HITACHI

S10mini

TROUBLESHOOTING MANUAL

SME-3-001 (B)

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BI-BI-YS<IC-NS> (FL-MW20, AI8.0)

SAFETY PRECAUTIONS

- Read this manual thoroughly and follow all the safety precautions and instructions given in this manual before operations such as system configuration and program creation.
- Keep this manual handy so that you can refer to it any time you want.
- If you have any question concerning any part of this manual, contact your nearest Hitachi branch office or service engineer.
- Hitachi will not be responsible for any accident or failure resulting from your operation in any manner not described in this manual.
- Hitachi will not be responsible for any accident or failure resulting from modification of software provided by Hitachi.
- Hitachi will not be responsible for reliability of software not provided by Hitachi.
- Make it a rule to back up every file. Any trouble on the file unit, power failure during file access or incorrect operation may destroy some of the files you have stored. To prevent data destruction and loss, make file backup a routine task.
- Furnish protective circuits externally and make a system design in a way that ensures safety in system operations and provides adequate safeguards to prevent personal injury and death and serious property damage even if the product should become faulty or malfunction or if an employed program is defective.
- If an emergency stop circuit, interlock circuit, or similar circuit is to be formulated, it must be positioned external to the programmable controller. If you do not observe this precaution, equipment damage or accident may occur when the programmable controller becomes defective.
- Before changing the program, generating a forced output, or performing the RUN, STOP, or like procedure during an operation, thoroughly verify the safety because the use of an incorrect procedure may cause equipment damage or other accident.
- An attempt to directly send outputs to the external output device of PLCs results in direct output to the destination, independent of the interlock of the ladder circuit. Avoid such direct output because it is very dangerous in cases where it is used for driving an electric motor.

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PREFACE

Thank you for purchasing the Hitachi Programmable Controller (PCs).
This troubleshooting manual describes procedures for dealing properly with troubles associated with the product. Read this document carefully for effective troubleshooting of your S10mini Series PCs.

The document comprises the following sections:

<Trademarks>

* Microsoft® Windows® 95 operating system and Microsoft® Windows® 98 operating system are registered trademarks of Microsoft Corporation in the United States and/or other countries.
* Ethernet is a registered trademark of Xerox Corp.

<Note for storage capacity calculations>

- Memory capacities and requirements, file sizes and storage requirements, etc. must be calculated according to the formula 2^n. The following examples show the results of such calculations by 2^n (to the right of the equals signs).
  1 KB (kilobyte) = 1024 bytes
  1 MB (megabyte) = 1,048,576 bytes
  1 GB (gigabyte) = 1,073,741,824 bytes
- As for disk capacities, they must be calculated using the formula 10^n. Listed below are the results of calculating the above example capacities using 10^n in place of 2^n.
  1 KB (kilobyte) = 1000 bytes
  1 MB (megabyte) = 1000^2 bytes
  1 GB (gigabyte) = 1000^3 bytes

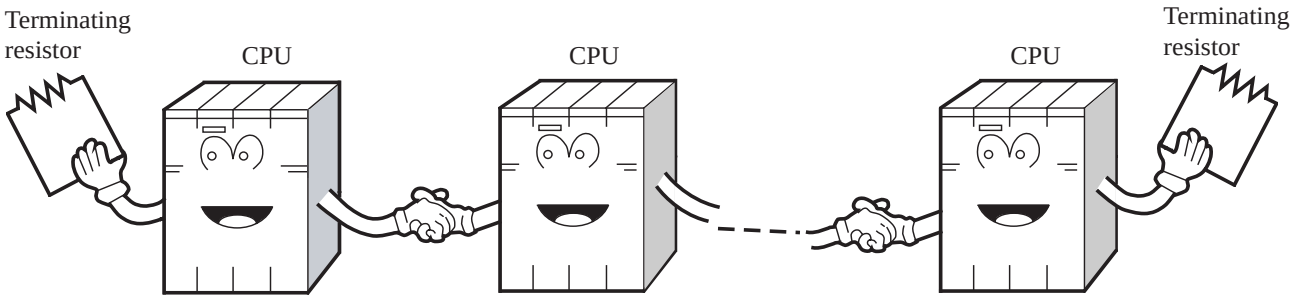
CONTENTS

1 PRELIMINARY CHECKS TO BE COMPLETED BEFORE TROUBLESHOOTING

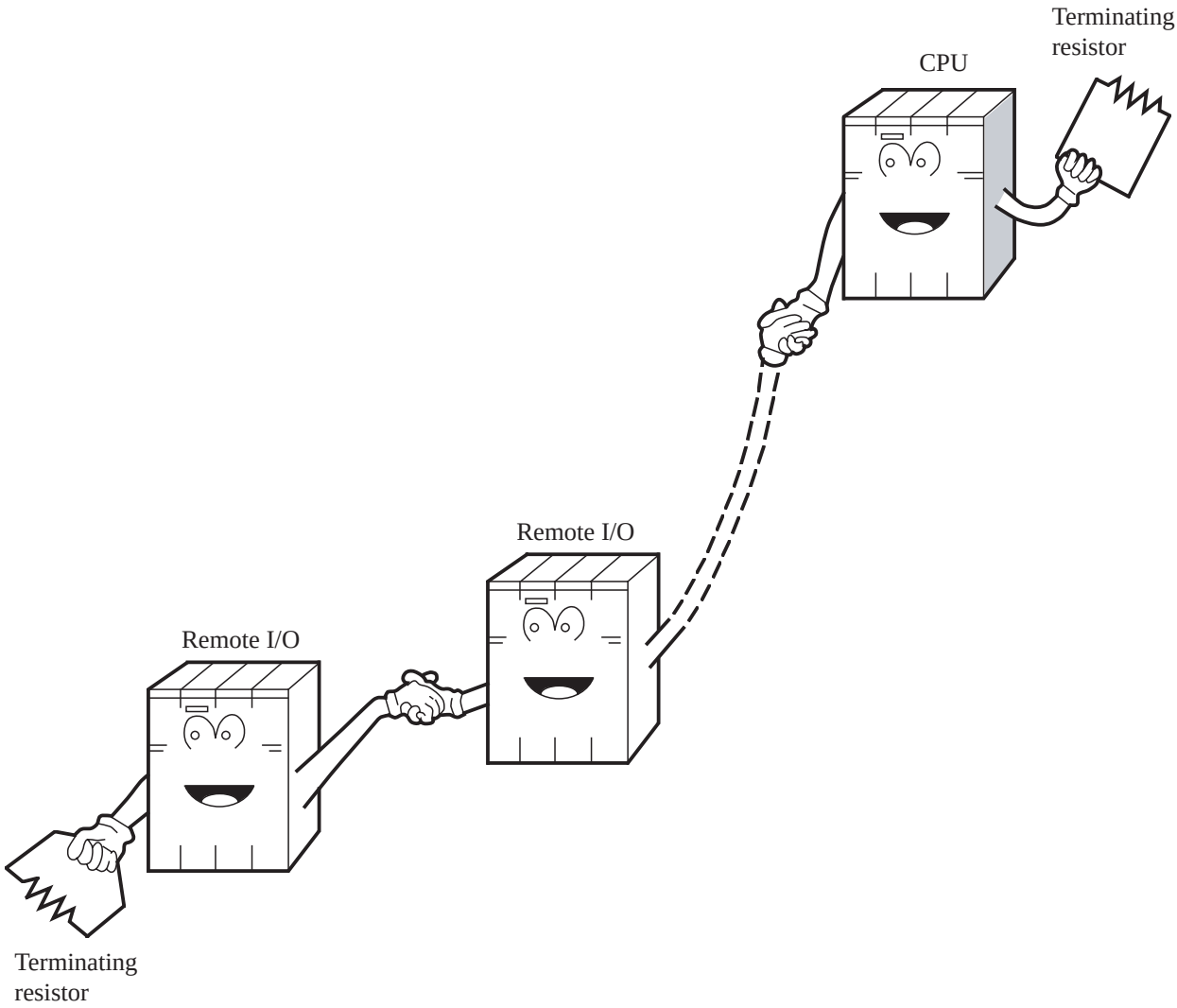
1 PRELIMINARY CHECKS TO BE COMPLETED BEFORE TROUBLESHOOTING

Before you start troubleshooting, be sure to carry out such preliminary checks as described below.

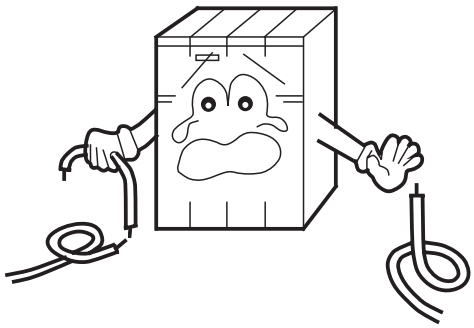
- Have you connected terminating resistors to both ends of the CPU link chain?
  The chain of CPU links must always be terminated properly at its ends.



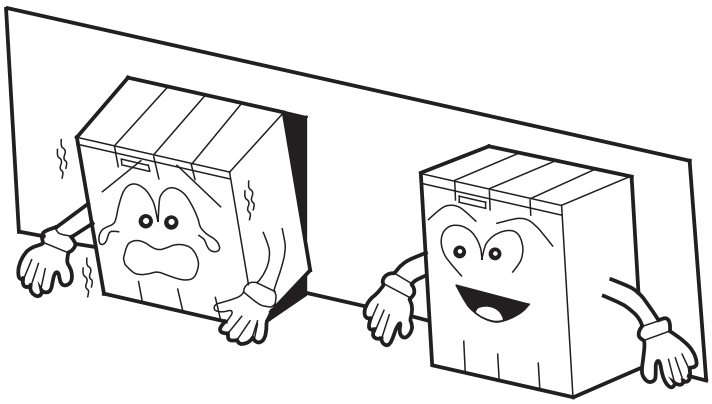
- Have you connected terminating resistors to both ends of the remote I/O line?
  The remote I/O line must always be terminated properly at its ends.



- Is cabling correctly?
  Check that there is disconnection or erroneous connection of cables.

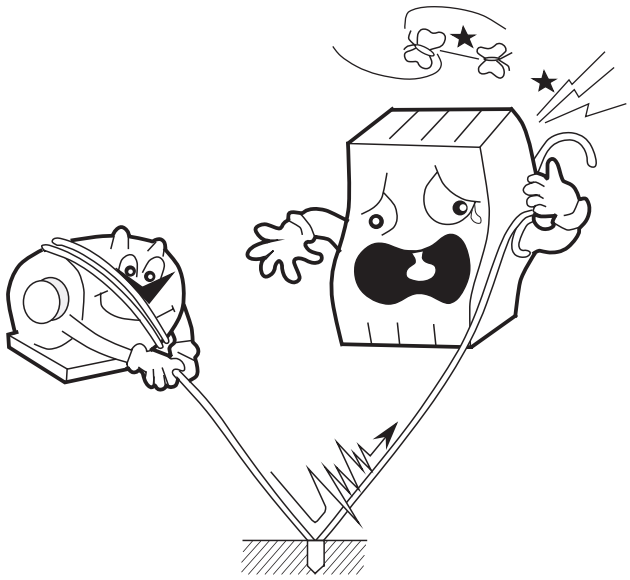


- Are the modules mounted correctly?
  Check that no set screws loosen.



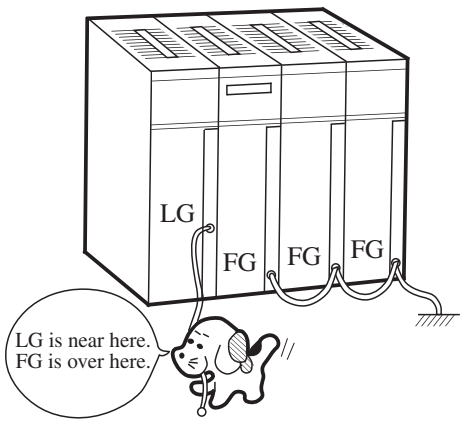
1 PRELIMINARY CHECKS TO BE COMPLETED BEFORE TROUBLESHOOTING

- Is ground made correctly?
  - Separate the grounding from that of high-voltage equipment.
  - Perform grounding work conforming to Class D grounding* or higher.



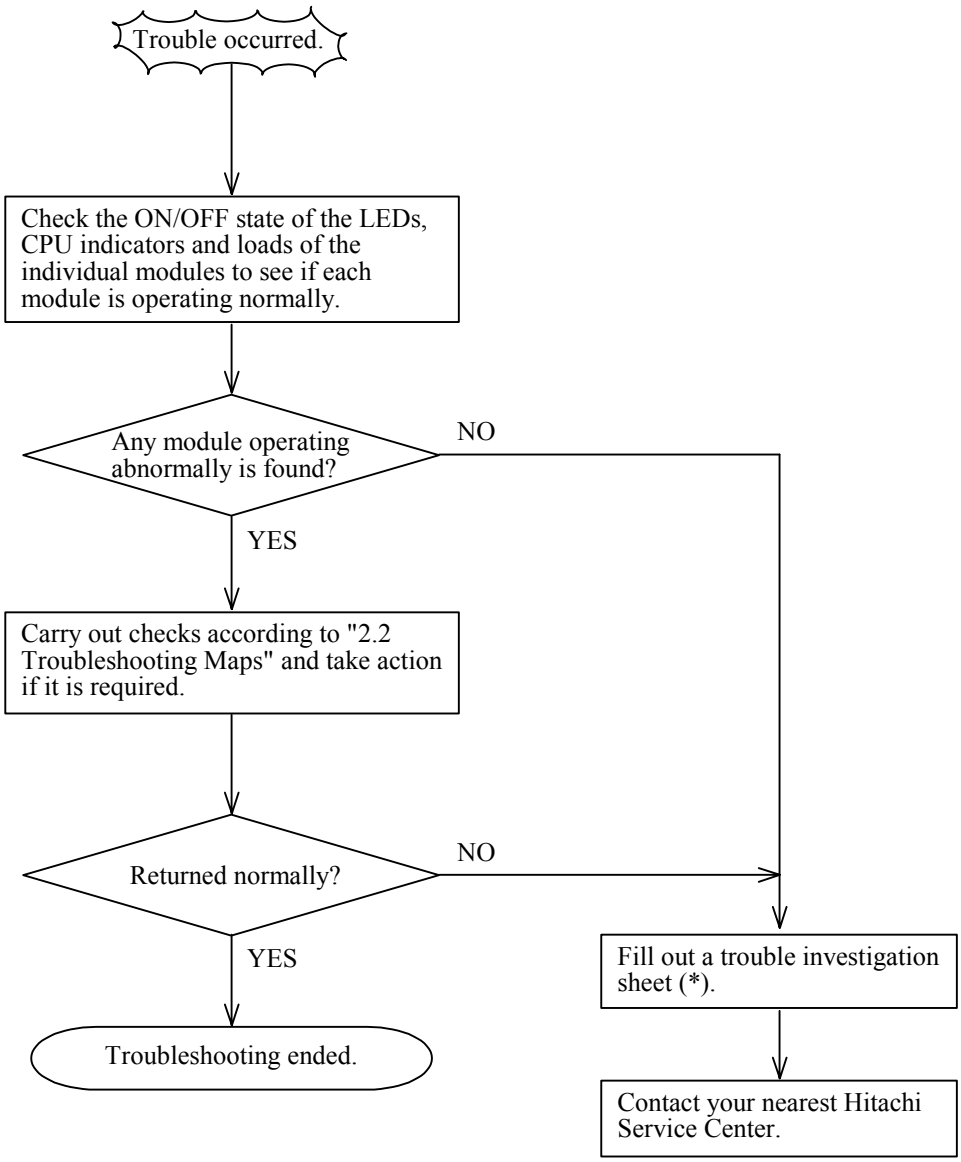
* Class D grounding is defined in the Technical Standard for Electrical Facilities of Japan. This standard states that the grounding resistance must be 100 ohms or less for equipment operating on 300 VAC or less, and 500 ohms or less for devices that shut down automatically within 0.5 seconds when shorting occurs in low tension lines.

- Are LG and FG separated?
  - If electrical noise from the power supply enters the FG (frame ground) via the LG (line ground), a malfunction may result. To prevent this, LG and FG must be separated.
  - Ground the LG at the power supply side.



2 TROUBLESHOOTING

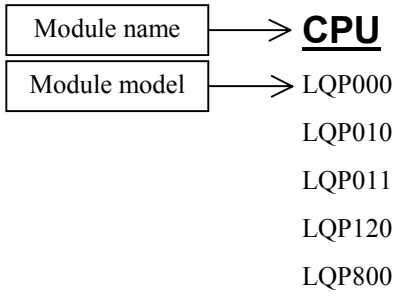
2.1 Troubleshooting Procedure



(*) Use the trouble investigation form provided in the APPENDIX.

2.2 Troubleshooting Maps

Each troubleshooting map given in this section is a guidance map that, when a defect or fault is detected in the system, helps you troubleshoot the system as quickly as possible. The troubleshooting maps have the following general format:



Defect or fault

- The CPU indicator is OFF although it should be ON.

Checkout item	Countermeasure
The CPU power module is running abnormally.	Follow the troubleshooting map for the power supply given below.
The CPU module or CPU power module is mounted improperly.	Mount them properly.
The power from the power module is abnormal in voltage.	Replace the power supply module.
There is a slot left unoccupied between the CPU module and an optional module mounted.	Remount the CPU module and optional module without leaving any unoccupied slot in between.
An I/O module is mounted between the CPU module and an optional module.	Always mount an I/O module to the right of an optional module.

Questions to be answered

Actions to be taken if the statement is true

CPU

LQP000

LQP010

LQP011

LQP120

LQP800

- The CPU indicator is OFF although it should be ON.

Checkout item	Countermeasure
The CPU power module is running abnormally.	Follow the troubleshooting map for the power supply given below.
The CPU module or CPU power module is mounted improperly.	Mount them properly.
The power from the power module is abnormal in voltage.	Replace the power supply module.
There is a slot left unoccupied between the CPU module and an optional module mounted.	Remount the CPU module and optional module without leaving any unoccupied slot in between.
An I/O module is mounted between the CPU module and an optional module.	Always mount an I/O module to the right of an optional module.

- An error message is displayed on the CPU indicator.

Checkout item	Countermeasure
The message on the indicator is actually an error message.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

CPU

LQP000

LQP010

LQP011

LQP120

LQP800

- The remote I/O feature sends out outputs, but it does not take in inputs.

Checkout item	Countermeasure
The CPUs are left unterminated. RI/O1 For termination using a 100Ω resistor, connect the resistor to terminal nos. A6 and A7. For termination using a 150Ω resistor, connect the resistor to terminal nos. A5 and A7. RI/O2 For termination using a 100Ω resistor, connect the resistor to terminal nos. B5 and B6. For termination using a 150Ω resistor, connect the resistor to terminal nos. B4 and B6.	Terminate the CPUs.

- The "PCs OK" output is OFF although it should be ON.

Checkout item	Countermeasure
The CPU switch is placed in the STOP or SIMU RUN position.	Place the switch in RUN.
The CPU power supply module is operating abnormally.	Follow the troubleshooting map for the power supply given below.
An error message is displayed on the indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
Incorrect wiring or connection is made.	Correct the incorrect wiring or connection.

CPU

LQP000

LQP010

LQP011

LQP120

LQP800

- A sequence program does not start running.

Checkout item	Countermeasure
The CPU switch is placed in the STOP or SIMU RUN position.	Place the switch in RUN.
An error message is displayed on the indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
An external STOP input is coming in.	Switch off the input.
The program has a fault in it.	Correct the program code.

- A DI/O or AI/O module mounted on the mount base does not run normally.

Checkout item	Countermeasure
An I/O number setting for the CPU is missing or incorrect.	Refer to "6 SETTINGS," of "CPU (Manual number SME-1-100)" and set the I/O numbers properly.

Power Supply

LQV000

LQV020

LQV100

- The "POWER ON" LED is OFF although it should be ON.

Checkout item	Countermeasure
The power cable is connected improperly.	Connect it properly. (For details, refer to "WIRING MANUAL [manual number SAE-4-001].")
The power cable is broken.	Replace it.
The external power supply is abnormal (in voltage and/or waveform).	Provide a normal external power supply.

ET.NET

LQE020

- No communication can initially be established.

Checkout item	Countermeasure
An error message is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
The module number is set improperly.	Turn the rotary switch at the front of the casing to the "0" (zero) position.
The cable is disconnected.	Insert the cable connector into the mating connector and lock it firmly.
The IP address for this module is set improperly.	Set up the module at the "ET.NET" menu window of PSE.
The IP address for this module is duplicated with some other module's.	Set a unique IP address and a unique subnet mask for each board.
The coaxial cable is left unterminated.	Connect terminating resistors to both ends of the cable.
The "ERR" LED of this module is ON.	Reset the CPU and thereby reboot it. If the "ERR" LED is lit again, replace the module.
Where this module is connected to a 10BASE-5 LAN, a 12-V external power supply is not connected to the terminal block of ET.NET module.	Connect it to the module.

ET.NET

LQE020

- Communication cannot be established with the tool.

Symptom	Checkout item	Countermeasure
The IP address of the ET.NET is not set.	The Module No. Switch of the ET.NET is placed in a position other than "4" or "5".	Using the 10BASE-T LAN, place the switch in the "4" position for the main module or in the "5" position for the submodule.
	The IP address of the personal computer is set to a value other than 192.192.192.**, where ** is in the range of 02 to 254.	Set it to 192.192.192.**, where ** is from 02 to 254.
The IP address of the ET.NET is set.	The IP address of the ET.NET is set via a route other than the RS-232C cable.	Set it via the RS-232C cable.
	The IP address of the personal computer is in conflict with the IP address of the ET.NET (i.e., the network addresses are not the same).	Use the same network address for the personal computer and ET.NET.
	The module No. is set improperly.	Set the module No. to "0" (main module) or "1" (submodule) for 10BASE-5 or to "2" (main module) or "3" (submodule) for 10BASE-T.
The connection information in the ET.NET system window indicates that the connection selection made is non-Ethernet.		Select Ethernet.
The 10BASE-T cable used is a prohibited one.		Use a straight cable when connecting the module to the hub, or a cross cable when connecting it directly to the personal computer.

RS-232C/422

LQE060

LQE160

LQE165

- The "TX" or "RX" LED is OFF although they should be ON.

Checkout item	Countermeasure
The MODU.No. (module No.) is set improperly.	Set it properly.
A parameter for the RS-232C or RS-422 module is set improperly.	Set it properly.
The cable is connected improperly.	Connect the cable properly.
One of the cable connectors of the cable is not firmly connected.	Connect it firmly.
There is a slot left unoccupied between the CPU module and an optional module mounted, or a DI/O or AI/O module is mounted between the CPU module and an optional module.	Remount the CPU module and optional module without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of an optional module.

- The "ERR" LED is ON.

Checkout item	Countermeasure
An RS-232C or RS-422 error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

CPU Link

LQE050

- The "LINK" LED is OFF although it should be ON.

Checkout item	Countermeasure
The CPU power supply module is operating abnormally.	Follow the troubleshooting map for the power supply given above.
The CPU link module or CPU power module is mounted improperly.	Mount them properly.
The MAIN/SUB setting switch is set improperly.	Set them properly. (For details, refer to "CPU LINK [Manual number SME-1-109].")
A support program or the PCs edition is set up improperly during initialization.	
The CPU module is abnormal.	Follow the troubleshooting map for the CPU given above.
The power from the power supply module is abnormal in voltage (at the voltage check terminal).	Replace the power supply module.

J.NET, J.NET-INT

LQE040

LQE045

- The "TX" and/or "RX" LED is OFF although they should be ON.

Symptom	Checkout item	Countermeasure
The "TX" and "RX" are both OFF.	The system information or NET information is set improperly.	Set them properly.
	The MODU.No. switch or BIT RATE switch is set improperly.	Set them properly.
The "TX" and "RX" LEDs are both OFF.	The RI/O STOP terminal on the CPU terminal block is short-circuited.	Clear the short-circuit condition.
	There is a slot left unoccupied between the J.NET or J.NET-INT module and the CPU module, or a DI/O or AI/O module is mounted between the J.NET/J.NET-INT module and CPU module.	Remount the J.NET/J.NET-INT and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.
The "TX" is blinking and the "RX" is OFF.	A J.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
	The cable is connected improperly.	Connect it properly.
	Both right and left terminating resistors are connected improperly.	Connect them properly.
	An abnormality exists in the slave.	Restart the slave normally.
	The NET information settings do not fit the slave.	Set the NET information in conformance with the specifications of the slave.
The "TX" and "RX" are both blinking.	A J.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
	The cable is connected improperly.	Connect it properly.
	A terminating resistor is connected improperly.	Connect it properly.
	The NET information settings do not fit the slave.	Set the NET information in conformance with the specifications of the slave.

- The "ERR" LED is ON.

Checkout item	Countermeasure
The MODU.No. switch or BIT RATE switch is set improperly.	Set them properly.
There is a slot left unoccupied between the J.NET or J.NET-INT module and the CPU module, or a DI/O or AI/O module is mounted between the J.NET/J.NET-INT module and CPU module.	Remount the J.NET/J.NET-INT and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.
A J.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

- Other faults

Symptom	Checkout item	Countermeasure
Digital outputs are cleared.	The set value of the max_int parameter is too small.	The set value of the max_int should be larger than or equal to the refresh cycle value multiplied by 5, which is set as an item of system information.
Neither transmitted data nor received data is updated.	The transfer area for NET information is defined improperly.	Define it properly.
Communications are timed out.	The communication cable is laid parallel to a high-voltage cable or near some other noise source.	Keep a sufficient distance between the communication cable and the noise sources.

OD.RING/SD.LINK

LQE010

LQE015

LQE030

- The "TX" or "RX" LED is OFF although they should be ON.

Checkout item	Countermeasure
The MODU.No. switch or CPL No. switch is set improperly.	Set them properly.
The parameters for the OD.RING or SD.LINK module are not set with an appropriate tool.	Set them properly with a designated tool.
The cable is connected improperly (e.g., it is broken or connected to a wrong destination).	Connect it properly.
The cable connectors of the cable are connected improperly.	Refer to "3.2 Wiring," of "OD.RING (Manual number SME-1-102)" or of "SD.LINK (Manual number SME-1-115)" and connect the cable connectors properly.
The OD.RING or SD.LINK module of the destination is operating abnormally.	Restart the modules properly at the destination.
The optical fiber cable is bent too sharply.	Replace the cable.

- The "ERR" LED is ON.

Checkout item	Countermeasure
The MODU.No. switch or CPL No. switch is set improperly.	Set them properly.
The CPL No. of this module is duplicated with some other OD.RING or SD.LINK module's.	Set a unique CPL No. for this module.
An OD.RING or SD.LINK error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
There is a slot left unoccupied between the OD.RING or SD.LINK module and the CPU module, or a DI/O or AI/O module is mounted between the OD.RING/SD.LINK module and CPU module.	Remount the OD.RING/SD.LINK and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.

D.NET

LQE070

LQE170

- The "MNS" LEDs do not come on normally.

Symptom	Checkout item	Countermeasure
The green LED is blinking and the red LED is OFF.	The cable is connected improperly.	Connect it properly.
	Both right and left terminating resistors are connected improperly.	Connect it properly.
	The slave is not yet defined in the system.	Define it properly.
	The slave is not up and running normally.	Restart the slave properly.
The green LED is OFF and the red LED is ON.	The NA switch setting for this node is duplicated with some other node's.	Set the NA switch of this node uniquely.
	The NA, DR or Module No. switch is set improperly.	Set them properly.
	A D.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
The green LED is OFF and the red LED is blinking.	The cable is connected improperly.	Connect it properly.
	Both right and left terminating resistors are connected improperly.	Connect it properly.
	The cable connector at this module is not firmly connected.	Connect it firmly.
The green LED and red LED are both OFF.	A D.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
	The NA, DR or Module No. switch is set improperly.	Set them properly.
	There is a slot left unoccupied between the D.NET module and the CPU module, or a DI/O or AI/O module is mounted between the D.NET module and CPU module.	Remount the D.NET and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.

- Other faults

Checkout item	Countermeasure
Where this module is connected with a slave from some other manufacturer, an external power supply is not connected to the terminal block of ET.NET module.	Connect it to the module.
Where this module is connected with a slave from some other manufacturer, the bit inversion mode is not selected by parameter setting.	Select the mode.

FL.NET

LQE000

- The "TX" or "RX" LED is OFF although they should be ON.

Checkout item	Countermeasure
The MODU.No. is set improperly.	Set it properly.
The IP address for this node is duplicated with some other node's.	Set a unique IP address for this node.
The IP address for this node is set improperly.	Use the same network address for this node and all other nodes in the same network. The recommended network address is 192.168.250.
A parameter for this FL.NET module is set improperly.	Set it properly.
Where this module is connected to a 10BASE-T LAN, the cable used is not a right one.	Use a straight cable when connecting the module to the hub. When connecting it directly to the destination by skipping the intervening hub, use a cross cable in place of straight cables.
Where this module is connected to a 10BASE-5 LAN, the SQE switch of the connected transceiver is set improperly.	Place the switch in the ON position if the connected transceiver is a single-port type. If the single-port transceiver is connected with a multiport transceiver or a repeater, place the SQE switch of the single-port transceiver in the OFF position.
The cable connector at this module is not firmly connected.	Connect the cable connector firmly and lock it.
Where this module is connected to a 10BASE-5 LAN, a 12-V external power supply is not connected to the terminal block of ET.NET module.	Connect it to the module.
There is a slot left unoccupied between the FL.NET module and the CPU module, or a DI/O or AI/O module is mounted between the FL.NET module and CPU module.	Remount the FL.NET and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.
The 10BASE-5 coaxial cable is left unterminated.	Terminate it properly.
The 10BASE-5 coaxial cable is grounded improperly.	Ground it properly.

- The "ERR" LED is ON.

Checkout item	Countermeasure
An FL.NET error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

- Other faults

Checkout item	Countermeasure
The FL.NET communication cable is connected with some other Ethernet (TCP/IP) line.	Disconnect the cable from the other Ethernet line.

- Common network problems and required actions

  (1) Network problems (communication not establishable) and required actions

Symptom	Faulty Location	Checkout item	Countermeasure
Communication not establishable	Power supply	The main power lamp of the FL.NET is OFF.	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
		The power lamp of the AUI power supply unit is OFF.	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
		The output voltage of the AUI power supply unit is not at the specified voltage value (12 V).	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
		The power lamp of the hub is OFF.	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
		The AUI power cable is connected improperly to the FL.NET.	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
	Communication cable and transceiver connection	The transceiver connection is loose.	Carry out wiring work again according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		A checking tool to check the transceiver wiring condition is indicating the presence of an abnormality.	Adjust the transceiver until the abnormality is cleared. If the same abnormality persists, reinstall the transceiver elsewhere.
		The transceiver is insulated improperly.	Carry out wiring work again according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		The transceiver is installed on a location other than the marker on the communication cable.	Reinstall the transceiver properly according the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
	Transceiver cable and transceiver connection	The transceiver cable connection is loose.	Carry out wiring work again according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)", and tighten the cable connection.
		A checking tool to check the transceiver wiring condition is indicating the presence of an abnormality.	Clear the abnormality according the checking tool instruction manual.
		The transceiver is locked improperly.	Relock it properly according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		The transceiver LED is OFF or illuminating unstably.	Check the power supply, power cable and voltage to see if they are normal or connected firmly. Then, the abnormality could be cleared.
	Transceiver cable and FL.NET connection	The transceiver cable connection is loose.	Carry out wiring work again according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)", and tighten the cable connection.
		The TX (transmission) or RX (reception) LED of the FL.NET is OFF or illuminating unstably.	Clear the abnormality according to the instructions given in Chapter 8 of "FL.NET (Manual number SME-1-101)."
		A media selector switch (e.g., the SQE switch) is set improperly.	Correct the switch setting according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."

(2) Network problems (communication unstable) and required actions

Symptom	Faulty Location	Checkout item	Countermeasure
Communication unstable or not establishable	Transmission path	The coaxial cable external conductor is not grounded at one point.	Ground it properly according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		The AUI cable's shielded wire is not properly grounded.	Ground it according to manufacturer instructions.
		A station does not properly respond to the Ping command.	Troubleshoot the power supply and cables of the non-responding station.
		The collision lamp frequently glows.	Troubleshoot any cable or connector that is in poor contact. With an analyzer, identify abnormalities. Clear abnormalities if they are identified.
		More than four repeaters are connected in cascade.	Review the configuration according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		A segment is beyond the specified length limit.	Review the configuration according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		Terminating resistors are not installed at both ends.	Review the configuration according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		The number of connected devices inside each segment is beyond the specified limits.	Review the configuration according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		More than three segments are connected to the device.	Review the configuration according to the instructions given in Section 9.6 of "FL.NET (Manual number SME-1-101)."
		The repeater power is OFF.	Check the power supply, power cable and voltage, then clear the abnormality.
	Communicating-station device setup check	The network IP address is set improperly.	With the support tool and analyzer, check the IP address setting and correct it.
		The device station number is set improperly.	With the support tool and analyzer, check the station number setting and correct it.
		A device parameter is set improperly.	With the support tool, check the device parameter setting and correct it.
		The CD (carrier detection) lamp does not glow steadily or intermittently.	Check the communication cable, AUI power supply, and other items, then clear the abnormality.
		The TX (transmission) lamp does not glow steadily or intermittently.	Check the device settings and clear the abnormality.
		The LK (link) lamp does not glow steadily.	Check the device parameter settings and clear the abnormality.

(3) Checking the IP address with the personal computer's "Ping" feature

The connection and IP address setting for the target FL.NET device can be checked without using the FL.NET network analyzer or any other special tool. Such a check can also be conducted with the "Ping" feature of a general-purpose Windows® 95 personal computer or the like. The table below outlines the IP address checkout procedure using the "Ping" feature.

<table>
<tr><td rowspan="4">Checking the IP connection with "Ping"</td><td>Check the IP connection by issuing the "Ping" command in the following procedure:</td></tr>
<tr><td>(1) From [Start] of Windows® 95, sequentially choose [Programs] and [MS-DOS Prompt] to open an MS-DOS window.

Microsoft® Windows 95
(C)Copyright Microsoft Corp 1981-1996.
C:\WINDOWS></td></tr>
<tr><td>(2) Enter the "Ping" command to conduct a basic communication test for the purpose of checking the communication between the link unit and personal computer.
To make a Ping command entry, type in "Ping [IP-address]" or "Ping [host-name]".
Example (IP address): Ping 192.168.250.13
When the target FL.NET device is properly set, the following message appears on the display.

Pinging 192.168.250. 13 with 32 bytes of data
Reply from 192.168.250. 13: bytes=32 time=2ms TTL=32
Reply from 192.168.250. 13: bytes=32 time=1ms TTL=32
Reply from 192.168.250. 13: bytes=32 time=1ms TTL=32
Reply from JEMA 192.168.250. 13 : bytes=32 time=1ms TTL=32
C:\WINDOWS></td></tr>
<tr><td>(3) If the connection is not verifiable (i.e., not such connection exists), the following timeout indication appears on the display.

Pinging 192.168.250. 13 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
C:\WINDOWS></td></tr>
</table>

- Precautions for FL.NET use

  For the FL.NET transmission path requirements, see IEEE 802.3 standard. In addition to such requirements, you must observe the FL.NET-specific limitations and precautions that are described in the table below.

<table>
<tr><th>Description</th></tr>
<tr><td>Ensure that no other Ethernet communication data flows along the FL.NET communication cable.</td></tr>
<tr><td>Do not connect the FL.NET to a router.</td></tr>
<tr><td>The use of a switching hub for the FL.NET does not produce any beneficial effect.</td></tr>
<tr><td>The use of infrared, radio, or like medium may substantially decrease the real-time capability of communications.</td></tr>
<tr><td>When you use a personal computer, the real-time capability of communications may substantially change depending on the personal computer capacity and the employed OS and applications.</td></tr>
<tr><td>Use a specified IP address only. The same network address must be used (the standard network address is 192.168.250.). For the node number (station number) in the IP address, the following input range is recommended.
A node number set is not checked for duplication during initialization; it is first checked when it is actually used for communication. If a duplicate node number is used for communication, a node number duplication error occurs. Exercise care not to set a duplicate node number.
<table>
<tr><th>Network Address</th><th>Node Number</th></tr>
<tr><td>192.168.250.</td><td>1 to 249</td></tr>
</table>
</td></tr>
<tr><td>Make a proper ground wire connection. Ensure that the employed ground wire has a sufficient thickness.</td></tr>
<tr><td>Ensure that the FL.NET is positioned at an adequate distance from a noise source. Also, avoid installing the FL.NET together with a mains power line or the like.</td></tr>
<tr><td>When cyclic data communication and message data communication are simultaneously effected, the real-time capability may deteriorate depending on the data amount and the like.</td></tr>
<tr><td>Cyclic data communication areas (common memory areas) need not contiguously be allocated.</td></tr>
<tr><td>When the transceiver is equipped with an SQE switch, set it up in accordance with its instruction manual.</td></tr>
<tr><td>The regular communication capability depends on the processing capacities of the connected devices. The entire communication is effected with the communication processing speeds of all the networked devices adjusted for the slowest device's communication processing capability (minimum permissible frame interval). Therefore, the connection or addition of a single device may significantly deteriorate the real-time capability of the entire system.</td></tr>
<tr><td>Although the header section of message data communications is in big-endian format, the data section is in little-endian format. Note, however, that the system parameters in the data section for a profile read are in big-endian format (the use of the big-endian format transmits the MSB first).</td></tr>
</table>

IR.LINK

LQE046

- The "TX" and/or "RX" LED is OFF although they should be ON.

Symptom	Checkout item	Countermeasure
The "TX" and "RX" LEDs are both OFF.	The system information or NET information is set improperly.	Set them properly.
	The MODU.No. switch or BIT RATE switch is set improperly.	Set them properly.
	The RI/O STOP terminal on the CPU terminal block is short-circuited.	Clear the short-circuit condition.
	There is a slot left unoccupied between the IR.LINK module and the CPU module, or a DI/O or AI/O module is mounted between the IR.LINK module and CPU module.	Remount the IR.LINK and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.
The "TX" is blinking and the "RX" is OFF.	An IR.LINK error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
	The cable is connected improperly.	Connect it properly.
	A terminating resistor is connected improperly.	Connect it properly.
	An abnormality exists in the slave.	Restart the slave normally.
	The NET information settings do not fit the slave.	Set the NET information in conformance with the specifications of the slave.
The "TX" and "RX" are both blinking.	An IR.LINK error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."
	The cable is connected improperly.	Connect it properly.
	A terminating resistor is connected improperly.	Connect it properly.
	The NET information settings do not fit the slave.	Set the NET information in conformance with the specifications of the slave.

- The "ERR" LED is ON.

Checkout item	Countermeasure
The MODU.No. switch or BIT RATE switch is set improperly.	Set them properly.
There is a slot left unoccupied between the IR.LINK module and the CPU module, or a DI/O or AI/O module is mounted between the IR.LINK module and CPU module.	Remount the IR.LINK and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.
An IR.LINK error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

- Other faults

Symptom	Checkout item	Countermeasure
Digital outputs are cleared.	The set value of the max_int parameter is too small.	The set value of max_int should be larger than or equal to the refresh cycle value multiplied by 5, which is set as an item of system information.
Neither transmitted data nor received data is updated.	The transfer area for NET information is defined improperly.	Define it properly.
Communications are timed out.	The communication cable is laid parallel to a high-voltage cable or near some other noise source.	Keep a sufficient distance between the communication cable and the noise sources.

SV.LINK

LQE021

- The "TX" or "RX" LED is OFF although they should be ON.

Checkout item	Countermeasure
The MODU.No. is set improperly.	Set it properly.
The IP address for this node is duplicated with some other node's.	Set a unique IP address for this node.
The IP address for this node is set improperly.	Set it properly.
A parameter for this SV.LINK module is set improperly.	Set it properly.
Where this module is connected to a 10BASE-T LAN, the cable used is not a right one.	Use a straight cable when connecting the module to the hub. When connecting it directly to the destination by skipping the intervening hub, use a cross cable in place of straight cables.
Where this module is connected to a 10BASE-5 LAN, the SQE switch of the connected transceiver is set improperly.	Place the switch in the ON position if the connected transceiver is a single-port type. If the single-port transceiver is connected with a multiport transceiver or a repeater, set the SQE switch of the single-port transceiver in the OFF position.
The cable connector at this module is not firmly connected.	Connect the cable connector firmly.
Where this module is connected to a 10BASE-5 LAN, a 12-V external power supply is not connected to the module.	Connect it to the module.
There is a slot left unoccupied between the SV.LINK module and the CPU module, or a DI/O or AI/O module is mounted between the SV.LINK module and CPU module.	Remount the SV.LINK and CPU modules without leaving any unoccupied slot in between, or remount the DI/O or AI/O module to the right of the optional module.

- The "ERR" LED is ON.

Checkout item	Countermeasure
An SV.LINK error indication is displayed on the CPU indicator.	Take appropriate action according to the instructions provided in "4 ERROR INDICATIONS."

