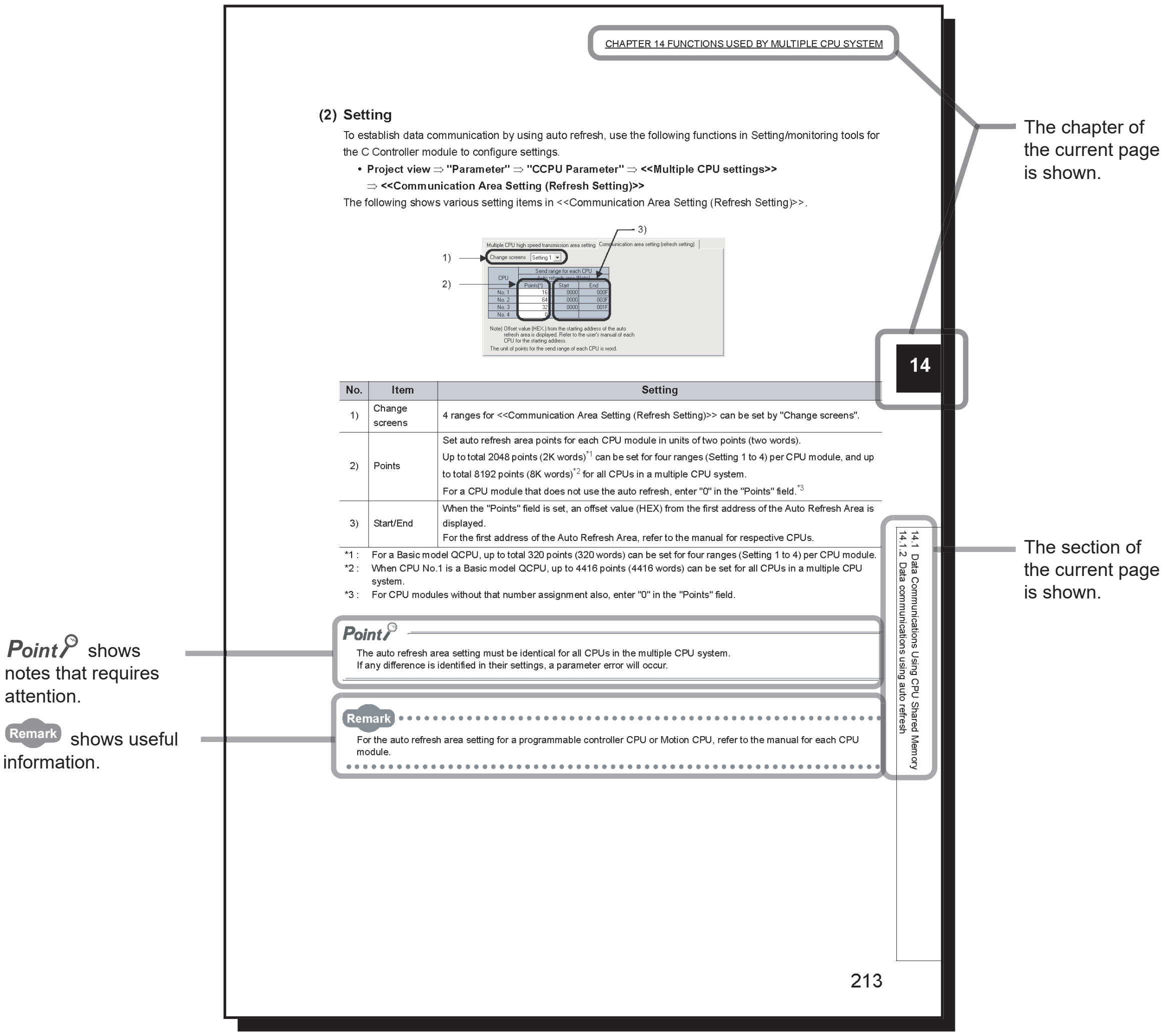
(5) Troubleshooting

Listed below are reference manuals for troubleshooting procedures of the C Controller module.

Purpose	Present manual	QCPU User's Manual		QnUCPU User's Manual	Setting/Monitoring Tools for the C Controller Module Operating Manual		CW Workbench Operating Manual	Manual for each module to use
		Hardware Design, Maintenance and Inspection	Multiple CPU System	Function Explanation, Program Fundamentals	Function Help	Operating Manual		
To learn about the C Controller module.	●	–	–	–	–	–	–	–
To learn about modules other than the C Controller module.	–	–	–	–	–	–	–	●
To learn the user programs.	●	–	–	–	–	–	●	–
To learn error codes of the dedicated function library.	●	–	–	–	●	–	–	–

MANUAL PAGE ORGANIZATION

In this manual, pages are organized and the symbols are used as shown below.
The following page illustration is for explanation purpose only, and the content is different from the actual page.



The chapter of the current page is shown.
The section of the current page is shown.
Point shows notes that requires attention.
Remark shows useful information.

CHAPTER 14 FUNCTIONS USED BY MULTIPLE CPU SYSTEM

(2) Setting

To establish data communication by using auto refresh, use the following functions in Setting/monitoring tools for the C Controller module to configure settings.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> ⇒ <<Communication Area Setting (Refresh Setting)>>**

The following shows various setting items in <<Communication Area Setting (Refresh Setting)>>.

Multiple CPU high speed transmission area setting
Communication area setting (refresh setting)
Change screens
Setting 1
1)
2)
3)

CPU	Points(*)	Start	End
No. 1	16	0000	000F
No. 2	64	0000	003F
No. 3	32	0000	001F
No. 4	0		

Note) Offset value (HEX.) from the starting address of the auto refresh area is displayed. Refer to the user's manual of each CPU for the starting address.
The unit of points for the send range of each CPU is word.

No.	Item	Setting
1)	Change screens	4 ranges for <<Communication Area Setting (Refresh Setting)>> can be set by "Change screens".
2)	Points	Set auto refresh area points for each CPU module in units of two points (two words). Up to total 2048 points (2K words)*1 can be set for four ranges (Setting 1 to 4) per CPU module, and up to total 8192 points (8K words)*2 for all CPUs in a multiple CPU system. For a CPU module that does not use the auto refresh, enter "0" in the "Points" field.*3
3)	Start/End	When the "Points" field is set, an offset value (HEX) from the first address of the Auto Refresh Area is displayed. For the first address of the Auto Refresh Area, refer to the manual for respective CPUs.

*1 : For a Basic model QCPU, up to total 320 points (320 words) can be set for four ranges (Setting 1 to 4) per CPU module.
*2 : When CPU No.1 is a Basic model QCPU, up to 4416 points (4416 words) can be set for all CPUs in a multiple CPU system.
*3 : For CPU modules without that number assignment also, enter "0" in the "Points" field.

Point

The auto refresh area setting must be identical for all CPUs in the multiple CPU system.
If any difference is identified in their settings, a parameter error will occur.

Remark

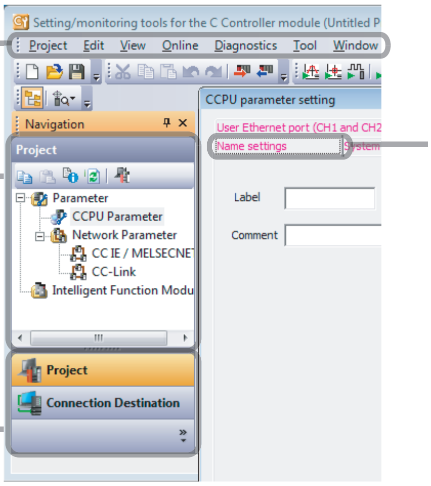
For the auto refresh area setting for a programmable controller CPU or Motion CPU, refer to the manual for each CPU module.

14
14.1 Data Communications Using CPU Shared Memory
14.1.2 Data communications using auto refresh
213

In this manual, operations of Setting/monitoring tools for the C Controller module are indicated with the following symbols.

Symbol	Description	Example
[ ]	Menu name on a menu bar	[Diagnostics]
" "	Screen name, item name on a screen or button name	"parameter"
<< >>	Tab name on a screen	<<Multiple CPU settings>>
▭	Keyboard key	F5
☞	Reference page	☞ Page 24
📖	Reference manual	📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

The following shows an operation sample of Setting/monitoring tools for the C Controller module.


Setting/monitoring tools for the C Controller module (Untitled P
Project Edit View Online Diagnostics Tool Window
CCPU parameter setting
User Ethernet port (CH1 and CH2
Name settings
System
Navigation
Project
Parameter
CCPU Parameter
Network Parameter
CC IE / MELSECNET
CC-Link
Intelligent Function Modu
Label
Comment
Project
Connection Destination

Menu bar

[Example]

·**[Diagnostics] ⇒ [CCPU diagnostics]**

From [Diagnostics] in the menu bar select [CCPU diagnostics].

Window selected in the view selection area is shown.

[Example]

·**Project view ⇒ "Parameter" ⇒ "CCPU parameter" ⇒ <<Name settings>>**

Select the project view in the view selection area. Then open "Parameter" in the project view and select "CCPU parameter" Select the <<Name settings>> tab in the screen that appears.

View selection area

Tab name

Remark

For details of operations of Setting/monitoring tools for the C Controller module, refer to the following.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

The following table explains the C Controller module icons that indicate the function availability.

Icon	Description
Model ○	This icon indicates that the corresponding module model is available.
Model △	This icon indicates that the corresponding module model is available with restrictions.
Model ×	This icon indicates that the corresponding module model is not available.
For "-LS", consult with the partner (operating system vendor).	This icon indicates that the availability of the corresponding module model is different depending on the specifications of the partner operating system. For the function, specification, and operation method of the module, consult the partner (operating system vendor). ☞ Page 10, (2)

TERMS

This manual uses the following terms unless otherwise specified.

□represents a variable part for a collective term for more than one model name and version, etc.

[Example]: Q33B, Q35B, Q38B, Q312B ⇒ Q3□B

(1) Terms related to C Controller module.

Term	Description
C Controller module	Generic term for Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS and Q12DCCPU-V In principle, 'C Controller module' indicates Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS and Q12DCCPU-V. When the classification is needed for such as comparison with other C Controller modules, 'Q24DHCCPU-V', 'Q24DHCCPU-LS', 'Q24DHCCPU-VG', 'Q26DHCCPU-LS', and 'Q12DCCPU-V' is mentioned.
Q24DHCCPU-V	Abbreviation for the Q24DHCCPU-V C Controller module
Q24DHCCPU-VG	Abbreviation for the Q24DHCCPU-VG C Controller module
Q24DHCCPU-LS	Abbreviation for the Q24DHCCPU-LS C Controller module
Q26DHCCPU-LS	Abbreviation for the Q26DHCCPU-LS C Controller module
Q12DCCPU-V	Abbreviation for the Q12DCCPU-V C Controller module In principle, 'Q12DCCPU-V' indicates Q12DCCPU-V (Extended mode). When the classification is needed for such as comparison with other modes, 'Q12DCCPU-V (Basic mode)' and 'Q12DCCPU-V (Extended mode)' are mentioned.
Q12DCCPU-V (Basic mode)	Status that Q12DCCPU-V is initialized with the basic mode
Q12DCCPU-V (Extended mode)	Status that Q12DCCPU-V is initialized with the extended mode
C Controller system	Generic term for the system where the C Controller module is mounted
Setting/monitoring tools for the C Controller module	Collective term for Setting/monitoring tools for the C Controller module (SW 4 PVC-CCPU)
VxWorks	Product name of the real-time operating system manufactured by Wind River Systems, Inc which is included in GENWARE3-VG
Partner OS	An operating system embedded in a user CPU of Q24DHCCPU-LS and Q26DHCCPU-LS that is provided by the partner (operating system vendor)
Partner application	A partner (application vendor)-provided-application that is installed in Q24DHCCPU-VG
CW Workbench	Collective term for the engineering tools for C Controller module listed below • Q24DHCCPU-V and Q24DHCCPU-VG SW1DND-CWWLQ24-E, SW1DND-CWWLQ24-EZ, SW1DND-CWWLQ24-EVZ • Q12DCCPU-V SW1DND-CWWLQ12-E, SW1DND-CWWLQ12-EZ, SW1DND-CWWLQ12-EVZ
Wind River Workbench	Abbreviation for Workbench manufactured by Wind River Systems, Inc.
GENWARE3-VG	Abbreviation for the "GENWARE3 for Q24DHCCPU-VG", the integrated development environment for embedded GUI systems manufactured by International Laboratory Corporation, which is the partner application
GENIFA3-VG	Abbreviation for the "GENIFA3 for Q24DHCCPU-VG", the graphics middleware operated on C Controller module, which is included in GENWARE3-VG
CI SKETCH-E	Abbreviation for the GUI editor included in GENWARE3-VG
Dedicated function library	Collective term for bus interface functions, MELSEC data link functions and C Controller module dedicated function
Battery	Generic term for the Q6BAT and Q7BAT batteries for CPU modules

Term	Description
User CPU	Name of a CPU that executes user program in the internal configurations of Q24DHCCPU-V and Q24DHCCPU-VG
	Name of a CPU that executes partner operating system and user program in the internal configurations of Q24DHCCPU-LS and Q26DHCCPU-LS
System CPU	Name of a CPU that executes MELSEC system program in the internal configurations of Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, and Q26DHCCPU-LS
MELSEC I/F	An interface which sends/receives data between a user CPU and a system CPU

(2) Terms related to modules other than the C Controller module

Term	Description
Single CPU system	Control system where a C Controller module is mounted in the CPU slot
Multiple CPU system	Control system where multiple CPU modules are mounted on a main base unit
Q series	Abbreviation for the Mitsubishi Electric programmable controllers, MELSEC-Q series
AnS series	Abbreviation for the Mitsubishi Electric programmable controllers, MELSEC-AnS series, which are the downsized series of the MELSEC-A series
Base unit	Generic term for the main base unit and extension base unit.
Power supply module	Collective term for Q series power supply modules: Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q62P, Q63P, Q64P, Q64PN, Q63RP, Q64RP, and Q64RPN type power supply modules.
CPU module	Generic term for the C Controller module, QCPU, and Motion CPU
QCPU	Generic term for the Basic model QCPU, High Performance model QCPU, Process CPU, and Universal model QCPU
Basic model QCPU	Generic term for the Q00CPU and Q01CPU
High Performance model QCPU	Generic term for the Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU
Process CPU	Generic term for the Q02PHCPU, Q06PHCPU, Q12PHCPU, and Q25PHCPU
Universal model QCPU	Generic term for the Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, and Q26UDVCPU
LCPU	Generic term for the L02SCPU, L02CPU, L02CPU-P, L06CPU, L26CPU, L26CPU-BT, and L26CPU-PBT
QnACPU	Generic term for the Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, and Q4ARCPU
ACPU	Generic term for the A1NCPU, A0J2HCPU, A1SCPU, A1SHCPU, A1SJCPU, A1SJHCPU, A2CCPU, A2CJCPU, A2NCPU, A2NCPU-S1, A2SCPU, A2SHCPU, A2ACPU, A2ACPU-S1, A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3NCPU, A3ACPU, A3UCPU, and A4UCPU
Motion CPU	Collective term for Mitsubishi Electric Motion Controllers: Q172DCPU, Q173DCPU, Q172DCPU-S1, Q173DCPU-S1, Q172DSCPU, and Q173DSCPU.
I/O module	Collective term for MELSEC-Q series and AnS series I/O modules.
Intelligent function module	Collective term for MELSEC-Q series and AnS series I/O modules with functions other than I/O function such as A/D and D/A conversion modules.
GX Works2	Product name for the MELSEC programmable controller software package
Control CPU	CPU module that controls I/O modules and intelligent function modules mounted on the main base unit and extension base units.
Controlled module	I/O module and intelligent function module controlled by a control CPU. Example: When CPU No. 2 controls a module mounted in Slot 3, the CPU No.2 is the control CPU of the module in the Slot 3, and the module in Slot 3 is the control module of the CPU No.2.

Term	Description
Non-controlled module	I/O module and intelligent function module other than controlled modules. Example: When CPU No. 2 controls a module mounted in Slot 3, the module in the Slot 3 is the non-controlled module of CPU No.1 and 3.

(3) Terms related to peripherals and network access

Term	Description
SD memory card	Memory card compliant with the SD standards formulated by the SD Association.
CompactFlash card (CF card)	A storage card regulated by the "CF+ and CompactFlash Specification" issued by the CompactFlash Association.
GOT	Abbreviation for the Mitsubishi Electric Graphic Operation Terminal
Target device	Personal computer, GOT, and other CPU modules, etc. connected to the CPU module for data communication.
Network module	Generic term for the CC-Link IE Controller Network module, MELSECNET/H module, CC-Link IE Field Network module and CC-Link module.
CC-Link IE Controller Network module	Collective term for CC-Link IE Controller Network modules QJ71GP21-SX and QJ71GP21S-SX.
MELSECNET/H module	Collective term for MELSECNET/H network modules QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE, and QJ71BR11.
CC-Link IE Field Network master/local module	Collective term for the CC-Link IE Field Network master/local modules QJ71GF11-T2.
CC-Link module	Collective term for the CC-Link system master/local modules QJ61BT11N and QJ61BT11 and CC-Link/LT master module QJ61CL12.
MC protocol	Abbreviation for the MELSEC communication protocols. Name for a communication method to access the CPU module from a target device based on the replacement procedure of the Q series programmable controller CPU (serial communication and Ethernet modules).

PRODUCT ORGANIZATION

The following shows the C Controller-compatible software.

○: Applicable, ×: Not applicable

<table>
<tr><th rowspan="4">Supported software</th><th colspan="4">C Controller module</th></tr>
<tr><th>Q24DHCCPU-V
Q24DHCCPU-VG
Q24DHCCPU-LS
Q26DHCCPU-LS</th><th colspan="3">Q12DCCPU-V</th></tr>
<tr><th>-</th><th colspan="2">"15102" or later*1</th><th>Earlier than "15102"*1</th></tr>
<tr><th>-</th><th>Extended mode</th><th colspan="2">Basic mode*2</th></tr>
<tr><td>SW4PVC-CCPU</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW3PVC-CCPU</td><td>×</td><td>×</td><td>○</td><td>○</td></tr>
</table>

*1 : First five digits of serial number

*2 : For Q12DCCPU-V earlier than "15102", the mode cannot be changed. Q12DCCPU-V earlier than "15102" is regarded as the basic mode in this manual.

PACKING LIST

The following items are included in the package of this product. Before use, check that all the items are included.

Product Name	Quantity
Module	1
Battery (Q6BAT)	1
Before Using the Product (BCN-P5976)	1

DISCONTINUED MODELS

The following models are described in this manual, but have no longer been produced.
For the onerous repair term after discontinuation of production, refer to "WARRANTY".

Model	Production discontinuation
Q61P-A1	March 2009
Q61P-A2	March 2009
Q64P	February 2010
Q64RP	October 2015

Memo

PART 1 OVERVIEW AND USAGE OF C CONTROLLER MODULE

This section describes the specifications and basic usage of the C Controller module.

CHAPTER 1 WHAT CAN BE DONE WITH C CONTROLLER MODULE

This chapter describes the overview and features of the C Controller module.

1.1 C Controller Module

C Controller module is a CPU module that controls I/O device of the MELSEC-Q series and manages the modules with programs created in C or C++ language.

1.1.1 Q24DHCCPU-V

Q24DHCCPU-V is the C Controller module in which VxWorks is embedded in the operating system.
The various functions such as Ethernet, USB port driver, and the dedicated function library for communications are implemented as a standard.

1.1.2 Q24DHCCPU-VG

Q24DHCCPU-VG is the C Controller module which supports the display function with the analog RGB output connector and graphic driver to connect to a general-purpose display in addition to a great variety of Q24DHCCPU-V functions.

1.1.3 Q24DHCCPU-LS

Q24DHCCPU-LS is C Controller module which can be embedded the desired operating system. Install the operating system (partner operating system) provided by the partner (operating system vendor). The drivers and libraries are provided by the partner (operating system vendor) as well. The required functions can be customized.

1.1.4 Q26DHCCPU-LS

Q26DHCCPU-LS is a C Controller module, which extends memory capacity of Work RAM of Q24DHCCPU-LS and built-in SSD.
Depending on the extension of memory capacity, developing a vision system or database system, which requires maximum capacity, becomes easier.

1.1.5 Q12DCCPU-V (Extended mode)

By using the Q12DCCPU-V (Extended mode), the memory and the network modules which can be used are added, and the functions are expanded compared with Q12DCCPU-V (Basic mode)

For details of the Q12DCCPU-V (Basic mode), refer to the following manual.
📖 C Controller Module User's Manual (Hardware Design, Function Explanation)
For the procedure to startup Q12DCCPU-V (Extended mode), refer to the following.
☞ Page 60, Section 5.4

1.2 Features

(1) High-speed processing of large-volume, complicated operation

MELSEC-Q series devices can be controlled by more complex and high-speed processing than the existing programmable controller CPU.

A large-volume data can be handled, so that the system which has increased the data, can be processed smoothly.

(2) Reduction of programming cost

(a) Utilization of created C programs

Since the user programs can be created using the existing programs, the costs such as system configuration, educational expenses for engineers, and engineering costs can be reduced.

- The user programs created with C or C++ language can be used.
- The desired operating system can be selected.

(b) Data can be accessed easily using dedicated interface

Since the data such as memory or devices can be accessed by using dedicated libraries, drivers, or tools, the programming cost for communication or maintenance can be reduced.

- Devices and memory of the modules can be accessed easily by using the function provided by the library.
- The desired data can be refreshed by setting the condition with the tool, without creating a program.
- Settings, diagnostics, and monitoring can be performed by the tool.

(3) Increasing security, and accelerating a non-PC environment

Since C Controller module supports the wide variety of network device, the appropriate system can be configured depending on the scale or purpose of the system.

By separating the network between the device and upper server network, the lower devices are incorporated and the productivity can be improved by protecting the system with the external errors or unauthorized access.

The management cost can be reduced because the devices can be monitored from the remote site via network.

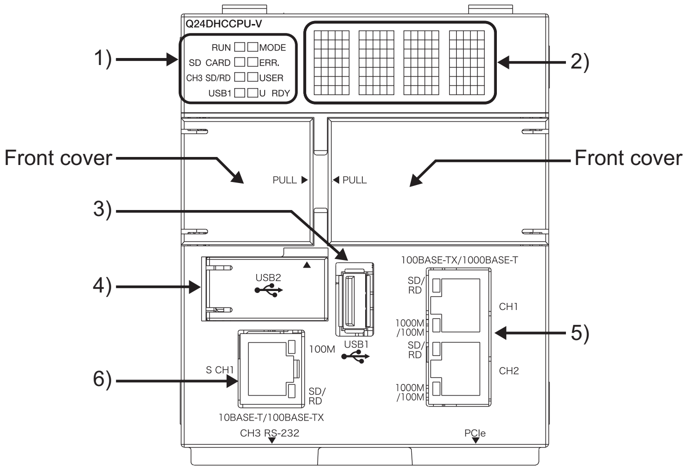
An error can be identified quickly without a personal computer because the status of the device can be diagnosed primarily with LED in front of the device or the general-purpose analog RGB display.

CHAPTER 2 PART NAMES

This chapter describes the name and application of each part of the C Controller module.

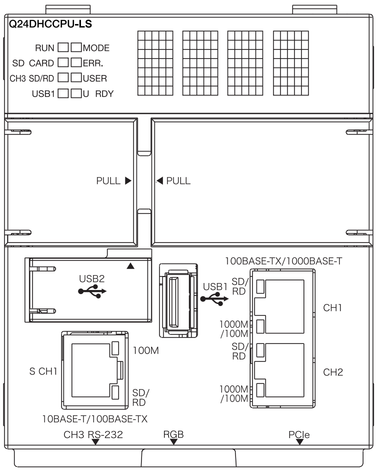
2.1 Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

<Q24DHCCPU-V>



[Front]

<Q24DHCCPU-VG>[*1]/<Q24DHCCPU-LS>/<Q26DHCCPU-LS>[*1]

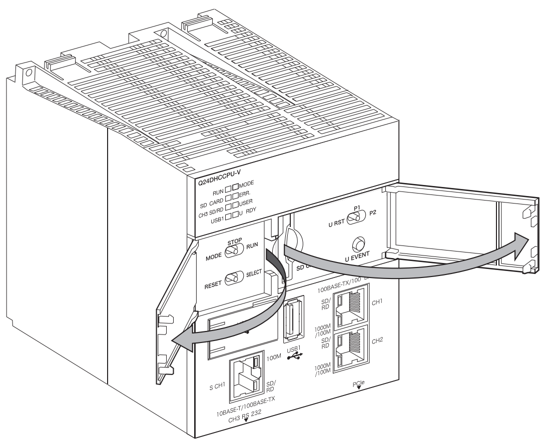


[Front]

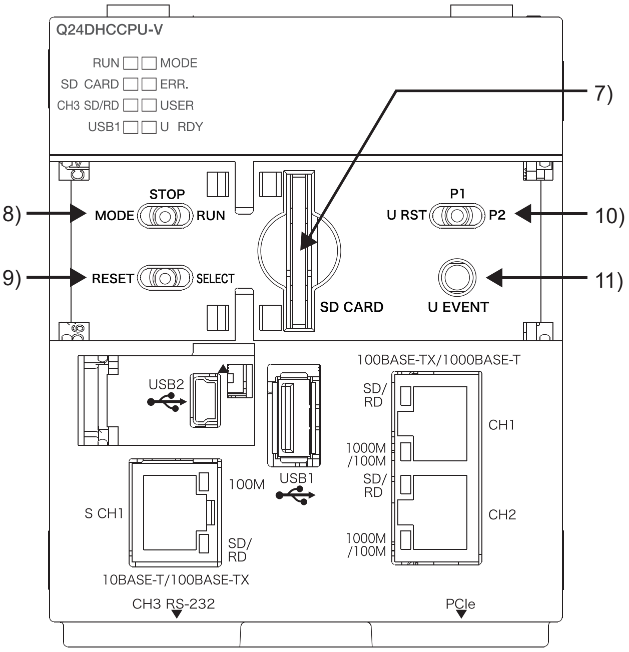
*1 : The outline drawing for Q24DHCCPU-LS is shown.

No.	Name			Description		
				Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS, Q26DHCCPU-LS
1)	Indicator LEDs			☞ Page 40, (1) in this section		
2)	Dot matrix LED			Displays settings and results at the time of initialization and hardware diagnostics. For the display during initialization, refer to the following. ☞ Page 63, Section 6.1.1 For the display during hardware diagnostics, refer to the following. ☞ Page 75, Section 6.5.1		
3)	USB connector (USB1)			USB connector used for connection with a USB device.		
4)	USB connector (USB2)			USB connector used for connection with Setting/monitoring tool for the C Controller module.		
5)	User Ethernet port			Ethernet port for connection with a user program development environment or a personal computer to use FTP or Telnet function.		
	CH1	SD/RD	On (green)	Physical Ethernet connection detected		
			Flash (green)	Data transmitting/receiving		
			Off	Physical Ethernet connection not detected		
		1000/ 100M	On (orange)	Connecting at 100Mbps (automatically determined based on the target device)		
			On (green)	Connecting at 1000Mbps (automatically determined based on the target device)		
			Off	Connecting at 10Mbps (automatically determined based on the target device)		
	CH2			The same as CH1.		
6)	System Ethernet port			Ethernet port used for connection with Setting/monitoring tool for the C Controller module.		
	S CH1	100M	On (green)	Connecting at 100Mbps (automatically determined based on the target device))		
			Off	Connecting at 10Mbps (automatically determined based on the target device)		
		SD/RD	On (green)	Physical Ethernet connection detected		
			Flash (green)	Data transmitting/receiving		
			Off	Physical Ethernet connection not detected		

Pull the section indicated by "PULL" on the front cover by finger and open the cover as shown in the figure below.



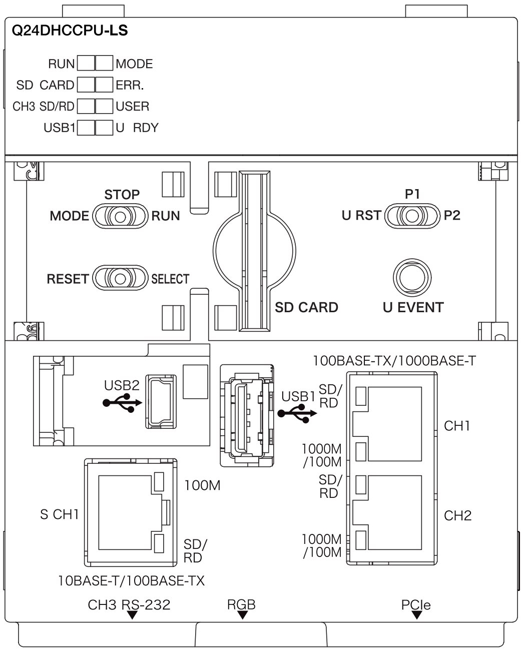
<Q24DHCCPU-V>



[Front cover opened]

Q24DHCCPU-V

<Q24DHCCPU-VG>*1/<Q24DHCCPU-LS>/
<Q26DHCCPU-LS>*1



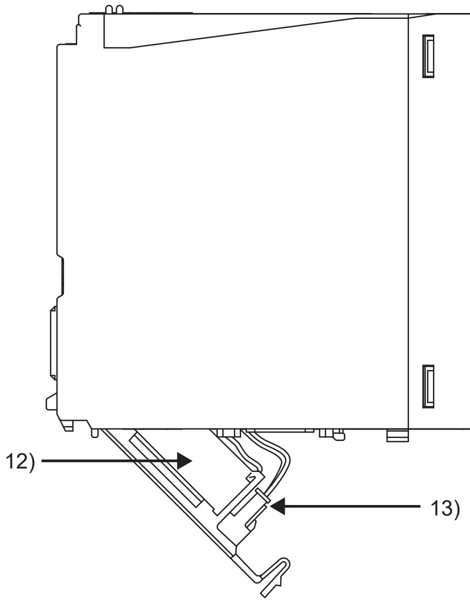
[Front cover opened]

Q24DHCCPU-LS

*1 : The outline drawing for Q24DHCCPU-LS is shown.

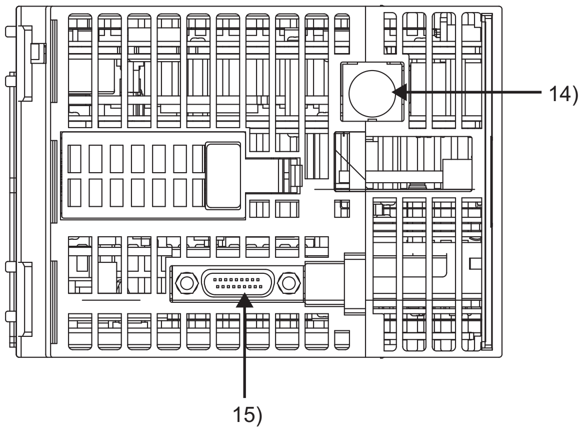
No.	Name	Description		
		Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS Q26DHCCPU-LS
7)	SD memory card slot	A slot into which an SD memory card is inserted on the C Controller module.		
8)	RUN/STOP/MODE switch[*1]	RUN: Sets the C Controller module operation status to RUN. STOP: Sets the C Controller module operation status to STOP. MODE: Used for initialization and hardware diagnostics. For usage during initialization, refer to the following. ☞ Page 63, Section 6.1.1 For usage during hardware diagnostics, refer to the following. ☞ Page 75, Section 6.5.1		
9)	RESET/SELECT switch[*1]	RESET: Resets the C Controller module. (☞ Page 71, Section 6.3) SELECT: Unmounts a Memory card. (☞ Page 120, Section 8.4) Pull down each switch for at least 1 second for resetting or unmounting. For usage during initialization, refer to the following. ☞ Page 63, Section 6.1.1 For usage during hardware diagnostics, refer to the following. ☞ Page 75, Section 6.5.1		
10)	U RST/P1/P2 switch[*1]	U RST: Reboots the user CPU. (☞ Page 73, Section 6.4) P1/P2: Issues an interrupt to the user program. • If P2 → P1, P1 switch interrupt is issued. • If P1 → P2, P2 switch interrupt is issued.		
		For processing in response to the switch interrupt, CCPU_WaitSwitchEvent function is used.		For the access method, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
11)	U EVENT switch[*1]	Issues an interrupt to the user program. Press the switch for at least 1 second.		
		For processing in response to the switch interrupt, CCPU_WaitSwitchEvent function is used.		For the access method, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).

[*1] : Operate the switches by hand. Using a tool such as a screwdriver can cause a failure.



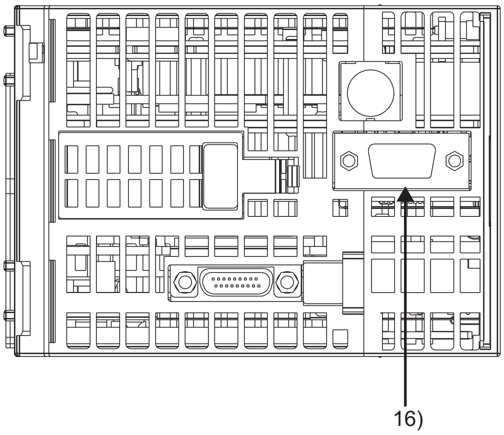
[Side]

<Q24DHCCPU-V>



[Bottom]

<Q24DHCCPU-VG>/<Q24DHCCPU-LS>/
<Q26DHCCPU-LS>

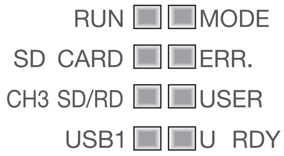


[Bottom]

No.	Name	Description		
		Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS Q26DHCCPU-LS
12)	Battery	Battery to retain the battery backup RAM and integral clock (RTC) data during power OFF.		
13)	Battery connector pin	For connection of the battery lead wires. (Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.)		
14)	RS-232 connector (CH3)	Connector used for connection with an RS-232 compatible device.		
		–		For the specification when connecting to the supported devices, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
15)	PCI Express® expanded connectors	PCI Express® interface for connection with a device with PCI Express® and PCI bus. For details, contact our local Mitsubishi representative or distributor.		
16)	Analog RGB output connector*2	–	Analog RGB output connector used for connection with a general-purpose analog RGB display.	For the specification when connecting to the supported devices, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).

*2 : Connect the display before powering ON.

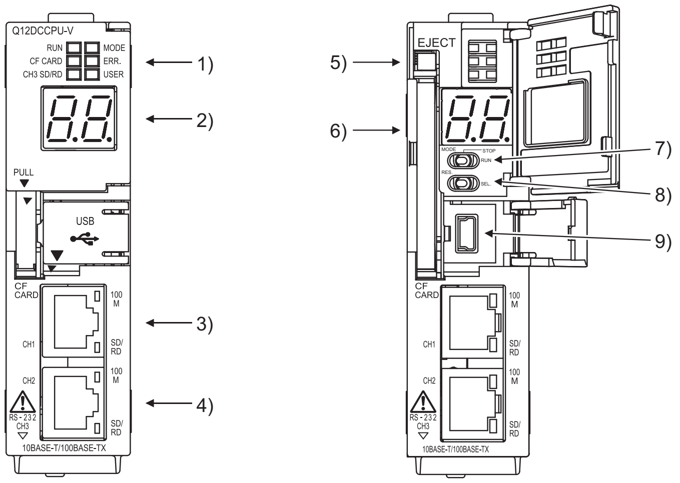
(1) Indicator LEDs



Name		Description		
		Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS Q26DHCCPU-LS
RUN		Displays the operation status		
	On	The C Controller module is in the RUN status.		
	Flash	Any of the following states: • Executing the script file "STARTUP.CMD" • Diagnosing hardware • Initializing modules		
	Off	The C Controller module is in the STOP/PAUSE status.		
MODE		Display the mode.		
	On (green)	Normal operation mode		
	Flash (green)	Initialization completion		
	On (orange)	Hardware diagnostics mode		
	Off	A hardware failure occurred or the C Controller module is in reset process.		
SD CARD		Displays mounting status of the SD memory card.		
	On	Mounting status		For the display contents, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
	Flash	During mounting or unmounting		
	Off	SD memory card not installed, or unmounted.		
ERR.		Displays error status. You may check the error detail by using Setting/monitoring tools for the C Controller module.		
	On	A continuation error occurred.		
	Flash	Stop error or hardware diagnostics error occurred.		
	Off	Normal		
CH3 SD/RD		Displays data transmission/reception status of the RS-232 connector (CH3).		
	On	Transmitting/receiving		
	Off	Not transmitting/receiving		
USER		LED indicator configurable by the user program.		
		Set the USER LED using the CCPU_SetLEDStatus function. For the display during initialization, refer to the following. ☞ Page 63, Section 6.1.1 For the display during hardware diagnostics, refer to the following. ☞ Page 75, Section 6.5.1		For the setting methods, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
USB1		Displays mounting status of the USB device.[*1]		
	On	Mounting status		For the display contents, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
	Flash	During mounting or unmounting		
	Off	USB device not installed, or unmounted.		
U RDY		Displays user CPU operation status.		
	On	Run		For the display contents, consult the partner (operating system vendor). For "-LS", consult with the partner (operating system vendor).
	Flash	Preparing (rebooting)		
	Off	Stopped		

*1 : The LED indication is not available when any USB device other than the one compliant with the USB Mass Storage Class standard is connected.

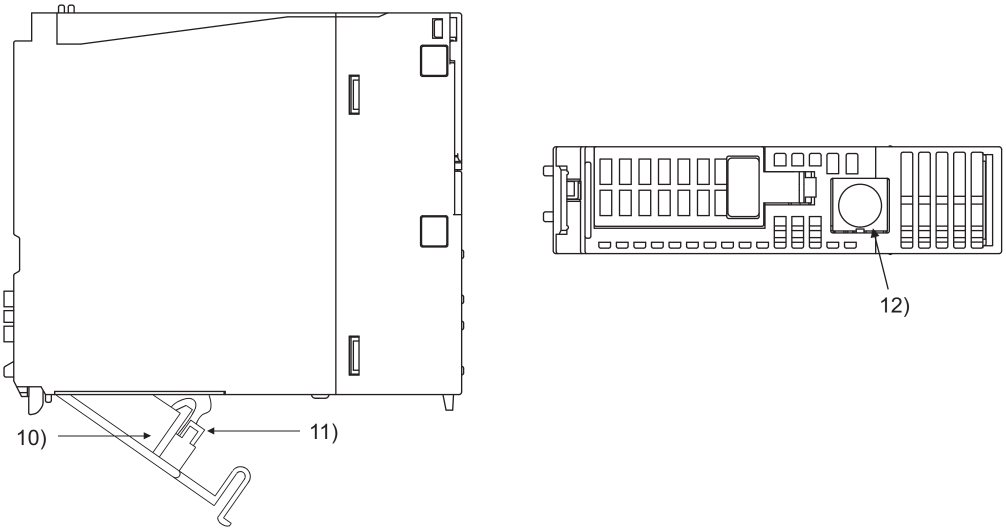
2.2 Q12DCCPU-V



[Front] [Front cover opened]

Q12DCCPU-V

No.	Name			Description
1)	Indicator LEDs			☞ Page 43, (1) in this section.
2)	7-segment LED			Displays settings and results at the time of initialization and hardware diagnostics. For the display during initialization, refer to the following. ☞ Page 67, Section 6.1.2 For the display during hardware diagnostics, refer to the following. ☞ Page 80, Section 6.5.2
3)	Built-in Ethernet port (CH1)	100M	On (green)	Connecting at 100Mbps (automatically determined based on the target device)
			Off	Connecting at 10Mbps (automatically determined based on the target device)
		SD/RD	On (green)	Physical Ethernet connection detected
			Flash (green)	Data transmitting/receiving
			Off	Physical Ethernet connection not detected
4)	Built-in Ethernet port (CH2)			The same as CH1.
5)	EJECT button			Used to eject a CompactFlash card from a C Controller module.
6)	CompactFlash card installation slot			Slot into which a CompactFlash card is installed.
7)	RUN/STOP/MODE switch			RUN: Sets the C Controller module operation status to RUN. STOP: Sets the C Controller module operation status to STOP. MODE: Used for initialization and hardware diagnostics. For usage during initialization, refer to the following. ☞ Page 67, Section 6.1.2 For usage during hardware diagnostics, refer to the following. ☞ Page 80, Section 6.5.2
8)	RESET/SELECT switch			RESET: Resets the C Controller module.(☞ Page 71, Section 6.3) SELECT: Unmount the CompactFlash card. (☞ Page 122, Section 8.5) Pull down each switch for at least 1 second for resetting or unmounting. For usage during initialization, refer to the following. ☞ Page 67, Section 6.1.2 For usage during hardware diagnostics, refer to the following. ☞ Page 80, Section 6.5.2
9)	USB connector			USB connector used for connection with Setting/monitoring tool for the C Controller module.



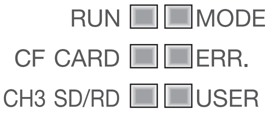
[Side]

[Bottom]

Q12DCCPU-V

No.	Name	Description
10)	Battery	Battery to retain the battery backup RAM and integral clock (RTC) data during power OFF.
11)	Battery connector pin	For connection of the battery lead wires. (Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.)
12)	RS-232 connector (CH3)	Connector used for connection with an RS-232 compatible device.

(1) Indicator LEDs



Name		Description	
		Basic mode	Extended mode
RUN		Displays the operation status.	
	On	The C Controller module is in the RUN status	
	Flash	Executing the script file "STARTUP.CMD"	
	Off	The C Controller module is in the STOP/PAUSE status	
MODE		Displays the mode.	
	On (green)	Normal operation mode	—
	On (orange)	Hardware diagnostics mode	Normal operation mode, Hardware diagnostics mode
	Flash (orange)	—	Standard ROM shutdown status
	Off	A hardware failure occurred or the C Controller module is in reset process	
CF CARD		Displays the mount status of the CompactFlash card.	
	On	Mount status	
	Flash	Unmount processing of CompactFlash card operated with the RESET/SELECT switch operation	
	Off	CompactFlash card is not installed, or unmount status	
ERR.		Displays error status. You may check the error detail by using Setting/monitoring tools for the C Controller module.	
	On	A continuation error occurred	
	Flash	Stop error or hardware diagnostics error occurred	
	Off	Normal	
CH3 SD/RD		Displays data transmission/reception status of the RS-232 connector (CH3).	
	On	Transmitting/receiving	
	Off	Not transmitting/receiving	
USER		LED indicator configurable by the user program. Set the USER LED using the CCPU_SetLEDStatus function. For the display during initialization, refer to the following. ☞ Page 67, Section 6.1.2 For the display during hardware diagnostics, refer to the following. ☞ Page 80, Section 6.5.2	

CHAPTER 3 SPECIFICATIONS

This chapter describes the specifications of the C Controller module.

3.1 General Specifications

The following indicates the general specifications.

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature	-25 to 75°C[*1]					
Operating ambient humidity	5 to 95%RH, non-condensing[*2]					
Storage ambient humidity						
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	–	Frequency	Constant acceleration	Half amplitude	Sweep count
		Under intermittent vibration	5 to 8.4Hz	–	3.5mm	10 times each in X, Y and Z directions
			8.4 to 150Hz	9.8m/s^2	–	
		Under continuous vibration	5 to 8.4Hz	–	1.75mm	–
			8.4 to 150Hz	4.9m/s^2	–	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s^2, 3 times each in 3 directions X, Y, Z)					
Operating atmosphere	No corrosive gases					
Operating altitude[*3]	0 to 2000m					
Installation location	Inside a control panel					
Overvoltage category[*4]	II or less					
Pollution degree[*5]	2 or less					
Device class	Class I					

*1 : The storage ambient temperature is -20 to 75°C if the system includes an AnS series module.

*2 : The operating ambient humidity and storage ambient humidity are 10 to 90%RH if the system includes an AnS series module.

*3 : Do not use or store the C Controller module under pressure higher than the atmospheric pressure at sea level.
Doing so can cause malfunction.For use in a pressurized environment, please consult your local Mitsubishi representative.

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

*5 : This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

Remark

To install/connect peripherals to the C Controller module, the specifications of both the C Controller module and peripherals should be satisfied.

3.2 Performance Specifications

3.2.1 Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

The following indicates the performance specifications.

Item			Specifications			
			Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS	Q26DHCCPU-LS
Hardware specifications (System CPU)			–			
	CPU		SH4A			
Hardware specifications (User CPU)			–			
	Endian format (Memory layout)		Little endian			
	CPU		Intel® ATOM™ Processor			
	Memory capacities	Work RAM	512 MB			1 GB
		Standard RAM	0~4 MB[*1]		–	
		Standard ROM	382 MB		–	
		Built-in SSD	–		512 MB[*2]	8 GB[*2]
		Battery backup RAM	1~5 MB[*3]		5 MB	
Software specifications			–			
	Operating system		VxWorks Version 6.8.1		For "-LS", consult with the partner (operating system vendor).	
	Programming language		C language (C/C++)			
SD memory card specifications			–			
	Interface		SD memory card/SDHC memory card(Up to 16 GB)			
	Power supply		DC+3.3V; Up to 200mA			
USB connector (USB1) specifications			–			
	Interface		USB2.0 ready			
	Connector		Connector type A			
	Transmission speed		480Mbps(High Speed)			
	Power supply		Bus power DC+5V; Up to 500mA[*4]			
	Supported standard		USB Mass Storage Class Standard (Up to 2TB)		For "-LS", consult with the partner (operating system vendor).	
USB connector (USB2) specifications			–			
	Interface		USB2.0 ready			
	Connector		Connector type mini-B			
	Transmission speed		12Mbps(Full Speed)			
	Power supply		Self-Powered			

[*1] The area for standard RAM is created by specifying the memory capacity in the battery backup RAM with parameters.

[*2] Since the partner operating system is installed, the capacity for a user program will be smaller.

[*3] When the area for standard RAM is created, the memory specified for standard RAM is occupied, therefore, the battery backup RAM area will be decreased.

[*4] Select appropriate USB connected devices to observe the current consumption limit.

Item		Specifications		
		Q24DHCCPU-V	Q24DHCCPU-VG	Q24DHCCPU-LS Q26DHCCPU-LS
User Ethernet port (CH1, CH2)[5]		–		
	Interface	10BASE-T/100BASE-TX/1000BASE-T		
	Communication method	Full- or half-duplex		
	Data transmission speed	10Mbps(10BASE-T)/100Mbps(100BASE-TX) /1000Mbps(1000BASE-T)		
	Transmission method	Base band		
	Maximum segment length (distance between hub and node)	100m		
	Connector applicable to external wiring	RJ45		
	Supported function	Auto negotiation function (automatic recognition of communication speed/communication method)		
		Auto-MDIX function (automatically recognizes straight or crossing cable)		
System Ethernet port (S CH1)[5]		–		
	Interface	10BASE-T/100BASE-TX		
	Communication method	Full- or half-duplex		
	Data transmission speed	10Mbps(10BASE-T)/100Mbps(100BASE-TX)		
	Transmission method	Base band		
	Maximum segment length	100m		
	Connector applicable to external wiring	RJ45		
	Supported function	Auto negotiation function (automatic recognition of communication speed/communication method)		
		Auto-MDIX function (automatically recognizes straight or crossing cable)		
Analog RGB output connector		–	D-sub 15pin	
	Maximum resolution		1024 × 768 (XGA)[6]	For "-LS", consult with the partner (operating system vendor).
	Number of colors		16.7 million colors	
	Refresh rate		60Hz	

[5] : For the possible base number when using a switching hub, follow the specifications of the switching hub used.
The possible base number when a repeater hub is used is up to 4 for 10BASE-TX and up to 2 for 100BASE-TX.

[6] : The resolution can be changed to the following settings:

- 1024 × 768 (XGA)
- 800 × 600 (SVGA)
- 640 × 480 (VGA)

Item			Specifications	
			Q24DHCCPU-V	Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS
RS-232 connector (CH3) specifications			–	
	Interface		Compliant with RS-232	
	Communication method		Full- or half-duplex	
	Synchronization method		asynchronous communication	
	Transmission speed		9600, 14400, 19200, 28800, 38400, 57600, 115200 bps	
	Transmission distance		Up to 15m (49.21 feet)	
	Data format	Start bit	1	
		Data bit	7 / 8	
		Parity bit	1 / None	
		Stop bit	1 / 2	
	Parity check		Yes (Even/Odd)/No	
	Sum check code		Yes/No	
	Transmission control		Flow control (RS/CS control)	
	Recommended cable		7/0.127 □P HRV-SV outside diameter: 8.5mm (0.33 inches) or larger[7] (Limited Specify the number of pairs in □.)	
	Connector applicable to external wiring		Round connector (10-pin)	
PCI Express® expanded connector specifications[8]			–	
	Interface		PCI Express® standards	
	Link width		× 1	
	Transmission speed		2.5Gbps	
Number of I/O points			4096 points (X/Y 0 to FFF)	
Clock function		Displayed information	Year, month, day, hour, minute, second, day of week (automatic leap year detection)	
		Accuracy	Daily error -10.89 to +8.64 seconds (0 to 55 deg.C) Daily error -4.32 to +5.25 seconds (25 deg.C)	
Allowable momentary power failure time			Depends on the power supply module	
5V DC internal current consumption			2.8 A	
External dimensions			98 (3.86 in.) (H) × 83 (3.27 in.) (W) × 115 (4.53 in.) (D)[mm]	
Weight			0.630 kg	0.638 kg

[7] : Oki Electric Cable Company (www.okidensen.co.jp)

[8] : For usage of this interface, contact our local Mitsubishi representative or distributor.

3.2.2 Q12DCCPU-V

The following indicates the performance specifications

Item			Specifications
Hardware specifications			–
	Endian format (Memory layout)		Little endian
	CPU		SH4A
	Memory capacities	Work RAM	128 MB
		Standard RAM	0~3 MB[*1]
		Standard ROM	12 MB
		Battery backup RAM	512 KB~3.584 KB[*2]
Software specifications			–
	Operating system		VxWorks Version 6.4
	Programming language		C language (C/C++)
CompactFlash card specifications			–
	Interface		TYPE I card (Up to 8 GB) TYPE II card is not allowed. I/O cards, such as a modem card are not allowed.
	Power supply		DC+3.3V; Up to 150mA
USB connector specifications			–
	Interface		USB2.0 ready
	Connector		Connector type mini-B
	Transmission speed		12Mbps(Full Speed)
	Power supply		Self-Powered
Built-in Ethernet port (CH1 and CH2)[*3]			–
	Interface		10BASE-T/100BASE-TX
	Communication method		Full- or half-duplex
	Data transmission speed		10Mbps(10BASE-T)/100Mbps(100BASE-TX)
	Transmission method		Base band
	Maximum segment length		100m
	Connector applicable to external wiring		RJ45
	Supported function		Auto negotiation function (automatic recognition of communication speed/communication method)
			Auto-MDIX function (automatically recognizes straight or crossing cable)

[*1] The area for standard RAM is created by specifying the memory capacity in the battery backup RAM with parameters.

[*2] When the area for standard RAM is created, the memory specified for standard RAM is occupied, therefore, the battery backup RAM area will be decreased.

[*3] For the possible base number when using a switching hub, follow the specifications of the switching hub used.
The possible base number when a repeater hub is used is up to 4 for 10BASE-TX and up to 2 for 100BASE-TX.

Item			Specifications
RS-232 connector (CH3) specifications			–
	Interface		Compliant with RS-232
	Communication method		Full- or half-duplex
	Synchronization method		asynchronous communication
	Transmission speed		9600, 14400, 19200, 28800, 38400, 57600, 115200 bps
	Transmission distance		Up to 15m (49.21 feet)
	Data format	Start bit	1
		Data bit	7 / 8
		Parity bit	1 / None
		Stop bit	1 / 2
	Parity check		Yes (Even/Odd)/No
	Sum check code		Yes/No
	Transmission control		Flow control (RS/CS control)
	Recommended cable		7/0.127 □P HRV-SV outside diameter: 8.5mm (0.33 inches) or larger (Limited Specify the number of pairs in □.)
	Connector applicable to external wiring		Round connector (10-pin)
Number of I/O points			4096 points (X/Y 0 to FFF)
Clock function	Displayed information		Year, month, day, hour, minute, second, day of week (automatic leap year detection)
	Accuracy		Daily error -10.89 to +8.64 seconds (0 to 55 deg.C) Daily error -4.32 to +5.25 seconds (25 deg.C)
Allowable momentary power failure time			Depends on the power supply module
5V DC internal current consumption			0.97A
External dimensions			98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) × 115 (4.53 in.) (D)[mm]
Weight			0.24kg

3.3 Device Specifications

This section describes the available devices.

3.3.1 Device list

Described below are names of the available devices and range of use.

Classification	Type	Device name	Initial value			Setting range*1
			Number of points	Range of use		
I/O device	Bit device	Input	4096 point	X0 to FFF	Hexa decimal	N/A
		Output	4096 point	Y0 to FFF	Hexa decimal	
Internal user device	Bit device	Internal relay	8192 point	M0 to 8191	Decimal	Available
		Link relay	8192 point	B0 to 1FFF	Hexa decimal	
	Word device	Data register	12288 point	D0 to 12287	Decimal	
		Link register	8192 point	W0 to 1FFF	Hexa decimal	
Internal system device	Bit device	Special relay	2048 point	SM0 to 2047	Decimal	N/A
	Word device	Special register	2048 point	SD0 to 2047	Decimal	
Link direct device*2	Bit device	Link input	16384 point	Jn\X0 to 3FFF	Hexa decimal	N/A
		Link output	16384 point	Jn\Y0 to 3FFF	Hexa decimal	
		Link relay	32768 point	Jn\B0 to 7FFF	Hexa decimal	
		Link special relay	512 point	Jn\SB0 to 1FF	Hexa decimal	
	Word device	Link register	131072 point	Jn\W0 to 1FFFF	Hexa decimal	
		Link special register	512 point	Jn\SW0 to 1FF	Hexa decimal	
Module access device	Word device	Intelligent function module device*3	65536 point	Un\G0 to 65535	Decimal	N/A
		Multiple CPU area device*4	4096 point	U3En\G0 to 4095	Decimal	Available
			14336 point	U3En\G10000 to 24335	Decimal	

*1 : If the setting range is "Available," the number of points for the respective device can be changed.
For parameter settings, refer to the following.
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

*2 : The number of points and range of use for the link direct device vary depending on network modules.
For the number of points and range of use for the link direct device, refer to the manual for the network module.

*3 : The actual number of available points varies depending on intelligent function modules.
For the number of points for the buffer memory, refer to the manual for the respective intelligent function module.

*4 : These devices can be used only for the multiple CPU system configurations.

Point

- Do not use any devices that are not described above.
- Do not specify file registers (ZR) when reading/writing data.
  Doing so may result in a malfunction caused by the data writing to data registers (D) and link registers (W).

3.3.2 Device Description

Described below are the overview of the available devices.
For details, refer to the following manual.
📖QCPU User's Manual (Function Explanation, Program Fundamentals)

Device			Description
I/O Device			This is a device that corresponds to various user applications.
	Input[*1,*2]	X	Input is used for giving commands and data to the C Controller module from an external device such as a push-button switch, a selector switch, a limit switch, or a digital switch.
	Output[*3]	Y	Output is for outputting program control results to an external signal lamp, digital HMI, electromagnetic switch (contactor), solenoid, etc.
Internal User Device			This is a device created on the work RAM of the C Controller module. This is a device that corresponds to various user applications. To create an internal user device, use the device function (☞ Page 169, Section 11.6).
	Internal relay	M	This is an auxiliary relay used inside the C Controller module.
	Data register	D	This memory can store numerical data (-32768 to 32767 or 0000H to FFFFH).
	Link relay	B	This is a relay/memory on the C Controller module side available to refresh the network module link device (LX/LY/LB/LW/RX/RY/RWw/RWr) to the C Controller module, or to refresh the data within the C Controller module to the network modules link device.
	Link register	W	
Internal System Device			This is a device for system.
	Special relay	SM	This is an internal relay with specification defined inside the C Controller module, that stores the C Controller module status. For details of the special relay, refer to the following. ☞ Page 474, Appendix 6
	Special register	SD	This is an internal register with specification defined inside the C Controller module, that stores the C Controller module status (failure diagnostics and system information). For details of the special register, refer to the following. ☞ Page 476, Appendix 7
Link Direct Device			This device directly accesses a link device in the network module. Link devices in network module can be read or written by user programs, independently of the link device refresh of the C Controller module.
	Link input	Jn\X	
	Link output	Jn\Y	
	Link relay	Jn\B	
	Link special relay	Jn\SB	
	Link register	Jn\W	
	Link special register	Jn\SW	
Module Access Device			
	Intelligent function module device	Un\G	This device is for directly accessing the buffer memory of an intelligent function module installed in the base unit from the C Controller module.
	Multiple CPU area device	U3En\G	This device accesses the CPU shared memory in each CPU module of the multiple CPU system. For the CPU shared memory, refer to the following. ☞ Page 251, Section 14.1

[*1] : Writing to the input (X) is ignored.

[*2] : If the following input (X) is read out, the read data will be 0 (OFF).
- No module is installed.
- An output module is installed.

[*3] : If the following output (Y) is read out, the read data will be 0 (OFF).
- No module is installed.
- An output module is installed.

CHAPTER 4 SOFTWARE PACKAGES

This chapter describes each software package associated with the C Controller module.

The following software packages can be used for the C Controller module.

Software		Version				
		Q24DHCCPU			Q26DHCCPU	Q12DCCPU
		-V	-VG	-LS	-LS	-V
Setting/monitoring tools for the C Controller module[1] (SW4PVC-CCPU-E)		Version 4.01B or later[2]	Version 4.09K or later	Version 4.03D or later	Version 4.11M or later	Version 4.04E or later
CW Workbench	SW1DND-CWWLQ24-E, SW1DND-CWWLQ24-EZ	Version 1.00A or later		–		Version 1.00A or later
	SW1DND-CWWLQ12-E, SW1DND-CWWLQ12-EZ	–				Version 1.00A or later
Wind River Workbench		Version 3.2				Version 3.2
GX Works2		Version 1.91V or later	Version 1.513K or later	Version 1.492N or later	Version 1.540N or later	Version 1.50C or later
GT Designer3	(SW1DNC-GTWK3-J)	Version 1.60N or later	Version 1.112S or later	Version 1.73B or later	–	Version 1.15R or later
	(SW1DNC-GTWK3-E)	Version 1.63R or later	Version 1.112S or later	Version 1.74C or later	–	Version 1.17T or later
MX Component		Version 4.02C or later	–			Version 3.14Q or later

[1] : Cannot be connected to Q12DCCPU-V (Basic mode).

[2] : For Q24DHCCPU-V with a serial number whose first five digits are "15042" or higher, use Setting/monitoring tools for the C Controller module Version 4.02C or later.

Point

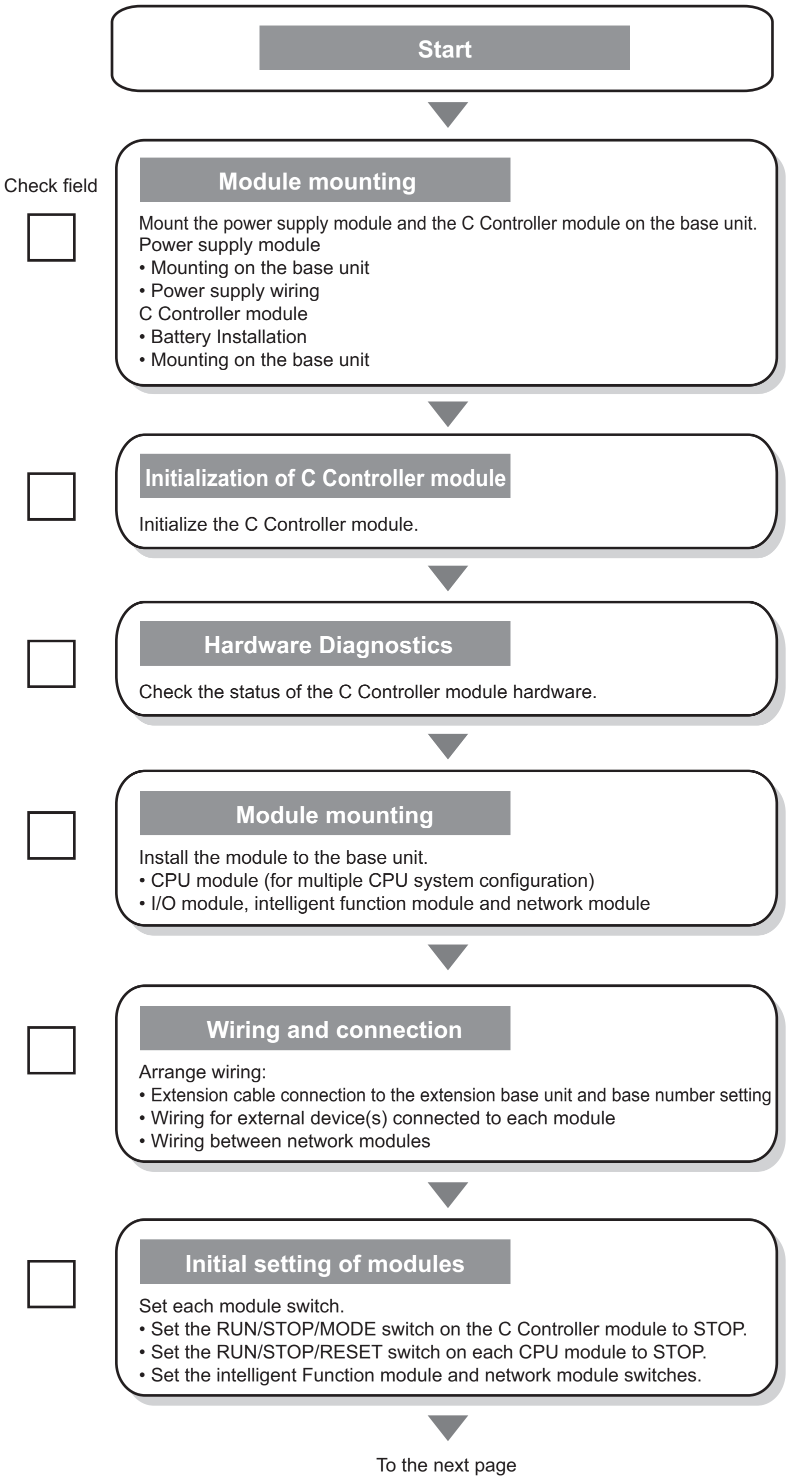
- For Setting/monitoring tools for the C Controller module, refer to the following.
  📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual
- For CW Workbench, refer to the following.
  📖CW Workbench Operating Manual
- To create a user program for the C Controller module, CW Workbench or Wind River Workbench 3.2 are necessary. In this manual programming by using CW Workbench is described.
- This is a product of Wind River Workbench is Wind River Systems, Inc. To use the Wind River Workbench, refer to the manual for Wind River Workbench.

CHAPTER 5 PREPARATORY PROCEDURE

This chapter describes the procedure to startup the C Controller module.

5.1 Q24DHCCPU-V

The following explains the start-up procedure for Q24DHCCPU-V.



Start

Check field

□ **Module mounting**

Mount the power supply module and the C Controller module on the base unit.
Power supply module
- Mounting on the base unit
- Power supply wiring

C Controller module
- Battery Installation
- Mounting on the base unit

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
☞ Page 116, CHAPTER 8

□ **Initialization of C Controller module**

Initialize the C Controller module.

☞ Page 62, Section 6.1

□ **Hardware Diagnostics**

Check the status of the C Controller module hardware.

☞ Page 75, Section 6.5

□ **Module mounting**

Install the module to the base unit.
- CPU module (for multiple CPU system configuration)
- I/O module, intelligent function module and network module

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

□ **Wiring and connection**

Arrange wiring:
- Extension cable connection to the extension base unit and base number setting
- Wiring for external device(s) connected to each module
- Wiring between network modules

📖Manual for respective module

□ **Initial setting of modules**

Set each module switch.
- Set the RUN/STOP/MODE switch on the C Controller module to STOP.
- Set the RUN/STOP/RESET switch on each CPU module to STOP.
- Set the intelligent Function module and network module switches.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
📖Manual for respective module
☞ Page 35, CHAPTER 2

To the next page

From the previous page

▼

Check field

□

System power-on

Power on after check that:
- power supply wiring is properly arranged.
- power supply voltage is within the operational range.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

▼

□

Parameter setting

Create a parameter.
- Install Setting/monitoring tools for the C Controller module to the development environment (Personal computer).
- Set the parameters by Setting/monitoring tools for the C Controller module.
- Connect the C Controller module and the development environment (Personal computer).
(Use USB2 or S CH1. After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Write the parameters to the C Controller module.

☞ Page 288, CHAPTER 15
☞ Page 111, Section 7.6.5
☞ Page 129, Section 8.7.2 (3)
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

▼

□

C Controller system reset

Set the RUN/STOP/MODE switch on the C Controller module to RUN.
Reset the C Controller system.

☞ Page 71, Section 6.3

▼

□

Error check

Check for any error indicated by the C Controller module LEDs.
Perform troubleshooting if any error is present.
If any error is present in other than the C Controller module, refer to and follow the manual for respective module(s) to perform troubleshooting.

☞ Page 394, CHAPTER 23
📖Manual for respective module

▼

□

User program creation

Create the user program.
- Install CW Workbench to the development environment (Personal computer).
- Create a user program and script file(s).
- Connect the C Controller module and the development environment (Personal computer).(Use CH1 or CH2.After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Register the user program to the C Controller module.
- Debug the user program.

☞ Page 336, CHAPTER 19
☞ Page 111, Section 7.6.5
☞ Page 127, Section 8.7.2
📖CW Workbench Operating Manual

▼

Operation

5.2 Q24DHCCPU-VG

The following explains the start-up procedure for Q24DHCCPU-VG.

Start

▼

Check field

□ **Module mounting**

Mount the power supply module and the C Controller module on the base unit.
Power supply module
- Mounting on the base unit
- Power supply wiring

C Controller module
- Battery Installation
- Mounting on the base unit

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
☞ Page 116, CHAPTER 8

▼

□ **Clearing memory of C Controller module**

- Install Setting/monitoring tools for the C Controller module to the development environment (Personal computer).
- Clearing the battery backup RAM with Setting/monitoring tools for the C Controller module.

📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

Point

When C Controller module has been initialized, the partner application is deleted.
☞ Page 62, Section 6.1

▼

□ **Hardware Diagnostics**

Check the status of the C Controller module hardware.

☞ Page 75, Section 6.5

▼

□ **Module mounting**

Install the module to the base unit.
- CPU module (for multiple CPU system configuration)
- I/O module, intelligent function module and network module

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

▼

□ **Wiring and connection**

Arrange wiring:
- Extension cable connection to the extension base unit and base number setting
- Wiring for external device(s) connected to each module
- Wiring between network modules

📖Manual for respective module

▼

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Check field

□

Initial setting of modules

Set each module switch.

- Set the RUN/STOP/MODE switch on the C Controller module to STOP.
- Set the RUN/STOP/RESET switch on each CPU module to STOP.
- Set the intelligent Function module and network module switches.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
📖Manual for respective module
☞ Page 35, CHAPTER 2

□

System power-on

Power on after check that:

- power supply wiring is properly arranged.
- power supply voltage is within the operational range.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

□

Parameter setting

Create a parameter.

- Set the parameters by Setting/monitoring tools for the C Controller module.
- Connect the C Controller module and the development environment (Personal computer).
(Use USB2 or S CH1. After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Write the parameters to the C Controller module.

☞ Page 288, CHAPTER 15
☞ Page 111, Section 7.6.5
☞ Page 129, Section 8.7.2 (3)
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

□

C Controller system reset

Set the RUN/STOP/MODE switch on the C Controller module to RUN.
Reset the C Controller system.

☞ Page 71, Section 6.3

□

Error check

Check for any error indicated by the C Controller module LEDs.
Perform troubleshooting if any error is present.
If any error is present in other than the C Controller module, refer to and follow the manual for respective module(s) to perform troubleshooting.

📖Manual for respective module
☞ Page 394, CHAPTER 23

□

User program creation

Create the user program.

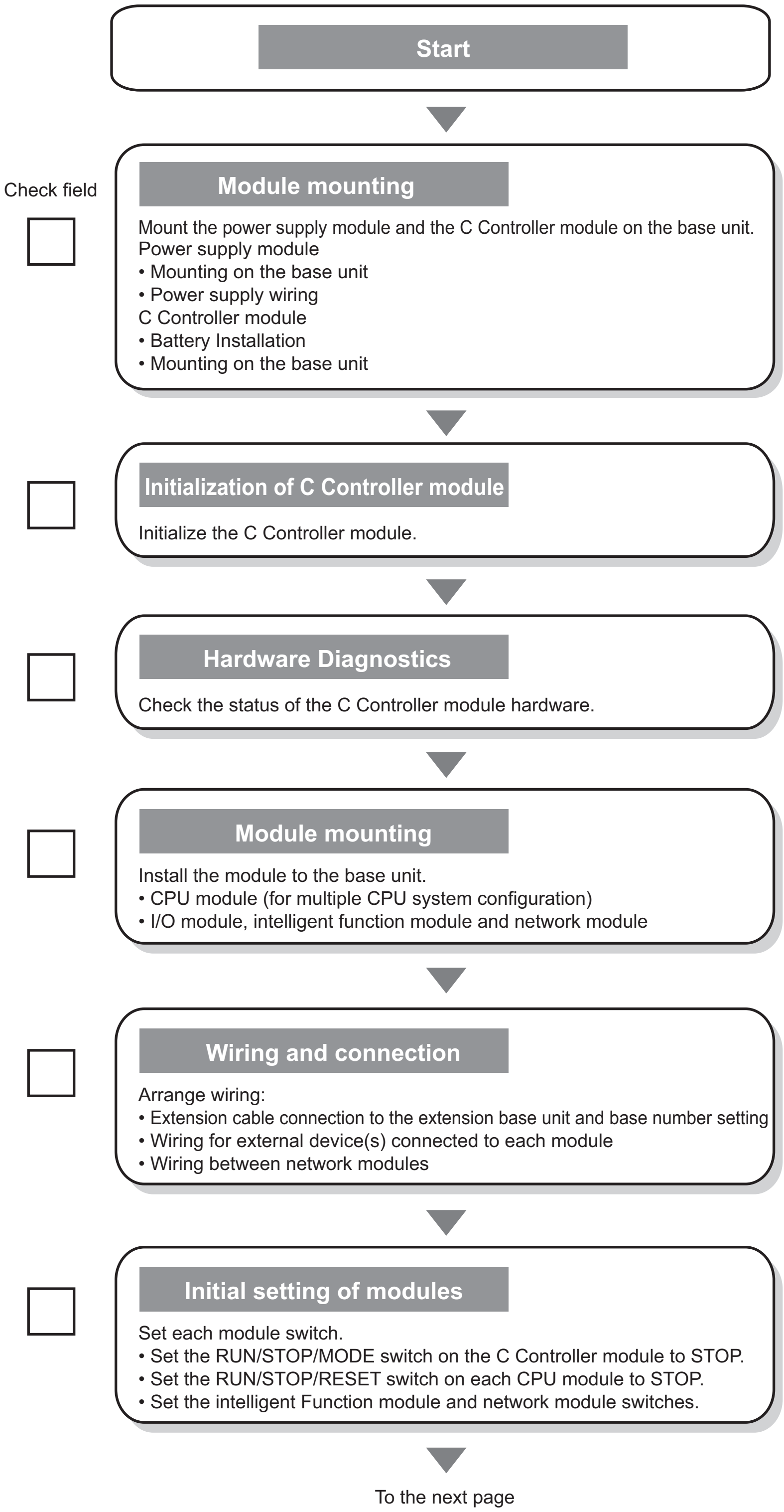
- Install CW Workbench to the development environment (Personal computer).
- Create a user program and script file(s).
- Connect the C Controller module and the development environment (Personal computer). (Use CH1 or CH2.After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Register the user program to the C Controller module.
- Debug the user program.

☞ Page 336, CHAPTER 19
☞ Page 188, Section 11.10
☞ Page 111, Section 7.6.5
☞ Page 129, Section 8.7.2 (3)
📖CW Workbench Operating Manual

Operation

5.3 Q24DHCCPU-LS and Q26DHCCPU-LS

The following explains the start-up procedure for Q24DHCCPU-LS and Q26DHCCPU-LS.



Start

Check field

□ **Module mounting**

Mount the power supply module and the C Controller module on the base unit.
Power supply module
- Mounting on the base unit
- Power supply wiring

C Controller module
- Battery Installation
- Mounting on the base unit

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
☞ Page 116, CHAPTER 8

□ **Initialization of C Controller module**

Initialize the C Controller module.

☞ Page 62, Section 6.1

□ **Hardware Diagnostics**

Check the status of the C Controller module hardware.

☞ Page 75, Section 6.5

□ **Module mounting**

Install the module to the base unit.
- CPU module (for multiple CPU system configuration)
- I/O module, intelligent function module and network module

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

□ **Wiring and connection**

Arrange wiring:
- Extension cable connection to the extension base unit and base number setting
- Wiring for external device(s) connected to each module
- Wiring between network modules

📖Manual for respective module

□ **Initial setting of modules**

Set each module switch.
- Set the RUN/STOP/MODE switch on the C Controller module to STOP.
- Set the RUN/STOP/RESET switch on each CPU module to STOP.
- Set the intelligent Function module and network module switches.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
📖Manual for respective module
☞ Page 35, CHAPTER 2

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▼

Check field

□ **System power-on**

Power on after check that:
- power supply wiring is properly arranged.
- power supply voltage is within the operational range.

📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

▼

□ **Parameter setting**

Create a parameter.
- Install Setting/monitoring tools for the C Controller module to the development environment (Personal computer).
- Set the parameters by Setting/monitoring tools for the C Controller module.
- Connect the C Controller module and the development environment (Personal computer).
  (Use USB2 or S CH1. After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Write the parameters to the C Controller module.

☞ Page 288, CHAPTER 15
☞ Page 111, Section 7.6.5
☞ Page 129, Section 8.7.2 (3)
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

▼

□ **C Controller system reset**

Set the RUN/STOP/MODE switch on the C Controller module to RUN.
Reset the C Controller system.

☞ Page 71, Section 6.3

▼

□ **Error check**

Check for any error indicated by the C Controller module LEDs.
Perform troubleshooting if any error is present.
If any error is present in other than the C Controller module, refer to and follow the manual for respective module(s) to perform troubleshooting.

☞ Page 394, CHAPTER 23
📖Manual for respective module

▼

□ **Installation of partner operating system**

Install a partner operating system to this product.

☞ Page 59, Section 5.3.1

▼

□ **User program creation**

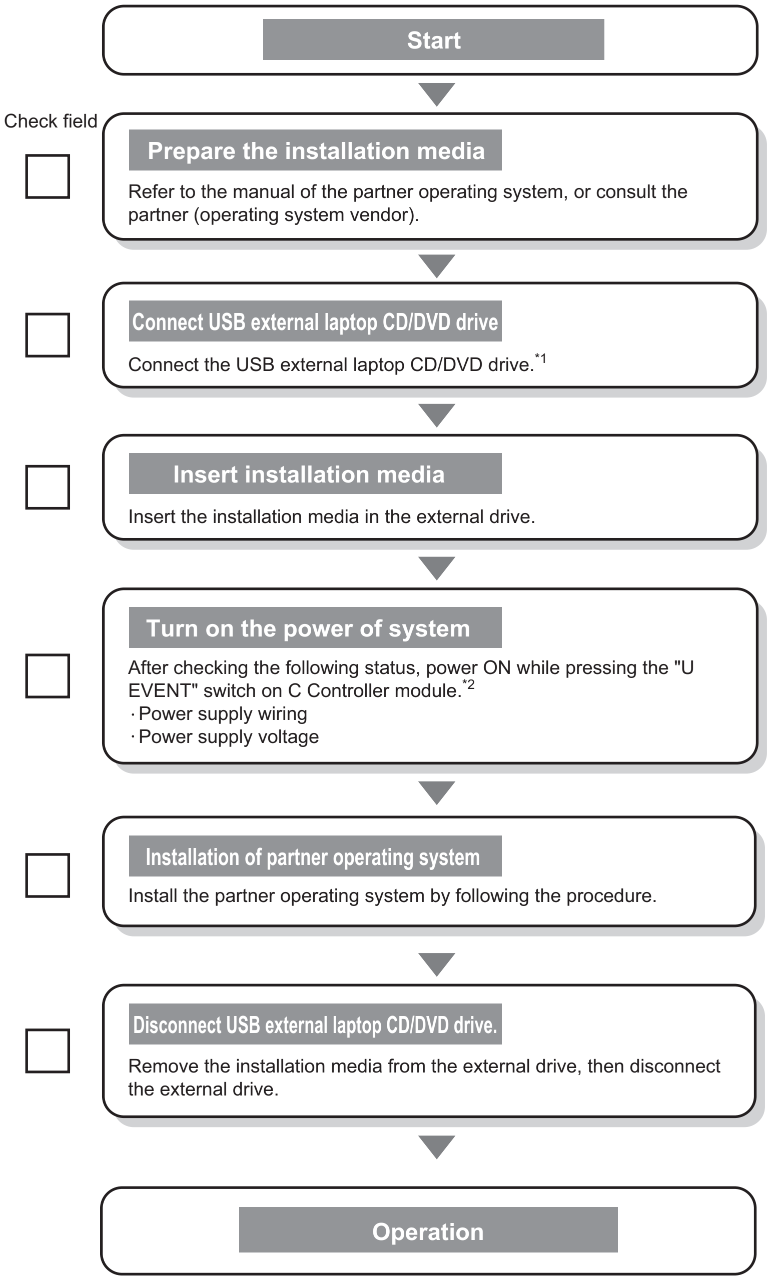
Refer to the manual of the partner operating system, or consult the partner (operating system vendor).

▼

Operation

5.3.1 Installation procedure for partner operating system

The following explains the installation procedure for partner operating system.



Start

Check field

□ **Prepare the installation media**

Refer to the manual of the partner operating system, or consult the partner (operating system vendor).

□ **Connect USB external laptop CD/DVD drive**

Connect the USB external laptop CD/DVD drive.[*1]

□ **Insert installation media**

Insert the installation media in the external drive.

□ **Turn on the power of system**

After checking the following status, power ON while pressing the "U EVENT" switch on C Controller module.[*2]

· Power supply wiring
· Power supply voltage

□ **Installation of partner operating system**

Install the partner operating system by following the procedure.

□ **Disconnect USB external laptop CD/DVD drive.**

Remove the installation media from the external drive, then disconnect the external drive.

Operation

*1 : The self-powered drive is required.
When using a keyboard/mouse, connect it via USB hub.

*2 : Press the EVENT switch until POWER LED of the power module turns ON.
All the display LEDs of the module are turned OFF (because the status of the system CPU is reset).

5.4 Q12DCCPU-V

The following explains the start-up procedure for Q12DCCPU-V.

Start

▼

Check field

□ **Module mounting**

Mount the power supply module and the C Controller module on the base unit.
Power supply module
- Mounting on the base unit
- Power supply wiring

C Controller module
- Battery Installation

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
☞ Page 116, CHAPTER 8

▼

□ **Initialization of C Controller module**

Initialize the C Controller module.
Select the following mode and perform the initialization.
- Mode "12" module initialization setting (Extended mode)

☞ Page 62, Section 6.1

▼

□ **Hardware Diagnostics**

Check the status of the C Controller module hardware.

☞ Page 75, Section 6.5

▼

□ **Module mounting**

Install the module to the base unit.
- CPU module (for multiple CPU system configuration)
- I/O module, intelligent function module and network module

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)

▼

□ **Wiring and connection**

Arrange wiring:
- Extension cable connection to the extension base unit and base number setting
- Wiring for external device(s) connected to each module
- Wiring between network modules

📖Manual for respective module

▼

□ **Initial setting of modules**

Set each module switch.
- Set the RUN/STOP/MODE switch on the C Controller module to STOP.
- Set the RUN/STOP/RESET switch on each CPU module to STOP.
- Set the intelligent Function module and network module switches.

📖QCPU User's Manual
(Hardware Design, Maintenance and Inspection)
📖Manual for respective module
☞ Page 35, CHAPTER 2

▼

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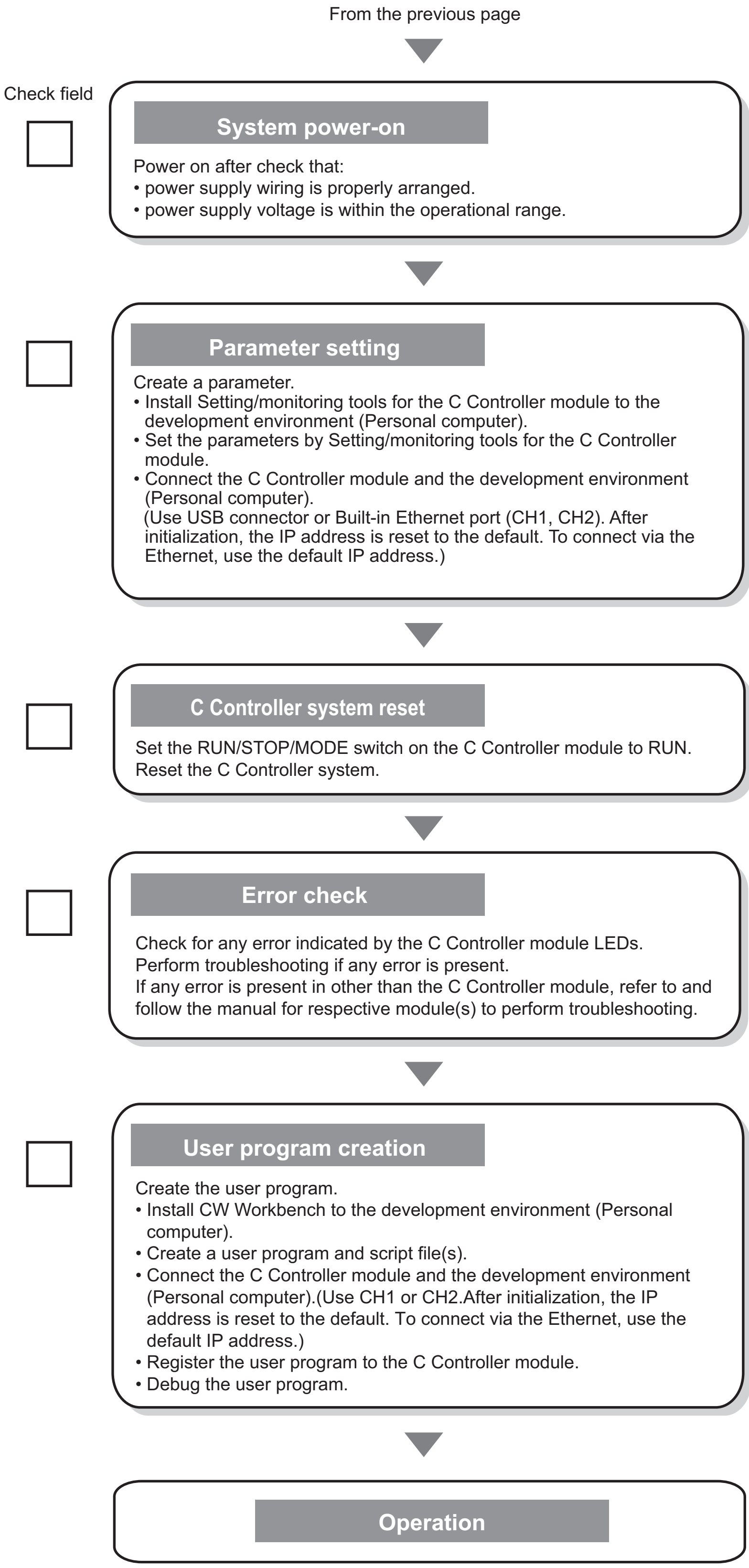

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Check field

□ **System power-on**

Power on after check that:
- power supply wiring is properly arranged.
- power supply voltage is within the operational range.

📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

□ **Parameter setting**

Create a parameter.
- Install Setting/monitoring tools for the C Controller module to the development environment (Personal computer).
- Set the parameters by Setting/monitoring tools for the C Controller module.
- Connect the C Controller module and the development environment (Personal computer).
  (Use USB connector or Built-in Ethernet port (CH1, CH2). After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)

☞ Page 288, CHAPTER 15
☞ Page 111, Section 7.6.5
☞ Page 129, Section 8.7.2 (3)
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

□ **C Controller system reset**

Set the RUN/STOP/MODE switch on the C Controller module to RUN.
Reset the C Controller system.

☞ Page 71, Section 6.3

□ **Error check**

Check for any error indicated by the C Controller module LEDs.
Perform troubleshooting if any error is present.
If any error is present in other than the C Controller module, refer to and follow the manual for respective module(s) to perform troubleshooting.

☞ Page 394, CHAPTER 23
📖Manual for respective module

□ **User program creation**

Create the user program.
- Install CW Workbench to the development environment (Personal computer).
- Create a user program and script file(s).
- Connect the C Controller module and the development environment (Personal computer).(Use CH1 or CH2.After initialization, the IP address is reset to the default. To connect via the Ethernet, use the default IP address.)
- Register the user program to the C Controller module.
- Debug the user program.

☞ Page 336, CHAPTER 19
☞ Page 111, Section 7.6.5
☞ Page 127, Section 8.7.2
📖CW Workbench Operating Manual

Operation

CHAPTER 6 HARDWARE OPERATIONS

This chapter describes the switch operations of the C Controller module.

6.1 Initialization

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Described in this section is the initialization of the C Controller module.
Initialization is useful in the following situations:

- Initial operation
- When the C Controller module cannot be started up by executing the script file (user program) registered with the standard ROM
- When you forgot the account information configured in the C controller module
- When enabling the "Setting/monitoring tools for the C Controller module operation" setting which was disabled in the service setting function.

6.1.1 Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

(1) Initialization status

Initialization brings the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS into the following status:

(a) Default IP setting

- The execution of the script file registered on the "/ROM" drive (standard ROM) is stopped. **Note6.1**
- The IP address of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS is set to the default.

Item	Description			
	Q24DHCCPU			Q26DHCCPU-LS
	-V	-VG	-LS	
User Ethernet port CH1	192.168.3.3		No change[*1]	
User Ethernet port CH2	No setting			
System Ethernet port S CH1	192.168.3.39			
Script file	No file		No change[*1]	

[*1] : The items are not initialized by this function. For the method for initialization, consult the partner (operating system vendor).

(b) Module initialization setting

○: Supported ×: Not supported

Description	CPU module			
	Q24DHCCPU			Q26DHCCPU-LS
	-V	-VG	-LS	
Parameters are reset to the initial values.	○			
Battery backup RAM data is cleared to 0.				
"/ROM" drive (standard ROM) is formatted. **Note6.1** (All directories and files in the "/ROM" drive is deleted.)				
The resolution is set to 1024 × 768 (XGA).	×	○	×	
The keyboard is set to the OADG-compliant Japanese 106-key keyboard (106JIS).				

Point

- For Q24DHCCPU-VG, the partner application will be deleted by performing the module initialization setting.
For information on how to reinstall it, refer to the manuals provided by the partner (application vendor), or consult the partner (application vendor).
- Initialization deletes data in the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.
Before you can perform the initialization, back up all necessary data, user programs and parameters.

Note6.1 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

(2) Operating procedure

(a) Preparation

Before initializing the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS, take the steps listed below:

1. **Install the module.**

Install the power supply module and Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS to the base unit.
Insert the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS into the CPU slot.
Do not install any module other than a power supply module and the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.

Point

● For C Controller modules listed below, the initialization can be performed even when the module is mounted on the slot other than the CPU slot.
To perform initialization with the module mounted on the slot other than the CPU slot, mount another CPU module on the CPU slot.
Although an error may be detected on the CPU module mounted on the CPU slot, the initialization of the C Controller module can be performed.

- Q24DHCCPU-V with a serial number whose first five digits are "15042"
- Q24DHCCPU-VG

2. **Check the wiring.**

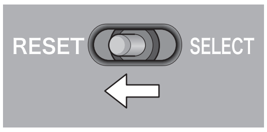
Check that the power supply wiring is property arranged.
Do not connect any cable other than power supply cables.

3. **Power on.**

Check that the power supply voltage is within the specified range.
Check that the RUN/STOP/MODE switch is positioned in STOP.

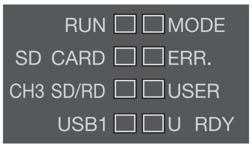
(b) Initialization setting

Perform the following operations to configure settings for initialization.

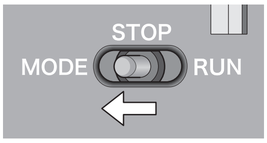


1. **Move the RESET/SELECT switch to the RESET position.**

Do not release the switch while pulling it down.

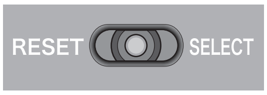


2. **Check that the LED goes off.**



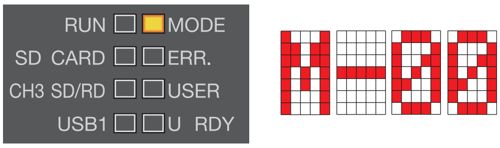
3. **Move the RUN/STOP/MODE switch to MODE position.**

Do not release the switch while pulling it down.



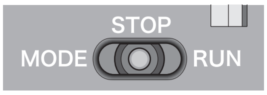
4. **Move the RESET/SELECT switch back to the center.**

Release the switch then it returns to its center position.



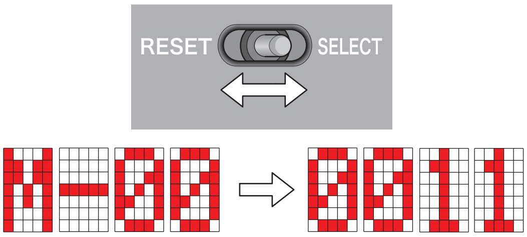
5. **Check that the MODE LED turns on in orange.**

Dot matrix LED indicates "M-00".



6. **Move the RUN/STOP/MODE switch back to the STOP position.**

Release the switch then it returns to its center position.

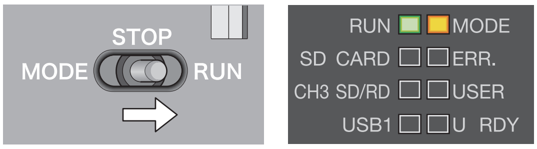


7. **Move the RESET/SELECT switch to the SELECT position.**

Each time you move the switch to the SELECT position, the mode changes and a value representing the respective mode is displayed by the LEDs.

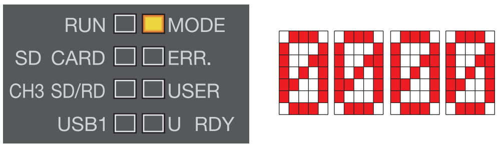
Repeat this step until the dot matrix LED shows target mode in the table below.

Mode	Description
0010	Default IP setting
0011	Module initialization setting



8. **Move the RUN/STOP/MODE switch back to RUN position.**

During execution of the initialization setting, RUN LED is flashed green.



9. **Check that the RUN LED goes off.**

Dot matrix LED indicates "0000".

(c) Countermeasures for abnormal completion

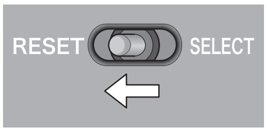
Flashing of the ERR. LED indicates abnormal completion.

- If the dot matrix LED shows "E0F0" and "E0F1" an error occurred during the initialization setting.
- If the dot matrix LED is off and only ERR. LED flashed, a system error is present.

When any error has occurred, take initialization steps again. If failure is detected again, any hardware error may exist. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

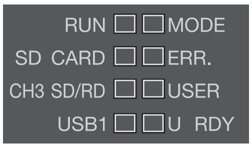
(d) Execution of initialization

Perform the following operations to execute initialization.

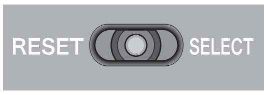


1. **Move the RESET/SELECT switch to the RESET position.**

Do not release the switch while pulling it down.

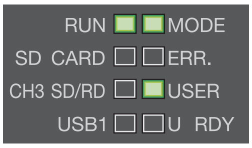


2. **Check that the MODE LED goes off.**



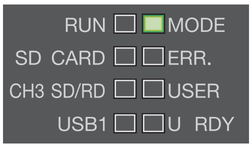
3. **Move the RESET/SELECT switch back to the center.**

Release the switch then it returns to its center position.



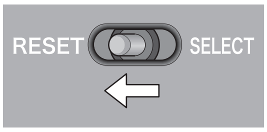
4. **Check that the MODE LED turns on in green.**

During initialization, RUN LED and USER LED are flashed.



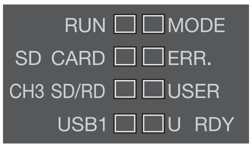
5. **Check that the USER LED goes off.**

RUN LED goes off, and MODE LED is flashed green.

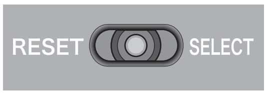


6. **Move the RESET/SELECT switch to the RESET position.**

Do not release the switch while pulling it down.

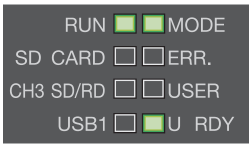


7. **Check that the MODE LED goes off.**



8. **Move the RESET/SELECT switch back to the center.**

Release the switch then it returns to its center position.



9. **Check that the MODE LED is lit green.**

During user CPU restarting, the U RDY LED flashes and, when it is completed, the U RDY LED is lit.

(e) Countermeasures for abnormal completion

Flashing of the ERR.LED indicates abnormal completion.

When any error has occurred, take initialization steps again. If failure is detected again, any hardware error may exist. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

6.1.2 Q12DCCPU-V

(1) Initialization status

Initialization brings the Q12DCCPU-V into the following status:

(a) Default IP setting

- The execution of the script file registered on the "/ROM" drive (standard ROM) is stopped.
- The IP address of the Q12DCCPU-V is set to the default.

Item	Description
Built-in Ethernet port CH1	192.168.3.3
Built-in Ethernet port CH2	No setting
Script file	No file

(b) Module initialization setting (Extended mode)

- Parameters are reset to the initial values.
- Battery backup RAM data is cleared to 0.
- "/ROM" drive (standard ROM) is formatted.
  (All directories and files in the "/ROM" drive is deleted.)

Point

Initialization deletes data in the Q12DCCPU-V.
Before you can perform the initialization, back up all necessary data, user programs and parameters.

(2) Operating procedure

(a) Preparation

Before initializing the Q12DCCPU-V, take the steps listed below:

1. Install the module.

Install the power supply module and Q12DCCPU-V to the base unit.
Insert the C Controller module into the CPU slot.
Do not install any module other than a power supply module and the Q12DCCPU-V.

Point

● For Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or higher, the initialization can be executed even if the module is mounted on the slot other than the CPU slot. When executing the initialization with mounting Q12DCCPU-V (Extended mode) other than CPU slot, mount another CPU module on the CPU slot.
- Although an error may be detected on the CPU mounted on the CPU slot, the initialization can be executed.

2. Check the wiring.

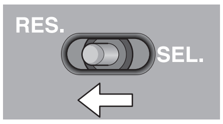
Check that the power supply wiring is property arranged.
Do not connect any cable other than power supply cables.

3. Power on.

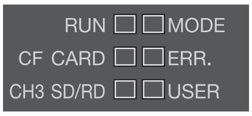
Check that the power supply voltage is within the specified range.
Check that the RUN/STOP/MODE switch is positioned in STOP.

(b) Initialization setting

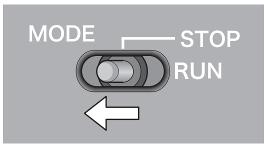
Perform the following operations to configure settings for initialization.



1. Move the RESET/SELECT switch to the RESET position.

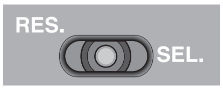


2. Check that the MODE LED goes off.

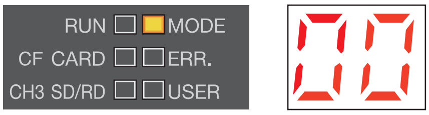


3. Move the RUN/STOP/MODE switch to MODE position.

Do not release the switch while pulling it down.

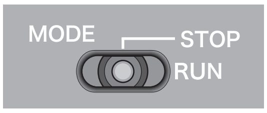


4. Move the RESET/SELECT switch back to the center.



5. Check that the MODE LED turns on in orange.

7-segment LED indicates "00".



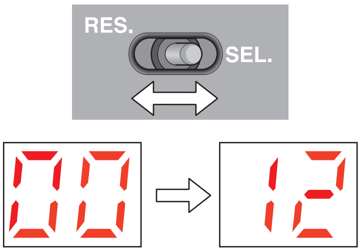
6. Move the RUN/STOP/MODE switch back to the STOP position.

Release the switch then it returns to its center position.

7. Move the RESET/SELECT switch to the SELECT position.

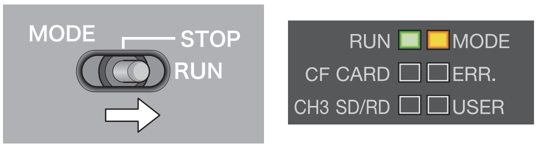
Each time you move the switch to the SELECT position, the mode changes and a value representing the respective mode is displayed by the LEDs.

Repeat this step until the 7-segment LED shows target mode in the table below.



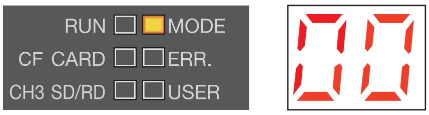
Mode	Description
10	Default IP setting
11	Module initialization setting (Basic mode)
12	Module initialization setting (Extended mode)*1

*1 : Be sure to select Mode 12 to perform the initialization. If Mode 11 is selected, the mode becomes the basic mode and cannot be connected with SW4PVC-CCPU.



8. Move the RUN/STOP/MODE switch back to RUN position.

During execution of the initialization setting, RUN LED is flashed green.



9. Check that the RUN LED goes off.

7-segment LED indicates "00".

(c) Countermeasures for abnormal completion

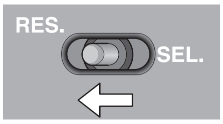
Flashing of the ERR. LED indicates abnormal completion.

- If the 7-segment LED shows "Eb" and "EC" an error occurred during the initialization setting.
- If the 7-segment LED is off and only ERR. LED flashed, a system error is present.

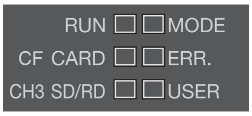
When any error has occurred, take initialization steps again. If failure is detected again, any hardware error may exist. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

(d) Execution of initialization

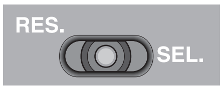
Perform the following operations to execute initialization.



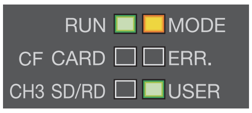
1. **Move the RESET/SELECT switch to the RESET position.**



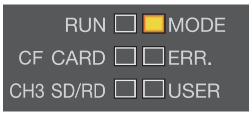
2. **Check that the MODE LED goes off.**



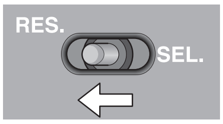
3. **Move the RESET/SELECT switch back to the center.**



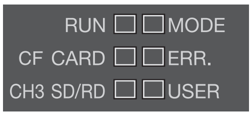
4. **Check that the MODE LED turns on in orange.**
   During initialization, RUN LED and USER LED are flashed.



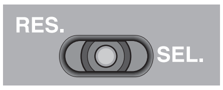
5. **Check that the RUN LED and USER LED go off.**
   The MODE LED flashes.



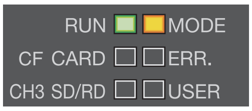
6. **Move the RESET/SELECT switch to the RESET position.**



7. **Check that the MODE LED goes off.**



8. **Move the RESET/SELECT switch back to the center.**



9. **Check that the MODE LED is lit orange.**

(e) Countermeasures for abnormal completion

Flashing of the ERR.LED indicates abnormal completion.
When any error has occurred, take initialization steps again. If failure is detected again, any hardware error may exist. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

6.2 Change of Operation Status (RUN/STOP)

You may use RUN/STOP/MODE switch operations to change the C Controller module operation status (RUN/STOP). For details of the operation status, refer to the following.

☞ Page 307, Section 17.2.3 RUN, STOP and PAUSE status operation processing

Point

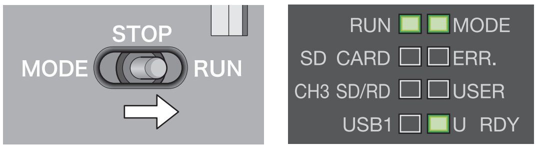
- Changing the operation status (RUN/STOP/PAUSE) also changes output from the user program. For details, refer to the following.
  ☞ Page 151, Section 11.1.5 Output (Y) status setting for switching STOP to RUN
- When the operation status is STOP/PAUSE, the user program task does not stop.
- For the remote operation, refer to the following.
  ☞ Page 163, Section 11.5 Remote Operation Function

(1) Operating procedure

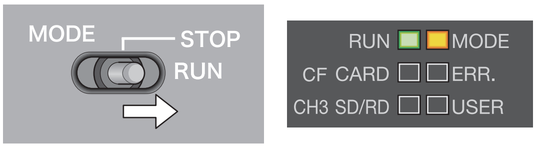
Switch operations are described below.

(a) RUN

<Q24DHCCPU-V/-VG/-LS><Q26DHCCPU-LS>



<Q12DCCPU-V>



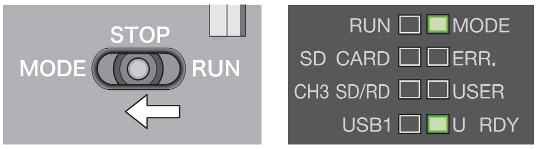
1. **Move the RUN/STOP/MODE switch to the RUN position.**

Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS···RUN LED is lit green.

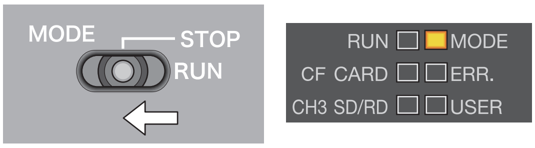
Q12DCCPU-V···RUN LED is lit orange.

(b) STOP

<Q24DHCCPU-V/-VG/-LS><Q26DHCCPU-LS>



<Q12DCCPU-V>



1. **Move the RUN/STOP/MODE switch to the STOP position.**

RUN LED goes off.

6.3 Reset

Reset is an operation to apply any parameter and/or user program change and reboot the entire system.
The procedures to reset the C Controller system are described below.

- Power cycle (power OFF → ON)
- Reset the C Controller module (for multiple CPU system, the CPU module No.1)

Point

In any of the following conditions, do not reset the entire system:

- Accessing to the SD memory card
- Accessing to the CompactFlash card
- Accessing to the USB device
- Accessing to the standard ROM or user files in the standard RAM

(1) Status after resetting

Resetting the C Controller module brings the C Controller module into the following status:

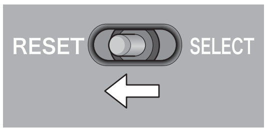
- The change(s) in user program(s) is applied.
- The change(s) in parameter setting(s) is applied.
- The data refresh memory[*1] and CPU shared memory are cleared to 0.
- Initial processing is executed. (☞ Page 305, Section 17.2.1)

[*1] : The data refresh memory cannot be used in Q12DCCPU-V.

(2) Operating procedure

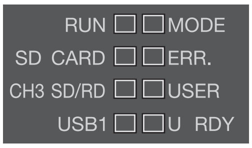
Switch operations for resetting the C Controller module are described below.

(a) Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS



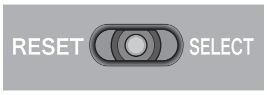
1. Move the RESET/SELECT switch to the RESET position.

Do not release the switch while pulling it down.



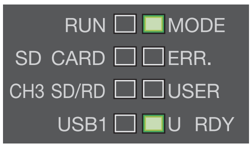
2. Check that the MODE LED goes off.

U RDY LED also goes off.



3. Move the RESET/SELECT switch back to the center.

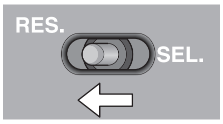
Release the switch then it returns to its center position.



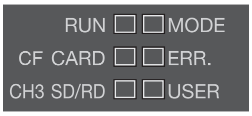
4. Check that the MODE LED turns on in green.

During user CPU restarting, the U RDY LED flashes.
When completed, U RDY LED is lit.

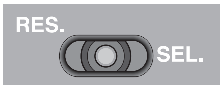
(b) Q12DCCPU-V



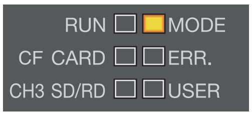
1. **Move the RESET/SELECT switch to the RESET position.**



2. **Check that the MODE LED goes off.**



3. **Move the RESET/SELECT switch back to the center.**



4. **Check that the MODE LED turns on in orange.**

Point

- For the remote reset operation, refer to the following.
  ☞ Page 163, Section 11.5
- Resetting CPUs No.2-4 in multiple CPU system
  You cannot reset CPU modules No.2-4 individually.
  When you reset any one of No.2 through No.4 during operations of the multiple CPU system, an error occurs in the other modules.
  In this case, the entire multiple CPU system is down regardless of the operation mode set in Multiple CPU Setting (All station stop by stop error of PLC2-PLC4/Continue).

6.4 Restarting User CPU

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

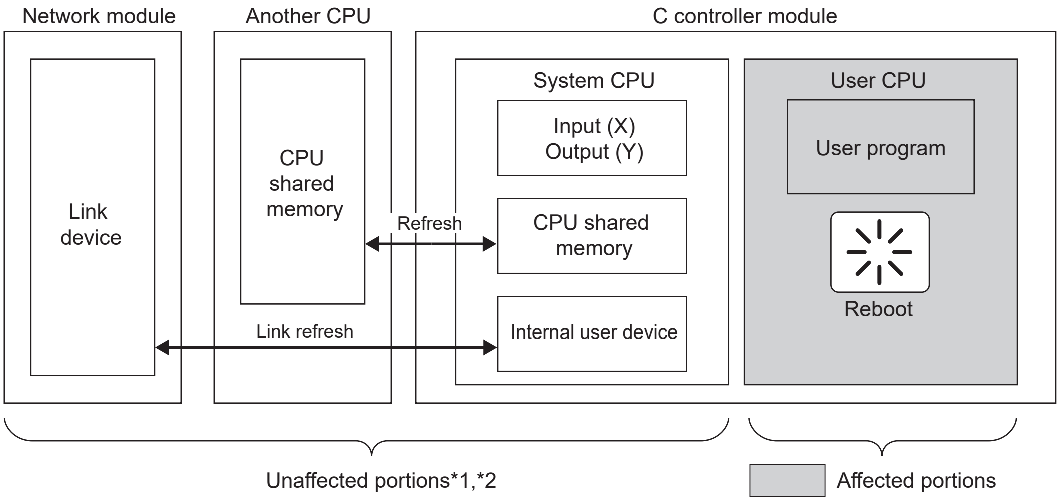
User CPU restarting is an operation to apply the changes made in the user program while the system is running. You may restart the user CPU by operating U RST/P1/P2 switches.
In addition, user CPU restarting is also possible from Setting/monitoring tools for the C Controller module or user program.

Point

- In any of the following conditions, do not restart the user CPU.
  - Accessing to the SD memory card
  - Accessing to the USB device
  - Accessing to the standard ROM or user files in the standard RAM
- Before restarting the user CPUs, check that:
  - the CPU operation status is STOP;
  - the user program stop and close operations are performed;
  - file operations are not in process;
  - the U RDY LED is not flashing (user CPUs preparing for operations).

(1) Components influenced by user CPU restarting

User CPU restarting will apply any change in the user program.
For components influenced by restarting, refer to the following figure.



*1 : Input (X), output (Y), internal user device and CPU shared memory values will be retained.
*2 : Link refreshing with the network module and refreshing with the CPU shared memory will be continued.

Point

- To apply any change in parameter settings, reset the system. User CPU restarting does not apply parameter setting changes.
- To clear input (X), output (Y), internal user device and CPU shared memory values, reset the entire system or clear the respective device(s).
- For initial processing for the entire system by the user program, execute the initial processing again after user CPU restarting, or reset the entire system.

(2) Setting method

Set the following setting item to "Enable" through Setting/monitoring tools for the C Controller module.

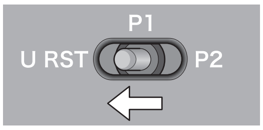
- **"CCPU Parameter" ⇒ <<System settings>> ⇒ "Restart user CPU"**

(3) Methods

There are 3 ways to execute user CPU restarting, which are described in the following pages.

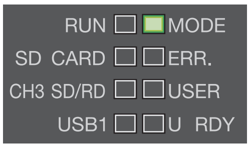
- **By switch operations**
  Switch operations are described below.

1. **Set the CPU operation status to STOP.**



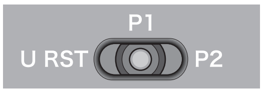
2. **Move the U RST/P1/P2 switch to the U RST position.**

Do not release the switch while pulling it down.



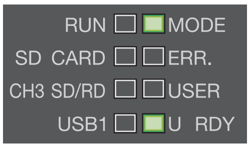
3. **Check that the U RDY LED goes off.**

During user CPU restarting, the U RDY LED flashes.



4. **Move the U RST/P1/P2 switch back to the ”P1” position.**

Release the switch then it returns to its center position.



5. **Check that the U RDY LED is lit.**

- **Using Setting/monitoring tools for the C Controller module**
  [Online] ⇒ [Remote Operation]
- **Using user program Note6.2**
  Restart the user CPU by executing the C Controller module dedicated function (CCPU_Restart function).
  The following shows the function(s) used for restarting user CPU.

Function name	Function
CCPU_Restart	Restarts the user CPUs on the C Controller module.

Point

For the remote reset operation, refer to the following.
☞ Page 163, Section 11.5

(4) How to check user CPU restarting from the other CPUs

To check if the C Controller module is restarting the user CPU, refer to the "LED Status" in the "Host CPU operation information area" in the CPU shared memory. (☞ Page 252, Section 14.1.1)
If the "U RDY" LED value in "LED Status" is other than "1: On", the user CPU are preparing for operations and the user program never runs.

Note6.2 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

6.5 Hardware Diagnostics

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Hardware diagnostics is a test to check the hardware within the C Controller module.

Hardware diagnostics is useful in the following situations:

- Initial operation
- Troubleshooting

Point

During hardware diagnostics, do not power OFF or reset the C Controller system.
Otherwise, the C Controller module may no longer be started up normally.
If such situation occurs, initialize the C Controller module.
☞ Page 62, Section 6.1

6.5.1 Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

(1) Diagnostics types

In the hardware diagnostics test, diagnostics on the following items are performed.

(a) Q24DHCCPU-V/-VG

Mode	Dot matrix LED display	Diagnostic item	Description
0	M-00	Diagnostic test of Mode 1 to Mode 6	Conducts tests in the order from Mode 1 to Mode 6.
1	M-01	ROM diagnostic test	Reads the ROM data and performs error detection.
		Work RAM diagnostic test	Checks test data by writing/reading/verifying them on the work RAM.
		Battery backup RAM diagnostic test	Checks test data by writing/reading/verifying them on the battery backup RAM.
2	M-02	Ethernet diagnostic test	Diagnoses the status of the Ethernet port (CH1, CH2 and S CH1).
3	M-03	SD memory card interface diagnostic test	Diagnoses the SD memory card slot status.
4	M-04	RS-232 diagnostic test	Conducts a self-loopback test of RS-232 connector (CH3). The wiring for self-loopback is required.
5	M-05	USB diagnostic test	Diagnoses the status of the USB connector (USB1, USB2).
6	M-06	Bus diagnostic test	Writes/reads/verifies the memory of the internal bus and register.
7	M-07	Dot matrix LED test	Shows the dot matrix LED test display.

(b) Q24DHCCPU-LS and Q26DHCCPU-LS

Mode	Dot matrix LED display	Diagnostic item	Description
0	M-00	Diagnostic test of Mode 1 to Mode 6	Diagnoses in order of Mode 1 → Mode 2 → Mode 5 → Mode 6.
1	M-01	Battery backup RAM diagnostic test	Checks test data by writing/reading/verifying them on the battery backup RAM.
2	M-02	Ethernet diagnostic test	Diagnoses the status of the Ethernet port (S CH1).
5	M-05	USB diagnostic test	Diagnoses the status of the USB connector (USB2).
6	M-06	Bus diagnostic test	Writes/reads/verifies the memory of the internal bus and register.
7	M-07	Dot matrix LED test	Shows the dot matrix LED test display.

(2) Operating procedure

(a) Preparation

Before performing the hardware diagnostics test on the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS, take the steps listed below:

1. **Install the module.**

Install the power supply module and the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS to the base unit.
Insert the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS into the CPU slot.
Do not install any module other than a power supply module and the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.

Point

● For C Controller modules listed below, the hardware diagnostics can be performed even when the module is mounted on the slot other than the CPU slot.
To perform the hardware diagnostics with the module mounted on the slot other than the CPU slot, mount another CPU module on the CPU slot.
Although an error may be detected on the CPU module mounted on the CPU slot, the hardware diagnostics can be performed.

- Q24DHCCPU-V with a serial number whose first five digits are "15042"
- Q24DHCCPU-VG

2. **Check the wiring.**

Check that the power supply wiring is property arranged.
Do not connect any cable other than power supply cables.

3. **Prepare for respective diagnostics as necessary. (☞ Page 77, (2)(b) in this section)**

4. **Power on.**

Check that the power supply voltage is within the specified range.
Check that the RUN/STOP/MODE switch is positioned in STOP.

(b) Necessary preparations for each diagnostics

Before performing each hardware diagnostics test, take the steps listed below.

- When executing Mode 0

  Perform all preparation tasks for executing the following mode from 1 to 6.
- When executing Mode 1

  Back up all data in the standard ROM and battery backup RAM data.

Remark

- ● Backup of data in the standard ROM For "-LS", consult with the partner (operating system vendor).

  Use the FTP function to backup the standard ROM data to the PC. (☞ Page 197, Section 12.1.2)

- ● Backup of battery backup RAM data For "-LS", consult with the partner (operating system vendor).

  From [Online] ⇒ [Battery backup RAM monitor] in Setting/monitoring tools for the C Controller module, or by using the C Controller module dedicated function (CCPU_ReadSRAM function), read out the contents and save data in any location other than in the standard ROM, e.g. your PC.

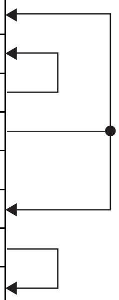
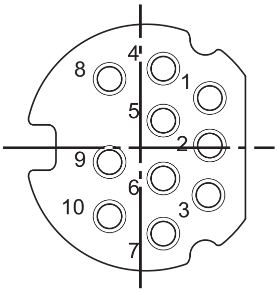
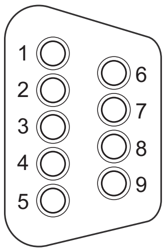
- When executing Mode 2

  Check that no cable is connected to the Ethernet port (CH1, CH2 and S CH1).
- When executing Mode 3

  Check that the SD memory card is not installed.
- When executing Mode 4

  Connect a cable to RS-232 connector (CH3) as shown below.

  The table below shows the connector pin positions and cable connection.

Pin No.	Signal code	Signal name	Cable connection	C controller module	Q12DCCPU-CBL RS-232 device side
1	CD(DCD)	Data Carrier Detect			
2	RD(RXD)	Received Data			
3	SD(TXD)	Transmitted Data			
4	ER(DTR)	Data Terminal Ready			
5	SG	Signal Ground			
6	DR(DSR)	Data Set Ready			
7	RS(RTS)	Request To Send			
8	CS(CTS)	Clear To Send			
9	CI(RI)	Ring Indicator			
10	SG	Signal Ground			

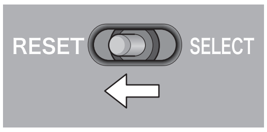
- When executing Mode 5

  Check that no cable is connected to the USB connectors (USB1 and USB2).
- When executing Mode 6

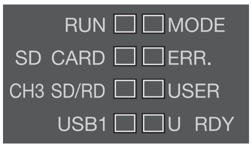
  No preparation tasks for this mode.

(c) Test mode selection

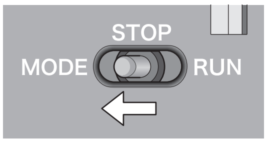
Perform the following operations to select a test mode to execute.



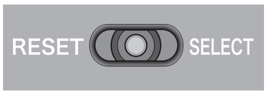
1. **Move the RESET/SELECT switch to the RESET position.**
   Do not release the switch while pulling it down.



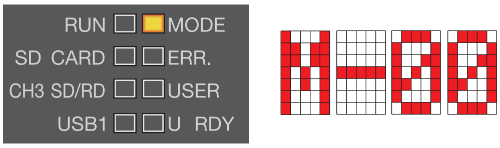
2. **Check that the LED goes off.**



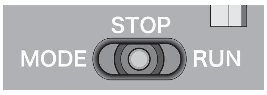
3. **Move the RUN/STOP/MODE switch to the MODE position.**
   Do not release the switch while pulling it down.



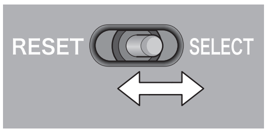
4. **Move the RESET/SELECT switch back to the center.**
   Release the switch then it returns to its center position.

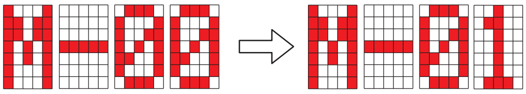


5. **Check that the MODE LED turns on in orange.**
   Dot matrix LED indicates "M-00".



6. **Move the RUN/STOP/MODE switch back to the STOP position.**
   Release the switch then it returns to its center position.

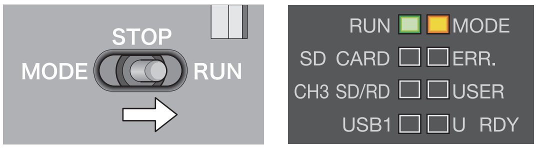


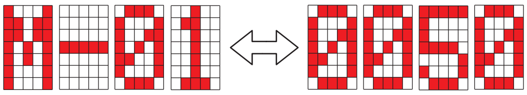


7. **Move the RESET/SELECT switch to the SELECT position.**
   Each time you move the switch to the SELECT position, the mode changes and a value representing the respective mode is displayed by the LEDs.
   Repeat this step until the dot matrix LED shows the desired mode.

(d) Execution of the test (mode 0-6)

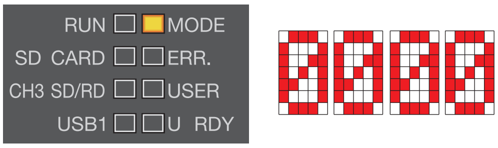
Perform the following operations to execute the test.





1. **Move the RUN/STOP/MODE switch to the RUN position.**
   While the test is running, RUN LED is flashed green.

   The dot matrix LED shows the current mode and progress alternately.
   [Example] "M-01" ← Alternately displayed → "0050" (progress)



2. **Check that the RUN LED goes off.**
   When the test is completed normally, the dot matrix LED shows "0000".
   If other than "0000" is shown, refer to the following.
   ☞ Page 79, (2)(e) in this section
3. **Power OFF.**

(e) If the dot matrix LED shows other than "0000"

The "ERR." LED starts flashing once the error is detected during diagnostics or setting.
A value corresponding to the diagnostics for which the error occurred is displayed on the dot matrix LED.
If the dot matrix LED is off and only "ERR." LED flashes, a system error is present.

Mode	Dot matrix LED display	Error diagnostics
1	E010, E011	ROM diagnostic test
	E020, E021	Work RAM diagnostic test
	E031	Battery backup RAM diagnostic test
2	E040	Ethernet diagnostic test (CH1)
	E050	Ethernet diagnostic test (CH2)
	E061	Ethernet diagnostic test (S CH1)
3	E080	SD memory card interface diagnostic test
4	E090	RS-232 diagnostic test [*1]
5	E0A0, E0A1	USB diagnostic test
6	E0B1	Bus diagnostic test
-	E101	(Occurred in system CPU and user CPU control)

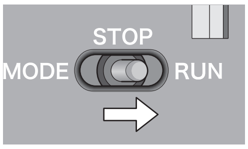
*1 : An error may occur if a distribution cable is not connected correctly.
Correctly connect and distribute the cable again, and then reexecute the self-diagnostic test for Mode 4.

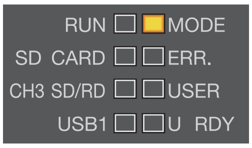
Upon detection of the failure, the diagnostics and setting will be terminated.

Retry the diagnostics and setting if they failed.
If failure is detected again, the hardware of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS may be faulty.
Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

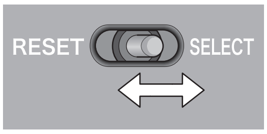
(f) Execution of the dot matrix LED test (mode 7)

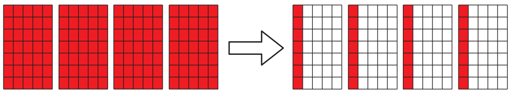
Perform the following operations to execute the test.





1. **Move the RUN/STOP/MODE switch to the RUN position.**





2. **Move the RESET/SELECT switch to the SELECT position.**
Each time you move the switch to the SELECT position, the dot matrix LED is turned on/off in order from the all-on status.
Visually check the displayed status.

3. **Power OFF.**

Point

Visually check there is no inactive dot in the 4-digit dot matrix LED.
If there is any inactive LED, the hardware of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS may be faulty.
Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

6.5.2 Q12DCCPU-V

(1) Diagnostics types

In the hardware diagnostics test, diagnostics on the following items are performed.

Mode	7-segment LED display	Diagnostic item	Description
0	00	Diagnostic test of Mode 1 to Mode 6	Conducts tests in the order from Mode 1 to Mode 6.
1	01	ROM diagnostic test	Reads the ROM data and performs error detection.
		Work RAM diagnostic test	Checks test data by writing/reading/verifying them on the work RAM.
		Battery backup RAM diagnostic test	Checks test data by writing/reading/verifying them on the battery backup RAM.
2	02	Ethernet diagnostic test	Diagnoses the status of the Built-in Ethernet port (CH1 and CH2).
3	03	CompactFlash card interface diagnostic test	Diagnoses the Compact flash card slot status.
4	04	RS-232 diagnostic test	Conducts a self-loopback test of RS-232 connector (CH3). The wiring for self-loopback is required.
5	05	USB diagnostic test	Diagnoses the status of the USB connector.
6	06	Bus diagnostic test	Writes/reads/verifies the memory of the internal bus and register.
7	07	7-segment LED test	Shows the 7-segment LED test display.

(2) Operating procedure

(a) Preparation

Before performing the hardware diagnostics test on the Q12DCCPU-V, take the steps listed below:

1. Install the module.

Install the power supply module and the Q12DCCPU-V to the base unit.
Insert the Q12DCCPU-V into the CPU slot.
Do not install any module other than a power supply module and the Q12DCCPU-V.

Point

- For Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or higher, the hardware diagnostics can be executed even if the module is mounted on the slot other than the CPU slot. When executing the hardware diagnostics with mounting Q12DCCPU-V (Extended mode) other than CPU slot, mount another CPU module on the CPU slot.
  - Although an error may be detected on the CPU mounted on the CPU slot, the hardware diagnostics can be executed.

2. Check the wiring.

Check that the power supply wiring is property arranged.
Do not connect any cable other than power supply cables.

3. Prepare for respective diagnostics as necessary. (☞ Page 77, (2)(b) in this section)

4. Power on.

Check that the power supply voltage is within the specified range.
Check that the RUN/STOP/MODE switch is positioned in STOP.

(b) Necessary preparations for each diagnostics

Before performing each hardware diagnostics test, take the steps listed below.

- When executing Mode 0

  Perform all preparation tasks for executing the following mode from 1 to 6.
- When executing Mode 1

  Back up all data in the standard ROM and battery backup RAM data.

Remark

- ● Backup of data in the standard ROM

  Use the FTP function to backup the standard ROM data to the PC. (☞ Page 197, Section 12.1.2)
- ● Backup of battery backup RAM data

  From [Online] ⇒ [Battery backup RAM monitor] in Setting/monitoring tools for the C Controller module, or by using the C Controller module dedicated function (CCPU_ReadSRAM function), read out the contents and save data in any location other than in the standard ROM, e.g. your PC.

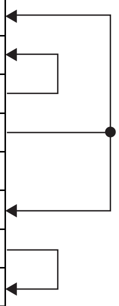
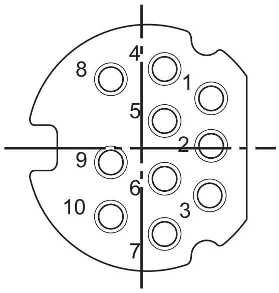
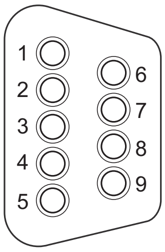
- When executing Mode 2

  Built-in Ethernet port (CH1 and CH2) by an Ethernet cable (crossing cable).
- When executing Mode 3

  Install a CompactFlash card.
- When executing Mode 4

  Connect a cable to RS-232 connector (CH3) as shown below.

  The table below shows the connector pin positions and cable connection.

Pin No.	Signal code	Signal name	Cable connection	C controller module	Q12DCCPU-CBL RS-232 device side
1	CD(DCD)	Data Carrier Detect			
2	RD(RXD)	Received Data			
3	SD(TXD)	Transmitted Data			
4	ER(DTR)	Data Terminal Ready			
5	SG	Signal Ground			
6	DR(DSR)	Data Set Ready			
7	RS(RTS)	Request To Send			
8	CS(CTS)	Clear To Send			
9	CI(RI)	Ring Indicator			
10	SG	Signal Ground			

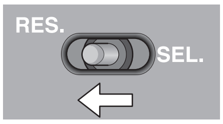
- When executing Mode 5

  Check that no cable is connected to the USB connectors.
- When executing Mode 6

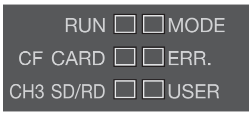
  No preparation tasks for this mode.

(c) Test mode selection

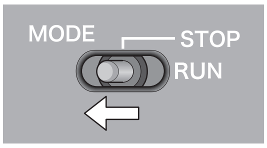
Perform the following operations to select a test mode to execute.



1. Move the RESET/SELECT switch to the RESET position.

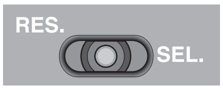


2. Check that the MODE LED goes off.

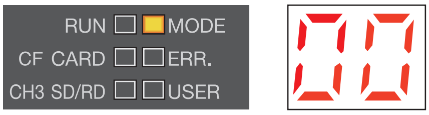


3. Move the RUN/STOP/MODE switch to the MODE position.

Do not release the switch while pulling it down.

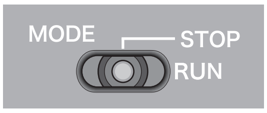


4. Move the RESET/SELECT switch back to the center.



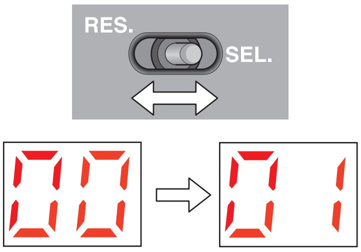
5. Check that the MODE LED turns on in orange.

7-segment LED indicates "00".



6. Move the RUN/STOP/MODE switch back to the STOP position.

Release the switch then it returns to its center position.



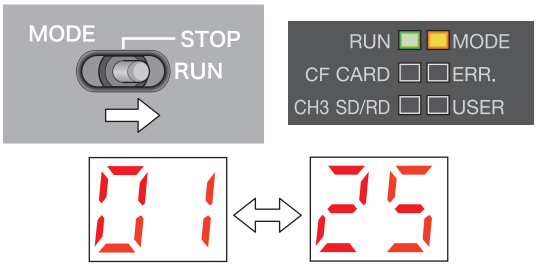
7. Move the RESET/SELECT switch to the SELECT position.

Each time you move the switch to the SELECT position, the mode changes and a value representing the respective mode is displayed by the LEDs.

Repeat this step until the 7-segment LED shows the desired mode.

(d) Execution of the test (mode 0-6)

Perform the following operations to execute the test.

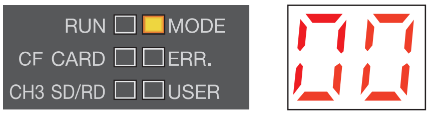


1. Move the RUN/STOP/MODE switch to the RUN position.

While the test is running, RUN LED is flashed green.

The 7-segment LED shows the current mode and progress alternately.

[Example] "01" ← Alternately displayed → "25" (progress)



2. Check that the RUN LED goes off.

When the test is completed normally, the 7-segment LED shows "00".

If other than "00" is shown, refer to the following.

☞ Page 83, (2)(e) in this section

3. Power OFF.

(e) If the 7-segment LED shows other than "00"

The "ERR." LED starts flashing once the error is detected during diagnostics or setting.
A value corresponding to the diagnostics for which the error occurred is displayed on the 7-segment LED.
If the 7-segment LED is off and only "ERR." LED flashes, a system error is present.

Mode	7-segment LED display	Error diagnostics
1	E1	ROM diagnostic test
	E2	Work RAM diagnostic test
	E3	Battery backup RAM diagnostic test
2	E4	Ethernet diagnostic test (CH1)
	E5	Ethernet diagnostic test (CH2)
	E6	During Ethernet loopback test
3	E7	CompactFlash card interface diagnostic test[*1]
4	E8	RS-232 diagnostic test [*2]
5	E9	USB diagnostic test
6	EA	Bus diagnostic test

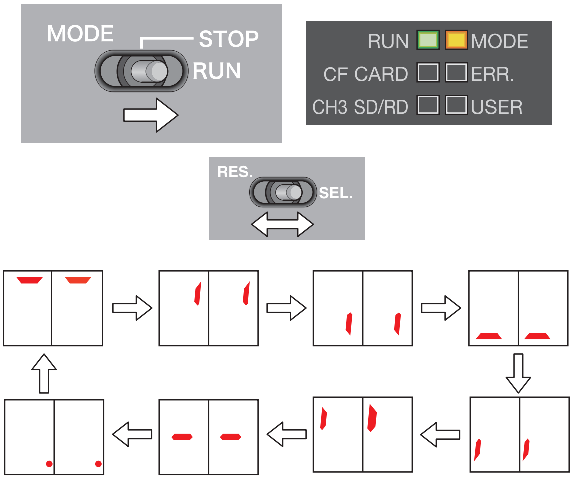
*1 : An error may occur if a CompactFlash card is not inserted.
*2 : An error may occur if a distribution cable is not connected correctly.
Correctly connect and distribute the cable again, and then reexecute the self-diagnostic test for Mode 4.

