MELSEC System Q

Programmable logic controller

Users Manual

Hardware
PPC-CPU 686(MS)-64
PPC-CPU 686(MS)-128

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Version A

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Using the Product Safely

Safety Precautions

Take the following precautions to use the product safely.

- Do not use or store the product where it is subject to shock or vibration as it contains precision electronic components.
- Do not modify the product. CONTEC bears absolutely no responsibility for the product which has been modified.
- Do not use or store the product where it is exposed to extremely high or low temperature or to an abrupt change in temperature.
- Do not use or store the product under direct sunlight or near any heating apparatus such as a heater or stove.
- Some products have to be set up before they can be used normally. Be sure to check whether the product is one before use. Set the switches and jumpers only as specified, or the product may develop trouble.
- Do not use or store the product in a highly humid or dusty place.
- If you find anything wrong with the product, consult your local retailer, CONTEC sales office, or the CONTEC Information Center.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	Indicates an imminent danger of causing death or severe injury unless the situation is avoided correctly as instructed.
⚠ WARNING	Indicates a potential danger of causing death or severe injury unless the situation is avoided correctly as instructed.
⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

Design Precautions

⚠ DANGER	Indicates an imminent danger of causing death or severe injury unless the situation is avoided correctly as instructed.

Provide this Unit with external safety circuits so that the entire system is protected even if the external power supply or the Unit goes wrong.

(1) Configure those circuits outside the Unit which include an emergency stop circuit, a protection circuit, an interlock circuit for contrary operations such as normal and reverse rotations, and an interlock circuit for preventing a machine from breaking beyond the upper or lower positioning limit.

(2) The Unit stops arithmetic operations and turns all outputs off upon detection of the following states.

The overcurrent or overvoltage protector of the power supply module has been actuated.
The self-diagnostic feature of this Unit has detected an error such as a watchdog timer error.
If I/O control transparent to this Unit causes an error, all of the outputs may be turned on.
Provide the Unit with an external fail-safe circuit or mechanism so that the machine operates on the safe side in that case.

(3) Depending on the fault of a relay or transistor in an output unit, the output may remain on or off.
For output signals which can result in serious accidents, provide external monitor circuits.

If an overcurrent continues to flow to the output for an extended period of time due to a rating error or short-circuited load, the output unit may smoke or burn. Provide an external safety circuit such as a fuse.
Configure the circuit containing this Unit so that the external power supply is turned on after the Unit is turned on.
Turning on the external power supply before the Unit may result in an output error or malfunction, possibly causing an accident.
When a data link causes a communication error, the operation status of the affected station changes depending on the type of the data link in use. Configure an interlock circuit in a user program so that the system acts on the safe side.
An output error or malfunction may cause an accident.

(1) The data link holds data existing prior to the occurrence of the communication error.

(2) The remote I/O station of MELSECNET/H turns all of its outputs off.

When configuring the system, do not leave an empty slot in the base unit. If the base unit has an empty slot, be sure to apply a blank cover (QG60) to the slot.
Internal components of the Unit may scatter around when a short-circuit test is performed or when an overcurrent or overvoltage is applied to the external I/O section.

⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

Any control line or communication cable should be neither bundled with nor routed adjacent to the main circuit or power line. The control line and communication cable should be at least 100mm away from the main circuit and power line.
Poor wiring conditions result in malfunctions caused by noise.
When the output unit controls components such as the lamp load, heater, and solenoid valve, a large current (about 10 times the normal value) may flow at the OFF-to-ON transition of the output. Take appropriate measures, for example, by replacing it with a unit of a higher rated current.

Installation Precautions

⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

- Use the Unit in the environment specified in this manual. Using the Unit in an environment not satisfying all the specifications can cause an electric shock, fire, malfunction, product damage, and/or product degradation.
- Mount the Unit on the base unit with the unit fixing hook at the bottom of the Unit fit in the fixing slot in the base unit. Failure to mount the Unit correctly can let the Unit malfunction or fall. Before attempting to use the Unit in a place subject to considerable vibration or shock, use the unit fixing screw to fasten the Unit securely to the base unit. The unit fixing screw must be tightened within the specified tightening torque range. Tightening the screw loosely can let the Unit fall, cause a short circuit, or malfunction. Tightening the screw excessively can break the screw or the Unit, letting the Unit fall, cause a short circuit, or malfunction.
- When connecting an extension cable, plug it securely into the relevant connector on the base unit or the Unit. Check the connection after plugging it to prevent an imperfect contact which can cause input and output errors.
- Before attaching or detaching this Unit, be sure to turn the external power supply off for all phases, or the product may be damaged.
- Do not directly touch any conductive part or electronic component of the Unit. Doing so may cause the Unit to malfunction or fail.

Wiring Precautions

⚠ DANGER	Indicates an imminent danger of causing death or severe injury unless the situation is avoided correctly as instructed.

- Before mounting or wiring the Unit or any other product, be sure to turn the external power supply for all phases.
  Failure to turn it off for all phases may cause an electric shock, product damage, or malfunction.

⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

- Be sure to ground the FG and LG terminals by at least Class D Grounding (former Class3 Grounding) exclusive for sequencers. Failure to do so may cause an electric shock or malfunction.
- Be careful not to let foreign matters such as chips and wire tailings in the Unit.
  Foreign matters caught in the Unit may cause a fire, fault, or malfunction.
- Wire each product to the Unit correctly after checking the rated voltage and pin assignments of the product. Connecting a power supply not matching the rating or miswiring may cause a fire or fault.
- Tighten each terminal screw within the specified tightening torque range. Tightening the terminal screw loosely may result in a short circuit or malfunction. Tightening the terminal screw excessively can break the screw or the Unit, also resulting in a short circuit or malfunction.

- The cables connected to this Unit must be either enclosed in ducts or fixed with clamps. Doing neither allows the cables to hang loose, move, or be pulled inadvertently, resulting in the Unit and/or cables damaged or the Unit malfunctioning due to an imperfect contact in cable connection.
- When disconnecting each cable from this Unit, do not hold the line to pull. Unplug the cable after loosening the screws fastening the cable end to the connector in the Unit. Pulling the cable connected to the Unit may break the Unit and/or cable or cause the Unit to malfunction due to an imperfect contact in the cable connection.
- Do not connect the outputs of two or more power units in parallel.
  Doing so heats up the power units, possibly causing a fire or fault.
- The connectors for external connection must be crimped, welded with pressure, or soldered correctly with the relevant tool. For the crimping and pressure welding tools, refer to the input/output module user's manual. An imperfect connection can cause a short circuit, fire, or malfunction.

Power Supply and Maintenance Precautions

⚠ DANGER	Indicates an imminent danger of causing death or severe injury unless the situation is avoided correctly as instructed.

Do not touch any terminal with the Unit powered, or it may malfunction.