- Other faults

Checkout item	Countermeasure
The SV.LINK communication cable is connected with a station of some other Ethernet network.	Disconnect the cable from the other Ethernet line.

RI/O

LQS000

- The "RI/O" LED is OFF.

Checkout item		Countermeasure
The CPU switch is placed in the SIMU RUN position.		Place the switch in STOP or RUN.
The CPU module is operating abnormally.		Follow the troubleshooting map for the CPU given above.
The set station number is incorrect.		Set the correct station number. (For details, refer to "CPU [Manual number SME-1-100].")
The remote I/O cable has an abnormality.	Wire broken	Replace the cable.
	Impermissible wiring length	
	Defective connection	Connect it firmly.
	Left unterminated	Terminate it.
The set value of the remote I/O transfer point count is smaller than the number of such transfer points actually used. (Check the count in the PCs edition.)		Change the count to a value greater than the number of the actually used transfer points.
The I/O power supply module is operating abnormally.		Follow the troubleshooting map for the power supply given above.
The power supply module or station module is installed improperly.		Install it properly.
The power from the power module is abnormal in voltage (at the voltage check terminal).		Replace the power supply module.
The RI/O STOP input terminal on the CPU terminal block is receiving the input signal.		Switch off the RI/O STOP input.

D.Station

LQS070

- The "MNS" LEDs do not come on normally.

Symptom	Checkout item	Countermeasure
The green LED is blinking and the red LED is OFF.	The cable is connected improperly or disconnected.	Connect it properly.
	A terminating resistor is connected improperly.	Connect it properly.
	The D.Station module is not yet defined in the master.	Define it properly.
	The D.Station module definition in the master is incorrect.	Redefine the module in conformance with the D.Station specifications.
	The master is not up and running normally.	Restart the master properly. If the master is a D.NET module, follow the troubleshooting map for the D.NET module given above.
The green LED is OFF and the red LED is ON.	The NA switch setting for this node is duplicated with some other node's.	Set the NA switch of this node uniquely.
	The NA, SLOT, FUNK1 or FUNK2 switch is set improperly.	Set them properly.
The green LED is OFF and the red LED is blinking.	The cable is connected improperly.	Connect it properly.
	A terminating resistor is connected improperly.	Connect it properly.
	The cable connector at this module is not firmly connected.	Connect it firmly.
The green LED and red LED are both OFF.	The NA, SLOT, FUNK1 or FUNK2 switch is set improperly.	Set them properly.
	The NA switch setting for this node is duplicated with some other node's.	Set the NA switch of this node uniquely.

- Other faults

Checkout item	Countermeasure
Where this module is connected with a DeviceNet master from some other manufacturer, an external power supply for the master is not connected to the network.	Connect it to the network. (If the master is a D.NET module, an external power supply need not be connected.)

IR.Station

LQS000

- The "TX/RX" LED is OFF although they should be ON.

Checkout item	Countermeasure
The BIT RATE or ST.No. switch is set improperly.	Set them properly.
The IR.Station module is connected improperly on the terminal block.	Connect it properly.
The IR.LINK module is not up and running normally.	Restart the module properly. If an IR.LINK error is reported, see the troubleshooting map for the IR.LINK module.
The IR.LINK settings do not fit the IR.Station.	Re-set the IR.LINK module in conformance with the IR.Station specifications.
The cable is connected improperly.	Connect it properly.
The cable is not firmly connected.	Firmly connect it to the terminal block.
A terminating resistor is connected improperly.	Connect it properly.

- The "ERR" LED is ON.

Checkout item	Countermeasure
The BIT RATE or ST.No. switch is set improperly.	Set them properly.

J.Station

LQS020

- The "J-NET" LED is OFF although it should be ON.

Checkout item	Countermeasure
The BIT RATE or ST.No. switch is set improperly.	Set them properly.
The J.Station module is connected improperly on the terminal block.	Connect it properly.
The master is not up and running normally.	Restart the master properly. If the master is a J.NET module, see the troubleshooting map for the J.NET module.
The master settings do not fit the J.Station.	Re-set the master in conformance with the J.Station specifications.
The cable is connected improperly.	Connect it properly.
The cable is not firmly connected.	Firmly connect it to the terminal block.
A terminating resistor is connected improperly.	Connect it properly.

- The "ERR" LED is ON.

Checkout item	Countermeasure
The BIT RATE or ST.No. switch is set improperly.	Set them properly.

Analog Input

LQA0**

LQA1**

LQA2**

- Unable to take in input data

Checkout item	Countermeasure
The I/O power supply module is operating abnormally.	Follow the troubleshooting map for the power supply given above.
The station is operating abnormally.	Follow the troubleshooting map for the station given above.
The analog input module is mounted improperly.	Remount it properly.
The terminal block is mounted improperly.	Remount it properly.
The input cable is connected improperly.	Re-connect the cable properly.
The grounding used disregards the grounding rules.	Ground it properly.
The allowable input range is exceeded.	Observe the range rule.
Where mode 1 is selected by parameter setting, the analog module is undefined in the CPU.	Define the module with the tool.
The RANGE switch is set improperly.	Set it properly.

Analog Output

LQA5**

LQA6**

- Output voltage or current is abnormal.

Checkout item	Countermeasure
The I/O power supply module is operating abnormally.	Follow the troubleshooting map for the power supply given above.
The station is operating abnormally.	Follow the troubleshooting map for the station given above.
The analog output module is mounted improperly.	Remount it properly.
The terminal block is mounted improperly.	Remount it properly.
The output cable is connected improperly.	Re-connect the cable properly.
The grounding used disregards the grounding rules.	Ground it properly.
The output is directed to a wrong channel.	Output the correct channel data.
Where mode 1 is selected by parameter setting, the analog module is undefined in the CPU.	Define the module with the tool.
The RANGE switch is set improperly.	Set it properly.

Digital Input

LQX***

- Not all input points turn ON when all should.

Checkout item			Countermeasure
The operation status indicator LED is ON or OFF.	OFF	The terminal block is mounted improperly.	Remount it properly.
		The module-mounting screws are loose.	Retighten the screws.
		External power is not being supplied to the module.	Supply it to the module.
		The voltage of the external power source is too low.	Increase the voltage.
		The voltage of the internal power supply is too low (at the voltage check terminal of the PS).	Replace the power supply module.
		Incorrect external wiring.	Correct it.
	ON	The station module is operating abnormally.	Follow the troubleshooting map for the station module given above.

- Particular input points do not turn ON.

Checkout item			Countermeasure
The operation status indicator LED is ON or OFF.	OFF	The terminal block (connector) is loose.	Reinstall it properly.
		The terminal block (connector) is destroyed.	Replace it.
		The external input remains ON too short.	Adjust the external equipment.
		Loose external wiring.	Wire it properly.
	ON	A wrong I/O address is used.	Correct the I/O address.

Digital Input

LQX***

- Not all input points turn OFF when all should.

Checkout item	Countermeasure
The operation status indicator LED is OFF.	Replace the module.
The operation status indicator LED does not come on.	Check if the external wiring is correct. If it is correct, replace the module.

- The input points turn ON and OFF irregularly.

Checkout item	Countermeasure
The external input voltage is too low.	Increase it.
The anti-noise measure taken is insufficient.	• Install surge killers. • Keep the input cable away from noise sources. For more information, refer to "WIRING MANUAL (Manual number SAE-4-001)."

- Particular input points do not turn OFF.

Checkout item	Countermeasure
External equipment is abnormal.	Adjust it.

Digital Output

LQY***

- Not all load points turn ON when all should.

Checkout item			Countermeasure
The I/O power supply module is operating abnormally.			Follow the troubleshooting map for the power supply given above.
The module is mounted improperly.			Remount it properly.
The operation status indicator LED is ON or OFF.	OFF	The station module is operating abnormally.	Follow the troubleshooting map for the station given above.
		The CPU is operating abnormally.	Follow the troubleshooting map for the CPU given above.
	ON	External load power is not being supplied.	Supply it.
		The voltage of the external load power supply is too low.	Increase it.

- Particular load points do not turn ON.

Checkout item			Countermeasure
The operation status indicator LED is ON or OFF.	OFF	The duration of the ON condition is too short.	Correct the program.
		A wrong I/O address is used.	
	ON	The external load is disconnected.	Troubleshoot the load.
		The terminal block (connector) is loose.	Reinstall it properly.
		The terminal block (connector) is destroyed.	Replace it.
		Incorrect external wiring.	Correct it.
		Module failure due to an overcurrent.	Troubleshoot the external load and replace the module.

Digital Output

LQY***

- Not all load points turn OFF when all should.

Checkout item	Countermeasure
The station module is operating abnormally.	Follow the troubleshooting map for the station given above.
The CPU is operating abnormally.	Follow the troubleshooting map for the CPU given above.

- Particular load points do not turn OFF.

Checkout item			Countermeasure
The operation status indicator LED is ON or OFF.	OFF	Malfunction due to a leakage current or saturation voltage.	Connect resistors outside of digital outputs to suppress a leakage current.
		Module failure due to an overcurrent.	Troubleshoot the external load and replace the module.
	ON	The station module is operating abnormally.	Follow the troubleshooting map for the station given above.
		The CPU is operating abnormally.	Follow the troubleshooting map for the CPU given above.

Digital Output

LQY***

- The load points turn ON and OFF irregularly.

Checkout item		Countermeasure
The external load power supply voltage is too low.		Increase it.
The anti-noise measure taken is insufficient.		• Install surge killers. • Keep the output cable away from noise sources. For more information, refer to "WIRING MANUAL (Manual number SAE-4-001)."
The remote I/O cable has an abnormality.	Wire broken	Replace the cable.
	Impermissible wiring length	
	Defective connection	Connect it firmly.
	Left unterminated	Terminate it.
The program has a fault in it.		Correct the program code.

Pulse Counter

LQC000

- The counter does not count.

Checkout item		Countermeasure
The I/O power supply module is operating abnormally.		Follow the troubleshooting map for the power supply given above.
The station module is operating abnormally.		Follow the troubleshooting map for the station given above.
The module is mounted improperly.		Mount it properly.
An external stop pulse is input.		Clear it.
The user program coded assumes that a "stop counting" signal is continuously coming in.		Correct the coding.
The Up/Down direction indicator LED is blinking or not during input of pulses.		
Not blinking	The wiring for input pulses is incorrect.	Correct the wiring. (For details, refer to "4 CHANNEL ANALOG/PULSE COUNTER (Manual number SAE-2-201.)"
	External power is not being supplied to the module.	Supply it to the module.
	The voltage of the external power source is too low.	Increase the voltage.
	The input pulses received do not meet the following requirements: 20k PPS 50% duty ratio	Feed input pulses meeting the stated requirements.
The pulse counter is undefined in the CPU.		Defined it with the tool.

Pulse Counter

LQC000

- The count value is abnormal.

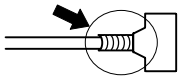
Checkout item	Countermeasure
The input pulse count exceeds 20k PPS.	Reduce it to 20k PPS or less.
Extra pulses due to noise are received.	Take a sufficient anti-noise measure.

- The external comparison output capability is not functioning.

Checkout item	Countermeasure
External power is not being supplied to the module.	Supply it to the module.
The voltage of the external power source is too low.	Increase the voltage.
Incorrect external wiring.	Correct it.

Personal Computer Connection

- A connection cannot be established with the PCs via the RS232-C port.

Checkout item	Countermeasure
The cable connector is loose.	Tighten the cable connector screws.
A connector pin is bent.	Replace the cable.
The connection between cable and connector is loose. 	
A cable type other than specified is used.	

- A connection cannot be established with the PCs via the Ethernet (ET.NET) port.
  See "Communication cannot be established with the tool" under "ET.NET" in this section.

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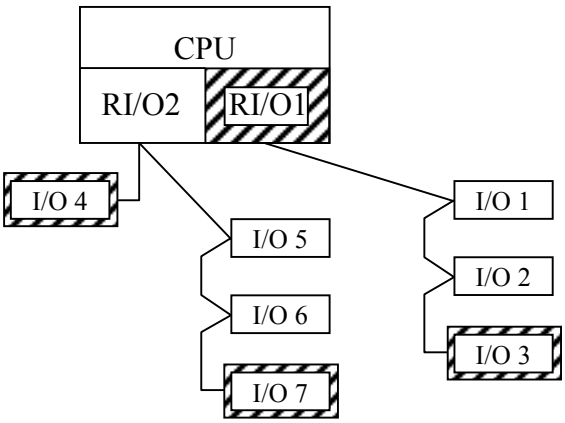
3 TECHNICAL SUPPORT INFORMATION

3.1 Troubleshooting of Remote I/O

If input/output operations on the X and Y areas fail, troubleshoot the remote I/O feature, as described below.

- Are terminating resistors connected?
  As shown below, terminating resistors must be connected to the CPU and I/O unit located at the two ends of a transmission line.



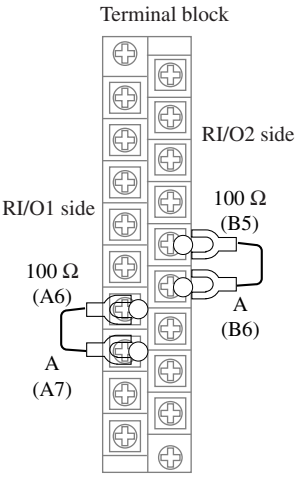
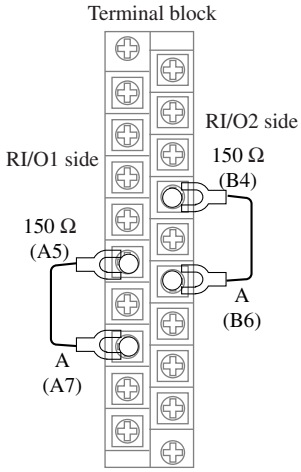
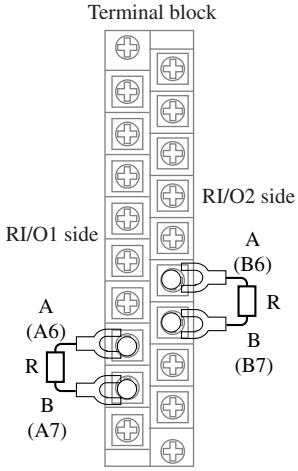
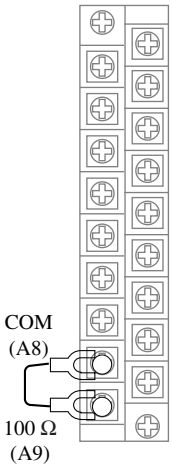
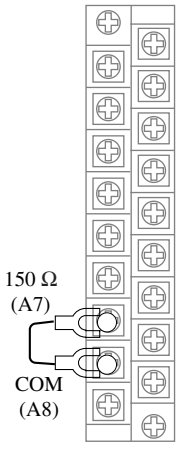
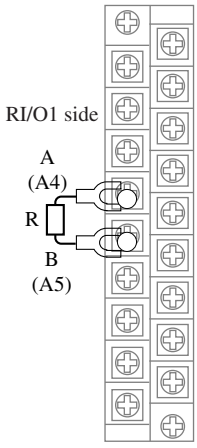
: A unit requiring a terminating resistor.

For instance, as regards the RI/O1-side line shown left, terminating resistors must be connected to its end points in the CPU and in the I/O3 unit. For the RI/O2-side line, its end points are located in the CPU, I/O4 and I/O7 units, and terminating resistors must be connected thereto.

Note: The CPU has two remote I/O lines: RI/O1 and RI/O2. The X and Y numbers assigned for these two lines are as follows:
RI/O1: 000 - 3FF
RI/O2: 400 - 7FF

How to Connect Terminating Resistors

When a specified cable type is used, it can be terminated with internal resistors of 100 Ω or 150 Ω by short-circuiting terminals on the terminal block as shown below. If a non-specified cable type is used and is to be terminated with resistors other than 100 Ω or 150 Ω, each resistor can be connected between the signal input terminals (A and B) on the terminal block.

	Terminating with 100 Ω Resistor	Terminating with 150 Ω Resistor	Terminating with User-selected Resistor
CPU module	 A: Connected along with a signal cable.	 A: Connected along with a signal cable. Connect terminating resistors to the ports left unconnected with remote I/O cables.	 R: Characteristic impedance of a remote I/O cable. A, B: Each connected with a signal cable.
RI/O station module			 R: Characteristic impedance of a remote I/O cable. A, B: Each connected with a signal cable.

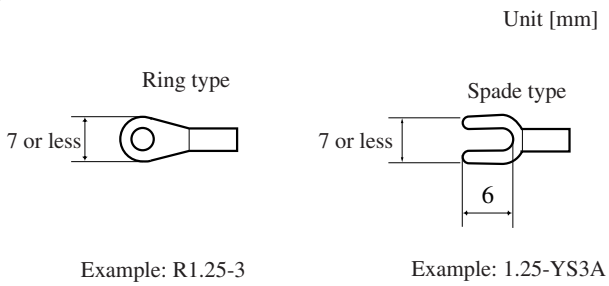
Signal Name	Terminal No.			
	CPU Module		RI/O Module	
	RI/O1	RI/O2	RI/O1	RI/O2
150 Ω	A5	B4	A7	-
100 Ω	A6	B5	A9	-
COM	-	-	A8	-
A	A7	B6	A4	B5
B	A8	B7	A5	B6
SHD	A9	B8	A6	B7

■ Recommended terminating resistor specification
Material: Metal oxide film or metal film.
Resistance: Same value as the cable impedance.
Precision: ±10%
Capacity: 1/2 W
Type: Axial-lead

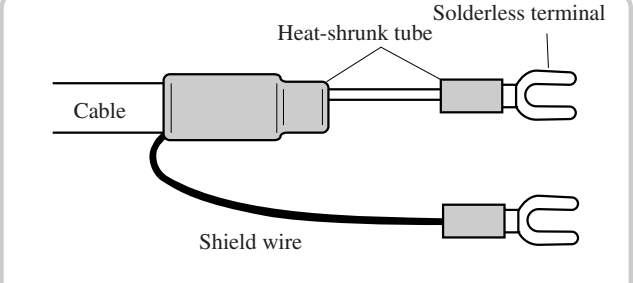
- Is it an I/O address and, if so, unique?
  Check the address switch of the station module in I/O unit.
- Is a remote I/O cable of specified type used?
  All the communication cables, power cables and grounding cables must conform to the following specification:

Item			Specification	Remarks
Remote I/O	Long-distance lines (up to 300 m per line)	Characteristic impedance	150 Ω	
		Attenuation factor	10 dB/km	750 kHz
		Cable size	• 0.75 mm^2 (CO-EV-SX-1P×0.75SQ) • 0.3 mm^2 (CO-EV-SB-1P×0.3SQ)	
		Recommended cable type	• CO-EV-SX-1P×0.75SQ • CO-EV-SB-1P×0.3SQ	Hitachi Cable, Ltd.
		Terminating resistance	150 Ω	
	Intermediate-distance lines (up to 200 m per line)	Characteristic impedance	150 Ω	
		Attenuation factor	12 dB/km	750 kHz
		Cable size	0.18 mm^2	
		Recommended cable type	CO-EV-SB-1P×0.18SQ	Hitachi Cable, Ltd.
		Terminating resistance	150 Ω	
	Short-distance lines (up to 100 m per line)	Characteristic impedance	100 Ω	
		Attenuation factor	21 dB/km	750 kHz
		Cable size	0.3 mm^2	
		Recommended cable type	CO-SPEV-SB-1P	Hitachi Cable, Ltd.
		Terminating resistance	100 Ω	

■ Connect the cable with solderless terminals.



Solderless terminal



Solderless terminals and cable connections

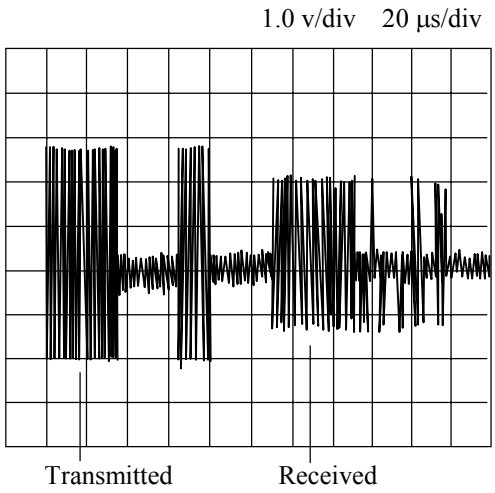
Note: Do not use different types of cable for the same communication line.

- Unnecessary X and Y numbers are defined.
  These unnecessary X and Y numbers need no correction if they are set along with an I/O address. This is true even when an I/O module is not installed for them. The reason is that X and Y numbers are always defined automatically.
  If unnecessary X and Y numbers are defined without an I/O address (i.e., a corresponding I/O unit nonexistent), it is conceivable that an I/O unit of some old model (in which a station module such as PST350 or PST360 is installed in the left-end slot) is connected to the CPU, and that the number of remote I/O transfer points for the CPU is set to 1024 or greater. If this is the case, reduce the number to 512 or smaller. It should be noted that old I/O unit models may only be connected to the RI/O1 line of the two existing remote I/O lines in the CPU. To avoid any trouble, use an S10/2α I/O unit instead.

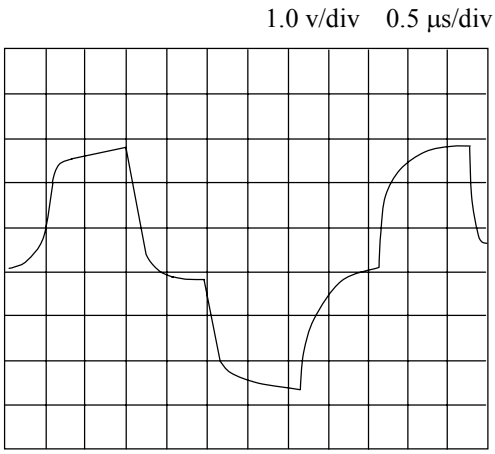
- Is power being supplied to the I/O unit?
  Check if the power lamp is lit on the power supply module LQV000, LQV020 or LQV100 installed in the left-end slot in the I/O unit. If not, supply power to it.

- Waveforms of remote I/O signals and inter-CPU link signals

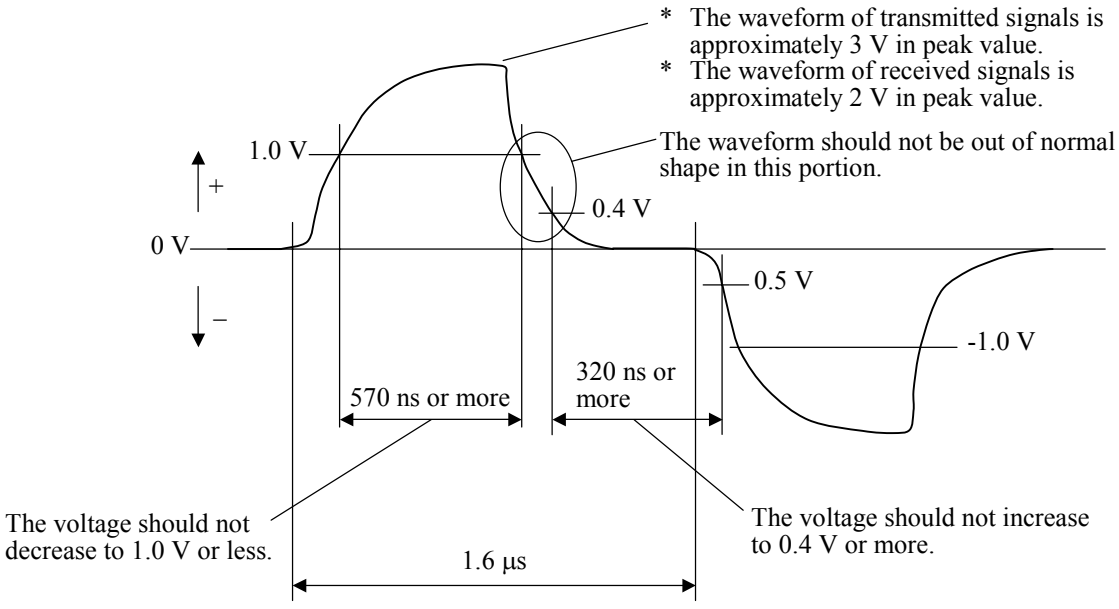
(1) Waveforms of transmitted and received signals



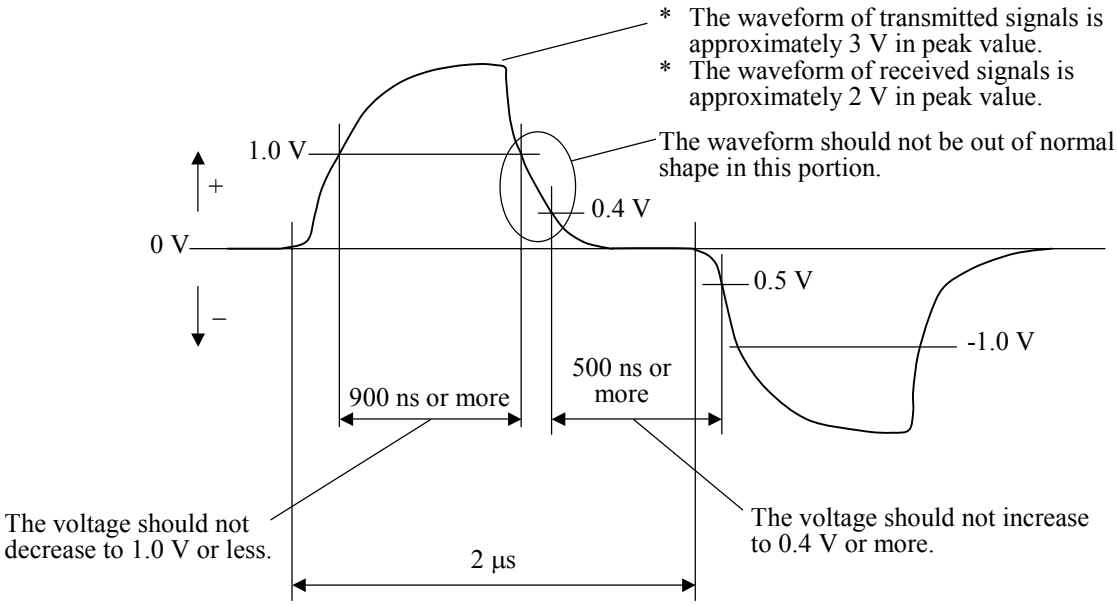
(2) Enlarged normal waveform (example)



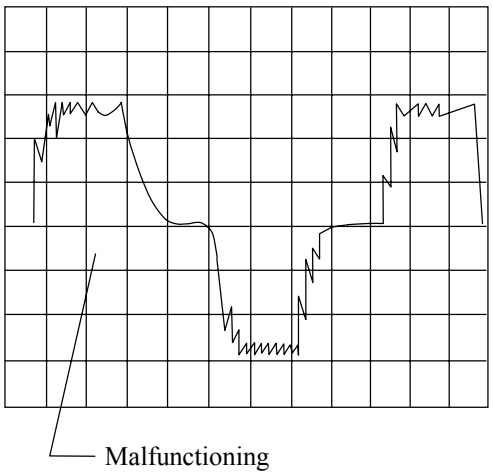
(3) Normal waveform of remote I/O signals



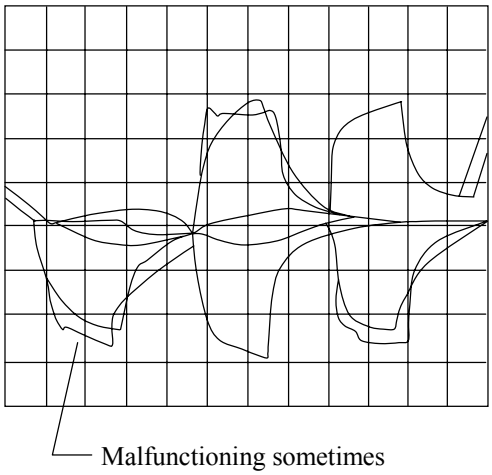
(4) Waveform of inter-CPU link signals



(5) Waveform (of reflected signals) due to mismatched terminating resistors



(6) Waveform (example) when a 75 Ω cable is terminated with 100 Ω



If the waveform of transmitted signals is interrupted or distorted, do the following checks:

- The cable is terminated at its two ends.
- The cable is broken or has a loose connection.
- The cable is a recommended one (or its characteristics conform to the specification).
- The cable is connected by multi-drop (no branching is allowed).

If the problem cannot be solved through all the troubleshooting described above, it may be caused by a hardware fault or noise. Replace the module or keep noise sources away from the hardware units, power cables and remote I/O cables.

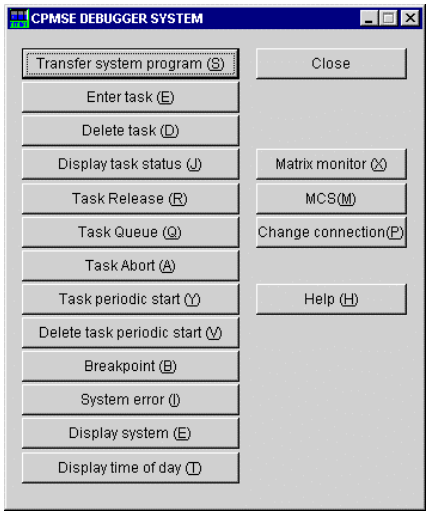
3.2 Collecting Error Stack Information

◆ Error stack information collection using the CPMSE debugger

Error stack information can be collected by using the System Error option in the CPMSE debugger system. Such information collection can also be effected with the MCS function of the ladder system. (For information on how to use the MCS function of the ladder system, see the description under "Error stack information collection using the ladder system" below.)

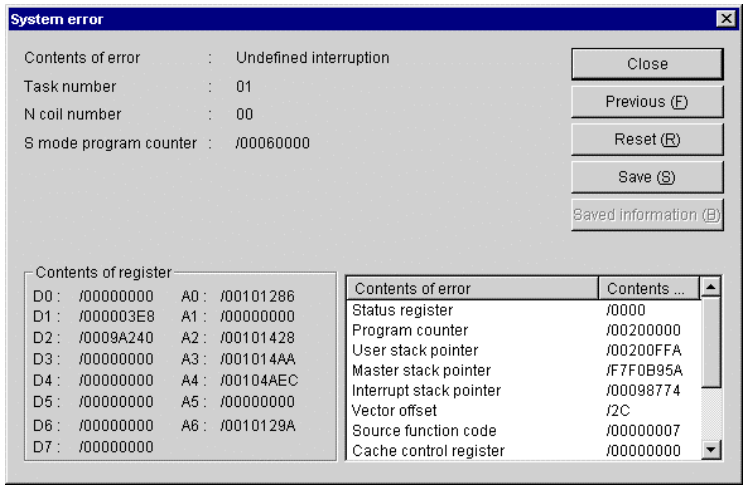
(1) Starting the CPMSE debugger system

Start the CPMSE debugger system on the personal computer you use in the system. Then, the following window appears on the screen.



(2) Displaying system error information

Click the [System error] button on the CPMSE debugger system window. Then, the following system error information is displayed.

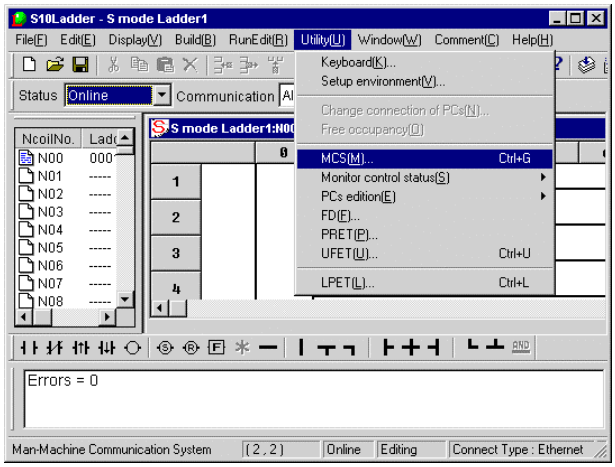


◆ Error stack information collection using the ladder system

Error stack information can be collected by using the MCS function of the ladder system.

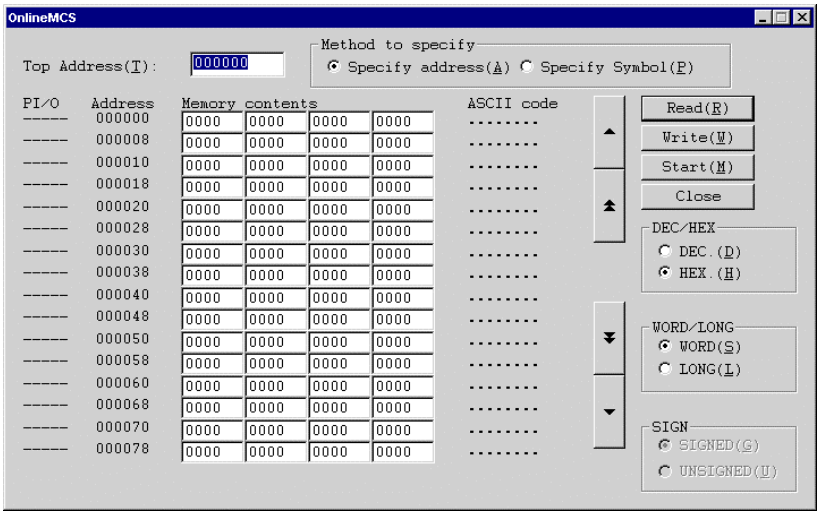
(1) Starting the ladder system

Start the ladder system on the personal computer you use in the system, and make the ladder system online-operational, i.e. ready for communication, by connecting it with the PCs.



(2) Displaying system error information

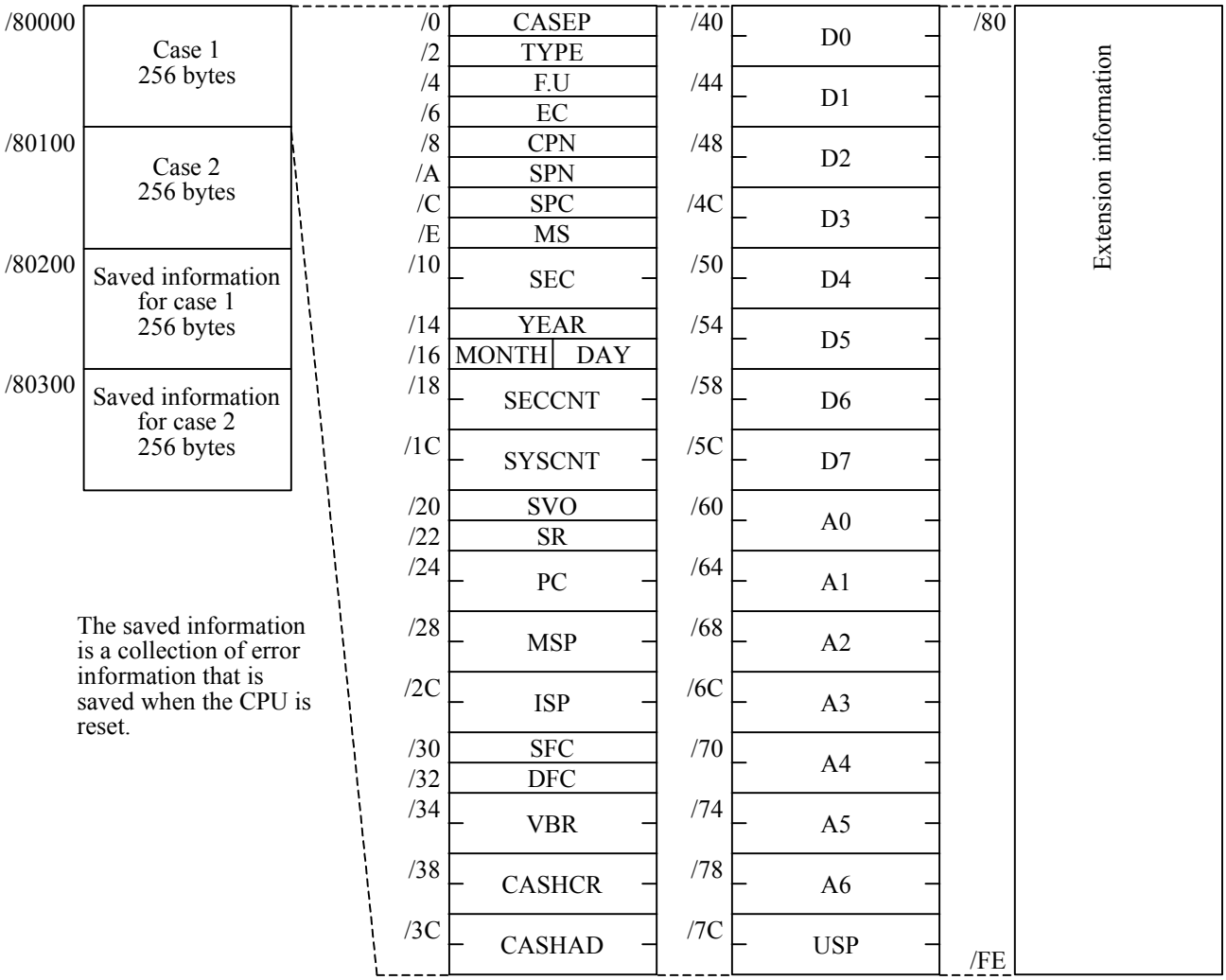
Select the [MCS] option from the [Utility] menu to display an MCS window as shown below. When the window is displayed, enter the starting address (/80000) of the error stack information area in memory into the "Top Address" box in the window. Then, click the [Read] button. Then, the information is displayed. To display information from the next address, click the ▼ button. Clicking the ▲ button displays information from the previous address.



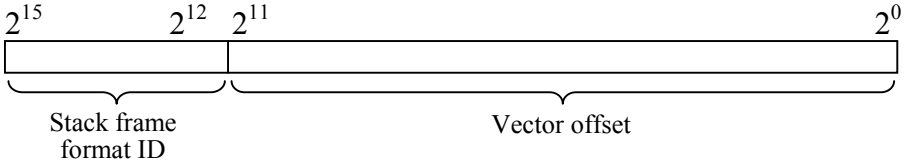
The structure of the error stack (ERSTK) is shown below.

<ERSTK Structure>

The ERSTK is a table in which up to two cases of error information can be stored. Two cases of error information are stored when more than one error occurs consecutively. The "extension information" in the table varies depending on the information stored in the stack frame format used.

