HITACHI

S10mini

S10mini
HARDWARE MANUAL

OPTION
CPU LINK

S10mini
HARDWARE MANUAL

OPTION
CPU LINK

SAFETY PRECAUTIONS

Be sure to read this manual and all other attached documents carefully before installing, operating inspecting or conducting maintenance on this unit.   Always use this unit properly.
Be sure to carefully read the information about the device, the safety information and precautions before using this unit.   Be sure that the person(s) responsible for maintenance receives and understands this manual completely.

This manual divides the safety precautions into DANGERs and CAUTIONs.

⚠ DANGER : Failure to observe these warnings may result in death or serious injury.

⚠ CAUTION : Failure to observe these cautions may result in injury or property damage.

Failure to observe any **⚠ CAUTION** may lead to serious consequences.

All of these DANGERs and CAUTIONs provide very important precautions and should always be observed.
Additional safety symbols representing a prohibition or a requirement are as follows:

🚫 : Prohibition.   For example, "Do not disassemble" is represented by:

🚫

❗ : Requirement.   For example, if a ground is required, the following will be shown:

⏚

⏚ REQUIREMENT

- An electric shock may lead to a deatch or burn.   Noise may cause the system to malfunction.   Ground the line ground (LG), frame ground (FG), and shield (SHD) terminals, as described below.
  - Electrically insulate the mount base from the cubicle.   To assure this, do not remove the insulating sheet from the mount base.
  - Ground the LG and FG terminals separately to prevent mutual interference. The LG terminal is grounded to prevent intrusion of power line noise, while FG and SHD terminals are grounded to suppress intrusion of line noise into external interfaces for remote I/O modules, interface modules, and other modules.

❗ REQUIREMENT

- Excessive accumulation of heat in the cubicle may cause a fire or hardware failure.   When the temperature in the cubicle reaches 48°C or higher, the maximum output current of the power supply module is limited.   At 55°C, for instance, it is limited to 5.85 A.   Where this is very likely, install a cooling fan in the cubicle or reduce the number of modules installed therein.
- The customer must not replace internal parts by themselves.   Otherwise, damage to internal parts may result.   If the unit should fail, replace it on a module basis.

⚠ DANGER

- Device an emergency stop circuit, interlock circuit, and other similar circuits outside the programmable controller.   Disregarding this rule may result in damage to the equipment or cause an accident if the programmable controller fails.
- Keep it in mind that this hardware unit operates on a high voltage.   If the user touches a high-voltage terminal inadvertently during connection or disconnection of this hardware unit or its cable, he or she may suffer from an electric shock.   Also, this hardware unit may be damaged due to a short circuit or noise.   Be sure to switch off the hardware unit before connecting or disconnecting it or its cable.
- Turn off the power before making connections to the terminal block.   Wiring with the power turned on may incur electrical shock hazards.

⚠ CAUTION

- High operating temperatures may cause the unit to fail. Further, electromagnetic interference from adjacent equipment may cause the unit to malfunction. Allow for clearances of specified dimensions between the enclosure and the programmable controllers and between the programmable controllers to assure heat dissipation and alleviate interference.
- During test running after mounting, measure the temperature around the programmable controllers in the enclosure to make sure that they do no exceed specified tolerances. If a clearance of specified dimensions is not available between the programmable controllers or the measured temperature is higher than specified, install a cooling fan to effect forced cooling.
- At an extremely high temperature, this hardware unit may fail. Secure the mount base to a vertical surface. If the mount base is secured horizontally, heat does not dissipate efficiently, resulting in an extremely high temperature. This may further cause the hardware unit to fail or its parts to deteriorate.
- This hardware unit may be damaged due to static electricity. Ground yourself before setting switches or connecting or disconnecting cables or connectors with the hardware unit.
- This hardware unit may be damaged during its installation or removal unless the following rules are observed:
  - Check that the connector pins are not damaged (bent or broken), are aligned straight and are free from dust.
  - Move the hardware unit along an imaginary vertical surface to the face of the mount base. If the product is inserted or removed slantwise from the connector on the mount base, connector pins may be bent.
- Turn off the power before operating the MAIN/SUB selector switch or the CPU No. selector switch. Operating these switches with the power turned on may cause the module to fail.

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.

This manual provides information for the following hardware product:

<Hardware product>
  CPU LINK (LQE050)

<Changes added to this manual>

Description of added changes	Page
Subsection 7.1.1, "Replacing or adding on the module" is newly added.	7-4

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

Revision record

Revision No.	Revision Record (revision details and reason for revision)	Month, Year	Remarks
A	First Edition	February 2001	
B	Subsection 7.1.1, "Replacing or adding on the module" is newly added.	October 2008	

PREFACE

We greatly appreciate your making use of an optional add-on to the S10mini Series CPU, called the inter-CPU link module or, simply, CPU link module.
This hardware manual on the optional S10mini CPU link module explains how to handle the module. Read this manual carefully to use the module properly.

For each S10mini Series product model, there are two types of product available: standard and environmentally resistant.
The environmentally resistant product has thicker platings and coatings than those with the standard one.
The model ID name of the environmentally resistant product is that of the standard product followed by "-Z".

      Example: Standard product: LQE050
                 Environmentally resistant product: LQE050-Z

The manuals that come with the two types of S10mini Series product are identical.   They describe only standard products; however, users of an environmentally resistant product can also follow the instructions given there without any problem.   So, please follow the instructions for the proper use of the product.

CONTENTS

FIGURES

TABLES

1   BEFORE USE

1.1 CPU Mount Base

A CPU mount base is needed to use this module. CPU mount bases are available in three types:

Figure 1-1 Mount Base
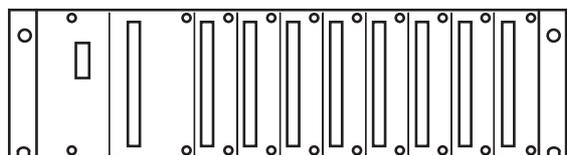
- Two-slot mount base (Type: HSC-1020)
- Four-slot mount base (Type: HSC-1040)
- Eight-slot mount base (Type: HSC-1080)

As an example, the eight-slot mount base houses up to eight optional modules.

1.2 Mounting Modules

CPU slot

PS slot

Slots 0 thru 7

Optional module, I/O module

CPU module

Power supply module
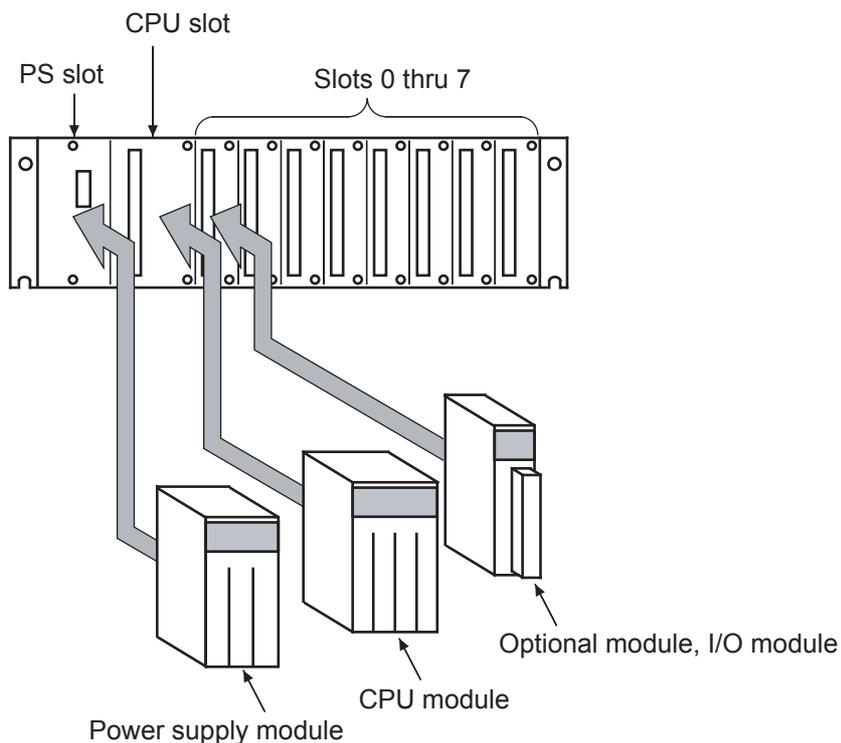
Figure 1-2 Mounting Modules

PS slot: Mount one of the following power supply modules:

- LQV000
- LQV100
- LQV020

CPU slot: Mount one of the CPU modules:

- LQP000
- LQP010
- LQP011
- LQP120

Slots 0 thru 7: Mount optional modules, such as the LQE050, and I/O modules.   Insert optional modules into slots, starting from slot 0, with no intervening vacant slots.   Do not leave any slot vacant or insert an I/O module between the CPU module and the optional module that follows.

