

HITACHI

USER'S MANUAL

OPTION

CPU LINK

(LQE550)

S10mini

SIOV

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(LQE550)

S10mini

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SAFETY PRECAUTIONS

- Before installation, operation, maintenance, and/or inspection of this product, be sure to read through carefully this manual and other related manuals. Do not use this product until you are familiar with all the information concerning this product, safety information, and precautions provided in those manuals.
- Keep this manual in a readily accessible place so that users of this product may easily reach it.
- This manual contains information on potential hazards that is intended as a guide for safe use of this product. The potential hazards listed in the manual are divided into four hazard levels of danger, warning, caution, and notice, according to the level of their severity. The following are definitions of the safety labels containing the corresponding signal words DANGER, WARNING, CAUTION, and NOTICE.



: This safety label identifies precautions that, if not heeded, will result in death or serious injury.





: Identifies precautions that, if not heeded, could result in death or serious injury.



: Identifies precautions that, if not heeded, could result in minor or moderate injury.



: This safety label without a safety alert symbol identifies precautions that, if not heeded, could result in property damage or loss not related to personal injury.

Failure to observe any of the  and  statements used in this manual could also lead to a serious consequence, depending on the situation in which this product is used. Therefore, be sure to observe all of those statements without fail.

The following are definitions of the phrases “serious injury,” “minor or moderate injury,” and “property damage or loss not related to personal injury” used in the above definitions of the safety labels.

Serious injury: Is an injury that requires hospitalization for medical treatment, has aftereffects, and/or requires long-term follow-up care. Examples of serious injuries are as follows: vision loss, burn (caused by dry heat or extreme cold), electric-shock injury, broken bone, poisoning, etc.

Minor or moderate injury: Is an injury that does not require either hospitalization for medical treatment or long-term follow-up care. Examples of minor or moderate injuries are as follows: burn, electric-shock injury, etc.

Property damage or loss not related to personal injury: Is a damage to or loss of personal property. Examples of property damages or losses not related to personal injury are as follows: damage to this product or other equipment or their breakdown, loss of useful data, etc.

The safety precautions stated in this manual are based on the general rules of safety applicable to this product. These safety precautions are a necessary complement to the various safety measures included in this product. Although they have been planned carefully, the safety precautions posted on this product and in the manual do not cover every possible hazard. Common sense and caution must be used when operating this product. For safe operation and maintenance of this product, establish your own safety rules and regulations according to your unique needs. A variety of industry standards are available to establish such safety rules and regulations.

1. General Safety Guidelines

Before installing, operating inspecting or conducting maintenance on this unit, read the following instructions carefully:

- Follow all the operating procedures provided in this manual.
- Pay special attention to and follow all the hazard warnings on the machine and in the manual. Failure to do so can cause injury to yourself or damage to the machine.
- Do not perform any operation or action in any way other than as provided in this manual. When in doubt, call the designated field engineer. Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand.
Be alert and use your common sense.
- Do not install, wire, handle, modify, or use maintenance parts in any manner not described in this manual. Such a practice may result in breakdown of this equipment or peripherals, injury or even death. Hitachi will not be responsible for any accident or failure resulting from such mishandling.

Read the following safety guidelines carefully and follow them when you conduct maintenance of the machine.

Before starting maintenance

- Maintenance of the machine must be done only by trained and qualified field engineers.
- Read and follow the safety guidelines and procedures in this manual and the related manuals.
- In this manual and on the machine, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand.
Be alert and use your common sense.

During work

- For each procedure, follow the given sequence of steps.
- Use the special tools and instruments, specified for the work in the manual or commercially available tools and instruments which fit the purpose.
- Use measurement instruments and powered tools which are properly calibrated or periodically inspected.
- Keep the maintenance area neat and tidy.
- Always put away parts, materials or tools when not in use.
- Wear an eye protector where anything may fly about.
- When using sharp objects or cutting tools, make sure that no part of your body lies in the path of the blade bit, or point.
- Before finishing your work, make sure that all parts removed during maintenance have been installed back in their original positions in the machine.
Make sure that no tool or foreign material is left in the machine.

Prevention of electric shocks

- Before starting work, make sure that, unless otherwise specifically instructed, there is no potential electric hazard in the maintenance area such as insufficient grounding or a wet floor.
- Before starting work, note where the emergency power-off switches are located and make sure you know how to operate them.
- Unless otherwise specifically instructed, cut off all power sources to the machine before starting maintenance. Just switching off the machine power supplies is usually not enough.

When power is fed from a wall or floor outlet, unplug the power supply cord, or turn off the switch on the power distribution panel or board. Attach a notice on the panel or board prohibiting the use of the switch.

If the energy isolating device such as the switch on the power distribution panel or board accepts a lockout device, turn off the power, lock out the energy isolating device, and bring the key with you. When you take over the work and the key for the lockout device if applicable, do not assume that the power is off. Make sure yourself that the above-mentioned conditions such as switches are satisfied. If necessary, use a measurement tool to ensure that the power is off.

- Do not touch any uninsulated conductor or surface, where so instructed, which remains charged for a limited time after the external power supply to the machine is disconnected.
- When working on a machine which has a grounding terminal, make sure that the terminal is properly connected to the facility's ground.
- When working close to a hazardously energized part, do not work alone; work with another person who can immediately turn off the power in an emergency.
- Do not wear any metallic item such as a wrist watch with a metallic surface, or metallic accessories.

If you wear eyeglasses with a metallic frame, take care not to let the frame touch an uninsulated surface.

- Make sure that your hands and arms are dry.
- Unless otherwise specifically instructed, use only one hand when it is necessary to work near an exposed live electric circuit.

This prevents the completion of the circuit through your heart even if you accidentally touch the circuit.

- Do not use a dental mirror near an exposed live electric circuit.

The mirror surface is conductive and can become hazardous even if it is made of plastic.

- Unless otherwise specifically instructed, do not supply power to any subassembly such as a power supply unit or a motor while it is removed from the machine.

Procedures in an emergency

For electric shock

- Do not panic. Do not become another victim through contact with the injured person.
- First, shut off the electric current passing through the victim.
Use the emergency power-off switch, if there is one, or, otherwise, a normal power-off switch. If this cannot be done, push the victim away from the source of the electric current by using a nonconductive object such as a dry wooden stick.
- Then, call an ambulance.
- If the victim is unconscious, artificial respiration may be necessary.
A proper method for performing artificial respiration or resuscitation should be learned beforehand. If the victim's heart is not beating, cardio-pulmonary resuscitation should be performed by a trained and qualified person.

For outbreak of fire

- First, shut off all the power from the machine using the emergency power-off switch, if there is one, or the normal power-off switch.
- If the fire continues burning after the power is shut off, take suitable actions including the use of a fire extinguisher or a call for the fire department.

2. Hazard Warning Statements

The following are the hazard warning statements contained in this manual.

2.1 DANGER Statement

(chapter 3, page 3-8)

DANGER

- Switch off the power supply before making connections to the terminal block. Wiring with the power supply switched on may incur electrical shock hazards.
- An electric shock may lead to a death or burn. Noise may cause the system to malfunction. Ground the line ground (LG), frame ground (FG), and shield wire (SHD) terminals.

2.2 WARNING Statement

(chapter 3, page 3-8)

WARNING

- If the module emits smoke or foreign odor, immediately switch off the power supply and investigate the problem cause.
- Do not perform any installation, wiring, handling, or internal modification procedures other than stated in this manual. In no event will Hitachi be responsible for personal injury or death or any damage to Hitachi's product or peripheral equipment arising out of the use of such an unauthorized procedure.
- While the power is applied, never touch a terminal strip or connector pin. If you touch a terminal strip or connector pin while the power is applied, you may receive an electric shock.

2.3 CAUTION Statements

(chapter 2, page 2-2)



CAUTION

Switch off the power supply before making connections to the terminal block. Wiring with the power supply switched on may incur electrical shock hazards.

(chapter 3, page 3-3)



CAUTION

- If the module emits smoke or foreign odor, immediately switch off the power supply and investigate the problem cause.
- Do not perform any installation, wiring, handling, or internal modification procedures other than stated in this manual. In no event will Hitachi be responsible for personal injury or death or any damage to Hitachi's product or peripheral equipment arising out of the use of such an unauthorized procedure.
- While the power is applied, never touch a terminal strip or connector pin. If you touch a terminal strip or connector pin while the power is applied, you may receive an electric shock.

(chapter 3, page 3-4)



CAUTION

- Observe the installation procedure stated in the manual. If the module is improperly installed, it may drop, become defective, or malfunction.
- Do not allow wire cuttings or other foreign matter to enter the module. The entry of foreign matter in the module may result in a fire or cause the module to become defective or malfunction.
- Static electricity may damage the module. Before starting the work, discharge all electrostatic charge from your body.
- Properly tighten the screws. If they are inadequately tightened, malfunction, smoke emission, or combustion may occur.
- Do not disassemble or modify the module. Failure to observe this precaution may result in a fire or cause the module to become defective or malfunction.

2.4 NOTICE Statements

(chapter 1, page 1-2)

NOTICE

Use only one type of cable to wire each line. Use of different types of cable in a single CPU link line may cause invalid data to be transmitted or received or cause communication errors.

(chapter 1, page 1-5)

NOTICE

Users of this product must have an adequate knowledge of the Windows® environment and user interface. This system conforms to the Windows® standard. This manual is prepared for users who are familiar with the basic Windows® operating procedures.

(chapter 1, page 1-6)

NOTICE

- If the software supplied by Hitachi is modified for use, Hitachi cannot be responsible for accidents or losses resulting from such modification.
- Hitachi cannot be responsible for reliability if you use software other than supplied from Hitachi.
- Back up files on a daily basis. You might lose the contents of files due, for instance, to a file unit failure, power failure during a file access, or operating error. To provide against such contingencies, back up files according to an appropriate plan.
- Before scrapping the product, ask a professional waste disposal dealer in charge of scrapping work.
- Do not use a transceiver, cellular phone, or similar device near the module because module malfunction or system failure may occur due to noise.
- The contents of the memory may become damaged due, for instance, to a module failure. Be sure to make a backup of important data.
- Before constructing a system, creating a program, or performing a similar procedure, thoroughly read this manual to become familiar with the contained instructions and precautions. If you perform any incorrect procedure, the system may malfunction.
- Store this manual at a predetermined place where it can readily be referred to whenever it is needed.
- If you have any doubt or question about the contents of this manual, contact your local source.
- Hitachi cannot be responsible for accidents or losses resulting from a customer's misuse.
- If an emergency stop circuit, interlock circuit, or similar circuit is to be formulated, it must be positioned external to this module. If you do not observe this precaution, equipment damage or accident may occur when this module becomes defective.

(chapter 2, page 2-3)

NOTICE

Do not set the MAIN/SUB selector switch to 2 to F. Switch setting to 2 to 4 may render the module inoperable or destroy transfer data (G000 to GFFF).

NOTICE

S10mini Series

- Mount the option module in option slots that is located to the immediate right of the CPU module. Be sure that no I/O module is mounted between this option module and CPU module. Also, ensure that there is no unoccupied slot between option modules.
- This module (LQE550) can be mounted together with the LQE050 CPU link module, which is specially designed for use with the S10mini.

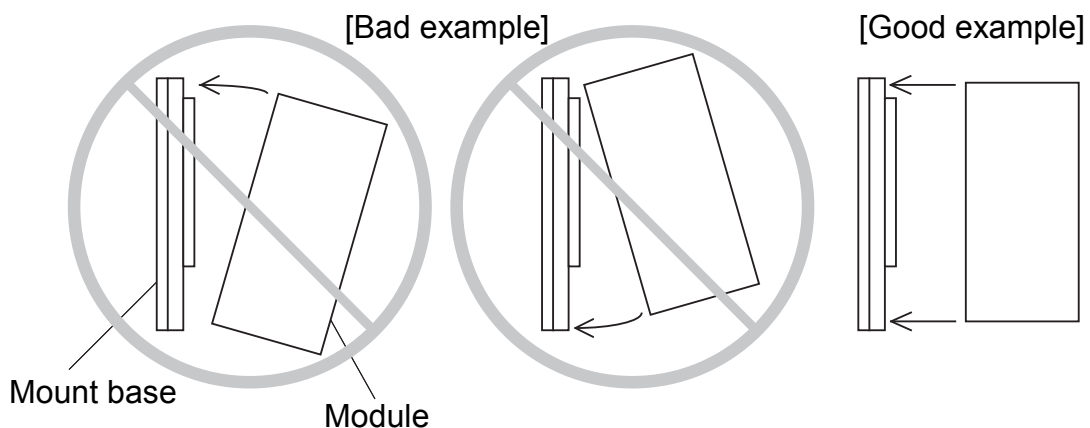
S10V Series

- There are no specific rules about the mounting position or unoccupied slots.
- The LQE050 CPU link module cannot be used as it is specially designed for use with the S10mini.

(chapter 3, page 3-3)

NOTICE

- Dust or other foreign matter might accumulate on the connector, resulting in poor contact. Immediately after the module is unpacked, perform the mounting and wiring procedures.
- To prevent the module from being damaged, observe the following precautions when you mount or demount the module:
 - Before mounting the module to the mount base connector, check that the connector pins are properly aligned and not bent, broken, or soiled with dirt or the like.
 - Ensure that the module is parallel to the mount base vertical surface as shown below when mounting. If you connect a module to or disconnect it from its connector while it is tilted, the connector pins may become damaged.
 - If the mount base is positioned overhead due to the employed enclosure structure, use a stepladder or the like and mount the module squarely. If you mount the module obliquely, the connector may become damaged.



(chapter 3, page 3-5)

NOTICE

The shield ground (SHD) × 2 terminal and the frame ground (FG) terminal are wired to each other internally. Be sure to connect the FG terminal to the ground.

(chapter 3, page 3-8)

NOTICE

- Electrically insulate the mount base from the enclosure. To assure this, do not remove the insulating sheet from the mount base.
- The LG is a ground terminal for power supply noise. The FG and SHD are ground terminals for the noise in the communication module and other external interface lines. To avoid interference between the ground terminals, separately ground the LG and FG.
- To avoid noise-induced malfunction, do not bundle the 100 VAC/100 VDC wiring and network cable together, but route them at least 100 mm away from each other.

(chapter 4, page 4-3)

NOTICE

- Do not set the MAIN/SUB selector switch to 2 to F. Switch setting to 2 to 4 may render the module inoperable or destroy transfer data (G000 to GFFF).
- Switch off the power supply before operating any switches. Operating switches with the power supply switched on may cause the module to fail.

(chapter 4, page 4-3)

NOTICE

Switch off the power supply before operating any switches. Operating switches with the power supply switched on may cause the module to fail.

(chapter 4, page 4-7)

NOTICE

Do not transfer the system program. If the system program is transferred, the built-in program in the CPU link module may get out of control, causing invalid data to be transmitted or CPU internal memory to be altered. If the system program is transferred by mistake, reset the CPU module for recovery.

(chapter 4, page 4-17)

NOTICE

Before installing the S10mini CPU link system, be sure to exit all the currently open Windows®-based programs. Do not forget to exit anti-virus software and other memory-resident programs. If you install the CPU link system without exiting such programs, an error may occur during installation. If such an error occurs, first uninstall the CPU link system as directed in “4.8.2 Uninstalling,” exit all the Windows®-based programs, and then install the S10mini CPU link system again.

(chapter 4, page 4-19)

NOTICE

- The S10V basic system is required for operating the S10V CPU link system. If it is not installed, you cannot install the S10V CPU link system.
- Before installing the S10V CPU link system, be sure to exit all the currently open Windows®-based programs. Do not forget to exit anti-virus software and other memory-resident programs. If you install the CPU link system without exiting such programs, an error may occur during installation. If such an error occurs, first uninstall the S10V CPU link system as directed in “4.8.2 Uninstalling,” exit all the Windows®-based programs, and then install the S10V CPU link system again.

(chapter 4, page 4-19)

NOTICE

- If Windows® opens a window during the uninstall process to display the question “Remove Shared File?,” click the button to retain shared files.
- When you want to reinstall the CPU LINK System, be sure to perform an uninstall and then perform an install.

(chapter 4, page 4-22)

NOTICE

The S10mini and S10V Series does not support GPIB. Do not select GPIB on the communication type selection window.

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WARRANTY AND SERVICING

Unless a special warranty contract has been arranged, the following warranty is applicable to this product.

1. Warranty period and scope

Warranty period

The warranty period for this product is for one year after the product has been delivered to the specified delivery site.

Scope

If a malfunction should occur during the above warranty period while using this product under normal product specification conditions as described in this manual, please deliver the malfunctioning part of the product to the dealer or Hitachi Engineering & Services Co., Ltd. The malfunctioning part will be replaced or repaired free of charge. If the malfunctioning is shipped, however, the shipment charge and packaging expenses must be paid for by the customer.

This warranty is not applicable if any of the following are true.

- The malfunction was caused by handling or use of the product in a manner not specified in the product specifications.
- The malfunction was caused by a unit other than that which was delivered.
- The malfunction was caused by modifications or repairs made by a vendor other than the vendor that delivered the unit.
- The malfunction was caused by a relay or other consumable which has passed the end of its service life.
- The malfunction was caused by a disaster, natural or otherwise, for which the vendor is not responsible.

The warranty mentioned here means the warranty for the individual product that is delivered. Therefore, we cannot be held responsible for any losses or lost profits that result from the operation of this product or from malfunctions of this product. This warranty is valid only in Japan and is not transferable.

2. Range of services

The price of the delivered product does not include on-site servicing fees by engineers. Extra fees will be charged for the following:

- Instruction for installation and adjustments, and witnessing trial operations.
- Inspections, maintenance and adjustments.
- Technical instruction, technical training and training schools.
- Examinations and repairs after the warranty period is concluded.
- Even if the warranty is valid, examination of malfunctions that are caused by reasons outside the above warranty scope.

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This manual provides information on the following hardware and program products:

<Hardware product>

CPU LINK (LQE550)

<Program products>

S-7890-01, S10 Tools SYSTEM, 07-13

S-7890-02, LADDER CHART SYSTEM, 07-13

S-7890-22, CPU LINK SYSTEM, 07-01

S-7895-22, S10V CPU LINK SYSTEM, 01-03

Revision record

Revision No.	Revision record (revision details and reason for revision)	Month, Year	Remarks
A	First edition	October 2002	
C	Replacing or adding on the module is newly added.	September 2008	
D	Offline editing functionality is newly added and safety precautions are revised.	February 2011	
E	<ul style="list-style-type: none">• All the safety precautions and instructions in this manual have been reviewed and necessary changes are added to them.• Windows® 7 (32-bit) operating system is newly supported.	December 2012	

In addition to the above changes, all the unclear descriptions and typographical errors found are also corrected without prior notice.