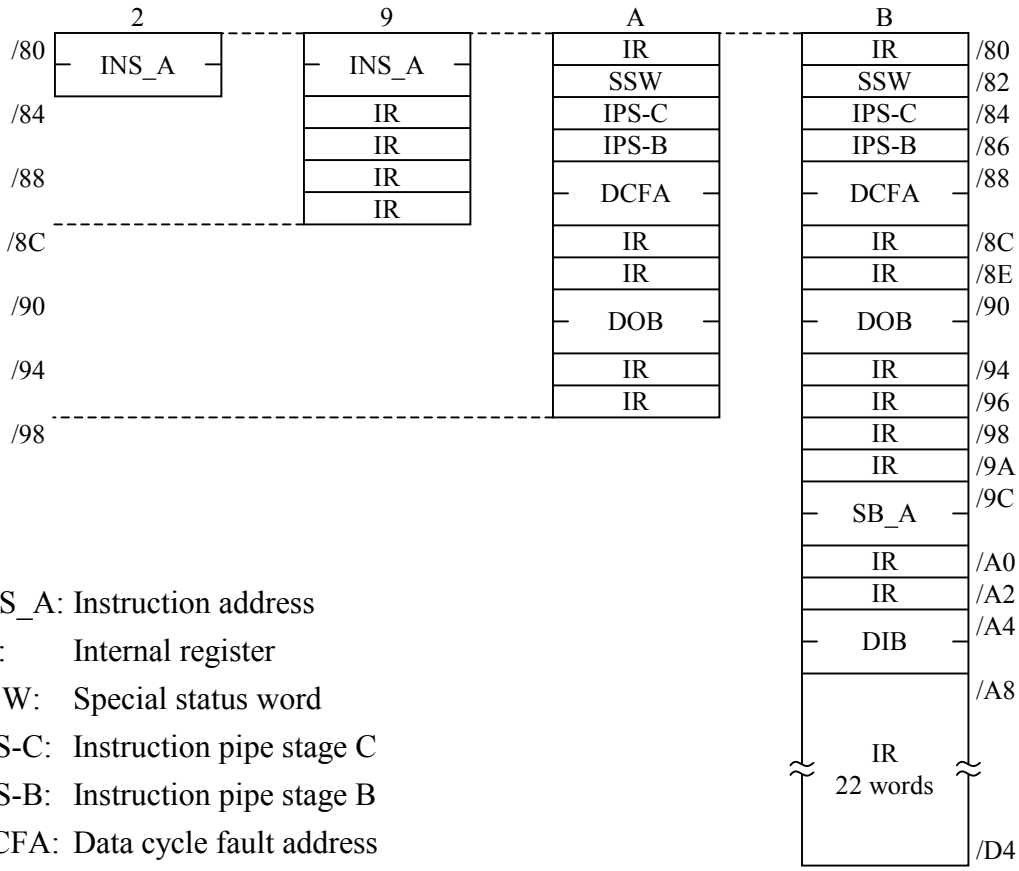


SVO: Stack frame format ID + vector offset



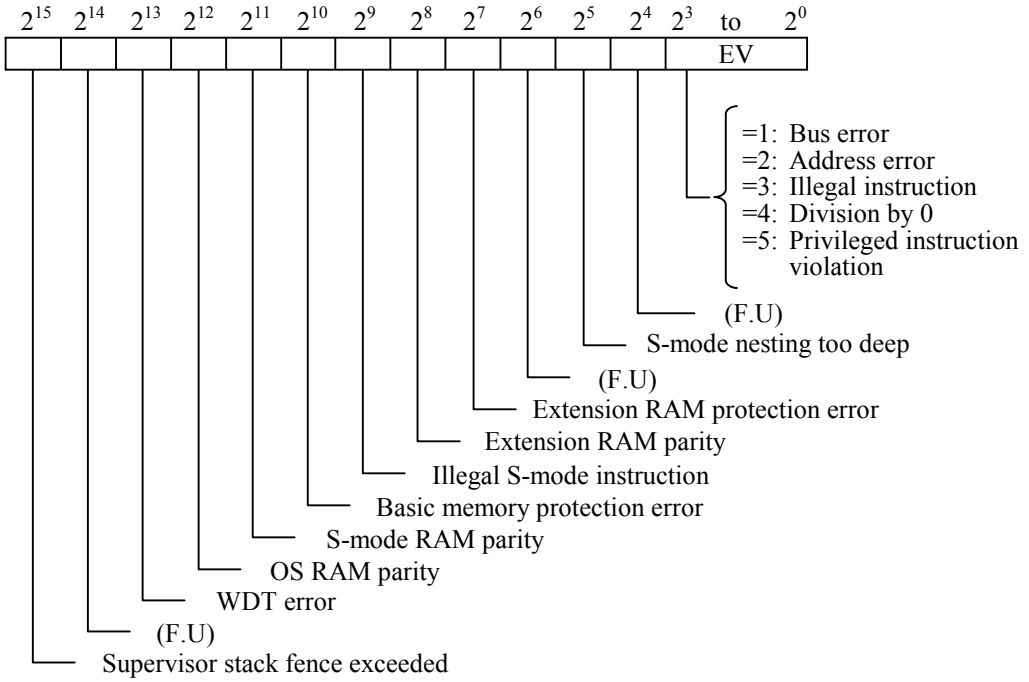
Stack frame format IDs and extension information:

For stack frame format IDs other than 2, 9, A and B, no extension information is provided in the table:



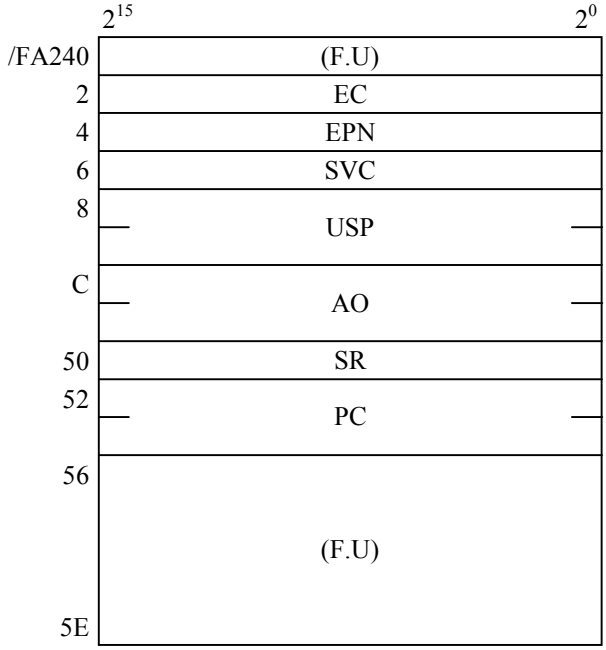
INS_A: Instruction address
IR: Internal register
SSW: Special status word
IPS-C: Instruction pipe stage C
IPS-B: Instruction pipe stage B
DCFA: Data cycle fault address
DOB: Data output buffer
SB_A: Stage-B address
DIB: Data input buffer

EC: Error code

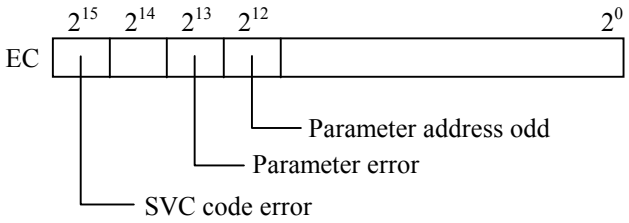


CASEP: Case point
TYPE: = /6820 for RAM-OS; = /6821 for ROM-OS.
EC: Error code
CPN: Task (P-coil) No.
SPN: S-mode program No.
SPC: S-mode program counter (significant only for illegal S-mode instructions and S-mode RAM parity)
MS: Milliseconds
SEC: Seconds
YEAR: Year
MONTH: Month
DAY: Day of month
} Set only when memory with a timer is installed.
SECCNT: Seconds counter
SYSCNT: System counter
SVO: Stack frame format ID + vector offset
SR: Status register content
PC: Program counter (MPU)
MSP: Master stack pointer
ISP: Interrupt stack pointer
SFC: Source function code
DFC: Destination function code
VBR: Vector base register
CASHCR: Cache control register
CASHAR: Cache address register
D0 to D7: Data register contents
A0 to A6: Address register contents
USP: User stack pointer

<SVCEB Table Structure>



EC: Error code



EPN: Error-ridden program No.
SVC: SVC macro No.
USP: USP at the time of error
AO: AO register at the time of error
SR: SR at the time of macro issuance
PC: Return address from macro instruction
F.U: Reserved for future extension

3.3 Clearing All the Memory

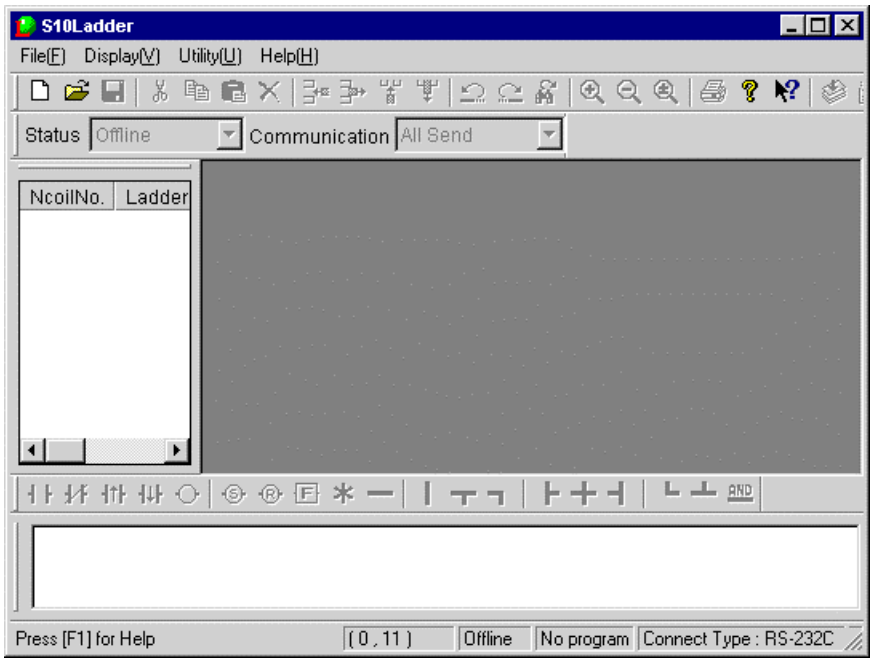
◆ Memory clearing when the Windows® version of the tool is ready for online operation
When the Windows® version of the tool and the PCs can both be placed into an online state (without being disturbed by errors, such as an "line error"), all the memory can be cleared with the PCs memory initialization feature of the Ladder Chart System. To accomplish this, perform the following procedure:

Operation on the PCs:

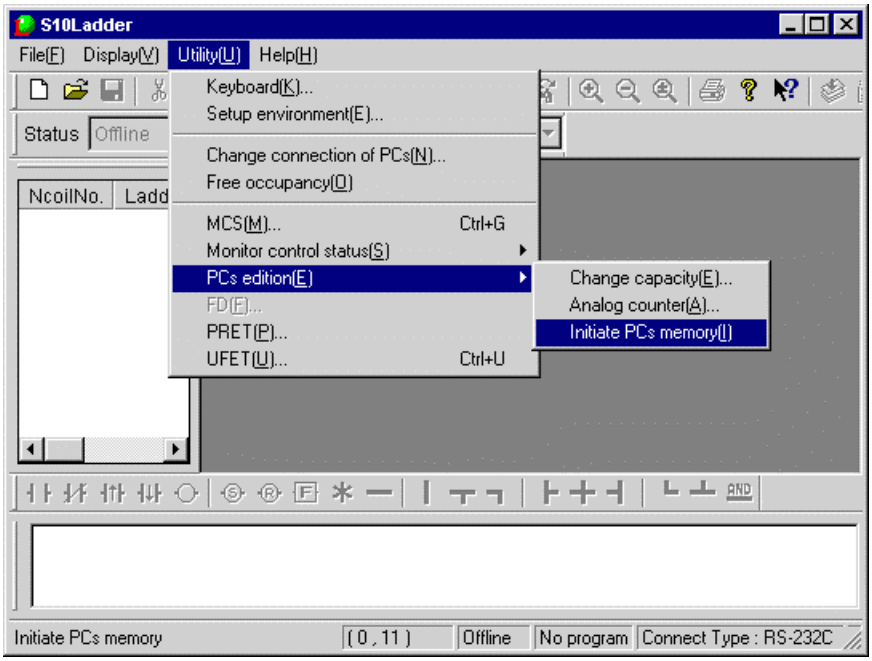
(1) Put the CPU into the STOP state by operating the Ladder Program (LADDER) switch.

Operation on the tool:

(1) Start the Ladder Chart System. Then, if the file that was previously closed when the Ladder Chart System was ended is opened again on the screen, close it by selecting [Close] from the [File] menu. Then, the Ladder Chart System's window looks like the following:

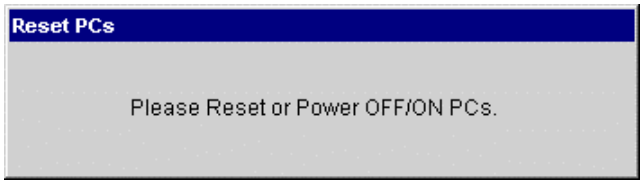


(2) Choose [PCs edition]-[Initiate PCs memory] from the [Utility] menu of the Ladder Chart System.



(3) The following confirmation message is displayed. Click the [OK] button.

(4) The following message is displayed. Reset the PCs, or power it down and then back up again.



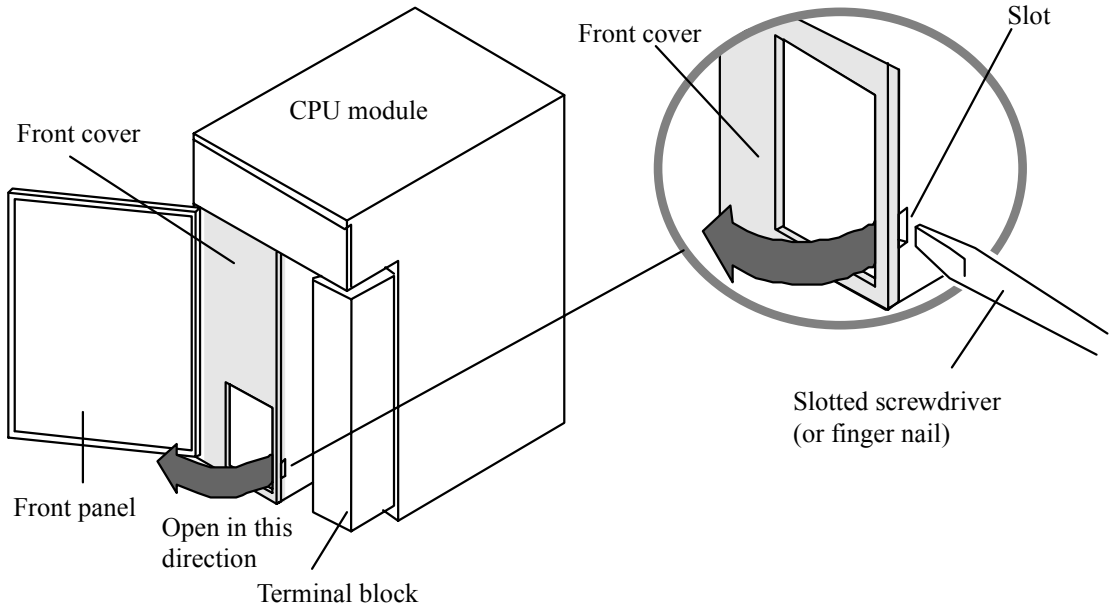
(5) When the message displayed in Step (4) disappears from the screen, the memory clearing operation is completed. End the Ladder Chart System.

◆ Memory clearing when the Windows® version of the tool is not ready for online operation
If neither the Windows® version of the tool nor the PCs can be placed into an online state (due to, for instance, an "line error"), discharge all the memory backup energy and clear the memory by performing the procedure described below. Then, restart the system.

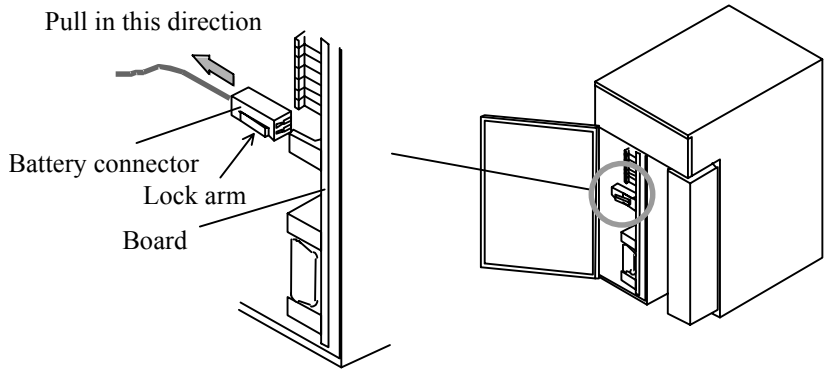
Memory clearing procedure:

(1) Before handling the CPU module, ground yourself to discharge any static electricity.
(2) Turn off the power switch on the power supply module.
(3) Open the front panel as shown below.
(4) Insert a finger nail or the tip of a slotted screwdriver about 1 mm into the slot at the lower right of the front cover (see the figure below). Then, carefully lift away the front cover in the direction of the arrow.

<Notice>
Do not insert the slotted screwdriver more than 1 mm. Otherwise, the internal PC board may be damaged.



(5) Unlock the lock arm of the battery connector as shown below, and carefully pull the lock arm in the direction indicated below until it comes off the board.



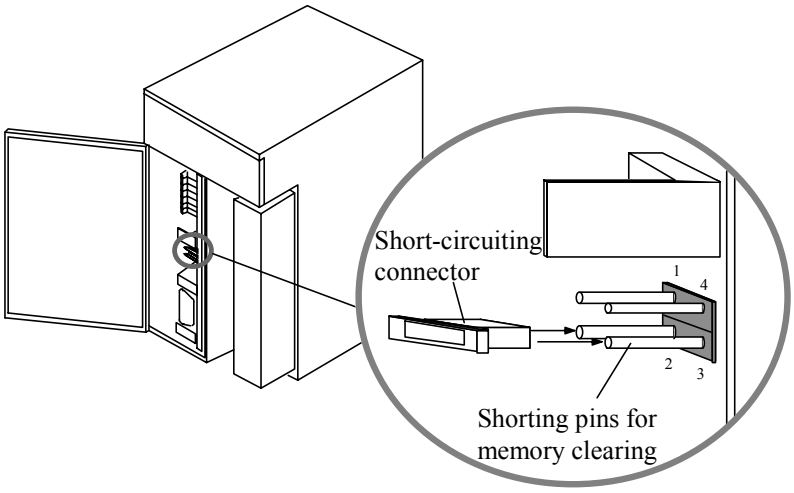
(6) Ensure that the battery connector is completely off the board. Then, connect a short-circuiting connector to shorting pins 2 and 3 provided under the battery connector for memory clearing. (Never short-circuit the pins, with the battery connector connected to the board. If this rule is disregarded, the battery will be rapidly discharged, resulting in battery low or complete discharge.)
Continue this shorting operation for more than 5 minutes, in order to discharge the internal super-capacitor.
As the short-circuiting connector, any of the I/O setting connectors connected can be used. After you use it, return it to its original position.

(7) After the 5-minute shorting operation, disconnect the short-circuiting connector.

(8) Ensure that the short-circuiting connector is disconnected, and reconnect the battery connector to the board. Then, reattach the front cover to the module and restore the module.

(9) Turn on the power supply and ensure that the CPU starts up normally without any error indication on the indicator, the OS version indication "CPMS ***" being presented thereon.

(10) When the above steps are completed, the system is in its initial state, with all the memory cleared. Reload the programs and re-set them up.



<Notice>

Be sure to push the battery connector into its mating connector on the board until it clicks into place. If the connection is loose, the connector may come out of its place, resulting in the loss of backup copies of the data.

3.4 Backing Up and Restoring Files

It is recommended that important files be backed up against accidental destruction of the programs due to disturbances or in anticipation of module replacement. When a module is replaced or existing programs are destroyed, the system can be returned to its previous condition to the module replacement or program destruction by restoring the backup copies.
If a problem arises in the system, be sure to save the user programs involved and all the parameter areas of applications affected for troubleshooting.
You can speed up backup and restore operations with the optional ET.NET system, as it uses faster communications than standard serial (RS-232C) communications.

◆ Backup and restore procedures using the Backup Restore System

<What Should Be Prepared>

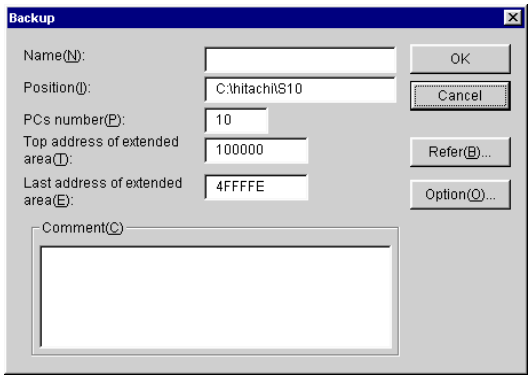
- ET.NET module (model LQE020)
- Windows® personal computer
- Ethernet cable (cross cable for direct connection, or straight cable for connection to the hub)

- Backup Restore System (S-7890-09) and ET.NET System (S-7890-29). These two systems need to be installed beforehand, along with the ET.NET module, which requires setting up.
- The ET.NET module does not allow live-wire insertion and removal, or hot swapping. If the module needs to be installed or removed, be sure to turn off the power to the module before installation or removal.

<Backing up Files>

If you want to save files onto floppy disks (FDs), prepare 3.5-type floppy disks by formatting in Windows format. Saving them onto the hard disk drive requires no such floppy disks.
Where an extension memory is installed, you are recommended to use the hard disk drive as the backup medium. The general backup procedure is as follows:

(1) Establish a connection between the personal computer and the PCs, and start the Backup Restore System on the personal computer. The [Backup/Restore] window then appears on the screen. On the window, click the [Backup] button. The [Backup] window as shown below then appears on screen.



(2) Enter into the respective boxes in the window the folder name of a backup folder, a location at which the folder is to be stored, the PCs number, and the starting and the ending address of the extension area. The extension area, in particular, is usually specified as follows:

- In version 08-00 or later
  By default, the starting and the ending address of the installed extension memory is displayed. You should back it up by using the addresses as is.
- In versions earlier than 08-00
  By default, both the starting and the ending address of the extension area are displayed as zeros (0s). Enter the two addresses. The starting address is usually H100000. If zeros (0s) are entered for both addresses, the extension memory will not be backed up.

The PCs number displayed is the default. Normally, use the default as is. If a backup operation is carried out on a non-default PCs number, the information backed up will not be able to be restored to the original PCs, except for the one backed up with the PCs number 9999, in which case the backed up information can be restored to any existing PCs.

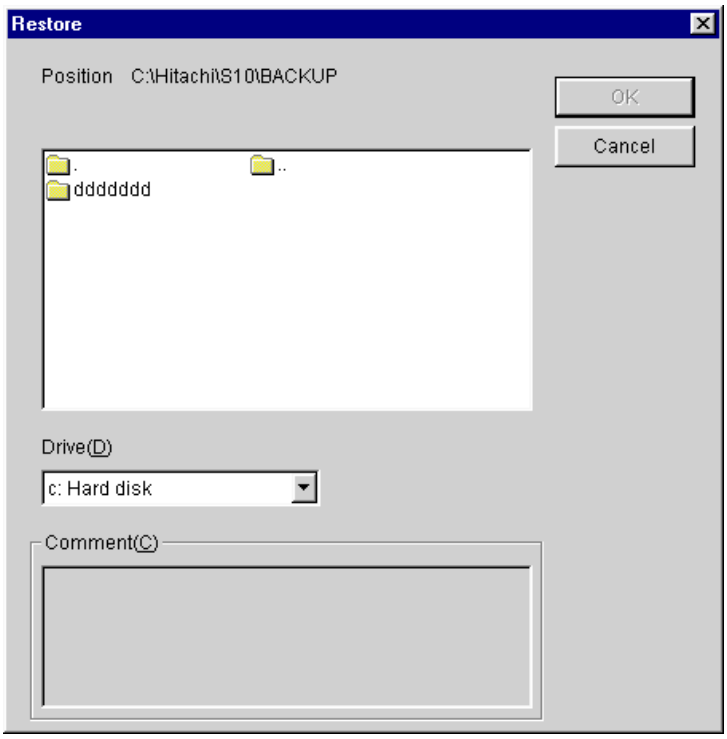
(3) The message "Do you ABORT all tasks?" is displayed on screen. Click the [Yes] button unless the plant facilities cannot be stopped. Selecting [Yes] will abort all the existing tasks, except when the debugger system is not installed in the specified PCs, in which case the message "Debugger monitor system is not loaded" is displayed and no existing tasks are aborted. To proceed, either click the [No] button or install the debugger system.

(4) The message "Do you save after stop OS?" is displayed. Click the [Yes] button unless the plant facilities cannot be stopped.
If the plant facilities can be stopped, terminate the OS. Unless it is terminated, a backup operation will be carried out while the work registers are dynamically changing in their contents. In these cases, the contents of some work registers may be left undefined, resulting in the need of initialization of the OS before normal operation.

<Restoring the Backup Copies>

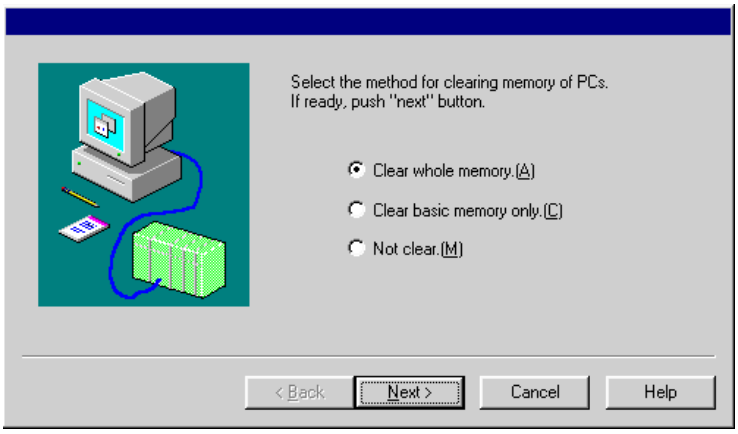
Before restoring the files backed up as explained above, you have to ensure that the hard disk drive or 3.5-type floppy disks holding the files are at hand. You can carry out a restore operation only when the CPU of the PCs is in the STOP state.

(1) Establish a connection between the personal computer and the PCs, and start the Backup Restore System on the personal computer. The [Backup/Restore] window then appears on the screen. On the window, click the [Restore] button. The [Restore] window as shown below then appears on screen. Select the folder to be restored, and click the [OK] button.



(2) A restore operation begins and the message "Please Reset or Power OFF/ON PCs" is displayed on screen. In response to the message, reset the PCs, or power it down and back up again.

(3) When resetting the PCs, or powering it down and back up again is completed, the dialog box as shown below is displayed that asks if you want to clear the memory before restoration. Select "Clear whole memory". If "Clear basic memory only" (the basic memory is an area in which the ladder program is stored) or "Not clear" is selected instead, fragments of the destroyed program will remain undeleted from portions of the area where overwriting does not take place.



(4) When the memory clearing operation is completed, the message "Please Reset or Power OFF/ON PCs" is displayed. In response to the message, reset the PCs, or power it down and back up again.

(5) The message "Do you recover the information on measurement value of keep coil and counter?" is displayed on screen. Select [Yes] or [No] as you like. A restore operation then begins with the restoration-in-process dialog box displayed on screen.

(6) If you click the [Cancel] button during the course of the restore operation, the restoration-in-progress dialog box disappears and the [Restore] window appears again. At this moment, the restore operation has been aborted. The outcome of such an incomplete restore operation will result in a system malfunction if the system is put into operation. To avoid this, carry out a restore operation again.

When a restore operation is completed, the [Finish] button can be clicked. Click it, and then the restoration-in-process dialog box disappears and the message "Please Reset or Power OFF/ON PCs" is displayed again.

The above "Please Reset or Power OFF/ON PCs" message is replaced by the message "Please Reset PCs" in cases where an RS-232C module is used in place of the ET.NET module. Reset the PCs in accordance with the message. If the PCs is powered down and back up again instead of resetting, the contents of the LGB table for the RS-232C module will not be reflected in the system thereafter.

With the ET.NET module, resetting the PCs, or powering it down and back up again results in disappearance of the "Please Reset or Power OFF/ON PCs" message, followed by reappearance of the Restore window on screen.

Note: During the course of a restore operation, the messages "LOAD OS" and "ROM IDLE" are displayed on the CPU module's indicator. These messages do not indicate an abnormality.

<User Program Areas and Parameter Areas>
The table below is a list of the user areas (user program and parameter areas) defined in the system. When you back up files onto appropriate floppy disks, the memory areas not saved automatically, which do not have a check mark in the table, require their address to be specified.

User area name		Addresses	Areas Automatically Saved by Windows® Version of the Programming Tool (Ver. 6 or Later)						
			Ladder Chart System					HI-FLOW System	Backup Restore System
			Sequence	Sequence + Data	Sequence + Fence	Sequence + Work	All the Areas		
PCs edition	Timer (T), one-shot (U), counter (C) points, sequence cycle setting, remote I/O points, CPU-link transfer area/control data setting, 10-ms timer (T) points, S-mode fence setting, 4-channel analog pulse counter control data definition, external stop input No. definition	/060000 to /060BEE	√	√	√	√	√		√
Ladder chart	Ladder program edition table (LPET)	/060BF0 to /060FFE	√	√	√	√	√		√
	Data registers (DW000 thru FFF)	/061000 to /062FFE		√	√	√	√		√
	Timer set values (TS000 thru 1FF)	/063000 to /0633FE	√	√	√	√	√		√
	One-shot set values (US000 thru 0FF)	/063400 to /0635FE	√	√	√	√	√		√
	Counter set values (CS000 thru 0FF)	/063600 to /0637FE	√	√	√	√	√		√
	User program	/063800 to /07FFFE	√ (*2)	√ (*2)	√	√	√		√
	Other registers (X, Y, R, M, G, J, Q, E)	/0E0000 to /0E1FFE					√		
	Work registers (FW000 thru BFF)	/0E2000 to /0E37FE				√	√		√
	Long-word registers (BD000 thru 1FF)	/0E3800 to /0E3FFC				√	√		√
	Keep coils (K000 thru FFF)	/0E1000 to /0E11FE					√		√ (*3)
	Counter count values (CC000 thru 0FF)	/0F0600 to /0F07FE					√		√ (*3)
C language	User program (including user stack areas)	/110000 to /4FFFFE (*1)							√ (*4)
	User task registration tables (PRET, TCB)	/0FA700 to /0FAAFE							√
	User math. and logical function table	/0FAB40 to /0FAC3E	√	√	√	√	√		√
HI-FLOW	User program	/120000 to /4FFFFE (*1)						√ (*2)	√ (*4)
LGB table	RS-232C (Ch. 0)	/F48100 to /F481FE							√
	RS-232C (Ch. 1)	/F58100 to /F581FE							√
	RS-232C (Ch. 2)	/F68100 to /F681FE							√
	RS-232C (Ch. 3)	/F78100 to /F781FE							√
Reception task registration table	RS-232C (Ch. 0)	/1070CA to /1070D0							√ (*4)
	RS-232C (Ch. 1)	/10714A to /107150							√ (*4)
	RS-232C (Ch. 2)	/1071CA to /1071D0							√ (*4)
	RS-232C (Ch. 3)	/10724A to /107250							√ (*4)
IP address, subnet mask	ET.NET (main)	/0FBFE0 to /0FBFE6							
	ET.NET (sub)	/0FBFE8 to /0FBFEE							

(*1) This allocated range depends on user settings.
(*2) The range of this saved area depends on the size of user programs. (Unused areas are not saved.)
(*3) Whether this item is saved or not depends on user settings.
(*4) The saved area of extension memory is specified by users.

√: Automatically saved.

3.5 Measuring the CPU Load

The load of the C-mode processor(*) needs to be taken into account in an early stage of user program development.

(*) The S10mini CPU has two processors in it, one used in the S(sequence)-mode and the other used in the C(computing)-mode. The C-mode processor, in particular, processes mathematical and logical functions of ladders; HI-FLOW and C programming languages; PSE functions such as monitoring and saving/loading; and communication capabilities such as Ethernet and inter-CPU links or, simply, CPU links.

The processing speed of user programs (ladder, HI-FLOW and C) may slow down when the load factor of the C-mode processor exceeds 100% with a temporarily increasing load due to such activities as heavy usage of mathematical/logical functions for the ladder and as monitoring and saving. In some cases, some of the LED indicators may stop flickering at that time and, when the CPU is reset, may go out. When the usage of mathematical/logical functions is increasing the load factor, in particular, a C-mode task running at a lower priority level than those functions may stop unexpectedly.

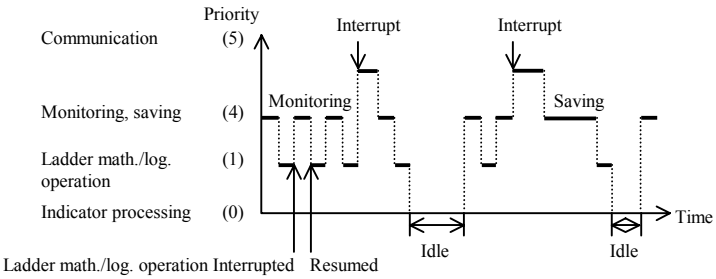
To avoid such problems, the load of the C-mode processor should be measured with the idles count feature described below and, in an early stage of their development, user programs should be designed so as not to cause the maximum load to exceed 100%. As a rough estimate of the load factor realized during initialization, 70% or less (a margin of about 30%) is recommended which assumes increases in load due to the connection with S10mini of programming tools for monitoring and saving and to nonroutine activities. If user program modifications are expected in the future, the user programs should be designed not to cause the load factor to exceed 50%.

<Idles Count Feature>

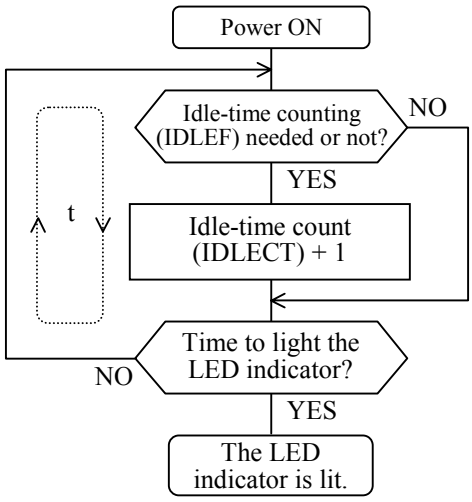
The idles count feature determines a total amount of idle time of the OS within a fixed time period. This feature can be used for the following purposes: to check if the user program under development can run normally and to find a rough load factor of the OS.

The OS is event-driven, that is, it begins the corresponding process when it recognizes a generated interrupt. When the process is completed, the OS enters an idle state and waits for a next interrupt to be generated. Thus, the longer the total amount of idle time, the smaller the load the OS has to bear will be, resulting in more time available for user program execution.

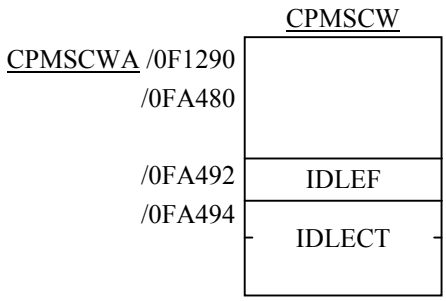
[Conceptual Diagram]



[Counting Flowchart]



[Addresses]



<CPU Load Measurement Procedure>

Using the MCS function of the ladder system:

(1) Clear to 0 the idles count flag (IDLEF) and idles counter (IDLECT):

IDLEF	(Address: /0FA492)	: H0000: Do not count. Other: Count.
IDLECT	(Address: /0FA494)	: Count (one long word in length)

(2) Set IDLEF to "1" and start counting.

(3) Upon the elapse of a fixed time period (T[s]), set IDLEF to "0" and stop counting. Generally, the longer the measuring time (T), the smaller the error will be; however, a rough estimate of T is about 10 seconds.

(4) Monitor the count-up value of IDLECT for the measuring time (T) by using long-word decimal format. Then, use the following equation and calculate the load factor:

$$\text{Load factor (P)} = 100 - \frac{\text{Count value (IDLECT)} \times \text{Counting-up time (t)}}{\text{Measuring time (T)} \times 10^4} \quad [\%]$$

* Counting-up time (t) = 20.0[μs] LQP800
5.9[μs] LQP000
4.5[μs] LQP010, 011, 120

<Reducing the CPU Load>

If the load factor for the CPU exceeds its rough estimate, reduce the load by taking one of the three measures listed below.

(1) Extend the sequence cycle time specified in the PCs edition and thereby allow a margin in the task execution time.

(2) Reduce simultaneous starts and consecutive starts of mathematical/logical functions not affecting timing in any way to a minimum, and alter the user programs so that they will begin to run in non-busy states.

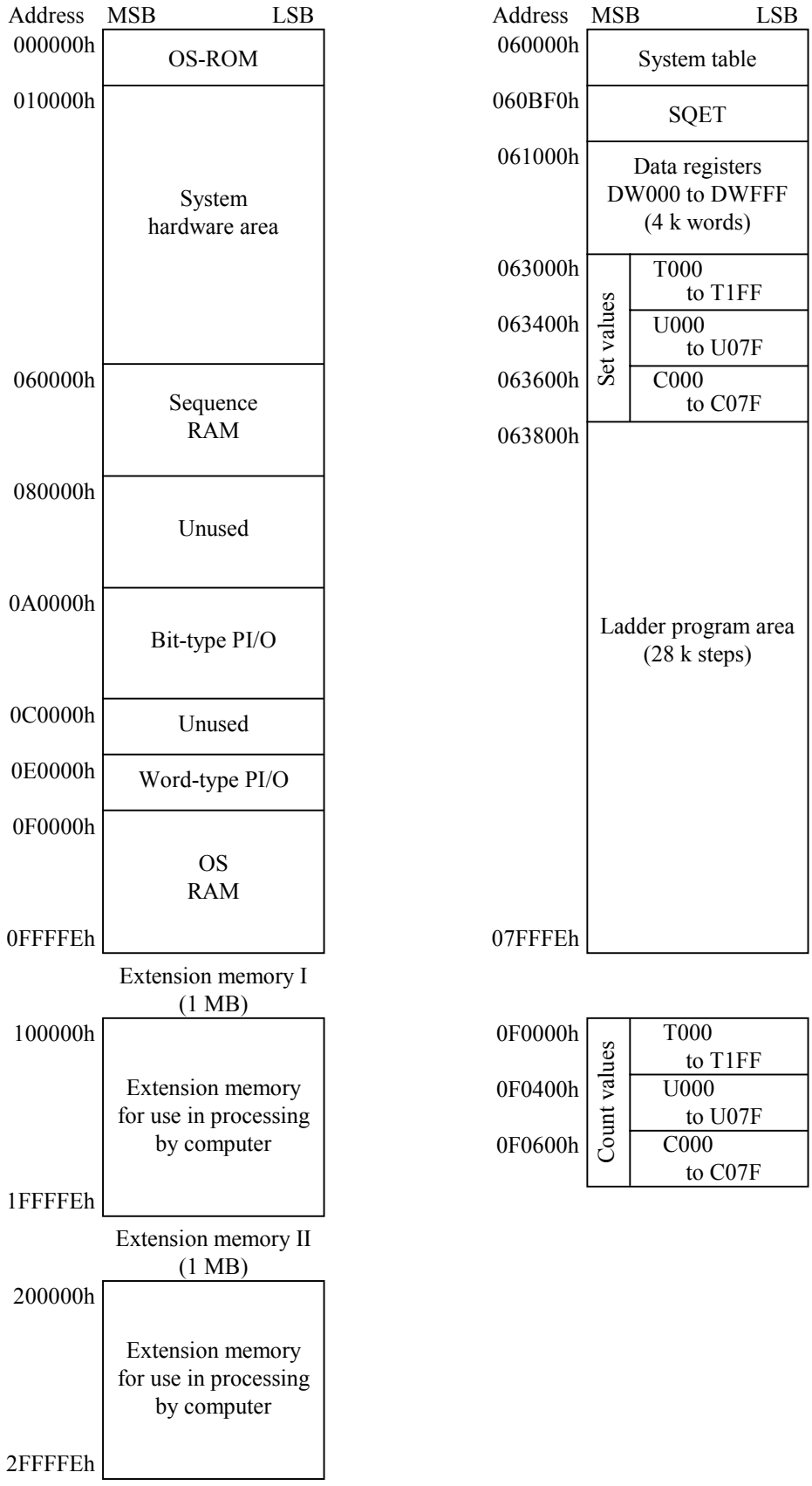
(3) Replace the CPU module of model LQP800, LQP000, LQP010 or LQP011 with a faster model (containing a faster processor), such as LQP120. The table below compares the performance (measured values) of these CPU models.

Comparison of CPU Processing Speeds (in reference to LWP000 given ratings of 1.0)

	LQP800	LQP000, LQP010, LQP011	LQP120
OS memory (0F0000 to 0FFFFF)	1.0	2.6	3.4
Extension memory (100000 to 1FFFFF)	1.0	1.7	3.4
SEQ memory (060000 to 07FFFF)	1.0	1.4	3.0
PI/O memory (0E0000 to 0E3FFF)	1.0	1.5	2.6

* These processing speeds may vary depending upon the type of memory in which the running program is loaded and the types of memory which the program accesses.

3.6 Memory Maps



PI/O Word Form Area

Address	MSB LSB
0E0000h	XW000 to XWFF0 Contacts
0E0200h	Reserved for system use (JW)
0E0400h	YW000 to YWFF0 Contacts, coils
0E0600h	Reserved for system use (QW)

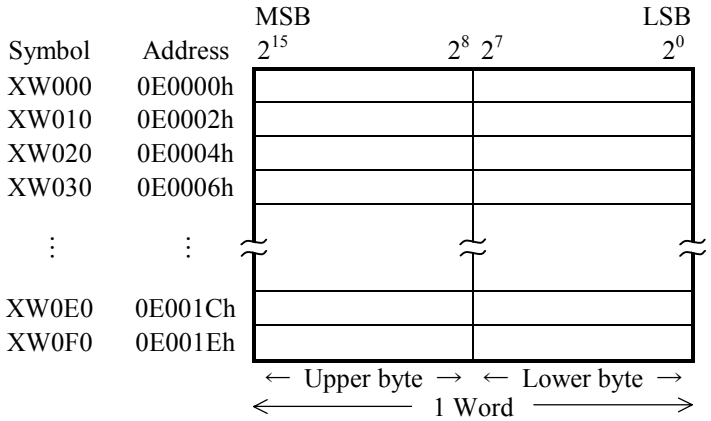
Address	MSB LSB
0E0800h	GW000 to GWFF0 Contacts, coils
0E0A00h	Reserved for system use (AW)
0E0BC0h	CV-NET α Busy Flag
0E0C00h	RW000 to RWFF0 Contacts, coils
0E0E00h	Reserved for system use (MW)

Address	MSB LSB
0E1000h	KW000 to KWFF0 Contacts, coils
0E1200h	Unused
0E1280h	Unused
0E1300h	TW000 to Contacts
0E1380h	Reserved for system use
0E1400h	Unused
0E1480h	Unused
0E1500h	UW000 to Contacts
0E1580h	Reserved for system use
0E1600h	Unused
0E1680h	Unused
0E1700h	CW000 to Contacts
0E1780h	Unused

Address	MSB LSB
0E1800h	NW000 to NW0F0
0E1880h	Unused
0E1900h	PW001 to PW080 Contacts, coils
0E1A00h	VW000 to VWFF0 Contacts, coils
0E1C00h	EW000 to EWFF0 Contacts, coils
0E1E00h	ZW000 to ZW3F0 Contacts, coils
0E1E80h	SW000 to SWBF0 Contacts

Notes: • This memory area is accessed on a word form (1 word = 2 bytes).
• This memory area is addressed on a byte form (1 byte = 8 bits).
• The ranges of available data points shown above vary with contact types used with the PCs.