1.3   Ground Wiring

Carry out ground wiring as shown in Figure 1-3 by following these steps:

① Connect the FG terminals of the power supply module, CPU module and optional modules by crossover wiring to the mount base's grounding seat, a hexagon nut fitted to the mount base (with a wire diameter of 2.0 mm^2 or more).

  • For information on how to make a connection to the FG terminal of the LQE050, see Chapter 3, "NAMES AND FUNCTIONS OF EACH PART AND CABLING".   (Some optional modules do not have an FG terminal.)

② Wire the mount base's grounding seat to the PCs grounding terminal 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 PCs grounding terminal of the enclosure using a wire with a wire diameter of 5.5 mm^2 or more.

FG terminal to each individual module

PCs grounding terminal of the enclosure

To the mount base's grounding seat

2.0 mm^2 or more

2.0 mm^2 or more

5.5 mm^2 or more
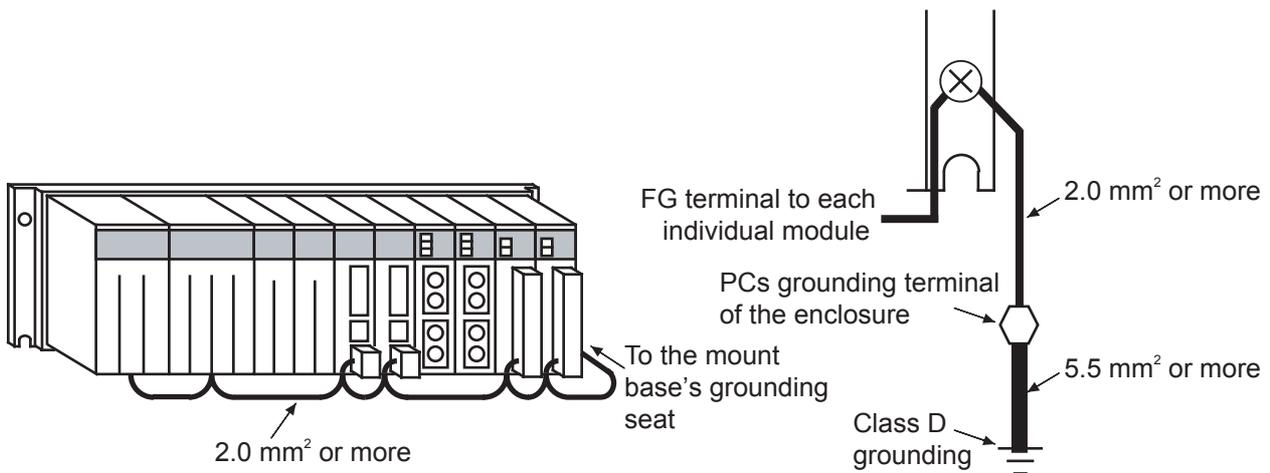
Class D grounding

Figure 1-3   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

Turn off the power before making connections to the terminal block.   Wiring with the power turned on may incur electrical shock hazards.

⏚ REQUIREMENT

An electric shock may lead to a deatch or burn.   Noise may cause the system to malfunction.   Ground the line ground (LG), frame ground (FG), and shield (SHD) terminals, as described below.

• Electrically insulate the mount base from the cubicle.   To assure this, do not remove the insulating sheet from the mount base.

• Ground the LG and FG terminals separately to prevent mutual interference. The LG terminal is grounded to prevent intrusion of power line noise, while FG and SHD terminals are grounded to suppress intrusion of line noise into external interfaces for remote I/O modules, interface modules, and other modules.

2 SPECIFICATIONS

2.1   Usage

The CPU link module is used to transfer I/O image data between CPUs.

2.2   Specifications

Table 2-1   CPU Link Module Specification

Item		Specifications
Module type		LQE050
Number of CPU link modules mounted		Up to 2/CPU (main link and sublink)
Number of CPUs linked		Up to 16/link line (main links and sublinks)
Data transfer area (*1)		G000 to GFFF (4,096 locations)
Data output area		Up to 1,024 locations/CPU (must be unique across all CPUs)
Link cable (*2)	Total extension of up to 1 km	Characteristic impedance: 150Ω (at 500 kHz) Attenuation: 8.5dB/km (at 500 kHz) Recommended cable type: CO-EV-SX 1P × 0.75mm^2 Hitachi Cable, Ltd. Terminal register: 150Ω
		Characteristic impedance: 150Ω (at 500 kHz) Attenuation: 7.8dB/km (at 500 kHz) Recommended cable type: CO-EV-SB 1P × 0.3mm^2 Hitachi Cable, Ltd. Terminal register: 150Ω
	Total extension of up to 600 m	Characteristic impedance: 100Ω (at 500 kHz) Attenuation: 12dB/km (at 500 kHz) Recommended cable type: CO-SPEV-SB 1P × 0.5mm^2 Hitachi Cable, Ltd. Terminal register: 100Ω
	Total extension of up to 300 m	Characteristic impedance: 100Ω (at 500 kHz) Attenuation: 17dB/km (at 500 kHz) Recommended cable type: CO-SPEV-SB 1P × 0.3mm^2 Hitachi Cable, Ltd. Terminal register: 100Ω
	Terminal block	18-point terminal block connectors (M3 screws)

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

(*2) 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.

2.3   Connecting to an S10 Series CPU Link Module

The S10mini CPU link module (LQE050) can be connected to S10 Series CPU link modules listed in Table 2-2.

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

Series name	Module type
HITACHI S10/2 α	LWE020
HITACHI S10/4 α	LWE820
HITACHI S10/2	CPL350

3 NAMES AND FUNCTIONS OF EACH PART AND CABLING

3.1   Names and Functions of Each Part
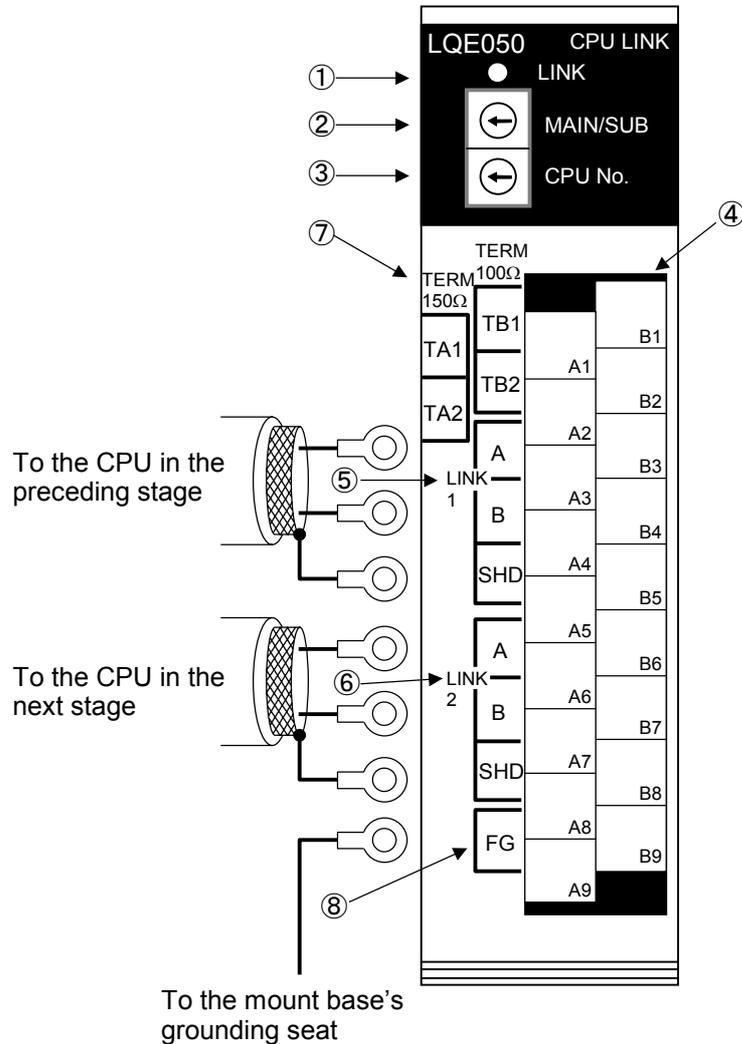
Figure 3-1   Names and Functions of Each Part

⚠ **DANGER**

Turn off the power before making connections to the terminal block.   Wiring with the power turned on may incur electrical shock hazards.