PREFACE

Thank you for purchasing the CPU link module, which is an option for use with the S10mini/S10V. This manual, named “USER’S MANUAL OPTION CPU LINK,” describes how to use the CPU link module. For proper use of the CPU link module, it is requested that you thoroughly read this manual.

The term “CPU” used in this manual refers to the S10mini’s CPU and S10V’s LPU.

The S10mini and S10V products are available in two types: standard model and environmentally resistant model. The environmentally resistant model has thicker platings and coatings than those for the standard model.

The model number of the environmentally resistant model is marked by adding the suffix “-Z” to the model number of the standard model.

(Example) Standard model: LQE550

Environmentally resistant model: LQE550-Z

This manual is applicable to both the standard model and environmentally resistant models. Although the descriptions contained in this manual are based on the standard model, follow the instructions set forth in this manual for proper use of the product even if you use the environmentally resistant model.

<Trademarks>

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<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) = 1,024 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) = 1,000 bytes

1 MB (megabyte) = 1,000² bytes

1 GB (gigabyte) = 1,000³ bytes

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1 SPECIFICATIONS

1 SPECIFICATIONS

1.1 Use

The CPU link module (Model LQE550) is a communications module that provides inter-CPU data exchange.

When this module (Model LQE550) is used with the S10mini's CPU unit, it is allowed to coexist with the Model LQE050 CPU link module, which is specially designed for use with the S10mini (the LQE050 cannot be used with the S10V's LPU unit).

1.2 Specifications

Table 1-1 CPU Link Module Specification

Item		Specifications
Module type		LQE550
Number of CPU link modules mounted		S10mini: Up to 2/CPU (main link and sublink) S10V: Up to 2/LPU (main links and sublinks)
Number of CPUs linked		Up to 16/link line (main links and sublinks)
Data transfer area (*)		G000 to GFFF (4,096 locations)
Data output area		Up to 1,024 locations/unit (must be unique across all units)
Link cable	Total extension of up to 1 km	Characteristic impedance: 150 Ω (at 500 kHz) Attenuation: 8.5 dB/km (at 500 kHz) Recommended cable type: CO-EV-SX 1P×0.75 mm ² Hitachi Cable, Ltd. Terminal register: 150 Ω
		Characteristic impedance: 150 Ω (at 500 kHz) Attenuation: 7.8 dB/km (at 500 kHz) Recommended cable type: CO-EV-SB 1P×0.3 mm ² Hitachi Cable, Ltd. Terminal register: 150 Ω
	Total extension of up to 600 m	Characteristic impedance: 100 Ω (at 500 kHz) Attenuation: 12 dB/km (at 500 kHz) Recommended cable type: CO-SPEV-SB 1P×0.5 mm ² Hitachi Cable, Ltd. Terminal register: 100 Ω
	Total extension of up to 300 m	Characteristic impedance: 100 Ω (at 500 kHz) Attenuation: 17 dB/km (at 500 kHz) Recommended cable type: CO-SPEV-SB 1P×0.3 mm ² Hitachi Cable, Ltd. Terminal register: 100 Ω
Terminal block		18 points (M3 screws), connector type

(*) The main links and the sublinks share the data transfer area.

NOTICE

Use only one type of cable to wire each line. Use of different types of cable in a single CPU link line may cause invalid data to be transmitted or received or cause communication errors.

1.3 Connecting to a Preceding CPU Link Module

The CPU link module (LQE550) can be connected to preceding CPU link modules listed in Table 1-2.

Table 1-2 CPU Link Modules to Which the S10mini CPU Link Module can Connect

Series name	Module type
S10mini and S10V	LQE550
S10mini	LQE050
HITACHI S10/2 α	LWE020
HITACHI S10/4 α	LWE820
HITACHI S10/2	CPL350

1 SPECIFICATIONS

1.4 System Software Specifications

1.4.1 System overview

When you use the CPU link module, you must register various items of information in the module. Register the module information using the following system software (tools) and by performing operating procedures similar to those for general Windows®-based applications.

Table 1-3 Types of System Software (Tools)

Package name	Model		Supply style
	For S10mini	For S10V	
S10Tools system	S-7890-01	None	Optional
Ladder chart system	S-7890-02	None	Optional
CPU link system	S-7890-22	S-7895-22	Optional

1.4.2 Required hardware and software

The following hardware and software are required for the use of the CPU link system software:

(1) For S10mini

- Personal computer (main unit) containing a Pentium 133 MHz or faster CPU
- Personal computer (main unit) containing a Pentium 300 MHz or faster CPU (when Windows® 2000 or Windows® XP is used)
- Display having a resolution of 800 × 600 dots (SVGA) or higher
- Microsoft® Windows® 95 operating system, Microsoft® Windows® 98 operating system, Microsoft® Windows® 2000 operating system or Microsoft® Windows® XP operating system
- Microsoft® Internet Explorer 4.01 or later
- At least 32 MB of RAM
- At least 64 MB of RAM (when Windows® 2000 is used)
- At least 128 MB of RAM (when Windows® XP is used)
- At least 10 MB of free hard disk space
- Cable for connecting the personal computer to the CPU unit (RS-232C cross cable with D-sub 9-pin connectors) or cable for connecting the personal computer to the ET.NET module (10BASE-T twisted pair cross cable with RJ-45 modular connectors)

(2) For S10mini

- Personal computer (main unit) containing a Pentium 300 MHz or faster CPU, or a 1 GHz or faster CPU (when Windows® 7 (32-bit version) is used)
- Display having a resolution of 800 × 600 dots (SVGA) or higher
- Microsoft® Windows® 2000 operating system, Microsoft® Windows® XP operating system or Microsoft® Windows® 7 (32-bit) operating system
- At least 64 MB of RAM (when Windows® 2000 is used)
- At least 128 MB of RAM (when Windows® XP is used)
- At least 1 GB of RAM (when Windows® 7 (32-bit) is used)
- At least 10 MB of free hard disk space
- Cable for connecting the personal computer to the LPU unit (RS-232C cross cable with D-sub 9-pin connectors) or cable for connecting the personal computer to the CMU or ET.NET module (10BASE-T or 100BASE-T twisted pair cross cable with RJ-45 modular connectors)

NOTICE

Users of this product must have an adequate knowledge of the Windows® environment and user interface. This system conforms to the Windows® standard. This manual is prepared for users who are familiar with the basic Windows® operating procedures.

NOTICE

- If the software supplied by Hitachi is modified for use, Hitachi cannot be responsible for accidents or losses resulting from such modification.
- Hitachi cannot be responsible for reliability if you use software other than supplied from Hitachi.
- Back up files on a daily basis. You might lose the contents of files due, for instance, to a file unit failure, power failure during a file access, or operating error. To provide against such contingencies, back up files according to an appropriate plan.
- Before scrapping the product, ask a professional waste disposal dealer in charge of scrapping work.
- Do not use a transceiver, cellular phone, or similar device near the module because module malfunction or system failure may occur due to noise.
- The contents of the memory may become damaged due, for instance, to a module failure. Be sure to make a backup of important data.
- Before constructing a system, creating a program, or performing a similar procedure, thoroughly read this manual to become familiar with the contained instructions and precautions. If you perform any incorrect procedure, the system may malfunction.
- Store this manual at a predetermined place where it can readily be referred to whenever it is needed.
- If you have any doubt or question about the contents of this manual, contact your local source.
- Hitachi cannot be responsible for accidents or losses resulting from a customer's misuse.
- If an emergency stop circuit, interlock circuit, or similar circuit is to be formulated, it must be positioned external to this module. If you do not observe this precaution, equipment damage or accident may occur when this module becomes defective.

2 NAMES AND FUNCTIONS OF EACH PART

2 NAMES AND FUNCTIONS OF EACH PART

2.1 Names and Functions of Each Part

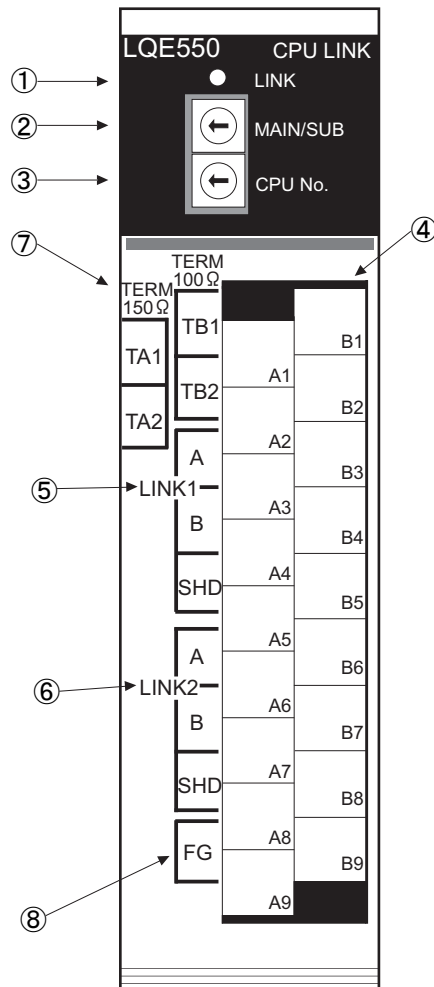


Figure 2-1 Names and Functions of Each Part



CAUTION

Switch off the power supply before making connections to the terminal block. Wiring with the power supply switched on may incur electrical shock hazards.

① LINK LED

Lights when data is transmitted over the line from the LQE550, regardless of the kind of the data.

② MAIN/SUB selector switch

In mounting two units of the LQE550 on a single unit, use this switch to specify to which they are connected, the main link or the sublink.

Table 2-1 lists the possible switch settings.

Table 2-1 MAIN/SUB Selector Switch Settings

Setting	Explanation
0	Main link
1	Sublink
2 to F	Unused

NOTICE

Do not set the MAIN/SUB selector switch to 2 to F. Switch setting to 2 to 4 may render the module inoperable or destroy transfer data (G000 to GFFF).

③ CPU number selector switch

Set a number between 0 to F to identify each CPU or LPU that is connected to the CPU link line.

The CPU number that is set here differs from the PCs number that is set with a special tool.

④ Terminal block

Used to connect ⑤ to ⑧ below. Houses removable connectors.

⑤ LINK1 line connection terminal

Connect the cable from the CPU or LPU in the preceding stage to this terminal.

LINK1 is internally wired to LINK2.

⑥ LINK2 line connection terminal

Connect the cable from the CPU or LPU in the next stage to this terminal.

LINK1 is internally wired to LINK1.

2 NAMES AND FUNCTIONS OF EACH PART

⑦ Terminating-resistor setup terminals

Used to terminate the modules at both ends of the line. The terminating resistance value depends on the characteristic impedance of the kind of cable used.

- Strap TA1 and TA2 together if a cable with a characteristic impedance of 150 Ω is used (leave TB1 and TB2 open).
- Strap TB1 and TB2 together if a cable with a characteristic impedance of 100 Ω is used (leave TA1 and TA2 open).

Verify the characteristic impedance of a cable by consulting “1.2 Specifications.”

Do not strap TA1 and TA2, and TB1 and TB2 together at the same time. Otherwise, successful communication may be disabled.

⑧ FG terminal

Connect the cable shield to this terminal.

The FG terminal is internally wired to the SHD terminals of LINK1 and LINK2.

For information on how to connect the FG terminal, see “3.3.3 Ground wiring.”

3 MOUNTING AND WIRING

3.1 Mount Base

This module can be mounted in the mount bases shown in Table 3-1.

Table 3-1 Mount Bases Applicable to the CPU Link Module

Series	Name	Model	Specifications
S10mini	2-slot mount base	HSC-1020	Power supply + CPU + 2 slots (option, for I/O)
	4-slot mount base	HSC-1040	Power supply + CPU + 4 slots (option, for I/O)
	8-slot mount base	HSC-1080	Power supply + CPU + 8 slots (option, for I/O)
S10V	4-slot mount base	HSC-1540	Power supply + LPU + 4 slots (option, for I/O)
	8-slot mount base	HSC-1580	Power supply + LPU + 8 slots (option, for I/O)

3.2 Mounting the Module

Mount the option module in option slots (slot number 0 through 7) on the mount base as shown below:

NOTICE

S10mini Series

- Mount the option module in option slots that is located to the immediate right of the CPU module. Be sure that no I/O module is mounted between this option module and CPU module. Also, ensure that there is no unoccupied slot between option modules.
- This module (LQE550) can be mounted together with the LQE050 CPU link module, which is specially designed for use with the S10mini.

S10V Series

- There are no specific rules about the mounting position or unoccupied slots.
- The LQE050 CPU link module cannot be used as it is specially designed for use with the S10mini.

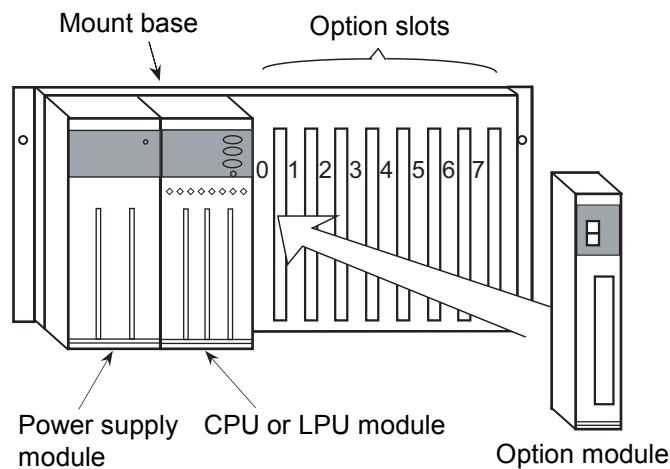


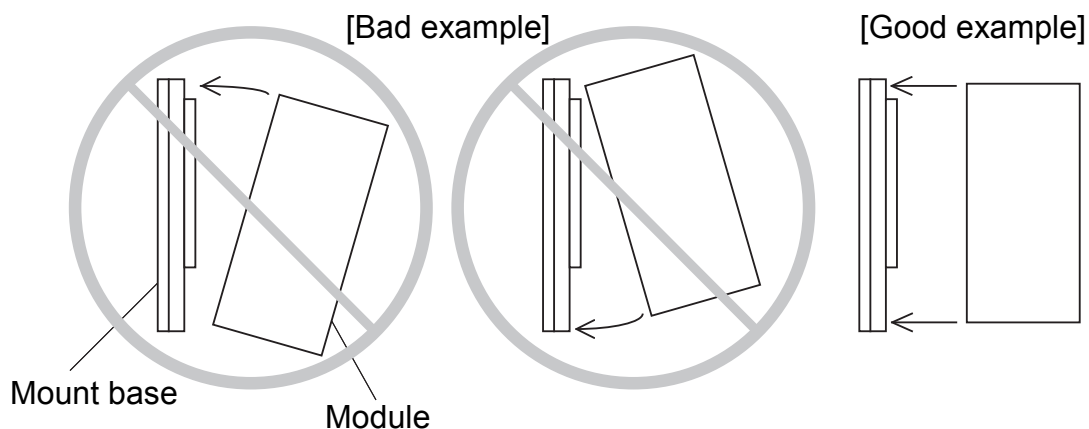
Figure 3-1 Mounting the Option Module

**CAUTION**

- If the module emits smoke or foreign odor, immediately switch off the power supply and investigate the problem cause.
- Do not perform any installation, wiring, handling, or internal modification procedures other than stated in this manual. In no event will Hitachi be responsible for personal injury or death or any damage to Hitachi's product or peripheral equipment arising out of the use of such an unauthorized procedure.
- While the power is applied, never touch a terminal strip or connector pin. If you touch a terminal strip or connector pin while the power is applied, you may receive an electric shock.

NOTICE

- Dust or other foreign matter might accumulate on the connector, resulting in poor contact. Immediately after the module is unpacked, perform the mounting and wiring procedures.
- To prevent the module from being damaged, observe the following precautions when you mount or demount the module:
 - Before mounting the module to the mount base connector, check that the connector pins are properly aligned and not bent, broken, or soiled with dirt or the like.
 - Ensure that the module is parallel to the mount base vertical surface as shown below when mounting. If you connect a module to or disconnect it from its connector while it is tilted, the connector pins may become damaged.
 - If the mount base is positioned overhead due to the employed enclosure structure, use a stepladder or the like and mount the module squarely. If you mount the module obliquely, the connector may become damaged.





CAUTION

- Observe the installation procedure stated in the manual.
If the module is improperly installed, it may drop, become defective, or malfunction.
- Do not allow wire cuttings or other foreign matter to enter the module.
The entry of foreign matter in the module may result in a fire or cause the module to become defective or malfunction.
- Static electricity may damage the module. Before starting the work, discharge all electrostatic charge from your body.
- Properly tighten the screws. If they are inadequately tightened, malfunction, smoke emission, or combustion may occur.
- Do not disassemble or modify the module. Failure to observe this precaution may result in a fire or cause the module to become defective or malfunction.

3.3 Wiring

3.3.1 Interface signals

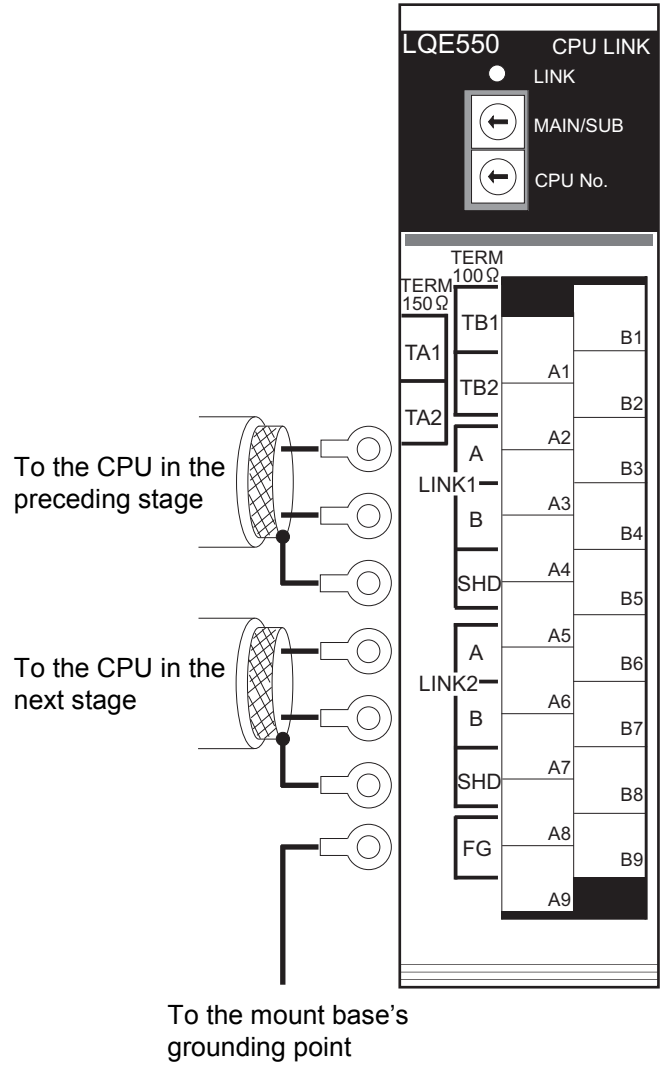


Figure 3-2 Wiring the Module

NOTICE

The shield ground (SHD) × 2 terminal and the frame ground (FG) terminal are wired to each other internally. Be sure to connect the FG terminal to the ground.