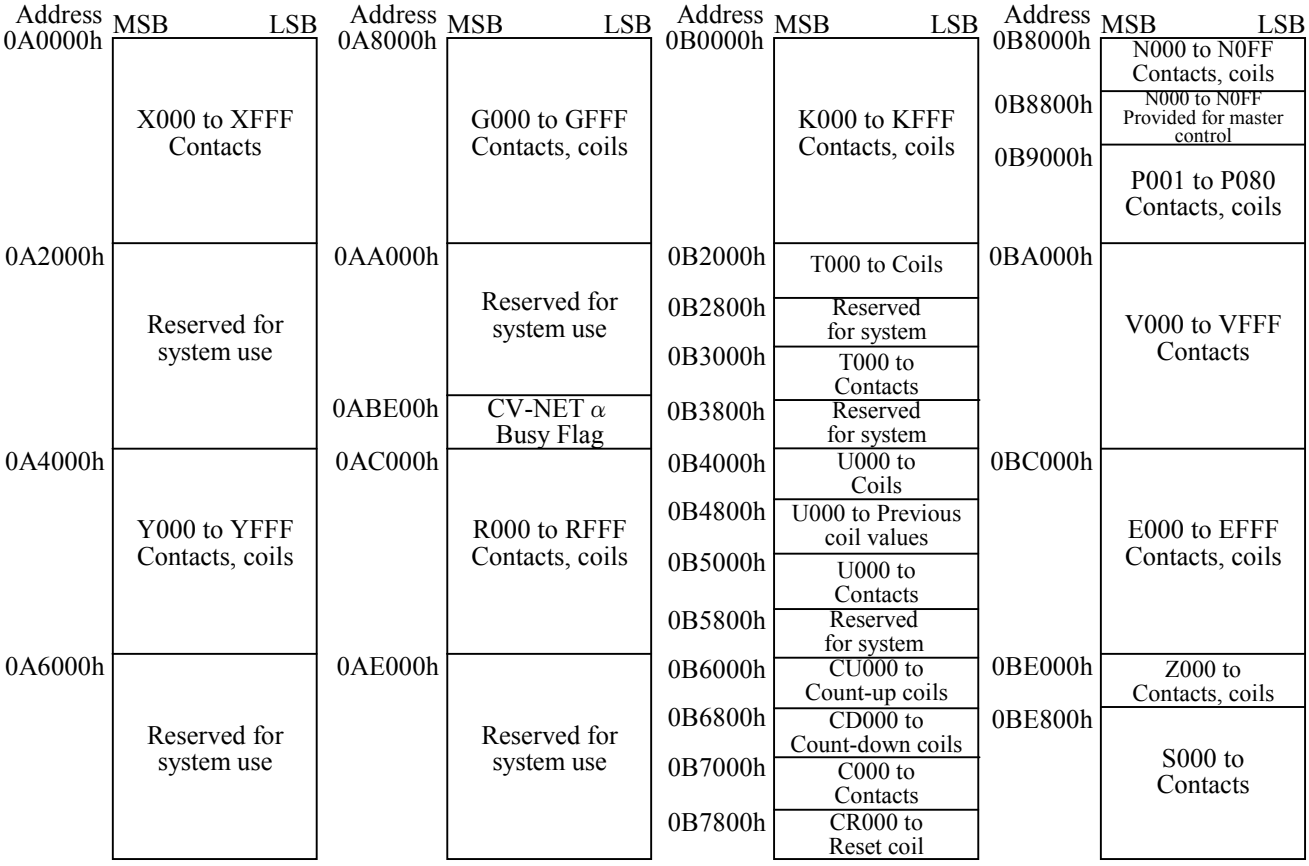
Example of Byte Addressing:



Correspondence between Word and Bit:

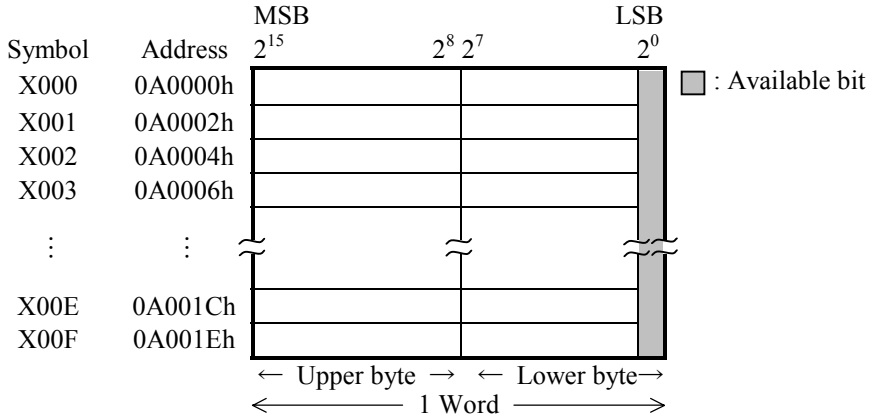
		MSB							LSB
XW000	0E0000h	X000	X001	X002	X003	·····	X00D	X00E	X00F
XW010	0E0002h	X010	X011	X012	X013	·····	X01D	X01E	X01F
		2^{15}							2^0

PI/O Bit Form Area

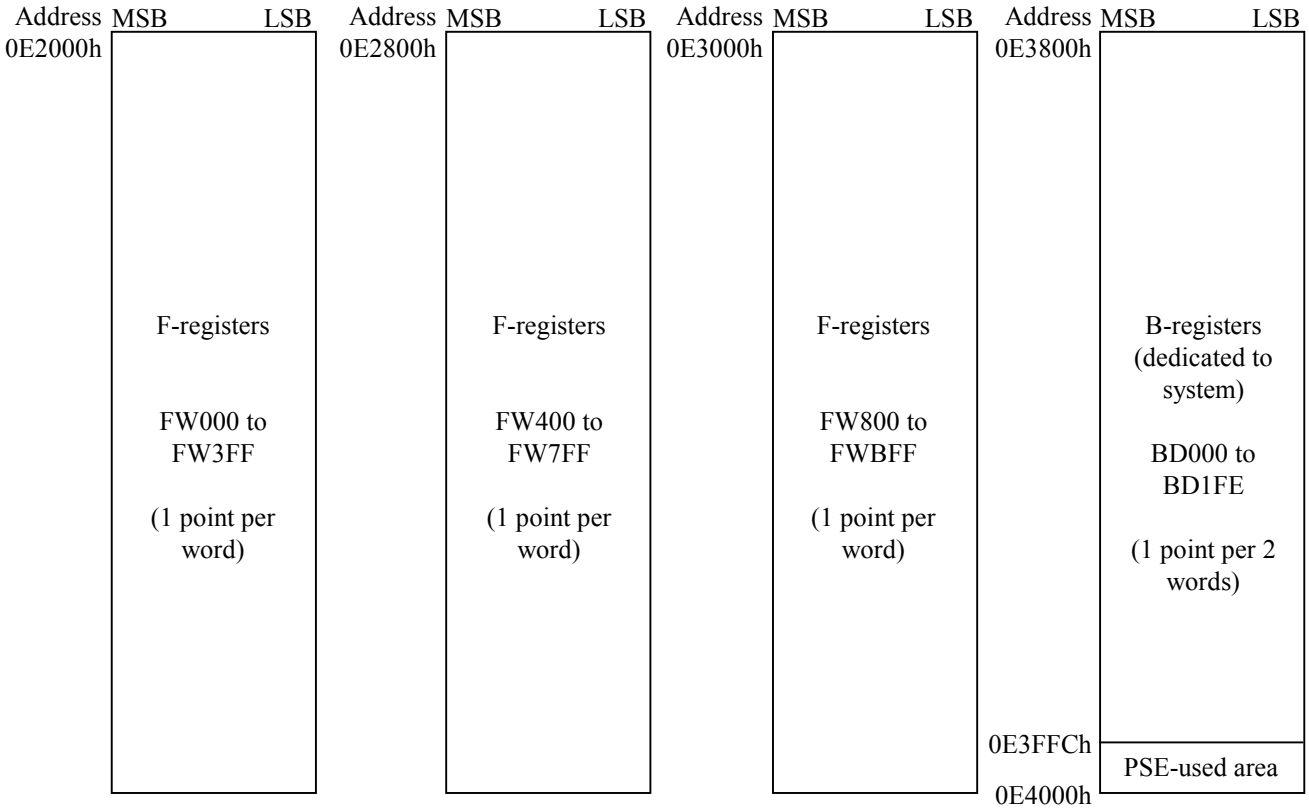


Notes: • This memory area is accessed on a word form (1 word = 2 bytes).
• In this memory area, only the LSB (least significant bit) is available.
• This memory area is addressed on a byte form (1 byte = 8 bits).
• The ranges of available data points shown above vary with contact types used with the PCs.

Example of Byte Addressing:

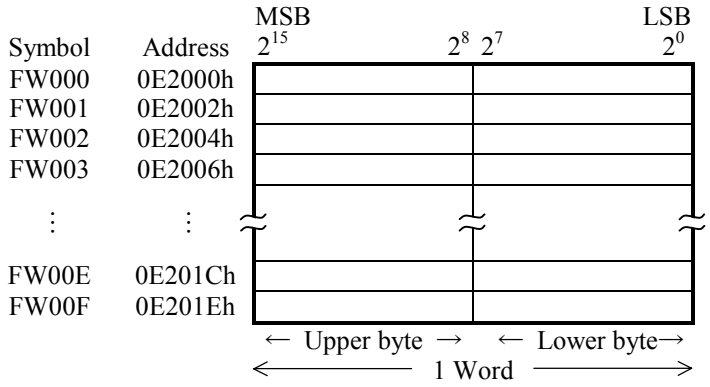


User Work Area

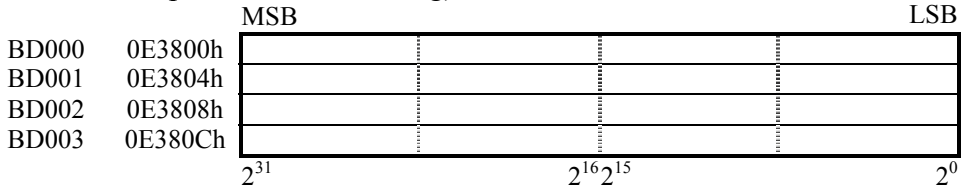


Notes: • This memory area is accessed on a word form (1 word = 2 bytes).
• This memory area is addressed on a byte form (1 byte = 8 bits).
• The ranges of available data points shown above vary with contact types used with the PCs.

Example of Byte Addressing:
F-registers (each is a data point of 1 word long)



B-registers (each is a data point of 2 words long)



3.7 Registers

■ Bit registers

Name	Symbol	Description	Instruction Capable of Using Ladder Charts					Usable Range in Ladder Charts	Condition after Resetting	Remarks
			-| |- -|/|-	-|↑|- -|↓|-	-( )	-(S) -(R)	-[F]			
External input	X	Input module	√	nu	nu	nu	√	000 - FFF	Clear	
External output	Y	Output module	√	nu	√	nu	√	000 - FFF	Clear	
Internal register	R	Internal auxiliary relay	√	nu	√	nu	√	000 - FFF	Clear	
Extension internal register	M	Internal auxiliary relay	√	nu	√	nu	√	000 - FFF	Clear	
Keep relay	K	Blackout hold latch type	√	nu	nu	√	√	000 - FFF	Hold	
On-delay timer	T	100-ms timer	√	nu	√	nu	√	000 - 1FF	Clear	Any of T000 to T00F may be set for the 10-ms timer.
One-shot timer	U		√	nu	√	nu	√	000 - 0FF	Clear	
Up/down counter	CU	Count up	nu	nu	√	nu	√	00 - FF	Hold	
	CD	Count down	nu	nu	√	nu	√	00 - FF	Hold	
	CR	Count reset	nu	nu	√	nu	√	00 - FF	Hold	
	C	Contact	√	nu	nu	nu	√	000 - 0FF	Hold	
Global link register	G	CPU linking	√	nu	√	nu	√	000 - FFF	Clear	
Transfer register	J	HI-FLOW-to-ladder-chart linking	√	nu	nu	nu	√	000 - FFF	Clear	
Receive register	Q	Ladder-chart-to-HI-FLOW linking	√	nu	√	nu	√	000 - FFF	Clear	
Nesting coil	NM	Master control	nu	nu	√	nu	√	01 - FF	Clear	
	NZ	Zone control	nu	nu	√	nu	√	01 - FF	Clear	
	N	Contact	√	nu	nu	nu	√	001 - 0FF	Clear	
Process coil	P	Computer program (task) start	√	nu	√	nu	√	001 - 080	Clear	
Event register	E	Display on CPU indicator (E000 to 0FF)	√	nu	√	nu	√	000 - FFF	Clear	All of E400 thru FFF are used by 4-channel analog pulse counters.
Edge contact	V	Rising/falling edge detection	nu	√	nu	nu	√	000 - FFF	Clear	
Z-register	Z	Z0FE: Start of tracing Z0FF: End of tracing	√	nu	√	nu	√	000 - 3FF	Clear	
System register	S	CPU status display	√	nu	nu	nu	√	000 - BFF	Initial value	

√: Can be used; nu: Cannot be used

■ Word registers

Name	Symbol	Description	Data Size	Usable Range	Condition after Resetting	Remarks
External input	XW	Input module	1 word/16 points	000 - FF0	Clear	
External output	YW	Output module	1 word/16 points	000 - FF0	Clear	
Internal register	RW	Internal auxiliary relay	1 word/16 points	000 - FF0	Clear	
Extension internal register	MW	Internal auxiliary relay	1 word/16 points	000 - FF0	Clear	
Keep relay	KW	Blackout hold latch type	1 word/16 points	000 - FF0	Hold	
On-delay timer	TW	Contacts	1 word/16 points	000 - 1F0	Clear	
	TS	Initial values	1 word/1 point	000 - 1FF	Hold	Data input range: 0000 to 9999 (×100[ms])
	TC	Count values	1 word/1 point	000 - 1FF	Clear	
One-shot timer	UW	Contacts	1 word/16 points	000 - 0F0	Clear	
	US	Initial values	1 word/1 point	000 - 0FF	Hold	Data input range: 0000 to 9999 (×100[ms])
	UC	Count values	1 word/1 point	000 - 0FF	Clear	
Up/down counter	CW	Contacts	1 word/16 points	000 - 0F0	Hold	
	CS	Initial values	1 word/1 point	000 - 0FF	Hold	Data input range: 0000 to 9999 (counts)
	CC	Count values	1 word/1 point	000 - 0FF	Hold	
Global link register	GW	CPU linking	1 word/16 points	000 - FF0	Clear	
Transfer register	JW	HI-FLOW-to-ladder-chart linking	1 word/16 points	000 - FF0	Clear	
Receive register	QW	Ladder-chart-to-HI-FLOW linking	1 word/16 points	000 - FF0	Clear	
Nesting coil	NW	Contacts	1 word/16 points	000 - 0F0	Clear	
Process coil	PW	Computer program (task) start	1 word/16 points	000 - 080	Clear	
Event register	EW	Display on CPU indicator	1 word/16 points	000 - FF0	Clear	
Edge contact	VW	Rising/falling edge detection	1 word/16 points	000 - FF0	Clear	
Z-register	ZW	Logic tracer, higher-level interrupts	1 word/16 points	000 - 3F0	Clear	
System register	SW	CPU status display	1 word/16 points	000 - BF0	Initial value	
Data register	DW	Used for constants	1 word/1 point	000 - FFF	Hold	
Work register	FW	Used for variables	1 word/1 point	000 - BFF	Hold	
Long-word register	BD	Used for variables	2 words/1 point	000 - 1FE	Hold	BD1FF is used by the system.

Note: All the word registers above are usable in mathematical and logical functions. The basic instructions for ladder charting (drawing) are not usable therein.

■ System registers

Register No.	Name	Content	Description
S000 to 005	Flag register for mathematical/logical function	S000=Extend S001=Error S002=Positive S003=Negative S004=Zero S005=Overflow	(X) (E) (P) (N) (Z) (V)
S010 to 013	Ladder program control register	Always ON Always OFF S012=STOP->RUN S013=RUN->STOP	S012 and S013 remain accessible only during one cycle (the RUN states include SIMU.RUN). S013 does not turn on upon a power failure.
S100 to 10F (SW100)	10-ms accumulation counter		Cleared to 0 upon a power recovery or a reset. Upon an overflow, restarts counting from 0.
S110 to 11F (SW110)	100-ms accumulation counter		
S120 to 13F (SW120,130)	1-s accumulation counter		
S140 to 14F (SW140)	Sequence cycle accumulation counter		Cleared to 0 when the CPU makes the transition from the STOP state to the RUN state. Upon an overflow, restarts counting from 0.
S150 to 15F (SW150)	Remote I/O cycle accumulation counter		Cleared to 0 when the RI/O feature makes the transition from the STOP state to the RUN state. Upon an overflow, restarts counting from 0.
S200	Time control register	0 = Time updating stopped. 1 = Time being updated.	Each indicates the timer status or is used to set the timer (only where memory with a timer is installed).
S201		0 = STOP request not issued. 1 = STOP request issued.	
S202		0 = Ordinary usage. 1 = Data setting and start.	
S20F		0 = Cell normal. 1 = Cell-related error.	
S210 to 212	Time control register	S210 = "month, day of month, hours" S211 = "day of month, hours, minutes" S212 = "hours, minutes, seconds"	Used to set a display format for use in displaying on the CPU indicator (only where memory with a timer is installed). • When none of the three S210 thru S212 is defined with a display format, the "year, month, day of month" format is used for displaying on the CPU indicator. • If more than one display format is set in time control registers, the smaller- or smallest-numbered register has priority.
S288 to 28F (SW280)	Time setting register	Seconds (0 to 59)	No value outside each permitted range may be set in the register. (1 = Sunday; 2 = Monday; 3 = Tuesday; 4 = Wednesday; 5 = Thursday; 6 = Friday; 7 = Saturday)
S298 to 29F (SW290)		Minutes (0 to 59)	
S2A8 to 2AF (SW2A0)		Hours (0 to 23)	
S2B8 to 2BF (SW2B0)		Day of month (0 to 31)	
S2C8 to 2CF (SW2C0)		Month (0 to 12)	
S2D8 to 2DF (SW2D0)		Year (1900 to 2199)	
S2E8 to 2EF (SW2E0)		Day of week (1 to 7)	

<table>
<tr><th>Register No.</th><th>Name</th><th>Content</th><th>Description</th></tr>
<tr><td>S300 to 37F
(SW300 to 370)</td><td>Station registration</td><td>0 = Not registered
1 = Registered</td><td rowspan="3"><table><tr><th></th><th>St. Registration</th><th>St. Time-out</th><th>St. Fuse</th></tr><tr><td>X,Y000 to 00F</td><td>S300</td><td>S380</td><td>S400</td></tr><tr><td>X,Y010 to 01F</td><td>S301</td><td>S381</td><td>S401</td></tr><tr><td>X,Y020 to 02F</td><td>S302</td><td>S382</td><td>S402</td></tr><tr><td>X,Y030 to 03F</td><td>S303</td><td>S383</td><td>S403</td></tr><tr><td>X,Y040 to 04F</td><td>S304</td><td>S384</td><td>S404</td></tr><tr><td>:</td><td>:</td><td>:</td><td>:</td></tr><tr><td>X,Y7F0 to 7FF</td><td>S37F</td><td>S3FF</td><td>S47F</td></tr></table>The above flags are set at the same time the LED is lit (once every 2 seconds).</td></tr>
<tr><td>S380 to 3FF
(SW380 to 3F0)</td><td>Station time-out</td><td>0 = Not timed out.
1 = Timed out.</td></tr>
<tr><td>S400 to 47F
(SW400 to 470)</td><td>Station fuse</td><td>0 = Not blown.
1 = Blown.</td></tr>
<tr><td>S588 to 58A</td><td rowspan="6">CPU link main module information</td><td>001 = RAM SSP exceeded.
010 = μ not loaded yet.
100 = μ already loaded.
110 = CPU No. error.
111 = Reception currently interrupted.</td><td rowspan="6">Loaded with error information from μ RAM.
• Cleared to 0 upon a power recovery or a reset.
(μ: Microprogram)

Normal values: 588=1
589=0
58A=0
58B=0
58C=0
58D=0
58E=0
58F=0</td></tr>
<tr><td>S58B</td><td>0 = Normal.
1 = RAM parity error.</td></tr>
<tr><td>S58C</td><td>0 = Normal.
1 = RAM checksum error.</td></tr>
<tr><td>S58D</td><td>0 = Normal.
1 = ROM checksum error.</td></tr>
<tr><td>S58E</td><td>0 = Normal.
1 = WDT error (software).</td></tr>
<tr><td>S58F</td><td>0 = Normal.
1 = WDT error (hardware).</td></tr>
<tr><td>S598 to 59A</td><td rowspan="6">CPU link submodule information</td><td>001 = RAM SSP exceeded.
010 = μ not loaded yet.
100 = μ already loaded.
110 = CPU No. error.
111 = Reception currently interrupted.</td><td rowspan="6">Loaded with error information from μ RAM.
• Cleared to 0 upon a power recovery or a reset.
(μ: Microprogram)

Normal values: 598=1
599=0
59A=0
59B=0
59C=0
59D=0
59E=0
59F=0</td></tr>
<tr><td>S59B</td><td>0 = Normal.
1 = RAM parity error.</td></tr>
<tr><td>S59C</td><td>0 = Normal.
1 = RAM checksum error.</td></tr>
<tr><td>S59D</td><td>0 = Normal.
1 = ROM checksum error.</td></tr>
<tr><td>S59E</td><td>0 = Normal.
1 = WDT error (software).</td></tr>
<tr><td>S59F</td><td>0 = Normal.
1 = WDT error (hardware).</td></tr>
<tr><td>S5C0</td><td rowspan="5">RS-232C transmission information (channel 2)</td><td>0 = Ready for transmission.
1 = Transmission in process.</td><td rowspan="5">• Cleared to 0 upon a power recovery or a reset.

(TRCP: Transmission control program)

(RCS: Reception cancel and send)</td></tr>
<tr><td>S5C1</td><td>0 = Handler error not detected.
1 = Handler error detected.</td></tr>
<tr><td>S5C2</td><td>0 = TRCP error not detected.
1 = TRCP error detected.</td></tr>
<tr><td>S5C3</td><td>0 = RCS error not detected.
1 = RCS error detected.</td></tr>
<tr><td>S5C8 to 5CF</td><td>Error detail code</td></tr>
</table>

Register No.	Name	Content	Description
S5D0	RS-232C reception information (channel 2)	0 = No data received. 1 = Data received.	• Cleared to 0 upon a power recovery or a reset.
S5D1		0 = Handler error not detected. 1 = Handler error detected.	
S5D2		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S5D3		0 = System error not detected. 1 = System error detected.	
S5D4 to 5D7		Reception handler error code	
S5D8 to 5DF		Error detail code	
S5E0	RS-232C transmission information (channel 3)	0 = Ready for transmission. 1 = Transmission in process.	• Cleared to 0 upon a power recovery or a reset.
S5E1		0 = Handler error not detected. 1 = Handler error detected.	
S5E2		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S5E3		0 = RCS error not detected. 1 = RCS error detected.	(RCS: Reception cancel and send)
S5E8 to 5EF		Error detail code	
S5F0	RS-232C reception information (channel 3)	0 = No data received. 1 = Data received.	• Cleared to 0 upon a power recovery or a reset.
S5F1		0 = Handler error not detected. 1 = Handler error detected.	
S5F2		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S5F3		0 = System error not detected. 1 = System error detected.	
S5F4 to 5F7		Reception handler error code	
S5F8 to 5FF		Error detail code	
S600	RS-232C transmission information (channel 0)	0 = Ready for transmission. 1 = Transmission in process.	• Cleared to 0 upon a power recovery or a reset.
S601		0 = Handler error not detected. 1 = Handler error detected.	
S602		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S603		0 = RCS error not detected. 1 = RCS error detected.	(RCS: Reception cancel and send)
S608 to 60F		Error detail code	
S610	RS-232C reception information (channel 0)	0 = No data received. 1 = Data received.	• Cleared to 0 upon a power recovery or a reset.
S611		0 = Handler error not detected. 1 = Handler error detected.	
S612		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S613		0 = System error not detected. 1 = System error detected.	
S614 to 617		Reception handler error code	
S618 to 61F		Error detail code	

Register No.	Name	Content	Description
S620	RS-232C transmission information (channel 1)	0 = Ready for transmission. 1 = Transmission in process.	• Cleared to 0 upon a power recovery or a reset.
S621		0 = Handler error not detected. 1 = Handler error detected.	
S622		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S623		0 = RCS error not detected. 1 = RCS error detected.	(RCS: Reception cancel and send)
S628 to 62F		Error detail code	
S630	RS-232C reception information (channel 1)	0 = No data received. 1 = Data received.	• Cleared to 0 upon a power recovery or a reset.
S631		0 = Handler error not detected. 1 = Handler error detected.	
S632		0 = TRCP error not detected. 1 = TRCP error detected.	(TRCP: Transmission control program)
S633		0 = System error not detected. 1 = System error detected.	
S634 to 637		Reception handler error code	
S638 to 63F		Error detail code	
S900 to 90F (SW900)	Sequence cycle scan time calculation area	Latest measured values (ms)	From SEQFG (H6018E): 0 = Measure. 1 = Do not measure.
S910 to 91F (SW910)		Maximum measured values (ms)	
S920 to 92F (SW920)		Minimum measured values (ms)	
S930 to 93F (SW930)		Average of the most recent 10 measured values (ms)	
S980 to 98F (SW980)	D.NET (MODU No.0)	0 = Serious problem going on. 1 = "Bus off" condition going on. 2 = Duplicate MAC ID detected. 3 = Timed-out condition going on. 4 = Parameter setting error. 5 = 17 frames in 10 ms. F = ON at the start of communication.	0 = Module operation stopped. 1 = Communication interrupted while the condition lasts; the register turns off when the problem is solved. 2 = Communication stopped. 3 = CAN transmission timed out. Communication interrupted while the condition lasts; the register turns off when the problem is solved. 4 = Station parameter setting error detected. Communication stopped. 5 = Station parameter set to a value indicating 17 or more frames to occur in each 10-ms interval. Communication stopped. F = The register does not turn off even when a serious problem arises.
S990 to 99F (SW990)	D.NET (MODU No.1)	0 = Serious problem going on. 1 = "Bus off" condition going on. 2 = Duplicate MAC ID detected. 3 = Timed-out condition going on. 4 = Parameter setting error. 5 = 17 frames in 10 ms. F = ON at the start of communication.	0 = Module operation stopped. 1 = Communication interrupted while the condition lasts; the register turns off when the problem is solved. 2 = Communication stopped. 3 = CAN transmission timed out. Communication interrupted while the condition lasts; the register turns off when the problem is solved. 4 = Station parameter setting error detected. Communication stopped. 5 = Station parameter set to a value indicating 17 or more frames to occur in each 10-ms interval. Communication stopped. F = The register does not turn off even when a serious problem arises.

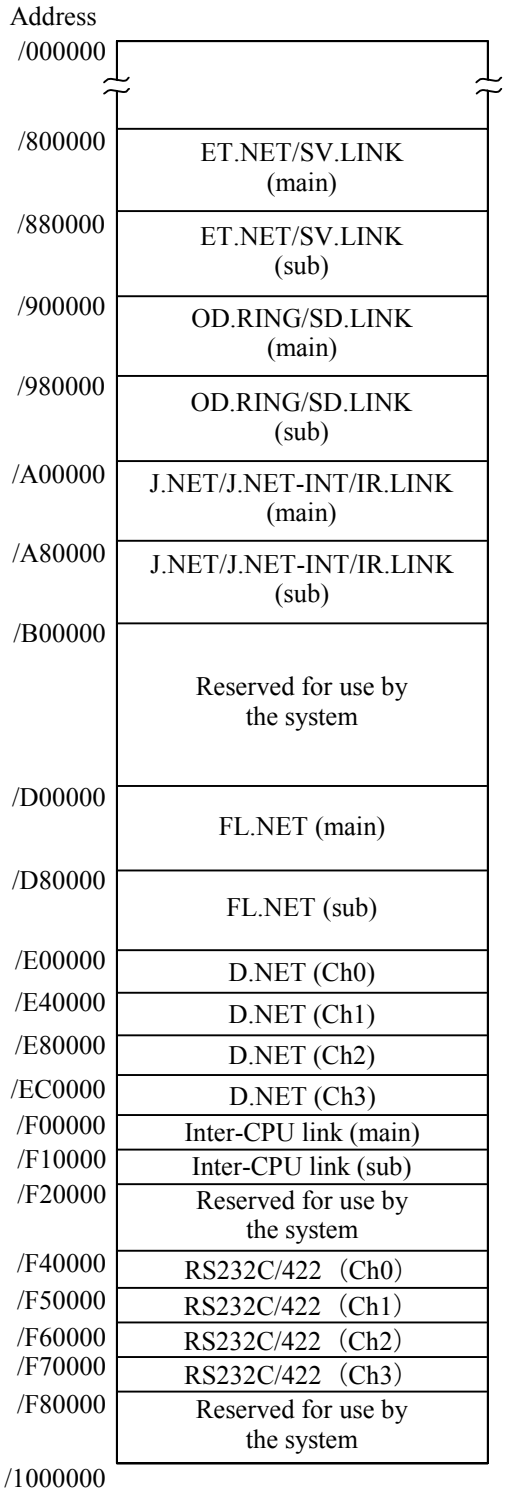
Register No.	Name	Content	Description
S9A0 to 9AF (SW9A0)	D.NET (MODU No.2)	0 = Serious problem going on. 1 = "Bus off" condition going on. 2 = Duplicate MAC ID detected. 3 = Timed-out condition going on. 4 = Parameter setting error. 5 = 17 frames in 10 ms. F = ON at the start of communication.	0 = Module operation stopped. 1 = Communication interrupted while the condition lasts; the register turns off when the problem is solved. 2 = Communication stopped. 3 = CAN transmission timed out. Communication interrupted while the condition lasts; the register turns off when the problem is solved. 4 = Station parameter setting error detected. Communication stopped. 5 = Station parameter set to a value indicating 17 or more frames to occur in each 10-ms interval. Communication stopped. F = The register does not turn off even when a serious problem arises.
S990 to 99F (SW990)	D.NET (MODU No.3)	0 = Serious problem going on. 1 = "Bus off" condition going on. 2 = Duplicate MAC ID detected. 3 = Timed-out condition going on. 4 = Parameter setting error. 5 = 17 frames in 10 ms. F = ON at the start of communication.	0 = Module operation stopped. 1 = Communication interrupted while the condition lasts; the register turns off when the problem is solved. 2 = Communication stopped. 3 = CAN transmission timed out. Communication interrupted while the condition lasts; the register turns off when the problem is solved. 4 = Station parameter setting error detected. Communication stopped. 5 = Station parameter set to a value indicating 17 or more frames to occur in each 10-ms interval. Communication stopped. F = The register does not turn off even when a serious problem arises.
SA00	J.NET main NET1	0 = Communication going on normally. 1 = Communication error detected.	
SA01		0 = Operating normally. 1 = Hardware error detected.	
SA08	J.NET main NET2	0 = Communication going on normally. 1 = Communication error detected.	
SA09		0 = Operating normally. 1 = Hardware error detected.	
SA80	J.NET sub-NET1	0 = Communication going on normally. 1 = Communication error detected.	
SA81		0 = Operating normally. 1 = Hardware error detected.	
SA88	J.NET sub-NET2	0 = Communication going on normally. 1 = Communication error detected.	
SA89		0 = Operating normally. 1 = Hardware error detected.	
SBA0 to BAF (SWBA0)	Fixed I/O pattern	[01010101 10101010]	If the pattern is found destroyed, resetting clears all the I/O memory.
SBB0 to BBF (SWBB0)		[11101110 10011001]	

Note: The contents of SA00 to SAFF vary with installed modules.

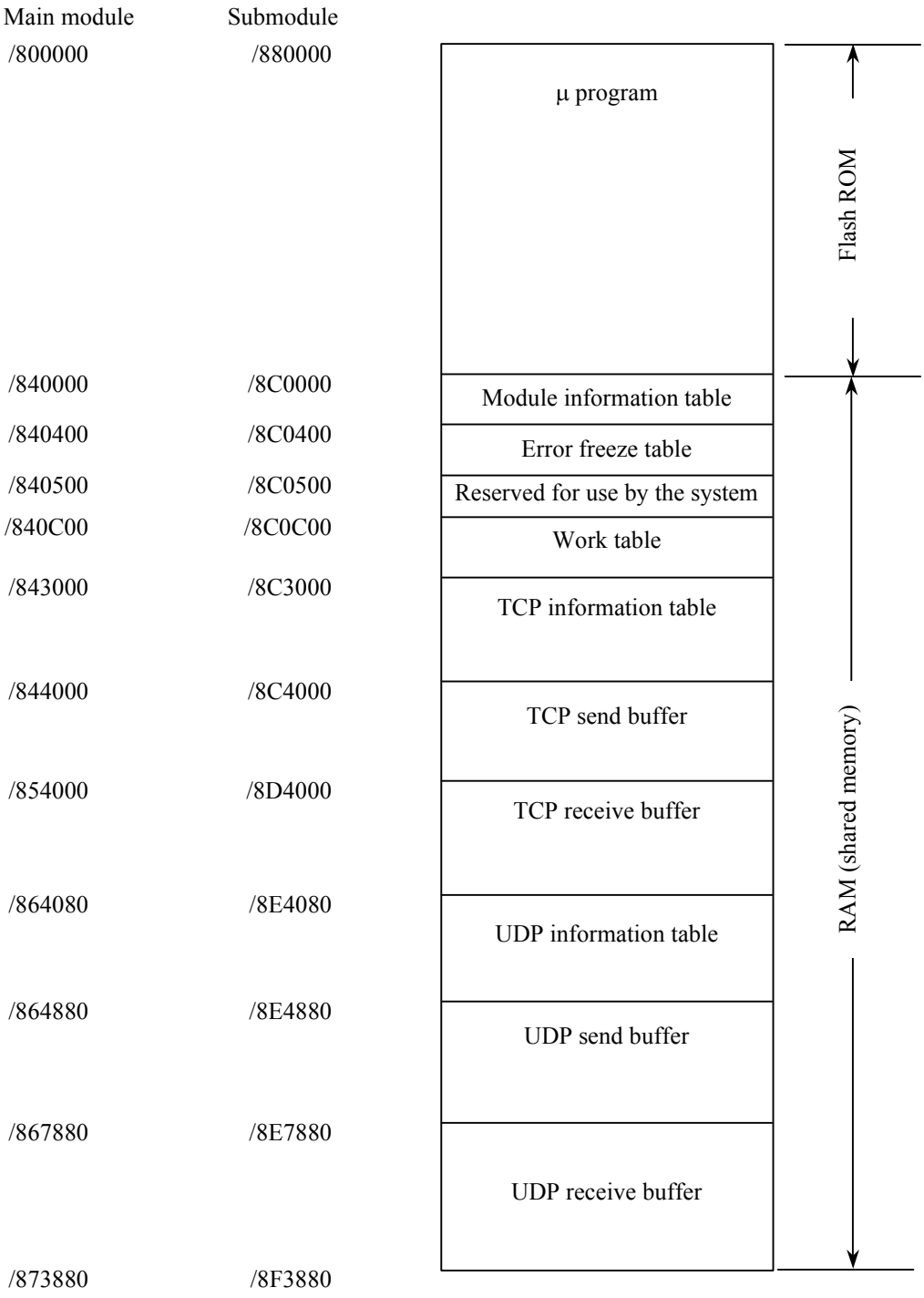
Register No.	Name	Content	Description
SBF0	CPU status	0 = Currently in RUN state. 1 = Currently in STOP state.	
SBF1		0 = Currently in ordinary-RUN state. 1 = Currently in SIMU state.	
SBF2		(0 = ordinary mode) (1 = FORCE mode)	(SBF2 FORCE mode is reserved for future extension.)
SBF3		0=PROT.OFF 1=PROT.ON	
SBF4		0 = RI/O stopped. 1 = RI/O operating.	
SBF5		0 = Task running. 1 = Task stopped.	
SBF8		0 = Cell normal. 1 = Cell-related error warning.	(Cell: Memory backup battery cell)
SBF9		0 = T.O.E.ST nonexistent. 1 = T.O.E.ST existent.	(T.O.E.: time-out error) (ST: Station)
SBFA		0 = No ST with brown fuse is existent. 1 = ST with brown fuse is existent.	
SBFB		0 = OPT error not detected. 1 = OPT error detected.	(OPT: Optional module)
SBFD		Cleared to 0 upon a power recovery or a reset.	
SBFE		0 = Operating normally. 1 = CPU down.	
SBFF		0 = OS running on the CPU. 1 = CPU being started up.	

3.8 Memory Maps for Optional Modules

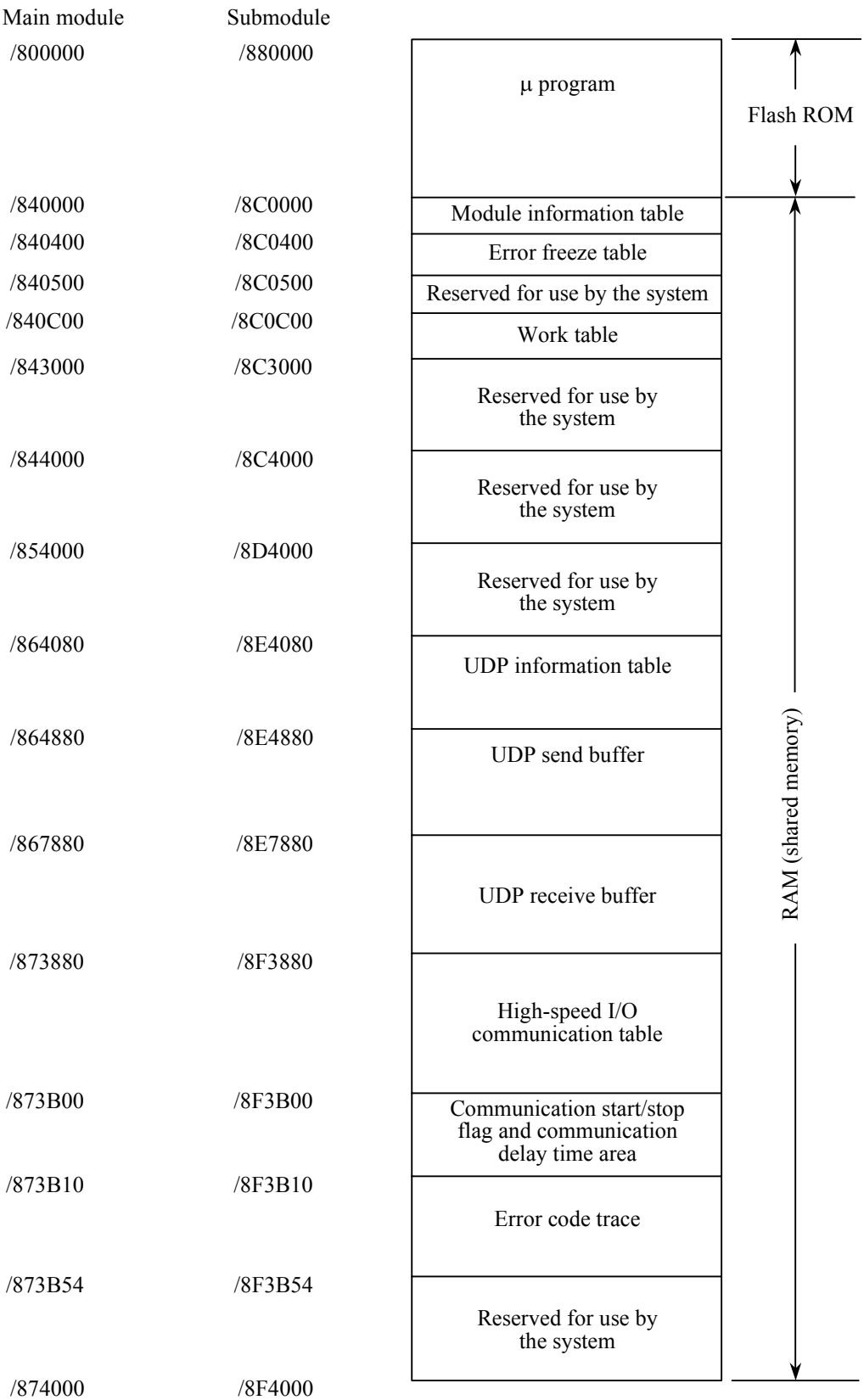
Optional modules are mapped onto memory in the following way, starting from the address /800000.