Upon detection of the failure, the diagnostics and setting will be terminated.

Retry the diagnostics and setting if they failed.
If failure is detected again, the hardware of the Q12DCCPU-V may be faulty.
Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

(f) Execution of the 7-segment LED test (mode 7)

Perform the following operations to execute the test.



1. **Move the RUN/STOP/MODE switch to the RUN position.**

2. **Move the RESET/SELECT switch to the SELECT position.**

The mode shifts as pull the switch to SELECT side, each segment of 7 segment LED turns ON/OFF in order.
Check the display status by visually.

3. **Power OFF.**

Point

Visually check there is no inactive dot in the 7-segment LED.
If there is any inactive LED, the hardware of the Q12DCCPU-V may be faulty.
Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

Memo

PART 2 HARDWARE DESIGN, MAINTENANCE AND INSPECTION

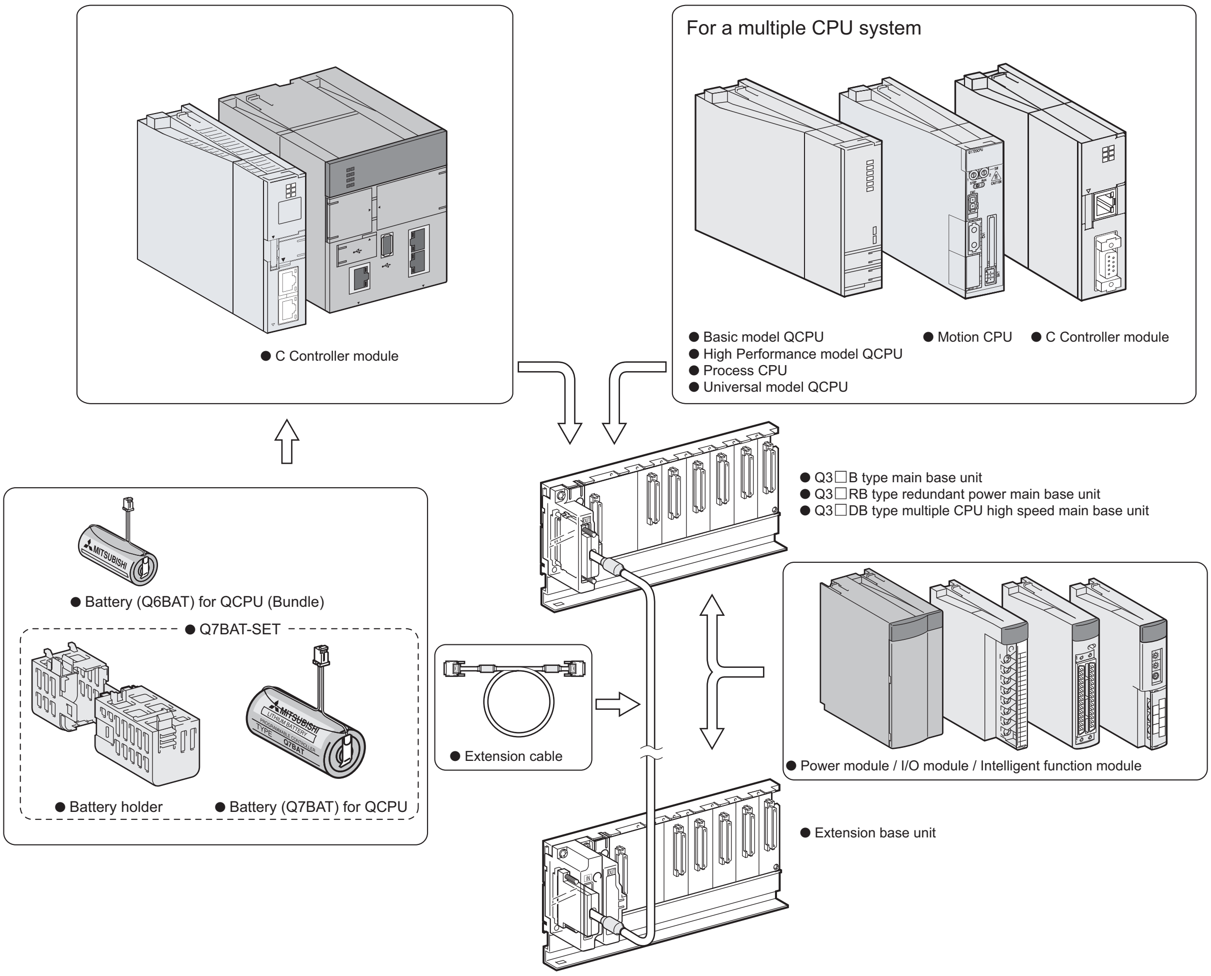
This section describes items related to hardware design, maintenance and inspection.

CHAPTER 7 SYSTEM CONFIGURATION

This chapter describes the overall configuration, precautions for configuration and peripherals.

7.1 Overall Configuration

The overall configuration of the C Controller system is illustrated below.


● C Controller module
For a multiple CPU system
● Basic model QCPU
● High Performance model QCPU
● Process CPU
● Universal model QCPU
● Motion CPU
● C Controller module
● Q3□B type main base unit
● Q3□RB type redundant power main base unit
● Q3□DB type multiple CPU high speed main base unit
● Battery (Q6BAT) for QCPU (Bundle)
● Q7BAT-SET
● Battery holder
● Battery (Q7BAT) for QCPU
● Extension cable
● Power module / I/O module / Intelligent function module
● Extension base unit

For details, refer to the following.

Item	Reference
Main base unit/Power supply module	Page 88, Section 7.3.1
Extension base unit/Extension cable	Page 88, Section 7.3.2
Battery	Page 90, Section 7.3.3
Multiple CPU system configuration	Page 91, Section 7.4
I/O module/Intelligent function module	Page 96, Section 7.5

Point

For proper system configuration, observe the precautions described in the following section.
☞ Page 87, Section 7.2

7.2 Precautions for System Configuration

This section explains the precautions for configuring the system.

(1) Restrictions on the number of mountable modules

Modules with constraints on the number of installations are listed below.

Restricted modules		Restrictions of number of mountable modules		
Product	Model	Per C Controller module		Per multiple CPU system
CC-Link IE Controller Network module	QJ71GP21-SX QJ71GP21S-SX	Up to 4	Up to 4	(Same as the left)
MELSECNET/H network module	QJ71BR11 QJ71LP21G QJ71LP21GE QJ71LP21-25 QJ71LP21S-25	Up to 4 (PLC to PLC network/ Remote I/O Network)		
CC-Link IE Field Network master/local module	QJ71GF11-T2	No restriction*1		(Same as the left)
CC-Link system master/local module	QJ61BT11 QJ61BT11N	Up to 8		No restriction
Interrupt module	QI60 QX40H*2 QX70H*2 QX80H*2 QX90H*2	1*3		Up to 4*3
High-speed data logger module	QD81DL96	1		Up to 4 (Note that, only 1 can be controlled by 1 CPU module)
GOT	GOT1000series GOT2000series (only when in bus connection)*4	Up to 5		(Same as the left)

*1 : Only up to 8 modules can be network parameters set and controlled by Setting/monitoring tools for C Controller module.
There is not restrictions on the number of mountable modules on the buffer memory for the network module.
For how to set the parameters by buffer memory, refer to the following.
📖 MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual

*2 : The module is available only when the interrupt module is selected by setting the function selector switch (SW2) to OFF.

*3 : With interrupt event settings activated, the number of installations is not restricted.

*4 : For applicable GOT models, refer to the following.
📖 Connection manuals for GOT2000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS/Fieldbus Products, Peripherals)
📖 Connection manuals for GOT1000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS Products, Peripherals)

Remark

If the No.1 module is other CPU module than the C Controller module, refer to the manual for the No.1 CPU module used for modules with restriction on the number of installations.

(2) Time adjustment and time notification of GOT

For multiple CPU system configuration, the No.1 CPU module is the target when performing time adjustment and time notification by GOT connected to the No.2 to No.4 C Controller modules. Synchronize the clocks of No.2-4 modules with that of the No.1.

(3) Total current consumption

The total current consumption for system configuration must not exceed the power supply module's rated output current of DC5V. For specifications of the power supply module, refer to the manual for respective modules.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

7.3 Basic Configuration (Single CPU System Configuration)

Described in this section is the basic configuration with a C Controller module.

7.3.1 Main base unit/power supply module

The power supply module and main base units available for the C Controller system are listed below.
For details of each power supply module and main base units, refer to the following.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Type		Model
Power supply module	Q series power supply module	Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q62P, Q63P, Q64P, Q64PN, Q63RP, Q64RP
Main base unit	Main base unit	Q33B, Q35B, Q38B, Q312B
	Redundant power main base unit	Q38RB
	Multiple CPU high speed main base unit	Q35DB, Q38DB, Q312DB

7.3.2 Extension base unit/extension cable

Use an extension base unit that can be combined with a main base unit available for the C Controller system. For details of each extension base unit and extension cable, refer to the following.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

(1) Upper limit of extensions and mountable modules

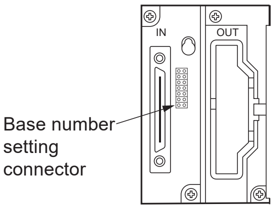
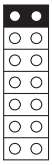
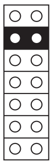
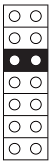
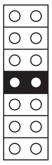
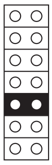
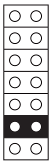
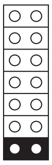
The upper limit of extensions on the C Controller system is as follows:

Item	Description
Maximum number of extension bases of extension base unit	7 extension bases
Maximum number of I/O modules	65 modules - (the number of available CPU slots) (Up to 62 slots)
Maximum total extension cable length	13.2m

(2) Extension stage number setting

To use 2 or more extension base units, it is necessary to set the extension base number by the extension base number setting connector on the extension base unit.

When a C controller module is used, extension base number can be up to 7.

Base number setting connector	Extension stage number setting						
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
							

For details of base number setting procedures, refer to the following.

📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Point

- Set extension base numbers in the order of connection, starting from the extension base unit connected to the main base unit.
- Set correct extension base number for the base number setting connector. Do not set the same extension base number for two or more extension base units and do not skip extension base number setting. Doing so may cause incorrect input or incorrect output.
- If an extension stage number is skipped, it will not be reserved as the number for an empty base unit. To reserve an extension stage, perform the base unit setting in the <<I/O assignment settings>> of parameter.
☞ Page 303, Section 16.3

7.3.3 Battery

The batteries available for the C Controller module are listed below.

(1) Specifications

Item	Model	
	Q6BAT	Q7BAT
Type	Manganese dioxide lithium primary battery	
Initial voltage	3.0V	
Nominal current capacity	1800mAh	5000mAh
Battery life when stored	Actual 5 years (room temperature)	
Battery life when used	☞ Page 483, Appendix 8	
Lithium content	0.57g[*1]	1.55g
Application	Backup of the battery backup RAM data, Backup of clock data	
Accessories	–	Battery holder [*2]

*1 : The lithium content of batteries manufactured in July 2017 or earlier differs from this list.
For details, refer to the following.

- Changes in battery parts (FA-A-0242)

*2 : Supplied only with Q7BAT-SET.

(2) Precautions

During use, observe the following precautions. Improper use of batteries may corrupt the battery backup RAM data and clock data.

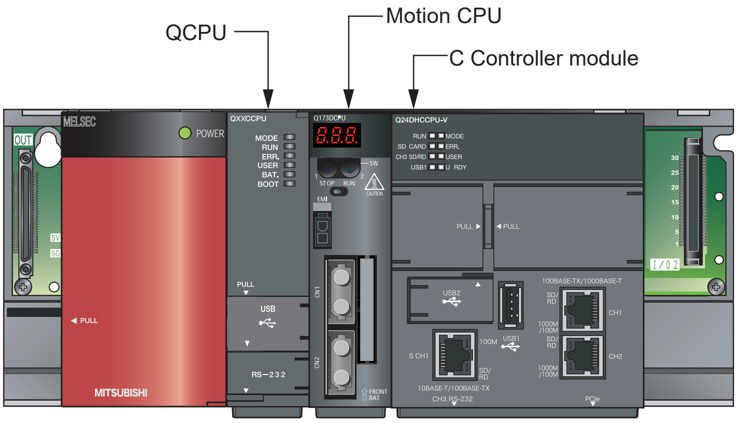
- Use the C Controller module with a battery installed.
- For operations without any battery, use the battery less drive function.
- If any battery error has occurred, replace the battery.
- Follow the procedures in this document for installation and replacement of batteries.

Remark

- For battery installation procedures, refer to ☞ Page 119, Section 8.3.
- For battery replacement procedures, refer to ☞ Page 136, Section 9.3.
- For details of battery less drive, refer to ☞ Page 190, Section 11.11.
- For battery lifetime, refer to ☞ Page 483, Appendix 8.
- For battery regulations applicable in EU countries and precautions for battery transportation, refer to the following.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

7.4 Multiple CPU System Configuration

A multiple CPU system consists of two or more CPU modules mounted on a main base unit, and each CPU module controls I/O module(s) and/or intelligent function module(s) individually.
For concepts of the multiple CPU system, refer to the following.
📖QCPU User's Manual (Multiple CPU System)



7.4.1 Supported CPU modules

CPU modules available for the C Controller module and multiple CPU system are listed in the table below:

○: Compatible, –: Incompatible

CPU module			Base unit		
			Q3□B	Q3□DB	Q3□RB
QCPU	Basic model QCPU	Q00CPU, Q01CPU	○	○	–
	High Performance model QCPU	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU			○
	Process CPU	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU			○
	Universal model QCPU	Q00UCPU, Q01UCPU, Q02UCPU			–
		Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU			○
Motion CPU		Q172DCPU, Q173DCPU, Q172DCPU-S1, Q173DCPU-S1, Q172DSCPU[*1], Q173DSCPU[*1]	–	○	–
C Controller module		Q06CCPU-V, Q12DCCPU-V (Basic mode)	○	○	–
		Q12DCCPU-V (Extended mode), Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS	○	○	○

[*1] : The advanced synchronous control method can be used only for the following C Controller modules.
- Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "16012" or higher
- Q24DHCCPU-V with a serial number whose first five digits are "16012" or higher
- Q24DHCCPU-VG

Remark

For details of each module, refer to the manual for respective modules.

7.4.2 Combination of CPU modules

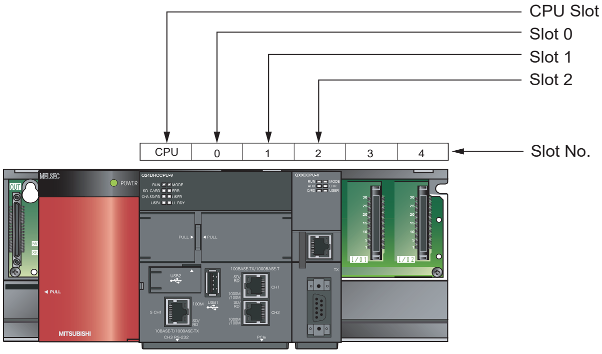
Described in this section is possible CPU module combination in the multiple CPU system by using a C Controller module.
For combination of CPU modules for other than this product, refer to the manual for respective CPU module.

–: Incompatible

CPU No.1		Number of CPUs that can be mounted as CPU No.2 or others									Maximum number of mountable modules (including CPU No.1)
		High Performance model QCPU Process CPU Universal model QCPU	Motion CPU	C Controller module							
				Q06CCPU -V	Q12DCCPU-V		Q24DHCCPU			Q26DHC CPU -LS	
					Basic mode	Extended mode	-V	-VG	-LS		
Basic model QCPU		📖QCPU User's Manual (Multiple CPU System)				1	1				3
High Performance model QCPU/ Process CPU						1	1				4
Universal model QCPU	Q00UCPU, Q01UCPU, Q02UCPU					1	1				3
	Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU					1	1				4
C Controller module	Q06CCPU-V	📖C Controller Module User's Manual (Hardware Design and Functions)				1	1				4
	Q12DCCPU-V (Basic mode)					1	1				4
	Q12DCCPU-V (Extended mode)	–	1	–	1	1	1				4
	Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS	–	1	–	1	1	1				2

7.4.3 Mounting position

The C Controller module can be mounted in the base unit CPU slot and slots 0 through 2.

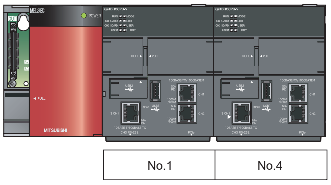


(1) Parameter setting precautions

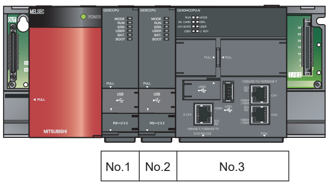
(a) I/O assignment setting

As the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS is 3-slot, set 2 slots at the right to "Empty" or "CPU (Empty)" to set parameter I/O assignment.

- Setting example with 2 Q24DHCCPU-V installed

Installation example	Slot	Type	Model	Number of points
	CPU Slot	CPU No.1	Q24DHCCPU-V	–
	Slot 0	CPU (Empty)	(Slot 2)	–
	Slot 1	CPU (Empty)	(Slot 3)	–
	Slot 2	CPU No.4	Q24DHCCPU-V	–
	Slot 3	Empty	(Slot 2)	0 point
	Slot 4	Empty	(Slot 3)	0 point

- Setting example with 2 QCPUs and a Q24DHCCPU-V installed

Installation example	Slot	Type	Model	Number of points
	CPU Slot	CPU No.1	Q06UDHCPU	–
	Slot 0	CPU No.2	Q06UDHCPU	–
	Slot 1	CPU No.3	Q24DHCCPU-V	–
	Slot 2	CPU (Empty)	(Slot 2)	–
	Slot 3	Empty	(Slot 3)	0 point

(b) Number of CPUs setting

The number of CPUs set in the Multiple CPU Setting in Parameter for Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS is as follows:

<table>
<tr><th colspan="4">CPU module position</th><th rowspan="2">Number of CPU modules</th><th rowspan="2">Number of parameter CPUs</th></tr>
<tr><th>CPU Slot</th><th>Slot 0</th><th>Slot 1</th><th>Slot 2</th></tr>
<tr><td colspan="3" rowspan="7">Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS</td><td>Q24DHCCPU-V</td><td rowspan="7">2</td><td rowspan="7">4</td></tr>
<tr><td>Q24DHCCPU-VG</td></tr>
<tr><td>Q24DHCCPU-LS</td></tr>
<tr><td>Q26DHCCPU-LS</td></tr>
<tr><td>Q12DCCPU-V
(Basic mode)</td></tr>
<tr><td>Q12DCCPU-V
(Extended mode)</td></tr>
<tr><td>CPU module</td></tr>
</table>

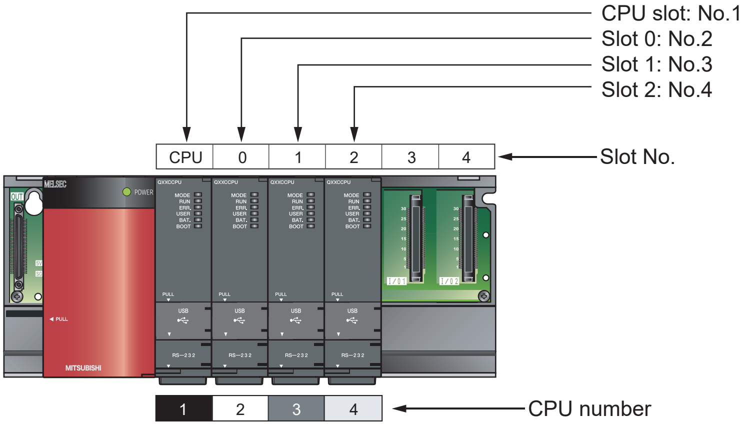
(2) Precautions for combination with CPU module(s) other than this product

Observe the following precautions for combination:

- QCPU cannot be installed to the right of any C Controller module.
  (If the C Controller module is No.1, QCPU cannot be installed.)
- There is no priorities for mount positions of C Controller module and Motion CPUs.
- For precautions regarding to mount positions of CPU modules other than this product, refer to the manual for respective module.
- If a QCPU is No.1, refer to the following for precautions regarding to its mount position.
  📖 QCPU User's Manual (Multiple CPU System)

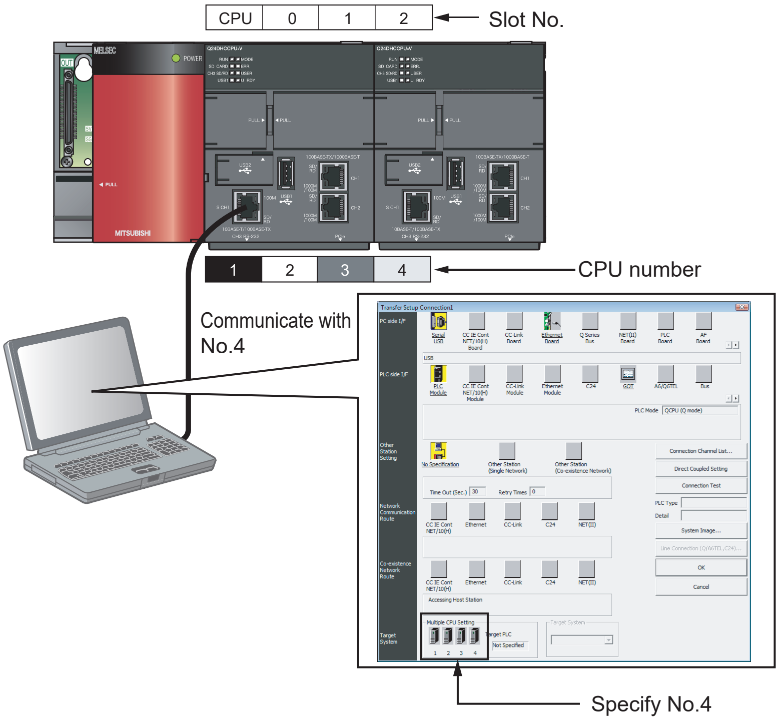
7.4.4 CPU number

CPU numbers are allocated for identifying the CPU modules mounted on the main base unit in the multiple CPU system. CPU No.1 is allocated to the CPU slot, and CPU No.2, No.3 and No.4 are allocated to the right of the CPU No.1 in this order.



CPU No's are used for setting by setting monitoring tools for the C Controller module or GX Works2.

- Specifying the connection target



USB

PLC Mode QCPU (Q mode)

Time Out (Sec.) 30 Retry Times 0

Accessing Host Station

Target PLC Not Specified

- Specify a control CPU for I/O assignment setting and the target CPU for the multiple CPU setting in parameter settings.

Remark

- For Setting/monitoring tools for the C Controller module, refer to the following.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

7.5 I/O Module/Intelligent Function Module

This section describes I/O modules and intelligent function modules that can be used with the C Controller module.

7.5.1 Applicable modules

Available I/O modules and intelligent function modules are listed below.
The MELSEC-AnS/Q2AS series I/O modules and special function modules are not applicable.
(For restrictions on the number of installations, refer to ☞ Page 87, Section 7.2)

Module type		Model	Restriction on support version
AC input module		Q series modules are applicable. For details, refer to the manual for respective modules.	–
DC input module			
DC/AC input module			
High-speed input module		QX40H, QX70H, QX80H, QX90H[*1]	–
Contact output module		Q series modules are applicable. For details, refer to the manual for respective modules.	–
Triac output module			
Transistor output module			
DC input/transistor output combined module			
High-speed output module		QY41H	–
Interrupt module		QI60	
		QX40H, QX70H, QX80H, QX90H[*2]	–
Analog conversion module	Inter-channel non-insulated	Q64AD, Q68ADV, Q68ADI, Q62DA, Q64DA, Q68DAV, Q68DAI	Use the product of function version B or later.
		Q64ADH, Q64DAH, Q62DAN, Q64DAN, Q68DAVN, Q68DAIN, Q68CT	–
	Channel-isolated	Q66DA-G, Q64AD-GH, Q62AD-DGH, Q62DA-FG, Q68AD-G, Q66AD-DG	–
Analog Input/Output Module		Q64AD2DA	–
Load Cell Input Module		Q61LD	–
Temperature control module		Q64TCTTN, Q64TCTTBWN, Q64TCRTN, Q64TCRTBWN	–
		Q64TCTT, Q64TCRT, Q64TCTTBW, Q64TCRTBW	Use the product of function version B or later.
Temperature input module	Inter-channel non-insulated	Q64RD	–
	Channel-isolated	Q64TD, Q68TD-G-H01, Q68TD-G-H02, Q68RD3-G	–
		Q64TDV-GH, Q64RD-G	Use the product of function version B or later.
High-speed counter		QD62, QD62D, QD62E, QD64D2, QD65PD2	–
Multi channel high-speed counter		QD63P6	–
Loop control module		Q62HLC	–
Channel-isolated pulse input module		QD60P8-G	–
MODBUS® interface module		QJ71MB91, QJ71MT91	–

*1 : The module is available only when the High-speed input module is selected by setting the function selector switch (SW2) to ON.
*2 : The module is available only when the interrupt module is selected by setting the function selector switch (SW2) to OFF.

Module type		Model	Restriction on support version
Positioning module		QD75M1, QD75MH1, QD75M2, QD75MH2, QD75M4, QD75MH4, QD74MH8, QD74MH16, QD70D4, QD70D8, QD72P3C3, QD75P1N, QD75P2N, QD75P4N, QD75D1N, QD75D2N, QD75D4N, QD73A1	–
		QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4, QD70P4, QD70P8	Use the product of function version B or later.
Energy measuring module		QE81WH, QE84WH, QE81WH4W, QE83WH4W, QE82LG	–
High-speed data logger module		QD81DL96	Use the product with a serial number whose first five digits are "12062" or higher.
High Speed Data Communication Module		QJ71DC96	–
FL-net module	Ver.1.00 specifications	QJ71FL71-T, QJ71FL71-B5	–
		QJ71FL71, QJ71FL71-B2	Use the product of function version B or later.
	Ver.2.00 specifications	QJ71FL71-T-F01, QJ71FL71-B5-F01	–
		QJ71FL71-F01, QJ71FL71-B2-F01	Use the product of function version B or later.
CC-Link IE Controller Network module		QJ71GP21-SX, QJ71GP21S-SX	Use the product with a serial number whose first five digits are "09042" or higher.
MELSECNET/H module		QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE, QJ71BR11	Use the product of function version B or later.
CC-Link IE Field Network master/local module		QJ71GF11-T2	Use the product with a serial number whose first five digits are "14082" or higher.
CC-Link module		QJ61BT11N	–
		QJ61BT11	Use the product of function version B or later.
CC-Link/LT module		QJ61CL12	Use the product of function version B or later.
Serial communication module[*3]		QJ71C24N, QJ71C24N-R2, QJ71C24N-R4	Use the product with a serial number whose first five digits are "10042" or higher.
PROFIBUS module		QJ71PB93D, QJ71PB92V	–
		QJ71PB92D	Use the product of function version B or later.
AS-i master module		QJ71AS92	Use the product of function version B or later.
AnyWire DB A20 master module		QJ51AW12D2	–
Web server module		QJ71WS96	Use the product with a serial number whose first five digits are "14022" or higher.

*3 : Only Non-Procedural protocol is supported.

Module type	Model	Restriction on support version
MES interface module	QJ71MES96	Use the product with a serial number whose first five digits are "12092" or higher.
ID interface module	QD35ID1, QD35ID2	–
Simple motion module	QD77MS2, QD77MS4, QD77MS16, QD77GF16	–
C Controller interface module	Q173SCCF	–
GP-IB module	EQGPIB	–
GOT	For applicable GOT models, refer to the following. 📖 Connection manuals for GOT2000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS/Fieldbus Products, Peripherals) 📖 Connection manuals for GOT1000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS Products, Peripherals)	

Remark

- Modules available for multiple CPU system
  The C Controller module can control I/O modules and intelligent function modules listed in this section as control modules. For modules controlled by the other CPUs (non-controlled modules), follow the specifications of each CPU module.
  For details of control modules, refer to the following.
  📖QCPU User's Manual (Multiple CPU System)

- Online change by multiple CPU system
  Although online module change for modules controlled by this product is not supported, modules controlled by the CPU modules with online module change function can be subject to online module change.

7.5.2 Operating precautions

This section explains the precautions for using I/O modules and intelligent function modules.For details of precautions, refer to the manual for respective modules.

Point

The instructions dedicated to intelligent function modules cannot be used for C Controller modules.

(1) Precautions for using a CC-Link IE Controller Network module

The following restrictions are applied to the CC-Link IE controller network module controlled by the C Controller module.

- The module cannot be used as a relay station for the data link transfer function or the routing function. When using either of these functions, use a CC-Link IE controller network module controlled by a programmable controller CPU as a relay station.
- The link dedicated instructions for the CC-Link IE controller network cannot be used. However, message communication function equivalent to SEND instruction/RECV instruction is available (☞ Page 221, Section 13.3.1).
- Interrupt sequence program start is not applicable.
- When accessing to a redundant CPU on another station, the system of the redundant CPU cannot be specified.
  Only host system access (station-numberspecified access) is available.
- The pairing setting for the redundant system is not applicable.

(2) Precautions for using a MELSECNET/H module

The following restrictions are applied to the MELSECNET/H module controlled by the C Controller module.

- The MELSECNET/H module cannot be used on a remote I/O network.
  Use of the module is allowed on a PLC-to-PLC network only.
- The module cannot be used as a relay station for the data link transfer function or the routing function. When using either of these functions, use a MELSECNET/H module controlled by a programmable controller CPU as a relay station.
- The link dedicated instructions for MELSECNET/H cannot be used. However, message communication function equivalent to SEND instruction/RECV instruction is available (☞ Page 221, Section 13.3.1).
- Interrupt sequence program start is not applicable.
- The network diagnostics (test) function is not available.
- The simple dual-structure network function is not applicable.
  (The network type cannot be set to "MNET/H standby station")
- When accessing to a redundant CPU on another station, the system of the redundant CPU cannot be specified.
  Only host system access (station-numberspecified access) is available.
- The mode cannot be set to "Debug mode".

(3) Precautions for using the CC-Link IE Field Network master/local module

The following restrictions are applied to the CC-Link IE field network master/local module controlled by the C Controller module.

- The module cannot be used as a relay station for the data link transfer function or the routing function. When using either of these functions, use a CC-Link IE field network master/local module controlled by a programmable controller CPU as a relay station.
- The link dedicated instructions for the CC-Link IE field network cannot be used. However, message communication function equivalent to SEND instruction/RECV instruction is available (☞ Page 221, Section 13.3.1).
- Interrupt sequence program start is not applicable.
- When accessing to a redundant CPU on another station, the system of the redundant CPU cannot be specified.
  Only host system access (station-number specified access) is available.
- The pairing setting for the redundant system is not applicable.
- It cannot be used as a sub-master station.

(4) Precautions for using a CC-Link module

The following restrictions are applied to the CC-Link module controlled by the C Controller module.

- The CC-Link dedicated instructions cannot be used.
- Interrupt sequence program start is not applicable.
- Automatic CC-Link start is not applicable.
- The standby master function cannot be used.
- The remote I/O network mode is not available.

(5) Precautions for using a serial communication module

The following restrictions are applied to the serial communication module controlled by the C Controller module.

- SLMP (MC protocol) and bidirectional protocol are not applicable.
  Only communication by the nonprocedural protocol is supported.
- Dedicated instruction for the serial communication module is not applicable.
- The programmable controller CPU monitoring function is not applicable.
- The modem function is not applicable.

The following settings are required for using an interrupt program.

- Set the interrupt event No. from [System settings] in Setting/monitoring tools for the C Controller module.
- Write "1" to the buffer memory (address 2010H/2110H) of the serial communication module.
- For the user program, use the bus interface function (QBF_WaitUnitEvent function) to receive interrupt event(s) and perform processing.

(6) Precautions for using an FL-net module

The following restrictions are applied to the FL-net module controlled by the C Controller module.

- The word block read/write request messages using the message transmission function cannot be received.
- The auto refresh function is not applicable.

(7) Precautions on interrupt processing

Interrupts are used for communications of the C Controller module.
These communications may be disabled if a program that disables interrupts is executed.
Also, communication may become slow if a program with frequent interrupts is executed.

(8) Precautions for using a MES interface module and Web server module

The following restrictions are applied to the MES interface module and Web server module controlled by the C Controller module.

- Only the control CPU is accessible. (Multiple CPU setting and other station setting are not supported.)
- Do not set B device to 60K or higher points in the device function settings for the C Controller module using a MES interface module with a serial number whose first five digits are "13092" or lower, or a Web server module with a serial number whose first five digits are "14022" or lower. Otherwise, access to the B device is denied.
- The dedicated instructions of Web server module are not supported.

(9) Precautions for using a High-speed data logger module

The following restrictions are applied to the High-speed data logger module controlled by the C Controller module.

- Only the control CPU is accessible. (Multiple CPU setting and other station setting are not supported.)
- High-speed sampling is not available.
- Do not set B device to 60K or higher points in the device function settings for the C Controller module using a High-speed data logger module with a serial number whose first five digits are "14062" or lower. Otherwise, access to the B device is denied.

(10)Precautions for using a High Speed Data Communication Module

The following restrictions are applied to the High Speed Data Communication Module controlled by the C Controller module.

- Only the control CPU is accessible. (Multiple CPU setting and other station setting are not supported.)
- High-speed sampling is not available.

(11)Precautions for access range of the multiple CPU system

For multiple CPU system, the access range varies among modules controlled by the host module (control modules) and those controlled by the other modules (non-controlled modules).
Following accesses to non-controlled modules are defined:

- Output to the output module, I/O combined module and intelligent function module
- Writing to the buffer memory on the intelligent function module

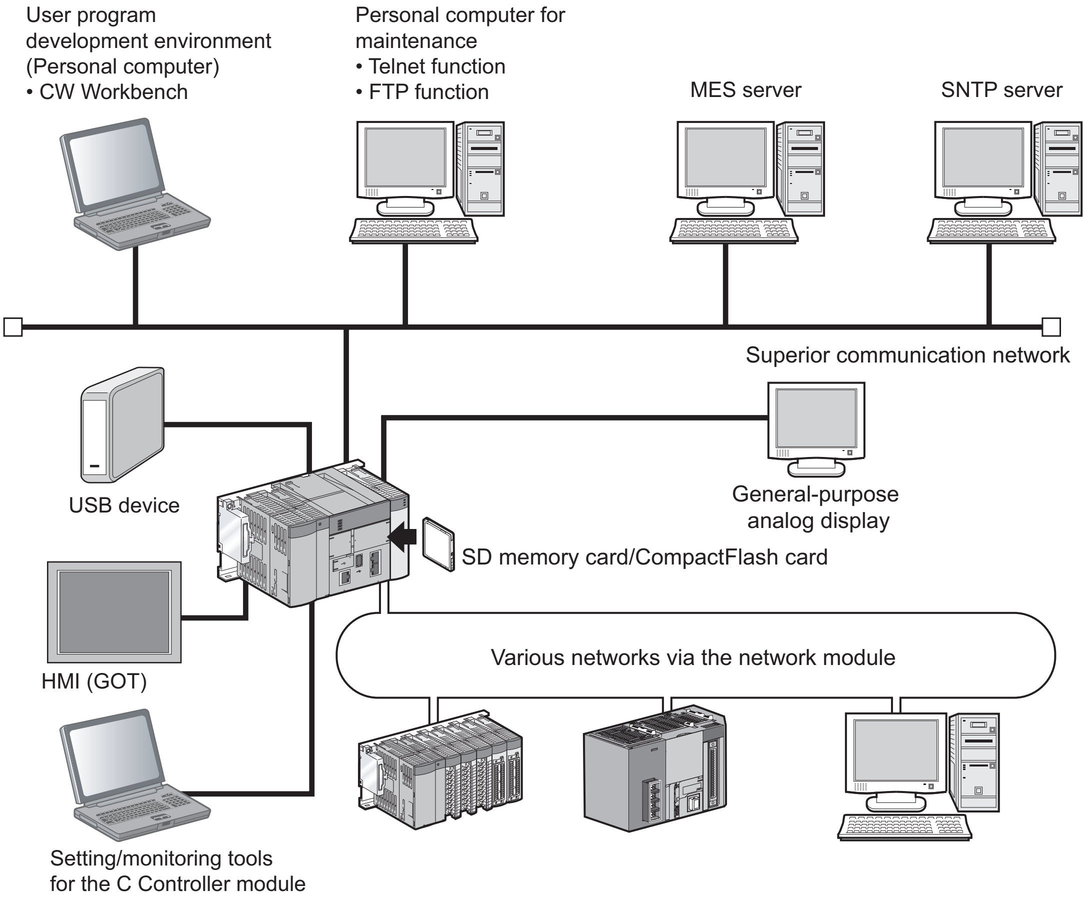
For details, refer to the following manual.
📖QCPU User's Manual (Multiple CPU System)

(12) Precautions for using MODBUS® interface module

The following restrictions are applied to the MODBUS® interface module controlled by the C Controller module.

- The dedicated instruction cannot be used.
- The MODBUS® device assignment cannot be used.

7.6 Peripheral Configuration



For connection with peripherals, refer to the following.

Item	Reference
SD memory card	Page 103, Section 7.6.1
CompactFlash card	Page 104, Section 7.6.2
Connection with USB device	Page 106, Section 7.6.3
Connection with HMI (GOT)	Page 109, Section 7.6.4
Connection with Personal computer	Page 111, Section 7.6.5
Connection with other peripherals (C Controller module, etc.)	Page 114, Section 7.6.6

For access to each network configuration devices, refer to the following.

Item	Reference
Access via the Ethernet port • Host communication network, etc.	Page 192, CHAPTER 12
Various networks via the network module • CC-Link IE Controller Network • MELSECNET/H • CC-Link IE Field Network • CC-Link	Page 208, CHAPTER 13

7.6.1 SD memory card

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

An SD memory card can be mounted to a Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.

(1) Available SD memory cards

For "-LS", consult with the partner (operating system vendor).

Available Mitsubishi Electric Corporation's SD memory cards are as listed below:

- NZ1MEM-2GBSD (memory capacity: 2GB)
- NZ1MEM-4GBSD (memory capacity: 4GB)
- NZ1MEM-8GBSD (memory capacity: 8GB)
- NZ1MEM-16GBSD (memory capacity: 16GB)
- L1MEM-2GBSD (memory capacity: 2GB) (discontinued product)
- L1MEM-4GBSD (memory capacity: 4GB) (discontinued product)

Point

- SD memory cards manufactured by Mitsubishi conform to IEC 61131-2 when being used in the C Controller module. (☞ Page 11, COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES)
- If power is shut off, the CPU module is reset, or the SD memory card is removed during an access to the SD memory card, data in the SD memory card may corrupt. Stop accessing to an SD memory card, and then power OFF the CPU module, reset the CPU module, or remove an SD memory card.
- Backing up important data at a regular basis by saving data to other media, such as CDs and DVDs is recommended.

(2) Inserting and removing an SD memory card

For "-LS", consult with the partner (operating system vendor).

For how to install/remove an SD memory card to/from the Q24DHCCPU-V/-VG, refer to the following.

☞ Page 120, Section 8.4

(3) Data which can be stored

For "-LS", consult with the partner (operating system vendor).

For Q24DHCCPU-V, refer to the following.

☞ Page 313, Section 18.1.2

For Q24DHCCPU-VG, refer to the following.

☞ Page 322, Section 18.2.2

(4) Precautions

For "-LS", consult with the partner (operating system vendor).

During access to files in an SD memory card, do not perform the following operations. Otherwise, data in the SD memory card may be corrupted or any file system failure may occur.

- Power OFF
- Reset
- Restarting User CPU
- Unmounting SD memory card
- Removing SD memory card

7.6.2 CompactFlash card

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
×	×	×	×	○

A CompactFlash card can be mounted to a Q12DCCPU-V.

(1) Available CompactFlash cards

Available Mitsubishi Electric Corporation's CompactFlash cards are as listed below:*1

- QD81MEM-512MBC (memory capacity: 512MB)
- QD81MEM-1GBC (memory capacity: 1GB)
- QD81MEM-2GBC (memory capacity: 2GB)
- QD81MEM-4GBC (memory capacity: 4GB)
- QD81MEM-8GBC (memory capacity: 8GB)

Point

● CompactFlash cards have limited lives (the limited number of writes).

- For the QD81MEM

Model	Total writable size *1 (G bytes)
QD81MEM-512MBC	0.5 GB (512 MB) 100,000 = 50,000
QD81MEM-1GBC	1 GB × 100,000 = 100,000
QD81MEM-2GBC	2 GB × 100,000 = 200,000
QD81MEM-4GBC	4 GB × 100,000 = 400,000
QD81MEM-8GBC	8 GB × 100,000 = 800.000

*1 : The total writable size means the total size that can be written until a CompactFlash card reaches the end of life (the limitation of writing).

● Saving the important data on the backup media such as CD or DVD is recommended.

(2) Inserting and removing a CompactFlash card

For how to install/remove a CompactFlash card to/from the Q12DCCPU-V, refer to the following.

☞ Page 122, Section 8.5

(3) Data which can be stored

For Q12DCCPU-V, refer to the following.

☞ Page 331, Section 18.4.2

(4) Precautions

During access to files in a CompactFlash card, do not perform the following operations. Otherwise, data in the CompactFlash card may be corrupted or any file system failure may occur.

- Power OFF
- Reset
- Unmounting CompactFlash card
- Removing CompactFlash card

(5) Measures against static electricity for commercially available CompactFlash cards in compliance with the EMC directives

The C Controller system may be affected by static electricity discharged to a commercially available CompactFlash card.

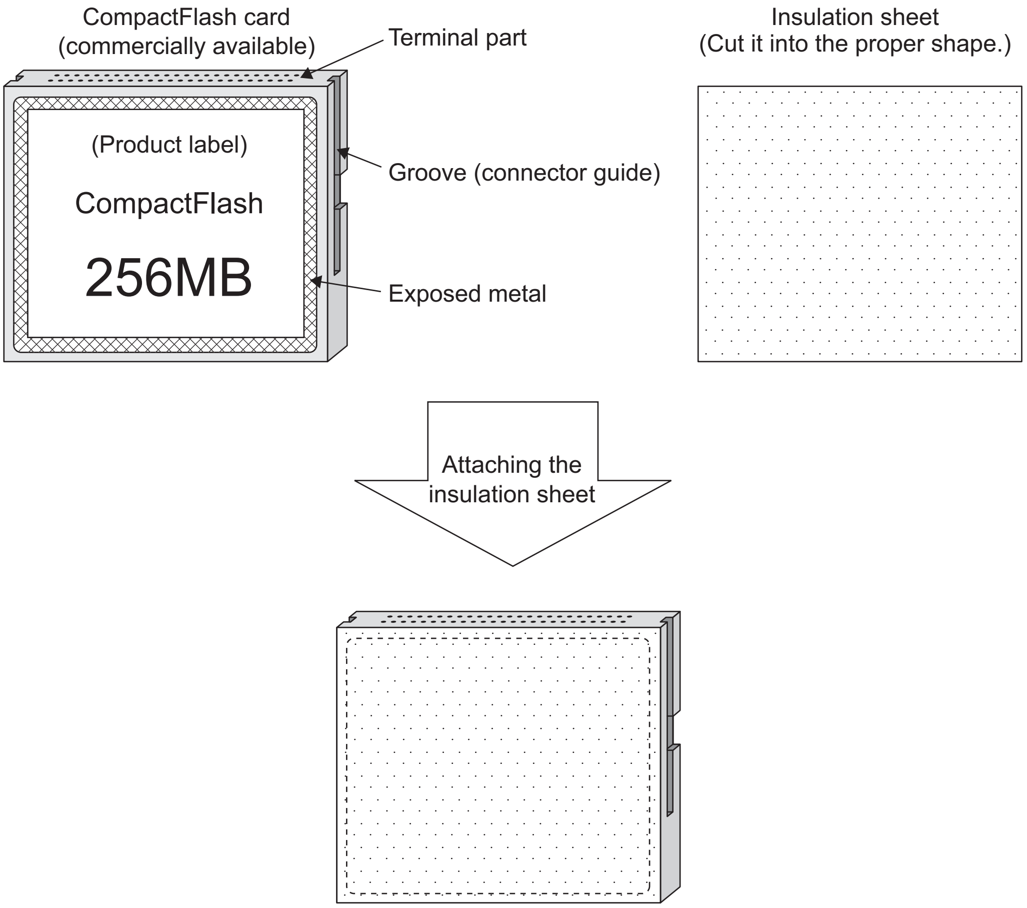
The following explains an example of static electricity countermeasures for commercially available CompactFlash card.

Point

Although information in this section is based on the requirements and standards of current regulations, it does not guarantee that the entire machinery constructed according to the information will comply with the EMC Directive.
The compliance with the EMC Directive must be finally confirmed by the manufacturer of each machinery.

(a) Preventive measure example

Attach an insulation sheet to the CompactFlash card. All the metal part except the terminal part must be covered with the insulation sheet as shown below. Be sure not to protrude the insulation sheet on the CompactFlash card surface or the grooves (connector guide) in the sides of the CompactFlash card. The CompactFlash card may not be able to be inserted in C Controller module.



Attach another sheet on the other side as well.

(b) Insulation sheet example

Single-sided adhesive sheet for electric insulation

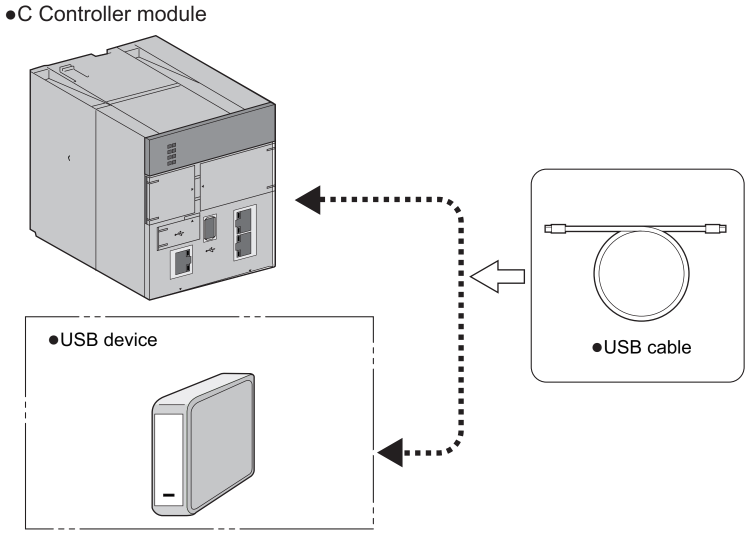
- Base material: 50 m-PET film (UL compliant)
- Adhesive: Acrylic pressure sensitive adhesive

7.6.3 Connection with USB device

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

(1) Q24DHCCPU-V

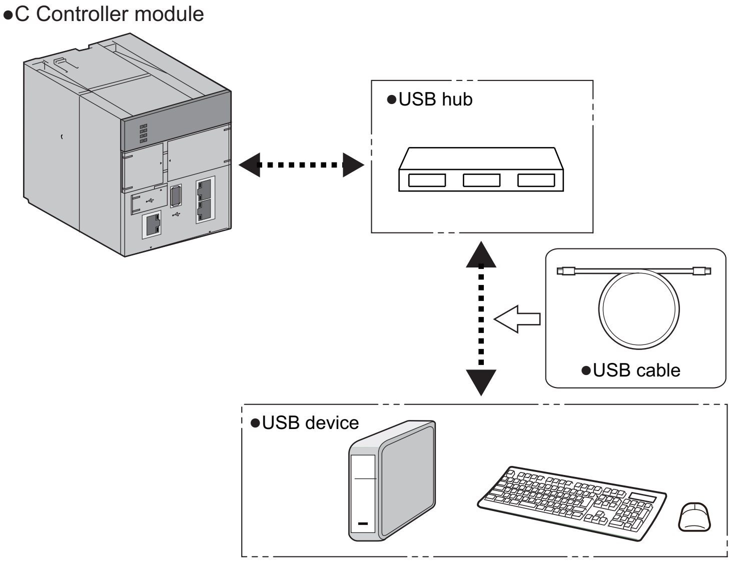
USB device(s) compliant with the USB Mass Storage Class standard can be connected to the Q24DHCCPU-V.



(2) Q24DHCCPU-VG

In addition to USB device compliant with the USB Mass Storage Class standard, a mouse and a keyboard can be connected to Q24DHCCPU-VG. It can also connect multiple devices by using a USB hub[*1].

[*1] : Use a USB hub with the external power supply. Note that it does not support a cascade connection.



Point

- For a USB device other than the one compliant with the USB Mass Storage Class standard, more than one same-type USB cannot be connected.
  To connect those devices, connect them before turning ON the power supply for C Controller module.

(3) Q24DHCCPU-LS and Q26DHCCPU-LS

For details on USB device can be connected to Q24DHCCPU-LS and Q26DHCCPU-LS, consult the partner (operating system vendor).

(4) Connection via USB connector For "-LS", consult with the partner (operating system vendor).

Use the USB connector USB1 for connection.

For specifications and wiring of the USB cable, refer to the following.

☞Page 125, Section 8.7.1

(5) Installation/removal of USB device For "-LS", consult with the partner (operating system vendor).

For how to install/remove an USB device to/from the Q24DHCCPU-V/-VG, refer to the following.

☞Page 124, Section 8.6

When using a USB device other than the one compliant with the USB Mass Storage Class standard, connect a USB cable to the USB connector.

(6) Precautions For "-LS", consult with the partner (operating system vendor).

(a) Operations prohibited during file access

During access to an USB device, do not perform the following operations Otherwise, data in the USB device may be corrupted or any file system failure may occur.

- Power OFF
- Reset
- Restarting User CPU
- Unmounting USB device
- Removing USB device

(b) Time until accessible

Depending on format types and capacities of USB Mass Storage Class standard compliant devices to connect, it may take several minutes until it becomes accessible.

(c) Connectable keyboard

An OADG-compliant Japanese 106-key keyboard and English 101-key keyboard can be connected. Since a Japanese keyboard is enabled as standard, execute one of the following commands with “STARTUP.CMD” or the Telnet connection according to the keyboard to be used, and switch the setting.

The changed setting will be enabled at the time of next startup of the display application.

- Switching to an OADG-compliant Japanese 106-key keyboard

```
CCPUCMD_ChangeKbd106JIS
```

- Switching to English 101-key keyboard

```
CCPUCMD_ChangeKbd101US
```

- Checking the currently enabled keyboard

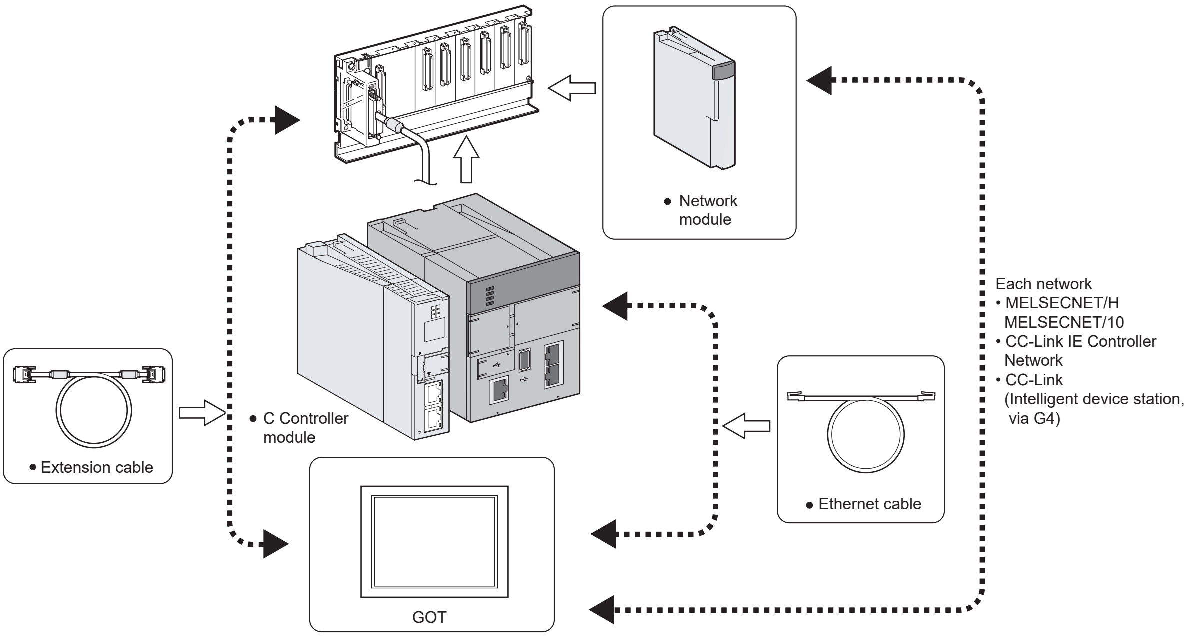
```
CCPUCMD_GetCurrentKbd
```

Japanese 106-key keyboard: 106JIS
English 101-key keyboard: 101US

7.6.4 Connection with HMI (GOT)

HMI (GOT) can be connected to the C Controller module as illustrated below.

- Connection via the Ethernet port
- Bus connection
- Connection via network modules
  - MELSECNET/H, CMELSECNET/10 connection (PLC-to-PLC network)
  - CC-Link IE Controller Network connection
  - CC-Link IE Field Network connection
  - CC-Link connection(intelligent device station, via G4)



Point

For applicable GOT models, refer to the following.

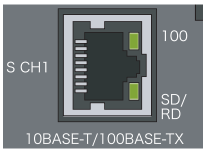
📖 Connection manuals for GOT2000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS/Fieldbus Products, Peripherals)

📖 Connection manuals for GOT1000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS Products, Peripherals)

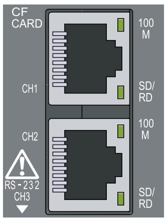
(1) Connection via the Ethernet port

Use the system Ethernet port (S CH1)/built-in Ethernet port (CH1 and CH2) for connection.

Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS



Q12DCCPU-V



For wiring of the Ethernet cable, refer to the following.

☞ Page 127, Section 8.7.2

(2) Bus connection

Use the main base unit/extension base unit's extension cable connector for connection.

(a) How the C Controller module recognizes the GOT

If a GOT is connected in a bus topology, the C Controller module recognizes the GOT as an intelligent function module of 16 I/O points.

Therefore, assign I/O to the C Controller module in GOT setup.

(For GOT bus connection, occupy one the extension base (16 points x 10 slots).)

Point

For details of the GOT, refer to the following.

📖 Connection manuals for GOT2000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS/Fieldbus Products, Peripherals)

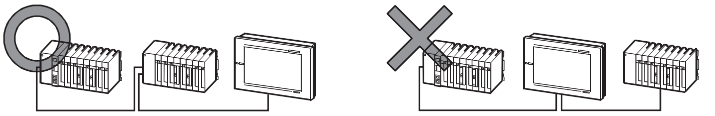
📖 Connection manuals for GOT1000 series (Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1), (Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS Products, Peripherals)

(b) Maximum number of GOTs

Up to five GOTs can connected in a bus topology.

(c) Precautions

- In a bus topology, the GOT must be connected to the last base unit.
  A GOT cannot be connected between base units.



- Select an appropriate extension cable for connecting the GOT to the bus so that the total extension cable length is 13.2 m at maximum.
- A bus extension connector box (A9GT-QCNB) must be used if the first GOT is to be placed at a distance of more than 13.2 meters away.
- For details of A9GT-QCNB, refer to the following.
  📖A9GT-QCNB type Bus extension connector box User's Manual
- Configure the bus connection settings (extension base number and slot number settings) on the GOT before activating the C Controller module and GOT.
- Power on the C Controller module and GOT in any of the following sequences.
  - Power on the C Controller module and GOT at the same time.
  - Power on the C Controller module and then GOT.
- The following system alarm may occur in the GOT at start-up, depending on the system configuration and GOT settings.
  "402 A communication timeout occurred. Check the communication path or module."
  To avoid the occurrence of the above system alarm, set the GOT title display time to be sufficiently longer than the C Controller module start-up time.
  For how to set the GOT title display time, refer to the following.
  📖GT Designer3 Version1 Screen Design Manual (Fundamentals)

(3) Connection via network modules

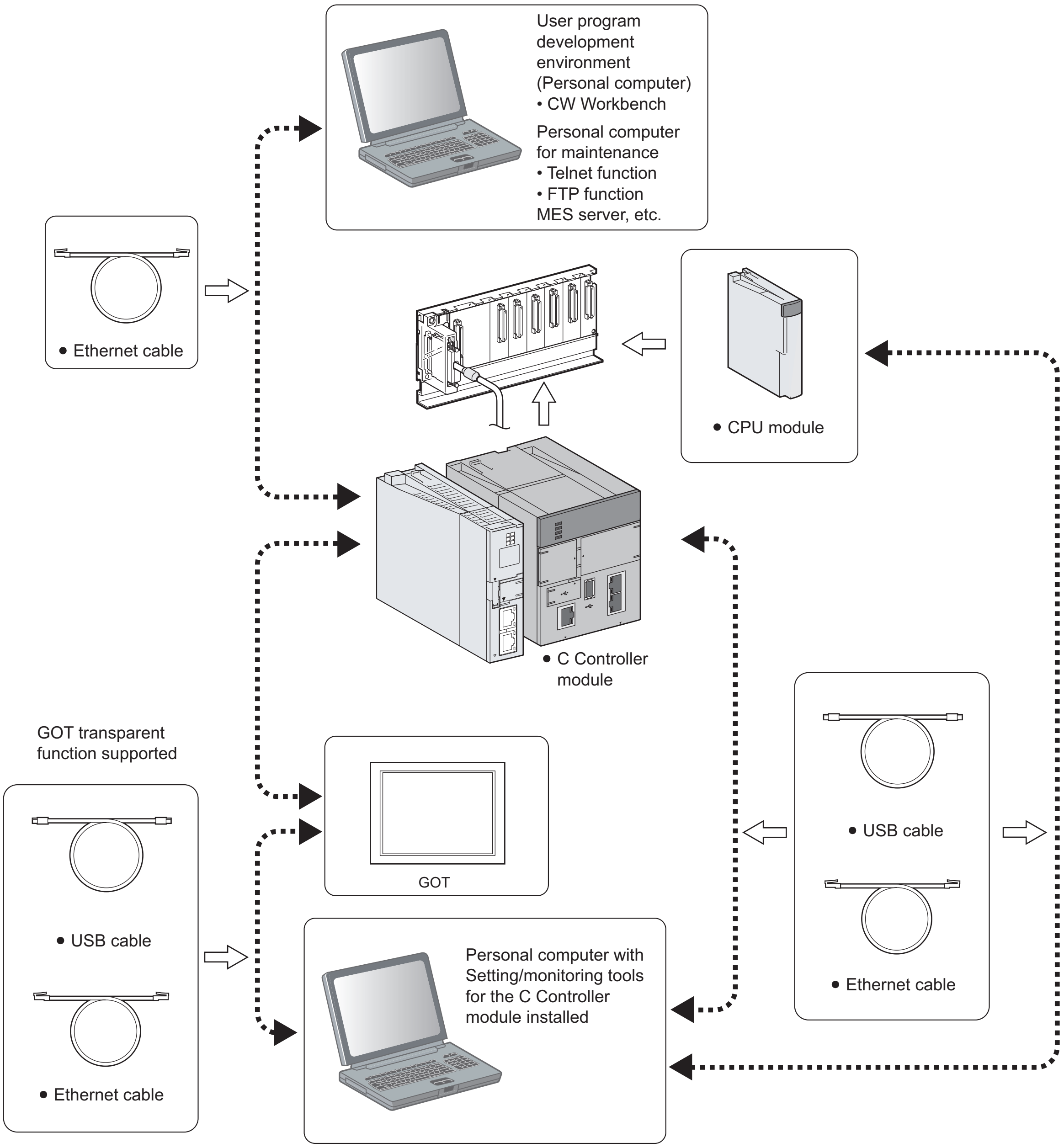
For connection via network modules, refer to the manual for respective network modules.

7.6.5 Connection with Personal computer

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

A Personal computer can be connected to the C Controller module as illustrated below.

- Connection via USB connector
- Connection via the Ethernet port
- Connection via the CPU module by the multiple CPU system
- Connection via GOT (support of GOT transparent function)


User program development environment (Personal computer)
• CW Workbench
Personal computer for maintenance
• Telnet function
• FTP function
MES server, etc.
• Ethernet cable
• CPU module
• C Controller module
GOT transparent function supported
• USB cable
• Ethernet cable
GOT
• USB cable
• Ethernet cable
Personal computer with Setting/monitoring tools for the C Controller module installed

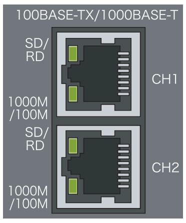
(1) Connection to user program development environment, Personal computer for maintenance, and superior control servers, etc.

For "-LS", consult with the partner (operating system vendor).

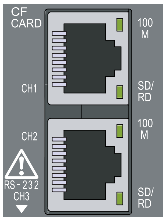
The following personal computer can be connected using the user Ethernet port (CH1 and CH2)/built-in Ethernet port (CH1 and CH2).

- User program development environment (CW Workbench and Wind River Workbench)
- Personal computer for maintenance (Telnet and FTP functions)
- Host communication network's superior control servers (MES server and SNTP server, etc.)

Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS



Q12DCCPU-V



For wiring of the Ethernet cable, refer to the following.
☞ Page 127, Section 8.7.2

Remark

- For the functions of user Ethernet port/built-in Ethernet port, refer to the following.
  ☞ Page 192, Section 12.1

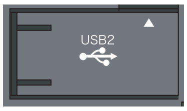
(2) Connection to Personal computer with Setting/monitoring tools for the C Controller module installed

The following illustrates a sample case of connection with Setting/monitoring tools for the C Controller module.
For versions of Setting/monitoring tools for the C Controller module, refer to the following.
☞ Page 52, CHAPTER 4

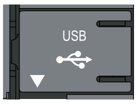
(a) Connection via USB connector

Use the USB connector for connection.[*1]

Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS

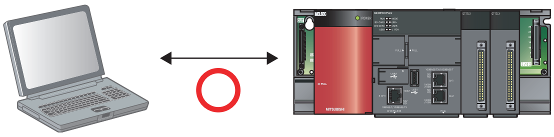


Q12DCCPU-V

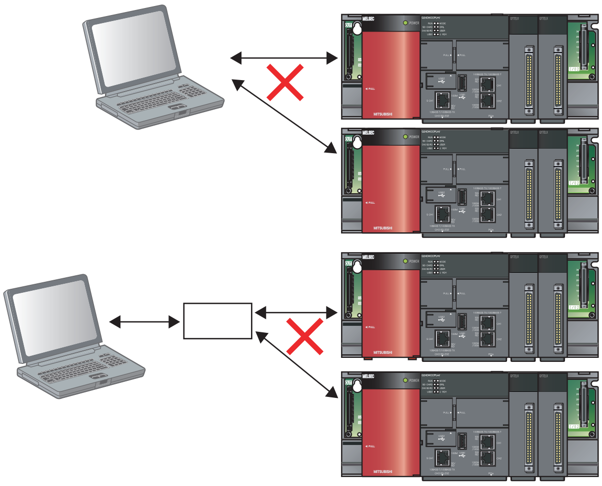


*1 : Use USB2 for Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.

For specifications and wiring of the USB cable, refer to the following.
☞ Page 125, Section 8.7.1
Connection to USB connector is only possible from 1 Personal computer to 1 C Controller module.

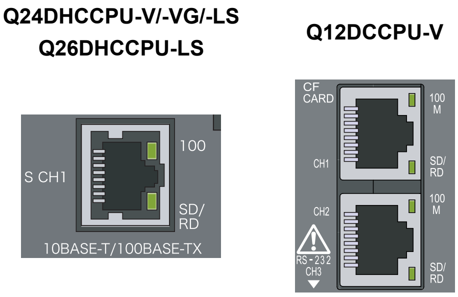


Connection from 1 Personal computer to multiple C Controller modules is not allowed.



(b) Connection via the Ethernet port

Use the system Ethernet port (S CH1)/built-in Ethernet port (CH1 and CH2) for connection.



For wiring of the Ethernet cable, refer to the following.

☞ Page 127, Section 8.7.2

Remark

- For the functions of system Ethernet port/built-in Ethernet port, refer to the following.
  ☞ Page 200, Section 12.2

(c) Connection via the CPU module by the multiple CPU system

Connect the multiple CPU system to the C Controller module(s) of the other CPUs via the CPU module connected with a Personal computer.

(d) Connection via GOT (support of GOT transparent function)

Use the GOT transparent function to connect via GOT.

For cable to connect with GOT, settings on GOT and precautions, refer to the manual for respective GOT to connect.

📖 Connection manuals for GOT2000 series
(Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1),
(Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS/Fieldbus Products, Peripherals)

📖 Connection manuals for GOT1000 series
(Mitsubishi Electric Products), (Non-Mitsubishi Electric Products 1),
(Non-Mitsubishi Electric Products 2), (Microcomputer, MODBUS Products, Peripherals)

7.6.6 Connection with other peripherals (C Controller module, etc.)

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
△	○	△	△	△

The C Controller module can be connected with other C Controller modules and/or various network peripherals in the device (internal microcomputers, etc.) by using the following methods:

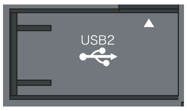
- Connection via USB connector
- Connection via the Ethernet port
- Connection with a general-purpose analog RGB display Note7.1
- Connection via the RS-232 connector
- Connection via network modules
  - MELSECNET/H, CMELSECNET/10 connection (PLC-to-PLC network)
  - CC-Link IE Controller Network connection
  - CC-Link IE Field Network connection
  - CC-Link connection

(1) Connection via USB connector

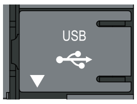
For "-LS", consult with the partner (operating system vendor).

Use the USB connector for connection.[*1]

Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS



Q12DCCPU-V



[*1] : Use USB2 for Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.

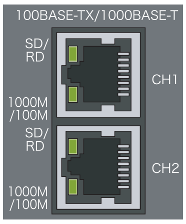
For specifications and wiring of the USB cable, refer to the following.
☞ Page 125, Section 8.7.1

(2) Connection via the Ethernet port

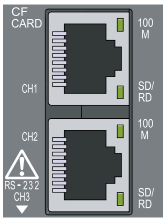
For "-LS", consult with the partner (operating system vendor).

Use the user Ethernet port (CH1 and CH2)/built-in Ethernet port (CH1 and CH2) for connection.

Q24DHCCPU-V/-VG/-LS
Q26DHCCPU-LS



Q12DCCPU-V



For wiring of the Ethernet cable, refer to the following.
☞ Page 127, Section 8.7.2

(3) Connection with a general-purpose analog RGB display For "-LS", consult with the partner (operating system vendor).

Use the analog RGB output connector for connection.
For specifications and wiring of analog RGB output connector, refer to the following.

☞ Page 131, Section 8.7.3

(a) Precautions for connection with a general-purpose analog RGB display

- Power management function
  C Controller module does not support the VESA DPMS-compliant power management function.

(4) Connection via the RS-232 connector For "-LS", consult with the partner (operating system vendor).

Use the RS-232 connector at the bottom of the C Controller module.
For wiring of the RS-232 cable, refer to the following.

☞ Page 132, Section 8.7.4

(5) Connection via network modules For "-LS", consult with the partner (operating system vendor).

For connection via network modules, refer to the manual for respective network modules.

Note7.1 Q24DHCCPU-V Q12DCCPU-V

Q24DHCCPU-V and Q12DCCPU-V cannot be connected.

CHAPTER 8 INSTALLATION AND WIRING

This chapter describes the installation and wiring procedures for C Controller module and other optional products.

8.1 Installation Environment and Installation Position

For precautions for installation environment and installation position, refer to the following.
📖 QCPU User's Manual (Hardware Design, Maintenance and Inspection)

8.2 Installation and Removal of Module

The following explains how to install and remove a C Controller module.

For precautions and procedures for handling, installation and removal of CPU module, I/O module, intelligent function module, power supply module and base unit, etc., refer to the following.
📖 QCPU User's Manual (Hardware Design, Maintenance and Inspection)

(1) Installation to base unit

Securely insert the module fixing projection*1 into the module fixing hole so that the latch is not misaligned.

↓

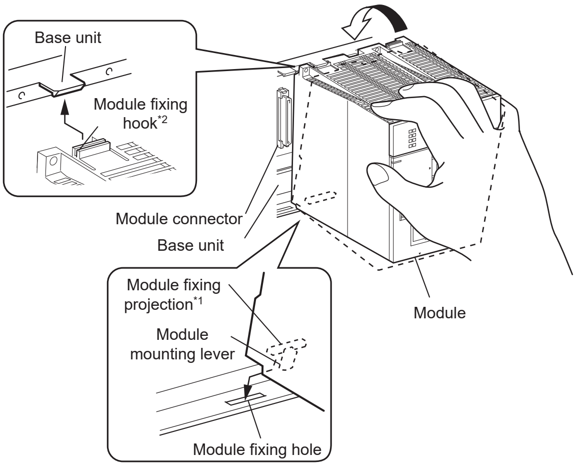
Using the module fixing hole as a supporting point, push the module in the direction of arrow until it clicks.

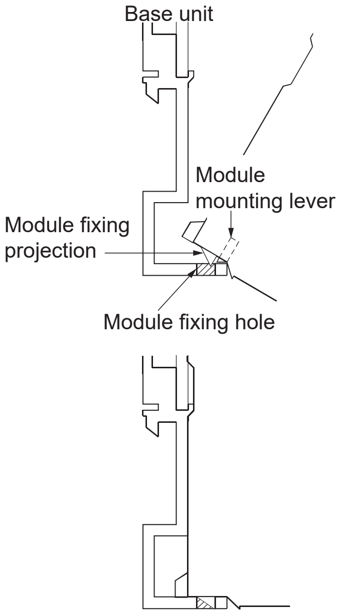
↓

Make sure that the module is inserted in the base unit securely.

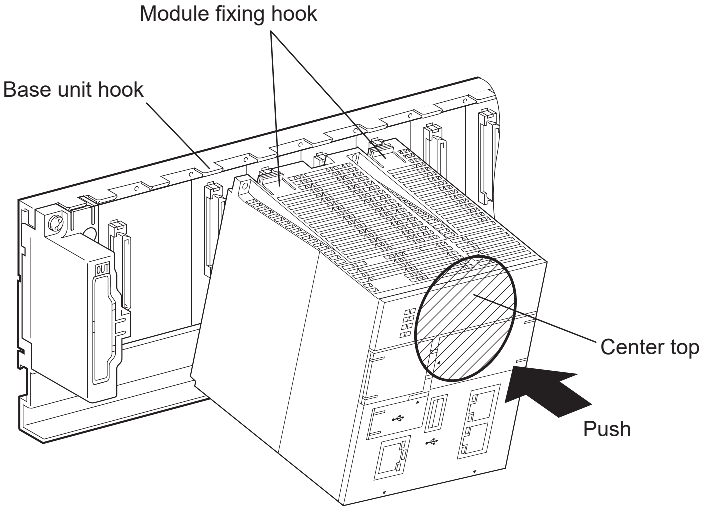
↓

Completed





*1 : Insert the two module fixing projections on the right and left into the module fixing holes so that they are not misaligned.

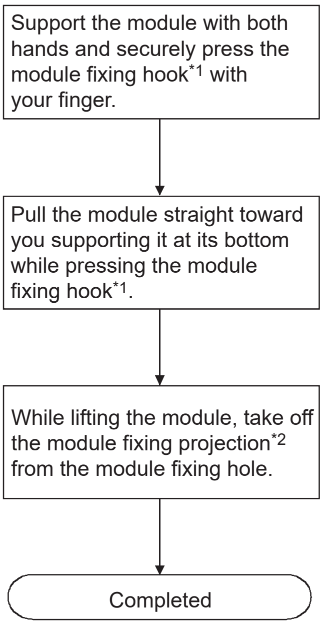


*2 : Push the center top of the module so that the two module fixing hooks on the right and left are securely engaged with the base unit hooks.

Point

- When mounting the module, always insert the module fixing projection into the module fixing hole of the base unit. At that time, securely insert the module fixing projection so that it does not come off from the module fixing hole. Failure to do so may damage the module connector and module.
- When using the programmable controller in an environment of frequent vibration or impact, secure the module to the base unit using screws.
  Module fixing screw : M3 × 12 (user-prepared)
  Tightening torque range: 0.36 to 0.48N • m
- After first use of the product, do not mount or remove the module onto or from the base unit more than 50 times (IEC 61131-2 compliant). Exceeding the limit of 50 times may cause malfunction.

(2) Removal from base unit

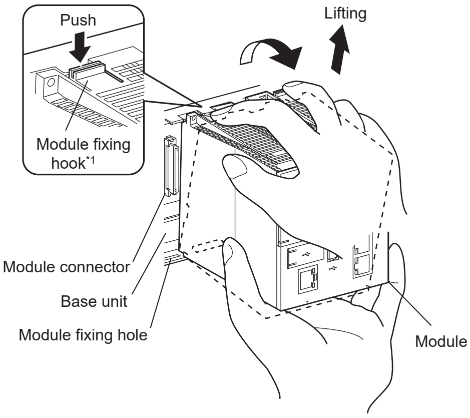


Support the module with both hands and securely press the module fixing hook[*1] with your finger.

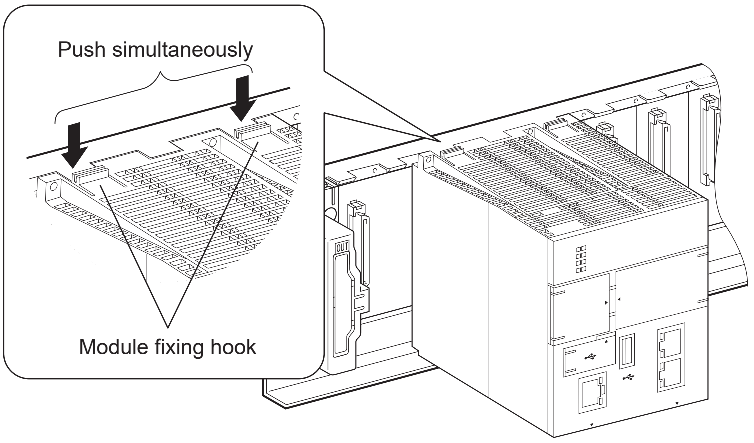
Pull the module straight toward you supporting it at its bottom while pressing the module fixing hook[*1].

While lifting the module, take off the module fixing projection[*2] from the module fixing hole.

Completed



*1 : Push the two modules fixing hooks on the right and left of the module top simultaneously with your fingers until they stop.



*2 : Remove the two module fixing projections on the right and left of the module bottom from the module fixing holes.

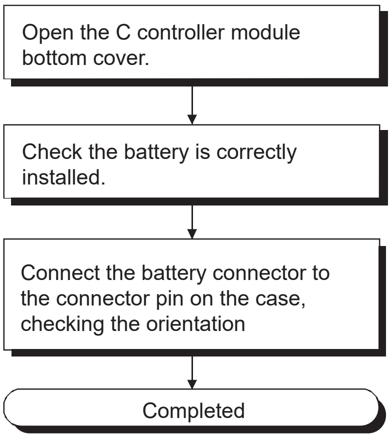
Point

When removing the module which is secured by module fixing screw, remove the module fixing screw first and then module fixing projection off the module fixing hole of the base unit.
Failure to do so may damage the module fixing projection.

8.3 Battery Installation

This section describes the procedures of installing a battery into the C Controller module.
The battery connector is disconnected from the battery before shipping.
Connect the battery connector before use.
For operations without any battery, use the battery less drive function (☞ Page 190, Section 11.11).

(1) Q6BAT battery installation procedure

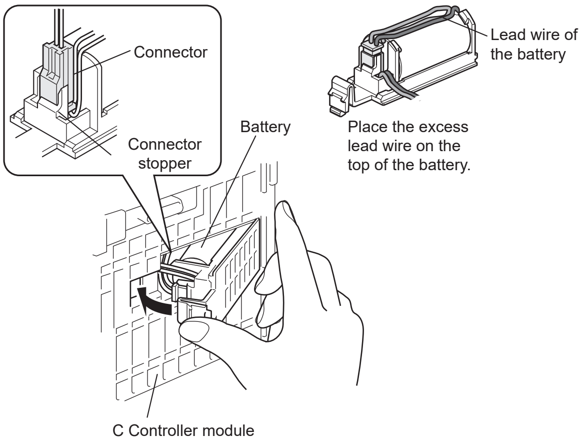


Open the C controller module bottom cover.

Check the battery is correctly installed.

Connect the battery connector to the connector pin on the case, checking the orientation

Completed

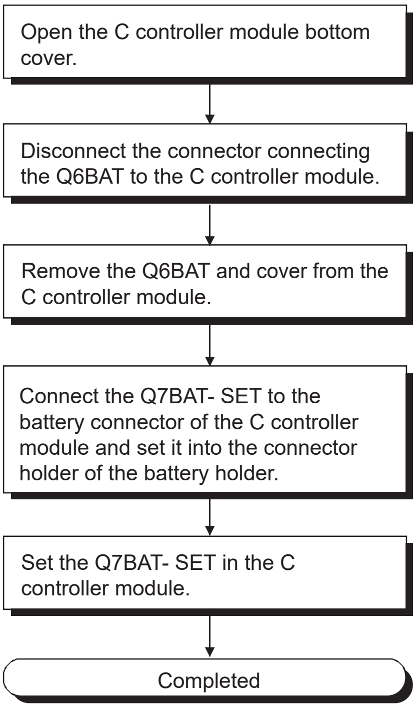


Point

- Firmly push the battery connector all the way in to the connector pin.

(2) Q7BAT-SET battery installation procedure

When changing the battery for the C controller module from the Q6BAT to the Q7BAT, set the battery and connect its connector in the following procedure.



Open the C controller module bottom cover.

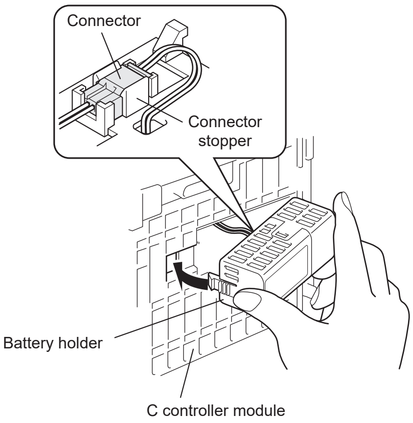
Disconnect the connector connecting the Q6BAT to the C controller module.

Remove the Q6BAT and cover from the C controller module.

Connect the Q7BAT- SET to the battery connector of the C controller module and set it into the connector holder of the battery holder.

Set the Q7BAT- SET in the C controller module.

Completed



8.4 Inserting and Removing an SD Memory Card

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

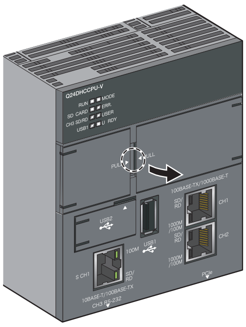
This section describes the procedures of inserting/removing an SD memory card into the C Controller module.

For "-LS", consult with the partner (operating system vendor).

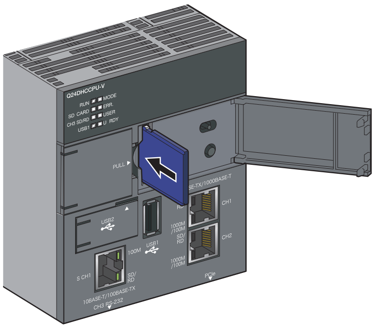
Point

- Before handling an SD memory card, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause failure of the SD memory card or malfunction.
- Failure to insert/remove an SD memory card in accordance with the procedures described here may cause the data in the SE memory card be corrupted and/or any file system failure.
- During access to an SD memory card, do not perform the following operations:
  - Power OFF
  - Reset
  - Restarting user CPU

(1) Insertion procedure



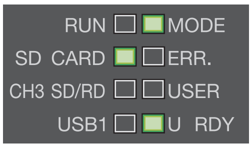
1. Pull the section labeled as "PULL" on the right cover to open the cover.



2. Insert an SD memory card into the SD memory card slot.

When inserting an SD memory card, pay attention to its orientation.

Press in an SD memory card until it clicks.



3. Close the C Controller module front cover until it clicks.

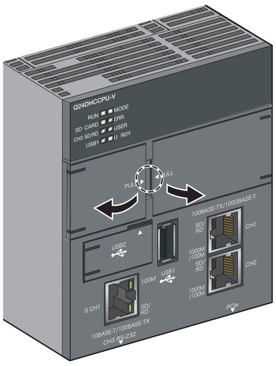
4. SD CARD LED flashed and then on.

The SD CARD LED is flashing with the SD memory card mounted, and lit when it completes.

Point

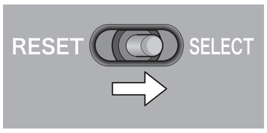
- If an SD memory card is already inserted when the power is up, it is automatically mounted.
- Any unmounted SD memory card cannot be used with the SD CARD LED turned off. In such case, remove and then insert it again. To make it usable without removing it, use the CCPU_MountMemoryCard function from the user program to mount the SD memory card.

(2) Removal procedure



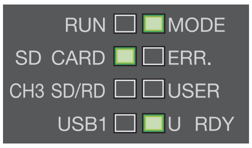
1. **Pull the section labeled as "PULL" on the cover to open the cover.**

Open both right and left covers.

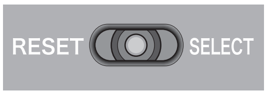


2. **Move the RESET/SELECT switch to the SELECT position.**

Do not release the switch while pulling it down.

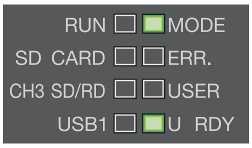


3. **Check that the SD CARD LED start flashing.**

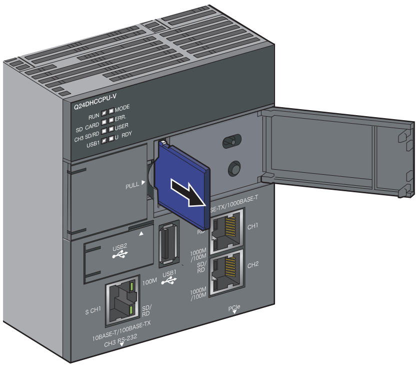


4. **Move the RESET/SELECT switch back to the center.**

Release the switch then it returns to its center position.



5. **Check that the SD CARD LED goes off.**



6. **Press the SD memory card into the SD memory card slot until it clicks and then pull it out straight.**

7. **Close the C Controller module front cover until it clicks.**

Point

- During access to an SD memory card, do not perform the following operations:
  - Unmounting SD memory card
  - Removing SD memory card
- You may also unmount the SD memory card from the user program by using the CCPU_UnmountMemoryCard.

8.5 Installing/uninstalling and unmounting a CompactFlash card

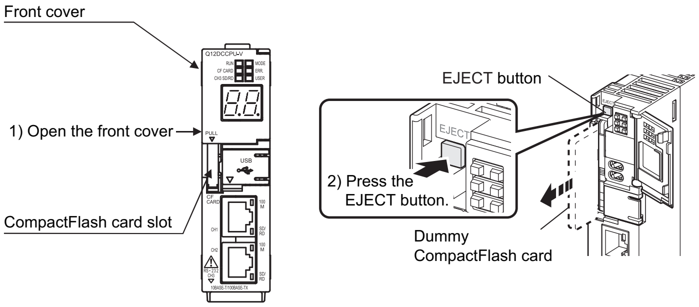
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
×	×	×	×	○

This section describes the procedures of inserting/removing a CompactFlash card into the C Controller module.

Point

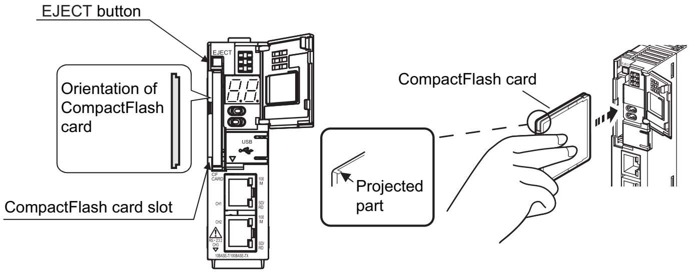
- Before handling a CompactFlash card, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause failure of the module or malfunction.
- If the CompactFlash card is not installed/uninstalled properly as follow the procedure in this section, data corruption or file error in the CompactFlash card may occur.
- Do not operate the following operations during accessing to the CompactFlash card.
  - Turn the power OFF
  - Reset

(1) Installation procedure



1. **Pull the section labeled as "PULL" on the front cover to open the cover.**

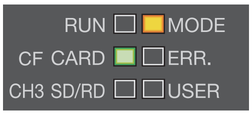
2. **Press the EJECT button to remove the dummy CompactFlash card.**
Please keep the removed dummy CompactFlash card in a secure location.



3. **Insert a CompactFlash card into the CompactFlash card installation slot.**
When inserting a CompactFlash card, pay attention to its orientation.
Insert the CompactFlash card into the installation slot and push it until the card edge is flush with the EJECT button.

4. **Close the C Controller module front cover until it clicks.**

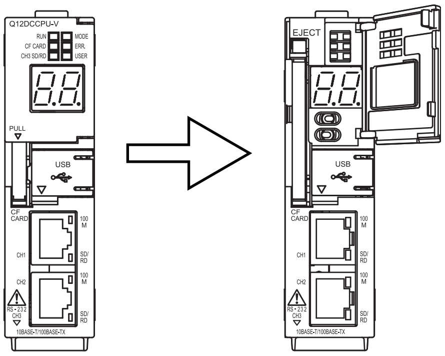
5. **Check if the CF CARD LED turns ON.**



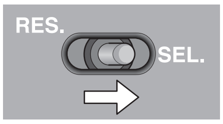
Point

- If a CompactFlash card is already inserted when the power is up, it is automatically mounted.
- Any unmounted CompactFlash card cannot be used with the CF CARD LED turned off. In such case, remove and then insert it again. To make it usable without removing it, use the CCPU_MountMemoryCard function from the user program to mount the CompactFlash card.

(2) Uninstallation procedure

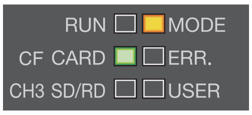


1. **Pull the section labeled as "PULL" on the front cover to open the cover.**



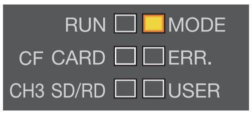
2. **Move the RESET/SELECT switch to the SELECT position.**

Do not release the switch while pulling it down.

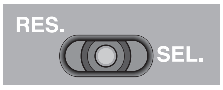


3. **Check that the CF CARD LED start flashing.**

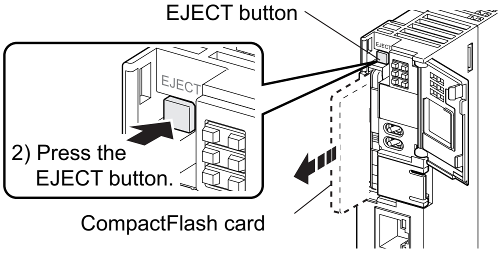
Keep the switch at the SELECT side while flashing the LED.



4. **Check that the CF CARD LED goes off.**



5. **Move the RESET/SELECT switch back to the center.**



6. **Press the EJECT button to remove the CompactFlash card.**

While no CompactFlash card is used, a dummy CompactFlash card must be used.

7. **Close the C Controller module front cover until it clicks.**

Point

- During access to a CompactFlash card, do not perform the following operations:
  - Unmounting CompactFlash memory card
  - Removing CompactFlash memory card
- You may also unmount the CompactFlash card from the user program by using the CCPU_UnmountMemoryCard.

8.6 Inserting/removing and Unmounting a USB Mass Storage Class Standard Compliant Device

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

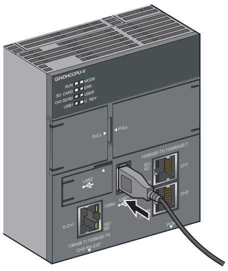
This section explains how to insert/remove a device compliant with the USB Mass Storage Class standard into/from C Controller module. For "-LS", consult with the partner (operating system vendor).

Point

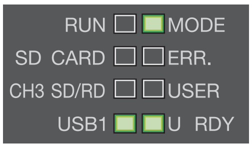
Do not perform the following operations while accessing to a device compliant with the USB Mass Storage Class standard:

- Power OFF
- Reset
- Restarting user CPU
- Unmounting a device compliant with the USB Mass Storage Class standard
- Removing a device compliant with the USB Mass Storage Class standard

(1) Insertion procedure



1. Firmly insert a USB device or USB cable connector into the USB connector (USB1).



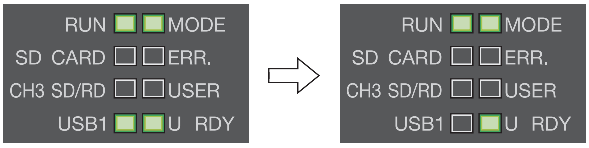
2. USB1 LED flashed and then on.

The USB1 LED is flashing with the USB device mounted, and lit when it completes.

For specifications and wiring of USB cables, refer to the following.

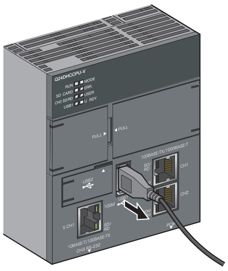
☞ Page 125, Section 8.7.1

(2) Removal procedure



1. Use the CCPU_UnmountMemoryCard function to unmount the USB device from the user program.

2. Check that the USB1 LED is turned off.



3. Disconnect the USB device or USB cable connector from the USB connector (USB1).

8.7 Cabling

8.7.1 USB cabling

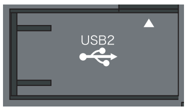
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Described in this section are the specifications and wiring of compatible USB cables.

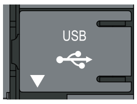
(1) USB connector

(a) Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

There are 2 types of USB connectors: USB1 and USB2. Use them accordingly to peripherals to be connected.

USB connector		Connection destination
USB1 For "-LS", consult with the partner (operating system vendor).		USB device
USB2		Personal computer with Setting/monitoring tools for the C Controller module installed

(b) Q12DCCPU-V

USB connector		Connection destination
USB		Personal computer with Setting/monitoring tools for the C Controller module installed

(2) USB cable

(a) Connection with USB device For "-LS", consult with the partner (operating system vendor).

Use a USB cable supplied with the USB device.

The type of cable connector compatible with the USB connector (USB1) is the connector type A.

(b) Connection with Personal computer

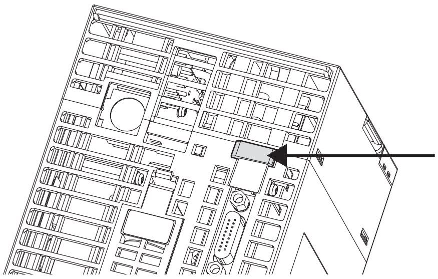
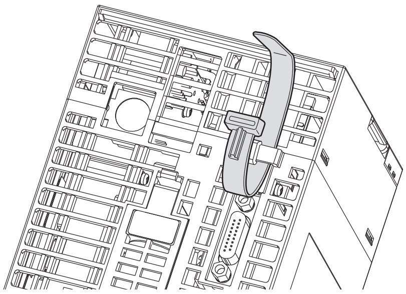
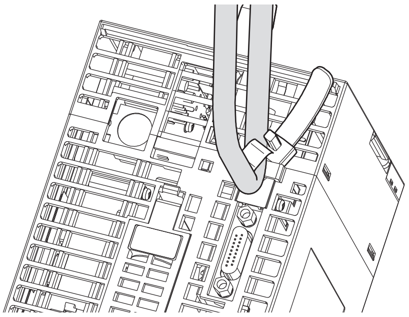
The types of cable connector compatible with the USB connector (USB2, USB) are as follows.

- C Controller module side: Connector type miniB
- Personal computer side: Connector type A

Use a USB cable of 3m (9.84 feet) or less.

(3) USB cable fall-off prevention (Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS)

USB cable(s) can be fixed to the C Controller module enclosure with a fixing band (recommended specifications: Width: 6-9 mm and Thickness: 1mm or less).

Procedure	Figure	Description
1		A through hole for a fixing band is prepared next to the PCI Express® connector at the bottom of the C Controller module.
2		• Let a fixing band through as illustrated. • When a PCI Express® cable is connected, disconnect the PCI Express® cable before performing this task.
3		• Let a USB cable through the fixing band to fix it. • A knot of the fixing band should face forward. • Connect the PCI Express® cable back.

(4) Precautions

Precautions for use of USB cables:

- Do not activate the resume function, suspend setting, energy saving function and standby mode on the Personal computer communicating with the C Controller module. Otherwise a communication error may occur.
- Before inserting/removing a USB cable, resetting the C Controller module, or powering up/off, put connected tool(s) in offline state. Frequent inserting/removing a USB cable, resetting the C Controller module, and powering up/off during communication may cause an unrecoverable communicating error.
  When operation is not recovered from an error, remove a USB cable. Then, connect it again after five or more seconds. (Even after this operation, an error may occur at initial communication. However, communication will be successful after that.)
- A communication error may occur depending on the combination of personal computers and USB cables.

8.7.2 Ethernet wiring

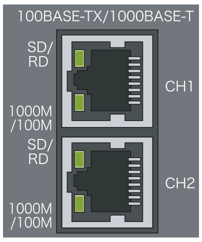
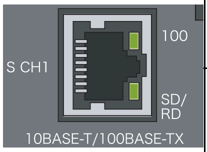
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Described in this section are the specifications and wiring of compatible twisted pair cables.

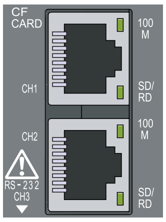
(1) Ethernet port

(a) Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

There are 2 types of Ethernet port: user Ethernet port (CH1 and CH2) and system Ethernet port (S CH1). Use them accordingly to peripherals to be connected.

Ethernet port		Connection destination	
User Ethernet port (CH1 and CH2) For "-LS", consult with the partner (operating system vendor).	 100BASE-TX/1000BASE-T SD/ RD CH1 1000M /100M SD/ RD CH2 1000M /100M	User program development environment (Personal computer)	
			CW Workbench
		Personal computer for maintenance	
			Telnet function
			FTP function
			Host communication network's peripherals (MES server, etc.)
System Ethernet port (S CH1)		Personal computer with Setting/monitoring tools for the C Controller module installed	
		GOT	

(b) Q12DCCPU-V

Ethernet port		Connection destination	
Built-in Ethernet port (CH1 and CH2)	 CF CARD 100 M CH1 SD/ RD CH2 100 M RS-232 CH3 SD/ RD	User program development environment (Personal computer)	
			CW Workbench
		Personal computer for maintenance	
			Telnet function
			FTP function
		Host communication network's peripherals (MES server, etc.)	
		Personal computer with Setting/monitoring tools for the C Controller module installed	
		GOT	

Point

The reference time from powering up the C Controller module to establishment of communication with Ethernet port is as follows. Required time may vary depending on system configurations.

- User Ethernet port (CH1 and CH2) : 30 seconds
- System Ethernet port (S CH1) : 15 seconds
- Built-in Ethernet port (CH1 and CH2) : 15 seconds

(2) Twisted pair cable

Specifications of cables that can be used for connection with peripherals by using the user Ethernet ports (CH1 and CH2), system Ethernet port (S CH1), and Built-in Ethernet ports (CH1 and CH2) are described in the table below.

Cables conforming to the IEEE802.3 10BASE-T/100BASE-TX/1000BASE-T standards can be used.

○: Available, -: N/A

Type	Unshielded twisted pair (UTP) cable, Shielded twisted pair (STP) cable		User Ethernet port (CH1 and CH2) For "-LS", consult with the partner (operating system vendor).	System Ethernet port (S CH1)	Built-in Ethernet port (CH1 and CH2)
	Straight cable	Crossing cable			
10Mbps	Category 3 or higher	Category 3 to 5e	○	○	○
100Mbps	Category 5 or higher	Category 5 or 5e	○	○	○
1000Mbps	Category 5e or higher	Category 5e	○	-	-

Point

In the high-speed communication (100Mbps/1000Mbps) by 100BASE-TX/1000BASE-T connection, a communication error may occur due to high frequency noise generated from a device other than the C Controller module, depending on the installation environment.

When configuring a network system, take the following measures on the C Controller module side to eliminate the influence of high frequency noise.

- Wiring
  Do not install the twisted pair cables together with the main circuit lines or power cables.
  Place the twisted pair cables in a duct.
- Cable
  In an environment where the system is susceptible to noise, use shielded twisted pair (STP) cables.
- Retry processing
  In an environment where the system is susceptible to noise, include the retry processing in the user program.
- Data transmission speed
  Change the destination device to connect with the C Controller module from 100Mbps and 10Mbps changes the data transmission speed for communication.

(3) Setting an IP address

To use the Ethernet port(s), it is necessary to set an IP address.

You may set an IP address by using parameters by Setting/monitoring tools for the C Controller module.

Point

- Do not set an IP address for the C Controller module from the user program. Otherwise, network may no longer be function properly.

(a) For the first connection

For factory connection or connection after initialization, use the default IP address.

The C Controller IP addresses set in factory or after initialization are listed below.

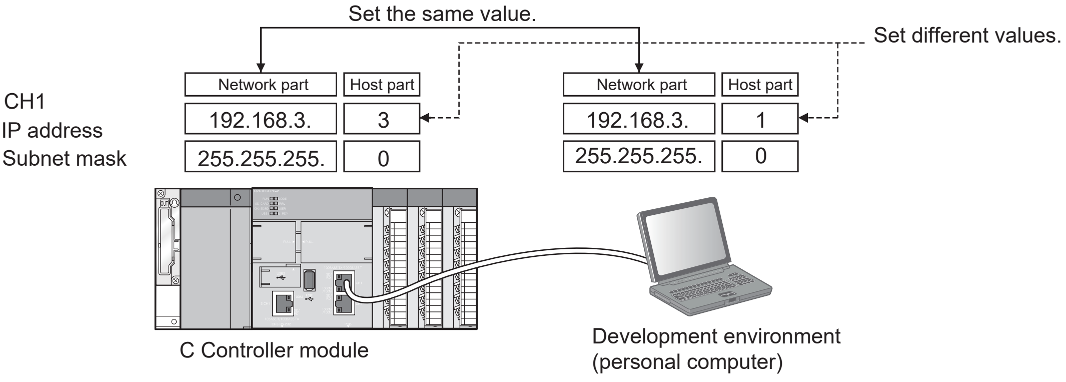
<Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS>

Ethernet port	Default IP address
User Ethernet port (CH1) For "-LS", consult with the partner (operating system vendor).	192.168.3.3
User Ethernet port (CH2) For "-LS", consult with the partner (operating system vendor).	(No IP address setting)
System Ethernet port (S CH1)	192.168.3.39

<Q12DCCPU-V>

Ethernet port	Default IP address
Built-in Ethernet port (CH1)	192.168.3.3
Built-in Ethernet port (CH2)	(No IP address setting)

An example of setting is illustrated below:



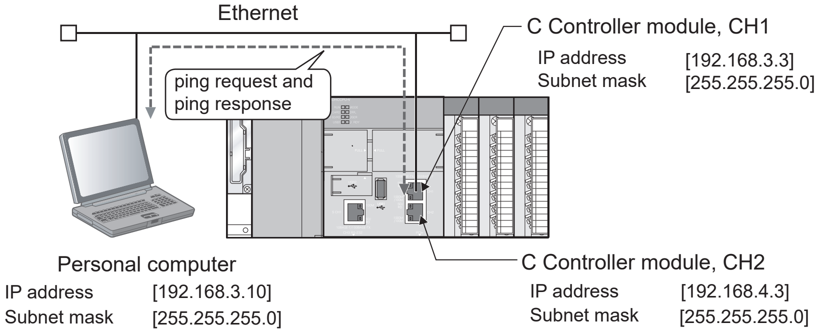
(b) Precautions for IP address setting For "-LS", consult with the partner (operating system vendor).

The network portion of the IP address must be the same in both the destination device to connect and the user Ethernet port or Built-in Ethernet port.

CH1 and CH2 of user Ethernet port and built-in Ethernet port must have different network portions in their IP addresses.

A message to the destination device (including response packet such as ping) is sent (as a response) from the user Ethernet port or Built-in Ethernet port that has the same network portion in the IP address.

- Example of ping execution from a personal computer

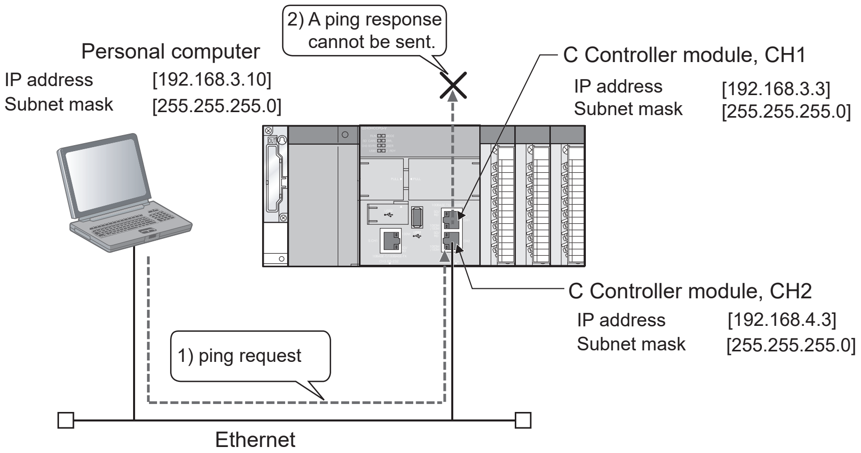

Ethernet
ping request and ping response
C Controller module, CH1
IP address [192.168.3.3]
Subnet mask [255.255.255.0]
Personal computer
IP address [192.168.3.10]
Subnet mask [255.255.255.0]
C Controller module, CH2
IP address [192.168.4.3]
Subnet mask [255.255.255.0]

1. **Transmit ping request from Personal computer to the C Controller module.**

2. **A ping response is transmitted (as a response) from the user Ethernet port CH1 with the same network portion (192.168.3) as the destination device.**

As illustrated below, no message (including response packet such as ping) is not transmitted (as a response) to the destination device if you connect a user Ethernet port and a destination device with different network portion in their IP addresses.

- Communication not available


2) A ping response cannot be sent.
Personal computer
IP address [192.168.3.10]
Subnet mask [255.255.255.0]
C Controller module, CH1
IP address [192.168.3.3]
Subnet mask [255.255.255.0]
C Controller module, CH2
IP address [192.168.4.3]
Subnet mask [255.255.255.0]
1) ping request
Ethernet

3. **Transmit ping request from Personal computer to the C Controller module.**

4. **A ping response is transmitted (as a response) from the user Ethernet port CH1 with the same network portion (192.168.3) as the destination device. (No transmission from CH2 that received the ping request.)**

CH1 is not connected to the destination device, so no ping response is returned.

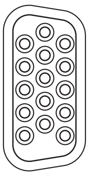
8.7.3 Analog RGB output cabling

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
×	○	○	○	×

Described in this section are the specifications and wiring of compatible RGB cables.

(1) Analog RGB output connector

The analog RGB output connector is located at the bottom face of the module.

Analog RGB output connector	Connection destination
	General-purpose RGB display [*1]

*1 : Connect the display before powering ON.

(a) Q24DHCCPU-VG

- Connection with a general-purpose analog RGB display
  For the connectable cables and peripheral devices, the ones meet the specifications of analog RGB connector for C Controller module can be used.
  ☞ Page 45, Section 3.2

(b) Q24DHCCPU-LS and Q26DHCCPU-LS

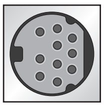
For the connectable cables and peripheral devices, refer to the manual of the partner operating system, or consult the partner (operating system vendor).

8.7.4 RS-232 cabling

Described in this section are the specifications and wiring of compatible RS-232 cables.

(1) RS-232 connector

RS-232 connector is located at the bottom of the module.

RS-232 connector	Connection destination
	Peripheral device

(a) When 9-pin D-sub connector is used

To use a 9-pin D-sub connector RS-232 cable, use an optional RS-232 conversion connector cable.

Cable model	Maker name	Model name
RS-232 conversion cable (Round connector → 9-pin D-sub connector)	Mitsubishi Electric Corporation	Q12DCCPU-CBL

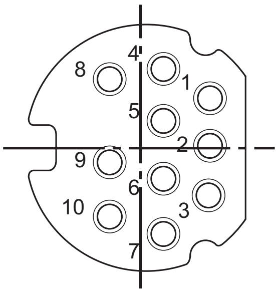
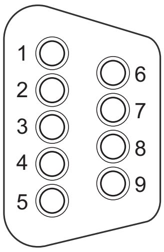
Use the following product as a connection cable connector.

Connector type	Maker name	Model name
D-sub connector (Solder-connection type)	DDK Ltd. (www.ddknet.co.jp/English/index.html)	17JE-23090-02 (D8A)(-CG)

Specifications of fixing screws are as follows:

- Connector fitting screw : M2.6 (user-prepared)
- Tightening torque ranges : 0.206 to 0.39N • m

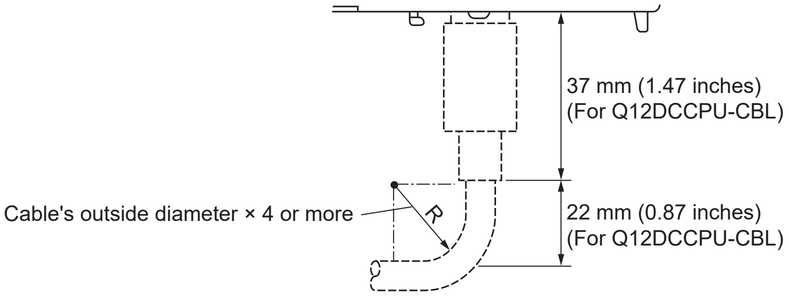
The table below shows the connector pin positions and signal direction.

Pin No.	Mnemonic	Signal name	C controller module	Signal direction	Q12DCCPU-CBL RS-232 device side
1	CD(DCD)	Data Carrier Detect		←	
2	RD(RXD)	Received Data		←	
3	SD(TXD)	Transmitted Data		→	
4	ER(DTR)	Data Terminal Ready		→	
5	SG	Signal Ground		-	
6	DR(DSR)	Data Set Ready		←	
7	RS(RTS)	Request To Send		→	
8	CS(CTS)	Clear To Send		←	
9	CI(RI)	Ring Indicator		←	
10	SG	Signal Ground		-	

(2) Precautions

Precautions for use of RS-232 cables:

- Ground the shield of the RS-232 cable to a single point.
- Bend radius of the cable portion near the connector should be "cable's outside diameter × 4" or more.
- Confirm the specifications of the peripheral device before connecting it.
- Do not short the FG and SG signals of the RS-232 cable.
- When the FG and SG signals are connected inside of the peripheral device, do not connect the FG signal to the C Controller module.
- To install a cable, a space for cabling is required as illustrated below.
  The bend radius (R) near the connector must be "cable's outside diameter × 4" or more when an RS-232 cable is used.
  For the Q12DCCPU-CBL, "cable's outside diameter 4" is 22 mm (0.87 inches) or more.



CHAPTER 9 MAINTENANCE AND INSPECTION

This chapter explains items you should perform routinely or at regular intervals to ensure normal and the best conditions of the C Controller module.

9.1 Daily Inspection

The following table lists the items to be inspected daily.

No.	Item	Inspection	Criterion	Action
1	Installation of base unit	Check the fixing screws and cover for looseness.	The base unit is securely installed.	Retighten the screws.
2	Installation of I/O modules	Check the module and module fixing hook for looseness.	The module fixing hooks are securely engaged and the modules are securely mounted.	Securely engage the module fixing hooks.
3	Connection	Check the terminal screws for looseness.	No looseness.	Retighten the terminal screws.
		Check the distance between solderless terminals.	Proper clearance between solderless terminals.	Provide proper clearance between solderless terminals
		Check the connector part of the cable.	Connectors are securely connected.	Retighten the connector fixing screws.
4	Indicator LEDs	-		
	Power supply module "POWER" LED	Check that the LED is lit.	Lit green. (Faulty if the LED is off or on (red))	☞ Page 394, CHAPTER 23
	Power supply module *1 "LIFE" LED	Check that the LED is lit.	Lit green or orange, flashing (orange) (Faulty if the LED is off, on (red), of flashing (red))	
	C Controller module "MODE" LED	Check that the LED is lit in the RUN status.	Lit. (Faulty if the LED is off)	
	C Controller module "ERR." LED	Check that the LED is off.	Off (Faulty if the LED is off or flashing)	
	Input module Input LED	Check for on/off of the LED.	Lit when the input is on. Off when the input is off. (Faulty if the reaction is other than above.)	📖 QCPU User's Manual (Hardware Design, Maintenance and Inspection)
	Output module Output LED	Check for on/off of the LED.	Lit when the input is on. Off when the input is off. (Faulty if the reaction is other than above.)	☞ Page 394, CHAPTER 23

*1 : When the Life detection power supply module (Q61P-D) is used, check the LIFE LED.

9.2 Periodical Inspection

This section explains the items to be inspected once or twice every six months or every year.
Note that these inspections are required when the system is moved or modified including re-wiring.

No.	Item	Inspection	Criterion	Action
1	Ambient environment *1	-		
	Ambient temperature	Measure with a thermometer and a hygrometer. Measure corrosive gas.	0 to 55 deg. C	Criteria must be met.
	Ambient humidity		5 to 95%RH *2	
	Ambience		No corrosive gas	
2	Power voltage	Measure a voltage across the terminals of 100/200V AC and 24V DC.	85 to 132V AC	Change the power supply.
			170 to 264V AC	
			15.6 to 31.2V DC	
3	Installation	-		
	Looseness, rattling	Move the module to check for looseness and rattling.	The module is securely installed.	Retighten the screws. For the C Controller module, I/O modules, or power supply module, secure the module with screws.
	Dirt, foreign matter	Visual check.	No dirt or foreign matter.	Remove and clean it.
4	Connection	-		
	Looseness of terminal screws	Further tighten with a screwdriver.	No looseness.	Retighten the terminal screws.
	Distance between solderless terminals.	Visual check.	Proper clearance between solderless terminals.	Provide proper clearance between solderless terminals.
	Looseness of connectors.	Visual check.	No looseness.	Retighten the connector fixing screws.
5	Battery	Check [CCPU diagnostics] screen of Setting/monitoring tools for the C Controller module*3	No "battery error" occurrence	Replace the battery (☞ Page 136, Section 9.3)
		Check the length of term after purchasing the battery.	Must not be used more than 5 years.	
6	Standard ROM life (☞ Page 137, Section 9.4)	Check [Event history] screen of Setting/monitoring tools for the C Controller module*3	Event No.80001000 ("The count for clearing the standard ROM drive, "/ROM" exceeds the 100,000.") has not occurred.	Replace the C controller module.
7	Built-in SSD life (☞ Page 137, Section 9.5)	Refer to the manual of the partner operating system, or consult the partner (operating system vendor)		

*1 : When using it inside the panel, inspec the in-panel environment.

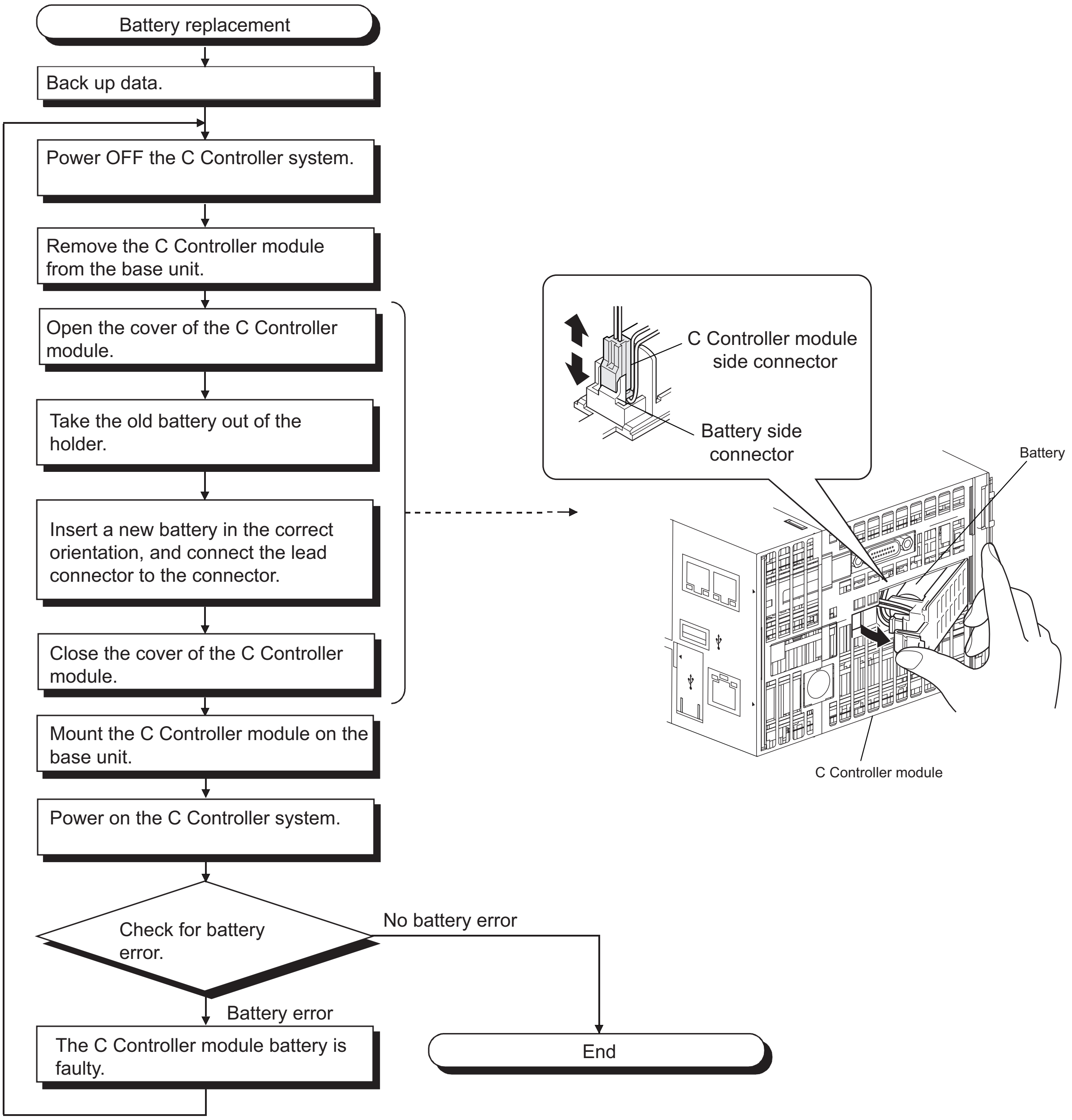
*2 : 10 to 90%RH when an AnS series module is used in a multiple CPU system.

*3 : For Setting/monitoring tools for the C Controller module, refer to the following.
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

9.3 Battery Replacement Procedure

Before the C Controller module battery reaches the limit of its life, replace it by the following procedure.
Before removing the battery, turn on the C Controller system power for 10 minutes or more.
Data will be backed up by the capacitor for a while after removing the battery.
However, quickly replace the battery since the data may be cleared if it takes more than the following guaranteed time.

Backup power time
3 minutes


Battery replacement
Back up data.
Power OFF the C Controller system.
Remove the C Controller module from the base unit.
Open the cover of the C Controller module.
Take the old battery out of the holder.
Insert a new battery in the correct orientation, and connect the lead connector to the connector.
Close the cover of the C Controller module.
Mount the C Controller module on the base unit.
Power on the C Controller system.
Check for battery error.
No battery error
Battery error
The C Controller module battery is faulty.
End
C Controller module side connector
Battery side connector
Battery
C Controller module

9.4 Standard ROM Life

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Described in this section is the standard ROM lifetime.

Point

Do not write files other than parameter and script files to the standard ROM.
If you need to do so, write files into an SD memory card or CompactFlash card.

(1) Standard ROM life

- The life of the standard ROM is represented as write count index value and writing is allowed until it reaches to 100,000.
- As the C Controller module make an effect to extend the writing life of the standard ROM, actual write count index value will not be the same as actual count of writing.
- Replace the C Controller module when the write count index value has reached to 100,000 times.
  (If the write count index value exceeds 100,000, writing to the standard ROM may become slower or result in an error.)

(2) Standard ROM write count index value check

- The standard ROM write count index value can be obtained by the C Controller module dedicated function (CCPU_GetCpuStatus) from the user program.
- If the write count index value exceeds 100,000, it is registered to the event history.

Point

- As the standard ROM operations were checked in our shipping inspection, the initial value of the write count index value is not 0.
- Normally, C Controller module always checks data in the standard ROM area, so the write count index value may be increased.

9.5 Built-in SSD Life

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
×	×	○	○	×

For the life of built-in SSD and the checking method, refer to the manual of the partner operating system, or consult the partner (operating system vendor)

Memo

PART 3 FUNCTION

This section describes the functions available for the C Controller module.

CHAPTER 10 FUNCTION LIST

This chapter explains the C Controller module functions.

(1) Basic functions

○: Supported ×: Not supported △: Supported with restrictions

<table>
<tr><th rowspan="3">Function</th><th rowspan="3">Description</th><th colspan="5">CPU module</th><th rowspan="3">Reference</th></tr>
<tr><th colspan="3">Q24DHC</th><th rowspan="2">Q26DHC
-LS</th><th rowspan="2">Q12DC
-V</th></tr>
<tr><th>-V</th><th>-VG</th><th>-LS</th></tr>
<tr><td colspan="8">I/O module, intelligent function module, and interrupt module control function</td></tr>
<tr><td>I/O module and intelligent function module access function</td><td>Controls I/O modules or intelligent function modules from the user program of the C Controller module.</td><td colspan="2">○</td><td colspan="2">△</td><td>○</td><td>Page 146, Section 11.1.1</td></tr>
<tr><td>Switch settings for I/O and intelligent function modules</td><td>Configure the settings for intelligent function modules and interrupt modules. (For details, refer to the manual for each module.)</td><td colspan="5">○</td><td>Page 147, Section 11.1.2</td></tr>
<tr><td>Interrupt from intelligent function module and interrupt module</td><td>Issues an interrupt event (I50 to I255) in response to an interrupt request from an intelligent function module and interrupt module.</td><td colspan="2">○</td><td colspan="2">×</td><td>○</td><td>Page 148, Section 11.1.3</td></tr>
<tr><td>Input response time selection
(I/O response time)</td><td>Allows selection of the response time for the Q series input modules, I/O combined modules, high-speed input modules, and interrupt modules.</td><td colspan="5" rowspan="5">○</td><td>Page 150, Section 11.1.4</td></tr>
<tr><td>Output (Y) setting for switching from STOP to RUN</td><td>Set the output status (Y) for the case where the STOP status is switched to the RUN status.</td><td>Page 151, Section 11.1.5</td></tr>
<tr><td>Error time output mode setting</td><td>Set whether to clear or hold the outputs to Q series output modules, I/O combined modules, and intelligent function modules when a stop error occurs in the C Controller module.</td><td>Page 152, Section 11.1.6</td></tr>
<tr><td>Hardware error time CPU operating mode setting</td><td>Set whether to stop or run the C Controller module when a hardware error occurs in an intelligent function module.</td><td>Page 153, Section 11.1.7</td></tr>
<tr><td>Self-diagnostic function</td><td>Monitors the operating status of each module, and when an error has occurred, displays error information.</td><td>Page 154, Section 11.2</td></tr>
<tr><td>Watchdog timer (WDT)</td><td>Detects a hardware error or a user program error of the C Controller module.</td><td colspan="2" rowspan="2">○</td><td colspan="2" rowspan="2">△</td><td>△</td><td>Page 158, Section 11.3</td></tr>
<tr><td>Clock function</td><td>Reads clock data in the C Controller module by the user program, and uses them for time control.</td><td>○</td><td>Page 160, Section 11.4</td></tr>
</table>

Function	Description	CPU module					Reference
		Q24DHC			Q26DHC	Q12DC	
		-V	-VG	-LS	-LS	-V	
Remote operation function	Controls the execution status (RUN/STOP/PAUSE) of the C Controller module from its user program or development environment.	○					Page 163, Section 11.5
Device function	Creates a device such as a programmable controller CPU in work RAM of the C Controller module.						Page 169, Section 11.6

○: Supported ×: Not supported △: Supported with restrictions

<table>
<tr><th rowspan="3">Function</th><th rowspan="3">Description</th><th colspan="5">CPU module</th><th rowspan="3">Reference</th></tr>
<tr><th colspan="3">Q24DHC</th><th rowspan="2">Q26DHC
-LS</th><th rowspan="2">Q12DC
-V</th></tr>
<tr><th>-V</th><th>-VG</th><th>-LS</th></tr>
<tr><td colspan="8">Refresh function</td></tr>
<tr><td>Refresh cycle setting</td><td>Sets the refresh cycle used by the C Controller module.</td><td colspan="2">○</td><td colspan="2">△</td><td>×</td><td>Page 170, Section 11.7</td></tr>
<tr><td>Data refresh function</td><td>Performs refreshing automatically between the devices of the C Controller module (X, Y, buffer memory) and the data refresh memory.</td><td colspan="5" rowspan="2">○</td><td>Page 171, Section 11.7.1</td></tr>
<tr><td>Link refresh function</td><td>Performs refreshing automatically between the devices of the C Controller module (B and W) and the link device of the network module.</td><td>Page 175, Section 11.7.2</td></tr>
<tr><td colspan="8">Security function</td></tr>
<tr><td>Access authority setting function</td><td>Restricts operations from Setting/monitoring tools for the C Controller module, Telnet function and FTP function by setting (adding/deleting) user(s) to the C Controller module.</td><td colspan="5">○</td><td>Page 177, Section 11.8.1</td></tr>
<tr><td>Individual identification function</td><td>Creates a user program operable only with a certain C Controller module with individual identification information, by reading out individual identification information of the C Controller module.</td><td colspan="2">○</td><td colspan="2">△</td><td>○</td><td>Page 179, Section 11.8.2</td></tr>
<tr><td>File access restriction function</td><td>Restricts accesses to files and operations by setting an attribute for each file.</td><td colspan="2">○</td><td colspan="2">×</td><td>○</td><td>Page 183, Section 11.8.3</td></tr>
<tr><td>Service setting function</td><td>The status of services (enabling/disabling services) to be operated on the C Controller module can be set.</td><td colspan="5">○</td><td>Page 185, Section 11.8.4</td></tr>
<tr><td>Event history collection function</td><td>Registers the history of up to 500 events that have occurred on the C Controller system along with occurrence time.</td><td colspan="5">○</td><td>Page 187, Section 11.9</td></tr>
<tr><td>Analog RBG port display function</td><td>Displays the GUI screen created with GENWARE3-VG on the general-purpose analog RGB display connected to the analog RGB port.</td><td>×</td><td>○</td><td colspan="3">×</td><td>Page 188, Section 11.10</td></tr>
<tr><td>Battery less drive</td><td>Operates the C Controller module without battery.</td><td colspan="5">○</td><td>Page 190, Section 11.11</td></tr>
</table>

(2) Functions accessed via Ethernet ports

○: Supported ×: Not supported △: Supported with restrictions

<table>
<tr><th rowspan="3">Function</th><th rowspan="3">Description</th><th colspan="5">CPU module</th><th rowspan="3">Reference</th></tr>
<tr><th colspan="3">Q24DHC</th><th>Q26DHC</th><th>Q12DC</th></tr>
<tr><th>-V</th><th>-VG</th><th>-LS</th><th>-LS</th><th>-V</th></tr>
<tr><td colspan="8">User Ethernet port/Built-in Ethernet port function</td></tr>
<tr><td>Communication function with peripheral devices</td><td>Communicates with Ethernet device (development personal computer, etc.) and user Ethernet port, or built-in Ethernet port of C Controller module.</td><td colspan="2" rowspan="4">○</td><td colspan="2" rowspan="3">△</td><td rowspan="3">○</td><td>Page 192, Section 12.1</td></tr>
<tr><td>Telnet function</td><td>Without using CW Workbench, from the Telnet tool of the development environment (personal computer), allows simple remote debugging of the C Controller module.</td><td>Page 194, Section 12.1.1</td></tr>
<tr><td>FTP function</td><td>Operates file(s) in the C Controller module from a destination device with the FTP client function.</td><td>Page 197, Section 12.1.2</td></tr>
<tr><td>Time setting function (SNTP)</td><td>Collects time information from the time information server (SNTP server) connected to LAN in the user Ethernet port or built-inEthernet port of C Controller module.</td><td colspan="2">×</td><td>×</td><td>Page 199, Section 12.1.3</td></tr>
<tr><td colspan="8">System Ethernet port/Built-in Ethernet port function</td></tr>
<tr><td>Communication function with peripheral devices</td><td>Communicates with peripheral device (GOT, or Setting/monitoring tools for C Controller, etc.) and system Ethernet port, or built-in Ethernet port of C Controller module.</td><td colspan="5" rowspan="3">○</td><td>Page 200, Section 12.2</td></tr>
<tr><td>Time setting function (SNTP)</td><td>Collects time information from the time information server (SNTP server) connected to LAN in the system Ethernet port or built-in Ethernet port of C Controller module and automatically sets time on CPU module(s).</td><td>Page 202, Section 12.2.1</td></tr>
<tr><td>SLMP (MC protocol) communication</td><td>Performs SLMP (MC protocol) communication using C Controller module's system Ethernet port or built-in Ethernet port.</td><td>Page 204, Section 12.2.2</td></tr>
</table>

(3) Functions accessed via a network module

○: Supported ×: Not supported △: Supported with restrictions

Function	Description	CPU module					Reference
		Q24DHC			Q26DHC	Q12DC	
		-V	-VG	-LS	-LS	-V	
Cyclic transmission function							
Access function by link refresh function	From the user program of the C Controller module, accesses to device(s) of the C Controller module. Device(s) communicate with the link device of the network module by link refreshing.	○	○	△	△	○	Page 212, Section 13.2.1
Direct access function	From the user program of the C Controller module, directly accesses to a link device of the network module.			×	×		Page 217, Section 13.2.2
Buffer memory access function	From the user program of the C Controller module, accesses to a buffer memory of the network module.						Page 219, Section 13.2.3
Transient transmission function							
Message communication function	From the user program of the C Controller module, reads out/writes data by using the network module channel from the C Controller module.	○	○	×	×	○	Page 221, Section 13.3.1
Function to access to other station	From the user program of the C Controller module, directly accesses to a link device of the network module of the other station via the network.						Page 223, Section 13.3.2
Each network module access function							
CC-Link IE Controller Network master/local module access function	Transmits data via CC-Link IE controller network module.	○	○	×	×	○	Page 225, Section 13.4.1
MELSECNET/H module access function	Transmits data via MELSECNET/H modules.						Page 230, Section 13.4.2
CC-Link IE Field Network master/local module access function	Transmits data via CC-Link IE field network master/local module.						Page 232, Section 13.4.3
CC-Link module access function	Transmits data via CC-Link module.						Page 237, Section 13.4.4

(4) Functions used by multiple CPU system

○: Supported ×: Not supported △: Supported with restrictions

Function	Description	CPU module					Reference
		Q24DHC			Q26DHC	Q12DC	
		-V	-VG	-LS	-LS	-V	
Data communications using CPU shared memory							
Data communications using auto refresh	Transmits/receives data by using automatic refresh between the C Controller module and programmable controller CPU, or Motion CPU, etc.	○	○	△	△	○	Page 256, Section 14.1.2
Communication using the multiple CPU high speed transmission area and auto refresh	Transmits/receives data by using automatic refresh via multiple CPU high speed transmission of the CPU shared memory between the C Controller module and programmable controller CPU, or Motion CPU, etc.						Page 261, Section 14.1.3
Data communications without using auto refresh	Transmits/receives data without automatic refresh between the C Controller module and programmable controller CPU, or Motion CPU, etc.						Page 266, Section 14.1.4
Interrupt from another CPU	Resumes the user program set to the state waiting for an interrupt event by the bus interface function.	○	○	×	×	○	Page 274, Section 14.2
Multiple CPU synchronous interrupt function	Creates a user program to be synchronized with the Motion CPU and executed by waiting for a multiple CPU synchronous interrupt event by the bus interface function.						Page 279, Section 14.3
Issuing an interrupt to another CPU	Issues an interrupt to other CPU modules from the user program of the C Controller module.						Page 280, Section 14.4
Function to access to devices of other CPU modules	From the C Controller module, accesses to device(s) of other CPU modules (programmable controller CPU, C Controller module and Motion CPU).						Page 281, Section 14.5
Remote control function of other CPU modules	From the user program of the C Controller module, controls the execution status of the programmable controller CPU.						Page 283, Section 14.6
Sequence program control function	From the user program of the C Controller module, controls the execution type of the sequence program.						Page 284, Section 14.7
Motion CPU control instruction	From the user program of the C Controller module, start a Motion CPU's SFC program or servo program or changes the set or present values of the servo.						Page 285, Section 14.8
Multiple CPU synchronized boot-up function	Synchronizes startup of CPU modules No.1 through No.4.	○	○	○	○	○	Page 286, Section 14.9

CHAPTER 11 BASIC FUNCTIONS

This chapter explains the basic functions of the C Controller module.

Remark

Check details of each function from the following functions of Setting/monitoring tools for the C Controller module.