---

① LINK LED

Lights when data is transmitted over the line from the LQE050, regardless of the kind of the data.

② MAIN/SUB selector switch

In mounting two units of the LQE050 on a single CPU, use this switch to specify to which they are connected, the main link or the sublink.

Table 3-1 lists the possible switch settings.

Table 3-1   MAIN/SUB Selector Switch Settings

Setting	Explanation
0	Main link
1	Sublink
2 to F	Unused

NOTE

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 FFF).

③ CPU No. selector switch

Set a number between 0 to F to identify each CPU 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 in the preceding stage to this terminal.
LINK1 is internally wired to LINK2.

⑥ LINK2 line connection terminal

Connect the cable from the CPU in the next stage to this terminal.
LINK1 is internally wired to LINK1.

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 150Ω is used (leave TB1 and TB2 open).

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

Verify the characteristic impedance of a cable by consulting Section 2.2, "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 Section 1.3, "Ground Wiring."

4   OPERATIONS

4.1   Transfer

(1)   Transfer operation

The CPU link module transfers data to the CPUs connected to the CPU link line so as to equalize the contents of their G-registers (G0000 to GFFF).
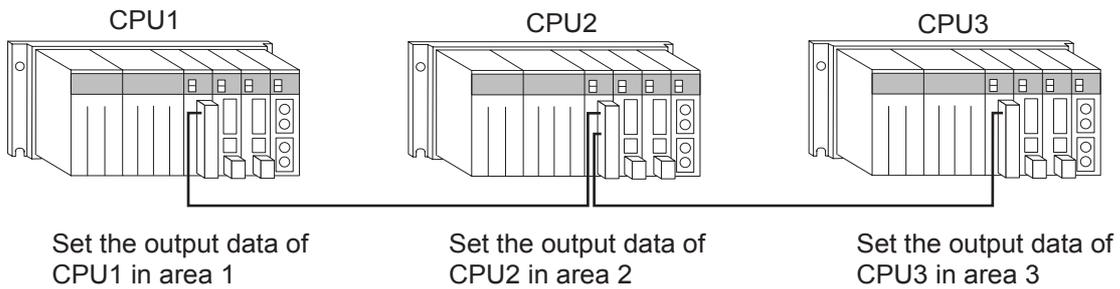
(2)   Transfer area and range

Using the personal computer, set the number and range of words that each CPU can transfer from its G-registers.   The words of up to 1,024 G-registers (256 words each) can be transferred from each CPU.

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 Section 5.4, "Setting Up from the Personal Computer."

CPUs have their transfer area set to zero by default.

Sample configuration:

CPU1   CPU2   CPU3

Set the output data of   Set the output data of   Set the output data of
CPU1 in area 1   CPU2 in area 2   CPU3 in area 3

G-register area states:

CPU1   CPU2   CPU3
G-register area   G-register area   G-register area

Area 1   →   Area 1   →   Area 1

Area 2   ←   Area 2   →   Area 2

Area 3   ←   Area 3   ←   Area 3
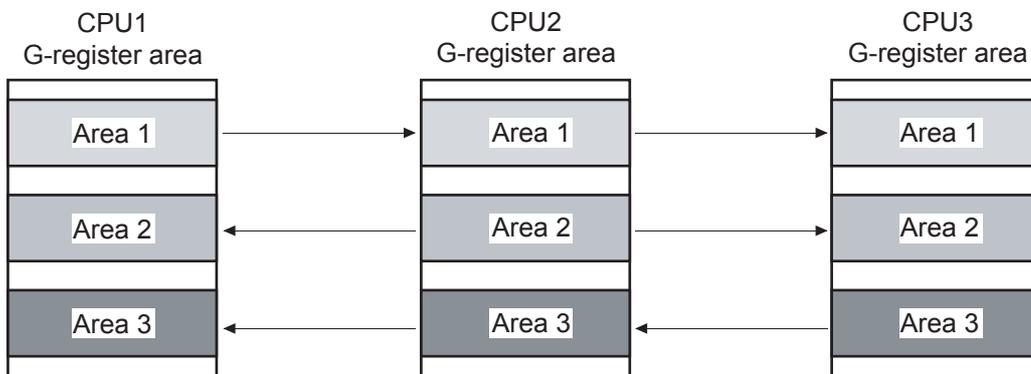
・ CPU1 transfers area 1 to CPU2 and CPU3.
・ CPU2 transfers area 2 to CPU1 and CPU3.
・ CPU3 transfers area 3 to CPU1 and CPU2.

Figure 4-1   Transfer Operation Examples

(3) Transfer stop

Transfers stop depending on the states of the CPU link module and the CPU module defined in Table 4-1.

Table 4-1   Transfer Stop

State	Cause	Transmission	Reception
Power off	The power module is powered off, or the power switch is off.	Stopped	Stopped
CPU STOP	The RUN/STOP switch on the CPU module's front-panel is set to STOP.	Stopped	Enabled
CPU DOWN	An internal error occurred in the CPU.	Stopped	Stopped
CPU reset	The reset switch on the CPU module's front-panel was pressed.	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 connected to the link line has been disabled from transmission due to any condition mentioned in item (3) in Section 4.1, "Transfer."

• 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, 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 Section 5.4 "Setting Up from the Personal Computer."
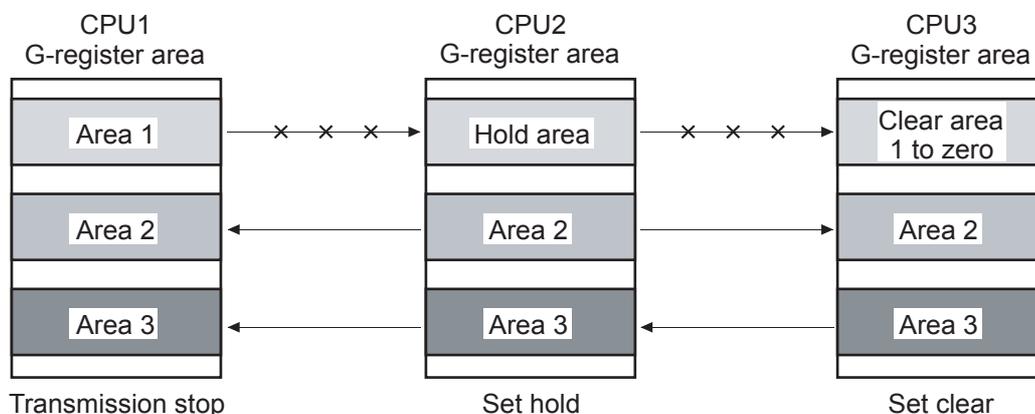
Figure 4-2   Clear/Hold Setting

(5) Operations using main links and sublinks
- Up to 16 CPUs 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 connected to the sublink line.   Likewise, the G-register data that is transferred over the sublink line is not reflected in the CPUs connected to the main link line.