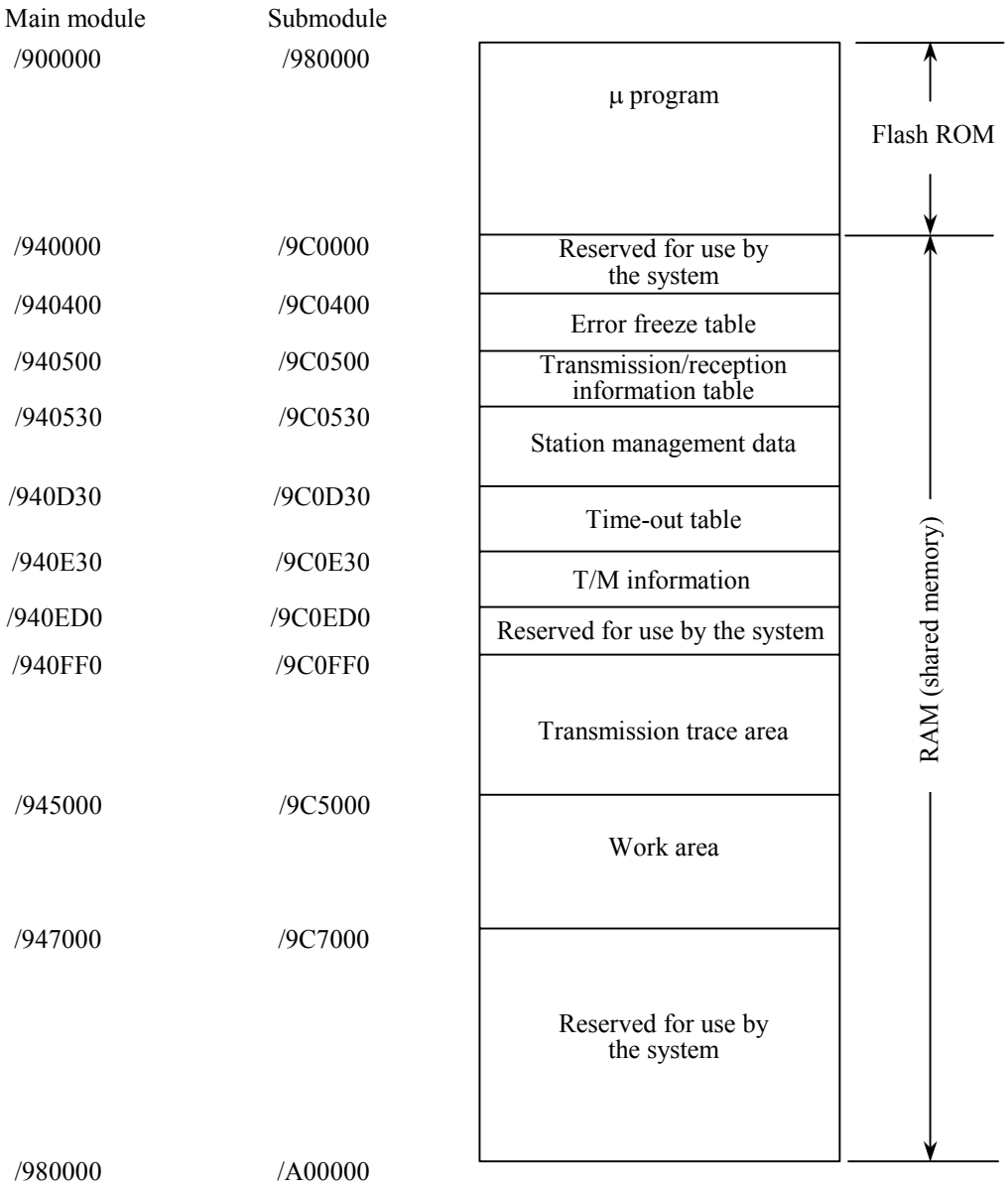
◆ Memory map for ET.NET modules



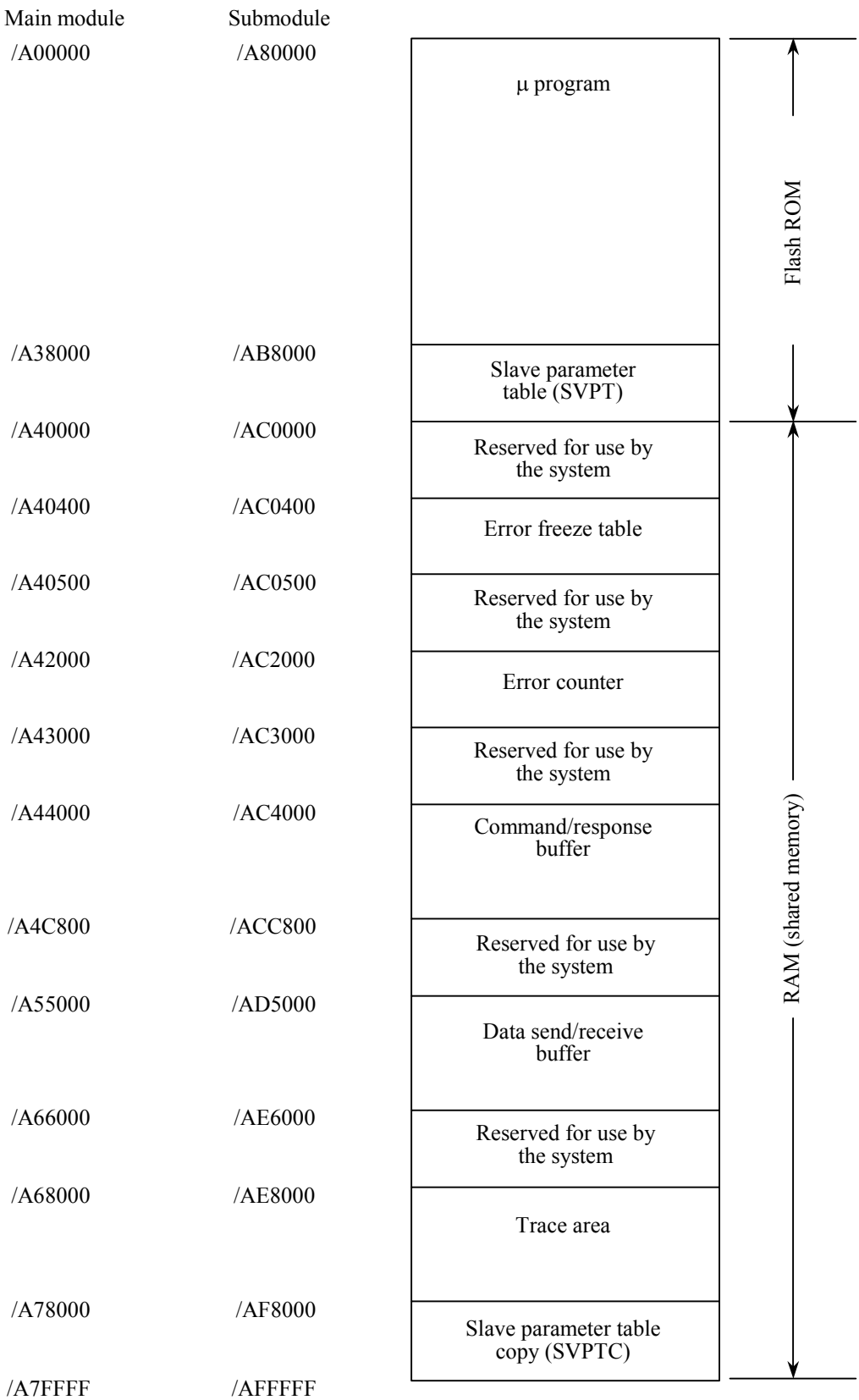
◆ Memory map for SV.LINK modules



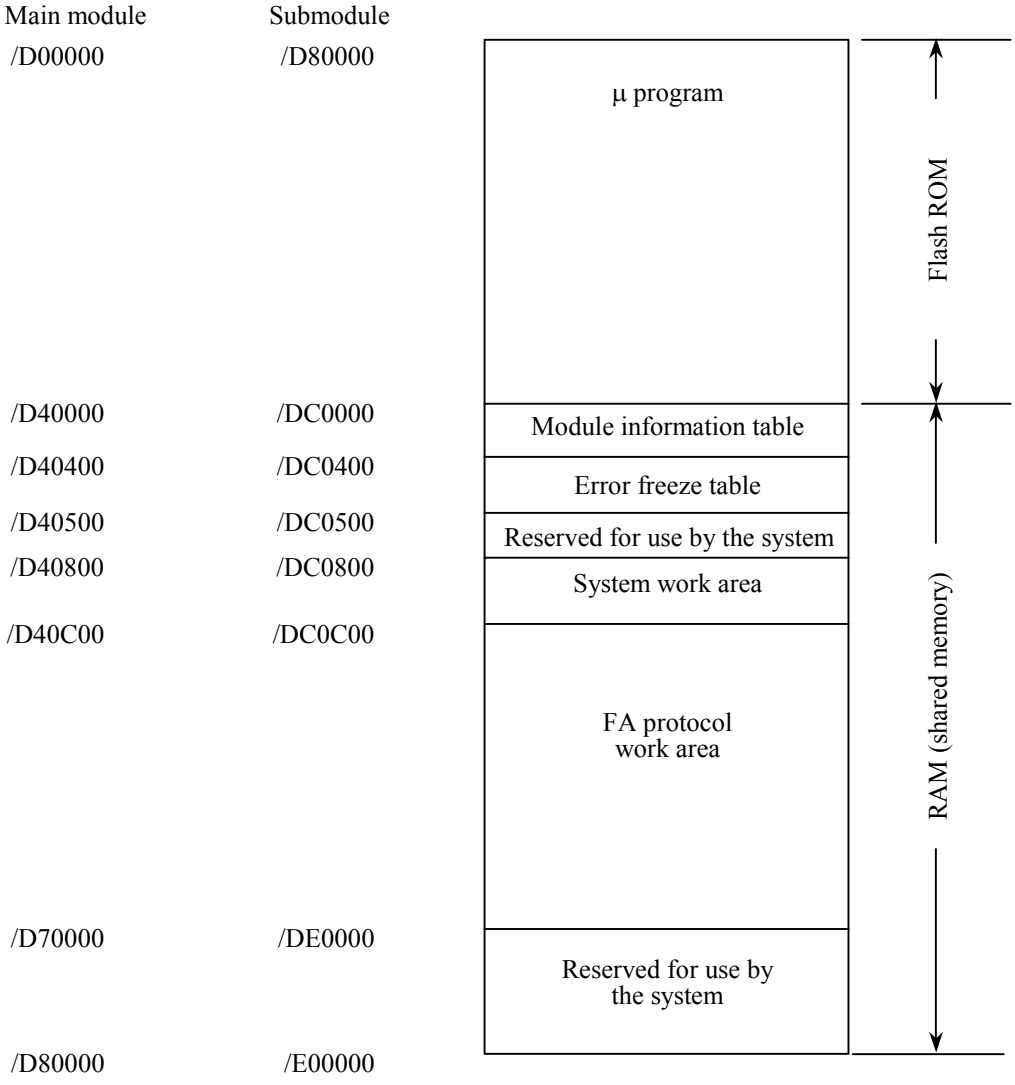
◆ Memory map for OD.RING/SD.LINK modules



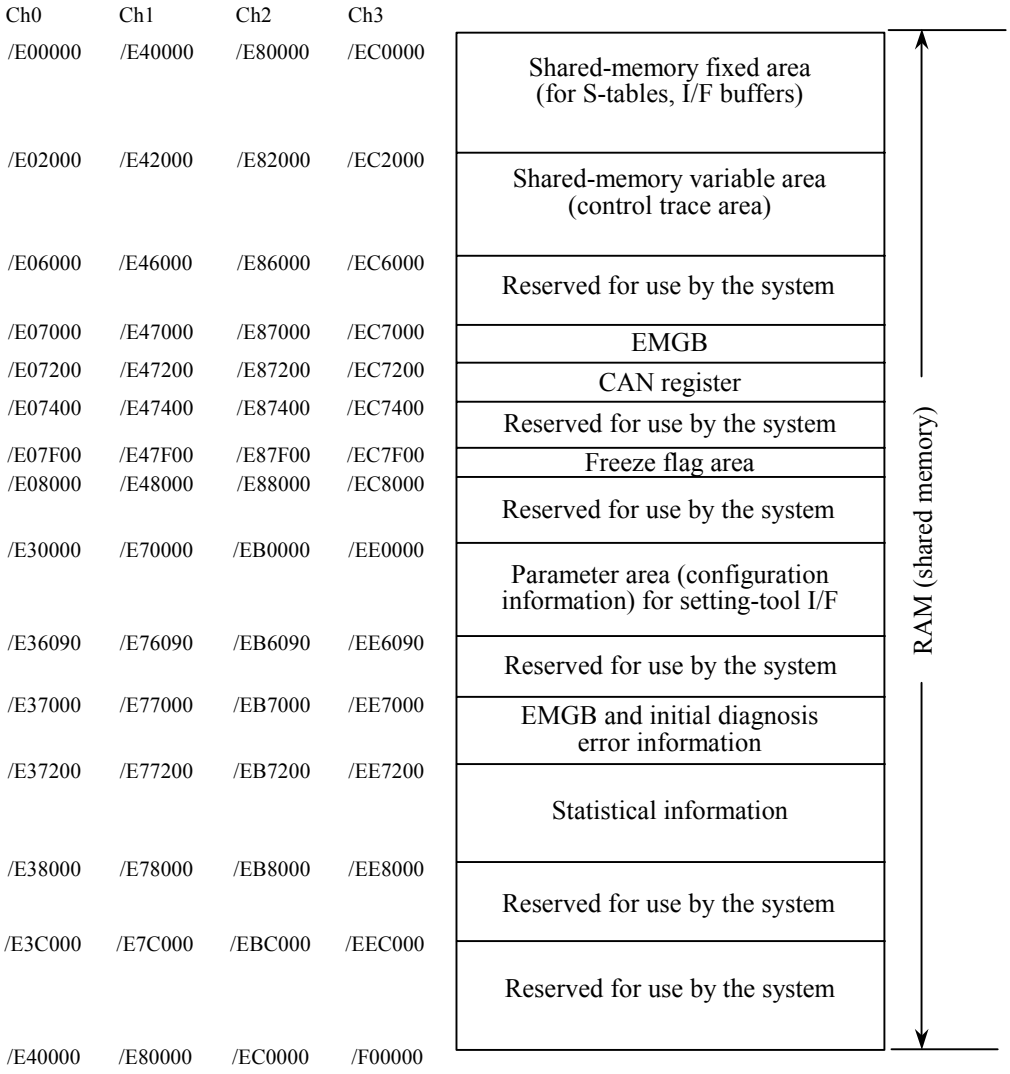
◆ Memory map for J.NET/J.NET-INT/IR.LINK modules



◆ Memory map for FL.NET modules



◆ Memory map for D.NET modules

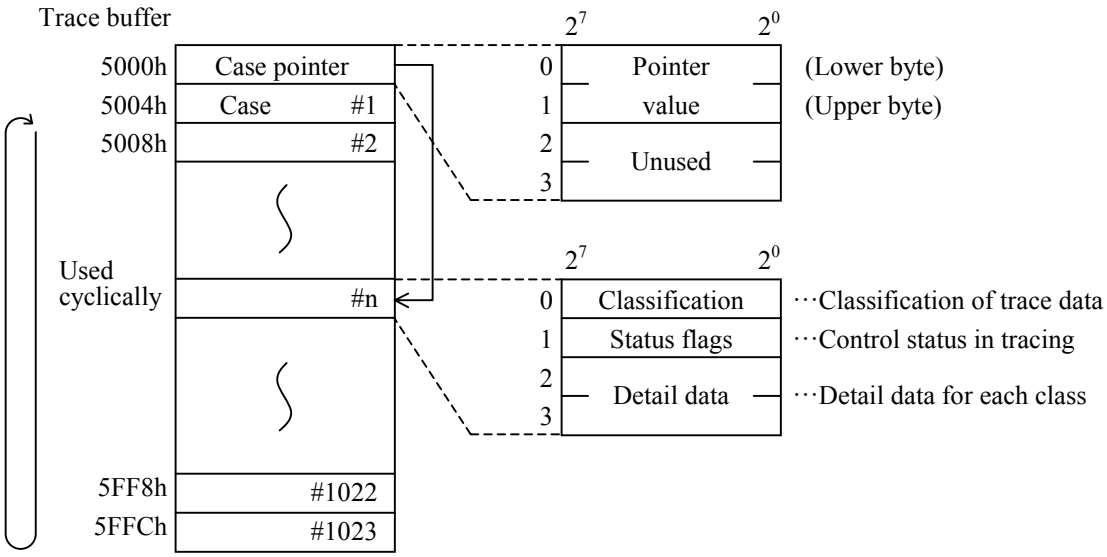


3.9 External Equipment Link Trace Information

Trace Buffer:

(1) Trace buffer structure

As shown below, the trace buffer consists of a number of 4-byte trace data areas, each corresponding to a single case of tracing. These trace data areas, pointed to by a pointer, are used cyclically whenever the entire buffer area becomes full with trace data.



Trace data is stored in the buffer, beginning with the case #1 area and ending with the last case area, at which time the next set of trace data is stored in the case #1 area, i.e. the buffer is used cyclically.

(2) Classification of trace data

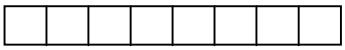
Trace data is internally classified as shown in the table below. This classification information is stored in ASCII format so that it can be read out by the MCS function of the external-equipment (device) link support system.

Classification		Indicates:
ASCII	Hexadecimal	
'R'	52	Data reception
'S'	53	Data transmission
'D'	44	A send or other request issued from the CPU to the communication control program.
'I'	49	A report of the end of reception or some other event issued from the communication control program to the CPU.
'E'	45	Whether reception can be carried out or not, which depends on changes in CD signal input.
'B'	42	The transmission suspended or resumed due to changes in CS or DR signal input.

(3) Status flags

These status flags (bits) are set to indicate a variety of conditions of the communication control program arising in data tracing.

(MSB) 2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0 (LSB)

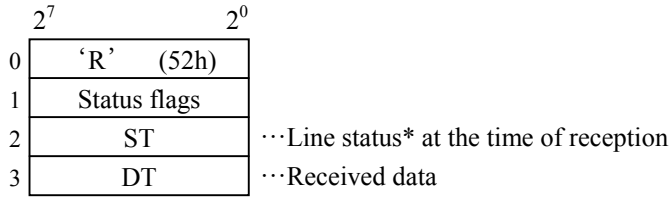


Bit	Identified Condition	Bit Values	
		'1'	'0'
0	Reserved for future extension		
1			
2			
3			
4	Reception allowed or not	Data reception cannot be carried out, because CD signal input is currently indicating no carrier present.	Data reception can be carried out because CD signal input is currently indicating a carrier present.
5	Transmission suspended	Transmission is currently suspended because a suspend code has been received, CS signal input is indicating no send request received, or DR signal input is not ready.	Transmission is not suspended.
6	Text being received	Text data is currently being received.	No text data is currently being received.
7	Data being transmitted	Data is currently being transmitted.	No data is currently being transmitted.

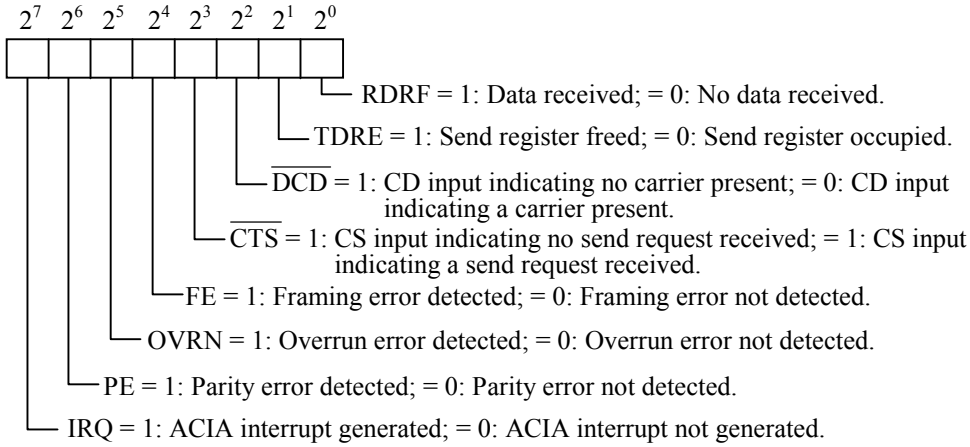
(4) Detail data from trace

(4-1) "R" (52h) -- data reception

This symbol indicates data has been received.

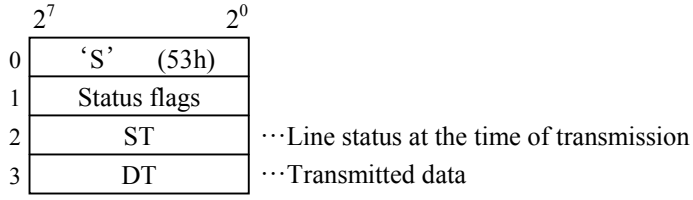


* ST: Details of line status:



(4-2) "S" (53h) -- data transmission

This symbol indicates that data has been transmitted to the external equipment.



(4-3) "D" (44h) -- a send or other request issued from the CPU to the communication control program.

This symbol indicates that a send or other request has been issued from the CPU (sub-OS and application programs) to the communication control program, or that a response to a reception report has been received.

No.	Trace Data (hexadecimal)				Description	Data Classification*4			Response given or not
	1	2	3	4		Request	Report	Response	
1	D		80	80	Software reset request to communication control program	√			
2	D		01	00	Data transmission request	√			Given
3	D		40	00	Hardware status read request	√			Given
4	D		40	01	RS-422 transmission gate control request	√			Given
5	D		40	02	DTR(ER)-setting request	√			Given
6	D		40	03	RTS(RS)-setting request	√			Given
7	D		80	00	Response to a resetting report from communication control program. (I-14)			√	
8	D		01	01	Response to an end-of-transmission report. (I-1)			√	
9	D	(*2)	01	83	Response to a suspension time-out report. (I-2)			√	
10	D		01	84	Response to a transmission suspension time-out report generated while CS input is indicating "unable to send." (I-3)			√	
11	D		01	85	Response to a transmission suspension time-out report generated while CS input is indicating "not ready." (I-4)			√	
12	D		02	00	Response to a data reception report. (I-5)			√	
13	D		02	80	Response to a reception parity error report. (I-6)			√	
14	D		02	81	Response to a reception overrun error report. (I-7)			√	
15	D		02	82	Response to a reception framing error report. (I-8)			√	
16	D		02	83	Response to a reception time-out error report. (I-9)			√	
17	D		02	84	Response to an ASCII conversion error report. (I-10)			√	
18	D		02	85	Response to an ECD error report. (I-11)			√	
19	D		02	86	Response to a BCC check error report. (I-12)			√	

(*3) (*1) √: Applicable

(*1) Each parenthesized number in the table above is keyed to the numbers for "I" (49h) below, so that it can be readily determined which response is made to which report.
(*2) See the description in item (3), "Status flags," above.
(*3) D = 44h: Device status word.
(*4) The request is one that is issued by the sub-OS to the communication control program, and the report is one that is issued by the communication control program to the sub-OS.

(4-4) "I" (49h) -- a report of the end of reception or some other event issued from the communication control program to the CPU.

This symbol indicates that an end-of-reception, error or some other report has been issued from the communication control program to the CPU (sub-OS and application programs).

No.	Trace Data (hexadecimal)				Description	Data Classification*4			Response given or not
	1	2	3	4		Request	Report	Response	
1	I		01	01	Transmission terminated normally.		√		Given
2	I		01	83	Transmission suspension code time-out error		√		Given
3	I		01	84	Transmission suspension time-out error while CS input is indicating "unable to send."		√		Given
4	I		01	85	Transmission suspension time-out error while CS input is indicating "not ready."		√		Given
5	I		02	00	Data received normally.		√		Given
6	I		02	80	Received-data parity error		√		Given
7	I		02	81	Received-data overrun error		√		Given
8	I		02	82	Received-data framing error		√		Given
9	I		02	83	Reception time-out error		√		Given
10	I		02	84	Received-data ASCII conversion error		√		Given
11	I		02	85	Received-data ECD error		√		Given
12	I		02	86	Received-data BCC error		√		Given
13	I	(*2)							
14	I		80	00	GR initialize		√		Given
15	I		80	F0	ROM checksum error		√		Not given
16	I		80	F1	Communication control program all cleared.		√		Not given
17	I		80	F2	Communication control program not yet loaded in.		√		Not given
18	I		80	F3	Communication control program checksum error		√		Not given
19	I		80	F4	Communication control program down.		√		Not given
20	I		80	F5	Communication control program memory parity error.		√		Not given
21	I		01	00	Start-of-transmission response to a send request. (D-2)			√	
22	I		01	80	Unable-to-send response to a send request when reception is in process. (D-2)			√	
23	I		01	81	Unable-to-send response to a send request when transmission is in process. (D-2)			√	
24	I		01	82	Unable-to-send response to a send request when the hardware is not ready. (D-2)			√	
25	I		40	00	Response to a hardware status read request. (D-3)			√	
26	I		40	01	Response to an RS-422 transmission gate control request. (D-4)			√	
27	I		40	02	Response to an ER "ready"/"not ready" setting request. (D-5)			√	
28	I		40	03	Response to an RS "send request present or not" setting request. (D-6)			√	

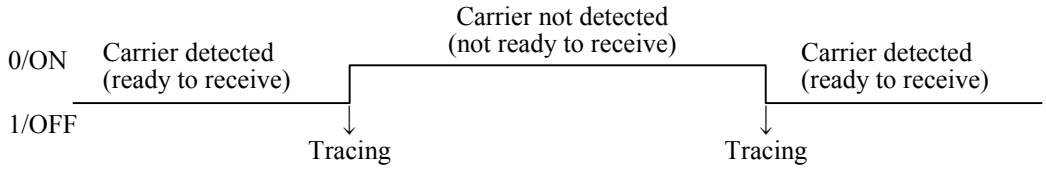
(*3) (*1) √: Applicable

(*1) Each parenthesized number in the table above is keyed to the numbers for "D" (44h) above, so that it can be readily determined which response is made to which report.
(*2) See the description in item (3), "Status flags," above.
(*3) I = 49h: Interrupt status word.
(*4) The request is one that is issued by the sub-OS to the communication control program, and the report is one that is issued by the communication control program to the sub-OS.

(4-5) "E" (45h) -- whether reception can be carried out or not, which depends on changes in CD signal input.

	2^7 ... 2^0	
0	'E' (45h)	
1	Status flags	
2	ST	··· Line status upon changes in CD input (see the asterisked [*] information in item (4-1), "R" (52h) -- data reception).
3	DT	··· Content of the receive data register upon changes in CD input.

CD Input:

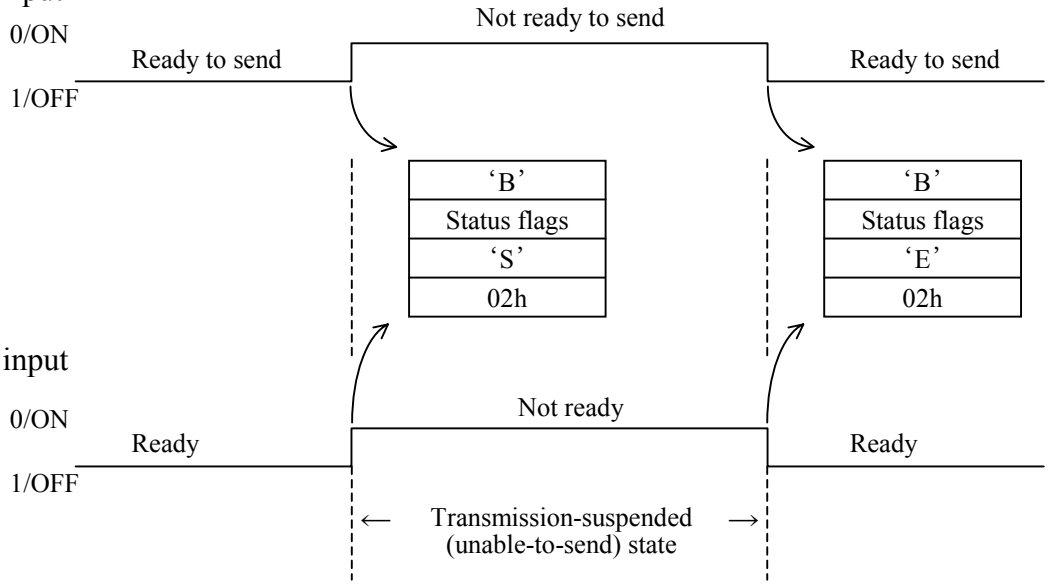


Tracing is made upon each change in CD input.

(4-6) "B" (42h) -- The transmission suspended or resumed due to changes in CS or DR input.

	2^7 ... 2^0	
0	'B' (42h)	
1	Status flags	
2	ST	··· "S" (53h) -- start of suspension.
3	02h	··· "E" (45h) -- end of suspension.

CS input

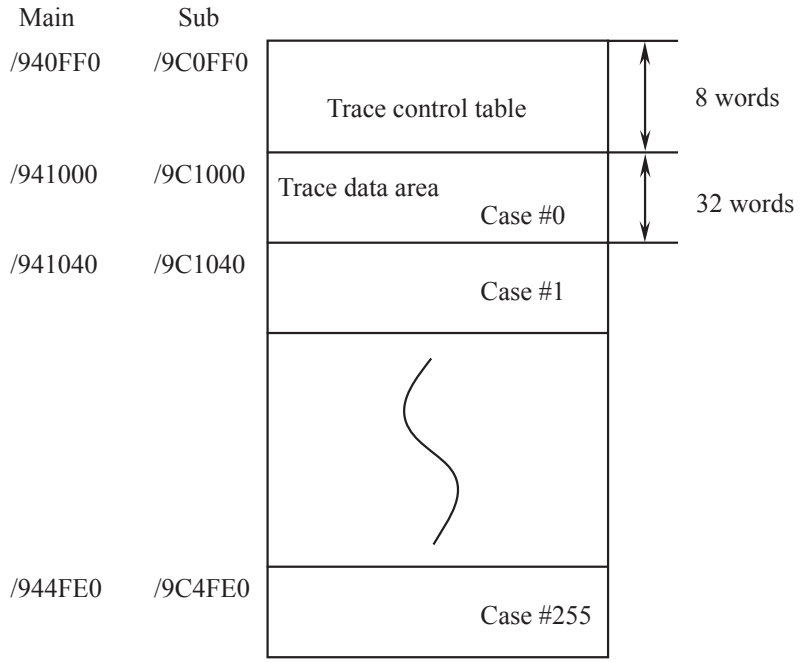


3.10 OD.RING/SD.LINK Communication Trace Information

The optical dual ring modules are capable of tracing communications and their details. The trace data produced by this capability can be used for troubleshooting if a problem arises during communication.

(1) Trace buffer structure

As shown below, the trace buffer consists of an 8-word trace control table and 256 32-word trace data areas, each corresponding to a single case of tracing. These trace data areas, pointed to by a pointer, are used cyclically whenever the entire buffer area becomes full with trace data.



Trace data is stored in the buffer, starting with the case #0 area and ending with the last case area (case #255), at which time the next set of trace data is stored in the case #0 area, i.e., the buffer is used cyclically.

(2) Trace control table

The trace control table is eight words long as shown below.

Main	Sub	
/940FF0	/9C0FF0	① Perform/Stop
/940FF2	/9C0FF2	Unused
/940FF4	/9C0FF4	② Trace target address
/940FF8	/9C0FF8	③ Mask data
/940FFA	/9C0FFA	④ Comparison data
/940FFC	/9C0FFC	⑤ Pointer
/940FFE	/9C0FFE	Unused

① Perform/Stop

This table entry is used to set one of the following directives to the tracing capability:

0: Stop tracing.

1: Perform tracing until a given condition is met.

2: Perform tracing until a given condition is met or an error occurs.

Upon a power recovery or the completion of a reset, this item is automatically set to "2". If an error occurs or a given tracing condition is met, the tracing is automatically stopped and the item is set to "0".

② Trace target address

This specifies the starting address of a target area for conditional tracing.

③ Mask data entry

This specifies mask data for conditional tracing. The entry is used to mask out only 0-bits in bit data.

④ Comparison data

This entry is used in conditional tracing. It is compared with the result of ANDing of the trace target address and mask data and, if they are identical, the condition is considered to be met.

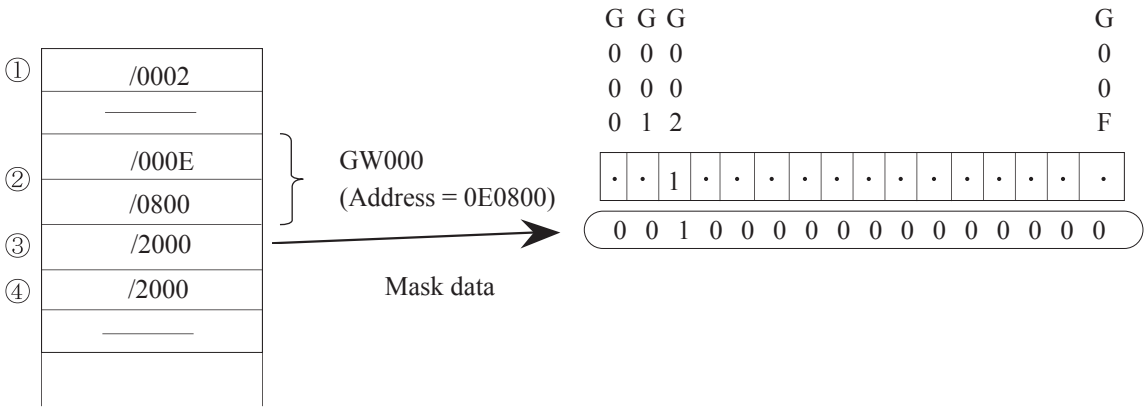
⑤ Pointer

This entry points to a case area in which the next set of trace data is to be stored.

The latest set of trace data is stored in the #(subtract 1 from the current pointer value) case area, except when the current pointer value is equal to 0, in which case the latest set has been stored in the #255 case area.

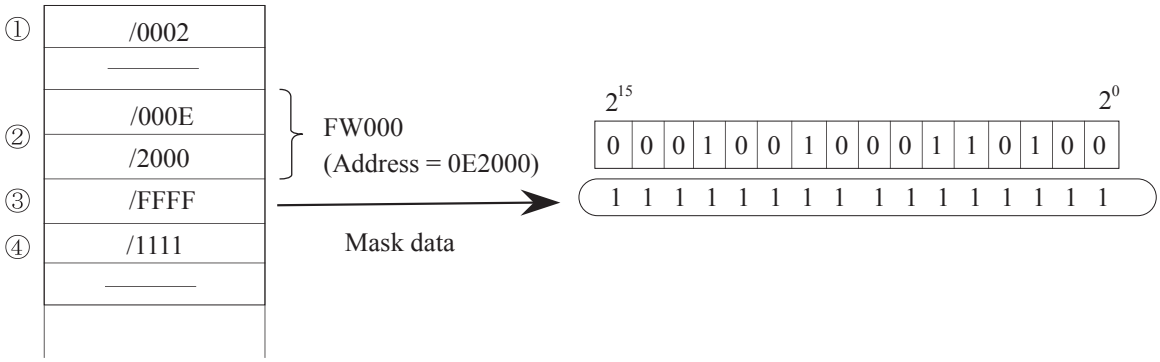
<Usage Example 1>

Suppose that G002 must always be equal to 1, and that, when it happens to be set equal to 0, tracing is to be stopped. Then, set the following entries in the trace control table:



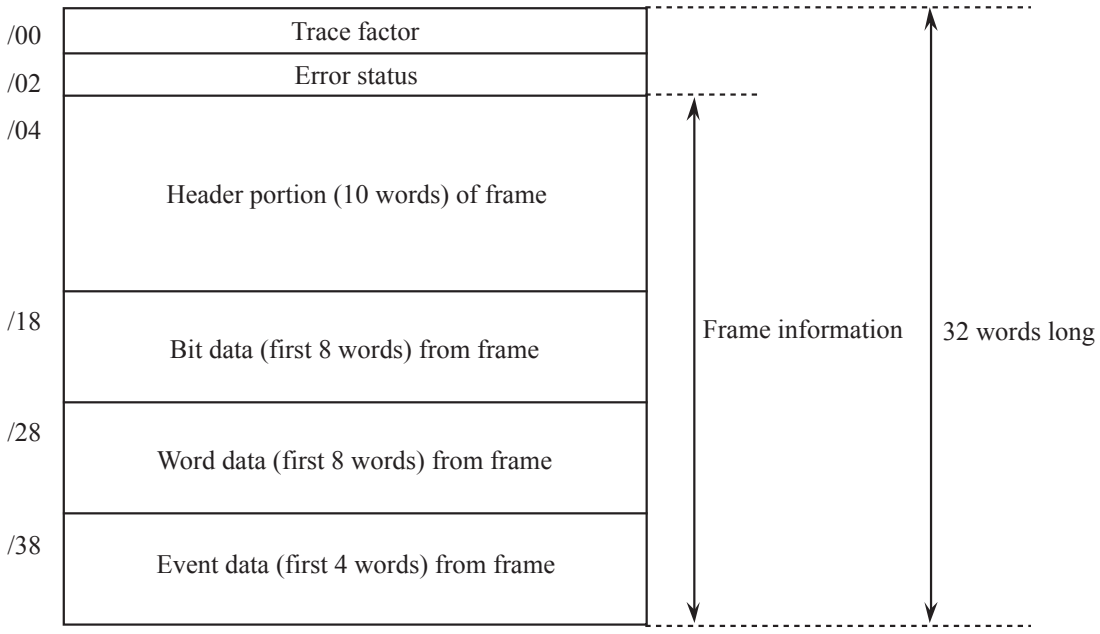
<Usage Example 2>

Suppose that FW000 must always be equal to 1234, and that, when it happens to be set equal to 1111, tracing is to be stopped. Then, set the following entries in the trace control table:

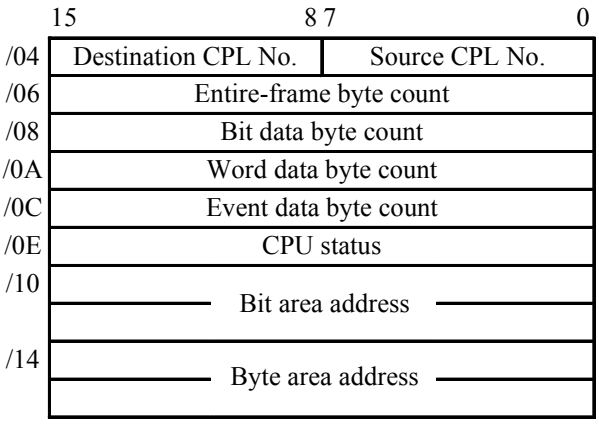


(3) Trace data

The trace data for each case of tracing consists of 32 words as shown below.



<Details of Frame Header Portion>



(4) Trace events and processes performed on their occurrence

The table shows the relationships between events causing the generation of trace data and processes performed on the occurrence of the events.

Event	Condition Testing	Stop on Error	Trace Factor	Error Status	Frame Information
Start of transmission	Performed	Not performed	Effective	Insignificant	Significant
Transmission terminated normally	Not performed	Not performed	Effective	Insignificant	Insignificant
Transmission terminated on error	Not performed	Performed	Effective	Significant	Insignificant
Transmission timed out	Not performed	Performed	Effective	Insignificant	Insignificant
Reception started	Not performed	Not performed	Effective	Insignificant	Insignificant
Reception terminated normally	Performed	Not performed	Effective	Insignificant	Significant
Reception terminated on error	Performed	Performed	Effective	Significant	Significant
Reception timed out	Not performed	Performed	Effective	Significant	Significant

- Condition testing

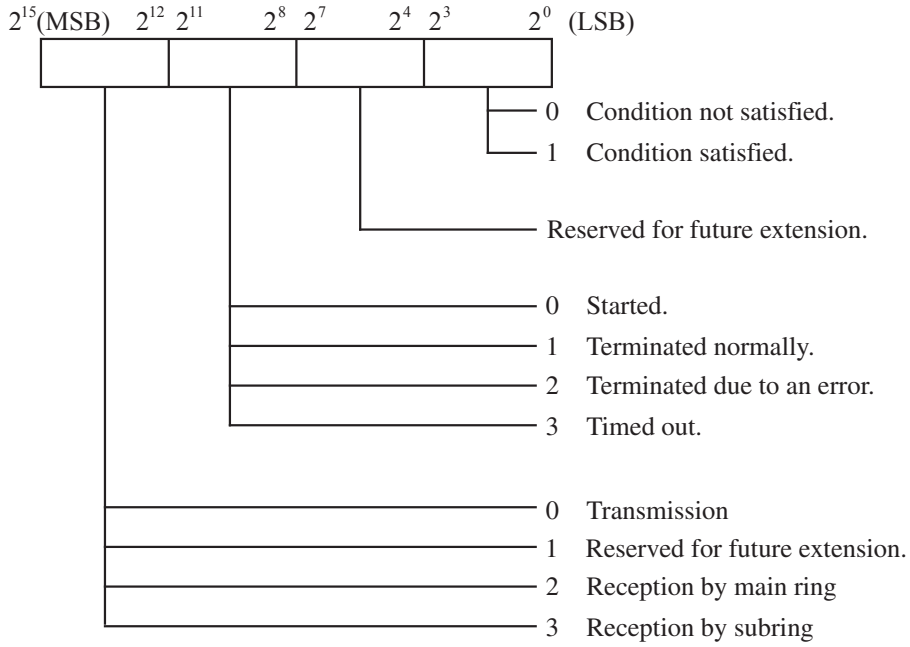
  Conditions are tested and, if they are satisfied, tracing is terminated, the fact being flagged in the trace factor.