- [Help] ⇒ [Function help] ⇒ [C Controller module function help]

11.1 I/O Module and Intelligent Function Module Access Function

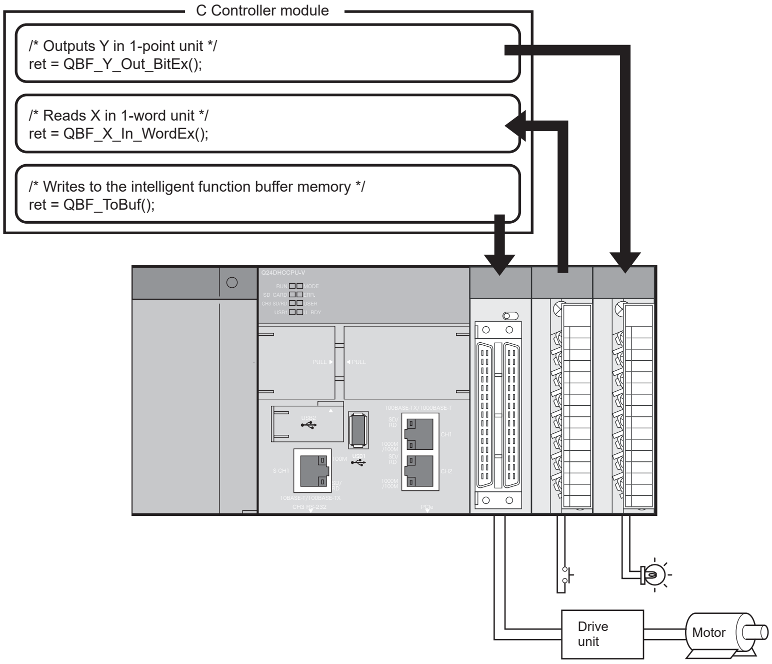
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

11.1.1 I/O module and intelligent function module access function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Reading/writing of devices/buffer memory of the I/O module and intelligent function module controlled by the C Controller module by creating a user program with the bus interface function. **Note11.1**

(1) Example



```
/* Outputs Y in 1-point unit */
ret = QBF_Y_Out_BitEx();
```

```
/* Reads X in 1-word unit */
ret = QBF_X_In_WordEx();
```

```
/* Writes to the intelligent function buffer memory */
ret = QBF_ToBuf();
```

Note11.1 Q24DHCCPU-LS Q26DHCCPU-LS

When using Q24DHCCPU-LS and Q26DHCCPU-LS, the intelligent function modules can be accessed by the data refresh function.

(2) Function

In the table below, functions used for I/O modules and intelligent function modules are listed.

Function name	Function
QBF_X_In_BitEx	Reads out input signals (X) in bit (1 point).
QBF_X_In_WordEx	Reads out input signals (X) in word (16 points).
QBF_Y_Out_BitEx	Outputs output signals (Y) in bit (1 point).
QBF_Y_Out_WordEx	Outputs output signals (Y) in word (16 points).
QBF_Y_In_BitEx	Reads out output signals (Y) in bit (1 point).
QBF_Y_In_WordEx	Reads out output signals (Y) in word (16 points).
QBF_ToBuf	Writes data to the CPU shared memory of the specified module and the buffer memory of the intelligent function module (To instruction).
QBF_FromBuf	Reads data from the CPU shared memory of the specified module and the buffer memory of the intelligent function module (From instruction).
mdSendEx	Batch writes devices.
mdReceiveEx	Batch reads devices.
mdRandWEx	Writes devices randomly. *1
mdRandREx	Reads devices randomly. *1
mdDevSetEx	Set the bit device (to ON). *1
mdDevRstEx	Reset the bit device (to OFF). *1

*1 : Access is not allowed to the shared CPU memory.

11.1.2 Switch settings for I/O and intelligent function modules

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This function allows to set contents of the intelligent function module and interrupt module switches by Setting/monitoring tools for the C Controller module.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

1. **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>>**
2. **Set "Intelligent" in "Type" from "I/O Assignment".**
3. **Configure "Switch Setting".**

For setting contents, refer to the manuals for the respective intelligent function module and interrupt module.

(2) Precautions

The Switch Setting is active after writing by Setting/monitoring tools for the C Controller module in either of the following situations.

- The C Controller system is powered on.
- The C Controller module is reset.

11.1.3 Interrupt from intelligent function module and interrupt module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The C Controller module can resume the user program that has been in the interrupt event waiting status when an interrupt from the intelligent function module or interrupt module occurs.

Remark

This section describes operations on the C Controller module. For settings on the respective intelligent function module and interrupt module side, refer to the manuals for respective modules.

(1) Setting method

To receive an interrupt from the intelligent function module or interrupt module (2nd or later), configure settings by using the following functions of Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Interrupt event settings"**

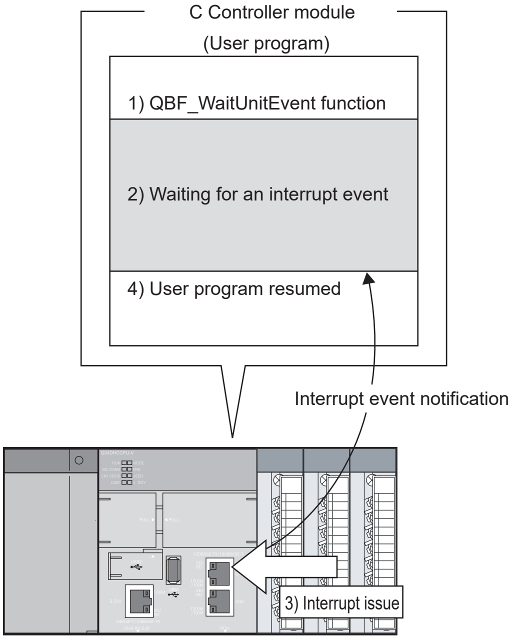
For setting contents, refer to the manuals for the respective intelligent function module and interrupt module.

Point

- For the first interrupt module, the setting is not necessary. To the first interrupt module, events No.0 through 15 have been assigned.
- For the second and subsequent interrupt modules, this setting is necessary.

(2) Restarting a user program

1. **In the user program, call the bus interface function (QBF_WaitUnitEvent).**
2. **The user program is placed into the interrupt event waiting status by procedure 1.**
3. **An interrupt from the intelligent function module or interrupt module is issued in the status of procedure 2.**
4. **The user program receives an interrupt event by procedure 3 and restarts.**


C Controller module
(User program)
1) QBF_WaitUnitEvent function
2) Waiting for an interrupt event
4) User program resumed
Interrupt event notification
3) Interrupt issue

(3) Function

The following are functions used in interrupts from the intelligent function module or interrupt module.

Function name	Function
QBF_WaitUnitEvent	Waits for an interrupt event notification issued when an interrupt occurs from an intelligent function module or an interrupt module.

(4) Precautions

(a) Interrupt event is already notified when the QBF_WaitUnitEvent function is executed

When an interrupt event from the intelligent function module or interrupt module is already notified when the QBF_WaitUnitEvent function is executed, the user program restarts from the interrupt event waiting status simultaneously with the execution of the QBF_WaitUnitEvent function.
If multiple interrupt events with the same interrupt event No. at the time of the QBF_WaitUnitEvent function execution are already notified, the user program processes them as a single interrupt event notification.

(b) Using the QBF_WaitUnitEvent function by multiple user programs

Do not enter the same CPU number or the same interrupt event number by multiple user programs.
Doing so result in the uncertain situation of which user program to receive the interrupt event.

11.1.4 Input response time selection (I/O response time)

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

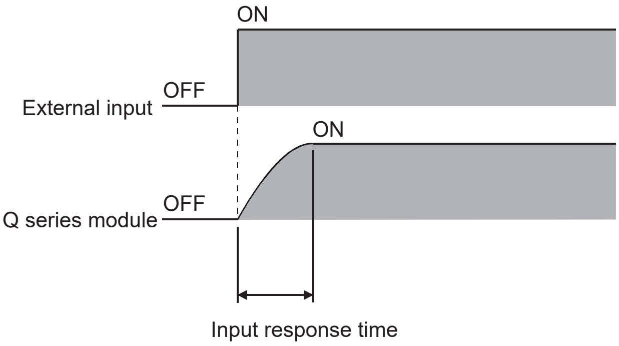
The input response time can be changed for each Q series module.

(1) Applicable modules and setting contents

The following table shows the modules whose input response time can be changed and time options for them.

Module whose input response time can be changed	Type	Option
Input module	Input	1ms, 5ms, 10ms, 20ms, 70ms (Default: 10ms)
I/O combined module	I/O Mix	
High-speed input module	Hi Input	0.1ms, 0.2ms, 0.4ms, 0.6ms, 1ms (Default: 0.2ms)
Interrupt module	Interrupt	

The above Q series modules load external inputs within the specified input response time.



(2) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Detailed Settings" ⇒ "I/O Response Time"**

(3) Precautions

(a) When the input response time is reduced

Reducing the input response time value for high-speed response will make the module noise-sensitive. Take into account the operating environment when setting the input response time.

(b) Timing when the setting takes effect

The input response time setting takes effect when:

- The C Controller system is powered on.
- The C Controller module is reset.

11.1.5 Output (Y) status setting for switching STOP to RUN

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

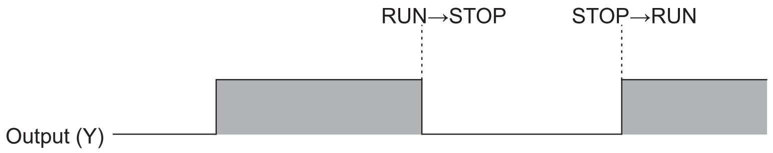
When the C Controller module status is switched from RUN to STOP, the output data (Y) in the RUN status are saved in the C Controller module and actual outputs are all turned off.
In the STOP status, the output (Y) status cannot be changed from the user program.
Either of the following two options can be selected for the case of switching STOP to RUN.

- Outputting the output status data before STOP. (Previous state)
- Clearing the output (Y) data. (Reset output (Y))

(1) Processing

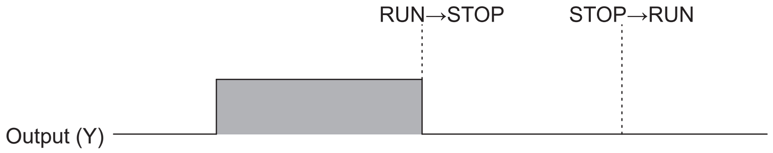
(a) Previous state (Default)

The output status (Y) immediately before the change to STOP is output.
Then, output from the user program is enabled.



(b) Reset output (Y)

The outputs turn to OFF.
Then, output from the user program is enabled.



(2) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Output Mode at STOP to RUN"**

(3) Precautions

(a) When output (Y) is forced to turn ON in the STOP status and then the status is changed to RUN

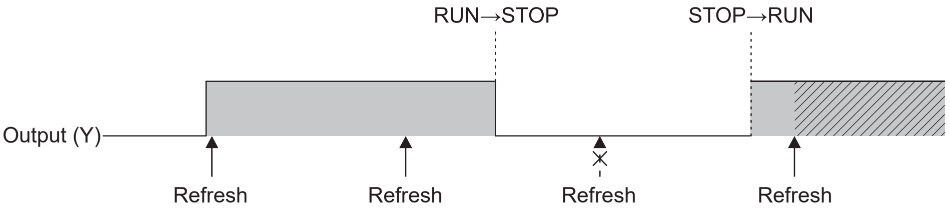
The table below shows the output operation when the output (Y) is forced to turn ON with the C Controller module set to STOP and then the STOP status is changed to RUN.

Output mode at STOP to RUN	Previous State	When output (Y) is forced to turn ON in the STOP status and then the status is changed to RUN
Previous state	OFF	OFF (Outputs the status before STOP.)
	ON	ON (Outputs the status before STOP.)
Reset output (Y)	OFF	ON (Outputs the Force ON status.)
	ON	ON (Outputs the Force ON status.)

(b) Operations in case where writing operation to output (Y) is set in the data refresh settings

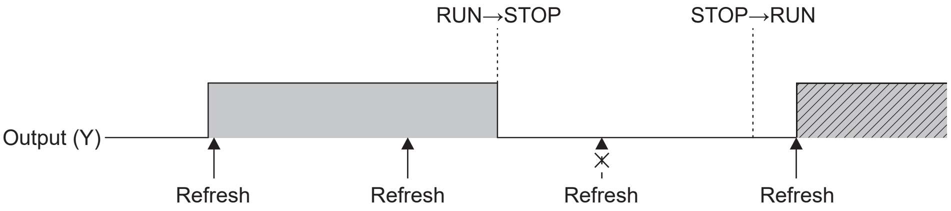
Regardless of the parameter "Output mode at STOP to RUN" (Previous State/Recalculate), the output (Y) is refreshed by the data refresh right after the status is changed from STOP to RUN.

- When "Previous State" is selected



▨ Output by data refresh writing operation right after transition from STOP to RUN status

- When "Recalculate" is selected



▨ Output by data refresh writing operation right after transition from STOP to RUN status

To maintain the state where output (Y) is cleared (OFF), clear the data refresh memory by the user program when the status changes from RUN to STOP.

11.1.6 Error time output mode setting

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This setting determines whether to clear or hold the outputs to the following modules when a stop error occurs in the C Controller module.

- Output modules
- I/O combined modules
- Intelligent function modules
- Interrupt modules

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Detailed Settings" ⇒ "Error Time Output Mode"**

(2) Precautions

The error time output mode setting takes effect when:

- The C Controller system is powered on.
- The C Controller module is reset.

11.1.7 Hardware error time CPU operation mode setting

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This setting determines whether to stop or continue the output (Y) from the C Controller module and writing to the buffer memory if a hardware error occurs in an intelligent function module or interrupt module.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Detailed Settings" ⇒ "CPU Operation Mode at H/W Error"**

(2) Precautions

The hardware error time CPU operation mode setting takes effect when:

- The C Controller system is powered on.
- The C Controller module is reset.

11.2 Self-Diagnostic Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

The self-diagnostic function allows the C Controller module to detect its own error during operation, preventing a malfunction and providing preventive maintenance.

(1) Self-diagnostics timing

When an error occurs at power-on of the C controller module or during RUN/STOP of the C controller module, an error is detected and displayed, and the operation of the C controller module will be stopped by the self-diagnostic function.

Point

Note that errors may not be detected by the self-diagnostic function depending on the error occurrence status and the instruction to be executed. Even if the operation will not be stopped by the self-diagnostics, establish a safety circuit outside so that the entire system operates safely.

(2) Error checking

(a) LED ON

When the C controller module detects an error, it turns on ERR. LEDs.
For LED status, refer to the following.
☞ Page 156, (5) in this section

(b) Checking the error details

You may check the error code and error information from the following functions of Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [CCPU diagnostics] ⇒ <<CCPU diagnostics>>**

(c) Checking the event history

Any error that occurred during error detection will be registered to the event history.
You may check the registered event history from the following functions of Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [Event history] ⇒ <<Event history>>**

(3) Processing after error detection

Upon detection of an error, outputs (Y) from the user program and writing to the buffer memory is disabled, and outputs to output modules, I/O modules, and intelligent function modules are cleared.
For the following items, you may check operations in error detection by using Setting/monitoring tools for the C Controller module.

(a) Output mode

Whether to clear or retain the output to the module with any error detected can be selected.
For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Detailed Settings" ⇒ "Error Time Output Mode"**

(b) CPU operation mode

Whether to stop or continue the output (Y) from the user program and writing to the buffer memory can be selected for the module.

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Detailed Settings" ⇒ " CPU Operation Mode at H/W Error"**

(c) Operation mode

Whether to stop or continue the output (Y) from the user program and writing to the buffer memory when fuse blown error or module verify error occurs can be selected.

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> ⇒ "Operating mode at the time of error"**

(d) Multiple CPU operation mode

Whether to stop all of the multiple CPU system or not can be selected for the case where a stop error occurs in any of CPU No.2 to No.4 in the multiple CPU system.

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU setting>> ⇒ "Operation Mode"**

(4) Selectable error detection

If any of the following items under "Error check" is not selected in the <<RAS Setting>> of parameter, the corresponding error detection is not performed.

- Battery check
- Fuse blown check
- Module verification
- Diagnostics of redundant power supply system [*1]

[*1] When it is deselected, the information of SM, SD1780-1783, and C Controller module dedicated function (CCPU_GetPowerStatus function) will not be updated.

(5) Self-diagnostic function list

The following shows the self-diagnostic functions available during normal operation.

Item	Error message	Diagnostic timing	CPU module status *1	LED status	
				RUN	ERR.
Hardware error	-				
CPU error *2	MAIN CPU DOWN	• Any time	Stop	Off	Flash
RAM check	RAM ERROR	• Any time	Stop	Off	Flash
Fuse blown *3	FUSE BREAK OFF	• Any time	Stop/Continue *4	Off/On	Flash/On
I/O module verify error *2	I/O INT.ERROR	• Any time	Stop	Off	Flash
Intelligent function module error	SP.UNIT DOWN	• At power-on, at reset • At module access • When interrupt occurs	Stop/Continue *5	Off/On	Flash/On
Control bus error	CONTROL-BUS.ERR.	• At power-on, at reset • At module access • When interrupt occurs • Any time	Stop	Off	Flash
Multiple CPU high speed bus error	MULTI-C.BUS.ERR.	• Any time	Stop	Off	Flash
Momentary power failure occurrence *2	AC/DC DOWN	• Any time	Continue	On	Off
Reduction of redundant base unit power supply voltage	SINGLE PS.DOWN	• Any time	Continue	On	On
Redundant power supply module error *6	SINGLE PS.ERROR	• Any time	Continue	On	On
Battery error *3	BATTERY ERROR	• Any time	Continue	On	On
Handling error	-				
Module verify *3	UNIT VERIFY ERR.	• At power-on, at reset	Stop/Continue *4	Off/On	Flash/On
Intelligent function module assignment error	SP.UNIT LAY ERR.	• At power-on, at reset	Stop	Off	Flash
Intelligent function module version error	SP.UNIT VER.ERR.	• At power-on, at reset	Stop	Off	Flash
No parameter	MISSING PARA.	• At power-on, at reset	Stop	Off	Flash
Unable to execute instruction	CAN'T EXE.PRG.	• At power-on, at reset	Stop	Off	Flash
Intelligent program execution error	SP.UNIT ERROR	• Any time • At power-on, at reset	Stop	Off	Flash

Item		Error message	Diagnostic timing	CPU module status [*1]	LED status	
					RUN	ERR.
Parameter error		-				
	Parameter setting check	PARAMETER ERROR	• At power-on, at reset	Stop	Off	Flash
	Link parameter error	LINK PARA.ERROR	• At power-on, at reset	Stop	Off	Flash
	Intelli-parameter error	SP.PARA.ERROR	• At power-on, at reset	Stop	Off	Flash
	Refresh time over	REF. TIME OVER	• At power-on, at reset	Continue	On	On
	Network No. duplication error	DUPLICAT.NET.NO.	• At power-on, at reset	Stop	Off	Flash
CPU error		-				
	System watchdog timer error	SYSTEM WDT ERROR	• Any time	Stop	Off	Flash
	User watchdog timer error	USER WDT ERROR	• Any time	Stop	Off	Flash
Multiple CPU system error		-				
	Other CPU critical error	MULTI CPU DOWN	• Any time • At power-on, at reset	Stop/Continue [*7]	Off	Flash
	Multiple CPU execution error	MULTI EXE.ERROR	• Any time • At power-on, at reset	Stop/Continue [*7]	Off	Flash
	Multiple CPU consistency error	CPU LAY ERROR	• Any time • At power-on, at reset	Stop/Continue [*7]	Off	Flash
	Other CPU minor error	MULTI CPU ERROR	• Any time	Continue	On	On

*1 : When "Stop" is detected in CPU operating status, no script file is executed.

*2 : How many times a momentary stop was detected can be confirmed by the C Controller module dedicated function (CCPU_GetPowerStatus).
While the C Controller module is detecting "Main CPU error", "Momentary stop detection" (including detection count update) and "Power OFF detection" are not performed.
Further, the module may not be started up when this error occurs.

*3 : "Not checked" can be set in "Error check" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings >>in Setting/monitoring tools for the C Controller module.

*4 : The CPU operation status for error detection can be changed to "Continue" in "Operation mode at the time of error" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings >> in Setting/monitoring tools for the C Controller module.

*5 : The CPU operation status for error detection can be changed to "Continue" in "H/W error time CPU operation mode" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> in Setting/monitoring tools for the C Controller module.

*6 : For error details, you may check information in special relays (☞ Page 474, Appendix 6), special registers (☞ Page 476, Appendix 7).

*7 : Whether to stop the multiple CPU system or not when an error occurs in CPU No.2, No.3, or No.4 can be set in "Operation mode" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> in Setting/monitoring tools for the C Controller module.

(6) Clearing errors

A C Controller module can clear only continuation errors.

(a) Error clear procedure

To clear errors, complete the following procedure.

1. **Eliminate the reason for the error.**
2. **Perform one of the following operations or processes.**
   - **Perform the error clear operations in [Diagnostics] ⇒ [CCPU diagnostics] ⇒ <<CCPU diagnostics>> ⇒ "Clear error" in Setting/monitoring tools for the C Controller module.**
   - **Execute the C Controller module dedicated function (CCPU_ClearError).** Note11.2
3. **The target error will be cleared.**

(b) The status after clearing errors

When the C Controller module is restored with error clear, the special relay, special register and LED related to the error return to the status before the error occurred.

When the same error occurs after error clear is performed, the error is registered to the event history again.

Point

Errors occurring as a result of cause other than the C Controller module cannot be cleared.

[Example]
Since "SP. UNIT DOWN" is an error that occurred on the Q bus, the error cause cannot be resolved if error cancellation is performed.
Refer to the following, and resolve the error cause.
☞ Page 394, CHAPTER 23 TROUBLESHOOTING

11.3 Watchdog Timer (WDT)

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	△

Watchdog timers are provided inside the C Controller module to detect failure of the hardware or user program.

The C Controller module has the following two different watchdog timers.

○: Supported △: Supported with restrictions

Item	Description	CPU module				
		Q24DHC			Q26DHC -LS	Q12DC -V
		-V	-VG	-LS		
System watchdog timer	The system watchdog timer monitors the system of the C Controller module, and is used to detect a fault in the hardware or system software.	○				
User watchdog timer	The user watchdog timer monitors the user programs, and is used to detect an error in the hardware of user programs.	○	△			△[*1]

[*1] : Cannot be set in Setting/monitoring tool for the C Controller module parameter. Set the user watchdog timer by using a user program.

Note11.2 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

(1) Conditions for watchdog timer time out

- System watchdog timer
  Times out when the system processing has been suspended for a long time, for reasons such as C Controller module hardware error and interrupt program execution, etc.
- User watchdog timer For "-LS", consult with the partner (operating system vendor).
  Times out when the system processing has been suspended for a long time, for reasons such as C Controller module hardware error and interrupt program execution, etc.
  Further, it also times out when the user program cannot complete processing within the time specified by the C Controller module dedicated function (CCPU_StartWDT function) and cannot execute the C Controller module dedicated function (CCPU_ResetWDT function).

(2) When a watchdog timer times out

When a watchdog timer times out, a watchdog timer error is detected and the following conditions occur.

- The C Controller module turns off all the outputs.
- The RUN LED turns off, and the ERR.LED flashes.
  Only for a system watchdog timer error, the MODE LED also turns off.
- An abnormal completion (WDT error) is detected when the C Controller module dedicated function is used.

(3) Setting a watchdog timer

- System watchdog timer
  Can be set and changed in the range of 20ms to 2000ms (in increments of 10ms) in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> in Setting/monitoring tools for the C Controller module.
  (The default is 1000ms.)
- User watchdog timer For "-LS", consult with the partner (operating system vendor).
  Can be set and changed in the range of 100ms to 10000ms (in increments of 10ms) in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> in Setting/monitoring tools for the C Controller module.
  (The default is 1000ms.)

Point

● For setting of the user watchdog timer by the user program For "-LS", consult with the partner (operating system vendor).
Each timer can be set and changed by using the C Controller module dedicated function (CCPU_StartWDT function) after deselecting the Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> ⇒ "Use user WDT" checkbox in Setting/monitoring tools for the C Controller module.

(4) Resetting a watchdog timer

- System watchdog timer
  The system watchdog timer is periodically reset in the C Controller module.
- User watchdog timer For "-LS", consult with the partner (operating system vendor).
  The user watchdog timer is periodically reset in the C Controller module.

Point

● For resetting of the user watchdog timer by the user program For "-LS", consult with the partner (operating system vendor).
Use the C Controller module dedicated function (CCPU_StartWDT function) to start monitoring and the C Controller module dedicated function (CCPU_ResetWDT function) to reset the timer.

11.4 Clock Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This function serves as the integral clock (RTC: Real Time Clock) in the C Controller module.
Clock data of the integral clock can be set and checked (read out) from Setting/monitoring tools for the C Controller module and the user program.
Clock data are used for C Controller system's time management, e.g. event history information of the C Controller module and intelligent function module.

Point

- File time stamp
  OS clock time is used for file time stamp.
  Time of the C Controller module integral clock and that of the OS clock may vary, so correct the OS clock time by using the user program.

(1) Clock operation during power OFF, reset or momentary power failure

Even while the C Controller module is powered off, reset or has failed for longer than the allowable momentary power failure time, the clock operation continues by the battery inside the C Controller module.
However, the clock data are initialized during the battery less drive. For details of the battery less drive function, refer to the following.
☞ Page 190, Section 11.11

(2) Clock data

Clock data are data used by the C Controller module integral clock.
The following indicates the details of clock data.

Data name	Description	
YY	4 digits (available from 2000 to 2099)	
MM	1 to 12	
DD	1 to 31 (automatic leap year adjustment)	
Hr.	0 to 23 (24-hour system)	
Min.	0 to 59	
Sec.	0 to 59	
Day of week	0	Sunday
	1	Monday
	2	Tuesday
	3	Wednesday
	4	Thursday
	5	Friday
	6	Saturday

(3) Changing and reading clock data

(a) Changing clock data

There are 2 ways to change clock data as described below.

- Using Setting/monitoring tools for the C Controller module
  Select [Online] ⇒ [Set Clock] to change the clock data.
- Using user program Note11.3
  Use the C Controller module dedicated function (CCPU_SetRTC function) to change the clock data.
  Obtain clock data from an external computer or programmable controller CPU on the network.
  Then, by setting the clock data again for the C Controller module with the CCPU_SetRTC function, adjust the clock of the C Controller module.

Function name	Function
CCPU_SetRTC	Sets time in the C Controller module integral clock.

Point

● OS clock setting
C Controller module sets its integral clock time to the OS clock time at the power up or startup after resetting.
Set the time to the running OS clock by using the user program.

(b) Reading clock data For "-LS", consult with the partner (operating system vendor).

To read clock data, use the C Controller module dedicated function (CCPU_GetRTC).

Function name	Function
CCPU_GetRTC	Acquires time in the C Controller module integral clock.

(4) Clock data accuracy

For accuracy of the clock data, refer to the following.

☞ Page 45, Section 3.2

To correct the clock data, synchronize the data with the time of the SNTP server on the network.For the time setting function (SNTP), refer to the following.

☞ Page 202, Section 12.2.1

Note11.3 Q24DHCCPU-LS Q26DHCCPU-LS

Q24DHCCPU-LS and Q26DHCCPU-LS cannot be set by user programs.

(5) Multiple CPU clock synchronization function

The multiple CPU clock synchronization function allows clock data synchronization with CPU No.1 when the C Controller module is set as CPU No.2, No.3, or No.4 in a multiple CPU system.

Clock data will be received from CPU No.1 at the following timing.

- When the multiple CPU system is powered on
- When the multiple CPU system status is changed from RESET or STOP to RUN
- At intervals of one second after startup of the multiple CPU system

Point

- As clock data are set in seconds by the No.1 CPU module, clock data for other CPU modules may be different from the No.1 CPU module's scan time by up to 1 second.
- The C Controller modules (Q12DCCPU-V, Q24DHCCPU-V, and Q24DHCCPU-VG) synchronize the clock data if there is any discrepancy of 3 seconds or more between the clock data received from No.1 module and the clock data in the C Controller module.
- Clock data of CPU No.1 must be set to the year 2000 or later.
  The C Controller module supports only the year 2000 or later clock data.

(a) When using the time setting function (SNTP)

For No.2 through No.4 modules, the time synchronization with the No.1 CPU module has a priority, so time synchronization by "Time setting function (SNTP)" will not be conducted.

(b) When using GOT time adjustment and time notification

The No.1 CPU module is the target when performing time adjustment and time notification by GOT connected to the No.2 to No.4 C Controller modules.

Synchronize the clocks of No.2-4 modules with that of the No.1.

(6) Precautions

(a) Initial clock data setting

No clock data are set for the C Controller module prior to shipping.

Therefore, before using the C Controller module for the first time, be sure to set accurate clock time.

(b) Correcting clock data

Even if a part of clock data is to be corrected, all of clock data must be written to the C Controller module again.

(c) Changing clock data by a user program

When changing clock data by a user program, use the C Controller module dedicated function (CCPU_SetRTC).

If any other clock data setting function is used, correct clock data will not be set in the C Controller module.

(d) Standard time

The C Controller module integral clock cannot use the local standard time and the global standard time simultaneously.

Set the local standard time to set time to the integral clock.

11.5 Remote Operation Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The remote operation function controls the operation status of the C Controller module or a programmable controller CPU from the user program or Setting/monitoring tools for the C Controller module.

Use the dedicated function library for control by the user program. Note11.4

There are the following three different remote operations.

- Remote RUN/STOP (☞ Page 163, (1) in this section)
- Remote PAUSE (☞ Page 165, (2) in this section
- Remote RESET (☞ Page 166, (3) in this section)
- Restarting user CPU (☞ Page 73, Section 6.4)

Point

For the remote operation, refer to the manual for the programmable controller CPU.

(1) Remote RUN/STOP

The remote RUN/STOP is a control from Setting/monitoring tools for the C Controller module, by which the C Controller module can run or stop with its RUN/STOP/MODE switch set to RUN.

(a) Application

The remote RUN/STOP is useful when:

- The C Controller module is out of reach.
- External signals are used to run or stop the C Controller module inside a control panel.

(b) Operation

The remote RUN/STOP makes the C Controller module behave as described below.

- Remote STOP
  As soon as remote STOP is requested, the C Controller module is stopped.
  (☞ Page 307, Section 17.2.3 (2))
- Remote RUN
  Executing remote RUN in the remote STOP status will change the C Controller module status to RUN again. (☞ Page 307, Section 17.2.3 (1))

Note11.4 Q24DHCCPU-LS Q26DHCCPU-LS

Q24DHCCPU-LS and Q26DHCCPU-LS cannot be set by user programs.

(c) Methods for remote RUN/STOP

There are the following 2 different ways to execute remote RUN/STOP.

- **Using Setting/monitoring tools for the C Controller module**
  [Online] ⇒ [Remote Operation]
- **Using user program**
  Execute a bus interface function (QBF_ControlEx) to perform remote RUN/STOP.
  The following shows the function(s) used for remote RUN/STOP.

Function name	Function
QBF_ControlEx	Controls remote RUN/STOP/PAUSE operations of the other programmable controller CPU modules and C Controller module.

(d) Precautions

Pay attention to the following since the C Controller module gives priority to STOP.

- STOP timing
  The C Controller module is stopped when remote STOP is executed from either of the user program or Setting/monitoring tools for the C Controller module.
- Changing the remote STOP status to RUN again
  Execute remote RUN.
- Output (Y) status during STOP
  When "Output mode at STOP to RUN" is set to "Previous state" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> in Setting/monitoring tools for the C Controller module, the output (Y) data at the time when RUN is changed to STOP are output in remote RUN mode.
- User program during STOP
  The user program will not stop even if the C Controller module is placed in the remote STOP status.
  To change the program processing according to the operation status of the C Controller module, utilize the C Controller module dedicated function (CCPU_GetCpuStatus) in programming.

Remark

The operation status of the C Controller module can be confirmed by the following.

- "CPU operation status" in [Diagnostics] ⇒ [CCPU diagnostics] ⇒ <<CCPU diagnostics>> in Setting/monitoring tools for the C Controller module
- C Controller module dedicated function (CCPU_GetCpuStatus)

(2) Remote PAUSE

The remote PAUSE is a control from the user program or Setting/monitoring tools for the C Controller module, by which the C Controller module can be placed in the PAUSE status with its RUN switch set to RUN.

(a) Application

The remote PAUSE is useful in process control, for example, to keep the ON status of output (Y) set in the RUN status even if the C Controller module status is changed from RUN to PAUSE.

(b) Operation

As soon as remote PAUSE is requested, the C Controller module enters to PAUSE status.
(☞ Page 307, Section 17.2.3 (3))

(c) Methods for remote PAUSE

There are the following 2 different ways to execute remote PAUSE.

- **Using Setting/monitoring tools for the C Controller module**
  [Online] ⇒ [Remote Operation]
- **Using user program**
  Execute a bus interface function (QBF_ControlEx) to perform remote PAUSE.
  The following shows the function(s) used for remote PAUSE.

Function name	Function
QBF_ControlEx	Controls remote RUN/STOP/PAUSE operations of the other programmable controller CPU modules and C Controller module.

(d) Precautions

The user program will not stop even if the C Controller module is placed in the remote PAUSE status.
To change the program processing according to the operation status of the C Controller module, utilize the C Controller module dedicated function (CCPU_GetCpuStatus) in programming.

Remark

The operation status of the C Controller module can be confirmed by the following.
- "CPU operation status" in [Diagnostics] ⇒ [CCPU diagnostics] ⇒ <<CCPU diagnostics>> in Setting/monitoring tools for the C Controller module
- C Controller module dedicated function (CCPU_GetCpuStatus)

(3) Remote RESET

The remote RESET is a control from the user program or Setting/monitoring tools for the C Controller module, by which the C Controller module or programmable controller CPU can be reset when it is in the STOP status.

(a) Application

The C Controller module or programmable controller CPU can be remotely reset when an error occurs in the place where direct control of the switch on the CPU module is not available.

(b) Remote RESET timing

This is only executable when the C Controller module or the programmable controller CPU is in STOP status. When the C Controller module or programmable controller CPU is in the RUN status, change the status to STOP by remote STOP.
Even if the switch of the C Controller module or programmable controller CPU is set to RUN, it can be reset when it is stopped due to an error that can be detected by the self-diagnostic function.

(c) Setting/operation before performing remote RESET

Perform the setting/operation steps 1 through 4 below before performing remote RESET.
Otherwise, remote RESET cannot be performed.

1. **Set "Remote Reset" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> in Setting/monitoring tools for the C Controller module to "Enable".**
2. **Write parameters into the C Controller module.**
3. **Reset the C Controller module.**
4. **Set the C Controller module in STOP status.**

(d) Methods for remote RESET

There are the following 2 different ways to execute remote RESET.

- **Using Setting/monitoring tools for the C Controller module**
  [Online] ⇒ [Remote Operation]
- **Using user program**
  Execute a bus interface function (QBF_Reset) to perform remote RESET.
  The following shows the function(s) used for remote RESET.

Function name	Function
QBF_Reset	For single CPU system, resets the C Controller module. For multiple CPU system, resets the No.1 CPU.

(e) Precautions

- Before performing remote RESET
  Close the respective user programs in the C Controller module before performing remote RESET. Execution of remote RESET during user program operation may damage the user program and data files.
- Status after completion of resetting
  Execution of remote RESET changes the operation status of the target C Controller module or programmable controller CPU to the status set with the switch.
- Remote RESET during stop due to an error
  If remote RESET is executed when the C Controller module in a single CPU system or CPU No.1 in a multiple CPU system has stopped due to an error, upon completion of the reset, the module status will be changed to the one set by the switch. Therefore, special attention must be paid.
- Remote RESET by using Setting/monitoring tools for the C Controller module
  Remote RESET will cuts off communication between Setting/monitoring tools for the C Controller module and C Controller module.
  Reconnect Setting/monitoring tools for the C Controller module to the C Controller module after remote RESET.
- Remote RESET for multiple CPU system with programmable controller CPU as No.1
  For remote RESET of programmable controller CPU, refer to the manual for the programmable controller CPU.

(4) Relation between remote operation and RUN/STOP status

This section explains the relation between the remote operations and the switch setting of the C Controller module.

(a) Relation between remote operation and RUN/STOP status of C Controller module

Switch	Remote operation			
	RUN	STOP	PAUSE	RESET
RUN	RUN	STOP	PAUSE	Cannot operate [*1]
STOP	STOP	STOP	STOP	RESET [*2]

*1 : Reset is available when the C Controller module with the switch set to RUN has been placed in the STOP status by remote STOP.

*2 : Includes the case where the C Controller module is stopped due to an error.

(b) Remote operations from the same Setting/monitoring tools for the C Controller module or user program

When more than one remote operation are attempted from the same Setting/monitoring tools for the C Controller module or the same user program, the status resulted from the last one is effective.

(c) Remote operations from multiple Setting/monitoring tools for the C Controller module or user programs

For the C Controller module to which remote operation has already been executed, another remote operation can be executed from a different Setting/monitoring tools for the C Controller module or user program.

11.6 Device Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

Creates a device such as a programmable controller CPU in work RAM on the C Controller module.

(1) Device list

The following shows the device that can be created, initial values and setting range.

Type	Device name	Default value			Setting range
		Number of points	Range		
Bit device	Internal relay	8192 points	M0 to 8191	Decimal	0 to 60K
	Link relay	8192 points	B0 to 1FFF	Hexadecimal	0 to 640K
Word device	Data register	12288 points	D0 to 12287	Decimal	0 to 4086K
	Link register	8192 points	W0 to 1FFF	Hexadecimal	0 to 1024K

(2) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Device settings>>**

(3) Precautions

(a) Number of device points

Set only the required number of device points.

Because a device is created in work RAM, the available range of work RAM, such as in a user program, decreases due to an extra setting.

The consumption of work RAM is calculated by the following formulas.

- Bit device

  16 points is calculated as one word.

  (Consumption of work RAM in the bit device) =
  ((Number of points assigned to the internal relay (M)) + (Number of points assigned to the link relay (B)) / 16 [word]

- Word device

  1 point is calculated as one word.

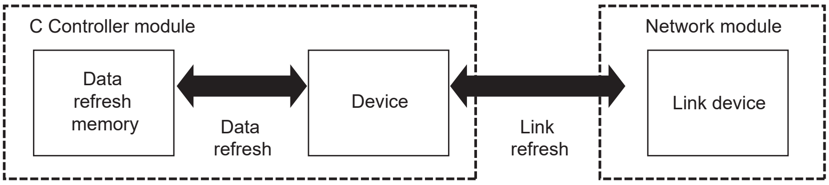
  (Consumption of work RAM in the word device) =
  ((Number of points assigned to the data register (D)) + (Number of points assigned to the link register (W)) [word]

11.7 Refresh Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	△

Refresh function automatically reads/writes device data of the C Controller module to the set area in a cycle.
There are following 2 types of refresh function in the C Controller module.

Function	Description	Reference
Data refresh function	Perform refreshing between the devices of the C Controller module and the data refresh memory.	Page 171, Section 11.7.1
Link refresh function	Perform refreshing between the internal user devices of the C Controller module and the network module link device.	Page 175, Section 11.7.2



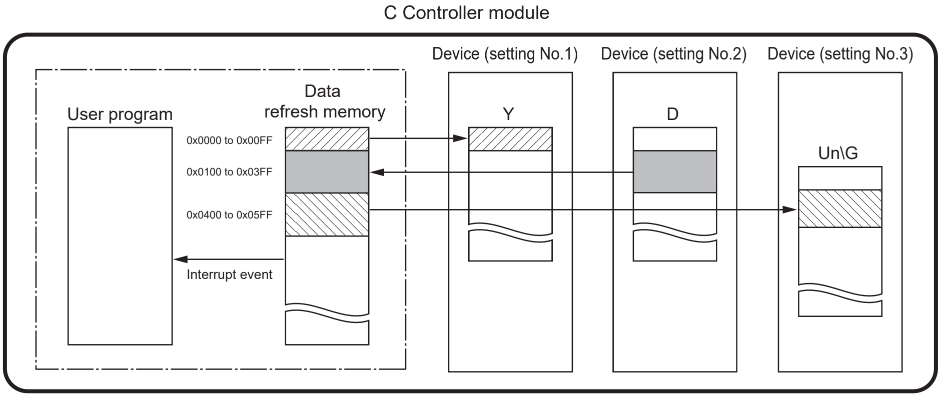
Execution cycle of data refresh and link refresh is called a refresh cycle.
For refresh cycle, refer to the following.
☞ Page 175, Section 11.7.3

11.7.1 Data refresh function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	×

This function performs refreshing automatically between the devices of the C Controller module (X, Y, buffer memory) and the data refresh memory.

Also, it issues an interrupt event when the data refresh memory value meets the specified condition.



C Controller module devices for refreshing are listed below.

Device name		Setting range	Operation
I/O device	Input *1	X0000 to 0FFF	Read
	Output*1	Y0000 to 0FFF	Read/write *4
Internal user device	Internal relay *1*2	M0 to 61439	Read/write
	Link relay *1*2	B0000 to B9FFFF	Read/write
	Data register *2	D0 to 4184063	Read/write
	Link register *2	W0000 to FFFFF	Read/write
Internal system device	Special relay	SM0 to 2047	Read
	Special device	SD0 to 2047	Read
Module access device	Intelligent function module device	Un\G0 to 65535	Read/write
	Multiple CPU shared memory *3	G0 to 4095	Read/write
		G10000 to 24335	Read/write

*1 : For bit device, specify a multiple of 16 at the beginning of the device.

*2 : The number of device points set in the device function (☞ Page 169, Section 11.6) parameter is the upper limit of the set range.

*3 : Some addresses are not readable/writable depending on applications and settings of the shared multiple CPU memory.
For details, refer to the following.
☞ Page 251, Section 14.1

*4 : Regardless of the parameter "Output mode at STOP to RUN" (to Previous State/Recalculate) setting, the output (Y) is refreshed by the data refresh right after the status is changed from STOP to RUN.

Point

To read from/write to the bit device, extract only desired bit information after read-out in words and read/write data.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Data refresh settings>>**

Point

The number of points available for data refresh settings is up to 48K words.

(2) Data refresh time

The following indicates formulas to obtain time required for data refreshing.

Data refresh time D (ms)

= ((CCPU device access time) → ((Total X/Y points / 16 × 1 word access time (T_1 [*1]))
+
(Total points of M/B/SM / 16 × 1 word access time (T_2 [*2]))
+
(Total points of D/W/SD × 1 word access time (T_2 [*2]))
+
(CPU shared memory / buffer memory access time) → (Total points of G × 1 word access time (T_3 [*3]))
+
(Number of settings × K [*4])

) / 1000 [*5]

[*1] : T_1 = 2 µs
[*2] : T_2 = 0.2 µs
[*3] : T_3 = 0.01 µs
[*4] : K = 16 µs
[*5] : Odd numbers should be rounded up.

Point

In any of the following conditions, data refresh delay may occur.

- The user program is accessing to the device
- An interrupt event from an interrupt module or an intelligent function module occurs
- The system is communicating with peripheral(s)

(3) How to access the data refresh memory

For "-LS", consult with the partner (operating system vendor).

The data refresh memory can be accessed by using the following C Controller module dedicated function from the user program.

Function name	Function
CCPU_WriteDataRefreshMemory	Writes data to the data refresh memory of the C controller module.
CCPU_ReadDataRefreshMemory	Reads data from the data refresh memory of the C controller module.

(4) Interrupt event issuance condition

The following indicates conditions where an interrupt event can be issued.

Device	Detection Method	Interrupt condition		Word device setting value
Bit device	Level detect	ON	Interrupts when ON	-
		OFF	Interrupts when OFF	
	Edge detect	ON	Interrupts when rising	
		OFF	Interrupts when falling	
	Value change detect	-	Interrupts when value changes	
Word device	Level detect	Equal	Interrupts when value matches	0 to 65535 (0H to FFFFH)
		Unequal	Interrupts when value does not match	
	Edge detect	Equal	Interrupts when value matches (First time only)	
		Unequal	Interrupts when value does not match (First time only)	
	Value change detect	-	Interrupts when value changes	-

(5) Interrupt event issuance setting

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Data refresh settings>> ⇒ "Interrupt settings"**

(6) Interrupt event reception method For "-LS", consult with the partner (operating system vendor).

Data refresh interrupt event can be received by executing the following C Controller module dedicated function from the user program.

Function name	Function
CCPU_WaitDataRefreshEvent	Waits for an occurrence of a data refresh interrupt event.

(7) Precautions

(a) Device duplication setting

For Setting/monitoring tools for the C Controller module version 4.07H or later, the settings of devices can be duplicated.
For details of the settings, refer to the following.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(b) Operations in STOP/PAUSE status

Writing operation data refresh to the output device, intelligent function module device and multiple shared CPU memory is only executed with the C Controller module in RUN status.
For operations in STOP/PAUSE status, refer to the following.
☞ Page 307, Section 17.2.3

(c) Interrupt event issuance timing

The data refresh interrupt event is issued in the timing of data refresh cycle.

For details, refer to the following.

☞ Page 175, Section 11.7.3

(d) When an interrupt event has already been notified at execution of the C Controller module dedicated function (CCPU_WaitDataRefreshEvent function) For "-LS", consult with the partner (operating system vendor).

The user program is restarted from the interrupt event waiting status at the same time with the CCPU_WaitDataRefreshEvent function execution.

If multiple interrupt events with the same interrupt event No. at the time of the CCPU_WaitDataRefreshEvent function execution are already notified, the user program processes them as a single interrupt event notification.

(e) When using the C Controller module dedicated function (CCPU_WaitDataRefreshEvent function) in multiple user programs For "-LS", consult with the partner (operating system vendor).

Do not enter the same interrupt event number by multiple user programs.

Doing so result in the uncertain situation of which user program to receive the interrupt event.

(f) Operations in reset

When the C Controller system is reset, the data refresh memory is all initialized to 0.

Interrupt condition check is only valid right after resetting.

Therefore, an interrupt event may be issued depending on the interrupt condition.

(g) Assurance of data refresh

Old and new data may be mixed depending on data refresh timing.

However, this does not occur in the following conditions.

- Data refresh data are 16-bit
- Data refresh data are 32-bit and the dare refreshing and data refreshed addresses are of even numbers

(h) I/O to uncontrolled module in multiple CPU system

I/O values to uncontrolled input module/output module/I/O combined module/intelligent function module may vary from the actual I/O values.

For details of access to uncontrolled modules, refer to the following.

📖 QCPU User's Manual (Multiple CPU System)

(i) When the devices which do not exist are specified

For the data refresh setting, specify the existing devices. If the devices which do not exist, the data refresh and link refresh will be stop.

11.7.2 Link refresh function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This function performs refreshing automatically between the devices of the C Controller module (B and W) and the link device of the network module.

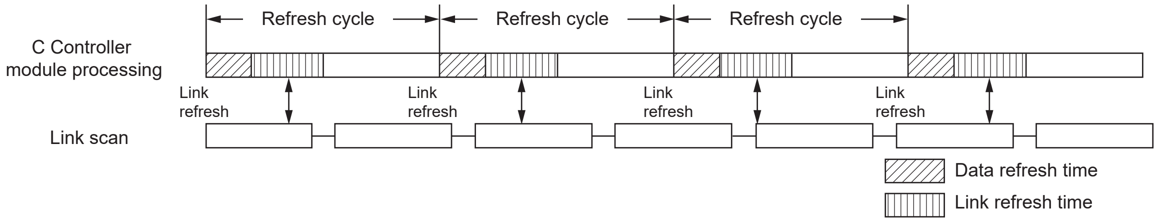
For details of link refresh, refer to the following.

☞ Page 212, Section 13.2.1

11.7.3 Link refresh cycle setting

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

The refresh cycle is the execution cycle for the data refresh function and link refresh function.



(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module. (Setting range 10 to 2000 ms)

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Refresh setting"**

(2) Calculation method

For refresh cycle, set valid values in terms of the following formula.

- Refresh cycle (L) > Total refresh time = Link refresh time + Data refresh time

For link refresh time, refer to the following.

☞ Page 244, Section 13.5.1

For data refresh time, refer to the following.

☞ Page 171, Section 11.7.1

(3) Refresh time check

The actual refresh time values (maximum, minimum and current values) while the C Controller system is running can be checked by using Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [CCPU diagnostics] ⇒ <<CCPU diagnostics>> ⇒ "Refresh information"**

(a) Refresh time

From "Refresh time" in "Refresh information," the actual measurement value for the total refresh time can be checked. (Total refresh time = Link refresh time + Data refresh time)
Use the confirmed maximum refresh time value as a reference to set the refresh cycle.

(b) Link refresh time

From "Link refresh time" in "Refresh information," the actual measurement value for the total link refresh time for all network modules controlled by the C Controller module can be checked.

(c) Data refresh time

From "Data refresh time" in "Refresh information," the actual measurement value for the data refresh time can be checked.

Point

If the user program processing performance is poor, i.e. higher downtime ratio relative to the user program operation time, perform the following processing as necessary.

- Increase the refresh cycle setting value.
- Reduce the number of link refresh points to shorten the link refresh time. (☞ Page 249, Section 13.5.3)
- Review the user program task configuration, priority and processing, etc.

11.8 Security Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	△

This function limits operations to the C Controller module to protect data.

Point

The Security function is one of the methods for preventing illegal access (such as program or data corruption) from an external device. However, this function does not prevent illegal access completely. Incorporate measures other than this function if the C Controller system's safety must be maintained against illegal access from an external device. Mitsubishi Electric Corporation cannot be held responsible for any system problems that may occur from illegal access.
Examples of measures for illegal access are shown below.

- Install a firewall.
- Install a personal computer as a relay station, and control the relay of send/receive data with an application program.
- Install an external device for which the access rights can be controlled as a relay station. (For details on the external devices for which access rights can be controlled, consult the network provider or equipment dealer.)

11.8.1 Access authority setting function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	△

This function restricts operations and access to C Controller module by setting the access authority and lockout setting[*1] for each user account.

[*1] : Lockout setting is a function to limit the allowed number of account authentication failures in a row. If the number is exceeded, authentication is locked out for a certain period of time to prevent brute force attacks by unauthorized users.

There are 2 types of access authority to restrict the following operations: Administrator and Maintenance. **Note11.5**

○: Available, ×: N/A

Function/service	Operation		Access authority		No account
			Administrator	Maintenance	
Setting/monitoring tools for the C Controller module	Online	CCPU read-out	○	○	×
		CCPU writing	○	×	×
		CCPU verify	○	○	×
		Remote operation	○	○	○
		CCPU data deletion	○	×	×
		Set Clock	○	○	○
		Device monitor	○	○	○
		Battery backup RAM monitor	○	○	×
		Data refresh memory monitor	○	○	○
		Watch	○	○	×
	Tool	Tolls for intelligent function module	○	○	×
		Request of Parameter Initialization/ Flash ROM Write Request	○	×	×
	Diagnostics	CCPU diagnostics	○	○	○
		Event history	○	○	○
		CPU status	○	○	○
		Drive information	○	○	○
		CC IE Control diagnostics	○	○	○
		CC IE Field diagnostics	○	○	○
		MELSECNET diagnostics	○	○	○
		CC-Link/CC-Link/LT diagnostics	○	○	○
		System monitor	○	○	○
Telnet	Connected		○	×	×
FTP	Connected		○	×	×

Note11.5 Q24DHCCPU-LS Q26DHCCPU-LS Q12DCCPU-V

The following function and service are not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

- Telnet, FTP

The following function and service are not supported by Q12DCCPU-V.

- Data refresh memory monitor

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Account settings>>**

Up to 16 accounts can be created.

(2) Factory account settings

The following shows factory account settings of Setting/monitoring tools for the C Controller module.

Item	Value
User name	"target"
Password	"password"
Access authority	Administrator
Lockout setting	No setting

(3) Precautions

(a) Deleting account

It is not allowed to delete all accounts with administrator authority.
At least 1 account have the administrator authority.

(b) Account lockout setting

The number of consecutive failures in account authentication is still retained after power OFF/resetting of the C Controller module.
Elapsed time after lockout is only valid when the C Controller module power is on.

(c) Account and password

- For characters that can be used in user name and password, refer to the following.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual
- If you forgot your password, initialize the C Controller module.
  Initialization restore the factory account settings of the system. For initialization, refer to the following.
  ☞ Page 62, Section 6.1

(d) Adding/deleting account by VxWorks command Note11.6

Accounts cannot be added/deleted by the VxWorks commands (loginUserAdd and loginUserDelete).

Note11.6 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

11.8.2 Individual identification function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This function prevents creation of unauthorized copy system (imitation) of the C Controller module.
The C Controller module can read the individual identification information by accessing to a certain memory.
User program(s) that is not activated by the other C Controller modules can be created by the user program by implementing the authentication function (activation function) that utilizes the individual identification information.

(1) Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

(a) Read-out method

For "-LS", consult with the partner (operating system vendor).

Described below is the procedure to read the individual identification information.

1. Acquire device setting register address

In the pciFindDevice function[*1], specify the vendor ID [8086H], device ID [10D3H], int Index[0 = CH1, 1 = CH2] and acquire PCI bus No. (int BusNo), PCI device No. (int DeviceNo), and PCI function number (int FuncNo).

```
status = pciFindDevice( 0x8086, 0x10D3, Index, &BusNo, &DeviceNo, &FuncNo);
```

In the pciConfigInLong function[*1], specify BusNo, DeviceNo, FuncNo, and base address register 0 [0010H] and acquire the base address (UINT32 BaseAddr).

```
status = pciConfigInLong ( BusNo, DeviceNo, FuncNo, 0x10, &BaseAddr );
```

*1 : When using pciFindDevice function and pciConfigInLong function, include the include file "pciConfigLib.h" (path: \WindRiver\vxworks-6.8\target\h\drv\pci).

2. Calculate the read register (EERD) address

Add an offset value [0014H] to the base address acquired by the pciConfigInLong function.

```
EERD = (ULONG*)(BaseAddr + 0x0014);
```

3. Read the individual identification information.

The individual identification information value is stored in read register (EERD) read addresses (0000H-0002H) as illustrated below.

[Example] If the individual identification information is "00:26:92:1E:8F:F0"

Read-out address		b15 b8	b7 b0	
	0000H	26	00	Individual identification information 2, 1 byte
	0001H	1E	92	Individual identification information 4, 3 bytes
	0002H	F0	8F	Individual identification information 6, 5 bytes

Point

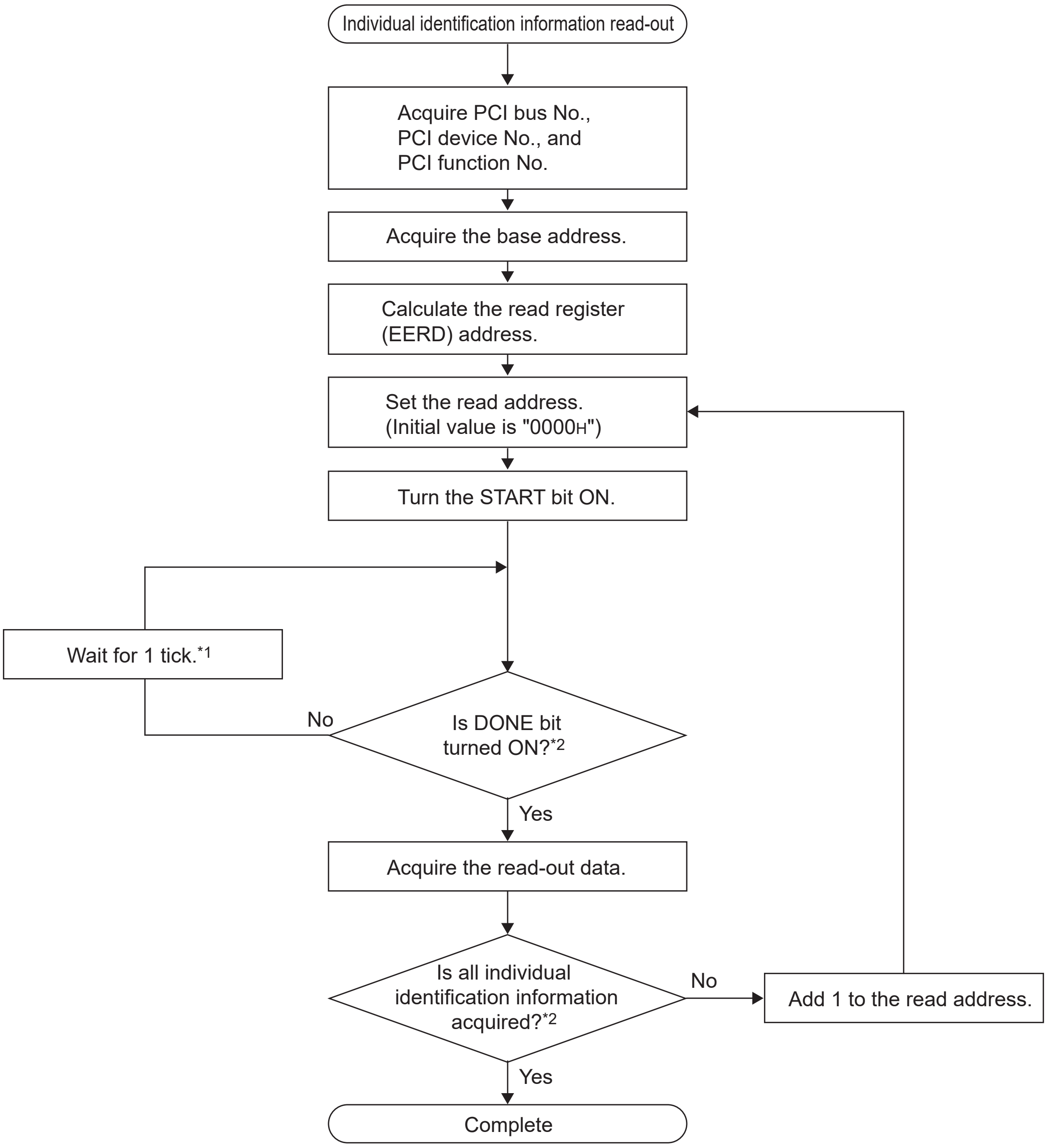
The read register (EERD) specifications are as follows:

[bit 0]	START	Start reading (START bit)
[bit1]	DONE	End reading (DONE bit)
[bit 2 to 15]	ADDR	Read address (0000H to 0002H)
[bit 16 to 31]	DATA	Read data

Set any of the target addresses 0000H to 0002H in ADDR and write "1" in Start reading (START bit), then data reading starts. When data reading is done, the End read (DONE bit) turns to "1". Then confirm data reading completion and acquire read data (DATA) information.

(b) Flowchart

Illustrated below is an example of the sequential processing flow chart.


Individual identification information read-out
Acquire PCI bus No., PCI device No., and PCI function No.
Acquire the base address.
Calculate the read register (EERD) address.
Set the read address. (Initial value is "0000H")
Turn the START bit ON.
Wait for 1 tick.*1
No
Is DONE bit turned ON?*2
Yes
Acquire the read-out data.
Is all individual identification information acquired?*2
No
Add 1 to the read address.
Yes
Complete

*1 : If the DONE turns to ON after 1000 ticks, stop the processing.

*2 : Though the individual identification information consists of 6 bytes, only 2 bytes can be acquired in one read processing. To acquire the entire individual identification information, it is necessary to read from the read addresses "0000H", "0001H", "0002H".

(c) Sample program

For "-LS", consult with the partner (operating system vendor).

Illustrated below is an example of the sequential processing program.

```
/* Individual identification information read-out processing */
#include <vxWorks.h>
#include "pciConfigLib.h"
#include <taskLib.h>

void readIdentify(void){
  /* Variable declaration */
  unsigned short      Identify[3];      /* Individual identification information storage area */
  STATUS status = OK;                   /* Function execution status */
  int Index = 0;                        /* Index */
  int BusNo = 0;                        /* PCI bus No. */
  int DeviceNo = 0;                     /* PCI bus device No. */
  int FuncNo = 0;                       /* PCI function No. */
  UINT32 BaseAddr = 0;                  /* Base address */
  ULONG* EERD = NULL;                   /* Read register (EERD) address */
  int i = 0;                            /* Counter */
  int j = 0;                            /* Counter */

  /* 1) Device setting register address acquisition */
  status = pciFindDevice( 0x8086, 0x10D3, Index, &BusNo, &DeviceNo, &FuncNo);
  if(status == OK){
    status = pciConfigInLong ( BusNo, DeviceNo, FuncNo, 0x10, &BaseAddr );
    if(status == OK){
      /* 2) Read register (EERD) address calculation */
      EERD = (ULONG*)(BaseAddr + 0x0014);
      /* 3) Individual identification information read-out */
      for(i = 0; i <= 2; i++ ){         /* Read individual identification information */
        *EERD = (i << 0x02 ) + 1;       /* Set read address and START bit */
        while(( *EERD & 2 ) == 0 ){     /* Wait until DONE bit rises */
          taskDelay( 1 );
          j++;
          if(j == 1000){
            break;
          }
        }
        if(j == 1000){
          break;
        }
        Identify[i] = ( *EERD >> 16 );  /* Acquire read-out data */
      }
    }
  }
  return;
}
```

(2) Q12DCCPU-V

(a) Read-out method

Described below is the procedure to read the individual identification information.

1. **Read the individual identification information.**

The value of the individual identification information is stored in the memory address (0xA00BFFF4 to 0xA00BFFFF) as follows.

Example) The individual identification information is '00:26:92:1E:8F:F0:00:26:92:1E:8F:F1'

		+0				+4				+8				+C			
Memory Address	0xA00BFFF0	-	-	-	-	00	26	92	1E	8F	F0	00	26	92	1E	8F	F1

(b) Sample program

Illustrated below is an example of the sequential processing program

```
/* Individual identification information read-out processing */
#include <vxWorks.h>

void readIdentify(void){
  /* Variable declaration */
  unsigned char Identify[12];      /* Individual identification information storage area */

  /* 1) Individual identification information read-out */
memcpy(Identify,0xA00BFFF4,12);

return;
}
```

11.8.3 File access restriction function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This function restricts accesses to prevent unauthorized editing on files stored on the standard ROM, standard RAM, or work RAM (when RAM drive is used).
By setting file attributes (a system file attribute and/or a hidden file attribute) to files under the memories described below, accesses to the files are restricted, and thus the falsifications by unauthorized users or file leaks can be prevented.

○: Supported ×: Not supported

Target memory	Remark	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
Standard ROM (/ROM)	-	○		
Work RAM (/specified by user)	-			
Standard RAM (/RAM)	-			
SD memory card (/SD)	-	○		×
CompactFlash card (/CF)	-	×		○
USB device (/USB0)	Mass storage compatible device	○		×

Point

- Attributes of files on the system ROM (/SYSTEMROM) cannot be changed.
- Accessing to the files stored on an SD memory card, CompactFlash card, or USB device can also be restricted. Since all files can be accessed when an access-authorized SD memory card, CompactFlash card, or USB device is connected with a module other than a C Controller module, conduct a measure to prevent the removal of the SD memory card, CompactFlash card, or USB device.
- The access authority cannot be set to a directory using this function.

(1) File attributes

File attributes can be changed with the password set in "File access restriction setting" on the <<Security settings>> tab of Setting/monitoring tools for the C Controller module.
For details of the file access restriction setting, refer to the following.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(a) File attribute setting

Use the attrib() command to set the file attribute on the file to be protected.
The following shows the file attributes that can be used on C Controller module.

Attribute	Description
S: System file attribute	The file operation can be prohibited when the file access restriction is enabled.
R: Read-only attribute	Deleting and writing files can be prohibited.
H: Hidden file attribute[*1]	Files are not displayed on the lists of ls command and FTP file when the file access restriction is enabled.

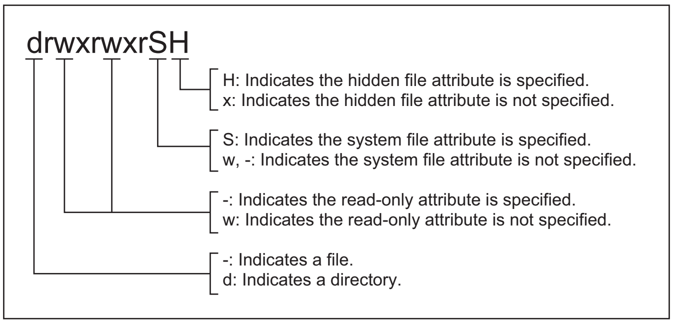
[*1] : Operations on the file are allowed when the file name is directly specified.
The system file attribute must be specified to prohibit the operations.

For details of the attrib() command, refer to the manual for Vx Works.

(b) Checking file attribute

Use the ll() command to check the file attribute.

The following explains how to identify the file attribute.


drwxrwxrSH
H: Indicates the hidden file attribute is specified.
x: Indicates the hidden file attribute is not specified.
S: Indicates the system file attribute is specified.
w, -: Indicates the system file attribute is not specified.
-: Indicates the read-only attribute is specified.
w: Indicates the read-only attribute is not specified.
-: Indicates a file.
d: Indicates a directory.

For details of the ll() command, refer to the manual for Vx Works.

(2) Operations on files with system file attribute

The access authority needs to be removed with the C Controller module dedicated function.

To change the access authority, the password set in "File access restriction setting" on the <<Security settings>> tab of Setting/monitoring tools for the C Controller module is required.

For details of C Controller module dedicated function, refer to the following.

☞ Page 353, CHAPTER 20

Point

When accessing the files with the system file attribute in the script file "STARTUP.CMD", remove the access authority inside the script file. After removing the system file attribute of the file, specify the system file attribute to the script file "STARTUP.CMD" in order to prevent the leakage of the password.

(a) Changing access authority

The access authority can be changed with the Shell command, script file, or C Controller module dedicated function in the user program.

(b) Checking access authority

The access authority can be checked with the Shell command or C Controller module dedicated function in the user program.

(3) Precautions

(a) Do not use files with the system file attribute in the script file "STARTUP.CMD" stored on the SD memory card or CompactFlash card to prevent the password leak.

(b) When the parameter is written with Setting/monitoring tools for the C Controller module version 4.01B or earlier, the password set to "Security password setting" on the <<Security settings>> tab is initialized. (Q24DHCCPU-V only)

(c) Account and password

- For characters that can be used in user name and password, refer to the following.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual
- If you forgot your password, initialize the C Controller module.
  Initialization restore the factory account settings of the system. For initialization, refer to the following.
  ☞ Page 62, Section 6.1

11.8.4 Service setting function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This function sets the services status (enable/disable) operated on the C Controller module.
By restricting the service which can be performed, accessing from an unexpected user can be prevented.

(1) List of services

○: Supported ×: Not supported

Item	Description	CPU module				
		Q24DHC			Q26DHC	Q12DC
		-V	-VG	-LS	-LS	-V
Setting/monitoring tools for the C Controller module operation	The service in which the account authority is limited to the administrator or maintenance user • [Online operation] Operations on C Controller module (reading/writing/verifying/deleting data), battery backup RAM, watch • [Tool operation] Intelligent function module tool, parameter initialization/flash ROM data write request	○	○	○	○	○
MELSEC data link function	The service required for using the MELSEC data link function.	○	○	×	×	○
SD memory card access	The service to access the SD memory card			×	×	×
SD memory card script execution	The service required to execute the script file (STARTUP.CMD) stored on the SD memory card					
CF card access[*1]	The service to access the CompactFlash card	×	×			○
CF card script execution[*1]	The service required to execute the script file (STARTUP.CMD) stored on the CompactFlash card					
CF card parameter boot[*1]	The service required to boot the parameter file stored on the CompactFlash card					
Telnet	The service required to control the computer remotely	○	○			
FTP	The service required to use the file transfer function					
WDB	The service required to connect CW Workbench					
Shell	The service required to execute shell commands Vx Works					
DHCP	The service required to use the function for assigning network settings automatically					
USB storage access	The service required to access the USB memory					×

*1 : Change the service setting by using the parameter setting stored in the "Standard ROM". When changing the service, write to "Standard ROM".

(2) Setting method

Set the settings with the following function in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Security settings>> ⇒ "Service settings"**

(3) Default service settings

The settings become the default settings when the module is initialized.

(a) Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS

All service settings are enabled.

(b) Q12DCCPU-V

All service settings are enabled except for "CF card parameter boot".

(4) Precautions

(a) Since the parameters cannot be set when the "Setting/monitoring tools for the C Controller module operation" setting is disabled, the module needs to be initialized to perform the services again.

(b) When using a CompactFlash card, conduct a measure to prevent the removal of the CompactFlash card.

(c) When selecting CompactFlash card at the target memory of the parameter, enable "CF card parameter boot". (The initial setting is set to disabled.)

(d) When the parameter is written to Q24DHCCPU-V with Setting/monitoring tools for the C Controller module version 4.01B or earlier, the Service settings is initialized.

(e) When the following services are disabled, the specific service cannot be performed at the same time.

- SD memory card access
  "SD memory card script" cannot be used.
- CF card access
  "CF card script execution" and "CF card parameter boot" cannot be used.
- Shell
  Telnet cannot be used.

11.9 Event History Collection Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Up to 500 events that occurred in the C Controller system will be registered as event history with occurrence time. If the number of event history items exceeds 500, the oldest event is deleted.
For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [Event history] ⇒ <<Event history>>**

Point

- As the clock data in the C Controller module is used for event history occurrence time, be sure to set the accurate time first.
- If the battery less drive is enabled, clock data are initialized at power-on. The event history occurrence time registered right after power-on may be the initial value for clock data (00:00:00, Jan 1, 2000).
- If "Do not register system (information) event details." is selected in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS Setting>> ⇒ "Event history registration settings", event(s) in the C Controller system will not be registered with the event history.
- If error is occurring, new error(s) may not be registered with the event history.

(1) Event type

There are following types of events in the C Controller system.

Type	Description
System (Err.)	The event is a C Controller system error.
System (Warning)	The event is a C Controller system warning.
System (Info.)	The event is a C Controller system information.
Application	This event is registered by using the C Controller module dedicated function (CCPU_RegistEventLog) from the user program.

For details of events registered by the C Controller module, refer to the following.
☞ Page 434, Appendix 2

(2) Clearing event history

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [Event history] ⇒ <<Event history>> ⇒ "Clear"**

The registered event history is all cleared.

(3) Registering events from the user program Note11.7

Execute the C Controller module dedicated function (CCPU_RegistEventLog) to register event logs with the event history.

Function name	Function
CCPU_RegistEventLog	Registers an event log to the event history.

Note11.7 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

(4) Precautions

If the battery less drive is enabled, event history is cleared at power OFF or reset. Backup any necessary event history to the personal computer by using Setting/monitoring tools for the C Controller module.

For details of battery less drive, refer to the following.

☞ Page 190, Section 11.11

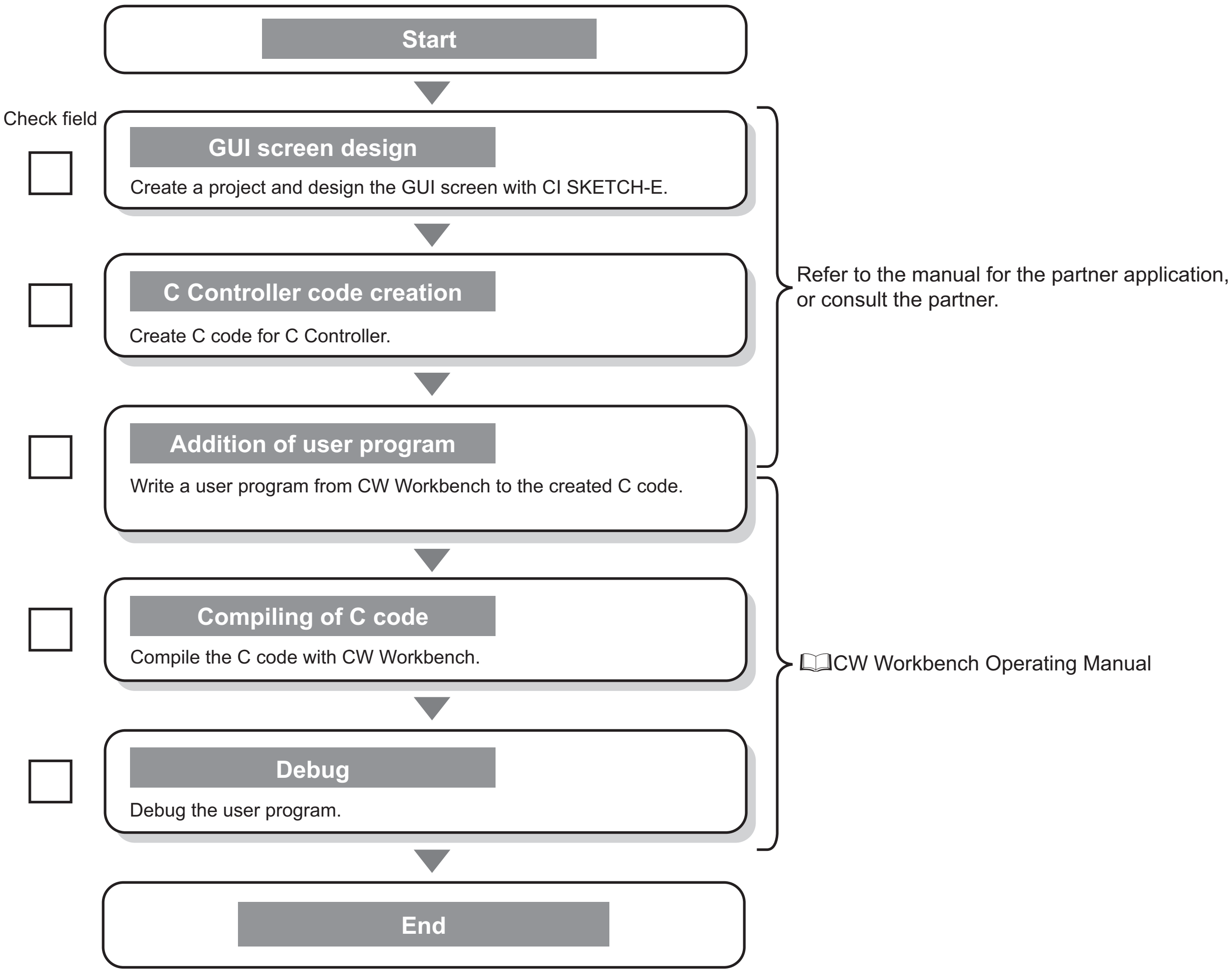
11.10 Analog RGB Port Display Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
×	○	×	×	×

This function displays the GUI screen created with the partner application on the general-purpose analog RGB display connected to the analog RGB port.

(1) GUI screen development procedure

The following shows the development procedure using CI SKETCH-E and CW Workbench.



Create a project and design the GUI screen with CI SKETCH-E.

Create C code for C Controller.

Write a user program from CW Workbench to the created C code.

Compile the C code with CW Workbench.

Debug the user program.

Refer to the manual for the partner application, or consult the partner.

📖CW Workbench Operating Manual

(2) Resolution setting

Execute one of the commands below with “STARTUP.CMD” or the Telnet connection to switch the screen display.
The changed setting will be enabled at the time of next startup of the display application.
For more information on the supported resolution, refer to the following section.
☞ Page 45, Section 3.2

(a) Changing the resolution

- VGA

```
CCPUCMD_ChangeVGA
```

- SVGA

```
CCPUCMD_ChangeSVGA
```

- XGA

```
CCPUCMD_ChangeXGA
```

(b) Checking the resolution

Execute the following command with the Telnet connection to check the resolution currently set.

```
CCPUCMD_GetResolution
```

(3) Precautions

(a) If the analog RGB cable is connected with the power supply for C Controller module turned ON, the display will not be recognized.

(b) GENWARE3-VG[*1] is required in order to use this function. For specifications and functions of GENWARE3-VG, consult the partner (application vendor).

[*1] : It is pre-installed in Q24DHCCPU-VG.

(c) When the battery less drive is enabled, the resolution setting is initialized at power-on. For details on the battery less drive, refer to the following section.

☞ Page 190, Section 11.11

11.11 Battery Less Drive

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This function operates the C Controller module without battery.

The battery less drive function can improve the maintainability by establishing a system requiring no battery replacement.

Point

Data listed below are all initialized by powering ON or resetting C Controller system with the battery removed. Configure the settings again.

○: Supported ×: Not supported

Setting data	Status after initialization	CPU module				
		Q24DHC			Q26DHC	Q12DC
		-V	-VG	-LS	-LS	-V
Event history	The number of event history data is initialized to zero.	○				
Battery backup RAM	Data is detected to 0.					
Standard RAM	Formatted.					
Clock data	Reset to "00:00, Jan 1, 2000".					
Resolution	1024 × 768 (XGA)	×	○	×		
Keyboard	106JIS (OADG-compliant Japanese 106-key keyboard)					

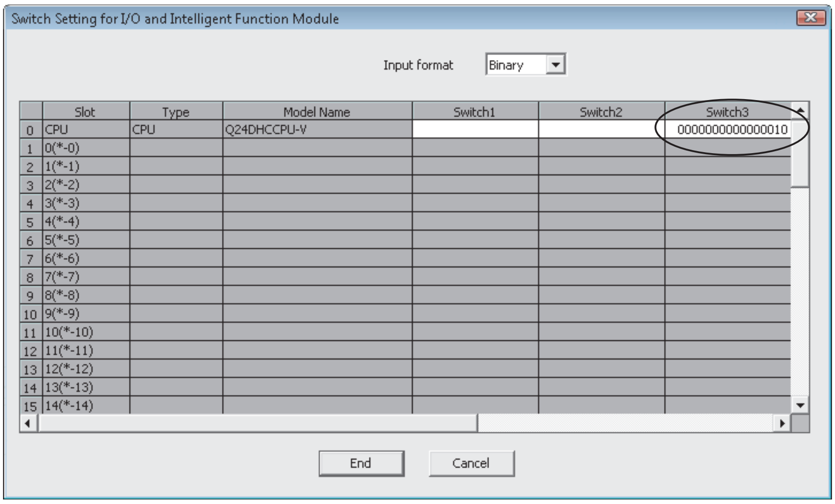
(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Switch Settings"**

Set the b1 of the "Switch3" in the slot connected with the C Controller module to "ON".
(Doing this to the other CPU slots, the setting is ignored.)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
														ON	



Switch Setting for I/O and Intelligent Function Module

Input format: Binary

	Slot	Type	Model Name	Switch1	Switch2	Switch3
0	CPU	CPU	Q24DHCCPU-V			0000000000000010
1	0(*-0)					
2	1(*-1)					
3	2(*-2)					
4	3(*-3)					
5	4(*-4)					
6	5(*-5)					
7	6(*-6)					
8	7(*-7)					
9	8(*-8)					
10	9(*-9)					
11	10(*-10)					
12	11(*-11)					
13	12(*-12)					
14	13(*-13)					
15	14(*-14)					

(2) Precautions

(a) Battery error

During battery less drive, battery error cannot be detected.

Point

During battery less drive, the following settings in Setting/monitoring tools for the C Controller module are ignored.

- Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> ⇒ "Carry Out Battery Check"
  (☞ Page 154, Section 11.2)

(b) Battery backup RAM and Standard RAM

For battery less drive, do not use the battery backup RAM and standard RAM.

(c) Clock data

- If the C Controller module in a multiple CPU configuration is No.1,
  do not use the battery less drive function.
  Otherwise, time in other than No.1 module will be set incorrectly, since the CPU modules other than No.1 are synchronized with time in No.1.
- When the C Controller module in a multiple CPU configuration is No.2 through No.4 modules
  The C Controller module clock data are operated with the initialized value (00:00:00, Jan 1, 2000) from the rising of the C Controller module to the completion of time synchronization with No.1 CPU module.
- When the SNTP function is used
  The C Controller module clock data are operated with the initialized value (00:00:00, Jan 1, 2000) from the rising of the C Controller module to the completion of time synchronization with a SNTP server.

CHAPTER 12 FUNCTIONS ACCESSED VIA ETHERNET PORTS

This chapter describes the communication with peripherals, Telnet function and FTP client function.

Point

When using Q12DCCPU-V, consider the terms as shown in the following table.

Before	After
Q24DHCCPU-V/-VG/-LS **Q26DHCCPU-LS**	**Q12DCCPU-V**
User Ethernet port (CH1 and CH2)	Built-in Ethernet port (CH1 and CH2)
System Ethernet port (S CH1)	

12.1 User Ethernet Port (Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS) / Built-in Ethernet Port (Q12DCCPU-V) Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

User Ethernet port (CH1 and CH2) can establish communication with the following peripherals. For "-LS", consult with the partner (operating system vendor).

- CW Workbench
- Personal computer for maintenance (such as Telnet and FTP)

Point

- Following peripherals cannot establish communication with the user Ethernet port (CH1 and CH2).
  Connect to the system Ethernet port (S CH1).
  - Setting/monitoring tools for the C Controller module
  - GOT
- Compatible with jumbo frame for the series Q24DHCCPU-V/-VG that comes first five digits "17092" or higher of serial No. MTU value (Maximum Transmission Unit) used in the IP communication can be changed by using the following operations. (The default value of MTU is 1500 bytes.)

  ```
  ifconfig("Interface name mtu MTU value")
     Specify "gei0" and "gei1" for interface name: CH1 and CH2 respectively.
     Specify MTU value within the range of 1 to 9000 bytes.
  [Example] When changing MTU of CH1 to 9000 bytes.
     ifconfig("gei0 mtu 9000")
  To check the set value, execute ifconfig with no argument.
  ```

  Ethernet frame exceeding the set MTU will be divided and sent. However, there is an upper limit to the packet size of TCP or UDP using socket communication once. When setting the MTU that exceeds the set upper limit, an error occurs while sending a request.
  If an error occurs, change the MTU value or the upper limit of the packet size. (The default upper limit of the packet size is IPNET_SOCK_DEFAULT_SEND_BUFSIZE of kernel configuration and is set to 10000 bytes.)
  The upper limit of the packet size can be changed by specifying the option name "SO_SNDBUF" in the setsockopt() from the Socket API of VxWorks component. For details, refer to VxWorks manual.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

<Q24DHCCPU-V/-VG>

- **Project view ⇒ ”Parameter" ⇒ "CCPU Parameter" ⇒ <<User Ethernet port (CH1 and CH2) settings>>**

<Q12DCCPU-V>

- **Project view ⇒ ”Parameter" ⇒ "CCPU Parameter" ⇒ <<Built-in Ethernet port (CH1 and CH2) settings>>**

(2) Precautions

(a) Checking by KeepAlive

When protocols are set in TCP, KeepAlive checks the status.

An existence check function is sent 22 seconds after the messaging reception of the last existence check function from the external device to check for a response from the external device.

If there is no response, the existence check function is continuously sent at one second interval.

If a response cannot be confirmed within 8 seconds (30 seconds from the last messaging reception), the connection is disconnected due to the lack of existence of the external device. (The connection will be disconnected 30 seconds after the messaging reception of the last existence check function.)

The connection may also be disconnected if the target device is not compatible with the TCP KeepAlive function (a response corresponding to the ACK function for KeepAlive).

(b) Resend processing for TCP connections

Resend processing for TCP connections when there is no ACK response of the TCP protocols from the external device for sending in TCP connection, resend processing is performed at the following numbers of resends and resend intervals.

Number of resends	12 times[*1]
Interval until resend[*2]	(Number of resents x Number of resents x RTO[*3]) / 1024 [Second]

*1 : After 30 seconds from establishment of the connection, destination device error is assumed and the connection is released even if the number of resends does not reach to 12 times.

*2 : The maximum resend interval is 60 seconds.

*3 : RTO (retransmission timeout) is a value that is increased exponentially based on RTT (round-trip time).

After the final resend, if there is no ACK response of the TCP protocol within 60 seconds, the connection will be disconnected as an external device error.

(c) Connection not covered by the operation assurance

Operations of the following commercial connection devices are not assured. Customers need to confirm the operation before using it.

- Connection using the Internet (a general public line)
- Connection using firewall devices
- Connection using broadband routers
- Connection using wireless LAN

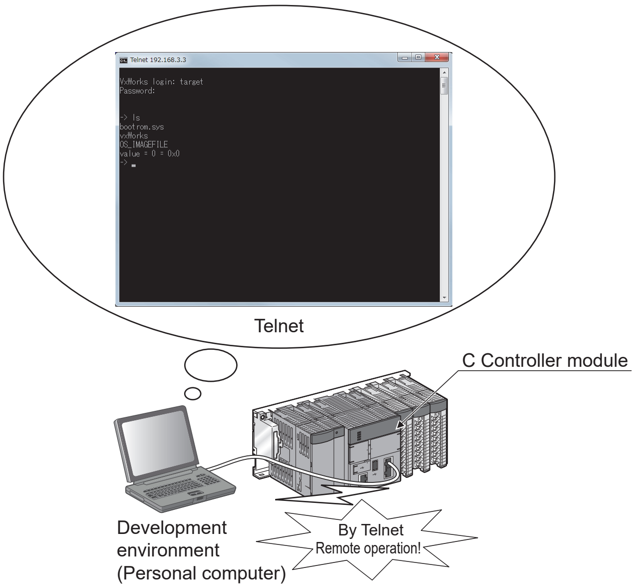
12.1.1 Telnet function

For "-LS", consult with the partner (operating system vendor).

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This function executes shell commands from Telnet tool in the development environment (Personal computer) without using CW Workbench.

This allows simple remote debugging (task information display, memory dumping, etc.) of the C Controller module.



```
Telnet 192.168.3.3

VxWorks login: target
Password:


-> ls
bootrom.sys
vxWorks
OS_IMAGEFILE
value = 0 = 0x0
->
```

(1) Setting method

A user name and password is required to use the Telnet function.

Before using the Telnet function, set the user name, password and access authority in the C Controller module.

By setting the user information (user name, password and access authority), Telnet users can be restricted. For details, refer to the following.

☞ Page 177, Section 11.8.1

(2) Available commands

Shell commands of CW Workbench can be used.

For shell commands, refer to the following.

📖Manual for VxWorks

(3) Remote debug by serial communication

Remote debug by serial communication is possible as with Telnet connection.

The standard I/O destination can be switched to the serial communication side by executing the following commands from Telnet shell or by STARTUP.CMD.

```
fd = open("/tyCo/0",2,0)
ioctl(fd,4,115200)        Transmission speed: 115200[bps]
ioctl(fd,3,0x7F)
ioGlobalStdSet(0,fd)
ioGlobalStdSet(1,fd)
ioGlobalStdSet(2,fd)
```

(4) Precautions

(a) Number of connections

Connections from multiple Telnet tools to the same C Controller module is not allowed.
Telnet tool must be connected to the C Controller module on a one-to-one basis.
Further, be sure close the Telnet tool being connected and connect another Telnet tool to the C Controller module.

(b) Timeout

When the line is disconnected during Telnet connection, it takes 30 seconds before Telnet connection (TCP connection) times out on the C Controller module. Telnet cannot be reconnected until it times out.
Timeout time may be changed by the (ipcom_sysvar_set) command provided by VxWorks.

- Obtaining timeout time

<Q24DHCCPU-V/-VG>
Timeout time = iptcp.KeepIdle value + (iptcp.KeepIntvl value × iptcp.KeepCnt value)

iptcp.KeepIdle: Interval from line disconnection to the first retry
iptcp.KeepIntvl: Interval between retries
iptcp.KeepCnt: Number of retries

- Program example

```
ipcom_sysvar_set("iptcp.KeepIdle", "XX", 1);
ipcom_sysvar_set("iptcp.KeepIntvl", "YY", 1);
ipcom_sysvar_set("iptcp.KeepCnt", "ZZ", 1);
ipcom_ipd_kill ("iptelnets");
ipcom_ipd_start ("iptelnets");
```

XX: Specify the time (in seconds). When this is specified to "0", no timeout will occur‘
YY: Specify the time (in seconds). When this is specified to "0", no timeout will occur‘
ZZ: Specify the number of retries

<Q12DCCPU-V>
Timeout time = net.inet.tcp.keepidle + (net.inet.tcp.keepintvl × 8 (number of retries))

net.inet.tcp.keepidle: Interval from line disconnection to the first retry
net.inet.tcp.keepintvl: Interval between retries

- Program example

```
Sysctl("net.inet.tcp.keepidle = XXXXX");
Sysctl("net.inet.tcp.keepintvl = YYYYY");
```

XXXXX: Specify the time (in ms).
YYYYY: Specify the time (in ms).

Described below is the procedure to change the Telnet connection (TCP connection) timeout time for the running C Controller module.

1. **Establish Telnet connection by a Telnet tool.**
2. **Execute the commands above from the Telnet tool shell command to change the timeout time and reboot the Telnet server**
3. **Close the Telnet connection.**
4. **Establish Telnet connection by a Telnet tool again.**

Described below is the procedure to change the Telnet connection (TCP connection) timeout time at the startup of the C Controller module.

1. **Describe the commands above in the script file (STARTUP.CMD).**
2. **Power on the C Controller module.**

(c) Shell command

Shell commands entered from the Telnet tool are operated for Priority1 tasks.

In the following cases, system errors/stop (system watchdog timer error, etc.) may occur in the C Controller module.

- Execution of commands occupying CPU processing
  Before executing commands, be sure to check command specifications.
- Reboot by execution of VxWorks (reboot) function and entering Ctrl+X
  Reset the C Controller module to reboot VxWorks.
- Execution of command with argument without argument specification (i.e. 0 is specified for argument)
  Before executing commands, be sure to check command specifications/argument specification.
  [Example] Do not execute the (close) command with no argument specified. Doing so will close the resources reserved in the VxWorks system.

In any of the following cases, interrupt is prohibited for long period of time and no processing called from the interrupt routine will be performed. So interrupt that occurs at certain intervals (i.e. synchronization interrupt between multiple CPUs) may be delayed.

- Execution of command to show the status (Show)

(d) Message display on the shell

Message(s) issued by VxWorks during Telnet connection may be displayed on the shell.
For messages to VxWorks, refer to manuals for VxWorks, and Help of CW Workbench.

(e) Telnet password

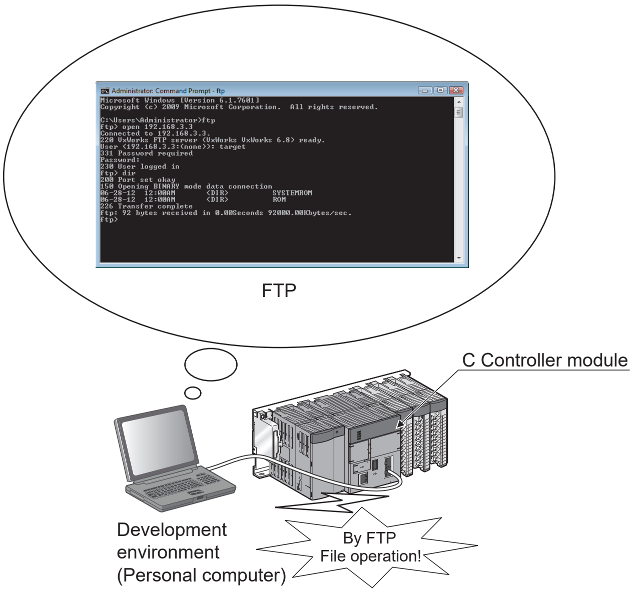
If you forgot your Telnet password, initialize the C Controller module.
Initialization restore the factory account settings of the system. For details, refer to the following.
☞ Page 62, Section 6.1

12.1.2 FTP function

For "-LS", consult with the partner (operating system vendor).

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The server function of FTP (File Transfer Protocol), a protocol for file transfer to/from destination devices, is supported. This allows for direct access to file(s) in the C Controller module from a destination device with the FTP client function.



Administrator: Command Prompt - ftp

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\Administrator>ftp
ftp> open 192.168.3.3
Connected to 192.168.3.3.
220 VxWorks FTP server (VxWorks VxWorks 6.8) ready.
User (192.168.3.3:(none)): target
331 Password required
Password:
230 User logged in
ftp> dir
200 Port set okay
150 Opening BINARY mode data connection
06-28-12  12:00AM       <DIR>          SYSTEMROM
06-28-12  12:00AM       <DIR>          ROM
226 Transfer complete
ftp: 92 bytes received in 0.00Seconds 92000.00Kbytes/sec.
ftp>
```

Operations of file(s) in the C Controller module from a destination device with the FTP client function are allowed.

- File read-out (download) from C Controller module
  A function to store C Controller module files on the destination device(s).
- File writing (upload) from C Controller module
  A function to register files stored in the destination device(s) to the C Controller module.
- Showing directories and files in the C Controller module
  A function to view files registered in the C Controller module on the destination device(s).

(1) Setting method

A user name and password is required to use the FTP function.

Before using the FTP function, set the user name, password, and access authority in the C Controller module.

By setting the user information (user name, password and access authority), FTP users can be restricted. For details, refer to the following.

☞ Page 177, Section 11.8.1

(2) Precautions

(a) FTP client specifications

For FTP client specifications implemented in destination device(s), refer to the manuals for the respective destination device(s).

(b) Operations during file access

During file access, do not power OFF or reset the system, or insert/remove the memory card.
Doing so may corrupt files.

(c) Reconnection in the event of timeout

If any timeout error occurs in file transfer, the TCP connection is closed (disconnected).
To resume file transfer, login the C Controller module by the FTP client again.

(d) File transfer time

File transfer processing time varies depending on the following factors:

- Ethernet line contribution percentage (line busyness)
- Number of simultaneous connections (communication processing for other connections)
- System configuration

(e) Number of simultaneous connections

The number of destination devices (FTP clients) allowed to login to the C Controller module is 10.
In case of connection from the other FTP client(s) in login status, connection fails and an error is generated.
If UDP communication is established during FTP file transfer, errors such as timeout may occur.
Establish communication after file transfer, or by TCP.

(f) File writing

Files with read-only file attribute or locked by other models/function may not be written.
Any write attempt cause a writing error.
If the memory card is write protect, file transfer involving writing is not allowed. Any write attempt cause a writing error.
To write any large file, change the CPU operation status to STOP in advance.

(g) File deletion

Determine the timing to delete files in view of the entire system including the C Controller module and peripherals.

(h) If you forgot FTP password

If you forgot your FTP password, initialize the C Controller module.
Initialization restore the factory account settings of the system. For details, refer to the following.
☞ Page 62, Section 6.1

12.1.3 Time setting function (SNTP)

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	×

By using VxWorks standard API function in the user program, the time information can be obtained from the time information server (SNTP server) connected on the LAN.

(1) Considerations

(a) VN (Version Number) in the SNTP request

For Q24DHCCPU-V/-VG that comes first five digits "17091" or lower of serial No., the VN (Version Number) in the SNTP request is Version 1.

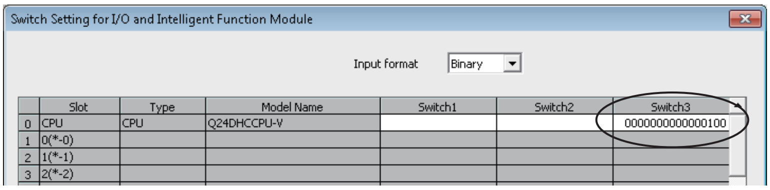
For Q24DHCCPU-V/-VG that comes first five digits "17092" or higher of serial No., the VN (Version Number) in the SNTP request can be changed to Version 1 (default setting) or Version 4.
For changing the VN (Version Number), use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Switch Settings"**

If the settings of the user Ethernet port are changed, the settings of the system Ethernet port will also be changed. (☞ Page 202, Section 12.2.1)

Set the b2 of the "Switch3" in the slot connected with the C Controller module to "ON". (Doing this to the other CPU slots, the setting is ignored.)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
													ON		



Switch Setting for I/O and Intelligent Function Module

Input format: Binary

	Slot	Type	Model Name	Switch1	Switch2	Switch3
0	CPU	CPU	Q24DHCCPU-V			0000000000000100
1	0(*-0)					
2	1(*-1)					
3	2(*-2)					

- When the b2 is ON
  Set the VN (Version Number) in the request to Version 4 and then send to the SNTP server. If the destination SNTP server is not compatible with the Version 4, it will fail in time inquiry.
- When the b2 is OFF
  Set the VN (Version Number) in the request to Version 1 and then send to the SNTP server.

Point

Start the SNTP daemon by using the following procedure to obtain the time information from the SNTP server that uses the user Ethernet port (CH1, CH2). Change the local time using the user program as per the requirement since OS time is UTC (Coordinated Universal Time).
For details, refer to the manual of Wind River.

- SNTP daemon startup procedure
  - ipcom_sysvar_set("ipsntp.client.primary.addr","primary SNTP server address",1);
  - ipcom_sysvar_set("ipsntp.client.backup.addr","backup SNTP server address",1);
  - ipcom_ipd_start("ipsntp");

12.2 System Ethernet Port (Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS) / Built-in Ethernet Port (Q12DCCPU-V) Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

System Ethernet port (S CH1) can establish communication with the following peripherals.

- Setting/monitoring tools for the C Controller module
- GOT

Point

Following peripherals cannot establish communication with the system Ethernet port (S CH1).
Connect to the user Ethernet port (CH1 and CH2).

- CW Workbench
- Personal computer for maintenance (such as Telnet and FTP)

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

<Q24DHCCPU-V/-VG/-LS><Q26DHCCPU-LS>

- **Project view ⇒ ”Parameter" ⇒ "CCPU Parameter" ⇒ <<System Ethernet port (S CH1) settings>>**

<Q12DCCPU-V>

- **Project view ⇒ ”Parameter" ⇒ "CCPU Parameter" ⇒ <<Built-in Ethernet port (CH1 and CH2) settings>>**

(2) Precautions

(a) Checking by KeepAlive

The same as user Ethernet port (CH1 and CH2).
(☞ Page 193, Section 12.1 (2)(a))

(b) Resend processing for TCP connections

Resend processing for TCP connections When there is no ACK response of the TCP protocols from the external device for sending in TCP connection, resend processing is performed at the following numbers of resends and resend intervals.
After the final resend, if there is no ACK response of the TCP protocol within 64n seconds, the connection will be disconnected as an external device error.

Number of resends	Interval until resend	
	When connection is being established[*1 *2]	After connection is established[*1]
First	n seconds	n seconds
Second	n seconds	2n seconds
Third	n seconds	4n seconds
Fourth	n seconds	8n seconds
Fifth	n seconds	16n seconds
Sixth	2n seconds	32n seconds
Seventh	4n seconds	64n seconds
Eighth	8n seconds	64n seconds
Ninth	16n seconds	64n seconds
Tenth	32n seconds	64n seconds
Eleventh	64n seconds	64n seconds
Twelfth	64n seconds	64n seconds

*1 : The variable n is a coefficient calculated dynamically based on the external device and network status.

*2 : After 30 seconds, destination device error is assumed and the connection is released even if the number of resends does not reach to 12 times.

(c) Connection not covered by the operation assurance

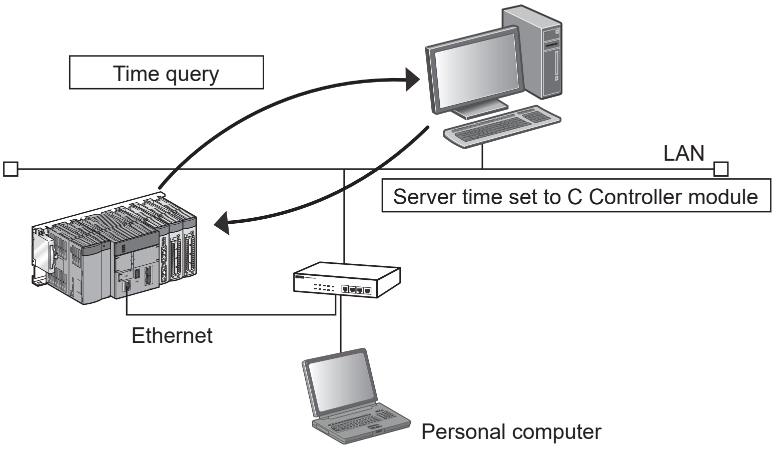
Operations of the following commercial connection devices are not assured. Customers need to confirm the operation before using it.

- Connection using the Internet (a general public line)
- Connection using firewall devices
- Connection using broadband routers
- Connection using wireless LAN

12.2.1 Time setting function (SNTP)

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This function collects time information from the time information server (SNTP server) connected to LAN in the specified timing and sets time on C Controller module(s).



Select timing of time information acquisition from

- C Controller module power-on or reset
- Execution at certain intervals (execution interval specification)
- Execution in the specified time (specify execution time)

Point

- The time setting function changes the settings for the integral clock (RTC: Real Time Clock).
  Do not modify OS clock (used for file time stamp).
  For details of the integral clock and OS clock, refer to the following.
  ☞ Page 160, Section 11.4
- Before setting time at power-on or reset of the C Controller module, check the hub or destination device connection.
  During execution of the time setting function, ignore the other time setting operations.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

<Q24DHCCPU-V/-VG/-LS><Q26DHCCPU-LS>

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System Ethernet port (S CH1) settings>> ⇒ "Time Setting"**

<Q12DCCPU-V>

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Built-in Ethernet port (CH1 and CH2) settings>> ⇒ "Time Setting"**

(2) Precautions

(a) Timeout

Communication times out in 20 seconds from time query.

(b) Delay due to communication time

The set time delays due to time for communication with the time information server.
For high-accuracy time setting, use a time information server as close as possible on the network.

(c) Time setting function in multiple CPU system configuration

Enable the time setting function only when the C Controller module is No.1.
For details of the clock function, refer to the following.
☞ Page 160, Section 11.4

(d) VN (Version Number) in the SNTP request

For Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS that comes first five digits "17091" or lower of serial No., the VN (Version Number) in the SNTP request is Version 1.

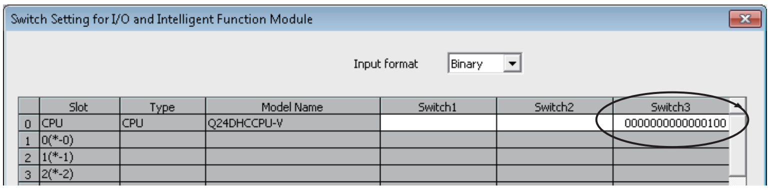
For Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS that comes first five digits "17092" or higher of serial No., the VN (Version Number) in the SNTP request can be changed to Version 1 (default setting) or Version 4.
For changing the VN (Version Number), use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Switch Settings"**

If the settings of the system Ethernet port are changed, the settings of the user Ethernet port will also be changed. (☞ Page 199, Section 12.1.3)

Set the b2 of the "Switch3" in the slot connected with the C Controller module to "ON". (Doing this to the other CPU slots, the setting is ignored.)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
													ON		


Switch Setting for I/O and Intelligent Function Module

Input format: Binary

	Slot	Type	Model Name	Switch1	Switch2	Switch3
0	CPU	CPU	Q24DHCCPU-V			0000000000000100
1	0(*-0)					
2	1(*-1)					
3	2(*-2)					

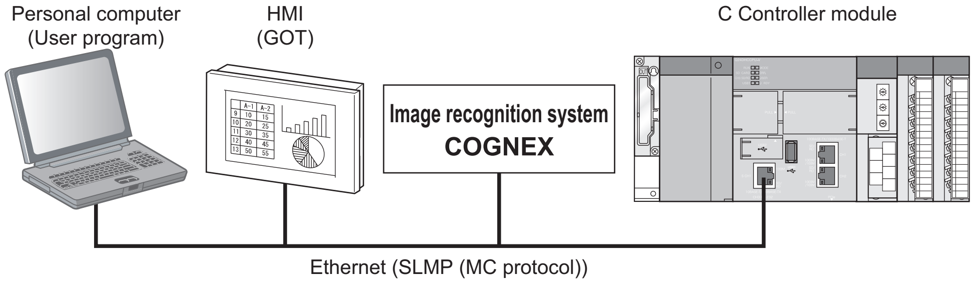
- When the b2 is ON
  Set the VN (Version Number) in the request to Version 4 and then send to the SNTP server. If the destination SNTP server is not compatible with the Version 4, it will fail in time inquiry.
- When the b2 is OFF
  Set the VN (Version Number) in the request to Version 1 and then send to the SNTP server.

12.2.2 SLMP (MC protocol) communication

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

Device data can be written to/read from a personal computer or HMI (GOT) using the SLMP (MC protocol)[*1].
By writing/reading device data, operation monitoring, data analyses, and production management can be performed on C Controller module.

*1 : For details of SLMP (MC protocol), refer to the following.
📖MELSEC Communication Protocol Reference Manual


Personal computer (User program)
HMI (GOT)
C Controller module
Image recognition system
COGNEX
Ethernet (SLMP (MC protocol))

(1) Connection range for SLMP (MC protocol) communication

- **Only connected C Controller modules can be accessed.**
- **The access to other CPUs which are not connected to Ethernet, and the communication with other stations via C Controller module cannot be performed in a multiple CPU system.**

(2) Data communication frames and data codes

The following table shows the data communication frames and data codes which can be used for C Controller module.

○: Available, ×: Not available

Data communication frame and data code		Availability
4E frame	ASCII code	×
	Binary code	×
QnA compatible 3E frame	ASCII code	×
	Binary code	○
A compatible 1E frame	ASCII code	×
	Binary code	×

(3) Error codes for SLMP (MC protocol) communication

For details of the error codes, refer to the following section.

☞ Page 433, Appendix 1.5 Error code for SLMP (MC protocol) communication

(4) Setting method

Set the settings with the following function in Setting/monitoring tools for the C Controller module.
<Q24DHCCPU-V/-VG/-LS><Q26DHCCPU-LS>

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System Ethernet port (S CH1) settings>> ⇒ "Open setting"**

<Q12DCCPU-V>

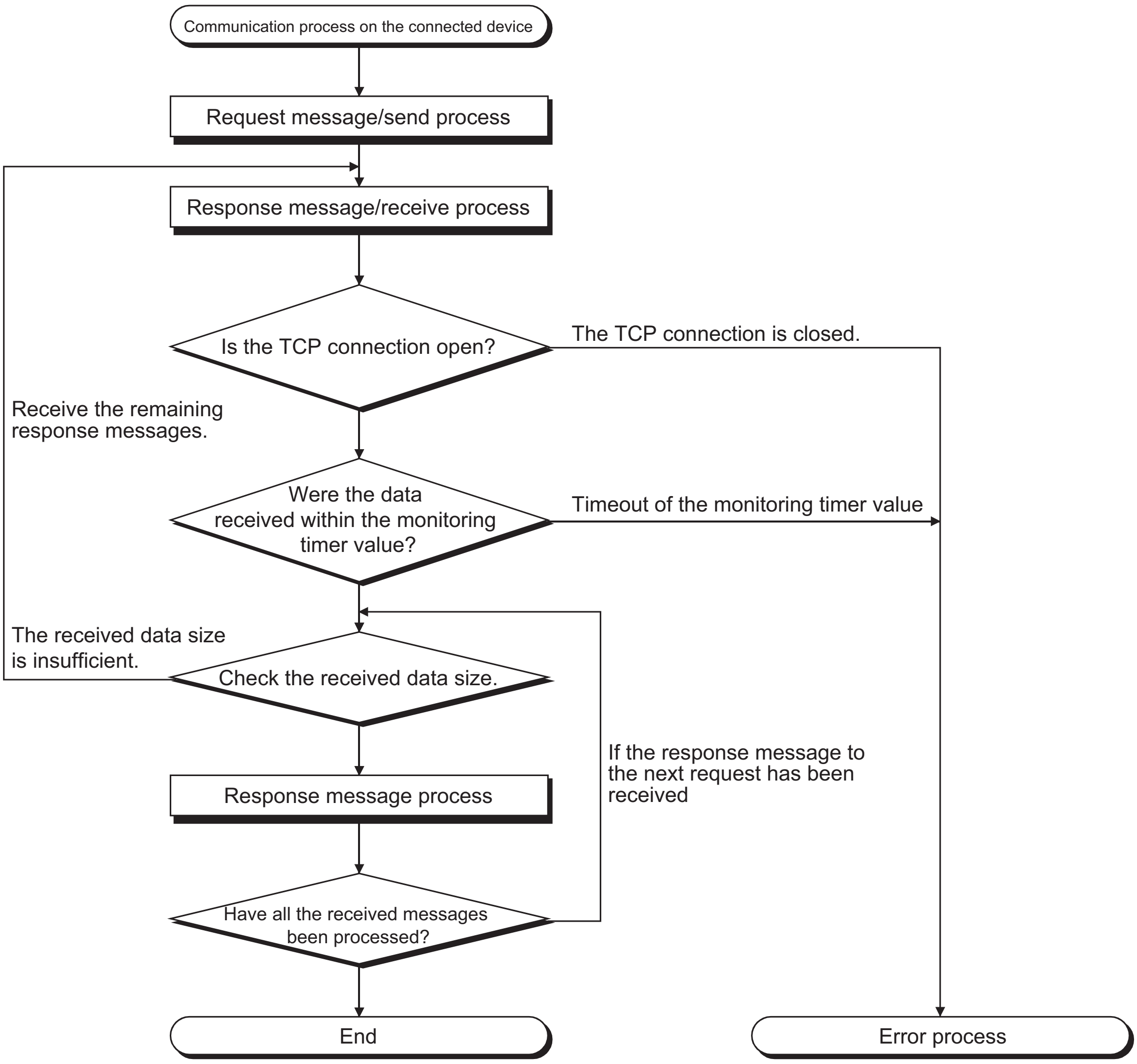
- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Built-in Ethernet port (CH1 and CH2) settings>> ⇒ "Open setting"**

Point

- When a new request message is sent to a single UDP port in a period from sending a request message until receiving a response message, the new request message is discarded.
- The setting of two or more same host station port numbers for UDP is equivalent to the setting of only one port number. Select TCP for the protocol when communicating with two or more connected devices using the same host station port number.

(5) Receive processing of response message

A receive processing example on the connected device side is shown below.


Communication process on the connected device
Request message/send process
Response message/receive process
Is the TCP connection open?
The TCP connection is closed.
Receive the remaining response messages.
Were the data received within the monitoring timer value?
Timeout of the monitoring timer value
The received data size is insufficient.
Check the received data size.
If the response message to the next request has been received
Response message process
Have all the received messages been processed?
End
Error process

Point

For the Ethernet communication, the TCP socket function is used on a personal computer.
When this function is sent from the send side by calling once, the receive side needs to call the recv function once, or more than once. (The ratio of the send function and the recv function is not 1 to 1.)
Therefore, the receive processing described above is required for the program processing on the connected device.

(6) Command list

The commands listed in the following table can be executed in the SLMP (MC protocol) communication function on C Controller module.

Function			Command (Subcommand)[1]	Description	Processing points
Device memory	Batch read	Bit unit	0401 (0001)	Reads bit devices in 1-point unit.	7168 points
		Word unit	0401 (0000)	Reads bit devices in 16-point unit.	960 words (15360 points)
				Reads word devices in 1-point unit.	960 points
	Batch write	Bit unit	1401 (0001)	Writes bit devices in 1-point unit.	7168 points
		Word unit	1401 (0000)	Writes bit devices in 16-point unit.	960 words (15360 points)
				Writes word devices in 1-point unit.	960 points
	Random read	Word unit	0403 (0000)	Reads bit devices in 16-point unit and 32-point unit by specifying devices and device numbers randomly.	192 points
				Reads word devices in 1-point unit and 2-point unit by specifying devices and device numbers randomly.	
	Test (random write)	Bit unit	1402 (0001)	Sets/resets bit devices in 1-point unit by specifying devices and device numbers randomly.	188 points
		Word unit	1402 (0000)	Sets/resets bit devices in 16-point unit and 32-point unit by specifying devices and device numbers randomly.	*2
				Writes word devices in 1-point unit and 2-point unit by specifying devices and device numbers randomly.	

*1 : QnA-compatible 3E frame command

*2 : Set the processing points within the range of the following calculation formula.
(Word access points) x 12 + (Double word access points) x 14 <= 1920

- For bit devices, 1 point is 16 bits for word access and 32 bits for double word access.
- For word devices, 1 point is 1 word for word access and 2 words for double word access.

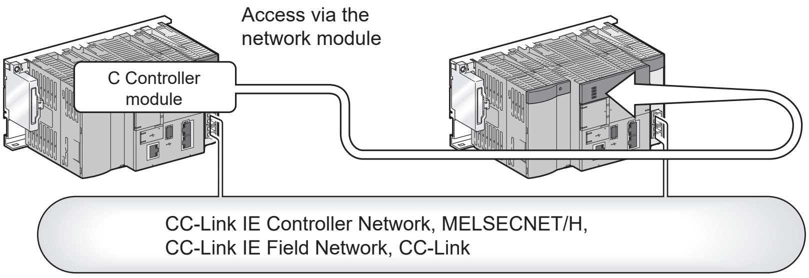
(7) Available devices

Device		Device code[1]	Device number range	
I/O device	Input	9CH	0H to FFFH	Hexadecimal
	Output	9DH	0H to FFFH	Hexadecimal
Internal user device	Internal relay	90H	The range can be specified with the device numbers available on the target C Controller module.	Decimal
	Data register	A8H		Decimal
	Link relay	A0H		Hexadecimal
	Link register	B4H		Hexadecimal
Internal system device	Special relay	91H	0 to 2047	Decimal
	Special register	A9H	0 to 2047	Decimal

*1 : ASCII code cannot be used.

CHAPTER 13 FUNCTIONS ACCESSED VIA A NETWORK MODULE

This chapter describes the functions used for network module(s). The C Controller module can establish data communicate with network-connected devices by using various network modules.


Access via the network module
C Controller module
CC-Link IE Controller Network, MELSECNET/H,
CC-Link IE Field Network, CC-Link

Point

For multiple CPU system configuration, access via any network module controlled by the other modules is not allowed.

(1) Network module

Network modules available for the C Controller module are listed below:

- CC-Link IE Controller Network module
- MELSECNET/H module
- CC-Link IE Field Network master/local module
- CC-Link module

For the module names, refer to the following.

☞ Page 96, Section 7.5.1

(2) Precautions

For the number of mountable network modules and precautions for use, refer to the following.

- Precautions for mountable modules ☞ Page 87, Section 7.2
- Precautions for use ☞ Page 99, Section 7.5.2

(3) Network parameter setting

To use network module(s), network parameter setting is necessary.

For network parameter setting, refer to the following.

📖MELSEC-Q CC-Link IE Controller Network Reference Manual

📖Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

📖MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual

📖MELSEC-Q CC-Link System Master/Local Module User's Manual

Remark

Use Setting/monitoring tools for the C Controller module to set parameters.
For operation procedures, refer to the following manual.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

13.1 Overview of Data Communication via Network

There are main types of data communication from the C Controller module via each network.

Transmission type	Description	Access target	Reference
Cyclic transmission	Communication method to automatically transmit/receive data range predefined in the network parameters in a cycle.	From the user program, uses the host network module link device controlled by the C Controller module. Data are transmitted/received between networks by the cyclic transmission function of the network module.	Page 209, Section 13.2
Transient transmission	Communication method to transmit/receive data during cyclic transmission only upon communication request.	From the user program, specifies and accesses the network module device(s) or buffer memory, etc. of the other destination stations' network module via the network.	Page 221, Section 13.3

There are following types of each transmission method.

Transmission type	Access method	Reference
Cyclic transmission	Access by link refresh function	Page 212, Section 13.2.1
	Direct access	Page 217, Section 13.2.2
	Buffer memory access	Page 219, Section 13.2.3
Transient transmission	Message communication	Page 221, Section 13.3.1
	Other station device access	Page 223, Section 13.3.2

Section 13.2 and Section 13.3 describe the overall functions.
For each network function, refer to the following.
☞ Page 225, Section 13.4

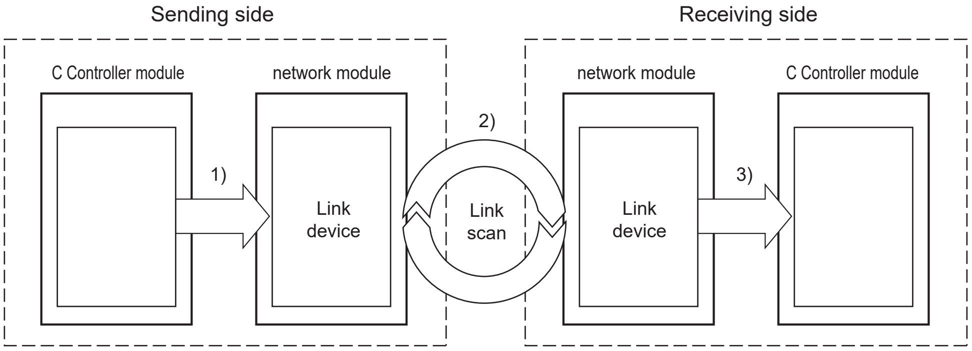
13.2 Cyclic Transmission

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Cyclic transmission is a transmission method specific to the programmable controller network.
A data area dedicated to the network, called a link device, is used for cyclic and automatic transmission/reception of data.

(1) Data flow

Data flow in cyclic transmission is illustrated below.



1) The sending C Controller module writes data to the network module link device.
2) The sending link device data are stored in the receiving link device by link scan.
3) The receiving C Controller module reads data from the network module link device.

(2) Link device

A link device is a data area for network module(s) to share data with the other stations on the network. Data of each station are updated upon each link scan. Use of the link device allows for the other stations through cyclic transmission. Link devices available for each network are listed below.

○: Available –: N/A

Link device		CC-Link IE Controller Network	MELSECNET/H	CC-Link IE Field Network	CC-Link
Link input	LX	○	○	–	–
Link output	LY				
Link relay	LB				
Link register	LW				
Remote input	RX	–	–	○	○
Remote output	RY				
Remote register	RWw				
	RWr				
Link special relay	SB	○	○	○	○
Link special register	SW				

(3) Link scan and link scan time

Cyclic transmission allows for each network station to transmit data in the transmission area of the host station in order at the defined intervals. A go-around of transmission processing by each station is called a link scan. Transmission authority is passed to each station in each link scan. Time taken for one cycle is called the link scan time.

For link scan, it is necessary to set network range assignment (network configuration settings) by parameters.

(4) Network range assignment (network configuration settings)

For link scan, it is necessary to set the following parameters.

Network name	Setting item
CC-Link IE Controller Network	Control station network parameter "Network Range Assignment"
MELSECNET/H	
CC-Link IE Field Network	Master station network parameter "Network Configuration Settings"
CC-Link	Control station network parameter "Network Range Assignment (Common Parameters)"

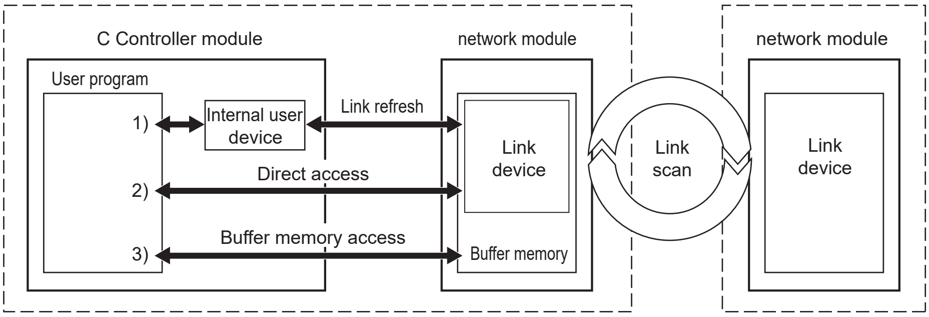
Remark

If the control CPU of the network module (control station/master station) is the C Controller module, use Setting/monitoring tools for the C Controller module to set parameters. If it is the programmable controller CPU, use GX Works2.

(5) Link device access function

The dedicated function is used from the user program to access the link device.

There are the following 3 methods to access the link device(s) of the controlled network module from the C Controller module.



Transmission type		Description	Appropriate data	Reference
1)	Access by link refresh function	A method to access internal user device(s) of the C Controller module from the user program. Data in the internal user device(s) are communicated to the link device of the network module by link refreshing.	• Frequently used link device • Link device that requires block data assurance per station[*1]	Page 212, Section 13.2.1
2)	Direct access	A method to directly access network module link device(s) from the user program.	• Infrequently used link device	Page 217, Section 13.2.2
3)	Buffer memory access	A method to access network module buffer memory from the user program.		Page 219, Section 13.2.3

*1 : For CC-Link module, setting of block data assurance per station is enabled by buffer memory access.

Point

- Proper use of transmission types
  For infrequently used devices, excluding them from the link refresh range without using access by link refresh may reduce the link refresh time. (☞ Page 249, Section 13.5.3)

Link device access methods available from the C Controller module to each controlled network module are listed below.

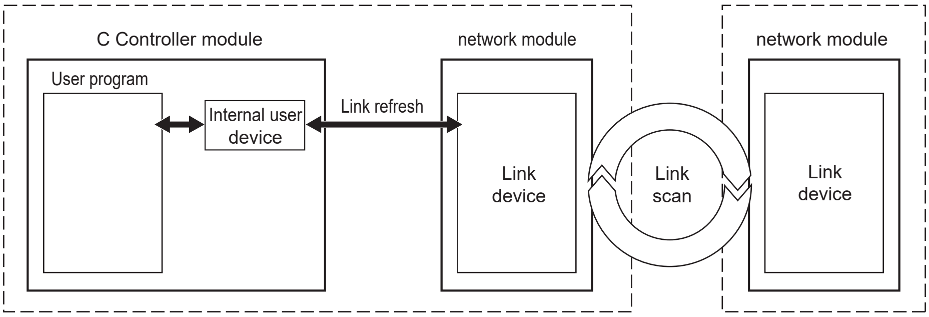
○: Available –: N/A

Transmission type		CC-Link IE Controller Network	MELSECNET/H	CC-Link IE Field Network	CC-Link
1)	Access by link refresh function	○	○	○	–
2)	Direct access	○	○	○	○
3)	Buffer memory access	–	–	○	○

13.2.1 Access by link refresh function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Access by link refresh function is a method to access internal user device(s) of the C Controller module from the user program. Internal user devices of the C Controller module performs link refresh with the network module link device to communicate data.



(1) Internal user device

The C Controller module uses the following internal user devices to share data with network module(s).

- Link relay (B)   : ON/OFF information
- Link register (W): 16-bit number information

(2) Link refresh and refresh cycle

Link refresh is a processing to communicate device data between the internal user devices of the C Controller module and the network module link device. Link refresh is performed in each refresh cycle of the C Controller module (☞ Page 175, Section 11.7.3).

(3) Parameters to set

To perform link refresh, set the following parameters.

(a) Refresh parameter settings

To perform link refresh, it is necessary to set the refresh parameters.

The refresh parameters are parameters to transfer the network module link device(s) to the internal user device(s) on the C Controller module to make them available for the user program.

For a setting example of the refresh parameter, refer to the following.

☞ Page 227, Section 13.4.1 (2)(a), Page 234, Section 13.4.3 (2)(a)

(b) Device point setting for internal user devices

Device points can be changed with CCPU parameters in Setting/monitoring tools for the C Controller module. Initial setting values without change are listed below.

Internal user device	Number of points (initial value)	Range of use (initial value)
Link relay (B)	8192	B0 to B1FFF
Link register (W)	8192	W0 to W1FFF

(c) Setting of block data assurance per station

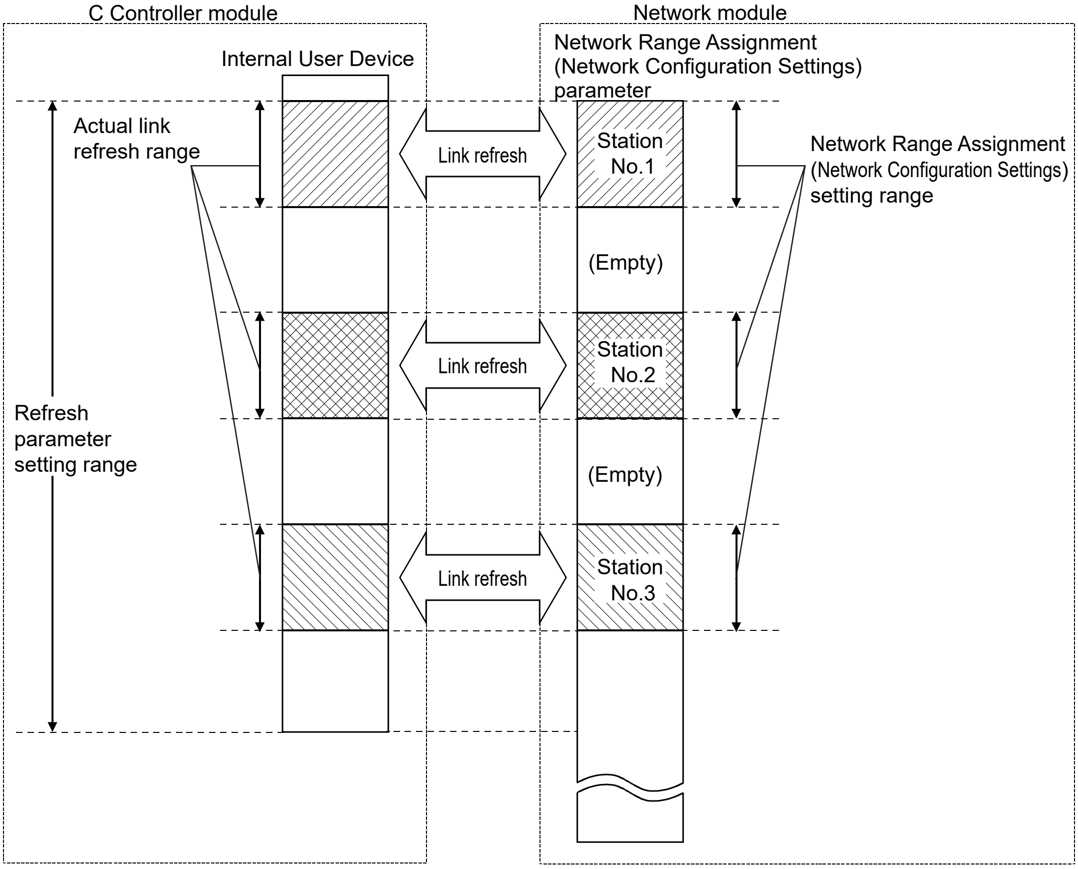
The function of the block data assurance per station is set in the network parameters. Setting location varies depending on networks. (☞ Page 214, Section 13.2.1 (5))

Remark

If the control CPU of the network module is the C Controller module, use Setting/monitoring tools for the C Controller module to set parameters. If it is the programmable controller CPU, use GX Works2.

(4) Refresh range

Refresh is performed on the range set by refresh parameters and set in the network range assignment (network configuration settings). For access by link refresh, specify internal user device(s) in the refresh range.


C Controller module
Network module
Internal User Device
Network Range Assignment (Network Configuration Settings) parameter
Actual link refresh range
Link refresh
Station No.1
Network Range Assignment (Network Configuration Settings) setting range
(Empty)
Link refresh
Station No.2
Refresh parameter setting range
(Empty)
Link refresh
Station No.3

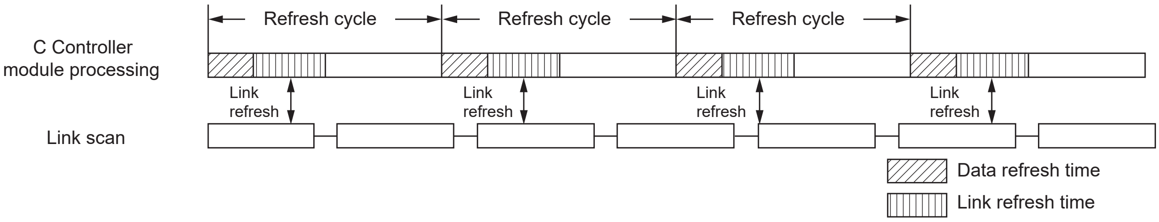
Point

All the range of refresh parameters from the first to the last is set in initial setting. Clicking the "Default" button during refresh parameter setting in Setting/monitoring tools for the C Controller module will restore the initial setting.
For operation methods of Setting/monitoring tools for the C Controller module, refer to the following.
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(5) Assurance of cyclic data integrity (block data assurance per station)

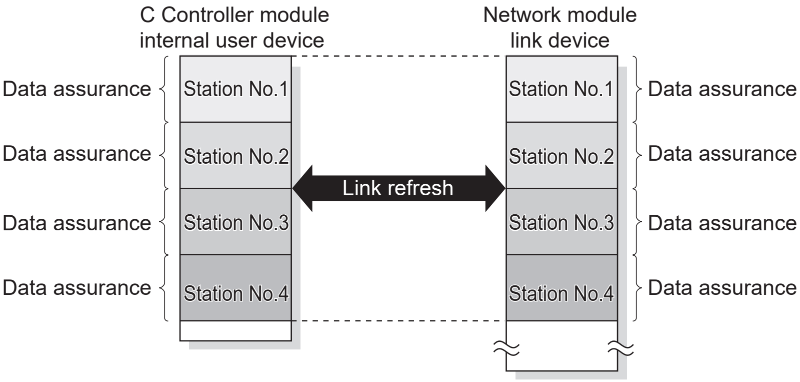
The function of block data assurance per station prevents mixing of previous link scan data and new link scan data in 1 station data set.

Link scan is performed asynchronously with link refresh in the C Controller module.
Therefore, if 32-bit or higher cyclic data is handled, new data and old data may be mixed.



*1 : For data refresh time, refer to the following.
☞ Page 171, Section 11.7.1

When the function of block data assurance per station is set, the C Controller module adjusts link refresh timing with network module(s), so cyclic data are assured per station.



The function of the block data assurance per station is set in the parameters. Setting location varies depending on networks.

Network name	Name of setup field
CC-Link IE Controller Network	Select "Block data assurance per station is available" in "Block data assurance per station" from the network parameter "Network Range Assignment" - "Supplementary Setting".
MELSECNET/H	Select "Block send data assurance per station"/"Block receive data assurance per station" from the network parameter "Network Range Assignment" - "Supplementary Setting".
CC-Link IE Field Network	Select "Assure Block Data" in "Block Data Assurance per Station" from master station's network parameter "Network Range Assignment" - "Supplementary Setting".
CC-Link	Select "Enable Setting" in "Block Data Assurance per Station" from the network parameter "Operational Setting".

For details of block data assurance per station function, and the other data assurance functions, refer to the manuals for respective network modules.

Point

To enable block data assurance per station, the following settings are required.

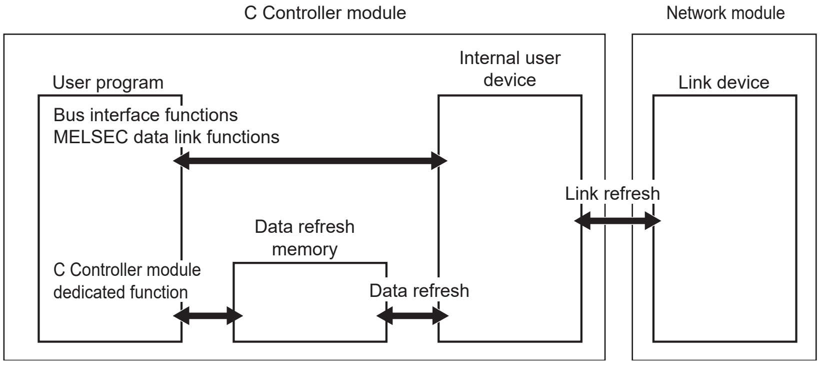
- Set the refresh parameters in Network Parameter.
- Set a value other than 0 for refresh cycle. Enabling the block data assurance per station with refresh cycle set to 0, normal cyclic transmission may be prevented, resulting in a data link error.

(6) Function to use Note13.1

The dedicated function is used from the user program to access internal user device(s).

There are the following 2 ways to access internal user device(s):

- Directly accessing to internal device(s)
  (Use the bus interface function and MELSEC data link function.)
- Accessing to data refresh memory and using data refresh
  (Use the C Controller module dedicated function.)



Functions used for access by link refresh are indicated below.

(a) Bus interface functions

Function name	Function
QBF_WriteDevice	Writes data to the internal user device of the C Controller module.
QBF_ReadDevice	Reads data from the internal user device of the C Controller module.

(b) MELSEC data link functions

Function name	Function
mdSendEx	Writes data to the internal user device of the C Controller module.
mdRandWEx	
mdDevSetEx	
mdDevRstEx	
mdReceiveEx	Reads data from the internal user device of the C Controller module.
mdRandREx	

(c) C Controller module dedicated function

When the data refresh function (☞ Page 171, Section 11.7.1) is used and internal device(s) is set in the data refresh memory, reading/writing of internal user device data is allowed by the following functions.

Function name	Function
CCPU_WriteDataRefreshMemory	Writes data to the data refresh memory of the C controller module.
CCPU_ReadDataRefreshMemory	Reads data from the data refresh memory of the C controller module.

Note13.1 Q24DHCCPU-LS Q26DHCCPU-LS

Q24DHCCPU-LS and Q26DHCCPU-LS cannot be accessed to the internal user devices. Access to them using the data refresh function.

Point

- Proper use of dedicated function libraries
  For cyclic access to device(s) of the C Controller module (host), use of C Controller module dedicated function and data refresh function may improve the user program processing performance.
  If the block data assurance per data station is enabled, use QBF_WriteDevice/QBF_ReadDevice to access internal user device(s). Use of the mdSendEx/mdReceiveEx/mdRandWEx/mdRandREx function may cause inconsistency of data.

(7) Devices specified by functions (internal user device)

Internal user devices compatible with each link device are listed below.

The corresponding device numbers (range) are to be set in the refresh parameters.

In the dedicated function libraries, specify a device name defined for each function.

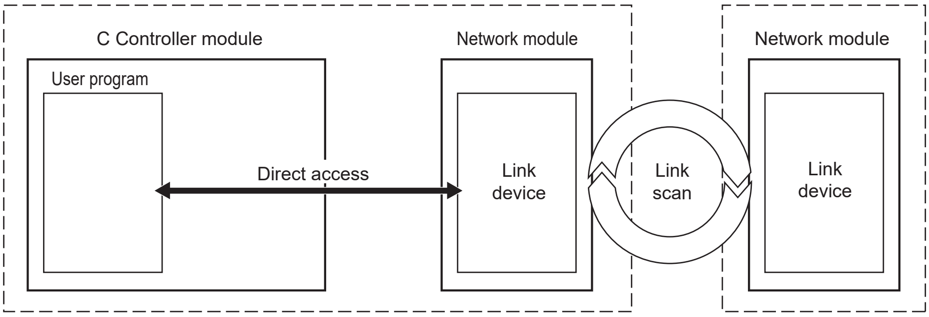
Link device		Internal user device	Specified function device name	
			Bus interface functions	MELSEC data link functions
Link input	LX	B W	QBFDev_CCPU_B QBFDev_CCPU_W	DevB DevW
Link output	LY			
Link relay	LB			
Link register	LW			
Remote input	RX			
Remote Link output	RY			
Remote register	RWw			
	RWr			
Link special relay	SB	Access by link refresh not allowed. Use direct access.		
Link special register	SW			

When any C Controller module dedicated function is used, specify the data refresh memory offset. Specify an area on which the internal user device(s) is set in the parameter data refresh settings.

13.2.2 Direct access

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Direct access is a method to directly access network module link device(s) from the user program.



(1) Function to use

The dedicated function is used from the user program to access link device(s).

Functions used for direct access are indicated below.

(a) Bus interface functions

Function name	Function
QBF_WriteLinkDevice	Writes data directly into network module link device(s).
QBF_ReadLinkDevice	Reads data directly from network module link device(s).

(b) MELSEC data link functions

Function name	Function
mdSendEx	Writes data directly into network module link device(s).
mdRandWEx	
mdDevSetEx	
mdDevRstEx	
mdReceiveEx	Reads data directly from network module link device(s).
mdRandREx	

Point

- Proper use of dedicated function libraries
  To access to module(s) in the same C Controller module, use of bus interface functions better improves the user program processing performance.
  In case of CC-Link, use MELSEC data link functions. Access by the bus interface function is not allowed.

(2) Devices specified by functions (direct link device)

In the dedicated function libraries, specify a device name defined for each function.

Link device		Specified function device name			
		Bus interface functions	MELSEC data link functions		
			CC-Link IE Controller Network, MELSECNET/H	CC-Link IE Field Network	CC-Link
Link input	LX	QBFDev_LX	DevLX(0)[*1]	–	–
Link output	LY	QBFDev_LY	DevLY(0)[*1]	–	–
Link relay	LB	QBFDev_LB	DevLB(0)[*1]	–	–
Link register	LW	QBFDev_LW	DevLW(0)[*1]	–	–
Remote input	RX	QBFDev_LX	–	DevLX	DevX
Remote Link output	RY	QBFDev_LY	–	DevLY	DevY
Remote register	RWw	QBFDev_LW	–	DevLW	DevWw
	RWr	QBFDev_LW	–	DevLW	DevWr
Link special relay	SB	QBFDev_LSB	DevSM, DevQSB, DevLSB(0)	DevSM, DevQSB, DevLSB(0)	DevSM,DeVQSB
Link special register	SW	QBFDev_LSW	DevSD, DevQSW, DevLSW(0)	DevSD, DevQSW, DevLSW(0)	DevSD,DevQSW

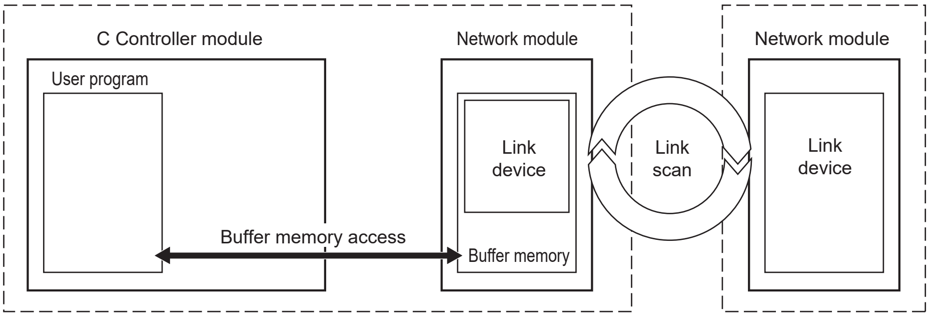
[*1] Bracketed values () are argument values for device name specifications. For the host station, specify "0".

For access to the other stations, refer to the following.
☞Page 223, Section 13.3.2

13.2.3 Buffer memory access

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Buffer memory access is a method to access network module buffer memory from the user program.



(1) Function to use

The dedicated function is used from the user program to access buffer memory.

Functions used for access by buffer memory are indicated below.

(a) Bus interface functions

Function name	Function
QBF_ToBuf	Writes data directly into network module buffer memory.
QBF_FromBuf	Reads data from the network module buffer memory.
QBF_RefreshLinkDevice	Requests refresh to read data from /write data to the CC-Link module buffer memory and link device(s). (Used when the manual refresh is selected)

(b) MELSEC data link functions

Function name	Function
mdSendEx	Writes data directly into network module buffer memory.
mdRandWEx	
mdReceiveEx	Reads data from the network module buffer memory.
mdRandREx	

Point

- Proper use of dedicated function libraries
  To access to module(s) in the same C Controller module, use of bus interface functions better improves the user program processing performance.

(2) Devices specified by functions (buffer memory)

Each link device is assigned to a certain address in the buffer memory.

In the dedicated function libraries, specify a device name defined for each function.

Link device		Specified function device name
Remote input	RX	DevSPB
Remote Link output	RY	
Remote register	RWw	
	RWr	
Link special relay	SB	
Link special register	SW	

When any bus interface function is used, specify the buffer memory offset.

For buffer memory addresses compatible with each link device, refer to the following.

📖MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual

📖MELSEC-Q CC-Link System Master/Local Module User's Manual

For access to the other stations, refer to the following.

☞ Page 223, Section 13.3.2

13.3 Transient Transmission

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Transient transmission is a communication method to communicate data by using the sequence program link dedicated instructions in the programmable controller system.

In the C Controller module, use the dedicated function library for the user program.

There are 2 methods for transient transmission: message transmission by controlled network module channel and direct access to the other station device(s).

13.3.1 Message communication

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

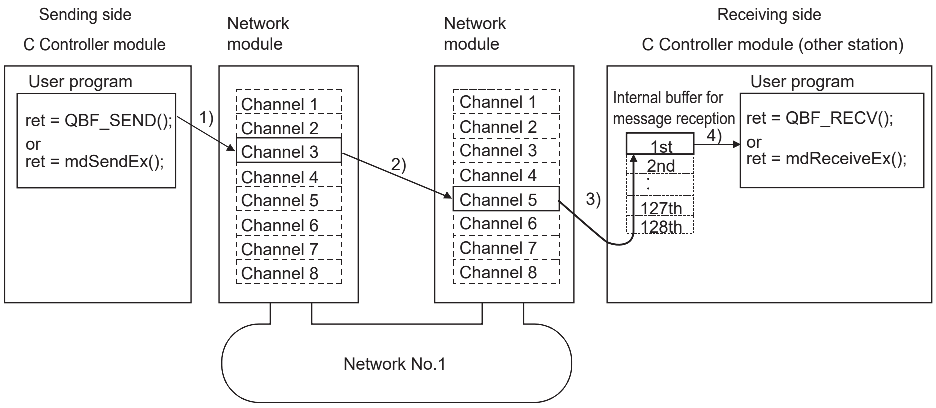
Message communication is a method to read/write data by using controlled network module channel from the C Controller module.

Use the dedicated function library for the user program to establish the message communication.

The message communication function allows for data communication equivalent to link dedicated instructions, SEND/RECV instructions.

(1) Data flow

Data flow in message communication is illustrated below.



1) The sending C Controller module utilizes the user program's message transmission function to specify the host channel and destination channel(s) and then performs transmission.
2) From the sending channel, data are transmitted to the receiving channel(s).
3) The receiving C Controller module(s) (other) automatically confirms the receiving channel(s) and stores the received data in the internal buffer for message reception.
4) The receiving C Controller module(s) (other) reads messages from the internal buffer for message reception by using message reception functions of the user program.

Point

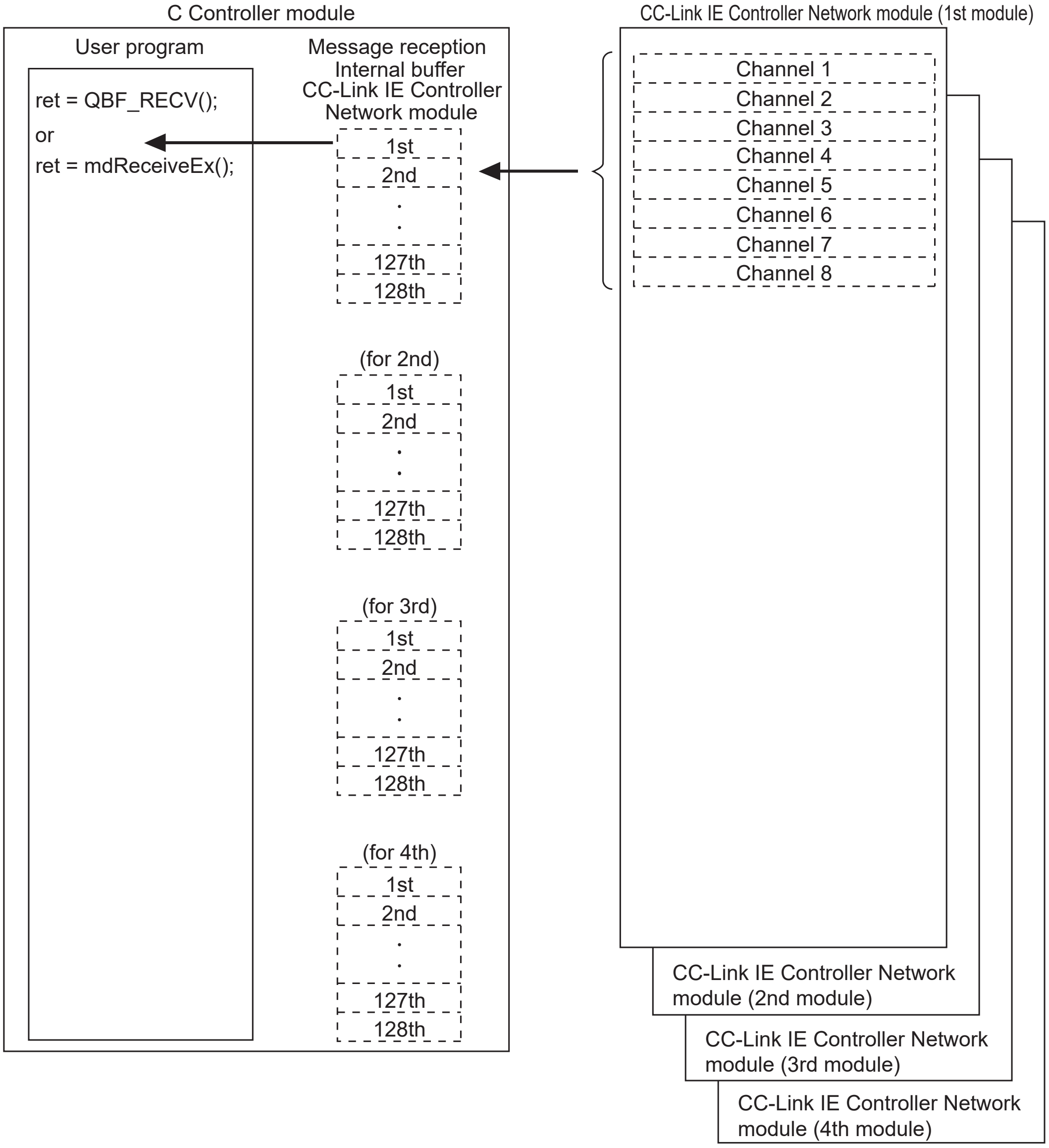
- When communicating massages with CPU modules other than the C Controller module
  The message communication function is also available for CPU modules with sending or receiving station(s) that is not the C Controller module.
  In destination CPU module(s), use the link dedicated instructions, SEND/RECV instructions, or equivalent functions.
- When sending data twice to the same channel of the receiving station with ACK set
  Do this after the receiving station(s) reads data by using a message reception function (or a RECV instruction).
  If the sending station transmits data to the same channel as the receiving station(s) before read-out completion by the receiving station(s), an error occurs. If an error is detected, retry the transmission after a little while.

(2) Channel

Each network module has a data area used for message communication, called a "channel".
By using multiple channels, simultaneous access from the host to multiple other stations, and simultaneous reading and writing to the same module are allowed. The number of channels varies depending on network types.

(3) Internal buffer for message reception

The C Controller module uses the internal buffer for message reception to store specified data. Internal buffer for message reception may store up to 128 reception data sets per network module. If data are received when the buffer area has been full of received data, they will be discarded instead of being stored in the buffer. Therefore, read received data before the number of the data stored in the internal receive buffer exceeds 128.
In message reception, data of the channel specified in the message receiving function are retrieved from the data stored in the internal buffer.


C Controller module
User program
ret = QBF_RECV();
or
ret = mdReceiveEx();
Message reception Internal buffer CC-Link IE Controller Network module
1st
2nd
127th
128th
(for 2nd)
1st
2nd
127th
128th
(for 3rd)
1st
2nd
127th
128th
(for 4th)
1st
2nd
127th
128th
CC-Link IE Controller Network module (1st module)
Channel 1
Channel 2
Channel 3
Channel 4
Channel 5
Channel 6
Channel 7
Channel 8
CC-Link IE Controller Network module (2nd module)
CC-Link IE Controller Network module (3rd module)
CC-Link IE Controller Network module (4th module)

(4) Function to use

The dedicated function is used from the user program to access channels and internal buffer for message reception. Functions used for message communication are indicated below.

(a) Bus interface functions

Function name	Function
QBF_SEND	Sends a message to the other station via CC-Link IE Controller Network module.
QBF_RECV	Receives a message from the other station via CC-Link IE Controller Network module.

(b) MELSEC data link functions

Function name	Function
mdSendEx	Sends a message to the other station via CC-Link IE Controller Network module.
mdReceiveEx	Receives a message from the other station via CC-Link IE Controller Network module.

Point

- ● Proper use of dedicated function libraries
  To access to module(s) in the same C Controller module, use of bus interface functions better improves the user program processing performance.

13.3.2 Other station device access

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Access to the other devices is a method to access the other station device(s) that is relayed via the network directly from the user program. Access to target network module(s) and controlled CPU module(s) is allowed.

(1) Function to use

The dedicated function is used from the user program to access the other station device(s).
Functions used for other station access are indicated below.

(a) MELSEC data link functions

Function name	Function
mdSendEx	Writes data directly into the other station device(s).
mdRandWEx	
mdDevSetEx	
mdDevRstEx	
mdReceiveEx	Reads data directly from the other station device(s).
mdRandREx	

Point

The bus interface functions can be used for access to module(s) in the same C Controller module.
Specify the other station device(s) by using each function for direct access and buffer memory access.

(2) Accessible range of reach function

For accessible range over each network, refer to the following.
☞ Page 366, Section 22.5

(3) Devices specified by functions

(a) Other station link device access

In the dedicated function libraries, specify a device name defined for each function.

For access to other station link device(s), specify the direct link device (other station side).

Link device		Specified function device name		
		MELSEC data link functions		
		CC-Link IE Controller Network, MELSECNET/H	CC-Link IE Field Network	CC-Link
Link input	LX	DevLX(1) to DevLX(255)[*1]	–	–
Link output	LY	DevLY(1) to DevLY(255)[*1]	–	–
Link relay	LB	DevLB(1) to DevLB(255)[*1]	–	–
Link register	LW	DevLW(1) to DevLW(255)[*1]	–	–
Remote input	RX	–	DevLX	DevRX
Remote Link output	RY	–	DevLY	DevRY
Remote register	RWw	–	DevLW	DevRW
	RWr	–	DevLW	DevRW
Link special relay	SB	DevLSB(1) to DevLSB(255)[*1]	DevSB	DevSB
Link special register	SW	DevLSW(1) to DevLSW(255)[*1]	DevSW	DevSW

*1 : Bracketed values () are argument values (1-255) for device name specifications. Specify the "Network No.".

(b) Other station buffer memory access

For access to other station buffer memory, specify the special direct buffer register and intelligent function module buffer memory.

Link device		Specified function device name
Remote input	RX	DevSPG(0) to DevSPG(255)*1
Remote Link output	RY	
Remote register	RWw	
	RWr	
Link special relay	SB	
Link special register	SW	

*1 : Bracketed values () are argument values (0-255) for device name specifications. Specify "Start I/O No. / 10H".

(c) Other station control CPU module access

For devices to be specified by the user program in order for access to the other stations' controlled CPU modules, refer to the following.

☞ Page 366, Section 22.5

13.4 Each Network Module Access Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The network module access function transmits data to the network connected device(s) via network module(s) controlled by the C Controller module.

This section describes network module access functions available for each network module.

For description of overall functions, refer to the following.

☞Page 209, Section 13.1 to Page 221, Section 13.3

13.4.1 CC-Link IE Controller Network module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Described below is the function to transmit data via CC-Link IE controller network module.

(1) Available functions

The following functions are available through the CC-Link IE Controller Network module.

(a) Available access methods

The following access methods are available.

Transmission type	Access method	Reference
Cyclic transmission	Access by link refresh function	Page 212, Section 13.2.1, Page 226, (2) in this section
	Direct access	Page 217, Section 13.2.2, Page 228, (3) in this section
Transient transmission	Message communication	Page 221, Section 13.3.1, Page 229, (4) in this section
	Other station device access	Page 223, Section 13.3.2

(b) Available link devices

The following link devices are available.

- Link input (LX)
- Link output (LY)
- Link relay (LB)
- Link register (LW)
- Link special relay (SB)*1
- Link special register (SW)*1

*1 : Link device refresh is not available for the SB/SW. Use the direct access.

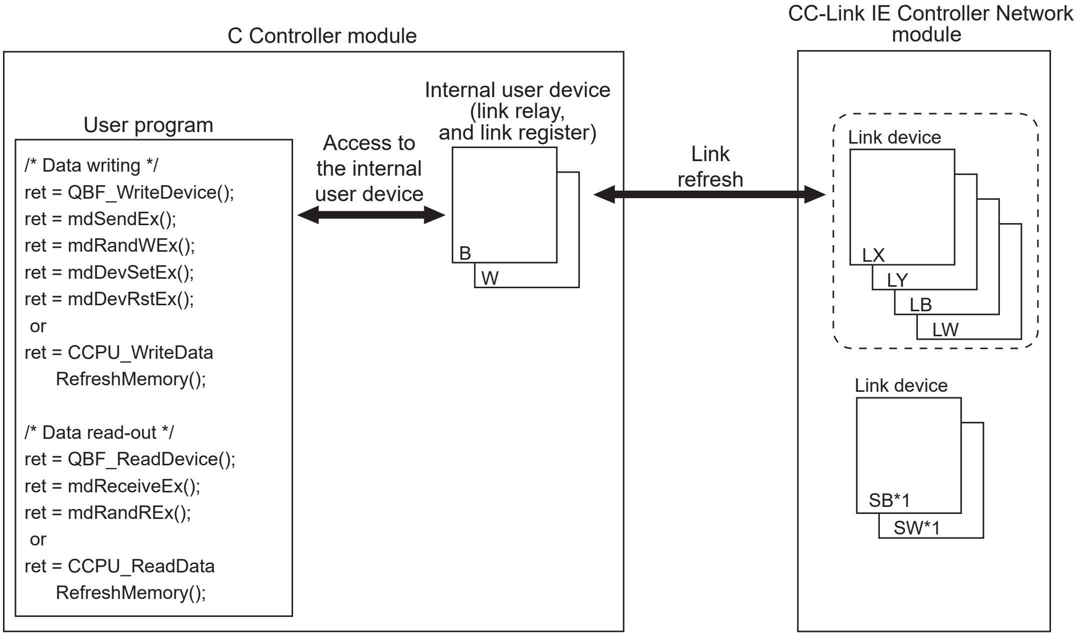
(2) Access by link refresh function

Access by link refresh function is a method to access internal user device(s) (Link Relay B and Link Register W) of the C Controller module from the user program.

There are the following 2 ways to access internal user device(s):

- Directly accessing to internal device(s)
  (Use the bus interface function and MELSEC data link function.)
- Accessing to data refresh memory and using data refresh
  (Use the C Controller module dedicated function.)

Internal user device data are cyclic-transmitted to the other stations by reading from/writing to link device(s) on network module(s) by link refresh.


C Controller module
CC-Link IE Controller Network module
User program
Access to the internal user device
Internal user device (link relay, and link register)
B
W
Link refresh
Link device
LX
LY
LB
LW
Link device
SB*1
SW*1