3 MOUNTING AND WIRING

3.3.2 Wiring interface signals

An example of typical wiring of the three units by CPU link modules (with cables having a characteristic impedance of $150\ \Omega$) is shown below.

This is a basic wiring practice. To replace the module without exiting the communication state, complete wiring as explained in “1.2.8 Note on replacing the module,” in “S10V WIRING MANUAL (manual number SVE-3-002).”

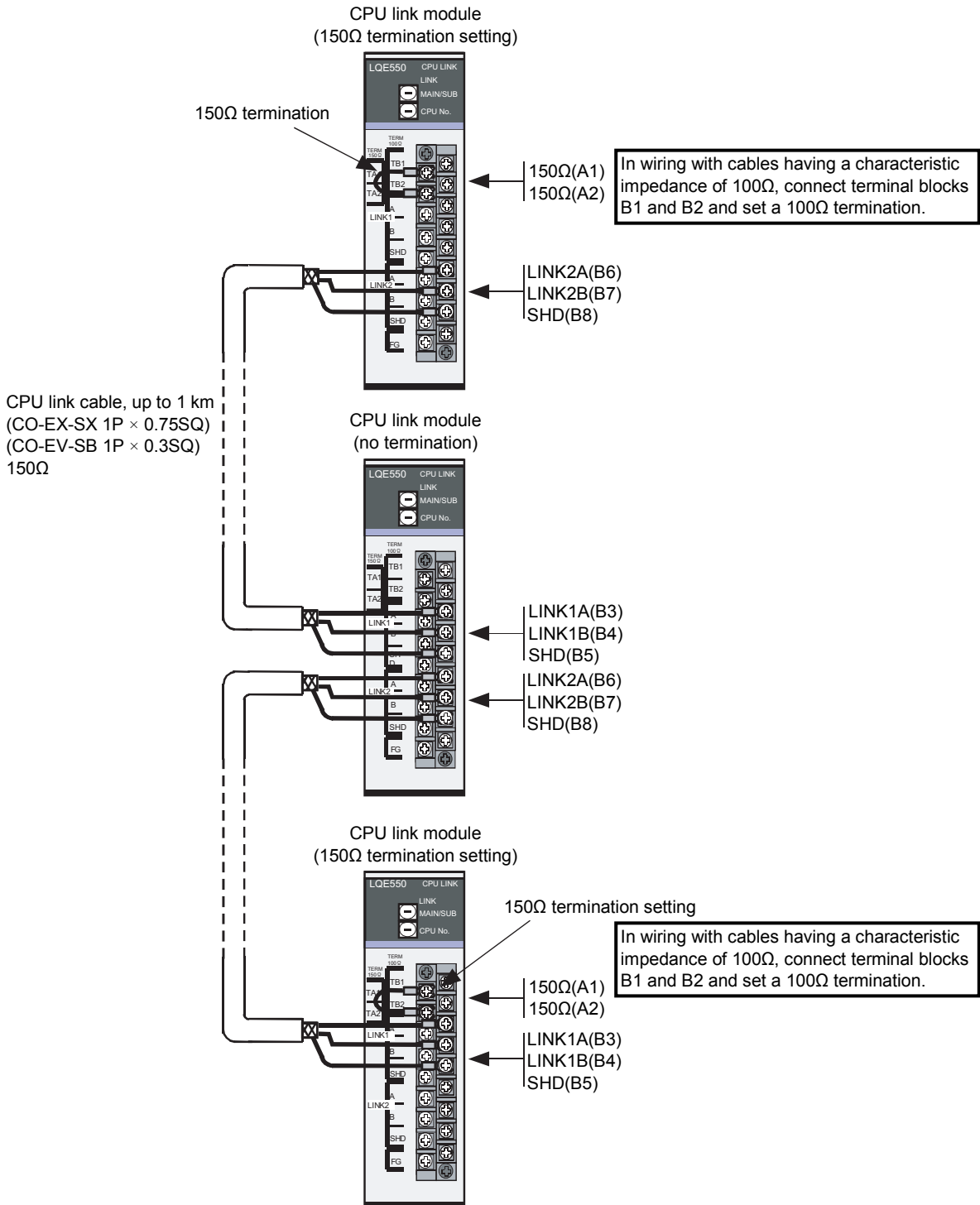


Figure 3-3 Wiring Interface Signals

3.3.3 Ground wiring

Carry out ground wiring as shown in Figure 3-4 by following these steps:

- ① Connect the FG terminals of the power supply module, CPU or LPU module and optional modules by crossover wiring to the mount base's grounding point, a hexagon nut fitted to the mount base FG terminal (with a wire diameter of 2.0 mm^2 or more).
- ② Wire the mount base FG terminal to the PC's unit grounding point of the enclosure in which the mount base is housed (with a wire diameter of 2.0 mm^2 or more).
- ③ Perform Class D grounding from the PC's unit grounding point of the enclosure using a wire with a wire diameter of 5.5 mm^2 or more.

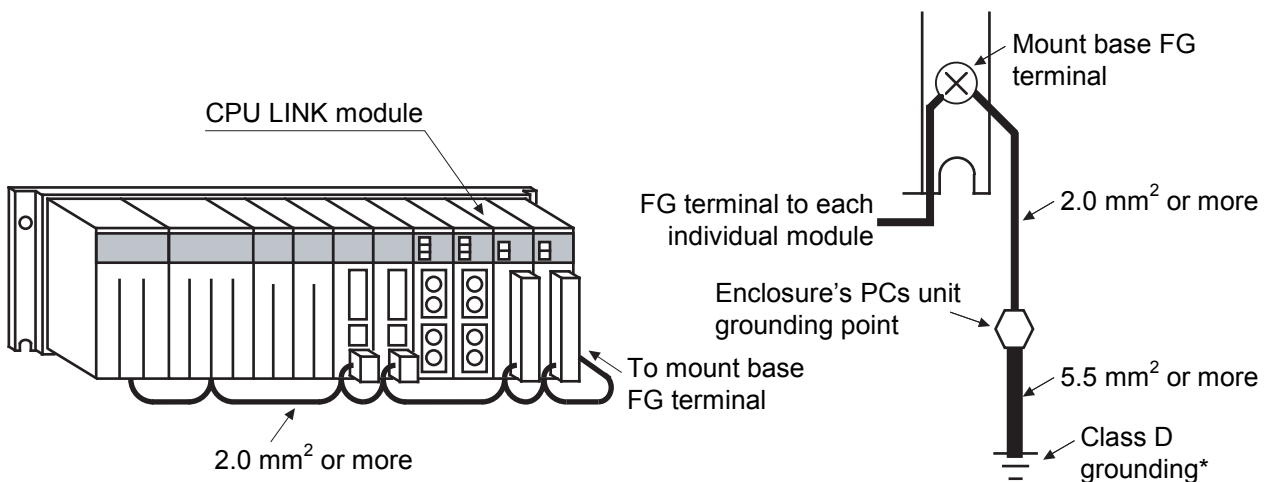


Figure 3-4 Ground Wiring

* 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.



DANGER

- Switch off the power supply before making connections to the terminal block. Wiring with the power supply switched on may incur electrical shock hazards.
- An electric shock may lead to a death or burn. Noise may cause the system to malfunction. Ground the line ground (LG), frame ground (FG), and shield wire (SHD) terminals.



WARNING

- If the module emits smoke or foreign odor, immediately switch off the power supply and investigate the problem cause.
- Do not perform any installation, wiring, handling, or internal modification procedures other than stated in this manual. In no event will Hitachi be responsible for personal injury or death or any damage to Hitachi's product or peripheral equipment arising out of the use of such an unauthorized procedure.
- While the power is applied, never touch a terminal strip or connector pin. If you touch a terminal strip or connector pin while the power is applied, you may receive an electric shock.

NOTICE

- Electrically insulate the mount base from the enclosure. To assure this, do not remove the insulating sheet from the mount base.
- The LG is a ground terminal for power supply noise. The FG and SHD are ground terminals for the noise in the communication module and other external interface lines. To avoid interference between the ground terminals, separately ground the LG and FG.
- To avoid noise-induced malfunction, do not bundle the 100 VAC/100 VDC wiring and network cable together, but route them at least 100 mm away from each other.

4 OPERATION

4.1 Startup Procedure

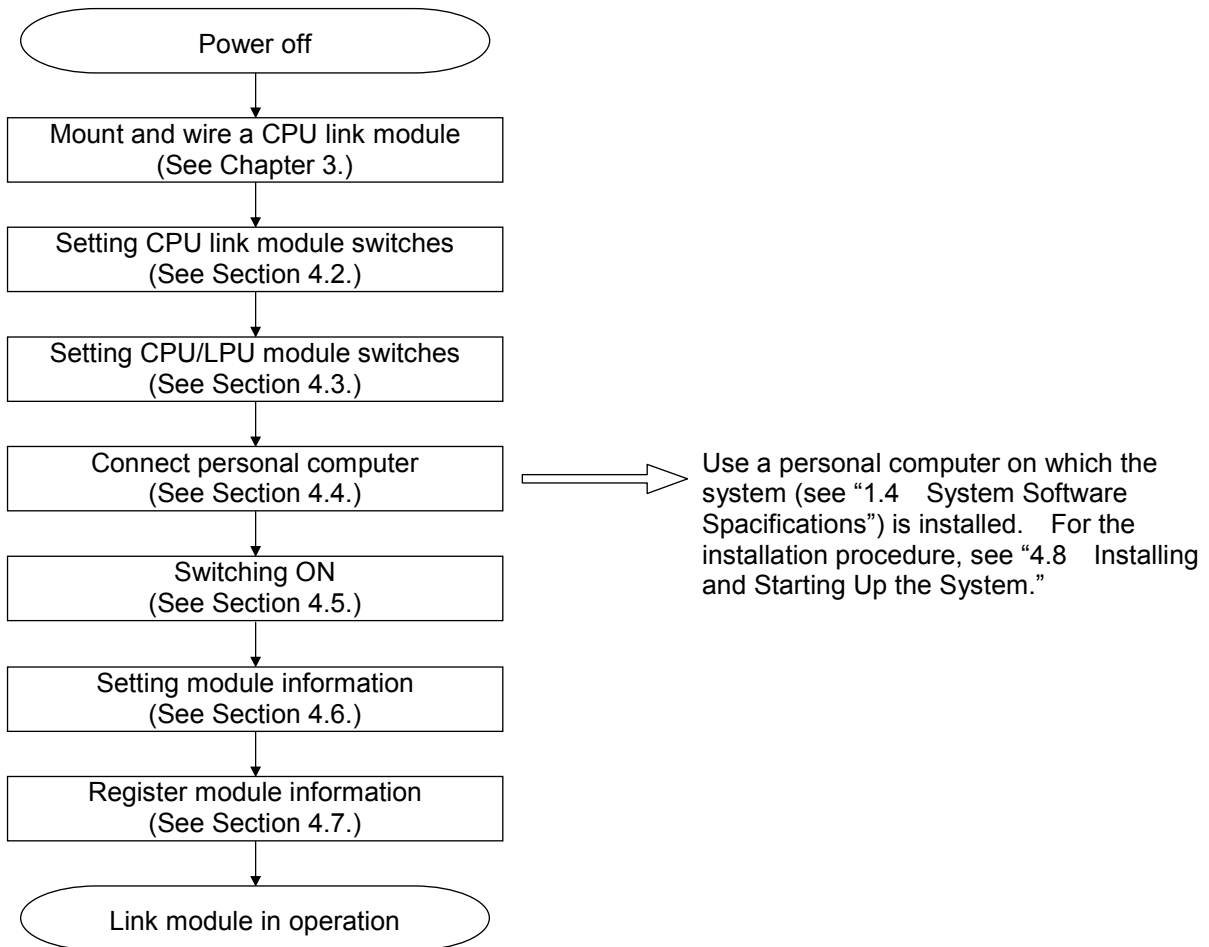


Figure 4-1 Startup Procedure

4.2 Setting CPU Link Module Switches

(1) MAIN/SUB selector switch

Two CPU link modules can be mounted on a single CPU or LPU, each being connected to a separate line.

Table 4-1 MAIN/SUB Selector Switch Settings

Number of units mounted	First	Second
One	“0” (main)	–
Two	“0” (main)	“1” (sub)

NOTICE

- Do not set the MAIN/SUB selector switch to 2 to F. Switch setting to 2 to 4 may render the module inoperable or destroy transfer data (G000 to GFFF).
- Switch off the power supply before operating any switches. Operating switches with the power supply switched on may cause the module to fail.

(2) CPU number selector switch

Set this selector switch to a number between 0 to F for each CPU or LPU that is connected to the CPU link line. The CPU number that is set here differs from the PC's number that is set with a special tool.

Ensure that the CPU link modules connected to the same line do not have their CPU numbers set in duplicate.

NOTICE

Switch off the power supply before operating any switches. Operating switches with the power supply switched on may cause the module to fail.

4.3 Setting CPU/LPU Module Switches

Set the CPU module or LPU module switches as indicated below:

- For CPU module
 - LADDER switch: STOP
 - MODE switch: NORM or SIMU
 - PROTECT switch: ON or OFF

- For LPU module
 - LADDER switch: STOP
 - RESET switch: OFF

4.4 Connect Personal Computer

Have on hand a personal computer on which the system is installed (see “4.8 Installing and Starting Up the System”). Connect this personal computer to the CPU unit or LPU unit.

4.5 Switching ON

Open the power supply module cover, and then switch on the power by placing the POWER switch in the ON position.

4.6 Setting Module Information

4.6.1 Setting up from the S10Tools system and ladder diagram system (S10mini only)

① Start the ladder diagram system

If the S10Tools system is used, start the ladder diagram system included with the S10Tools system. If the ladder system diagram is used, simply start it.

② Choose [Utility] on the toolbar, then [PCs edition] and [Change capacity ...] to see the [Change capacity] window open:

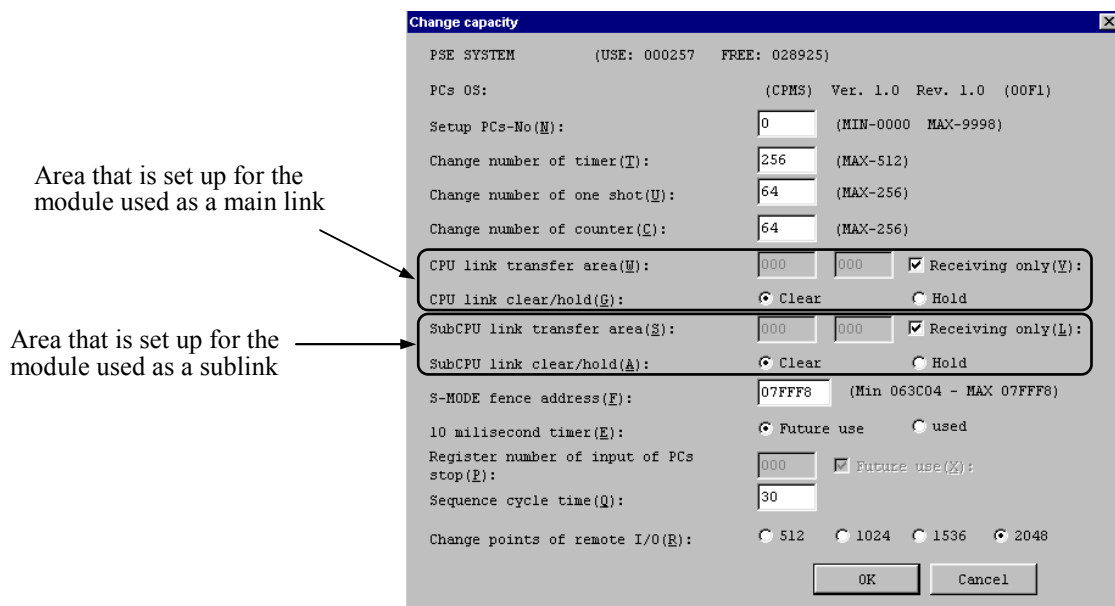


Figure 4-2 [Change capacity] window (Initial State)

4 OPERATION

③ Defaults

Transfer areas: None (Receiving only)

Hold/clear: Clear

(You can either “hold” or “clear” the associated G-register area when a reception timeout is detected. For details, see under “(4) Reception timeout” in “5.1 Transfer Cycle.”)

To change the settings, follow these instructions:

- To set a transfer area

Uncheck the “Receiving only” check box by clicking it and enter the starting address and the ending address into the left-side and right-side boxes of the transfer area, respectively. The G-register area (G000 to GFFF) is used for transfer. Enter the start address and end address values that are within the range of /000 to /FFF.

For details on the number and range of transfer words, see “5.1 Transfer Cycle.”

- To change the clear/hold setting to “Hold”

Click the [Hold] radio button.

Figure 4-3 shows a sample transfer area setting of G100 to G1FF, with a clear/hold setting of “Hold.”

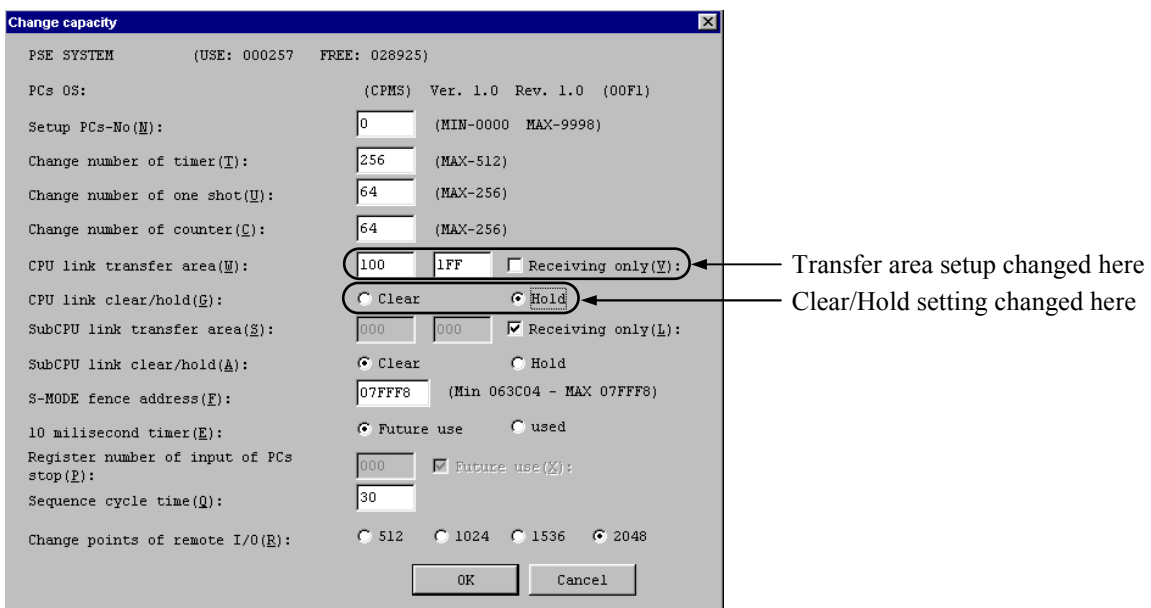


Figure 4-3 [Change capacity] Window (Updated)

- ④ Click the button.