- Before cleaning the Unit or tightening up terminal screws, be sure to turn the external power supply off for all phases.
  Failure to turn it off for all phases may either result in an electric shock or cause the Unit to fail or malfunction. Tightening the screw loosely can let the Unit fall, cause a short circuit, or malfunction. Tightening the screw excessively can break the screw or the Unit, letting the Unit fall, cause a short circuit, or malfunction. Do not touch any terminal with the Unit powered, or it may malfunction.

⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

- Read the manual thoroughly and check the entire system sufficiently for safety before performing online operations during a machine run (in particular, for a program change, forced output, and operation status change). An operation error can break the machine or cause an accident.
- Do not disassemble or modify any unit. Doing so may result in a fault, malfunction, injury, or fire.
- Before attaching or detaching the Unit, be sure to turn the external power supply off for all phases. Failure to turn it off for all phases may cause the Unit to fail or malfunction.

Disposal Precautions

⚠ CAUTION	Indicates a potential danger of either causing a minor or moderate injury or resulting only in property damage unless the situation is avoided correctly as instructed.

- When disposing of the product, treat it as industrial waste.

EMC and Low Voltage Directives

To make the equipment based on the MELSEC-Q Series PLC including this Unit conform to the EMC and Low Voltage Directives, be sure to refer to "EMC and Low Voltage Directives" in the following MELSEC-Q Series manual to configure the equipment as specified therein.
QCPU (Q Mode) CPU Unit User's Manual (Hardware)

Model name: QCPU(Q)-U(H/W)-E
QCPU (Q Mode) CPU Unit User's Manual (Hardware Design, Maintenance and Inspection)
Model name: QCPU(Q)-U(HH)-E

* The cables lead from this Unit to the outside of the control panel must be shielded cables. For each shielded cable, apply a metal clamp to the shield exposed by partly stripping the cable and ground it for connection to the control panel as near this Unit as possible.

Note! *Before turning off the power to this Unit, shut down the OS. Note that, if you turn it off with the OS up and running, the OS may fail to get started normally the next time you boot the Unit.*

Also, you should connect an uninterruptible power supply (UPS) to the Unit in case of a power failure.

Table of Contents

1 Introduction

The PC CPU module is a PC/AT compatible personal computer that can be incorporated into the MELSEC-Q Series manufactured by Mitsubishi Electric Corporation. The Unit is available in the following two models different in memory capacity.

PPC-CPU686(MS)-64	64 MB installed
PPC-CPU686(MS)-128	128 MB installed

1.1 Features

Capable of processing information and control data seamlessly by the combination of the MELSEC-Q Series PLC CPU module for sequence control and the PC CPU module for information processing.
Integrating the major features of the personal computer in a compact unit fit in two slots in the MELSEC-Q Series base unit.
Employing a low-power consumption, high-speed CPU of Intel Mobile Celeron 400MHz (with 100-MHz FSB), enabling processing of a large amount of data at high speed without a fan.
- Containing the CONTEC-customized BIOS (manufactured by Phoenix Technologies), providing BIOS-level support.
- Coming standard with a 100BASE-TX LAN interface.
- Coming standard with PC Card slots (PCMCIA slots).
- Capable of connecting a hard disk unit and a more reliable silicon disk unit as external storage devices on the same base unit. Best suited for use in a place subject to vibration and shock or for continuous operation for an extended period of time.

1.2 OS’s Supported

- Windows 2000 Professional
- Windows NT Workstation 4.0
- Windows NT Embedded 4.0

1.3 Limited One-Year Warranty

CONTEC Interface boards are warranted by CONTEC Co., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.
Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.
This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original boards. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

1.4 How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice.
Please obtain a Return Merchandise Authorization Number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

1.5 Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

1.6 Organization of This Manual

This manual consists of the following chapters:

Chapter 1	Introduction
Chapter 2	Overview This chapter lists the specifications of the PPC-CPU686(MS) and introduces the names of major units making up the entire system.
Chapter 3	Installing and Uninstalling the Hardware This chapter explains how to install and uninstall the PPC-CPU686(MS).
Chapter 4	BIOS Setup This chapter describes BIOS Setup.
Chapter 5	Functions of Components This chapter locates the major parts of the PPC-CPU686(MS) and describes their functions.
Chapter 6	Combination with the MELSEC-Q Series This chapter discusses the combination of the PPC-CPU686(MS) with the MELSEC-Q Series.
Chapter 7	Reset Specifications This chapter describes the procedures for resetting the system.
Chapter 8	Troubleshooting This chapter summarizes the check items for troubleshooting.
Chapter 9	Appendix This chapter contains the memory map and I/O port address list of the PPC-CPU686(MS).
Chapter 10	Options This chapter lists the options available to the PPC-CPU686(MS).
Chapter 11	PC CPU Related Manuals This chapter lists the manuals for related products.
Chapter 12	Recommended Third-Party Products This chapter lists third-party products available to the PPC-CPU686(MS).