```
/* Data writing */
ret = QBF_WriteDevice();
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();
 or
ret = CCPU_WriteData
     RefreshMemory();

/* Data read-out */
ret = QBF_ReadDevice();
ret = mdReceiveEx();
ret = mdRandREx();
 or
ret = CCPU_ReadData
     RefreshMemory();
```

*1 : Link device refresh is not available for the SB/SW. Use the direct access.

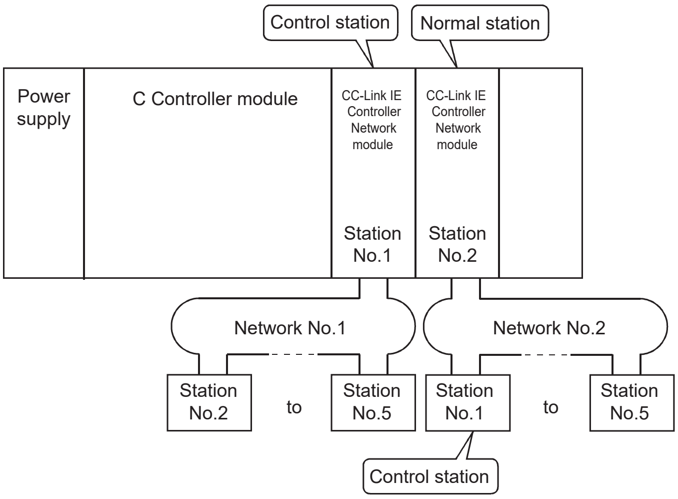
(a) Refresh parameter setting example

To perform link refresh, it is necessary to set the refresh parameters.

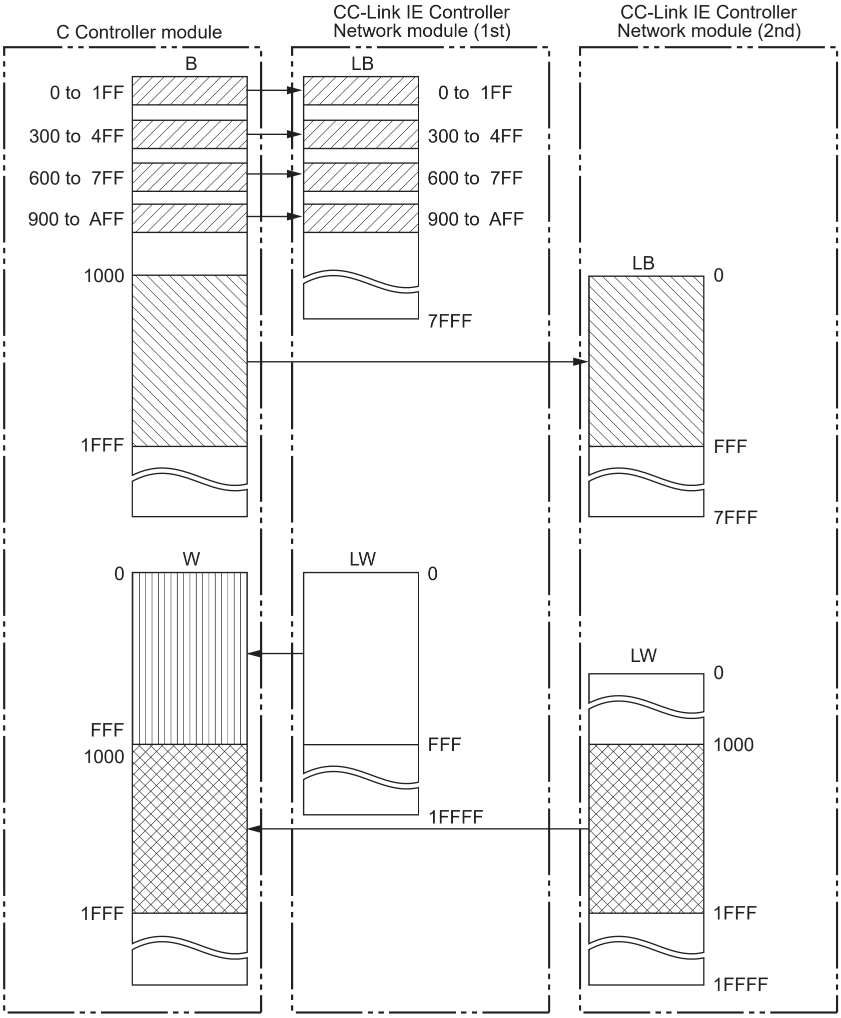
Illustrated below is an example of refresh parameter settings on a CC-Link IE Controller Network module.

The C Controller module can set up to 64 transfer settings per CC-Link IE Controller Network module.

- System Configuration



- Parameter assignment



- CC-Link IE Controller Network module (1st module) setting

Transfer settings	Link side				C Controller module			
	Device name	Number of points	Start	End	Device name	Number of points	Start	End
Transfer 1	LB	512	0000	01FF	B	512	0000	01FF
Transfer 2	LB	512	0300	04FF	B	512	0300	04FF
Transfer 3	LB	512	0600	07FF	B	512	0600	07FF
Transfer 4	LB	512	0900	0AFF	B	512	0900	0AFF
Transfer 5	LW	4096	00000	00FFF	W	4096	00000	00FFF

- CC-Link IE Controller Network module (2nd module) setting

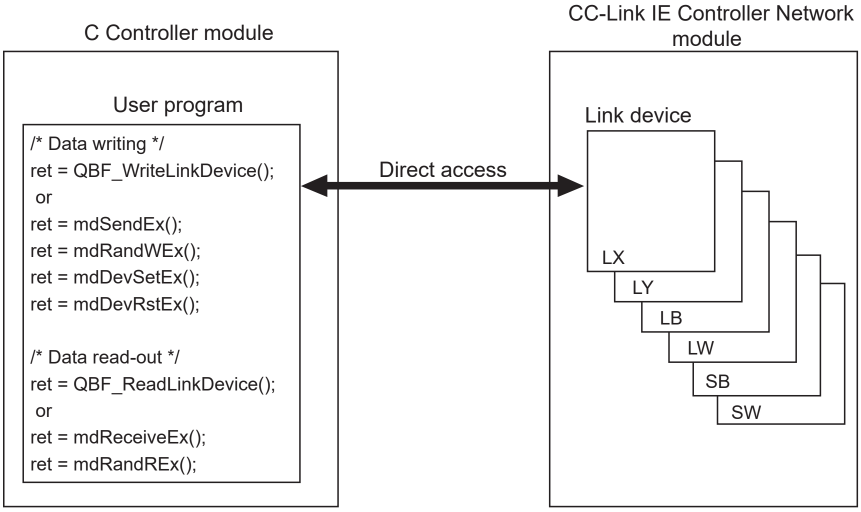
Transfer settings	Link side				C Controller module			
	Device name	Number of points	Start	End	Device name	Number of points	Start	End
Transfer 1	LB	4096	0000	0FFF	B	4096	1000	1FFF
Transfer 2	LW	4096	01000	01FFF	W	4096	01000	01FFF

Remark

If the control CPU of the network module is the C Controller module, use Setting/monitoring tools for the C Controller module to set parameters. If it is the programmable controller CPU, use GX Works2.
For Setting/monitoring tools for the C Controller module, refer to the following.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(3) Direct access

Direct access is a method to directly access network module link device(s) from the user program. Network module link device data are cyclic-transmitted to the other stations.



```
/* Data writing */
ret = QBF_WriteLinkDevice();
 or
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();

/* Data read-out */
ret = QBF_ReadLinkDevice();
 or
ret = mdReceiveEx();
ret = mdRandREx();
```

(4) Message communication

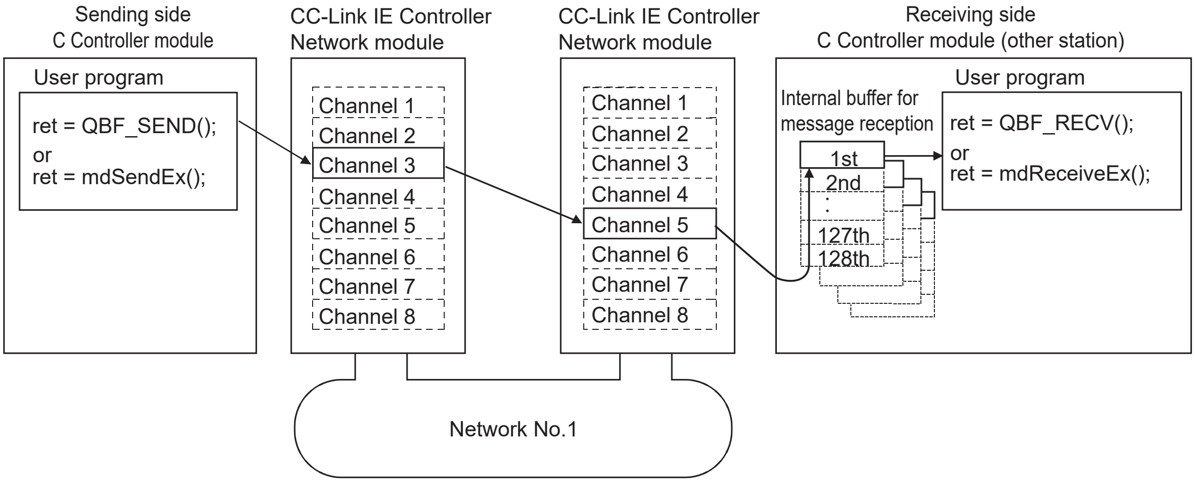
The message communication function (☞ Page 221, Section 13.3.1) can be used by the C Controller module via the controlled CC-Link IE Controller Network module.

Remark

For accessible range, refer to the following.
☞ Page 366, Section 22.5

(a) Number of channels and Internal buffer for message reception

Up to 8 channels can be used for message communication by the CC-Link IE Controller Network module, and the capacity of the internal buffer for message reception is for 4 modules.



13.4.2 MELSECNET/H module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Described below is the function to transmit data via the MELSECNET/H module.

(1) Available functions

The following functions are available through the MELSECNET/H module.

(a) Available access methods

The following access methods are available.

Transmission type	Access method	Reference
Cyclic transmission	Access by link refresh function	Page 212, Section 13.2.1,Page 226, Section 13.4.1 (2)*1
	Direct access	Page 217, Section 13.2.2,Page 228, Section 13.4.1 (3)*1
Transient transmission	Message communication	Page 221, Section 13.3.1,Page 230, (2) in this section
	Other station device access	Page 223, Section 13.3.2

*1 : For this function, the same as CC-Link IE Controller Network. Read the stated network name as the relevant name when referring to the CC-Link IE Controller Network module's access function.

(b) Available link devices

The following link devices are available.

- Link input (LX)
- Link output (LY)
- Link relay (LB)
- Link register (LW)
- Link special relay (SB)*1
- Link special register (SW)*1

*1 : Link device refresh is not available for the SB/SW. Use the direct access.

(2) Message communication

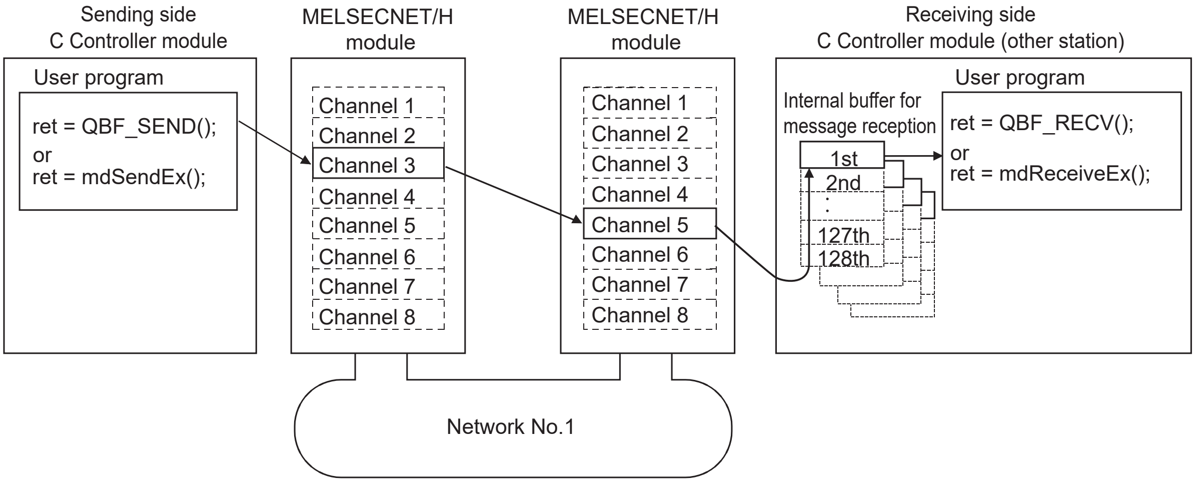
The message communication function (☞ Page 221, Section 13.3.1) can be used by the C Controller module via the controlled MELSECNET/H module.

Remark

For accessible range, refer to the following.
☞ Page 366, Section 22.5

(a) Number of channels and Internal buffer for message reception

Up to 8 channels can be used for message communication by the MELSECNET/H module, and the capacity of the internal buffer for message reception is for 4 modules.



(b) Logical channel

The MELSECNET/H module can change the channel No. from 1 through 64 for each of the 8 channels. The channel No. changed by the module is called a "logical channel".

Change the link special register (SW0008-SW000F) value to set the logical channel setting.

Link special register	Description	Setting range	Initial value
SW0008	Channel 1 logical channel No. setting	1 to 64	0[*1]
SW0009	Channel 2 logical channel No. setting		
:	:		
SW000F	Channel 8 logical channel No. setting		

[*1] : If the value is 0, the logical channel No. is treated as 1-8 as with the actual channel No.

The following shows how to specify channels for each function.

Function	Function type	Function name	Channel specification method
Message transmission	Bus interface functions	QBF_SEND	Can be specified by logical channel No.
	MELSEC data link functions	mdSendEx	Specified by channel No. 1-8
Message reception	Bus interface functions	QBF_RECV	
	MELSEC data link functions	mdReceiveEx	

13.4.3 CC-Link IE Field Network master/local module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Described below is the function to transmit data via CC-Link IE Field Network module.

(1) Available functions

The following functions are available through the CC-Link IE Field Network master/local module.

(a) Available access methods

The following access methods are available.

Transmission type	Access method	Reference
Cyclic transmission	Access by link refresh function	Page 212, Section 13.2.1, Page 233, (2) in this section
	Direct access	Page 217, Section 13.2.2, Page 235, (3) in this section
	Buffer memory access	Page 219, Section 13.2.3, Page 236, (4) in this section
Transient transmission	Message communication	Page 221, Section 13.3.1, Page 236, (5) in this section
	Other station device access	Page 223, Section 13.3.2

(b) Available link devices

The following link devices are available.

- Remote input (RX)
- Remote output (RY)
- Remote relay (RWw)
- Remote register (RWr)
- Link special relay (SB)[*1]
- Link special register (SW)[*1]

[*1] : Link device refresh is not available for the SB/SW. Use the direct access or buffer memory access.

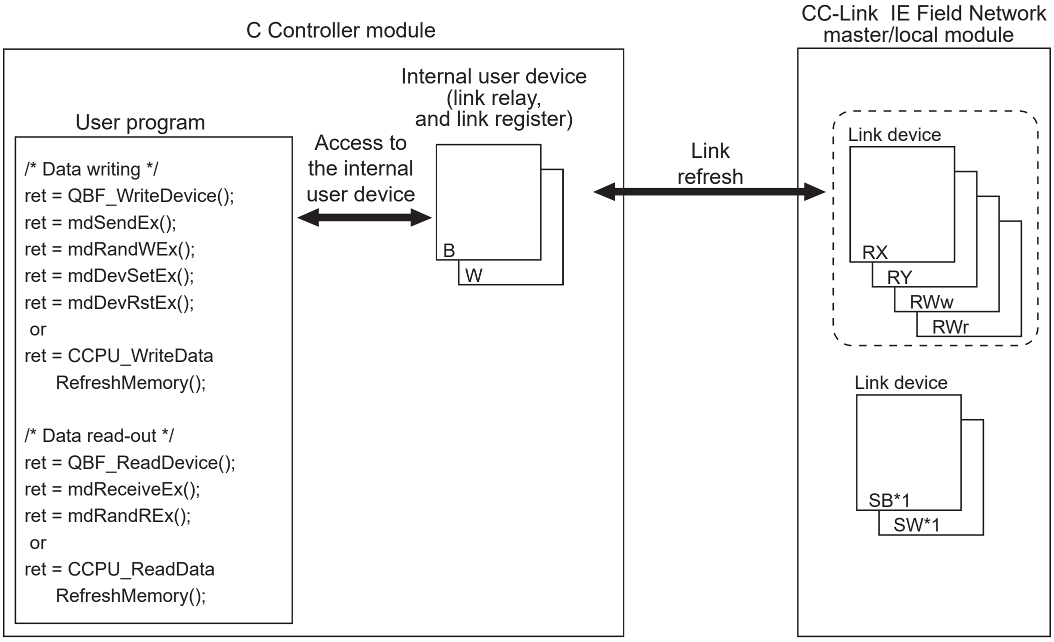
(2) Access by link refresh function

Access by link refresh function is a method to access internal user device(s) (Link Relay B and Link Register W) of the C Controller module from the user program.

There are the following 2 ways to access internal user device(s):

- Directly accessing to internal device(s)
  (Use the bus interface function and MELSEC data link function.)
- Accessing to data refresh memory and using data refresh
  (Use the C Controller module dedicated function.)

Internal user device data are cyclic-transmitted to the other stations by reading from/writing to link device(s) on network module(s) by link refresh.



```
/* Data writing */
ret = QBF_WriteDevice();
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();
 or
ret = CCPU_WriteData
     RefreshMemory();

/* Data read-out */
ret = QBF_ReadDevice();
ret = mdReceiveEx();
ret = mdRandREx();
 or
ret = CCPU_ReadData
     RefreshMemory();
```

C Controller module
User program
Access to the internal user device
Internal user device (link relay, and link register)
B
W
Link refresh
CC-Link IE Field Network master/local module
Link device
RX
RY
RWw
RWr
Link device
SB*1
SW*1

*1 : Link device refresh is not available for the SB/SW. Use the direct access or buffer memory access.

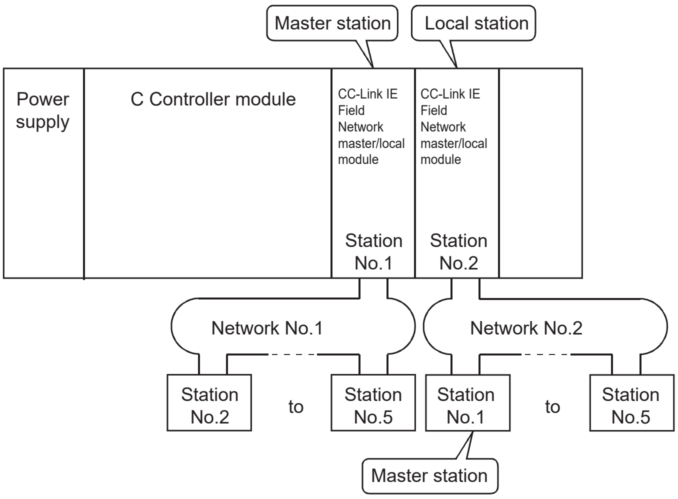
(a) Refresh parameter setting example

To perform link refresh, it is necessary to set the refresh parameters.

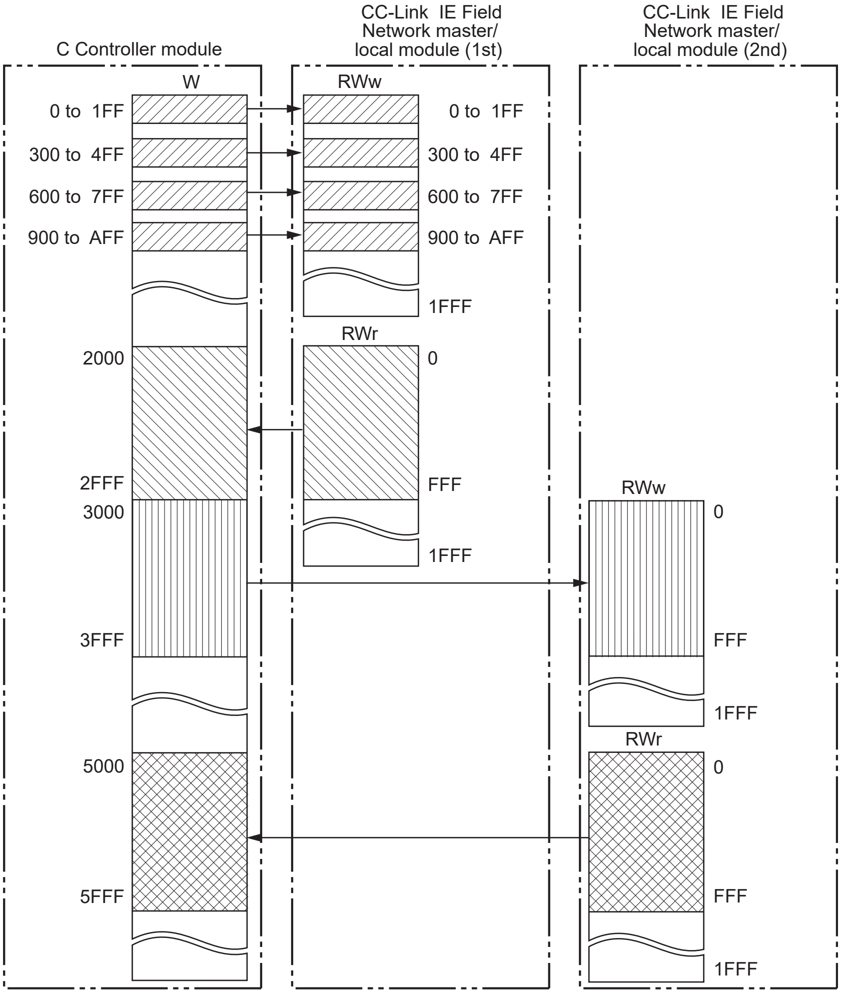
Illustrated below is an example of refresh parameter settings on a CC-Link IE Field Network master/local module.

The C Controller module can set up to 256 transfer settings per CC-Link IE Field Network master/local module.

- System configuration



- Parameter assignment



- CC-Link IE Field Network module (1st module) setting

Transfer settings	Link side				C Controller module			
	Device name	Number of points	Start	End	Device name	Number of points	Start	End
Transfer 1	RWw	512	0000	01FF	W	512	000000	0001FF
Transfer 2	RWw	512	0300	04FF	W	512	000300	0004FF
Transfer 3	RWw	512	0600	07FF	W	512	000600	0007FF
Transfer 4	RWw	512	0900	0AFF	W	512	000900	000AFF
Transfer 5	RWr	4096	0000	0FFF	W	4096	002000	002FFF

- CC-Link IE Field Network module (2nd module) setting

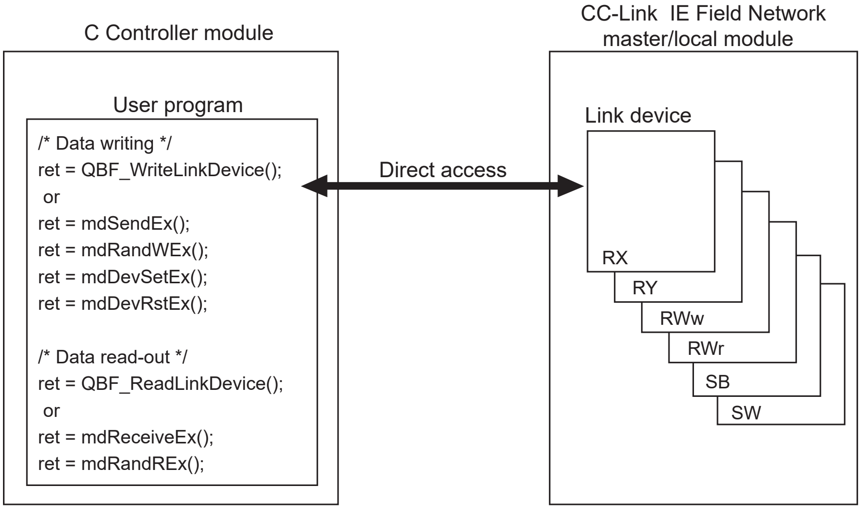
Transfer settings	Link side				C Controller module			
	Device name	Number of points	Start	End	Device name	Number of points	Start	End
Transfer 1	RWw	4096	0000	0FFF	W	4096	003000	003FFF
Transfer 2	RWr	4096	0000	0FFF	W	4096	005000	005FFF

Remark

If the control CPU of the network module is the C Controller module, use Setting/monitoring tools for the C Controller module to set parameters. If it is the programmable controller CPU, use GX Works2.
For Setting/monitoring tools for the C Controller module, refer to the following.
Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(3) Direct access

Direct access is a method to directly access network module link device(s) from the user program. Network module link device data are cyclic-transmitted to the other stations.

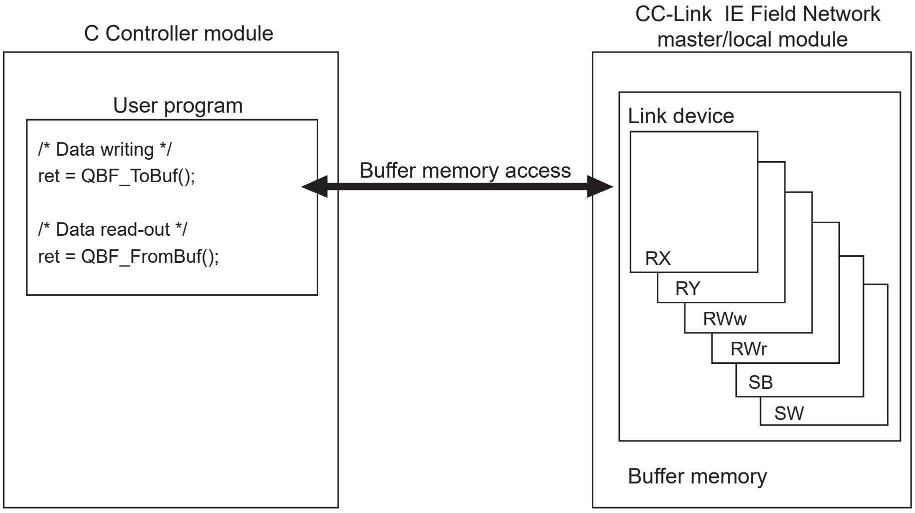


```
/* Data writing */
ret = QBF_WriteLinkDevice();
 or
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();

/* Data read-out */
ret = QBF_ReadLinkDevice();
 or
ret = mdReceiveEx();
ret = mdRandREx();
```

(4) Buffer memory access

Buffer memory access is a method to access network module buffer memory from the user program. Buffer memory data are refreshed with link device(s) and cyclic-transmitted to the other stations.



(5) Message communication

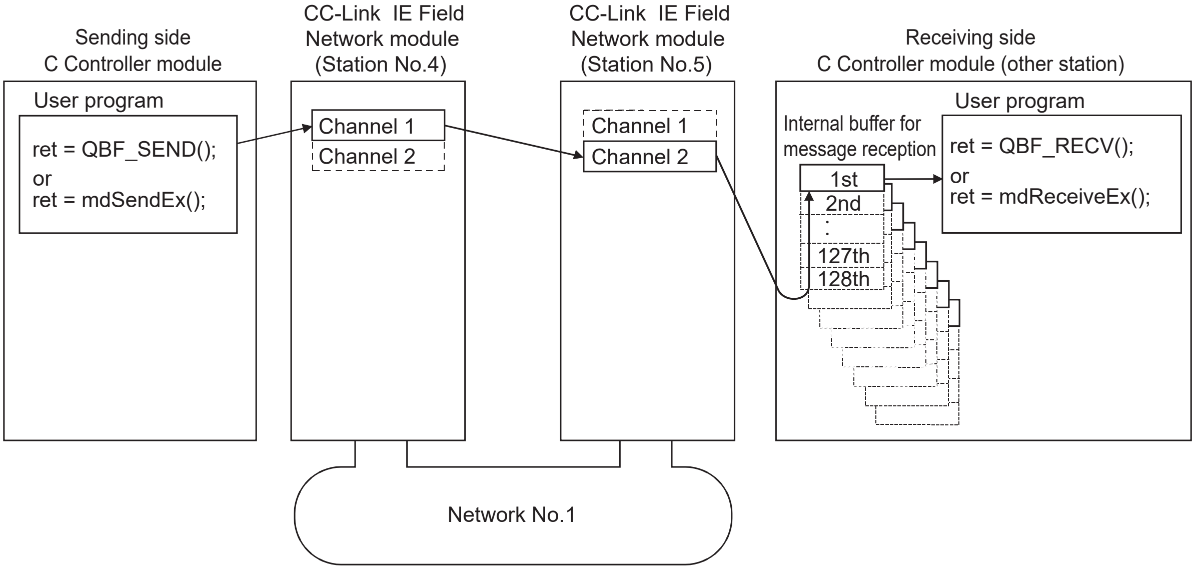
The message communication function (☞ Page 221, Section 13.3.1) can be used by the C Controller module via the controlled CC-Link IE Field Network master/local module.

Remark

For accessible range, refer to the following.
☞ Page 366, Section 22.5

(a) umber of channels and Internal buffer for message reception

Up to 2 channels can be used for message communication by the CC-Link IE Field Network master/local module, and the capacity of the internal buffer for message reception is for 8 modules.



13.4.4 CC-Link module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Described below is the function to transmit data via CC-Link module.

(1) Available functions

The following functions are available through the CC-Link module.

(a) Available access methods

The following access methods are available.

Transmission type	Access method	Reference
Cyclic transmission	Direct access	Page 217, Section 13.2.2, Page 237, (2) in this section
	Buffer memory access	Page 219, Section 13.2.3, Page 238, (3) in this section to Page 241, (5) in this section
Transient transmission	Other station device access	Page 223, Section 13.3.2

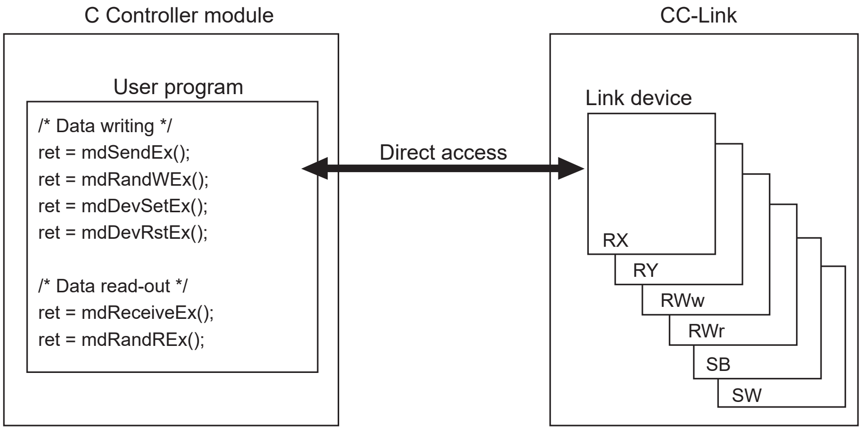
(b) Available link devices

The following link devices are available.

- Remote input (RX)
- Remote output (RY)
- Remote relay (RWw)
- Remote register (RWr)
- Link special relay (SB)
- Link special register (SW)

(2) Direct access

Direct access is a method to directly access network module link device(s) from the user program. Network module link device data are cyclic-transmitted to the other stations.

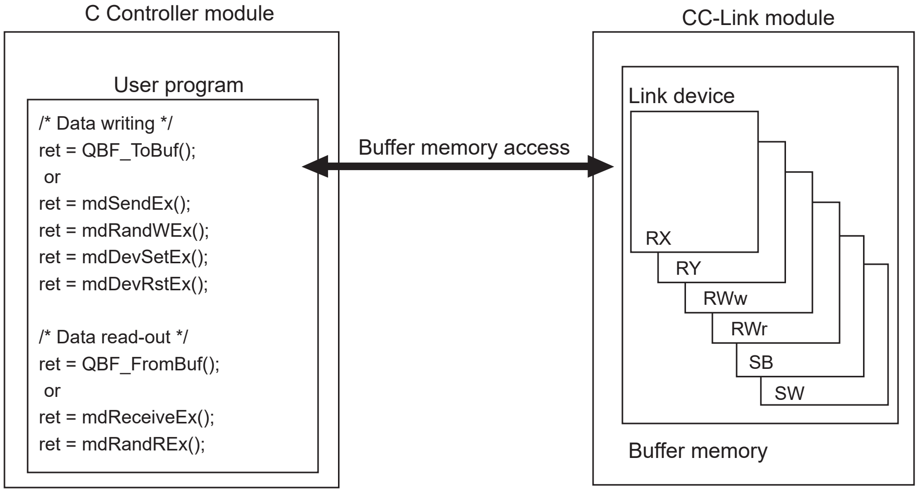


```
/* Data writing */
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();

/* Data read-out */
ret = mdReceiveEx();
ret = mdRandREx();
```

(3) Buffer memory access

Buffer memory access is a method to access network module buffer memory from the user program. Buffer memory data are refreshed with link device(s) and cyclic-transmitted to the other stations.



```
/* Data writing */
ret = QBF_ToBuf();
 or
ret = mdSendEx();
ret = mdRandWEx();
ret = mdDevSetEx();
ret = mdDevRstEx();

/* Data read-out */
ret = QBF_FromBuf();
 or
ret = mdReceiveEx();
ret = mdRandREx();
```

(4) Reading from buffer memory when using the block data assurance per station function

To enable the Block Data Assurance per Station and read data from the buffer memory, follow the following procedures.

Method	Description	Reference
Automatic cyclic data refresh	Data are automatically refreshed during the link scan and read out just by executing the QBF_FromBuf function.	Page 239, (4)(a) in this section
Manual cyclic data refresh	Data are manually refreshed with the QBF_RefreshLinkDevice function, and then they are read out by executing the QBF_FromBuf function.	Page 240, (4)(b) in this section

Point

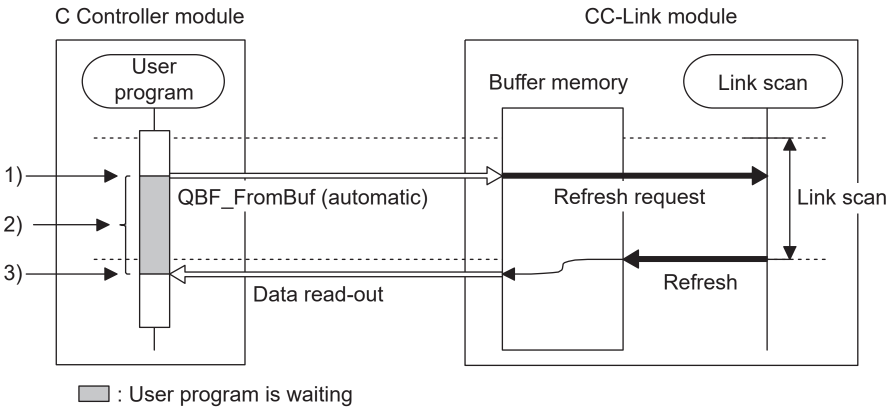
Use the manual cyclic data refresh method if user program processing is to be continued during the waiting time which will occur in the automatic cyclic data refresh.

- The following shows the CC-Link module that supports the block data assurance per station function.

Model	Version
QJ61BT11N	Serial number whose first five digits are "08032" or higher.

(a) Automatic cyclic data refresh

1) Execute the QBF_FromBuf function with "automatic" specified for "CC-Link refresh method" of the third argument (ulOffset).
2) In the timing of the next link scan, refreshed cyclic data (in the buffer memory) are read out. User program processing is suspended until the reading is completed.
3) Upon completion of reading, the user program processing resumes.



Point

During execution of the QBF_FromBuf function, a time of up to one link scan may be spent for standby.

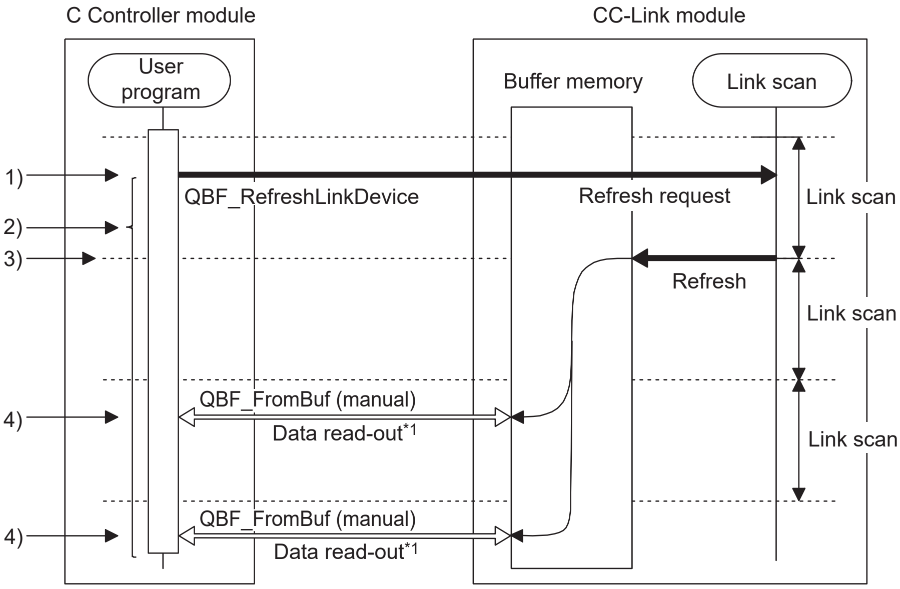
(b) Manual cyclic data refresh

1) Use the QBF_RefreshLinkDevice function to issue a refresh request.

2) The user program is continued.

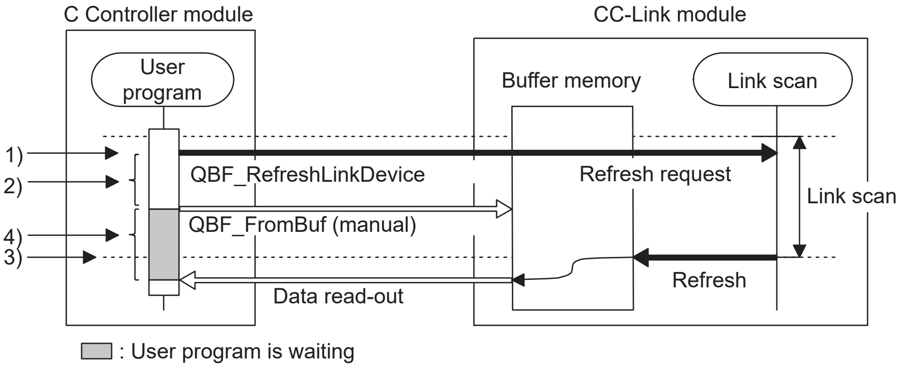
3) Data are refreshed by the request in 1).

4) Execute the QBF_FromBuf function with "manual" specified for "CC-Link refresh method" of the third argument (ulOffset).
Cyclic data (in the buffer memory) are read out.



*1: Read out data are the same refresh data.

- If execution of the QBF_FromBuf function is attempted before refreshing data by the QBF_RefreshLinkDevice function, user program processing is suspended until completion of the refresh. Upon completion of the refresh, cyclic data (in the buffer memory) are read out, and the user program processing resumes.



▨ : User program is waiting

Point

When any of the following operations is performed for the CC-Link module for which the block data assurance per station is enabled, cyclic data are automatically refreshed even if the QBF_RefleshLinkDevice function is not executed.

- Monitoring on Setting/monitoring tools for the C Controller module.
- Device reading from another user program (another task) with the QBF_FromBuf function (automatic refresh method) or a MELSEC data link function

Note that the write (send) area of the link refresh device (in the buffer memory) is not refreshed.
Also, cyclic data are not refreshed when monitoring is performed with another station's CC-Link module specified in Setting/monitoring tools for the C Controller module.

(5) Writing to buffer memory when using the block data assurance per station function

To enable the Block Data Assurance per Station and write data to the buffer memory, follow the following procedures.

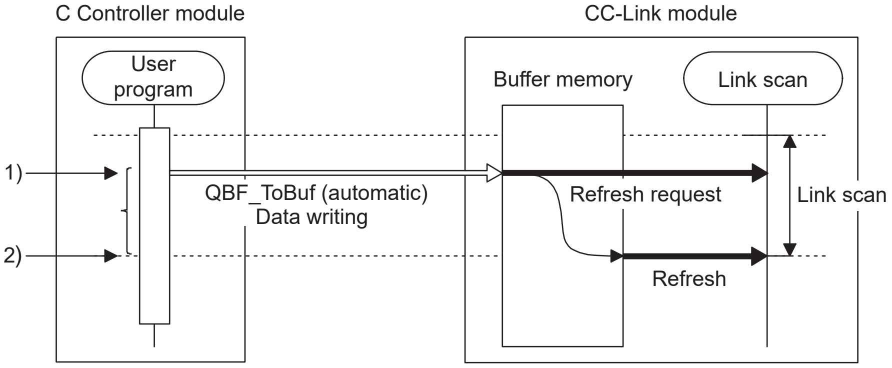
Method	Description	Reference
Automatic cyclic data refresh	Data are automatically written by just executing the QBF_ToBuf function in advance, and then they are automatically refreshed at the time of next link scan.	Page 241, (5)(a) in this section
Manual cyclic data refresh	Data are written with the QBF_ToBuf function, and then they are manually refreshed by executing the QBF_RefreshLinkDevice function.	Page 242, (5)(b) in this section

Point

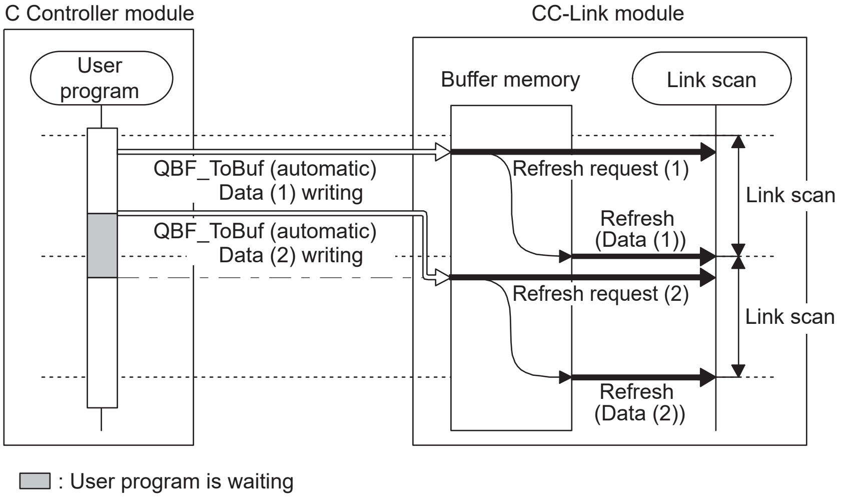
Use the manual cyclic data refresh method if user program processing is to be continued during the waiting time which will occur in the automatic cyclic data refresh.

(a) Automatic cyclic data refresh

1) Execute the QBF_ToBuf function with "automatic" specified for "CC-Link refresh method" of the third argument (ulOffset).
2) In the timing of the next link scan, data are refreshed.



- If execution of the QBF_ToBuf function is attempted before completion of the previous refresh, data writing is suspended until completion of the refresh.



Point

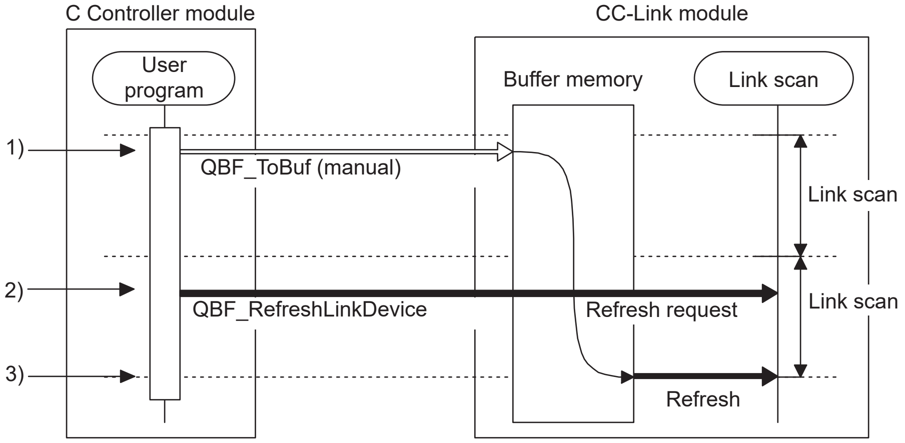
Up to a time of up to one link scan may be required for refreshing the written data after execution of the QBF_ToBuf function.

(b) Manual cyclic data refresh

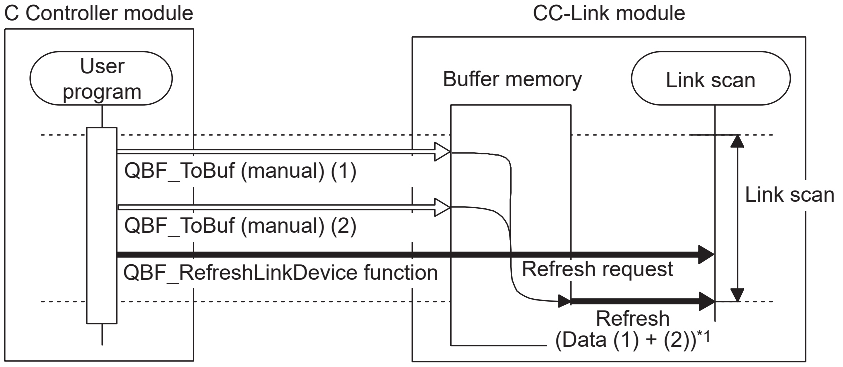
1) Execute the QBF_ToBuf function with "manual" specified for "CC-Link refresh method" of the third argument (ulOffset).

2) Use the QBF_RefreshLinkDevice function to issue a refresh request.

3) In the timing of the next link scan, refresh is performed.

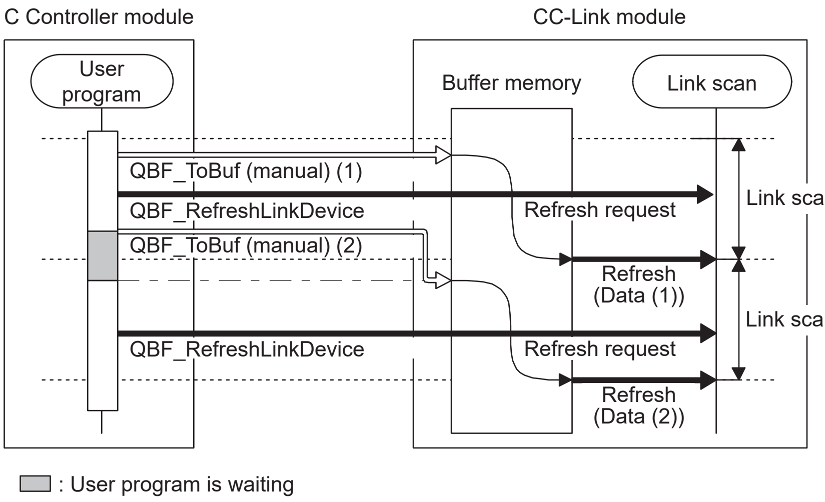


- If data are written to the same address area before execution of the QBF_RefreshLinkDevice function, the area will be overwritten with the data refreshed later.
  By writing the data to another address area, both of the data can be written.



*1: Data written to the same address will be overwritten by the buffer memory, so data written later will be refreshed.
If data are written to another address area, both written data sets will be refreshed.

- If data writing is attempted before completion of the refresh after execution of the QBF_RefreshLinkDevice function, the data will be not written until completion of the previous refresh.



Point

When any of the following operations is performed for the CC-Link module for which the block data assurance per station is enabled, cyclic data are automatically refreshed even if the QBF_RefleshLinkDevice function is not executed.

- Forced writing to the buffer memory on Setting/monitoring tools for the C Controller module.
- Device writing in Setting/monitoring tools for the C Controller module.
- Device writing from another user program (another task) with the QBF_ToBuf function (automatic refresh method) or a MELSEC data link function

Note that the read (receive) area of the link refresh device (in the buffer memory) is not refreshed.
Also, cyclic data are not refreshed when device writing is performed with another station's CC-Link module specified in Setting/monitoring tools for the C Controller module.

13.5 Processing Times

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

Described in this section is the cyclic transmission processing time associated with network module access.
For transient transmission processing time, refer to processing time for each function.
(☞ Page 471, Appendix 5)

13.5.1 Link refresh time

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

(1) For CC-Link IE Controller Network, MELSECNET/H

The following describes processing time in the CC-Link IE Controller Network and MELSECNET/H.
Link refresh time can be calculated by the following formula, with the points assigned to link devices.

Link refresh time [ms]
KM1 + KM2 × {(LB + LX + LY) / 16 + LW}

KM1, KM2: Constants

Network module location	CC-Link IE Controller Network		MELSECNET/H	
	KM1	KM2	KM1	KM2
Main base unit	1.0	0.36×10^{-3}	1.0	0.41×10^{-3}
Extension base unit	1.0	0.97×10^{-3}	1.0	0.97×10^{-3}

LB: Total points of link relay (LB) refreshed by the station[*1]

LX: Total points of link input (LX) refreshed by the station[*1]

LY: Total points of link output (LY) refreshed by the station[*1]

LW: Total points of link register (LW) refreshed by the station[*1]

[*1] : Total of link device points within the range set by refresh parameters and set in the network range assignment. (Excluding the points assigned to reserved stations)

(2) For CC-Link IE Field Network

The following describes processing time in the CC-Link IE Field Network.
Link refresh time can be calculated by the following formula, with the points assigned to link devices.

Link refresh time [ms]
KM1 + KM2 × {(RX + RY) / 16 + RWw + RWr}

KM1, KM2: Constants

Network module location	KM1	KM2
Main base unit	1.0	0.41×10^{-3}
Extension base unit	1.0	0.99×10^{-3}

RX: Total points of link input (RX) refreshed by the station[*1]

RY: Total points of link output (RY) refreshed by the station[*1]

RWw, RWr: Total points of link register (RWw, RWr) refreshed by the station[*1]

[*1] : Total of link device points within the range set by refresh parameters and set in the network range assignment. (Excluding the points assigned to reserved stations)

13.5.2 Delay time in cyclic transmission

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

(1) CC-Link IE Controller Network

The following shows the formulas to obtain cyclic transmission delay time in the CC-Link IE Controller Network.

Mode	Block data assurance per station	R_T vs. LS	Calculated value	Transmission delay time [ms]
Normal mode	None	(None)	Normal value	$P_T + LS \times 0.5 + P_R \times 0.5$
			Max. value	$P_T + LS + P_R$
	Valid	When $R_T > LS$	Normal value	$P_T \times 1.5 + LS \times 0.5 + P_R \times 0.5$
			Max. value	$P_T \times 2 + LS + P_R$
		When $R_T < LS$	Normal value	$P_T + LS + P_R \times 0.5$
			Max. value	$P_T + LS \times 2 + P_R$
Extended mode	None	When $R_T > LS$	Normal value	$P_T + LS \times 0.5 + P_R \times 0.5$
			Max. value	$P_T + LS + P_R$
		When $R_T < LS$	Normal value	$P_T + LS + P_R \times 0.5$
			Max. value	$P_T + LS \times 2 + P_R$
	Valid	When $R_T > LS$	Normal value	$P_T \times 1.5 + LS \times 0.5 + P_R \times 1.5$
			Max. value	$P_T \times 2 + LS + P_R \times 2$
		When $R_T < LS$	Normal value	$P_T + LS + P_R \times 1.5$
			Max. value	$P_T + LS \times 2 + P_R \times 2$

P_T: Sending side processing time = $R_T + \alpha_T$

P_R: Receiving side processing time = $R_R + \alpha_R$

R_T, R_R: Sending/receiving side refresh cycle (☞ Page 175, Section 11.7.3)

α_T, α_R: Sending/receiving side link refresh time[*1] (☞ Page 244, Section 13.5.1 (1))

LS: Link scan time[*2]

[*1] Total time for the number of mounted network modules.

[*2] For link scan time, refer to the following.
📖 MELSEC-Q CC-Link IE Controller Network Reference Manual

Remark

For multiple network system, transfer of link device(s) to another network by the relay station's CPU module by using the inter-link transfer function affects the transfer processing time of the relay station's CPU module. For details, refer to the following.
📖MELSEC-Q CC-Link IE Controller Network Reference Manual

If the sending module is a Q series programmable controller CPU, apply the following processing time of the sending programmable controller CPU to the transmission delay time formulas instead of the stated sending side processing time (P_T).

P_T: Sending side processing time = Q_T: Programmable controller CPU (sending side) processing time = $S_T + \alpha_T$

S_T: Sequence scan time of the programmable controller CPU (sending side) (link refresh time not included)[*1]

α_T: Link refresh time of the programmable controller CPU (sending side)[*1][*2]

[*1] For details, refer to the following.
📖MELSEC-Q CC-Link IE Controller Network Reference Manual

[*2] Total time for the number of mounted network modules.

Formulas to obtain the transmission delay time applicable when the receiving module is a Q series programmable controller CPU are listed below.

Mode	Block data assurance per station	R_T vs. LS	Calculated value	Transmission delay time [ms]
Normal mode	None	(None)	Normal value	P_T + LS × 0.5 + Q_R × 1.5
			Max. value	P_T + LS + Q_R × 2
	Valid	When R_T > LS	Normal value	P_T × 1.5 + LS × 0.5 + Q_R × 1.5
			Max. value	P_T × 2 + LS + Q_R × 2
		When R_T < LS	Normal value	P_T + LS + Q_R × 1.5
			Max. value	P_T + LS × 2 + Q_R × 2
Extended mode	None	When R_T > LS	Normal value	P_T + LS × 0.5 + Q_R × 1.5
			Max. value	P_T + LS + Q_R × 2
		When R_T < LS	Normal value	P_T + LS + Q_R × 1.5
			Max. value	P_T + LS × 2 + Q_R × 2
	Valid	When R_T > LS	Normal value	P_T × 1.5 + LS × 0.5 + Q_R × 2.5
			Max. value	P_T × 2 + LS + Q_R × 3
		When R_T < LS	Normal value	P_T + LS + Q_R × 2.5
			Max. value	P_T + LS × 2 + Q_R × 3

LS: Link scan time[*1]

P_T: Processing time of the C Controller module (sending side) = $R_T + \alpha_T$

R_T: Refresh time of the C Controller module (sending side) (☞ Page 175, Section 11.7.3)

α_T: Link refresh time of the C Controller module (sending side)[*2] (☞ Page 244, Section 13.5.1 (1))

Q_R: Programmable controller CPU (receiving side) processing time = $S_R + \alpha_R$

S_R: Sequence scan time of the programmable controller CPU (receiving side) (link refresh time not included)[*1]

α_R: Link refresh time of the programmable controller CPU (receiving side)[*1*2]

*1 : For details, refer to the following.
📖MELSEC-Q CC-Link IE Controller Network Reference Manual

*2 : Total time for the number of mounted network modules.

(2) MELSECNET/H

The following shows the formulas to obtain cyclic transmission delay time in the MELSECNET/H.

Mode	Block data assurance per station	R_T vs. LS	Calculated value	Transmission delay time [ms]
Normal mode	None	(None)	Normal value	P_T + LS × 0.5 + P_R × 0.5
			Max. value	P_T + LS + P_R
	Valid	When R_T > LS	Normal value	P_T × 1.5 + LS × 0.5 + P_R × 0.5
			Max. value	P_T × 2 + LS + P_R
		When R_T < LS	Normal value	P_T + LS + P_R × 0.5
			Max. value	P_T + LS × 2 + P_R

P_T: Sending side processing time = $R_T + \alpha_T$

P_R: Receiving side processing time = $R_R + \alpha_R$

R_T, R_R: Sending/receiving side refresh cycle (☞ Page 175, Section 11.7.3)

α_T, α_R: Sending/receiving side link refresh time[*1] (☞ Page 244, Section 13.5.1 (1))

LS: Link scan time[*2]

*1 : Total time for the number of mounted network modules.

*2 : For link scan time, refer to the following.
📖Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

Remark

For multiple network system, transfer of link device(s) to another network by the relay station's CPU module by using the inter-link transfer function affects the transfer processing time of the relay station's CPU module. For details, refer to the following.
Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

If the sending module is a Q series programmable controller CPU, apply the following processing time of the sending programmable controller CPU to the transmission delay time formulas instead of the stated sending side processing time (P_T).

P_T: Sending side processing time = Q_T: Programmable controller CPU (sending side) processing time = $S_T + \alpha_T$

S_T: Sequence scan time of the programmable controller CPU (sending side) (link refresh time not included)*1

α_T: Link refresh time of the programmable controller CPU (sending side)*1*2

*1 : For details, refer to the manual for respective network modules.
Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

*2 : Total time for the number of mounted network modules.

Formulas to obtain the transmission delay time applicable when the receiving module is a Q series programmable controller CPU are listed below.

Mode	Block data assurance per station	R_T vs. LS	Calculated value	Transmission delay time [ms]		
Normal mode	None	(None)	Normal value	P_T	+ LS × 0.5	+ Q_R × 1.5
			Max. value	P_T	+ LS	+ Q_R × 2
	Valid	When R_T > LS	Normal value	P_T × 1.5	+ LS × 0.5	+ Q_R × 1.5
			Max. value	P_T × 2	+ LS	+ Q_R × 2
		When R_T < LS	Normal value	P_T	+ LS	+ Q_R × 1.5
			Max. value	P_T	+ LS × 2	+ Q_R × 2

LS: Link scan time*1

P_T: Processing time of the C Controller module (sending side) = $R_T + \alpha_T$

R_T: Refresh time of the C Controller module (sending side) (☞ Page 175, Section 11.7.3)

α_T: Link refresh time of the C Controller module (sending side)*2 (☞ Page 244, Section 13.5.1 (1))

Q_R: Programmable controller CPU (receiving side) processing time = $S_R + \alpha_R$

S_R: Sequence scan time of the programmable controller CPU (receiving side) (link refresh time not included)*1

α_R: Link refresh time of the programmable controller CPU (receiving side)*1*2

*1 : For details, refer to the following.
Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

*2 : Total time for the number of mounted network modules.

(3) Transmission delay time on CC-Link IE Field Network

For formulas to obtain cyclic transmission delay time in the CC-Link IE Field Network, refer to the following.
MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual
At that time, use the following processing time instead of "SM: Master station sequence scan time" and "SL: Local station sequence scan time":
SM, SL = P = R + α

P: Processing time of C controller system

R: Link refresh cycle (☞ Page 175, Section 11.7.3)

α: Link refresh time (☞ Page 244, Section 13.5.1 (2))

If direct access or buffer memory access are used, it takes no refresh time.
For function processing time, refer to the following.
☞ Page 471, Appendix 5

(4) Transmission delay time on CC-Link

For formulas to obtain cyclic transmission delay time in the CC-Link, refer to the following.
MELSEC-Q CC-Link System Master/Local Module User's Manual
At that time, use the following processing time for buffer memory access functions instead of "SM: Master station sequence scan time" and "SL: Local station sequence scan time".
For function processing time, refer to the following.
☞ Page 471, Appendix 5

(5) Transmission delay time calculation example

The following shows a calculation example for cyclic transmission delay time in a single network system.

The following indicates the system configuration and conditions.

Item		Description
CPU on sending and receiving station		C Controller module
Total number of stations per network		2 (Control station: 1, Normal station: 1)
Total link device points	LB/LW	1024 points
	LX/LY	0 points
	SB/SW	0 points
Refresh cycle		100ms
Transient transmission		None
Block data assurance per station		Enabled (Block data assurance per station)
CC-Link IE controller network module		Installed to Slot 0 of main base unit
Faulty station		None

(a) Link refresh time (α_T, α_R)

The formula is indicated below.

Link refresh time
α_T, α_R = KM1 + KM2 × {(LB + LX + LY) / 16 + LW}

Variable values are as follows:

KM1: Constants = 1.0

KM2: Constants = 0.36×10^{-3}

LB, LW: Total number of points of link devices (LB and LW) = 1024

LX, LY: Total number of points of link devices (LX and LY) = 0

Assignment of variables in formulas are as follows:

$$\alpha_T, \alpha_R = 1.0 + 0.36 \times 10^{-3} \times \{(1024 + 0 + 0) / 16 + 1024\}$$
$$\fallingdotseq 1.39(\text{ms})$$

(b) Transmission delay time

Formulas in case LT is larger than LS with Block Data Assurance per Station enabled are indicated below.

Calculated value	Transmission delay time
Normal value	$P_T \times 1.5$ + LS × 0.5 + $P_R \times 0.5$
Max. value	$P_T \times 2$ + LS + P_R

Variable values are as follows:

P_T: Sending side processing time = $R_T + \alpha_T$

P_R: Receiving side processing time = $R_R + \alpha_R$

R_T, R_R: Refresh cycle = 100(ms)

α_T, α_R: Link refresh time ≒ 1.39(ms)

LS: Link scan time ≒ 1.25(ms)[*1]

Assignment of variables in formulas are as follows:

Normal value = {(100 + 1.39) × 1.5} + (1.25 × 0.5) + {(100 + 1.39) × 0.5} = 203.405(ms)

Max. value = {(100 + 1.39) × 2} + 1.25 + (100 + 1.39) = 305.420(ms)

[*1] For link scan time, refer to the following.
📖MELSEC-Q CC-Link IE Controller Network Reference Manual

13.5.3 Reducing the link refresh time

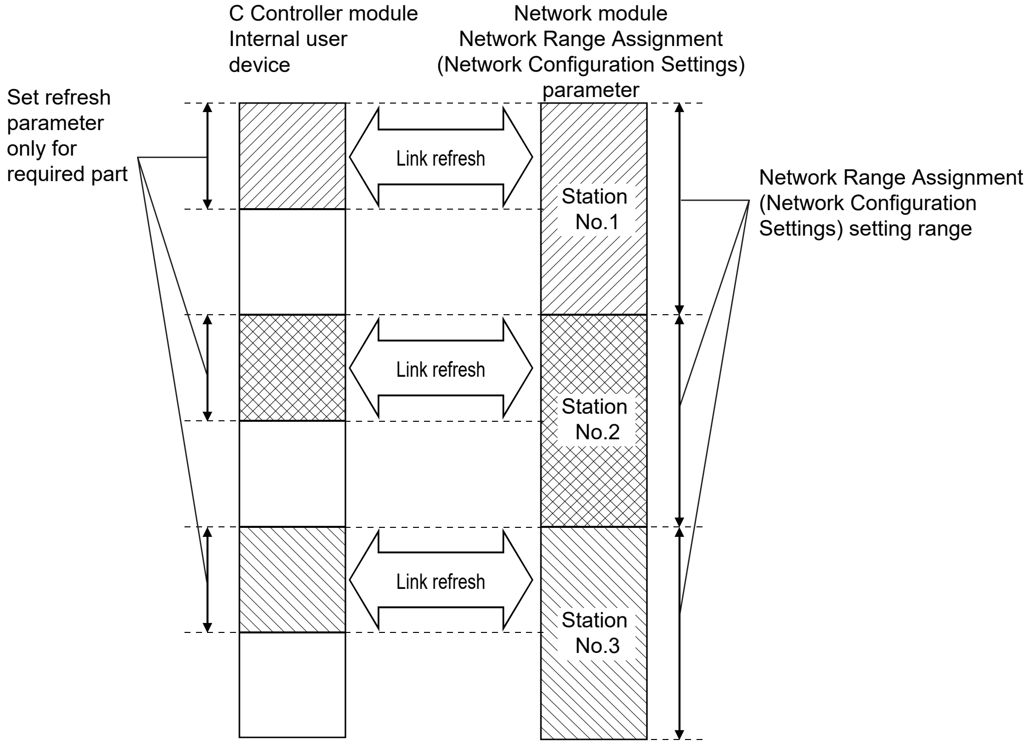
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

The link refresh time can be reduced by decreasing the number of refresh points for the C Controller module. To decrease the refresh points, modify the refresh and network range assignment (network configuration settings) parameter settings and use the direct access method for accessing link devices.

(1) Reducing the number of refresh points

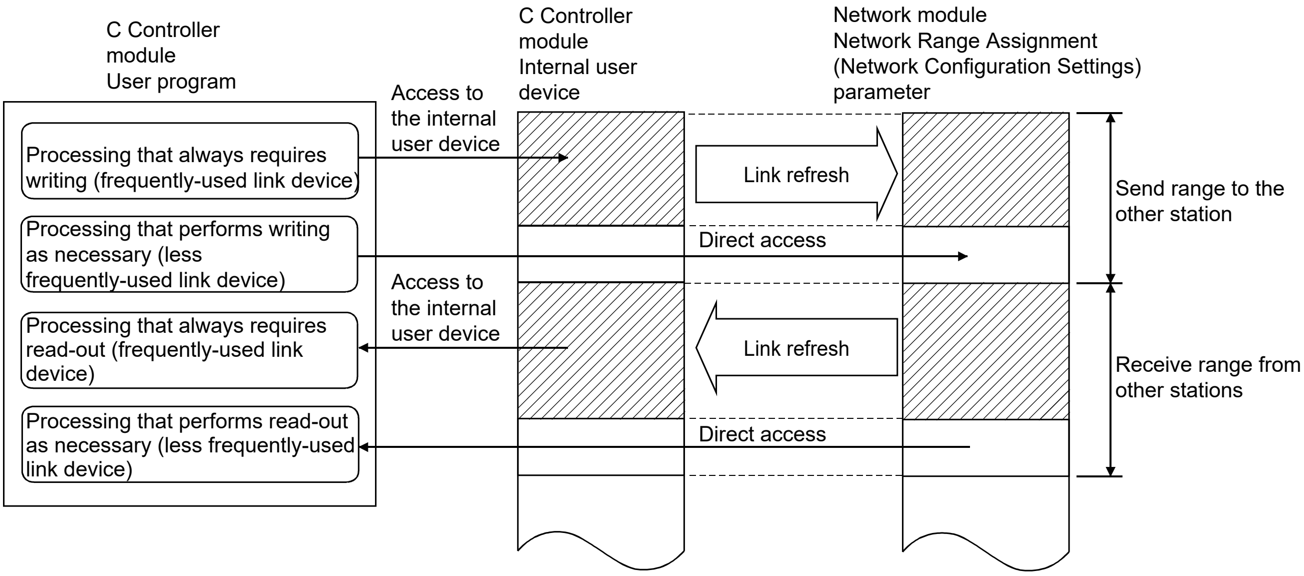
(a) Refresh parameters

Set the range required to be refreshed in the refresh parameters.
Link refresh time can be reduced by limiting refresh range to necessary parts only.



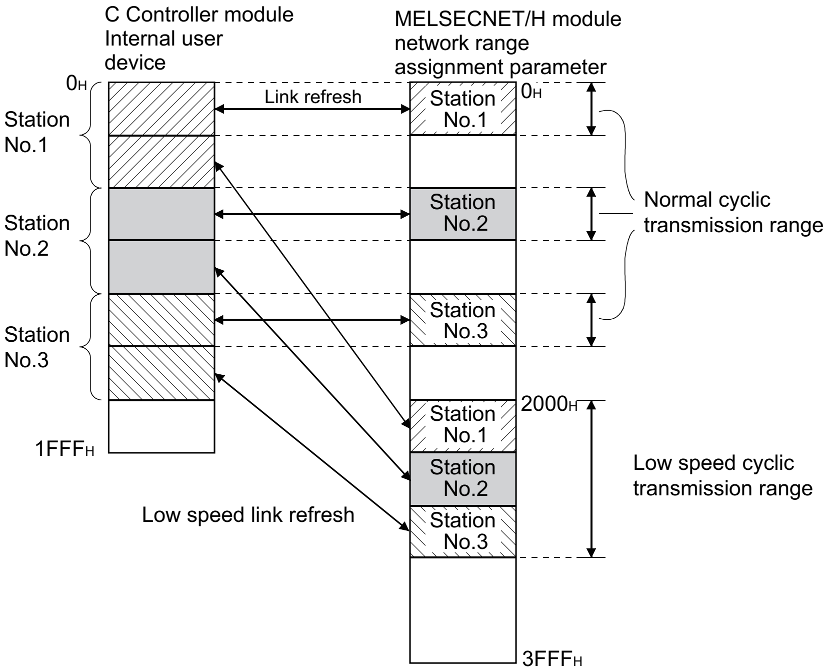
(b) Direct access/buffer memory access

Link refresh time can be reduced by excluding infrequently used link devices in the host station from the link refresh range by means of direct access or buffer memory access.


C Controller module User program
Processing that always requires writing (frequently-used link device)
Processing that performs writing as necessary (less frequently-used link device)
Processing that always requires read-out (frequently-used link device)
Processing that performs read-out as necessary (less frequently-used link device)
Access to the internal user device
Access to the internal user device
C Controller module Internal user device
Network module Network Range Assignment (Network Configuration Settings) parameter
Link refresh
Direct access
Link refresh
Direct access
Send range to the other station
Receive range from other stations

(2) Reducing the link scan time

For MELSECNET/H, link refresh and link scan data (LB/LW) can be reduced by assigning data not required to be high-speed during normal cyclic transmission (LB/LW) to the extension area (2000H to 3FFFH) and performing low-speed cyclic transmission.



CHAPTER 14 FUNCTIONS USED BY MULTIPLE CPU SYSTEM

This chapter describes control/access functions of the C Controller module and programmable controller CPU/Motion CPU in the multiple CPU system.

Remark

For details of each function, install Setting/monitoring tools for the C Controller module and refer to the [C Controller module function help].

14.1 Data Communications Using CPU Shared Memory

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Data communication using the CPU shared memory can be used between the C Controller module and the CPU modules by creating a user program with the bus interface function. **Note14.1**

Remark

Shared CPU memory can be used only in the multiple CPU configuration.

(1) Data communication methods using the CPU shared memory

There are the following three kinds of the communication methods.

- Using the auto refresh. (☞ Page 256, Section 14.1.2)
- Using the multiple CPU high speed transmission area. (☞ Page 261, Section 14.1.3)
- Not using the auto refresh. (☞ Page 266, Section 14.1.4)

Note14.1 Q24DHCCPU-LS Q26DHCCPU-LS

When using Q24DHCCPU-LS and Q26DHCCPU-LS, the CPU shared memory can be accessed by the data refresh function.

(2) Selection of a data communication method

Select a data communication method of the CPU shared memory from the target CPU module.

The following table lists the availability for each type.

Target CPU module	Data communication methods using the CPU shared memory		
	Using the auto refresh	Using the multiple CPU high speed transmission area	Not using the auto refresh
Programmable controller CPU	○	○[*1]	○
Motion CPU (Q172DCPU(-S1), Q173DCPU(-S1), Q172DSCPU,Q173DSCPU)	×	○	○
C Controller module (Q24DHCCPU-V, Q24DHCCPU-VG, Q12DCCPU-V (Basic mode) Q12DCCPU-V (Extended mode), Q06CCPU-V)	×	○[*2]	○

*1 : Universal Model QCPU excluding Q00UCPU, Q01UCPU, and Q02UCPU only.

*2 : Except the Q06CCPU-V.

(3) Functions

The following shows the functions used for reading from/writing to the CPU shared memory.

Function name	Function
QBF_ToBuf[*1]	Writes data to the CPU shared memory of the specified module and the buffer memory of the intelligent function module (To instruction).
QBF_FromBuf[*2]	Reads data from the CPU shared memory of the specified module and the buffer memory of the intelligent function module (From instruction).

*1 : MELSEC data link function (mdSendEx function) is also available.

*2 : MELSEC data link function (mdReceiveEx function) is also available.

14.1.1 CPU shared memory structure

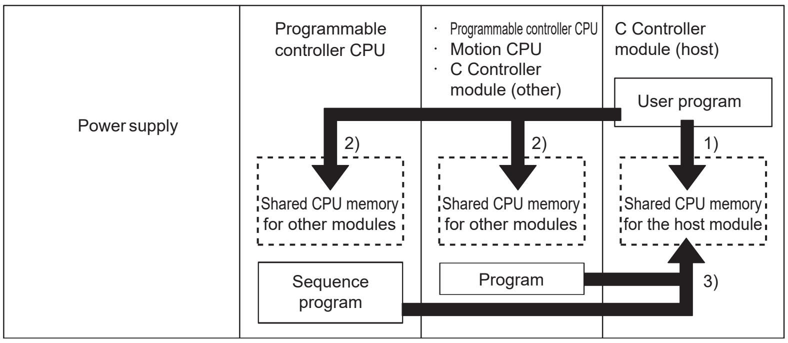
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

Configuration of CPU shared memory for the C Controller module is described below:

Area name		Description
QCPU standard area	Host CPU operation information area	Error details or operation status of the host CPU (C Controller module) are stored in this area. (☞ Page 254, (2) in this section)
	System area	This area is used by the system.
	Auto refresh area	This area data are automatically refreshed into devices of the programmable controller CPU or Motion CPU, based on the auto refresh settings. The area size varies depending on the parameter settings.
	User setting area	This area are not refreshed automatically. The area size varies depending on the parameter settings for the Auto refresh area.
Multiple CPU high speed transmission area		This area is used for the multiple CPU high speed transmission. (☞ Page 262, Section 14.1.3 (2)) The auto refresh area or user setting area can be set with a parameter.

(1) Accessibility

Accessibility of the CPU shared memory is illustrated below.


Power supply
Programmable controller CPU
· Programmable controller CPU
· Motion CPU
· C Controller module (other)
C Controller module (host)
User program
2)
2)
1)
Shared CPU memory for other modules
Shared CPU memory for other modules
Shared CPU memory for the host module
Sequence program
Program
3)

1) Access to host CPU
2) Access to another CPU
3) Access to host CPU

CPU shared memory area address*1	Area name		Access from host CPU				Access from another CPU*2	
			1) Access to host CPU		2) Access to another CPU		3) Access to host CPU	
			Write	Read	Write	Read	Write	Read

0H(0H)
to
1FFH(5FH)
	QCPU standard area	Host CPU operation information area	×	○	×	○	×	○

200H(60H)
to
7FFH(BFH)
		System area	×	×	×	○	×	○

800H(C0H)
to
FFFH(1FFH)
		Auto refresh area	○	○	×	○	×	○

		User setting area	○	○	×	○	×	○
1000H to 270FH	Use prohibited*3		×	×	×	×	×	×
2710H to 5F0FH	Multiple CPU high speed transmission area*3		○	○	×	○	×	○

*1 : When CPU No.1 is a Basic model QCPU, addresses of the CPU shared memory are as shown in parentheses.

*2 : For information on how to access from another CPU (programmable controller CPU or Motion CPU), refer to the manual for each CPU module.

*3 : Q00UCPU, Q01UCPU, and Q02UCPU have no unavailable area or multiple CPU high speed transmission area.

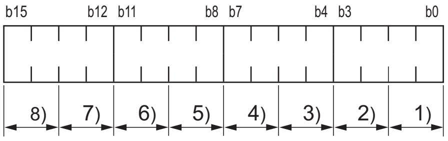
(2) Host CPU operation information areas

Contents of the host CPU operation information areas are described in the table below.

Shared memory address	Name	Description	Details
0H	Information presence	Information flag	The area is provided for checking if information is stored in the host CPU's operation information area (1H to 1FH) or not. 0: No information, 1: Information exists.
1H	Diagnostic error	Diagnostic error number	The error number that occurred in diagnostics is stored as a BIN code in this area.*1
2H	Date and time of diagnostic error	Date and time of diagnostic error	The year and month when the error number is stored in the CPU shared memory address 1H is stored as a 2-digit BCD code in this area.*1
3H			The date and time when the error number is stored in the CPU shared memory address 1H is stored as a 2-digit BCD code in this area.*1
4H			The minute and second when the error number is stored in the CPU shared memory address 1H is stored as a 2-digit BCD code in this area.*1
5H	Error information identification code	Error information identification code	The identification codes used to determine what error information stored in the common error information and individual error information are stored in this area.*1
6H to 10H	Common error information	Common error information	The common information of the error number that occurred in diagnostics is stored in this area.*1
11H to 1BH	Individual error information	Individual error information	The individual information of the error number that occurred in diagnostics is stored in this area.*1
1CH	Empty	–	Not used
1DH	Switch status	C Controller module switch status	The C Controller module switch status is stored in this area. 0: RUN, 1: STOP
1EH	LED status	C Controller module LED status	The bit pattern of the C Controller module's LEDs is stored in this area. The same data can be acquired by the C Controller module dedicated function (CCPU_GetLEDStatus). For details of the LED status, refer to the following. ☞ Page 255, (2)(a) in this section
1FH	C Controller module operation status	C Controller module operation status	The operation status of the C Controller module is stored in this area. The same data can be acquired by the C Controller module dedicated function (CCPU_GetCpuStatus). For details of the operation status, refer to the following. ☞ Page 255, (2)(b) in this section

*1 : If no error is detected, 0 is stored.

(a) LED status

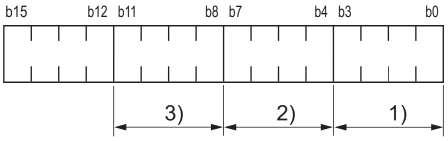


No.	Corresponding information	Status
1)	"RUN" LED	0 : Off, 1 : On, 2 : Flashing(slow), 3 : Flashing(fast)
2)	"ERR." LED	
3)	"USER" LED	
4)	"SD CARD" LED	
	"CF CARD" LED	
5)	"USB1" LED	
6)	"U RDY" LED	
7)	"USER" LED color[*1]	0 : Red, 1 : Green, 2 : Orange, 3 : Not used
8)[*2]	"MODE" LED	0 : Off, 1 : Lit green, 2 : Lit orange, 3 : Flashing

[*1] : Valid only when USER LED is on/flashing

[*2] : Flashed orange is not stored.

(b) Operation status



No.	Corresponding information	Status
1)	C Controller module operation status	0 : RUN, 1: Reserved, 2 : STOP, 3 : PAUSE,
2)	STOP/PAUSE factor (in chronological order)	0 : RUN/STOP/MODE switch 1 : Reserved 2 : Reserved 3 : Execution of bus interface function (QBF_ControlEx) from the user program 4 : Error 5 : Remote operation
3)	Mode	0 : Basic mode 1 : Extended mode

14.1.2 Data communications using auto refresh

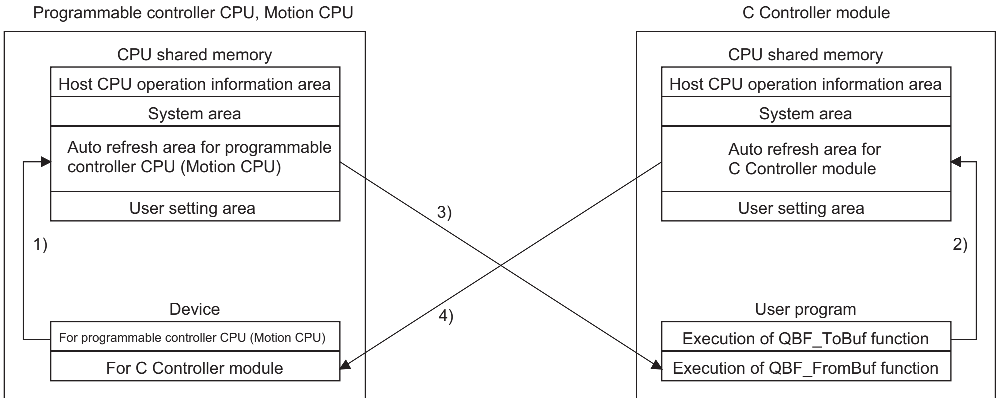
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This is a communication method that uses the auto refresh area in the CPU shared memory.

This section described processing in this communication method, and setting methods.

(1) Processing overview

The following shows the processing of data communication when using auto refresh.



Programmable controller CPU, Motion CPU
CPU shared memory
Host CPU operation information area
System area
Auto refresh area for programmable controller CPU (Motion CPU)
User setting area
1)
Device
For programmable controller CPU (Motion CPU)
For C Controller module
3)
4)
C Controller module
CPU shared memory
Host CPU operation information area
System area
Auto refresh area for C Controller module
User setting area
2)
User program
Execution of QBF_ToBuf function
Execution of QBF_FromBuf function

Processing	In END processing of programmable controller CPU or Motion CPU	At bus interface function execution of C Controller module
1)	Data in the device for programmable controller CPU (or Motion CPU) are transferred to the auto refresh area in the CPU shared memory.	–
2)	–	Execution of the bus interface function (QBF_ToBuf) transfers user program settings to the auto refresh area in the C Controller module's CPU shared memory.
3)	–	Execution of the bus interface function (QBF_FromBuf) transfers the auto refresh area data of the programmable controller CPU (or Motion CPU) to the user program.
4)	Auto refresh area data in the C Controller module are transferred to the device for C Controller module in the programmable controller CPU (or Motion CPU).	–

Point

Auto refresh cannot be used for communication between a C Controller module and Motion CPU(Q172DCPU(-S1), Q173DCPU(-S1),Q172DSCPU,Q173DSCPU).

Use the auto refresh function in the multiple CPU high speed transmission area.

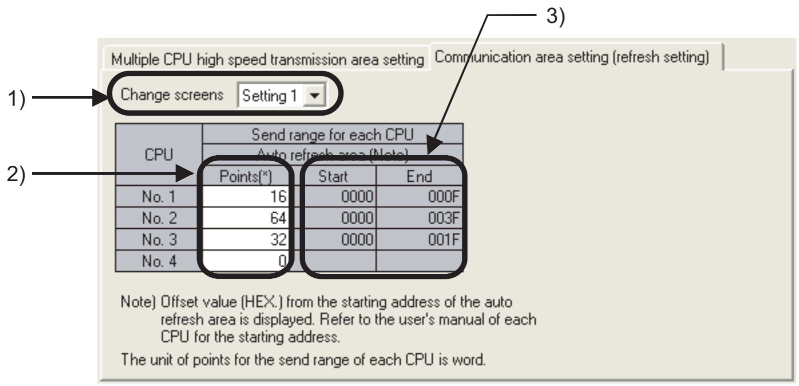
☞ Page 261, Section 14.1.3

(2) Setting

To establish data communication by using auto refresh, use the following functions in Setting/monitoring tools for the C Controller module to configure settings.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> ⇒ <<Communication Area Setting (Refresh Setting)>>**

The following shows various setting items in <<Communication Area Setting (Refresh Setting)>>.



Multiple CPU high speed transmission area setting | Communication area setting (refresh setting)

Change screens: Setting 1

CPU	Send range for each CPU		
	Auto refresh area (Note)		
	Points(*)	Start	End
No. 1	16	0000	000F
No. 2	64	0000	003F
No. 3	32	0000	001F
No. 4	0		

Note) Offset value (HEX.) from the starting address of the auto refresh area is displayed. Refer to the user's manual of each CPU for the starting address.

The unit of points for the send range of each CPU is word.

No.	Item	Setting
1)	Change screens	4 ranges for <<Communication Area Setting (Refresh Setting)>> can be set by "Change screens".
2)	Points	Set auto refresh area points for each CPU module in units of two points (two words). Up to total 2048 points (2K words)[*1] can be set for four ranges (Setting 1 to 4) per CPU module, and up to total 8192 points (8K words)[*2] for all CPUs in a multiple CPU system. For a CPU module that does not use the auto refresh, enter "0" in the "Points" field.[*3]
3)	Start/End	When the "Points" field is set, an offset value (HEX) from the first address of the Auto Refresh Area is displayed. For the first address of the Auto Refresh Area, refer to the manual for respective CPUs.

[*1] : For a Basic model QCPU, up to total 320 points (320 words) can be set for four ranges (Setting 1 to 4) per CPU module.

[*2] : When CPU No.1 is a Basic model QCPU, up to 4416 points (4416 words) can be set for all CPUs in a multiple CPU system.

[*3] : For CPU modules without that number assignment also, enter "0" in the "Points" field.

Point

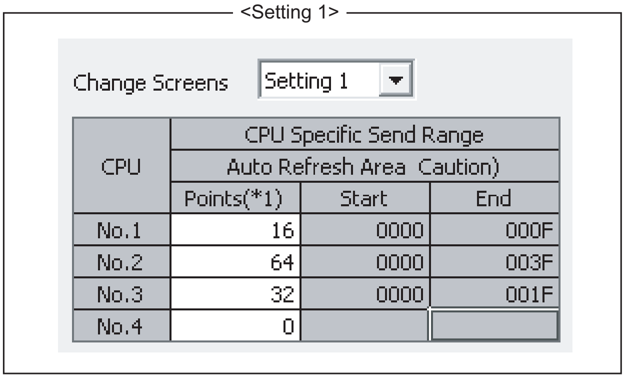
The auto refresh area setting must be identical for all CPUs in the multiple CPU system.
If any difference is identified in their settings, a parameter error will occur.

Remark

For the auto refresh area setting for a programmable controller CPU or Motion CPU, refer to the manual for each CPU module.

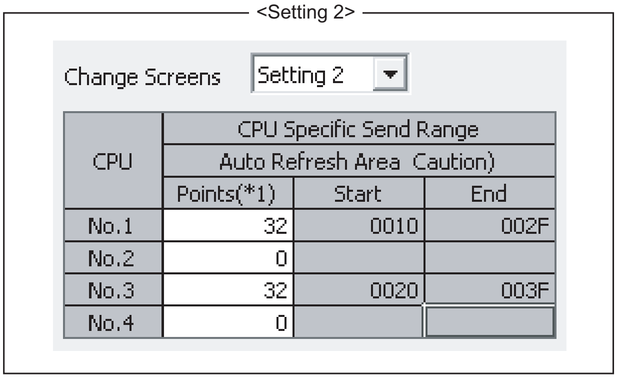
(3) Setting example

A setting example where a high performance model QCPU and a C Controller module are used for No.1 and No.4, respectively, and no auto refresh is used is shown below.


<Setting 1>

Change Screens: Setting 1

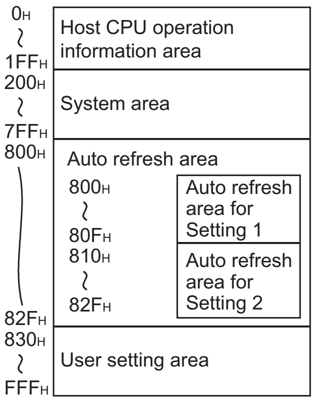
CPU	CPU Specific Send Range Auto Refresh Area Caution)		
	Points(*1)	Start	End
No.1	16	0000	000F
No.2	64	0000	003F
No.3	32	0000	001F
No.4	0		


<Setting 2>

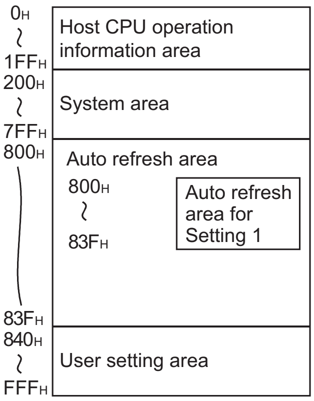
Change Screens: Setting 2

CPU	CPU Specific Send Range Auto Refresh Area Caution)		
	Points(*1)	Start	End
No.1	32	0010	002F
No.2	0		
No.3	32	0020	003F
No.4	0		

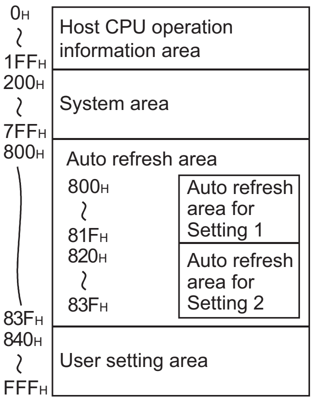
<CPU shared memory of CPU No. 1>


0H
1FFH
Host CPU operation information area
200H
7FFH
System area
800H
Auto refresh area
800H
80FH
Auto refresh area for Setting 1
810H
82FH
Auto refresh area for Setting 2
82FH
830H
FFFH
User setting area

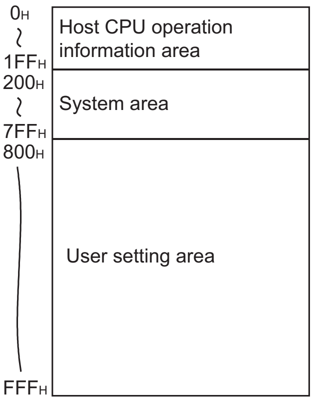
<CPU shared memory of CPU No. 2>



<CPU shared memory of CPU No. 3>


0H
1FFH
Host CPU operation information area
200H
7FFH
System area
800H
Auto refresh area
800H
81FH
Auto refresh area for Setting 1
820H
83FH
Auto refresh area for Setting 2
83FH
840H
FFFH
User setting area

<CPU shared memory of CPU No. 4>



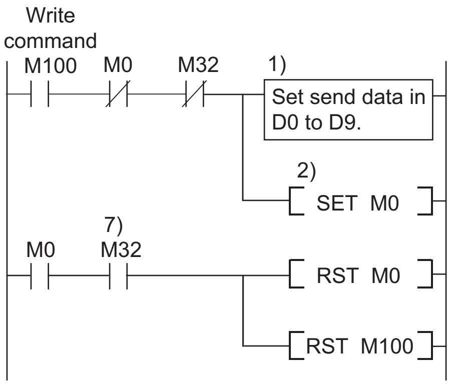
(4) Precautions

Depending on the timing of writing data to the host CPU's auto refresh area or reading data from another CPU, old and new data may be mixed in the area for each CPU.
Therefore, configure an interlock program for auto refresh so that data of another CPU will not be used when old and new data are mixed.

The following parameter settings show an example program to perform interlock in data transmission from No.1 module (programmable controller CPU) to No.2 module (C Controller module).

Auto refresh setting for CPU No.1							Direction	Auto refresh setting for CPU No.2				
CPU No.	Setting No.	CPU specific send range			CPU side device			CPU No.	Setting No.	CPU specific send range		
		Points	Start	End	Start	End				Points	Start	End
No.1	Setting 1	2	0	1	M0[*1]	M31	→	No.1	Setting 1	2	0	1
	Setting 2	10	2	11	D0	D9			Setting 2	10	2	11
No.2	Setting 1	2	0	1	M32[*2]	M63	←	No.2	Setting 1	2	0	1

*1 : M0 as an interlock device (Data set completion bit) of CPU No.1.
*2 : M32 as an interlock device (Data processing completion bit) of CPU No.2.

Sending side program(CPU No.1)	Processing flow (The numbers from 1) through 9) represent the execution sequence.)
	1) Transmission data are stored in D0-D9. 2) The data set complete bit (M0) is turned ON. END processing by the No.1 module writes the above data into the auto refresh area in the No.1 transmission area of the host station. Data in the auto refresh area in the No.1 transmission area are transmitted to the No.2 module. 7) END processing reads the data from the auto refresh area in the No.1 module's No.2 transmission area into the specified device. Data processing complete bit (M32) ON is detected. The data set complete bit (M0) is turned OFF.

Receiving side program(CPU No.2)

Processing flow (The numbers from 1) through 9) represent the execution sequence.)

```
{
                     :
  unsigned short   usBuf;              /* Data storage destination */
  unsigned short   pusData[128];       /* Data storage destination */
                     :
/******************************************************************************/
/* Confirm that 1 is set in the area corresponding to M0 in the CPU area No.1 auto refresh */
/* (CPU No.1 data set completion bit turns ON.) */
/******************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 0x800, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x1 ) break; /* Exit the loop when 1 is set */
        taskDelay(2);
    }
/******************************************************************************/
/* Data are read from the area corresponding to D0 to D9 in the CPU No.1 auto refresh area. */
/******************************************************************************/
    sRet = QBF_FromBuf(lPath, 0x3E0, 0x802, 10, pusData, 128);
    if( sRet != 0) return(sRet);
/******************************************************************************/
/* 1 is set in the host CPU's auto refresh area corresponding to M32 of CPU No.1. */
/* (CPU No.2 data processing completion bit turns ON.) */
/******************************************************************************/
    usBuf = 1;
    sRet = QBF_ToBuf(lPath, 0x3E1, 0x800, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
/******************************************************************************/
/* Confirm that 0 is set in the area corresponding to M0 in the CPU No.1 auto refresh area */
/* (CPU No.1 data set completion bit turns OFF.) */
/******************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 0x800, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x0 ) break; /* Exit the loop when 0 is set */
        taskDelay(2);
    }
/******************************************************************************/
/* 0 is set in the host CPU's auto refresh area corresponding to M32 of CPU No.1. */
/* (CPU No.2 data processing completion bit turns OFF.) */
/******************************************************************************/
usBuf = 0;
    sRet = QBF_ToBuf(lPath, 0x3E1, 0x800, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
}
```

3) Data are read out from the No.1 module's auto refresh area into the internal buffer.

4) The No.2 module detects the data set complete bit (M0) ON.

5) Received data processing is performed.

6) The received data processing complete bit (area refreshed to No.1 module's M32) is turned ON.

8) The No.1 module's data set complete bit (M0) OFF is confirmed.

9) The received data processing complete bit (area refreshed to No.1 module's M32) is turned OFF.

14.1.3 Communication using the multiple CPU high speed transmission area and auto refresh

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

This is a communication method that uses the auto refresh area in the multiple CPU high speed transmission area in the CPU shared memory.

Refresh is performed at certain intervals (multiple CPU high speed transmission cycle = 0.88ms).

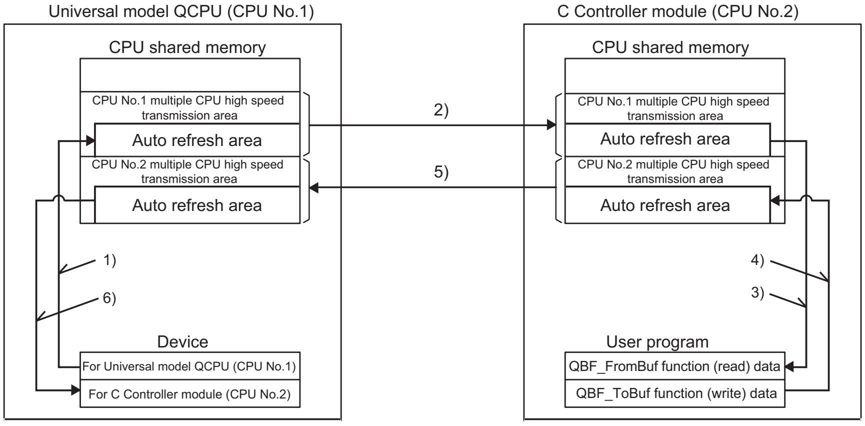
Point

Communication by the multiple CPU high speed transmission area is allowed when the following conditions are all satisfied.

- A multiple CPU high speed main base unit (Q3□DB) is used.
- Any of universal model QCPUs (except for Q00UCPU, Q01UCPU, and Q02UCPU) and C Controller modules (Q24DHCCPU-V, Q24DHCCPU-VG, Q12DCCPU-V (Basic mode), or Q12DCCPU-V (Extended mode)) is No.1.
- Any two of universal model QCPUs (except for Q00UCPU, Q01UCPU, and Q02UCPU), C Controller modules (Q24DHCCPU-V, Q24DHCCPU-VG, Q12DCCPU-V (Basic mode), or Q12DCCPU-V (Extended mode)), or Motion CPUs (Q172DCPU (-S1), Q173DCPU (-S1), Q172DSCPU, or Q173DSCPU) are used.

(1) Processing overview

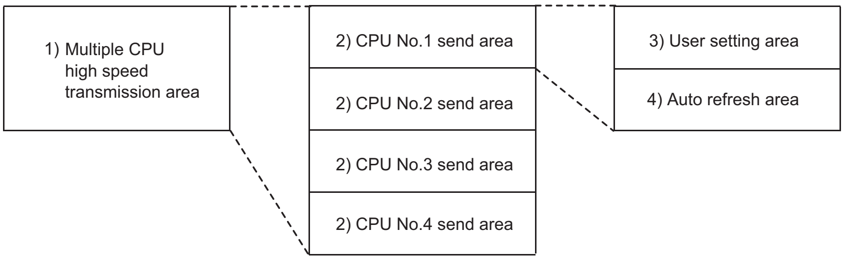
Operations outline of auto refresh in a configuration in which an universal model QCPU and a C Controller module are used as No.1 and No.2 modules, respectively is illustrated below.


Universal model QCPU (CPU No.1)
CPU shared memory
CPU No.1 multiple CPU high speed transmission area
Auto refresh area
CPU No.2 multiple CPU high speed transmission area
Auto refresh area
1)
6)
Device
For Universal model QCPU (CPU No.1)
For C Controller module (CPU No.2)
2)
5)
C Controller module (CPU No.2)
CPU shared memory
CPU No.1 multiple CPU high speed transmission area
Auto refresh area
CPU No.2 multiple CPU high speed transmission area
Auto refresh area
4)
3)
User program
QBF_FromBuf function (read) data
QBF_ToBuf function (write) data

Processing	Processing in universal model QCPU (No.1)	Processing in C Controller module (No.2)
1)	In END processing by the No.1 module, device data of the No.1 module are transferred to the auto refresh area of the host station.	–
2)	The multiple CPU high speed transmission area data in the No.1 module are transmitted to the No.2 module.	–
3)	–	The No.2 module's user program reads the received data by executing the bus interface function (QBF_FromBuf).
4)	–	The No.2 module's user program write data into the auto refresh data area by executing the bus interface function (QBF_ToBuf).
5)	–	The multiple CPU high speed transmission area data in the No.2 module are transferred to the No.1 module.
6)	In END processing by the No.1 module, the received data are transferred to the No.2 module's device data.	–

(2) Memory structure

The following illustrates memory configuration in the multiple CPU high speed transmission area.



No.	Name	Description	Size	
			Setting range	Setting unit
1)	Multiple CPU high speed transmission area	• The area for data communications between CPU modules in a multiple CPU system.	0 to 14K words	1K word
2)	CPU No.n send area	• The area where send data of each CPU module are stored. • Data stored in the host CPU's send area are sent to another CPU. • Data received from another CPU are stored in the send area for another CPU.	0 to 14K words	1K word
3)	User setting area	• The area for transmission/reception of data to/from other CPUs by reading/writing by the user program without using auto refresh.	–[*1]	–
4)	Auto refresh area	• The area for communicating device data with other CPUs using auto refresh. • Auto refresh area is assigned from behind the No.n module transmission area.	0 to 14K words	2 word

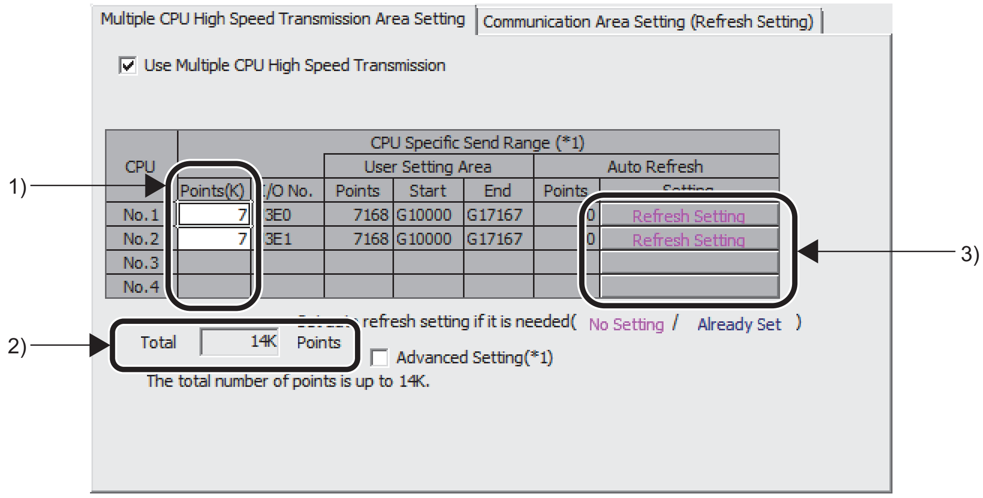
[*1] : A value obtained by subtracting the number of points set in the auto refresh area from the No.n module's automatic transmission area size.

(3) Setting method

To establish data communication by using auto refresh are in the multiple CPU high speed transmission area, use the following functions in Setting/monitoring tools for the C Controller module to configure settings.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> ⇒ <<Multiple CPU High Speed Transmission Area Setting>>**

The following shows various setting items in <<Multiple CPU High Speed Transmission Area Setting>>.



Multiple CPU High Speed Transmission Area Setting | Communication Area Setting (Refresh Setting)

☑ Use Multiple CPU High Speed Transmission

CPU	CPU Specific Send Range (*1)						
			User Setting Area			Auto Refresh	
	Points(K)	I/O No.	Points	Start	End	Points	Setting
No.1	7	3E0	7168	G10000	G17167	0	Refresh Setting
No.2	7	3E1	7168	G10000	G17167	0	Refresh Setting
No.3							
No.4							

refresh setting if it is needed(No Setting / Already Set)

Total 14K Points

□ Advanced Setting(*1)

The total number of points is up to 14K.

No.	Item	Setting
1)	Points	Sets the number of transmission area points for each CPU (the sum of "User Setting Area" and "Auto Refresh Area").
2)	Total	Displays the total number of points in the CPU specific send range*1
3)	Refresh setting	Sets the number of points in data to be auto-refreshed.

*1 : A value obtained by subtracting the number of points set in the auto refresh area from the No.n module's automatic transmission area size.

Number of CPUs	Upper limit of the total number of points in the CPU specific send range
2	14K points
3	13K points
4	12K points

Point

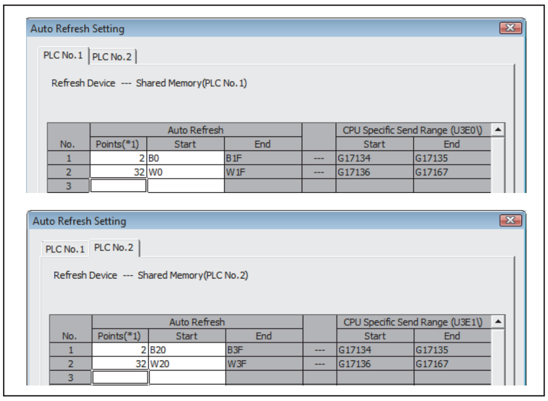
For a CPU module not supporting the multiple CPU high speed transmission, or a CPU module without number assignment, set the number of transmission area points to 0.

Remark

For Setting/monitoring tools for the C Controller module, refer to the following.
Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(4) Setting example

Settings of the reception and transmission areas for auto refresh in 2 ranges (Setting No.1 and Setting No.2) in a configuration in which an universal model QCPU and a C Controller module are used as No.1 and No.2 modules, respectively is described below.



Auto Refresh Setting

PLC No.1 | PLC No.2

Refresh Device --- Shared Memory(PLC No.1)

	Auto Refresh				CPU Specific Send Range (U3E0\)	
No.	Points(*1)	Start	End		Start	End
1	2	B0	B1F	---	G17134	G17135
2	32	W0	W1F	---	G17136	G17167
3						

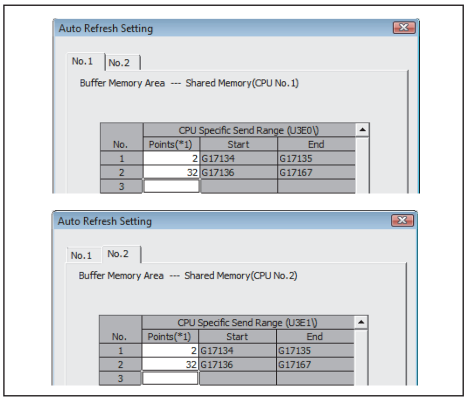
Auto Refresh Setting

PLC No.1 | PLC No.2

Refresh Device --- Shared Memory(PLC No.2)

	Auto Refresh				CPU Specific Send Range (U3E1\)	
No.	Points(*1)	Start	End		Start	End
1	2	B20	B3F	---	G17134	G17135
2	32	W20	W3F	---	G17136	G17167
3						

Auto refresh setting for Universal model QCPU (CPU No.1)



Auto Refresh Setting

No.1 | No.2

Buffer Memory Area --- Shared Memory(CPU No.1)

	CPU Specific Send Range (U3E0\)		
No.	Points(*1)	Start	End
1	2	G17134	G17135
2	32	G17136	G17167
3			

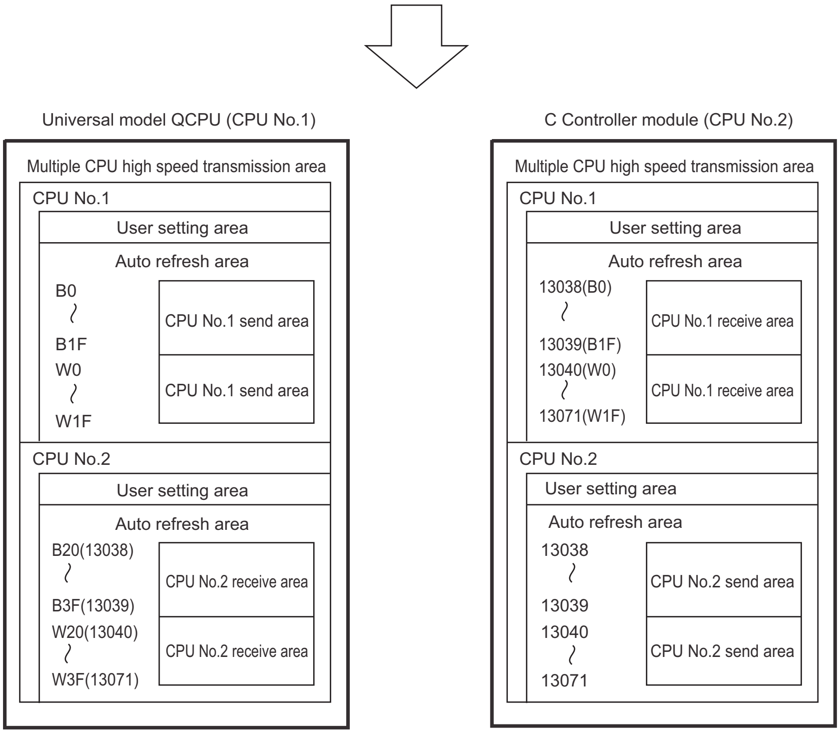
Auto Refresh Setting

No.1 | No.2

Buffer Memory Area --- Shared Memory(CPU No.2)

	CPU Specific Send Range (U3E1\)		
No.	Points(*1)	Start	End
1	2	G17134	G17135
2	32	G17136	G17167
3			

Auto refresh setting for C Controller module (CPU No.2)



(5) Precautions

(a) Auto refresh execution

Auto refresh is executed when the CPU module is in the RUN, STOP, or PAUSE status.

(b) Transmission delay time

A transmission delay caused by auto refresh will be within the following range.

0.09 ms to (1.80 + (Sending-side write time[*1] + Receiving-side reading cycle[*2] × 2)) ms

*1 : For the write time of the bus interface function (QBF_ToBuf), refer to the following.
☞ Page 471, Appendix 5

*2 : When the receiving side is a C Controller module, there is no reading cycle (i.e. 0ms).
When the receiving side is other than a C Controller module, it is the scan time on the receiving side.

(c) Assurance of data sent among CPUs

Depending on the timing of sending data from the host CPU and auto-refreshing data in another CPU, new and old data may be mixed in the area for each CPU.

Therefore, configure an interlock program for auto refresh so that data of another CPU will not be used when old and new data are mixed.

Point

For the auto refresh method, transfer is performed in descending order of "Setting No." in the auto refresh setting parameters.

Therefore, use the "Setting No." smaller than the transfer data for an interlock device so that data of another CPU will not be used when old and new data are mixed.

For an example of program for interlocking, refer to the following.

☞ Page 259, Section 14.1.2 (4)

14.1.4 Data communications without using auto refresh

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The following areas in the CPU shared memory are used for data communication without use of auto refresh.

1) User setting area

This area is available for CPU modules.

Addresses of the user setting areas vary depending on the CPU module used.

For details, refer to the following.

☞ Page 252, Section 14.1.1

2) User setting area in the multiple CPU high speed transmission area

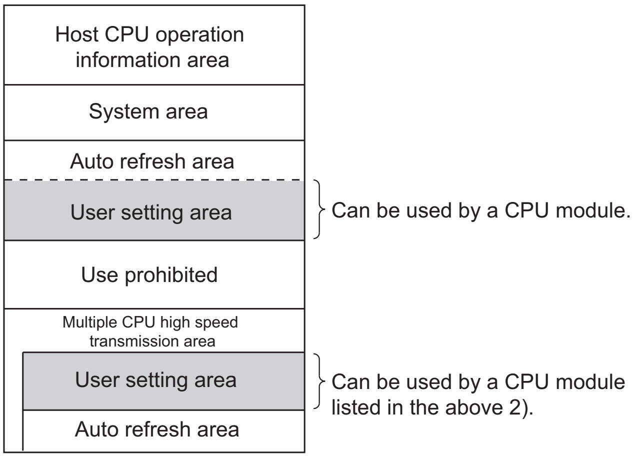
This area is only available for the following CPU modules.

- Universal model QCPU (except for Q00UCPU, Q01UCPU, and Q02UCPU)
- Motion CPU (Q172DCPU(-S1), Q173DCPU(-S1), Q172DSCPU, and Q173DSCPU)
- C Controller module (Q24DHCCPU-V, Q24DHCCPU-VG, Q12DCCPU-V (Basic mode), and Q12DCCPU-V (Extended mode))

Transmission area address for each module varies depending on set parameters (multiple CPU high speed transmission area settings).

For details, refer to the following.

☞ Page 261, Section 14.1.3

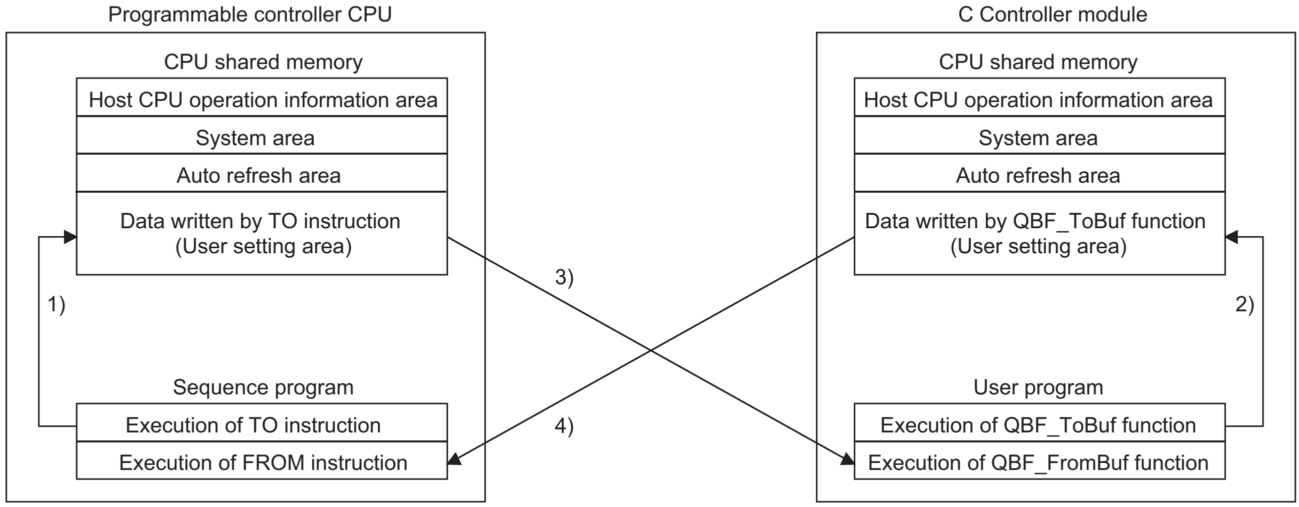

Host CPU operation information area
System area
Auto refresh area
User setting area
Can be used by a CPU module.
Use prohibited
Multiple CPU high speed transmission area
User setting area
Can be used by a CPU module listed in the above 2).
Auto refresh area

The following 3 data communication patterns are described in the following pages.

- Programmable controller CPU ⇔ C Controller module (☞ Page 267, (1) in this section)
- C Controller module ⇔ C Controller module(☞ Page 270, (2) in this section)
- Motion CPU ⇔ C Controller module(☞ Page 273, (3) in this section)

(1) In case of programmable controller CPU ⇔ C Controller module

(a) Processing overview


Programmable controller CPU
CPU shared memory
Host CPU operation information area
System area
Auto refresh area
Data written by TO instruction (User setting area)
1)
Sequence program
Execution of TO instruction
Execution of FROM instruction
3)
4)
C Controller module
CPU shared memory
Host CPU operation information area
System area
Auto refresh area
Data written by QBF_ToBuf function (User setting area)
2)
User program
Execution of QBF_ToBuf function
Execution of QBF_FromBuf function

Processing	When executing sequence program of programmable controller CPU	At bus interface function execution of C Controller module
1)	By the TO instruction, the data are written to the user setting area in the CPU shared memory of the programmable controller CPU.	–
2)	–	Execution of the bus interface function (QBF_ToBuf), the data are written to the user setting area in the CPU shared memory of the C controller module.
3)	–	Execution of the bus interface function (QBF_FromBuf), the data in the auto refresh area in the programmable controller CPU are transferred to the user program.
4)	By the FROM instruction, the data are read out to the specified device in the programmable controller CPU.	–

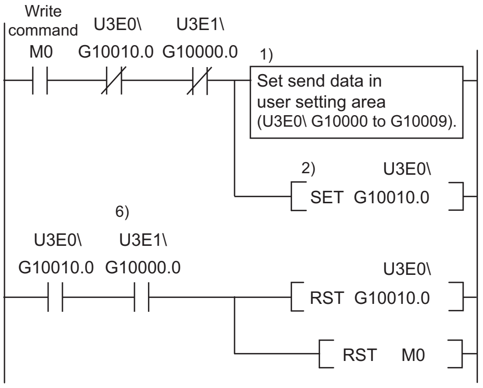
(b) Precautions

Old and new data may be mixed in the user setting area depending on the following timing.

- Timing when data writing to the user setting area by another module and read-out from the host module to another module's user setting area takes place simultaneously.
- Timing when data writing to the user setting area by the host module and read-out from another module to the host module's user setting area takes place simultaneously.

Therefore, configure an interlock program for auto refresh so that data of another CPU will not be used when old and new data are mixed.

The following example user setting area in the multiple CPU high speed transmission area show an example program to perform interlock in data transmission from No.1 module (Programmable controller CPU) to No.2 module (C Controller module).

Sending side program(CPU No.1)	Processing flow (The numbers from 1) through 8) represent the execution sequence.))
 Write command M0 U3E0\ G10010.0 U3E1\ G10000.0 1) Set send data in user setting area (U3E0\ G10000 to G10009). 2) SET U3E0\ G10010.0 6) U3E0\ G10010.0 U3E1\ G10000.0 RST U3E0\ G10010.0 RST M0	1) Transmitted data are written into the user setting area. 2) Data set complete bit ON is written into the user setting area. The multiple CPU high speed transmission area data in the No.1 module are automatically transmitted to the No.2 module. 6) The received data processing complete bit ON is detected and the data complete bit is turned OFF.

Receiving side program (CPU No.2)

Processing flow (The numbers from 1) through 8) represent the execution sequence.))