Sample configuration:
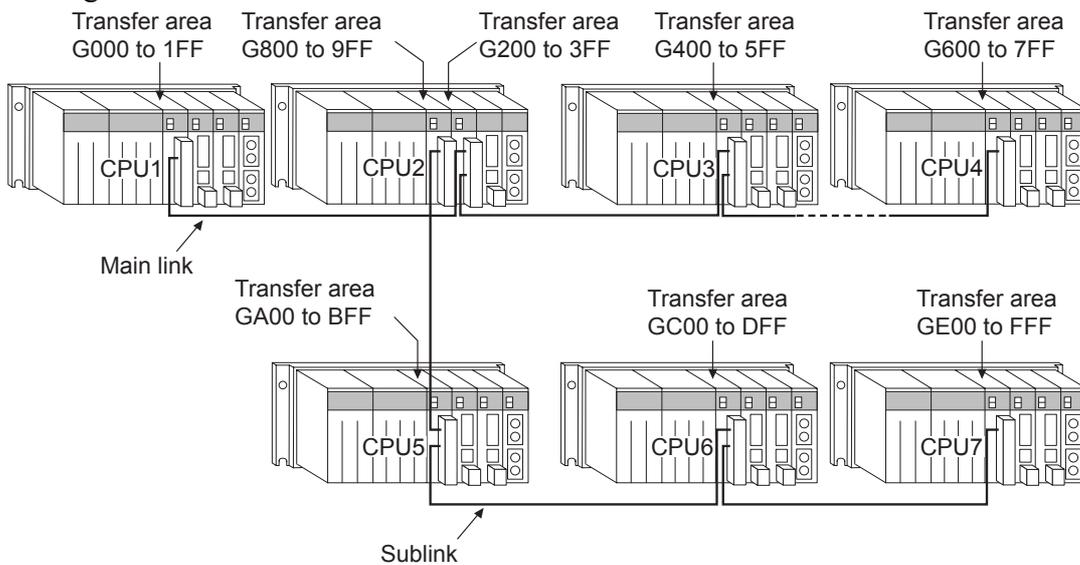
G-register area transfer operation:

Figure 4-3   Main Links and Sublinks

4.2   System Registers

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

(1)   Storage registers

● Main link

● Sublink
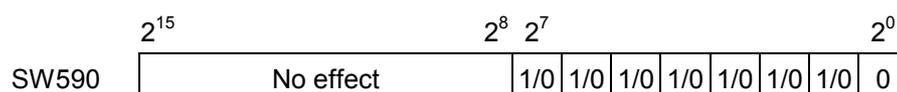
• Word data and bit data relationship
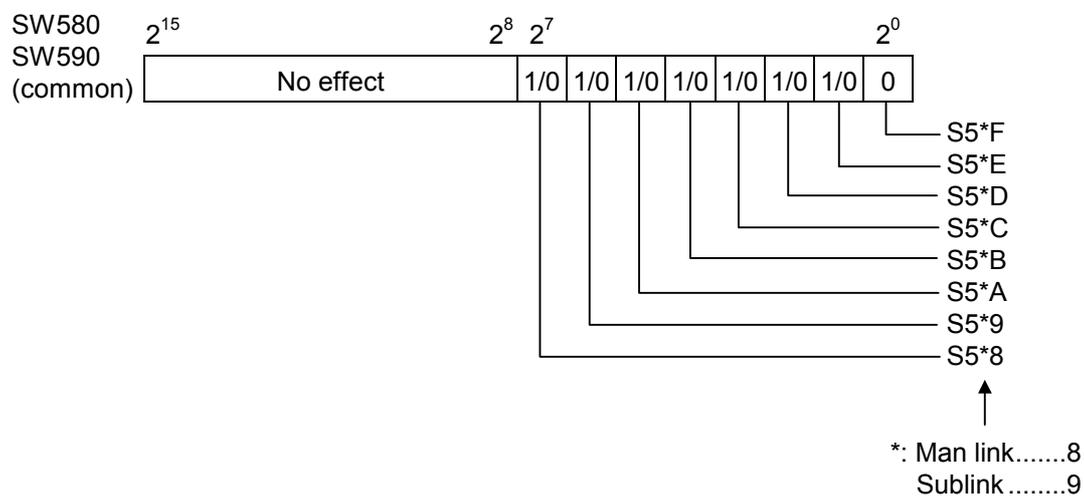
Figure 4-4   System Register Addresses

(2) Bit definitions

(common to both the main link and sublink)
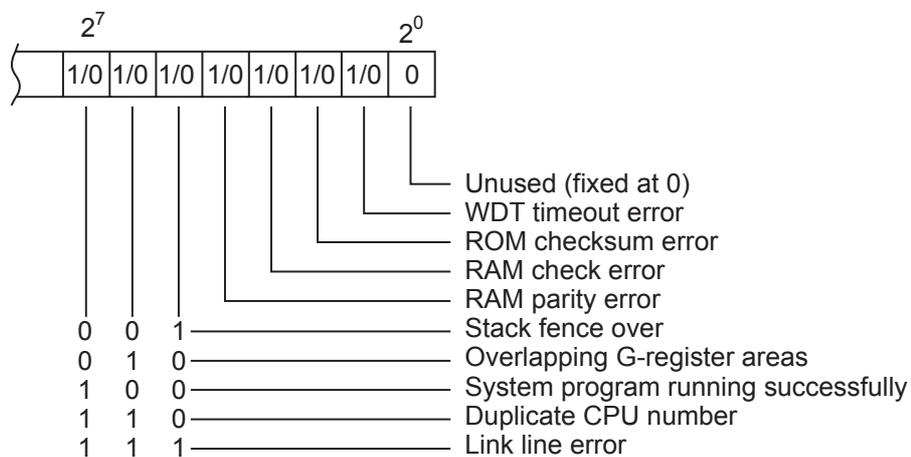
Figure 4-5   System Register Contents
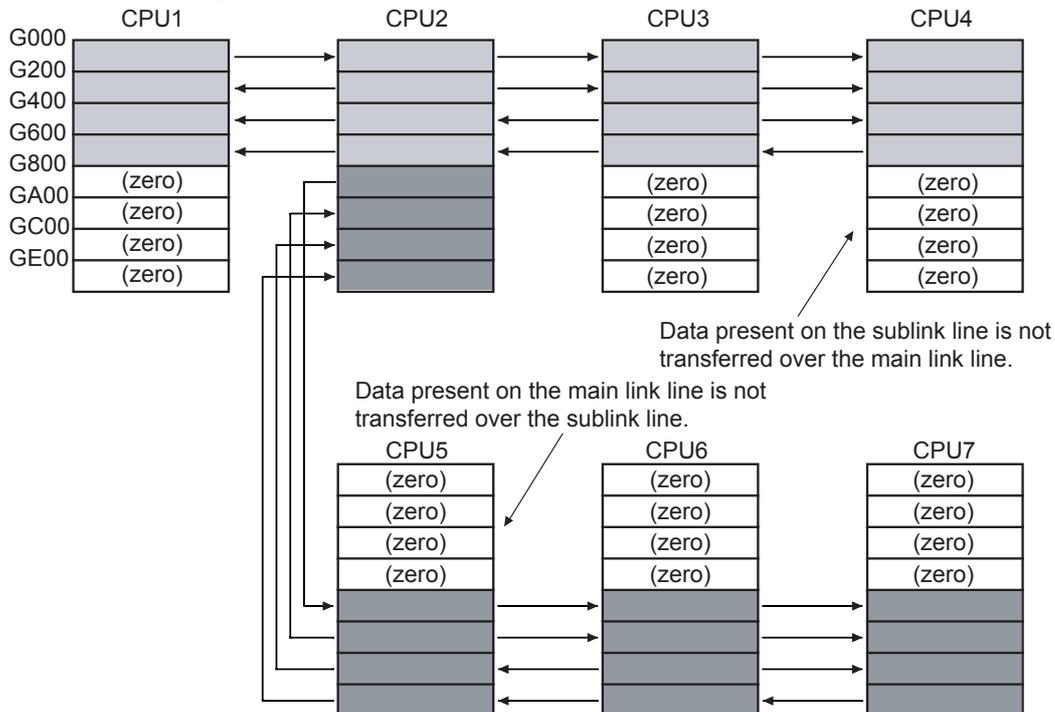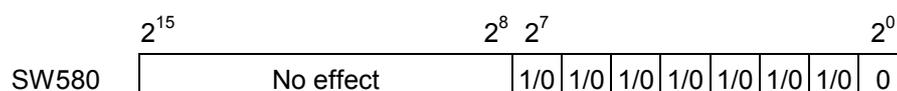
4.3 Response Time

Figure 4-6 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 is reflected in the G-register in another CPU 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 4-6.