- Termination on error

  If the "perform/stop" entry in the table is set equal to 2, communication tracing is terminated on the occurrence of an error.

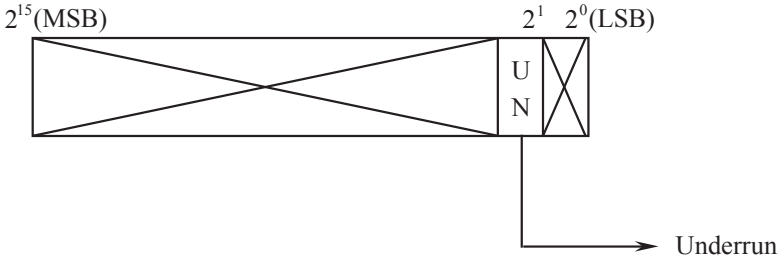
- Trace factor

  The "trace factor" entry in the table consists of flags to indicate a variety of causes of trace data generation:

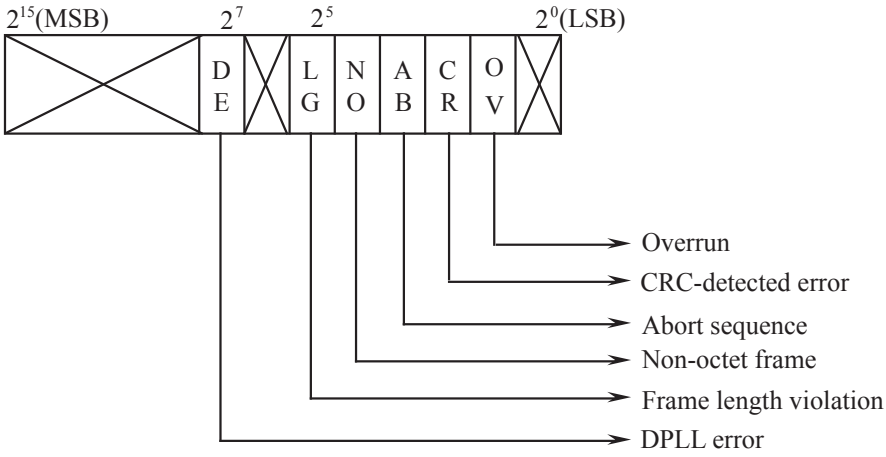


- Error status

<Error Status of Transmission>



<Error Status of Reception>



CAUTION

The error status is set to "FFFF" when a reception time-out error is detected.

The table below sets forth the details of the error status.

Transmission/ Reception	Error Name	Error Description
Transmission	Underrun	While an HDLC controller is transmitting data from the corresponding data buffer, an underrun occurs at the transmitter.
Reception	DPLL error	In decoding modes in which transitions occur with regard to each bit, a missing transition is detected, resulting in setting of the DE bit.
	Frame length violation	An illegal frame length is detected which is larger than its maximum permitted value defined for this channel.
	Non-octet frame	An illegal frame is received whose length in bits is not exactly divisible by 8.
	Abort sequence	Seven or more 1s are received consecutively during frame reception.
	CRC-detected error	An error is detected in a frame by a CRC.
	Overrun	An overrun has occurred at the receiver during frame reception.
	Reception time-out error	An attempt is made to transmit or receive more frames than permitted.

- Frame information

  Frame information is stored in the predetermined locations.

3.11 J.NET/J.NET-INT/IR.LINK Error Information

(1) Error counter

This counter counts communication errors occurring between the J.NET/J.NET-INT/IR.LINK module (master) and stations (slaves). The counter is initialized when a reset is made.

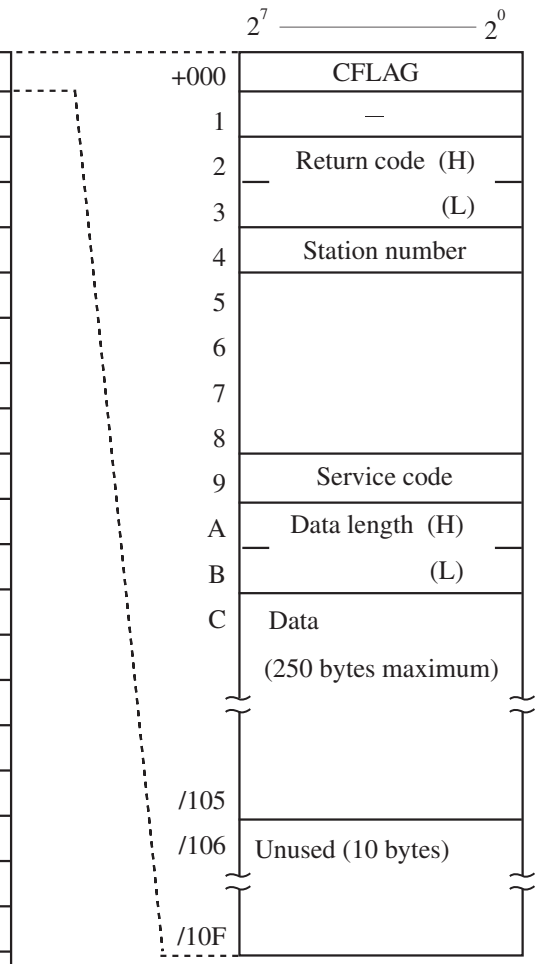
[N1]	[N2]	
/A42000	/A42400	(Used in broadcast)
/A42020	/A42420	Station ID = 01
/A42040	/A42440	Station ID = 02
/A42060	/A42460	Station ID = 03
/A42080	/A42480	Station ID = 04
/A420A0	/A424A0	Station ID = 05
/A420C0	/A424C0	Station ID = 06
/A420E0	/A424E0	Station ID = 07
/A42100	/A42500	Station ID = 08
/A42120	/A42520	Station ID = 09
/A42140	/A42540	Station ID = 0A
/A42160	/A42560	Station ID = 0B
/A42180	/A42580	Station ID = 0C
/A421A0	/A425A0	Station ID = 0D
/A421C0	/A425C0	Station ID = 0E
/A421E0	/A425E0	Station ID = 0F
/A42200	/A42600	Station ID = 10
/A42220	/A42620	Station ID = 11
/A42240	/A42640	Station ID = 12
/A42260	/A42660	Station ID = 13
/A42280	/A42680	Station ID = 14
/A422A0	/A426A0	Station ID = 15
/A422C0	/A426C0	Station ID = 16
/A422E0	/A426E0	Station ID = 17
/A42300	/A42700	Station ID = 18
/A42320	/A42720	Station ID = 19
/A42340	/A42740	Station ID = 1A
/A42360	/A42760	Station ID = 1B
/A42380	/A42780	Station ID = 1C
/A423A0	/A427A0	Station ID = 1D
/A423C0	/A427C0	Station ID = 1E
/A423E0	/A427E0	Station ID = 1F

	2^7 —— 2^0	
+00	Transmitter underrun	(TXUN)
02	CTS lost	(TXCT)
04	Frame length violation	(RXLG)
06	Non-octet frame	(RXNO)
08	Abort sequence	(RXAB)
0A	CRC-detected error	(RXCR)
0C	Overrun	(RXOV)
0E	CD lost	(RXCD)
10	Time-out	(RXTO)
12	Unused (14 bytes)	
+1E		

(2) Command/response buffer

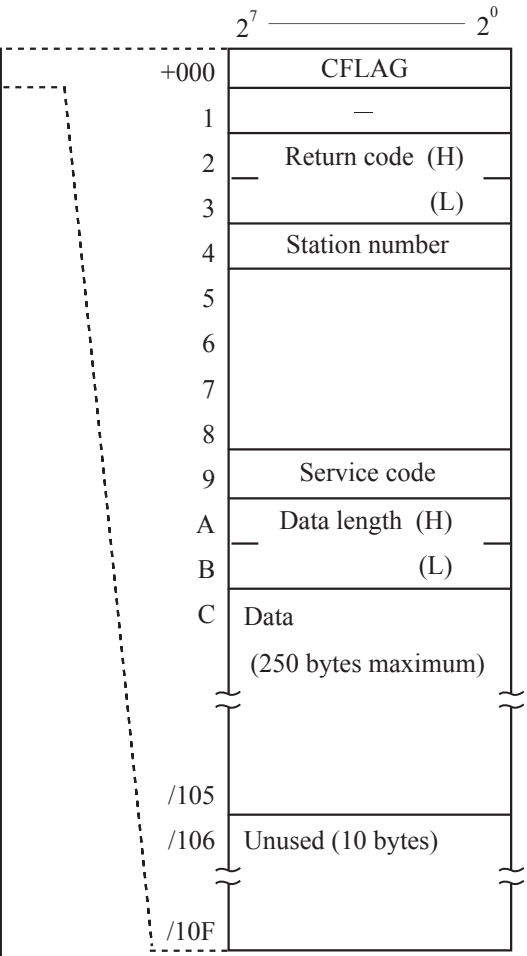
● Command buffer

[N1]	[N2]	
/A44110	/A46310	Station ID = 01
/A44220	/A46420	Station ID = 02
/A44330	/A46530	Station ID = 03
/A44440	/A46640	Station ID = 04
/A44550	/A46750	Station ID = 05
/A44660	/A46860	Station ID = 06
/A44770	/A46970	Station ID = 07
/A44880	/A46A80	Station ID = 08
/A44990	/A46B90	Station ID = 09
/A44AA0	/A46CA0	Station ID = 0A
/A44BB0	/A46DB0	Station ID = 0B
/A44CC0	/A46EC0	Station ID = 0C
/A44DD0	/A46FD0	Station ID = 0D
/A44EE0	/A470E0	Station ID = 0E
/A44FF0	/A471F0	Station ID = 0F
/A45100	/A47300	Station ID = 10
/A45210	/A47410	Station ID = 11
/A45320	/A47520	Station ID = 12
/A45430	/A47630	Station ID = 13
/A45540	/A47740	Station ID = 14
/A45650	/A47850	Station ID = 15
/A45760	/A47960	Station ID = 16
/A45870	/A47A70	Station ID = 17
/A45980	/A47B80	Station ID = 18
/A45A90	/A47C90	Station ID = 19
/A45BA0	/A47DA0	Station ID = 1A
/A45CB0	/A47EB0	Station ID = 1B
/A45DC0	/A47FC0	Station ID = 1C
/A45ED0	/A480D0	Station ID = 1D
/A45FE0	/A481E0	Station ID = 1E
/A460F0	/A482F0	Station ID = 1F



● Response buffer

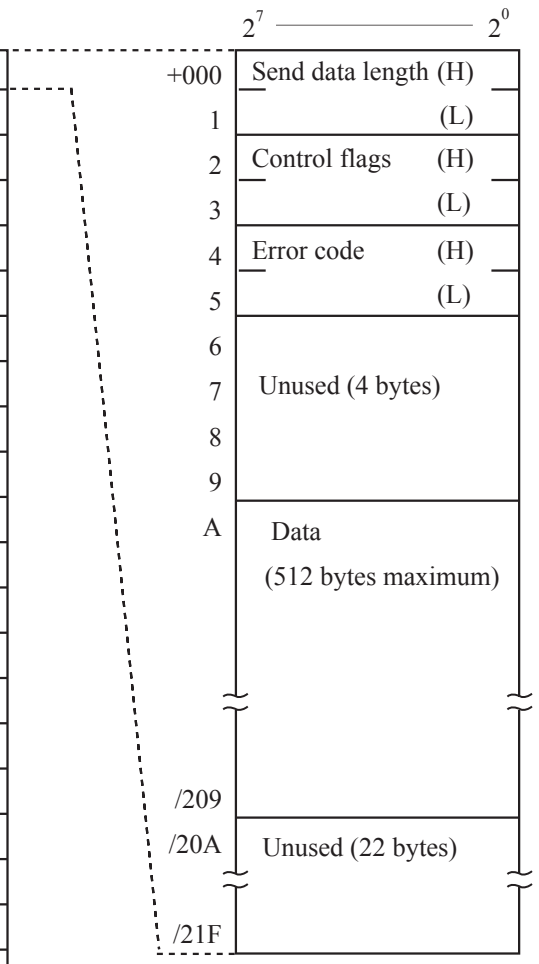
[N1]	[N2]	
/A48510	/A4A710	Station ID = 01
/A48620	/A4A820	Station ID = 02
/A48730	/A4A930	Station ID = 03
/A48840	/A4AA40	Station ID = 04
/A48950	/A4AB50	Station ID = 05
/A48A60	/A4AC60	Station ID = 06
/A48B70	/A4AD70	Station ID = 07
/A48C80	/A4AE80	Station ID = 08
/A48D90	/A4AF90	Station ID = 09
/A48EA0	/A4B0A0	Station ID = 0A
/A48FB0	/A4B1B0	Station ID = 0B
/A490C0	/A4B2C0	Station ID = 0C
/A491D0	/A4B3D0	Station ID = 0D
/A492E0	/A4B4E0	Station ID = 0E
/A493F0	/A4B5F0	Station ID = 0F
/A49500	/A4B700	Station ID = 10
/A49610	/A4B810	Station ID = 11
/A49720	/A4B920	Station ID = 12
/A49830	/A4BA30	Station ID = 13
/A49940	/A4BB40	Station ID = 14
/A49A50	/A4BC50	Station ID = 15
/A49B60	/A4BD60	Station ID = 16
/A49C70	/A4BE70	Station ID = 17
/A49D80	/A4BF80	Station ID = 18
/A49E90	/A4C090	Station ID = 19
/A49FA0	/A4C1A0	Station ID = 1A
/A4A0B0	/A4C2B0	Station ID = 1B
/A4A1C0	/A4C3C0	Station ID = 1C
/A4A2D0	/A4C4D0	Station ID = 1D
/A4A3E0	/A4C5E0	Station ID = 1E
/A4A4F0	/A4C6F0	Station ID = 1F



(3) Data transmission/reception buffer

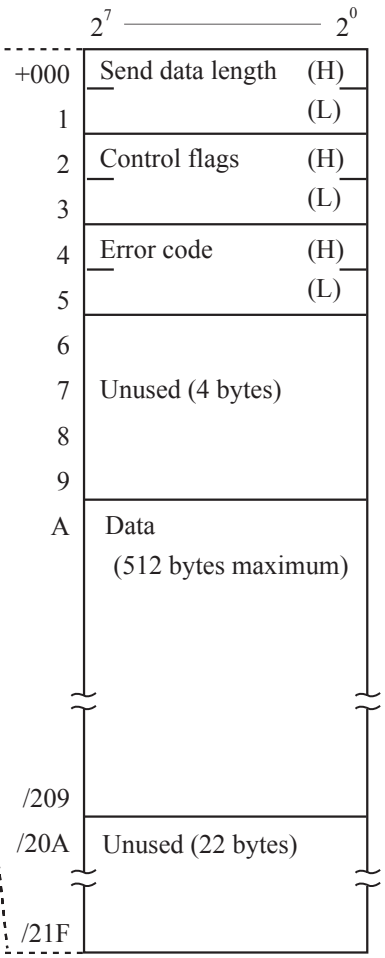
● Send buffer

[N1]	[N2]	
/A55220	/A59620	Station ID = 01
/A55440	/A59840	Station ID = 02
/A55660	/A59A60	Station ID = 03
/A55880	/A59C80	Station ID = 04
/A55AA0	/A59EA0	Station ID = 05
/A55CC0	/A5A0C0	Station ID = 06
/A55EE0	/A5A2E0	Station ID = 07
/A56100	/A5A500	Station ID = 08
/A56320	/A5A720	Station ID = 09
/A56540	/A5A940	Station ID = 0A
/A56760	/A5AB60	Station ID = 0B
/A56980	/A5AD80	Station ID = 0C
/A56BA0	/A5AFA0	Station ID = 0D
/A56DC0	/A5B1C0	Station ID = 0E
/A56FE0	/A5B3E0	Station ID = 0F
/A57200	/A5B600	Station ID = 10
/A57420	/A5B820	Station ID = 11
/A57640	/A5BA40	Station ID = 12
/A57860	/A5BC60	Station ID = 13
/A57A80	/A5BE80	Station ID = 14
/A57CA0	/A5C0A0	Station ID = 15
/A57EC0	/A5C2C0	Station ID = 16
/A580E0	/A5C4E0	Station ID = 17
/A58300	/A5C700	Station ID = 18
/A58520	/A5C920	Station ID = 19
/A58740	/A5CB40	Station ID = 1A
/A58960	/A5CD60	Station ID = 1B
/A58B80	/A5CF80	Station ID = 1C
/A58DA0	/A5D1A0	Station ID = 1D
/A58FC0	/A5D3C0	Station ID = 1E
/A591E0	/A5D5E0	Station ID = 1F



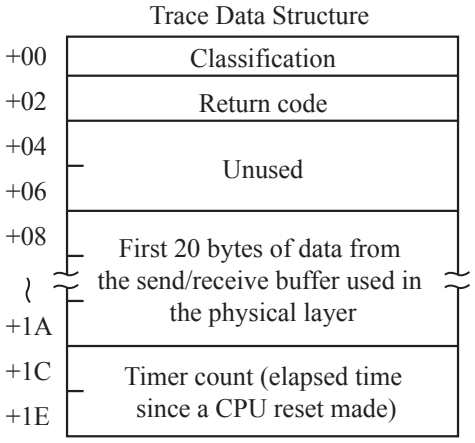
● Receive buffer

[N1]	[N2]	
/A5DA20	/A61E20	Station ID = 01
/A5DC40	/A62040	Station ID = 02
/A5DE60	/A62260	Station ID = 03
/A5E080	/A62480	Station ID = 04
/A5E2A0	/A626A0	Station ID = 05
/A5E4C0	/A628C0	Station ID = 06
/A5E6E0	/A62AE0	Station ID = 07
/A5E900	/A62D00	Station ID = 08
/A5EB20	/A62F20	Station ID = 09
/A5ED40	/A63140	Station ID = 0A
/A5EF60	/A63360	Station ID = 0B
/A5F180	/A63580	Station ID = 0C
/A5F3A0	/A637A0	Station ID = 0D
/A5F5C0	/A639C0	Station ID = 0E
/A5F7E0	/A63BE0	Station ID = 0F
/A5FA00	/A63E00	Station ID = 10
/A5FC20	/A64020	Station ID = 11
/A5FE40	/A64240	Station ID = 12
/A60060	/A64460	Station ID = 13
/A60280	/A64680	Station ID = 14
/A604A0	/A648A0	Station ID = 15
/A606C0	/A64AC0	Station ID = 16
/A608E0	/A64CE0	Station ID = 17
/A60B00	/A64F00	Station ID = 18
/A60D20	/A65120	Station ID = 19
/A60F40	/A65340	Station ID = 1A
/A61160	/A65560	Station ID = 1B
/A61380	/A65780	Station ID = 1C
/A615A0	/A659A0	Station ID = 1D
/A617C0	/A65BC0	Station ID = 1E
/A619E0	/A65DE0	Station ID = 1F



(4) Tracing

Tracing begins in the error stop mode (i.e., tracing is stopped when an error occurs) on a reset or power recovery and produces logs for each transmission or reception performed in a variety of services as listed below. The trace data structures produced have the following format:



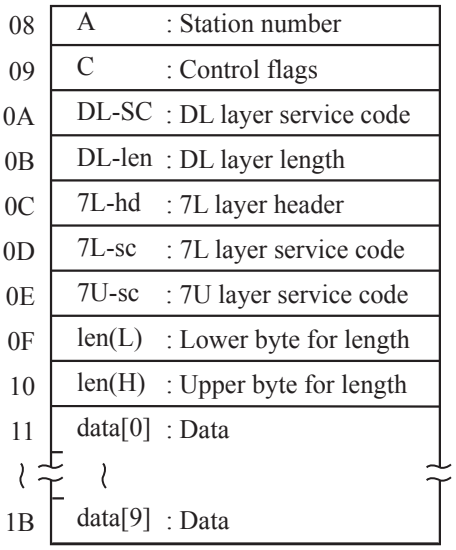
- Classification

1030	Initialization service transmission performed normally
1010	I/O service transmission performed normally
2030	Initialization service reception performed normally
2010	I/O service reception performed normally
3030	Initialization service transmission error
3010	I/O service transmission error
4030	Initialization service reception error
4010	I/O service reception error

- Return code

  For details, refer to "6.3.4 Communication error," of "J.NET (Manual number SME-1-104)."

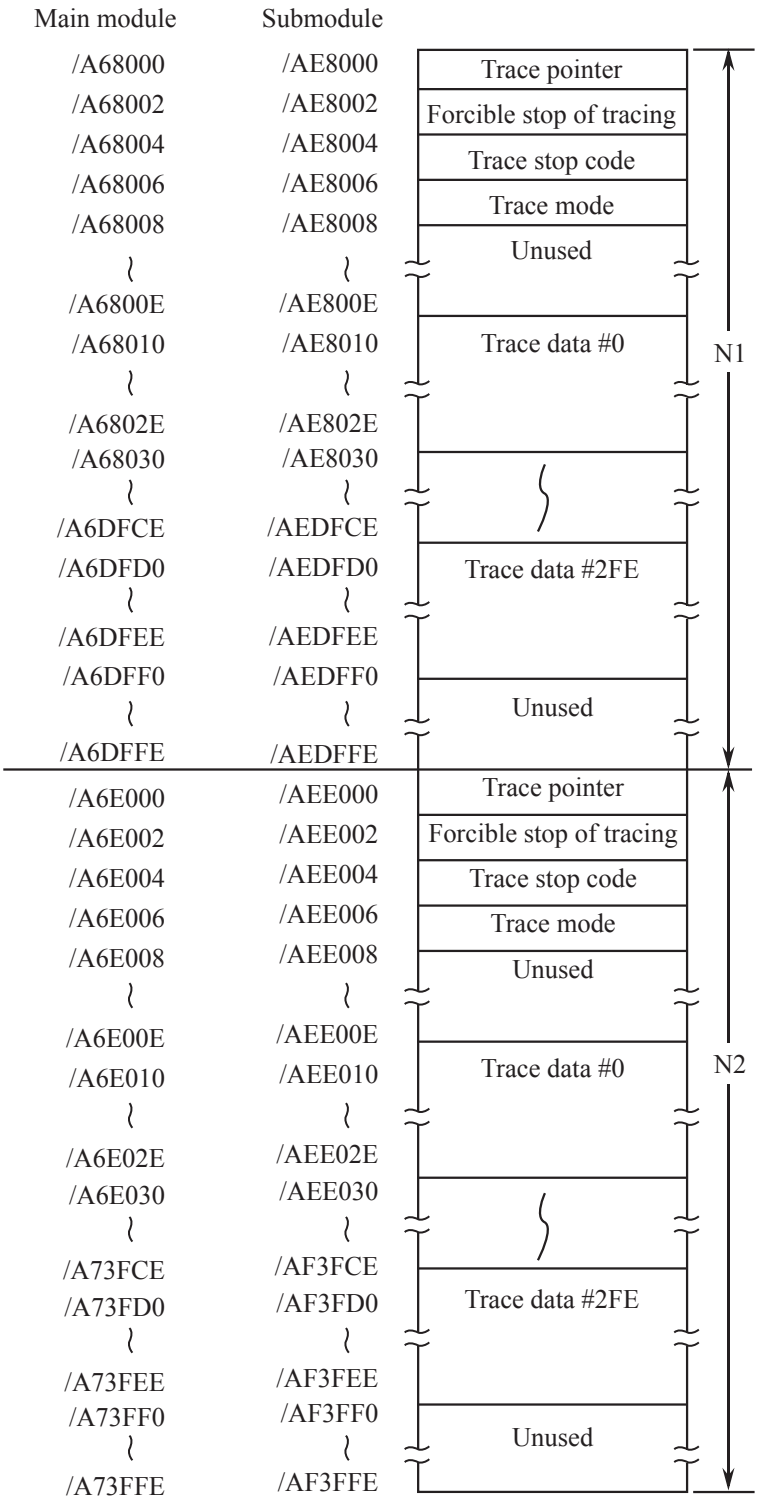
- First 20 bytes of data from the send/receive buffer used in the physical layer



- Timer count (1-ms increments)

  Although the increment is 1 ms, the timer count is updated every 4 ms.

Trace Area



- Trace pointer
  The trace pointer takes values in the range of 0 to 2FE. To determine the address of a trace data storage location from the trace pointer, the following formula is used:
  Address = /A68010 + (trace pointer * /20)
  For the submodule, the value /AE8010 is used in place of /AE8010.

- Forcible stop of tracing
  0: Forcible stop
  Other: Release from forcible stop

- Trace stop code
  For details, see the table under "Classification" above.

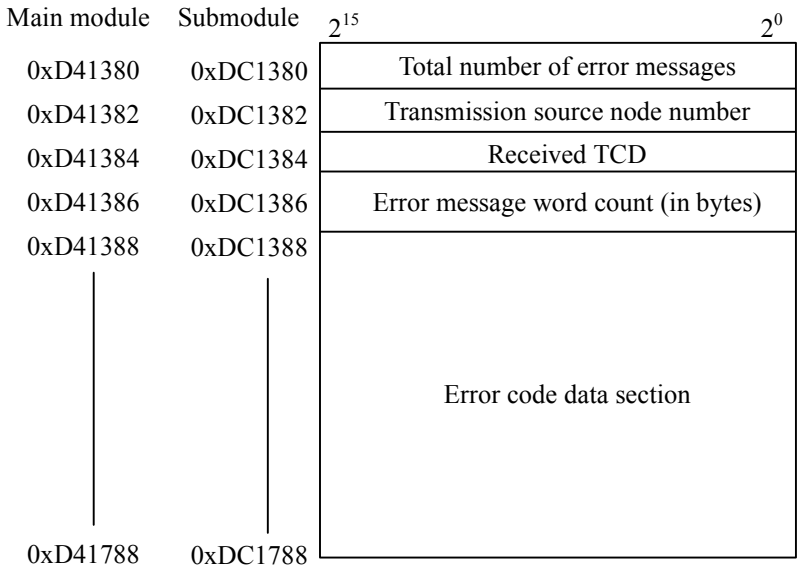
- Trace mode
  0: Stop tracing.
  1: Trace indefinitely.
  2: Stop when an error occurs.
  (The trace mode become 0 when en error occurs.)

- Trace data
  The entire trace data area is used cyclically, i.e., the next area used after #2FE is #0.

3.12 FL.NET Error Information

■ Error message data table

If a response message to a message request issued from the local node is an abnormal response message, the message data is stored in the error message data table within the FL.NET module. The error message data table has the following specification:



Item	Detail
Total number of error messages	Total number of abnormal response messages received after power ON.
Transmission source node number	Node number of the source of transmission of an abnormal response message
Received TCD	TCD number of an abnormal response message
Error message word count	Data section size (error code size) in bytes of an abnormal response message.
Error code data section	Area used to store the data section (error code) of an abnormal response message. Can hold up to 1024 bytes of data.

Note: If another abnormal response message is received when an abnormal response message is already stored in the error message table, the total error message count is incremented (by one) and the contents of the error message are overwritten with those of the newly received one.

■ Error codes for errors detectable by the C-mode handler and mathematical/logical functions

The table below shows error codes and remedies concerning the errors that may occur when the C-mode handler or mathematical/logical function issues a request to the FL.NET module.

(1/2)

Error code	Description	Cause	Remedy
0x0000	Normal end of message handling	—	—
0x0001	Message response error	An abnormal response message is received from a specified node number.	The contents of the abnormal response message are stored in the error message storage table. Refer to the instruction manual for the specified node and check the status of the specified node.
0x0002	Message not supported	The specified node does not support the user-requested message feature.	Do not issue any unsupported message to the node.
0xFE00	Parameter error	A user-specified parameter is abnormal. If a transparent message reception request has been issued, the associated transparent message is not received.	Check the parameters used when the request was issued. Do not initiate a transparent message reception until the occurrence of message receptions is verified.
0xFE01	Local node not connected	The FL.NET module is not participating in the network.	Issue a request after the FL.NET module has joined the network.
0xFE02	Specified node not connected	No node having a user-specified node number is participating in the network.	Specify the node number of a node that has joined the network.
0xFE03	Message processing already in progress	The newly issued request cannot be accepted, because the previously issued request is being processed.	Issue the new request again after the processing of the previously issued request terminates.
0xFE04	Message Ack response not received	An Ack response is not received from the node having a specified node number.	It is conceivable that the module may be defective. Replace the module.
0xFE06	No data received	A response to a message request was not received within 30 seconds after the message request issuance to a specified node number.	It is conceivable that the module may be defective. Replace the module.

(2/2)

Error code	Description	Cause	Remedy
0xFE08	Ack reception sequence number error	An Ack response from a specified node number reported a sequence number error.	It is conceivable that the module may be defective. Replace the module.
0xFE09	Ack reception sequence number version error	An Ack response from a specified node number reported a sequence number version error.	
0xFE12	Message queue full	The message queue for a specified node number is full. The specified node number cannot receive a request.	Reissue the request after a while or decrease the number of requests issued to the specified node number.
0xFE13	Initialization error	Message processing initialization is not completed for a specified node number.	Reissue the request after a while.
0xFE16	Message size error	A specified node number reported that an abnormal message size was requested by the local node.	It is conceivable that the module may be defective. Replace the module.
0xF0XX or 0xFFXX	Driver abnormal	An abnormality was detected by a driver at the time of a user-requested message transmission.	

3.13 ET.NET Error Information

(1) Error codes for errors detectable by socket handlers

The table below shows error codes and remedies concerning the errors that can be detected by socket handlers.

(1/2)

Error code	Description	Cause	Remedy
0xF000	Connection not yet established	A connection is not yet established or the port is released when the handler is called.	Establish a connection by calling tcp_open or tcp_popen, and then call the handler.
0xF002	FIN received	An FIN is received when the handler is called.	Clear the connection by calling tcp_close and then re-establish a connection by calling tcp_open or tcp_popen.
0xF010	Invalid socket ID	• The socket ID is not within the permitted range (for TCP, 1 ≦ ID ≦ 15; for UDP, 0 × 20 ≦ ID ≦ 0 × 27); or • An unused socket ID or an already released socket ID is specified; or • A connection is not yet made or opened (only in tcp_accept).	Check the user program (e.g., check if a return value from tcp_open or tcp_popen is used as the socket ID).
0xF011	Socket count limit exceeded	An attempt has been made to register more sockets than permitted. (For TCP, up to 16; for UDP, up to 8.)	Close any unused sockets (by calling tcp_close or udp_close) and then re-establish a connection by calling tcp_open or tcp_popen.
0xF012	Socket driver timed out	No response has been obtained from the socket driver within a fixed time period.	Clear the connection by calling tcp_close, and then try to re-establish a connection with tcp_open or tcp_popen. If communication cannot be achieved by repeating such an attempt, check if the connectors, cables and remote station involved are all functioning normally.
0xF013	Module stopped	A socket driver has not been able to be initialized completely within 100 seconds when the handler was called.	Call tcp_close repeatedly as long as the application does not complain. Then, try to re-establish a connection by calling tcp_open or tcp_popen.
0xF020	Illegal send data length	A send data length used exceeded the permitted limits (for TCP, 1 ≦ data length ≦ 4096; for UDP, 1 ≦ data length ≦ 1472).	Check the user program (to see if all the send data lengths specified are within the stated limits).
0xF021	Illegal receive buffer length	A receive data length used exceeded the permitted limits (1 ≦ data length ≦ 4096).	Check the user program (to see if all the receive data lengths specified are within the stated limits).

(2/2)

Error code	Description	Cause	Remedy
0xF0FF	Port released	• A port has been released (due to an RST reception) when the handler was called (this error is related to tcp_open); or • A port was already released when the handler was called (this error is related to tcp_send or tcp_receive).	• Re-establish a connection with tcp_open or tcp_popen; or • Clear the connection by calling tcp_close, and then re-establish a connection with tcp_open or tcp_popen.
0xFFF0	Invalid address	• As the IP address and/or port number of a destination station, zero values (0s) are used; or • An Ethernet-level error (e.g., a collision) has occurred in udp_send.	• Check the user program; or • When the traffic decreases, try udp_send again.
0xFFF3	Illegal parameter	An illegal parameter has been detected.	Check the user program.
0xFFF5	Connection operation timed out	No response has been obtained from the remote station.	Clear the connection by calling tcp_close, and then try to re-establish a connection with tcp_open or tcp_popen. If communication cannot be achieved by repeating such an attempt, check if the connectors, cables and remote station involved are all functioning normally.
0xFFF6	Already closed	A command has been issued for a socket ID whose connection was already terminated (by closing or aborting).	Re-establish a connection with tcp_open or tcp_popen.
0xFFF8	FIN received	An FIN has been received from the remote station.	Close the socket by calling tcp_close.
0xFFFA	Connection forcibly terminated	The connection has been forcibly terminated by (transmission of an RST from) the remote station. (tcp_receive was called after the RST reception.)	Clear the connection by calling tcp_close, and then re-establish a connection with tcp_open or tcp_popen.
0xFFFC	Illegal net handle	An attempt has been made to transmit or receive data with a handle number not opened in the TCP or UDP. This kind of error may occur when an RST is received (in tcp_receive waiting for data to be received).	Close the socket by calling tcp_close, and then re-establish a connection with tcp_open or tcp_popen.
0xFFFD	Duplicate socket	The same socket (using the remote station's IP address or port number, or the local station's port number) is already existent.	Check the user program.
0xFFFE	Illegal control block	The maximum permitted number of usable sockets has been exceeded.	Close unused sockets (by calling tcp_close or udp_close) and re-establish a connection with tcp_open or tcp_popen.

(2) Routing information setting error table

When routing-information setting ends up with an error, the corresponding error code is set in the following table:

Main module	Submodule	2^{31} ——— 2^{0}
/873880	/8F3880	Default
/873884	/8F3884	User (1)
/873888	/8F3888	User (2)
/87388C	/8F388C	User (3)
/873890	/8F3890	User (4)
/873894	/8F3894	User (5)
/873898	/8F3898	User (6)
/87389C	/8F389C	User (7)
/8738A0	/8F38A0	User (8)
/8738A4	/8F38A4	User (9)
/8738A8	/838A8F	User (10)
/8738AC	/8F38AC	User (11)
/8738B0	/8F38B0	User (12)
/8738B4	/8F38B4	User (13)
/8738B8	/8F38B8	User (14)

+0	Error code
+2	Duplicate user number

Error code: See the table below.

Duplicate user number: A set user number duplicated.
(Default = 0; other user number = 1 to 14.)

No.	Error code	Description	User Number Duplicated Or Not
1	0010H	The remote station's IP address is duplicated with the local station's IP address.	Not duplicated
2	0011H	The remote station's IP address is duplicated with another gateway's IP address.	Duplicated
3	0012H	The remote station's IP address is duplicated with another remote station's IP address.	Duplicated
4	0013H	The same network address as the local station's is set as the network address in the remote station's IP address.	Not duplicated
5	0014H	The network address in the remote station's IP address is duplicated with the network address in another remote station's IP address.	Duplicated
6	0016H	The remote station's IP address is 255.255.255.255.	Not duplicated
7	0020H	The gateway's IP address is duplicated with the local station's IP address.	Not duplicated
8	0022H	The gateway's IP address is duplicated with another local station's IP address.	Duplicated
9	0023H	The same network address as the local station's is set as the network address in a gateway's IP address.	Not duplicated
10	0024H	The network address in a gateway's IP address is duplicated with the network address in another local station's IP address.	Duplicated
11	0026H	The gateway's IP address is 255.255.255.255.	Not duplicated
12	0030H	The subnetwork identified by a gateway's IP address does not match the subnetwork of the local station.	Not duplicated

3.14 D.NET Statistical Information and Trace Information

■ Statistical information

Each unit of statistical information is 2 bytes long and the counter points to the entire statistical information area of 0 to 0xFFFF cyclically, i.e., the next unit of statistically information pointed to after 0xFFFF is 0.