```
{
                    :
 unsigned short   usBuf;              /* Data storage destination */
 unsigned short   pusData[128];       /* Data storage destination */
                    :
/***************************************************************************/
/* The ON status of CPU No.1 data set completion bit is detected. */
/***************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x1 ) break; /* Exit the loop when 1 is set */
        taskDelay(2);
    }
```

3) Transmitted data set complete bit ON is detected.

```
/***************************************************************************/
/* Data are read out from the CPU No.1 user setting area. */
/***************************************************************************/
    sRet = QBF_FromBuf(lPath, 0x3E0, 10000, 10, pusData, 128);
    if( sRet != 0) return(sRet);
```

4) Received data processing is performed.

```
/***************************************************************************/
/* CPU No.2 data processing completion bit turns ON. */
/***************************************************************************/
    usBuf = 1;
    sRet = QBF_ToBuf(lPath, 0x3E1, 10000, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
```

5) Received data complete bit ON is written into the user setting area.

The multiple CPU high speed transmission area data in the No.2 module are automatically transmitted to the No.1 module.

```
/***************************************************************************/
/* The OFF status of CPU No.1 data set completion bit is detected. */
/***************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x0 ) break; /* Exit the loop when 0 is set */
        taskDelay(2);
    }
```

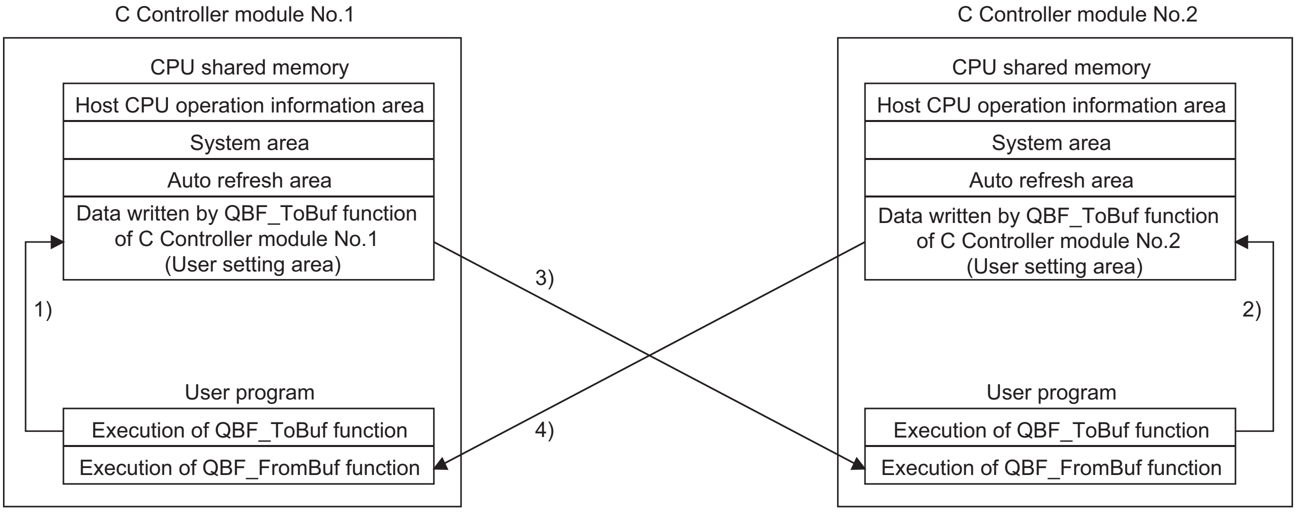
7) Transmitted data set complete bit OFF is detected.

```
/***************************************************************************/
/* CPU No.2 data processing completion bit turns OFF. */
/***************************************************************************/
usBuf = 0;
    sRet = QBF_ToBuf(lPath, 0x3E1, 10000, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
}
```

8) Data processing complete bit OFF is written into the user setting area.

(2) In case of C Controller module ⇔ C Controller module

(a) Processing overview


C Controller module No.1
CPU shared memory
Host CPU operation information area
System area
Auto refresh area
Data written by QBF_ToBuf function of C Controller module No.1 (User setting area)
1)
User program
Execution of QBF_ToBuf function
Execution of QBF_FromBuf function
3)
4)
C Controller module No.2
CPU shared memory
Host CPU operation information area
System area
Auto refresh area
Data written by QBF_ToBuf function of C Controller module No.2 (User setting area)
2)
User program
Execution of QBF_ToBuf function
Execution of QBF_FromBuf function

Processing	At bus interface function execution of C Controller module No.1	At bus interface function execution of C Controller module No.2
1)	Execution of the bus interface function (QBF_ToBuf) writes the data to the user setting area in the CPU shared memory of C Controller module No.1.	–
2)	–	Execution of the bus interface function (QBF_ToBuf) writes the data to the user setting area in the CPU shared memory of C Controller module No.2.
3)	–	Execution of the bus interface function (QBF_FromBuf) reads out the user setting area data of C Controller module No.1 onto the user program.
4)	Execution of the bus interface function (QBF_ToBuf) reads out the user setting area data of C Controller module No.2 onto the user program.	–

(b) Precautions

Old and new data may be mixed in the data for CPU No. depending on the following timing.

- Timing when data writing to the user setting area by another module and read-out from the host module to another module's user setting area takes place simultaneously.
- Timing when data writing to the user setting area by the host module and read-out from another module to the host module's user setting area takes place simultaneously.

Therefore, configure an interlock program for auto refresh so that data of another CPU will not be used when old and new data are mixed.

The following example user setting area in the multiple CPU high speed transmission area show an example program to perform interlock in data transmission from No.1 module (C Controller module) to No.2 module (C Controller module).

Sending side program for CPU No.1	Processing flow (The numbers from 1) through 9) represent the execution sequence.))
{ : unsigned short usBuf; /* Data storage destination */ unsigned short pusData[128]; /* Data storage destination */ :	

/***/
/* CPU No.1 send data are written to the user setting area. */
/***/
sRet = QBF_ToBuf(lPath, 0x3E0, 10000, 10, pusData, 128);
if(sRet != 0) return(sRet);
	1) Transmitted data are written into the user setting area.

/***/
/* CPU No.1 data set completion bit turns ON. */
/***/
usBuf = 1;
sRet = QBF_ToBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
if(sRet != 0) return(sRet);
	2) Data set complete bit ON is written into the user setting area.
	The multiple CPU high speed transmission area data in the No.1 module are automatically transmitted to the No.2 module.

/***/
/* The ON status of CPU No.2 data processing completion bit is detected. */
/***/
while(1){
sRet = QBF_FromBuf(lPath, 0x3E1, 10000, 1, &usBuf, 1);
if(sRet != 0) return(sRet);
if((usBuf & 0x1) == 0x0) break; /* Exit the loop when 0 is set */
taskDelay(2);
}
	6) Received data processing complete bit ON is detected.

/***/
/* CPU No.1 data set completion bit turns OFF. */
/***/
usBuf = 0;
sRet = QBF_ToBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
if(sRet != 0) return(sRet);
}
	7) The data set complete bit is turned OFF.
	The multiple CPU high speed transmission area data in the No.1 module are automatically transmitted to the No.2 module.

Receiving side program for CPU No.2

```
{
                    :
  unsigned short   usBuf;              /* Data storage destination */
  unsigned short   pusData[128];      /* Data storage destination */
                    :
/******************************************************************************/
/* The ON status of CPU No.1 data set completion bit is detected. */
/******************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x1 ) break; /* Exit the loop when 1 is set */
        taskDelay(2);
    }
/******************************************************************************/
/* Data are read out from CPU No.1 user setting area. */
/******************************************************************************/
    sRet = QBF_FromBuf(lPath, 0x3E0, 10000, 10, pusData, 128);
    if( sRet != 0) return(sRet);
/******************************************************************************/
/* CPU No.2 data processing completion bit turns ON. */
/******************************************************************************/
    usBuf = 1;
    sRet = QBF_ToBuf(lPath, 0x3E1, 10000, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
/******************************************************************************/
/* The OFF status of CPU No.1 data set completion bit is detected. */
/******************************************************************************/
    while(1){
        sRet = QBF_FromBuf(lPath, 0x3E0, 10010, 1, &usBuf, 1);
        if( sRet != 0) return(sRet);
        if( (usBuf & 0x1) == 0x0 ) break; /* Exit the loop when 0 is set */
        taskDelay(2);
    }
/******************************************************************************/
/* CPU No.2 data processing completion bit turns OFF. */
/******************************************************************************/
usBuf = 0;
    sRet = QBF_ToBuf(lPath, 0x3E1, 10000, 1, &usBuf, 1);
    if( sRet != 0) return(sRet);
}
```

Processing flow
(The numbers from 1) through 9) represent the execution sequence.))

3) Transmitted data set complete bit ON is detected.

4) Received data processing is performed.

5) Received data complete bit ON is written into the user setting area.

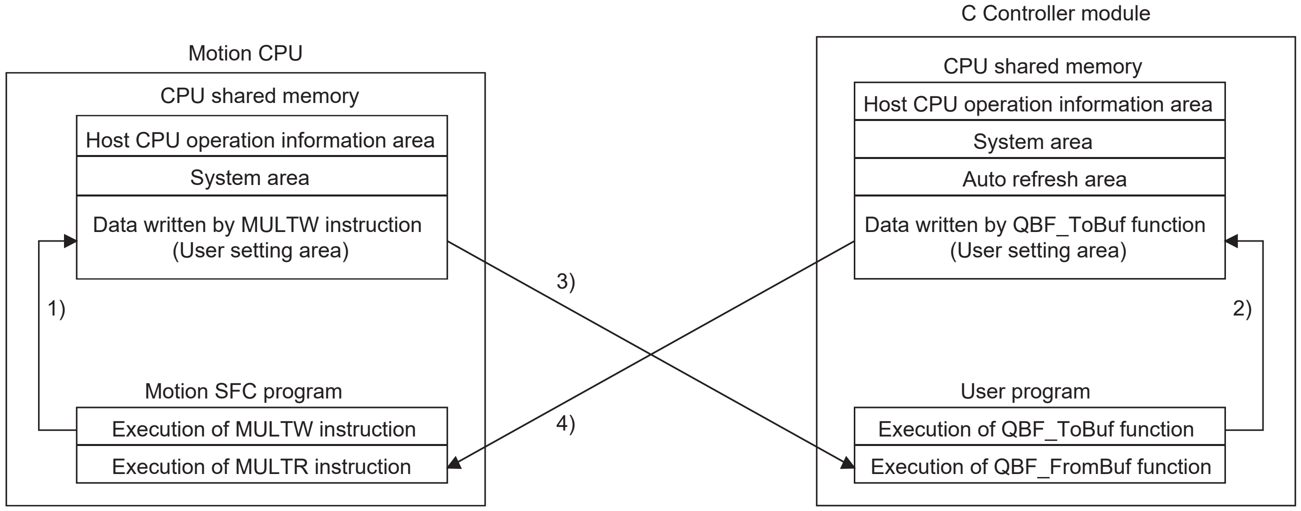
The multiple CPU high speed transmission area data in the No.2 module are automatically transmitted to the No.1 module.

8) Transmitted data set complete bit OFF is detected.

9) Received data processing complete bit OFF is written into the user setting area.

(3) In case of Motion CPU ⇔ C Controller module

(a) Processing overview


Motion CPU
CPU shared memory
Host CPU operation information area
System area
Data written by MULTW instruction (User setting area)
1)
Motion SFC program
Execution of MULTW instruction
Execution of MULTR instruction
3)
4)
C Controller module
CPU shared memory
Host CPU operation information area
System area
Auto refresh area
Data written by QBF_ToBuf function (User setting area)
2)
User program
Execution of QBF_ToBuf function
Execution of QBF_FromBuf function

Processing	When executing Motion SFC program of Motion CPU	At bus interface function execution of C Controller module
1)	By the MULTW instruction, the data are written to the user setting area in the CPU shared memory of the Motion CPU.	–
2)	–	Execution of the bus interface function (QBF_ToBuf) writes the data to the user setting area in the C Controller module's CPU shared memory.
3)	–	Execution of the bus interface function (QBF_FromBuf function) reads out the user setting area data of the Motion CPU onto the user program.
4)	By the MULTR instruction, the user setting area data of the C Controller module are read out to the specified device in the Motion CPU.	–

Remark

For instructions of the Motion CPU, refer to the manual for respective Motion CPU.

14.2 Interrupt from Another CPU

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

An interrupt from another CPU (programmable controller CPU or C Controller module) can restart the user program that is waiting for an interrupt event by the bus interface function (QBF_WaitEvent).

Described below is the procedure to restart the user program that is waiting for an interrupt event.

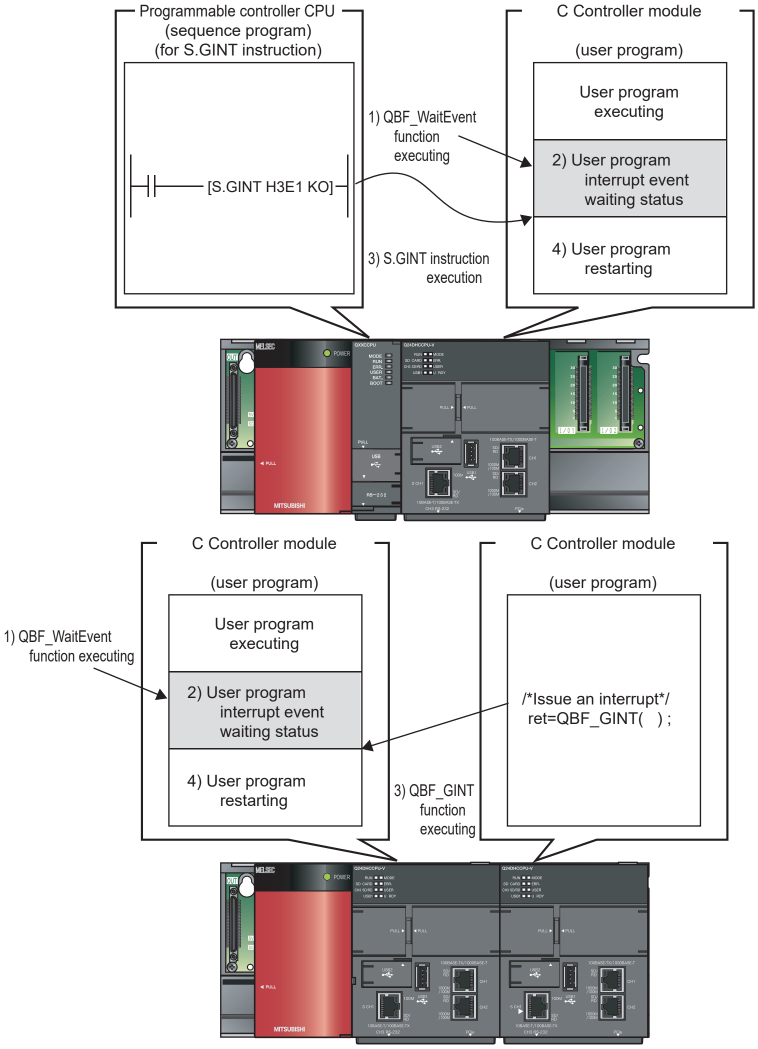
1) In the user program, call the bus interface function (QBF_WaitEvent).

2) By 1), the user program is placed into the interrupt event waiting status.

3) In the above 2) status, execute either of the following.

- User program of the other C Controller module (another CPU) (QBF_GINT)
- Sequence program of a programmable controller CPU (another CPU) (S.GINT or D.GINT instruction)

4) The user program is restarted by 3).


Programmable controller CPU
(sequence program)
(for S.GINT instruction)
[S.GINT H3E1 KO]
1) QBF_WaitEvent function executing
3) S.GINT instruction execution
C Controller module
(user program)
User program executing
2) User program interrupt event waiting status
4) User program restarting
C Controller module
(user program)
1) QBF_WaitEvent function executing
User program executing
2) User program interrupt event waiting status
4) User program restarting
3) QBF_GINT function executing
C Controller module
(user program)
/*Issue an interrupt*/
ret=QBF_GINT( ) ;

(1) Functions

The following shows the functions used for interrupt from another CPU.

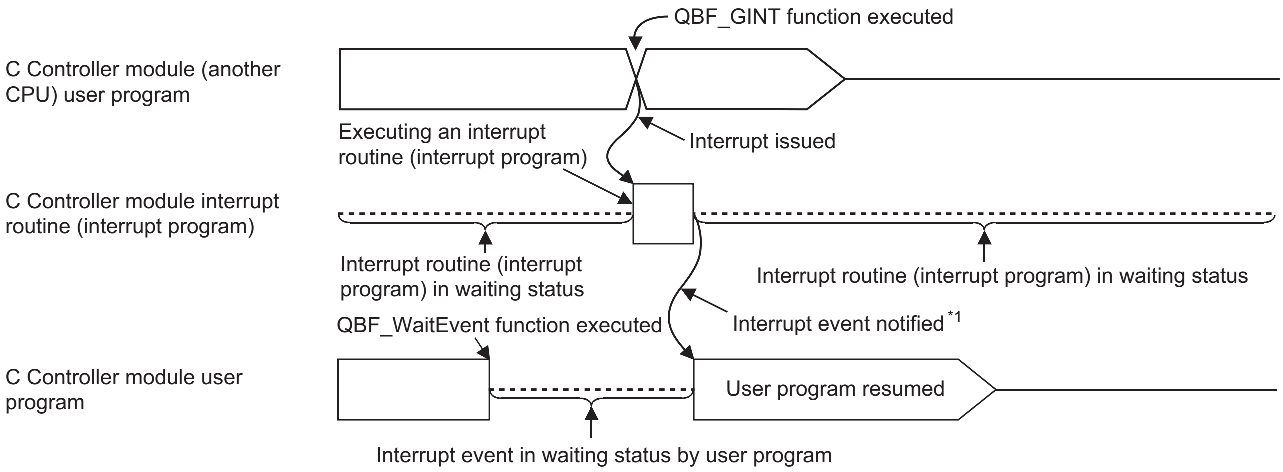
Function name	Function
QBF_WaitEvent	Waits for an interrupt event notified in the event of any interrupt from another CPU.

14.2.1 Interrupt from C Controller module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The following describes how to interrupt from the C Controller module (another CPU).

(1) Operation timing


QBF_GINT function executed
C Controller module (another CPU) user program
Executing an interrupt routine (interrupt program)
Interrupt issued
C Controller module interrupt routine (interrupt program)
Interrupt routine (interrupt program) in waiting status
Interrupt routine (interrupt program) in waiting status
QBF_WaitEvent function executed
Interrupt event notified *1
C Controller module user program
User program resumed
Interrupt event in waiting status by user program

*1: Interrupt event notified after the interrupt routine (interrupt program) ends

(2) Functions

The following shows the functions used for interrupt from C Controller module (another CPU)

Function name	Function
QBF_GINT	Issues an interrupt to another CPU. When receiving an interrupt from another CPU, a C Controller module resumes the user program that is waiting for an interrupt event by the QBF_WaitEvent function.

Remark

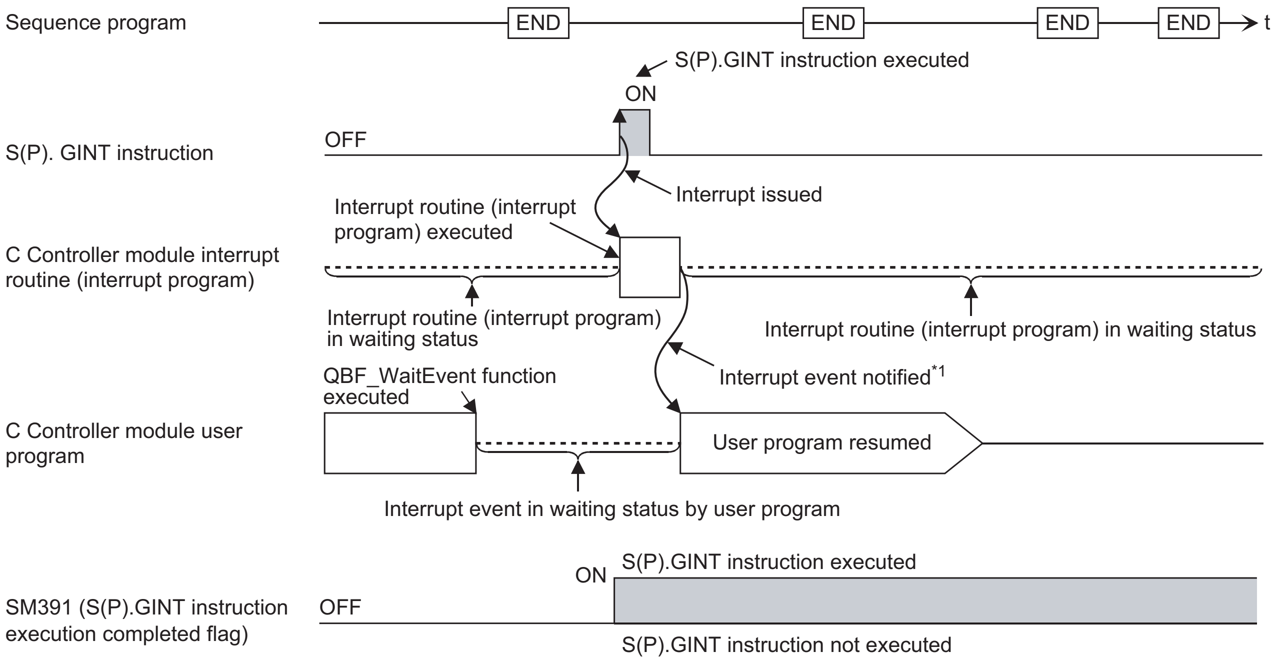
The bus interface function (QBF_GINT) may also issue an interrupt to a Motion CPU.

14.2.2 Interrupt from Controller CPU

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The following describes how to interrupt from the programmable controller CPU.

(1) Operation timing

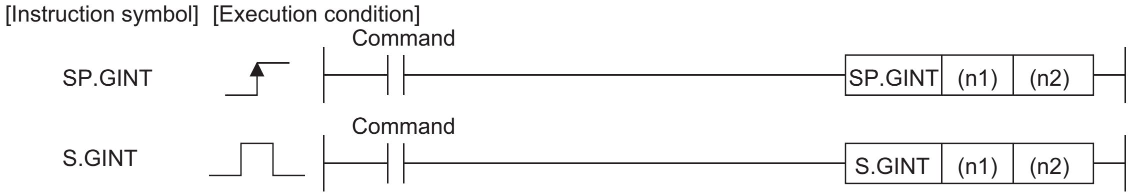


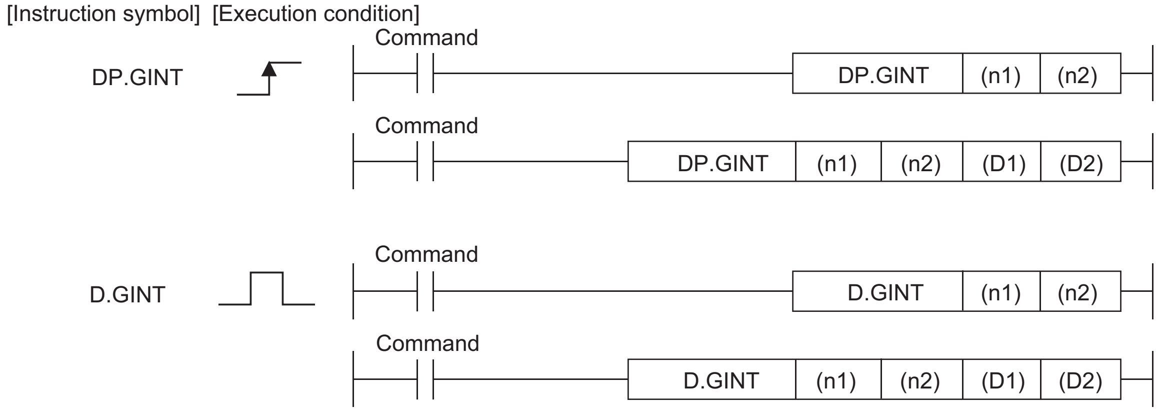
Sequence program
END
END
END
END
t
S(P).GINT instruction executed
ON
OFF
S(P). GINT instruction
Interrupt issued
Interrupt routine (interrupt program) executed
C Controller module interrupt routine (interrupt program)
Interrupt routine (interrupt program) in waiting status
Interrupt routine (interrupt program) in waiting status
QBF_WaitEvent function executed
Interrupt event notified*1
C Controller module user program
User program resumed
Interrupt event in waiting status by user program
ON
S(P).GINT instruction executed
SM391 (S(P).GINT instruction execution completed flag)
OFF
S(P).GINT instruction not executed

*1: Interrupt event notified after the interrupt routine (interrupt program) ends.

(2) Dedicated instructions

The following shows programmable controller CPU dedicated instructions used for interrupt from a programmable controller CPU (another CPU).





○: Applicable △: Partly applicable ×: Not applicable

Setting data	Available devices									
	Internal device (System, user)		File register R, ZR		Link direct device J□¥□		Intelligent function module U□¥G□	Index register, Zn	Constant K, H	Others
	Bit	Word	Bit	Word	Bit	Word				
(n1)	–	○*1	–	○	–				○	–
(n2)	–	○*2	–	○	–				○	–
(D1)*3	△*4	–	△*4	–	–				–	–
(D2)*3	–	△*4	–	△*4	–				–	–

*1 : Index modification is allowed for basic model QCPUs, high performance model QCPUs and universal model QCPUs.
*2 : Index modification is allowed for basic model QCPUs and universal model QCPUs.
*3 : Only when both of (D1) and (D2) are omitted, they can be actually omitted.
*4 : Local devices cannot be used.

Remark

For details of D(P).GINT instruction used for interrupt from a Motion CPU, refer to the following.
SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q172D(S)]

(a) Setting data

Setting data	Setting	Data type
(n1)	Start I/O No. of target CPU ÷ 10H Actually specified values are as follows: CPU No.1: 3E0H, CPU No.2: 3E1H, CPU No.3: 3E2H, CPU No.4: 3E3H	BIN 16 bits
(n2)	Interrupt pointer No. (0 to 15)	BIN 16 bits
(D1)*1	Completion device (D1+0): Device that is turned ON for one scan upon completion of the instruction processing (D1+1): Device that is turned ON for one scan upon failure of the instruction processing (When failed, D1+0 is also turned ON.)	Bit
(D2)*1	Device where the completion status data is stored.	Word

*1 : Only when both of (D1) and (D2) are omitted, they can be actually omitted.

(b) Usable devices

Internal device		File register	Constant
Bit	Word*1		
M, L, B	D, W, @□	R, ZR	K, H

*1 : Number of bit device digits can be specified for word data.
It can be specified with Digits Bit device start No.
For example, 16 points from M0 to M15 are specified with K4M0

(c) Control details

On the rise (OFF to ON) of the S(P).GINT or D(P).GINT execution command in the sequence program, an interrupt is issued to the C Controller module.

When receiving an interrupt from a programmable controller CPU, a C Controller module resumes the user program that is waiting for an interrupt event by the QBF_WaitEvent function.

Point

Whether or not the programmable controller CPU successfully transmitted instruction command to the C Controller module should be determined based on the following.

- If instruction command is successfully transmitted
  The SM391 (S(P).GINT or D(P).GINT execution completed) flag of the programmable controller CPU is set to ON.
- If instruction command is not successfully transmitted
  The SM391 (S(P).GINT or D(P).GINT execution completed) flag of the programmable controller CPU is set to OFF.

(d) Error details

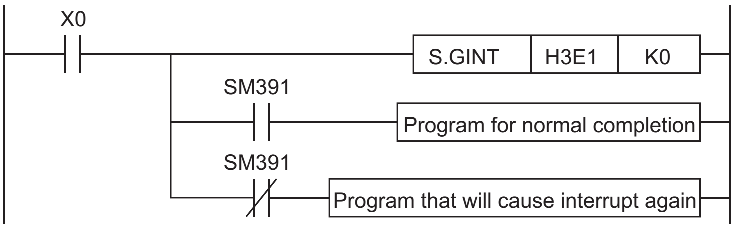
In any of the following cases, an operation error occurs, the error flag (SM0) of the programmable controller CPU is set to ON, and an error code is stored in SD0.

Error code*1	Cause	Action
2110	CPU No. of a reserved ("Empty" setting) or non-mounted CPU is specified for the target CPU start I/O No. ÷ 10H (n1).	Check and correct the sequence program.
2114	The originating CPU is specified for the target CPU start I/O No. ÷ 10H (n1).	
2117	A module that does not support the S(P).GINT and D(P).GINT instructions is specified for the target CPU start I/O No. ÷ 10H (n1).	
4100	Any of 0 to 3DFH, or 3E4H is specified for the target CPU start I/O No. ÷ 10H (n1).	

*1 : 0000H if the processing is normally completed.

(e) Program example

The following is the sequence program that issues an interrupt to C Controller module No.2.


X0
S.GINT
H3E1
K0
SM391
Program for normal completion
SM391
Program that will cause interrupt again

14.2.3 Precautions

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

(1) When an interrupt event has already been notified at execution of the QBF_WaitEvent function

When an interrupt event has already been notified from a programmable controller CPU or C Controller module (another CPU) at the time of the QBF_WaitEvent function execution, the user program is restored from the interrupt event waiting status at the same time with the QBF_WaitEvent function execution.

If multiple interrupt events have been notified with the same interrupt event No. at the time of the QBF_WaitEvent execution, the user program processes them as a single interrupt event notification.

(2) When using the event notification function in multiple user programs

Do not set the same CPU No. and the same interrupt event No. on more than one program.

If such settings are specified, which user program will receive the interrupt event will be uncertain.

14.3 Multiple CPU Synchronous Interrupt Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The multiple CPU synchronous interrupt is an interrupt issued in the same timing as the Motion CPU*1 control cycle (multiple CPU high speed transmission cycle = 0.88ms).

Creates a user program to be synchronized with the Motion CPU*1 and executed by waiting for a multiple CPU synchronous interrupt event by the bus interface function (QBF_WaitMultiCPUSyncEvent function).

*1 : Supported Motion CPUs are shown in the following table.
- Q172DCPU(-S1)
- Q173DCPU(-S1)
- Q172DSCPU
- Q173DSCPU

(1) Functions

The following shows the function(s) used for multiple CPU synchronous interrupt.

Function name	Function
QBF_WaitMultiCPUSyncEvent	Waits for a multiple CPU synchronous interrupt event notification.

Point

As the multiple CPU synchronous interrupt is a event notification function, it is not guaranteed that the user program with QBF_WaitMultiCPUSyncEvent function operates in 0.88ms cycle.

Check the number of receptions from the number of interrupts acquired by the QBF_WaitMultiCPUSyncEvent function.

14.4 Issuing an Interrupt to Another CPU

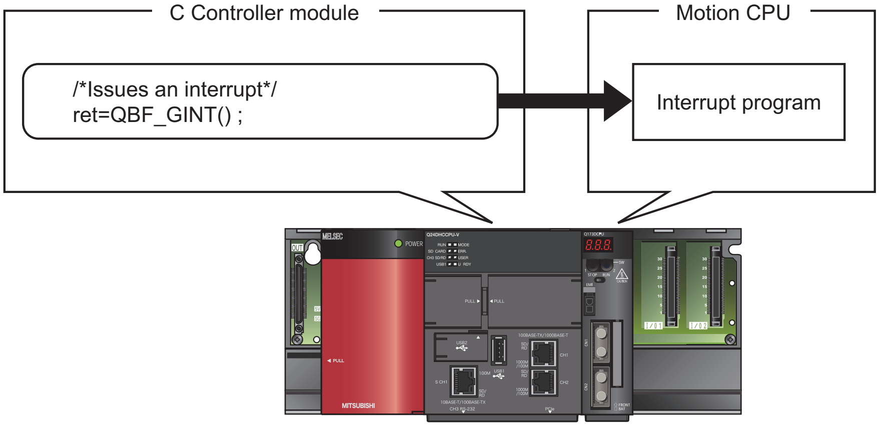
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This function allows the C Controller module to issue an interrupt to another CPU (Motion CPU or C Controller module) from its own user program.

No interrupt can be issued to a programmable controller CPU.

(1) Interrupt to Motion CPU

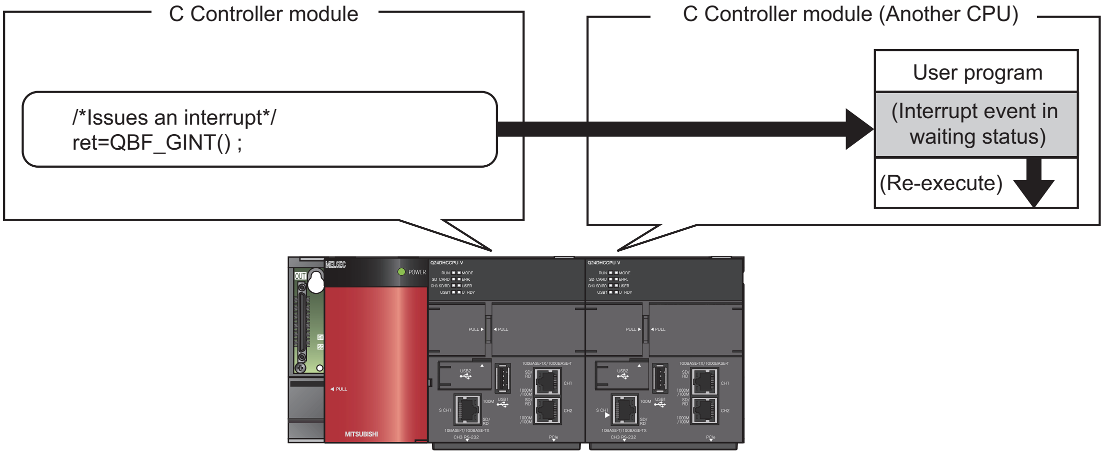
When an interrupt is issued to a Motion CPU, the Motion CPU starts an interrupt program.



```
/*Issues an interrupt*/
ret=QBF_GINT() ;
```

(2) Interrupt to C Controller module (another CPU)

When an interrupt is issued to a C Controller module (another CPU), Resumes the user program that is waiting for an interrupt event by the Bus interface functions (QBF_WaitEvent function.)


C Controller module
C Controller module (Another CPU)
User program
(Interrupt event in waiting status)
(Re-execute)

```
/*Issues an interrupt*/
ret=QBF_GINT() ;
```

(3) Functions

The following shows the function(s) used for multiple CPU synchronous interrupt.

Function name	Function
QBF_GINT	Issues an interrupt to another CPU.

14.5 Function to Access to Devices of Other CPU Modules

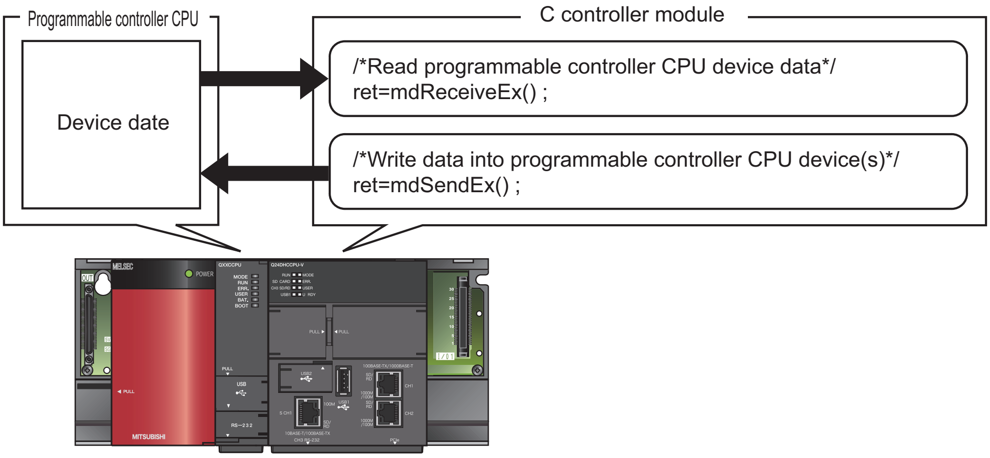
Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This function allows for access to device(s) of another CPU (programmable controller CPU, C Controller module or Motion CPU) from the C Controller module.

14.5.1 Access to programmable controller CPU and C Controller module

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Use a MELSEC data link function when creating a user program for the C Controller module.


Programmable controller CPU
Device date
C controller module
/*Read programmable controller CPU device data*/
ret=mdReceiveEx() ;
/*Write data into programmable controller CPU device(s)*/
ret=mdSendEx() ;

(1) Functions

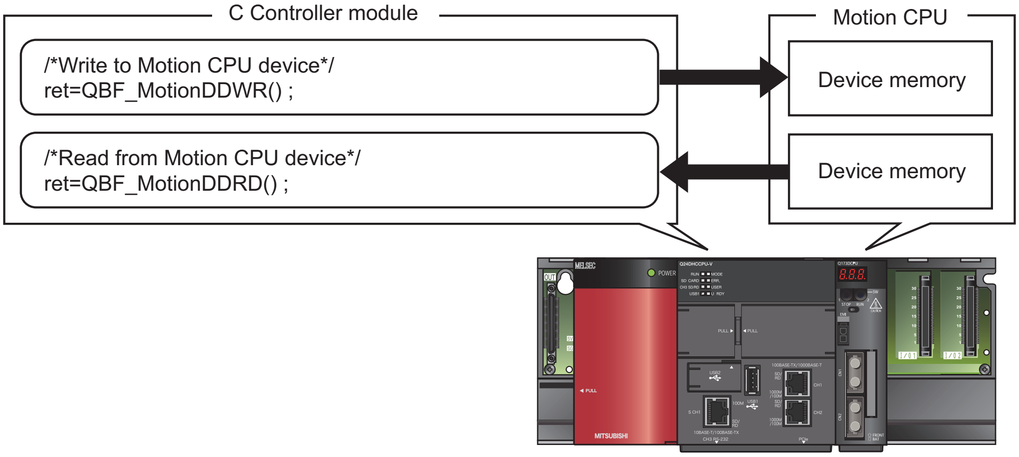
The following shows the functions used for access to programmable controller CPU, and C Controller module (another CPU).

Function name	Function
mdSendEx	Batch writes devices.
mdReceiveEx	Batch reads devices.
mdRandWEx	Writes devices randomly
mdRandREx	Reads devices randomly.
mdDevSetEx	Sets the bit device.
mdDevRstEx	Resets the bit device.

14.5.2 Access to Motion CPU

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Use the bus interface functions when creating a user program of the C Controller module.



```
/*Write to Motion CPU device*/
ret=QBF_MotionDDWR() ;
```

```
/*Read from Motion CPU device*/
ret=QBF_MotionDDRD() ;
```

(1) Functions

Functions used for access to a Motion CPU are indicated below.

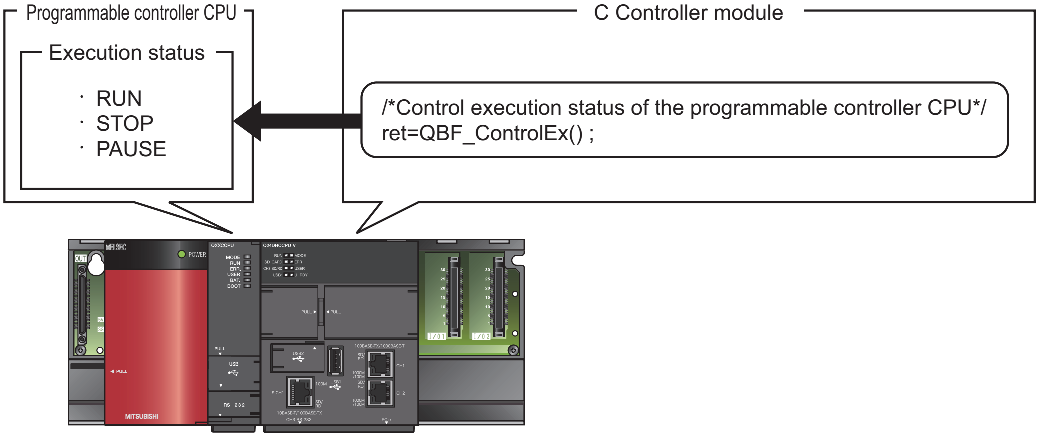
Function name	Function
QBF_MotionDDWR	Writes data to the Motion CPU device.
QBF_MotionDDRD	Reads data from the Motion CPU device.

14.6 Remote Control Function of Other CPU Modules

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This function allows the C Controller module to control execution status of a programmable controller CPU and a C Controller module.

Use the bus interface functions when creating a user program of the C Controller module.



```
/*Control execution status of the programmable controller CPU*/
ret=QBF_ControlEx() ;
```

(1) Functions

The following shows the functions used for the remote control function of the programmable controller CPU, and C Controller module.

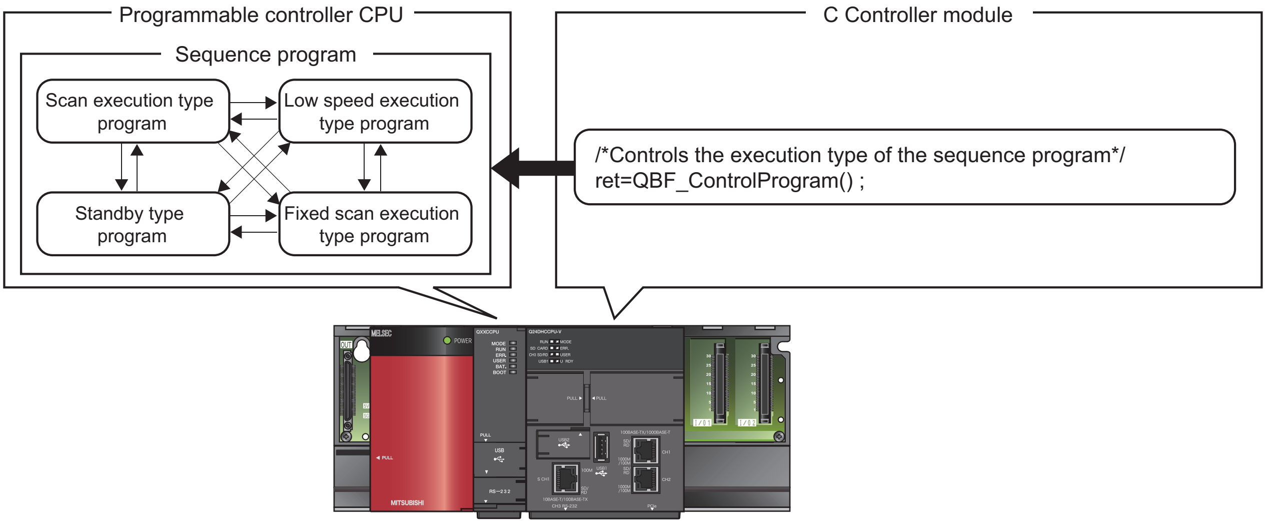
Function name	Function
QBF_ControlEx	Performs remote RUN/STOP/PAUSE operations of the programmable controller CPU module and C Controller module.

14.7 Sequence Program Control Function

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This function allows the C Controller module to control (change) the sequence program execution type of a programmable controller CPU.

Use a bus interface function when creating a user program for the C Controller module.


Programmable controller CPU
Sequence program
Scan execution type program
Low speed execution type program
Standby type program
Fixed scan execution type program
C Controller module

```
/*Controls the execution type of the sequence program*/
ret=QBF_ControlProgram() ;
```

(1) Functions

Functions used for the sequence program control function are indicated below.

Function name	Function
QBF_ControlProgram	Controls the execute type of the programmable controller CPU module.

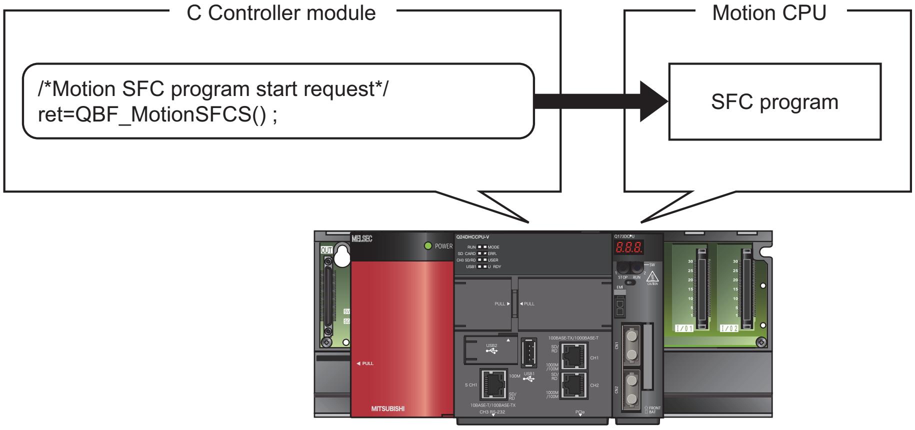
Point

When using this function, use a high performance model QCPU as a programmable controller CPU.

14.8 Motion CPU Control Instruction

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

Control instructions can be given to a Motion CPU from a user program of the C Controller module.
Use bus interface functions when creating a user program of the C Controller module.



(1) Functions

Functions used for control instruction to a Motion CPU are indicated below.

Function name	Function	CPU module		
		Q24DHC		Q12DC-V
		-V	-VG	
QBF_MotionSFCS	Requests to start the Motion SFC program.	○		
QBF_MotionSVST	Requests to start the specified servo program.			
QBF_MotionCHGA	Requests to change the current value of the specified axis.			
QBF_MotionCHGAS	Requests to change the current value of the specified axis.	○[*1]	○	○[*1]
QBF_MotionCHGV	Requests to change the speed of the specified axis.	○		
QBF_MotionCHGVS	Requests to change the speed of the specified axis.	○[*1]	○	○[*1]
QBF_MotionCHGT	Requests to change the torque limit value of the specified axis.	○		
QBF_MotionCHGT2	Requests to change the torque limit value of the specified axis.			

[*1] : Use the product with a serial number whose first five digits are "16012" or higher.

14.9 Multiple CPU Synchronized Boot-Up

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	○	○	○

This function synchronizes the startup of CPU modules No.1 through No.4.
Since start-up of each CPU can be monitored, an interlock program for checking start-up of another CPU before access is no more required.
Note that, however, the speed of system start-up may slow down because it depends on the slowest CPU module.

Point

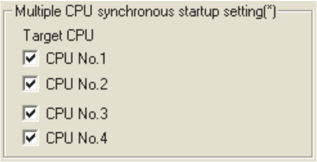
- Multiple CPU synchronous startup is not a function to start operations simultaneously among CPU modules after startup.
- The multiple CPU synchronized boot-up is available for the following CPU modules:
  - Universal model QCPU (except for Q00UCPU, Q01UCPU, and Q02UCPU)
  - Motion CPU (Q172DCPU(-S1), Q173DCPU(-S1), Q172DSCPU and Q173DCPU)
  - C Controller module (Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q26DHCCPU-LS, Q12DCCPU-V (Basic mode), and Q12DCCPU-V (Extended mode))

(1) Setting

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> ⇒ "Multiple CPU Synchronous Startup Setting"**

By default, modules No.1 through No.4 are all selected. Deselect them if not to perform multiple CPU synchronous startup.



Multiple CPU synchronous startup setting(*)

Target CPU

☑ CPU No.1
☑ CPU No.2
☑ CPU No.3
☑ CPU No.4

Activate the same multiple CPU synchronous startup setting for all CPU modules comprising the multiple CPU system.

Point

If a multiple CPU system is configured by using any CPU module that does not support multiple CPU synchronous startup, deselect the checkbox for the pertinent CPU No.

PART 4 SOFTWARE DESIGN AND PROGRAMMING

This section describes items related to software design and creation of user programs.

CHAPTER 15 PARAMETER

This chapter describes the parameters required to be set for configuring a C controller module.

(1) Parameter types

The following parameters are provided

- CCPU parameters (☞ Page 289, Section 15.1.1)
  These parameters are set when a C controller module is used.
- Network parameters (Page 291, Section 15.1.2)
  These parameters are set when a network module is used.

(2) Parameter setting method

Use Setting/monitoring tools for the C Controller module to set parameters.

For operation methods of the setting/monitoring tools for the C Controller module, refer to the following.

📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

Remark

Setting/monitoring tools for the C Controller module can set the common function parameters from the equivalent interface to that of GX Works2.

When referring to the manuals for the programmable controller CPU and modules used for related functions and parameter setting methods, replace the following parameters as shown below.

- CCPU parameter → PC parameter
- Network parameter CC IE/MELSECNET → Ethernet/CC IE/MELSECNET

(3) Parameter setting procedures

Described below are procedures to create parameters and write into C Controller modules.

1. **Start up the Setting/monitoring tools for the C Controller module.**
2. **Create a project.**
3. **Set parameters.**
4. **Connect the a personal computer to the C Controller module. (☞ Page 125, Section 8.7)**
5. **Write the parameters.**
   [Online] ⇒ [Write to CCPU]
6. **Reset the C Controller system. (☞ Page 71, Section 6.3)**
   The written parameters are applied.

(4) Error detection

If any error occurs in the parameter settings, ERR.LED of the C Controller module is lit.

Use the following functions in Setting/monitoring tools for the C Controller module to check and correct the error factors.

- **[Diagnostics] ⇒ [CCPU diagnostics]**
- **[Diagnostics] ⇒ [Event history]**

Double-clicking an event item in the event history display field shows the "Detailed event information" screen. The "Detailed event information" shows the Parameter No. (☞ Page 296, Section 15.3).

15.1 Parameter List

This section shows the list of parameter setting items.
For each setting screen and setting item, refer to the following.
📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

For Parameter No., refer to the following.
☞ Page 296, Section 15.3

15.1.1 CCPU parameter settings

CCPU parameters are listed below.

Set in:	Item		Parameter No.	Reference
<<Name settings>>	Label		0000H	–
	Comment		0001H	
<<System settings>>	Points Occupied by Empty Slot		1007H	Page 299, Section 16.1.2
	Remote Reset		1002H	Page 163, Section 11.5
	Output Mode at STOP to RUN		1003H	Page 151, Section 11.1.5
	Refresh setting	Refresh cycle	FD10H	Page 170, Section 11.7
	Intelligent Function Module Setting (interrupt event settings)		100AH	Manuals for respective intelligent function modules and interrupt modules
	Module Synchronization		100CH	
	Restarting user CPU		FD05H	Page 73, Section 6.4
	Standard RAM settings		FD03H	Page 309, Section 18.1.1
<<RAS settings>>	WDT (Watchdog Timer) Setting	System WDT Setting	3000H	Page 158, Section 11.3
		User WDT Setting	FD06H	
	Error Check	Carry Out Battery Check	3001H	Page 154, Section 11.2
		Carry Out Fuse Blown Check		
		Verify Module		
		Diagnose Redundant Power Supply System		
	Operating Mode When There is an Error	Fuse Blown	3002H	
		Module Verify Error		
	Event history registration settings	Do not register system (information) event details.	FD00H	Page 187, Section 11.9
<<Device settings>>	Device Points		2000H	Page 169, Section 11.6 Page 212, Section 13.2.1

Set in:	Item		Parameter No.	Reference
<<I/O assignment settings>>	I/O Assignment		0400H	Page 301, Section 16.2
	Base Setting		0401H	Page 303, Section 16.3
	Switch Setting		0409H	Page 147, Section 11.1.2
	Detailed Setting	Error Time Output Mode	0403H	Page 152, Section 11.1.6 Page 154, Section 11.2
		H/W error time CPU operation mode	4004H	Page 153, Section 11.1.7 Page 154, Section 11.2
		I/O Response Time	0405H	Page 150, Section 11.1.4
		Control CPU	0406H	QCPU User's Manual (Multiple CPU System)
<<Multiple CPU settings>>	Number of CPUs		0E00H	–
	Host CPU number		E00CH	QCPU User's Manual (Multiple CPU System)
	Operation mode		0E01H	Page 154, Section 11.2
	Multiple CPU synchronous startup setting		E00BH	Page 286, Section 14.9
	Online module change		E006H	(Page 96, Section 7.5.1)
	I/O Sharing When Using Multiple CPUs		0E04H	QCPU User's Manual (Multiple CPU System)
	Multiple CPU High Speed Transmission Area Setting		E008H	Page 261, Section 14.1.3
	Communication Area Setting (Refresh Setting)		E003H	Page 256, Section 14.1.2
<<User Ethernet port (CH1 and CH2) settings>>	IP Address Setting CH1		FD02H	Page 192, Section 12.1
	IP Address Setting CH2			
<<System Ethernet port (S CH1) settings>>	IP Address Setting S CH1		1016H	Page 200, Section 12.2
	Time Setting			Page 202, Section 12.2.1
<<Built-in Ethernet port (CH1 and CH2) settings>>	IP Address Setting CH1			Page 192, Section 12.1 Page 200, Section 12.2
	Time Setting			Page 202, Section 12.2.1
	IP Address Setting CH2		FD09H	Page 192, Section 12.1 Page 200, Section 12.2
<<MELSEC data link function settings>>	Q series bus interface (Channel No.12)		FDD0H	Function Help (Setting/monitoring tools for the C Controller module)
	MELSECNET/H (Channel No. 51 to 54)		FDD2H	
	CC-Link (Channel No.81 to 88)		FDD1H	
	CC-Link IE Controller Network (Channel No. 151 to 154)		FDD3H	
	CC-Link IE Filed Network (Channel No. 181 to 188)		FDD4H	
<<Account settings>>	Account settings		FD01H	Page 177, Section 11.8.1
<<Data refresh settings>>	Data refresh settings		FD11H	Page 171, Section 11.7.1
	Interrupt Settings		FD12H	
<<Security settings>>	Service setting		FD07H	Page 185, Section 11.8.4
	Password setting		FD08H	Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

15.1.2 Network parameter settings

Network parameters are listed below.

(1) CC-Link IE Controller Network setting

Network parameters for the CC-Link IE controller are listed below.

Set in:	Item	Parameter No.	Reference
CC IE/MELSECNET (When the CC-Link IE Controller Network station is selected by network type)	Network Type	A000H	MELSEC-Q CC-Link IE Controller Network Reference Manual
	Start I/O No.	ANM0H	
	Channel No.	FDD3H	
	Network No.	ANM0H	
	Total Stations	ANM0H	
	Group No.	0A**H	
	Station No.	ANM0H	
	Mode	ANM0H	
	Network Range Assignment	ANM2H	
		ANM3H	
	Refresh Parameters	ANM1H	Page 227, Section 13.4.1 (2)(a) Page 249, Section 13.5.3
	Target Settings	FDD3H	MELSEC-Q CC-Link IE Controller Network Reference Manual
	Transient transmission size	FDD3H	
	Routing Parameters	5003H	

(2) MELSECNET/H settings

Network parameters for MELSECNET/H and MELSECNET/10 are listed below.

Set in:	Item	Parameter No.	Reference
CC IE/MELSECNET (When the MELSECNET/H, and MELSECNET/10 mode station is selected by network type)	Network Type	5000H	Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)
	Start I/O No.	5NM0H	
	Channel No.	FDD2H	
	Network No.	5NM0H	
	Total Stations	5NM0H	
	Group No.	05**H	
	Mode	5NM0H	
	Network Range Assignment	5NM2H	
	Refresh Parameters	5NM1H	Page 227, Section 13.4.1 (2)(a) Page 249, Section 13.5.3
	Return as control station/ Return as normal station	5NM2H	Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)
	Target Settings	FDD2H	
	Transient transmission size	FDD2H	
	Routing Parameters	5003H	

(3) CC-Link IE Field Network settings

Network parameters for the CC-Link IE Field Network are listed below.

Set in:	Item		Parameter No.	Reference
CC IE/MELSECNET (When the CC-Link IE Field Network station is selected by network type)	Network Type		A080H	MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual
	Start I/O No.		ANM0H	
	Channel No.		FDD4H	
	Network No.		ANM0H	
	Total Stations		ANM0H	
	Station No.		0A**H	
	Mode		0A**H	
	Network Configuration Settings	Station No.	ANM2H	
		Station Type		
		RX/RY Setting		
		RWw/RWr Setting		
		Reserved/Error Invalid Station		
		Supplementary setting		
		Alias	ANM3H	
		Comment		
	Network Operation Settings			
	Refresh Parameters		ANM1H	Page 234, Section 13.4.3 (2)(a) Page 249, Section 13.5.3
	Target Settings		FDD4H	MMELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual
	Transient transmission size		FDD4H	
	Routing Parameters		5003H	

(4) CC-Link settings

CC-Link IE network parameters are listed below.

Set in:	Item	Parameter No.	Reference
CC-Link	Number of Modules	C000H	MELSEC-Q CC-Link System Master/ Local Module User's Manual
	Start I/O No.	CNM2H	
	Channel No.	FDD1H	
	Operation Setting	CNM2H	
	Type	C000H	
	Mode	CNM2H	
	All connect count	CNM2H	
	Retry Count	CNM2H	
	Auto return station count	CNM2H	
	Standby Master Station No.	CNM2H	
	CPU Down Select	CNM2H	
	Delay information setting	CNM2H	
	Station information settings	CNM2H	
	Target Settings	FDD1H	

Meaning of "mn", "**", "M", and "N" in parameters is indicated below.

mn	: Start I/O No. divided by 16
**	: Any given value
N	: The module number
M	: Network type

Network types are indicated in the following table.

CC-Link IE / MELSECNET setting

M	Network type
1	CC-Link IE Control (Control station), CC-Link IE Control Extended mode (Control station), MNET/10 mode (Control station), MNET/H mode (Control station), MNET/H Extended mode (Control station)
2	CC-Link IE Control (Normal station), CC-Link IE Control Extended mode (Normal station), MNET/10 mode (Normal station), MNET/H mode (Normal station), MNET/H Extended mode (Normal station)
8	CC-Link IE Field (Master station)
9	CC-Link IE Field (Local station)

CC-Link setting

M	Network type
0	Master station
1	Local station

15.2 Multiple CPU System Parameter Settings

CCPU parameter (PLC Parameter) settings, with some exceptions, must be the same across all CPU modules used in the multiple CPU system.

For the procedure to import multiple CPU parameters set in another project, refer to the following.

☞ Page 295, Section 15.2.2

When parameters have been changed, make the same settings for all CPUs in the multiple CPU system, then reset CPU No.1 or reapply power to the multiple CPU system (power OFF to ON).

15.2.1 Parameters required for multiple CPU system

Necessity of parameter item settings required for a multiple CPU system and necessity of the same setting are described below.

Parameters not indicated below can be set in the multiple CPU module and each CPU module individually as in the single CPU system.

Set in:	Item		Necessity of setup[*1]	Necessity of same setting[*2]
<<System settings>>	Points Occupied By Empty Slot		–	○
<<I/O assignment settings>>	I/O Assignment	Type	–	○
		Points	–	○
		Start X/Y	–	○
	Base Setting	Slots	–	○
	Detailed Setting	Control CPU	○	○
<<Multiple CPU settings>>	Number of CPUs		○	○
	Operation Mode		△	○
	I/O Sharing When Using Multiple CPUs	All CPUs can read all inputs	△	△
		All CPUs can read all outputs	△	△
	Communication Area Setting (Refresh Setting)	Send range for each CPU	△	○
	Online Module Change		△	△
	Multiple CPU High Speed Transmission Area Setting	CPU specific send range	△	○
	Host Station		△	–

[*1] : Necessity of setting
○: Required for multiple CPU systems. (Not operable without the setting)
△: Can be set if necessary for the multiple CPU system.
–: Set in the same way as single CPU system setting.

[*2] : Same setting
○: Must be the same for all the CPU modules in the multiple CPU system.
△: Items to have the same settings among CPU modules that can be set for a multiple CPU system.
(These items may not be valid in some CPU modules)
–: Can be set individually for each CPU module of the multiple CPU system.

15.2.2 Multiple CPU parameter importing

The following describes the procedure to utilize multiple CPU parameters set in another project.

For each setting screen and setting item, refer to the following.

📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(1) Operating procedure

The following is the procedure to import multiple CPU parameters set in another project.

1. **Start up the Setting/monitoring tools for the C Controller module.**
2. **Create a project.**
   [Project] ⇒ [New]
3. **Select a source project and read out I/O assignment and multiple CPU setting data.**
   Project view ⇒ "Parameter" ⇒ "CCPU Parameter"
   ⇒ <<I/O assignment settings>> / <<Multiple CPU settings>> ⇒ "Import Multiple CPU Parameter"
4. **Use the same setting for Points Occupied by Empty Slot in all CPU modules.**
   Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>>
   ⇒ "Points Occupied by Empty Slot"
5. **Acknowledge details of <<I/O assignment settings>>.**
   Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>>
   Set the individual items that can be set in each CPU module for the multiple CPU system, as necessary.
   Check that items with * in the setting screen are the same across all CPU modules.
6. **Acknowledge details of <<Multiple CPU settings>>.**
   Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>>
   Set the individual items that can be set in each CPU module for the multiple CPU system, as necessary.
   Check that items with * in the setting screen are the same across all CPU modules.
7. **Set parameters for other than multiple CPU system.**
8. **Save a project.**
   [Project] ⇒ [Save]
9. **Connect the PC to the C Controller module. (☞ Page 125, Section 8.7)**
10. **Write the parameters.**
    [Online] ⇒ [Write to CCPU]
11. **Reset the C Controller system. (☞ Page 71, Section 6.3)**
    The written parameters are applied.

15.3 Parameter Number

A parameter number is displayed on the “Detailed event information” screen of Setting/monitoring tools for the C Controller module when an error occurs in parameter setting. Parameters numbers are listed below.

For various settings, refer to the following.

- <<Item>> ☞ Page 289, Section 15.1.1
- CC IE Control ☞ Page 291, Section 15.1.2 (1)
- MNET/H, MNET/10 ☞ Page 291, Section 15.1.2 (2)
- CC IE Field ☞ Page 292, Section 15.1.2 (3)
- CC-Link ☞ Page 292, Section 15.1.2 (4)

No.	Item	Set in:
0000H	Label	<<Name settings>>
0001H	Comment	
1002H	Remote reset	<<System settings>>
1003H	Output mode at STOP to RUN	
1007H	Points occupied by empty slot	
100AH	Intelligent function module settings (Interrupt event settings)	
100CH	Module synchronization	
1016H	IP address setting S CH1	<<System Ethernet Port (S CH1) Setting>>
	Time setting	
	IP address setting S CH1	<<Built-in Ethernet Port (CH1 and CH2) Settings>>
	Time setting	
2000H	Number of device points	<<Device Setting>>
3000H	System WDT setting	<<RAS Setting>>
3001H	Error check	
3002H	Operation mode at the time of error	
0400H	I/O assignment	<<I/O Assignment>>
0401H	Base setting	
0403H	Error time output mode	
4004H	H/W error time CPU operation mode	
0405H	I/O response time	
0406H	Control CPU	
0409H	Switch settings	
05**H	Group No.	MNET/H, MNET/10
5000H	Network Type	
5003H	Routing parameter	
5NM0H	Start I/O No.	
	Network No.	
	Total stations	
	Mode	
5NM1H	Refresh parameters	

No.	Item	Set in:
5NM2H	Network range assignment	MNET/H, MNET/10
	Return as control station/ Return as normal station	
0A**H	Group No.	CC IE Control
	Station number	CC IE Field
	Mode	
A000H	Network Type	CC IE Control
A080H	Network Type	CC IE Field
ANM0H	Start I/O No.	CC IE Control CC IE Field
	Network No.	
	Network range assignment	
	Station number	CC IE Control
	Mode	
ANM1H	Refresh parameters	CC IE Control CC IE Field
ANM2H	Network range assignment	CC IE Control
ANM3H		
ANM2H	Network configuration settings	CC IE Field
ANM3H	Network configuration settings	
	Network operation settings	
C000H	Number of modules	CC-Link
	Type	
CNM2H	Start I/O No.	
	Operation setting	
	Mode	
	All connect count	
	Retry count	
	Auto return station count	
	Standby master station No.	
	CPU Down Select	
	Delay information setting	
	Station information settings	

No.	Item	Set in:
0E00H	Number of CPU	<<Multiple CPU Setting>>
0E01H	Operation mode	
E003H	Normal area setting	
0E04H	I/O sharing when using Multiple CPUs	
E006H	Online module change	
E008H	Multiple CPU high speed transmission area setting	
E00BH	Multiple CPU synchronous startup setting	
E00CH	Host CPU number	
FD00H	Event history registration settings	<<RAS Setting>>
FD01H	Account settings	<<Account settings>>
FD02H	IP address setting CH1	<<User Ethernet port (CH1 and CH2) settings>>
	IP address setting CH2	
FD03H	Standard RAM settings	<<System settings>>
FD05H	Restart user CPU	
FD06H	User WDT setting	<<RAS Setting>>
FD07H	Service setting	<<Security settings>>
FD08H	Password setting	
FD09H	IP address setting CH2	<<Built-in Ethernet Port (CH1 and CH2) Settings>>
FD10H	Refresh setting	<<System settings>>
FD11H	Data refresh settings	<<Data refresh settings>>
FD12H	Interrupt Settings	

No.	Item	Set in:
FDD0H	Q series bus interface (Channel No.12)	<<MELSEC data link function settings>>
FDD1H	CC-Link (Channel No.81 to 88)	<<MELSEC data link function settings>>
	Channel No.	CC-Link
	Target Settings	
FDD2H	MELSECNET/H (Channel No. 51 to 54)	<<MELSEC data link function settings>>
	Channel No.	MNET/H, MNET/10
	Target Settings	
	Transient transmission size	
FDD3H	CC-Link IE Controller Network (Channel No. 151 to 154)	<<MELSEC data link function settings>>
	Channel No.	CC IE Control
	Target Settings	
	Transient transmission size	
FDD4H	CC-Link IE Filed Network (Channel No. 181 to 188)	<<MELSEC data link function settings>>
	Channel No.	CC IE Field
	Target Settings	
	Transient transmission size	

Meaning of "mn", "**", "M", and "N" in parameters is indicated below.

mn	: Start I/O No. divided by 10H
**	: Any given value
N	: The module number
M	: Network type

Network types are indicated in the following table.

CC-Link IE / MELSECNET setting

M	Network type
1	CC-Link IE Control (Control station), CC-Link IE Control Extended mode (Control station), MNET/10 mode (Control station), MNET/H mode (Control station), MNET/H Extended mode (Control station)
2	CC-Link IE Control (Normal station), CC-Link IE Control Extended mode (Normal station), MNET/10 mode (Normal station), MNET/H mode (Normal station), MNET/H Extended mode (Normal station)
8	CC-Link IE Field (Master station)
9	CC-Link IE Field (Local station)

CC-Link setting

M	Network type
0	Master station
1	Local station

CHAPTER 16 I/O NUMBER ASSIGNMENT

This chapter describes the assignment of I/O numbers and base units.

(1) Setting method

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>>**

For the assignment of I/O numbers, refer to the following.
☞ Page 301, Section 16.2
For the assignment of the base unit, refer to the following.
☞ Page 303, Section 16.3

(2) Checking method

You may check the I/O numbers of the installed modules from the following functions of Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [System Monitor]**

16.1 I/O Number Assignment

The CPU module assigns I/O numbers at power on or reset, according to the I/O assignment setting.

16.1.1 Assignment order

I/O numbers are assigned from the main base units to extension base units, in order.
In each base unit, I/O numbers are assigned in sequence from the left slot to the right.

(1) Main base unit assignment sequence

The I/O numbers are assigned to the modules from left to right in a sequential order, starting from 00H assigned to the module on the right of the CPU module.
For the start point of the I/O numbers (00H), refer to the following.
☞ Page 300, Section 16.1.4

(2) Extension base unit assignment sequence

The leftmost (Slot 0) is assigned a subsequent number of the previous base unit number.
For base number setting of the C Controller module, refer to the following.
☞ Page 88, Section 7.3.2
For details of extension base number setting procedure, refer to the following.
📖 QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Point

When base units are assigned automatically, if an extension stage number is skipped, it will not be reserved as the number for an empty base unit. To reserve an extension stage, perform the base unit setting in the <<I/O Assignment Settings>> of parameter.

16.1.2 I/O number of each slot

Each slot on the base unit occupies I/O numbers by the number of I/O points of the mounted modules.
The occupied points and start I/O No. of each slot can be set in parameters. For settings, refer to the following.
☞ Page 301, Section 16.2

(1) Number of base unit slots

The number of assigned I/O numbers is the same as the number of slots set for each base unit. For setting of the number of base unit slots, refer to the following.
☞ Page 303, Section 16.3

(2) Number of occupied points for empty slot

The number of points specified in parameters are assigned to an empty slot if Auto is set.
(The default is 16 points.)
For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Points Occupied by Empty Slot"**

16.1.3 I/O number of each CPU module

In a multiple CPU system configuration, a specific I/O number is assigned to each CPU module for identification.
Each of these I/O number is fixed to the corresponding slot and cannot be changed in the <<I/O assignment setting>> of parameter.

CPU module position	Start I/O number
CPU slot	$3E00_H$
Slot 0	$3E10_H$
Slot 1	$3E20_H$
Slot 2	$3E30_H$

16.1.4 Start point of the I/O numbers (00H)

The following describes a start point of the I/O numbers (00H)

(1) Automatic assignment

In case of automatic assignment, the start point of the I/O number (00H) are determined as described below.

(a) For a single CPU system

Slot 0 of the main base unit is assigned as 00H.
(The immediate right of the C Controller module is Slot 2.)

(b) For a multiple CPU system

The right hand side slot of each CPU module set in parameters in the main base unit is assigned as 00H.
Use the following functions in Setting/monitoring tools for the C Controller module to set the number of CPUs.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<Multiple CPU settings>> ⇒ "No. of CPU"**

(2) To set the immediate right of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS as a start point

The Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS takes up 3 slots. 2 of the 3 slots are treated as empty slots. Therefore, the start point (00H) of the I/O numbers assigned automatically may be the second or third slot of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS.
To set the immediate right of the Q24DHCCPU-V/-VG/-LS and Q26DHCCPU-LS (slot to which the I/O modules and intelligent function modules can be actually inserted) as the I/O number start point (00H), perform either of the following settings in parameters.

(a) Setting the number of occupied points for empty slot

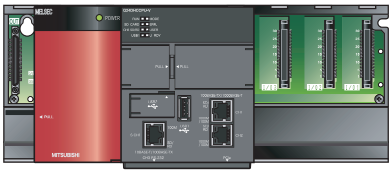
Use Setting/monitoring tools for the C Controller module to set the number of occupied points for empty slots to 0.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>>**
  ⇒ "Points Occupied by Empty Slot"

(b) To set I/O assignment

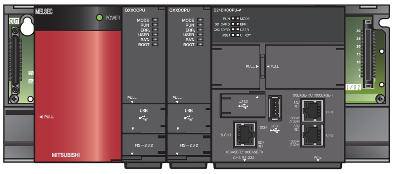
Set the type and number of points of 2 right-hand slots of the used slots to "Empty" and "0 Point", respectively.

- Setting example of Q24DHCCPU-V

Installation example	Slot	Type	Model name	Points
	CPU slot	CPU No.1	Q24DHCCPU-V	-
	Slot 0	Empty	(Slot 2)	0 Point
	Slot 1	Empty	(Slot 3)	0 Point
	Slot 2	(Setting not required)		
	Slot 3			

In case of the multiple CPU system, set the type to "CPU (Empty)".

- Setting example with 2 QCPUs and a Q24DHCCPU-V

Installation example	Slot	Type	Model name	Points
	CPU slot	CPU No.1	Q06UDHCPU	-
	Slot 0	CPU No.2	Q06UDHCPU	-
	Slot 1	CPU No.3	Q24DHCCPU-V	-
	Slot 2	CPU (Empty)	(Slot 2)	-
	Slot 3	Empty	(Slot 3)	0 Point

16.2 Setting I/O Numbers

When changing I/O numbers of each slot, a new start I/O number can be entered for each slot.
For details of setting I/O number, refer to the following.
📖 QnUCPU Users Manual (Function Explanation, Program Fundamentals)
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "I/O Assignment"**

On the I/O Assignment tab, the following items can be set for each slot on the base unit.

- "Points" (I/O points)
- "Start XY" (start I/O number)
- "Type" (module type)

To change the I/O number of the specified slot, setting is allowed only to the number of points.

(a) Points

When I/O assignment is set for a slot, the setting has priority over the actual module-mounting status.

The number of points of the mounted module is applied to a slot without any specified number of points.

However, the empty slot is assigned the number of points set in System settings.

Point

- When setting the number of I/O points less than that of mounted I/O modules
  The available number of I/O points for the mounted I/O modules will be reduced. When the number of I/O points is set to 16 points in the I/O Assignment tab of the PLC parameter dialog box for the slot where a 32-point input module is mounted, the second half 16 points of the module becomes unavailable.
- When setting the number of I/O points less than that of mounted intelligent function module
  An error (error code: 2100, SP.UNIT LAY ERR.) occurs.
- When setting the number of I/O points exceeding that of mounted I/O modules
  The exceeded number of points will not be used in the I/O modules.
- When setting 0 points for empty slots
  Setting "Empty" for Type and "0 Point" for Points even occupies one slot. To set slots after the specific slot number unoccupied, set the number of slots in detail mode.

(b) Start XY

When changing I/O numbers of each slot, enter a new start I/O number.

When I/O assignment is set for a slot, the setting has priority over the actual module-mounting status.

To the slot with no start X/Y setting, I/O numbers following those of the configured slot are assigned in order.

Point

For the I/O assignment settings, set the last I/O number to be within the maximum number of I/O points (FFF_{H}).
If it exceeds the maximum number of I/O points (FFF_{H}), an error (error code: 2124, SP.UNIT LAY ERR.) occurs.

(c) Type

The type set in the I/O Assignment tab must be the same as that of the mounted module.

Setting a different type may cause incorrect operation. For an intelligent function module, the number of I/O points must also be the same to the I/O assignment setting.

The following table lists the operations when the mounted module type differs from the one set in the I/O Assignment tab.

Mounted module	I/O assignment setting	Result
Input module, Output module, I/O combined module	• Intelli. • Interrupt	Error (error code:2100, SP.UNIT LAY ERR.)
Intelligent function module	• Input • Hi. Input • Output • I/O Mix	
Empty slot	• Input • Hi. Input • Output • I/O Mix • Intelli. • Interrupt	Empty slot
All modules	• Empty	
Other combinations	-	Incorrect operation may be caused, no error occurrence. Or, error (error code: 3000, PARAMETER ERROR)

16.3 Base Unit Assignment Setting

The number of slots that can be mounted to the main base units and extension base units can be set for each base unit regardless of the actual number of slots in the base units used.
For details of base unit assignment, refer to the following.
📖 QnUCPU Users Manual (Function Explanation, Program Fundamentals)
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

For this setting, use the following functions in Setting/monitoring tools for the C Controller module.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>> ⇒ "Base Setting"**
  When "Auto" is selected in the Base Mode, the number of points for the mounted slot becomes valid.
  When "Detail" is selected in the Base Mode, the number of slots can be set for each base unit.

Point

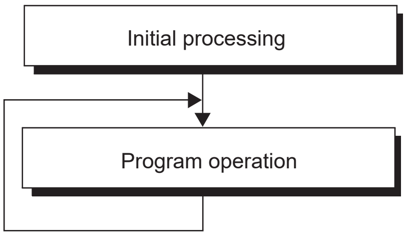
- In auto mode, when any extension base unit number is skipped at the setting using the base number setting connector, an empty extension base unit cannot be reserved. To reserve empty extension base units for future extension, select detail mode.
- In detail mode, set the number of slots to all base units used. Failure to do so may result in incorrect I/O assignment setting.

CHAPTER 17 EXECUTION ORDER AND OPERATION PROCESSING OF C CONTROLLER MODULE

This chapter describes how the parameters and programs are processed by the C Controller module.

17.1 Execution Order

The C Controller module executes programs in the following order.



17.2 Operation Processing

This chapter explains the operation processing of the C Controller module.

17.2.1 Initial processing

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The initial processing performs pre-processing required for program operations.
The processing is executed at power-on and reset of C Controller module.
When the initial processing is completed, the CPU module is placed in the status preset by the RUN/STOP/MODE switch.

Items executed in initial processing are as follows:

- I/O module initialization
- Parameter check
- Multiple CPU system parameter consistency check
- Automatic I/O number assignment of mounted module
- IP address setting of C Controller module
- Network information set for the following networks:
  - CC-Link IE Field Network
  - CC-Link IE Controller Network
  - MELSECNET/H
  - CC-Link
- Intelligent function module switch setting
- Script file execution*1 **Note17.1**

*1 : Q24DHCCPU-V/-VG : starting a user program from the standard ROM, or an SD memory card.
Q12DCCPU-V : starting a user program from the standard ROM, standard RAM , or a CompactFlash card.

Note17.1 Q24DHCCPU-LS Q26DHCCPU-LS

Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

17.2.2 I/O access timing

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	△

This section explains the input (X) and output (Y) data transfer timings of the C Controller module.

(1) Input (X) loading timing Note17.2

The C Controller module loads input (X) data at one of the following timings.

- When a bus interface function (such as the md_RandREx, QBF_X_In_BitEx) is executed in the user program
- When data refresh is executed
- When input (X) data are read out from a peripheral device
  (When monitoring using the device monitor function of Setting/monitoring tool for the C Controller module.)

(2) Output (Y) writing timing Note17.2

The C Controller module writes output (Y) data at one of the following timings.

- When a bus interface function (such as the md_RandWEx, QBF_Y_Out_BitEx) is executed in the user program
- When data refresh is executed
- When output (Y) data are written from a peripheral device
  (When monitoring using the device monitor function of Setting/monitoring tool for the C Controller module.)

Remark

For details of the bus interface functions, refer to the following.
☞ Page 356, CHAPTER 21

Note17.2 Q24DHCCPU-LS Q26DHCCPU-LS Q12DCCPU-V

The bus interface function is not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.
The data refresh function is not supported by Q12DCCPU-V.

17.2.3 RUN, STOP and PAUSE status operation processing

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The C Controller module has three different operation states: RUN, STOP and PAUSE.

The C Controller module continues the user program operations in either status.

Changing the operation status also changes status of following outputs from the C Controller module:

- Output (Y) to each module
- Buffer memory writing

Point

● Acquisition of module status

- To change the program processing according to the operation status of the C Controller module, use a function to acquire status and perform programming.
- Operation status of the C Controller module can be acquired by the C Controller module dedicated function (CCPU_GetCPUStatus). For "-LS", consult with the partner (operating system vendor).

(1) Operation processing in the RUN status

In the RUN status, output (Y) to each module and buffer memory writing are enabled from the user program in the C Controller module.

(a) Output status when entering the RUN status

Output after transition of the status from STOP to RUN can be selected from the following: (☞ Page 151, Section 11.1.5)

- Output (Y) status saved in the STOP status (default)
- Result of operations performed after one scan

(2) Operation processing in the STOP status

In the STOP status, output (Y) to each module and buffer memory writing from the user program of the C Controller module are disabled.

The C Controller module is also set in the STOP status when a stop error occurs.

(a) Output status when entering the STOP status

When the status changes from STOP to RUN, the C Controller module saves the output status data and clears all outputs (Y) to OFF.

(3) Operation processing in the PAUSE status

In the PAUSE status, output (Y) to each module and buffer memory writing from the user program of the C Controller module are disabled, with the ON/OFF output data (Y) held.

Point

Regardless of which status the C Controller module is in (RUN/STOP/PAUSE), output (Y) operations and writing into the buffer memory are allowed from Setting/monitoring tools for the C Controller module.

(4) Related functions

The following indicates the related functions.

Function	Description	Reference
Output (Y) setting for switching from STOP to RUN	Selects the status after transition from STOP to RUN from the following: • Outputting the output status data before STOP. • Clearing the output (Y) data.	Page 151, Section 11.1.5
Hardware error time CPU operating mode setting	Set whether to stop or run the C Controller module when a hardware error occurs in an intelligent function module.	Page 153, Section 11.1.7

(5) Operation procedures Note17.3

The operation status can be changed by remote operations from the RUN/STOP/MODE switch or Setting/monitoring tools for the C Controller module.

Operation procedures	Operation status			Reference
	RUN status	STOP status	PAUSE status	
RUN/STOP/MODE switch	RUN	STOP	-	Page 70, Section 6.2
User program	Execute remote RUN	Execute remote STOP	Execute remote PAUSE	Page 163, Section 11.5
Setting/monitoring tools for the C Controller module				

17.2.4 Operation processing during momentary power failure

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	△	△	○

The C Controller module detects a momentary power failure when the input power voltage supplied to the power supply module falls below the specified range.
When a momentary power failure is detected, either of the following operations is performed.

(1) When momentary power failure time is within the allowable range

When a momentary power failure occurs, the output status is held and the operation stops.
After power is restored, the error information is registered to the event history file. (The initial time only)

(a) After recovering from a momentary power failure

The operation processing is resumed when the module recovers from a momentary power failure.

(b) Confirming the number of detections For "-LS", consult with the partner (operating system vendor).

The C Controller module counts how many time momentary power failure has been detected and holds the data.
The number of momentary power failure detections can be confirmed by the C Controller module dedicated function (CCPU_GetPowerStatus) and special register SD53.

(2) When power failure lasts longer than the allowable momentary power failure time

Initial start is required for the C Controller module.
The processing executed at power-on and reset of C Controller module is performed.
☞ Page 305, Section 17.2.1

Note17.3 Q24DHCCPU-LS Q26DHCCPU-LS

The remote operation from a user program is not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

CHAPTER 18 MEMORIES AND FILES

This chapter describes the memories handled by the C Controller module and files that can be stored.

18.1 Memories and files of Q24DHCCPU-V

The following describes the available memories and files that can be stored in Q24DHCCPU-V.

18.1.1 Memory type

The following memories are available.

- System ROM .... ☞ Page 309, (1) in this section
- Internal ROM .... ☞ Page 309, (2) in this section
- Standard ROM... ☞ Page 309, (3) in this section
- Work RAM/RAM disk .... ☞ Page 310, (4) in this section
- Battery backup RAM/Standard RAM .... ☞ Page 310, (5) in this section
- SD memory card...................................... ☞ Page 311, (6) in this section
- USB device .... ☞ Page 311, (7) in this section
- CPU shared memory .... ☞ Page 312, (8) in this section
- Data refresh memory .... ☞ Page 312, (9) in this section

(1) System ROM

A system ROM is a memory that stores system software and VxWorks image files required for operations of the C Controller module.

Only read-out from FTP, Telnet and user programs is allowed.

(2) Internal ROM

An internal ROM is a memory that store parameters.

Use the following functions in Setting/monitoring tools for the C Controller module to read/write parameters.

- **[Online] ⇒ [Read from CCPU]/[Write to CCPU]**

Access from FTP, Telnet and user programs is not allowed.

Initialization (☞ Page 62, Section 6.1) restores the initial parameter values.

(3) Standard ROM

A standard ROM is a memory that store files such as user programs.

Access from FTP, Telnet and user programs is allowed.

Since a standard ROM is a flash ROM, write count (life) is limited.

For the procedures to check the life and writing frequency of a standard ROM, refer to the following.

☞ Page 137, Section 9.4

(4) Work RAM / RAM disk

(a) Work RAM

A work RAM is a volatile memory for program execution.

The following programs and software are read and executed in a work RAM.

- User programs stored into a standard ROM, and SD memory card
- C Controller module's OS and system software stored in the system ROM

A work RAM cannot store files. To store files, create a RAM disc within a work RAM.

(b) RAM disk

Create the VxWorks function in a work RAM by the user program.

It can be accessed from FTP, Telnet and user programs and store files.

Point

- ● Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files.
- ● A sample program to create a RAM disc (MakeRAMDisk) is stored in Setting/monitoring tools for the C Controller module.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(5) Battery backup RAM / Standard RAM

(a) Battery backup RAM

A battery backup RAM is a memory that stores data that need to be retained through power OFF among data used by user programs, etc.

Access to a battery backup RAM from the C Controller module dedicated function by using the user program is allowed. Functions used are indicated below.

Function name	Function
CCPU_WriteSRAM	Writes data to the battery backup RAM.
CCPU_ReadSRAM	Reads data from the battery backup RAM.
CCPU_WriteSRAM_ISR	Writes data to the battery backup RAM. Executable from the interrupt service routine.
CCPU_ReadSRAM_ISR	Reads data from the battery backup RAM. Executable from the interrupt service routine.

Remark

For C Controller module dedicated function, refer to the following.
☞ Page 353, CHAPTER 20

A battery backup RAM cannot store files. To store files, create a standard RAM area within a battery backup RAM.

(b) Standard RAM

The area for standard RAM is created by specifying the memory capacity in the battery backup RAM with parameters.
As with a standard ROM, it can be accessed from FTP, Telnet and user programs and store files.

Use the following functions in Setting/monitoring tools for the C Controller module to set a memory capacity of a standard RAM.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Standard RAM settings"**

Point

- A standard RAM is created when the set parameters are applied (power OFF→ON /reset).
- When the area for standard RAM is created, the memory specified for standard RAM is occupied, therefore, the battery backup RAM area will be decreased.
  [Example] If a 2MB standard RAM is created
  5MB (total capacity) - 2MB (standard RAM capacity) = 3MB (available battery backup RAM capacity)
- Before modifying the standard RAM setting, it is recommended to backup the standard RAM data. When the standard RAM setting is modified, the standard RAM area is cleared to 0.

(6) SD memory card

An SD memory card can store parameters and files such as user programs.
Access from FTP, Telnet and user programs is allowed.
For SD memory cards, refer to the following.
☞Page 103, Section 7.6.1

(7) USB device

A USB device can store files other than user programs.
Access from FTP, Telnet and user programs is allowed.
For USB devices, refer to the following.
☞Page 106, Section 7.6.3

(8) CPU shared memory

A CPU shared memory is a memory in a multiple CPU system that stores data to cooperation between CPU modules. It is cleared to 0 at power OFF or reset.

A CPU shared memory is accessed from the user program by using the bus interface function or MELSEC data link function.
Functions used are indicated below.

Function name	Function
QBF_ToBuf	Writes data into the CPU shared memory in the specified module location.
QBF_FromBuf	Reads data from the CPU shared memory in the specified module location.
mdSendEx	Batch writes devices[*1].
mdReceiveEx	Batch reads devices[*1].

*1 : Specify DevSPB1-DevSPB4 as a device name. (☞ Page 366, Section 22.5)

Remark

- For the bus interface function and MELSEC data link function, refer to the following.
  ☞ Page 356, CHAPTER 21. Page 362, CHAPTER 22
- For data communication function by the CPU shared memory, refer to the following.
  ☞ Page 252, Section 14.1.1

(9) Data refresh memory

A data refresh memory is a memory that stores device data to be read/written by the data refresh function. It is cleared to 0 at power OFF or reset.

Access to a data refresh memory from the C Controller module dedicated function by using the user program is allowed. Functions used are indicated below.

Function name	Function
CCPU_WriteDataRefreshMemory	Writes data into the data refresh memory.
CCPU_ReadDataRefreshMemory	Reads data from the data refresh memory.

Remark

- For C Controller module dedicated function, refer to the following.
  ☞ Page 353, CHAPTER 20
- For data refresh between the data refresh memory and user device(s), refer to the following.
  ☞ Page 171, Section 11.7.1

18.1.2 Storable data

The following table lists data that can be stored in each memory.

○: Storable, ×: Not storable

Memory	Parameter	Script file	General files other than the left	Other than files
System ROM[*1]	×	×	×	×
Internal ROM	○	×	×	×
Standard ROM	×	○	○[*2]	×
Work RAM	×	×	○[*3]	○
Battery backed up RAM/ Standard RAM	×	×	○[*4]	○
SD memory card	×	○	○	×
USB device	×	×	○	×
CPU shared memory	×	×	×	○
Data refresh memory	×	×	×	○

*1 : Writing into the system ROM is not allowed.

*2 : Do not use the user program to write into the standard ROM. As the write count of the standard ROM is limited, doing so will reduce the operation life of the C Controller module.

*3 : Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files. To store files in the work RAM, create a RAM disc.

*4 : To store files in the battery backup RAM, create a standard RAM.

18.1.3 Drive name assignment and format

The following memories can be accessed from FTP, Telnet and user programs.

For access from the user program, and file reading/writing by FTP, the target memory is specified by a drive name.

The procedure for drive name assignment to the memory, supported file systems, and formatting methods are described below.

Memory	Drive name	File systems	Formatting method
System ROM	/SYSTEMROM	FAT16	Cannot be formatted.
Standard ROM	/ROM	FAT16	☞ Page 314, (1) in this section
Work RAM[*1]	(arbitrary)[*2]	(FAT16/FAT32)	–
Standard RAM	/RAM	FAT16	☞ Page 315, (2) in this section
SD memory card	/SD	FAT16/FAT32	☞ Page 315, (3) in this section
USB device	/USB0[*3]	FAT16/FAT32	

*1 : A RAM disc can be created by using VxWorks function from the user program.

*2 : Do not assign the same name as any other drives. Otherwise, the system may fail.

*3 : If the drive is partitioned, the second and subsequent partitions are "/USB0:2","USB0:3".

(1) Format operation of standard ROM

1. Write the following script file "STARTUP.CMD" to the SD memory card, insert it into the C Controller module, and then start the C Controller module.
(The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard ROM formatting[*1]>

STARTUP.CMD

```
diskFormat("/ROM")
CCPU_SetDotMatrixLED(1,"END")
```

*1 : The sample script file for standard ROM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. The dot matrix LED indicates "END" upon completion of standard ROM format.
The ERR. LED flashes if the standard ROM formatting is terminated in error.
In this case, initialize C Controller module. (Page 62, Section 6.1)

3. Power OFF the C Controller module, and remove the SD memory card.

Point

- Do not format the standard ROM using a command from Workbench Shell.
- Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
    - Power OFF
    - Reset
    - Restarting user CPU

(a) After formatting standard ROM

After formatting a standard ROM, the data such as user programs are deleted. Write the user programs after the connection.

(2) Format operation of standard RAM

1. Write the following script file "STARTUP.CMD" to the SD memory card, insert it into the C Controller module, and then start the C Controller module.
(The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard RAM formatting[*1]>

STARTUP.CMD

```
diskFormat("/RAM")
CCPU_SetDotMatrixLED(1,"END")
```

[*1] : The sample script file for standard RAM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. The dot matrix LED indicates "END" upon completion of standard RAM format.
The ERR. LED flashes if the standard RAM formatting is terminated in error.
In this case, initialize C Controller module. (Page 62, Section 6.1)

3. Power OFF the C Controller module, and remove the SD memory card.

Point

- ● Do not format the standard RAM using a command from Workbench Shell.
- ● Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
  - • Power OFF
  - • Reset
  - • Restarting user CPU

(a) After formatting standard RAM

After formatting a standard RAM, the data such as user programs are deleted. Write the user programs after the connection.

(3) Formatting of SD memory card and USB device in use

Use a device formatted by a supported file system.
For formatting methods, refer to the manual for respective devices.

18.1.4 Files

(1) Files configuration

Folder and file configuration of the C Controller module is described below:

○: Access allowed/Valid, ×: Access not allowed/Invalid

Drive	Folder	File	Overview	FTP access	Factory setting	After initialization
/SYSTEMROM			System ROM	○	○	○
		prjParams.h	VxWorks component list	○	○	○
	OS_IMAGEFILE		VxWorks image storage folder	○	○	○
		Q24DHCCPU-V_XXXXX-Y[1]	VxWorks image file (☞ Page 343, Section 19.5)	○	○	○
/ROM			Standard ROM	○	○	○
Arbitrary[2]			Work RAM	○	×	×
/RAM			Standard RAM	○	×	×
/SD			SD memory card	○	×[3]	×[3]
/USB0[4]			USB device	○	×[5]	×[5]

[1] : The last part of the file name "XXXXX-Y" indicates the upper five digits of the serial number and function version.

[2] : Specify when creating RAM disk in user program.

[3] : A "/SD" drive is created when an SD memory card is inserted (mounted) into the SD memory card installation slot.

[4] : If the drive is partitioned, the second and subsequent partitions are "/USB0:2", "/USB0:3" and so on.

[5] : A "/USB0" drive is created when a USB device is connected (mounted) into the USB connector (USB1).

Point

- Characters that can be used in file and directory names are as follows:
  - Single-byte alphanumeric characters
  - Single-byte special characters (excluding \ / * ? < > | : ")
- If wrong characters are used, the following symptoms may occur:
  - Garbled file and directory names
  - File name and directory loss

(2) Precautions for file operations

This section describes the operations and precautions of memories and drives of the C Controller module.

(a) File writing

Before writing files by FTP and Telnet, etc. during user program operations, make sure that the file(s) to write will not affect the running user program.

(b) File writing destination

Do not use the user program to write into the standard ROM.

As the write count of the standard ROM is limited, doing so will reduce the operation life of the C Controller module. If files are to be written from the user program frequently, write files into the RAM disc, standard RAM, SD memory card, USB device and network device[1] (via FTP/NFS/netDrv), etc.

[1] : For details, 📖refer to the manual for VxWorks.

(c) Access to the same file

Files being written are not accessible.

Files being accessed are not writable.

(d) Operations not allowed during file access

During access to files in a standard ROM, standard RAM, SD memory card, or USB device, do not perform the following operations. Otherwise, data in the SD memory card and USB device may be corrupted or any file system failure may occur.

- Power OFF
- Reset
- Restarting user CPU
- Unmounting SD memory card and USB device
- Removing SD memory card and USB device

Configure the program to close the file(s) being accessed and perform the above operations when you access user file(s) in any of the above memories.

(e) The number of files and directories

The maximum number of files and directories that can be created in the root directory of the following memories are 512.

- Standard ROM
- Standard RAM

However, the maximum number may be reduced depending on file name length and character types.

The maximum number of files and directories that can be created in the root directory of the following memories mountable to this product varies depending on memory capacity and file system format.

- SD memory card
- USB device

Moreover, the number directories and the number of files in the root directory are 100 or less. Set this number to 500 or less.
If you store more files or directories than the above-mentioned, the file access time might significantly increase. Due to this, it may affect the operation of the C controller module and user program.

(f) Creating a directory

Do not create a directory in the root "/" of the C Controller module. Such directory creation processing fails or an unintended directory may be created. (These errors occur also when transferring a directory to the root "/" through FTP.)

18.2 Memories and files of Q24DHCCPU-VG

The following describes the available memories and files that can be stored in Q24DHCCPU-VG.

18.2.1 Memory type

The following memories are available.

- System ROM.. ☞Page 318, (1) in this section
- Internal ROM.. ☞Page 318, (2) in this section
- Standard ROM .... ☞Page 318, (3) in this section
- Work RAM/RAM disk .... ☞Page 319, (4) in this section
- Battery backup RAM/Standard RAM .... ☞Page 319, (5) in this section
- SD memory card .... ☞Page 320, (6) in this section
- USB device .... ☞Page 320, (7) in this section
- CPU shared memory .... ☞Page 321, (8) in this section
- Data refresh memory .... ☞Page 321, (9) in this section

(1) System ROM

A system ROM is a memory that stores system software and VxWorks image files required for operations of the C Controller module.

Only read-out from FTP, Telnet and user programs is allowed.

(2) Internal ROM

An internal ROM is a memory that store parameters.

Use the following functions in Setting/monitoring tools for the C Controller module to read/write parameters.

- **[Online] ⇒ [Read from CCPU]/[Write to CCPU]**

Access from FTP, Telnet and user programs is not allowed.

Initialization (☞Page 62, Section 6.1) restores the initial parameter values.

(3) Standard ROM

A standard ROM is a memory that store files such as user programs.

Access from FTP, Telnet and user programs is allowed.

Since a standard ROM is a flash ROM, write count (life) is limited.

For the procedures to check the life and writing frequency of a standard ROM, refer to the following.

☞Page 137, Section 9.4

(4) Work RAM / RAM disk

(a) Work RAM

A work RAM is a volatile memory for program execution.

The following programs and software are read and executed in a work RAM.

- User programs stored into a standard ROM, and SD memory card
- C Controller module's OS and system software stored in the system ROM

A work RAM cannot store files. To store files, create a RAM disc within a work RAM.

(b) RAM disk

Create the VxWorks function in a work RAM by the user program.

It can be accessed from FTP, Telnet and user programs and store files.

Point

- Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files.
- A sample program to create a RAM disc (MakeRAMDisk) is stored in Setting/monitoring tools for the C Controller module.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(5) Battery backup RAM / Standard RAM

(a) Battery backup RAM

A battery backup RAM is a memory that stores data that need to be retained through power OFF among data used by user programs, etc.

Access to a battery backup RAM from the C Controller module dedicated function by using the user program is allowed. Functions used are indicated below.

Function name	Function
CCPU_WriteSRAM	Writes data to the battery backup RAM.
CCPU_ReadSRAM	Reads data from the battery backup RAM.
CCPU_WriteSRAM_ISR	Writes data to the battery backup RAM. Executable from the interrupt service routine.
CCPU_ReadSRAM_ISR	Reads data from the battery backup RAM. Executable from the interrupt service routine.

Remark

For C Controller module dedicated function, refer to the following.
☞ Page 353, CHAPTER 20

A battery backup RAM cannot store files. To store files, create a standard RAM area within a battery backup RAM.

(b) Standard RAM

The area for standard RAM is created by specifying the memory capacity in the battery backup RAM with parameters.
As with a standard ROM, it can be accessed from FTP, Telnet and user programs and store files.

Use the following functions in Setting/monitoring tools for the C Controller module to set a memory capacity of a standard RAM.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Standard RAM settings"**

Point

- A standard RAM is created when the set parameters are applied (power OFF→ON /reset).
- When the area for standard RAM is created, the memory specified for standard RAM is occupied, therefore, the battery backup RAM area will be decreased.
  [Example] If a 2MB standard RAM is created
  5MB (total capacity) - 2MB (standard RAM capacity) = 3MB (available battery backup RAM capacity)
- Before modifying the standard RAM setting, it is recommended to backup the standard RAM data. When the standard RAM setting is modified, the standard RAM area is cleared to 0.

(6) SD memory card

An SD memory card can store parameters and files such as user programs.
Access from FTP, Telnet and user programs is allowed.
For SD memory cards, refer to the following.
☞ Page 103, Section 7.6.1

(7) USB device

A USB device can store files other than user programs.
Access from FTP, Telnet and user programs is allowed.
For USB devices, refer to the following.
☞ Page 106, Section 7.6.3

(8) CPU shared memory

A CPU shared memory is a memory in a multiple CPU system that stores data to cooperation between CPU modules. It is cleared to 0 at power OFF or reset.

A CPU shared memory is accessed from the user program by using the bus interface function or MELSEC data link function.
Functions used are indicated below.

Function name	Function
QBF_ToBuf	Writes data into the CPU shared memory in the specified module location.
QBF_FromBuf	Reads data from the CPU shared memory in the specified module location.
mdSendEx	Batch writes devices[1].
mdReceiveEx	Batch reads devices[1].

[1] Specify DevSPB1-DevSPB4 as a device name. (☞ Page 366, Section 22.5)

Remark

- For the bus interface function and MELSEC data link function, refer to the following.
  ☞ Page 356, CHAPTER 21. Page 362, CHAPTER 22
- For data communication function by the CPU shared memory, refer to the following.
  ☞ Page 252, Section 14.1.1

(9) Data refresh memory

A data refresh memory is a memory that stores device data to be read/written by the data refresh function. It is cleared to 0 at power OFF or reset.

Access to a data refresh memory from the C Controller module dedicated function by using the user program is allowed. Functions used are indicated below.

Function name	Function
CCPU_WriteDataRefreshMemory	Writes data into the data refresh memory.
CCPU_ReadDataRefreshMemory	Reads data from the data refresh memory.

Remark

- For C Controller module dedicated function, refer to the following.
  ☞ Page 353, CHAPTER 20
- For data refresh between the data refresh memory and user device(s), refer to the following.
  ☞ Page 171, Section 11.7.1

18.2.2 Storable data

The following table lists data that can be stored in each memory.

○: Storable, ×: Not storable

Memory	Parameter	Script file	General files other than the left	Other than files
System ROM[*1]	×	×	×	×
Internal ROM	○	×	×	×
Standard ROM	×	○	○[*2]	×
Work RAM	×	×	○[*3]	○
Battery backup RAM/ Standard RAM	×	×	○[*4]	○
SD memory card	×	○	○	×
USB device	×	×	○	×
CPU shared memory	×	×	×	○
Data refresh memory	×	×	×	○

*1 : Writing into the system ROM is not allowed.

*2 : Do not use the user program to write into the standard ROM. As the write count of the standard ROM is limited, doing so will reduce the operation life of the C Controller module.

*3 : Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files. To store files in the work RAM, create a RAM disc.

*4 : To store files in the battery backup RAM, create a standard RAM.

18.2.3 Drive name assignment and format

The following memories can be accessed from FTP, Telnet and user programs.
For access from the user program, and file reading/writing by FTP, the target memory is specified by a drive name.
The procedure for drive name assignment to the memory, supported file systems, and formatting methods are described below.

Memory	Drive name	File systems	Formatting method
System ROM	/SYSTEMROM	FAT16	Cannot be formatted.
Standard ROM	/ROM	FAT16	☞ Page 323, (1) in this section
Work RAM[*1]	(arbitrary)[*2]	(FAT16/FAT32)	–
Standard RAM	/RAM	FAT16	☞ Page 324, (2) in this section
SD memory card	/SD	FAT16/FAT32	☞ Page 324, (3) in this section
USB device	/USB0[*3]	FAT16/FAT32	

*1 : A RAM disc can be created by using VxWorks function from the user program.
*2 : Do not assign the same name as any other drives. Otherwise, the system may fail.
*3 : When connecting multiple USB Mass Storage compliant devices, up to 5 devices can be connected and the second and subsequent devices will be "/USB0:2","USB0:3". If the drive is partitioned, the second and subsequent partitions are "/USB0:2","USB0:3".

(1) Format operation of standard ROM

1. Write the following script file "STARTUP.CMD" to the SD memory card, insert it into the C Controller module, and then start the C Controller module.
(The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard ROM formatting[*1]>

STARTUP.CMD

```
diskFormat("/ROM")
CCPU_SetDotMatrixLED(1,"END")
```

*1 : The sample script file for standard ROM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. The dot matrix LED indicates "END" upon completion of standard ROM format.
The ERR. LED flashes if the standard ROM formatting is terminated in error.
In this case, initialize C Controller module. (Page 62, Section 6.1)

3. Power OFF the C Controller module, and remove the SD memory card.

Point

- Do not format the standard ROM using a command from Workbench Shell.
- Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
    - Power OFF
    - Reset
    - Restarting user CPU

(a) After formatting standard ROM

After formatting a standard ROM, the data such as user programs are deleted. Write the user programs after the connection.

(2) Format operation of standard RAM

1. **Write the following script file "STARTUP.CMD" to the SD memory card, insert it into the C Controller module, and then start the C Controller module.**
(The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard RAM formatting[*1]>

```
STARTUP.CMD

    diskFormat("/RAM")
    CCPU_SetDotMatrixLED(1,"END")
```

[*1] : The sample script file for standard RAM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. **The dot matrix LED indicates "END" upon completion of standard RAM format.**
The ERR. LED flashes if the standard RAM formatting is terminated in error.
In this case, initialize C Controller module. (Page 62, Section 6.1)

3. **Power OFF the C Controller module, and remove the SD memory card.**

Point

- Do not format the standard RAM using a command from Workbench Shell.
- Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
  - Power OFF
  - Reset
  - Restarting user CPU

(a) After formatting standard RAM

After formatting a standard RAM, the data such as user programs are deleted. Write the user programs after the connection.

(3) Formatting of SD memory card and USB device in use

Use a device formatted by a supported file system.
For formatting methods, refer to the manual for respective devices.

18.2.4 Files

(1) Files configuration

Folder and file configuration of the C Controller module is described below:

○: Access allowed/Valid, ×: Access not allowed/Invalid

Drive	Folder	File	Overview	FTP access	Factory setting	After initialization
/SYSTEMROM			System ROM	○	○	○
		prjParams.h	VxWorks component list	○	○	○
	OS_IMAGEFILE		VxWorks image storage folder	○	○	○
		Q24DHCCPU-VG_XXXXX-Y[1]	VxWorks image file (☞ Page 343, Section 19.5)	○	○	○
/ROM			Standard ROM	○	○	○
Arbitrary[2]			Work RAM	○	×	×
/RAM			Standard RAM	○	×	×
/SD			SD memory card	○	×[3]	×[3]
/USB0[4]			USB device	○	×[5]	×[5]

[1] : The last part of the file name "XXXXX-Y" indicates the upper five digits of the serial number and function version.

[2] : Specify when creating RAM disk in user program.

[3] : A "/SD" drive is created when an SD memory card is inserted (mounted) into the SD memory card installation slot.

[4] : When connecting multiple USB Mass Storage compliant devices, up to 5 devices can be connected and the second and subsequent devices will be "/USB0:2","USB0:3". If the drive is partitioned, the second and subsequent partitions are "/USB0:2", "/USB0:3" and so on.

[5] : A "/USB0" drive is created when a USB device is connected (mounted) into the USB connector (USB1).

Point

- Characters that can be used in file and directory names are as follows:
  - Single-byte alphanumeric characters
  - Single-byte special characters (excluding \ / * ? < > | : ")
- If wrong characters are used, the following symptoms may occur:
  - Garbled file and directory names
  - File name and directory loss

(2) Precautions for file operations

This section describes the operations and precautions of memories and drives of the C Controller module.

(a) File writing

Before writing files by FTP and Telnet, etc. during user program operations, make sure that the file(s) to write will not affect the running user program.

(b) File writing destination

Do not use the user program to write into the standard ROM.
As the write count of the standard ROM is limited, doing so will reduce the operation life of the C Controller module. If files are to be written from the user program frequently, write files into the RAM disc, standard RAM, SD memory card, USB device and network device[1] (via FTP/NFS/netDrv), etc.

[1] : For details, 📖refer to the manual for VxWorks.

(c) Access to the same file

Files being written are not accessible.
Files being accessed are not writable.

(d) Operations not allowed during file access

During access to files in a standard ROM, standard RAM, SD memory card, or USB device, do not perform the following operations. Otherwise, data in the SD memory card and USB device may be corrupted or any file system failure may occur.

- Power OFF
- Reset
- Restarting user CPU
- Unmounting SD memory card and USB device
- Removing SD memory card and USB device

Configure the program to close the file(s) being accessed and perform the above operations when you access user file(s) in any of the above memories.

(e) The number of files and directories

The maximum number of files and directories that can be created in the root directory of the following memories are 512.

- Standard ROM
- Standard RAM

However, the maximum number may be reduced depending on file name length and character types.

The maximum number of files and directories that can be created in the root directory of the following memories mountable to this product varies depending on memory capacity and file system format.

- SD memory card
- USB device

Moreover, the number directories and the number of files in the root directory are 100 or less. Set this number to 500 or less.

If you store more files or directories than the above-mentioned, the file access time might significantly increase. Due to this, it may affect the operation of the C controller module and user program.

(f) Creating a directory

Do not create a directory in the root "/" of the C Controller module. Such directory creation processing fails or an unintended directory may be created. (These errors occur also when transferring a directory to the root "/" through FTP.)

18.3 Memories of Q24DHCCPU-LS and Q26DHCCPU-LS

The following describes the available memories in Q24DHCCPU-LS and Q26DHCCPU-LS.

18.3.1 Memory type

The following memories are available.
For the usage methods of each memory, refer to the manual of the partner operating system, or consult the partner (operating system vendor).

- Internal ROM .... ☞ Page 327, (1) in this section
- Built-in SSD .... ☞ Page 327, (2) in this section
- Work RAM......................... ☞ Page 327, (3) in this section
- Battery backup RAM......... ☞ Page 327, (4) in this section
- SD memory card .... ☞ Page 327, (5) in this section
- USB device .... ☞ Page 327, (6) in this section
- CPU shared memory .... ☞ Page 328, (7) in this section
- Data refresh memory .... ☞ Page 328, (8) in this section

(1) Internal ROM

A memory that stores parameters.
Use the following functions in Setting/monitoring tools for the C Controller module to read/write parameters.

- **[Online] ⇒ [Read from CCPU]/[Write to CCPU]**

The initial value is set to parameter by initialization. (☞ Page 62, Section 6.1)

(2) Built-in SSD

A sub memory controlled by the partner operating system.
A memory that stores the partner operating system and user program.
For the life of the built-in SSD, refer to the following.
☞ Page 137, Section 9.5

(3) Work RAM

A main memory controlled by the partner operating system.
A work RAM is a volatile memory for program execution.

(4) Battery backup RAM

A memory that stores data that need to be retained through power OFF among data used by user programs, etc.

(5) SD memory card

A memory card that stores parameters and files such as user programs.

(6) USB device

A device that stores files other than user programs.

(7) CPU shared memory

A memory in a multiple CPU system that stores data to cooperation between CPU modules. It is cleared to 0 at power OFF or reset.

Remark

For data communication function by the CPU shared memory, refer to the following.
☞ Page 252, Section 14.1.1

(8) Data refresh memory

A memory that stores device data to be read/written by the data refresh function. It is cleared to 0 at power OFF or reset.

Remark

For data refresh between the data refresh memory and user device(s), refer to the following.
☞ Page 171, Section 11.7.1

18.4 Memories and files of Q12DCCPU-V

The following describes the available memories and files that can be stored in Q12DCCPU-V.

18.4.1 Memory type

The following memories are available.

- System ROM .... ☞ Page 329, (1) in this section
- Standard ROM.. ☞ Page 329, (2) in this section
- Work RAM/RAM disk .... ☞ Page 329, (3) in this section
- Battery backup RAM/Standard RAM .... ☞ Page 330, (4) in this section
- CompactFlash card................................... ☞ Page 331, (5) in this section
- CPU shared memory .... ☞ Page 331, (6) in this section

(1) System ROM

A system ROM is a memory that stores system software and VxWorks image files required for operations of the C Controller module.

(2) Standard ROM

A standard ROM is a memory that store files such as user programs.
Since a standard ROM is a flash ROM, write count (life) is limited.
For the procedures to check the life and writing frequency of a standard ROM, refer to the following.
☞ Page 137, Section 9.4

(3) Work RAM / RAM disk

(a) Work RAM

A work RAM is a volatile memory for program execution.
The following programs and software are read and executed in a work RAM.

- User programs stored into a standard ROM, and SD memory card
- C Controller module's OS and system software stored in the system ROM

A work RAM cannot store files. To store files, create a RAM disc within a work RAM.

(b) RAM disk

Create the VxWorks function in a work RAM by the user program.
It can be accessed from FTP, Telnet and user programs and store files.

Point

- Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files.
- A sample program to create a RAM disc (MakeRAMDisk) is stored in Setting/monitoring tools for the C Controller module.
  📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(4) Battery backup RAM / Standard RAM

(a) Battery backup RAM

A battery backup RAM is a memory that stores data that need to be retained through power OFF among data used by user programs, etc.

Access to a battery backup RAM from the C Controller module dedicated function by using the user program is allowed. Functions used are indicated below.

Function name	Function
CCPU_WriteSRAM	Writes data to the battery backup RAM.
CCPU_ReadSRAM	Reads data from the battery backup RAM.
CCPU_WriteSRAM_ISR	Writes data to the battery backup RAM. Executable from the interrupt service routine.
CCPU_ReadSRAM_ISR	Reads data from the battery backup RAM. Executable from the interrupt service routine.

Remark

For C Controller module dedicated function, refer to the following.
☞ Page 353, CHAPTER 20

A battery backup RAM cannot store files. To store files, create a standard RAM area within a battery backup RAM.

(b) Standard RAM

The area for standard RAM is created by specifying the memory capacity in the battery backup RAM with parameters.

As with a standard ROM, it can be accessed from FTP, Telnet and user programs and store files.

Use the following functions in Setting/monitoring tools for the C Controller module to set a memory capacity of a standard RAM.

- **Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<System settings>> ⇒ "Standard RAM settings"**

Point

- A standard RAM is created when the set parameters are applied (power OFF→ON /reset).
- When the area for standard RAM is created, the memory specified for standard RAM is occupied, therefore, the battery backup RAM area will be decreased.
  [Example] If a 2MB standard RAM is created
  5MB (total capacity) - 2MB (standard RAM capacity) = 3MB (available battery backup RAM capacity)
- Before modifying the standard RAM setting, it is recommended to backup the standard RAM data. When the standard RAM setting is modified, the standard RAM area is cleared to 0.

(5) CompactFlash card

A CompactFlash card can store parameters and files such as user programs.
For CompactFlash card, refer to the following.
☞ Page 104, Section 7.6.2

(6) CPU shared memory

A CPU shared memory is a memory in a multiple CPU system that stores data to cooperation between CPU modules. It is cleared to 0 at power OFF or reset.

A CPU shared memory is accessed from the user program by using the bus interface function or MELSEC data link function.
Functions used are indicated below.

Function name	Function
QBF_ToBuf	Writes data into the CPU shared memory in the specified module location.
QBF_FromBuf	Reads data from the CPU shared memory in the specified module location.
mdSendEx	Batch writes devices[*1].
mdReceiveEx	Batch reads devices[*1].

*1 : Specify DevSPB1-DevSPB4 as a device name. (☞ Page 366, Section 22.5)

Remark

- For the bus interface function and MELSEC data link function, refer to the following.
  ☞ Page 356, CHAPTER 21. Page 362, CHAPTER 22
- For data communication function by the CPU shared memory, refer to the following.
  ☞ Page 252, Section 14.1.1

18.4.2 Storable data

The following table lists data that can be stored in each memory.

○: Storable, ×: Not storable

Memory	Parameter	Script file	General files other than the left	Other than files
System ROM[*1]	×	×	×	×
Standard ROM	○	○[*2]	○	×
Work RAM	×	×	○[*3]	○
Battery backup RAM / Standard RAM	×	○[*2]	○[*4]	○
CompactFlash card	○[*5]	○[*2]	○	×

*1 : Writing into the system ROM is not allowed.
*2 : Store the file either to standard ROM, to standard RAM, or to compactFlash card.
*3 : Since this is a volatile memory, files are lost upon power OFF. Use it when creating temporary files. To store files in the work RAM, create a RAM disc.
*4 : To store files in the battery backup RAM, create a standard RAM.
*5 : When the parameter data stored in the memory card is Q12DCCPU-V (Basic mode) data, the parameter data stored in the standard ROM is enabled.

18.4.3 Drive name assignment and format

The following memories can be accessed from FTP, Telnet and user programs.
For access from the user program, and file reading/writing by FTP, the target memory is specified by a drive name.
The procedure for drive name assignment to the memory, supported file systems, and formatting methods are described below.

Memory	Drive name	File systems	Formatting method
System ROM	/SYSTEMROM	FAT16	Cannot be formatted.
Standard ROM	/ROM	FAT16	☞ Page 332, (1) in this section
Work RAM[*1]	(arbitrary)[*2]	(FAT16/FAT32)	–
Standard RAM	/RAM	FAT16	☞ Page 333, (2) in this section
CompactFlash card	/CF	FAT16/FAT32	☞ Page 333, (3) in this section

*1 : A RAM disc can be created by using VxWorks function from the user program.
*2 : Do not assign the same name as any other drives. Otherwise, the system may fail.

(1) Format operation of standard ROM

1. **Write the following script file "STARTUP.CMD" to the CompactFlash card, insert it into the C Controller module, and then start the C Controller module.**
(The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard ROM formatting[*1]>

```
STARTUP.CMD

  diskFormatForCCPU("/ROM")
  CCPU_ShutdownRom()
```

*1 : The sample script file for standard ROM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. **When the RUN LED stopped flashing and the MODE LED started flashing, the standard ROM formatting and shutdown processing is completed. Power OFF the C Controller module.**
If the formatting of the standard ROM is terminated in error, the ERR. LED flashes.
In this case, initialize C Controller module. (Page 62, Section 6.1)

3. **Power OFF the C Controller module, and remove the CompactFlash card.**

Point

- ● Do not format the standard ROM using a command from Workbench Shell.
- ● Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
  - • Power OFF
  - • Reset

(a) After formatting standard ROM

After formatting a standard ROM, the files such as parameters and user programs are deleted. Write the default parameters (or desired parameters) after the connection.
(After formatting the standard ROM, resetting the module causes a parameter error (no parameters) and the ERR. LED flashes.)

(2) Format operation of standard RAM

1. **Write the following script file "STARTUP.CMD" to the CompactFlash card, insert it into the C Controller module, and then start the C Controller module.**
   (The RUN LED flashes during processing the script file "STARTUP.CMD".)

<Sample script file for standard RAM formatting[*1]>