Transfer areas per unit
——— – – — : 1 word
——— – —— – – : 8 words
— —— — — – : 16 words
- - - - - - - - - - : 32 words
——————— : 64 words
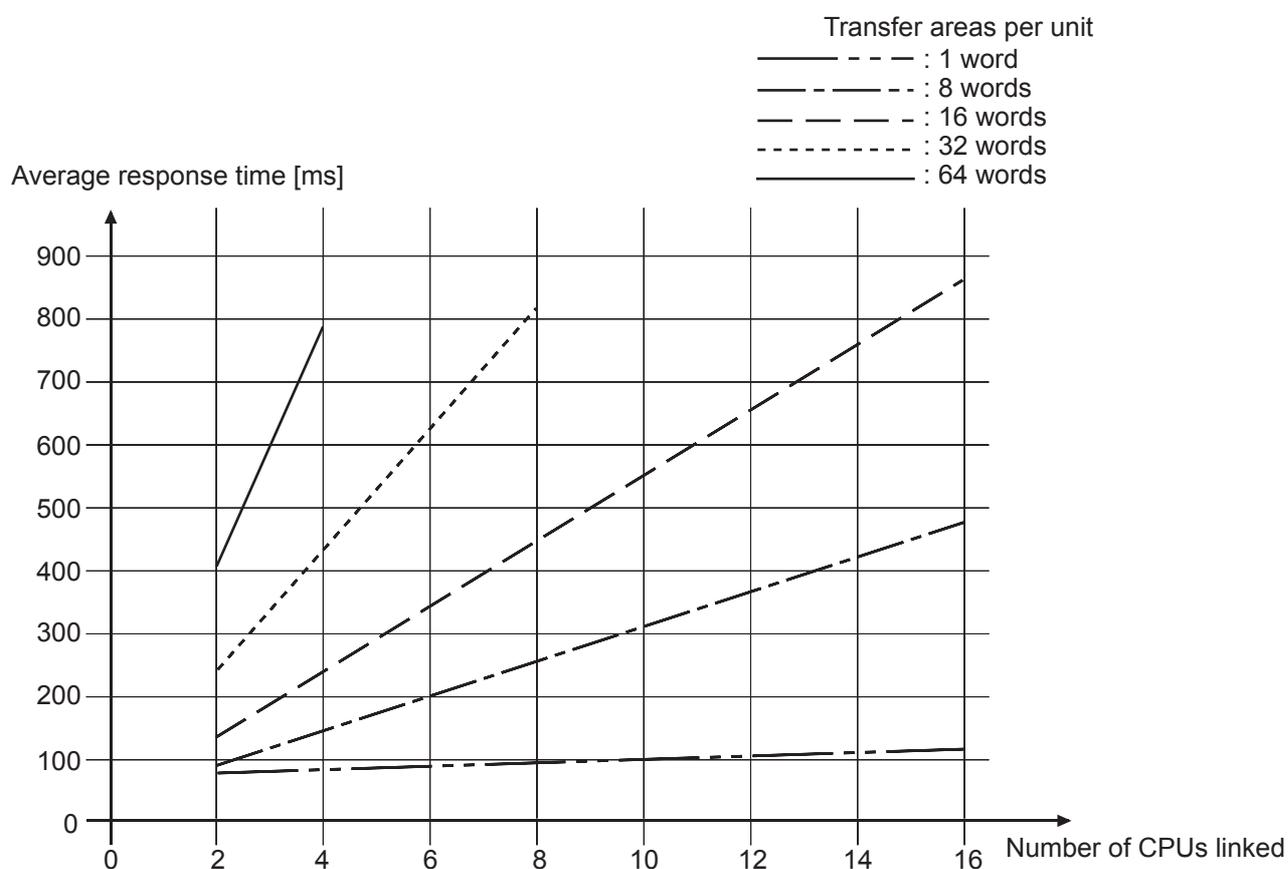
Figure 4-6   Response Time

5 SETUP AND OPERATIONS

5.1 Start-up Procedure
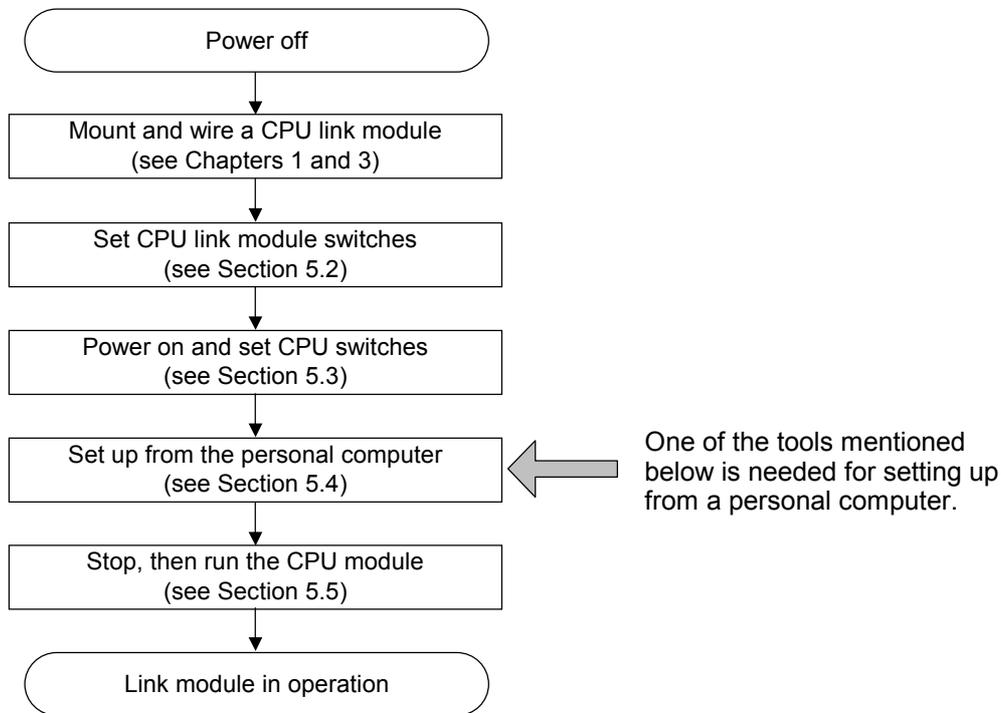
Figure 5-1　Startup Procedure

Table 5-1　Kinds of Tools Used for Setting Up from a Personal Computer

Package name	Kind	Form of supply
S10Tools system	S-7890-01J	Option
Ladder diagram system	S-7890-02J	Option
CPU link system	S-7890-22J	Option

5.2   Set CPU Link Module Switches

(1)   MAIN/SUB selector switch

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

Table 5-2   MAIN/SUB Selector Switch Settings

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

NOTE
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 FFF).

(2)   CPU No. selector switch

Set this selector switch to a number between 0 to F for each CPU 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.

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

⚠ **CAUTION**
Turn off the power before operating any switches.   Operating switches with the power turned on may cause the module to fail.

5.3   Power On and Setting CPU Switches

Turn on the power supply module's power switch and set the CPU switches.   Either action may come first.

(1) Power on
     With the power supply module cover open, set the POWER switch to ON to turn on the power.