(1) Event buffer usage rate counts (provided for future extension)

0xE*7200	Event queue overflow detection count
0xE*7202	Event queue buffer current use count
0xE*7204	Event queue buffer peak use count
0xE*7206	Event queue overflow detection count
0xE*7208	Event queue buffer current use count
0xE*720A	Event queue buffer peak use count
0xE*720C	Event queue overflow detection count
0xE*720E	Event queue buffer current use count
0xE*7210	Event queue buffer peak use count
0xE*7212 0xE*721E	Reserved for future extension

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

(2) Data buffer usage rate counts

0xE*7220	Transmission buffer overflow detection count
0xE*7222	Transmission buffer current use count
0xE*7224	Transmission buffer peak use count
0xE*7226	Reception buffer overflow detection count
0xE*7228	Reception buffer current use count
0xE*722A	Reception buffer peak use count
0xE*722C	System reception buffer overflow detection count
0xE*722E	System reception buffer current use count
0xE*7230	System reception buffer peak use count
0xE*7232 0xE*723E	Reserved for future extension

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

(3) CAN control counts

0xE*7240	Stack error detection count
0xE*7242	Form error detection count
0xE*7244	Ack. error detection count
0xE*7246	Bit-1 error detection count
0xE*7248	Bit-0 error detection count
0xE*724A	CRC error detection count
0xE*724C	CAN error overcount detection count
0xE*724E	Transmission path bus OFF detection count
0xE*7250	Transmission path bus OFF recovery count
0xE*7252	CAN invalid interrupt count
0xE*7254	Remote frame-reception detection count
0xE*7256	CAN chip error passive-condition occurrence count
0xE*7258	REC count-up detection count
0xE*725A	TEC count-up detection count
0xE*725C	HCAN reset completion wait retry count
0xE*725E	HCAN initialization completion wait retry count

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

For LQE170/5 only

(4) Activity information counts

0xE*7260	Transmission completion count
0xE*7262	Reception completion count
0xE*7264	Successful I/O data read count
0xE*7266	Successful I/O data write count
0xE*7268	Command request acceptance count
0xE*726A	Command acceptance completion report count
0xE*726C	Command response report count
0xE*726E	Service request acceptance count
0xE*7270	Open acceptance count
0xE*7272	Close acceptance count
0xE*7274	Explicit acceptance count
0xE*7276	Service acceptance completion report count
0xE*7278	Service response report count
0xE*727A	System message report count
0xE*727C	AI report count
0xE*727E	Successful I/O data high-speed write count

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

(5) User error 1 counts

0xE*7280	Unsuccessful I/O data read count
0xE*7282	Unsuccessful I/O data write count (unused)
0xE*7284	Effective data length error detection count
0xE*7286	Service duplication start detection count
0xE*7288	Open duplicate start detection count
0xE*728A	Open issuance destination error detection count
0xE*728C	Close issuance destination error detection count
0xE*728E	MACID error detection count
0xE*7290	Service issuance status error detection count
0xE*7292	Service acceptance failure detection count
0xE*7294	Service start failure detection count
0xE*7296	UCMM start failure detection count
0xE*7298	Fragmentation Ack time-out detection count for clients
0xE*729A	Fragmentation Ack time-out detection count for servers
0xE*729C	Fragmentation transmission data excessive length detection count for clients
0xE*729E	Fragmentation transmission data excessive length detection count for servers

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

(6) User error 2 counts

0xE*72A0	Transmission connection error detection count for clients
0xE*72A2	Transmission connection error detection count for servers
0xE*72A4	Explicit connection time-out detection count for clients
0xE*72A6	Explicit connection time-out detection count for servers
0xE*72A8	CAN transmission time-out detection count
0xE*72AA	Explicit frame cancel detection count (CAN transmission time-out)
0xE*72AC	Transmission frame cancel count (NetStatus inconsistency)
0xE*72AE	Reception frame cancel count (NetStatus inconsistency)
0xE*72B0	User suppression occurrence count
0xE*72B2	Reception protocol error count for clients
0xE*72B4	Reception protocol error count for servers
0xE*72B6	Transmission connection error detection count for I/O
0xE*72B8	Reception protocol error detection count for I/O
0xE*72BA	Transmission connection error detection count for UCMM
0xE*72BC	Transmission protocol error detection count for UCMM
0xE*72BE	I/O connection time-out detection count

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

(7) System error counts

0xE*72C0	Service duplicate start detection count (TI wait)
0xE*72C0	Service acceptance completion buffer busy detection count
0xE*72C0	Service response queue busy detection count
0xE*72C0	Service response report wait detection count
0xE*72C0	System message queue busy detection count
0xE*72C0	System message buffer busy detection count
0xE*72C0	AI queue busy detection count
0xE*72C0	AI buffer busy detection count
0xE*72D0	Exclusive allocation failure detection count for io_Write
0xE*72D0	Exclusive allocation failure detection count for io_Read
0xE*72D0	Mismatched fragmentation reception count (for I/O)
0xE*72D0	Abnormal fragmentation reception count (for I/O)
0xE*72D0	Excessive data volume detection count (for I/O)
0xE*72D0	CPU monitoring time-out detection count
0xE*72D0	CPU monitoring time-out recovery detection count
0xE*72D0	Reserved for future extension

*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

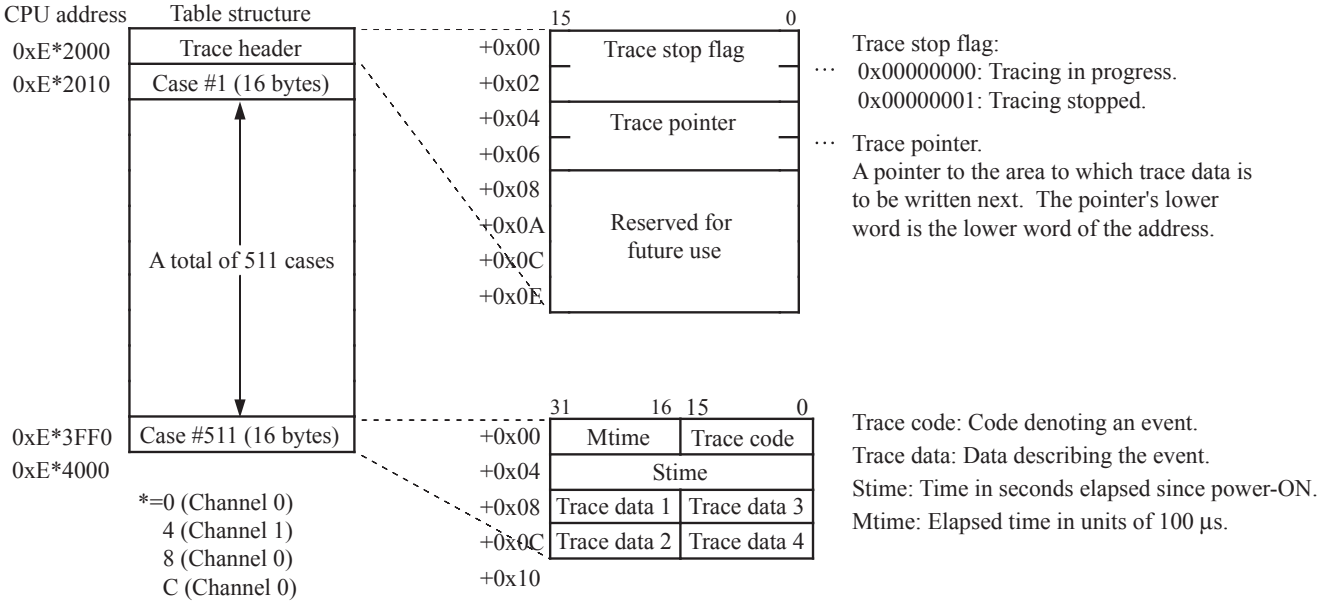
(8) User error 3 counts (for LQE170/5 only)

0xE*72E0	IoSeq frame cancel count (CAN transmission time-out)
0xE*72E2	IoSeq reception report queue busy detection count
0xE*72E4	IoSeq reception report wait detection count
0xE*72E6	IoSeq transmission duplicate start detection count (TI wait)
0xE*72E8	IoSeq transmission acceptance completion buffer busy detection count
0xE*72EA	Reception protocol error detection count (for proxies)
0xE*72EC	Explicit transmission right acquisition failure detection count for user/master start
0xE*72EE	Explicit transmission right acquisition failure detection count for proxy start
0xE*72F0 0xE*72FE	Reserved for future extension

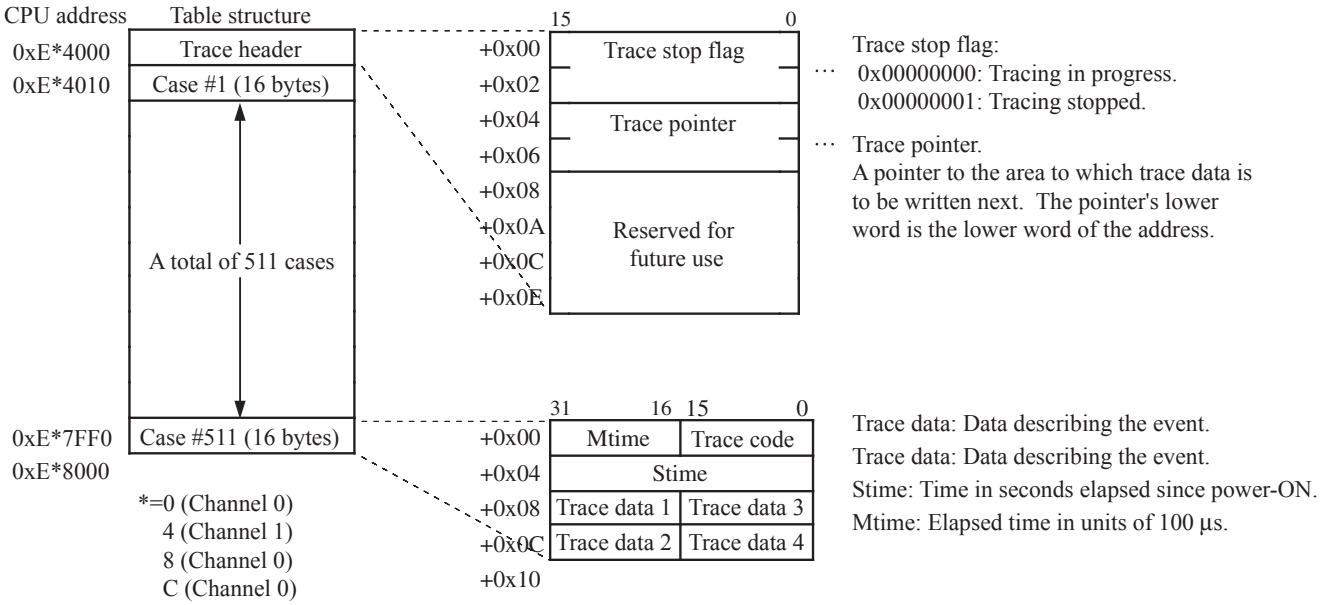
*=3 (Channel 0)
7 (Channel 1)
B (Channel 0)
F (Channel 0)

■ Trace information

(1) Normal trace table structure



(2) Special trace table structure (for LQE170/5 only)



(3) Trace information list

Message Router Object

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]		Trace data [2]		Trace data [3]		AI report	Log name
1	In a command reception, the specified class ID was out of range.	0x2001	0	Reception In	0	Local station MACID	Service code	ClassID	InstanceID	Received data [0]	Received data [1]		
2	In a request reception, the specified class ID was out of range.	0x2002	0	ClassID		Received CANID (*)		0		0			
3	Error response transmission buffer acquisition was not successful.	0x2003	0	Reception In		0		Remote station MACID	0x94	Gen_Err	Add_Err		

(*) A byte-swapped value is stored.

DeviceNet Object

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]	Trace data [2]	Trace data [3]	AI report	Log name
1	Bus OFF retry limit exceeded (special).	0x3000	1	Retry counter	0	0	0		

Master Object

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]	Trace data [3]		AI report	Log name
1	The connection establishment process was ended normally.	0x6010	0	Remote station MACID		Issued command code	Slave management information	0		—	—
2	The connection establishment process was ended abnormally (transmission buffer acquisition failed).	0x6020	1	Remote station MACID		Issued command code	Slave management information	0		—	—
3	The connection establishment process was ended abnormally (error response received).	0x6021	1	Remote station MACID		Issued command code	Slave management information	Gen_Err	Add_Err	—	—
4	The connection establishment process was ended abnormally (response timed out).	0x6022	1	Remote station MACID		Issued command code	Slave management information	0		—	—
5	The connection establishment process was abnormal (data length improper).	0x6023	0	Remote station MACID		Issued command code	Slave management information	0		—	—
6	The connection establishment process was abnormal (service code improper).	0x6024	0	Remote station MACID		Issued command code	Slave management information	0		—	—
7	The connection establishment process was ended abnormally (connection size mismatch).	0x6025	1	Remote station MACID	Service code	Slave management information	ProducedConnection Size	ConsumedConnection Size		—	—
8	A response was received in the connection establishment process.	0x6030	0	Remote station MACID		Slave management information	Data section [0] [1]	Data section [2] [3]		—	—
9	The connection establishment process was abnormal (response timed out).	0x6040	0	Remote station MACID		0	Slave management information	0		—	—
10	The connection establishment process was abnormal (data length or service code improper).	0x6041	0	Remote station MACID	Reception In	Issued command code	Slave management information	Data section [0] [1]		—	—

Type:
0 = Normal trace.
1 = Special trace.

Event Object

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]		Trace data [2]	Trace data [3]	AI report	Log name
1	A command was received.	0x8010	0	Data length of detailed data section	Specified MACID	Service code	Detailed data section 1	Detailed data section 2		com_accept
2	Command TI report	0x8020	0	0	Error code		Error data	0		com_ti_rpt
3	A duplicate command execution was attempted.	0x8011	0	TV flag	RV flag		"Busy" flag	0		ser_dup
4	Command response report.	0x8030	0	Data length of detailed data section	Specified MACID	Service code	Detailed data section 1	Detailed data section 2		com_rsp_rpt
5	AI report	0x8040	0	System Msg code, data size	Error code		Error data	0		ai_rpt
6	The AI report queue table was full.	0x8041	0	0	Error code		Error data	0		ai_que_busy
7	An AI report was awaited (AI report buffer full or TI not reported).	0x8042	0	System message buffer PP/CP	Error code		Error data	"Busy" flag		ai_wait

µOS link function

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]	Trace data [2]	Trace data [3]	AI report	Log name
1	Error stop	0xf000	0	Error code	0	0	0		com_accept

Type:
0 = Normal trace.
1 = Special trace.

Connection Object

No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	√	√	An Explicit transmission was accepted.	0x4001	0	InstanceID	Transmission ln	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
2	√	√	An Explicit reception was accepted.	0x4002	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
3	√		Transmission was unachievable (the connection status was other than "Established" [starting source: IFO]).	0x4101	1	InstanceID	state	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]	0x7105	sendc_err_client
4	√		Transmission was unachievable (the connection status was other than "Established" [starting source: MO]).	0x4102	1	InstanceID	state	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		sendc_err_client
5		√	Transmission was unachievable (the connection status was other than "Established").	0x4103	0	InstanceID	state	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		sendc_err_server
6		√	Transmission was unachievable (the instance type was I/O)	0x4104	0	InstanceID	Instance type	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		sendc_err_server
7		√	Transmission was unachievable (the transmission buffer destination MACID did not match the MACID of the connection destination).	0x4105	0	InstanceID	Remote station MACID	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		sendc_err_server
8		√	Transmission was unachievable (the server process was not being performed).	0x4106	0	InstanceID	Remote station MACID	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		sendc_err_server
9	√		Transmission was unachievable (a duplicate transmission start was attempted [starting source: IFO]).	0x4107	1	InstanceID	Remote station MACID	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]	0x5102	ser_dup
10	√		Transmission was unachievable ([starting source: MO]).	0x4108	1	InstanceID	Remote station MACID	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		ser_dup_client
11	√		A reception was canceled (the effective data length of one frame was 0 or 1 byte).	0x4201	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot _err_client
12		√	A reception was canceled (the effective data length of one frame was 0 or 1 byte).	0x4202	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
13	√		A reception was canceled (the fragmented effective data of received response was 0 bytes [there was no data before ServiceCode]).	0x4203	1	InstanceID	Remote station MACID	Received data cumulative length	0		0			prot_err_client
14		√	A reception was canceled (the fragmented effective data of received response was 0 bytes [there was no data before ServiceCode]).	0x4204	1	InstanceID	Remote station MACID	Received data cumulative length	0		0			prot_err_server
15		√	A reception was canceled (the fragmented effective data of received request was 1 or 2 bytes [there was no data before InstanceID]).	0x4205	1	InstanceID	Remote station MACID	Received data cumulative length	0		0			prot_err_server
16		√	A reception was canceled (a 2-byte nonfragmented request was received [there was no data before InstanceID]).	0x4206	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
17	√		A reception was canceled (the cumulative length of received fragmented data exceeded 71 bytes).	0x4207	1	InstanceID	Reception ln	Received data cumulative length	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
18		√	A reception was canceled (the cumulative length of received fragmented data exceeded 71 bytes).	0x4208	1	InstanceID	Reception ln	Received data cumulative length	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
19	√		A reception was canceled (a request was received in a fragmentation transmission to a client).	0x4209	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
20		√	A reception was canceled (a response was received in a fragmentation transmission to a server).	0x420A	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
21	√		A reception was canceled (a request was received in a nonfragmentation transmission to a client port).	0x420B	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
22		√	A reception was canceled (a response was received in a nonfragmentation transmission to a server port).	0x420C	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
23	√		A reception was canceled (fragmented data was received with FragCnt ≠ 0 when Type = beginning).	0x420D	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client

C: Client.
S: Server.
√: Applicable.

Type:
0 = Normal trace.
1 = Special trace.

(*) A byte-swapped value is stored.

No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
24		√	A reception was canceled (fragmented data was received with FragCnt ≠ 0 when Type = beginning).	0x420E	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
25	√		A reception was canceled (fragmented data whose type was other than the beginning was received in a wait for the beginning).	0x420F	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
26		√	A reception was canceled (fragmented data whose type was other than the beginning was received in a wait for the beginning).	0x4210	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
27	√		A reception was canceled (fragmented data having a different FragmentCount was received in a wait for the next Frag).	0x4211	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
28		√	A reception was canceled (fragmented data having a different FragmentCount was received in a wait for the next Frag).	0x4212	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
29	√		A reception was canceled (the beginning was received in a wait for the next Frag (processing was continued with this situation handled as the reception of the beginning)).	0x4213	0	InstanceID	Received number	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
30		√	A reception was canceled (the beginning was received in a wait for the next Frag (processing was continued with this situation handled as the reception of the beginning)).	0x4214	0	InstanceID	Received number	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
31	√		A reception was canceled (fragmented data whose count was not 0 was received in the reception of the beginning in a wait for the next Frag).	0x4215	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
32		√	A reception was canceled (fragmented data whose count was not 0 was received in the reception of the beginning in a wait for the next Frag).	0x4216	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
33	√		A reception was canceled (the FragType was changed to "last" in a retry operation).	0x4217	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
34		√	A reception was canceled (the FragType was changed to "last" in a retry operation).	0x4218	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
35	√		A reception was canceled (a response was received although a request was not transmitted [Fragment]).	0x4219	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
36		√	A reception was canceled (a response was received although a request was not transmitted [Non-Fragment]).	0x421A	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
37	√		A reception was canceled (a server reception occurred during a server reception process [Fragment]).	0x421B	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
38		√	A reception was canceled (a server reception occurred during a server reception process [Non-Fragment]).	0x421C	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
39	√		A reception was canceled (the received CANID did not match the Instance reception CANID).	0x421D	0	InstanceID	Remote station MACID	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
40		√	A reception was canceled (the received CANID did not match the Instance reception CANID).	0x421E	0	InstanceID	state	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
41	√		A reception was canceled (the connection status was other than "Established").	0x421F	0	InstanceID	state	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
42		√	A reception was canceled (the connection status was other than "Established").	0x4220	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
43		√	A reception was canceled (InstanceType was I/O).	0x4221	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
44		√	A reception was canceled (the Explicit port of Group 2 server received data from other than the master).	0x4222	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Master MACID			prot_err_server
45	√		A reception was canceled during a hold (nonfragmented data was received during a fragmentation reception [processing was continued]).	0x4301	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client

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S: Server.
√: Applicable.

Type:
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No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
46		√	A reception was canceled during a hold (nonfragmented data was received during a fragmentation reception [processing was continued]).	0x4302	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
47	√		An Ack reception was canceled (the received Ack data length was abnormal).	0x4401	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
48		√	An Ack reception was canceled (the received Ack data length was abnormal).	0x4402	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
49	√		An Ack reception was canceled (the received Ack serial number did not agree with the Ack serial number whose reception was awaited).	0x4403	0	InstanceID	Remote station MACID	Ack number for the next reception awaited	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
50		√	An Ack reception was canceled (the received Ack serial number did not agree with the Ack serial number whose reception was awaited).	0x4404	0	InstanceID	Remote station MACID	Ack number for the next reception awaited	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
51	√		An Ack reception was canceled (Ack was received while no fragmentation transmission was performed).	0x4405	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_client
52		√	An Ack reception was canceled (Ack was received while no fragmentation transmission was performed).	0x4406	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
53	√		Transmission was unachievable (the received Ack status was abnormal).	0x4501	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		ack_sts1_client
54		√	Transmission was unachievable (the received Ack status was abnormal).	0x4502	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		ack_sts1_server
55	√		Transmission was unachievable (fragmentation transmission buffer acquisition failed).	0x4601	0	InstanceID	Remote station MACID	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
56		√	Transmission was unachievable (fragmentation transmission buffer acquisition failed).	0x4602	0	InstanceID	Remote station MACID	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
57		√	Response transmission was unachievable (response transmission buffer acquisition for a short request failed).	0x4603	0	InstanceID	Remote station MACID	SysBufGet return code	0		0			
58		√	Response transmission was unachievable (response transmission buffer acquisition for a short request failed).	0x4604	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
59	√		Ack transmission was unachievable (Ack transmission buffer acquisition failed).	0x4605	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
60		√	Ack transmission was unachievable (Ack transmission buffer acquisition failed).	0x4606	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
61	√		A WDT timeout occurred (Explicit).	0x4701	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0		0x7107	ex_wdto_client
62		√	A WDT timeout occurred (Explicit).	0x4702	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0			ex_wdto_server
63	√	√	A WDT timeout occurred (I/O).	0x4703	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0			ex_wdto_io
64	√		Ack time-out occurred (1st occurrence).	0x4801	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0			ack_to_client
65		√	Ack time-out occurred (1st occurrence).	0x4802	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0			ack_to_server
66	√		Ack time-out occurred (2nd occurrence = Ack retry limit exceeded).	0x4803	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0		0x7101	ack_to_client
67		√	Ack time-out occurred (2nd occurrence = Ack retry limit exceeded).	0x4804	0	InstanceID	Remote station MACID	Produced ConnectionID (*)	Consumed ConnectionID (*)		0			ack_to_server

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No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
68	–		I/O transmission was unachievable (transmission data acquisition failed).	0x4901	0	InstanceID	0	IF_IoRead return code	Produced ConnectionID (*)		0			sendc_err_io
69	–		I/O transmission was unachievable (a TransportClassTrigger mismatch occurred).	0x4902	0	InstanceID	0	TransportClass Trigger	Produced ConnectionID (*)		0			sendc_err_io
70	–		I/O transmission was unachievable (the connection status was other than "Established").	0x4903	0	InstanceID	0	state	Produced ConnectionID (*)		0			sendc_err_io
71	–		An I/O reception was canceled (a TransportClassTrigger mismatch occurred).	0x4904	0	InstanceID	0	TransportClass Trigger	Produced ConnectionID (*)		0			sendc_err_io
72	–		An I/O reception was canceled (the connection status was other than "Established").	0x4905	0	InstanceID	0	Received CANID (*)	Instance Type		0			recvc _err_io
73	–		An I/O reception was canceled (the received CANID did not match the Instance reception CANID).	0x4906	0	InstanceID	0	Received CANID (*)	InitialComm Characteristics		0			sendc_err_io
74	–		I/O transmission was unachievable (an Instance Type mismatch occurred).	0x4907	0	InstanceID	0	state	Transmitted CANID*		0			recvc _err_io
75	–		I/O transmission was unachievable (an InitialCommCharacteristics mismatch occurred).	0x4908	0	InstanceID	0	Received CANID (*)	Consumed ConnectionID (*)		0			recvc_err_io
76	–		A transfer menu table was created (the I/O communication count setting was exceeded).	0x4A07	1	CreateCyclicMenu rtn		0x5108	0		0			
77	–		A transfer menu table was created (the I/O transmission port was not found).	0x4A08	0	CreateCyclicMenu rtn		0	0		0			
78	√		A CAN transmission was started (Non-Fragment).											co_send
79		√	A CAN transmission was started (Non-Fragment).											co_send
80	√		A CAN transmission was started (fragmentation transmission).											co_send
81		√	A CAN transmission was started (fragmentation transmission).											co_send
82	√		A CAN transmission was started (Ack transmission).											co_send
83		√	A CAN transmission was started (Ack transmission).											co_send
84		√	A CAN transmission was started (error response transmission to a short request).											co_send
85	√		A local station-addressed Explicit message was received.											co_rcv
86		√	A local station-addressed Explicit message was received.											co_rcv
87	–		A local station-addressed I/O message was received.											co_rcv
88	–		An I/O reception was canceled (the connection status was other than "Established").	0x4B01	0	InstanceID	0	state	Received CANID(*)		0			recvc_err_io
89	–		An I/O reception was canceled (the received CANID did not match the Instance reception CANID).	0x4B02	0	InstanceID	0	Received CANID (*)	Consumed ConnectionID (*)		0			recvc_err_io
90	–		An I/O reception was canceled (the beginning was received in a wait for the next Frag (processing was continued with this situation handled as the reception of the beginning).	0x4B03	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
91	–		An I/O reception was canceled (fragmented data having an improper count was received in a wait for the beginning although Type = beginning).	0x4B04	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err
92	–		An I/O reception was canceled (the cumulative length of received fragmented data exceeded the maximum permissible received data length).	0x4B05	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_over

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√: Applicable.

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No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
93	–		An I/O reception was canceled (fragmented data having an improper count was received in a wait for the next Frag).	0x4B06	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
94	–		An I/O reception was canceled (fragmented data whose Type was other than the beginning was received in a wait for the beginning).	0x4B07	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
95	–		An I/O reception was canceled (Ack was received).	0x4B08	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err
96	–		An I/O reception was canceled (0-byte data was received).	0x4B09	0	InstanceID	0	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err
97	–		An I/O reception was canceled (an Instance Type mismatch occurred).	0x4B0A	0	InstanceID	0	Received CANID (*)	InstanceType		0			recvc_err_io
98	–		An I/O reception was canceled (an InitialCommCharacteristics mismatch occurred).	0x4B0B	0	InstanceID	0	Received CANID (*)	InitialComm Characteristics		TransportClassTrigger			recvc_err_io

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√: Applicable.

Type:
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UCMM Object

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	"Open" transmission was unachievable (the State was the Configuring state).	0x5001	1	Remote station MACID	Transmission ln	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_ucmm
2	"Close" transmission was unachievable (the State was the Configuring state).	0x5002	1	Remote station MACID	Transmission ln	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_ucmm
3	"Open" transmission was unachievable (the connection to the remote device was already established).	0x5003	0	Remote station MACID	Transmission ln	0	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]	0x5103	dup_open
4	Heartbeat transmission was unachievable (the heartbeat transmission buffer was not successfully acquired).	0x5004	0	SysBufGet return code		Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
5	DupMacRsp transmission was unachievable (the transmission buffer was not successfully acquired).	0x5005	1	SysBufGet return code		Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		ucmm_sbuf_err
6	DupMacRsp transmission was unachievable (the transmission buffer was not successfully acquired [a local event was restarted]).	0x5006	0	SysBufGet return code		Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
7	Response transmission was unachievable (the OpenResponse transmission buffer was not successfully acquired).	0x5007	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
8	Response transmission was unachievable (the CloseResponse transmission buffer was not successfully acquired).	0x5008	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
9	Response transmission was unachievable (the error response transmission buffer was not successfully acquired).	0x5009	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
10	A response reception was canceled (the State was the Configuring state).	0x5101	0	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
11	A response reception was canceled (the Group did not match the remote device type).	0x5102	0	Remote station MACID	Remote type	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
12	A response reception was canceled (a request was received [R/R = 0]).	0x5103	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
13	A response reception was canceled (the received data did not contain data before the service code).	0x5104	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
14	A response reception was canceled (the connection to the remote device was already established).	0x5105	0	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
15	A response reception was canceled (the message body format value was illegal).	0x5106	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
16	A response reception was canceled (the G3 received data length was illegal).	0x5107	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
17	A response reception was canceled (the transmitting end MsgID was illegal).	0x5108	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
18	A response reception was canceled (the G2 received data length was illegal).	0x5109	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
19	A response reception was canceled (the response to an Open request was improperly timed).	0x510A	0	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
20	A response reception was canceled (Create was not successful).	0x510B	1	Remote station MACID	Create return code	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
21	A response reception was canceled (CloseResponse was improperly timed).	0x510C	0	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
22	A response reception was canceled (the CloseResponse data length was illegal).	0x510D	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm

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No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]		Trace data [2]		Trace data [3]		AI report	Log name
23	A response reception was canceled (the heartbeat data length was illegal).	0x510E	1	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
24	A response reception was canceled (an illegal response other than Error Response was received).	0x510F	1	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
25	A response reception was canceled (the Shutdown data length was illegal).	0x5110	1	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
26	A request reception was canceled (the State was the Configuring state).	0x5201	0	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
27	A request reception was canceled (Fragment [Frag = 1] or Response [R/R = 1]).	0x5102	1	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
28	A request reception was canceled (the received data did not contain data before the service code).	0x5103	1	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
29	A request reception was canceled (the OpenRequest received data length was illegal).	0x5104	1	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
30	A request reception was canceled (the CloseRequest received data length was illegal).	0x5105	1	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
31	A DupMAC reception was canceled (the received data length was illegal).	0x5106	1	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_ucmm
32	Reception reporting of a locally transmitted heartbeat was unachievable (the system message reception buffer was not successfully acquired).	0x5301	0	SysBufGet return code		Received CANID (*)		Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
33	Reception reporting of locally transmitted DupMacRsp was unachievable (the reception buffer was not successfully acquired).	0x5302	0	SysBufGet return code		Received CANID (*)		Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
34	Reception reporting of locally transmitted DupMacReq was unachievable (the reception buffer was not successfully acquired).	0x5303	0	SysBufGet return code		Received CANID (*)		Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
35	A duplicate MACID was reported (problems at remote stations).	0x5401	0	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]	0x4101	
36	A duplicate MACID was reported (remote station illegality at remote and local stations).	0x5402	1	0	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]	0x4101	
37	A duplicate MACID was detected (local station graceful degradation).	0x5403	1	0x4201		0	Local station MACID	0		0		0x4201	
38	An error response was transmitted.	0x5501	0	Remote station MACID	Reception ln	Error code		Received data [0]	Received data [1]	Received data [2]	Received data [3]		
39	An "Open" start was accepted.	0x5601	0	Remote station MACID	Transmission ln	Remote station device type	Start source type	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
40	A "Close" start was accepted.	0x5602	0	Remote station MACID	Transmission ln	Remote station device type	Start source type	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
41	A "Heartbeat" start was accepted.	0x5603	0	0		0		Transmitted data [5]	Transmitted data [6]	Transmitted data [7]	Transmitted data [8]		
42	A "Duplicate MACID Request" start was accepted (1st).	0x5611	0	0		0		0		0			
43	A "Duplicate MACID Request" start was accepted (2nd).	0x5612	0	0		0		0		0			
44	A "Duplicate MACID Response" start was accepted.	0x5613	0	0		0		0		0			
45	A response was received at the UCMM port.	0x5701	0	Remote station MACID	Reception ln	Received CANID (*)		Received data [0]	Received data [1]	Received data [2]	Received data [3]		

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No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
46	A request was received at the UCMM port.	0x5702	0	Remote station MACID	Reception In	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
47	Heartbeat was received.	0x5703	0	Remote station MACID	Reception In	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
48	Shutdown was received.	0x5704	0	Remote station MACID	Reception In	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
49	Reception occurred at a Duplicate MACID port.	0x5711	0	0	Reception In	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		

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Interface Object

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]		Trace data [2]	Trace data [3]	AI report	Log name
1	A service request was accepted.	0x7010	0	Data length of detailed data section		Specified MACID	Service code	Detailed data section 1	Detailed data section 2		ser_accept
2	"Open" was accepted.										open_accept
3	"Close" was accepted.										close_accept
4	"Explicit" was accepted.										exp_accept
5	A service was called before the report of a previous service TI.	0x7011	0	Data length of detailed data section		Specified MACID	Service code	Detailed data section 1	Detailed data section 2		ser_dup_wait
6	A service TI was reported.	0x7020	0	MACID		Error code		Error data	0		ser_ti_rpt
7	Service request acceptance was completed with the buffer full.	0x7021	0	MACID		Error code		Error data	0		ser_ti_buf_busy
8	A response was reported.	0x7030	0	Data length of detailed data section		Specified MACID	Service code	Detailed data section 1	Detailed data section 2		ser_rsp_rpt
9	A response was reported with the queue table full.	0x7031	0	Buffer type	Effective data length	CANID (*)		Data section 1	Data section 2		ser_rsp_que_busy
10	A response report was awaited (the service response buffer was full or a TI report was not yet made).	0x7032	0	MACID		Response buffer PP/CP		"Busy" flag	0		ser_rsp_wait
11	A system message was reported.	0x7040	0	System message code	Data size	CANID (*)		Error data	Data section 2		sys_msg_rpt
12	A system message was reported with the queue table full.	0x7041	0	Buffer type	Effective data length	CANID (*)		Error data	Data section 2		sys_msg_que_busy
13	The buffer for system message reception was full.	0x7042	0	CANID (*)		System message buffer PP/CP		0	0		sys_msg_buf_busy

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CAN Object

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	A reception buffer acquisition failure trace was performed.	0x9010	0	SysBufferGet return code		Received CANID	Received data [0]	Received data [1]	Received data [2]	Received data [3]		rcvbuf_ovf
2	A transmission buffer cancel trace was performed due to NetStatus inadequacy.	0x9020	1	NetStatus		Transmitted CANID	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		net_txerr
3	A reception buffer cancel trace was performed due to NetStatus inadequacy.	0x9021	0	NetStatus		Received CANID	Received data [0]	Received data [1]	Received data [2]	Received data [3]		net_rxerr
4	A bus OFF occurrence trace was performed.	0x9030	0	0		0	0		0			can_busoff
5	A bus OFF recovery trace was performed.	0x9031	0	0		0	0		0			can_busoff_recover
6	A CAN transmission time-out detection trace was performed.	0x9040	0	0	Trans-mission ln	Transmitted CANID	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		can_txtout
7	An explicit message cancel trace was performed due to a CAN transmission time-out.	0x9050	0	Remote sta-tion MACID	Trans-mission ln	Transmitted CANID	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		can_txtout_exp
8	A CAN chip error trace was performed.	0x9060	1	LEC		0	0		0			6 types including stuff_err
9	A trace was performed on the completion of a transmission message write into the CAN chip (other than I/O).	0x9070	0	Frame type	Trans-mission ln	Transmitted CANID	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		_
10	A CAN transmission completion trace was performed (other than I/O).	0x9080	0	0	Trans-mission ln	Transmitted CANID	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		can_tx
11	A CAN invalid interrupt was generated.	0x9090	1	Interrupt ID		0	0		0			can_invalid_int

S10 Interface Object

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]	Trace data [2]	Trace data [3]	AI report	Log name
1	An internal Set_Bind call trace was performed.	0xB001	0	0	0	0	0		
2	An internal Finish_Conf call trace was performed.	0xB002	0	0	0	0	0		
3	An internal Start_Conf call trace was performed.	0xB003	0	0	0	0	0		
4	Internal Start call trace was performed.	0xB004	0	0	0	0	0		
5	A "recovery from 'bus OFF retry limit exceeded' condition" trace was performed.	0xB010	0	0	0	0	0		

Type:
0 = Normal trace.
1 = Special trace.

Connection Object (trace information stored by LQE170/5 only)

No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	√		(Proxy:) An Explicit request transmission to the slave was accepted (starting source: Proxy).	0x4003	0	InstanceID	Transmission ln	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
2		√	(Proxy:) An Explicit request reception from the tool was accepted.	0x4004	0	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
3		√	(Proxy:) An Explicit response transmission to the tool was accepted (starting source: Proxy).	0x4005	0	InstanceID	Transmission ln	0 (invalid)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		
4	√		(Proxy:) Transmission was unachievable (the connection status was other than "Established" [starting source: Proxy]).	0x4109	1	InstanceID	state	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_client
5	√		(Proxy:) Transmission was unachievable (InitialCommCharacteristics indicates other than G2OnliClient [starting source: Proxy]).	0x410A	1	InstanceID	Init. Comm.	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_client
6	√		(Proxy:) Transmission was unachievable (a duplicate transmission start was attempted [starting source: Proxy]).	0x410B	1	InstanceID	Remote station MACID	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		ser_dup
7		√	(Proxy:) Transmission was unachievable (the ProxyConnection status was other than "Established" [starting source: Proxy]).	0x410C	0	InstanceID	ProxyState	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_server
8		√	(Proxy:) Transmission was unachievable (the server process was not being performed).	0x410D	0	InstanceID	Remote station MACID	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		prot_err_server
9		√	(Proxy:) A reception was canceled (a nonfragmented request was received with no data provided before InstanceID).	0x4223	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
10		√	(Proxy:) A reception was canceled (a fragmented request was received with no data provided before FragCount).	0x4224	1	InstanceID	Remote station MACID	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_server
11		√	(Proxy:) Response transmission was unachievable (response transmission buffer acquisition for a short request failed).	0x4607	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
12	–		(IoFragment:) I/O transmission was unachievable (transmission data acquisition failed).	0x4909	0	InstanceID	0	IF_IoRead return code	Produced ConnectionID (*)		0			prot_err_io
13	–		(IoNonFragment:) An I/O reception was canceled (the cumulative length of received data exceeded the maximum permissible received data length).	0x490A	0	InstanceID	Data length	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_data_ovf
14	–		(IoSequence:) I/O transmission was unachievable (an Instance Type mismatch occurred).	0x490B	0	InstanceID	0	Transmitted CANID (*)	InstanceType		0			prot_err_io
15	–		(IoSequence:) I/O transmission was unachievable (an InitialCommCharacteristics mismatch occurred).	0x490C	0	InstanceID	0	Transmitted CANID (*)	InitalCommCharacter.		TransportClassTrigger			prot_err_io
16	–		(IoSequence:) An I/O reception was canceled (the cumulative length of received data exceeded the maximum permissible received data length).	0x4B0C	0	InstanceID	Data length	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_data_ovf
17	–		(IoSequence:) An I/O reception was canceled (an Instance Type mismatch occurred).	0x4B0D	0	InstanceID	0	Consumed ConnectionID (*)	InstanceType		0			recvc_err_io
18	–		(IoSequence:) An I/O reception was canceled (an InitialCommCharacteristics mismatch occurred).	0x4B0E	0	InstanceID	0	Consumed ConnectionID (*)	InitalCommCharacter.		TransportClassTrigger			recvc_err_io
19	–		(IoSequence:) An I/O reception was canceled (the received CANID did not match the Instance reception CANID).	0x4B0F	0	InstanceID	0	Received CANID (*)	Consumed ConnectionID (*)		0			recvc_err_io
20	–		(IoSequence:) An I/O reception was canceled (the connection status was other than "Established").	0xaB10	0	InstanceID	0	state	Received CANID (*)		0			recvc_err_io
21	–		(IoSequence:) An I/O reception was canceled (fragmented data of 0 bytes long was received [the fragmented data header was missing]).	0xaB11	0	InstanceID	0	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err

C: Client.
S: Server.
√: Applicable.

Type:
0 = Normal trace.
1 = Special trace.

(*) A byte-swapped value is stored.

No.	C	S	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
22	–		(IoSequence:) An I/O reception was canceled (the beginning was received in a wait for the next Frag (processing was continued with this situation handled as the reception of the beginning).	0xaB12	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
23	–		(IoSequence:) An I/O reception was canceled (fragmented data whose type was other than the beginning or end to which FragCnt is set equal, was received in a wait for the beginning).	0xaB13	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err
24	–		(IoSequence:) An I/O reception was canceled (the cumulative length of received fragmented data exceeded the maximum permissible received data length).	0xaB14	0	InstanceID	Data length	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_data_ovf
25	–		(IoSequence:) An I/O reception was canceled (fragmented data having an improper fragment count was received in a wait for the next Frag).	0xaB15	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
26	–		(IoSequence:) An I/O reception was canceled (fragmented data whose Type was other than the beginning was received in a wait for the beginning).	0xaB16	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_ilg
27	–		(IoSequence:) An I/O reception was canceled (Ack was received).	0xaB17	0	InstanceID	Count	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_frag_err
28	√		(Proxy:) Explicit transmission semaphore flag acquisition failed (G2OnliClient).	0x4C01	0	InstanceID	Starting source type	0 (invalid)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]	0x710B	exp_sem_busy
29	√		(Proxy:) Explicit transmission semaphore flag acquisition failed (G2OnliClient).	0x4C02	0	InstanceID	Starting source type	Transmitted CANID (*)	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [3]		exp_sem_busy_ proxy
30	√		(Proxy:) Proxy nonfragmented data delivery was unachievable (slave-to-tool delivery transmission buffer acquisition failed).	0x4C03	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
31		√	(Proxy:) Proxy nonfragmented data delivery was unachievable (tool-to-slave delivery transmission buffer acquisition failed).	0x4C04	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
32	√		(Proxy:) Proxy fragmented data delivery was unachievable (slave-to-tool delivery transmission buffer acquisition failed).	0x4C05	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
33		√	(Proxy:) Proxy fragmented data delivery was unachievable (tool-to-slave delivery transmission buffer acquisition failed).	0x4C06	1	InstanceID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		

C: Client.
S: Server.
√: Applicable.

Type:
0 = Normal trace.
1 = Special trace.

(*) A byte-swapped value is stored.

UCMM Object (trace information stored by LQE170/5 only)

No.	Trace name	Trace code	Type	Trace data [0]		Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	(Proxy:) A request reception was canceled (the OpenRequest received data length was illegal).	0x5801	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_proxy
2	(Proxy:) Response transmission was unachievable (the OpenResponse transmission buffer was not successfully acquired).	0x5802	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
3	(Proxy:) A request reception was canceled (the OpenRequest received data length was illegal).	0x5803	1	Remote station MACID	Reception ln	Received CANID (*)	Received data [0]	Received data [1]	Received data [2]	Received data [3]		prot_err_proxy
4	(Proxy:) Response transmission was unachievable (the OpenResponse transmission buffer was not successfully acquired).	0x5804	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
5	(Proxy:) An error response was transmitted.	0x5805	0	Remote station MACID	Reception ln	Error code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		
6	(Proxy:) (the ErrorResponse transmission buffer was not successfully acquired).	0x5806	0	Remote station MACID	Reception ln	SysBufGet return code	Received data [0]	Received data [1]	Received data [2]	Received data [3]		

(*) A byte-swapped value is stored.

Interface Object (trace information stored by LQE170/5 only)

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]	Trace data [2]		Trace data [3]		AI report	Log name
1	An I/O transmission start was accepted.	0x7012	0	Port number	Transmission request data length	Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [2]		io_rcv_que_busy
2	I/O reception P.TI reporting was completed.	0x7050	0	Port number	Error code	Error data		0			io_rcv_wait
3	An I/O reception was accepted.	0x7051	0	Port number	0	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_send_dup_wait
4	The I/O reception report queue table was full.	0x7052	0	Port number	Queue PP	Queue CP		Received data [0]	Received data [1]		io_rcv_que_busy
5	An I/O reception report was awaited (the reception notification buffer was full).	0x7053	0	Port number	Reception notification area PP	Reception notification area CP		0			io_rcv_wait
6	An I/O transmission was started before the previous I/O transmission TI was reported.	0x7054	0	Port number	Queue PP	Queue CP		Detailed data section 2			io_send_dup_wait
7	The service request acceptance completion buffer was full.	0x7055	0	Port number	P.TI report area PP	P.TI report area CP		0			io_rcv_buf_busy
8	I/O reception reporting was completed.	0x7056	0	Port number	Received data length	Received data [0]	Received data [1]	Received data [2]	Received data [3]		io_send_dup_wait

Type:
0 = Normal trace.
1 = Special trace.

CAN Object (trace information stored by LQE170/5 only)

No.	Trace name	Trace code	Type	Trace data [0]	Trace data [1]		Trace data [2]		Trace data [3]		AI report	Log name
1	An I/O sequence control frame cancel trace was performed due to a CAN transmission time-out.	0x9051	0	Transmission ln	Transmitted CANID		Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [2]		can_txtout_ioseq
2	An I/O sequence control frame cancel trace was performed due to a CAN transmission time-out.	0x9052	0	Transmission ln	Transmitted CANID (*)		Transmitted data [0]	Transmitted data [1]	Transmitted data [2]	Transmitted data [2]		can_txtout_ioseq
3	A CAN chip error trace was performed.	0x9061	1	IRR register	Rec internal work area	Rec register	Tec internal work area	Tec register	0			can_errpassive can_rec_cntup can_rec_cntup
					Rec register	Rec internal work area	Rec register	Rec internal work area				
4	A CAN invalid interrupt was generated.	0x9061	1	IRR register	0		0		0			can_invalid_int
5	A remote frame reception was performed.	0x90A0	1	IRR register	RXPR register		RFPR register		0			can_rmtrcv

Type:
0 = Normal trace.
1 = Special trace.