```
STARTUP.CMD

    diskFormatForCCPU("/RAM")
    data=0x7171
    CCPU_Set7SegLED(0,&data)
```

*1 : The sample script file for standard RAM formatting is registered to the development environment (personal computer) after installation of SW4PVC-CCPU.

2. **The 7-segment LED indicates "FF" upon completion of standard RAM format.**
   The ERR. LED flashes if the standard RAM formatting is terminated in error.
   In this case, initialize C Controller module. (Page 62, Section 6.1)
3. **Power OFF the C Controller module, and remove the CompactFlash card.**

Point

● Do not format the standard RAM using a command from Workbench Shell.

● Do not perform any of the following operations. Doing so may cause the data corruption or file system abnormal error.
- Power OFF
- Reset

(a) After formatting standard RAM

After formatting a standard RAM, the data such as user programs are deleted. Write the user programs after the connection.

(3) Formatting of CompactFlash card and USB device in use

Use a device formatted by a supported file system.
For formatting methods, refer to the manual for respective devices.

18.4.4 Files

(1) Files configuration

Folder and file configuration of the C Controller module is described below:

○: Access allowed/Valid, ×: Access not allowed/Invalid

Drive	Folder	File	Overview	FTP access	Factory setting	After initialization
/SYSTEMROM			System ROM	○	○	○
		prjParams.h	VxWorks component list	○	○	○
	OS_IMAGEFILE		VxWorks image storage folder	○	○	○
		Q12DCCPU-V_XXXXX-Y_ModeEX*1	VxWorks image file (☞ Page 343, Section 19.5)	○	○	○
/ROM			Standard ROM	○	○	○
	MQbf		Parameter storage folder	○	○	○
		param.qpa	CCPU parameter	○	○	○
		iparam.qpa	Intelligent function parameter	○	○	○
Arbitrary*2			Work RAM	○	×	×
/RAM			Standard RAM	○	×	×
/CF			CompactFlash card	○	×*3	×*3

*1 : The last part of the file name "XXXXX-Y" indicates the upper five digits of the serial number and function version.

*2 : Specify when creating RAM disk in a user program.

*3 : A "/CF" drive is created when a CompactFlash card is inserted (mounted) into the CompactFlash card installation slot.

Point

- Characters that can be used in file and directory names are as follows:
  - Single-byte alphanumeric characters
  - Single-byte special characters (excluding \ / * ? < > | : ")
- If wrong characters are used, the following symptoms may occur:
  - Garbled file and directory names
  - File name and directory loss

(2) Precautions for file operations

This section describes the operations and precautions of memories and drives of the C Controller module.

(a) File writing

Before writing files by FTP and Telnet, etc. during user program operations, make sure that the file(s) to write will not affect the running user program.

(b) File writing destination

Do not write files to the standard ROM with a user program.

Since a standard ROM has a write cycle limit, the life of C Controller module will be shortened.

When writing files using a user program frequently, write to a standard RAM, CompactFlash card, or network device*1 (via FTP/NFS/netDrv).

*1 : For details, refer to the manual for VxWorks.

(c) Access to the same file

Files being written are not accessible.

Files being accessed are not writable.

(d) Operations not allowed during file access

Do not operate the following operations during file accessing to the standard ROM, standard RAM, or CompactFlash card. Doing so may result in data corruption or file system error in the CompactFlash card.

- Power OFF
- Reset
- Unmount of a CompactFlash card
- Removal of a CompactFlash card

Configure the program to close the file(s) being accessed and perform the above operations when you access user file(s) in any of the above memories.

(e) The number of files and directories

The maximum number of files and directories that can be created in the root directory of the following memories are 256.

- Standard ROM
- Standard RAM
- CompactFlash card

However, the maximum number may be reduced depending on file name length and character types.

Moreover, the number directories and the number of files in the root directory are 100 or less. Set this number to 500 or less.

If you store more files or directories than the above-mentioned, the file access time might significantly increase. Due to this, it may affect the operation of the C controller module and user program.

(f) Creating a directory

Do not create a directory in the root "/" of the C Controller module. Such directory creation processing fails or an unintended directory may be created. (These errors occur also when transferring a directory to the root "/" through FTP.)

CHAPTER 19 PROGRAMMING

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This chapter describes the programming of the C Controller module.

The user program perform programming according to the VxWorks specifications.

In the user program, VxWorks standard API functions and functions provided by the C Controller module can be used.

For programming of VxWorks standard API functions, refer to the manual of VxWorks.

- Q24DHCCPU-V/-VG.......VxWorks 6.8
- Q12DCCPU-V.................VxWorks 6.4

For functions provided by the C Controller module, refer to the following.

☞ Page 337, Section 19.3

Remark

- To create a user program for the C Controller module, CW Workbench or Wind River Workbench 3.2 are necessary. In this manual programming by using CW Workbench is described.
- This is a product of Wind River Systems, Inc., Wind River Workbench. To use the Wind River Workbench, refer to the manual for Wind River Workbench.

19.1 Development Environment

Use CW Workbench when creating a user program for the C Controller module.

Prepare a PC with CW Workbench installed, as a development environment.

For PC operational environment and installation procedure, refer to the following.

📖CW Workbench Operating Manual

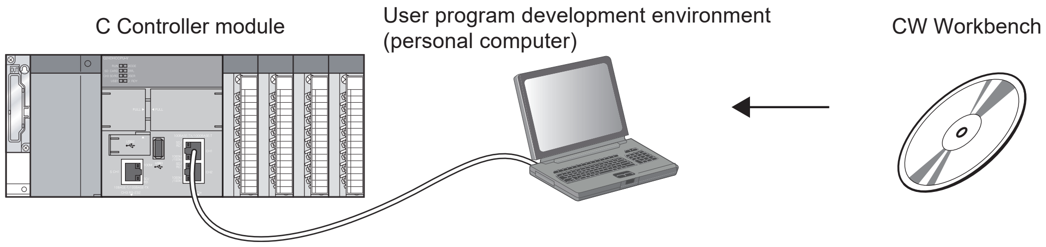
To perform debugging and registration of the user program, connect the development environment (personal computer) with CW Workbench installed to the user Ethernet port (CH1 and CH2) of the C Controller module with a cable.

For specifications and connection procedure for the cable used, refer to the following.

☞ Page 125, Section 8.7

For CW Workbench settings to establish communication, refer to the following.

📖CW Workbench Operating Manual



19.2 Programming Procedure

Described below are procedures to create a user program and write into C Controller modules.

1. **Install CW Workbench into the development environment (personal computer).**
2. **Start CW Workbench.**
3. **Specify a VxWorks image file (☞ Page 343, Section 19.5) of the same version as the C Controller module, from CW Workbench.**
4. **Create a project.**
5. **Program a user program.**
6. **Build a user program.**
7. **Connect the personal computer to the C Controller module.**
8. **Use CW Workbench to download the user program to the C Controller module.**
9. **Use CW Workbench to debug the user program.**
10. **Create a script file and register the created user program. (☞ Page 344, Section 19.6)**
11. **Reset the C Controller system, or restart the user CPU[*1].**
12. **The written user program are applied.**

[*1] : The user CPU restarting function is not supported by Q12DCCPU-V.

19.3 Dedicated Function Library

The C Controller module provides the following dedicated function libraries.

- C Controller module dedicated function
- Bus interface function
- MELSEC data link function

Described in this section is the applications of functions and related functions.

Remark

● For the list of functions and precautions, refer to the following.
☞ Page 353, CHAPTER 20, Page 356, CHAPTER 21, Page 362, CHAPTER 22

● For details of each function, refer to the following in Setting/monitoring tools for the C Controller module.
[Help] ⇒ [Function help] ⇒ [C Controller module function help]

Point

● Device access
Any dedicated function library can access device(s).
To improve the processing performance of the user program, observe the following policies in programming.

- To access device(s) of the C Controller module cyclically
  → Use the C Controller module dedicated function and data refresh function.
- To access device(s) of the C Controller module only as necessary
  → Use bus interface functions.
- To access destination device(s) of the other stations via network module(s) cyclically
  → Use the C Controller module dedicated function, refresh function, and the cyclic transmission.
- To access destination device(s) of the other stations via network module(s) only as necessary
  → Use MELSEC data link functions.

(1) C Controller module dedicated function

(a) Application

The functions are used to control data of the C Controller module (host), such as those listed below.

- Integral clock (RTC) data
- Data refresh memory
- Battery backup RAM
- event history file (event log registration)
- Operation status, Indicator LED

(b) Related functions

The following indicates the related main functions.

Related functions	Reference
Watchdog timer (WDT)	Page 158, Section 11.3
Clock function	Page 160, Section 11.4
Data refresh function	Page 171, Section 11.7.1
Event history collection function	Page 187, Section 11.9
Access by link refresh function	Page 212, Section 13.2.1

(2) Bus interface function

(a) Application

This function is used for access to module(s) in the same C Controller module via a bus. Some examples of the application are indicated below.

- Controlling I/O module and intelligent function module
- Using network module's link refresh function
- Cooperation with other CPU modules in a multiple CPU system

(b) Related functions

The following indicates the related main functions.

Related functions	Reference
I/O module and intelligent function module access function	Page 146, Section 11.1.1
Interrupt from intelligent function module and interrupt module	Page 148, Section 11.1.3
Remote operation function	Page 163, Section 11.5
Device function	Page 169, Section 11.6
Cyclic transmission	Page 209, Section 13.2
Communications between CPU modules	Page 251, Section 14.1

(3) MELSEC data link function

(a) Application

This function is used for reading/writing of other destination station device(s) and message communication via network module(s).

(b) Related functions

The following indicates the related main functions.

Related functions	Reference
Functions accessed via a network module	Page 208, CHAPTER 13

19.4 Precautions for Programming

The following describes precautions for programming.

19.4.1 Precautions for program creation

(1) Endian format (memory layout)

The endian format (memory layout) of the C Controller module is little endian.
Compile the user program in the little endian format.

(2) VxWorks real-time process (RTP)

The C Controller module does not support applications running in VxWorks real-time process.
Create a user program as an application based on the VxWorks kernel.

(3) User program execution

Execute a user program by starting a task from the script file. (☞ Page 344, Section 19.6)
The system may malfunction if the user program is executed without a task being started.

(4) Number of tasks (Using Q24DHCCPU-V/-VG)

The number of tasks that can simultaneously execute user programs that use the bus interface function, MELSEC data link function and C Controller module dedicated function is up to 180.
If over 180 tasks are simultaneously executed, the system may not operate properly.

(5) Startup of a task that performs floating-point operations

Always specify the VX_FP_TASK option for the third argument of taskSpawn when activating a task that:

- Performs floating-point operations
- Calls a function that returns a floating-point value.
- Calls a function that takes a floating-point value as an argument.

If the above task is activated without the VX_FP_TASK option specified, the operating system may run away.
When specifying the VX_FP_TASK option in a script file, refer to the following.
☞ Page 344, Section 19.6 (2)(b)
For details on the VX_FP_TASK option, refer to the manual for VxWorks.

(6) Execution of the task in STOP or PAUSE status

Even if the C Controller module operation status is STOP or PAUSE, the user program task does not stop.
Use the CCPU_GetCpuStatus function when splitting the user program processing according to the operation status of the C Controller module.

(7) Access to USB device

To create a program that accesses to a USB device, perform processing to check if access to the USB device is allowed, and retry.
Though a USB device is automatically mounted when connected, it may take several minutes until it becomes accessible depending on format types and capacities of the USB device.

(8) Execution type priority

Set the priority of a task for executing the FTP user program as described below.

(a) When access is not made via FTP during user program execution

Set the priority of the user program task to 100 or more (100 to 255).

If the priority is set within 0 to 99, the system may not operate properly.

(b) When access is made via FTP during user program execution

The actual FTP processing (task) of the C Controller module is performed at the priority of 200.

When accessing via FTP during executing a user program, perform programming as described below.

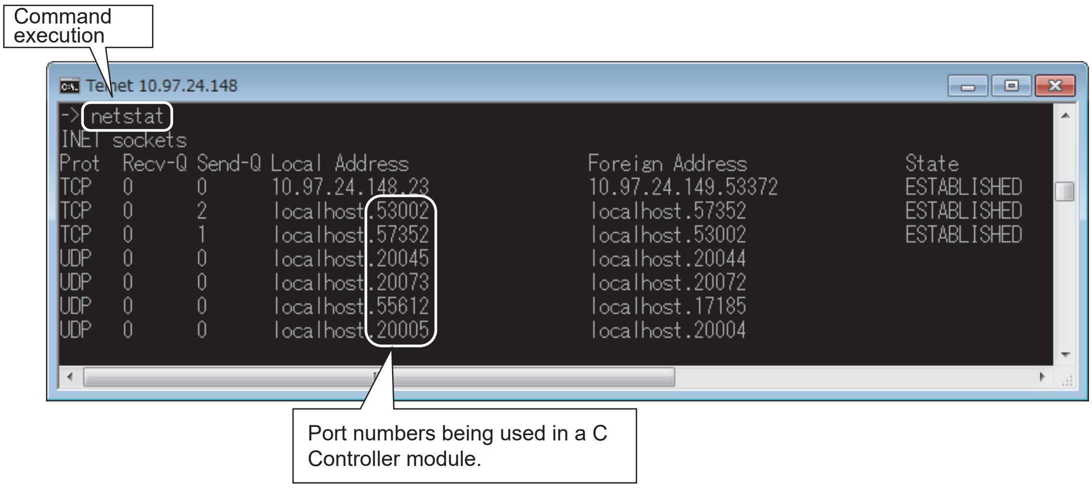
- Set the priority of the user program task within 201 to 255.
- When setting the priority of the user program task within 100 to 200, insert a wait processing (such as taskDalay) in the user program to let the actual FTP processing operate.

(9) To communicate with a target device by Ethernet communication

Check the port number being used in the C Controller module by using the VxWorks standard "netstat" command. Do not use any port number that has already been used. Normal communication may not be available if used.

Use the Telnet tool to execute the "netstat".

[Example] When the Telnet tool is used



Command execution

```
-> netstat
INET sockets
Prot  Recv-Q Send-Q Local Address              Foreign Address             State
TCP   0      0      10.97.24.148.23            10.97.24.149.53372          ESTABLISHED
TCP   0      2      localhost.53002            localhost.57352             ESTABLISHED
TCP   0      1      localhost.57352            localhost.53002             ESTABLISHED
UDP   0      0      localhost.20045            localhost.20044
UDP   0      0      localhost.20073            localhost.20072
UDP   0      0      localhost.55612            localhost.17185
UDP   0      0      localhost.20005            localhost.20004
```

Port numbers being used in a C Controller module.

(10)Processing in case there is no response from the function

There may be no response from the function if an error ("MAIN CPU DOWN") occurs in the C Controller module. Design a user program taking into account the possibility that there is not response from the function.

The error occurrence status can be confirmed by using the C Controller module dedicated function (CCPU_GetErrInfo).

(11)Fragmentation of memory

When the memory is allocated and free frequently, the system may not operate properly because of the fragment of the memory.

19.4.2 Precautions for interrupt service routine (ISR)

Be familiar with specifications of VxWorks, the C Controller module OS, before creating routines executed in an interrupt service routine (ISR).

The following shows the functions executable from an interrupt service routine (ISR) in the C Controller module. Executing any function other than those listed below from the interrupt service routine (ISR) or setting an inappropriate value for the function argument, the operating system may run away.

○: Available, ×: Not available

Function library	Functions executable from the interrupt service routine	CPU module		
		Q24DHC		Q12DC-V
		-V	-VG	
C Controller module dedicated function	CCPU_Get7segLED_ISR	×		○
	CCPU_GetCounterMillis_ISR	○		×
	CCPU_GetCounterMicros_ISR			
	CCPU_GetDotMatrixLED_ISR			
	CCPU_ReadSRAM_ISR			○
	CCPU_Set7segLED_ISR	×		
	CCPU_SetDotMatrixLED_ISR	○		×
	CCPU_SetLEDStatus_ISR	×		○
	CCPU_WriteSRAM_ISR	○		
Bus interface functions	QBF_DisableCpuInt_ISR	×		○
	QBF_DisableMultiCPUSyncInt_ISR			
	QBF_DisableUnitInt_ISR			
	QBF_EnableCpuInt_ISR			
	QBF_EnableMultiCPUSyncInt_ISR			
	QBF_EnableUnitInt_ISR			
	QBF_FromBuf_ISR			
	QBF_ReadDevice_ISR			
	QBF_ResetDevice_ISR			
	QBF_SetDevice_ISR			
	QBF_ToBuf_ISR			
	QBF_WriteDevice_ISR			
	QBF_X_In_Word_ISR			
	QBF_Y_In_Word_ISR			
	QBF_Y_Out_Word_ISR			

When executing the function other than above provided by C Controller module at the same timing as the interruption, create a user program which contains a notification processing and execute with task.

Point

When a problem occurs in an interrupt service routine (ISR), the operating system may reboot forcibly.

- Perform the troubleshooting according to the error description when a runaway operating system occurs, or a system error/stop (such as user watchdog timer error) occurs from rebooting the C Controller module.
  ☞ Page 400, Section 23.3 Checking the Error Details

19.4.3 Precautions for CW Workbench connection

(1) Errors in program download

When a user program is specified and downloaded to the target (C Controller module) from CW Workbench, a system error or stop (such as a system watchdog timer error) may occur in the C Controller module during downloading if the program is too large. When a system error or stop (such as a system watchdog timer error) has occurred, take either of the following measures.

- Increase the value of "WDT (watchdog timer) setting" on the System settings tab of Setting/monitoring tools for the C Controller module.
- Load the program in the C Controller module before debugging.

(2) Interrupt processing delay

During remote debugging by CW Workbench, interrupt of the C Controller module may be prohibited. Meantime, processing called from an interrupt routine (example: C Controller module dedicated function for ISR) is not executed.

Interrupts that are expected to occur at fixed intervals, such as a cyclic timer interrupt, may delay.

(3) When restarting the C Controller module

If the destination C Controller module is restarted with CW Workbench connected ("Connect"), Workbench automatically connects ("Connect") after startup of the C Controller module. At that time, system task(s) operating in the C Controller module is temporarily blocked, so an error may occur. To restart the destination C Controller module, ensure that CW Workbench is disconnected ("Disconnect") in advance.

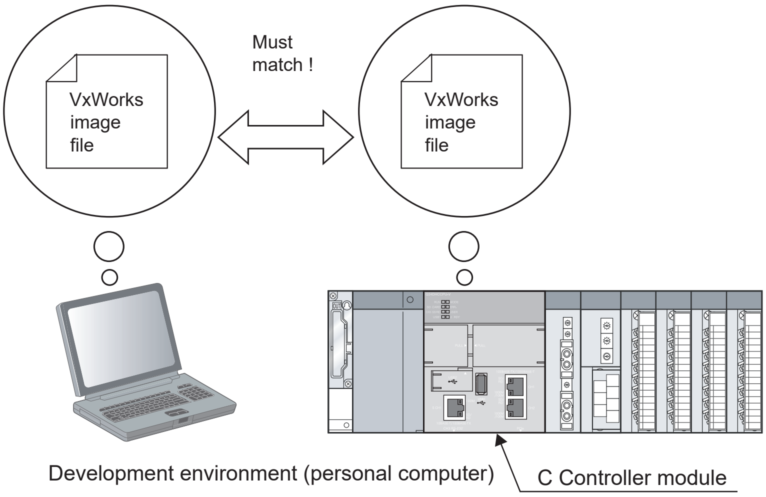
(4) Message displayed on Host Shell

Message(s) issued by VxWorks during Host Shell connection may be displayed.

For messages of VxWorks, refer to manuals for VxWorks, Workbench, or Help of CW Workbench.

19.5 VxWorks Image File Check

Before debugging the user program, ensure that a VxWorks image file of the same version as the C Controller module is specified in CW Workbench.
Specifying a different file prevents normal debugging.



(1) Checking method

Ensure that the serial number and the function version are the same as described below.

(a) C controller module

Check the 5-digit serial number and function version by using Setting/monitoring tools for the C Controller module, or on the faceplate on the side of the C Controller module. For details, refer to the following.
☞ Page 484, Appendix 9

(b) Development environment (personal computer)

Check by the VxWorks image file names specified by CW Workbench.

<Q24DHCCPU-V>

Q24DHCCPU-V_XXXXX-Y
- XXXXX: Serial number (first five digits)
- Y: Function version

<Q24DHCCPU-VG>

Q24DHCCPU-VG_XXXXX-Y
- XXXXX: Serial number (first five digits)
- Y: Function version

<Q12DCCPU-V>

Q12DCCPU-V_XXXXX-Y_ModeEX
- XXXXX: Serial number (first five digits)
- Y: Function version

(2) When VxWorks image files are not identical

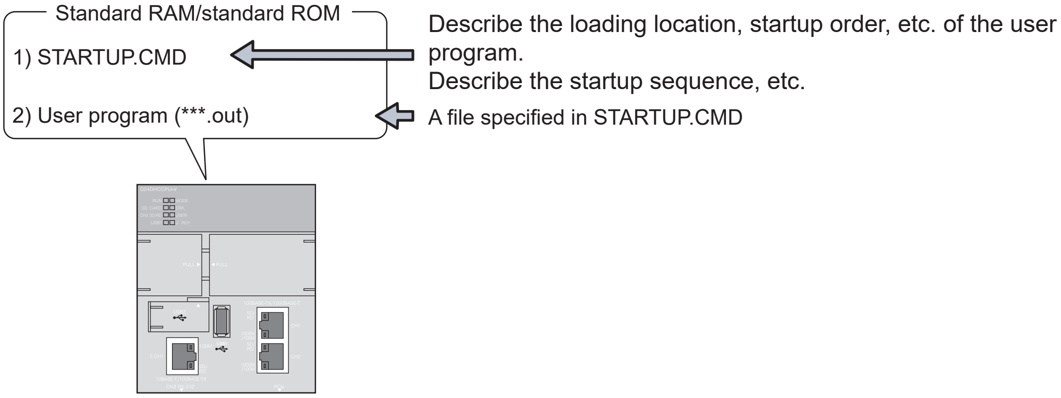
Acquire and use the VxWorks image files from the C Controller module.

1. **Use FTP to copy the VxWorks image files stored in the C Controller module's system ROM (/SYSTEMROM/OS_IMAGEFILE) to the development environment (personal computer).**
2. **Configure target server connection settings by CW Workbench.**
   For details, refer to the following.
   📖CW Workbench Operating Manual

19.6 Creating a Script File

(1) Script file

"STARTUP.CMD" is a script file of a user program which starts in booting up of the C Controller module, and it contains the loading location, startup order, etc. of the user program.


Standard RAM/standard ROM
1) STARTUP.CMD
2) User program (***.out)
Describe the loading location, startup order, etc. of the user program.
Describe the startup sequence, etc.
A file specified in STARTUP.CMD

Point

- The script file is executed after the U RDY LED is lit (after startup of user CPUs).
- The RUN LED flashes during executing the script file (command).

(2) Precautions for creating a script file

(a) User program startup

Describe a command that starts the task (priority 100 to 255) when the user program is executed.

(b) To specify VX_FP_TASK option

When specifying a VX_FP_TASK option for the third argument of taskSpawn in a script file, specify 0x1000000.

[Example] When activating the "funcA" function with the VX_FP_TASK option specified:

```
taskSpawn("taskA",100,0x1000000,20000,funcA,0,0,0,0,0,0,0)
```

For details on the VX_FP_TASK option, refer to the manual for VxWorks.

(c) Login user setting

Do not describe the login user settings (add/modify).

Set login user(s) by Setting/monitoring tools for the C Controller module.

(3) Script file storage location

The script file can be stored into the standard ROM, standard RAM, SD memory card, and CompactFlash card.

(a) Storage drive

The following shows drives to store script files.

Store the script file in the root directory.

○: Available, ×: Not available

Memory	Drive	CPU module		
		Q24DHC		Q12DC-V
		-V	-VG	
Standard ROM	/ROM	○		
Standard RAM	/RAM	×		○
SD memory card	/SD	○		×
CompactFlash card	/CF	×		○

(b) When a script file is stored in multiple memory

- <Q24DHCCPU-V/-VG>
  When a script file is stored into both a standard ROM and an SD memory card, the one in the SD memory card will be given priority. The script file in the standard ROM is ignored.
- <Q12DCCPU-V>
  When a script file is stored into a standard ROM, standard RAM, and SD memory card, the one in the CompactFlash card will be given priority. The script file in the standard ROM and standard RAM is ignored.
  Note that, when the script file is stored only in a standard ROM and a standard RAM, the script file in a standard RAM will be given priority.

Point

- Example of SD memory card use
  By inserting an SD memory card that stores script files for maintenance into the system operating per a script file stored in the standard ROM, only during maintenance, it can easily be switched to maintenance processing.
- Example of CompactFlash card use
  By inserting a CompactFlash card that stores script files for maintenance into the system operating per a script file stored in the standard ROM or standard RAM, only during maintenance, it can easily be switched to maintenance processing.

(4) Description of script

(a) Description of command

- Only one command can be described in one line.
- Up to 12 arguments can be specified for one command.

(b) Description of comment statement

Describe "//" at the beginning of a line.

No restrictions are applied on the number of characters in a comment statement.

(c) When C++ function is executed

Describe the function declaration part of C++ source code as follows.

```
extern "C" { Function declaration part }
```

Remark

● Description in the script file allows for the following operations.

- Copy registration of a program to the standard ROM of Q24DHCCPU-V/-VG
  ☞ Page 349, Section 19.7.1 (2)
- Copy registration of a program to the standard ROM and standard RAM of Q12DCCPU-V
  ☞ Page 351, Section 19.7.2 (2)
- Standard ROM and standard RAM formatting

● Commands described in a script file are identical with those described in the startup script file for VxWorks.
For details, refer to the manual for VxWorks.

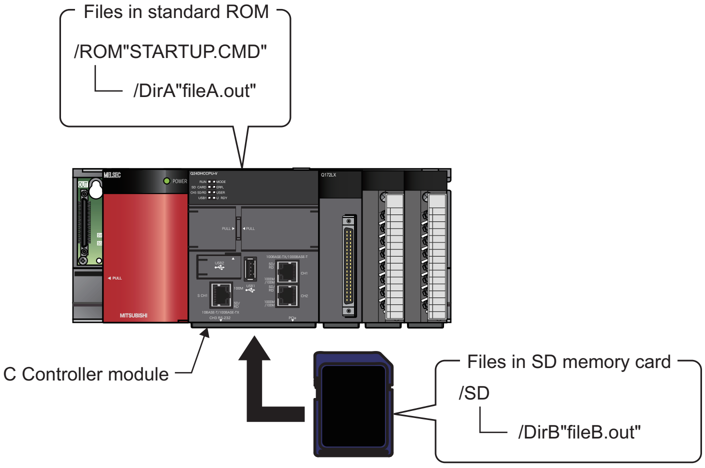
● For the sample file of the script file, refer to the following.
📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(5) Example of script file description

The following is an example of loading a user program in the standard ROM and SD memory card from the script file in the standard ROM.

Point

For Q12DCCPU-V, read the explanation in this section regarding SD memory card (/SD) as CompactFlash card (/CF).



(a) Stored files

Memory	File storage location	File name	Description
Standard ROM	/ROM	STARTUP.CMD	Script file to load the user program
	/ROM/DirA	fileA.out	User program ("funcA" function already included)
SD memory card	/SD/DirB	fileB.out	User program ("funcB" function already included)

(b) Task settings

Startup order	Task name	Priority	Stack size	Function name	Argument specification
1	Default: tN (N=1, 2, ...)	Default: 100	Default: 20000	funcA	None
2	taskB	120	5000	funcB	Specified (First argument: 10)

(c) Example of script file description

STARTUP.CMD

```
//The "fileA.out" file is loaded from the standard ROM "DirA" directory.
ld (1, 0, "/ROM/DirA/fileA.out")
//The "fileB.out" file is loaded from the SD memory card "DirB" directory.
ld (1, 0, "/SD/DirB/fileB.out")
//The "funcA" function is generated under the default task name (t1). ("funcA" function already included in fileA.out)
sp (funcA, 0, 0, 0, 0, 0, 0, 0, 0, 0)
//The "funcB" function is generated under the task name "taskB". ("funcB" function already included in fileB.out)
taskSpawn ("taskB", 120, 0, 5000, funcB, 10, 0, 0, 0, 0, 0 )
```

Point

Since the maximum number of arguments to be specified for one command is 12, up to seven arguments can be given to the function entry specified in taskSpawn (funcB in the above example).
The task will not start if eight or more arguments are specified for the function entry specified in task Spawn (funcB in the above example).

19.7 User Program Registration

The following is an overview of the user program registration procedure.

1. **Describe the loading location of the user program which starts in booting up of the C Controller module in the script file "STARTUP.CMD".**

2. **Write a script file and user program files into the C Controller module.**

3. **Reset the C Controller module or perform a power cycle OFF → ON.**

Point

- ● User program storage memory
  User program files can be stored in any memories that can store files.
  For memories that can store files, refer to the following.
  ☞ Page 313, Section 18.1.2
- ● When registering by overwriting
  Close the file to overwrite before overwriting. Otherwise, overwriting may fail.

There are the following 2 ways to write to files:

- Writing from the development environment (personal computer) by using the FTP function
- Copying from an SD memory card or CompactFlash card by using a script command

Each user program registration procedure is described below in this section.

19.7.1 Q24DHCCPU-V/-VG

(1) Registration from development environment (personal computer)

To write files from the development environment (personal computer) to a memory, use the FTP function (☞ Page 197, Section 12.1.2).

1. **Create the following files.**

File name	Description
STARTUP.CMD	Script file to load the user program
file.out	User program (Use any file name.)

STARTUP.CMD

```
//The "file.out" file is loaded from the standard ROM root directory.
ld (1, 0, "/ROM/file.out")
//The "func" function is generated under the default task name (t1). ("func" function already included file.out)
sp (func, 0, 0, 0, 0, 0, 0, 0, 0, 0)
```

For details of description of scripts to load user program(s), refer to the following.
☞ Page 347, Section 19.6 (5)

2. **Power on the C Controller module.**

3. **Connect the development environment (personal computer) to the C Controller module.**

4. **Use the FTP function to write files into a memory.**

5. **Reset the C Controller module or perform a power cycle OFF → ON.**

6. **Check that the U RDY LED is lit and then the RUN LED start flashing.**
The script file "STARTUP.CMD" is started.

7. **Check that the RUN LED is lit or goes off.**
The user program is executed.

(2) Registration from SD memory card

In any of the following cases, files can be copied from an SD memory card to a memory by using a script file command.

- Connection to the development environment (personal computer) fails
- The same user program is to be registered with multiple C Controller modules

1. Create the following files.

File name	Description
STARTUP.CMD	Script file to copy files to the standard ROM
STARTUP.ROM	Script file to load the user program (File name must be other than "STARTUP.CMD".)
file.out	User program (Use any file name.)

STARTUP.CMD

```
//The user program "file.out" in the SD memory card is copied to the standard ROM.
copy "/SD/file.out", "/ROM/file.out"
//Rename the operational script file "STARTUP.ROM" in the SD memory card to "STARTUP.CMD", and
//copy it to the standard ROM.
copy "/SD/STARTUP.ROM", "/ROM/STARTUP.CMD"
```

STARTUP.ROM

```
//The "file.out" file is loaded from the standard ROM root directory.
ld (1, 0, "/ROM/file.out")
//The "funcA" function is generated under the default task name (t1). ("funcA" function already included file.out)
sp (funcA, 0, 0, 0, 0, 0, 0, 0, 0, 0)
```

For details of description of scripts to load user program(s), refer to the following.

☞ Page 347, Section 19.6 (5)

2. Write the created file into an SD memory card.

3. Insert the SD memory card into the C Controller module.

4. Reset or power on the C Controller module.

5. Check that the U RDY LED is lit and then the RUN LED start flashing.

The script file "STARTUP.CMD" in the SD memory card is started.
Command(s) described in the script file "STARTUP.CMD" is executed and files in the SD memory card are copied into the standard ROM of the C Controller module.

6. Check that the RUN LED is lit or goes off.

The script ends.

7. Power OFF the C Controller module and remove the SD memory card.

8. Power on the C Controller module.

9. Check that the U RDY LED is lit and then the RUN LED start flashing.

The script file "STARTUP.CMD" (a script file to load the user program) copied into the standard ROM is started.

10. Check that the RUN LED is lit or goes off.

The user program is executed.

19.7.2 Q12DCCPU-V

(1) Registration from development environment (personal computer)

To write files from the development environment (personal computer) to a memory, use the FTP function (☞Page 197, Section 12.1.2).

1. **Create the following files.**

File name	Description
STARTUP.CMD	Script file to load the user program
file.out	User program (Use any file name.)

STARTUP.CMD

```
//The "file.out" file is loaded from the standard ROM root directory.
ld (1, 0, "/ROM/file.out")
//The "func" function is generated under the default task name (t1). ("func" function already included file.out)
sp (func, 0, 0, 0, 0, 0, 0, 0, 0, 0)
```

For details of description of scripts to load user program(s), refer to the following.
☞ Page 347, Section 19.6 (5)

2. **Power on the C Controller module.**
3. **Connect the development environment (personal computer) to the C Controller module.**
4. **Use the FTP function to write files into a memory.**
5. **Reset the C Controller module or perform a power cycle OFF → ON.**
6. **Check that RUN LED flashes.**
   The script file "STARTUP.CMD" is started.
7. **Check that the RUN LED is lit or goes off.**
   The user program is executed.

(2) Registration from CompactFlash card

In any of the following cases, files can be copied from an CompactFlash card to a memory by using a script file command.

- Connection to the development environment (personal computer) fails
- The same user program is to be registered with multiple C Controller modules

1. Create the following files.

- **When copying to standard ROM**

File name	Description
STARTUP.CMD	Script file to copy files to the standard ROM
STARTUP.ROM	Script file to load the user program (File name must be other than "STARTUP.CMD".)
file.out	User program (Use any file name.)

STARTUP.CMD

```
//The user program "file.out" in the CF card is copied to the standard ROM.
copy "/CF/file.out", "/ROM/file.out"
//Rename the operational script file "STARTUP.ROM" in the CF card to "STARTUP.CMD", and
//copy it to the standard ROM.
copy "/CF/STARTUP.ROM", "/ROM/STARTUP.CMD"
```

STARTUP.ROM

```
//The "file.out" file is loaded from the standard ROM root directory.
ld (1, 0, "/ROM/file.out")
//The "funcA" function is generated under the default task name (t1). ("funcA" function already included file.out)
sp (funcA, 0, 0, 0, 0, 0, 0, 0, 0, 0)
```

- **When copying to standard RAM**

File name	Description
STARTUP.CMD	Script file to copy files to the standard RAM
STARTUP.RAM	Script file to load the user program (File name must be other than "STARTUP.CMD".)
file.out	User program (Use any file name.)

STARTUP.CMD

```
//The user program "file.out" in the CF card is copied to the standard RAM.
copy "/CF/file.out", "/RAM/file.out"
//Rename the operational script file "STARTUP.RAM" in the CF card to "STARTUP.CMD", and
//copy it to the standard RAM.
copy "/CF/STARTUP.RAM", "/RAM/STARTUP.CMD"
```

STARTUP.RAM

```
//The "file.out" file is loaded from the standard RAM root directory.
ld (1, 0, "/RAM/file.out")
//The "funcA" function is generated under the default task name (t1). ("funcA" function already included file.out)
sp (funcA, 0, 0, 0, 0, 0, 0, 0, 0, 0)
```

For details of description of scripts to load user program(s), refer to the following.
☞ Page 347, Section 19.6 (5)

2. **Write the created file into a CompactFlash card.**
3. **Insert the CompactFlash card into the C Controller module.**
4. **Reset or power on the C Controller module.**
5. **Check that RUN LED flashes.**

   The script file "STARTUP.CMD" in the CompactFlash card is started.

   Command(s) described in the script file "STARTUP.CMD" is executed and files in the CompactFlash card are copied into the standard ROM or standard RAM of the C Controller module.
6. **Check that the RUN LED is lit or goes off.**

   The script ends.
7. **Power OFF the C Controller module and remove the CompactFlash card.**
8. **Power on the C Controller module.**
9. **Check that RUN LED flashes.**

   The script file "STARTUP.CMD" (a script file to load the user program) copied into the standard ROM or standard RAM is started.
10. **Check that the RUN LED is lit or goes off.**

    The user program is executed

CHAPTER 20 PROGRAMMING OF C CONTROLLER MODULE DEDICATED FUNCTION

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This chapter describes the program flow and precautions for the C Controller module dedicated function.

20.1 Outline of Functions

The C Controller module dedicated function are used for operation status reading, LED control, reading/writing of integral clock (RTC:Real Time Clock), reading/writing of battery backup RAM, and reading/writing of data refresh memory, etc.

20.2 Function list

The C Controller module dedicated function are listed below.
For details of each function, install Setting/monitoring tools for the C Controller module and refer to the [C Controller module function help].

○: Supported ×: Not supported

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
CCPU_ClearError	Clears an error of the C Controller module.	○	○	○
CCPU_ChangeFileSecurity	Changes the access restriction of the file used on the C Controller module.			
CCPU_EntryCyclicTimerInt	Registers a routine to a cyclic timer interrupt of the C Controller module.	○	○	×
CCPU_EntryWDTInt	Registers a routine that is called in the event of user watchdog timer error interrupt in the C Controller module.	○	○	○
CCPU_EntryTimerEvent	Registers a timer event.	×	×	○
CCPU_Get7SegLED	Acquires a value being displayed on the 7 segment LED on C Controller module.			
CCPU_GetCpuStatus	Acquires the operation status of the C Controller module.	○	○	○
CCPU_GetCounterMillis	Acquires the 1 millisecond counter value of C Controller module.	○	○	×
CCPU_GetCounterMicros	Acquires the 1 microsecond counter value of C Controller module.			
CCPU_GetDotMatrixLED	Acquires a value displayed in the dot matrix LED on the C Controller module.			
CCPU_GetErrInfo	Acquires the error information of the C Controller module.	○	○	○
CCPU_GetFileSecurity	Acquires the access restriction removal mode of the file used on the C Controller module.			
CCPU_GetLEDStatus	Acquires the displayed LED status of the C Controller system.			
CCPU_GetPowerStatus	Acquires the power supply status of the C Controller module.			
CCPU_GetRefreshStatus	Acquires the refresh status of the C Controller module.			
CCPU_GetRTC	Acquires time data from the integral clock (RTC) in the C Controller module.			
CCPU_GetSwitchStatus	Acquires the switch status of the C Controller module.			
CCPU_MountMemoryCard	Mounts a memory card inserted in the C Controller module.			
CCPU_ReadDataRefreshMemory	Reads data from a data refresh memory of the C controller module.	○	○	×

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
CCPU_ReadSRAM	Reads data from a battery backup RAM of the C controller module.	○		
CCPU_RegistEventLog	Registers an event log with event history of the C Controller module.			
CCPU_ResetWDT	Resets the user watchdog timer of the C Controller module.			
CCPU_Restart	Restarts the internal system of the C Controller module.	○		×
CCPU_Set7SegLED	Sets a value to be displayed on the 7 segment LED on C Controller module.	×		○
CCPU_SetDotMatrixLED	Sets a value displayed in the dot matrix LED on the C Controller module.	○		
CCPU_SetLEDStatus	Sets the displayed LED status of the C Controller module.	○		
CCPU_SetRTC	Sets time data to the integral clock (RTC) in the C Controller module.			
CCPU_StartWDT	Sets the user watchdog timer of the C Controller module and starts up the user watchdog timer.			
CCPU_StopWDT	Stops the user watchdog timer of the C Controller module.			
CCPU_ShutdownRom	Shuts down the standard ROM of C Controller module to power OFF.	×		○
CCPU_UnmountMemoryCard	Unmounts a memory card inserted in the C Controller module.	○		
CCPU_WaitDataRefreshEvent	Waits for an occurrence of a data refresh interrupt event of the C Controller module.	○		×
CCPU_WaitSwitchEvent	Waits for an occurrence of a switch interrupt event of the C Controller module.	○		×
CCPU_WaitTimerEvent	Waits for an occurrence of a timer event.	×		○
CCPU_WriteDataRefreshMemory	Writes data to the data refresh memory of the C controller module.	○		×
CCPU_WriteSRAM	Writes data to the battery backup RAM of the C controller module.	○		

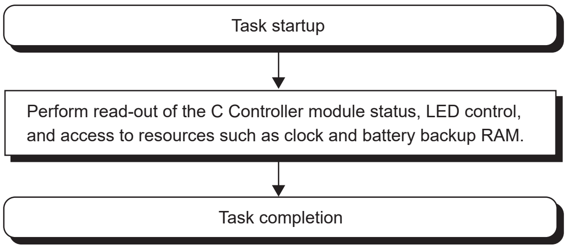
Execute the following functions from an interrupt service routine (ISR). Otherwise, the operating system may run away.

○: Supported ×: Not supported

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
CCPU_Get7SegLED_ISR	Acquires a value being displayed on the 7 segment LED on C Controller module.	×		○
CCPU_GetCounterMillis_ISR	Acquires the 1 millisecond counter value of C Controller module.	○		×
CCPU_GetCounterMicros_ISR	Acquires the 1 microsecond counter value of C Controller module.			
CCPU_GetDotMatrixLED_ISR	Acquires a value displayed in the dot matrix LED on the C Controller module.			
CCPU_ReadSRAM_ISR	Reads data from a battery backup RAM of the C controller module.	○		
CCPU_Set7SegLED_ISR	Sets a value to be displayed on the 7 segment LED on C Controller module.	×		○
CCPU_SetDotMatrixLED_ISR	Sets a value displayed in the dot matrix LED on the C Controller module.	○		×
CCPU_SetLEDStatus_ISR	Sets the status of the indicator LED on C Controller module.	×		○
CCPU_WriteSRAM_ISR	Writes data to the battery backup RAM of the C controller module.	○		

20.3 Programming Flow

The following shows the user program flow that involves these functions.


Task startup
Perform read-out of the C Controller module status, LED control, and access to resources such as clock and battery backup RAM.
Task completion

20.4 Precautions

(1) Clock setting

Do not perform clock setting in event notification waiting status (where QBF_WaitEvent function and QBF_WaitUnitEvent function are already executed).

CHAPTER 21 PROGRAMMING USING BUS INTERFACE FUNCTIONS

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

The following describes the bus interface function program flow and precautions.

21.1 Outline of Functions

The bus interface functions are used for access to I/O modules and intelligent function module's buffer memory controlled by the C Controller module via the base module.

21.2 Function List

The list of bus interface functions is indicated in the table below.
For details of each function, install Setting/monitoring tools for the C Controller module and refer to the [C Controller module function help].

(1) Available functions

○: Supported ×: Not supported

Function name	Function	CPU module		
		Q24DHC		Q12DC -V
		-V	-VG	
QBF_Close	Closes a bus.	○		
QBF_ControlEx	Controls remote RUN/STOP/PAUSE operations of the programmable controller CPU modules and C Controller module.			
QBF_ControlProgram	Controls the execute type of the programmable controller CPU module.			
QBF_DisableCpuInt	Disables a routine program which is registered as an interrupt program from another module.	×		○
QBF_DisableMultiCPUSyncInt	Disables a routine program executed when processing the multiple CPU synchronous interrupt program.			
QBF_DisableUnitInt	Disables a routine program which is registered as an interrupt program from an intelligent function module/interrupt module.			
QBF_EnableCpuInt	Enables a routine program which is registered as an interrupt program from another module.			
QBF_EnableMultiCPUSyncInt	Enables a routine program executed when processing the multiple CPU synchronous interrupt program.			
QBF_EnableUnitInt	Enables a routine program which is registered as an interrupt program from an intelligent function module/interrupt module.			
QBF_EntryCpuInt	Resisters a routine program to call when an interrupt from another module has occur.			
QBF_EntryMultiCPUSyncInt	Resisters a routine program to call when an interrupt from multiple CPU synchronous interrupt program has occur.			
QBF_EntryUnitInt	Resisters a routine program to call when an interrupt from intelligent function module/interrupt module has occur.			

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
QBF_FromBuf	Reads data from the CPU shared memory of the specified module and the buffer memory of the intelligent function module (From instruction).	○		
QBF_GINT	Issues an interrupt to another CPU.			
QBF_MotionCHGA	Requests to change the current value of the specified axis.			
QBF_MotionCHGAS	Requests to change the current value of the specified axis.	○*1	○	○*1
QBF_MotionCHGT	Requests to change the torque limit value of the specified axis.	○		
QBF_MotionCHGT2	Requests to change the torque limit value of the specified axis.			
QBF_MotionCHGV	Requests to change the speed of the specified axis.			
QBF_MotionCHGVS	Requests to change the speed of the specified axis.	○*1	○	○*1
QBF_MotionDDRD	Reads data from the Motion CPU devices.	○		
QBF_MotionDDWR	Writes data to the Motion CPU devices.			
QBF_MotionSFCS	Requests to start the specified Motion SFC program.			
QBF_MotionSVST	Requests to start the specified servo program.			
QBF_Open	Opens a bus.			
QBF_ReadDevice	Reads data from the internal user or system devices of the C Controller module.			
QBF_ReadLinkDevice	Reads data from link device(s) of the following network modules (host). • CC-Link IE controller network module • CC-Link IE Field Network Master/Local Module • MELSECNET/H module			
QBF_RECV	Receives a message from the other station via the following modules. • CC-Link IE controller network module • CC-Link IE Field Network Master/Local Module • MELSECNET/H module			
QBF_RefreshLinkDevice	Refreshes the CC-Link module link device.			
QBF_Reset	Resets the C Controller module. Resets No.1 CPU in case of a multiple CPU configuration.			
QBF_ResetDevice	Resets the internal user or system devices (bit devices) of the C Controller module.			
QBF_REMFR	Reads data from the buffer memory of the intelligent device station.	○*2	○	
QBF_REMTO	Writes data to the buffer memory of the intelligent device station.	○*2	○	
QBF_SEND	Sends a message to another station via the following modules. • CC-Link IE controller network module • CC-Link IE Field Network Master/Local Module • MELSECNET/H module	○		
QBF_SetDevice	Sets the internal user or system devices (bit devices) of the C Controller module.			
QBF_ToBuf	Writes data to the CPU shared memory of the specified module and the buffer memory of the intelligent function module (To instruction).			
QBF_UnitInfo	Reads module configuration information.			
QBF_WaitEvent	Waits for an interrupt event notification from another CPU.			
QBF_WaitMultiCPUSyncEvent	Waits for a multiple CPU synchronous interrupt event notification.	○		×

*1 : Use the product with a serial number whose first five digits are "16012" or higher.

*2 : Use the product with a serial number whose first five digits are "15102" or higher.

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
QBF_WaitUnitEvent	Waits for an interrupt event notification from an intelligent function module or an interrupt module.	○		
QBF_WriteDevice	Writes data to the internal user or system devices of the C Controller module.			
QBF_WriteLinkDevice	Writes data into link device(s) of the following network modules (host). • CC-Link IE Controller Network module • CC-Link IE Field Network Master/Local Module • MELSECNET/H module			
QBF_X_In_BitEx	Reads out input signals (X) in bit (1 point).	○		
QBF_X_In_WordEx	Reads out input signals (X) in word (16 points).			
QBF_Y_In_BitEx	Reads out output signals (Y) in bit (1 point).			
QBF_Y_In_WordEx	Reads out output signals (Y) in word (16 points).			
QBF_Y_Out_BitEx	Outputs output signals (Y) in bit (1 point).			
QBF_Y_Out_WordEx	Outputs output signals (Y) in word (16 points).			

Execute the following functions from an interrupt service routine (ISR). Otherwise, the operating system may run away.

○: Supported ×: Not supported

Function name	Function	CPU module		
		Q24DHC		Q12DC
		-V	-VG	-V
QBF_DisableCpuInt_ISR	Disables a routine program which is registered as an interrupt program from another module.	×		○
QBF_DisableMultiCPUSyncInt_ISR	Disables a routine program executed when processing the multiple CPU synchronous interrupt program.			
QBF_DisableUnitInt_ISR	Disables a routine program which is registered as an interrupt program from an intelligent function module/interrupt module.			
QBF_EnableCpuInt_ISR	Enables a routine program which is registered as an interrupt program from another module.			
QBF_EnableMultiCPUSyncInt_ISR	Enables a routine program executed when processing the multiple CPU synchronous interrupt program.			
QBF_EnableUnitInt_ISR	Enables a routine program which is registered as an interrupt program from an intelligent function module/interrupt module.			
QBF_FromBuf_ISR	Reads data from the CPU shared memory of the specified module and the buffer memory of the intelligent function module.			
QBF_ReadDevice_ISR	Reads data from the internal user device of C Controller module and the internal system device.			
QBF_ResetDevice_ISR	Resets the internal user device of C Controller module and the internal system device (bit device).			
QBF_SetDevice_ISR	Sets the internal user device of C Controller module and the internal system device (bit device).			
QBF_ToBuf_ISR	Writes data to the CPU shared memory of the specified module and the buffer memory of the intelligent function module.			
QBF_WriteDevice_ISR	Writes data to the internal user device of C Controller module and the internal system device.			
QBF_X_In_Word_ISR	Reads the input signal (X) in word unit (16 points).			
QBF_Y_In_Word_ISR	Reads the output signal (Y) in word unit (16 points).			
QBF_Y_Out_Word_ISR	Outputs the output signal (Y) in word unit (16 points).			

(2) Functions for compatibility

The following functions are for Q12DCCPU-V (Basic mode). Use them for utilizing user program(s) for Q12DCCPU-V (Basic mode). To create a new user program, use the C Controller module dedicated function (☞ Page 353, CHAPTER 20) or the "Available functions" described in (1) above, instead of these functions.

○: Supported ×: Not supported

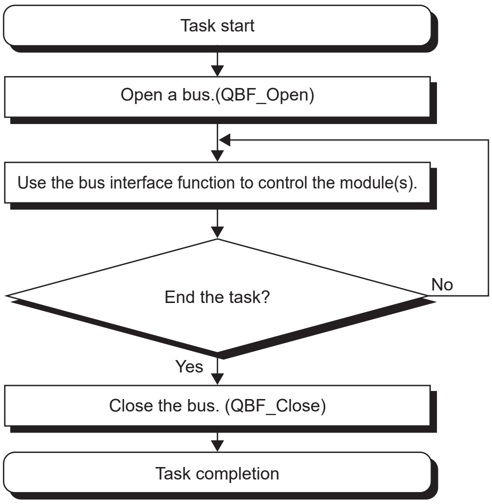
<table>
<tr><th rowspan="3">Function name</th><th rowspan="3">Function</th><th colspan="3">CPU module</th></tr>
<tr><th colspan="2">Q24DHC</th><th rowspan="2">Q12DC
-V</th></tr>
<tr><th>-V</th><th>-VG</th></tr>
<tr><td>QBF_ClearError</td><td>Clears an error.</td><td rowspan="3" colspan="3">○</td></tr>
<tr><td>QBF_Control</td><td>Controls remote RUN/STOP/PAUSE operations of the C Controller module.</td></tr>
<tr><td>QBF_Control7SegLED</td><td>Controls the 7 segment LED of C Controller module.</td></tr>
<tr><td>QBF_Control7SegLED_ISR</td><td>Controls the 7 segment LED of C Controller module.</td><td colspan="2">×</td><td>○</td></tr>
<tr><td>QBF_ControlLED</td><td>Controls USER LED of C Controller module.</td><td colspan="3">○</td></tr>
<tr><td>QBF_ControlLED_ISR</td><td>Controls USER LED of C Controller module.</td><td colspan="2">×</td><td>○</td></tr>
<tr><td>QBF_EntryTimerEvent</td><td>Registers timer events.</td><td rowspan="5" colspan="3">○</td></tr>
<tr><td>QBF_EntryWDTInt</td><td>Registers a routine for the user WDT error interrupt.</td></tr>
<tr><td>QBF_GetTime</td><td>Reads clock data.</td></tr>
<tr><td>QBF_MountCfCard</td><td>Mounts a Memory card</td></tr>
<tr><td>QBF_ReadSRAM</td><td>Reads data from the battery backup RAM.</td></tr>
<tr><td>QBF_ReadSRAM_ISR</td><td>Reads data from battery backup RAM.</td><td colspan="2">×</td><td>○</td></tr>
<tr><td>QBF_ReadStatusEx</td><td>Reads the status information (LED, error, etc.) of C Controller module.</td><td rowspan="9" colspan="3">○</td></tr>
<tr><td>QBF_RegistEventLog</td><td>Registers event logs in the event history file.</td></tr>
<tr><td>QBF_ResetWDT</td><td>Resets the user WDT.</td></tr>
<tr><td>QBF_SetTime</td><td>Sets up clock data.</td></tr>
<tr><td>QBF_StartWDT</td><td>Sets an interval of WDT and starts up the user WDT.</td></tr>
<tr><td>QBF_StopWDT</td><td>Stops the user WDT.</td></tr>
<tr><td>QBF_UnmountCfCard</td><td>Unmounts a Memory card.</td></tr>
<tr><td>QBF_WaitTimerEvent</td><td>Waits for an occurrence of a timer event.</td></tr>
<tr><td>QBF_WriteSRAM</td><td>Writes data to the battery backup RAM.</td></tr>
<tr><td>QBF_WriteSRAM_ISR</td><td>Writes data to battery backup RAM.</td><td colspan="2">×</td><td>○</td></tr>
</table>

Remark

For importing of user program(s) for Q12DCCPU-V (Basic mode), refer to the following.
☞ Page 465, Appendix 4

21.3 Programming Flow

The following shows the user program flow that involves these functions.


Task start
Open a bus.(QBF_Open)
Use the bus interface function to control the module(s).
End the task?
No
Yes
Close the bus. (QBF_Close)
Task completion

21.4 Precautions

(1) Opening and closing processing of the bus

Execute the opening and closing (QBF_Open function/QBF_Close function) processing of the bus at the start (task startup) and end (task end) of each user program.
Repeating opening and closing for each communication impairs communication performance.

(2) Execution of functions in multiple tasks

- Execute the bus opening processing in (1) for each task. A path acquired by the QBF_Open function cannot be shared among tasks.
- When the MELSEC data link function are requested simultaneously in multiple tasks, one of the task starts its processing and the other tasks will have to wait until the processing is complete.

(3) Function execution in remote STOP or remote PAUSE status

An error will occur if the following functions are executed with the C Controller module in the operation status of remote STOP or remote PAUSE.

- Output (Y) (QBF_Y_Out_BitEx function, QBF_Y_Out_WordEx function)
- Buffer memory writing (QBF_ToBuf function)

However, turning ON/OFF the output (Y) and writing to buffer memory from the [Online] ⇒ [Device monitor] of Setting/monitoring tools for the C Controller module are allowed.

(4) Host station device access for network module

Create a user program to read/write data after ensuring the following conditions so that data reading/writing is allowed.

If the following conditions are met, data become valid. However, reading/writing functions may complete normally even when the conditions are not valid.

(a) CC-Link module

- Module error (Xn0) is off (normal)
- Module ready (XnF) is on (operable)
- Own data link status (Xn1) is on (in data link)

(b) MELSECNET/H module

- Module status (SB20) is off (normal)
- Baton pass status of host station (SB47) is off (normal)
- Data link status of host station (SB49) is off (in data link)

(c) Cc-link IE Controller Network Module/Cc-link IE Field Network Master/local Module

- Data link status of own station (SB49) is off (in data link)
- Cyclic transmission status (the bit corresponding to the communication targets in SWB0 to B7 which is read from the own station) is off (normal)

CHAPTER 22 PROGRAMMING USING MELSEC DATA LINK FUNCTIONS

Q24DHC-V	Q24DHC-VG	Q24DHC-LS	Q26DHC-LS	Q12DC-V
○	○	×	×	○

This chapter describes the MELSEC data link function program flow and precautions.

22.1 Outline of Functions

MELSEC data link functions are used for reading/writing via network, or from/to the other programmable controller CPU device(s) comprising a multiple CPU configuration.

22.2 Function List

The list of MELSEC data link functions is indicated in the table below.
For details of each function, install Setting/monitoring tools for the C Controller module and refer to the [C Controller module function help].

(1) Available functions

Function name	Description
mdClose	Closes a communication line.
mdControl	Remote operations (RUN/STOP/PAUSE) of the programmable controller CPU.
mdDevRstEx	Resets (OFF) the bit device.
mdDevSetEx	Sets (ON) the bit device.
mdInit	Initializes the programmable controller CPU device information table.
mdOpen	Opens a communication line.
mdRandREx	Reads devices randomly.
mdRandWEx	Writes devices randomly.
mdReceiveEx	• Batch reads devices. • Receives messages.
mdSendEx	• Batch writes devices. • Sends messages
mdTypeRead	Reads the model name of the programmable controller CPU.

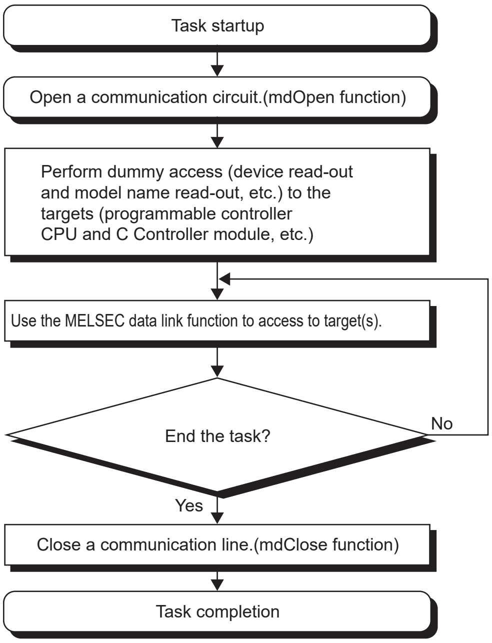
(2) Functions for compatibility

The following functions are for Q12DCCPU-V. Use them for importing user program(s) for Q12DCCPU-V. To create a new user program, use the functions described in (☞ Page 362, (1) in this section), instead of these functions.

Function name	Description
mdDevRst	Resets (OFF) the bit device.
mdDevSet	Sets (ON) the bit device.
mdRandR	Reads devices randomly.
mdRandW	Writes devices randomly.
mdReceive	• Batch reads devices. • Receives messages.
mdSend	• Batch writes devices. • Sends messages

22.3 Programming Flow

The following shows the user program flow that involves these functions.


Task startup
Open a communication circuit.(mdOpen function)
Perform dummy access (device read-out and model name read-out, etc.) to the targets (programmable controller CPU and C Controller module, etc.)
Use the MELSEC data link function to access to target(s).
End the task?
No
Yes
Close a communication line.(mdClose function)
Task completion

22.4 Precautions

(1) Opening and closing of communication lines

Execute the opening and closing (mdOpen function/mdClose function) processing of the communication lines at the start (task startup) and end (task end) of each user program.

Repeating opening and closing for each communication impairs communication performance.

(2) Dummy access

Execute the dummy access to the communication target CPU module before starting access required for control (In case of the first access to CPU modules by the task, the function execution time may be prolonged).

In addition, if there are multiple target CPU modules, execute dummy access to all CPU modules.

(3) Execution of functions in multiple tasks

Execute opening and closing of the communication lines in (1) in each task. A path acquired by the mdOpen function cannot be shared among tasks.

(4) Number of communication target CPU modules

The number of CPU modules to be accessed by each task must be set to 8 or less. Otherwise, the communication performance may be impaired.

(5) Occurrence of stop error

When stop error occurs on the C Controller module, do not access to the station using the block data assurance per station of the network.

(6) Occurrence of communication timeout

If a communication timeout occurs, adjust the timeout time in "CCPU Parameter" ⇒ <<MELSEC data link function settings>> in Setting/monitoring tools for the C Controller module.

(7) Access to host or another station of the network module

Create a user program to read/write data after ensuring the following conditions so that data reading/writing is allowed.

If the following conditions are met, data become valid. However, reading/writing functions may complete normally even when the conditions are not valid.

(a) CC-Link module

①Host station device access

- Module error (Xn0) is off (normal)
- Module ready (XnF) is on (operable)
- Own station link status (Xn1) is off (in data link)

②Access to another station device and remote operations of another station programmable controller CPU

The following condition is added to the ① conditions.

- Data link status of the access target station (Bits corresponding to a communication target station of SW80 to 83, which are read from the own station) is off (normal communication).

(b) Access via MELSECNET/H module

①Host station device access

- Module status (SB20) is off (normal)
- Baton pass status of host station (SB47) is off (normal)
- Data link status of host station (SB49) is off (in data link)

②Access to another station device and remote operations of another station programmable controller CPU

The following condition is added to the ① conditions.

- Baton pass status of the access target station (Bits corresponding to a communication target station of SW70 to 73, which are read from the host station) is off (normal communication).
- Data link status (Bits corresponding to the communication target station of SW74 to 77, which are read from the host station) is off (normal communication).

(c) Access via CC-Link IE Controller Network module/CC-Link IE Field Network master/local module

①Host station device access

- Data link status of host station (SB49) is off (in data link)
- Cyclic transmission status (the bit corresponding to the communication targets in SWB0 to B7 which is read from the own station) is off (normal)

②Access to another station device and remote operations of another station programmable controller CPU

The following condition is added to the ① conditions.

- Baton pass status of host station (SB47) is off (normal)
- Baton pass status of the access target station (Bits corresponding to a communication target station of SWA0 to A7, which are read from the host station) is off (normal communication).

22.5 Accessible Networks and Devices

This section indicates accessibility by access methods, network types, and combinations of destination devices.

(1) Access method

The table in this section divides the functions used for access into "Batch" and "Random" and indicates accessibility for each of these 2 categories.

Access method	Specific functions
Batch	• Batch write (mdSendEx function) • Batch read (mdReceiveEx function)
Random	• Random write (mdRandWEx functions) • Random read (mdRandREx function) • Bit set (mdDevSetEx function) • Bit reset (mdDevRstEx function)

(2) Accessibility by networks

The following indicates accessibility for each network.

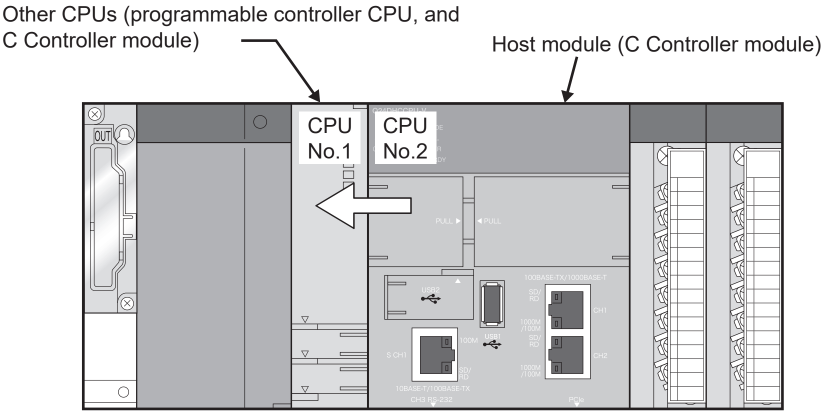
Network	Reference
Bus	Page 367, Section 22.5.1
CC-Link IE controller network	Page 370, Section 22.5.2
MELSECNET/H	Page 375, Section 22.5.3
CC-Link IE field network	Page 381, Section 22.5.4
CC-Link	Page 387, Section 22.5.5

22.5.1 Access via a bus

(1) Accessible range

Via a bus connection, access to the following is allowed.

- Own station (C Controller module)
- Other station (Programmable controller CPU or C Controller module)


Other CPUs (programmable controller CPU, and C Controller module)
Host module (C Controller module)
CPU No.1
CPU No.2

(2) Accessible devices

(a) Host station access

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target
			Own station (C Controller module)
X	Batch/ Random	DevX	○
Y		DevY	
M		DevM	
SM (special relay), SB		DevSM	
D		DevD	
SD (special register), SW		DevSD	
B		DevB	
W		DevW	
Special direct buffer register, Intelligent function module buffer memory		DevSPG(0) to DevSPG(255)	
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	○
	Random		×

(b) Another station access

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target	
			Programmable controller CPU	C Controller module
X	Batch/ Random	DevX	○	○
Y		DevY		
L		DevL	○	×
M		DevM	○	○
SM (special relay), SB		DevSM		
F		DevF	○	×
T (contact)		DevTT		
T (coil)		DevTC		
C (contact)		DevCT		
C (coil)		DevCC		
T (current value)		DevTN		
C (current value)		DevCN		
D		DevD	○	○
SD (special register), SW		DevSD		
T (main setting)		DevTM	×	×
T (sub setting 1)		DevTS		
T (sub setting 2)		DevTS2		
T (sub setting 3)		DevTS3		
C (main setting)		DevCM		
C (sub setting 1)		DevCS		
C (sub setting 2)		DevCS2		
C (sub setting 3)		DevCS3		
A		DevA		
Z		DevZ	○	×
V (index register)		DevV	×	
R (file register)		DevR	×[*1]	
ZR (file register)		DevZR	○	
ER (extended file register)		DevER(0) to evER(256)		
B		DevB	○	
W		DevW		
Q/QnA link special relay (within Q/QnACPU)		DevQSB	○	×
Retentive timer (contact)		DevSTT		
Retentive timer (coil)		DevSTC		
Q/QnA link special register (within Q/QnACPU)		DevQSW		
Q/QnA edge relay (within Q/QnACPU)		DevQV		
Own station random access buffer		DevMRB	×	
Retentive timer (current value)		DevSTN	○	
Own station link register (for sending)		DevWw	×	
Own station link register (for receiving)		DevWr	×	

○: Accessible ×: Inaccessible

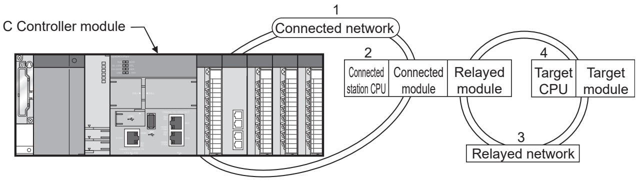
Device	Access method	Device type (Device name specification)	Access target	
			Programmable controller CPU	C Controller module
Own station buffer memory	Batch/ Random	DevSPB	×	×
Direct link input (other station side)		DevLX(1) to DevLX(255)	○	○
Direct link output (other station side)		DevLY(1) to DevLY(255)		
Direct link relay (other station side)		DevLB(1) to DevLB(255)		
Direct link register (other station side)		DevLW(1) to DevLW(255)		
Direct link special relay (other station side)		DevLSB(1) to DevLSB(255)		
Direct link special register (other station side)		DevLSW(1) to evLSW(255)		
Special direct buffer register, Intellligent function module buffer memory		DevSPG(0) to DevSPG(255)		
Other station buffer memory	Batch/ Random	DevRBM	×	×
Other station random access buffer		DevRAB		
Other station RX		DevRX		
Other station RY		DevRY		
Other station link register		DevRW		
Other station SB (link special relay for CC-Link)		DevSB		
Other station SW (link special relay for CC-Link)		DevSW		
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	○	○
	Random		×	×

*1 : For the access, use ZR (file register) or ER (extended file register).

22.5.2 Access via CC-Link IE Controller Network

(1) Accessible range

This section indicates accessible range for each combination of "1. Connection network", "2. Connected station CPU", "3. Relayed network", and "4. Target CPU" illustrated in the figure below.



- The host station and "2. Connected station CPU" are all accessible.
- "4. Target CPU" devices are represented by the following symbols.

No.	CPU type
1)	Q06CCPU-V, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q24DHCCPU-V, Q24DHCCPU-VG, PC CPU module
2)	Personal computer interface board

○: Accessible ×: Inaccessible

1.Connected network	2.Connected station CPU	3.Relayed network	4.Target CPU						
			QCPU		QnACPU	ACPU	1)	2)	LCPU
			Q mode	A mode					
CC-Link IE Controller Network	QCPU (Q mode)	CC-Link IE Controller Network[*1]	○[*2]	×	×	×	○[*3,*4]	○	×
		CC-Link IE Field Network[*1]	○[*2]	×	×	×	○[*5]	○	○
		MELSECNET/H	○[*2]	×	×	×	○[*4]	○	×
		MELSECNET/10	○[*2]	○	○	○	○[*4]	○	×
		MELSECNET(II)	×	×	×	×	×	×	×
		Ethernet	○	×	×	×	×	×	×
		Computer link	×						
		CC-Link	×						
	C Controller module[*3]	CC-Link IE Controller Network	×						
		CC-Link IE Field Network							
		MELSECNET/H							
		MELSECNET/10							
		MELSECNET(II)							
		Ethernet							
		Computer link							
		CC-Link							

*1 : Accessible only when all controlled CPUs of the relayed network after the station No.65 are all universal model QCPUs.

*2 : Access is not allowed when the connected station CPU is the Q00CPU or Q00JCPU or Q01CPU.

*3 : Accessible only for the following C Controller modules:

- Q06CCPU-V with a serial number whose first five digits are "10102" or higher
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later
- Q24DHCCPU-V/-VG

*4 : Access is not allowed to the PC CPU modules.

*5 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

(2) Accessible devices

(a) Host station access

Accessible devices are listed below.

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Accessibility
Own station direct link input (LX)	Batch/ Random	DevLX(0)	○
Own station direct link output (LY)		DevLY(0)	
Own station direct link relay (LB)		DevLB(0)	
Own station direct link register (LW)		DevLW(0)	
Own station direct link special relay*1 (SB)		DevSM, DevQSB, DevLSB(0)	
Own station direct link special register*1 (SW)		DevSD, DevQSW, DevLSW(0)	
Q/QnA RECV function	Batch	DevMAIL	○
	Random		×

*1 : There are multiple device types. Which to specify does not make any difference.

(b) Another station access

Destinations are represented by the following symbols.

No.	Access target
1)	A1NCPU
2)	A0J2HCPU, A1S(H)CPU, A1SJ(H)CPU, A2NCPU(-S1), A2S(H)CPU
3)	A2ACPU(-S1), A2UCPU(-S1), A2USCPU(-S1), A2USHCPU-S1
	Q02(H)CPU-A, Q06HCPU-A
4)	A3NCPU, A3ACPU, A3UCPU
5)	A4UCPU
6)	Q2ACPU(-S1), Q3ACPU, Q4ACPU, Q4ARCPU, Q2ASCPU(-S1), Q2ASHCPU(-S1)
	Q00JCPU, Q00CPU, Q01CPU
	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PRHCPU, Q25PRHCPU
	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU
	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU
7)	Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q06CCPU-V
8)	PC CPU module, personal computer interface board
9)	L02CPU, L26CPU-BT, L02CPU-P, L26CPU-PBT, LJ72GF15-T2, NZ2GF-ETB

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
X	Batch/ Random	DevX	○	○	○	○	○	○	○*1	×	○
Y		DevY	○	○	○	○	○	○	○*1		
L		DevL	○	○	○	○	○	○	×		
M		DevM	○	○	○	○	○	○	○*1		
SM (special relay), SB		DevSM	○	○	○	○	○	○	○*1		
F		DevF	○	○	○	○	○	○	×		
T (contact)		DevTT	○	○	○	○	○	○			
T (coil)		DevTC	○	○	○	○	○	○			
C (contact)		DevCT	○	○	○	○	○	○			
C (coil)		DevCC	○	○	○	○	○	○			
T (current value)		DevTN	○	○	○	○	○	○			
C (current value)		DevCN	○	○	○	○	○	○			
D		DevD	○	○	○	○	○	○	○*1		
SD (special register), SW		DevSD	○	○	○	○	○	○	○*1		
T (main setting)	Batch	DevTM	○	○	○	○	○	×	×	×	×
	Random		×	×	×	×	×				
T (sub setting 1)	Batch	DevTS	×	×	○*2	○	○				
	Random				×	×	×				
T (sub setting 2)	Batch	DevTS2	×	×	×	×	○				
	Random						×				
T (sub setting 3)	Batch	DevTS3	×	×	×	×	○				
	Random						×				
C (main setting)	Batch	DevCM	○	○	○	○	○				
	Random		×	×	×	×	×				
C (sub setting 1)	Batch	DevCS	×	×	○*2	○	○				
	Random				×	×	×				
C (sub setting 2)	Batch	DevCS2	×	×	×	×	○				
	Random						×				
C (sub setting 3)	Batch	DevCS3	×	×	×	×	○				
	Random						×				
A	Batch/ Random	DevA	○	○	○	○	○	×	×	×	×
Z		DevZ	○	○	○	○	○	○			○
V (index register)		DevV	○	○	○	○	○	×			×
R (file register)		DevR	×	○	○	○	○	×*3			○
ZR (file register)		DevZR	×	×	×	×	×	○*4			○
ER (extended file register)		DevER(0) to DevER(256)	×	○	○	○	○	○*4			○
B		DevB	○	○	○	○	○	○	○*5*6		○
W		DevW	○	○	○	○	○	○	○*5*6		○
Q/QnA link special relay (within Q/QnACPU)		DevQSB	×	×	×	×	×	○	×	×	○
Retentive timer (contact)		DevSTT	×	×	×	×	×	○	×	×	○
Retentive timer (coil)		DevSTC	×	×	×	×	×	○	×	×	○
Q/QnAlink special register (within Q/QnACPU)		DevQSW	×	×	×	×	×	○	×	×	○

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Q/QnA edge relay (within Q/QnACPU)	Batch/ Random	DevQV	×	×	×	×	×	○	×	×	○
Own station random access buffer		DevMRB	×	×	×	×	×	×			×
Retentive timer (current value)		DevSTN	×	×	×	×	×	○			○
Own station link register (for sending)		DevWw	×	×	×	×	×	×			×
Own station link register (for receiving)		DevWr	×	×	×	×	×	×			×
Own station buffer memory		DevSPB	×	×	×	×	×	×			×
Q/QnA SEND function (with arrival confirmation)*7	Batch	DevMAIL	×	×	×	×	×	○	○	×	○
	Random							×	×		×
Q/QnA SEND function (no arrival confirmation)*7	Batch	DevMAILNC	×	×	×	×	×	○	○		○
	Random							×	×		×
Direct link input (other station)	Batch/ Random	DevLX(1) to DevLX(255)	×	×	×	×	×	○	○*1	×	×
Other station RX (remote input RX for CC-Link IE Field)		DevLX(1) to DevLX(255)	×	×	×	×	×	○*5	○*5		
Direct link output (other station)		DevLY(1) to DevLY(255)	×	×	×	×	×	○	○*1		
Other station RY (remote output RY for CC-Link IE Field)		DevLY(1) to DevLY(255)	×	×	×	×	×	○*5	○*5		
Direct link relay (other station)		DevLB(1) to DevLB(255)	×	×	×	×	×	○	○*1		
Direct link register (other station)		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○*1		
Other station RWw (remote register (sending) RWw for CC-Link IE Field)		DevLW(1) to DevLW(255)	×	×	×	×	×	○*5	○*5		
Other station RWr (remote register (receiving) RWr for CC-Link IE Field)		DevLW(1) to DevLW(255)	×	×	×	×	×	○*5	○*5		
Direct link special relay (other station)		DevLSB(1) to DevLSB(255)	×	×	×	×	×	○	○*1		
Direct link special register (other station)		DevLSW(1) to DevLSW(255)	×	×	×	×	×	○	○*1		
Special direct buffer register, Intelligent function module buffer memory		DevSPG(0) to DevSPG(255)	×	×	×	×	×	○	○*1		○
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	×	×	×	×	×	○	○		×
	Random		×	×	×	×	×	×	×		×

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Other station buffer memory	Batch/ Random	DevRBM	×								
Other station random access buffer		DevRAB									
Other station RX (remote input RX for CC-Link)		DevRX									
Other station RY (remote output RY for CC-Link)		DevRY									
Other station link register		DevRW									
Other station SB (special relay SB for CC-Link)		DevSB									
Other station SW (special register SW for CC-Link)		DevSW									

*1 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*2 : Access is not allowed for the A2ACPU(-S1).

*3 : For the access, use ZR (file register) or ER (extended file register).

*4 : Access is not allowed for the Q00JCPU.

*5 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

*6 : For B32768 or higher and W32768 or higher, accessible only for the following C Controller modules:

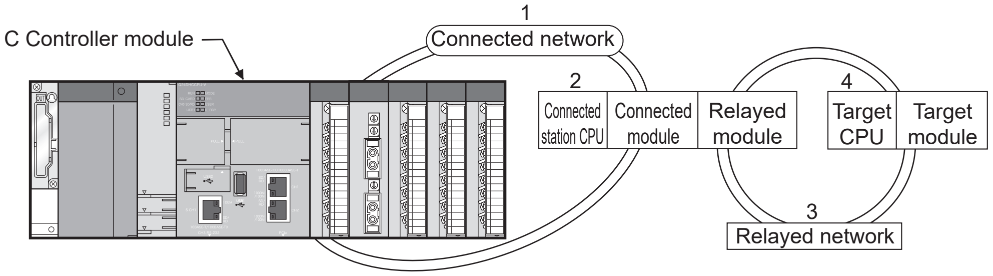
- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V with a serial number whose first five digits are "15102" or later
- Q24DHCCPU-VG

*7 : This function is used to send messages to a network module on the other station via a CC-Link IE Controller Network module. Access is not allowed to a multiple CPU system (when the logical station numbers are specified).

22.5.3 Access via MELSECNET/H

(1) Accessible range

This section indicates accessible range for each combination of "1. Connection network", "2. Connected station CPU", "3. Relayed network", and "4. Target CPU" illustrated in the figure below.



- The host station and "2. Connected station CPU" are all accessible.
- "4. Target CPU" devices are represented by the following symbols.

No.	CPU type
1)	Q06CCPU-V, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q24DHCCPU-V, Q24DHCCPU-VG, PC CPU module
2)	PC interface board

○: Accessible ×: Inaccessible

1.Connected network	2.Connected station CPU	3.Relayed network	4.Target CPU						
			QCPU		QnACPU	ACPU	1)	2)	LCPU
			Q mode	A mode					
MELSECNET/H	QCPU (Q mode)	CC-Link IE controller network*1	○	×	×	×	○*4, *5	○	×
		CC-Link IE field Network*1	○	×	×	×	○*7	○	○
		MELSECNET/H*2	○	×	×	×	○	○	×
		MELSECNET/10*3	○	○	○	○	○	○	×
		MELSECNET(II)	×	×	×	×	×	×	×
		Ethernet	○	×	×	×	×	×	×
		Computer link	×						
		CC-Link	×						
	C Controller module*6	CC-Link IE controller network	×						
		CC-Link IE field Network							
		MELSECNET/H							
		MELSECNET/10							
		MELSECNET(II)							
		Ethernet							
		Computer link							
		CC-Link							

○: Accessible ×: Inaccessible

1.Connected network	2.Connected station CPU	3.Relayed network	4.Target CPU						
			QCPU		QnACPU	ACPU	1)	2)	LCPU
			Q mode	A mode					
MELSECNET/10	QCPU (Q mode)	CC-Link IE controller network*1	○	×	×	×	○*4, *5	○	×
		CC-Link IE field Network*1	×	×	×	×	×		
		MELSECNET/H	○	×	×	×	○*5		
		MELSECNET/10	○	○	○	○	○*5		
		MELSECNET(II)	×	×	×	×	×	×	
		Ethernet	○						
		Computer link	×						
		CC-Link	×						
	QnACPU	CC-Link IE controller network	×	×	×	×	×	×	×
		CC-Link IE field Network							
		MELSECNET/H							
		MELSECNET/10	○	○	○	○	○*5	○	
		MELSECNET(II)	×	×	×	×	×	×	
		Ethernet	×	×	○				
		Computer link	×	×	×				
		CC-Link	×	×	×				
	QCPU (A mode), ACPU	CC-Link IE controller network	×	×	×	×	×	×	×
		CC-Link IE field Network							
		MELSECNET/H							
		MELSECNET/10	○	○	○	○	○*5	○	
		MELSECNET(II)	×						
		Ethernet	×						
		Computer link	×						
		CC-Link	×						
	C Controller module*6	CC-Link IE controller network	×						
		CC-Link IE field Network							
		MELSECNET/H							
		MELSECNET/10							
		MELSECNET(II)							
		Ethernet							
		Computer link							
		CC-Link							

*1 : Accessible only when all controlled station CPUs of the relayed network after the station No.65 are all universal model QCPUs.

*2 : Access is allowed when the MELSECNET/H module of the connected station is in the MELSECNET/H mode.

*3 : Access is allowed when the MELSECNET/10(H) module of the connected station is in the MELSECNET/10 mode.

*4 : The "4. Target CPU" C Controller module is accessible only for the following C Controller modules:
- Q06CCPU-V with a serial number whose first five digits are "10012" or higher
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*5 : Access is not allowed to PC CPU modules.

*6 : Accessible for the following C Controller modules:
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*7 : Accessible only for the following C Controller modules:
- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

(2) Accessible devices

(a) Host station access

Accessible devices are listed below.

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Accessibility
Q/QnA RECV function	Batch	DevMAIL	○
	Random		×
Own station direct link input (LX)	Batch/ Random	DevLX(0)	○
Own station direct link output (LY)		DevLY(0)	
Own station direct link relay (LB)		DevLB(0)	
Own station direct link register (LW)		DevLW(0)	
Own station direct link special relay*1 (SB)		DevSM, DevQSB, DevLSB(0)	
Own station direct link special register*1 (SW)		DevSD, DevQSW, DevLSW(0)	

*1 : There are multiple device types. Which to specify does not make any difference.

(b) Another station access

Destinations are represented by the following symbols.

No.	Access target
1)	A1NCPU
2)	A0J2HCPU, A1S(H)CPU, A1SJ(H)CPU, A2NCPU(-S1), A2S(H)CPU
3)	A2ACPU(-S1), A2UCPU(-S1), A2USCPU(-S1), A2USHCPU-S1
	Q02(H)CPU-A, Q06HCPU-A
4)	A3NCPU, A3ACPU, A3UCPU
5)	A4UCPU
6)	Q2ACPU(-S1), Q3ACPU, Q4ACPU, Q4ARCPU, Q2ASCPU(-S1), Q2ASHCPU(-S1)
	Q00JCPU, Q00CPU, Q01CPU
	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU
	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU
	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU
7)	Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q06CCPU-V
8)	PC CPU module, personal computer interface board
9)	L02CPU, L26CPU-BT, L02CPU-P, L26CPU-PBT, LJ72GF15-T2, NZ2GF-ETB

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
X	Batch/ Random	DevX	○	○	○	○	○	○	○*1	×	○
Y		DevY	○	○	○	○	○	○	○*1		
L		DevL	○	○	○	○	○	○	×		
M		DevM	○	○	○	○	○	○	○*1		
SM (special relay), SB		DevSM	○	○	○	○	○	○	○*1		
F		DevF	○	○	○	○	○	○	×		
T (contact)		DevTT									
T (coil)		DevTC									
C (contact)		DevCT									
C (coil)		DevCC									
T (current value)		DevTN									
C (current value)		DevCN									
D		DevD	○	○	○	○	○	○	○*1		
SD (special register), SW		DevSD	○	○	○	○	○	○	○*1		
T (main setting)	Batch	DevTM	○	○	○	○	○	×	×	×	×
	Random		×	×	×	×	×				
T (sub setting 1)	Batch	DevTS	×	×	○*2	○	○				
	Random				×	×	×				
T (sub setting 2)	Batch	DevTS2	×	×	×	×	○				
	Random						×				
T (sub setting 3)	Batch	DevTS3	×	×	×	×	○				
	Random						×				
C (main setting)	Batch	DevCM	○	○	○	○	○				
	Random		×	×	×	×	×				
C (sub setting 1)	Batch	DevCS	×	×	○*2	○	○				
	Random				×	×	×				
C (sub setting 2)	Batch	DevCS2	×	×	×	×	○				
	Random						×				
C (sub setting 3)	Batch	DevCS3	×	×	×	×	○				
	Random						×				
A	Batch/ Random	DevA	○	○	○	○	○	×	×	×	×
Z		DevZ	○	○	○	○	○	○			×
V (index register)		DevV	○	○	○	○	○	×			×
R (file register)		DevR	×	○	○	○	○	×*3			○
ZR (file register)		DevZR	×	×	×	×	×	○*4			○
ER (extended file register)		DevER(0) to DevER(256)	×	○	○	○	○	○*4			○
B		DevB	○	○	○	○	○	○	○*5*6		○
W		DevW	○	○	○	○	○	○	○*5*6		○
Q/QnA link special relay (within Q/QnACPU)		DevQSB	×	×	×	×	×	○	×		○
Retentive timer (contact)		DevSTT	×	×	×	×	×	○	×		○
Retentive timer (coil)		DevSTC	×	×	×	×	×	○	×		○

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Q/QnA link special register (within Q/QnACPU)	Batch/ Random	DevQSW	×	×	×	×	×	○	×	×	○
Q/QnA edge relay (within Q/QnACPU)		DevQV	×	×	×	×	×	○			○
Own station random access buffer		DevMRB	×	×	×	×	×	×			×
Retentive timer (current value)		DevSTN	×	×	×	×	×	○			○
Own station link register (for sending)		DevWw	×	×	×	×	×	×			×
Own station link register (for receiving)		DevWr									×
Own station buffer memory		DevSPB									×
Q/QnA SEND function (with arrival confirmation)[7]	Batch	DevMAIL	×	×	×	×	×	○	○	×	○
	Random							×	×		×
Q/QnA SEND function (no arrival confirmation)[7]	Batch	DevMAILNC	×	×	×	×	×	○	○		○
	Random							×	×		×
Direct link input (other station)	Batch/ Random	DevLX(1) to DevLX(255)	×	×	×	×	×	○	○[1]		×
Other station RX (remote input RX for CC-Link IE Field)	Batch	DevLX(1) to DevLX(255)	×	×	×	×	×	○[5]	○[5]		○
	Random										
Direct link output (other station)	Batch/ Random	DevLY(1) to DevLY(255)	×	×	×	×	×	○	○[1]		×
Other station RY (remote output RY for CC-Link IE Field)	Batch	DevLY(1) to DevLY(255)	×	×	×	×	×	○[5]	○[5]		○
	Random										
Direct link relay (other station)	Batch/ Random	DevLB(1) to DevLB(255)	×	×	×	×	×	○	○[1]		×
Direct link register (other station)		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○[1]		×
Other station RWw (remote register (sending) RWw for CC-Link IE field)		DevLW(1) to DevLW(255)	×	×	×	×	×	○[5]	○[5]		○
Other station RWr (remote register (receiving) RWr for CC-Link IE Field)		DevLW(1) to DevLW(255)	×	×	×	×	×	○[5]	○[5]		○
Direct link special relay (other station)		DevLSB(1) to DevLSB(255)	×	×	×	×	×	○	○[1]		○
Direct link special register (other station)		DevLSW(1) to DevLSW(255)	×	×	×	×	×	○	○[1]		○
Special direct buffer register, Intelligent function module buffer memory		DevSPG(0) to DevSPG(255)	×	×	×	×	×	○	○[1]		○
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	×	×	×	×	×	○	○		×
	Random		×	×	×	×	×	×	×		×

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Other station buffer memory	Batch/ Random	DevRBM	×								
Other station random access buffer		DevRAB									
Other station RX (remote input RX for CC-Link)		DevRX									
Other station RY (remote output RY for CC-Link)		DevRY									
Other station link register		DevRW									
Other station SB (special relay SB for CC-Link)		DevSB									
Other station SW (special register SW for CC-Link)		DevSW									

*1 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*2 : Access is not allowed for the A2ACPU(-S1).

*3 : For the access, use ZR (file register) or ER (extended file register).

*4 : Access is not allowed for the Q00JCPU.

*5 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

*6 : For B32768 or higher and W32768 or higher, accessible only for the following C Controller modules:

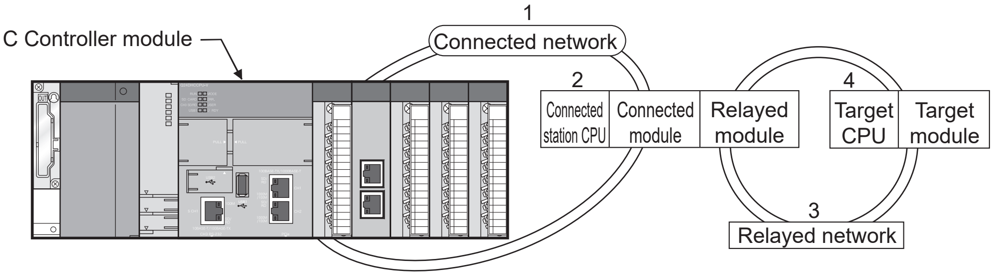
- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V with a serial number whose first five digits are "15102" or later
- Q24DHCCPU-VG

*7 : This function is used to send messages to a network module on the other station via a MELSECNET/H module.
Access is not allowed to a multiple CPU system (when the logical station numbers are specified).

22.5.4 Access via CC-Link IE field network

(1) Accessible range

This section indicates accessible range for each combination of "1. Connection network", "2. Connected station CPU", "3. Relayed network", and "4. Target CPU" illustrated in the figure below.



- The host station and "2. Connected station CPU" are all accessible.
- Target devices are represented by the following symbols.

No.	CPU type
1)	Q06CCPU-V, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q24DHCCPU-V, Q24DHCCPU-VG, PC CPU module
2)	Personal computer interface board

○: Accessible ×: Inaccessible

1.Connected network	2.Connected station CPU	3.Relayed network	4.Target CPU						
			QCPU		QnACPU	ACPU	1)	2)	LCPU
			Q mode	A mode					
CC-Link IE Field Network	QCPU (Q mode)	CC-Link IE Controller Network[*1]	○[*2]	×	×	×	○[*3]	○	×
		CC-Link IE Field Network[*1]	○[*2]	×	×	×	○[*4]	○	○
		MELSECNET/H	○[*2]	×	×	×	○	○	×
		MELSECNET/10	○[*2]	○	○	○	○	○	×
		MELSECNET(II)	×	×	×	×	×	×	×
		Ethernet							
		Computer link							
		CC-Link							
	C Controller module[*4]	CC-Link IE Controller Network	×	×	×	×	×	×	×
		CC-Link IE Field Network							
		MELSECNET/H							
		MELSECNET/10							
		MELSECNET(II)							
		Ethernet							
		Computer link							
		CC-Link							

○: Accessible ×: Inaccessible

1.Connected network	2.Connected station CPU	3.Relayed network	4.Target CPU						
			QCPU		QnACPU	ACPU	1)	2)	LCPU
			Q mode	A mode					
CC-Link IE Field Network	LCPU	CC-Link IE controller network	×	×	×	×	×	×	×
		CC-Link IE field Network							
		MELSECNET/H							
		MELSECNET/10							
		MELSECNET(II)							
		Ethernet							
		Computer link							
		CC-Link							

*1 : Accessible only when all controlled CPUs of the relayed network after the station No.65 are all universal model QCPUs.

*2 : Access is not allowed when the connected station CPU is the Q00JCPU or Q00CPU or Q01CPU.

*3 : Accessible only for the following C Controller modules:

- Q06CCPU-V with a serial number whose first five digits are "10102" or higher
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*4 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

(2) Accessible devices

(a) Host station access

Accessible devices are listed below.

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Accessibility
Host station remote input (RX)	Batch/ Random	DevLX(0)	○
Host station remote output (RY)		DevLY(0)	
Own station direct link special relay[*1] (SB)		DevSM, DevQSB, DevLSB(0)	
Own station direct link special register[*1] (SW)		DevSD, DevQSW, DevLSW(0)	
Host station remote register (sending) (RWw)		DevLW(0)	
Host station remote register (receiving) (RWr)		DevLW(0)	
Buffer memory		DevSPB	
Q/QnA RECV function	Batch	DevMAIL	○
	Random		×

*1 : There are multiple device types. Which to specify does not make any difference.

(b) Another station access

Destinations are represented by the following symbols.

No.	Access target
1)	A1NCPU
2)	A0J2HCPU, A1S(H)CPU, A1SJ(H)CPU, A2NCPU(-S1), A2S(H)CPU
3)	A2ACPU(-S1), A2UCPU(-S1), A2USCPU(-S1), A2USHCPU-S1
	Q02(H)CPU-A, Q06HCPU-A
4)	A3NCPU, A3ACPU, A3UCPU
5)	A4UCPU
6)	Q2ACPU(-S1), Q3ACPU, Q4ACPU, Q4ARCPU, Q2ASCPU(-S1), Q2ASHCPU(-S1)
	Q00JCPU, Q00CPU, Q01CPU
	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU
	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU
	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU
7)	Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q12DCCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q06CCPU-V
8)	PC CPU module, personal computer interface board
9)	L02CPU, L02CPU-P, L26CPU-BT, L26CPU-PBT, LJ72GF15-T2, NZ2GF-ETB

Accessible devices are listed below.

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
X	Batch/ Random	DevX	○	○	○	○	○	○	○*1	×	○
Y		DevY	○	○	○	○	○	○	○*1	×	○
L		DevL	○	○	○	○	○	○	×	×	○
M		DevM	○	○	○	○	○	○	○*1	×	○
SM (special relay), SB		DevSM	○	○	○	○	○	○	○*1	×	○
F		DevF	○	○	○	○	○	○	×	×	○
T (contact)		DevTT									
T (coil)		DevTC									
C (contact)		DevCT									
C (coil)		DevCC									
T (current value)		DevTN									
C (current value)		DevCN									
D		DevD	○	○	○	○	○	○	○*1	×	○
SD (special register), SW		DevSD	○	○	○	○	○	○	○*1	×	○
T (main setting)	Batch	DevTM	○	○	○	○	○	×	×	×	×
	Random		×	×	×	×	×				
T (sub setting 1)	Batch	DevTS	×	×	○*2	○	○				
	Random				×	×	×				
T (sub setting 2)	Batch	DevTS2	×	×	×	×	○				
	Random						×				
T (sub setting 3)	Batch	DevTS3	×	×	×	×	○				
	Random						×				
C (main setting)	Batch	DevCM	○	○	○	○	○				
	Random		×	×	×	×	×				
C (sub setting 1)	Batch	DevCS	×	×	○*2	○	○				
	Random				×	×	×				
C (sub setting 2)	Batch	DevCS2	×	×	×	×	○				
	Random						×				
C (sub setting 3)	Batch	DevCS3	×	×	×	×	○				
	Random						×				
A	Batch/ Random	DevA	○	○	○	○	○	×	×	×	×
Z		DevZ	○	○	○	○	○	○	×		○
V (index register)		DevV	○	○	○	○	○	×	×		×
R (file register)		DevR	×	○	○	○	○	×*3	×		○
ZR (file register)*5		DevZR	×	×	×	×	×	○*4	×		○
ER (extended file register)		DevER(0) to DevER(256)	×	○	○	○	○	○*4	×		○
B		DevB	○	○	○	○	○	○	○ *5*6		○
W		DevW	○	○	○	○	○	○	○ *5*6	×	○
Q/QnA link special relay (within Q/QnACPU)		DevQSB	×	×	×	×	×	○	×	×	○
Retentive timer (contact)		DevSTT	×	×	×	×	×	○	×	×	○
Retentive timer (coil)		DevSTC	×	×	×	×	×	○	×	×	○
Q/QnA link special register (within Q/QnACPU)		DevQSW	×	×	×	×	×	○	×	×	○

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Q/QnA edge relay (within Q/QnACPU)	Batch/ Random	DevQV	×	×	×	×	×	○	×	×	○
Own station random access buffer		DevMRB	×	×	×	×	×	×			×
Retentive timer (current value)		DevSTN	×	×	×	×	×	○			○
Own station link register (for sending)		DevWw	×	×	×	×	×	×			×
Own station link register (for receiving)		DevWr									×
Own station buffer memory		DevSPB									×
Q/QnA SEND function (with arrival confirmation)	Batch	DevMAIL	×	×	×	×	×	○	○[*7]	×	○
	Random							×	×		×
Q/QnA SEND function (no arrival confirmation)	Batch	DevMAILNC	×	×	×	×	×	○	○[*7]		○
	Random							×	×		×
Direct link input (other station)	Batch/ Random	DevLX(1) to DevLX(255)	×	×	×	×	×	○	○	×	×
Other statio RX (remote input RX for CC-Link IE Field)		DevLX(1) to DevLX(255)	×	×	×	×	×	○	○[*5]		○
		DevLY(1) to DevLY(255)	×	×	×	×	×	○	○		×
Direct link output (other station)		DevLY(1) to DevLY(255)	×	×	×	×	×	○	○[*5]		○
Other station RY (remote output RY for CC-Link IE Field)		DevLB(1) to DevLB(255)	×	×	×	×	×	○	○		×
		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○		×
Direct link relay (other station)		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○[*5]		○
Direct link register (other station)		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○[*5]		○
Other station RWw (remote register (sending) RWw for CC-Link IE Field)		DevLSB(1) to DevLSB(255)	×	×	×	×	×	○	○[*1]		○
Other station RWr (remote register (receiving) RWr for CC-Link IE Field)		DevLSW(1) to DevLSW(255)	×	×	×	×	×	○	○[*1]		○
Direct link special relay (other station)		DevSPG(0) to DevSPG(255)	×	×	×	×	×	○	○[*1]	×	○
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	×	×	×	×	×	○	○	×	×
	Random		×	×	×	×	×	×	×	×	×

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)
Other station buffer memory	Batch/ Random	DevRBM	×								
Other station random access buffer		DevRAB									
Other station RX (remote input RX for CC-Link)		DevRX									
Other station RY (remote output RY for CC-Link)		DevRY									
Other station link register		DevRW									
Other station SB (special relay SB for CC-Link)		DevSB									
Other station SW (special register SW for CC-Link)		DevSW									

*1 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*2 : Access is not allowed for the A2ACPU(-S1).

*3 : For the access, use ZR (file register) or ER (extended file register).

*4 : Access is not allowed for the Q00JCPU.

*5 : Accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG

*6 : For B32768 or higher and W32768 or higher, accessible only for the following C Controller modules:

- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V with a serial number whose first five digits are "15102" or later
- Q24DHCCPU-VG

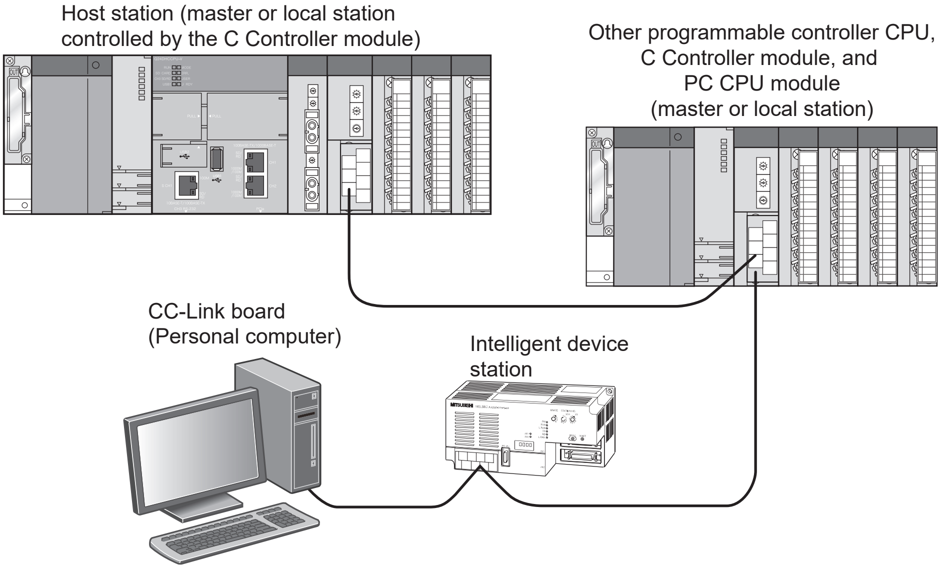
*7 : Access is not allowed for the PC CPU module.

22.5.5 Access via CC-Link

(1) Accessible range

The following accesses are allowed via CC-Link.

- Programmable controller CPU that controls CC-Link module
- C Controller module that controls CC-Link module
- Intelligent device station of CC-Link
- Personal computer with the CC-Link board is installed


Host station (master or local station controlled by the C Controller module)
Other programmable controller CPU, C Controller module, and PC CPU module (master or local station)
CC-Link board (Personal computer)
Intelligent device station

Point

Access to the other stations is not allowed if the station No. of master or local stations controlled by the C Controller module is 64. Access is allowed only to the own station.

(a) Host station access

Accessible devices are listed below.

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Accessibility
Own station RX	Batch/ Random	DevX	○
Own station RY		DevY	
Host station SB (special relay SB for CC-Link)		DevSM	
Host station SW (special register SW for CC-Link)		DevSD	
Own station link register (for sending)		DevWw	
Own station link register (for receiving)		DevWr	
Own station buffer memory		DevSPB	
Own station random access buffer		DevMRB	

(b) Another station access

Destinations are represented by the following symbols.

No.	Access target
1)	A1NCPU
2)	A0J2HCPU, A1S(H)CPU, A1SJ(H)CPU, A2NCPU(-S1), A2S(H)CPU
3)	A2ACPU(-S1), A2UCPU(-S1), A2USCPU(-S1), A2USHCPU-S1
	Q02(H)CPU-A, Q06HCPU-A
4)	A3NCPU, A3ACPU, A3UCPU
5)	A4UCPU
6)	Q2ACPU(-S1), Q3ACPU, Q4ACPU, Q4ARCPU, Q2ASCPU(-S1), Q2ASHCPU(-S1)
	Q00JCPU, Q00CPU, Q01CPU
	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU
	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU
	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU
7)	Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, Q12DCPU-V (Basic mode), Q12DCCPU-V (Extended mode), Q06CCPU-V
8)	PC CPU module, personal computer interface board, Intelligent device station on CC-Link
9)	L02CPU, L02CPU-P, L26CPU-BT, L26CPU-PBT

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)[*1]
X	Batch/ Random	DevX	○	○	○	○	○	○	○[*2]	×	○
Y		DevY	○	○	○	○	○	○	○[*2]		
L		DevL	○	○	○	○	○	○	×		
M		DevM	○	○	○	○	○	○	○[*2]		
SM (special relay), SB		DevSM	○	○	○	○	○	○	○[*2]		
F		DevF	○	○	○	○	○	○	×		
T (contact)		DevTT									
T (coil)		DevTC									
C (contact)		DevCT									
C (coil)		DevCC									
T (current value)		DevTN									
C (current value)		DevCN									
D		DevD	○	○	○	○	○	○	○[*2]		
SD (special register), SW		DevSD	○	○	○	○	○	○	○[*2]		
T (main setting)	Batch	DevTM	○	○	○	○	○	×	×	×	×
	Random		×	×	×	×	×				
T (sub setting 1)	Batch	DevTS	×	×	○[*3]	○	○				
	Random				×	×	×				
T (sub setting 2)	Batch	DevTS2	×	×	×	×	○				
	Random						×				
T (sub setting 3)	Batch	DevTS3	×	×	×	×	○				
	Random						×				
C (main setting)	Batch	DevCM	○	○	○	○	○				
	Random		×	×	×	×	×				
C (sub setting 1)	Batch	DevCS	×	×	○[*3]	○	○				
	Random				×	×	×				
C (sub setting 2)	Batch	DevCS2	×	×	×	×	○				
	Random						×				
C (sub setting 3)	Batch	DevCS3	×	×	×	×	○				
	Random						×				
A	Batch/ Random	DevA	○	○	○	○	○	×	×	×	×
Z		DevZ	○	○	○	○	○	○	×	×	○
V (index register)		DevV	○	○	○	○	○	×	×	×	×
R (file register)		DevR	×	○	○	○	○	×[*4]	×	×	○
ZR (file register)		DevZR	×	×	×	×	×	○[*5]	×	×	○

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)[1]
ER (extended file register)	Batch/ Random	DevER(0) to DevER(256)	×	○	○	○	○	○[5]	×	×	○
B		DevB	○	○	○	○	○	○	○[6][7]	×	○
W		DevW	○	○	○	○	○	○	○[6][7]	×	○
Q/QnA link special relay (within Q/QnACPU)		DevQSB	×	×	×	×	×	○	×	×	○
Retentive timer (contact)		DevSTT									
Retentive timer (coil)		DevSTC									
Q/QnA link special register (within Q/QnACPU)		DevQSW									
Q/QnA edge relay (within Q/QnACPU)		DevQV									
Own station random access buffer		DevMRB	×	×	×	×	×	×	×	×	×
Retentive timer (current value)		DevSTN	×	×	×	×	×	○	×	×	○
Own station link register (for sending)		DevWw	×	×	×	×	×	×	×	×	×
Own station link register (for receiving)		DevWr									
Own station buffer memory		DevSPB									
Q/QnA SEND function (with arrival confirmation)		DevMAIL									
Q/QnA SEND function (no arrival confirmation)		DevMAILNC									
Direct link input (Other station side)		DevLX(1) to DevLX(255)	×	×	×	×	×	○	○[2]	×	○
Direct link output (Other station side)		DevLY(1) to DevLY(255)	×	×	×	×	×	○	○[2]		
Direct link relay (Other station side)		DevLB(1) to DevLB(255)	×	×	×	×	×	○	○[2]		
Direct link register (Other station side)		DevLW(1) to DevLW(255)	×	×	×	×	×	○	○[2]		
Direct link special relay (Other station side)		DevLSB(1) to DevLSB(255)	×	×	×	×	×	○	○[2]		
Direct link special register (Other station side)		DevLSW(1) to DevLSW(255)	×	×	×	×	×	○	○[2]		
Special direct buffer register, Intelligent function module buffer memory		DevSPG(0) to DevSPG(255)	×	×	×	×	×	○	○[2]	×	○
CPU shared memory	Batch	DevSPB1 (for CPU No.1), DevSPB2 (for CPU No.2), DevSPB3 (for CPU No.3), DevSPB4 (for CPU No.4)	×	×	×	×	×	○	○	×	×
	Random		×								
Other station buffer memory[8]	Batch	DevRBM	○								
	Random		×								

○: Accessible ×: Inaccessible

Device	Access method	Device type (Device name specification)	Access target								
			1)	2)	3)	4)	5)	6)	7)	8)	9)[*1]
Other station random access buffer[*8]	Batch	DevRAB	○								
	Random		×								
Other station RX[*8]	Batch	DevRX	○								
	Random		×								
Other station RY[*8]	Batch	DevRY	○								
	Random		×								
Other station link register[*8]	Batch	DevRW	○								
	Random		×								
Other station SB (special relay SB for CC-Link)[*8]	Batch	DevSB	○								
	Random		×								
Other station SW (special register SW for CC-Link)[*8]	Batch	DevSW	○								
	Random		×								

*1 : Accessible only for the following C Controller modules:
- Q06CCPU-V with a serial number whose first five digits are "10102" or higher
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*2 : Accessible only for the following C Controller modules:
- Q12DCCPU-V (Basic mode) with a serial number whose first five digits are "12042" or later and Q12DCCPU-V (Extended mode) with a serial number whose first five digits are "15102" or later.
- Q24DHCCPU-V/-VG

*3 : Access is not allowed for the A2ACPU(-S1).

*4 : For the access, use ZR (file register) or ER (extended file register).

*5 : Access is not allowed for the Q00JCPU.

*6 : Accessible only for the following C Controller modules:
- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V/-VG
- Q24DHCCPU-V/-VG

*7 : For B32768 or higher and W32768 or higher, accessible only for the following C Controller modules:
- Q12DCCPU-V (Extended mode)
- Q24DHCCPU-V with a serial number whose first five digits are "15102" or later
- Q24DHCCPU-VG

*8 : Indicates the access to the buffer memory of a CC-Link module (intelligent device station) installed with each CPU module. Access is not allowed to multiple CPU systems (when the logical station number is specified).

Memo

PART 5 TROUBLESHOOTING

This section describes actions against troubles.

CHAPTER 23 TROUBLESHOOTING

This chapter describes how to investigate the root cause of troubles in the C Controller system and corresponding corrective actions.

When any trouble has occurred, check the following items.

(1) LED lighting state

After checking the LED lighting state indicated on the front face of the C Controller module, refer to the following to take actions.

☞ Page 395, Section 23.1

(2) Display state

After checking the state of the general-purpose analog RGB display, refer to the following to take actions.

☞ Page 399, Section 23.2

(3) Error

Refer to the following to check for any error.

☞ Page 400, Section 23.3

(4) I/O signal

Use the following methods to check if the I/O module(s), external device(s) and user program(s) are connected with correct I/O numbers as per the design.

- Change the input (X) ON/OFF to check if read-out by the user program is allowed.
- Use the user program to change the output (Y) ON/OFF to check if the external device status changes in conjunction with output (Y).

(5) Cabling

Check communication cables, connectors and module terminal blocks used for any looseness or disconnection, and check the wiring is correctly arranged.

For wiring of the C Controller module main, refer to the following.

☞ Page 125, Section 8.7

(6) Module installation status

Check that each module is securely installed to the base unit.

For the C Controller module, refer to the following.

☞ Page 116, Section 8.2

Then, divide the trouble sources into the following categories to resolve problems in each section:

- C Controller module
- Connection cable
- Module other C Controller module
- external devices

If performing the check items and corresponding actions described in this chapter does not resolve the problem, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

23.1 LED Lighting State

The LED lighting states are as shown below.

LED lighting state to be checked		Reference
The POWER LED on the power supply module		-
	Off	Page 395, Section 23.1.1 (1)
	On(red)	Page 395, Section 23.1.1 (2)
	On (orange)	Page 396, Section 23.1.1 (3)
The LIFE LED on the Life detection power supply module		-
	Off	Page 396, Section 23.1.2 (1)
	On(red)	Page 396, Section 23.1.2 (2)
	Flash(red)	Page 396, Section 23.1.2 (3)
POWER LED of the redundant power supply module is lit red		Page 397, Section 23.1.3
The MODE LED on the C Controller module		-
	When MODE LED is not lit	Page 397, Section 23.1.4
	When ERR.LED is lit or flashing	Page 397, Section 23.1.5
	When RUN LED is kept flashing	Page 398, Section 23.1.6
	When U RDY LED is not lit	Page 398, Section 23.1.7
When the output module LED is not lit		Page 398, Section 23.1.8

23.1.1 The POWER LED on the power supply module

(1) When POWER LED is not lit

Check the following items.

Check item	Corrective action
MODE LED of the C Controller module is lit.	The power supply module has failed. Replace the power supply module.
Power supply voltage is not appropriate.	Supply power voltage within the specified range.
The internal current consumption for the entire system exceeds the rated output current of the power supply module.	Reexamine the system configuration so that the internal current consumption does not exceed the rated output current.
POWER LED is lit when the power supply is turned on again with all modules other than the power supply module disconnected.	Repeatedly supply power to the system, returning the modules back to the system one by one. The last installed module at the time POWER LED becomes no longer active has failed. Replace the defective module.

(2) When POWER LED is lit red

Check the following items.

Check item	Corrective action
POWER LED is lit red even when the pertinent power supply module is removed and installed to another normal base unit and then the power is turned on again.	The power supply module has failed. Replace the power supply module.

(3) When POWER LED is lit orange

Check the following items.

Check item	Corrective action
POWER LED is lit orange even when the power is turned on again.	The power supply module has failed. Replace the power supply module.

23.1.2 The LIFE LED on the Life detection power supply module

(1) When LIFE LED is not lit

Check the following items.

Check item	Corrective action
LIFE LED is lit red for 1 second when the power is turned on again.	The life detection power supply module has reached the end of life. Replace the power supply module.
LIFE LED is kept off when the power is turned on again.	The power supply module should be replaced as the life diagnostics is impossible.

(2) When LIFE LED is lit red

Check the following items.

Check item	Corrective action
The ambient temperature of the life detection power supply module exceeds the range of 0-55°C.	Keep the operating ambient temperature within the range of 0 to 55°C.
LIFE LED is lit red even when the power is turned on again.	Stop the operation of the power supply module for a while, and resupply power to the system after the internal temperature of the module is lowered. Replace the pertinent power supply module if power-on again does not light the LED green or orange.

(3) When LIFE LED is flashing red

Check the following items.

Check item	Corrective action
LG-FG wiring status (grounding and routing) is correct. 📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)	Arrange correct wiring.

Remark

For lighting status other than the above, refer to the following.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

23.1.3 POWER LED of Redundant Power Supply Module is lit red

Check the following items.

Check item	Corrective action
POWER LED is lit green when the pertinent power supply module is replaced and the power is turned on again.	The power supply module has failed. Replace the power supply module.
POWER LED is not lit when the power supply is turned on again with all modules other than the power supply module disconnected.	The Redundant power supply base unithas failed. Replace the edundant power supply base unit
The internal current consumption for the entire system exceeds the rated output current of the power supply module.	Reexamine the system configuration so that the internal current consumption does not exceed the rated output current.

Remark

For the procedure to replace the redundant power supply module during operations of the C Controller system, refer to the following.
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

23.1.4 When MODE LED of the C Controller module is not lit

Check the following items.

Check item	Corrective action
ERR.LED is flashing.	System watchdog timer error has occurred. Take actions against occurrence of any system watchdog timer error (CPU Error code : 5000). (☞ Page 409, Appendix 1)
The module is started up in the hardware diagnostics mode.	Power OFF the module to terminate the hardware diagnostics mode and power-on the module again.

Point

If the MODE LED does not light after checking the items and performing the corresponding actions described above, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

23.1.5 C Controller module ERR.LED is lit or flashing

An error has occurred.
For error details, check the event history and error code in [Diagnostics] ⇒ [CCPU diagnostics] in Setting/monitoring tools for the C Controller module.

Check item	Corrective action
Event history	Check if multiple errors have occurred at the same time.
Error code	Take actions according to the error code. If multiple error have occurred at the same time, take actions against the first error. For error codes, refer to the following. ☞ Page 409, Appendix 1

23.1.6 C Controller module RUN LED is kept flashing

RUN LED flashing status indicates that the script file (STARTUP.CMD) is running.
After applicable "Corrective action" described in the "Check item" below is taken, correct the script file and the user program that is started up from the script file.

Check item	Corrective action
The script file is stored in the standard ROM.	• Store the unprocessed script file in an SD memory card or CompactFlash card, and turn the power on again. • Initialize the C Controller module. (☞ Page 62, Section 6.1)
The standard ROM script file cannot be overwritten.	• Store the unprocessed script file in an SD memory card or CompactFlash card, and turn the power on again. • Cordon a free space in the standard ROM. • Initialize the C Controller module. (☞ Page 62, Section 6.1)

23.1.7 C Controller module U RDY LED is not lit

Check the following items. For "-LS", consult with the partner (operating system vendor).

Check item	Corrective action
U RDY LED is kept lit.	• Network load is increased and startup may be prevented. Disconnect the Ethernet cable and start the C Controller module again. • Initialize the C Controller module. (☞ Page 62, Section 6.1)

23.1.8 Output module LED is not lit

Check the following items.

Check item	Corrective action
C Controller module RUN LED is off.	Put the C Controller module into RUN status.
The target device (Y) is not ON in [Online] ⇒ [Device monitor] in Setting/monitoring tools for the C Controller module.	Reexamine the user program.
The target output module's LED is not turned ON when the target device (Y) is turned ON from [Online] ⇒ [Device monitor] in Setting/monitoring tools for the C Controller module, with the C Controller module in the STOP status.	Check the "Start I/O" of the target module in [Diagnostics] ⇒ [System monitor] in Setting/monitoring tools for the C Controller module and correct the output No. of the user program.
The target output module's LED is turned ON when the target device (Y) is turned ON from [Online] ⇒ [Device monitor] in Setting/monitoring tools for the C Controller module, with the C Controller module in the STOP status.	Reexamine the user program.

23.2 Display State

The states of general-purpose analog RBG display are as shown below.

23.2.1 Nothing is displayed on the general-purpose analog RGB display

Check the following items.

Check item	Corrective action
C Controller module has not been connected with the display correctly.	Check if C Controller module is connected with the display correctly.
An error occurred on C Controller module.	Remove the error factors according to the corrective actions.
The general-purpose analog RGB display was connected after the power for C Controller module had been turned ON.	Connect the general-purpose analog RGB display before powering ON.

23.3 Checking the Error Details

(1) Error details of the C Controller module

Check the currently active error code(s) in [Diagnostics] ⇒ [CCPU diagnostics] in Setting/monitoring tools for the C Controller module. Refer to the following to take action(s) according to the respective error code.
☞ Page 409, Appendix 1

(2) Error details of modules controlled by the C Controller module

Check the currently active error code(s) in each module in [Diagnostics] ⇒ [System monitor] in Setting/monitoring tools for the C Controller module. Refer to the manuals for respective modules to take action(s) according to the respective error code.

23.4 Checking for Functional Errors

If the C Controller module has a functional problem, check the following items and perform troubleshooting.
In addition, if ERR.LED is lit or flashing, eliminate its cause(s).

Functional error	Reference
Setting/monitoring tools for the C Controller module cannot be USB-connected	Page 401, Section 23.4.1
Ethernet communication between the development environment (PC) and the C Controller module cannot be established	Page 402, Section 23.4.2
PING command response is incorrect	Page 402, Section 23.4.2 (1)
PING command response is correct	Page 402, Section 23.4.2 (2)
Setting/monitoring tools for the C Controller module cannot be connected	Page 403, Section 23.4.2 (2)(a)
CW Workbench connection fails	Page 403, Section 23.4.2 (2)(b)
Telnet connection fails	Page 404, Section 23.4.2 (2)(c)
FTP connection fails	Page 404, Section 23.4.2 (2)(d)
Parameter reading/writing fails	Page 404, Section 23.4.3
File access fails	Page 405, Section 23.4.4
Communication with peripherals fails	Page 405, Section 23.4.5
USB device cannot be recognized	Page 406, Section 23.4.6
File read-out (download) from C Controller module fails	Page 406, Section 23.4.7
An error occurs during user program execution	Page 406, Section 23.4.8
Event history data are incorrect	Page 408, Section 23.4.10
Refresh function (data refresh, link refresh) and data link of network are stopped	Page 408, Section 23.4.11
Partner application does not operate	Page 408, Section 23.4.12

23.4.1 Setting/monitoring tools for the C Controller module cannot be USB-connected

Check the following items.

Check item	Corrective action
The destination of Setting/monitoring tools for the C Controller module is set to the route other than USB.	Set a correct destination of Setting/monitoring tools for the C Controller module.
The communication test in "Transfer Setup" screen of Setting/monitoring tools for the C Controller module is normally completed with the user program not operating.	Review the task priorities of the user program. • Set priorities in the range of 100-255. • Use a wait processing (taskDelay, etc.).
After initialization of the C Controller module, the communication test in the "Transfer Setup" of Setting/ monitoring tools for the C Controller module is not completed normally.	The hardware of the C Controller module may be faulty.
User name and password is not sure.	Initializes a C Controller module. (☞ Page 62, Section 6.1 Initialization)
A USB driver is not installed.	Install a USB driver. (📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual)
The C Controller module is inserted in a slot other than that for No.1 in a multiple CPU system configuration.	• Connect it to the No.1 CPU module and take actions according to the error code. • Reset CPU No.1 or reactivate the multiple CPU system power supply.
In the multiple CPU system configuration, a CPU module incompatible with the multiple CPU system is mounted.	• Remove the incompatible CPU module from the main base unit. • Replace the incompatible CPU module with a compatible one.
The configuration is a multiple CPU system configuration incompatible with the C Controller module.	Review and make the configuration to be a multiple CPU system configuration compatible with the C Controller module.
The system in a multiple CPU system is faulty.	Reset the multiple CPU system and restart it.
The "Setting/monitoring tools for the C Controller module operation" setting in the service setting function is disabled.	Initialize the C Controller module. (☞ Page 62, Section 6.1 Initialization)
The C Controller module has been communicated using Setting/monitoring tool for the C Controller module whose version is not supported.	• Initialize the C Controller module. (☞ Page 62, Section 6.1 Initialization) • Perform communication with the C Controller module using the supported version of the Setting/monitoring tool for the C Controller module. (☞ Page 52, CHAPTER 4 SOFTWARE PACKAGES)

23.4.2 Ethernet communication with the C Controller module cannot be established

Issue PING from the personal computer to the C Controller module and check the response.

(1) PING response is incorrect

Check the following items and take appropriate actions so that the PING response becomes normal.

Check item	Corrective action
The IP address segments of the personal computer and C Controller module are different.	Set both the personal computer and C Controller module to the same segment. (☞ Page 129, Section 8.7 (3)) If it is relayed through another segment LAN via the gateway, contact the network administrator of the connected LAN.
The duplicated IP addresses of personal computer and C Controller module exist in the connected LAN.	Contact the LAN network administrator to eliminate the IP address duplication.
Replacement of the C Controller module makes PING not responding normally.	Resets all terminals of the network to which the C Controller module is connected.
IP address not in the correct range is specified.	Check the following items and specify a right IP address. • The IP address shall start with a number from 1 to 233, excluding 127. • There shall be no space in the IP address.
The system in a multiple CPU system is faulty.	Reset the multiple CPU system and restart it.
A large number of files and directories stored in the root directory of the drive.	The number of files and directories stored in the root directory are reduced to 100 or less. Or, move to the subdirectory. (☞ Page 309, CHAPTER 18)

Point

To set parameters of the C Controller module, connect Setting/monitoring tools for the C Controller module to the USB connector.

(2) PING response is correct

Check the reference of any relevant trouble and take appropriate actions.

No.	Problem	Reference
1	Setting/monitoring tools for the C Controller module cannot be connected	Page 403, (2)(a) in this section
2	CW Workbench connection fails	Page 403, (2)(b) in this section
3	Telnet connection fails	Page 404, (2)(c) in this section
4	FTP connection fails	Page 404, (2)(d) in this section

(a) Setting/monitoring tools for the C Controller module cannot be connected

Check the following items.

Check item	Corrective action
The Ethernet cable is not connected to the system Ethernet port (S CH1).	Connect the Ethernet cable.
The Ethernet cable is not connected to the built-in Ethernet port (CH1 and CH2).	
The destination of Setting/monitoring tools for the C Controller module is set to a different route.	Set a correct destination of Setting/monitoring tools for the C Controller module, via Ethernet.
The C Controller module is inserted in a slot other than that for No.1 in a multiple CPU system configuration.	• Connect it to the No.1 CPU module and take actions according to the error code. • Reset CPU No.1 or reactivate the multiple CPU system power supply.
In the multiple CPU system configuration, a CPU module incompatible with the multiple CPU system is mounted.	Remove the incompatible CPU module from the main base unit, or replace it with a compatible one.
The configuration is a multiple CPU system configuration incompatible with the C Controller module.	Review and make the configuration to be a multiple CPU system configuration compatible with the C Controller module.
The "Setting/monitoring tools for the C Controller module operation" setting in the service setting function is disabled.	Initialize the C Controller module. (☞ Page 62, Section 6.1 Initialization)
The C Controller module has been communicated using Setting/monitoring tool for the C Controller module whose version is not supported.	• Initialize the C Controller module. (☞ Page 62, Section 6.1 Initialization) • Perform communication with the C Controller module using the supported version of the Setting/monitoring tool for the C Controller module. (☞ Page 52, CHAPTER 4 SOFTWARE PACKAGES)

(b) CW Workbench connection fails

Check the following items.

Check item	Corrective action
The Ethernet cable is not connected to the user Ethernet port (CH1 and CH2).	Connect the Ethernet cable.
The Ethernet cable is not connected to the built-in Ethernet port (CH1 and CH2).	
"Target Server Options" of CW Workbench are not properly set.	Set "Target Server Options" of CW Workbench properly. (📖CW Workbench Operating Manual)

(c) Telnet connection fails

Check the following items.

Check item	Corrective action
The Ethernet cable is not connected to the user Ethernet port (CH1 and CH2).	Connect the Ethernet cable.
The Ethernet cable is not connected to the built-in Ethernet port (CH1 and CH2).	
User name and password is not sure.	Initializes a C Controller module. (☞ Page 62, Section 6.1)
A message "Sorry, session limit reached." appears.	Terminate the Telnet connection from another personal computer and take any of the following actions: • Reconnect after the Telnet connection timeout time has elapsed (☞ Page 195, Section 12.1.1 (4)) • Reset the C Controller system

(d) FTP connection fails

Check the following items.

Check item	Corrective action
The Ethernet cable is not connected to the user Ethernet port (CH1 and CH2).	Connect the Ethernet cable.
The Ethernet cable is not connected to the built-in Ethernet port (CH1 and CH2).	
User name and password is not sure.	Initializes a C Controller module. (☞ Page 62, Section 6.1)
There are 11 or more FTP connections to one C Controller module.	Make an adjustment so that the number of FTP connections becomes 10 or less.
A FTP connection can be established normally from the Windows® command prompt.	Change to a FTP client tool that can establish a connection normally.

23.4.3 Parameter reading/writing fails

Check the following items.

Check item	Corrective action
Setting/monitoring tools for the C Controller module is connected by a user name without "Administrator" access authority.	Connect to Setting/monitoring tools for the C Controller module by a user name with "Administrator" access authority.
Administrator's user name and password is not sure.	Initializes a C Controller module. (☞ Page 62, Section 6.1)

23.4.4 File access fails

Check the following items.

Check item	Corrective action
SD CARD LED is off with the reading/writing target set to an SD memory card.	Insert an SD memory card. (Re-insert an SD memory card.)
CF CARD LED is off with the reading/writing target set to an CF card.	Insert an CF card. (Re-insert an CF card.)
The SD memory card is write-protected with the writing target set to an SD memory card.	Cancel the write protection of the SD memory card. (Refer to the manual for the SD memory card used.)
USB LED is off with the reading/writing target set to a USB device.	Install a USB device. (Re-install a USB device.)
There is no free space in the write target drive.	• Allocate a free space in the write target drive. • Change the write target to another drive.
The user program that uses the write target files is running.	Stop the user program that uses the write target files.
A file system error has occurred in an SD memory card, CF card or a USB Mass Storage Class compatible device.	Restore the file system in the SD memory card, CF card or a USB Mass Storage Class compatible device. (☞ Page 405, (1) in this section)

(1) Diagnostics and restoration of the file system in the drive

Use the FAT format for the file system in following drives:

- SD memory card ("/SD")
- CF card ("/CF")
- USB device ("/USB0")

For diagnostics of the FAT format structure, use the "chkdsk" command.

Be sure to execute the "chkdsk" in a format that starts tasks by the "sp" command from the following tools:

- CW Workbench shell
- Telnet

For specifications of the "chkdsk" command, refer to the manual for VxWorks.

Point

Backup the program files and data before restoring a file system, and write the backup files and data after restoration. After file restoration, a partial error, i.e. loss of stored files, may occur.

23.4.5 Communication with peripherals fails

Check the following items.

Check item	Corrective action
The system in a multiple CPU system is faulty.	Reset the multiple CPU system and restart it.

23.4.6 USB device cannot be recognized

Check the following items.

Check item	Corrective action
C Controller module has not been connected with the USB device correctly.	Check if C Controller module is connected with the USB device correctly. ☞ Page 106, Section 7.6.3
An error occurred on C Controller module.	Remove the error factors according to the corrective actions for each error.
USB device (other than the one compliant with the USB Mass Storage Class standard) was connected with the power supply for C Controller module turned ON.	Connect a USB device (other than the one compliant with the USB Mass Storage Class standard) before turning ON the power supply for C Controller module.

23.4.7 File read-out (download) from C Controller module fails

Check the following items.

Check item	Corrective action
Check the transfer mode of FTP.	Change the transfer mode of FTP to a proper mode.

23.4.8 An error occurs during user program execution

Check the following items.

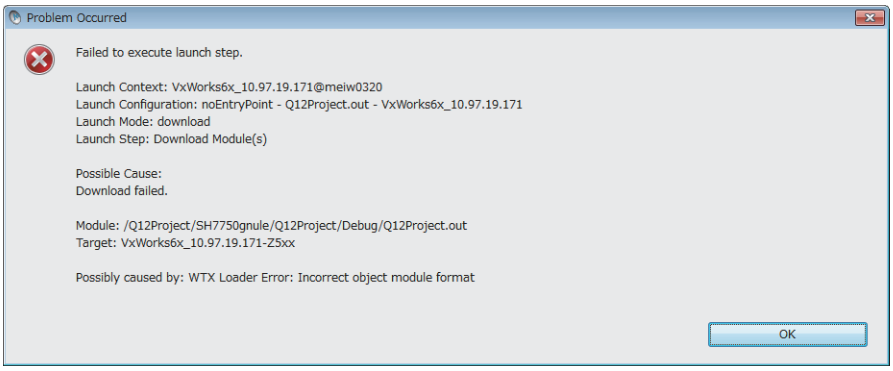
Check item	Corrective action
An error occurs in executable file (*.out) loading. (☞ Page 407, (1) in this section)	• Set the "Build Spec" in compiling to "PENTIUM4gnu". (📖CW Workbench Operating Manual) • Cordon a free space in the work RAM. • Download the files with all symbols required for files to load first.
Event(s) is registered with the event history.	Take appropriate actions according to details of the registered event(s). (☞ Page 434, Appendix 2)
An error occurs in C Controller module dedicated function, bus interface functions or MELSEC data link functions.	• Take appropriate actions according to the error code shown at the time of function execution. (☞ Page 409, Appendix 1) • Check the mode which has been executed the initialization setting. (☞ Page 62, Section 6.1)
An error occurs in VxWorks standard API functions.	Refer to the manual for VxWorks. If the error persists, consult Wind River Systems, Inc.
Stack size of the task that runs the user program is insufficient.	Increase the task stack size.
The pointer used by the user program refers to an invalid address.	Make correction to make the pointer refer to a valid address.
The memory area specified in Size is not allocated.	Allocate the memory area.
The VX_FP_TASK option is not specified for the task that performs floating-point operations.	Specify the VX_FP_TASK option for the task that performs floating-point operations.
A VxWorks message appears when an error occurs.	Consult the Wind River Systems, Inc.

(1) Error display in case of Build Spec unmatch

If the executable file's Build Spec is other than "PENTIUM4gnu", the following error message appears during loading (Download, ld command of CW Workbench).

(a) When CW Workbench downloads an executable file

The following screen appears.



Problem Occurred

Failed to execute launch step.

Launch Context: VxWorks6x_10.97.19.171@meiw0320
Launch Configuration: noEntryPoint - Q12Project.out - VxWorks6x_10.97.19.171
Launch Mode: download
Launch Step: Download Module(s)

Possible Cause:
Download failed.

Module: /Q12Project/SH7750gnule/Q12Project/Debug/Q12Project.out
Target: VxWorks6x_10.97.19.171-Z5xx

Possibly caused by: WTX Loader Error: Incorrect object module format

(b) When the ld command loads an executable file (from Telnet)

The following response is returned.

```
->ld(1,0,"/SD/Demo1.out")
ld(): error loading file (errno = 0x610001).
value = 0 = 0x0
```

Remark

The details of ermo can be checked by the printErrno command.