(2) Setting the CPU module switches
     Set the following CPU module switches to the positions shown below:
     • LADDER switch: STOP
     • MODE switch: NORM or SIMU
     • PROTECT switch: ON or OFF

     For the switch positions, see Figure 5-2, which illustrates the case of using an LQV000 as a power supply module and an LQP000 as a CPU module.   If any other module is used, the switch indications, such as the module type, differ from those shown in Figure 5-2, but the switch positions and operation procedures are identical.
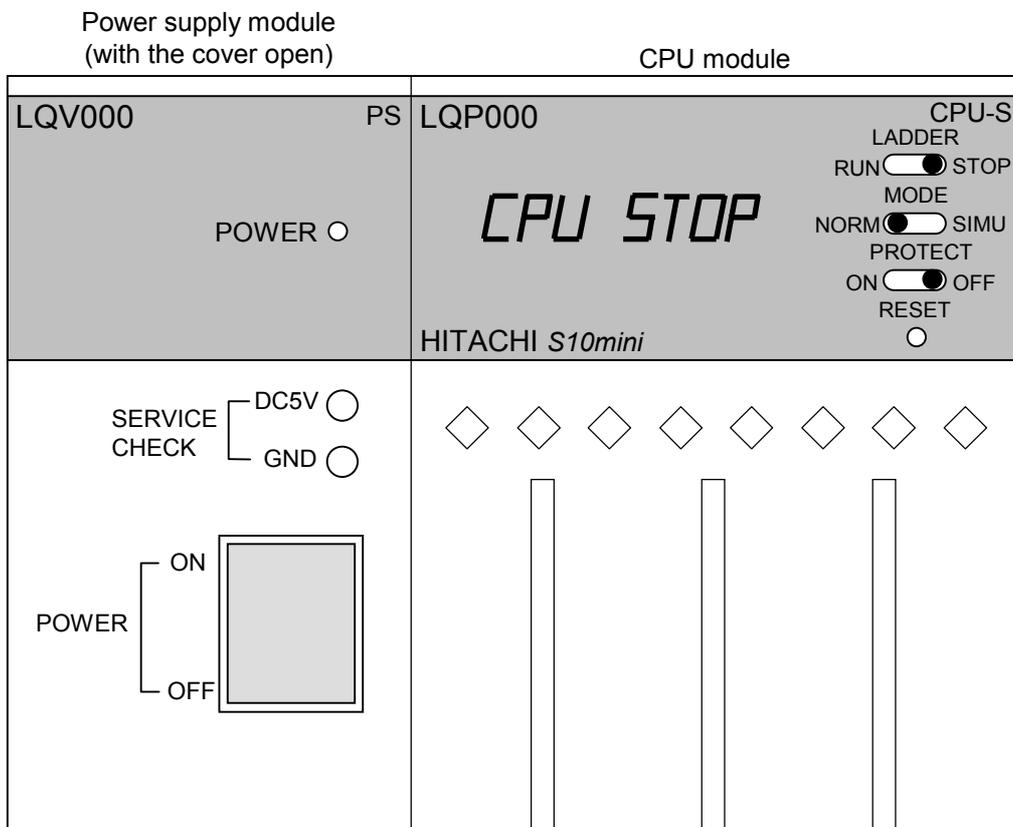
Figure 5-2   Power Supply Switch Positions and CPU Module Switch Settings

5.4   Setting Up from the Personal Computer

5.4.1   Setting up from the S10Tools system and ladder diagram system

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 following dialog box open:

Area that is set up for the module used as a main link

Area that is set up for the module used as a sublink
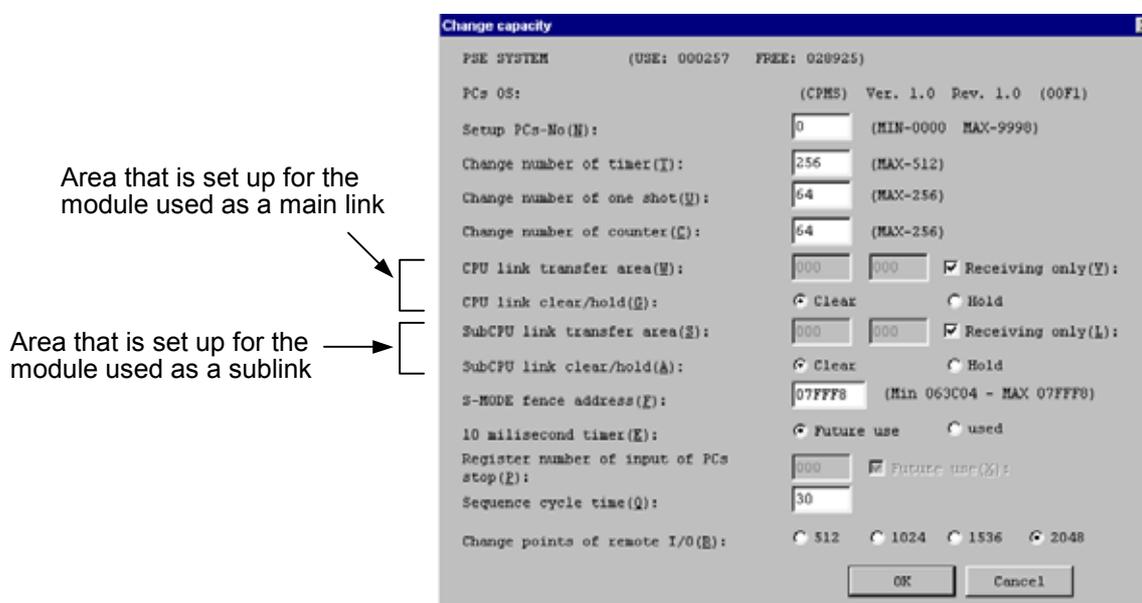
Figure 5-3   Change Capacity Dialog Box (Initial State)

③ Defaults

Transfer areas: None (Receiving only)

Hold/clear: Clear

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.

• To change the clear/hold setting to "Hold"

Click the "Hold" radio button.

Figure 5-4 shows a sample transfer area setting of G100 to G1FF, with a clear/hold setting of "Hold."
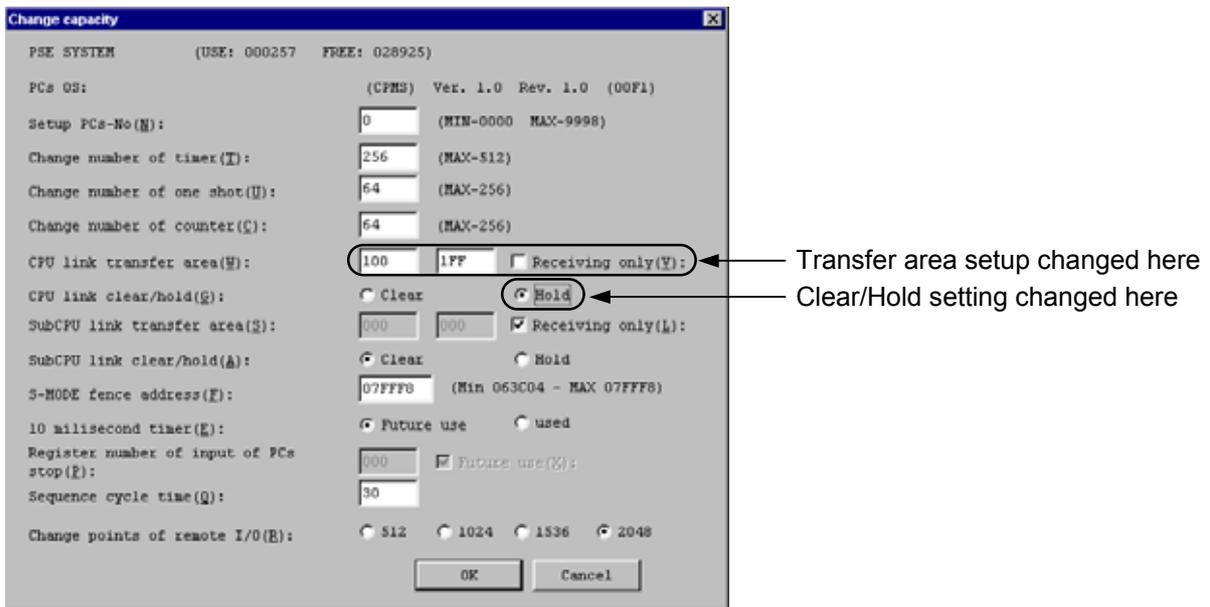
Figure 5-4   Change Capacity Dialog Box (Updated)

④ Click the OK button.

The setup is now completed.