2 Overview

2.1 Specifications

<table>
<tr><th colspan="2">Model</th><th>PPC-CPU686(MS)-64</th><th>PPC-CPU686(MS)-128</th></tr>
<tr><td colspan="2">CPU</td><td colspan="2">Mobile Celeron Processor-LP 400MHz, FSB100MHz (Intel)</td></tr>
<tr><td colspan="2">Chipset</td><td colspan="2">440BX (Intel)</td></tr>
<tr><td rowspan="3">Memory</td><td>L1 Cache</td><td colspan="2">16KB</td></tr>
<tr><td>L2 Cache</td><td colspan="2">128KB</td></tr>
<tr><td>Main memory</td><td>64MB</td><td>128MB</td></tr>
<tr><td rowspan="5">Video</td><td>Controller</td><td colspan="2">B69000 (C&T)</td></tr>
<tr><td>Video RAM</td><td colspan="2">2 MB (Built in the controller)</td></tr>
<tr><td>CRT I/F</td><td colspan="2">Analog RGB 15-pin HD-SUB connector</td></tr>
<tr><td>Specifications</td><td colspan="2"><table><tr><th></th><th>VGA (640x480)</th><th>SVGA (800x600)</th><th>XGA (1024x768)</th></tr><tr><td>Horizontal sync signal frequency</td><td>31.5kHz</td><td>37.9kHz</td><td>48.4kHz</td></tr><tr><td>Vertical sync signal frequency</td><td>60Hz</td><td>60Hz</td><td>60Hz</td></tr><tr><td>Display colors</td><td>16,777,215</td><td>16,777,215</td><td>65,536</td></tr></table></td></tr>
<tr><td colspan="2">FDD I/F</td><td colspan="2">26-pin half-pitch connector. Optional FDD: PC-FDD25BH</td></tr>
<tr><td rowspan="2">IDE I/F</td><td>Primary</td><td colspan="2">40-pin half-pitch connector (Up to 2 units acceptable)</td></tr>
<tr><td>Secondary</td><td colspan="2">Not supported</td></tr>
<tr><td colspan="2">Serial interfaces</td><td colspan="2">RS-232C compliant: 2 channels (9-pin D-SUB connector and extension interface (EX.I/F)) Transfer rate: 50 to 115,200 bps</td></tr>
<tr><td colspan="2">Parallel interface</td><td colspan="2">1 channel (Extension interface (EX.I/F))
Supported modes: Normal, SPP, EPP 1.7/1.9, ECP</td></tr>
<tr><td rowspan="2">LAN</td><td>I/F</td><td colspan="2">Ethernet 100BASE-TX/10BASE-T RJ-45 connector</td></tr>
<tr><td>Controller</td><td colspan="2">82559 (Intel)</td></tr>
<tr><td rowspan="5">PC Cards</td><td>Controller</td><td colspan="2">PCI1420 (TI)</td></tr>
<tr><td>Card Type</td><td colspan="2">PCMCIA, CARD-BUS *1</td></tr>
<tr><td>Card Slot</td><td colspan="2">Type I/II x 2, or Type III x 1</td></tr>
<tr><td>Display *2</td><td colspan="2">Card detection LED (green) x 2</td></tr>
<tr><td>ATA card boot *3</td><td colspan="2">Enabled only in SLOT1.
Hot plugging not supported as ATA cards are handled as IDE devices.</td></tr>
<tr><td colspan="2">USB I/F *1</td><td colspan="2">2 channels (one of which is in the extension interface (EX.I/F))
Ver 1.1 compliant. Transfer rate: 1.5/12 Mbps</td></tr>
<tr><td colspan="2">Keyboard/PS2 mouse interface</td><td colspan="2">6-pin MINI DIN connector (shared by keyboard and mouse)
Both can be used at the same time with the conversion cable KB-PSY02K3 (SANWA SUPPLY).</td></tr>
<tr><td colspan="2">Watchdog timers</td><td colspan="2">2 channels
Time-out period: System WDT: 20 msec to 2 sec. User WDT: 20 msec to 10 sec</td></tr>
<tr><td colspan="2">RTC/CMOS</td><td colspan="2">Lithium-ion battery backup. Battery life: 10 years min. (at 25ºC)
Clock precision: [+/-]1 minute/month (at 25ºC)</td></tr>
<tr><td colspan="2">Display LEDs</td><td colspan="2">RDY (Green), B.RUN (Green), ERR. (Red), USER (Red), BAT. (Orange), EXIT (Green)</td></tr>
<tr><td colspan="2">Controls</td><td colspan="2">Reset pushbutton, 6-bit DIP switch, 3-position toggle switch</td></tr>
<tr><td colspan="2">OS's supported</td><td colspan="2">Windows 2000 Professional, Windows NT Workstation 4.0,
Windows NT Embedded 4.0</td></tr>
<tr><td colspan="2">Base unit slots occupied</td><td colspan="2">2 slots</td></tr>
<tr><td colspan="2">External dimensions (mm)</td><td colspan="2">55.2 (W) x 115.0 (D) x 98.0 (H) (Excluding protrusions)</td></tr>
<tr><td colspan="2">Power consumption (+5 VDC)</td><td colspan="2">5V 3.0A (Max.) *4</td></tr>
</table>

Tab. 2.1: *Function Specifications (1)*

Model	PPC-CPU686(MS)-64	PPC-CPU686(MS)-128
Acceptable momentary power failure time	Depending on the power supply module	
Weight	470g	

*1 Supported only by Windows 2000.

*2 Comes on when the card is recognized normally and remains on until unplugging the card is detected.

*3 Handled as drive C when booted from the ATA card. (Otherwise, handling depends on the OS and driver specifications.) Only the OS which can be booted from the ATA card is Windows NT Workstation 4.0 or Windows NT Embedded 4.0. Windows 2000 Professional cannot be booted that way. To boot the system from the ATA card, see Chapter 9 "Appendix".

*4 This does not include the current consumption by any peripheral device (such as the PC Card, USB device, keyboard, or mouse) or by the connector terminal.

Tab 2.1: *Function Specifications (2)*

<table>
<tr><th>Item</th><th colspan="4">Condition</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="4">0 to 55℃</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="4">-25 to 75℃</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="4">5 to 95% RH (No condensation allowed)</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="4">5 to 95% RH (No condensation allowed)</td></tr>
<tr><td>Vibration resistance</td><td>Conforming to JIS B3502 and IEC 61131-2</td><td colspan="2"><table><tr><td colspan="3">With intermittent vibration</td></tr><tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td></tr><tr><td>10 to 57Hz</td><td>—</td><td>0.075mm</td></tr><tr><td>57 to 150Hz</td><td>9.8m/s^2</td><td>—</td></tr></table><table><tr><td colspan="3">With continuous vibration</td></tr><tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td></tr><tr><td>10 to 57Hz</td><td>—</td><td>0.035mm</td></tr><tr><td>57 to 150Hz</td><td>4.9m/s^2</td><td>—</td></tr></table></td><td>Tested 10 times (for 80 minutes) in each of the X, Y, and Z directions</td></tr>
<tr><td>Shock resistance</td><td colspan="4">Conforming to JIS B3502 and IEC 61131-2
(147 m/s^2 3 times in each of three directions)</td></tr>
<tr><td>Operating ambiance</td><td colspan="4">No corrosive gas</td></tr>
<tr><td>Operating altitude</td><td colspan="4">2000m or less *3</td></tr>
<tr><td>Installation location</td><td colspan="4">Inside the control panel</td></tr>
<tr><td>Overvoltage category *1</td><td colspan="4">II or lower</td></tr>
<tr><td>Pollution degree *2</td><td colspan="4">2 or less</td></tr>
</table>

*1 The overvoltage category of a device indicates which distributor in the range from public distribution network to. machinery the device is assumed to be connected to. Category II applies to devices to which power is supplied fro fixed facilities. The surge voltage of those devices is 2500V whose rated voltage is 300V.

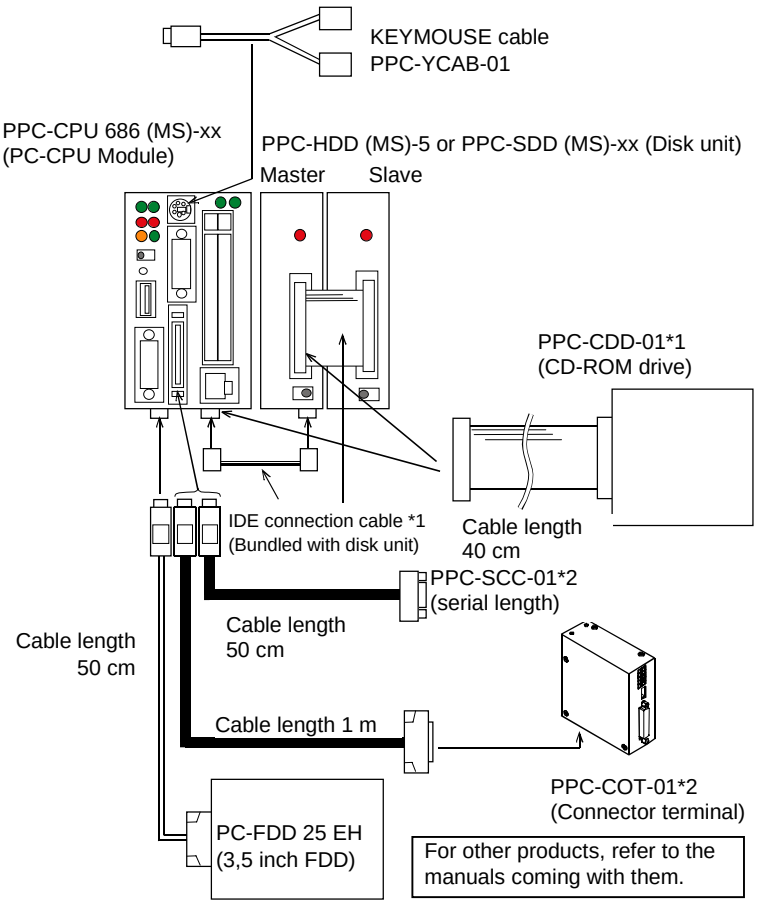
*2 The index indicating the degree to which conductive substances are generated in the operating environment. Pollution level 2 indicates the environment that generates only nonconductive pollutants while allowing accidental condensation to cause temporary conduction.