```
->printErrno 0x610001
errno = 0x610001 : S_loadElfLib_HDR_READ.
value = 0 = 0x0
```

23.4.9 The user program does not start

Check the following items

Check item	Corrective action
A large number of files and directories stored in the root directory of the drive.	The number of files and directories stored in the root directory are reduced to 100 or less. Or, move to the subdirectory. (☞ Page 309, CHAPTER 18)
The user program task has not been started by the script file.	Start the user program task by using taskSpawn or sp.
The script file name is incorrect.	Set the script file name to STARTUP.CMD.

23.4.10 Event history data are incorrect

Check the following items.

Check item	Corrective action
Error information, BATTERY ERROR, is lit red in the "CCPU diagnostics" of Setting/monitoring tools for the C Controller module.	Battery replacement

23.4.11 Refresh function (data refresh, link refresh) and data link of network are stopped

Check the following items.

Check item	Corrective action
The multiple CPU high-speed transmission area is specified to the data refresh setting without selecting "Use multiple CPU high speed communication" in the multiple CPU setting.	Clear the multiple CPU high-speed transmission area in the data refresh setting. Or, select "Use multiple CPU high speed communication" and configure the settings to be accessed.
An intelligent function module that cannot be accessed is specified to the data refresh setting.	Check the I/O assignment setting and the mounting status of the intelligent function module and configure the settings to be accessed.

23.4.12 Partner application does not operate

Check the following items.

Check item	Corrective action
C Controller module has been initialized.	The partner application will be deleted by performing the hardware initialization setting (☞ Page 62, Section 6.1). Reinstall the partner application when deleted.
Data necessary for the partner application has been deleted from FTP or user program.	Check data in the standard ROM to find if any data necessary for the partner application has been deleted. If deleted, reinstall the partner application.

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- Reinstalling the partner application
  For specifications and functions related to the partner application, refer to the manuals provided by the partner (application vendor), or consult the partner (application vendor).

APPENDICES

Appendix 1 Error Code List

This section explains error codes that are returned upon error occurrence.

Type	Description	Reference
CPU error code	Error code that occurs in C controller module.	Page 409, Appendix 1.1
Error code detected during device monitor execution	Error code detected during device monitor function execution in Setting/monitoring tools for the C Controller module.	Page 420, Appendix 1.2
Error code during function execution	Error code returned by bus interface functions, C Controller module dedicated function and MELSEC data link functions.	Page 421, Appendix 1.3
Error code returned to peripherals	Error code returned to communication request device from the intelligent function module and network system such as peripherals (GOT, etc.).	Page 432, Appendix 1.4

Point

In any of the following cases, please consult your local Mitsubishi service center or representative, explaining the details of the problem.

- Any error code not listed in the following table is detected
- The actions indicated in the following table does not resolve the program

A

Appendix 1 Error Code List
Appendix 1.1 CPU error code

Appendix 1.1 CPU error code

The error codes and respective detailed information and corrective actions are shown below.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
1000	MAIN CPU DOWN	-	Off	Flashing	Stop	CPU module drives recklessly or it breaks down. • Malfunction by noise etc. • Hardware error. • Data error of battery backup RAM was detected.	• Take a preventive measure against noise. • Initializes the C Controller module. • Check for any battery error, and replace the battery. • Reset the CPU module and restart it.
1009	MAIN CPU DOWN	-	Off	Flashing	Stop	• A failure was detected in the power supply module, C Controller module, main base unit, extension base unit, or extension cable. • When using the redundant base unit, the redundant power supply module failure in both systems and/or the redundant base unit failure are detected.	• Reset the C Controller module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
1106	RAM ERROR	-	Off	Flashing	Stop	Data error of battery backup RAM was detected.	• In the hardware diagnostic test, execute the battery backup RAM diagnostic test (mode 1). <When completed normally> For Q24DHCCPU-VG, clear the Battery backup RAM monitor screen with Setting/monitoring tools for the C Controller module, and then restart the C Controller module. For Q24DHCCPU-V/Q24DHCCPU-LS/ Q26DHCCPU-LS/Q12DCCPU-V, perform the module initialization setting procedure, and restart the C Controller module. <When failed> Replace the C Controller module. • Check for any battery error, and replace the battery, if any. • Take a preventive measure against noise • Initialize the module to restore the default status of the module.
1300	FUSE BREAK OFF	Module No.*1	Off/On	Flashing/ On	Stop/ Continue *2	The fuse of an output module has been blown.	Check the ERR. LED of each output module, and replace the module whose ERR. LED is on. • Read the error information in Setting/ monitoring tools for the C Controller module, and replace the fuse of the output module that corresponds to the value (module No.) • If a GOT is connected to the main or extension base unit in a bus topology, check the extension cable connection and the GOT grounding status.
1310	I/O INT.ERROR	-	Off	Flashing	Stop	An A series interrupt module is mounted in the position which set to Empty in the I/O assignment.	Check the I/O assignment and the actually mounted module.
			Off	Flashing	Stop	An interrupt occurred even though no interrupt module is mounted.	Check the modules and replace a faulty module.
1401	SP.UNIT DOWN	Module No.*1	Off/On	Flashing/ On	Stop/ Continue *3	• In the initial processing, no response returns from an intelligent function module. • The buffer memory size of an intelligent function module is incorrect. • An unsupported module is mounted.	• When unsupported module is mounted, remove the module. • If the module is supported, check the modules and replace a faulty module.
1403	SP.UNIT DOWN	Module No.*1	Off/On	Flashing/ On	Stop/ Continue *3	• An unsupported module is mounted. • An intelligent function module error was detected. (Handshake error) • An I/O module (including intelligent function modules and special function modules) is being removed, was removed. or mounted during operation.	• When unsupported module is mounted, remove the module. • If the module is supported, check the modules and replace a faulty module.
1412	CONTROL-BUS.ERR.	Module No.*1	Off	Flashing	Stop	The FROM/TO instruction cannot be executed due to a control bus error with an intelligent function module.	• Reset the C Controller module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1413	CONTROL-BUS.ERR.	-	Off	Flashing	Stop	In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted.	• Remove the incompatible CPU module from the main base unit. • Replace the incompatible CPU module with a compatible one. • Mount the CPU modules in the CPU slot and slot 0 to 2. • Check the modules and replace a faulty module.
			Off	Flashing	Stop	An error was detected on the system bus. • Self-diagnostic error of the system bus • Self-diagnostic error of the CPU module	• Reset the C Controller module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1414	CONTROL-BUS.ERR.	Module No.*1	Off	Flashing	Stop	• Failure of a mounted module was detected. • In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted.	• Remove the incompatible CPU module from the main base unit. • Replace the incompatible CPU module with a compatible one. • Reset the C Controller module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
1415	CONTROL-BUS.ERR.	Base No.	Off	Flashing	Stop	Failure of the main or extension base unit was detected.	• Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1416	CONTROL-BUS.ERR.	Module No.*1	Off	Flashing	Stop	A bus error was detected when power is turned on or the CPU module is reset.	
1430	MULTI-C.BUS.ERR.	-	Off	Flashing	Stop	The error of connected CPU was detected at the multiple CPU high speed transmission.	
1431	MULTI-C.BUS.ERR.	Module No.*1	Off	Flashing	Stop	Error (Disconnected) with other CPU was detected at the multiple CPU high speed transmission.	• Take a preventive measure against noise. • Check if the CPU module is mounted on the main base unit correctly. • Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1432	MULTI-C.BUS.ERR.	Module No.*1	Off	Flashing	Stop	Communication timeout with other CPU was detected at the multiple CPU high speed transmission.	• Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1433 1434 1435	MULTI-C.BUS.ERR.	Module No.*1	Off	Flashing	Stop	Error (Disconnected) with other CPU was detected at the multiple CPU high speed transmission.	• Take a preventive measure against noise. • Check if the CPU module is mounted on the main base unit correctly. • Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
		Module No.*1	Off	Flashing	Stop		
		Module No.*1	Off	Flashing	Stop		
1436	MULTI-C.BUS.ERR.	-	Off	Flashing	Stop	The error of the multiple CPU high speed transmission main base unit was detected at the multiple CPU high speed transmission. (The error of the multiple CPU high speed transmission was detected.)	• Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1437	MULTI-C.BUS.ERR.	-	Off	Flashing	Stop	The error of the multiple CPU high speed transmission main base unit was detected at the multiple CPU high speed transmission. (The error of the multiple CPU high speed transmission was detected.)	• Take a preventive measure against noise. • Check if the CPU module is mounted on the main base unit correctly. • Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1439	MULTI-C.BUS.ERR.	-	Off	Flashing	Stop	The error of the multiple CPU high speed transmission main base unit was detected at the multiple CPU high speed transmission. (The error of the multiple CPU high speed transmission was detected.)	• Reset the CPU module and set it to RUN again. • If the same error is displayed again, check the modules and replace a faulty module.
1500	AC/DC DOWN	-	Off	Flashing	Stop	• A momentary power failure occurred in the power supply. (The number of detected momentary power failures can be confirmed by the CCPU_GetPowerStatus function.) • The power supply was turned off.	Check the power supply.
1510	SINGLE PS.DOWN	Base No./ Power supply No.	On	On	Continue	On the redundant power supply base unit, the voltage of one of the power supplies dropped.	Check the supply power to the redundant power supply module on the redundant power supply base unit.
1520	SINGLE PS.ERROR	Base No./ Power supply No.	On	On	Continue	In the redundant power supply system, a failure was detected in one of the redundant power supply modules.	Check the modules and replace a faulty module.
1600	BATTERY ERROR	-	On	On	Continue	• The battery voltage of the CPU module has dropped to the specified value or less. • The lead connector of the battery in the CPU module is not connected. • The lead connector of the CPU module battery is not securely engaged.	• Replace the battery. • Connect the lead connector. • Check the lead connector of the CPU module for looseness. Firmly engage the connector if it is loose.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
2000	UNIT VERIFY ERR.	Module No.[*1]	Off/On	Flashing/ On	Stop/ Continue [*2]	In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted.	Replace the incompatible CPU module with a compatible one.
						The setting is different from the I/O module information input at power on. (The I/O module mounting status was changed during operation. Or, the module is almost disconnected.)	• Read the error information in Setting/ monitoring tools for the C Controller module, check the module corresponding to the value (module No.), and replace the module. • If a GOT is connected to the main or extension base unit in a bus topology, check the extension cable connection and the GOT grounding status.
2100	SP.UNIT LAY ERR.	Module No.[*1]	Off	Flashing	Stop	In the I/O assignment parameter setting, the slot of the QI60 is set to other than Intelli. (intelligent function module) and Interrupt (interrupt module).	Correct the I/O assignment parameter setting.
						• In the I/O assignment parameter setting, an I/O module is set as an intelligent function module, or vice versa. • In the I/O assignment parameter setting, a CPU module is set as another module type or empty, or vice versa. • In the I/O assignment parameter setting, the number of points set for an intelligent function module is less than the actual number of points. • In the I/O assignment parameter setting, the switches were set for the module than has no switch setting.	• Correct the I/O assignment parameters to match them to the actual mounting status of intelligent function modules and CPU modules. • In the I/O assignment parameter setting, remove the switch settings.
2103	SP.UNIT LAY ERR.	Module No.[*1]	Off	Flashing	Stop	• Two or more QI60 modules are mounted in the single CPU system. • Two or more QI60/A1SI61 modules are mounted for the same control CPU (programmable controller CPU only) in the multiple CPU system. • Two or more A1SI61 modules are mounted in the multiple CPU system.	• Use one QI60 in the single CPU system. • Change the number of QI60 modules set for the same control CPU to only one in the multiple CPU system. • Use only one A1SI61 in the multiple CPU system. • If an interrupt module is used for each QCPU in the multiple CPU system, replace it with the QI60. (Use one A1SI61 and up to three QI60 modules, or the QI60 modules only.)
						Two or more QI60 modules with no interrupt pointer setting are mounted.	• Use only one QI60. • Configure the interrupt event settings for the QI60 modules other than the first one.
2106	SP.UNIT LAY ERR.	Module No.[*1]	Off	Flashing	Stop	A total of five or more MELSECNET/H modules and/or CC-Link IE Controller Network modules are mounted on the entire system.	Reduce the total number of MELSECNET/ H modules and CC-Link IE Controller Network modules on the entire system to four or less.
						• Five or more MELSECNET/H modules are mounted. • Five or more CC-Link IE Controller Network modules are mounted. • Five or more Q series Ethernet modules are mounted.	• Reduce the number of MELSECNET/H modules to four or less. • Reduce the number of CC-Link IE Controller Network modules to four or less. • Reduce the number of Q series Ethernet modules to four or less.
						The same network No. or station No. is set for different networks or stations on the MELSECNET/H or CC-Link IE Controller Network system.	Check the network numbers or station numbers.
2107	SP.UNIT LAY ERR.	Module No.[*1]	Off	Flashing	Stop	The start X/Y set in the I/O assignment parameter setting is overlapped with the one set for another module.	Correct the I/O assignment parameters to match them to the actual mounting status of intelligent function modules.
2108	SP.UNIT LAY ERR.	Module No.[*1]	Off	Flashing	Stop	• A network module for the A2UCPU (A1SJ71LP21, A1SJ71BR11, A1SJ71LR21, A1SJ71AP21, A1SJ71AR21, or A1SJ71AT21B) is mounted. • A network module for the Q2AS (A1SJ71QLP21(S), A1SJ71QBR11, or A1SJ71QLR21) is mounted.	Replace the network module with a MELSECNET/H module.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
2110	SP.UNIT ERROR	Module No.*1	Off	Flashing	Stop	The following problem exist in a module specified in Data refresh settings: • The module other than intelligent function module/special function module • The module that does not include buffer memory • The module being accessed is faulty. • No module is installed. • Writing into a CPU shared memory of other than the host station is set.	• Read the error information in Setting/ monitoring tools for the C Controller module to identify the numeric value (module No.). Correct the data refresh setting corresponding to the value as necessary. • Check the destination intelligent function module/special function module and replace a faulty module.
2116	SP.UNIT ERROR	Module No.*1	Off	Flashing	Stop	• Any module controlled by another module is specified in Data refresh settings. • Any module for A and QnA series controlled by another module is specified in Data refresh settings.	Read the error information in Setting/ monitoring tools for the C Controller module to identify the numeric value (module No.). Correct the data refresh setting corresponding to the value as necessary.
2118	SP.UNIT ERROR	Module No.*1	Off	Flashing	Stop	When the online module change setting is set to be "enabled" in the PLC parameter in a multiple CPU system, an intelligent function module controlled by another module is specified in Data refresh settings.	• When performing the online module change in a multiple CPU system, correct the data refresh setting so that access will not be made to the intelligent function module controlled by the other CPU. • When accessing the intelligent function module controlled by the other CPU in a multiple CPU system, set the online module change setting to be "disabled" by parameter.
2120	SP.UNIT LAY ERR.	-	Off	Flashing	Stop	• In the single CPU system, the QA□B or QA1S□B base unit is used. • In a multiple CPU system configuration, a C Controller module is set as a CPU that controls modules on the QA□B or QA1S□B.	• Replace the base unit with the Q□B. • Set a High Performance model QCPU as a CPU that controls the modules on the QA□B or QA1S□B.
2121	SP.UNIT LAY ERR.	-	Off	Flashing	Stop	A CPU module is installed to other than the CPU slot and slot 0 to 2.	Check the slot position of the C Controller module and install the CPU module in the correct slot.
2122	SP.UNIT LAY ERR.	-	Off	Flashing	Stop	The QA1S□B is used as the main base unit.	Change the main base unit to the Q□B.
2124	SP.UNIT LAY ERR.	-	Off	Flashing	Stop	• A module is installed in the position of slot 65 or higher. • A module is installed in the position of the slot number that exceeds the number of slots set for the base unit. • A module is installed in the slot where I/O points of 4096 or higher are assigned. • A module is installed in the slot whose assigned I/O points cross over the boundary of 4096.	• Remove the module in slot 65 or higher. • Remove the module installed in the position of the slot number that exceeds the number of slots set for the base unit. • Remove the module installed in the slot where 4096 points or higher are assigned. • Replace the last module with a module whose I/O points do not exceed 4096.
2125	SP.UNIT LAY ERR.	Module No.*1	Off	Flashing	Stop	• A module that cannot be recognized is mounted. • No response returns from an intelligent function module.	• Mount applicable modules. • Check the modules and replace a faulty module.
2126	SP.UNIT LAY ERR.	Module No.*1	Off	Flashing	Stop	In the multiple CPU system, CPU modules are configured as follows: • The slot on the left of a CPU module is empty. • A CPU module other than High Performance model QCPUs is mounted on the left of a High Performance model QCPU. • When CPU No.1 is a High Performance model QCPU, a CPU module other than C Controller modules is mounted on the right of a C Controller module. • When CPU No.1 is a C Controller module, a programmable controller CPU is mounted on the right of the C Controller module. • When CPU No.1 is a Basic model QCPU, a CPU module is mounted on the right of the C Controller module.	• Eliminate any empty slot space between CPU modules. (An empty slot must be set on the right side of CPU modules.) • Replace the module other than High Performance model QCPUs on the left of the High Performance model QCPU with a High Performance model QCPU. • Remove the CPU module other than C Controller modules on the right of the C Controller module. • Remove the programmable controller CPU mounted on the right of the C Controller module. • Remove the CPU module mounted on the right of the C Controller module.
2150	SP.UNIT VER.ERR.	Module No.*1	Off	Flashing	Stop	In the multiple CPU system, an intelligent function module incompatible with the multiple CPU system is set to be controlled by a CPU other than CPU No.1.	• Change the module to an intelligent function module that supports the multiple CPU system (function version B or later). • Change the control CPU setting for the intelligent function module to CPU No.1.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
2200	MISSING PARA.	-	Off	Flashing	Stop	• No parameter file is set. • The parameters were written to a drive different from a valid one. • The system WDT times out and parameters are not correctly written.	• Set the parameter file. • Write the parameters to a valid drive. • Initialize the module and correct the system WDT setting values so that the parameter file writing is completed.
2502	CAN'T EXE.PRG.	-	Off	Flashing	Stop	• One command (one line) in the script file has 129 or more characters. • The command in the script file cannot be executed. (An error in the syntax, or no command exists.)	Correct the description of the error script file as shown below, and restart the C Controller module. • Reduce the number of characters for one command (one line) in the script file to 128 or less. • Confirm no error in the syntax and the presence of a command.
3000	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, an intelligent function module controlled by another CPU is specified in the interrupt event setting of Parameter.	• In the interrupt event setting of Parameter, specify the start I/O No. of the intelligent function module controlled by the host CPU. • Delete the interrupt event setting of Parameter.
						In the parameter setting, the points for an empty slot are not set within the range applicable to the C Controller module.	• Read the error information in Setting/ monitoring tools for the C Controller module, check the parameter item corresponding to the value (parameter No.), and correct it. • Write the corrected parameters again to the C Controller module, and restart the C Controller system or reset the C Controller module. • If the same error is displayed again, check the modules and replace a faulty module. • If the corrected parameters cannot be written to the C Controller module, initialize the C Controller module and use Setting/monitoring tools for the C Controller module supported by the module to be used.
3001	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	The parameter data are corrupted.	
						A large number of files and directories stored in the root directory of the drive.	The number of files and directories stored in the root directory are reduced to 100 or less. Or, move to the subdirectory. (☞ Page 309, CHAPTER 18)
3010	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, the number of CPU modules set in the Parameter setting differs from the number of actually mounted CPU modules.	Correct the number of CPU modules set in the Multiple CPU settings (the number of CPUs - CPU (Empty) setting in I/O assignment) to match it to the actual mounting status.
3012	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, the multiple CPU settings and control CPU settings written to a CPU are different from those of CPU No.1.	Correct the multiple CPU settings and control CPU settings to match them to those of CPU No.1.
3013	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	Multiple CPU auto refresh setting was following on the multiple CPU system. • The number of the sending points is odd number. • The total of the sending points exceeds the maximum refresh point.	In the refresh setting of the multiple CPU setting, check the following and correct as follows: • Set the number of send points to an even number. • Change the setting so that the total number of send points does not exceed the maximum refresh points.
3014	PARAMETER ERROR	Parameter No.*4	Off	Flashing	Stop	In s multiple CPU system configuration, the online module change parameter (multiple CPU system parameter) setting written to a CPU is different from that of CPU No.1.	Correct the online module change parameter (multiple CPU system parameter) setting written to the CPU to match it to that of CPU No.1.
						In s multiple CPU system configuration, the online module change is enabled even though the mounted CPU module does not support the online module change parameter.	Disable the online module change when the mounted CPU module does not support the online module change parameter.
3015	PARAMETER ERROR	Parameter No.*4/ CPU No.	Off	Flashing	Stop	When the multiple CPU system, it is different from CPU that the parameter setting verified.	Read the error information in Setting/ monitoring tools for the C Controller module, check the parameter item corresponding to the value (parameter No./ CPU No.) and the target CPU parameters, and correct them.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
3016	PARAMETER ERROR	Parameter No.*4/ CPU No.	Off	Flashing	Stop	On the multiple CPU synchronous startup setting, the CPU module that is not supported the multiple CPU synchronous startup was set as the target of synchronous startup.	Remove the CPU from the multiple CPU synchronized boot-up setting, and correct the setting.
3100	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, a CC-Link IE Controller Network module controlled by another CPU is assigned to the start I/O No. in the CC-Link IE Controller Network parameter setting.	• Delete the network parameters for the CC-Link IE Controller Network module controlled by another CPU. • Change the setting to the start I/O No. of the CC-Link IE Controller Network module controlled by the host CPU.
						A network parameter of a CC-Link IE Controller Network module acting as a normal station was changed to Control station. Or a network parameter of a CC-Link IE Controller Network module acting as a control station was changed to Normal station. (Network parameters are reflected to the module by resetting.)	Reset the CPU module.
						• The number of modules specified with the CC-Link IE Controller Network parameter does not match the number of modules actually mounted. • The start I/O No. specified with the CC-Link IE Controller Network parameter is different from the actual I/O No. • Invalid data are included in the parameters. • The network type of the CC-Link IE Controller Network was changed. • (To change the network type, the status must be changed from RESET to RUN.)	• Check the network parameters and the actual mounting status, and if any difference is identified, make them matched. If a network parameter is corrected, it must be written to the CPU module. • Check the setting for the number of extension base units. • Check the connected conditions of the extension base unit(s) and extension cables. If a GOT is connected to the main or extension base unit in the bus topology, also check the connection status. If the error occurs even after the above checks, check the modules and replace a faulty module.
						• A CC-Link IE Controller Network module is assigned to the start I/O No. in the MELSECNET/H network parameter setting. • A MELSECNET/H module is assigned to the start I/O No. in the CC-Link IE controller network parameter setting.	
						• No CC-Link IE Controller Network parameters are set even though a CC-Link IE Controller Network module is mounted. • No MELSECNET/H network parameters are set even though CC-Link IE controller network module(s) and MELSECNET/H module(s) are mounted.	
						The network parameters were written to a drive different from a valid one.	Write the network parameters to a valid drive.
						In the multiple CPU system, a MELSECNET/H module controlled by another CPU is assigned to the start I/O No. in the MELSECNET/H network parameter setting.	• Delete the MELSECNET/H network parameter for the MELSECNET/H module controlled by another CPU. • Change the setting to the start I/O No. of the MELSECNET/H module controlled by the host CPU.
						A link parameter of a MELSECNET/H module acting as a normal station was changed to Control station. Or a link parameter of a MELSECNET/H module acting as a control station was changed to Normal station. (Link parameters are reflected to the module by resetting.)	Reset the CPU module.
						• The number of modules specified with the MELSECNET/H parameter does not match the number of modules actually mounted. • The start I/O No. specified with the MELSECNET/H parameter is different from the actual I/O No. • Invalid data are included in the parameters. • The station type of the MELSECNET/H was changed while power is on. (To change the station type, the status must be changed from RESET to RUN.)	• Check the network parameters and the actual mounting status, and if any difference is identified, make them matched. If a network parameter is corrected, it must be written to the CPU module. • Check the setting for the number of extension base units. • Check the connected conditions of the extension base unit(s) and extension cables. If a GOT is connected to the main or extension base unit in the bus topology, also check the connection status. If the error occurs even after the above checks, check the modules and replace a faulty module.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
3101	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	• When the station No. of a MELSECNET/H module is 0, parameters for the PLC-to-PLC network are set. • When the station No. of a MELSECNET/H module is other than 0, parameters for a remote master are set.	Correct the type or station No. of the MELSECNET/H module.
						The refresh parameters for the CC-Link IE Controller Network are out of range.	• Check the network parameters and the actual mounting status, and if any difference is identified, make them matched. If a network parameter is corrected, it must be written to the CPU module. • Check the setting for the number of extension base units. • Check the connected conditions of the extension base unit(s) and extension cables. If a GOT is connected to the main or extension base unit in the bus topology, also check the connection status. If the error occurs even after the above checks, check the modules and replace a faulty module.
						• The network No. specified with the parameter is different from the actual network No. • The start I/O No. specified with the parameter is different from the actual I/O No. • The network type specified with the parameter is different from the actual network type. • Network refresh parameters for MELSECNET/H or MELSECNET/10 are out of range.	
3102	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	A network parameter error on the CC-Link IE Controller Network was detected.	• Correct the network parameters and write them. • If the error occurs after the correction, check the modules and replace a faulty module.
						• A network module detected a network parameter error. • A MELSECNET/H network parameter error was detected.	
3103	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, a Q series Ethernet module controlled by another CPU is specified for the start I/O No. in the Network parameter setting for Ethernet.	• Delete the network parameter of the Q series Ethernet module controlled by another CPU. • Change it to the start I/O No. of the Q series Ethernet module that the host CPU controls.
						• Although the number of modules is set to one or greater in the Ethernet module count parameter setting, the number of actually mounted modules is zero. • The start I/O No. in the Network parameter setting for Ethernet differs from that of the actually mounted module.	• Correct the network parameters and write them. • If the error occurs after the correction, check the modules and replace a faulty module.
3104	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	• The Ethernet, CC-Link IE Controller Network, MELSECNET/H and MELSECNET/10 use the same network number. • The network number, station number or group number set in the Parameter is out of range. • The specified I/O No. is outside the range of the CPU module. • The Ethernet-specific parameter setting is not normal.	
3105	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, a Q series CC-Link module controlled by another CPU is specified for the start I/O No. in the CC-Link parameter setting.	• Delete the network parameter of the Q series CC-Link module controlled by another CPU. • Change it to the start I/O No. of the Q series CC-Link module that the host CPU controls.
						• Although the number of modules is set to one or greater in the CC-Link module count parameter setting, the number of actually mounted modules is zero. • The start I/O No. in the common parameters is different from that of the actually mounted module. • The station type in the CC-Link module count parameter setting is different from that of the actual station.	• Correct the network parameters and write them. • If the error occurs after the correction, check the modules and replace a faulty module.
3107	LINK PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	• The CC-Link parameter setting is incorrect. • The current mode is not allowed for the version of the mounted CC-Link module.	Check the parameter setting.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
3150	DUPLICAT.NET.NO.	Parameter No.*4	Off	Flashing	Stop	• When the CC-Link IE Field Network is used, the network number set in the network parameter and the switch setting is duplicated. • No network parameter and switch setting are configured, or the CC-Link IE Field Network • module with an incorrect switch setting is mounted.	• Check the parameter setting. • Configure the network parameters and the switch settings, and then write network parameters and the switch settings to the module.
3300	SP.PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	The start I/O No. of an intelligent function module set in Setting/monitoring tools for the C Controller module differs from the actual I/O No.	Check the parameter setting.
3301	SP.PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	The refresh parameter of an intelligent function module is outside the range, or the refresh range exceeded the file register capacity.	
3302	SP.PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	An intelligent function parameter is not normal. Check the parameter setting.	
3303	SP.PARA.ERROR	Parameter No.*4	Off	Flashing	Stop	In the multiple CPU system, the parameter setting was performed for an intelligent function module controlled by another CPU.	• Delete the parameter setting of the intelligent function module controlled by another CPU. • Change it to the parameter setting of the intelligent function module that the host CPU controls.
5000	SYSTEM WDT ERROR	Time (set value: ms)	Off	Flashing	Stop	The system watchdog timer controlled by the system detected an error, or an error occurred in the system software. • The time set for the system watchdog timer is too short. • A task of high CPU utilization is running. • A program that will cause an error in the memory, stack, etc. was executed.*5 • An operation that increase the CPU utilization by the system task (restarting user CPU, and writing parameter from the setting/monitoring tools for the C Controller module) was executed. • At a stop error occurrence, the station using block data assurance per station of the network was accessed. • CPU module drives recklessly or it breaks down. (Malfunction by noise etc. and Hardware error)	• Restart the C Controller module • Increase the system WDT time value in System settings of Setting/monitoring tools for the C Controller module. • Decrease the CPU utilization of the task, or disable the task operation. • Check the user program.*5 • Taking into account the system task CPU utilization, sufficiently prolong the system WDT setting time. • Take a preventive measure against noise. • Check that the C Controller module is securely installed in the base unit and the ambient environment is within the general specification range. • Review the user program not to access to the station that is used block data assurance per station of the network at a stop error occurrence. If the error occurs even after the above checks, check the modules and replace a faulty module.
5001	USER WDT ERROR	Time (set value: ms)	Off	Flashing	Stop	Since the WDT reset was not executed within the user WDT setting time, the USER WDT (watchdog timer) controlled by the system detected an error. Or, an error occurred in the user program. • The user WDT setting time is too short. • A task of high CPU utilization is running. • A program that will cause an error in the memory, stack, etc. was executed. • It debugged while online connection with CW Workbench.*5 • The command was executed from Shell for debugging.*5 • Functions that increase the CPU*5 utilization by system tasks are used: •Mount/unmount of SD memory card •Mount/unmount of CompactFlash card •Ethernet communication •NFS server communication	• Restart the C Controller module • Increase the user WDT time. • Decrease the CPU utilization of the task, or disable the task operation. • Check the user program. • Check the command executed from Shell.*5 • Taking into account the system task CPU utilization, sufficiently prolong the system WDT setting time.*5 If the error occurs even after the above checks, check the modules and replace a faulty module.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
5012	REF. TIME OVER	Refresh cycle (set value: ms)/ Refresh time (measured value: ms)	On	On	Continue	The sum of the data refresh time and link refresh time exceeds the set refresh cycle. • The refresh cycle value is too short. • The number of set refresh points is excessive. • A task of high CPU utilization is running. (Ethernet communication load is high, etc.)	• Increase the refresh cycle value in Setting/monitoring tools for the C Controller module. • Decrease the number of set refresh points in Setting/monitoring tools for the C Controller module. • Decrease the CPU utilization of the task, or disable the task operation.
						The C Controller module was restarted while online connection with CW Workbench.[*5] For precautions for program debugging, refer to the following. 📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual	Restart the C Controller module with CW Workbench connection disconnected.[*5]
7000	MULTI CPU DOWN	Module No.[*1]	Off	Flashing	Stop	• In the operating mode of the multiple CPU system, a CPU error occurred in the CPU for which "All station stop by stop error of CPU" is selected. • In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted. • When CPU No.1 is a Basic model QCPU, a "CPU (Empty)" slot is set on the right side of the C Controller module. • Any CPU module other than CPU No.1 was disconnected from the base unit during operation. Or any CPU module other than CPU No.1 was reset.	• Identify the error of the CPU module and eliminate the error cause. • Remove the incompatible CPU module from the main base unit. • Change the setting. • Check the mounting status of CPU modules other than CPU No.1 and whether the CPU modules were reset.
						In the multiple CPU system, a stop error occurred in CPU No.1 during power-on, and thereby the other CPUs (No.2 to No.4) cannot start.	Identify the error of the CPU module and eliminate the error cause.
7002	MULTI CPU DOWN	Module No.[*1]	Off	Flashing	Stop	• During the initial communication in the multiple CPU system, no response returns from the target CPU. • In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted.	• Remove the incompatible CPU module from the main base unit. • Replace the incompatible CPU module with a compatible one. • Reset the CPU module and restart it. • If the same error is displayed again, check the modules and replace a faulty module.
7010	MULTI EXE.ERROR	Module No.[*1]	Off	Flashing	Stop	• In the multiple CPU system, a faulty CPU module is mounted. • In the multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted. (A CPU module compatible with the multiple CPU system detects this error.) • In the multiple CPU system, any of the CPU No.2 to No.4 was reset with power ON. (A CPU that released from the reset status detects this error.)	• Replace the faulty CPU. • Replace it with a CPU module that is compatible with the multiple CPU system. • Do not reset any of CPU No.2 to No.4. • Reset CPU No.1 and restart the multiple CPU system.
7011	MULTI EXE.ERROR	Module No.[*1]	Off	Flashing	Stop	In a multiple CPU system, the either of following setting was set. • Set the multiple CPU auto refresh setting to the CPU module that cannot execute the multiple CPU auto refresh setting. • Set the I/O sharing when using Multiple CPUs to the CPU module that cannot read the I/O of outside of the group.	• Correct the multiple CPU automatic refresh setting. • Correct the "I/O sharing when using multiple CPUs" setting.
		Module No.[*1]	Off	Flashing	Stop	It does not meet the system requirement to use the multiple CPU high speed transmission. • It is not used QnUD(H)CPU or QnDCCPU in CPU No.1. • It is not used the multiple CPU high speed main base unit (Q3□DB). • The send range is set excluding 0 point to the CPU module that is not supported the multiple CPU high speed transmission. • The send range is set excluding 0 point to the CPU module that is not supported the multiple CPU interchangeability area.	• Change the system configuration so that the conditions for using the multiple CPU high speed transmission function are met. • When performing automatic refresh in the multiple CPU compatible area, set the send range of a CPU that does not support the function to zero points.
7013	MULTI EXE.ERROR	Module No.[*1]	Off	Flashing	Stop	Q172(H)CPU(N) or Q173(H)CPU(N) is installed in CPU slot and slot 0 to 2 (There is a possibility that the module breaks down.).	Check QCPUs and Motion CPUs that can be used in multiple CPU systems, and change the system configuration.

Error code	Error message	Error information	LED status		CPU operation status	Error details and cause	Corrective action
			RUN	ERR.			
7020	MULTI CPU ERROR	Module No.*1	On	On	Stop	In the operating mode of the multiple CPU system, an error occurred in the CPU for which "All station stop by stop error of CPU" is not selected. (A normal CPU module detects this error.)	Identify the error of the CPU module, and eliminate the error.
7036	CPU LAY ERROR	Module No.*1	Off	Flashing	Stop	The number of connected CPU set in the multiple CPU setting does not match the number of connected CPU that is decided according to fixing point of CPU module.	• Mount the CPU module in the correct slot. • Change the host CPU No. set in the multiple CPU setting to the one determined by the mounting position of the CPU module.

*1 : The error information (module No.) in "Event information" in the <<Event history>> tab of Setting/monitoring tools for the C Controller module is displayed as follows:
"Error information: XX - YYY"
XX (DEC.): Slot No. (0 to 63), CPU No. (1 to 4)
YYY (HEX.): Start I/O No. 16 (000 to 0FF, 3E0 to 3E3)

*2 : The CPU operation status for error detection can be changed to "Continue" in "Operation mode at the time of error" in Project view ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<RAS settings>> in Setting/monitoring tools for the C Controller module.

*3 : Either of "Stop" or "Continue" can be set for each module >> in "Detailed Setting" ⇒ "CPU Operation Mode at H/W Error" through Project view" ⇒ "Parameter" ⇒ "CCPU Parameter" ⇒ <<I/O assignment settings>>

*4 : For the parameter setting location for each parameter number, refer to the following.
☞ Page 296, Section 15.3

*5 : Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

Appendix 1.2 Error code detected during device monitor execution

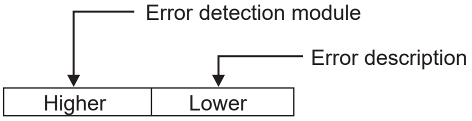
This section describes error codes detected during device monitor function execution in Setting/monitoring tools for the C Controller module.

Point

Error code may not be returned as described in "(1) How to read error code".
Check details of "(2) Precautions for error code checking" first, and then refer to "(1) How to read error code".

(1) How to read error code

The error code is composed of 4 bytes.
The higher 2 bytes represents the error detection module and the lower 2 bytes represents the error details.



Error code (Higher 2 bytes)	Error detection module
0101_H	QCPU (A mode), ACPU
0102_H	QnACPU
$010A_H$	QCPU (Q mode), LCPU, C Controller module
$010F_H$	GOT

Error code (Lower 2 bytes)	Error description
0000_H to $FFFF_H$	Refer to the manual for the error detection module.

(2) Precautions for error code checking

Precautions for error code checking are described below.

(a) Setting of "Transfer Setup" in Setting/monitoring tools for the C Controller module

Check that the actual system configuration and "Transfer Setup" are matched and monitored.

If the used system configuration and "Transfer Setup" setting are not matched, error code (higher 2 bytes) does not indicate the correct error detection module.
For example, if the destination CPU module is actually QCPU (Q mode) and ACPU is set in "Transfer Setup", error code (higher 2 bytes) may indicate the ACPU.

(b) To monitor another station

Check the manuals for used CPUs and the relayed network module also.

When it monitors another station, error details of the relayed network module (CC-Link IE Controller Network, MELSECNET/H, MELSECNET/10, CC-Link, or CC-Link IE Field Network) may be stored in error code (lower 2 bytes).
In such case, error code (higher 2 bytes) may not match with the module in which any error occurs.

Appendix 1.3 Error code during function execution

The error codes returned in bus interface, C Controller module dedicated function or MELSEC data link function execution are returned as a return value.

(1) Common error codes returned by each function

The following table provides the error descriptions and corrective actions to individual error code commonly returned in execution of bus interface functions, C Controller module dedicated function, and MELSEC data link functions.

Return value (HEX)[*1]	Error description	Corrective action
0 (0000H)	Completed normally	-
1 (0001H)	Driver not started • The driver has not been started.	• Check the channel No. • Correct the error that occurred when starting the driver. • Check the status of the system drive. • Check if the operating system is running normally.
2 (0002H)	Timeout error • A timeout occurred while waiting for response.	• Check the operation status and mounting condition of the accessed station(s). • Retry from the user program. • Increase MD function timeout value in Setting/monitoring tools for the C Controller module.
66 (0042H)	Already opened • The specified channel has already been opened.	Open once. (A correct path is returned to the argument even when this error occurs.)
67 (0043H)	Already closed • The specified channel has already been closed.	Close once.
69 (0045H)	Unsupported function execution error • A function which is not supported by the target station was executed.	• Check the path of channel, network number, and station number. • Check if the function is supported by the target station.
70 (0046H)	Station No. error • The specified station No. is incorrect. • This station received a request destined for another station. Or, the station No. corresponds to the own station (0xFF) but the network No. is not 0.	Correct the network No. and station No. in the user program.
71 (0047H)	Data reception error (When a RECV request is issued.) • Data have not been received.	• Retry. • Check the channel number. • Check whether the data is sent on the sending station with the SEND function.
77 (004DH)	Memory error/resource memory shortage error/excessive task number error • Sufficient memory could not be allocated. • Bus interface functions/C Controller module dedicated function/MELSEC data link functions are used in a excessive number of tasks.	• Terminate other task(s) currently running, or decrease the size of data to be accessed. • Check if the C Controller module is running normally. • Reset the C controller system. • Reduce the number of tasks that use bus interface functions/C Controller module dedicated function • /MELSEC data link functions and then retry. • Review the size and quantity specified in the function argument.
85 (0055H)	Network channel No. error (When a SEND/RECV request is issued.) Channel No. error	Check the specified channel No. when a SEND/RECV request is issued.
102 (0066H)	Transmission error • Transmitting data has failed.	• Retry. • Check if the C Controller module is running normally. • Reset the C controller system. • Retry after restarting.
103 (0067H)	Reception error • Receiving data has failed.	• Retry. • Check if the C Controller module is running normally. • Reset the C controller system.
130 (0082H)	Device No. error • The specified device No. is out of range. • Device No. in the bit device settings is not a multiple of 8.	• Check the device No.. • When specifying device No.32768(8000H) or higher, replace the "functions for compatibility" with "available functions". ☞ Page 356, Section 21.2, Page 362, Section 22.2
131 (0083H)	Device points error • The specified number of points is out of range. • The number of points in the bit device settings is not a multiple of 8.	• Check the number of device points. • When specifying a size of 32768(8000H) bytes or more, replace the "functions for compatibility" with "available functions". ☞ Page 356, Section 21.2, Page 362, Section 22.2
8193 (2001H)	• The specified device is a device that cannot be used with the Motion CPU. • The specified device is out of the device range.	• Check the specified device name. • Check the specified device No. and size.

Return value (HEX)*1	Error description	Corrective action
8194 (2002H)	The dedicated instruction which is not supported by the operating system of motion CPU is executed.	Check if the executed motion dedicated instruction is supported by the operating system of motion CPU used.
8320 (2080H)	The number of write data points set by the D(P).DDWR instruction is invalid.	Check the specified size.
8321 (2081H)	The number of read data points set by the D(P).DDRD instruction is invalid.	
8322 (2082H)	The interrupt pointer No. set by the D(P).GINT instruction is out of the range of 0 to 15.	Check the specified interrupt pointer No..
8448 (2100H)	• There were 33 or more instructions simultaneously requested from the Programmable controller CPU/C Controller module to the Motion CPU in D(P).GINT. The Motion CPU cannot process the instructions. • There were 65 or more instructions simultaneously requested to the Motion CPU in D(P).SFCS. The Motion CPU cannot process the instructions. • There were 65 or more instructions (for Q172DS/Q173DS using SV13/SV22 version B or later, 129 or more instructions) simultaneously requested from the Programmable controller CPU/C Controller module to the Motion CPU in D(P).SVST, D(P).CHGA, and D(P).CHGAS combined. The Motion CPU cannot process the instructions. • There were 65 or more instructions simultaneously requested from the programmable controller CPU/C language controller module to the Motion CPU in D(P).DDRD and D(P).DDWR combined. The Motion CPU cannot process the instructions.	• Wait for the Motion CPU to process instruction requests, and try again. • Reduce the number of instructions requested to the Motion CPU.
8704 (22004)	The Motion SFC program number to be started is out of the range of 0 to 255.	Check the specified SFC program No..
8705 (2201H)	The servo program number to be executed is out of the range of 0 to 4095.	Check the specified servo program No..
8706 (2202H)	The axis number set in the D(P).SVST instruction is invalid.	Check the specified axis No..
8707 (2203H)	The axis number set in the D(P).CHGA instruction is invalid.	
8708 (2204H)	The axis number set in the D(P).CHGV instruction is invalid.	
8709 (2205H)	The axis number set in the D(P).CHGT instruction is invalid.	
8710 (2206H)	The axis number set in the D(P).CHGT2 instruction is invalid.	
8711 (2207H)	The axis number set in the D(P).CHGAS instruction is invalid.	
8712 (2208H)	The axis number set in the D(P).CHGVS instruction is invalid.	
16384 (4000H) to 20479 (4FFFH)	Error detected in destination CPUs	Refer to the user's manual for the respective destination CPU module.
16385 (4001H)	An unprocessable request was received.	Change the request destination.
16386 (4002H)		
16400 (4010H)	Not executable during running	Reset the C Controller module when it is in the STOP status.
16432 (4030H)	The specified device type does not exist.	• Check the device type. • Check if the device number is validated on the target station.
16433 (4031H)	• The specified device No. is out of range. • The block No., network No., start I/O No. / 10H, or CPU No. of the specified device is invalid. • The specified device name is not supported by the CPU modules.	• Check the device No. • When specifying device No.32768(8000H) or higher, replace the "functions for compatibility" with "available functions". ☞ Page 356, Section 21.2, Page 362, Section 22.2 • Check the block No., network No., start I/O No. / 10H, and CPU No. (device type) of the specified device. • On the target, check if the specified device, block No., network No., start I/O No. / 10H, and CPU No. are valid. • Check the device settings of the CPU modules. • Check the device name.
16448 (4040H)	The module does not exist.	Do not issue a request that generated an error to the specified special function.

Return value (HEX)[*1]	Error description	Corrective action
16449 (4041$_H$)	The number of device points is out of range.	• Check the start address and number of access points. • When specifying a size of 32768(8000$_H$) bytes or more, replace the "functions for compatibility" with "available functions". ☞ Page 356, Section 21.2, Page 362, Section 22.2
	The specified device is not accessible.	Check the start address and the number of access points, and access an accessible device.
16450 (4042$_H$)	Corresponding module error.	Check if the specified module is operating normally.
16451 (4043$_H$)	The specified intelligent function module does not exist.	Check the I/O number and network No. of the specified intelligent function module.
	In a single CPU system configuration, an access to the CPU shared memory of the C Controller module was attempted.	To access the CPU shared memory of the C Controller module, configure a multiple CPU system.
	Access to an inaccessible CPU shared memory area was attempted.	Check the specified CPU shared memory area.
16480 (4060$_H$)	Online registration error • The online debug function is currently running on another peripheral device.	• After the operation has ended on the other peripheral device, execute the function once again. • In a case where the operation is in progress or the operation has been suspended on the other peripheral device, execute the operation once again on the other peripheral device, wait for the operation to end normally, and then execute the operation once again.
16523 (408B$_H$)	Remote request not executable	Allow "Remote reset" in Setting/monitoring tools for the C Controller module, and then execute remote reset.
16641 (4101$_H$)	The number of write data is out of the storage device range for data to be written.	Check and revise the program to a proper user program.
16716 (414C$_H$)	An inaccessible buffer memory address was specified.	Check and correct the buffer memory address.
	The inaccessible CPU shared memory address was specified.	Check and correct the CPU shared memory address.
17232 (4350$_H$)	The specified destination CPU module is wrong. A CPU No. set as reserved was specified. A CPU No. not mounted was specified. The start I/O No. of the destination CPU module divided by 10$_H$ is out of the range of 3E0$_H$ to 3E3$_H$.	Check and revise the program to a proper user program.
17233 (4351$_H$)	The instruction cannot be executed on the specified target CPU module. • The instruction name is wrong. • A non-supported instruction was executed on the target CPU module.	
17234 (4352$_H$)	The number of devices of the specified instructions is wrong.	
17235 (4353$_H$)	An inapplicable device was specified in the specified instruction.	
17236 (4354$_H$)	A non-supported string was specified in the specified instruction.	
17237 (4355$_H$)	The number of write data is out of the range of 1 to 20.	
18944 (4A00$_H$)	• Network No. or station No. is incorrect. • Routing parameter does not exist in other network settings • The module with relay network No. and station No. specified in the routing parameter settings is not mounted.	• Check the specified network No. and station No.. • Check the routing parameter settings.
19200 (4B00$_H$)	An error was detected in the target.	• Check the target. • Confirm the error occurred in the target or relay station, and then take a corrective action.
19201 (4B01$_H$)	The target is not the bus master CPU (CPU 1).	If the target is not the bus master CPU (CPU 1), it cannot execute remote reset.
19203 (4B03$_H$)	Unsupported communication path error • The request cannot be executed via the specified communication path/target.	• Check the communication path/target that supports the request. • Do not issue a request that has generated an error to a C Controller module. • When sending a request to the own station, select station No. 255 (FF$_H$).
19457 (4C01$_H$)	The instruction for the multiple CPU system is not supported by operating system of the Motion CPU. (The error code returned by the Motion CPU) ☞ Refer to the manual of the Motion CPU currently used.	Check the user program on C Controller module.
19458 (4C02$_H$)	Motion SFC program No. error (the error code returned by the Motion CPU) ☞ Refer to the manual of the Motion CPU currently used.	

Return value (HEX)[*1]	Error description	Corrective action
19460 (4C04H)	Axis No. specified in SVST function is invalid. (The error code returned by the Motion CPU) ☞ Refer to the manual of the Motion CPU currently used.	Check the user program on C Controller module.
19461 (4C05H)		
19462 (4C06H)		
19463 (4C07H)		
19464 (4C08H)	A total of 32 or more instructions are simultaneously requested to the Motion CPU from the programmable controller CPU/C Controller module, and the Motion CPU cannot process them. (The error code returned by the Motion CPU) ☞ Refer to the manual of the Motion CPU currently used.	
19465 (4C09H)	CPU No. of the requesting CPU is incorrect. (The error code returned by the Motion CPU) ☞ Refer to the manual of the Motion CPU currently used.	
19584 (4C80H)	H/W error of the target CPU	• Check the operating state of the target CPU. • Take a corrective action in the manual of the target CPU.
19585 (4C81H)		
19587 (4C83H)		
19588 (4C84H)		
-475 (FE25H) to -3839 (F101H)	Refer to the following. 📖 Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network) 📖 For QnA/Q4AR MELSECNET/10 Network System Reference Manual 📖 Type MELSECNET/10 Network system (PLC to PLC network) Reference Manual	Same as in the left.
-2174 (F782H)	Target station number error • The target station number is incorrect.	Check the target station number, and perform the operation again.
-7656 (E218H)		
-4097 (EFFFH) to -8192 (E000H)	Refer to the following. 📖 MELSEC-Q CC-Link IE Controller Network Reference Manual	Same as in the left.
-8193 (DFFFH) to -12288 (D000H)	Refer to the following. 📖 MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual	
-16386 (BFFEH) to -20222 (B102H)	Refer to the following. 📖 MELSEC-Q CC-Link System Master/Local Module User's Manual 📖 Control & Communication Link System Master/Local Module type AJ61QBT11/A1SJ61QBT11 User's Manual 📖 Control & Communication Link System Master/Local Module type AJ61BT11/A1SJ61BT11 User's Manual	
-18558 (B782H)	Target station number error • The target station number is incorrect.	Check the target station number, and perform the operation again.
-18572 (B774H)	Target station number error • A transient request was sent to a non-intelligent device station.	• Check the network No. and target station No.. • Check if the target station is an intelligent device station. • Check the device type.
-25056 (9E20H)	Processing code error • The target station cannot process the request.	• Check the station No. and processing code. • Do not execute the function other than mdTypeRead to other station's I/F board.
-26334 (9922H)	Reset error • Another task using the same channel executed reset operation while accessing other station. • Reset operation was executed during monitoring from Setting/monitoring tools for the C Controller module.	• Retry. • Monitor again.
-26336 (9920H)	Routing request error on routing function unsupported station • A routing to another loop was requested to the station which does not support the routing function.	Check the routing parameter setting.

Return value (HEX)*1	Error description	Corrective action
-28150 (920AH)	Device access error during data link stop • .RX/RY/RWw/RWr was accessed when the own station was not transmitting data.	• Check the specified device start number and size, or the device range of the parameter on the master station. • Restart the data link. (Writing/reading data will be performed even when this error occurs. However, the data are not guaranteed.)
-28151 (9209H)	Abnormal data reception error • An incorrect response data was received.	Check if there is an error in the target CPU, CC-Link module, or MELSECNET/H module. If the status is normal, try again.
-28155 (9205H)	SRAM write error • Battery backup RAM writing failed.	Change the C Controller module if the error persists.
-28158 (9202H)	WDT error • Watchdog timer (WDT) error occurred.	Reset the C Controller system.
-28410 (9106H)	Target CPU busy error • Target CPU is busy.	• Add a program to wait until the processing is completed or to retry. • Increase the timeout value in the user program.
-28412 (9104H)	Target CPU unsupported error • An unsupported request was sent to the target CPU.	Change the target CPU No. in the user program.
-28413 (9103H)	Target CPU down error • Check the operating status of the target CPU and trouble shoot the error.	Check the operating status of the target CPU and trouble shoot the error.
-28414 (9102H)	Target CPU abnormal start error • A request was sent to the CPU which was not operating normally.	
-28415 (9101H)	Target CPU critical error • A request was sent to the CPU where a critical error occurred.	
-28416 (9100H)	Target CPU not mounted error • A request was processed for the CPU No. to which no CPU module is installed.	• Check if the target CPU is mounted properly. • Change the target CPU No. specified in the user program.
-28622 (9032H)	Target module busy error • Target module is busy. • The channel specified for "Channel used by the own station" or "Target station channel" is being used by another instruction.	Add a program to wait until the processing is completed or to retry.
-28624 (9030H)	Function unsupported error • Processing was executed for the module that does not support the block data assurance per station function. • Processing was executed for the module where the block data assurance per station function was not activated. • Own CPU does not control the specified module.	• Check the version to see if the target module supports the block data assurance per station function. • Check if the block data assurance per station setting is enabled for the target module in Setting/monitoring tools for the C Controller module. • Check if the control CPU of the specified module is own CPU.
-28625 (902FH)	Intelligent function module offline error • Intelligent function module was accessed while offline.	Check the mode state of the intelligent function module and access the module while online.
-28626 (902EH)	Control data error • The specified control data is out of range.	Check the user program, and correct the control data setting.
-28627 (902DH)	Transient unsupported error • A transient request cannot be executed via the specified communication path and target. (With CC-Link communication, when the station No. of the own station was "64", other station was specified.)	• Check a communication path and target which supports the transient request. • Change the station No. of the own station.
-28628 (902CH)	Pointer address error (pointer address is invalid.) • The address of a short type pointer is not a multiple of 2. • The address of a long type pointer is not a multiple of 4.	Check the pointer type and address (cast, structure alignment, etc.).
-28629 (902BH)	WDT not running error • WDT was reset when WDT was started up.	Start the WDT and then reset WDT.
-28630 (902AH)	WDT startup error • WDT was started up while WDT was running.	Stop WDT and then restart WDT.
-28631 (9029H)	Buffer access range error • The specified offset is out of range. • The specified offset plus size is out of range.	• Check the offset. • Check the buffer size. • Check the offset plus size.
-28632 (9028H)	I/O No. error • The specified I/O No. is out of range. • The module is not mounted on the specified I/O No., or the specified module cannot be accessed.	Check the I/O No.
-28633 (9027H)	Non-controlled module read error • Reading from a non-controlled module is not allowed.	• Clear "Enable online module change with another CPU" selection in the multiple CPU setting. • Check if the control CPU of the specified module is own CPU (C Controller module).
-28634 (9026H)	Intelligent function module down error • There is a problem in the intelligent function module.	• Check if the intelligent function module is mounted properly. • Replace the intelligent function module or base unit.
-28635 (9025H)	Intelligent function module error • The intelligent function module is not mounted on the accessed slot.	• Check the I/O No. • Check if the intelligent function module is mounted properly.
-28636 (9024H)	Control bus error • Control bus error occurred.	• Check if there is an error in CPU 1 in the multiple CPU system. • Check if the intelligent function module is mounted properly. • Replace the intelligent function module or base unit.

Return value (HEX)*1	Error description	Corrective action
-28638 (9022$_H$)	Multiple CPU unsupported operation error	Reset CPU 1.
-28640 (9020$_H$)	STOP/PAUSE error • Output data was written to output module when the CPU operating status is STOP/ PAUSE. Buffer memory data was written to intelligent function module when the CPU operating status is STOP/PAUSE.	Change the CPU operating status to RUN.
-28653 (9013$_H$)	I/O assignment error • Input data was read from output module. • Output data was written to input module. • Output data was read from input module.	• Check the I/O No.
-28654 (9012$_H$)	Non-controlled module write error • Own CPU does not control the specified module.	Check if the control CPU of the specified module is own CPU.
-28660 (900C$_H$)	Access size error • The specified size is out of range.	Check the offset and size.
-28661 (900B$_H$)	Access area error • The specified area cannot be accessed.	
-28662 (900A$_H$)	CPU No. error • The specified CPU No. is out of range or invalid.	• Check the CPU No. • Check the operating status of the specified CPU.
-28663 (9009$_H$)	Base unit No. error • The specified base unit No. is out of range.	Check the base unit No.
-28664 (9008$_H$)	Data transmission area occupied.	Retry.
-28665 (9007$_H$)	No registration data error	Reset the C Controller system.
-28666 (9006$_H$)	Data length error	
-28668 (9004$_H$)	Reply data stored error	Resend the request.
-28669 (9003$_H$)	Area No. error • The specified area No., offset address, or mode is out of range.	Check the area No., offset address, or mode.
-28671 (9001$_H$)	Module identification error	• Check the parameter. • Check the specified module. • Reset the C controller system.
-28672 (9000$_H$)	Processing code error	Reset the C Controller system.

*1 : If the result value is a long type function, the value is 8-digit in hexadecimal form.

(2) Error codes returned by bus interface functions or C Controller module dedicated function

The following provides the error descriptions and corrective actions corresponding to individual error code returned in execution of bus interface functions or C Controller module dedicated function.

Return value (HEX)	Error description	Corrective action
0 (0000H)	Completed normally	-
-201 (FF37H)	Module identification error • The specified module identification is invalid.	Check the specified module.
-202 (FF36H)	Path error • The specified path is invalid.	Use the path pointer returned by "QBF_Open" function.
-203 (FF35H)	I/O No. error • The specified I/O No. is out of range.	Check the I/O No.
-204 (FF34H)	I/O access size error • The specified I/O access size is out of range.	Check the I/O access size (I/O No. and read/write size.)
-205 (FF33H)	I/O No. error • The specified I/O No. is out of range.	Check the I/O No.
-206 (FF32H)	Program execution type error • The specified program execution type is out of range.	Check the program execution type.
-208 (FF30H)	Offset error • The specified offset is out of range. • AnS series module (buffer memory) was accessed.	• Check the offset. • Check the I/O No.
-209 (FF2FH)	Buffer memory size error • The specified offset plus size is out of range. • The address of data storage buffer pointer is 0.	• Check the specified buffer memory size. • Check the offset plus size. • Check the data storage buffer pointer.
-210 (FF2EH)	Read area size error • The read area size is smaller than the read size.	• Check the read size and read area size.
-211 (FF2DH)	Time setting error • Time setting is out of range.	Check the specified time.
-214 (FF2AH)	Intelligent function module error • The intelligent function module is not mounted on the accessed slot.	• Check the I/O No. • Check if the intelligent function module is mounted properly.
-217 (FF27H)	Driver not started • Driver has not been started.	Check if the driver has been started.
-218 (FF26H)	Bus already opened • "QBF_Open" is executed twice.	Only one instance of "QBF_Open" can be executed.
-219 (FF25H)	Program name error • The specified program name is invalid. (The program name does not exist in the programmable controller CPU or is not registered with a parameter.)	Check the program name.
-220 (FF24H)	WDT type error • The specified WDT type is out of range.	Check the WDT type.
-222 (FF22H)	Bus master CPU reset error • Remote reset for the bus master CPU (CPU 1) has failed.	• Allow "Remote reset" in the system settings for the bus master CPU (CPU 1). • Change the status of the bus master CPU (CPU 1) to STOP. • Check if the bus master CPU (CPU 1) is programmable controller CPU or C Controller module.
-223 (FF21H)	Memory allocation error • Sufficient memory could not be allocated.	Check available memory.
-224 (FF20H)	LED set value error • The specified LED control value is out of range.	Check the LED set value.
-225 (FF1FH)	Event No. error • The specified event No. is out of range or duplicated.	Check the event No.
-227 (FF1DH)	Control code send error • Sending the control code has failed.	• Retry. • Check if the C Controller module is running normally. • Reset the C Controller system.
-231 (FF19H)	Event timeout error • A timeout occurred while waiting for the event.	• Increase the timeout value. • Check that the interrupt event No. is set properly.
-232 (FF18H)	CPU No. error • The specified CPU No. is incorrect. • The specified CPU cannot execute the request.	• Specify a different CPU No. • Do not issue a request that generated an error to the CPU.

Return value (HEX)	Error description	Corrective action
-234 (FF16$_H$)	Event wait error • An error other than timeout occurred while waiting for the event.	• Ensure the operating system is not forcibly terminating the program. • Check if the C Controller module is running normally. • Reset the C Controller system.
-235 (FF15$_H$)	Number of event settings error • The specified number of event settings is out of range.	Check the number of event settings.
-236 (FF14$_H$)	Remote operation code error • The specified remote operation code is out of range.	Check the remote operation code.
-237 (FF13$_H$)	Event source/event information character string error • Any character other than one-byte alphanumeric ('a'-'z', 'A'-'Z', '0'-'9') is in event source "pcSrcStr[]". • Any character string 11 bytes or more is in event source "pcSrcStr[]". • Any character string 201 bytes or more is in event information "pcAddMsg[]".	Change the event source/event information character string.
-238 (FF12$_H$)	Event log registration error • Event log registration has failed.	Reset the C Controller system.
-239 (FF11$_H$)	Memory card error • SD Memory card is not inserted. • CompactFlash card is not inserted.	• Check if the SD memory card is inserted. • Check if the CompactFlash card is inserted.
-240 (FF10$_H$)	Clock data error • The clock data setting/clock data setting to be read is invalid.	• Check the clock data setting. • If this error occurred when reading the clock data, set the clock data.
-241 (FF0F$_H$)	Cycle error • The specified event cycle is out of range. • The event cycle is being registered.	• Check the specified event cycle. • Check if the event cycle is being registered.
-242 (FF0E$_H$)	Synchronization type error • The specified synchronization type is out of range.	Check the specified synchronization type.
-243 (FF0D$_H$)	SRAM size error • The specified offset plus size is out of range.	• Check the specified size. • Check the offset plus size.
-245 (FF0B$_H$)	Not executable during interrupt service routine • A value other than 1 (ISR) was specified in "sFlg", and the function was executed as interrupt service routine.	Specify 1 (ISR) in "sFlg" to correct the routine registered.
-246 (FF0A$_H$)	Timer event registration error • Timer event registration has failed.	• Retry. • Check if the C Controller module is running normally. • Reset the C Controller system.
-247 (FF09$_H$)	Program No. error • The specified program No. is out of range or invalid. SFC program No. (0 to 255) Servo program No. (0 to 4095)	Correct the program No. in the user program.
-248 (FF08$_H$)	Number of axes error • 9 or more axes was specified.	Correct the number of axes in the user program.
-249 (FF07$_H$)	Axis type error • The specified axis type is not axis (stopped axis), synchronous encoder axis, or cam axis.	Correct the axis type in the user program.
-250 (FF06$_H$)	Axis No. error • The specified axis No. is out of range.	Correct the axis No. in the user program.
-252 (FF04$_H$)	Torque limit value error • The specified torque limit value is out of range.	Correct the torque limit value in the user program.
-253 (FF03$_H$)	Device No. error • The specified device No. is out of range. • Device No. in the bit device settings is not a multiple of 16.	Correct the start device No.
-254 (FF02$_H$)	Device type error • The specified device type is invalid.	Correct the device type in the user program.
-255 (FF01$_H$)	Size error • The specified start device No. plus size is out of range.	Correct the start device No. and size.
-256 (FF00$_H$)	Timeout error • A timeout occurred while waiting for response from other CPU.	• Increase the timeout value in the user program. • Correct the user program (including other tasks which execute Motion CPU control/access functions) • Check the program (user program, SFC program, or ladder program) of the target CPU. (e.g., Add WAIT instruction to enable execution from other CPU.)
-257 (FEFF$_H$)	The value specified as the interrupt type is out of range.	Review the specified value, and specify a value that is within range.
-258 (FEFE$_H$)	The value specified as the interrupt type is out of range.	
-259 (FEFD$_H$)	No interrupt routine service registration • When an attempt was made to enable processing for an event (interrupt), the processing was not registered.	Register the processing for the event (interrupt) and then execute the operation once again.

Return value (HEX)	Error description	Corrective action
-260 (FEFCH)	Memory card mount/unmount error • The SD memory card mounting process or un-mounting process has failed. • The CompactFlash card mounting process or un-mounting process has failed.	• Retry. • Verify that the SD memory card or CompactFlash card is not damaged. • Replace the SD memory card or CompactFlash card.
-262 (FEFAH)	User CPU restarting error • The user CPU is not ready for restarting.	• Configure settings to permit user CPU restarting in Setting/monitoring tools for the C Controller module. • Check if the C Controller module is in STOP status.
-263 (FEF9H)	Call source flag error • The value specified in the call source flag is out of range.	Review the specified value, and specify a value that is within range.
-264 (FEF8H)	Pointer error • The specified pointer address is invalid.	Check the specified pointer.
-265 (FEF7H)	The target system specification error • A value specified for the target system is out of range.	Review the specified value, and specify a value that is within range.
-266 (FEF6H)	Watchdog timer startup error • User watchdog timer is started up by Setting/monitoring tools for the C Controller module.	Check the user watchdog timer setting. (If user watchdog timer is started up by Setting/monitoring tools for the C Controller module, the user watchdog timer cannot be started up or stopped by the user program.)

(3) Error codes returned by MELSEC data link functions

The following provides the error descriptions and corrective actions corresponding to individual error code returned in execution of MELSEC data link functions.

Return value (HEX)*1	Error description	Corrective action
0 (0000$_H$)	Completed normally	-
-1 (FFFF$_H$)	Path error • The specified path is invalid.	User a path pointer returned by the mdOpen function.
-2 (FFFE$_H$)	Device No. error • The specified device No. is out of range. • Device No. in the bit device settings is not a multiple of 8. • Device No. plus the number of points specified in mdRandR/mdRandREx/ mdRandW/mdRandWEx function exceeds the range for the same block.	• Check the start device No. of the specified device. • Check the device No. plus the number of points of the same block. • Check if the specified device is validated in a programmable controller CPU on the target station. • When specifying device No.32768(8000$_H$) or higher, replace the "functions for compatibility" with "available functions". (☞ Page 356, Section 21.2) • When specifying within the expanded B or W device number range, check if using Q12DCCPU-V with a serial number whose first five digits are "15102" or later and the mode has been switched to the extended mode.
-3 (FFFD$_H$)	Device type error • The specified device type is invalid.	• Check if the specified device type is in the device list. • Check if the device number is validated on the target station. • When specifying within the expanded B or W device number range, check if using Q12DCCPU-V with a serial number whose first five digits are "15102" or later and the mode has been switched to the extended mode.
-5 (FFFB$_H$)	Size error • The device No. plus size exceeds the device range. • Access was attempted in odd byte(s). • The device No. plus size exceeds the range for the same block. • The total of the specified point of each block No. of mdRandREx, mdRandWEx exceeds 10240 points.	• Check the device size. • Check the device No. plus size. • When specifying device No.32768(8000$_H$) or higher, replace the "functions for compatibility" with "available functions". (☞ Page 356, Section 21.2) • When specifying a size of 32768(8000$_H$) bytes or more, replace the "functions for compatibility" with "available functions". (☞ Page 356, Section 21.2) • The total of the specified point of each block No. of mdRandREx, mdRandWEx is adjusted to 10240 points or less.
-6 (FFFA$_H$)	No. of blocks error • The number of blocks specified for mdRandR/mdRandREx/mdRandW/ mdRandWEx is out of range.	Check the number of blocks specified.
-8 (FFF8$_H$)	Channel No. error • The channel No. specified in the mdOpen function is invalid.	Check the channel No.
-11 (FFF5$_H$)	Insufficient buffer area • Read data storage size is smaller than the read data size.	Check the read data size and the read data storage size.
-12 (FFF4$_H$)	Block No. error • The specified block No. is invalid.	• Check the block No. (device type). • Check if the specified device and block No. are valid in the target.
-13 (FFF3$_H$)	Write protect error • The specified block No. of the extension file register is overlapping with the write protect area of the memory cassette.	• Check the block No. (device type) of the extension file register. • Check the write protect DIP switch of the accessed memory cassette.
-16 (FFF0$_H$)	Station No. error, Network No. error • The specified station No. or network No. is out of range.	Check the station No. and network No.
-17 (FFEF$_H$)	All stations/group No. specification error • All stations/group No. specification is not supported by the specified function.	• Check if the function allows for specifying all stations/group No.. • Specify the device type as "no arrival confirmation", when specified station No. is "All stations" or "Group No.".
-18 (FFEE$_H$)	Remote operation error • An inappropriate was specified.	Check the code.
-19 (FFED$_H$)	SEND/RECV channel No. error • The channel No. specified in the SEND/RECV function is out of range.	Specify the channel No. within the range. • MELSECNET/H, CC-Link IE Controller Network (1 to 8) • CC-Link IE Field Network (1 to 2)
-31 (FFE1$_H$)	Module load error • Loading a module required for executing the functions has failed.	• Memory may be insufficient. Terminate other task(s) currently running, or decrease the access size. • Check the system drive of C Controller module.
-32 (FFE0$_H$)	Resource time-out error • The resource is being used by other task(s) or thread(s). The resource is timed out after 30 seconds.	• Retry. • Memory may be insufficient. Terminate other task(s) currently running. • Check if the C Controller module is running normally. • Reset the C Controller system.

Return value (HEX)[*1]	Error description	Corrective action
-33 (FFDFH)	Incorrect access target error • The communication target specified by the network number and the station number is a model which is not supported.	• Check whether an unsupported communication target is specified by the network number and the station number. • Check the target setting of Setting/monitoring tools for the C Controller module.
-34 (FFDEH)	Registry open error • Opening parameter files in the registry has failed.	Check if the connection settings are correct in Setting/monitoring tools for the C Controller module.
-35 (FFDDH)	Registry read error • Reading parameter files in the registry has failed.	• Check if the connection settings are correct in Setting/monitoring tools for the C Controller module. • Check if the specified channel No. is valid. • Recheck the parameters in Setting/monitoring tools for the C Controller module, write the parameters, and then reset the C Controller system.
-36 (FFDCH)	Registry write error • Writing parameter files to the registry has failed.	• Check if the standard ROM has been shutdown. • Reset the C Controller system.
-37 (FFDBH)	Communication initialization error • Initializing communications has failed.	• Retry. • Memory may be insufficient. Terminate other task(s) currently running. • Check if the C Controller module is running normally. • Reset the C Controller system.
-42 (FFD6H)	Close error • Communication cannot be closed.	• Retry. • Check if the C Controller module is running normally. • Reset the C Controller system.
-43 (FFD5H)	ROM operation error • A TC setting value was written to the CPU during ROM operation.	Change the TC setting value during RAM operation.
-52 (FFCCH)	MELSEC data link function service error. • MELSEC data link function service are disabled.	Allow MELSEC data link function service in Setting/monitoring tools for the C Controller module.

[*1] : If the result value is a long type function, the value is 8-digit in hexadecimal form.

Appendix 1.4 Error code returned to peripherals

The C Controller module returns an error code to the request source when any error occurs during communication request from any of the following:

- Peripheral device (such as GOT)
- Intelligent function module
- Network system

Point

- Error codes shown in this section are not for the errors that can be detected by the self-diagnostic function of the C Controller module. Therefore, none of these are stored in the special register, Diagnostic error (SD0).
- When the request source is a peripheral device, a message or an error code will be shown on the peripheral device. When the request source is an intelligent function module or a network system, an error code for the requested processing will be returned to the request source.

The following table lists the error codes detectable by the C Controller module (4001H to 4FFFH) and troubleshooting actions.

Error code	Error description	Corrective action
4001H	Execution of an unsupported request was attempted.	Check the CPU module model selected for the peripheral device.
4002H		
4010H	The requested task cannot be executed because the C Controller module is in the RUN status.	Set the C Controller module to STOP.
4030H	The specified device name is not valid.	Confirm the specified device name.
4031H	The specified device No. is out of range.	• Check the specified device No. • Check the device settings of the C Controller module.
4040H	The specified intelligent function module cannot handle the request.	Check if the specified intelligent function module has a buffer memory.
4041H	The access range exceeded the buffer memory range of the specified intelligent function module.	Check the start address and the number of access points, and make an access within the range allowed for the intelligent function module.
	The buffer memory address, to which no access is allowed, was specified.	Check the buffer memory address, and correct it to retry.
4042H	Unable to access the specified intelligent function module.	• Check if the specified intelligent function module is operating normally. • Check the specified module for hardware failure.
4043H	The specified intelligent function module does not exist.	Check the I/O number of the specified intelligent function module.
408BH	The remote request cannot be executed.	• Set the C Controller module into the remote request-executable state and then make the request again. • For a remote reset operation, enable the remote reset with the parameter.
414AH	In a multiple CPU system, the operation was performed for an intelligent function module that is not in the controlled group.	Retry the operation from the control CPU of the target module.
414CH	The buffer memory address, to which no access is allowed, was specified.	Check the buffer memory address, and correct it to retry.
	The CPU shared memory address, to which no access is allowed, was specified.	Check the CPU shared memory address, and correct it to retry.
4201H	The requested task cannot be executed because the online module change function is enabled in the multiple CPU parameter settings.	Do not make the request, or disable the online module change function and then execute the request again.
4A00H	• Unable to access the specified station because no routing parameters are set for the source and relay CPU modules. • In the case of a relay through a multiple CPU system, the control CPU of the relaying network module has not been activated. • In a redundant system configuration, an access to another station through a network module was performed while system A or B is not defined.	• To access the specified station, set the routing parameters for the relevant stations. • Wait a little while, and retry. Or, after confirming activation of the relay system, start the communication. • In the case of a redundant system configuration, activate systems A and B normally with a tracking cable, and then start communication again.
4A01H	The network of the network No. set for the routing parameter does not exist.	Check the routing parameter set for the relevant stations, and correct it.
4A02H	Unable to access the specified station.	• Check the network module or link module for failure or offline mode. • Check the specified network No. and station No. for an error.
4B00H	Failure has occurred at the access target or a relay station. Or, the specified connection destination (I/O number of the requested module) is incorrect.	• Identify the error occurred at the specified access target or a relay station on the route to the access destination, and take action. • Check the access target specification (I/O number or station number of the request target module).
4B01H	The target is not CPU No.1 of the multiple CPU system.	Execute the request to CPU No.1 of the multiple CPU system.
4B02H	The request is not addressed to a CPU module.	Perform the operation to a module that can execute the specified function.
4B03H	• The specified module version does not support the route. • The communication target CPU module is not mounted.	Check if the specified route is supported.

Appendix 1.5 Error code for SLMP (MC protocol) communication

The following table provides the descriptions and corrective actions for error codes sent from a C Controller module to external devices at the error occurrence related to the SLMP (MC protocol) communication.

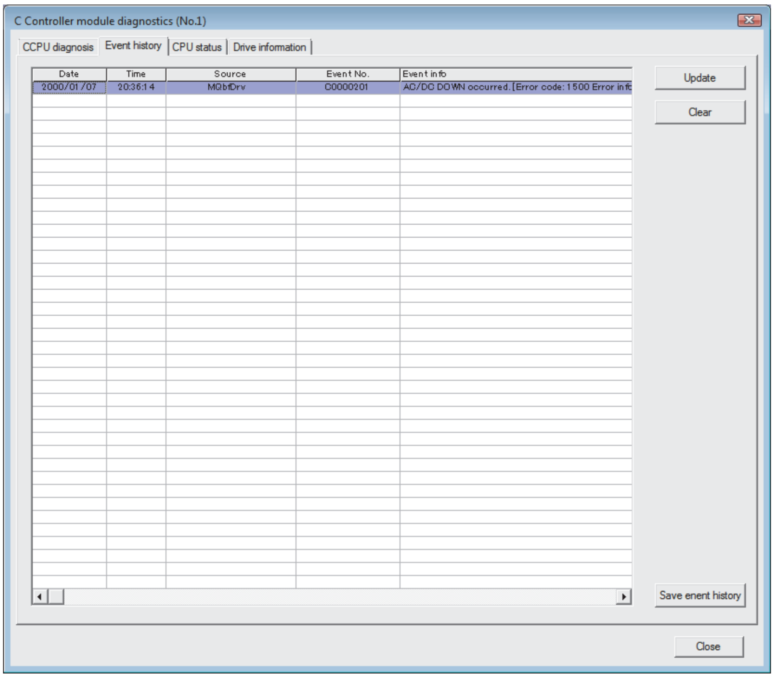
Error code	Error description	Corrective action
4000$_H$ to 4FFF$_H$	An error detected by the C Controller module for the function other than the SLMP (MC protocol) communication function	Refer to the C Controller Module User's Manual and check the corrective action.
C051$_H$ to C054$_H$	The number of write/read points is outside the allowable range.	Correct the number of read/write points and send the data to the C Controller module again.
C056$_H$	The read/write request exceeds the maximum address.	Correct the start address or the number of read/write points by making sure that the request does not exceed the largest address, and send the data to the C Controller module again.
C059$_H$	Incorrect specification of the command (subcommand) Inapplicable command (subcommand) for C Controller module	Correct the request details. Send a command (subcommand) that can be used on the C Controller module.
C05B$_H$	The C Controller module cannot read/write data from/to the specified device.	Check the write/read command.
C05C$_H$	Incorrect request (For example, a request for data read/write in bit units has been issued to a word device.)	Correct the request and send it to the C Controller module again. (A correction such as changing the subcommand)
C05F$_H$	This request cannot be executed to the target CPU module.	Correct the network number, personal computer number, request target module I/O number, or request target module station number.
C060$_H$	Incorrect request (For example, an incorrect specification on data for a bit device.)	Correct the request and send it to the C Controller module again. (A correction such as correcting data)
C061$_H$	The request data length does not match with the number of data in the character.	Check and correct the text or requested data length of the header. Then send the data to the C Controller module again.
C06F$_H$	ASCII request message was received when the communication data code setting was binary.	Send a request message corresponds to the communication data code setting. Change the communication data code setting corresponds to the request message.
C070$_H$	The device memory is extended for the target station.	Read/write data without extending the device memory.
C0B5$_H$	Data that cannot be processed on the CPU module was specified.	Correct the request. Cancel the current request.

Appendix 2 Event Number List

When an event such as an error occurs in the C Controller system, the event history (including event No.) is registered and can be checked from Setting/monitoring tools for the C Controller module. ([Diagnostics] ⇒ [Event history] ⇒ <<Event history>>)

When an event has occurred, check the event No. in the following procedure and take corrective actions.

When more than one event occur, take corrective actions for each event in chronological order.



C Controller module diagnostics (No.1)

Date	Time	Source	Event No.	Event info
2000/01/07	20:36:14	MQbfDrv	C0000201	AC/DC DOWN occurred.[Error code:1500 Error info

Check "source" and "event No.", and take corrective actions referring to the following table.

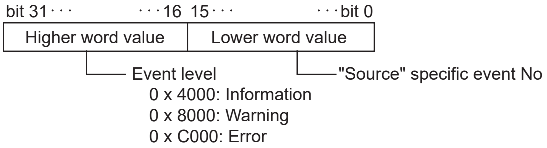
Point

For treatment of CPU error codes, refer to the following.
☞ Page 409, Appendix 1.1

Source	Data type	Reference
MQbfDrv	Bus interface driver (bus part) related	Page 435, (1) in this section
MXwdkDrv	Bus interface driver (system part) related	Page 436, (2) in this section
MUtlIFQbf	Utility communication I/F (bus interface part) related	Page 436, (3) in this section
MUtlIFMd	Utility communication I/F (MELSEC communication part) related	
MUtlIFCom	Utility communication I/F (common part) related	
MMain	C Controller module main part related	Page 437, (4) in this section
MFDrv	Built-in ROM, standard ROM, flash ROM, and standard RAM related	Page 438, (5) in this section
MSdDrv	SD memory card related	Page 438, (6) in this section
MCFDrv	CompactFlash card related	Page 439, (7) in this section
MEtherDrv	Ethernet related	Page 439, (8) in this section
MRs232Drv	RS-232 related	Page 439, (9) in this section
MUSBDrv	USB related	Page 439, (10) in this section
MelsecIF	MELSEC data link functions related	Page 439, (11) in this section

Point

- The following values are stored with an event No.



Event level	Description	Corrective action
Information	The C Controller module is running normally, but the customer system may be affected.	Refer to the event detail field of each event and take appropriate actions if the customer system may be affected.
Warning	The C Controller module is not running normally.	Refer to the processing field of each event and take appropriate actions.
Error	The C Controller module is not running.	

- In any of the following cases, please consult your local Mitsubishi service center or representative, explaining the details of the problem.
  - Any event No. not listed in the following table is detected
  - The actions indicated in the following table does not resolve the program

(1) Actions against each event No. that occurs in "MQbfDrv"

Actions against each event No. that occurs in "MQbfDrv" are described below.

Event No.	Event type	Event	Corrective action
C000011EH	System (Err.)	Failed to allocate memory required for the driver start-up.	• Increase the system memory. • Reduce the memory usage of other programs.
C0000127H	System (Err.)	SYSTEM WDT ERROR occurred.	Take corrective actions for error code 5000.
C0000131H	System (Err.)	USER WDT ERROR occurred.	Take corrective actions for error code 5001.
C0000201H	System (Err.)	AC/DC DOWN occurred.	Take corrective actions for error code 1500.
C0000202H	System (Err.)	CONTROL-BUS.ERR. occurred.	Take corrective actions for error code 1413, 1414, 1415, and 1416.
C0000204H	System (Err.)	UNIT VERIFY ERR. occurred.	Take corrective actions for error code 2000.
C0000206H	System (Err.)	FUSE BREAK OFF occurred.	Take corrective actions for error code 1300.
C0000207H	System (Err.)	SP.UNIT DOWN occurred.	Take corrective actions for error code 1401 and 1403.
C0000208H	System (Err.)	CONTROL-BUS.ERR. occurred.	Take corrective actions for error code 1412.
C0000209H	System (Err.)	SP.UNIT LAY ERR. occurred.	Take corrective actions for error code 2100, 2103, 2106, 2107, 2108, 2120, 2121, 2122, 2124, 2125, 2126, and 2150.
C000020AH	System (Err.)	PARAMETER ERROR occurred.	Take corrective actions for error code 3000, 3001, 3010, 3012, 3014, 3015, and 3016.
C000020BH	System (Err.)	An error occurred during module initialization. (Only the first error is displayed.)	Take corrective actions corresponding to the error code displayed in the event information.
C000020EH	System (Err.)	A CPU module built-in battery error occurred.	Take corrective actions for error code 1600.
C0000210H	System (Err.)	MULTI CPU DOWN occurred.	Take corrective actions for error code 7000 and 7002.
C0000211H	System (Err.)	MULTI EXE.ERROR occurred.	Take corrective actions for error code 7010, 7011, and 7013.
C0000212H	System (Err.)	MULTI CPU ERROR occurred.	Take corrective actions for error code 7020.
C0000213H	System (Err.)	SP.PARAMETER ERROR occurred.	Take corrective actions for error code 3300, 3301, 3302, and 3303.
C0000214H	System (Err.)	LINK PARAMETER ERROR occurred.	Take corrective actions for error code 3100, 3101, 3102, 3103, 3104, 3105, and 3107.
C0000215H	System (Err.)	I/O INT.ERROR occurred.	Take corrective actions for error code 1310.
C0000216H	System (Err.)	MAIN CPU DOWN occurred.	Take corrective actions for error code 1000 and 1009.
C0000218H	System (Err.)	LINK REFRESH TIME OVER occurred.	Take corrective actions for error code 5012.
C0000219H	System (Err.)	SINGLE PS.DOWN occurred.	Take corrective actions for error code 1510.
C000021AH	System (Err.)	SINGLE PS.ERROR occurred.	Take corrective actions for error code 1520.
C000021BH	System (Err.)	MULTI-C.BUS.ERR. occurred.	Take corrective actions for error code 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, and 1439.

Event No.	Event type	Event	Corrective action
C000021C$_H$	System (Err.)	CPU LAY ERROR occurred.	Take corrective actions for error code 7036.
C000021D$_H$	System (Err.)	DUPLICAT.NET.NO. occurred.	Take corrective actions for error code 3150.
C0000300$_H$	System (Warning)	Initialization of Ethernet port for MELSOFT connection failed.	Replace the C controller module.

(2) Actions against each event No. that occurs in "MXwdkDrv"

Actions against each event No. that occurs in "MXwdkDrv" are described below.

Event No.	Event type	Event	Corrective action
40000000$_H$	System (Info.)	The clock data of the C Controller module have been set. This event occurs when: • Clock data was set by the user program.*1 • Clock data was set by Setting/monitoring tools for the C Controller module. • Clock data was set by peripheral devices such as GOT.	-
40000002$_H$	System(info.)	The clock data were corrected by the clock synchronization function. This event is registered when a clock data difference from a CPU No. 1 is detected after enabling the Clock synchronization function.	
40000003$_H$	System(info.)	The clock data were corrected by the time setting function (SNTP function).	
80000004$_H$	System (Warning)	The event history information was initialized because an error was detected in the event history information.	
C0000001$_H$	System (Err.)	An exceptional error occurred.	• Reexamine the user program by checking the event detail information (such as error details, task names, and program counters).*1 • Check the operation methods of CW Workbench.*1 • Replace the C controller module.
C0001001$_H$	System (Err.)		

*1 : Not supported by Q24DHCCPU-LS and Q26DHCCPU-LS.

(3) Actions against each event No. that occurs in "MUtlIFQbf / MUtlIFMd / MUtlIFCom"

Actions against each event No. that occurs in "MUtlIFQbf / MUtlIFMd / MUtlIFCom" are described below

Event No.	Event type	Event	Corrective action
C0000000$_H$	System (Err.)	An illegal packet error occurred.	• Check the port number. • Change the IP address.
C0000001$_H$	System (Err.)	An instruction error occurred.	Check the version of the utility and C Controller module.
C0000002$_H$	System (Err.)	A socket generation error occurred.	• Restart the C Controller module. • Please consult your local Mitsubishi service center or representative, explaining the details of the problem.
C0000003$_H$	System (Err.)	A port acquisition error occurred.	
C0000004$_H$	System (Err.)	A bind error occurred.	

(4) Actions against each event No. that occurs in "MMain"

Actions against each event No. that occurs in "MMain" are described below.

Event No.	Event type	Event	Corrective action
80000331H	System (Warning)	Time synchronization to the SNTP server failed.	• Check the SNTP server's IP address. • Check the Ethernet cable. • Check that it is connected to the system Ethernet port (S CH1). • Check if the SNTP server is running normally.
C0000111H	System (Err.)	One command (one line) in the script file has 129 or more characters.	Reduce the number of characters for one command (one line) in the script file to 128 or less.
C0000330H	System (Err.)	Failed to access LAN.	• The parameter file (IP address setting area) does not exist. Using Setting/monitoring tools for the C Controller module, set the IP address or write the parameters. • Replace the C Controller module.
C0000400H	System (Err.)	MAIN CPU DOWN occurred.	Initializes the C Controller module.
C0000401H	System (Err.)	PARAMETER ERROR occurred.	
C0001111H	System (Err.)	The command in the script file cannot be executed. • An error in the syntax • No command exists • One command (one line) in the script file has 129 or more characters.	Take corrective actions for CPU error code 2502.
C0001400H	System (Err.)	MAIN CPU DOWN occurred.	Initializes the C Controller module.

Point

- Q24DHCCPU-V/-VG
  If the "U RDY" LED does not light after performing the corresponding actions described above, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.
- Q12DCCPU-V
  If performing the corresponding actions described above does not resolve the problem, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

(5) Actions against each event No. that occurs in "MFDrv"

Actions against each event No. that occurs in "MFDrv" are described below.

Event No.	Event type	Event	Corrective action
80000000H	System (Warning)	The index value of writing count of the internal ROM has exceeded 100 thousand.	Replace the C Controller module.
80000406H	System (Warning)	A timeout occurred during writing to file in the standard ROM drive "/ ROM".	• Write the file again if the file was not written correctly. • If this event occurs frequently, reexamine the user program (processing, task priority, etc.) that runs on the C Controller module.
80001000H	System (Warning)	The index value of writing count of the standard ROM drive "/ROM" has exceeded 100 thousand.	Replace the C Controller module.
C0000400H	System (Err.)	A built-in ROM drive "/ROM" format error occurred.	Reformat the built-in ROM drive "/ROM".
C0000402H	System (Err.)	An access beyond the flash ROM size occurred.	Replace the C Controller module.
C0000403H	System (Err.)	An internal ROM ("/ROM", "/SYSTEMROM") initialization error occurred.	
C0000404H	System (Err.)	An internal ROM drive "/ROM" start address error occurred.	
C0000405H	System (Err.)	An internal ROM drive "/ROM" block count error occurred.	
C000040AH	System (Err.)	MAIN CPU DOWN occurred.	Take corrective actions for CPU error code 1000.
C0000409H	System (Err.)	An internal ROM ("/ROM","/SYSTEMROM") error was detected.	Initializes the C Controller module.
C000040AH	System (Err.)	MAIN CPU DOWN occurred.	
C0000410H	System (Err.)	A standard RAM drive "/RAM" format error occurred.	
C0000411H	System (Err.)	An access operation exceeding the standard RAM drive size occurred.	
C0000412H	System (Err.)	A standard RAM drive "/RAM" initialization error occurred.	
C0000417H	System (Err.)	RAM ERROR occurred.	

Point

- Q24DHCCPU-V/-VG
  If the "U RDY" LED does not light after performing the corresponding actions described above, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.
- Q12DCCPU-V
  If performing the corresponding actions described above does not resolve the problem, the hardware may be faulty. Please consult your local Mitsubishi service center or representative, explaining the details of the problem.

(6) Actions against each event No. that occurs in "MSdDrv"

Actions against each event No. that occurs in "MSdDrv" are described below.

Event No.	Event type	Event	Corrective action
C0000480H	System (Err.)	The SD memory card is not responding.	• The SD memory card is pulled out once, and it inserts it again. • Replace the SD memory card.
C0000481H	System (Err.)	An error occurred while obtaining the SD memory card drive information.	
C0000482H	System (Err.)	An error occurred while reading master boot record (MBR).	• The SD memory card is pulled out once, and it inserts it again. • Reformat the SD memory card on a personal computer, etc. • Replace the SD memory card.
C0000483H	System (Err.)	The master boot record (MBR) cannot be recognized in this format.	• Reformat the SD memory card on a personal computer, etc. • Replace the SD memory card.
C0000490H	System (Err.)	A resource shortage error occurred.	Check the utilization of the memory, provide a free space, and execute again.
C0000491H	System (Err.)	A SD driver initialization error occurred.	Please consult your local Mitsubishi service center or representative, explaining the details of the problem.
C0000492H	System (Err.)	A device name registration error occurred	
C0000493H	System (Err.)	A block No. error occurred.	

(7) Actions against each event No. that occurs in "MCFDrv"

Actions against each event No. that occurs in "MCFDrv" are described below.

Event No.	Event type	Event	Corrective action
C0000480$_{\text{H}}$	System (Err.)	CF card is not responding.	• Pull the CompactFlash card once, and insert it again. • Replace the CompactFlash card.
C0000481$_{\text{H}}$	System (Err.)	An error occurred during acquiring the CF card information.	
C0000482$_{\text{H}}$	System (Err.)	An error occurred during reading master boot record (MBR).	• Pull the CompactFlash card once, and insert it again. • Reformat the CompactFlash card on a personal computer, etc. • Replace the CompactFlash card.
C0000483$_{\text{H}}$	System (Err.)	The master boot record (MBR) cannot be recognizes in this format.	• Reformat the CompactFlash card on a personal computer, etc. • Replace the CompactFlash card.
C0000490$_{\text{H}}$	System (Err.)	A resource shortage error occurred.	Check the memory usage condition, and execute again after creating a free capacity of the memory.
C0000491$_{\text{H}}$	System (Err.)	A CF card driver initialization error occurred.	Please consult your local Mitsubishi service center or representative, explaining the details of the problem.
C0000493$_{\text{H}}$	System (Err.)	A block number error occurred.	

(8) Actions against each event No. that occurs in "MEtherDrv"

There is no event that may occur in "MEtherDrv".

(9) Actions against each event No. that occurs in "MRs232Drv"

There is no event that may occur in "MRs232Drv".

(10)Actions against each event No. that occurs in "MUSBDrv"

Actions against each event No. that occurs in "MUSBDrv" are described below.

Event No.	Event type	Event	Corrective action
80000000$_{\text{H}}$	System (Warning)	An external device where current exceeding allowable supply current flows was connected.	Check the current consumption of the external device and review the configuration so that it is below the allowable supply current of the C Controller module.

(11)Actions against each event No. that occurs in "MelsecIF"

Actions against each event No. that occurs in "MelsecIF" are described below.

Event No.	Event type	Event	Corrective action
40000004$_{\text{H}}$	System (Info.)	User CPU restart was executed.	-
C0000000$_{\text{H}}$	System (Err.)	MAIN CPU DOWN occurred.	Refer to the CPU error code 1000.
C0000001$_{\text{H}}$	System (Err.)	PARAMETER ERROR occurred.	Refer to the CPU error code 3001.
C0000002$_{\text{H}}$	System (Err.)	SP.UNIT ERROR occurred.	Refer to the CPU error code 2110.
C0000003$_{\text{H}}$	System (Err.)	REF.TIME OVER occurred.	Refer to the CPU error code 5012.
C0001000$_{\text{H}}$	System (Err.)	MAIN CPU DOWN occurred.	Refer to the CPU error code 1000.
C0001001$_{\text{H}}$	System (Err.)	A battery backup RAM error was detected.	Refer to the CPU error code 1106.

Appendix 3 VxWorks Component List

This section describes the list of VxWorks components implemented in the C Controller module.

Remark

Description of each component can be displayed on the PC with CW Workbench installed.
Use the following procedure to display each description.

1. **Start CW Workbench.**
2. **Select [Help] ⇒ [Help Contents] from the menu bar.**
   The Web browser shows the CW Workbench Help.
3. **Enter a component name to show in the "Search" field and click the "Go" button.**

Appendix 3.1 Q24DHCCPU-V

Description	Name
32-bit physical address space	INCLUDE_MMU_P6_32BIT
Address Space Allocator Show Routines	INCLUDE_ADR_SPACE_SHOW
address space shell commands	INCLUDE_ADR_SPACE_SHELL_CMD
ANSI assert	INCLUDE_ANSI_ASSERT
ANSI ctype	INCLUDE_ANSI_CTYPE
ANSI errno to error string conversion function	INCLUDE_ANSI_STRERROR
ANSI locale	INCLUDE_ANSI_LOCALE
ANSI math	INCLUDE_ANSI_MATH
ANSI stdio	INCLUDE_ANSI_STDIO
ANSI stdio extentions	INCLUDE_ANSI_STDIO_EXTRA
ANSI stdlib	INCLUDE_ANSI_STDLIB
ANSI string	INCLUDE_ANSI_STRING
ANSI string duplication function	INCLUDE_ANSI_STRDUP
ANSI time	INCLUDE_ANSI_TIME
application inialization	INCLUDE_USER_APPL
arp utility wrapper	INCLUDE_IPWRAP_ARP
arpLib	INCLUDE_ARP_API
asynchronous IO show routine	INCLUDE_POSIX_AIO_SHOW
atomic operators support	INCLUDE_ATOMIC_OPERATORS
Attach END to IPv4	INCLUDE_IPATTACH
AUX clock	INCLUDE_AUX_CLK
Basic IO System	INCLUDE_IO_BASIC
basic memory allocator	INCLUDE_MEM_MGR_BASIC
basic MMU	INCLUDE_MMU_BASIC
basic network support	INCLUDE_NETWORK
binary semaphore creation routine	INCLUDE_SEM_BINARY_CREATE
binary semaphores	NCLUDE_SEM_BINARY
Boot parameter process	INCLUDE_NET_BOOT
BSP memory Configuration	INCLUDE_MEMORY_CONFIG
built-in symbol table	INCLUDE_STANDALONE_SYM_TBL
c line interpreter	INCLUDE_SHELL_INTERP_C

Description	Name
C++ compiler support routines	INCLUDE_CPLUS_LANG
C++ core runtime	INCLUDE_CPLUS
C++ iostreams and other standard library facilities	INCLUDE_CPLUS_IOSTREAMS
C++ symbol demangler	INCLUDE_CPLUS_DEMANGLER
cache support	INCLUDE_CACHE_SUPPORT
class show routine	INCLUDE_CLASS_SHOW
Classifier	INCLUDE_IPNET_CLASSIFIER
command line interpreter	INCLUDE_SHELL_INTERP_CMD
Common network infrastructure	INCLUDE_COMMON_NET
Commonly used legacy mbuf routines	INCLUDE_MBUF_UTIL1
coprocessor	INCLUDE_COPROCESSOR
coprocessor show routine	INCLUDE_COPROCESSOR_SHOW
Core NFS client	INCLUDE_CORE_NFS_CLIENT
counting semaphore creation routine	INCLUDE_SEM_COUNTING_CREATE
counting semaphores	INCLUDE_SEM_COUNTING
CPU Power Light utilization manager	INCLUDE_CPU_LIGHT_PWR_MGR
CPU Power management framework	INCLUDE_CPU_PWR_MGMT
debug shell commands	INCLUDE_DEBUG_SHELL_CMD
debugging facilities	INCLUDE_DEBUG
Device Manager	INCLUDE_DEVICE_MANAGER
DHCP Client	INCLUDE_IPDHCPC
Differentiated Services	INCLUDE_IPNET_DIFFSERV
DNS Client	INCLUDE_IPDNSC
DOS File System Consistency Checker	INCLUDE_DOSFS_CHKDSK
DOS File System FAT12/16/32 Handler	INCLUDE_DOSFS_FAT
DOS File System Old Directory Format Handler	INCLUDE_DOSFS_DIR_FIXED
DOS File System VFAT Directory Handler	INCLUDE_DOSFS_DIR_VFAT
DOS File System Volume Formatter Module	INCLUDE_DOSFS_FMT
DOS filesystem backward-compatibility	INCLUDE_DOSFS
Dos FS BIO buffer size	INCLUDE_DOSFS_VOL_BIO_BUFFER_SIZE
Dos FS Show Routines	INCLUDE_DOSFS_SHOW
dosfs File System Main Module (dosFs2)	INCLUDE_DOSFS_MAIN
doubly linked lists	INCLUDE_DLL
ED&R shell commands	INCLUDE_EDR_SHELL_CMD
ED&R show routines	INCLUDE_EDR_SHOW
EHCI	INCLUDE_EHCI
EHCI Init	INCLUDE_EHCI_INIT
EHCI Start	INCLUDE_EHCI_BUS
enable caches	INCLUDE_CACHE_ENABLE
enable guard pages for kernel task stacks	INCLUDE_PROTECT_TASK_STACK
enable non-executable kernel task stacks	INCLUDE_TASK_STACK_NO_EXEC
END driver polled statistics support	INCLUDE_END_POLLED_STATS
END: common Enhanced Network Device support	INCLUDE_END_COMMON
END: END-style interface support	INCLUDE_END
error status table	INCLUDE_STAT_SYM_TBL
Ethernet Interface support	INCLUDE_IPCOM_USE_ETHERNET
Event Reporting Framework	INCLUDE_ERF
exception handling	INCLUDE_EXC_HANDLING
exception show routines	INCLUDE_EXC_SHOW
exception task	INCLUDE_EXC_TASK
Extended Block Device	INCLUDE_XBD

Description	Name
extended object library	INCLUDE_OBJ_OPEN
File System and Disk Utilities	INCLUDE_DISK_UTIL