5.4.2   Setting up from the CPU link system

① Start the CPU link system.   The CPU link system, when started, opens the dialog box shown below.   Do not click the "Transfer system program (S)" button.   The system program used to run the CPU link module is contained in the module itself.
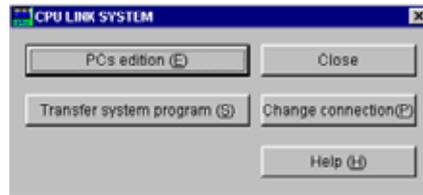
Figure 5-5   CPU Link System Startup Dialog Box

NOTE
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 (E)" button to see the following dialog box open:

Area that is set up for the module used as main link

Area that is set up for the module used as sublink
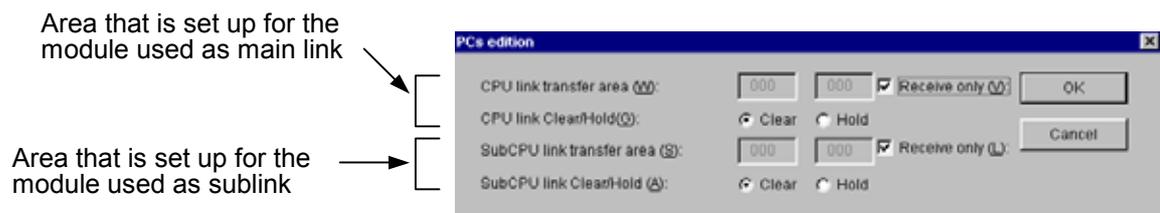
Figure 5-6   PCs Edition Dialog Box (Initial State)

③ Defaults

Transfer area: None (Reception only)

Hold/clear: Clear

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.

• To change the clear/hold setting to "Hold"

Click the "Hold" radio button.

Figure 5-7 shows a sample transfer area setting of G100 to G1FF, with a clear/hold setting of "Hold."
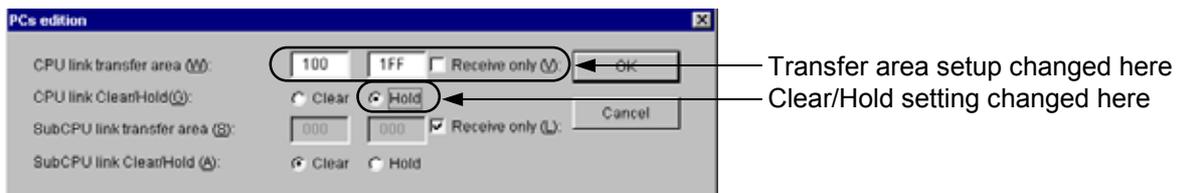
Figure 5-7   Change Capacity Dialog Box (Updated)

④ Click the OK button to return to the dialog box shown in ① and click the "Close" button.

The setup is now completed.

5.5   Stopping, Then Running CPU Module

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 LADDER switch, see Section 5.3; for the location of the LINK LED, see Chapter 3.
• RUN has two modes of operation: normal (NORM) and simulation (SIMU) (Use the CPU module MODE switch to choose between these two modes).   Either mode setting enables the CPU link module to transmit.

The settings entered in Section 5.4 are loaded into the CPU 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.

6   PROGRAM EXAMPLES

6.1   Program Examples

(1) Configuration and sample settings

Set the output data of
CPU1 in G000 to 0FF

Set the output data of
CPU2 in G100 to 1FF

Figure 6-1   Configuration and Sample Settings for Sample Program

(2) Sample program

Figure 6-2   Sample Program

<Operation description>
  • When CPU1 X000 turns on, CPU2 Y000 turns on via G000.
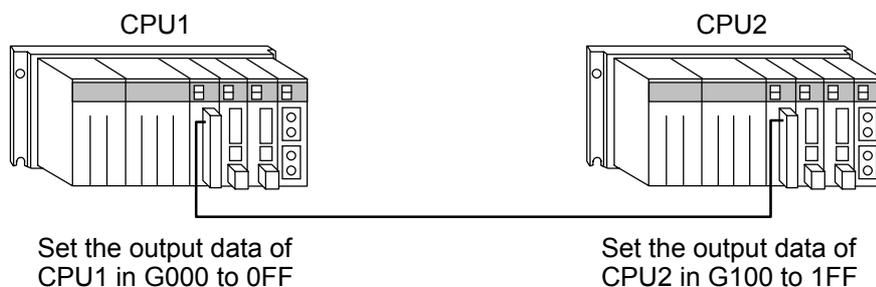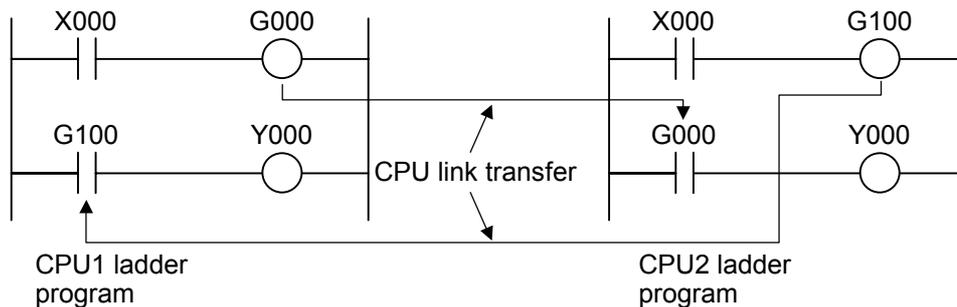 • When CPU2 X000 turns on, CPU1 Y000 turns on via G100.

7 TROUBLESHOOTING

7.1　Checks Done When the Machine Might Be Faulty

● Is the power supply module POWER LED lit?
　• If the power is off, the POWER LED remains off.
　　Turn on the power supply module power switch.

● Is the CPU module functioning normally?
　• Check to see if the CPU module error indicator shows an error condition.
　　For definitions of the CPU module indications, refer to Section 9.3, "Troubleshooting," of the
　　S10mini CPU manual (manual number SME-1-100).

● Is the terminal block wired as specified?
　• Ensure that the total extension of the link cable meets the specifications.　See Section 2.2,
　　"Specifications."
　• Use of different types of cables in a single CPU link line may cause communication errors.
　• Be sure to use a single type of cable to wire each line.
　• The modules at both ends of the CPU link line require termination.　Without termination,
　　continuous or intermittent communication errors may occur.

● Is the CPU link module mounted properly on the mount base?
　• Any vacant slot or an existing I/O module between the CPU module and the optional module
　　that follows will disable successful operations.　Mount optional modules to leave no vacant
　　slot in between after the CPU module.

● Does the CPU module error indicator indicate a CPU link module error?
　• See Section 7.2 for descriptions of CPU link module error indications and the associated
　　actions.

● None of the above
　• Check out and take action as suggested in Section 7.3.

Figure 7-1 illustrates the case of using an LQV000 as a power supply module and an LQP000 as a
CPU module.　If any other module is used, the switch indications, such as the module type, differ
from those shown in Figure 7-1, but the switch positions and operation procedures are identical.
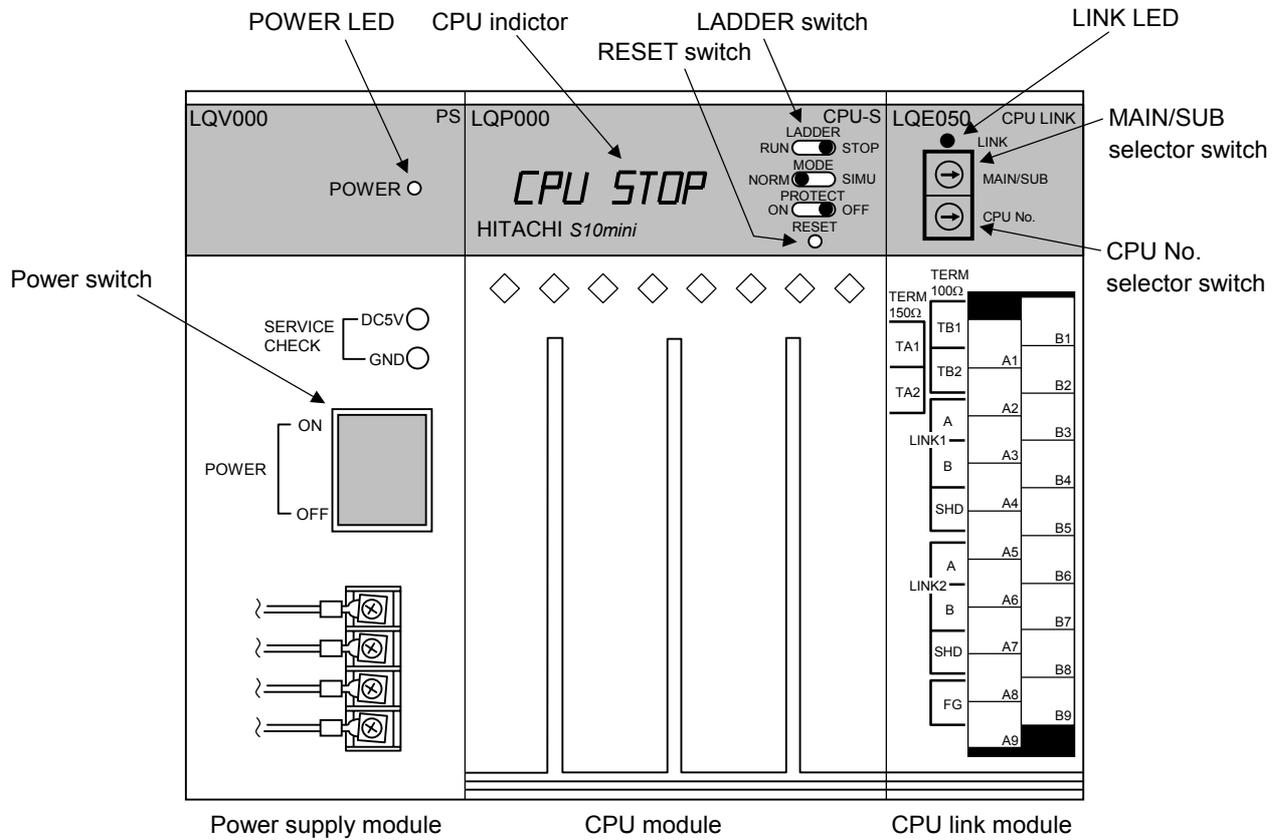
Figure 7-1   Places To Be Checked During Troubleshooting