*3 The Unit may fail and cannot be used in an environment in which the air is compressed to over the atmospheric pressure generated at an altitude of around 0m.

Tab 2.2: *Installation Environment Conditions*

Note! *When a commercial peripheral device (such as a PC Card, USB device, keyboard, or mouse) is installed, satisfy the installation environment conditions specified for that device or those for the Unit, whichever are harder.*

2.2 System Configuration



Notes: For *1 and *2, either of their respective cables is connected.

Fig 2.1: *System Configuration Diagram*

2.3 External Dimensions

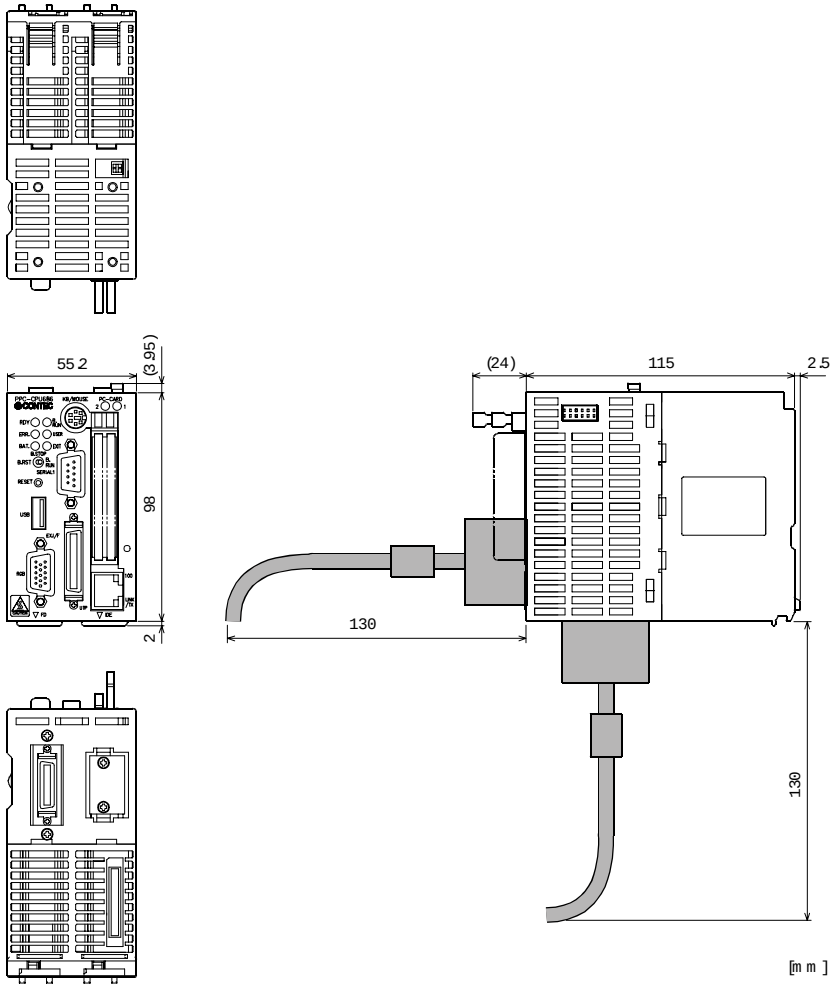


Fig. 2.2: *External Dimensions*

3 Installing and Uninstalling the Hardware

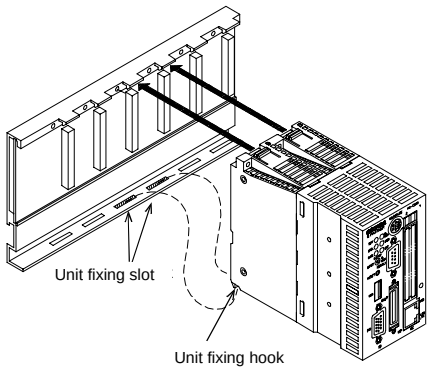
3.1 Notes on Use

Install the PC CPU module on the MELSEC-Q Series base unit before use. The Unit requires the MELSEC-Q Series power supply module as well.
Refer to the manuals for the base unit and power supply module for their specifications, installation procedures, and wiring methods.
Note that this Unit occupies two slots in the base unit.

Notes! *Before installing or uninstalling the Unit, be sure to turn the power off.*
Installing or uninstalling the Unit left powered can cause a fault or malfunction.

3.2 Installing the Unit

- Before installing the Unit, remove the transparent protective sheet from the rear panel (which comes into contact with the base unit).
- Fit the unit fixing hook in the unit fixing slot in the base unit, then push the Unit in the direction of the arrow to mount the Unit on the base unit.



-

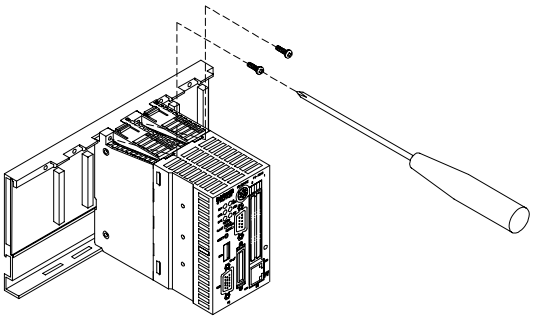
Note! *Be sure to turn off the power to the Unit before installing it.*

To use the Unit in a place subject to much vibration or shock, use two screws to fasten it to the base unit as illustrated below.