The setup is now completed.

4.6.2 Setting up from the CPU link system

- ① The CPU link system, when started, opens the [CPU LINK SYSTEM] window. Do not click the **Transfer system program** button. The system program used to run the CPU link module is contained in the module itself.

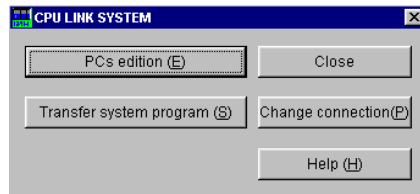


Figure 4-4 [CPU LINK SYSTEM] Window

NOTICE

Do not transfer the system program. If the system program is transferred, the built-in program in the CPU link module may get out of control, causing invalid data to be transmitted or CPU internal memory to be altered. If the system program is transferred by mistake, reset the CPU module for recovery.

- ② Click the **PCs edition** button to see the [PCs edition] window open:

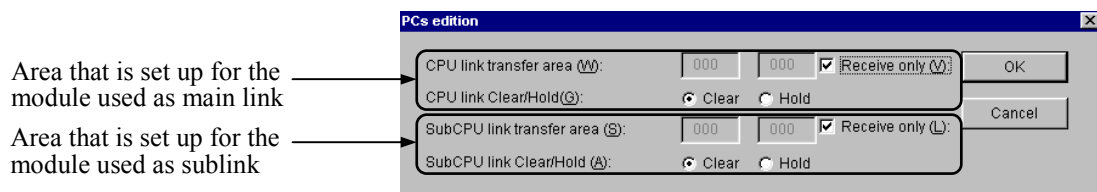


Figure 4-5 [PCs edition] Window (Initial State)

4 OPERATION

③ Defaults

Transfer area: None (Reception only)

Hold/clear: Clear

(You can either “hold” or “clear” the associated G-register area when a reception timeout is detected. For details, see under “(4) Reception timeout” in “5.1 Transfer Cycle.”)

To change the settings, follow these instructions:

- To set a transfer area

Uncheck the “Reception only” check box by clicking it and type the starting address and the ending address in the left-side and right-side boxes of the transfer area, respectively.

The G-register area (G000 to GFFF) is used for transfer. Enter the start address and end address values that are within the range of /000 to /FFF. The maximum number of data words (data points) that can be transferred at one time is 1024 (/400).

For details on the number and range of transfer words, see “5.1 Transfer Cycle.”

- To change the clear/hold setting to “Hold”

Click the [Hold] radio button.

Figure 4-6 shows a sample transfer area setting of G100 to G1FF, with a clear/hold setting of “Hold.”

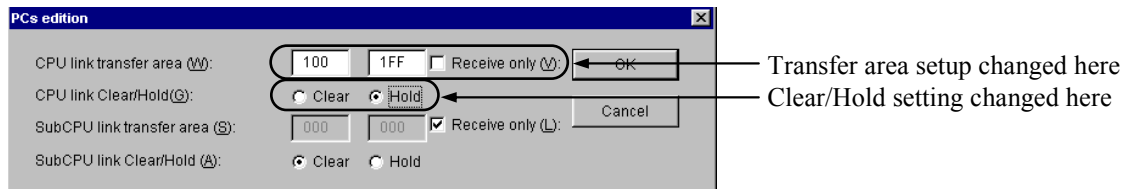


Figure 4-6 [PCs edition] Window (Updated)

- ④ Click the button to return to the window shown in ① and click the button.

The setup is now completed.

4.6.3 Setting parameters via the CPU link system (for S10V controllers)

The CPU link system for S10V controllers or, simply, the S10V CPU link system supports the setting and editing of parameters either in online mode or offline mode. It also supports both the printing of set parameters on a selected printer and their CSV(comma-separated values)-output to a specified file.

(1) Procedure for setting and editing parameters in online mode

- ① Start the CPU link system and make sure that the [[S10V] CPU LINK SYSTEM] window as shown below is displayed. As shown, the **PCs edition** and **PCs edition compare** buttons are unclickable. This indicates that at this moment no connection is established between the CPU link system and the programmable controller.

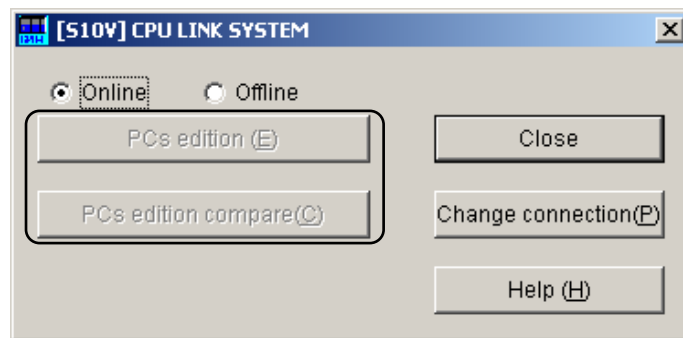


Figure 4-7 [[S10V] CPU LINK SYSTEM] Window (Initial State)

- ② Click on the **Change connection** button. The [Communication type] window as shown below will then appear. If you want to change the current connection with the programmable controller, specify the desired connection and click the **OK** button. (For details, see “4.8.4 Changing connection.”) If not, just click the **Cancel** button instead.

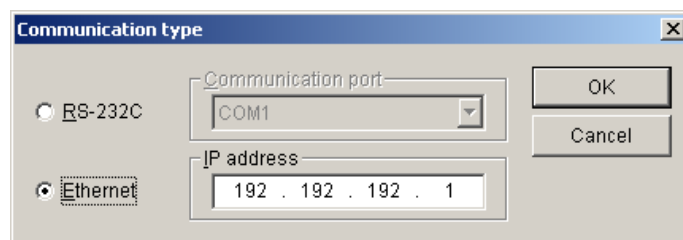


Figure 4-8 [Communication type] Window

4 OPERATION

Then, the [Communication type] window closes and both the **PCs edition** and **PCs edition compare** buttons become clickable as shown below.

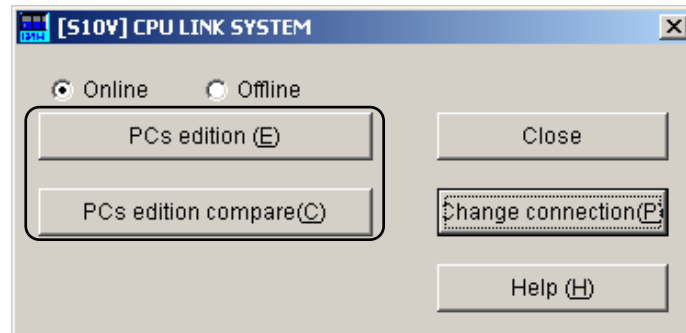


Figure 4-9 [[S10V] CPU LINK SYSTEM] Window after the Establishment of a Connection

- ③ Click the **PCs edition** button. The [[Online] PCs edition] window as shown below will then appear.

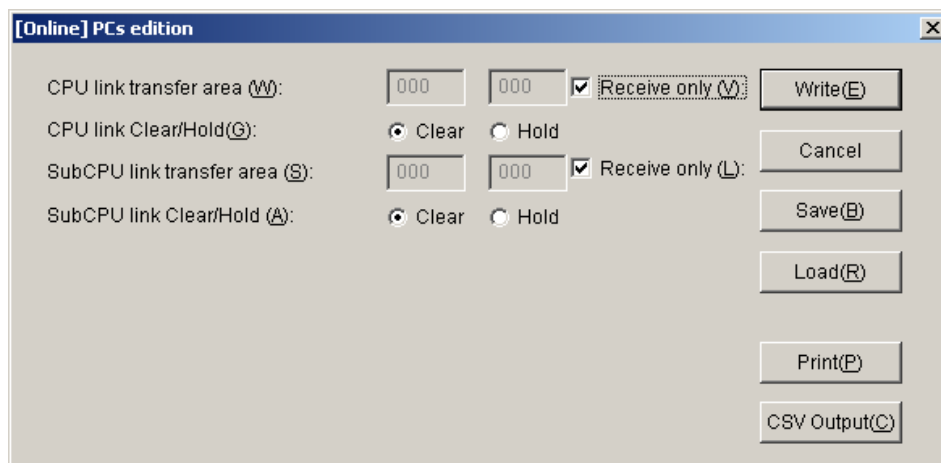


Figure 4-10 [[Online] PCs edition] Window (Initial State)

④ The PCs edition items' initial settings displayed are as follows:

Number of data words to be transferred at a time: None (for receive only)

Hold/Clear: Clear (This PCs edition item is used to determine whether to hold or clear the contents of the G-register area in the event of a reception timeout detected. For details, see “(4) Reception timeout” in “5.1 Transfer Cycle.”)

If you want to change these initial settings, do the following:

- Changing the number of data words to be transferred at a time

The number of data words to be transferred at a time (“CPU link transfer area”) can be changed by performing the following steps: 1) Click the “Receive only” check box to deselect it and 2) specify the starting address and ending address of the transfer area in the left edit box and the right edit box, respectively, within the transfer-area setup field. The transfer of data words is performed using the G-register area (G000 through GFFF), so the starting and ending addresses need to be specified in the range /000 to /FFF. The maximum number of data words (data points) that can be transferred at one time is 1024 (/400). For more information on the number of data words to be transferred at a time and their range, see “5.1 Transfer Cycle.”

- Changing the “Clear” setting to “Hold”

To change the “Clear” setting to “Hold”, just click the [Hold] radio button in the window.

Figure 4-11 shows an example in which the starting and ending addresses are set to /100 and /1FF, respectively, with “Clear” selected.

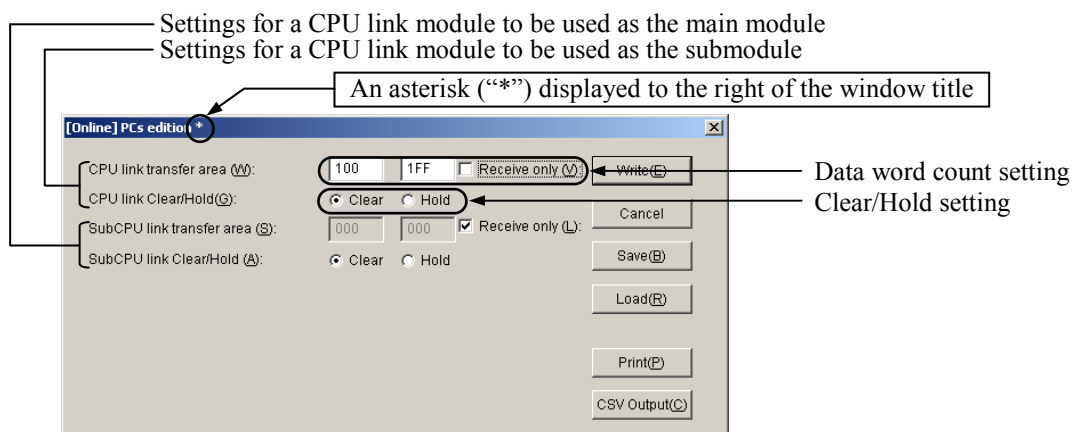


Figure 4-11 [[Online] PCs edition] Window (Updated)

As shown above, an asterisk (“*”) will be displayed to the right of the [[Online] PCs edition] window’s title when you add a change to the existing parameter values in the window.

4 OPERATION

- Click the **Write** button in the window if you want to write the specified parameter values to the programmable controller. When the write operation is completed, the **[[S10V] CPU LINK SYSTEM]** window will become active again. In this case, click the **Close** button.

If you do not want to write them to the above-mentioned destination, just click the **Cancel** button instead.

The procedure for setting and editing parameters in online mode is now complete.

(2) Procedure for setting and editing parameters in offline mode

- Display the **[[S10V] CPU LINK SYSTEM]** window on-screen by starting the S10V CPU link system and click the **[Offline]** radio button in the window. The **Change connection** button will then change into the **Edition file select** button, as shown below.

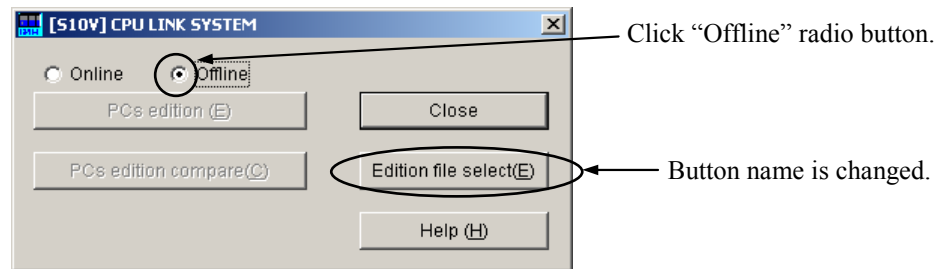


Figure 4-12 Clicking the [Offline] Radio Button

- ② Click the **Edition file select** button in the window. The [Open] window as shown below will then appear.

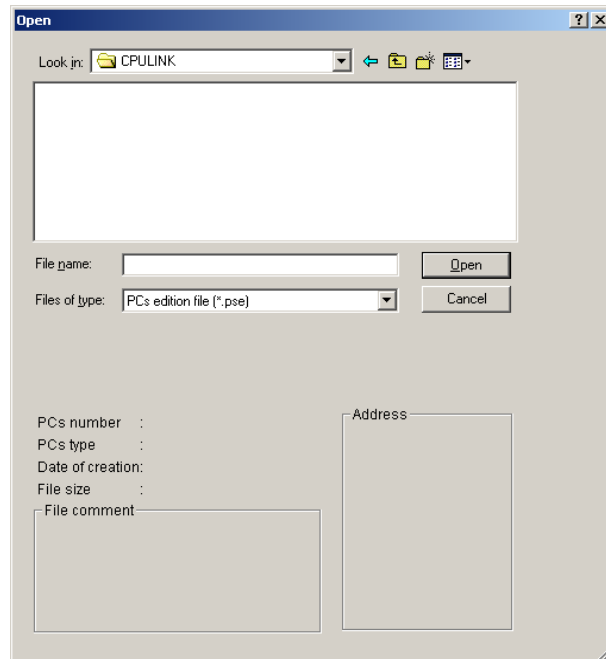


Figure 4-13 [Open] Window

<Creating a parameter file>

If you want to create a new CPU link parameter file, perform the following series of actions: 1) select the desired place in which to save the created file; 2) enter a unique file name (*); and 3) click the **Open** button. A confirmation dialog box as shown below will then appear. Click the **Yes** button.

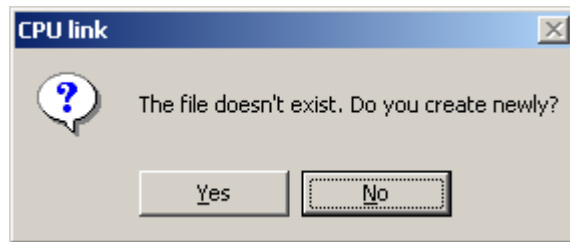


Figure 4-14 A Confirmation Dialog Box for Creating a Parameter File

(*) Care must be taken when you specify a file name. If a specified file name is already existent in the selected place, you are supposed to edit the existing parameter file. In this case, click the **No** button (default setting) in the confirmation dialog box, in order not to create a new parameter file.

<Editing an existing parameter file>

If you want to edit an existing CPU link parameter file, perform the following series of actions: 1) select the folder in which the parameter file is stored; 2) select the parameter file; and 3) click the **Open** button.

- ③ The **[[S10V] CPU LINK SYSTEM]** window becomes active again. Click the **PCs edition** button as shown below.

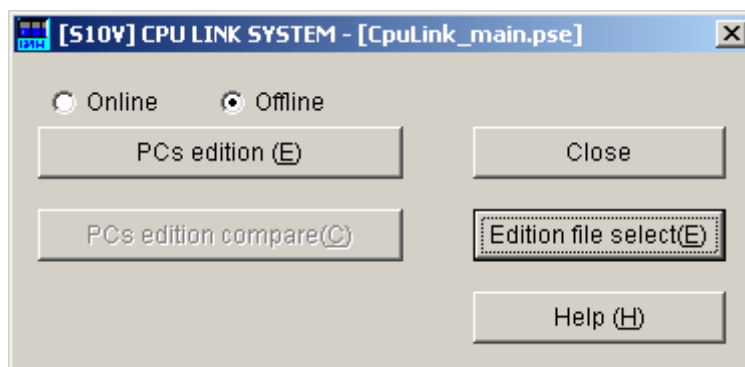


Figure 4-15 **[[S10V] CPU LINK SYSTEM]** Window

④ The [[Offline] PCs edition] window as shown below will appear.

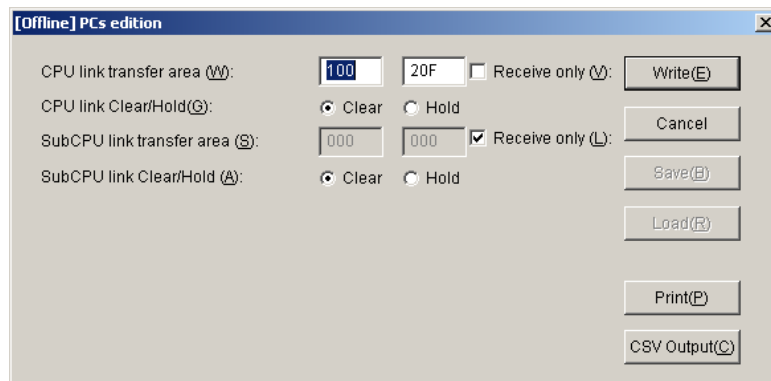


Figure 4-16 [[Offline] PCs edition] Window

In this window, add the desired changes to the existing parameter settings (see Step ④ in “(1) Procedure for setting and editing parameters in online mode” for details) and then click the **Write** button. All of the specified parameter values will then be saved to the desired file (which was specified or selected in Step ②) if they are all error-free; otherwise, they will not, in which case an error message will be displayed.

If an error message is displayed, remove the cause of the error and then click the **Write** button again.