7.1.1 Replacing or adding on the module
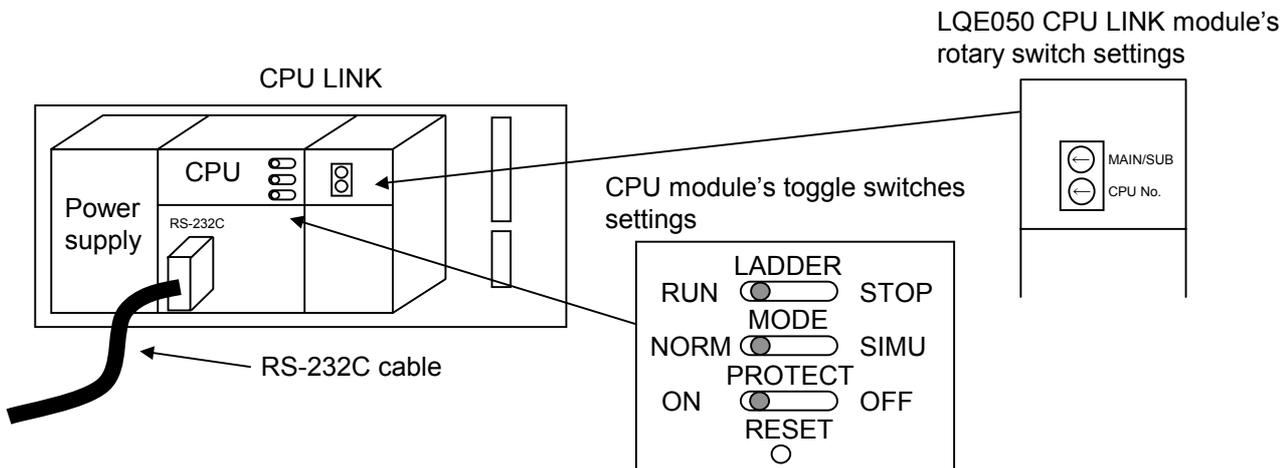
● What you should get in preparation
  ① Personal computer (with Hitachi's S10 CPU LINK System installed in it)
  ② RS-232C cable (or 10BASE-T cable if the communication module used is an ET.NET module)
  ③ New or add-on CPU LINK module (LQE050)
  ④ The above-mentioned ET.NET module is an optional module 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 three switches, labeled LADDER (toggle switch), MODE (toggle switch), and PROTECT (toggle switch), respectively, that are, as shown below, accessible at the front side of the CPU module.

LQE050 CPU LINK module's rotary switch settings

CPU LINK

CPU module's toggle switches settings

MAIN/SUB
CPU No.

LADDER
RUN — STOP
MODE
NORM — SIMU
PROTECT
ON — OFF
RESET

Power supply   RS-232C

RS-232C cable

  ③ Connect the personal computer and the CPU module together with the RS-232C cable.
  ④ Start Hitachi's S10 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 S10 Ladder System.)
  ⑤ Set the CPU 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 S10 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 CPU 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 CPU module's LADDER, MODE, and PROTECT 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 three switches, labeled LADDER (toggle switch), MODE (toggle switch), and PROTECT (toggle switch), respectively, that are accessible at the front side of the CPU 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 CPU 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 "1.2   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 CPU 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 S10 CPU LINK System.

⑥ Reset the CPU module by pressing the RESET switch 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 CPU module's LADDER, MODE, and PROTECT switches in the same way as you wrote down in Step ①.

⑨ Remove the RS-232C cable from both the personal computer and CPU 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.

7.2 CPU Module Indications and Associated Actions

Table 7-1 CPU Module Indications and Associated Actions

No.	Indication	Explanation	Action
1	CPL▲ ROM	ROM checksum error	• Press the CPU RESET switch for 1 second or longer, then release. For the location of the RESET switch, see Section 7.1. • If the indication won't clear, the CPU link module is faulty. Replace.
2	CPL▲ SSP	Stack fence over	
3	CPL▲ WDT	WDT timeout error	
4	CPL▲ RAM	System program error	
5	CPL▲ PTY	RAM parity error	
6	EX8■ PTY	Parity error while reading RAM in the CPU link module from the CPU or personal computer.	
7	CPL▲ NONG	A module having the same CPU number already exists on the CPU link line.	Verify the setting of the CPU No. selector switch on the CPU link module connected to the CPU link line and set it again to avoid defining the CPU number in duplicate.
8	CPL▲ GNG	The source and destination G-register areas are identical.	Verify the transfer area setting of the CPU link module connected to the CPU link line and set the transfer area again to avoid defining the G-register area in duplicate.
9	CPL▲ TRM	Continuous or intermittent reception errors while transferring the G-register area.	• Ensure that the total extension of the link cable meets the specifications. See Section 2.2, "Specifications." • Check to see if the link cable and the crimp terminal are not disconnected or broken. • Verify the terminating-resistor setting. For setup instructions, see Section 3.1, "Names and Functions of Each Part."
10	CPL▲ △ . □	The CPU link module is running successfully. △ denotes the version number of the internal program, □ the digit to the right of the dot in the revision number.	Signifies a successful operation, not an error.
11	None of 1 to 9 above	The CPU link module has not started up successfully due to corrupted data in ROM or the like.	• Press the CPU RESET switch for 1 second or longer, then release. For the location of the RESET switch, see Section 7.1. • If the indication persists, the CPU link module is faulty. Replace.

MAIN/SUB setting	▲	■
Module used as main link	M	0
Module used as sublink	S	1

⚠ CAUTION

Turn off the power before operating any switches.   Operating switches with the power turned on may cause the module to fail.

7.3   Typical Actions

If the items to check mentioned in Section 7.1 are found normal, continue to make checks with regard to the items listed below.

7.3.1   The LINK LED won't light

• Check out and take action as set forth in Table 7-2.
• If the LINK LED still won't light after the actions stated in Table 7-2, replace the CPU link module.

Table 7-2   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. For the location of the LADDER switch, see Section 7.1.
A transfer area has not been set up, or one has been set up for reception only.	Set a transfer area. For information on how to set a transfer area, see Section 5.4.
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.

The LINK LED lights only when the CPU link module is transmitting data over the link line.   The LINK LED will stay off, therefore, when the CPU link module is running in "reception only" mode.

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

• Check out and take action as set forth in Table 7-3.
• If the inability to receive data still persists after the actions stated in Table 7-3, replace the CPU link module.

Table 7-3   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.	• Check to see if the terminal block is wired as specified. (See Section 7.1.) • 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.

7.3.3 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 7-4.

• If the LINK LED still won't light after the actions stated in Table 7-4, replace the CPU link module.

Table 7-4   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.