Unit fixing screws: M3 x 12 (Prepared by the user)

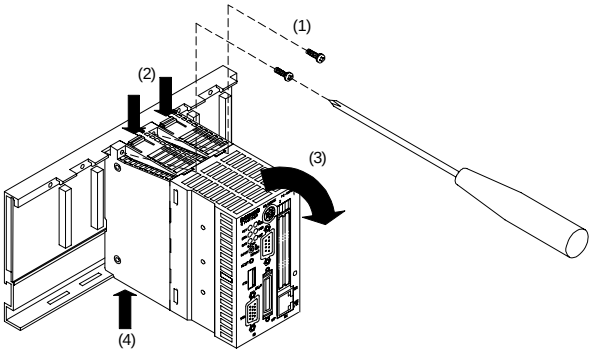
Tighten the screws within the following torque range:

Tightening torque range	36 to 48N·cm



3.3 Uninstalling the Unit

If the Unit has been fastened with unit fixing screws, remove them first (1).
While pressing the protrusions (2) on top of the Unit, pull the Unit toward you by the upper side (3).
Lift the Unit to remove the unit fixing hook from the unit fixing slot (4).



Note! *Be sure to turn off the power to the Unit before uninstalling it. If the OS is still up and running when you attempt to turn the power off, shut down the OS before turning the power off.*

4 BIOS Setup

4.1 BIOS Setup

BIOS Setup allows you to make various settings upon startup. When you use the Unit for the first time, be sure to execute this program. Once you have executed the program, the settings you made are backed up to be retained.

4.1.1 Invoking BIOS Setup

Turn on the power to your system, and the message “Press<F2> to enter SETUP” appears when the system is normal. Press the <F2> key at this prompt.

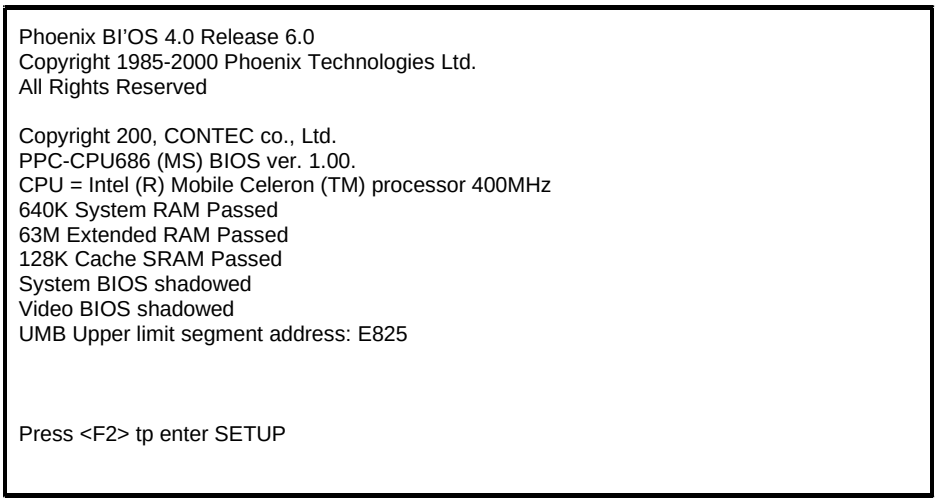


Fig 4.1: *Initial Screen*

4.1.2 Key Operations

The table below lists the major key functions used in BIOS Setup.

Key(s)	Function
→ , ←	Move around within the main menu
↑, ↓	Move around between setting items
<Tab>	Move forward within a setting item
<Shift>+<Tab>	Move backward within a setting item
<Spacebar>	Select the next value
+	Same effect as <Spacebar>
-	Select the previous value
<Enter>	Open the submenu
<Esc>	Move to the [Exit] window
<F9>	Reset all items to factory defaults.
<F10>	Save the current settings and exit Setup

Tab. 4.1: *Key Operations*

4.1.3 Main Menu

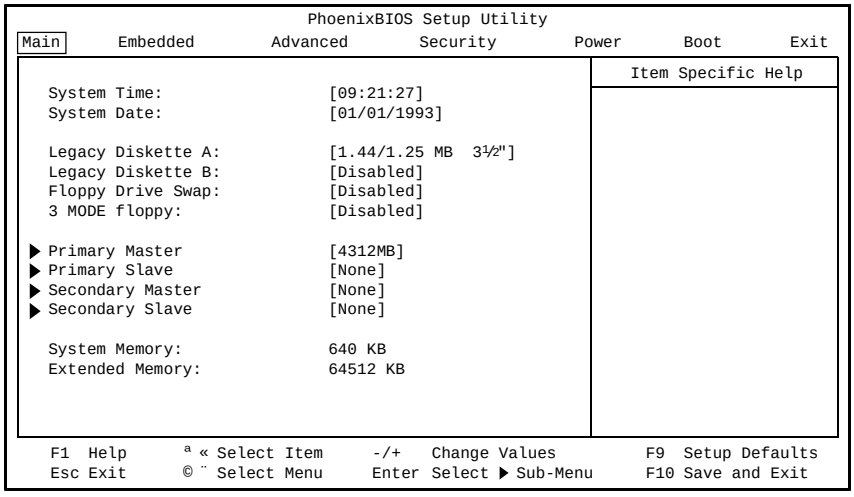


Fig 4.2: *Main Window (with Factory Defaults)*

System Time:
Set the time in the clock/calendar in the Unit.

System Date:
Set the date in the clock/calendar in the Unit.

Diskette A:
Identify the type of floppy disk for the FDD to be used as drive A. If no FDD is used, set this item to [Disabled]. Do not set it to 2.88 MB as the medium is not supported.
Diskette B: Cannot be connected. Leave this item set to [Disabled].

Floppy Drive Swap:
Leave this item set to [Disabled].

3 MODE floppy:
Leave this item set to [Disabled].

Primary Master:
Specify the type of the disk unit to be used as the first drive.
Use the [Auto] option usually.

Primary Slave:
Specify the type of the disk unit to be used as the second drive.
Use the [Auto] option usually.

Secondary Master:
Cannot be connected usually. Set this item if you have set [PCMCIA ATA DISK:] in the Advanced window to [Secondary].
Use the [Auto] option usually.

Secondary Slave:
Cannot be connected. Leave this item set to the factory default.

4.1.4 Embedded Window

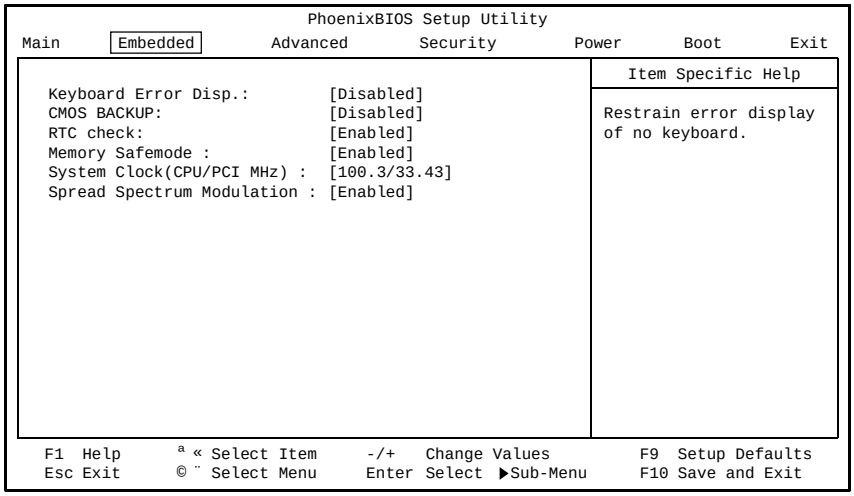


Fig 4.3: *Embedded Window (with Factory Defaults)*

Keyboard Error Disp.:
Determine whether the system displays an error upon starting without a keyboard attached.