If you want to exit this command without saving the specified parameter values, just click the **Cancel** button instead. An exit confirmation dialog box will then appear. If you click the **Yes** button, the [[S10V] CPU LINK SYSTEM] window will become active again.

If you click the **No** button instead of [Yes], the [[Offline] PCs edition] window will become active again.

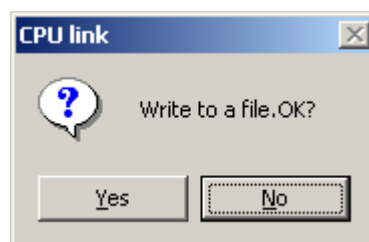


Figure 4-17 An Exit Confirmation Dialog Box

4.7 Register Module Information

Set the CPU module LADDER switch from STOP to RUN to start data transmission. The state of transmission in progress can be verified by viewing the LINK LED light on the CPU link module's front-panel.

- For the location of the LINK LED, see “2.1 Names and Functions of Each Part.”
- RUN has two modes of operation: normal (NORM) and simulation (SIMU) (use the CPU module's MODE switch to perform setup for the S10mini). Either mode setting enables the CPU link module to transmit.

The settings entered in “4.6 Setting Module Information” are loaded into the CPU (or LPU) link module when the LADDER switch is set from STOP to RUN or when the CPU is reset. Whenever a new setting is made (or the existing setting is changed), be sure to set the LADDER switch from STOP to RUN or reset the CPU (or LPU).

4.8 Installing and Starting Up the System

4.8.1 Installing

(1) Installing the S10mini CPU link system

To install the S10mini CPU link, you must execute the setup program that is stored in the DISK1 folder on the S10mini CPU link system CD.

Double-click “setup.exe” that is stored in the DISK1 folder on the “S10mini CPU link system CD.” Since no window opens upon completion of installation, attach a shortcut to the desktop as needed.

Click the button and choose [(All) Programs] – [Hitachi S10] – [CPU LINK SYSTEM] – [CPU LINK SYSTEM] from the [Start] menu on the Windows® screen. Click and hold the right mouse button on the [CPU LINK SYSTEM] and move the pointer to the desktop. Then, choose [Copy Here] from the pop-up menu.

NOTICE

Before installing the S10mini CPU link system, be sure to exit all the currently open Windows®-based programs. Do not forget to exit anti-virus software and other memory-resident programs. If you install the CPU link system without exiting such programs, an error may occur during installation. If such an error occurs, first uninstall the CPU link system as directed in “4.8.2 Uninstalling,” exit all the Windows®-based programs, and then install the S10mini CPU link system again.

(2) Installing the S10V CPU link system

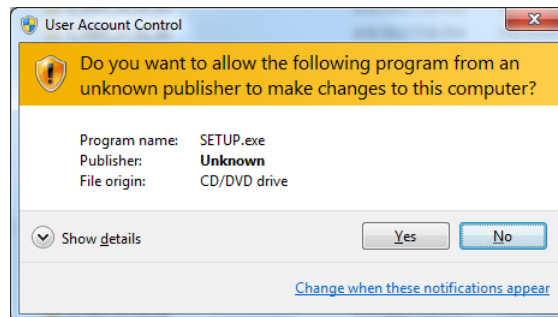
To install the S10V CPU link system, you must execute the setup program that is stored in the S10V CPU link system DISK1 folder on the CD.

Double-click “setup.exe” that is stored in the DISK1 folder on the S10V CPU link system CD. Since no window opens upon completion of installation, attach a shortcut to the desktop as needed.

Click the button and choose [(All) Programs] – [Hitachi S10V] – [S10V CPU LINK SYSTEM] – [S10V CPU LINK SYSTEM] from the [Start] menu on the Windows® screen. Click and hold the right mouse button on the [S10V CPU LINK SYSTEM] and move the pointer to the desktop. Then, choose [Copy Here] from the pop-up menu.

<Notes on installing in Windows® 7 (32-bit)>

Installing the S10V CPU LINK system in Windows® 7 (32-bit) operating system requires prior logging onto the operating system with an appropriate Administrator account, which is the Administrator account first created in the initial condition of your personal computer. When you have so logged on, you can then double-click “setup.exe” that is stored in the DISK 1 folder on the S10V CPU LINK System CD. When “setup.exe” is started, the dialog box as shown below will appear. Click the button to continue the execution of the setup program.



The S10V CPU LINK system cannot be installed on a per-user basis. To install the S10V CPU LINK system successfully, the user must first log onto the operating system with an appropriate Administrator account, which is the Administrator account first created in the initial condition of your personal computer.

The S10V CPU LINK system may not be installed properly in any of the following cases: 1) administrator permission is acquired by using User Account Control(*) with a standard user account and 2) logon is made with an Administrator account that has been created using User Account Control with a standard user account. If you make a logon with a user account that is different from the one you have used for the installation of the S10V CPU LINK system, the installed program may be missing from the program menu displayed. In this case, you should perform the following series of steps: 1) make a logon again with the Administrator account first created in the initial condition of your personal computer; 2) uninstall the installed program; and 3) install the program again. When you want to create a new account, be sure to make a logon with an Administrator account. Do not use User Account Control at that time.

(*) User Account Control is a Microsoft Windows feature that temporarily grants administrative rights to standard user accounts.

A message reporting a read-only file detected may be displayed during the reinstallation of the S10V CPU LINK system. In this case, click the button to set off overwriting.

NOTICE

- The S10V basic system is required for operating the S10V CPU link system. If it is not installed, you cannot install the S10V CPU link system.
- Before installing the S10V CPU link system, be sure to exit all the currently open Windows®-based programs. Do not forget to exit anti-virus software and other memory-resident programs. If you install the CPU link system without exiting such programs, an error may occur during installation. If such an error occurs, first uninstall the S10V CPU link system as directed in “4.8.2 Uninstalling,” exit all the Windows®-based programs, and then install the S10V CPU link system again.

4.8.2 Uninstalling

The existing S10V CPU LINK system needs to be uninstalled when, for instance, you want to upgrade it. The procedure required for uninstalling it is as follows:

(1) Uninstalling from Windows® 2000

Click on button on your Windows desktop and choose [Settings] – [Control Panel]. When the Control Panel opens, double-click on [Add/Remove Programs]. Then, choose “CPU LINK SYSTEM” (for S10mini controllers) or “S10V CPU LINK SYSTEM” (for S10V controllers) in the [Change or Remove Programs] tab and click the button. When the [Confirm File Deletion] dialog box appears, click the button.

(2) Uninstalling from Windows® XP

Click on button on your Windows desktop and choose ([Settings] –) [Control Panel]. When the Control Panel opens, double-click on [Add/Remove Programs]. Then, choose “CPU LINK SYSTEM” (for S10mini controllers) or “S10V CPU LINK SYSTEM” (for S10V controllers) in the [Change or Remove Programs] tab and click the button. When the [Confirm File Deletion] dialog box appears, click the button.

(3) Uninstalling from Windows® 7 (32-bit) -- for S10V controllers only

Click on button on your Windows desktop and choose [Control Panel]. When the Control Panel opens, click [Programs and features]. Then, select “S10V CPU LINK SYSTEM” and click button. When the [Confirm File Deletion] dialog box appears, click the button.

NOTICE

- If Windows® opens a window during the uninstall process to display the question “Remove Shared File?,” click the button to retain shared files.
- When you want to reinstall the CPU LINK System, be sure to perform an uninstall and then perform an install.

4 OPERATION

4.8.3 Starting up the system

To start up the CPU link system, perform the following procedure:

- ① While the Windows® desktop is displayed, double-click the mouse on the [CPU LINK SYSTEM] icon for S10mini or [S10V CPU LINK SYSTEM] icon for S10V. Or select **Start** button – [(All) Programs] – [CPU LINK System] – [CPU LINK System] for S10mini. Select **Start** button – [(All) Programs] – [Hitachi S10V] – [S10V CPU LINK System] – [S10V CPU LINK System] for S10V.
- ② When the [CPU LINK SYSTEM] for the S10mini or [[S10V] CPU LINK SYSTEM] window then opens, click the button for a desired command.

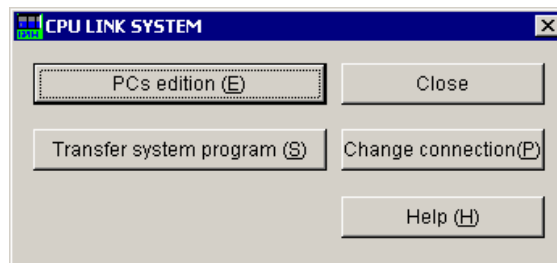


Figure 4-18 [CPU LINK SYSTEM] Window

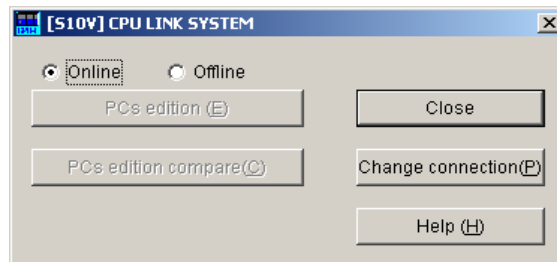


Figure 4-19 [[S10V] CPU LINK SYSTEM] Window

4.8.4 Changing connection

Function: Sets the PCs-to-personal computer communication type.

Procedure: The procedure is described below.

- ① In the [CPU LINK SYSTEM] or [[S10V] CPU LINK SYSTEM] window, click the Change connection button.
- ② The “Communication type” window then opens (the [S10V] CPU LINK SYSTEM does not have a GPIB button).

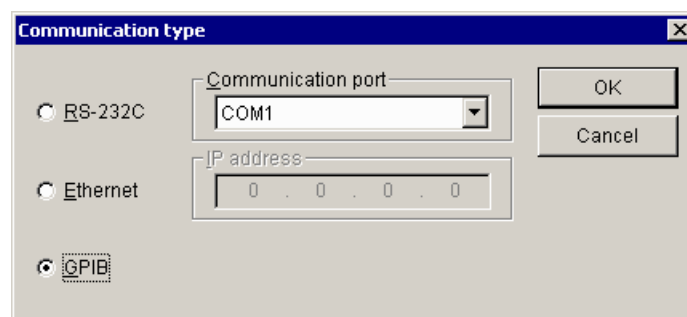


Figure 4-20 [Communication type] Window

- ③ For RS-232C communication, click “RS-232C” and then select a communication port. One of the four ports “COM1” through “COM4” is selectable. The default is “COM1”.

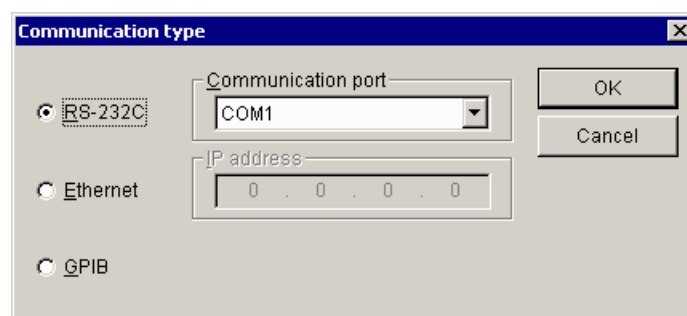


Figure 4-21 [Communication type] Window (Select RS-232C)

4 OPERATION

- ④ For Ethernet communication, click “Ethernet” and then enter the connection destination “IP address.”

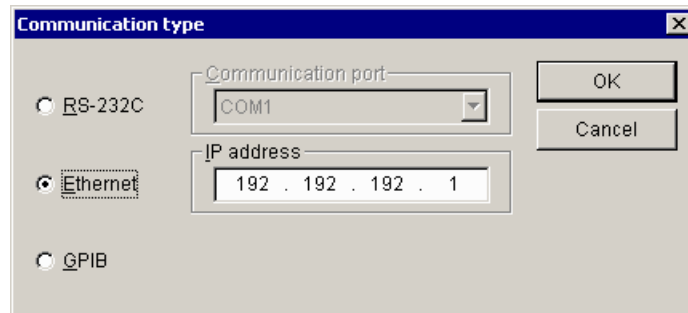


Figure 4-22 [Communication type] Window (Select Ethernet)

NOTICE

The S10mini and S10V Series does not support GPIB. Do not select GPIB on the communication type selection window.

- ⑤ After completion of setup, click the **OK** button. To abort the setup process, click the **Cancel** button.

4.8.5 Saving CPU link parameters in file (for S10V controllers only)

Function: Saves the displayed CPU link parameters in a specified file. (This feature is supported only by Ver-Rev 01-02 or later of the S10V CPU link system and can be used only in online mode.)

Operation: The procedure used is described below.

- ① In the [[Online] PCs edition] window displayed as shown below, click the **Save** button.

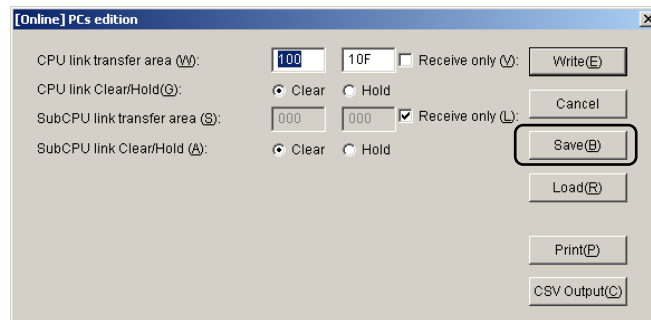


Figure 4-23 [[Online] PCs edition] Window and Clicking the **Save** Button

The [Save As] window will then appear if the range of storage specified by parameters is error-free. If not, an error message will be displayed instead. In this case, remove the cause of the error and click the **Save** button again.

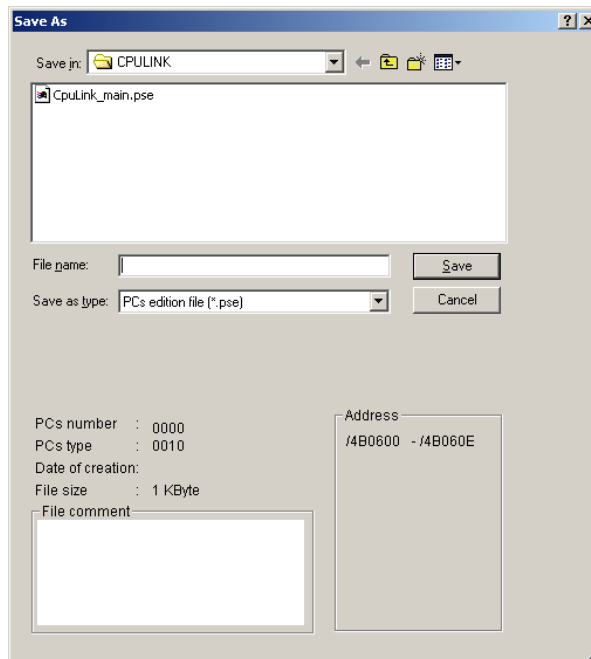


Figure 4-24 [Save As] Window

4 OPERATION

- ② Select the directory in which to store the saved file, and specify its file name. A file comment is optional, which is a string of up to 128 characters.
- ③ Click the button. The parameters displayed in the [[Online] PCs edition] window will then be saved in the specified file if its file name is unique in the specified directory. If a file with the same file name is already existent in that directory, an overwrite-save confirmation dialog box will appear that asks you whether or not to overwrite the existing file with the new parameter values.

4.8.6 Loading CPU link parameters in from file (for S10V controllers only)

Function: Loads the contents of a selected CPU link parameter file into the [[Online] PCs edition] window, thus enabling you to write them to the S10V controller. (This feature is supported only by Ver-Rev 01-02 or later of the S10V CPU link system and can be used only in online mode.)

Operation: The procedure used is described below.

- ① In the [[Online] PCs edition] window displayed as shown below, click the **Load** button.

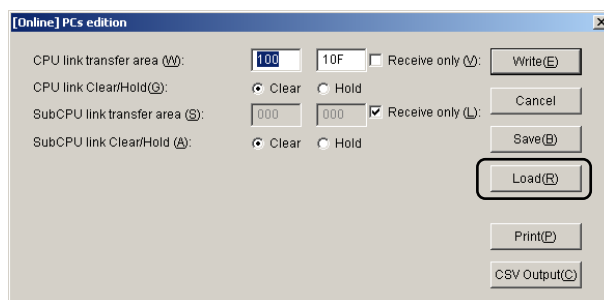


Figure 4-25 [[Online] PCs edition] Window and Clicking the **Load** Button

The [Open] window as shown below will then appear.

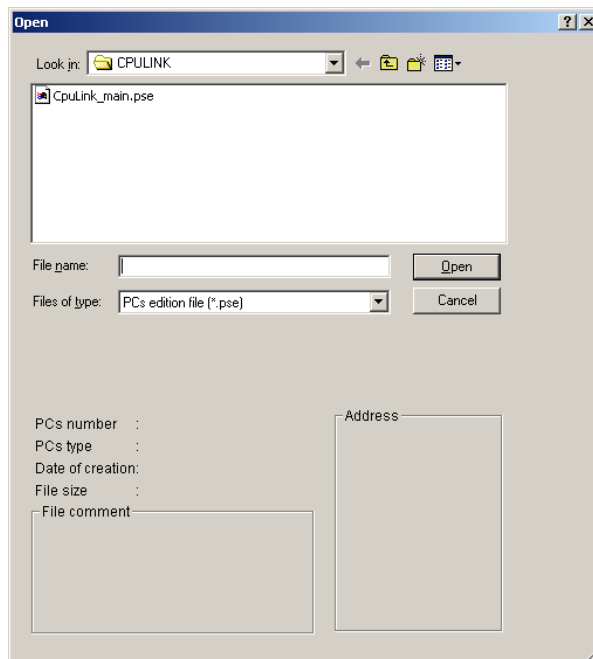


Figure 4-26 [Open] Window

4 OPERATION

- ② Select the directory in which the desired CPU link parameter file is stored, and specify its file name. Then, click the button.

The contents of the specified file will then be displayed in the [[Online] PCs edition] window if it is a CPU link parameter file. If not, an error message will be displayed. In this case, the [[Online] PCs edition] window remains unchanged.

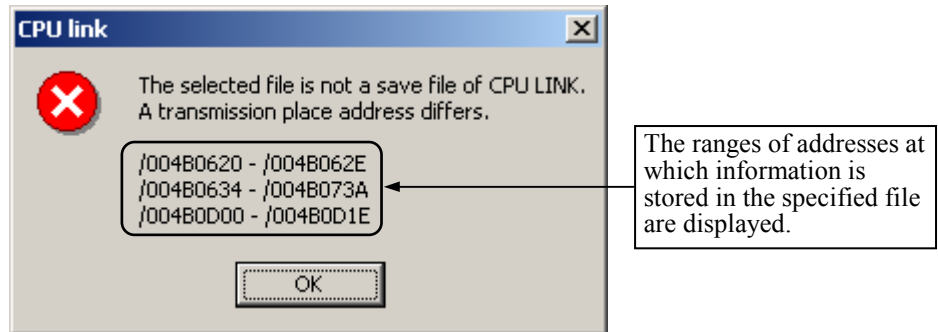


Figure 4-27 An Error Message

4.8.7 Printing CPU link parameters (for S10V controllers only)

Function: Prints the displayed CPU link parameters on a specified printer. (This feature is supported only by Ver-Rev 01-02 or later of the S10V CPU link system.)