File System Event Utilities	INCLUDE_FS_EVENT_UTIL
File System IO	INCLUDE_IO_FILE_SYSTEM
File System Monitor	INCLUDE_FS_MONITOR
file system shell commands	INCLUDE_DISK_UTIL_SHELL_CMD
file upload path initialization	INCLUDE_WVUPLOAD_FILE
floating point show routine	INCLUDE_HW_FP_SHOW
formatted IO	INCLUDE_FORMATTED_IO
formatted IO output routines	INCLUDE_FORMATTED_OUT_BASIC
fpp formatting for printf	INCLUDE_FLOATING_POINT
FTP Client Backend	INCLUDE_FTP
full featured memory allocator	INCLUDE_MEM_MGR_FULL
Generic PHY driver	INCLUDE_GENERICPHY
get name info	INCLUDE_GETNAMEINFO
get servce by name	INCLUDE_GETSERVBYNAME
get servce by port	INCLUDE_GETSERVBYPORT
gethostbyaddr wrapper	INCLUDE_IPWRAP_GETHOSTBYADDR
getnameinfo wrapper	INCLUDE_IPWRAP_GETNAMEINFO
getopt function	INCLUDE_GETOPT
getservbyname wrapper	INCLUDE_IPWRAP_GETSERVBYNAME
getservbyport wrapper	INCLUDE_IPWRAP_GETSERVBYPORT
Global configurations	INCLUDE_IPAIP_GLOBAL_CONFIGS
GNU compiler support routines	INCLUDE_GNU_INTRINSICS
GTF support	INCLUDE_GTF
gtf_timer_start	INCLUDE_GTF_TIMER_START
handle show routines	INCLUDE_HANDLE_SHOW
hardware fpp support	INCLUDE_HW_FP
hash library	INCLUDE_HASH
high resolution timestamping	INCLUDE_TIMESTAMP
Highly Reliable File System	INCLUDE_HRFS
host table	INCLUDE_HOST_TBL
host table sysctl support	INCLUDE_HOST_TBL_SYSCTL
Host/target breakpoint synchronization	INCLUDE_WDB_BP_SYNC
host/target modules and symbols synchronization	INCLUDE_WDB_MDL_SYM_SYNC
HRFS Default Write Mode	INCLUDE_HRFS_DEFAULT_WRITE_MODE
HRFS File System Consistency Checker	INCLUDE_HRFS_CHKDSK
HRFS Format	INCLUDE_HRFS_FORMAT
i8253 timer Driver	DRV_TIMER_I8253
ifconfig	INCLUDE_IFCONFIG
ifconfig wrapper	INCLUDE_IPWRAP_IFCONFIG
ifLib wrapper	INCLUDE_IPWRAP_IFLIB
ifShow wrapper	INCLUDE_IPWRAP_IFSHOW
inetLib	INCLUDE_INETLIB
inetLib wrapper	INCLUDE_IPWRAP_INETLIB
Init pre-kernel memory allocation globally	INIT_HWMEMPOOL_GLOBAL
initialize system symbol table	INCLUDE_SYM_TBL_INIT
Intel ICH SATA Controller	INCLUDE_DRV_STORAGE_INTEL_ICH
Intel ICH SATA Controller Show Routines	INCLUDE_DRV_STORAGE_INTEL_ICH_SHOW
Intel PRO/1000 VxBus Enhanced Network Driver	INCLUDE_GEI825XX_VXB_END
Intel timestamp Driver	DRV_TIMER_IA_TIMESTAMP

Description	Name
Interface #1 configuration	INCLUDE_IPNET_IFCONFIG_1
IO system	INCLUDE_IO_SYSTEM
IPCOM arp commands	INCLUDE_IPARP_CMD
IPCOM ifconfig commands	INCLUDE_IPIFCONFIG_CMD
IPCOM ipd commands	INCLUDE_IPD_CMD
IPCOM netstat commands	INCLUDE_IPNETSTAT_CMD
IPCOM ping commands	INCLUDE_IPPING_CMD
IPCOM radius client commands	INCLUDE_IPRADIUS_CMD
IPCOM route commands	INCLUDE_IPROUTE_CMD
IPCOM shell command interface	INCLUDE_IPCOM_SHELL_CMD
IPCOM sysvar commands	INCLUDE_IPCOM_SYSVAR_CMD
IPNET	INCLUDE_IPNET
IPNet loopback configuration	INCLUDE_IPNET_LOOPBACK_CONFIG
IPNet Stack	INCLUDE_IPNET_STACK
IPNet sysctl integration	INCLUDE_IPNET_SYSCTL
ipProto wrapper	INCLUDE_IPWRAP_IPPROTO
IPv4	INCLUDE_IPCOM_USE_INET
IPv4 AutoIP	INCLUDE_IPAIP
IPv4 IGMP	INCLUDE_IPMCP_USE_IGMP
IPv4 Multicast routing	INCLUDE_IPNET_USE_MCAST_ROUTING
ISR deferral	INCLUDE_ISR_DEFER
Job Queue support	INCLUDE_JOB_QUEUE
job task	INCLUDE_JOB_TASK
kernel	INCLUDE_KERNEL
linkBufPool	INCLUDE_LINKBUFPOOL
linked list library	INCLUDE_LSTLIB
Loopback Inrerface support	INCLUDE_IPNET_USE_LOOPBACK
M_BLK ethernet/802.3 header build and parse	INCLUDE_END_ETHER_HDR
mapped files shell commands	INCLUDE_MAPPED_FILES_SHOW_SHELL_CMD
Mc146818 RTC Driver	DRV_TIMER_MC146818
memory allocator info routines	INCLUDE_MEM_MGR_INFO
memory show routine	INCLUDE_MEM_SHOW
message logging	INCLUDE_LOGGING
message queue creation and deletion libraly	INCLUDE_MSG_Q_CREATE_DELETE
message queue info routines	INCLUDE_MSG_Q_INFO
message queue show routine	INCLUDE_MSG_Q_SHOW
message queues	INCLUDE_MSG_Q
MIB2 ICMP Management APIs	INCLUDE_MIB2_ICMP
MIB2 IF Counter Instrumentation	INCLUDE_MIB2_IF
MIB2 TCP Management APIs	INCLUDE_MIB2_TCP
MIB2 UDP Management APIs	INCLUDE_MIB2_UDP
MII bus controller module	INCLUDE_MII_BUS
Miscellaneous IO	INCLUDE_IO_MISC
MMU global map	INCLUDE_MMU_GLOBAL_MAP
module manager	INCLUDE_MODULE_MANAGER
Multicast proxy	INCLUDE_IPMCP
mutex semaphore creation routine	INCLUDE_SEM_MUTEX_CREATE
mutex semaphores	INCLUDE_SEM_MUTEX
MUX common suppoprt (all service and device styles)	INCLUDE_MUX_COMMON
MUX mux TkBind() service	INCLUDE_MUXTK
MUX mux TkBind() service / END-style device	INCLUDE_MUXTK_OVER_END

Description	Name
MUX mux2Bind() service	INCLUDE_MUX2
MUX mux2Bind() service / END-style device	INCLUDE_MUX2_OVER_END
MUX muxBind() service	INCLUDE_MUX
MUX private support for M_BLK/Ipcom_pkt conversion	INCLUDE_VXMUX_MBLK
netBufLib	INCLUDE_NETBUFLIB
netBufLib show routines	INCLUDE_NETPOOLSHOW
netBufPool	INCLUDE_NETBUFPOOL
NetDrv for remote IO	INCLUDE_NET_DRV
netstat	INCLUDE_NETSTAT
netstat wrapper	INCLUDE_IPWRAP_NETSTAT
network boot device configuration	INCLUDE_NET_BOOT_CONFIG
Network Daemon Support	INCLUDE_NET_DAEMON
network device netmask setup	INCLUDE_NETMASK_GET
network init	INCLUDE_NET_INIT
network remote I/O access	INCLUDE_NET_REM_IO
Network Stack Memory Pool Configuration	INCLUDE_NET_POOL
NETWORK SYSCTL	INCLUDE_NET_SYSCTL
NFS client All	INCLUDE_NFS_CLIENT_ALL
NFS server	INCLUDE_CORE_NFS_SERVER
NFS server All	INCLUDE_NFS_SERVER_ALL
NFS server V2	INCLUDE_NFS2_SERVER
NFS server V3	INCLUDE_NFS3_SERVER
NFS v2 client	INCLUDE_NFS2_CLIENT
NFS v3 client	INCLUDE_NFS3_CLIENT
non-blocking message logging	INCLUDE_NBIO_LOG
nullBufPool	INCLUDE_VXMUX_NULLBUFPOOL
object information	INCLUDE_OBJ_INFO
object management	INCLUDE_OBJ_LIB
object management ownership	INCLUDE_OBJ_OWNERSHIP
object show routines	INCLUDE_OBJECT_SHOW
oldRouteLib wrapper	INCLUDE_IPWRAP_OLDROUTELIB
PCI Bus legacy Auto Configuration Routines	INCLUDE_PCI_OLD_CONFIG_ROUTINES
PCI Bus Show Routines	INCLUDE_PCI_BUS_SHOW
Pentium PCI host controller	INCLUDE_PENTIUM_PCI
Peripheral Component Interconnect Bus	INCLUDE_PCI_BUS
persistent error log	INCLUDE_EDR_ERRLOG
persistent memory	INCLUDE_EDR_PM
PING client	INCLUDE_PING
ping wrapper	INCLUDE_IPWRAP_PING
pipes	INCLUDE_PIPES
pool allocation library	INCLUDE_POOL
POSIX advisory file locking	INCLUDE_POSIX_ADVISORY_FILE_LOCKING
POSIX AIO driver	INCLUDE_POSIX_AIO_SYSDRV
POSIX asynchornous IO	INCLUDE_POSIX_AIO
POSIX clocks	INCLUDE_POSIX_CLOCKS
POSIX directory utilities	INCLUDE_POSIX_DIRLIB
POSIX ftruncate	INCLUDE_POSIX_FTRUNC
POSIX IO	INCLUDE_IO_POSIX
POSIX Memory Mapped Files	INCLUDE_POSIX_MAPPED_FILES
POSIX message queue show routine	INCLUDE_POSIX_MQ_SHOW
POSIX message queues	INCLUDE_POSIX_MQ

Description	Name
POSIX mman	INCLUDE_POSIX_MEM
POSIX process scheduling	INCLUDE_POSIX_SCHED
POSIX scheduling support including SCHED_SPORADIC policy in RTPs	INCLUDE_PX_SCHED_SPORADIC_POLICY
POSIX semaphore show routine	INCLUDE_POSIX_SEM_SHOW
POSIX semaphores	INCLUDE_POSIX_SEM
POSIX signals	INCLUDE_POSIX_SIGNALS
POSIX thread CPU-time clock	INCLUDE_POSIX_THREAD_CPUTIME
POSIX thread scheduler in RTPs	INCLUDE_POSIX_PTHREAD_SCHEDULER
POSIX threads	INCLUDE_POSIX_PTHREADS
Posix timer show component	INCLUDE_POSIX_TIMER_SHOW
POSIX timers	INCLUDE_POSIX_TIMERS
POSIX TRACE	INCLUDE_POSIX_TRACE
POSIX_Shared Memory Objects	INCLUDE_POSIX_SHM
Pre-Kernel Memory Allocation	INCLUDE_HWMEM_ALLOC
process shell commands	INCLUDE_RTP_SHELL_CMD
process show shell commands	INCLUDE_RTP_SHOW_SHELL_CMD
Processor Local Bus	INCLUDE_PLB_BUS
ProxyARP	INCLUDE_IPPROXYARP
Pseudo terminal driver	INCLUDE_PTYDRV
public hostname setup	INCLUDE_NET_HOST_SETUP
Radius Authentication Support	INCLUDE_IPCOM_USE_AUTH_RADIUS
Radius client	INCLUDE_IPRADIUS
RAM Disk	INCLUDE_RAM_DISK
RAM disk driver	INCLUDE_RAMDRV
raw filesystem	INCLUDE_RAWFS
rBuff library	INCLUDE_RBUFF
rBuff show routine	INCLUDE_RBUFF_SHOW
read the bootline	INCLUDE_BOOT_LINE_INIT
reader/writer semaphore creation routine	INCLUDE_SEM_READ_WRITE_CREATE
reader/writer semaphores	INCLUDE_SEM_READ_WRITE
Remote Command	INCLUDE_REMLIB
Remote Command sysctl support	INCLUDE_REMLIB_SYSCTL
Removable IO	INCLUDE_IO_REMOVABLE
ring buffers	INCLUDE_RNG_BUF
RLOGIN/TELNET password protection	INCLUDE_SECURITY
routec	INCLUDE_ROUTECMD
routec wrapper	INCLUDE_IPWRAP_ROUTECMD
Routing socket support	INCLUDE_IPNET_USE_ROUTESOCK
RPC	INCLUDE_RPC
RTP	INCLUDE_RTP
RTP getnameinfo() sysctl support	INCLUDE_GETNAMEINFO_SYSCTL
RTP Hook Support	INCLUDE_RTP_HOOKS
RTP IO	INCLUDE_IO_RTP
RTP Show	INCLUDE_RTP_SHOW
RTP Startup Facility: User-defined code	INCLUDE_RTP_APPL_USER
run static initializers	INCLUDE_CTORS_DTORS
SD Host Controller driver	DRV_STORAGE_SD
select	INCLUDE_SELECT
semaphore deletion routines	INCLUDE_SEM_DELETE
semaphore exchange routine	INCLUDE_SEM_EXCHANGE
semaphore info routines	INCLUDE_SEM_INFO

Description	Name
semaphore show routine	INCLUDE_SEM_SHOW
shared data region support in RTPs or kernel	INCLUDE_SHARED_DATA
Shared Data Show	INCLUDE_SHARED_DATA_SHOW
shared data show shell commands	INCLUDE_SHARED_DATA_SHOW_SHELL_CMD
shared library commands	INCLUDE_SHL_SHELL_CMD
Shared Library Show	INCLUDE_SHL_SHOW
shared library support in RTPs	INCLUDE_SHL
shell banner	INCLUDE_SHELL_BANNER
show routine component	INCLUDE_SHOW_ROUTINES
Show routines for memory mapped objects	INCLUDE_MAPPED_FILES_SHOW
sigevent notification library	INCLUDE_SIGEVENT
signals	INCLUDE_SIGNALS
Simple Marker	INCLUDE_IPNET_DS_SM
Single Rate Three Color Marker	INCLUDE_IPNET_DS_SRTCM
SIO	INCLUDE_SIO
Sio Channel Utilities	INCLUDE_SIO_UTILS
SNTP Client (API)	INCLUDE_IPSNTPC_API
SNTP Client (daemon)	INCLUDE_IPSNTPC
SNTP common configurations	INCLUDE_IPSNTP_COMMON
sntpcTimeGet wrapper	INCLUDE_IPWRAP_SNTPCTIMEGET
Socket API	INCLUDE_SOCKLIB
Socket API System Call support	INCLUDE_SC_SOCKLIB
Socket backend	INCLUDE_IPNET_USE_SOCK_COMPAT
Socket support	INCLUDE_IPNET_SOCKET
spinLock	INCLUDE_SPINLOCK
spy	INCLUDE_SPY
Stack/Application Logging Utility	INCLUDE_APPL_LOG_UTIL
stdio	INCLUDE_STDIO
stdio show routine	INCLUDE_STDIO_SHOW
Support for reboot hooks	INCLUDE_REBOOT_HOOKS
symbol shell commands	INCLUDE_SYM_SHELL_CMD
symbol table show routine	INCLUDE_SYM_TBL_SHOW
SYSCTL	INCLUDE_SYSCTL
SYSCTL CLI	INCLUDE_SYSCTL_CLI
sysctl System Call	INCLUDE_SC_SYSCTL
System Call Hook Support	INCLUDE_SYSCALL_HOOKS
System clock	INCLUDE_SYSCLK_INIT
system debug flag	INCLUDE_EDR_SYSDBG_FLAG
System Viewer class instrumentation	INCLUDE_WINDVIEW_CLASS
System Viewer library	INCLUDE_WINDVIEW
system-defined timestamping	INCLUDE_SYS_TIMESTAMP
target loader	INCLUDE_LOADER
target loader shell command	INCLUDE_MODULE_SHELL_CMD
target symbol table	INCLUDE_SYM_TBL
target unloader	INCLUDE_UNLOADER
target-resident kernel shell	INCLUDE_SHELL
task create hooks	INCLUDE_TASK_CREATE_HOOKS
task hook show routine	INCLUDE_TASK_HOOKS_SHOW
task hooks	INCLUDE_TASK_HOOKS
task info routines	INCLUDE_TASK_INFO
task list management	INCLUDE_TASK_LIST

Description	Name
task shell commands	INCLUDE_TASK_SHELL_CMD
task show routine	INCLUDE_TASK_SHOW
task switch hooks	INCLUDE_TASK_SWITCH_HOOKS
task variables	INCLUDE_TASK_VARS
TCP	INCLUDE_IPTCP
TELNET Server	INCLUDE_IPTELNETS
terminal driver	INCLUDE_TTY_DEV
terminal driver support	INCLUDE_TYLIB
TFTP Client	INCLUDE_IPTFTPC
TFTP Client APIs	INCLUDE_TFTP_CLIENT
TFTP common configurations	INCLUDE_IPTFTP_COMMON
Thermal Monitor and Geyserville III suppport	INCLUDE_THERM_MONITOR
timex	INCLUDE_TIMEX
tip serial line connection utility	INCLUDE_TIP
TSFS upload path initialization	INCLUDE_WVUPLOAD_TSFSSOCK
Tunnel Interface suport	INCLUDE_IPNET_USE_TUNNEL
UART support for ns16550-compatible devices	DRV_SIO_NS16550
unix compatible environment variables	INCLUDE_ENV_VARS
unloader shell command	INCLUDE_UNLOADER_SHELL_CMD
USB GEN2 Helper Init	INCLUDE_USB_GEN2_HELPER
USB GEN2 Mass Storage	INCLUDE_USB_GEN2_STORAGE
USB GEN2 Mass Storage Init	INCLUDE_USB_GEN2_STORAGE_INIT
USB Host Stack	INCLUDE_USB
USB Host Stack Init	INCLUDE_USB_INIT
Use Authentication	INCLUDE_IPCOM_USE_AUTH
vi-like editing mode	INCLUDE_SHELL_VI_MODE
VIO driver	INCLUDE_WDB_VIO
virtual memory show shell commands	INCLUDE_VM_SHOW_SHELL_CMD
Virtual Root File System	INCLUDE_VRFS
VLAN Pseudo Interface support	INCLUDE_IPNET_USE_VLAN
VM library show routine	INCLUDE_VM_SHOW
vxBus Aux Clk Support	INCLUDE_VXB_AUX_CLK
VxBus Device Table	VXBUS_TABLE_CONFIG
vxBus Driver DMA System	INCLUDE_DMA_SYS
vxBus Driver Parameter System	INCLUDE_PARAM_SYS
vxBus subsystem	INCLUDE_VXBUS
vxBus subsystem show routines	INCLUDE_VXBUS_SHOW
vxBus Sys Clk Support	INCLUDE_VXB_SYS_CLK
vxBus Timer Support	INCLUDE_TIMER_SYS
vxBus Timestamp Support	INCLUDE_VXB_TIMESTAMP
vxMemProbe initializer for exception handler suport	INCLUDE_VXMEMPROBE_INIT
VxWorks events	INCLUDE_VXEVENTS
VxWorks IPCOM	INCLUDE_IPCOM
watchdog timer show routine	INCLUDE_WATCHDOGS_SHOW
watchdog timers	INCLUDE_WATCHDOGS
watchdog timers creation and deletion library	INCLUDE_WATCHDOGS_CREATE_DELETE
WDB agent	INCLUDE_WDB
WDB banner	INCLUDE_WDB_BANNER
WDB breakpoints	INCLUDE_WDB_BP
WDB call functions	INCLUDE_WDB_FUNC_CALL
WDB callouts	INCLUDE_WDB_DIRECT_CALL

Description	Name
WDB dynamic printf	INCLUDE_WDB_DPRINTF
WDB eventpoints	INCLUDE_WDB_EVENTPOINTS
WDB events	INCLUDE_WDB_EVENTS
WDB exception notification	INCLUDE_WDB_EXC_NOTIFY
WDB gopher	INCLUDE_WDB_GOPHER
WDB memory access	INCLUDE_WDB_MEM
WDB network connection	INCLUDE_WDB_COMM_NETWORK
WDB post kernel initialization	INCLUDE_WDB_POST_KERNEL_INIT
WDB register access	INCLUDE_WDB_REG
WDB RTP breakpoints	INCLUDE_WDB_RTP_BP
WDB RTP control support	INCLUDE_WDB_RTP_CONTROL
WDB RTP support	INCLUDE_WDB_RTP
WDB target server file system	INCLUDE_WDB_TSFS
WDB task breakpoints	INCLUDE_WDB_TASK_BP
WDB task creation	INCLUDE_WDB_START_NOTIFY
WDB task debugging	INCLUDE_WDB_TASK
WDB task exit notification	INCLUDE_WDB_EXIT_NOTIFY
WDB task hooks	INCLUDE_WDB_TASK_HOOKS
WDB task registers	INCLUDE_WDB_TASK_REG
WDB tasks	INCLUDE_WDB_CTXT
WDB user event	INCLUDE_WDB_USER_EVENT
WDB virtual I/O library	INCLUDE_WDB_VIO_LIB
write-protect program text	INCLUDE_PROTECT_TEXT
XBD Block Device	INCLUDE_XBD_BLK_DEV
XBD Disk Patition Handler	INCLUDE_XBD_PART_LIB
XBD Ram Drive	INCLUDE_XBD_RAMDRV
XDR	INCLUDE_XDR

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Description	Name
32-bit physical address space	INCLUDE_MMU_P6_32BIT
Address Space Allocator Show Routines	INCLUDE_ADR_SPACE_SHOW
address space shell commands	INCLUDE_ADR_SPACE_SHELL_CMD
ANSI assert	INCLUDE_ANSI_ASSERT
ANSI ctype	INCLUDE_ANSI_CTYPE
ANSI errno to error string conversion function	INCLUDE_ANSI_STRERROR
ANSI locale	INCLUDE_ANSI_LOCALE
ANSI math	INCLUDE_ANSI_MATH
ANSI stdio	INCLUDE_ANSI_STDIO
ANSI stdio extentions	INCLUDE_ANSI_STDIO_EXTRA
ANSI stdlib	INCLUDE_ANSI_STDLIB
ANSI string	INCLUDE_ANSI_STRING
ANSI string duplication function	INCLUDE_ANSI_STRDUP
ANSI time	INCLUDE_ANSI_TIME
application inialization	INCLUDE_USER_APPL
arp utility wrapper	INCLUDE_IPWRAP_ARP
arpLib	INCLUDE_ARP_API
asynchronous IO show routine	INCLUDE_POSIX_AIO_SHOW
atomic operators support	INCLUDE_ATOMIC_OPERATORS
Attach END to IPv4	INCLUDE_IPATTACH
AUX clock	INCLUDE_AUX_CLK
Basic IO System	INCLUDE_IO_BASIC
basic memory allocator	INCLUDE_MEM_MGR_BASIC
basic MMU	INCLUDE_MMU_BASIC
basic network support	INCLUDE_NETWORK
binary semaphore creation routine	INCLUDE_SEM_BINARY_CREATE
binary semaphores	INCLUDE_SEM_BINARY
Boot parameter process	INCLUDE_NET_BOOT
BSP memory Configuration	INCLUDE_MEMORY_CONFIG
built-in symbol table	INCLUDE_STANDALONE_SYM_TBL
c line interpreter	INCLUDE_SHELL_INTERP_C
C++ compiler support routines	INCLUDE_CPLUS_LANG
C++ core runtime	INCLUDE_CPLUS
C++ iostreams and other standard library facilities	INCLUDE_CPLUS_IOSTREAMS
C++ symbol demangler	INCLUDE_CPLUS_DEMANGLER
cache support	INCLUDE_CACHE_SUPPORT
class show routine	INCLUDE_CLASS_SHOW
Classifier	INCLUDE_IPNET_CLASSIFIER
command line interpreter	INCLUDE_SHELL_INTERP_CMD
Common network infrastructure	INCLUDE_COMMON_NET
Commonly used legacy mbuf routines	INCLUDE_MBUF_UTIL1
coprocessor	INCLUDE_COPROCESSOR
coprocessor show routine	INCLUDE_COPROCESSOR_SHOW
Core NFS client	INCLUDE_CORE_NFS_CLIENT
counting semaphore creation routine	INCLUDE_SEM_COUNTING_CREATE
counting semaphores	INCLUDE_SEM_COUNTING
CPU Power Light utilization manager	INCLUDE_CPU_LIGHT_PWR_MGR

Description	Name
CPU Power management framework	INCLUDE_CPU_PWR_MGMT
debug shell commands	INCLUDE_DEBUG_SHELL_CMD
debugging facilities	INCLUDE_DEBUG
Device Manager	INCLUDE_DEVICE_MANAGER
DHCP Client	INCLUDE_IPDHCPC
Differentiated Services	INCLUDE_IPNET_DIFFSERV
DNS Client	INCLUDE_IPDNSC
DOS File System Consistency Checker	INCLUDE_DOSFS_CHKDSK
DOS File System FAT12/16/32 Handler	INCLUDE_DOSFS_FAT
DOS File System Old Directory Format Handler	INCLUDE_DOSFS_DIR_FIXED
DOS File System VFAT Directory Handler	INCLUDE_DOSFS_DIR_VFAT
DOS File System Volume Formatter Module	INCLUDE_DOSFS_FMT
DOS filesystem backward-compatibility	INCLUDE_DOSFS
Dos FS BIO buffer size	INCLUDE_DOSFS_VOL_BIO_BUFFER_SIZE
Dos FS Show Routines	INCLUDE_DOSFS_SHOW
dosfs File System Main Module (dosFs2)	INCLUDE_DOSFS_MAIN
doubly linked lists	INCLUDE_DLL
ED&R shell commands	INCLUDE_EDR_SHELL_CMD
ED&R show routines	INCLUDE_EDR_SHOW
EHCI	INCLUDE_EHCI
EHCI Init	INCLUDE_EHCI_INIT
EHCI Start	INCLUDE_EHCI_BUS
enable caches	INCLUDE_CACHE_ENABLE
enable guard pages for kernel task stacks	INCLUDE_PROTECT_TASK_STACK
enable non-executable kernel task stacks	INCLUDE_TASK_STACK_NO_EXEC
END driver polled statistics support	INCLUDE_END_POLLED_STATS
END: common Enhanced Network Device support	INCLUDE_END_COMMON
END: END-style interface support	INCLUDE_END
error status table	INCLUDE_STAT_SYM_TBL
Ethernet Interface support	INCLUDE_IPCOM_USE_ETHERNET
Event Reporting Framework	INCLUDE_ERF
exception handling	INCLUDE_EXC_HANDLING
exception show routines	INCLUDE_EXC_SHOW
exception task	INCLUDE_EXC_TASK
Extended Block Device	INCLUDE_XBD
extended object library	INCLUDE_OBJ_OPEN
File System and Disk Utilities	INCLUDE_DISK_UTIL
File System Event Utilities	INCLUDE_FS_EVENT_UTIL
File System IO	INCLUDE_IO_FILE_SYSTEM
File System Monitor	INCLUDE_FS_MONITOR
file system shell commands	INCLUDE_DISK_UTIL_SHELL_CMD
file upload path initialization	INCLUDE_WVUPLOAD_FILE
floating point show routine	INCLUDE_HW_FP_SHOW
formatted IO	INCLUDE_FORMATTED_IO
formatted IO output routines	INCLUDE_FORMATTED_OUT_BASIC
fpp formatting for printf	INCLUDE_FLOATING_POINT
FTP Client Backend	INCLUDE_FTP
full featured memory allocator	INCLUDE_MEM_MGR_FULL
Generic PHY driver	INCLUDE_GENERICPHY
get name info	INCLUDE_GETNAMEINFO
get servce by name	INCLUDE_GETSERVBYNAME

Description	Name
get servce by port	INCLUDE_GETSERVBYPORT
gethostbyaddr wrapper	INCLUDE_IPWRAP_GETHOSTBYADDR
getnameinfo wrapper	INCLUDE_IPWRAP_GETNAMEINFO
getopt function	INCLUDE_GETOPT
getservbyname wrapper	INCLUDE_IPWRAP_GETSERVBYNAME
getservbyport wrapper	INCLUDE_IPWRAP_GETSERVBYPORT
Global configurations	INCLUDE_IPAIP_GLOBAL_CONFIGS
GNU compiler support routines	INCLUDE_GNU_INTRINSICS
GTF support	INCLUDE_GTF
gtf_timer_start	INCLUDE_GTF_TIMER_START
handle show routines	INCLUDE_HANDLE_SHOW
hardware fpp support	INCLUDE_HW_FP
hash library	INCLUDE_HASH
high resolution timestamping	INCLUDE_TIMESTAMP
Highly Reliable File System	INCLUDE_HRFS
host table	INCLUDE_HOST_TBL
host table sysctl support	INCLUDE_HOST_TBL_SYSCTL
Host/target breakpoint synchronization	INCLUDE_WDB_BP_SYNC
host/target modules and symbols synchronization	INCLUDE_WDB_MDL_SYM_SYNC
HRFS Default Write Mode	INCLUDE_HRFS_DEFAULT_WRITE_MODE
HRFS File System Consistency Checker	INCLUDE_HRFS_CHKDSK
HRFS Format	INCLUDE_HRFS_FORMAT
i8253 timer Driver	DRV_TIMER_I8253
ifconfig	INCLUDE_IFCONFIG
ifconfig wrapper	INCLUDE_IPWRAP_IFCONFIG
ifLib wrapper	INCLUDE_IPWRAP_IFLIB
ifShow wrapper	INCLUDE_IPWRAP_IFSHOW
Include Kernel Drivers(required for both kernel and RTP applications)	INCLUDE_WINDML
inetLib	INCLUDE_INETLIB
inetLib wrapper	INCLUDE_IPWRAP_INETLIB
Init pre-kernel memory allocation globally	INIT_HWMEMPOOL_GLOBAL
initialize system symbol table	INCLUDE_SYM_TBL_INIT
Intel ICH SATA Controller	INCLUDE_DRV_STORAGE_INTEL_ICH
Intel ICH SATA Controller Show Routines	INCLUDE_DRV_STORAGE_INTEL_ICH_SHOW
Intel PRO/1000 VxBus Enhanced Network Driver	INCLUDE_GEI825XX_VXB_END
Intel timestamp Driver	DRV_TIMER_IA_TIMESTAMP
Interface #1 configuration	INCLUDE_IPNET_IFCONFIG_1
IO system	INCLUDE_IO_SYSTEM
IPCOM arp commands	INCLUDE_IPARP_CMD
IPCOM ifconfig commands	INCLUDE_IPIFCONFIG_CMD
IPCOM ipd commands	INCLUDE_IPD_CMD
IPCOM netstat commands	INCLUDE_IPNETSTAT_CMD
IPCOM ping commands	INCLUDE_IPPING_CMD
IPCOM radius client commands	INCLUDE_IPRADIUS_CMD
IPCOM route commands	INCLUDE_IPROUTE_CMD
IPCOM shell command interface	INCLUDE_IPCOM_SHELL_CMD
IPCOM sysvar commands	INCLUDE_IPCOM_SYSVAR_CMD
IPNET	INCLUDE_IPNET
IPNet loopback configuration	INCLUDE_IPNET_LOOPBACK_CONFIG
IPNet Stack	INCLUDE_IPNET_STACK
IPNet sysctl integration	INCLUDE_IPNET_SYSCTL

Description	Name
ipProto wrapper	INCLUDE_IPWRAP_IPPROTO
IPv4	INCLUDE_IPCOM_USE_INET
IPv4 AutoIP	INCLUDE_IPAIP
IPv4 IGMP	INCLUDE_IPMCP_USE_IGMP
IPv4 Multicast routing	INCLUDE_IPNET_USE_MCAST_ROUTING
ISR deferral	INCLUDE_ISR_DEFER
Job Queue support	INCLUDE_JOB_QUEUE
job task	INCLUDE_JOB_TASK
kernel	INCLUDE_KERNEL
linkBufPool	INCLUDE_LINKBUFPOOL
linked list library	INCLUDE_LSTLIB
Loopback Inrerface support	INCLUDE_IPNET_USE_LOOPBACK
M_BLK ethernet/802.3 header build and parse	INCLUDE_END_ETHER_HDR
mapped files shell commands	INCLUDE_MAPPED_FILES_SHOW_SHELL_CMD
Mapping of device using shared data	INCLUDE_WINDML_GRAPHICS_SHARED_DATA
Mc146818 RTC Driver	DRV_TIMER_MC146818
memory allocator info routines	INCLUDE_MEM_MGR_INFO
memory show routine	INCLUDE_MEM_SHOW
message logging	INCLUDE_LOGGING
message queue creation and deletion libraly	INCLUDE_MSG_Q_CREATE_DELETE
message queue info routines	INCLUDE_MSG_Q_INFO
message queue show routine	INCLUDE_MSG_Q_SHOW
message queues	INCLUDE_MSG_Q
MIB2 ICMP Management APIs	INCLUDE_MIB2_ICMP
MIB2 IF Counter Instrumentation	INCLUDE_MIB2_IF
MIB2 TCP Management APIs	INCLUDE_MIB2_TCP
MIB2 UDP Management APIs	INCLUDE_MIB2_UDP
MII bus controller module	INCLUDE_MII_BUS
Miscellaneous IO	INCLUDE_IO_MISC
MMU global map	INCLUDE_MMU_GLOBAL_MAP
module manager	INCLUDE_MODULE_MANAGER
Multicast proxy	INCLUDE_IPMCP
mutex semaphore creation routine	INCLUDE_SEM_MUTEX_CREATE
mutex semaphores	INCLUDE_SEM_MUTEX
MUX common suppoprt (all service and device styles)	INCLUDE_MUX_COMMON
MUX mux TkBind() service	INCLUDE_MUXTK
MUX mux TkBind() service / END-style device	INCLUDE_MUXTK_OVER_END
MUX mux2Bind() service	INCLUDE_MUX2
MUX mux2Bind() service / END-style device	INCLUDE_MUX2_OVER_END
MUX muxBind() service	INCLUDE_MUX
MUX private support for M_BLK/Ipcom_pkt conversion	INCLUDE_VXMUX_MBLK
netBufLib	INCLUDE_NETBUFLIB
netBufLib show routines	INCLUDE_NETPOOLSHOW
netBufPool	INCLUDE_NETBUFPOOL
NetDrv for remote IO	INCLUDE_NET_DRV
netstat	INCLUDE_NETSTAT
netstat wrapper	INCLUDE_IPWRAP_NETSTAT
network boot device configuration	INCLUDE_NET_BOOT_CONFIG
Network Daemon Support	INCLUDE_NET_DAEMON
network device netmask setup	INCLUDE_NETMASK_GET
network init	INCLUDE_NET_INIT

Description	Name
network remote I/O access	INCLUDE_NET_REM_IO
Network Stack Memory Pool Configuration	INCLUDE_NET_POOL
NETWORK SYSCTL	INCLUDE_NET_SYSCTL
NFS client All	INCLUDE_NFS_CLIENT_ALL
NFS server	INCLUDE_CORE_NFS_SERVER
NFS server All	INCLUDE_NFS_SERVER_ALL
NFS server V2	INCLUDE_NFS2_SERVER
NFS server V3	INCLUDE_NFS3_SERVER
NFS v2 client	INCLUDE_NFS2_CLIENT
NFS v3 client	INCLUDE_NFS3_CLIENT
non-blocking message logging	INCLUDE_NBIO_LOG
nullBufPool	INCLUDE_VXMUX_NULLBUFPOOL
object information	INCLUDE_OBJ_INFO
object management	INCLUDE_OBJ_LIB
object management ownership	INCLUDE_OBJ_OWNERSHIP
object show routines	INCLUDE_OBJECT_SHOW
oldRouteLib wrapper	INCLUDE_IPWRAP_OLDROUTELIB
PCI Bus legacy Auto Configuration Routines	INCLUDE_PCI_OLD_CONFIG_ROUTINES
PCI Bus Show Routines	INCLUDE_PCI_BUS_SHOW
Pentium PCI host controller	INCLUDE_PENTIUM_PCI
Peripheral Component Interconnect Bus	INCLUDE_PCI_BUS
persistent error log	INCLUDE_EDR_ERRLOG
persistent memory	INCLUDE_EDR_PM
PING client	INCLUDE_PING
ping wrapper	INCLUDE_IPWRAP_PING
pipes	INCLUDE_PIPES
pool allocation library	INCLUDE_POOL
POSIX advisory file locking	INCLUDE_POSIX_ADVISORY_FILE_LOCKING
POSIX AIO driver	INCLUDE_POSIX_AIO_SYSDRV
POSIX asynchornous IO	INCLUDE_POSIX_AIO
POSIX clocks	INCLUDE_POSIX_CLOCKS
POSIX directory utilities	INCLUDE_POSIX_DIRLIB
POSIX ftruncate	INCLUDE_POSIX_FTRUNC
POSIX IO	INCLUDE_IO_POSIX
POSIX Memory Mapped Files	INCLUDE_POSIX_MAPPED_FILES
POSIX message queue show routine	INCLUDE_POSIX_MQ_SHOW
POSIX message queues	INCLUDE_POSIX_MQ
POSIX mman	INCLUDE_POSIX_MEM
POSIX process scheduling	INCLUDE_POSIX_SCHED
POSIX scheduling support including SCHED_SPORADIC policy in RTPs	INCLUDE_PX_SCHED_SPORADIC_POLICY
POSIX semaphore show routine	INCLUDE_POSIX_SEM_SHOW
POSIX semaphores	INCLUDE_POSIX_SEM
POSIX Shared Memory Objects	INCLUDE_POSIX_SHM
POSIX signals	INCLUDE_POSIX_SIGNALS
POSIX thread CPU-time clock	INCLUDE_POSIX_THREAD_CPUTIME
POSIX thread scheduler in RTPs	INCLUDE_POSIX_PTHREAD_SCHEDULER
POSIX threads	INCLUDE_POSIX_PTHREADS
Posix timer show component	INCLUDE_POSIX_TIMER_SHOW
POSIX timers	INCLUDE_POSIX_TIMERS
POSIX TRACE	INCLUDE_POSIX_TRACE
Pre-Kernel Memory Allocation	INCLUDE_HWMEM_ALLOC

Description	Name
process shell commands	INCLUDE_RTP_SHELL_CMD
process show shell commands	INCLUDE_RTP_SHOW_SHELL_CMD
Processor Local Bus	INCLUDE_PLB_BUS
ProxyARP	INCLUDE_IPPROXYARP
Pseudo terminal driver	INCLUDE_PTYDRV
public hostname setup	INCLUDE_NET_HOST_SETUP
Radius Authentication Support	INCLUDE_IPCOM_USE_AUTH_RADIUS
Radius client	INCLUDE_IPRADIUS
RAM Disk	INCLUDE_RAM_DISK
RAM disk driver	INCLUDE_RAMDRV
raw filesystem	INCLUDE_RAWFS
rBuff library	INCLUDE_RBUFF
rBuff show routine	INCLUDE_RBUFF_SHOW
read the bootline	INCLUDE_BOOT_LINE_INIT
reader/writer semaphore creation routine	INCLUDE_SEM_READ_WRITE_CREATE
reader/writer semaphores	INCLUDE_SEM_READ_WRITE
Remote Command	INCLUDE_REMLIB
Remote Command sysctl support	INCLUDE_REMLIB_SYSCTL
Removable IO	INCLUDE_IO_REMOVABLE
ring buffers	INCLUDE_RNG_BUF
RLOGIN/TELNET password protection	INCLUDE_SECURITY
routec	INCLUDE_ROUTECMD
routec wrapper	INCLUDE_IPWRAP_ROUTECMD
Routing socket support	INCLUDE_IPNET_USE_ROUTESOCK
RPC	INCLUDE_RPC
RTP	INCLUDE_RTP
RTP getnameinfo() sysctl support	INCLUDE_GETNAMEINFO_SYSCTL
RTP Hook Support	INCLUDE_RTP_HOOKS
RTP IO	INCLUDE_IO_RTP
RTP Show	INCLUDE_RTP_SHOW
RTP Startup Facility: User-defined code	INCLUDE_RTP_APPL_USER
run static initializers	INCLUDE_CTORS_DTORS
Run-time	INCLUDE_WINDML_ALL
SD Host Controller driver	DRV_STORAGE_SD
select	INCLUDE_SELECT
semaphore deletion routines	INCLUDE_SEM_DELETE
semaphore exchange routine	INCLUDE_SEM_EXCHANGE
semaphore info routines	INCLUDE_SEM_INFO
semaphore show routine	INCLUDE_SEM_SHOW
shared data region support in RTPs or kernel	INCLUDE_SHARED_DATA
Shared Data Show	INCLUDE_SHARED_DATA_SHOW
shared data show shell commands	INCLUDE_SHARED_DATA_SHOW_SHELL_CMD
shared library commands	INCLUDE_SHL_SHELL_CMD
Shared Library Show	INCLUDE_SHL_SHOW
shared library support in RTPs	INCLUDE_SHL
shell banner	INCLUDE_SHELL_BANNER
show routine component	INCLUDE_SHOW_ROUTINES
Show routines for memory mapped objects	INCLUDE_MAPPED_FILES_SHOW
sigevent notification library	INCLUDE_SIGEVENT
signals	INCLUDE_SIGNALS
Simple Marker	INCLUDE_IPNET_DS_SM

Description	Name
Single Rate Three Color Marker	INCLUDE_IPNET_DS_SRTCM
SIO	INCLUDE_SIO
Sio Channel Utilities	INCLUDE_SIO_UTILS
SNTP Client (API)	INCLUDE_IPSNTPC_API
SNTP Client (daemon)	INCLUDE_IPSNTPC
SNTP common configurations	INCLUDE_IPSNTP_COMMON
sntpcTimeGet wrapper	INCLUDE_IPWRAP_SNTPCTIMEGET
Socket API	INCLUDE_SOCKLIB
Socket API System Call support	INCLUDE_SC_SOCKLIB
Socket backend	INCLUDE_IPNET_USE_SOCK_COMPAT
Socket support	INCLUDE_IPNET_SOCKET
spinLock	INCLUDE_SPINLOCK
spy	INCLUDE_SPY
Stack/Application Logging Utility	INCLUDE_APPL_LOG_UTIL
stdio	INCLUDE_STDIO
stdio show routine	INCLUDE_STDIO_SHOW
Support for reboot hooks	INCLUDE_REBOOT_HOOKS
symbol shell commands	INCLUDE_SYM_SHELL_CMD
symbol table show routine	INCLUDE_SYM_TBL_SHOW
SYSCTL	INCLUDE_SYSCTL
SYSCTL CLI	INCLUDE_SYSCTL_CLI
sysctl System Call	INCLUDE_SC_SYSCTL
System Call Hook Support	INCLUDE_SYSCALL_HOOKS
System clock	INCLUDE_SYSCLK_INIT
system debug flag	INCLUDE_EDR_SYSDBG_FLAG
System Viewer class instrumentation	INCLUDE_WINDVIEW_CLASS
System Viewer library	INCLUDE_WINDVIEW
system-defined timestamping	INCLUDE_SYS_TIMESTAMP
target loader	INCLUDE_LOADER
target loader shell command	INCLUDE_MODULE_SHELL_CMD
target symbol table	INCLUDE_SYM_TBL
target unloader	INCLUDE_UNLOADER
target-resident kernel shell	INCLUDE_SHELL
task create hooks	INCLUDE_TASK_CREATE_HOOKS
task hook show routine	INCLUDE_TASK_HOOKS_SHOW
task hooks	INCLUDE_TASK_HOOKS
task info routines	INCLUDE_TASK_INFO
task list management	INCLUDE_TASK_LIST
task shell commands	INCLUDE_TASK_SHELL_CMD
task show routine	INCLUDE_TASK_SHOW
task switch hooks	INCLUDE_TASK_SWITCH_HOOKS
task variables	INCLUDE_TASK_VARS
TCP	INCLUDE_IPTCP
TELNET Server	INCLUDE_IPTELNETS
terminal driver	INCLUDE_TTY_DEV
terminal driver support	INCLUDE_TYLIB
TFTP Client	INCLUDE_IPTFTPC
TFTP Client APIs	INCLUDE_TFTP_CLIENT
TFTP common configurations	INCLUDE_IPTFTP_COMMON
Thermal Monitor and Geyserville III suppport	INCLUDE_THERM_MONITOR
timex	INCLUDE_TIMEX

Description	Name
tip serial line connection utility	INCLUDE_TIP
TSFS upload path initialization	INCLUDE_WVUPLOAD_TSFSSOCK
Tunnel Interface suport	INCLUDE_IPNET_USE_TUNNEL
UART support for ns16550-compatible devices	DRV_SIO_NS16550
unix compatible environment variables	INCLUDE_ENV_VARS
unloader shell command	INCLUDE_UNLOADER_SHELL_CMD
USB GEN2 Helper Init	INCLUDE_USB_GEN2_HELPER
USB GEN2 Keyboard	INCLUDE_USB_GEN2_KEYBOARD
USB GEN2 Keyboard Init	INCLUDE_USB_GEN2_KEYBOARD_INIT
USB GEN2 Mass Storage	INCLUDE_USB_GEN2_STORAGE
USB GEN2 Mass Storage Init	INCLUDE_USB_GEN2_STORAGE_INIT
USB GEN2 Mouse	INCLUDE_USB_GEN2_MOUSE
USB GEN2 Mouse Init	INCLUDE_USB_GEN2_MOUSE_INIT
USB GEN2 TouchPanel	INCLUDE_USB_GEN2_TOUCHPANEL
USB GEN2 TouchPanel Init	INCLUDE_USB_GEN2_TOUCHPANEL_INIT
USB Host Stack	INCLUDE_USB
USB Host Stack Init	INCLUDE_USB_INIT
Use Authentication	INCLUDE_IPCOM_USE_AUTH
vi-like editing mode	INCLUDE_SHELL_VI_MODE
VIO driver	INCLUDE_WDB_VIO
virtual memory show shell commands	INCLUDE_VM_SHOW_SHELL_CMD
Virtual Root File System	INCLUDE_VRFS
VLAN Pseudo Interface support	INCLUDE_IPNET_USE_VLAN
VM library show routine	INCLUDE_VM_SHOW
vxBus Aux Clk Support	INCLUDE_VXB_AUX_CLK
VxBus Device Table	VXBUS_TABLE_CONFIG
vxBus Driver DMA System	INCLUDE_DMA_SYS
vxBus Driver Parameter System	INCLUDE_PARAM_SYS
vxBus subsystem	INCLUDE_VXBUS
vxBus subsystem show routines	INCLUDE_VXBUS_SHOW
vxBus Sys Clk Support	INCLUDE_VXB_SYS_CLK
vxBus Timer Support	INCLUDE_TIMER_SYS
vxBus Timestamp Support	INCLUDE_VXB_TIMESTAMP
vxMemProbe initializer for exception handler suport	INCLUDE_VXMEMPROBE_INIT
VxWorks events	INCLUDE_VXEVENTS
VxWorks IPCOM	INCLUDE_IPCOM
watchdog timer show routine	INCLUDE_WATCHDOGS_SHOW
watchdog timers	INCLUDE_WATCHDOGS
watchdog timers creation and deletion library	INCLUDE_WATCHDOGS_CREATE_DELETE
WDB agent	INCLUDE_WDB
WDB banner	INCLUDE_WDB_BANNER
WDB breakpoints	INCLUDE_WDB_BP
WDB call functions	INCLUDE_WDB_FUNC_CALL
WDB callouts	INCLUDE_WDB_DIRECT_CALL
WDB dynamic printf	INCLUDE_WDB_DPRINTF
WDB eventpoints	INCLUDE_WDB_EVENTPOINTS
WDB events	INCLUDE_WDB_EVENTS
WDB exception notification	INCLUDE_WDB_EXC_NOTIFY
WDB gopher	INCLUDE_WDB_GOPHER
WDB memory access	INCLUDE_WDB_MEM
WDB network connection	INCLUDE_WDB_COMM_NETWORK

Description	Name
WDB post kernel initialization	INCLUDE_WDB_POST_KERNEL_INIT
WDB register access	INCLUDE_WDB_REG
WDB RTP breakpoints	INCLUDE_WDB_RTP_BP
WDB RTP control support	INCLUDE_WDB_RTP_CONTROL
WDB RTP support	INCLUDE_WDB_RTP
WDB target server file system	INCLUDE_WDB_TSFS
WDB task breakpoints	INCLUDE_WDB_TASK_BP
WDB task creation	INCLUDE_WDB_START_NOTIFY
WDB task debugging	INCLUDE_WDB_TASK
WDB task exit notification	INCLUDE_WDB_EXIT_NOTIFY
WDB task hooks	INCLUDE_WDB_TASK_HOOKS
WDB task registers	INCLUDE_WDB_TASK_REG
WDB tasks	INCLUDE_WDB_CTXT
WDB user event	INCLUDE_WDB_USER_EVENT
WDB virtual I/O library	INCLUDE_WDB_VIO_LIB
WDT task exit notification	INCLUDE_WDB_EXIT_NOTIFY
write-protect program text	INCLUDE_PROTECT_TEXT
XBD Block Device	INCLUDE_XBD_BLK_DEV
XBD Disk Patition Handler	INCLUDE_XBD_PART_LIB
XBD Ram Drive	INCLUDE_XBD_RAMDRV
XDR	INCLUDE_XDR

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Description	Name
Address Space Allocator Show Routines	INCLUDE_ADR_SPACE_SHOW
address space shell commands	INCLUDE_ADR_SPACE_SHELL_CMD
ANSI assert	INCLUDE_ANSI_ASSERT
ANSI ctype	INCLUDE_ANSI_CTYPE
ANSI errno to erro string conversion function	INCLUDE_ANSI_STRERROR
ANSI locale	INCLUDE_ANSI_LOCALE
ANSI math	INCLUDE_ANSI_MATH
ANSI stdio	INCLUDE_ANSI_STDIO
ANSI stdio extensions	INCLUDE_ANSI_STDIO_EXTRA
ANSI stdlib	INCLUDE_ANSI_STDLIB
ANSI string	INCLUDE_ANSI_STRING
ANSI string duplication function	INCLUDE_ANSI_STRDUP
ANSI time	INCLUDE_ANSI_TIME
application initialization	INCLUDE_USER_APPL
Application Interface	INCLUDE_CCI_COREAPI
arpLib	INCLUDE_ARP_API
Attach END to IPv4	INCLUDE_IPATTACH
AUX clock	INCLUDE_AUX_CLK
basic memory allocator	INCLUDE_MEM_MGR_BASIC
basic MMU	INCLUDE_MMU_BASIC
basic network support	INCLUDE_NETWORK
Basic PPP Components	INCLUDE_BASIC_PPP
binary semaphore creation routine	INCLUDE_SEM_BINARY_CREATE
binary semaphores	INCLUDE_SEM_BINARY
Boot parameter process	INCLUDE_NET_BOOT
BPF Support	INCLUDE_BPF
BSD socket support	INCLUDE_BSD_SOCKET
BSP Memory Configuration	INCLUDE_MEMORY_CONFIG
buffer manager	INCLUDE_BUF_MGR
builti-in symbol table	INCLUDE_STANDALONE_SYM_TBL
c line interpreter	INCLUDE_SHELL_INTERP_C
C++ symbol demangler	INCLUDE_CPLUS_DEMANGLER
C++ compiler support routines	INCLUDE_CPLUS_LANG
C++ core runtime	INCLUDE_CPLUS
C++ iostream and other standard library facilities	INCLUDE_CPLUS_IOSTREAM
cache support	INCLUDE_CACHE_SUPPORT
CIPHER-AES - Advanced Encryption Standard	INCLUDE_CCI_IMPORT_AES
CIPHER-DES/3DES/DESX - Data Encryption Encryption	INCLUDE_CCI_IMPORT_DES
CIPHER-NULL - Encryption	INCLUDE_CCI_IMPORT_NULL
CIPHER-RC4 - RC4 Encryption	INCLUDE_CCI_IMPORT_RC4
CIPHER-RC4TKIP - Wireless Temporal Key Integrity Protocol	INCLUDE_CCI_IMPORT_RC4TKIP
command line interpreter	INCLUDE_SHELL_INTERP_CMD
coprocessor	INCLUDE_COPROCESSOR
coprocessor show routine	INCLUDE_COPROCESSOR_SHOW
Core NFS client	INCLUDE_CORE_NFS_CLIENT
counting semaphore creation routine	INCLUDE_SEM_COUNTING_CREATE
counting semaphores	INCLUDE_SEM_COUNTING

Description	Name
Create Basic PPP Framework	INCLUDE_PPP_FRAMEWORK
debug shell commands	INCLUDE_DEBUG_SHELL_CMD
debugging facilities	INCLUDE_DEBUG
Default (Software)	INCLUDE_CCI_DEFAULT_PROVIDER
Device Manager	INCLUDE_DEVICE_MANAGER
DHCP client show routines	INCLUDE_DHCPC_SHOW
DHCP client taimestamp setup	INCLUDE_DHCPC_LEASE_GET
DHCP Core files	INCLUDE_DHCP_CORE
DHCPv4 boot-time client	INCLUDE_DHCPC_BOOT
DHCPv4 client common library	INCLUDE_DHCPC_SHARE
DHCPv4 Client Lease Verification/Assignment	INCLUDE_DHCPC_LEASE_TEST
DHCPv4 client timestamp storage	INCLUDE_DHCPC_LEASE_SAVE
DHCPv4 runtime client	INCLUDE_DHCPC
DNS resolver	INCLUDE_DNS_RESOLVER
DNS resolver debug output	INCLUDE_DNS_RESOLVER_DEBUG
DOS File System Consistency Checker	INCLUDE_DOSFS_CHKDSK
DOS File System FAT12/16/32 Handler	INCLUDE_DOSFS_FAT
DOS File System Old Directory Format Handler	INCLUDE_DOSFS_DIR_FIXED
DOS File System VFAT Directory Handler	INCLUDE_DOSFS_DIR_VFAT
DOS File System Volume Fomatter Module	INCLUDE_DOSFS_FMT
DOS filesystem backward-compatibility	INCLUDE_DOSFS
dosfs File System Main Module (dosFs2)	INCLUDE_DOSFS_MAIN
doubly linked lists	INCLUDE_DLL
ED&R shell commands	INCLUDE_EDR_SHELL_CMD
ED&R show routines	INCLUDE_EDR_SHOW
enable caches	INCLUDE_CACHE_ENABLE
enable guard pages for kernel task stacks	INCLUDE_PROTECT_TASK_STACK
enable non-executable kernel task stacks	INCLUDE_TASK_STACK_NO_EXEC
END driver polled statistics support	INCLUDE_END_POLLED_STATS
END interface support	INCLUDE_END
error status table	INCLUDE_STAT_SYM_TBL
Ethernet interface support	INCLUDE_ETHERNET
Event Reporting Framework	INCLUDE_ERF
exception handling	INCLUDE_EXC_HANDLING
exception show routines	INCLUDE_EXC_SHOW
exception task	INCLUDE_EXC_TASK
Extended Block Device	INCLUDE_XBD
extended object library	INCLUDE_OBJ_OPEN
File System and Disk Utilities	INCLUDE_DISK_UTIL
File System Event Utilities	INCLUDE_FS_EVNET_UTIL
File System Monitor	INCLUDE_FS_MONITOR
file system shell commands	INCLUDE_DISK_UTIL_SHELL_CMD
file upload path initialization	INCLUDE_WVUPLOAD_FILE
Firewall IP Filter*1	INCLUDE_FIREWALL_IP_FILTER
floating point show routine	INCLUDE_WH_FP_SHOW
formatted IO	INCLUDE_FORMATTED_IO
formatted output routines	INCLUDE_FORMATTED_OUT_BASIC
fpp formatting for printf	INCLUDE_FLOATING_POINT
FTP client	INCLUDE_FTP
full featured memory allocator	INCLUDE_MEM_MGR_FULL
General BSP macros	INCLUDE_BSP_MACROS

Description	Name
get name info	INCLUDE_GETNAMEINFO
get serv by name	INCLUDE_GETSERVBYNAME
GNU compiler support routines	INCLUDE_GNU_INTRINSICS
GTF support	INCLUDE_GTF
gtf_timer_start	INCLUDE_GTF_TIMER_START
handle show routines	INCLUDE_HANDLE_SHOW
hardware fpp support	INCLUDE_HW_FP
hash library	INCLUDE_HASH
HASH-CRC32 - Authentication	INCLUDE_CCI_IMPORT_HASH_CRC32
HASH-MD2 - Authentication	INCLUDE_CCI_IMPORT_HASH_MD2
HASH-MD4 - Authentication	INCLUDE_CCI_IMPORT_HASH_MD4
HASH-MD5 - Authentication	INCLUDE_CCI_IMPORT_HASH_MD5
HASH-RIP128 - Authentication	INCLUDE_CCI_IMPORT_HASH_RIP128
HASH-RIP160 - Authentication	INCLUDE_CCI_IMPORT_HASH_RIP160
HASH-SHA1 - Authentication	INCLUDE_CCI_IMPORT_HASH_SHA1
HASH-SHA224 - Authentication	INCLUDE_CCI_IMPORT_HASH_SHA224
HASH-SHA256 - Authentication	INCLUDE_CCI_IMPORT_HASH_SHA256
HASH-SHA384 - Authentication	INCLUDE_CCI_IMPORT_HASH_SHA384
HASH-SHA512 - Authentication	INCLUDE_CCI_IMPORT_HASH_SHA512
high resolution timestamping	INCLUDE_TIMESTAMP
Highly Reliable File System	INCLUDE_HRFS
HMAC-AESXCBC - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_AESXCBC
HMAC-MD4 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_MD4
HMAC-MD5 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_MD5
HMAC-RIP128 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_RIP128
HMAC-RIP160 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_RIP160
HMAC-SHA1 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_SHA1
HMAC-SHA224 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_SHA224
HMAC-SHA256 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_SHA256
HMAC-SHA384 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_SHA384
HMAC-SHA512 - Authentication using key	INCLUDE_CCI_IMPORT_HMAC_SHA512
host table	INCLUDE_HOST_TBL
Host/target breakpoint synchronization	INCLUDE_WDB_BP_SYNC
host/target modules and symbols synchronization	INCLUDE_WDB_MDL_SYM_SYNC
HRFS File System Consistency Checker	INCLUDE_HRFS_CHKDSK
HRFS Format	INCLUDE_HRFS_FORMAT
ICMP show routines	INCLUDE_ICMP_SHOW
ICMP v4	INCLUDE_ICMPV4
IF	INCLUDE_IF
ifIndex Initialization	INCLUDE_IFINDEX
IGMP v2/v3	INCLUDE_IGMP
Include Protocol Framework	INCLUDE_PROTOCOL_FRAMEWORK
inetLib	INCLUDE_INETLIB
initialize system symbol table	INCLUDE_SYM_TBL_INIT
INTEGER - Precision Math Operations	INCLUDE_CCI_IMPORT_INTEGER
IO system	INCLUDE_IO_SYSTEM
IP v4	INCLUDE_IPV4
IPSEC - Single Pass Encryption/Authentication	INCLUDE_CCI_IMPORT_IPSEC_SINGLEPASS
IPv4 interface address library	INCLUDE_IFLIB
Job Queue support	INCLUDE_JOB_QUEUE
job task	INCLUDE_JOB_TASK

Description	Name
kernel	INCLUDE_KERNEL
KEYWRAP - AES - Keywrap Algorithm	INCLUDE_CCI_IMPORT_AESKW
link BufPool	INCLUDE_LINKBUFPOOL
linked list library	INCLUDE_LSTLIB
logical set library	INCLUDE_SET
loopback interface support	INCLUDE_LOOPBACK
mapped files shell commands	INCLUDE_MAPPED_FILES_SHOW_SHELL_CMD
md5	INCLUDE_NET_MD5
memory allocator info routines	INCLUDE_MEM_MGR_INFO
memory show routine	INCLUDE_MEM_SHOW
message logging	INCLUDE_LOGGING
message queue creation and deletion library	INCLUDE_MESSAGE_Q_CREATE_DELETE
message queue info routines	INCLUDE_MESSAGE_Q_INFO
message queue show routine	INCLUDE_MSG_Q_SHOW
message queues	INCLUDE_MESSAGE_Q
MIB2 ICMP Management APIs	INCLUDE_MIB2_ICMP
MIB2 IF Counter Instrumentation	INCLUDE_MIB2_IF
MIB2 TCP Management APIs	INCLUDE_MIB2_TCP
MIB2 UDP Management APIs	INCLUDE_MIB2_UDP
MMU global map	INCLUDE_MMU_GLOBAL_MAP
module manager	INCLUDE_MODULE_MANAGER
mutex semaphore creation routine	INCLUDE_SEM_MUTEX_CREATE
mutex semaphores	INCLUDE_SEM_MUTEX
MUX support	INCLUDE_MUX
netBufLib	INCLUDE_NETBUFLIB
netBufPool	INCLUDE_NETBUFPOOL
NetDrv for remote IO	INCLUDE_NET_DRV
netstat	INCLUDE_NETSTAT
netstat for IPv4	INCLUDE_NETSTAT_IPV4
network boot device configuration	INCLUDE_NET_BOOT_CONFIG
Network Daemon Support	INCLUDE_NET_DAEMON
network device netmask setup	INCLUDE_NETMASK_GET
Network function binding	INCLUDE_NET_FUNCBIND
network init	INCLUDE_NET_INIT
Network interface show routines	INCLUDE_NET_IF_SHOW
network remote I/O access	INCLUDE_NET_REM_IO
Network route show routines	INCLUDE_NET_ROUTE_SHOW
Network route show snprintf buffering	INCLUDE_NET_ROUTE_SHOW_SNPRINTF
Network Stack Memory Pool Configuration	INCLUDE_NET_POOL
NETWORK SYSCTL	INCLUDE_NET_SYSCTL
NFS client All	INCLUDE_NFS_CLIENT_ALL
NFS server	INCLUDE_CORE_NFS_SERVER
NFS server All	INCLUDE_NFS_SERVER_ALL
NFS server V2	INCLUDE_NFS2_SERVER
NFS server V3	INCLUDE_NFS3_SERVER
NFS v2 client	INCLUDE_NFS2_CLIENT
NFS v3 client	INCLUDE_NFS3_CLIENT
non-blocking message logging	INCLUDE_NBIO_LOG
object management	INCLUDE_OBJ_LIB
object management ownership	INCLUDE_OBJ_OWNERSHIP
old route	INCLUDE_OLDROUTE

Description	Name
persistent error log	INCLUDE_EDR_ERRLOG
persistent memory	INCLUDE_EDR_PM
PING client	INCLUDE_PING
pipes	INCLUDE_PIPES
PKI - RSA - Public Key Encryption	INCLUDE_CCI_IMPORT_PUBLICKEY_RSA
pool allocation library	INCLUDE_POOL
POSIX advisory file locking	INCLUDE_POSIX_ADVISORY_FILE_LOCKING
POSIX AIO driver	INCLUDE_POSIX_AIO_SYSDRV
POSIX asynchoronous IO	INCLUDE_POSIX_AIO
POSIX clocks	INCLUDE_POSIX_CLOCKS
POSIX directory utilities	INCLUDE_POSIX_DIRLIB
POSIX ftruncate	INCLUDE_POSIX_FTRUNC
POSIX Memory Mapped Files for RTPs	INCLUDE_POSIX_MAPPED_FILES
POSIX message queue show routine	INCLUDE_POSIX_MQ_SHOW
POSIX message queues	INCLUDE_POSIX_MQ
POSIX mman	INCLUDE_POSIX_MEM
POSIX process scheduling	INCLUDE_POSIX_SCHED
POSIX PSE52 support for RTPs	INCLUDE_RTP_POSIX_PSE52
POSIX scheduling policies SCHED_FIFO/SCHED_RR/SCHED_OTHER support in RTPs	INCLUDE_PX_SCHED_DEF_PLICIES
POSIX semaphore	INCLUDE_POSIX_SEM
POSIX semaphore show routine	INCLUDE_POSIX_SEM_SHOW
POSIX Shared Memory Objects	INCLUDE_POSIX_SHM
POSIX signal	INCLUDE_POSIX_SIGNALS
POSIX thread CPU-time clock	INCLUDE_POSIX_THREAD_CPUTIME
POSIX thread scheduler in RTPs	INCLUDE_POSIX_PTHREAD_SCHEDULER
POSIX threads	INCLUDE_POSIX_PTHREADS
POSIX timers	INCLUDE_POSIX_TIMERS
PRNG - Pseudo Random Number Generation	INCLUDE_CCI_IMPORT_PRNG
process shell commands	INCLUDE_RTP_SHELL_CMD
process show shell commands	INCLUDE_RTP_SHOW_SHELL_CMD
Pseudo terminal driver	INCLUDE_PTYDRV
public hostname setup	INCLUDE_NET_HOST_SETUP
RAM Disk	INCLUDE_RAM_DISK
RAM disk driver	INCLUDE_RAMDRV
random	INCLUDE_KERN_RANDOM
raw filesystem	INCLUDE_RAWFS
RAW v4	INCLUDE_RAWV4
rBuff library	INCLUDE_RBUFF
read the bootline	INCLUDE_BOOT_LINE_INIT
Remote Command	INCLUDE_REMLIB
Reverse ARP client	INCLUDE_RARP
ring buffers	INCLUDE_RING_BUF
route	INCLUDE_ROUTE
route_storage	INCLUDE_ROUTE_STORAGE
Routing Socket	INCLUDE_ROUTING_SOCKET
RPC	INCLUDE_RPC
RTP	INCLUDE_RTP
RTP Hook Support	INCLUDE_RTP_HOOKS
RTP Show	INCLUDE_RTP_SHOW
RTP Startup Facility: User-defined code	INCLUDE_RTP_APPL_USER

Description	Name
run static initializers	INCLUDE_CTORS_DTORS
select	INCLUDE_SELECT
semaphore deletion routines	INCLUDE_SEM_DELETE
semaphore info routines	INCLUDE_SEM_INFO
semaphore show routine	INCLUDE_SEM_SHOW
SH-4A 32-Bit Address Extended Mode	INCLUDE_SH4A_EXTENDED_32BIT_SUPPORT
shared data region support in RTPs or kernel	INCLUDE_SHARED_DATA
Shared Data Show	INCLUDE_SHARE_DATA_SHOW
shared data show shell commands	INCLUDE_SHARED_DATA_SHOW_SHELL_CMD
shared library commands	INCLUDE_SHL_SHELL_CMD
Shared Library Show	INCLUDE_SHL_SHOW
shared library support in RTPs	INCLUDE_SHL
shell banner	INCLUDE_SHELL_BANNER
Show routines for memory mapped objects	INCLUDE_MAPPED_FILES_SHOW
sigevent notification library	INCLUDE_SIGEVENT
signals	INCLUDE_SIGNALS
SIO	INCLUDE_SIO
SNTP client	INCLUDE_SNTPC
Socket API	INCLUDE_SOCKLIB
Socket API System Call support	INCLUDE_SC_SOCKLIB
spy	INCLUDE_SPY
Stack/Application Logging Utility	INCLUDE_APPL_LOG_UTIL
stdio	INCLUDE_STDIO
stricmp	INCLUDE_STRICMP
strnicmp	INCLUDE_STRNICMP
Support for reboot hooks	INCLUDE_REBOOT_HOOKS
symbol shell commands	INCLUDE_SYM_SHELL_CMD
symbol table show routine	INCLUDE_SYM_TBL_SHOW
SYSCTL	INCLUDE_SYSCTL
SYSCTL CLI	INCLUDE_SYSCTL_CLI
sysctl System Call	INCLUDE_SC_SYSCTL
System Call Hook Support	INCLUDE_SYSCALL_HOOKS
System clock	INCLUDE_SYSCLK_INIT
system debug flag	INCLUDE_EDR_SYSDBG_FLAG
System Viewer class instrumentation	INCLUDE_WINDVIEW_CLASS
System Viewer library	INCLUDE_WINDVIEW
system-defined timestamping	INCLUDE_SYS_TIMESTAMP
target loader	INCLUDE_LOADER
target loader shell command	INCLUDE_MODULE_SHELL_CMD
target symbol table	INCLUDE_SYM_TBL
target unloader	INCLUDE_UNLOADER
target-resident kernel shell	INCLUDE_SHELL
task hook show routine	INCLUDE_TASK_HOOKS_SHOW
task hooks	INCLUDE_TASK_HOOKS
task shell commands	INCLUDE_TASK_SHELL_CMD
task show routine	INCLUDE_TASK_SHOW
task variables	INCLUDE_TASK_VARS
TCP v4	INCLUDE_TCPV4
Telnet server	INCLUDE_TELNET
TELNET/FTP password protection	INCLUDE_SECURITY
terminal driver	INCLUDE_TTY_DEV

Description	Name
terminal driver support	INCLUDE_TYLIB
TFTP client	INCLUDE_TFTP_CLIENT
timex	INCLUDE_TIMEX
TSFS upload path initialization	INCLUDE_WVUPLOAD_TSFSSOCK
UDP v4	INCLUDE_UDPV4
uipc_domain	INCLUDE_DOMAIN_INIT
unix compatible environment variables	INCLUDE_ENV_VARS
unloader shell command	INCLUDE_UNLOADER_SHELL_CMD
vi-like editing mode	INCLUDE_SHELL_VI_MODE
VIO driver	INCLUDE_WDB_VIO
virtual memory show shell commands	INCLUDE_VM_SHOW_SHELL_CMD
Virtual Root File Sytem	INCLUDE_VRFS
VM library show routine	INCLUDE_VM_SHOW
VxWorks events	INCLUDE_VXEVENTS
watchdog timers	INCLUDE_WATCHDOGS
watchdog timers creation and deletion library	INCLUDE_WATCHDOGS_CREATE_DELETE
WDB agent	INCLUDE_WDB
WDB banner	INCLUDE_WDB_BANNER
WDB breakpoints	INCLUDE_WDB_BP
WDB call functions	INCLUDE_WDB_FUNC_CALL
WDB callouts	INCLUDE_WDB_DIRECT_CALL
WDB eventpoints	INCLUDE_WDB_EVENTPOINTS
WDB events	INCLUDE_WDB_EVENTS
WDB exception notification	INCLUDE_WDB_EXC_NOTIFY
WDB gopher	INCLUDE_WDB_GOPHER
WDB memory access	INCLUDE_WDB_MEM
WDB network connection	INCLUDE_WDB_COMM_NETWORK
WDB post kernel initialization	INCLUDE_WDB_POST_KERNEL_INIT
WDB register access	INCLUDE_WDB_REG
WDB RTP breakpoints	INCLUDE_WDB_RTP_BP
WDB RTP control support	INCLUDE_WDB_RTP_CONTROL
WDB RTP support	INCLUDE_WDB_RTP
WDB target server file system	INCLUDE_WDB_TSFS
WDB task breakpoints	INCLUDE_WDB_TASK_BP
WDB task creation	INCLUDE_WDB_START_NOTIFY
WDB task debugging	INCLUDE_WDB_TASK
WDB task exit notification	INCLUDE_WDB_EXIT_NOTIFY
WDB task hooks	INCLUDE_WDB_TASK_HOOKS
WDB task registers	INCLUDE_WDB_TASK_REG
WDB tasks	INCLUDE_WDB_CTXT
WDB user event	INCLUDE_WDB_USER_EVENT
WDB virtual I/O library	INCLUDE_WDB_VIO_LIB
XBD Block Device	INCLUDE_XBD_BLK_DEV
XBD Disk Partition Handler	INCLUDE_XBD_PART_LIB
XBD Ram Drive	INCLUDE_XBD_RAMDRV
XDR	INCLUDE_XDR

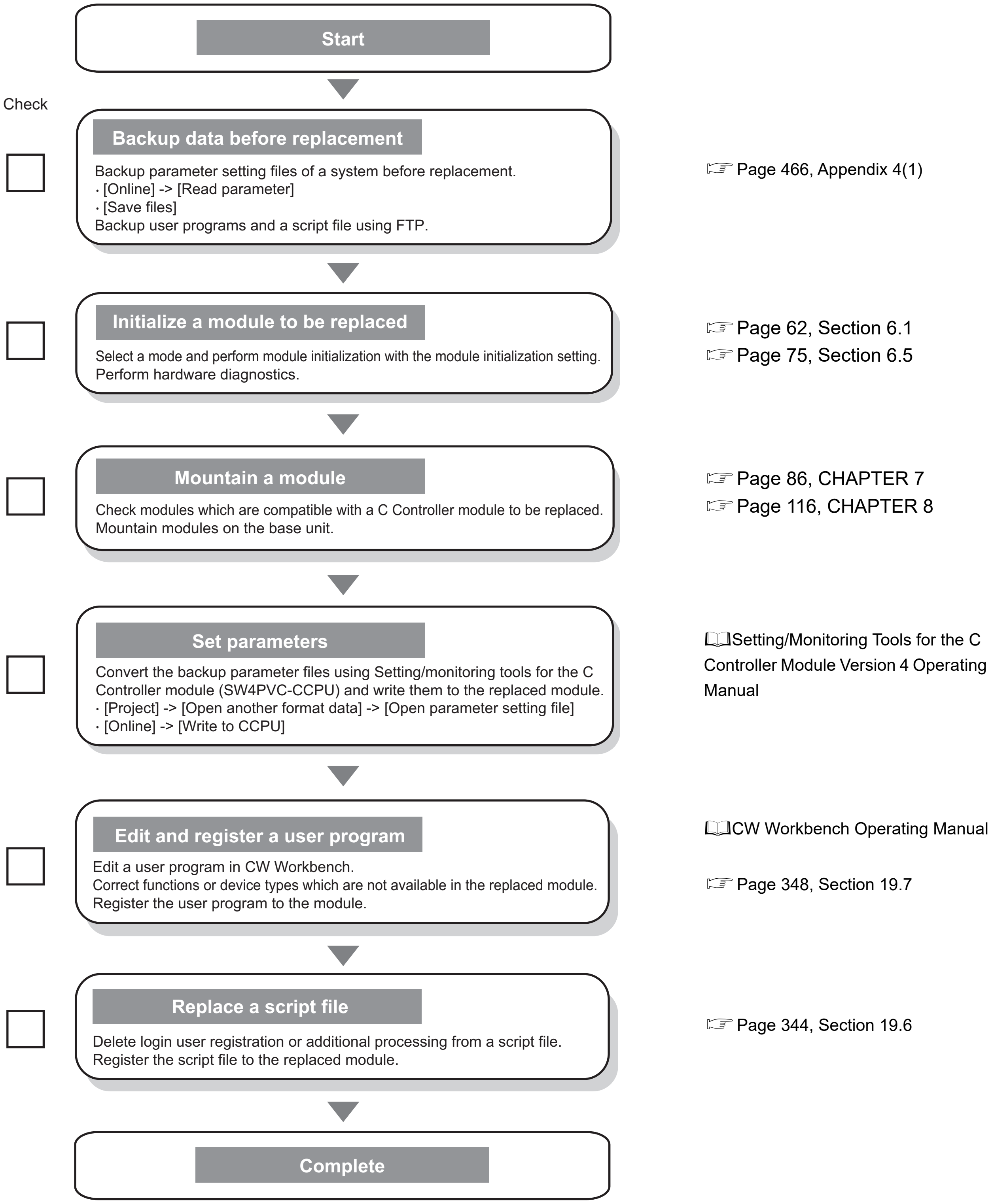
*1 : Not available for the following C Controller module.

- Q12DCCPU-V with serial number (first five digits) "19102" or earlier

Appendix 4 Replacement of an Existing Product

This section explains the method for replacing the following products.

- Q06CCPU-V → Q12DCCPU-V (Extended mode)
- Q12DCCPU-V (Basic mode) → Q12DCCPU-V (Extended mode)
- Q12DCCPU-V (Basic mode) → Q24DHCCPU-V/-VG



Start

Check

□ **Backup data before replacement**

Backup parameter setting files of a system before replacement.
· [Online] -> [Read parameter]
· [Save files]
Backup user programs and a script file using FTP.

☞ Page 466, Appendix 4(1)

□ **Initialize a module to be replaced**

Select a mode and perform module initialization with the module initialization setting.
Perform hardware diagnostics.

☞ Page 62, Section 6.1
☞ Page 75, Section 6.5

□ **Mountain a module**

Check modules which are compatible with a C Controller module to be replaced.
Mountain modules on the base unit.

☞ Page 86, CHAPTER 7
☞ Page 116, CHAPTER 8

□ **Set parameters**

Convert the backup parameter files using Setting/monitoring tools for the C Controller module (SW4PVC-CCPU) and write them to the replaced module.
· [Project] -> [Open another format data] -> [Open parameter setting file]
· [Online] -> [Write to CCPU]

📖Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

□ **Edit and register a user program**

Edit a user program in CW Workbench.
Correct functions or device types which are not available in the replaced module.
Register the user program to the module.

📖CW Workbench Operating Manual

☞ Page 348, Section 19.7

□ **Replace a script file**

Delete login user registration or additional processing from a script file.
Register the script file to the replaced module.

☞ Page 344, Section 19.6

Complete

Point

Thorough review and verification is needed after replacement.

(1) Data backup before replacement

Back up parameter setting files, user programs, and a script file of a C Controller module before replacement.

(a) Backup parameter setting files

Read parameters of a C Controller module to be replaced using Setting/monitoring tools for the C Controller module (SW3PVC-CCPU) and save them.

When using a network module, save utility parameters for each network as well.

📖C Controller Module User's Manual (Utility Operation, Programming)

(b) Backup user programs and a script file

Read files in the target memory using FTP from a development environment (a personal computer).

📖C Controller Module User's Manual (Hardware Design, Function Explanation)

(2) Initializing a module to be replaced

Initialize a C Controller module to be replaced.

☞ Page 62, Section 6.1

Check the hardware status of the C Controller module using the hardware diagnostics function.

☞ Page 75, Section 6.5

(3) Mounting modules

Check modules which are compatible with a C Controller module to be replaced.

☞ Page 86, CHAPTER 7

Mount the modules.

☞ Page 116, CHAPTER 8

(4) Parameter replacement

The following indicates the procedure to replace parameters.

1. **Use Setting/monitoring tools for the C Controller module (SW4PVC-CCPU) to read the parameter created by Setting/monitoring tools for the C Controller module (SW3PVC-CCPU).**
2. **Use Setting/monitoring tools for the C Controller module (SW4PVC-CCPU) to write the parameter into the replaced module.**

Point

Use the following function of Setting/monitoring tools for the C Controller module (SW4PVC-CCPU) to read the parameter of Setting/monitoring tools for the C Controller module (SW3PVC-CCPU)

- [Project] ⇒ [Open another format data] ⇒ [Open parameter setting file...]

For details, refer to the following manual.

📖 Setting/Monitoring Tools for the C Controller Module Version 4 Operating Manual

(5) User program replacement

The following indicates the procedure to replace a user program.

For procedures to create a user program and write it to a C Controller module, refer to the following:

☞Page 337, Section 19.2

📖CW Workbench Operating Manual

Before debugging the user program, ensure that a VxWorks image file of the same version as the C Controller module is specified in CW Workbench.

☞Page 343, Section 19.5

(a) Project replacement

The following indicates the procedure to replace a project in CW Workbench.

- Replacement Q06CCPU-V with Q12DCCPU-V (Extended mode)

  Create a project and add a user program used in an existing product in CW Workbench.

  📖CW Workbench Operating Manual

- Replacement Q12DCCPU-V (Basic mode) with Q12DCCPU-V (Extended mode)

  The CW Workbench project for Q12DCCPU-V (Basic mode) can be utilized directly into Q12DCCPU-V (Extended mode).

- Replacement Q12DCCPU-V (Basic mode) with Q24DHCCPU-V/-VG

  Import the Q12DCCPU-V (Basic mode) project by using CW Workbench (SW1DND-CWWLQ24-E) ("import") and modify "Available and enable build specs" in the project "Build Support and Specs" to "PENTIUM4gnu".

Point

For procedures to import the project and modify "Available and enable build specs", refer to the following.

📖CW Workbench Operating Manual

(b) VxWorks standard API function replacement

Replacement of VxWorks standard API functions is required when the version of VxWorks is updated.

C Controller module		VxWorks
Q06CCPU-V		VxWorks Version 5.4
Q12DCCPU-V	Basic mode	VxWorks Version 6.4
	Extended mode	
Q24DHCCPU-V/-VG		VxWorks Version 6.8.1

For replacement of VxWorks standard API functions, refer to VxWorks "MIGRATION GUIDE".

Point

VxWorks "MIGRATION GUIDE" PDF file is supplied with CW Workbench.

(c) Bus interface function replacement

Replace functions whose specifications are changed.

☞Page 469, Appendix 4.1

(d) Device type replacement

Replace the deleted device types.

Function	Deleted device type	
	Device	Device name specification
Bus interface function	Link input internal buffer (LX buffer)	QBFDev_LXBuf
	Link output internal buffer (LY buffer)	QBFDev_LYBuf
	Link relay internal buffer (LB buffer)	QBFDev_LBBuf
	Link register internal buffer (LW buffer)	QBFDev_LWBuf
Melsec date link function	Own station link input internal buffer (LX buffer)	DevX
	Own station link output internal buffer (LY buffer)	DevY
	Own station link relay internal buffer (LB buffer)	DevB
	Own station link register internal buffer (LW buffer)	DevW

When the deleted device types are used in a user program to be replaced, use the devices B and W (new available devices) to perform link refresh with the MELSECNET/H module and CC-Link IE Controller Network module.

For link refresh, refer to the following.

☞ Page 212, Section 13.2.1

(6) Script File replacement

Q12DCCPU-V (Extended mode) and Q24DHCCPU-V/-VG cannot register/add login user(s) by using script file. Register login user(s) in Setting/monitoring tools for the C Controller module.

(7) Verification of C Controller system after replacement

Thorough review and verification is needed after replacement.

(a) Replacement with Q24DHCCPU-V/-VG

Replacement of a C Controller module affects the operations of the C Controller system as follows.

- The number of occupied slots are changed from 1 to 3, so the installation positions of I/O module and intelligent function module, and start XY numbers are changed.
- Due to the change of C Controller module processing performance, the Q12DCCPU-V device and operation timing are changed.

Appendix 4.1 Correspondence table to existing functions

(1) Functions for compatibility

Bus interface functions will continuously be available. However, the following bus interface functions must be replaced with C Controller module dedicated functions when creating a new program.

Ensure to replace the functions after checking each function specification because some functions may require to change arguments or the others for the replacement.

Name of function required to be replaced	C Controller module dedicated function	
Q06CCPU-V Q12DCCPU-V (Basic mode)	Q12DCCPU-V (Extended mode)	Q24DHCCPU-V/-VG
QBF_StartWDT	CCPU_StartWDT	
QBF_ResetWDT	CCPU_ResetWDT	
QBF_StopWDT	CCPU_StopWDT	
QBF_EntryWDTInt	CCPU_EntryWDTInt	
QBF_EntryTimerEvent	CCPU_EntryTimerEvent	CCPU_EntryCyclicTimerInt[1]
QBF_WaitTimerEvent	CCPU_WaitTimerEvent	
QBF_ReadStatusEx[2]	CCPU_GetErrInfo	
	CCPU_GetSwitchStatus	
	CCPU_GetRefreshStatus	
	CCPU_GetLEDStatus	
	CCPU_GetCpuStatus	
	CCPU_GetPowerStatus	
QBF_ControlLED	CCPU_SetLEDStatus	
QBF_RegistEventLog	CCPU_RegistEventLog	CCPU_RegistEventLog
		CCPU_RegistEventLog_ISR
QBF_MountCfCard	CCPU_MountMemoryCard	
QBF_UnmountCfCard	CCPU_UnmountMemoryCard	
QBF_SetTime	CCPU_SetRTC	
QBF_GetTime	CCPU_GetRTC	
QBF_Control7SegLED	CCPU_Set7SegLED	CCPU_SetDotMatrixLED
QBF_WriteSRAM	CCPU_WriteSRAM	
QBF_ReadSRAM	CCPU_ReadSRAM	
QBF_ClearError	CCPU_ClearError	
QBF_Control7SegLED_ISR	CCPU_Set7SegLED_ISR	CCPU_SetDotMatrixLED_ISR
QBF_ControlLED_ISR	CCPU_SetLEDStatus_ISR	☞ Page 470, Appendix 4.1(2)
QBF_WriteSRAM_ISR	CCPU_WriteSRAM_ISR	
QBF_ReadSRAM_ISR	CCPU_ReadSRAM_ISR	

*1 : By using a routine called upon occurrence of a timer interrupt in the set cycle to implement processing to issue a timer event by the user program, a more flexible timer function can be used.

*2 : Acquire the IP address of the user Ethernet port (CH1 and CH2) by using VxWorks standard API functions from the user program.

(2) Obsolete functions

(a) Replacement Q06CCPU-V with Q12DCCPU-V (Extended mode)

The following bus interface function is obsolete in Q12DCCPU-V.

If it is used in the user program to be replaced, delete it.

- QBF_ShutdownRom

(b) Replacement Q12DCCPU-V (Basic mode) with Q24DHCCPU-V/-VG

The following bus interface functions are obsolete in Q24DHCCPU-V/-VG.

If any of them is used in the user program to be replaced, change it to the processing indicated in Substitute action.

Functions obsolete in Q24DHCCPU-V/-VG	Substitute action
QBF_ShutdownRom	Not required in Q24DHCCPU-V/-VG.
QBF_EntryMultiCPUSyncInt	Q24DHCCPU-V/-VG does not support registration of a routine called from ISR upon occurrence of multiple CPU synchronous interrupt. Use the QBF_WaitMultiCPUSyncEvent function to change the task to wait for an interrupt event notification.
QBF_EnableMultiCPUSyncInt	
QBF_DisableMultiCPUSyncInt	
QBF_EntryCpuInt	Q24DHCCPU-V/-VG does not support registration of a routine called from ISR upon occurrence of an interrupt from another CPU. Use the QBF_WaitEvent function to change the task to wait for an interrupt event notification.
QBF_EnableCpuInt	
QBF_DisableCpuInt	
QBF_EntryUnitInt	Q24DHCCPU-V/-VG does not support registration of a routine called from ISR upon occurrence of an interrupt from another CPU. Use the QBF_WaitUnitEvent function to change the task to wait for an interrupt event notification.
QBF_EnableUnitInt	
QBF_DisableUnitInt	
QBF_ControlLED_ISR	This product does not support module control from ISR. Change the task to control the module.
QBF_Control7SegLED_ISR	Use CCPU_SetDotMatrixLED_ISR function
QBF_WriteSRAM_ISR	Use CCPU_WriteSRAM_ISR function
QBF_ReadSRAM_ISR	Use CCPU_ReadSRAM_ISR function
QBF_X_In_Word_ISR	Q24DHCCPU-V/-VG does not support module control from ISR. Change the task to control the module.
QBF_Y_In_Word_ISR	
QBF_Y_Out_Word_ISR	
QBF_ToBuf_ISR	
QBF_FromBuf_ISR	
QBF_EnableMultiCPUSyncInt_ISR	
QBF_DisableMultiCPUSyncInt_ISR	
QBF_WriteDevice_ISR	
QBF_ReadDevice_ISR	
QBF_SetDevice_ISR	
QBF_ResetDevice_ISR	
QBF_EnableCpuInt_ISR	
QBF_DisableCpuInt_ISR	
QBF_EnableUnitInt_ISR	
QBF_DisableUnitInt_ISR	

Appendix 5 Function Processing Time

This section explains the time required for processing respective functions when a user program using bus interface function, MELSEC data link function, and/or C Controller module dedicated function is executed with the task priority set to 100.

Function specifications can be checked by using the following functions in Setting/monitoring tools for the C Controller module.

- **[Help] ⇒ [Function help] ⇒ [C Controller module function help]**

For the processing time of Q12DCCPU-V (Extended mode), refer to the following manual.
📖C Controller Module User's Manual (Hardware Design, Function Explanation)

Point

Processing time for the bus interface functions, MELSEC data link functions, C Controller module vary somewhat depending on the operation conditions of the OS, execution condition of the user program
The access time data shown in below are typical processing time values for respective functions

(1) Bus interface function processing time

(a) I/O access time

①When accessing an input module QX42 (Start input number: X0) in a single CPU system

Function	Access size	Access time
QBF_X_In_BitEx	1bit	384μs
QBF_X_In_WordEx	1word	428μs
	16words	446μs
	64words	533μs

②When accessing an output module QY42P (Start output number: Y0) in a single CPU system

Function	Access size	Access time
QBF_Y_Out_BitEx	1bit	380μs
QBF_Y_Out_WordEx	1word	413μs
	16words	434μs
	64words	519μs

(b) Buffer memory access time

①When accessing the QJ61BT11N (Start I/O number: 0) in a single CPU system, where the block data assurance per station function is disabled.

Function	Access size	Access time
QBF_FromBuf	1word	447μs
	64words	498μs
	512words	717μs
QBF_ToBuf	1word	436μs
	64words	489μs
	512words	721μs

②When accessing the QJ61BT11N (Start I/O number: 0) in a single CPU system, where the block data assurance per station function is enabled.

- To access the buffer memory not covered by the Block Data Assurance per Station

Function	Access size	Access time
QBF_FromBuf	1word	509μs
	64words	567μs
	512words	800μs
QBF_ToBuf	1word	473μs
	64words	525μs
	512words	778μs

- To access the buffer memory covered by the Block Data Assurance per Station

Function	CC-Link refresh method	Access size	Access time
QBF_FromBuf	Manual	1word	508μs
		64words	568μs
		512words	811μs
	Automatic	1word	Manual processing time + (0 to CC-Link module link scan time)
		64words	
		512words	
QBF_ToBuf	Manual	1word	471μs
		64words	525μs
		512words	793μs
	Automatic	1word	Manual processing time + (0 to CC-Link module link scan time)
		64words	
		512words	

③When accessing the positioning module other than QD72P3C3 in a single CPU system

Function	Access size	Access time
QBF_FromBuf	1word	451µs
	64words	511µs
	512words	741µs
QBF_ToBuf	1word	431µs
	64words	491µs
	512words	761µs

(c) Multiple CPU shared memory (auto refresh area or user setting area) access time

When accessing the CPU shared memory (auto refresh area or user setting area) in a multiple CPU system (CPU No.1:Q26UDHCPU, CPU No.2: C Controller module)

Function	Access size	Access time	
		Host	No.1
QBF_FromBuf	1word	424µs	420µs
	64words	450µs	484µs
	512words	545µs	711µs
QBF_ToBuf	1word	414µs	–
	64words	441µs	–
	512words	555µs	–

(d) Multiple CPU shared memory (multiple CPU high speed transmission area) access time

When accessing the CPU shared memory (multiple CPU high speed transmission area) in a multiple CPU system (CPU No.1:Q26UDHCPU, CPU No.2: C Controller module)

Function	Access size	Access time	
		Host	No.1
QBF_FromBuf	1word	433µs	437µs
	64words	481µs	508µs
	512words	585µs	736µs
QBF_ToBuf	1word	423µs	–
	64words	454µs	–
	512words	577µs	–

(2) MELSEC data link function processing time

The MELSEC data link function processing time varies depending on the target module, and the route and devices used for communication.

When the communication target is a programmable controller CPU, the operating status, sequence scan time, and link scan time of the programmable controller CPU may also affect the processing time.

(3) C Controller module dedicated function processing time

Function	Access size	Access time
CCPU_ReadDataRefreshMemory	1word	5µs
	64words	114µs
	512words	896µs
CCPU_WriteDataRefreshMemory	1word	3µs
	64words	15µs
	512words	114µs

Appendix 6 List of Special Relays

The special relay (SM) is an internal relay whose application is fixed in a C Controller module.
The special relay cannot be used in the same way as other internal relays are used in user programs.

Item	Description
Number	Indicates the number of the special relay.
Name	Indicates the name of the special relay.
Description	Indicates descriptions about the special relay.
Detailed description	Indicates detailed descriptions about the special relay.
Setting side (setting time)	Explains setting side and setting time at the system side. • Setting side S : Set at the system side. • Setting time Error occurrence : Set when an error occurs. System : Set when a fixed scan or the status is changed at the system side.

(1) Diagnostic information

Number	Name	Description	Detailed description	Setting side (setting time)
SM0	Diagnostic error	OFF: No error ON: Error	• Turns on when a diagnostic result error occurs. Later, on status is held even after returning to normal.	S (Error)
SM1	Self-diagnostic error	OFF: No self-diagnostic error ON: Self-diagnostic error	• Turns on when a diagnostic result error occurs. Later, on status is held even after returning to normal.	S (Error)
SM5	Common error information	OFF: No common error information ON: Common error information	• When SM0 turns on, the relay turns on if there is common error information.	S (Error)
SM16	Error individual information	OFF: No error individual information ON: Error individual information	• When SM0 turns on, the relay turns on if there is error individual information.	S (Error)
SM53	AC/DC DOWN detection	OFF: Without AC/DC DOWN ON: With AC/DC DOWN	• Turned on when a momentary power failure for 20ms or less occurs if the AC power supply module is used. Reset when a power cycle is performed.	S (Error)
SM60	Fuse blown detection	OFF: Normal ON: Fuse blown module	• Turns on when more than one output module in fuse blown status exist. Later, on status is held even after returning to normal.	S (Error)
SM61	I/O module verification error	OFF: Normal ON: Error	• Turns on when the I/O module is different from the status that was registered upon power on. Later, on status is held even after returning to normal.	S (Error)

(2) Redundant power supply module information

Number	Name	Description	Detailed description	Setting side (setting time)
SM1780	Power supply off detection flag	OFF: No redundant power supply module with input power OFF detected ON: Redundant power supply module with input power OFF detected	• Turns ON when one or more redundant power supply modules with input power OFF are detected. • Turns on if any of SD1780 bits is on. • Turns off if all bits of SD1780 are off. • This relay turns off when the main base unit is not the redundant main base unit (Q38RB). • When the multiple CPU system is configured, the flags are stored only to the CPU No.1.	S (System)
SM1781	Power supply failure detection flag	OFF: No faulty redundant power supply module detected ON: Faulty redundant power supply module detected	• Turns ON when one or more faulty redundant power supply modules are detected. • Turns on if any of SD1781 bits is on. • Turns off if all bits of SD1781 are off. • This relay turns off when the main base unit is not the redundant main base unit (Q38RB). • When the multiple CPU system is configured, the flags are stored only to the CPU No.1.	S (System)
SM1782	Momentary power failure detection flag for power supply 1 [*1]	OFF: No momentary power failure detected ON: Momentary power failure detected	• Turns ON when a momentary power failure of the input power supply to the power supply 1 or 2 is detected one or more times. After turning on, this relay remains on even if the power supply recovers from the momentary power failure. • Turns off the flags (SM1782 and SM1783) of the power supply 1 and 2 when the CPU module starts. • When the input power to one of the redundant power supply modules turns OFF the corresponding flag turns OFF. • This relay turns off when the main base unit is not the redundant main base unit (Q38RB). • When the multiple CPU system is configured, the flags are stored only to the CPU No.1.	S (System)
SM1783	Momentary power failure detection flag for power supply 2 [*2]			

*1 : Indicates the redundant power supply module mounted on the POWER 1 slot of the redundant base unit (Q38RB/Q68RB/Q65WRB).

*2 : Indicates the redundant power supply module mounted on the POWER 2 slot of the redundant base unit (Q38RB/Q68RB/Q65WRB).

Appendix 7 List of Special Registers

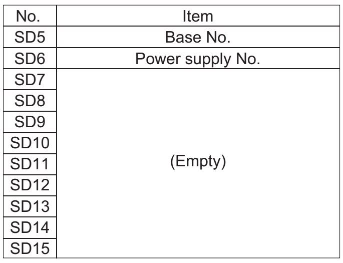
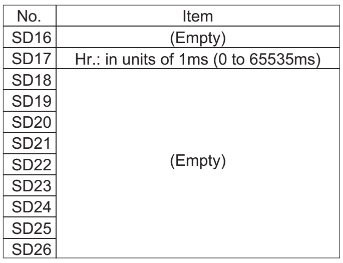
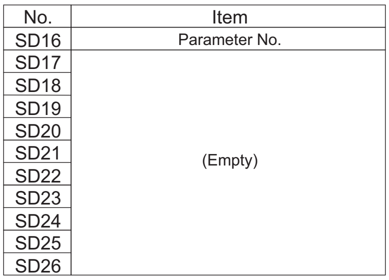
The special register (SD) is an internal register whose application is fixed in a C Controller module.
The special relay cannot be used in the same way as other internal relays are used in user programs.
Data is stored in binary format unless otherwise specified.

Item	Description
Number	Indicates the number of the special register
Name	Indicates the name of the special register.
Description	Indicates descriptions about the special register.
Detailed description	Indicates detailed descriptions about the special register.
Setting side (setting time)	Explains setting side and setting time at the system side. • Setting side S : Set at the system side. • Setting time System : Set when a fixed scan or the status is changed at the system side. Initial : Set only at initialization (power on, STOP RUN, etc.) Error : Set when an error occurs.

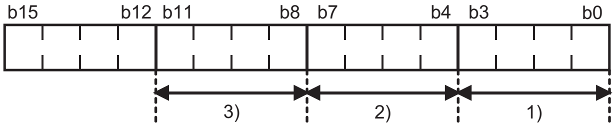
(1) Diagnostic information

Number	Name	Description	Detailed description	Setting side (setting time)
SD0	Diagnostic error	Diagnostic error code	• The error code occurred in diagnostics in diagnostics is stored as a binary code. • The information is the same as the latest error code.	S (Error)
SD1	Date and time of diagnostic error	Date and time of diagnostic error	• The year (the last two digits of the year) and month when SD0 data was updated are stored as a 2-digit BCD code. b15 to b8 b7 to b0 YY (0 to 99) | MM (1 to 12) (Example) October, 1995 H9510	S (Error)
SD2			• The date and time when SD0 data was updated are stored as a 2-digit BCD code. b15 to b8 b7 to b0 DD (1 to 31) | Hr. (0 to 23) (Example) Day of 25th, 10:00 H2510	S (Error)
SD3			• The minute and second when SD0 data was updated are stored as a 2-digit BCD code. b15 to b8 b7 to b0 Min. (0 to 59) | Sec. (0 to 59) (Example) 35 minutes, 48 seconds H3548	S (Error)
SD4	Error information identification	Error information identification code	• Identification codes used to determine what error information stored in the common information (SD5 to SD15) and individual information (SD16 to SD26) are stored. b15 to b8 b7 to b0 Individual information category code | Common information category code • In the common information category codes, the following codes are stored. 0: None 1: Module No. (Slot No./CPU No./Base No.) 3: Time (setting value) 7: Base No./power supply • In the individual information category codes, the following codes are stored. 00: None 3: Time (actual measurement value) 5: Parameter No.	S (Error)

<table>
<tr><th>Number</th><th>Name</th><th>Description</th><th>Detailed description</th><th>Setting side
(setting time)</th></tr>
<tr><td>SD5
to
SD15</td><td>Common error information</td><td>Common error information</td><td>
• Common information corresponding to the error code (SD0) is stored.
• The following three types of information are stored.
• Common error information type can be determined by "Common information category code" in SD4.
(The value of the Common information category code stored in SD4 corresponds to 1),3), and 7) below.)
①Module No..
<table>
<tr><th>No.</th><th>Item</th></tr>
<tr><td>SD5</td><td>Slot No./CPU No./BaseNo. *1, *2, *4</td></tr>
<tr><td>SD6</td><td>I/O No. *3</td></tr>
<tr><td>SD7</td><td>(Empty)</td></tr>
<tr><td>SD8</td><td></td></tr>
<tr><td>SD9</td><td></td></tr>
<tr><td>SD10</td><td></td></tr>
<tr><td>SD11</td><td></td></tr>
<tr><td>SD12</td><td></td></tr>
<tr><td>SD13</td><td></td></tr>
<tr><td>SD14</td><td></td></tr>
<tr><td>SD15</td><td></td></tr>
</table>
*1 : For multiple CPU systems, the slot No. or CPU No. is stored, depending on the error.
(Regarding which number is stored, refer to each error code.)
No. 1 CPU: 1, No. 2 CPU: 2, No. 3 CPU: 3, No. 4 CPU: 4
*2 : Definition of the base No. and slot No.
<Base No.>
The value to identify the base unit mounted on the C Controller module.
The definition of the base No. is shown in the following table.
<table>
<tr><th>BaseNo.</th><th>Definition</th></tr>
<tr><td>0</td><td>Indicates the main base unit which a CPU module is mounted.</td></tr>
<tr><td>1 to 7</td><td>Indicates an extension base unit.
The stage number setting by a base number setting connector of extension base unit turn to be Base No.
When a stage number setting is the first stage of extension module: Base No. = 1
When a stage number setting is the seventh stage of extension module: Base No. = 7</td></tr>
</table>
<Slot No.>
This value to identify the slot of each base unit and the module inserted in the slot.
• I/O slot 0 (the right side of slot for the CPU slot) of the main base unit is the slot of "Slot No. = 0".
• The slot No. order is the main base unit, the extension base unit numbers 1 to 7 in that order, and a serial number is assigned to each slot of each base unit.
• If I/O assignment of Setting/monitoring tools for the C Controller module is used to set the number of slots in the base unit, slot numbers are assigned for the set number of slots.
*3 : When FFFFH is stored in SD6 (I/O No.), the I/O No. is not identifiable, so specify the faulty sections in SD5.
*4 : If the slot No. does not exist in the module No., FFH is stored.
②Time (setting value)
<table>
<tr><th>No.</th><th>Item</th></tr>
<tr><td>SD5</td><td>(Empty)</td></tr>
<tr><td>SD6</td><td>Hr.: in units of 1ms (0 to 65535ms)</td></tr>
<tr><td>SD7</td><td>(Empty)</td></tr>
<tr><td>SD8</td><td></td></tr>
<tr><td>SD9</td><td></td></tr>
<tr><td>SD10</td><td></td></tr>
<tr><td>SD11</td><td></td></tr>
<tr><td>SD12</td><td></td></tr>
<tr><td>SD13</td><td></td></tr>
<tr><td>SD14</td><td></td></tr>
<tr><td>SD15</td><td></td></tr>
</table>
</td><td>S
(Error)</td></tr>
</table>

<table>
<tr><th>Number</th><th>Name</th><th>Description</th><th>Detailed description</th><th>Setting side
(setting time)</th></tr>
<tr><td>SD5
to
SD15</td><td>Common error information</td><td>Common error information</td><td>③Base No./power supply No..

<table>
<tr><th>No.</th><th>Item</th></tr>
<tr><td>SD5</td><td>Base No.</td></tr>
<tr><td>SD6</td><td>Power supply No.</td></tr>
<tr><td>SD7</td><td rowspan="9">(Empty)</td></tr>
<tr><td>SD8</td></tr>
<tr><td>SD9</td></tr>
<tr><td>SD10</td></tr>
<tr><td>SD11</td></tr>
<tr><td>SD12</td></tr>
<tr><td>SD13</td></tr>
<tr><td>SD14</td></tr>
<tr><td>SD15</td></tr>
</table>
1: Error occurring in power supply 1
2: Error occurring in power supply 2
"Power supply 1" :
Redundant power supply module mounting on POWER 1 slot of the redundant base unit (Q38RB, Q68RB, and Q65WRB)
"Power supply 2" :
Redundant power supply module mounting on POWER 2 slot of the redundant base unit (Q38RB, Q68RB, and Q65WRB)</td><td>S
(Error)</td></tr>
<tr><td>SD16
to
SD26</td><td>Error individual information</td><td>Error individual information</td><td>• Individual information corresponding to the error code (SD0) is stored.
• The following information ④⑤ are stored.
• Error individual information type can be determined by "individual information category code" in SD4.
(The value of the "individual information category code" stored in SD4 corresponds to ④⑤ below.)
④Time (actual measurement value)

<table>
<tr><th>No.</th><th>Item</th></tr>
<tr><td>SD16</td><td>(Empty)</td></tr>
<tr><td>SD17</td><td>Hr.: in units of 1ms (0 to 65535ms)</td></tr>
<tr><td>SD18</td><td rowspan="9">(Empty)</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
⑤Parameter No.

<table>
<tr><th>No.</th><th>Item</th></tr>
<tr><td>SD16</td><td>Parameter No.</td></tr>
<tr><td>SD17</td><td rowspan="10">(Empty)</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table></td><td>S
(Error)</td></tr>
<tr><td>SD53</td><td>AC/DC DOWN detection</td><td>AC/DC DOWN detection count</td><td>• The count increments by 1 each time the input voltage goes below the rated 85% (AC power supply)/65% (DC power supply) during CPU module operations.</td><td>S
(Error)</td></tr>
<tr><td>SD60</td><td>Fuse blown module No.</td><td>Fuse blown module No.</td><td>• The latest I/O number of the module that generated the blown fuse is stored.</td><td>S
(Error)</td></tr>
<tr><td>SD61</td><td>I/O module verification error No.</td><td>I/O module verification error No.</td><td>• The latest I/O number of the module that generated the I/O module verification error is stored.</td><td>S
(Error)</td></tr>
</table>

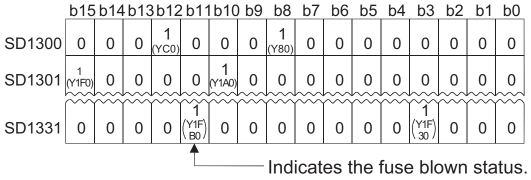
(2) System information

Number	Name	Description	Detailed description	Setting side (setting time)
SD200	Switch status	C Controller module switch status	• The switch status of the C Controller module is stored. 0: RUN, 1: STOP	S (System)
SD203	C Controller module operation status	C Controller module operation status	• The operation status of the C Controller module is stored as described below.  1): C Controller module operation status 0: RUN 1: Reserved 2: STOP 3: PAUSE 2): STOP/PAUSE factor (in chronological order) 0: RUN/STOP/MODE Switch 1: Reserved 2: Reserved 3: QBF_Control function executed from a user program 4: Error 5: Remote operation from another CPU 3): Mode 0: Basic mode 1: Extended mode	S (System)
SD286	Device assignment	M assignment points (for extension)	• The M assignment points are stored in 32-bit.	S (Initial)
SD287			• Even when M assignment points are 32K or less, the assignment points are stored.	
SD288		B assignment points (for extension)	• The B assignment points are stored in 32-bit. • Even when B assignment points are 32K or less, the assignment points are stored.	S (Initial)
SD289				
SD308	Device assignment 2 (including extension device settings)	D assignment points (internal + extension)	• The M assignment points are stored in 32-bit. (the total points of the D device and extension D device in the internal device memory area)	S (Initial)
SD309				
SD310		W assignment points (internal + extension)	• The W assignment points are stored in 32-bit. (the total points of the W device and extension W device in the internal device memory area)	S (Initial)
SD311				

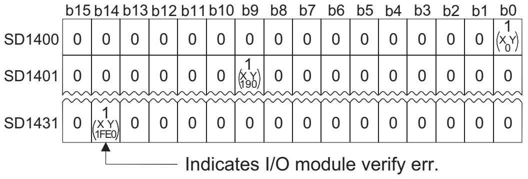
(3) Drive information

Number	Name	Description	Detailed description	Setting side (setting time)
SD670	Parameter-valid drive information	Parameter-valid drive No.	• Information for the valid parameter storage drive is stored. Q24DHCCPU-V/-VG 0 : Drive 0 (internal ROM) Q12DCCPU-V (Extended mode) 2 : Drive 2 (CF card) 4 : Drive 4 (Standard ROM)	S (Initial)

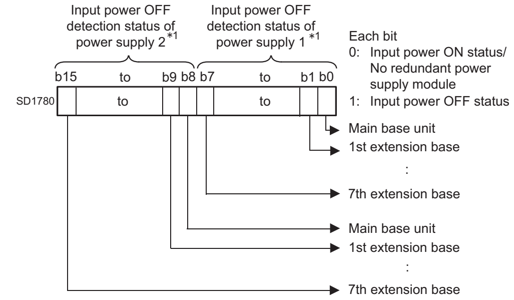
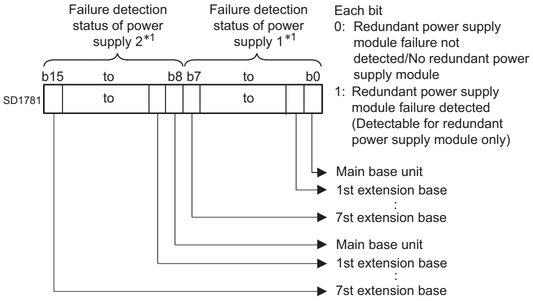
(4) Fuse blown module

Number	Name	Description	Detailed description	Setting side (setting time)
SD1300 to SD1331	Fuse blown module	The bit pattern of the fuse blown module in units of 16 points 0: No fuse blown 1: Fuse blown	• The output module number (by 16 points) in the fuse blown status is stored in bit pattern. (If it is set in parameters, the set number is applied.)  b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SD1300 0 0 0 1 (YC0) 0 0 0 1 (Y80) 0 0 0 0 0 0 0 0 SD1301 1 (Y1F0) 0 0 0 0 1 (Y1A0) 0 0 0 0 0 0 0 0 0 0 SD1331 0 0 0 0 1 (Y1F B0) 0 0 0 0 0 0 0 1 (Y1F 30) 0 0 0 Indicates the fuse blown status. • This is not cleared even when normal status is restored. Perform error clear to clear them.	S (Error)

(5) I/O module verification

Number	Name	Description	Detailed description	Setting side (setting time)
SD1400 to SD1431	I/O module verification error	Bit pattern of verification error module in units of 16 points 0: No I/O verification error 1: I/O verification error	• If an I/O module different from that in the I/O module information registered at power-on is detected, the I/O module number is stored in bit pattern. (If it is set in parameters, the set I/O module number is applied.)  b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SD1400 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 (X Y 0) SD1401 0 0 0 0 0 0 1 (X Y 190) 0 0 0 0 0 0 0 0 0 SD1431 0 1 (X Y 1FE0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Indicates I/O module verify err. • This is not cleared even when normal status is restored. Perform error clear to clear them.	S (Error)

(6) Redundant power supply module information

Number	Name	Description	Detailed description	Setting side (setting time)
SD1780	Power supply off detection status	Power supply off detection status	• The redundant power supply module (Q64RP) power OFF status is stored as indicated below.  Input power OFF detection status of power supply 2*1 Input power OFF detection status of power supply 1 *1 Each bit 0: Input power ON status/ No redundant power supply module 1: Input power OFF status b15 to b9 b8 b7 to b1 b0 SD1780 to to Main base unit 1st extension base : 7th extension base Main base unit 1st extension base : 7th extension base • "0" is stored when the main base unit is not the redundant main base unit (Q38RB). • When configuring multiple CPU, the status is stored to 1st CPU module.	S (System)
SD1781	Power supply failure detection status	Power supply failure detection status	• The fault detected status of the redundant power supply module (Q64RP) is stored as indicated below. • When configuring multiple CPU, the status is stored to 1st CPU module.  Failure detection status of power supply 2*1 Failure detection status of power supply 1*1 Each bit 0: Redundant power supply module failure not detected/No redundant power supply module 1: Redundant power supply module failure detected (Detectable for redundant power supply module only) b15 to b8 b7 to b0 SD1781 to to Main base unit 1st extension base : 7st extension base Main base unit 1st extension base : 7st extension base • "0" is stored when the main base unit is not the redundant main base unit (Q38RB). • When configuring multiple CPU, the status is stored to 1st CPU module.	S (System)

Number	Name	Description	Detailed description	Setting side (setting time)
SD1782	Momentary power failure detection counter for power supply 1[*1]	Momentary power failure detection count for power supply 1	• Counts the number of times of momentary power failure of the power supply 1/2. • Monitors the status of the power supply 1/ 2 mounted on the redundant power main base unit (Q38RB) and counts the number of times of momentary power failure. Status of power supply 1/power supply 2 mounted on the redundant extension base unit is not monitored. • When the CPU module starts, the counter of the power supply 1/ 2 is cleared to 0. • If the input power to one of the redundant power supply modules is turned OFF, the corresponding counter is cleared to 0. • The counter is incremented by one upon momentary power failure on the power supply 1 or 2. (The counter repeats increment and decrement of the value; 0 → 32767 → 32768 → 0 . (The value is displayed within the range of 0 to 65535 in the system monitor screen of programming tool.)) • "0" is stored when the main base unit is not the redundant main base unit (Q38RB). • When configuring multiple CPU, the status is stored to 1st CPU module.	S (System)
SD1783	Momentary power failure detection counter for power supply 2[*2]	Momentary power failure detection count for power supply 2		

[*1] : Indicates the redundant power supply module mounted on the POWER 1 slot of the redundant base unit (Q38RB/68RB/).

[*2] : Indicates the redundant power supply module mounted on the POWER 2 slot of the redundant base unit (Q38RB/68RB/).

Appendix 8 Battery Life

This section explains the C Controller module battery life.

Power-on time*1	Battery life					
	Q6BAT			Q7BAT		
	Guaranteed value*2 (70°C)	Actual service value (Reference value)*3 (40°C)	Guaranteed time after battery error occurrence*4	Guaranteed value*2 (70°C)	Actual service value (Reference value)*3 (40°C)	Guaranteed time after battery error occurrence*4
0%	9,200hr 1.05years	36,100hr 4.12years	456hr 18days	25,000hr 2.86years	43,800hr 5.02years	600hr 25days
30%	13,000hr 1.48years	43,800hr 5.02years	600hr 25days	35,200hr 4.02years	43,800hr 5.02years	600hr 25days
50%	17,800hr 2.03years	43,800hr 5.02years	600hr 25days	43,800hr 5.02years	43,800hr 5.02years	600hr 25days
70%	28,400hr 3.24years	43,800hr 5.02years	600hr 25days	43,800hr 5.02years	43,800hr 5.02years	600hr 25days
100%	43,800hr 5.02years	43,800hr 5.02years	600hr 25days	43,800hr 5.02years	43,800hr 5.02years	600hr 25days

*1 : The power-on time ratio indicates the ratio of programmable controller power-on time to one day (24 hours).
(When the total power-on time is 12 hours and the total power OFF time is 12 hours, the power-on time ratio is 50%.)

*2 : Guaranteed value refers to the total power failure time in the storage ambient temperature range of -25 to 75°C (operating ambient temperature between 0 to 55°C) guaranteed by Mitsubishi, subject to the characteristics value of the memory (SRAM) supplied by the parts manufacture.

*3 : The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40°C. This value is intended for reference only, as it varies with characteristics of the memory.

*4 : The guaranteed time after power OFF is 3 minutes in the following conditions.
- The battery connector is disconnected.
- The lead wire of the battery is broken.

Point

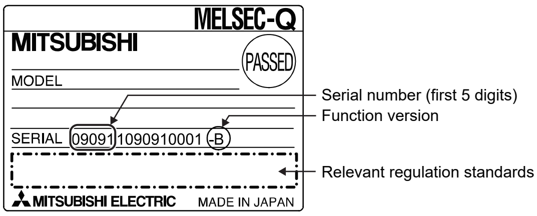
- Use the battery within the time shown by the guaranteed value of the battery life.
- It it is expected that the battery guaranteed time is exceeded, backup the data.
- After battery error occurrence, data are retained within the "guaranteed time after battery error occurrence" above, but replace the battery as soon as possible.
  Even if an alarm has not yet occurred, it is recommended to replace the battery periodically according to the operating condition.
- If the battery is not replaced after any battery error, the following data stored in the battery backup RAM may be initialized, or wrong values may be stored instead.
  - Event history information (If this is initialized, an event that notifies of error detection in the event history information is registered.)
  - Clock data (If this is initialized, it is reset to 00:00:00, Jan, 1, 2000.)
- When the battery (Q6BAT) is not connected to the C Controller module, its service life is five years.

Appendix 9 Checking Serial Number and Function Version

The function version and serial number of the C Controller module can be checked on the rated plate and serial number display and in Setting/monitoring tools for the C Controller module.

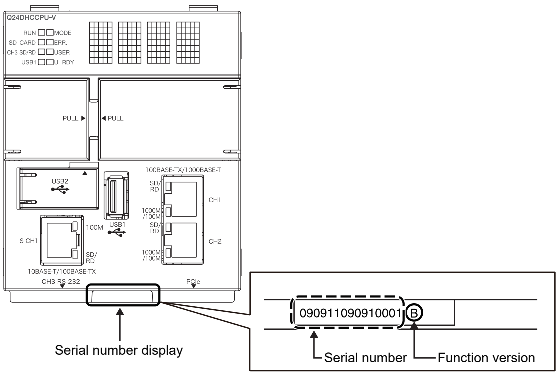
(1) Checking on the rating plate

The rating plate is located on module's sides.


MELSEC-Q
MITSUBISHI
PASSED
MODEL
SERIAL 09091 1090910001 -B
MITSUBISHI ELECTRIC
MADE IN JAPAN
Serial number (first 5 digits)
Function version
Relevant regulation standards

(2) Checking on serial number display

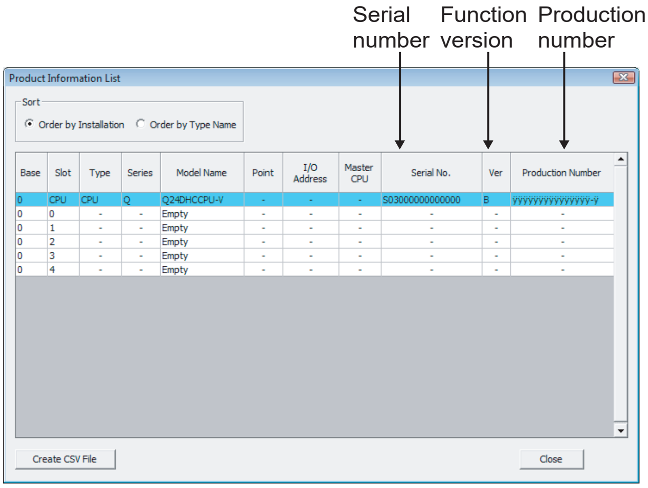
The serial number display is located on the front (bottom) of the module.



(3) Setting/monitoring tools for the C Controller module

They can be checked by the following function of Setting/monitoring tools for the C Controller module.

- **[Diagnostics] ⇒ [System Monitor] ⇒ "Product Information List"**



Base	Slot	Type	Series	Model Name	Point	I/O Address	Master CPU	Serial No.	Ver	Production Number
0	CPU	CPU	Q	Q24DHCCPU-V	-	-	-	S03000000000000	B	ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ-ÿ
0	0	-	-	Empty	-	-	-	-	-	-
0	1	-	-	Empty	-	-	-	-	-	-
0	2	-	-	Empty	-	-	-	-	-	-
0	3	-	-	Empty	-	-	-	-	-	-
0	4	-	-	Empty	-	-	-	-	-	-

The serial number (product number) printed on the rating plate of the module is displayed in the "Product No." column.[*1]
Note that "-" is displayed for the module that does not support the product number display.

Point

The serial number on the rating plate and the serial number displayed in Setting/monitoring tools for the C Controller module may be different.

- The serial numbers on the rating plate and the front of the module indicate the management information.
- The serial number displayed in the "Product Information List" screen of Setting/monitoring tools for the C Controller module represents the product function information.
  (The functional information of the product will be updated when a function is added.)

Appendix 10 Added or Changed Functions

Functions and specifications of the CPU module are added and/or changed at each version upgrade.
Available functions and specifications differ according to the function version and serial number of the CPU module.

Appendix 10.1 C Controller module upgrade

The following table shows the functions and specifications which are supported according to the upgrades.

Appendix 10.1.1 Q24DHCCPU-V

Serial No.	Software version	Added function	Reference
14122	Ver.4.01B	The following CPU modules are supported. • Universal model QCPU Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU	Page 27
15042	Ver.4.02C	The security function is supported. • File access restriction function[*1] • Service setting function[*1]	Page 176, Section 11.8
		The SLMP (MC protocol) is supported.	Page 200, Section 12.2
		The following CPU modules are supported. • High Speed Data Communication Module QJ71DC96 • Analog conversion module Q64ADH, Q68CT, Q64DAH • QD70 type positioning module QD73A1 • MODBUS® interface module QJ71MB91,QJ71MT91 • Energy measuring module QE81WH, QE84WH, QE81WH4W, QE83WH4W, QE82LG	Page 96, Section 7.5
15102	Ver.4.04E	The following CPU modules are supported. • Simple motion module QD77MS2, QD77MS4, QD77MS16, QD77GF16	Page 96, Section 7.5
		The following function are supported. • CCPU_GetCounterMillis • CCPU_GetCounterMicros • CCPU_GetCounterMillis_ISR • CCPU_GetCounterMicros_ISR • QBF_REMTO • QBF_REMFR	Page 353, Section 20.2
16012	Ver.4.06G	The advanced synchronous control method for Q172DSCPU and Q173DSCPU is supported.	–
		The following function are supported. • QBF_MotionCHGAS • QBF_MotionCHGVS	Page 356, Section 21.2

[*1] : When the parameter is written with Setting/monitoring tools for the C Controller module version 4.01B or earlier, the password set to "Security password setting" on the <<Security settings>> tab is initialized.

Serial No.	Software version	Added function	Reference
16012	Ver.4.07H	Device overlapping settings are enabled when the operations differ by the data refresh settings.	Page 173, Section 11.7 (7)(a)
17092	Ver.4.10L	Maximum value of frame size of Ethernet communication which uses User Ethernet port (CH1, CH2) is changed. (Jumbo frame supporting)	Page 192, Section 12.1
		SNTP version to be used can be selected in SNTP client function, which uses User Ethernet port (CH1, CH2) and system Ethernet port (S.CH1).	Page 199, Section 12.1.3

Appendix 10.1.2 Q24DHCCPU-VG

Serial No.	Software version	Added function	Reference
17102	Ver.4.10L	Maximum value of frame size of Ethernet communication which uses User Ethernet port (CH1, CH2) is changed. (Jumbo frame supporting)	Page 192, Section 12.1
		SNTP version to be used can be selected in SNTP client function, which uses User Ethernet port (CH1, CH2) and system Ethernet port (S.CH1).	Page 199, Section 12.1.3

Appendix 10.1.3 Q12DCCPU-V

Serial No.	Software version	Added function	Reference
15102	Ver.4.04E	Q12DCCPU-V (Extended mode) is supported.	Page 33, Section 1.1.5
		The setting/monitoring tool for the C Controller module connection function is supported.	Page 52, CHAPTER 4
		The following CPU modules are supported. • Universal model QCPU Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU	Page 27
		The Standard ROM is supported.	–
		The Time setting function (SNTP) is supported.	Page 202, Section 12.2.1
		The System Monitor is supported.	–
		The Battery less drive is supported.	Page 190, Section 11.11
		The security function is supported.	Page 176, Section 11.8
		The SLMP (MC protocol) communication is supported.	Page 204, Section 12.2.2
		The following CPU modules are supported. • Simple motion module QD77MS2, QD77MS4, QD77MS16, QD77GF16 • Analog conversion module Q64ADH, Q68CT, Q64DAH • Positioning module QD73A1 • MODBUS® interface module QJ71MB91 • High Speed Data Communication Module QJ71DC96 • Energy measuring module QE84WH, QE81WH4W, QE83WH4W • CC-Link IE Field Network master/local module QJ71GF11-T2	Page 96, Section 7.5
		The following function are supported. • QBF_REMTO • QBF_REMFR	Page 356, Section 21.2
16012	Ver.4.06G	The advanced synchronous control method for Q172DSCPU and Q173DSCPU is supported.	–
		The following function are supported. • QBF_MotionCHGAS • QBF_MotionCHGVS	Page 356, Section 21.2

Appendix 11 Fail-Safe Circuit

At power-on/off of the C Controller module, the control output may become inoperable temporarily due to the difference between the delay time and rising time of the C Controller module power supply and the controlled external power supply (especially for DC).

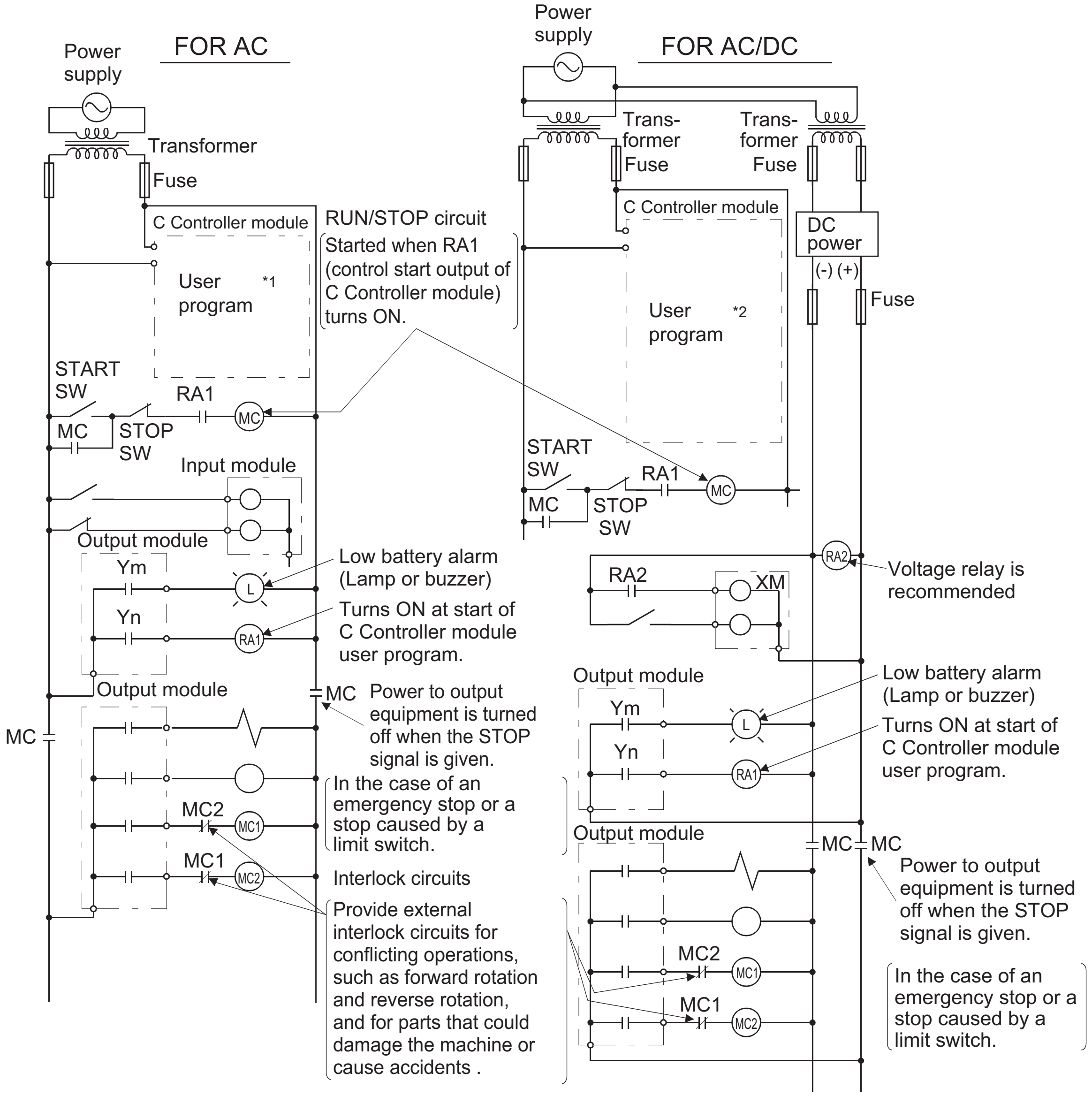
For example, if the controlled external power supply is energized in the DC output module and then the C Controller system power supply is energized, a momentary incorrect output may occur at power-on of the C Controller system by the DC output module. Therefore, It is necessary to configure a circuit that can be energized by the C Controller system power supply first.

In addition, a faulty operation may occur in the event of external power supply failure or failure of the C Controller module main.

Configure circuits outside the C Controller module for components for which machine damage and/or accidents may occur due to these faulty operations not leading to faulty operations of the entire system, or in view failsafe (emergency stop circuit, protection circuit, and interlock circuit, etc.).

A circuit example for system design prepared in the above point of view is illustrated in the next page.

(1) Circuit example for system design (when not using the $\overline{\text{ERR.}}$ contact of the power supply module)



FOR AC
Power supply
Transformer
Fuse
C Controller module
User program *1
RUN/STOP circuit
Started when RA1 (control start output of C Controller module) turns ON.
START SW
RA1
MC
MC
STOP SW
Input module
Output module
Ym
Yn
L
RA1
Low battery alarm (Lamp or buzzer)
Turns ON at start of C Controller module user program.
Output module
MC
MC
Power to output equipment is turned off when the STOP signal is given.
In the case of an emergency stop or a stop caused by a limit switch.
MC2
MC1
MC1
MC2
Interlock circuits
Provide external interlock circuits for conflicting operations, such as forward rotation and reverse rotation, and for parts that could damage the machine or cause accidents .
FOR AC/DC
Power supply
Trans-former
Fuse
Trans-former
Fuse
C Controller module
User program *2
DC power
(-) (+)
Fuse
START SW
RA1
MC
MC
STOP SW
RA2
RA2
XM
Voltage relay is recommended
Output module
Ym
Yn
L
RA1
Low battery alarm (Lamp or buzzer)
Turns ON at start of C Controller module user program.
Output module
MC
MC
Power to output equipment is turned off when the STOP signal is given.
MC2
MC1
MC1
MC2
In the case of an emergency stop or a stop caused by a limit switch.

The power-up procedure is as follows.

- For AC

1. **Turn on the power.**
2. **Set the C Controller module to "RUN".**
3. **Turn on the start switch.**
4. **When the magnetic contactor (MC) turns on, the output equipment is driven by the user program*1.**

*1 : Program the system so that the following operation will be performed at start-up of the C Controller module.

1. **When a battery voltage drop is detected, Ym is turned on.**
2. **Yn is turned on at start of the user program.**

- For AC/DC

1. **Turn on the power.**
2. **Set the C Controller module to "RUN".**
3. **When DC power is applied, RA2 is turned on.**
4. **When RA2 turns on, XM is turned on.**

   Upon 100% establishment of the DC input signal, processing is started by the user program*2.
5. **Turn on the start switch.**
6. **When the magnetic contact (MC) turns on, the output equipment is driven by the user program*2.**

*2 : Program the system so that the following operation will be performed at start-up of the C Controller module.

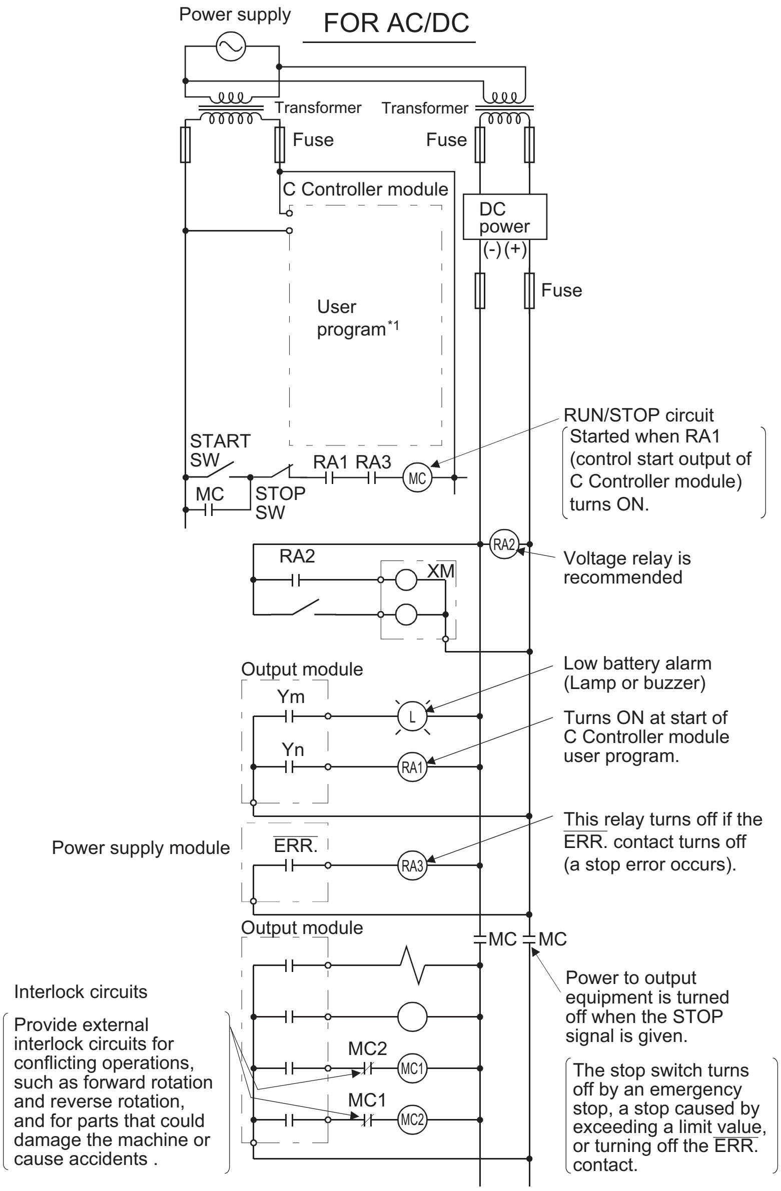
1. **When a battery voltage drop is detected, Ym is turned on.**
2. **Yn is turned on at start of the user program.**
3. **After XM turns on and the DC input signal is established, system processing is started.**

Create a program so that system processing will start when the DC input signal establishment time has elapsed after turn-on of XM (the status can be confirmed by the QBF_X_In_BitEx function). (The DC input signal establishment time is the time taken from "on" of RA2 to 100% establishment of the DC input signal. Set this time to 0.5 seconds.) However, when a voltage relay is used for RA2, the DC input signal establishment time need not be set in the user program.

Point

- ● Q24DHCCPU-V/-VG and Q12DCCPU-V(Extended mode)
  Use CCPU_GetErrInfo function QBF_Y_Out_BitEx or QBF_X_In_BitEx function. function.
- ● Q24DHCCPU-LS and Q26DHCCPU-LS
  Refer to the manual of the partner (operating system vendor), or consult the partner (operating system vendor).

(2) Circuit example for system design (When using the $\overline{\text{ERR.}}$ contact of the power supply module)



RUN/STOP circuit
Started when RA1 (control start output of C Controller module) turns ON.

Voltage relay is recommended

Low battery alarm (Lamp or buzzer)

Turns ON at start of C Controller module user program.

This relay turns off if the $\overline{\text{ERR.}}$ contact turns off (a stop error occurs).

Power to output equipment is turned off when the STOP signal is given.

The stop switch turns off by an emergency stop, a stop caused by exceeding a limit value, or turning off the $\overline{\text{ERR.}}$ contact.

Interlock circuits
Provide external interlock circuits for conflicting operations, such as forward rotation and reverse rotation, and for parts that could damage the machine or cause accidents .

The power-up procedure is as follows.

- For AC/DC

1. **Turn on the power.**
2. **Set the C Controller module to "RUN".**
3. **When DC power is applied, RA2 is turned on.**
4. **When RA2 turns on, XM is turned on.**

   Upon 100% establishment of the DC input signal, processing is started by the user program[*1].
5. **Turn on the start switch.**
6. **When the magnetic contact (MC) turns on, the output equipment is driven by the user program[*1].**

[*1] : Program the system so that the following operation will be performed at start-up of the C Controller module.

1. **When a battery voltage drop is detected, Ym is turned on.**
2. **Yn is turned on at start of the user program.**
3. **After XM turns on and the DC input signal is established, system processing is started.**

Create a program so that system processing will start when the DC input signal establishment time has elapsed after turn-on of XM (the status can be confirmed by the QBF_X_In_BitEx function). (The DC input signal establishment time is the time taken from "on" of RA2 to 100% establishment of the DC input signal. Set this time to 0.5 seconds.) However, when a voltage relay is used for RA2, the DC input signal establishment time need not be set in the user program.

Point

● Q24DHCCPU-V/-VG and Q12DCCPU-V(Extended mode)
Use CCPU_GetErrInfo function QBF_Y_Out_BitEx or QBF_X_In_BitEx function. function.

● Q24DHCCPU-LS and Q26DHCCPU-LS
Refer to the manual of the partner (operating system vendor), or consult the partner (operating system vendor).

(3) Fail-safe measures against C Controller system failure

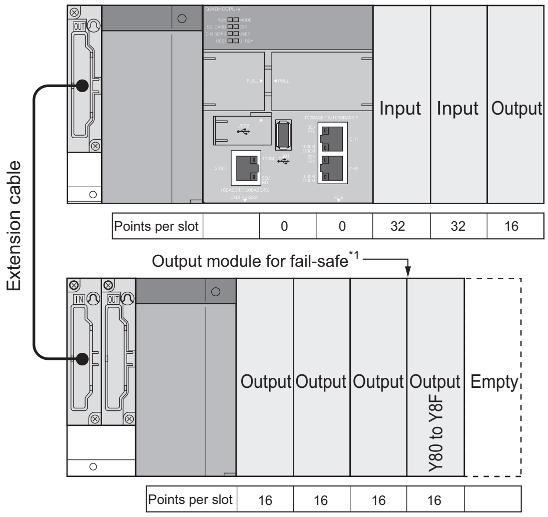
The C Controller module can detect its own failure by the self-diagnostic function.

However, it may not be able to detect a failure that occurred in an I/O control part.

In such a case, all of inputs and outputs may turn on or off depending on the failure, and normal operation of the control target and safety may not be ensured.

Though Mitsubishi Electric products are manufactured under strict quality control, it is recommended to configure external fail-safe circuits so that a C Controller system failure will not result in mechanical damage or accidents.

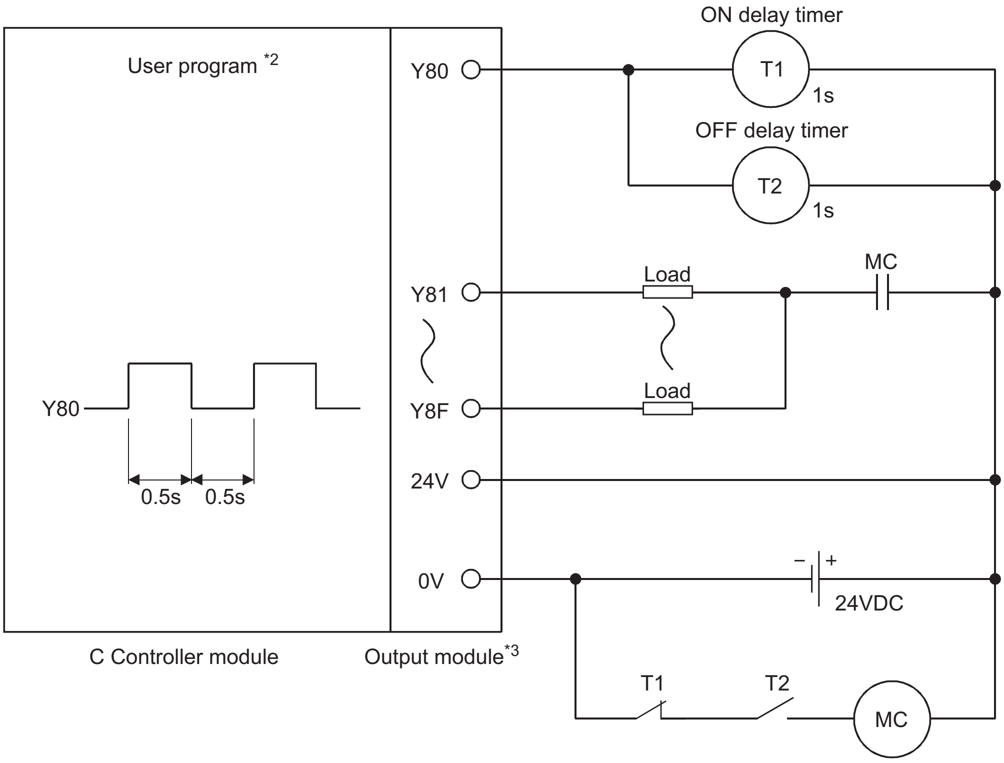
The following shows a system example and a fail-safe circuit example.



Points per slot		0	0	32	32	16

Points per slot	16	16	16	16	

*1 : The output module for fail-safe must be installed as the terminal module of the system. (Y80 to Y8F in the above system)



*2 : Create a program so that Y80 alternates between ON and OFF at intervals of 0.5 seconds.

- <Q24DHCCPU-V/-VG and Q12DCCPU-V(Extended mode)>
  Use the QBF_Y_Out_BitEx function.
  <Q24DHCCPU-LS and Q26DHCCPU-LS>
  Refer to the manual of the partner (operating system vendor), or consult the partner (operating system vendor).

*3 : Since Y80 turns on and off at 0.5s intervals, use a non-contact output module (a transistor in the above example).

Appendix 12 Calculating Heat Generation of Programmable Controller

The ambient temperature inside the panel storing the programmable controller must be suppressed to an ambient temperature of 55×C or less, which is specified for the programmable controller.

For the design of a heat releasing panel, it is necessary to know the average power consumption (heating value) of the devices and instruments stored inside.

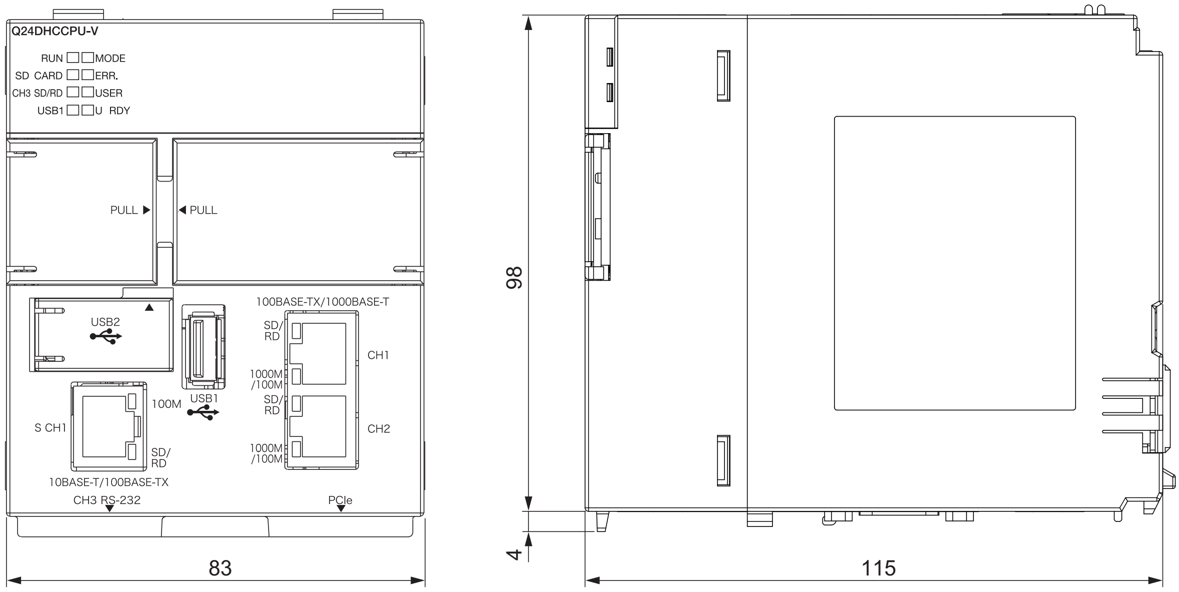
Obtain the average power consumption of the C Controller module and calculate the increase of in-panel temperature increase based on the power consumption.

For details, refer to the following.

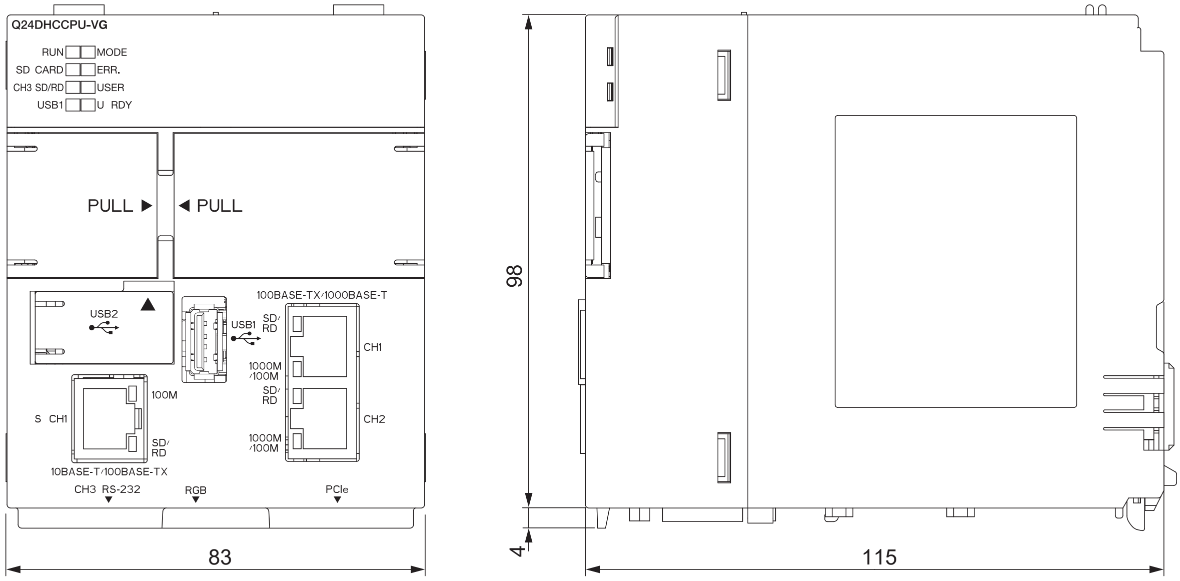
📖QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Appendix 13 External Dimensions

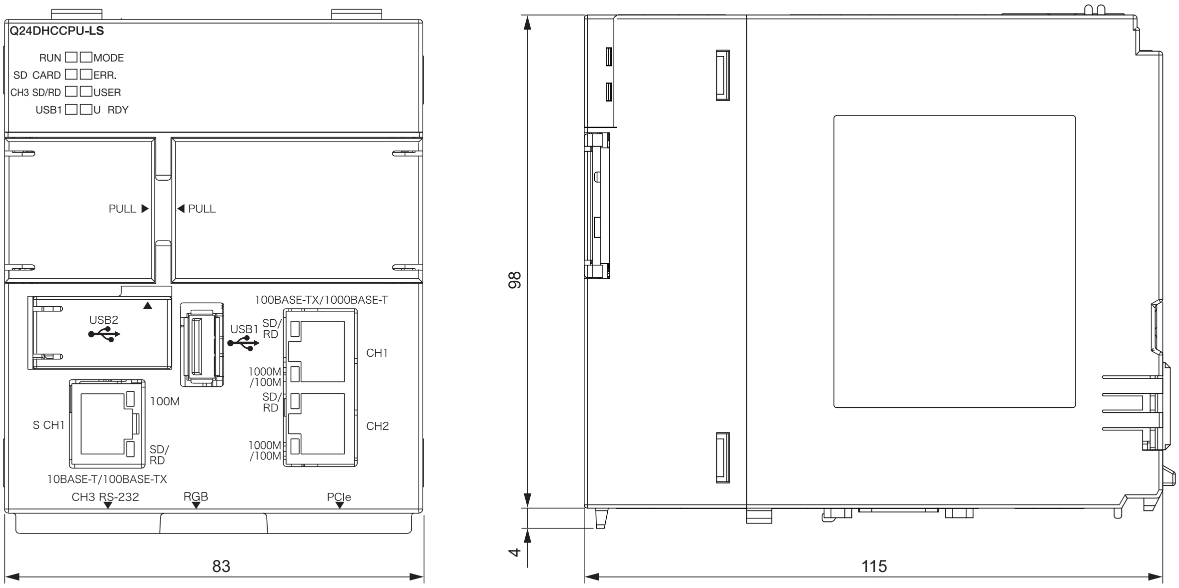
<Q24DHCCPU-V>



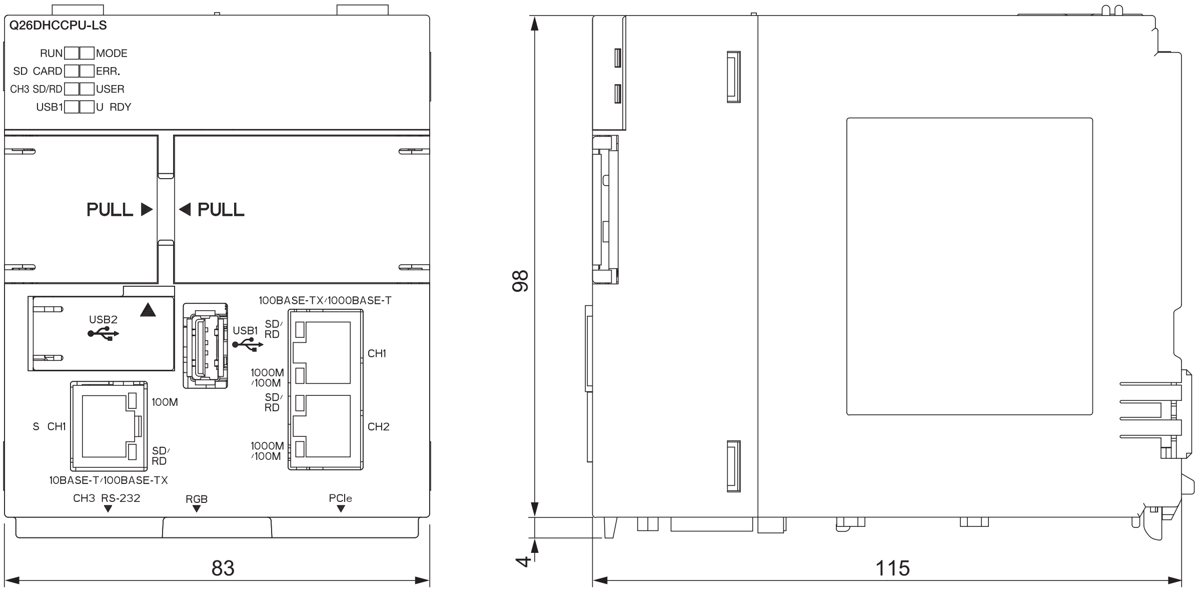
<Q24DHCCPU-VG>



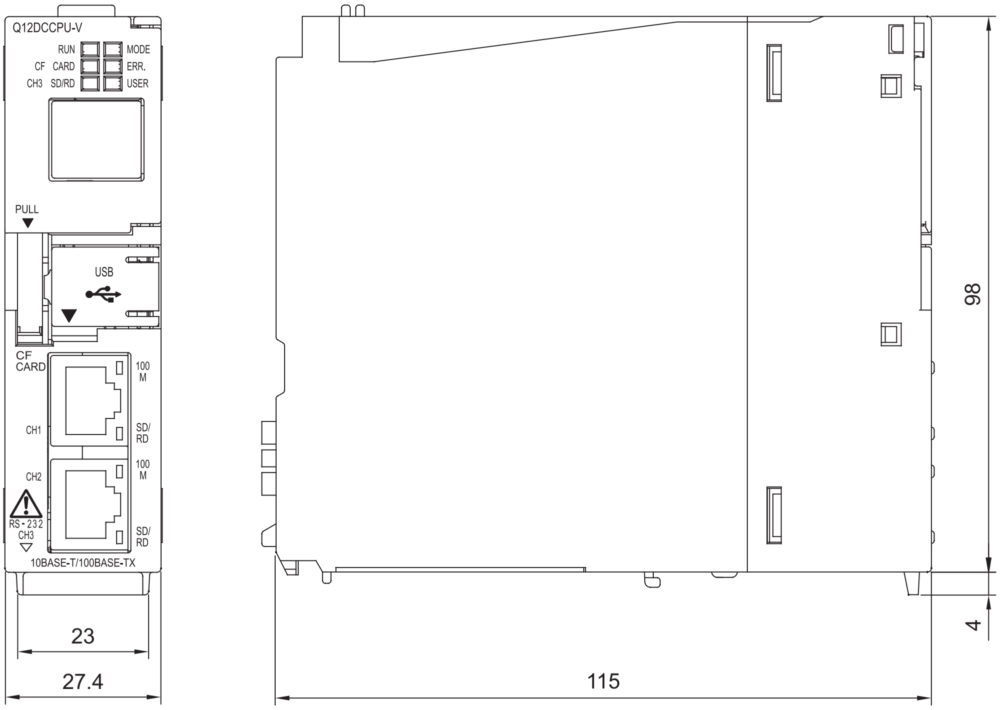
<Q24DHCCPU-LS>


Q24DHCCPU-LS
RUN
MODE
SD CARD
ERR.
CH3 SD/RD
USER
USB1
U RDY
PULL
PULL
USB2
USB1
100BASE-TX/1000BASE-T
SD/RD
CH1
1000M/100M
SD/RD
CH2
1000M/100M
100M
S CH1
SD/RD
10BASE-T/100BASE-TX
CH3 RS-232
RGB
PCIe
83
98
4
115

<Q26DHCCPU-LS>


Q26DHCCPU-LS
RUN
MODE
SD CARD
ERR.
CH3 SD/RD
USER
USB1
U RDY
PULL
PULL
USB2
USB1
100BASE-TX/1000BASE-T
SD/RD
CH1
1000M/100M
SD/RD
CH2
1000M/100M
100M
S CH1
SD/RD
10BASE-T/100BASE-TX
CH3 RS-232
RGB
PCIe
83
98
4
115

<Q12DCCPU-V>


Q12DCCPU-V
RUN
MODE
CF CARD
ERR.
CH3 SD/RD
USER
PULL
USB
CF CARD
100 M
CH1
SD/ RD
100 M
CH2
RS-232 CH3
SD/ RD
10BASE-T/100BASE-TX
23
27.4
115
98
4

Appendix 14 BIOS Setup

(1) Starting the setup

When Q24DHCCPU-VG/-LS and Q26DHCCPU-LS is started up, AMIBIOS is started as well.

The setup program can be started by the following operation while the BIOS setup screen is displayed.

- When executing POST, press the Delete key while the following message is displayed in the middle of the screen.*1

  'Press DEL to run Setup'

*1 : When executing POST, do not press the F11 key while the following message is displayed on the screen.
'Press F11 for BBS POPUP'

Point

When the message is disappeared before pressing the Delete key, reset the C Controller module or restart the user CPU.

(2) BIOS setup screen

(a) Main tab screen

○: Applicable ×: Not applicable

Item		Description	Setting applicability
AMIBIOS		Display the information about BIOS.	×
	Version	Display the core version.	
	BuildData	Display the date to be built.	
	ID	Display the ID for administration.	
Processor		Display the information about the processor.	
	(CPU)	Display the CPU name and operation frequency.	
	Speed	Display the operation frequency.	
	Count	Display the number of embedded CPUs.	
System Memory		Display the information of system memory.	
	Size	Display the capacity of work memory.	
System Time*1		Display the time.	○
System Data*1		Display the date.	
CMC		Display CMC code.	×

*1 : The setting contents are applied immediately.

(b) Exit screen

Item	Description
Save Changes and Exit	Exit the BIOS setup.

(3) Help window (General Help)

The Help window is displayed when pressing the F1 key on the BIOS setup screen.

Operation key	Description
←/→	Switch the tab between Main tab and Exit tab.
↑/↓	Switch the System Time and SystemDate.
+/-	Increase/decrease a number of input values of System Time and SystemDate.
Enter	• Display a pop-up window. • Move to the time setting item.
PgDown	Scroll the page downward.
PgUp	Scroll the page upward.
Home	Move the cursor to the top of the setting item on the screen.
End	Move the cursor to the bottom of the setting item on the screen.
F2/F3	Change the color of the screen.
F7	Discard the change.*1
F8	Read the failsafe value.*1
F9	Read the initial settings.*1
F10	End the BIOS setup with saving the change of all the setting information.
Esc	• Close the pop-up window. • End the BIOS setup without saving the change of all the setting information.

*1 : Invalid key operation.

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REVISIONS

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

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Dec., 2012	SH(NA)-081130ENG-A	First edition
Apr., 2013	SH(NA)-081130ENG-B	Correction RELATED MANUALS, TERMS, CHAPTER4, CHAPTER5, Section 6.1, Section 7.1, Section 7.4.1, Section 7.4.2, Section 7.5.1, Section 8.6.2, Section 8.6.2, CHAPTER10, Section 11.8, Section 11.8.2, Section 11.8.3, Section 11.8.4, Section 12.2, Section 12.2.2, CHAPTER19, Section 19.4.2, Section 20.2, Section 22.5, Section 22.5.1, Section 22.5.2, Section 22.5.3, Section 22.5.4, Section 22.5.5, Section 23.1.1, Section 23.3.1, Section 23.3.2, Section 23.6, Appendix 1.1, Appendix 10.1 Addition Section 11.8.3, Section 11.8.4, Section 12.2.2, Appendix 1.5
Jul., 2013	SH(NA)-081130ENG-C	Correction OPERATING PRECAUTIONS, INTRODUCTION, MANUAL PAGE ORGANIZATION, TERMS, CHAPTER 1, CHAPTER 2, CHAPTER 3, Section 3.2, CHAPTER 4, CHAPTER 5, CHAPTER 6, Section 6.1, Section 6.4, Section 6.5, CHAPTER 7, Section 7.2, Section 7.4.1, Section 7.4.2, Section 7.4.3, Section 7.5.1, Section 7.6, Section 7.6.1, Section 7.6.2, Section 7.6.4, Section 7.6.5, CHAPTER 8, Section 8.4, Section 8.5, Section 8.6, Section 8.6.1, Section 8.6.2, CHAPTER 9, Section 9.2, CHAPTER 10, CHAPTER 11, Section 11.1, Section 11.1.1, Section 11.1.3, Section 11.3, Section 11.4, Section 11.5, Section 11.7, Section 11.7.1, Section 11.8, Section 11.8.1, Section 11.8.2, Section 11.8.3, Section 11.8.4, Section 11.9, CHAPTER 12, Section 12.1, Section 12.1.1, Section 12.1.2, CHAPTER 13, Section 13.2, Section 13.2.1, Section 13.2.2, Section 13.2.3, Section 13.3, Section 13.4, CHAPTER 14, Section 14.1, Section 14.2, Section 14.3, Section 14.4, Section 14.5, Section 14.6, Section 14.7, Section 14.8, CHAPTER 17, Section 17.2, Section 17.2.1, Section 17.2.2, Section 17.2.3, Section 17.2.4, Section 18.2, Section 18.2.1, CHAPTER 19, CHAPTER 20, CHAPTER 21, CHAPTER 22, Section 23.1.7, Appendix 1.1, Appendix 2, Appendix 1.1, Appendix 10, Appendix 11, Appendix 13 Section 8.6.3 changed to 8.6.4, Section 18.2 changed to 18.1.4 Addition Section 5.2, Section 5.2.1, Section 8.6.3, Section 9.5, Section 18.1, Appendix 14 Deletion Section 18.2.2

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Nov., 2013	SH(NA)-081130ENG-D	Correction SAFETY PRECAUTIONS, INTRODUCTION, RELATED MANUALS, TERMS, CHAPTER 4, Section 5.1, Section 5.2, Section 6.2, Section 6.3, Section 6.4, Section 6.5, Section 7.1, Section 7.4.1, Section 7.4.2, Section 7.4.3, Section 7.5.1, Section 7.5.2, Section 7.6, Section 7.6.1, Section 7.6.3, Section 7.6.4, Section 7.6.5, Section 7.6.6, CHAPTER 8, Section 8.4, Section 8.6, Section 8.7, Section 8.7.1, Section 8.7.2, Section 8.7.3, CHAPTER 9, Section 9.4, Section 9.5, CHAPTER 10, CHAPTER 11, Section 11.1, Section 11.1.1, Section 11.1.3, Section 11.2, Section 11.3, Section 11.4, Section 11.5, Section 11.6, Section 11.7, Section 11.7.1, Section 11.8, Section 11.8.1, Section 11.8.2, Section 11.8.3, Section 11.8.4, Section 11.9, Section 11.10, CHAPTER 12, Section 12.1, Section 12.2, CHAPTER 13, Section 13.1, Section 13.2, Section 13.2.1, Section 13.2.2 Section 13.2.3, Section 13.3, Section 13.4, Section 13.4.2, Section 13.4.3, CHAPTER 14, Section 14.1, Section 14.1.3, Section 14.1.4, Section 14.2, Section 14.3, Section 14.4, Section 14.5, Section 14.6, Section 14.7, Section 14.8, Section 14.9, Section 15.1.1, Section 15.3, CHAPTER 16, Section 16.1.4, CHAPTER 17, Section 17.2, Section 17.2.2, Section 17.2.3, Section 17.2.4, CHAPTER 18, Section 18.1.1, Section 18.1.4, Section 18.2.1, CHAPTER 19, Section 19.4.2, Section 19.5, Section 19.6, Section 19.7, CHAPTER 20, CHAPTER 21, Section 21.2, CHAPTER 22, Section 22.5.2, Section 22.5.3, Section 22.5.4, Section 22.5.5, Section 23.3.1, Section 23.3.2, Section 23.3.7, Appendix 2, Appendix 4.1, Appendix 10 Addition PRODUCT ORGANIZATION, Section 1.1.3, Section 2.1, Section 2.2, Section 3.2.1, Section 3.2.2, Section 5.3, Section 6.1.1, Section 6.1.2, Section 6.5.1, Section 6.5.2, Section 7.6.2, Section 8.5, Section 18.3, Section 18.3.1, Section 18.3.2, Section 18.3.3, Section 18.3.4, Appendix 4.2
Jan., 2014	SH(NA)-081130ENG-E	Correction Section 7.4, Section 7.5.1, Section 14.8, Section 21.2, Appendix 1.3, Appendix 7
Mar., 2014	SH(NA)-081130ENG-F	Correction TERMS, Section 3.2.1, Section 3.2.2, Section 5.1, Section 5.2, Section 6.4, Section 6.5.1, Section 6.5.2, Section 9.4, Section 7.4, Section 11.2, Section 11.3, Section 11.5, Section 11.7.1, Section 11.8.3, Section 11.9, Section 13.2.1, Section 13.4.1, Section 13.4.3, Section 14.1.1, Section 14.1.2, Section 14.1.4, Section 17.2.3, Section 17.2.4, Section 18.1.1, Section 18.3.1, Section 19.3, Section 19.4.1, Section 19.4.2, Section 19.4.3, CAPTER 20, Section 20.1, Section 20.2, Section 21.2, Section 23.3.7, Appendix 1, Appendix 1.3, Appendix 3, Appendix 4.1, Appendix 4.2, Appendix 5, Appendix 8, Appendix 11

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Jul., 2014	SH(NA)-081130ENG-G	Correction OPERATING PRECAUTIONS, INTRODUCTION, RELATED MANUALS, TERMS, PRODUCT ORGANIZATION, Section 1.2, Section 2.1, Section 3.2.1, CHAPTER 4, Section 5.1, Section 5.3, Section 6.1, Section 6.1.1, Section 6.2, Section 6.3, Section 6.4, Section 6.5, Section 6.5.1, Section 7.2, Section 7.4.1, Section 7.4.2, Section 7.4.3, Section 7.5.1, Section 7.6.1, Section 7.6.2, Section 7.6.3, Section 7.6.4, Section 7.6.5, Section 7.6.6, Section 8.4, Section 8.5, Section 8.7.1, Section 8.7.2, Section 8.7.3, Section 9.4, Section 9.5, CHAPTER 10, Section 11.1, Section 11.1.1, Section 11.1.2, Section 11.1.3, Section 11.1.4, Section 11.1.5, Section 11.1.6, Section 11.1.7, Section 11.2, Section 11.3, Section 11.4, Section 11.5, Section 11.6, Section 11.7, Section 11.7.1, Section 11.7.2, Section 11.7.3, Section 11.8, Section 11.8.1, Section 11.8.2, Section 11.8.3, Section 11.8.4, Section 11.9, Section 11.11, CHAPTER 12, Section 12.1, Section 12.1.1, Section 12.1.2, Section 12.2, Section 12.2.1, Section 12.2.2, Section 13.2, Section 13.2.1, Section 13.2.2, Section 13.2.3, Section 13.3, Section 13.3.1, Section 13.3.2, Section 13.4, Section 13.4.1, Section 13.4.2, Section 13.4.3, Section 13.4.4, Section 13.5, Section 13.5.1, Section 13.5.2, Section 13.5.3, Section 14.1, Section 14.1.1, Section 14.1.2, Section 14.1.3, Section 14.1.4, Section 14.2, Section 14.2.1, Section 14.2.2, Section 14.2.3, Section 14.3, Section 14.4, Section 14.5, Section 14.5.1, Section 14.5.2, Section 14.6, Section 14.7, Section 14.8, Section 14.9, Section 16.1.4, Section 17.2.1, Section 17.2.2, Section 17.2.3, Section 17.2.4, Section 18.1.3, CHAPTER 19, Section 19.4.2, Section 19.5, Section 19.6, Section 19.7.1, CHAPTER 20, Section 20.2, CHAPTER 21, Section 21.2, CHAPTER 22, Section 22.5.2, Section 22.5.3, Section 22.5.4, Section 22.5.5, CHAPTER 23, Section 23.1, Section 23.4, Appendix 2, Appendix 4.1, Appendix 7, Appendix 11, Appendix 13, Appendix 14 Addition Section 1.1.2, Section 5.2, Section 8.6, Section 11.10, Section 18.2, Section 18.2.1, Section 18.2.2, Section 18.2.3, Section 18.2.4, Section 23.2, Section 23.2.1, Section 23.4.6, Section 23.4.11, Appendix 3.2
Feb., 2015	SH(NA)-081130ENG-H	Correction Section 7.3.3, Section 7.5.2
June, 2015	SH(NA)-081130ENG-I	Correction Section 7.6.1, Section 22.5.1, Section 22.5.2, Section 22.5.3, Section 22.5.4, Section 22.5.5
Sept, 2015	SH(NA)-081130ENG-J	Correction CHAPTER 10, Section 12.1, Section 12.2.1, Section 18.1.4, Section 18.2.4, Section 18.4.4, Section 23.4.2, Appendix 1, Appendix 2 Addition Section 12.1.3, Section 23.4.9

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Jun., 2016	SH(NA)-081130ENG-L	Correction TERMS, Section 11.8, Section 19.4.1 Addition DISCONTINUED MODELS
Nov., 2017	SH(NA)-081130ENG-M	Correction Section 7.3.3, Appendix 3.3, Appendix 11
July, 2020	SH(NA)-081130ENG-N	Correction SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT
Apr.,2021	SH(NA)-081130ENG-O	Correction Appendix 4

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
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 that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. 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.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

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SH(NA)-081130ENG-O(2104)KWIX
MODEL: Q24DHCCPU-V-U-E
MODEL CODE: 13JZ75

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