CMOS BACKUP:
Specify the source of BIOS data to be loaded. Leave this item set to [Disabled] (CMOS) usually.*1
Setting this item to [Enabled] causes the data saved to EEPROM to be used.

RTC check:
Determine whether the system displays a time error with the RTC backup battery dead. *2

Memory Safemode:
Leave this item set to [Enabled].

System Clock (CPU/PCI MHz):
Set the system clock. Leave this item set to [100.3/33.43] usually.

Spread Spectrum Modulation:
Leave this item set to [Enabled].

*1 CONTEC will receive your request for clearing CMOS at a charge for a repair.
*2 CONTEC will receive your request for replacing a dead backup battery at a charge for a repair

4.1.5 Advanced Window

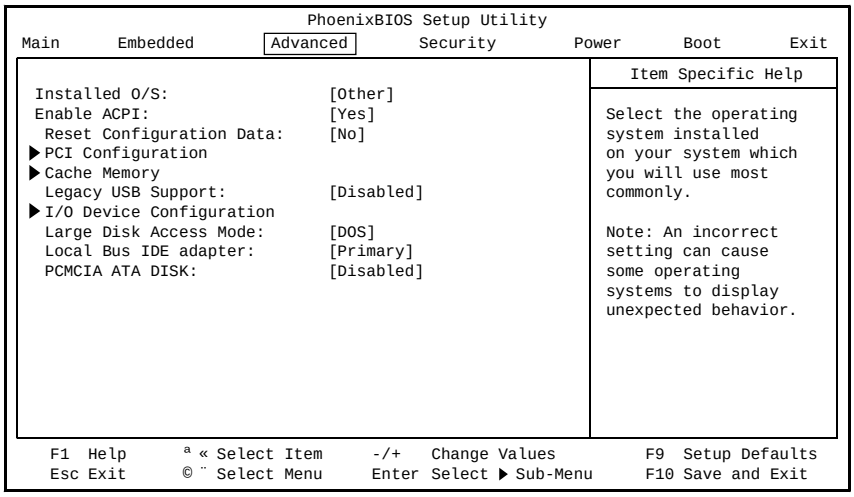


Fig 4.4: *Advanced Window (with Factory Defaults)*

Installed OS:
Leave this item set to [Other] usually.

Enable ACPI:
Leave this item set to [Yes] usually.

When an OS (such as Windows 2000) supporting ACPI is installed, the current ACPI setting is passed to and saved by the OS as ACPI information. Note that, if you change the setting using BIOS Setup later, the OS may fail to run normally because of the contradiction from the information saved by the OS. On the Windows 2000 Professional preinstalled model, in particular, do not set this item to [No] because the OS has been installed with this item set to [Yes] (ACPI enabled).
Reset Configuration Data:
Reset the assignments of resources for PCI and PnP devices.

PCI Configuration:
Reserve resources for legacy devices.

Cache Memory :
Enable or disable cache memory.

Legacy USB Support:
Leave this item set to [Disabled].

I/O Device Configuration:
Set COM/LPT (serial and parallel) devices.

Large Disk Access Mode :
Leave this item set to [DOS] usually.

Local Bus IDE adapter*:
Set the on-board IDE controller.

Set this item to [Primary] or [Disabled].
PCMCIA ATA DISK* :Enable this item to boot from the ATA card. Be careful not to conflict with the local IDE controller.

* [Local Bus IDE adapter] and [PCMCIA ATA DISK] allow a total of up to three devices to be used.

4.1.6 PCI Configuration Window

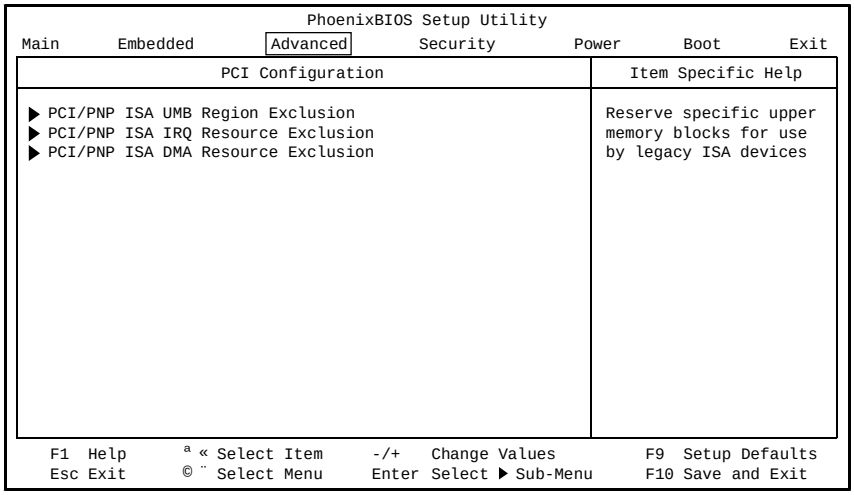


Fig 4.5: *PCI Configuration Window*

PCI/PNP ISA UMB Region Exclusion : Leave this item set to the factory default.
PCI/PNP ISA IRQ Resource Exclusion* : Leave this item set to the factory default usually.
PCI/PNP ISA DMA Resource Exclusion : Leave this item set to the factory default.

4.1.7 Cache Memory Window

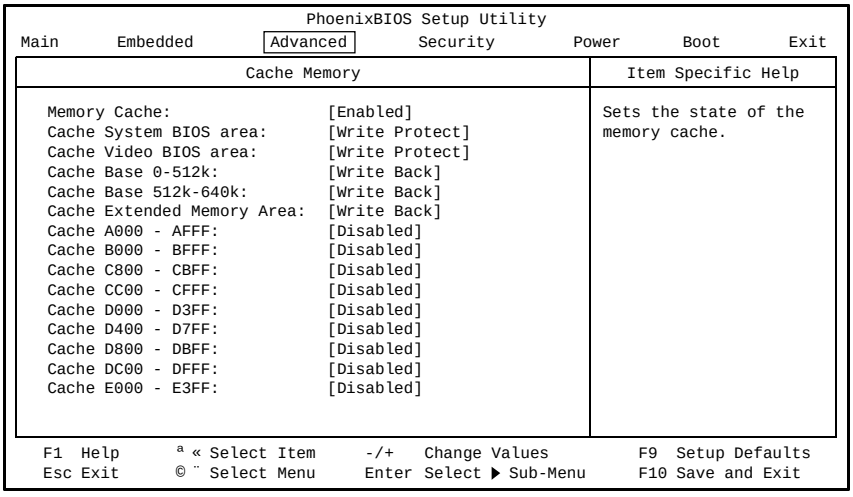


Fig 4.6: *Cache Memory Window (with Factory Defaults)*

Leave these items set to their factory defaults.