Operation: The procedure used is described below.

- ① Establish a connection with the programmable controller (see “(1) Procedure for setting and editing parameters in online mode” in Subsection 4.6.3) if the CPU link system is running in online mode. If it is running in offline mode, select the desired parameter file (see “(2) Procedure for setting and editing parameters in offline mode” in Subsection 4.6.3).
- ② Click the **Print** button in the [PCs edition] window as shown below.

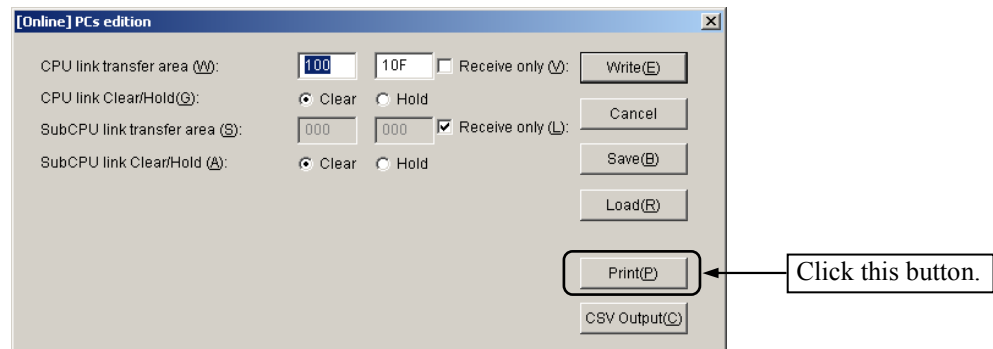


Figure 4-28 [PCs edition] Window

4 OPERATION

- ③ The [Print] dialog box as shown below will appear. Select the desired printer, specify its properties if necessary, and then click the **OK** button. The displayed CPU link parameters will then be printed on the selected printer, as shown in Figure 4-30.

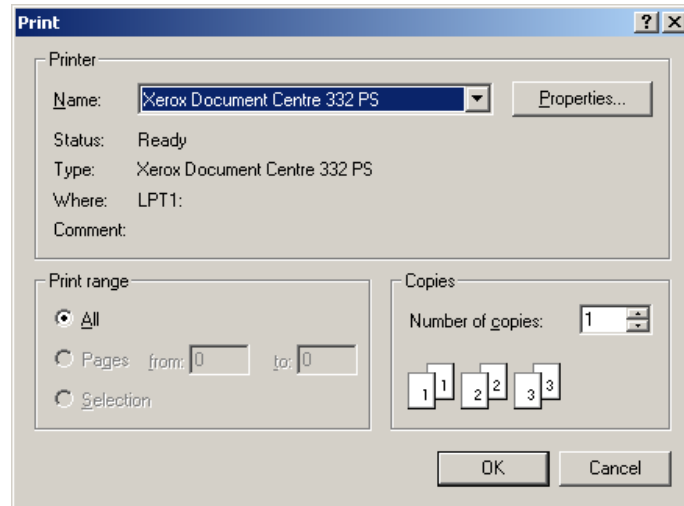


Figure 4-29 [Print] Dialog Box

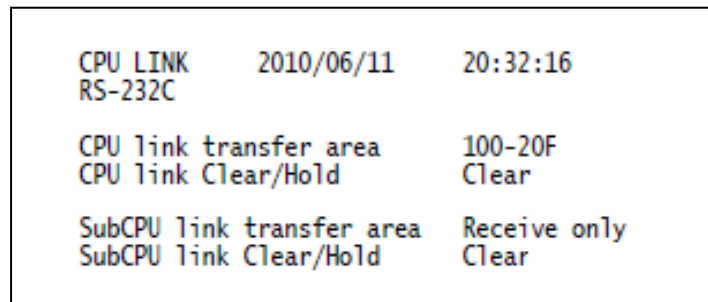


Figure 4-30 An Example of a CPU Link Parameters Printout

4.8.8 Outputting CPU link parameters in CSV format (for S10V controllers only)

Function: Outputs the displayed CPU link parameters to a specified file in CSV (comma-separated values) format. (This feature is supported only by Ver-Rev 01-02 or later of the S10V CPU link system.)

Operation: The procedure used is described below.

- ① Establish a connection with the programmable controller (see “(1) Procedure for setting and editing parameters in online mode” in Subsection 4.6.3) if the CPU link system is running in online mode. If it is running in offline mode, select the desired parameter file (see “(2) Procedure for setting and editing parameters in offline mode” in Subsection 4.6.3).
- ② Click the **CSV Output** button in the [PCs edition] window as shown below.

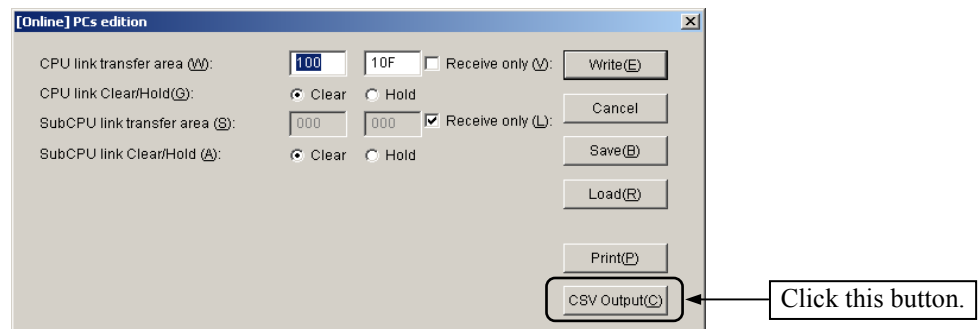


Figure 4-31 [PCs edition] Window

- ③ The [Save As] window as shown below appears. In this window, select the desired folder in which to store the saved file, and enter a unique file name. Then, click the **Save** button. The displayed CPU link parameters will then be output to the specified file in CSV format.

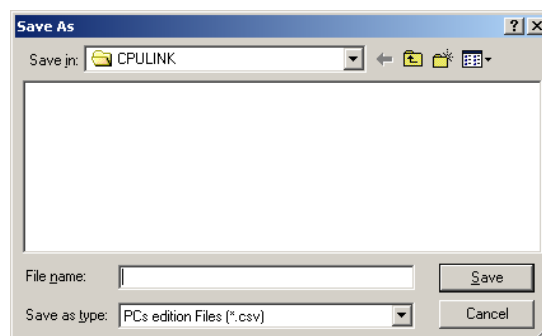


Figure 4-32 [Save As] Window

4 OPERATION

	1	2	3	4	5
1	CPU LINK	2010/06/11	20:33:19		
2	RS-232C				
3					
4	CPU link transfer area	100-20F			
5	CPU link Clear/Hold	Clear			
6					
7	SubCPU link transfer area	Receive only			
8	SubCPU link Clear/Hold	Clear			
9					
10					
11					
12					

Figure 4-33 An Example of a CPU Link Parameters Output in CSV-Format

4.8.9 Comparing PCs edition information (for S10V controllers only)

Function: Compares the CPU link parameters (PCs edition information) defined in the connected S10V controller with the CPU link parameters stored in a selected file and displays the result. (This feature is supported only by Ver-Rev 01-02 or later of the CPU link system and can be used only in online mode.)

Operation: The procedure used is described below.

- ① Establish a connection with the programmable controller (S10V) in online mode. (For details, see “(1) Procedure for setting and editing parameters in online mode” in Subsection 4.6.3.)
- ② Click the **PCs edition compare** button in the **[[S10V] CPU LINK SYSTEM]** window as shown below.

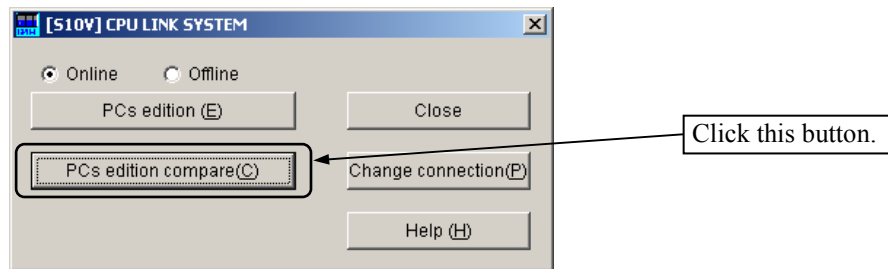


Figure 4-34 [[S10V] CPU LINK SYSTEM] Window

4 OPERATION

- ③ The [Open] window as shown below appears. Select the CPU link parameter file you want to compare with the S10V controller, and click the **Open** button. The CPU link parameters will then be compared between the selected file and the S10V controller.

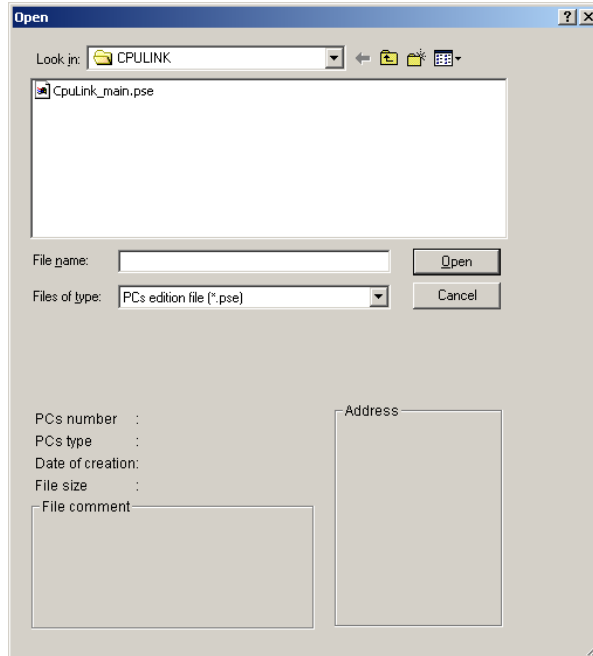


Figure 4-35 [Open] Window

④ The result of the comparison is displayed as shown below.

<Case 1: No differences found>

If no differences are found between the selected file and the S10V controller, a message to that effect is displayed as shown below. Click the button.



Figure 4-36 The No Differences Found Message

<Case 2: Differences found>

If differences are found between them, they will be displayed in a differences found message, as shown below. Click the button, check the differences, and correct them if necessary.

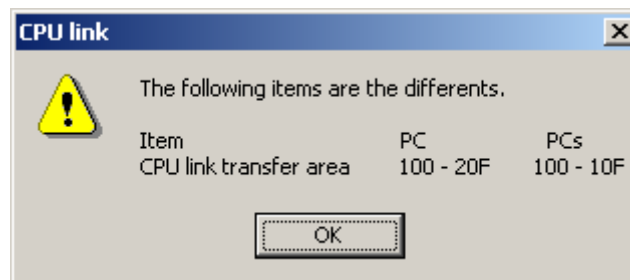


Figure 4-37 An Example of the Differences Found Message

4.8.10 Closing the system

In the [CPU LINK SYSTEM] window (see Figure 4-18) or [[S10V] CPU LINK SYSTEM] window (see Figure 4-19), click the button or button.

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5 PROGRAMMING

5.1 Transfer Cycle

(1) Transfer operation

The CPU link module transfers data to all of the CPUs and LPUs connected to the CPU link line so as to equalize the contents of their G-registers (G000 to GFFF).

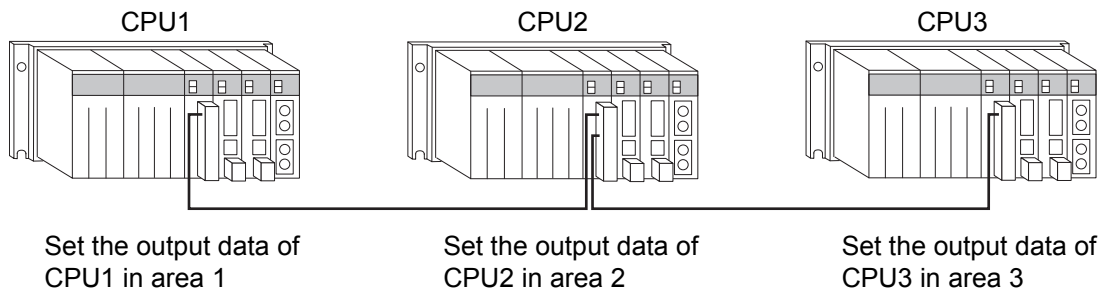
(2) Transfer area and range

With the personal computer, set the number and range of G-register words that are to be output to the CPU (or LPU). The words of up to 1,024 G-registers (256 words each) can be transferred from each CPU (or LPU).

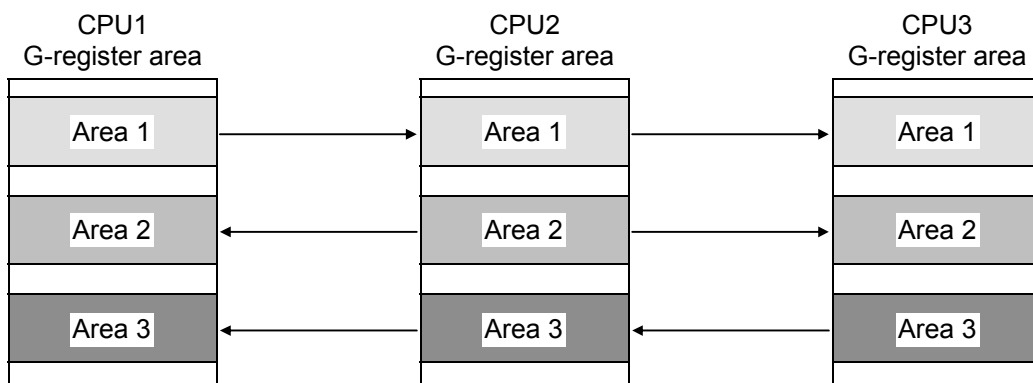
A CPU having its transfer area set to zero is set to “reception only.” For information on how to set the number and range of words that each CPU can transfer from its G-registers, see “4.6 Setting Module Information.”

CPUs have their transfer area set to zero by default.

Sample configuration:



G-register area states:



- CPU1 transfers area 1 to CPU2 and CPU3.
- CPU2 transfers area 2 to CPU1 and CPU3.
- CPU3 transfers area 3 to CPU1 and CPU2.

Figure 5-1 Transfer Operation Examples

(3) Transfer stop

Transfers stop depending on the states of the CPU link module and the CPU (or LPU) module defined in Table 5-1.

Table 5-1 Transfer Stop

State	Cause	Transmission	Reception
Power off	The power module is powered off, or the power is off.	Stopped	Stopped
CPU STOP	The LADDER switch on the CPU (or LPU) module's front-panel is set to STOP.	Stopped	Enabled
CPU DOWN	An internal error occurred in the CPU (or LPU).	Stopped	Stopped
CPU reset	The RESET switch on the CPU (or LPU) module's front panel was ON.	Stopped	Stopped
CPU link module internal error	The internal circuit has failed.	Stopped	Stopped
Unable to transmit	The CPU has its transfer area set to zero.	Stopped	Enabled

(4) Reception timeout

A reception timeout occurs in any of the following conditions:

- Any CPU (or LPU) connected to the link line has been disabled from transmission due to any condition mentioned in item (3) in "5.1 Transfer Cycle."
- Data has been destroyed (for a consecutive period of 500 ms or longer) due to sequential noise interference or any other effect.
- The link line cable is disconnected or has defective contact.

When a reception timeout is detected in the G-register area in a CPU (or LPU), the G-register area is either held or cleared to zero depending on the clear/hold setting that is entered from the personal computer.

For information on how to set hold/clear, see "4.6 Setting Module Information."

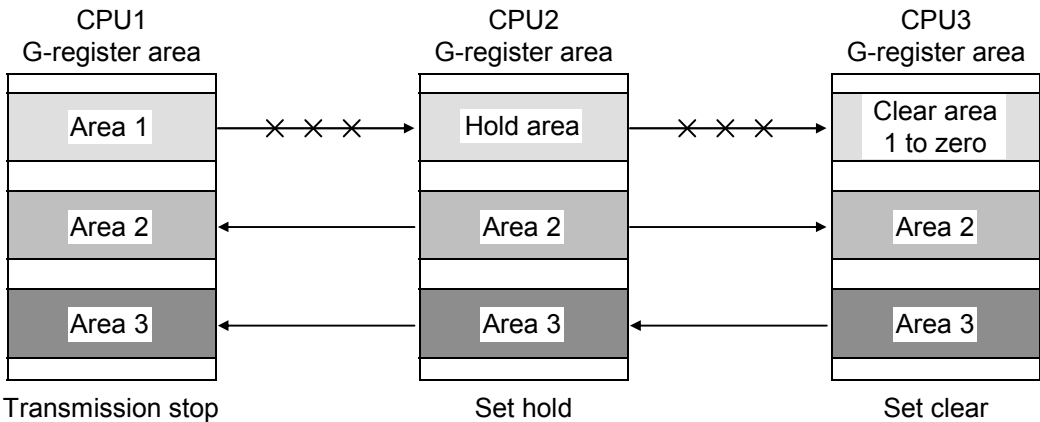


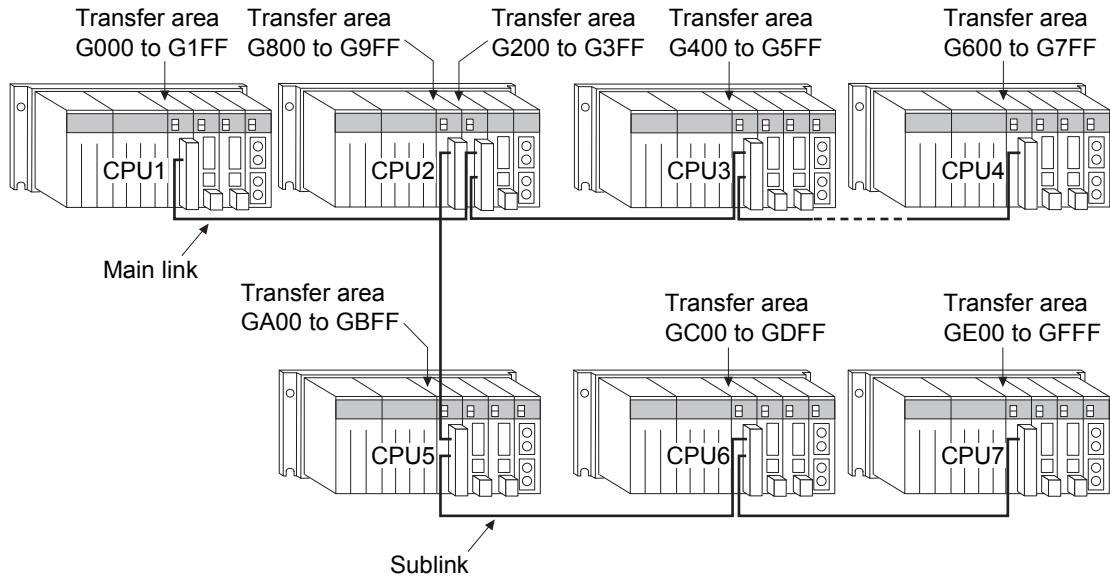
Figure 5-2 Clear/Hold Setting

5 PROGRAMMING

(5) Operations using main links and sublinks

- Up to 16 CPUs (or LPUs) can be connected by main links or sublinks.
- Allocate G-registers so they will not be transferred in duplicate.
- The G-register data that is transferred over the main link line is not reflected in the CPUs (or LPUs) connected to the sublink line. Likewise, the G-register data that is transferred over the sublink line is not reflected in the CPUs (or LPUs) connected to the main link line.