(*) A byte-swapped value is stored.

3.15 Error Freeze Information

On detection of a hardware error, the modules listed below light the error LED indicator, save the error freeze information in a predetermined area, and then stop their operation.
ET.NET, SV.LINK, OD.RING, SD.LINK, J.NET, J.NET-INT, IR.LINK, FL.NET
For the address at which the error freeze is saved, see "3.8 Memory Maps for Optional Modules." The error freeze information is stored in the following format:

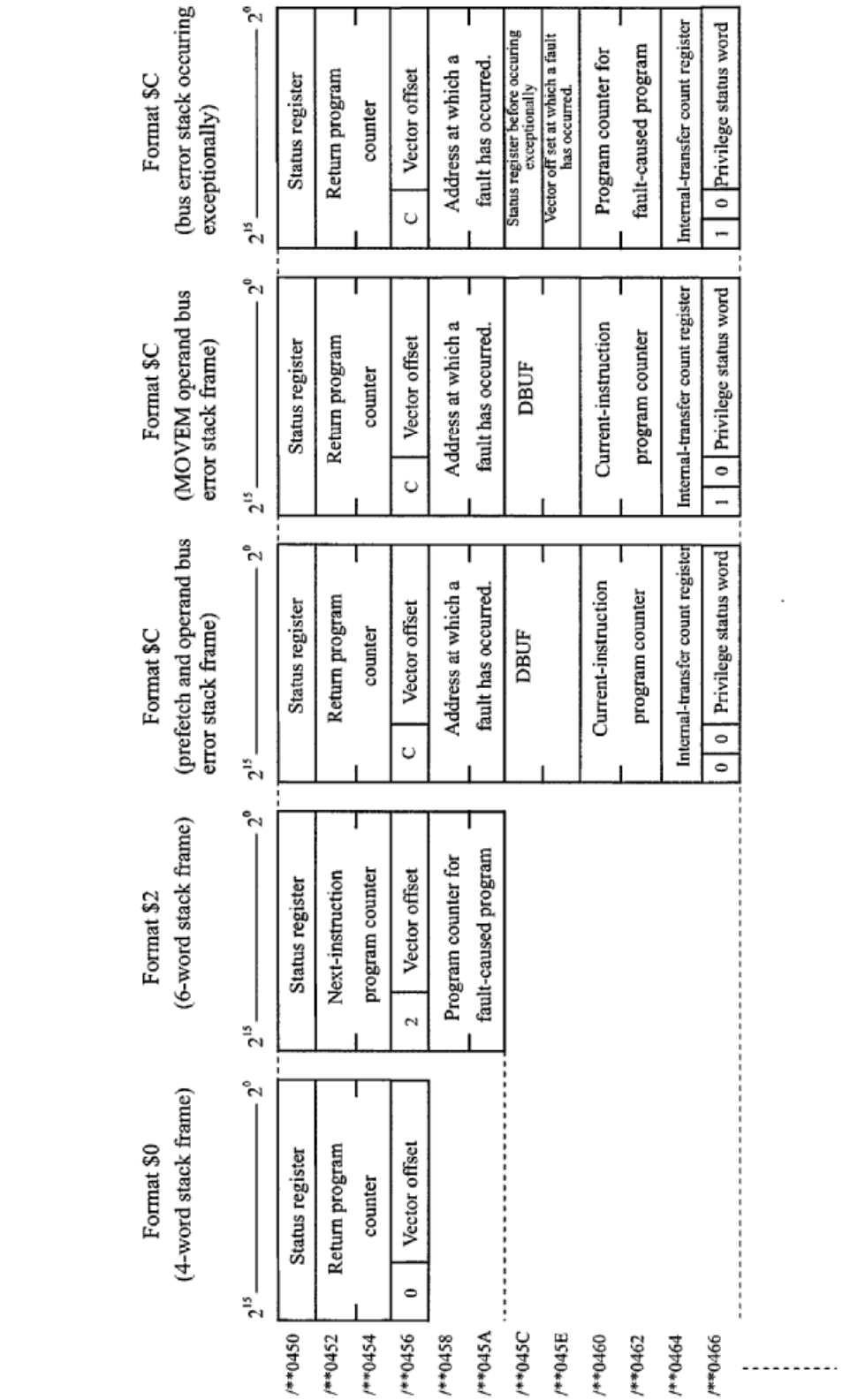
Address	2^{31} —— 2^{16} 2^{15} —— 2^{0}	
/**0400	Error code	—
/**0404	Time (ms) elapsed since a reset was completed.	··· This piece of information is saved only for J.NET, J.NET-INT, and IR.LINK modules.
	—	
	—	
/**0410	D0 register	
/**0414	D1 register	
/**0418	D2 register	
/**041C	D3 register	
/**0420	D4 register	
/**0424	D5 register	
/**0428	D6 register	
/**042C	D7 register	
/**0430	A0 register	
/**0434	A1 register	
/**0438	A2 register	
/**043C	A3 register	
/**0440	A4 register	
/**0444	A5 register	
/**0448	A6 register	
/**044C	A7 register	
/**0450	Stack frame (4-word, 6-word, or bus-error)	
/**04FC		

Note: The "**" portion of each address above varies with the module type in which a hardware error is detected and with the main/sub setting used.

The table below lists the error codes stored as error freeze information.

No.	Error code	Meaning		
		J.NET/J.NET-INT/IR.LINK	OD.RING/SD.LINK	ET.NET/FL.NET/SV.LINK
1	0010H	Bus error		
2	0011H	Address error		
3	0012H	Illegal instruction		
4	0013H	Division by 0		
5	0014H	Privilege violation		
6	0015H	WDT error		
7	0016H	Format error		
8	0017H	Spurious interrupt		
9	0018H	Unsupported exception (CHK, TRAPV, L1010, etc.)		
10	0019H	Parity error		
11	001AH	Power failure warning		
12	0100H	MODU.No. switch setting error		
13	0101H	BIT RATE switch setting error	CPL switch setting error	
14	0102H	ROM1 checksum error		
15	0103H	RAM1 compare error		
16	0105H	RAM2 compare error		
17	0107H	DMA transfer error (in module)	—	—
18	0108H			
19	0109H			
20	010AH			
21	010BH	ROM3 checksum error		
22	010CH	ROM write error		—
23	010DH			
24	010EH			
25	010FH			
26	0110H	Parameter rewrite count limit exceeded	CPL No. duplicated	—
27	0112H	—	—	Microprogram error
28	0113H	—	—	Undefined IP address
29	0114H	—	—	MAC address error
30	0200H	—	—	Routing information setting error

The figure below shows the contents of the stack frame provided in the error freeze information table.

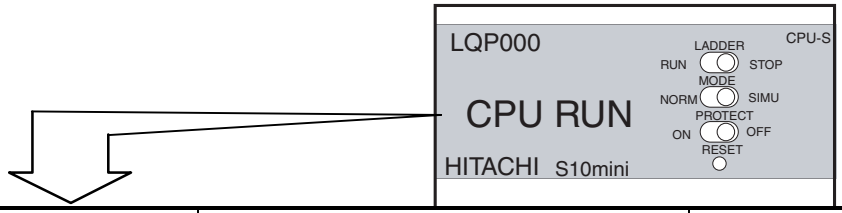


4 ERROR INDICATIONS

4.1 Indications on the CPU Indicator

#: "M" (main module), "S" (submodule).

*: "0" to "3" (each is a module number)



Indication	Meaning	Remedy
ADDR ERR	An address error has occurred in the running program.	The reason for this error is that a word or long-size access was attempted to an odd-numbered address. Check the C-mode user program or reload it into memory.
CPL# PTY	A RAM parity error has occurred in the reported CPU link module.	• Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, restart the CPU. • If restarting the CPU does not solve the problem, replace the link module.
CPL# RAM	A RAM program has caused an error in the reported CPU link module.	
CPL# ROM	A ROM program has caused an error in the reported CPU link module.	Press the RESET switch on the CPU once. If this does not solve the problem, replace the link module.
CPL# SSP	A "stack fence exceeded" error has occurred in the reported CPU link module.	• Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, restart the CPU. • If restarting the CPU does not solve the problem, replace the link module.
CPL# WDT	A WDT timeout error has occurred in the reported CPU link module.	
CPU CELL	The memory backup battery in the CPU is low.	Replace the CPU module.
CPU DOWN	The CPU is currently down.	Forcibly terminate all of the running sequence program, remote I/O, etc.
CPU RUN	The CPU is currently running.	This is not an error indication. A sequence program execution and a remote I/O transfer are in progress.
CPU SIMU	A simulation is currently in process on the CPU.	This is not an error indication. A sequence program execution is in progress, and the remote I/O transfers are all stopped.

Indication	Meaning	Remedy
CPU STOP	The CPU is currently stopped.	This is not an error indication. The sequence program execution is currently suspended, and a remote I/O transfer is in process.
DN* @.@	The reported D.NET module has been started up normally.	This is not an error indication.
DN* ADDR	An address error has occurred in the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* BOFF	The communication line of the reported D.NET module is malfunctioning.	Check for any loose connector connection or wiring, and check if the transmission speed, MAC ID (NA switch) and MODU.No. switch settings are all correct.
DN* CANA	A time-out error has occurred during an internal CAN access in the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* CANM	An error has occurred during a CAN register check in the reported D.NET module.	
DN* CANT	A CAN transmission time-out error has occurred in the reported D.NET module.	Check for any loose connector connection or wiring, and check if the transmission speed, MAC ID (NA switch) and MODU.No. switch settings are all correct.
DN* EXCP	An "unused" exception has occurred in the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* ILLG	An "illegal instruction" error has occurred in the reported D.NET module.	
DN* MACD	The MAC ID of the reported D.NET module is duplicated with the MAC ID of another node.	Correct the settings so that they will be unique in the system.
DN* MDSW	The module switch of the reported D.NET module is set improperly.	Correct the setting.
DN* MPUA	An error has occurred in an arithmetic/logic operation check in the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* MPUR	An error has occurred in a processor register check in the reported D.NET module.	
DN* PRCP	An error has occurred in a microprogram running in the reported D.NET module.	

Indication	Meaning	Remedy
DN* PRM1	An error is detected in a parameter setting for the reported D.NET module.	Set the correct parameter.
DN* PRM2	An error is detected in a transmission word count setting for the reported D.NET module.	Correct the setting.
DN* PTY1	A parity error has occurred in the shared memory of the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* PTY2	A parity error has occurred in the internal memory of the reported D.NET module.	
DN* RAMC	An error has occurred in a RAM check in the reported D.NET module.	
DN* ROM1	An error has occurred in a ROM1 program check in the reported D.NET module.	
DN* ROM2	An error has occurred in a ROM2 program check in the reported D.NET module.	
DN* ROM3	An error has occurred in a ROM3 program check in the reported D.NET module.	
DN* ROMC	An error has occurred in a flash memory check in the reported D.NET module.	
DN* RSTO	A RESET timer overflow has occurred in the reported D.NET module.	
DN* SBCP	An error has occurred in the OS running in the reported D.NET module.	
DN* SHM	An error has occurred in a processor built-in RAM check in the reported D.NET module.	
DN* SLOT	A "slot illegal instruction" error has occurred in the reported D.NET module.	
DN* TIM	An error has occurred in a timer check in the reported D.NET module.	

Indication	Meaning	Remedy
DN* TMER	A communication error has occurred during a T/M operation in the reported D.NET module.	Check for any loose connector connection or wiring, and check if the transmission speed, MAC ID (NA switch) and MODU.No. switch settings are all correct. Then, press the RESET switch on the CPU once. If the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
DN* WDT	A WDT time-out error has occurred in the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
ET# @.@	The reported ET.NET has been started up normally.	This is not an error indication.
ET# ADDR	An address error has occurred in the reported ET.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the ET.NET module may be down due to a hardware failure. Replace the module.
ET# BUS	A bus error has occurred in the reported ET.NET module.	
ET# EXCP	An "unused" exception has occurred in the reported ET.NET module.	
ET# FMAT	An instruction format error has occurred in the reported ET.NET module.	
ET# ILLG	An "illegal instruction" error has occurred in the reported ET.NET module.	
ET# IPING	An IP address has not yet been set in the reported ET.NET module.	Set an IP address with the tool.
ET# MAC	A MAC address has not yet been set in the reported ET.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the ET.NET module may be down due to a hardware failure. Replace the module.
ET# MDSW	The module switch of the reported ET.NET module is set improperly.	Correct the setting.
ET# PRG	An error has occurred in a microprogram running in the reported ET.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the ET.NET module may be down due to a hardware failure. Replace the module.
ET# PRIV	A privilege violation has occurred in the reported ET.NET module.	

Indication	Meaning	Remedy
ET# PTY	A parity error has occurred in the reported ET.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the ET.NET module may be down due to a hardware failure. Replace the module.
ET# R_NG	The routing information for the reported ET.NET module is set improperly.	Correct the setting.
ET# RAM1	An error has occurred in a RAM1 memory check in the reported ET.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the ET.NET module may be down due to a hardware failure. Replace the module.
ET# RAM2	An error has occurred in a RAM2 memory check in the reported ET.NET module.	
ET# ROM1	An error has occurred in a ROM1 program check in the reported ET.NET module.	
ET# ROM3	An error has occurred in a ROM3 memory check in the reported ET.NET module.	
ET# SINT	A "spurious interrupt" error has occurred in the reported ET.NET.	
ET# ZERO	A division-by-0 error has occurred in the reported ET.NET module.	
EX△△PRT	A memory protection error has occurred in the reported extension memory module (number EX△△).	Set the memory protection switch for the memory module properly.
EX△△PTY	A memory parity error has occurred in the reported extension memory module (number EX△△).	Clear the memory of the memory module and then reload all the programs, etc.
EX80␣PTY	A RAM parity error has occurred during reading by the CPU or PSEα of the RAM of the CPU link main module.	• Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, restart the CPU. • If restarting the CPU does not solve the problem, replace the link module.
EX81␣PTY	A RAM parity error has occurred during reading by the CPU or PSEα of the RAM of the CPU link submodule.	
EX92 PTY	A parity error has occurred during reading by the CPU of the memory of the (main) J.NET or IR.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, replace the link module.

Indication	Meaning	Remedy
EX93 PTY	A parity error has occurred during reading by the CPU of the memory of the J.NET or IR.LINK (sub) module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, replace the link module.
EXA0 PTY	A RAM parity error has occurred in the main module of the external device link.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, replace the link module.
EXA1 PTY	A RAM parity error has occurred in the submodule of the external device link.	
EXD0 PTY	A parity error has occurred during reading by the CPU (or PSE) of the RAM of the S10ET LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, restart the CPU. If restarting the CPU does not solve the problem, replace the S10ET LINK module.
EXF* PTY	A parity error has occurred during reading by the CPU of the memory of the reported D.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the D.NET module may be down due to a hardware failure. Replace the module.
EXF# ○.○	A mathematical/logical function system of version-revision ○.○ is running normally in the reported external device link module.	This is not an error indication.
EXT# ○.○	A task system of version-revision ○.○ is running normally in the reported external device link module.	
E***	The E-coil numbered *** is ON.	
FL-# @.@	The reported FL.NET module has been started up normally.	
FLN# ADBL	The common memory setting for the reported FL.NET module is duplicated with the common memory setting for another node.	Correct the settings so that they will be unique in the system.
FLN# ADDR	An address error has occurred in the reported FL.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the FL.NET module may be down due to a hardware failure. Replace the module.
FLN# BUS	A bus error has occurred in the reported FL.NET module.	
FLN# EXCP	An "unused" exception has occurred in the reported FL.NET module.	
FLN# FMAT	An instruction format error has occurred in the reported FL.NET module.	

Indication	Meaning	Remedy
FLN# ILLG	An "illegal instruction" error has occurred in the reported FL.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the FL.NET module may be down due to a hardware failure. Replace the module.
FLN# IPING	An IP address has not yet been set for the reported FL.NET module.	Set an IP address with the tool.
FLN# LER	The reported FL.NET module has not yet joined the network.	Check that the parameters for the module have been set properly. Also, ensure that the other stations are up and running.
FLN# MAC	A MAC address has not yet been set for the reported FL.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the FL.NET module may be down due to a hardware failure. Replace the module.
FLN# MDSW	The module switch of the reported FL.NET module is set improperly.	Correct the setting.
FLN# NDBL	The node number setting for the reported FL.NET module is duplicated with the node number setting for another node.	Correct the settings so that they will be unique in the system.
FLN# PER	The parameters for the reported FL.NET module are set improperly.	Set them properly.
FLN# PRG	An error has occurred in a microprogram running in the reported FL.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the FL.NET module may be down due to a hardware failure. Replace the module.
FLN# PRIV	A "privilege violation" error has occurred in the reported FL.NET module.	
FLN# PTY	A parity error has occurred in the reported FL.NET module.	
FLN# RAM1	An error has occurred in a RAM1 memory check in the reported FL.NET module.	
FLN# RAM2	An error has occurred in a RAM2 memory check in the reported FL.NET module.	
FLN# ROM1	An error has occurred in a ROM1 program check in the reported FL.NET module.	
FLN# ROM3	An error has occurred in a ROM3 memory check in the reported FL.NET module.	

Indication	Meaning	Remedy
FLN# SINT	A "spurious interrupt" error has occurred in the reported FL.NET module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the FL.NET module may be down due to a hardware failure. Replace the module.
FLN# TABT	The token hold time value set for the reported FL.NET module has been exceeded 3 or more times consecutively.	
FLN# ZERO	A division-by-0 error has occurred in the reported FL.NET module.	

Indication	Meaning		Remedy
GEMO□□□□	A ROM error has occurred in the main module of the external device link.		Look up the table below to find the meaning of the □□□□ portion. ⇩
GEMO	10	F0	ROM checksum error. Has occurred during a reset (GR).
		F1	RAM cleared. The RAM is all cleared while the ROM is idle.
		F2	Nothing loaded in the RAM. No program in the RAM.
		F3	RAM checksum error. Has occurred during a reset (GR).
		F4	RAM down. The RAM is down due to, for instance, a destroyed RAM program.
		F5	RAM parity error. A parity error has occurred in a RAM area.
GEMR□□□□	A reception error has occurred in the main module of the external device link.		Look up the table below to find the meaning of the □□□□ portion. ⇩
GEMR	20	80	Parity error. Has occurred with the received data.
		81	Overrun error. Has occurred with the received data.
		82	Framing error. Has occurred with the received data.
		83	Reception timed out. Not all the expected data has been received within a specified reception monitoring time period.
		84	ASCII conversion error. In a requested ASCII conversion, data outside the ranges "0" to "9" and "A" to "F" is received.
		85	End code error. In a requested ASCII conversion, data outside the ranges "0" to "9" and "A" to "F", or a non-end code is received.
		86	Block check character error. In a BCC reception, a BCC mismatch has occurred.
		87	Carrier detection timed out. The CD (carrier detection) input indicated no carrier present, resulting in the suspended reception. Then, the suspended reception has not been resumed, because the CD input did not indicate a carrier present within a specified reception monitoring time period.
		02	Reception process aborted. Due to the start of a transmission requested on a "local station first" basis during a data reception, a buffer containing incompletely received data exists.
		00	Receive buffer abnormality.

Indication	Meaning		Remedy
GEMS△△△△	A transmission error has occurred in the main module of the external device link.		Look up the table below to find the meaning of the △△△△ portion.
GEMS	20	80	Transmission unachievable in a "remote station first" condition. Transmission cannot be performed while the remote station is receiving data on a "remote station first" basis.
		81	Transmission unachievable during another transmission in progress. An already requested transmission is currently in progress (or suspended), so a new transmission request cannot be satisfied.
		82	Transmission unachievable when a send request is not present. Transmission is unachievable because the CS (send request) input is indicating a send request is not present, or because it is found by a specified DR (data set ready) check that the DR input is indicating "not ready".
		83	Transmission suspension timed out. After a transmission in progress was suspended by a suspend code, it has not be resumed by a resume code within a specified transmission suspension monitoring time period specified by a user in advance.
		84	Send request timed out. After a transmission in progress was suspended due to a change in indication of the CS (send request) input to "send request not present", it has not been resumed due to a change in indication of the CS input to "send request present" within a transmission suspension monitoring time period specified by user in advance.
		85	"Data set ready" timed out. A transmission in progress was suspended because it was found by a specified DR (data set ready) check that the indication of the DR input changed to "not ready" during the transmission. Then, the suspended transmission has not been resumed, because the indication of the DR input did not change to "ready" within a transmission suspension monitoring time period specified by a user in advance.
	10	×× (undefined)	Reception process aborted. Due to the start of a transmission requested on a "local station first" basis during a data reception, the data reception process in progress has been aborted.
GEMO□□□□	A ROM error has occurred in the submodule of the external device link.		Look up the table below to find the meaning of the □□□□ portion.
GESO	10	F0	ROM checksum error. Has occurred during a reset (GR).
		F1	RAM cleared. The RAM is all cleared while the ROM is idle.
		F2	Nothing loaded in the RAM. No program in the RAM.
		F3	RAM checksum error. Has occurred during a reset (GR).
		F4	RAM down. The RAM is down due to, for instance, a destroyed RAM program.
		F5	RAM parity error. A parity error has occurred in a RAM area.

Indication	Meaning	Remedy
GESR□□□□	A reception error has occurred in the submodule of the external device link.	Look up the table below to find the meaning of the □□□□ portion. ⇩

GESR	20	80	Parity error. Has occurred with the received data.
		81	Overrun error. Has occurred with the received data.
		82	Framing error. Has occurred with the received data.
		83	Reception timed out. Not all the expected data has been received within a specified reception monitoring time period.
		84	ASCII conversion error. In a requested ASCII conversion, data outside the ranges "0" to "9" and "A" to "F" is received.
		85	End code error. In a requested ASCII conversion, data outside the ranges "0" to "9" and "A" to "F", or a non-end code is received.
		86	BCC error. In a BCC reception, a BCC mismatch has occurred.
		87	Carrier detection timed out. The CD (carrier detection) input indicated no carrier present, resulting in the suspended reception. Then, the suspended reception has not been resumed, because the CD input did not indicate a carrier present within a specified reception monitoring time period.
		02	Reception process aborted. Due to the start of a transmission requested on a "local station first" basis during a data reception, a buffer containing incompletely received data exists.
		00	Receive buffer abnormality.

Indication	Meaning	Remedy
GESS△△△△	A transmission error has occurred in the submodule of the external device link.	Look up the table below to find the meaning of the △△△△ portion. ⇩

GESS	20	80	Transmission unachievable in a "remote station first" condition. Transmission cannot be performed while the remote station is receiving data on a "remote station first" basis.
		81	Transmission unachievable during another transmission in progress. An already requested transmission is currently in progress (or suspended), so a new transmission request cannot be satisfied.
		82	Transmission unachievable when a send request is not present. Transmission is unachievable because the CS (send request) input is indicating a send request is not present, or because it is found by a specified DR (data set ready) check that the DR input is indicating "not ready".
		83	Transmission suspension timed out. After a transmission in progress was suspended by a suspend code, it has not be resumed by a resume code within a specified transmission suspension monitoring time period.

<table>
<tr><th>Indication</th><th colspan="2">Meaning</th><th>Remedy</th></tr>
<tr><td rowspan="3">GESS</td><td rowspan="2">20</td><td>84</td><td>Send request timed out. After a transmission in progress was suspended due to a change in indication of the CS (send request) input to "send request not present", it has not been resumed due to a change in indication of the CS input to "send request present".</td></tr>
<tr><td>85</td><td>"Data set ready" timed out. A transmission in progress was suspended because it was found by a specified DR (data set ready) check that the indication of the DR input changed to "not ready" during the transmission. Then, the suspended transmission has not been resumed, because the indication of the DR input did not change to "ready" within a specified transmission suspension monitoring time period.</td></tr>
<tr><td>10</td><td>××
(unde-
fined)</td><td>Reception process aborted. Due to the start of a transmission requested on a "local station first" basis during a data reception, the data reception process in progress has been aborted.</td></tr>
<tr><td>GMDN10FF</td><td colspan="2">A WDT time-out error has occurred in the main module of the external device link.</td><td rowspan="2">Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, replace the link module.</td></tr>
<tr><td>GSDN10FF</td><td colspan="2">A WDT time-out error has occurred in the submodule of the external device link.</td></tr>
<tr><td>HI/O ERR</td><td colspan="2">An error has occurred in the high-speed remote I/O module.</td><td>Replace the module.</td></tr>
<tr><td>ILG INST</td><td colspan="2">An attempt has been made to execute an instruction (illegal instruction) which makes the running program unable to continue its execution.</td><td>Try to reload the program, and check if the reloading proceeds normally; or correct the program.</td></tr>
<tr><td>INV INT</td><td colspan="2">An undefined exception has occurred in the OS.</td><td>Check that 1) all such necessary things as the program are loaded in normally, 2) nothing causing the occurrence of an undefined exception, such as the CHK instruction, is present in the program, and 3) a program is present at the destination of a jump.</td></tr>
<tr><td>IO-F-***</td><td colspan="2">A fuse error has occurred in the PI/O module numbered ***.</td><td>Replace the module.</td></tr>
<tr><td>IO-T-***</td><td colspan="2">A line time-out error has occurred in the station module numbered ***.</td><td>Check the cable connecting to the station module for any abnormal condition, such as a line break, and check that the power to the PI/O module is ON.</td></tr>
<tr><td>IRL# @.@</td><td colspan="2">The reported IR.LINK module has been started up normally.</td><td>This is not an error indication.</td></tr>
</table>

Indication	Meaning	Remedy
IR# ADDR	An address error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR# BRSW	The bit rate switch of the reported IR.LINK module is set improperly.	Correct the setting.
IR# BUS	A bus error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR# EXCP	An "unused" exception has occurred in the reported IR.LINK module.	
IR# FMAT	An instruction format error has occurred in the reported IR.LINK module.	
IR# ILLG	An "illegal instruction" error has occurred in the reported IR.LINK module.	
IR# MDSW	The module switch of the reported IR.LINK module is set improperly.	Correct the setting.
IR# PRIV	A "privilege violation" error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR# PRME	A parameter storage error has occurred in the reported IR.LINK module.	Set the parameters properly.
IR# PTY	A parity error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR# RAM1	An error has occurred in a RAM1 memory check in the reported IR.LINK module.	
IR# RAM2	An error has occurred in a RAM2 memory check in the reported IR.LINK module.	
IR# ROM1	An error has occurred in a ROM1 program check in the reported IR.LINK module.	
IR# ROM3	An error has occurred in a ROM3 memory check in the reported IR.LINK module.	
IR# ROME	An error has occurred in a ROM3 program clearing in the reported IR.LINK module.	
IR# ROMW	A ROM3 write error has occurred in the reported IR.LINK module.	
IR# SINT	A "spurious interrupt" error has occurred in the reported IR.LINK module.	

Indication	Meaning	Remedy
IR# WDT	A WDT time-out error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR# WOVR	The maximum allowable number of ROM rewrites has been exceeded in the reported IR.LINK module.	The specified limit of 50,000 rewrites has been exceeded. Replace the IR.LINK module.
IR# ZERO	A "division-by-0" error has occurred in the reported IR.LINK module.	The IR.LINK module may be down due to a hardware failure. Replace the module.
IR#N○○○○	An error has been detected in the network to which the reported IR.LINK module is connected.	Refer to "6.3.3 Communication errors," of "IR.LINK (Manual number SME-1-117)."
IR#S△△△△	An error has been detected in the station to which the reported IR.LINK module is connected.	
JN# ADDR	An address error has occurred in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN# BRSW	The bit rate switch of the reported J.NET module is set improperly.	Correct the setting.
JN# BUS	A bus error has occurred in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN# EXCP	An "unused" exception has occurred in the reported J.NET module.	
JN# FMAT	An instruction format error has occurred in the reported J.NET module.	
JN# ILLG	An "illegal instruction" error has occurred in the reported J.NET module.	
JN# MDSW	The module switch of the reported J.NET module is set improperly.	Correct the setting.
JN# PRIV	A "privilege violation" error has occurred in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN# PRME	A parameter storage error has occurred in the reported J.NET module.	Set the parameters properly.
JN# PTY	A parity error has occurred in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN# RAM1	An error has occurred in a RAM1 memory check in the reported J.NET module.	
JN# RAM2	An error has occurred in a RAM2 memory check in the reported J.NET module.	

Indication	Meaning	Remedy
JN# ROM1	An error has occurred in a ROM1 program check in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN# ROM3	An error has occurred in a ROM3 memory check in the reported J.NET module.	
JN# ROME	An error has occurred in a ROM3 program clearing in the reported J.NET module.	
JN# ROMW	A ROM3 write error has occurred in the reported J.NET module.	
JN# SINT	A "spurious interrupt" error has occurred in the reported J.NET module.	
JN# WDT	A WDT time-out error has occurred in the reported J.NET module.	
JN# WOVR	The maximum allowable number of ROM rewrites has been exceeded in the reported J.NET module.	The specified limit of 50,000 rewrites has been exceeded. Replace the J.NET module.
JN# ZERO	A "division-by-0" error has occurred in the reported J.NET module.	The J.NET module may be down due to a hardware failure. Replace the module.
JN#N○○○○	An error has been detected in the network to which the reported J.NET module is connected.	Refer to "6.3.4 Communication errors," of "J.NET (Manual number SME-1-104)."
JN#S△△△△	An error has been detected in the station to which the reported J.NET module is connected.	
JNT# @.@	The reported J.NET module has been started up normally.	This is not an error indication.
LOAD OS	The OS programs have not yet been loaded in.	This is not an error indication. Load the OS programs in.
NST OVER	A level of N-coil nesting used in a sequence program has exceeded the limit.	Correct the program so that the total number of nested N-coils in the nesting will be 3 or less.
N***	The N-coil numbered *** is currently ON. (The indication N000 is not displayed.)	The only N-coil that is ON at the time of LED lighting is reported on the indicator. If, however, the duration of its ON condition is 1 second or shorter, the N-coil may not be reported.
OD# @.@	The reported OD.RING module has been started up normally.	This is not an error indication.

Indication	Meaning	Remedy
OD# ADDR	An address error has occurred in the reported OD.RING module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the OD.RING module may be down due to a hardware failure. Replace the module.
OD# BUS	A bus error has occurred in the reported OD.RING module.	
OD# CPSW	The CPL No. switch of the reported OD.RING module is set improperly.	Correct the setting.
OD# DPCP	The CPL No. switch setting for the reported OD.RING module is duplicated with the CPL No. switch setting for another existing OD.RING module.	Correct the settings so that they will be unique in the system.
OD# EXCP	An "unused" exception has occurred in the reported OD.RING module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the OD.RING module may be down due to a hardware failure. Replace the module.
OD# FMAT	An instruction format error has occurred in the reported OD.RING module.	
OD# GR	A GR(reset)-warning interrupt has been generated in connection with the reported OD.RING module.	
OD# ILLG	An "illegal instruction" error has occurred in the reported OD.RING module.	
OD# MDSW	The module switch of the reported OD.RING module is set improperly.	Correct the setting.
OD# PRIV	A "privilege violation" error has occurred in the reported OD.RING module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the OD.RING module may be down due to a hardware failure. Replace the module.
OD# PRME	A parameter storage error has occurred in the reported OD.RING module.	Set the parameters properly.
OD# PTY	A parity error has occurred in the reported OD.RING module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the OD.RING module may be down due to a hardware failure. Replace the module.
OD# RAM1	An error has occurred in a RAM1 memory check in the reported OD.RING module.	
OD# RAM2	An error has occurred in a RAM2 memory check in the reported OD.RING module.	
OD# ROM1	An error has occurred in a ROM1 program check in the reported OD.RING module.	
OD# ROM3	An error has occurred in a ROM3 memory check in the reported OD.RING module.	

Indication	Meaning	Remedy
OD# ROME	An error has occurred in a ROM3 program clearing in the reported OD.RING module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the OD.RING module may be down due to a hardware failure. Replace the module.
OD# ROMW	A ROM3 write error has occurred in the reported OD.RING module.	
OD# SINT	A "spurious interrupt" error has occurred in the reported OD.RING module.	
OD# WDT	A WDT time-out error has occurred in the reported OD.RING module.	
OD# ZERO	A "division-by-0" error has occurred in the reported OD.RING module.	
OS PTY	A parity error has occurred in the OS program storage area (/F0000 to /FFFFF).	Press the RESET switch on the CPU once and then reload the OS programs.
PRIV VIO	An attempt has been made to execute in a user program an instruction that is allowed to be executed only in the supervisor mode (OS).	Check if the destination of a jump from the error-ridden C-mode program is located in the OS program area. If so, correct it.
PROT ERR	An attempt has been made to rewrite the contents of the basic memory under protection.	Do not write to the basic memory in C-mode user programs. Alternatively, use such a write operation, with the CPU's key switch being set in the PROT OFF position.
P***	The P-coil numbered *** is currently ON.	The only P-coil that is ON at the time of LED lighting is reported on the indicator. If, however, the duration of its ON condition is 1 second or shorter, the P-coil may not be reported.
RAM ERR	The OS has been loaded in improperly.	Press the RESET switch on the CPU once and then reload the OS programs.
RAM DOWN	A jump has been made to the ROM program, due to a runaway RAM program.	Check the OS programs for any damage and, if necessary, reload them.
RAM SUM	A checksum error has occurred during loading in of the OS programs.	Press the RESET switch on the CPU once and then reload the OS programs.
ROM IDLE	The IPL program is running; or the battery is low, the battery connector is disconnected, or the battery backup program is destroyed.	This is not an error indication as long as it is displayed during program loading-in.

Indication	Meaning	Remedy
ROM SUM	A checksum error has occurred during loading in of the IPL program.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, replace the CPU module.
RSV ERR	A user task that was using a system resource exclusively by calling the RSERV macro has exited without releasing it by calling the FREE macro.	Correct the task program so that it will free a reserved resource at the time it exits.
RTC CELL	The memory backup battery for the memory module with a timer (RTC) is low.	Replace the memory module.
SD# @.@	The reported SD.LINK module has been started up normally.	This is not an error indication.
SD# ADDR	An address error has occurred in the reported SD.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SD.LINK module may be down due to a hardware failure. Replace the module.
SD# BUS	A bus error has occurred in the reported SD.LINK module.	
SD# CPSW	The CPL No. switch of the reported SD.LINK module is set improperly.	Correct the setting.
SD# DPCP	The CPL No. switch setting for the reported SD.LINK module is duplicated with the CPL No. switch setting for another existing SD.LINK module.	Correct the settings so that they will be unique in the system.
SD# EXCP	An "unused" exception has occurred in the reported SD.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SD.LINK module may be down due to a hardware failure. Replace the module.
SDM FMAT	An instruction format error has occurred in the reported SD.LINK module.	
SD# GR	A GR(reset)-warning interrupt has been generated in connection with the reported SD.LINK module.	
SD# ILLG	An "illegal instruction" error has occurred in the reported SD.LINK module.	
SD# MDSW	The module switch of the reported SD.LINK module is set improperly.	Correct the setting.
SD# PRIV	A "privilege violation" error has occurred in the reported SD.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SD.LINK module may be down due to a hardware failure. Replace the module.
SD# PRME	A parameter storage error has occurred in the reported SD.LINK module.	Set the parameters properly.

Indication	Meaning	Remedy
SD# PTY	A parity error has occurred in the reported SD.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SD.LINK module may be down due to a hardware failure. Replace the module.
SD# RAM1	An error has occurred in a RAM1 memory check in the reported SD.LINK module.	
SD# RAM2	An error has occurred in a RAM2 memory check in the reported SD.LINK module.	
SD# ROM1	An error has occurred in a ROM1 program check in the reported SD.LINK module.	
SD# ROM3	An error has occurred in a ROM3 memory check in the reported SD.LINK module.	
SD# ROME	An error has occurred in a ROM3 program clearing in the reported SD.LINK module.	
SD# ROMW	A ROM3 write error has occurred in the reported SD.LINK module.	
SD# SINT	A "spurious interrupt" error has occurred in the reported SD.LINK module.	
SD# WDT	A WDT time-out error has occurred in the reported SD.LINK module.	
SD# ZERO	A "division-by-0" error has occurred in the reported SD.LINK module.	
SMD INVL	An instruction that is disallowed to be executed in a sequence program has been executed.	Reload the sequence program into memory and check if the contents of the sequence program area are rewritten in a C-mode user program.
SMD PTY	A memory parity error has occurred in the sequence program area (/60000 to /7FFFF).	Clear the sequence program area and load the sequence program in again.
SPP OVER	The OS's supervisor stack has overflowed.	Load the OS in again.
SVC ERR	A parameter error has occurred in a macro instruction within a C-mode user program.	Check the parameters used in the macro instruction and correct the error.
SV# @.@	The reported SV.LINK module has been started up normally.	This is not an error indication.

Indication	Meaning	Remedy
SV# ADDR	An address error has occurred in the reported SV.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SV.LINK module may be down due to a hardware failure. Replace the module.
SV# BUS	A bus error has occurred in the reported SV.LINK module.	
SV# EXCP	An "unused" exception has occurred in the reported SV.LINK module.	
SV# FMAT	An instruction format error has occurred in the reported SV.LINK module.	
SV# ILLG	An "illegal instruction" error has occurred in the reported SV.LINK module.	
SV# IPNG	An IP address is undefined for the reported SV.LINK module.	Define an IP address for the module and then reset the CPU or power it down and up again.
SV# MAC	MAC address data is found abnormal in the reported SV.LINK module.	The SV.LINK module may be down due to a hardware failure. Replace the module.
SV# MDSW	The module switch of the reported SV.LINK module is set improperly.	In a power-off condition, set the module switch in the "0" (main) or the "1" (sub) position.
SV# PRAM	A communication parameter setting error has occurred in the reported SV.LINK module.	The set value of a communication parameter is incorrect. Refer to "4.7 Status and Communication Parameter Areas," of "SV.LINK (Manual number SME-1-116)," and set the correct value. Then, reset the CPU or power it down and up again.
SV# PRG	A microprogram error has occurred in the reported SV.LINK module.	The SV.LINK module may be down due to a hardware failure. Replace the module.
SV# PRIV	A "privilege violation" error has occurred in the reported SV.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SV.LINK module may be down due to a hardware failure. Replace the module.
SV# PTY	A parity error has occurred in the reported SV.LINK module.	
SV# RAM1	An error has occurred in a RAM1 memory check in the reported SV.LINK module.	A parity error has occurred in the reported SV.LINK module.
SV# RAM2	An error has occurred in a RAM2 memory check in the reported SV.LINK module.	
SV# ROM1	An error has occurred in a ROM1 program check in the reported SV.LINK module.	

Indication	Meaning	Remedy
SV# ROM3	An error has occurred in a ROM3 memory check in the reported SV.LINK module.	The SV.LINK module may be down due to a hardware failure. Replace the module.
SV# SINT	A "spurious interrupt" error has occurred in the reported SV.LINK module.	Press the RESET switch on the CPU once. Then, if the same indication appears on the indicator, the SV.LINK module may be down due to a hardware failure. Replace the module.
SV# ZERO	A "division-by-0" error has occurred in the reported SV.LINK module.	
WDT ERR	Sequence cycle processing has not been completed within a given monitoring time period (about 1 or 2 seconds).	Reduce the CPU load or check if the content of a relevant hardware register is rewritten in a program.
ZERO DIV	A division by 0 has been attempted in a running program.	Correct the C-mode user program that caused the error.
○○ : △△ : **	A time indication from the memory module with timer.	This is not an error indication.

APPENDIX

◆ Trouble Investigation Sheet

<table>
<tr><td colspan="2">Your company name</td><td></td><td>Person in charge</td><td></td></tr>
<tr><td colspan="2">Data and time of occurrence</td><td colspan="3">(year / month / day / hour / minute)</td></tr>
<tr><td rowspan="4">Where to make contact</td><td>Address</td><td colspan="3"></td></tr>
<tr><td>Telephone</td><td colspan="3"></td></tr>
<tr><td>FAX</td><td colspan="3"></td></tr>
<tr><td>E-mail</td><td colspan="3"></td></tr>
<tr><td colspan="2">Model of defective module</td><td></td><td>CPU model</td><td></td></tr>
<tr><td colspan="2">OS Ver. Rev.</td><td colspan="3">Program name: Ver. Rev.</td></tr>
<tr><td colspan="2">Support program</td><td colspan="3">Program name: Ver. Rev.</td></tr>
<tr><td colspan="2">Symptom of defect</td><td colspan="3"></td></tr>
<tr><td rowspan="4">Connection load</td><td>Type</td><td colspan="3"></td></tr>
<tr><td>Model</td><td colspan="3"></td></tr>
<tr><td>Wiring state</td><td colspan="3"></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">System configuration and switch setting</td><td colspan="3"></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="2">Space for correspondence</td><td colspan="3"></td></tr>
</table>