4.1.8 I/O Device Configuration Window

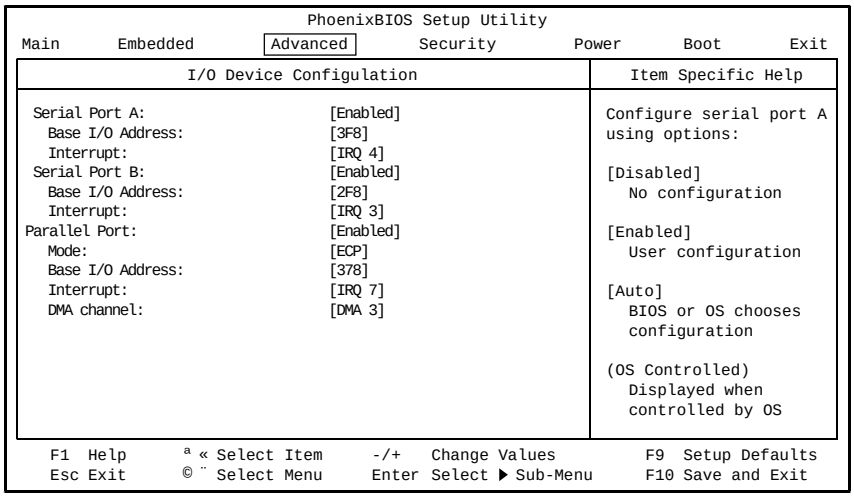


Fig 4.7: *I/O Device Configuration Window (with Factory Defaults)*

Serial port A:
Set the SERIAL1 connector on the Unit.

Serial port B:
Set the SERIAL2 port in the extension interface (EX.I/F).

Parallel port:
Set the PARALLEL port in the extension interface (EX.I/F).

Options Enable:
Specify the base I/O address and IRQ manually. Set the IRQ specified here to [Available] in the PCI Configuration Window.

Auto:
The BIOS sets the configuration items automatically. This option becomes [Enabled] upon startup of the BIOS.

OS Controlled:
The OS sets the configuration items automatically. This option is [Disabled] until a PnP OS is started.

Mode*:
Select the parallel port operation mode.

DMA channel*:
Specify the DMA channel to be used when ECP has been selected for the parallel port operation mode.

* Menu items available only to the parallel port.

4.1.9 Security Window

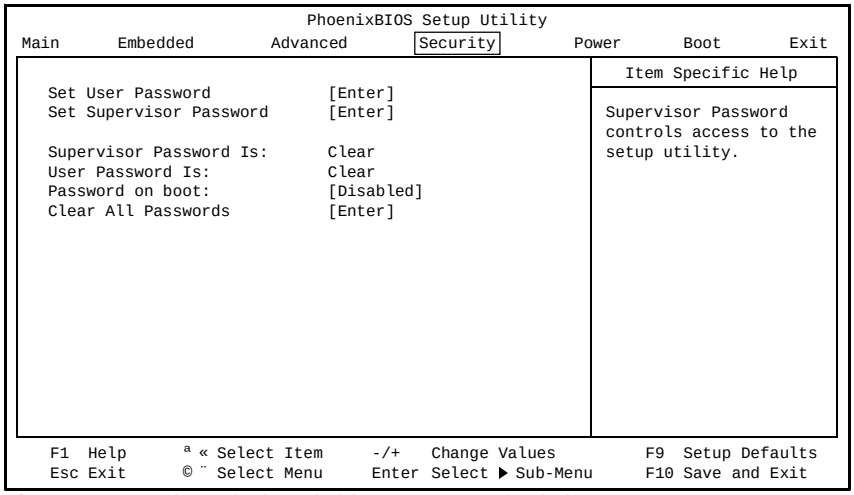


Fig 4.8: *Security Window (with Factory Defaults)*

Set User Password:
Determine whether BIOS Setup prompts you for a password upon startup. When a password has been set here, "User Password is" is followed by "Enabled". In User mode, you can set only the date and time.

Set Supervisor Password :
Determine whether BIOS Setup prompts you for a password upon startup.
When a password has been set here, "Supervisor Password is" is followed by "Enabled". In Supervisor mode, you can set all items.

Password on boot:
Determine whether the system prompts you for a password when booted.

Clear All Password:
The supervisor can erase both of the user and administrator passwords.

Notes! *Once you have set a password, you cannot clear the password without it. When you have set a password, record it and store the record carefully.*
If you loose your password, you need to request CONTEC for clearing internal CMOS data at a charge for a repair. Handle your password with great care.

4.1.10 Power Window

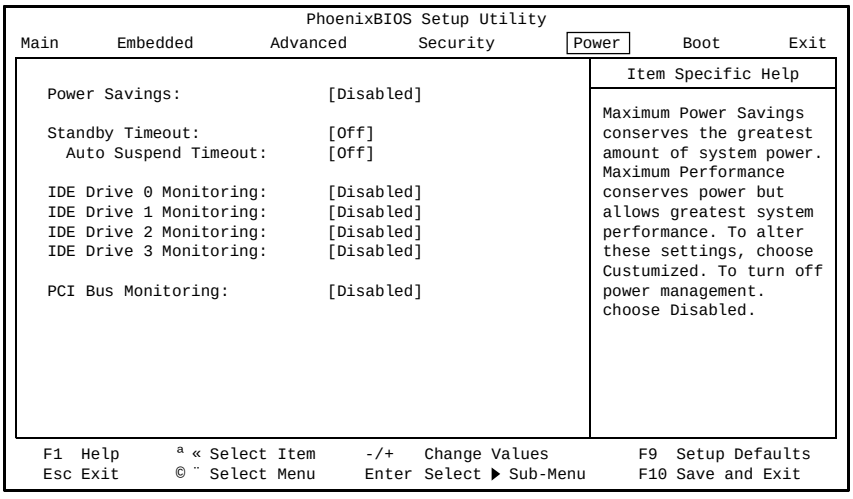


Fig 4.9: *Power Window (with Factory Defaults)*

Power Savings:
Set the power save mode by selecting [Disabled], [Customize], [Maximum Performance], or [Maximum Power Savings].

Standby Timeout:
Specify the time-out period for the unit to enter the standby mode from the idle state. The standby mode turns off the peripheral devices including the monitor.

Auto Suspend Timeout:
Specify the time-out period for the Unit to enter the suspend mode from standby mode.

IDE DRIVE 0 Monitoring :
IDE DRIVE 1 Monitoring :
IDE DRIVE 2 Monitoring :
IDE DRIVE 3 Monitoring :
PCI Bus Monitoring :

Select whether to use devices as idle timer reset events.