Sample configuration:



G-register area transfer operation:

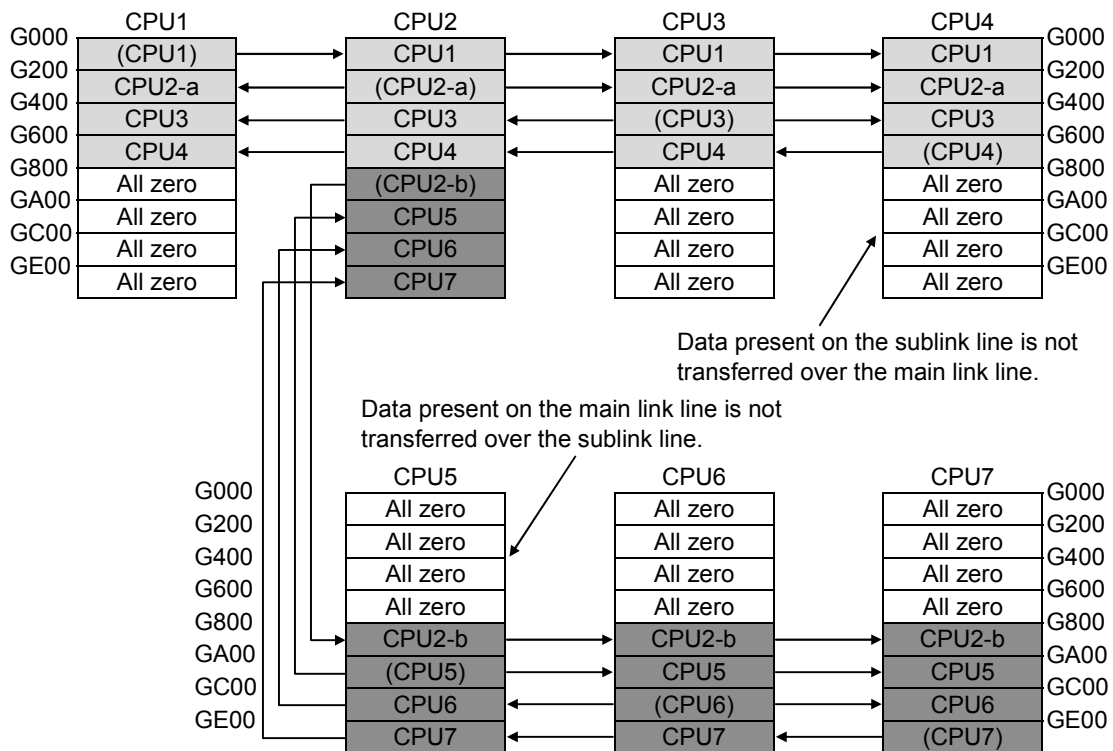


Figure 5-3 Main Links and Sublinks

5.2 System Registers

The status of the CPU link module is stored in a system register in the CPU (or LPU). The contents of the system register are shown below.

(1) Storage registers

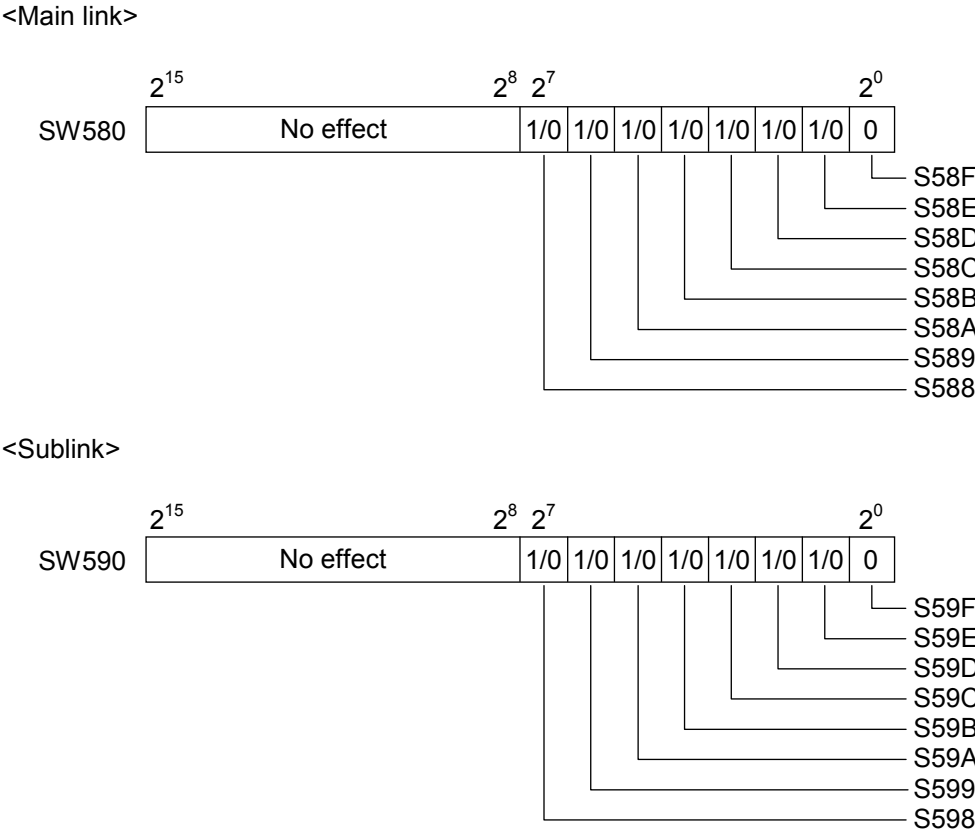


Figure 5-4 System Register Addresses

5 PROGRAMMING

(2) Bit definitions (common to both the main link and sublink)

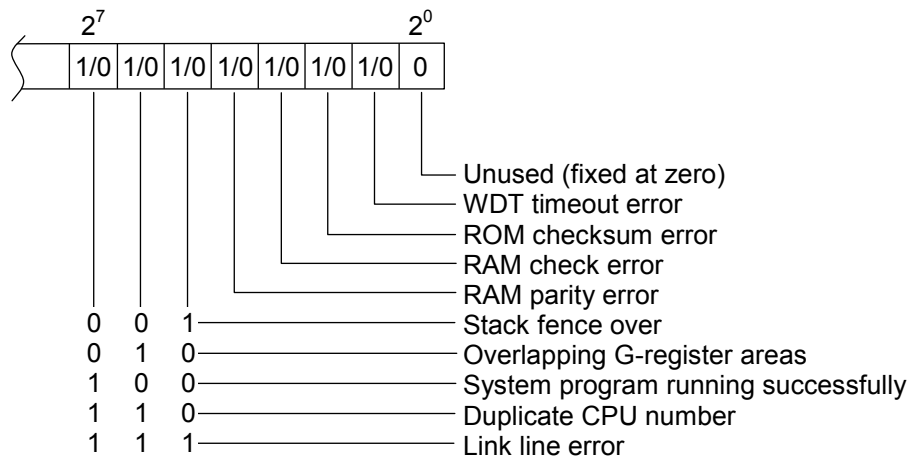


Figure 5-5 System Register Contents

5.3 Response Time

Figure 5-6 shows a plot of the response times the CPU link module takes to transfer G-register data (A response time is the interval time that elapses before the data in the G-register in one CPU (or LPU) is reflected in the G-register in another CPU (or other LPU) connected to the same link line).

The response times indicated here are those that are typical where only the CPU link module is mounted on the CPU mount base. If any other optional module, such as the ET.NET module, is additionally mounted, longer response times may result than those shown in Figure 5-6.

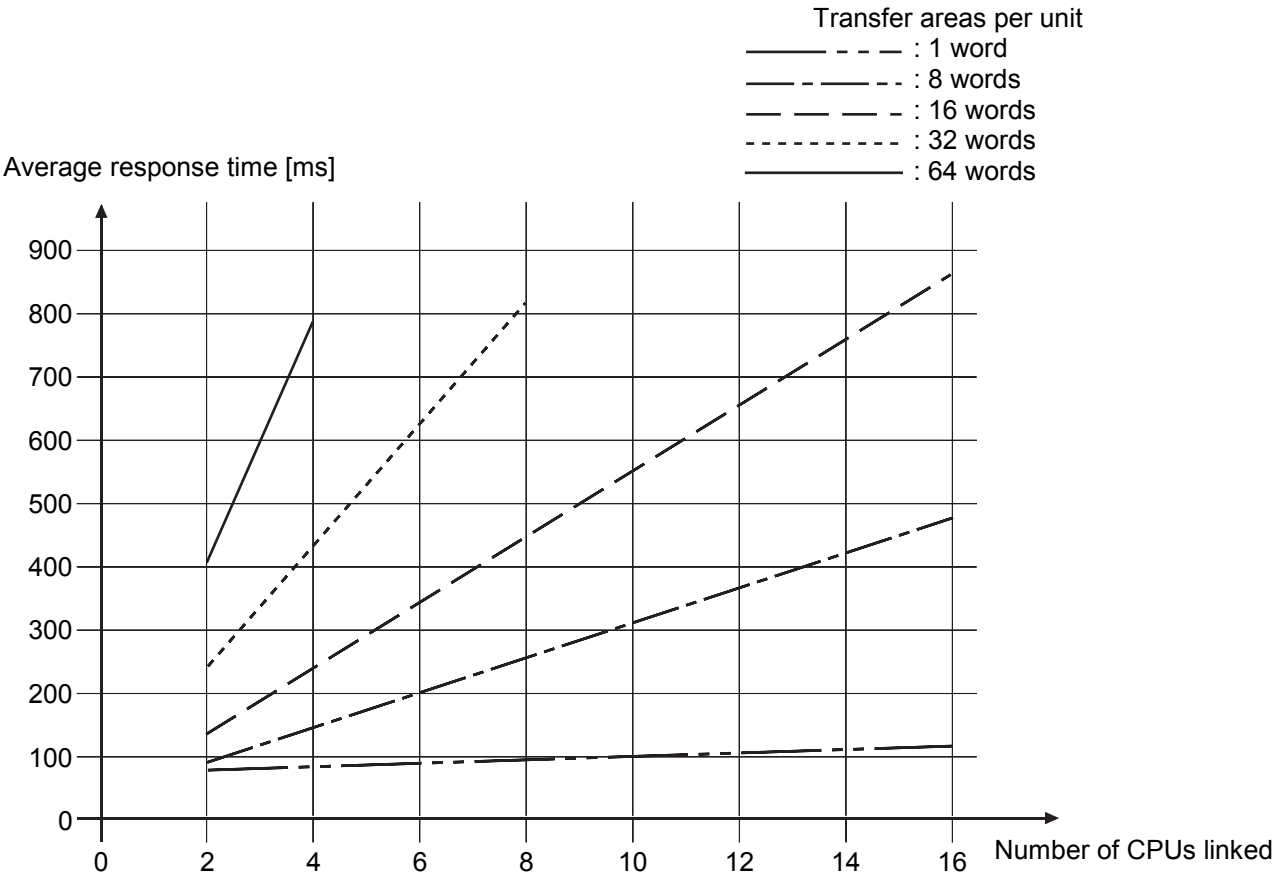


Figure 5-6 Response Time

5.4 Program Examples

(1) Configuration and sample settings

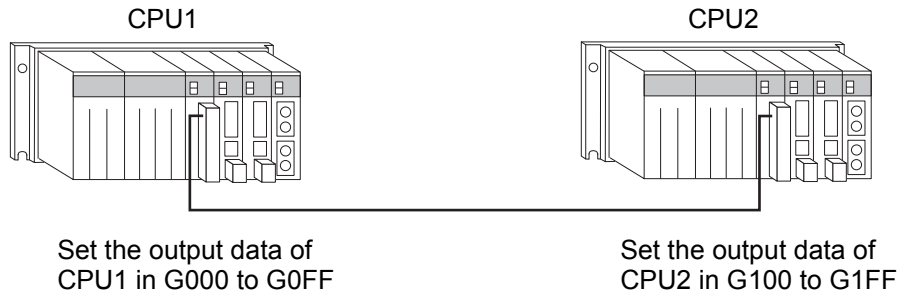


Figure 5-7 Configuration and Sample Settings for Sample Program

(2) Sample program

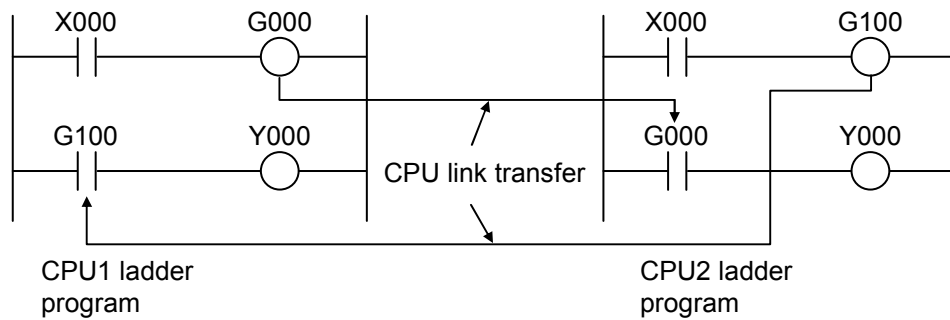


Figure 5-8 Sample Program

<Operation description>

- When CPU1 X000 turns on, CPU2 Y000 turns on via G000.
- When CPU2 X000 turns on, CPU1 Y000 turns on via G100.

6 MAINTENANCE

6.1 Maintenance and Inspection

6.1.1 Periodic check

Table 6-1 Periodic Check Items

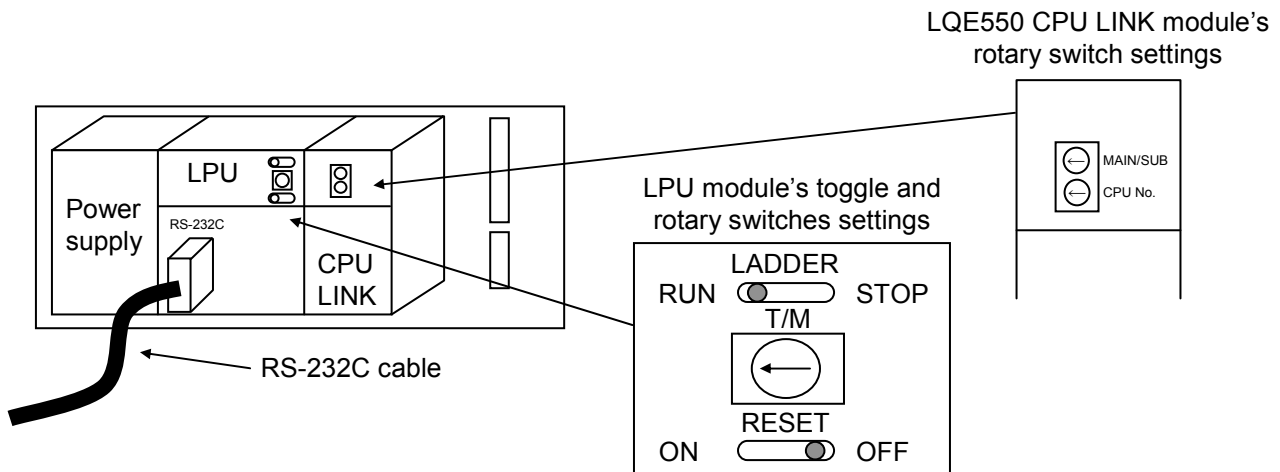
Item	Description	Frequency
Unit cleaning	Turn off all the power supplies and then cleaner the interior of the CPU link module through the slits in its casing. Do not raise dust during cleaning.	Twice/year or more
Mechanical check	Check CPU link module mounting screws, TB mounting screws, and communication cable mounting screws for looseness and damage. If a mounting screw is loose, tighten it. Replace damaged parts.	Twice/year or more

6.1.2 Replacing or adding on the module

- What you should get in preparation
 - ① Personal computer (with Hitachi's S10V CPU LINK System installed in it)
 - ② RS-232C cable (or 10BASE-T cable if the communication module used is an ET.NET module)
 - ③ New or add-on CPU LINK module (LQE550)
 - ④ The above-mentioned ET.NET module is an optional module and, if it is mounted in place, may be selected as the type of communication module to be used. For more information, refer to Section 2.1, "Names and Functions of Each Part," and Section 3.2, "Mounting the Module," in the USER'S MANUAL OPTION ET.NET (LQE520) (manual number SVE-1-103).

- Replacement procedure

- ① Write down, on a piece of paper, the current settings of the rotary switches that are, as shown below, accessible at the front side of the CPU LINK module to be replaced.
- ② Write down also the current settings of two switches, labeled LADDER (toggle switch) and T/M (rotary switch), respectively, that are, as shown below, accessible at the front side of the LPU module.



- ③ Connect the personal computer and the LPU module together with the RS-232C cable.
- ④ Start Hitachi's S10V CPU LINK system and write down the existing PCs edition information on a piece of paper. (If the PCs edition information is not accessible, read it from the "Change capacity" feature of Hitachi's S10V Ladder System.)
- ⑤ Set the LPU module's LADDER switch in STOP position and turn off the power supply of the controller unit.
- ⑥ Remove the connecting cables from the CPU LINK module to be replaced.
- ⑦ Replace the existing CPU LINK module with the new one and set the new CPU LINK module's rotary switches in the same way as you wrote down in Step ①.
- ⑧ Turn on the power supply of the controller unit. Then, check that the PCs edition information is identical between the two CPU LINK modules, old and new, by using the S10V CPU LINK system.
- ⑨ Turn off the power supply of the controller unit.
- ⑩ Remove the RS-232C cable from both the personal computer and LPU module, which were connected together in Step ③.
- ⑪ Connect to the new CPU LINK module the connecting cables that you removed in Step ⑥.
- ⑫ Set the LPU module's LADDER and T/M switches in the same way as you wrote down in Step ②.

- ⑬ Turn on the power supply of the controller unit and check that the new CPU LINK module is running normally.

- Add-on procedure

- ① Write down, on a piece of paper, the current settings of two switches, labeled LADDER (toggle switch) and T/M (rotary switch), respectively, that are accessible at the front side of the LPU module, the one that is installed in the controller unit in which you are adding on a CPU LINK module.
- ② Ensure that your application system has been shut down. Then, set the LPU module's LADDER switch in STOP position and turn off the power supply of the controller unit.
- ③ Mount the add-on CPU LINK module in place according to the instructions given under "3.2 Mounting the Module."
- ④ Set the add-on CPU LINK module's rotary switches in such a way that a new setting will not duplicate with any of the current rotary switch settings of the main CPU LINK module.
- ⑤ Connect the personal computer and the LPU module together with the RS-232C cable. Then, turn on the power supply of the controller unit and set parameters for the add-on CPU LINK module by using the S10V CPU LINK System.
- ⑥ Reset the LPU module by setting the RESET switch in ON position and then in OFF position at its front.
- ⑦ Turn off the power supply of the controller unit and connect the connecting cables to the add-on CPU LINK module.
- ⑧ Set the LPU module's LADDER and T/M switches in the same way as you wrote down in Step ①.
- ⑨ Remove the RS-232C cable from both the personal computer and LPU module, which were connected together in Step ⑤.
- ⑩ Turn on the power supply of the controller unit and check that the add-on CPU LINK module is running normally.

6.2 Troubleshooting

6.2.1 Procedure

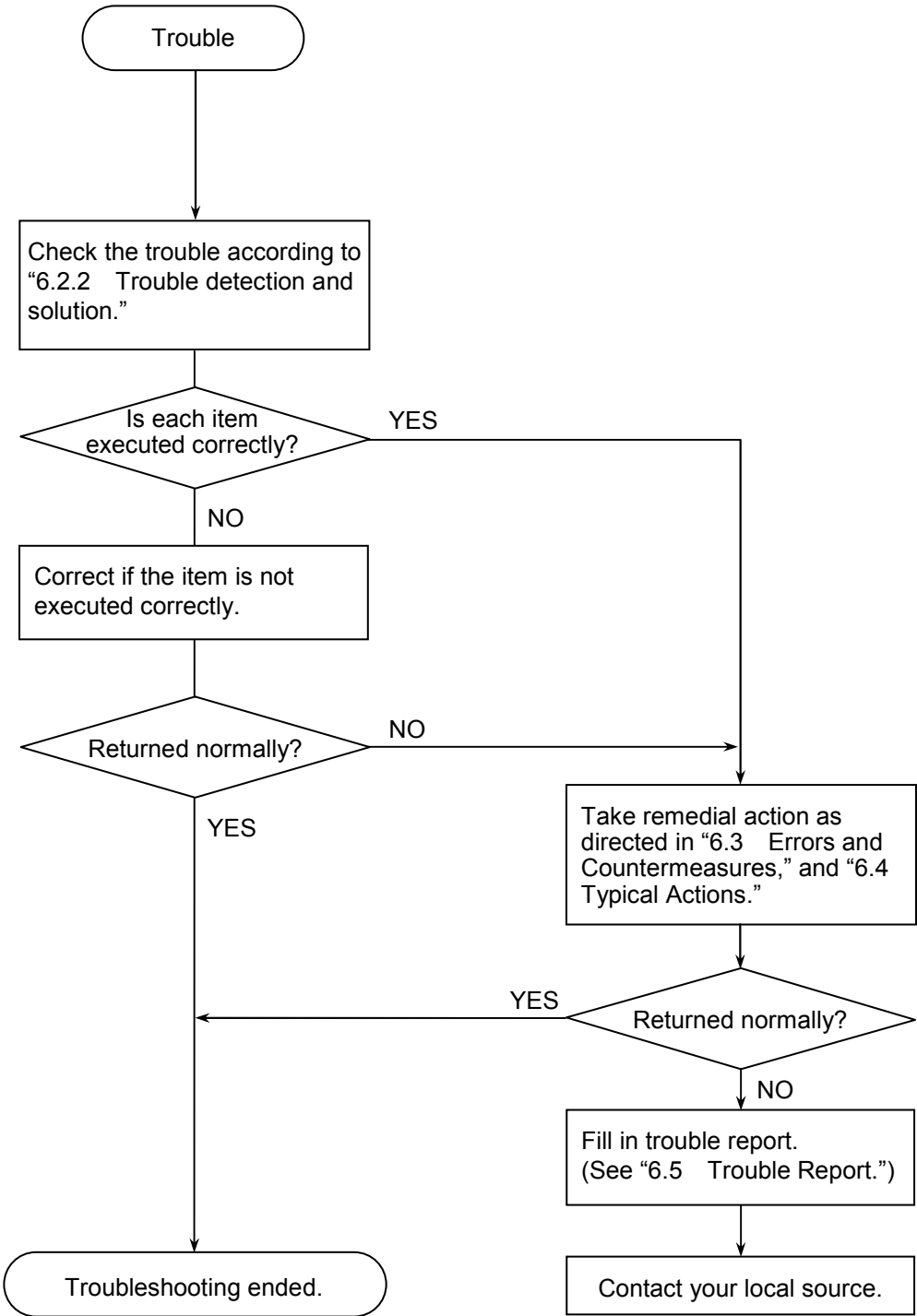
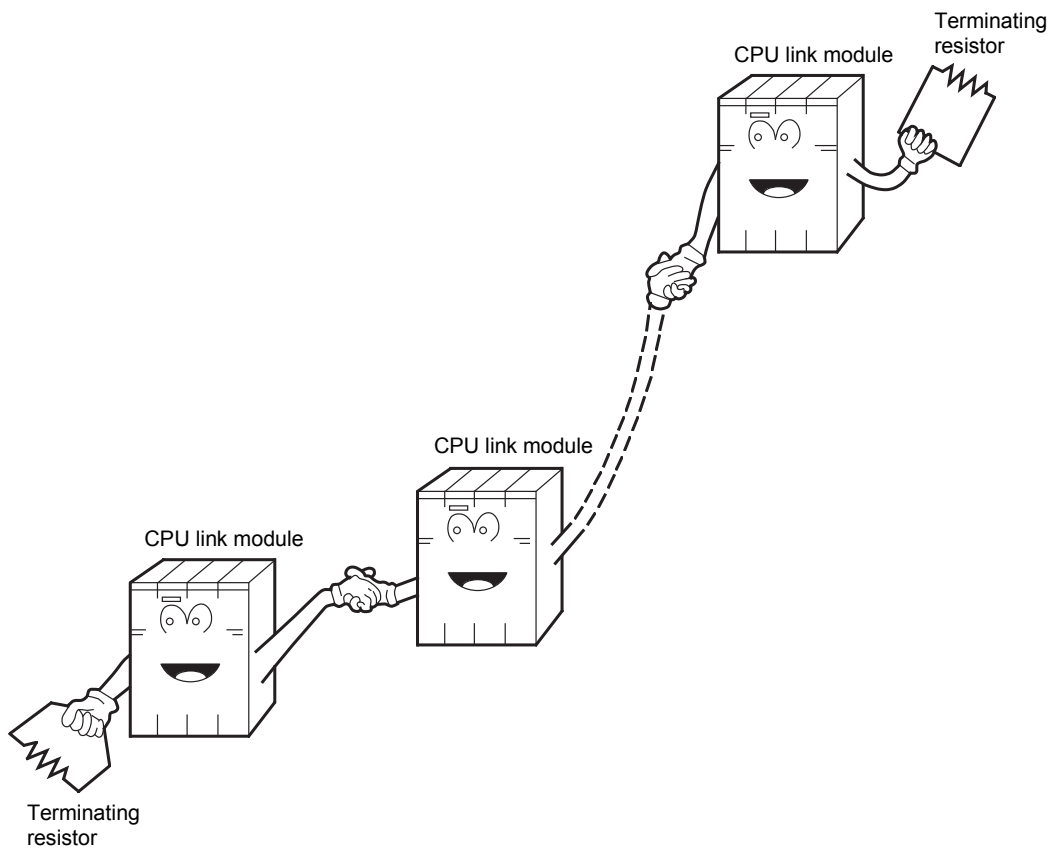


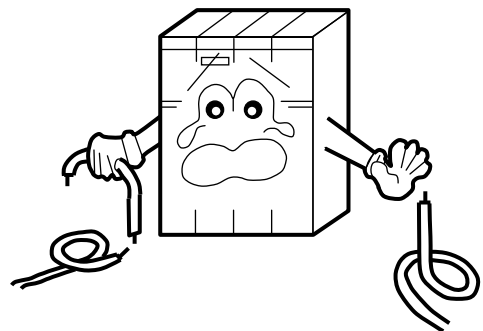
Figure 6-1 Troubleshooting Flow Chart

6.2.2 Trouble detection and solution

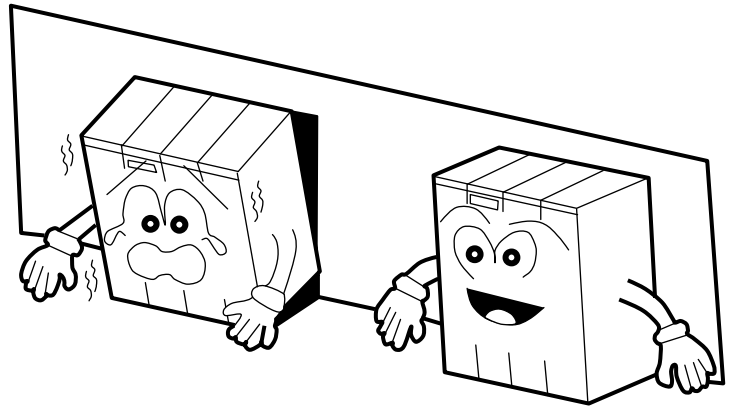
- Is the terminating resistor properly set?
 - Be sure to short a terminating-resistor setup terminal (see “2.1 Names and Functions of Each Part”) to a module positioned at the end of a line. If terminating resistor setup is not completed, a communication error occurs successively or intermittently.
 - Check that the employed terminating-resistor setup terminal matches the cable’s characteristic impedance.



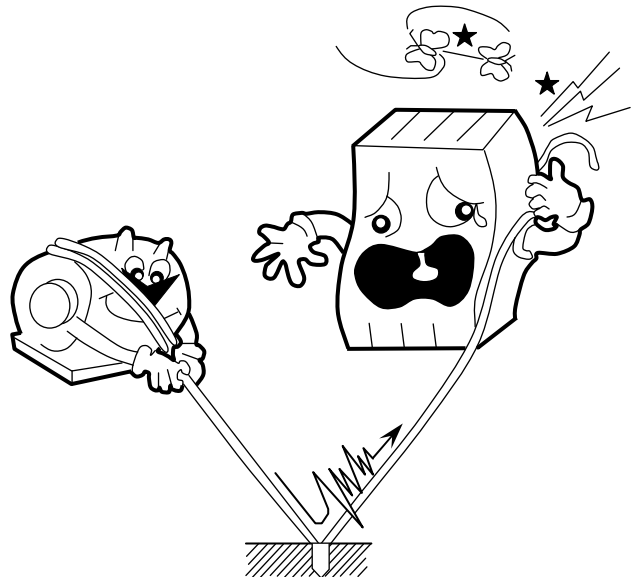
- Are the wiring connections properly made?
 - Check that the link cable extension length is as specified (see “1.2 Specifications”).
 - If different types of cables are used for the same CPU link line, a communication error may occur. When making wiring connections for a line, use only one type of cable.
 - Check cables for disconnection or incorrect connection.



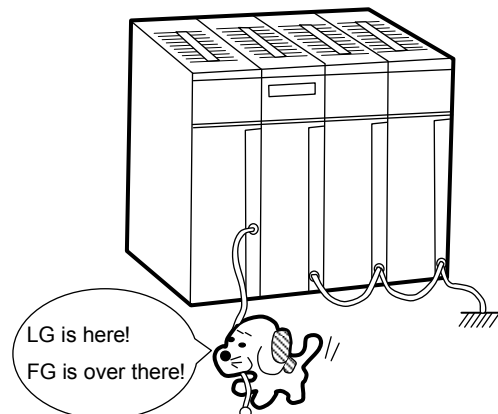
- Are the modules mounted correctly?
 - If there is an unoccupied slot or I/O module between the CPU module and optional module when the S10mini is used, the optional module does not operate properly. Mount the optional module right next to the CPU module.
 - Check that no set screws loosen.



- Is grounding correctly?
 - Do not ground the CPU link module in the same place where high-voltage equipment is grounded. They must be grounded in separate places.
 - Perform grounding work conforming to class D grounding or higher.



- Are LG and FG separated?
 - Be sure to separate the LG from the FG or vice versa because power noise enters the FG via the LG. Failure to observe this rule may result in an equipment malfunction.
 - Ground the LG at the power supply side.



6.3 Errors and Countermeasures

When an event or error occurs, the S10mini uses the CPU module's indicator to display a message as indicated in the Table below.

The S10V, on the other hand, collects error information, but does not indicate any error on the LPU module. You can view collected error information with "Error log" of the "Basic tool." For details, refer to "S10V USER'S MANUAL BASIC MODULE (manual number SVE-1-100)."

Table 6-2 CPU Module Error Indications and Remedies (1)

No.	CPU module indication (S10mini)	Error code (S10V)	Error description	Action
1	CPL▲ ROM	0x0004	ROM checksum error: An error occurred in the ROM.	<ul style="list-style-type: none"> • Hold the CPU or LPU RESET switch in the ON position for a period of longer than one second and then release it. • If the indication does not go off, replace the CPU link module because it is defective.
2	CPL▲ SSP	0x0020	Stack fence over error: A stack fence over error occurred.	
3	CPL▲ WDT	0x0002	WDT error: A watchdog timer timeout error occurred	
4	CPL▲ RAM	0x0008	RAM check error: An abnormality occurred in the system program	
5	CPL▲ PTY	0x0010	RAM parity error: A parity error occurred in the RAM.	
6	EX8■ PTY	0x1480 (MAIN) 0x1480 (SUB)	Optional module memory parity error: A parity error occurred the CPU or personal computer attempted to read the RAM in the CPU link module. The "Module" field of the S10V error log information reads "LPU." The other error indications are either "CPU link (main)" or "CPU link (sub)."	
7	CPL▲NONG	0x00C0	CPU number switch setting error: A module having the same CPU number as this module exists on the CPU link line.	Note the CPU number selector switch on the CPU link module connected to the CPU link line. Change the switch setting so that no CPU number is duplicated.
8	CPL▲ GNG	0x0040	G-register area duplication error: The G-register area transmitted by this module coincides with the received G-register area.	Note the preselected number of transfer words for the CPU link module connected to the CPU link line. Change the setting so as to avoid a duplication error

Either the ▲ mark or ■ mark appears to indicate whether the main module or sub-module is affected. (When the S10V is used, the tool system gives this type of indication.)

MAIN/SUB selector switch	▲	■
"0" (MAIN)	M	0
"1" (SUB)	S	1

Table 6-3 CPU Module Error Indications and Remedies (2)

No.	CPU module indication (S10mini)	Error code (S10V)	Error description	Action
9	CPL▲ TRM	0x00E0	Link line error: A reception error occurred successively or intermittently in G-register area transfer.	<ul style="list-style-type: none"> • Check that the link cable extension length is within the specified limit. For the specified limit, see “1.2 Specifications.” • Check that the link cable and crimp terminals are not broken or partly broken. • Check for improper terminating resistor setup. For the setup procedure, see “2.1 Names and Functions of Each Part.”
10	CPL▲ △. □	0x0080	System program operating normally: The CPU link module is operating normally.	A normal operation is indicated. No error is encountered.
11	No number (between 1 and 10) appears.	None	(None): The CPU link module is not normally started due, for instance, to damaged data in the ROM.	<ul style="list-style-type: none"> • Hold the CPU or LPU RESET switch in the ON position for a period of longer than one second and then release it. • If the indication does not go off, replace the CPU link module because it is defective.

- The value in the △ mark position indicates the internal program version number. The value in the □ mark position represents the leftmost digit of the revision number.
- Either the ▲ mark or ■ mark appears to indicate whether the main module or sub-module is affected. (When the S10V is used, the tool system gives this type of indication.)

MAIN/SUB selector switch	▲	■
“0” (MAIN)	M	0
“1” (SUB)	S	1

6.4 Typical Actions

6.4.1 The LINK LED won't light

Check out and take action as set forth in Table 6-4. If the suggested remedy does not help, replace the CPU link module.

Table 6-4 Probable Causes of the Failure of the LINK LED to Light, and Remedial Actions

Probable cause	Action
The CPU module LADDER switch is set to STOP.	Set the LADDER switch to RUN.
A transfer area has not been set up, or one has been set up for reception only.	Set a transfer area. See "4.6 Setting Module Information."
The setting of the MAIN/SUB selector switch does not match the transfer area setting (e.g., the MAIN/SUB selector switch is set to 0, but the transfer area is set up for a sublink line).	Modify either the transfer area or the MAIN/SUB setting.

6.4.2 Occasionally unable to receive data from the remote source when it is transmitting normally

Check out and take action as set forth in Table 6-5. If the suggested remedy does not help, replace the CPU link module.

Table 6-5 Probable Cause of the Inability to Receive, and Remedial Actions

Probable cause	Action
Noise present on the link line has corrupted the data on the line.	<ul style="list-style-type: none"> • Check to see if the terminal block is wired as specified. Also, check whether the link wiring and connection are as specified (see "1.2 Specifications," and "2.1 Names and Functions of Each Part"). • Check to see if there are sources of noise around the unit in which the CPU link module is mounted and if a high-current carrying wire is laid in parallel with the link cable.

6.4.3 The G-registers are cleared despite the CPU link set in hold mode (or reset) when another CPU stops

Check out and take action as set forth in Table 6-6. If the suggested remedy does not help, replace the CPU link module.

Table 6-6 Probable Cause of the Inability for the Setting to Take Effect, and Remedial Actions

Probable cause	Action
The LADDER switch has not been set from STOP to RUN after the CPU link was set or reset.	Set the LADDER switch from STOP to RUN or reset the CPU. The transfer area and hold/clear setup information does not take effect until the CPU module LADDER switch is set from STOP to RUN or the CPU module is reset.

6.5 Trouble Report

Fill out this form and submit it to local source.

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