4.1.11 Boot Window

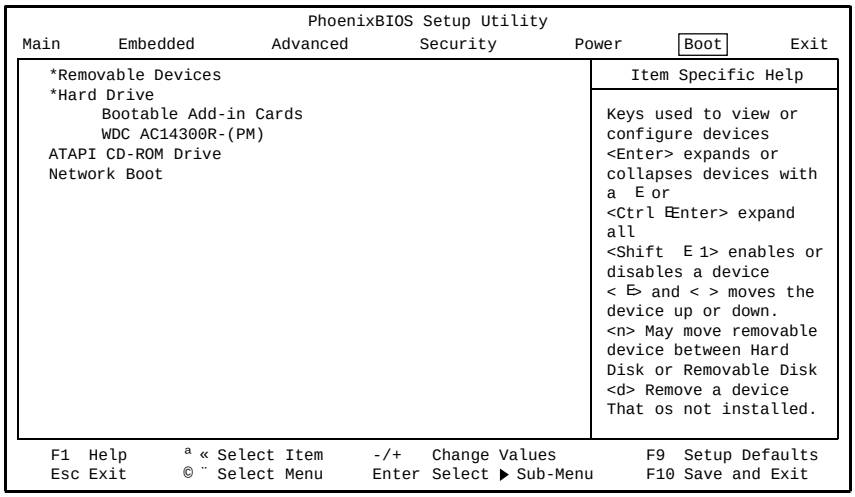


Fig 4.10: *Boot Window*

Specify the order of devices to be checked for the system to be booted. Use the <+> and <–> keys to rearrange the order of bootable devices.

The following types of devices can be specified as boot devices.

Removable Devices:
Floppy disk drive

Hard Drive:
Non-removable device such as the hard disk drive, silicon disk drive, or ATA card (when the ATA card boot has been enabled).

ATAPI CD-ROM Drive:
Optional CD-ROM drive (IDE type)

Network Boot:
This item cannot be used.
Devices are listed from top to bottom in the order of descending priorities.

4.1.12 Exit Window

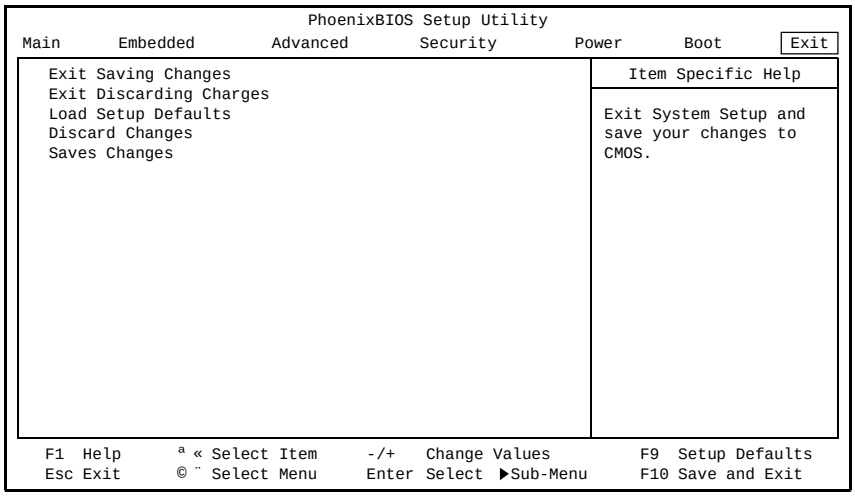


Fig 4.11: *Exit Window*

Exit Saving Changes:
Save the changes you have made in BIOS Setup windows to CMOS and EEPROM, then reboot the system with the new settings.

Exit Discarding Changes:
Discard the changes you have made without saving, then reboot the system with previous values.

Load Setup Defaults:
Load the default values retained by the BIOS.

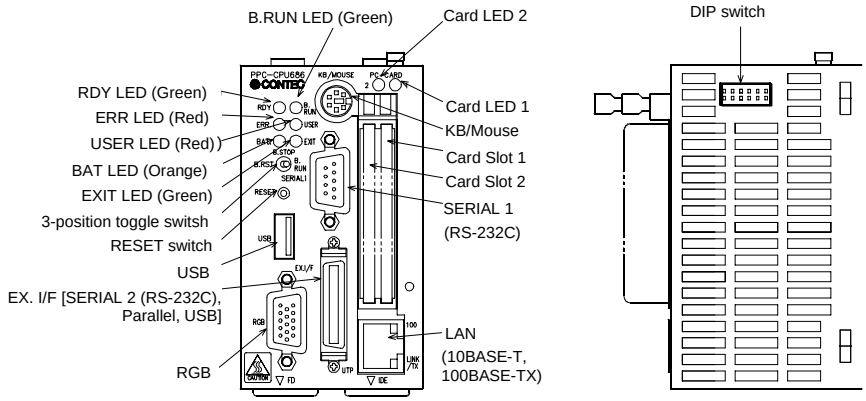
Discard Changes:
Load the current values from CMOS.

Save Changes:
Save the changes you have made in BIOS Setup windows to CMOS and EEPROM.

5 Functions of Components

5.1 Component Locations

Front panel



Bottom

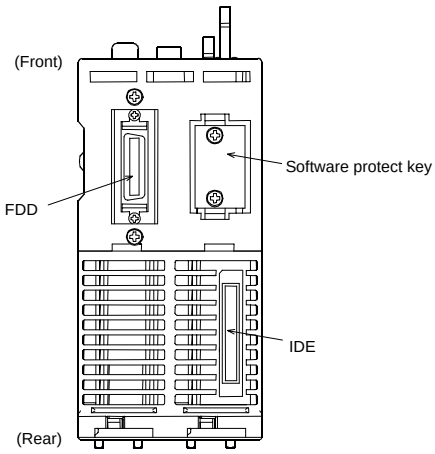


Fig 5.1 : *Component Locations*

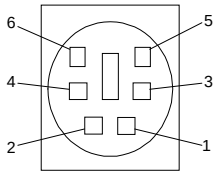
Name	Function
KB/MOUSE	Keyboard/PS2 mouse shared connector (6-pin MINI DIN connector)
FD	Floppy drive connector (26-pin half-pitch connector)
SERIAL 1	Serial port 1 connector (9-pin D-SUB male connector)
RGB	CRT connector (15-pin HD-SUB female connector)
PC-CARD	PCMCIA card slot
USB	USB port connector
UTP	Ethernet connector (RJ-45)
IDE	IDE connector (40-pin half-pitch connector)
EX.I/F	Connector terminal (Option), Serial conversion cable (option) connector
RESET	Hard reset pushbutton
3-position toggle switch	Bus interface driver control switch
DIP switch	Reset method select and KB/MOUSE connector select switches
RDY LED	Hardware ready display
B.RUN LED	Bus interface driver execution display
ERR. LED	System error display
USER LED	User error display
BAT. LED	Battery alarm display
EXIT LED	Shutdown (power-off) display
PC-CARD 1 LED	PC-CARD1 accessible display
PC-CARD 2 LED	PC-CARD2 accessible display
100 LED	Ethernet transfer rate display
LINK/TX LED	Link/data transmission display
Software protect key	Key for software to identify the installed machine with

Tab 5.1: *Component Functions*

5.2 Keyboard/Mouse Interface

The Unit has a shared connector for use by the keyboard and the mouse. The connector name is [KB/MOUSE].
SW-6 in the DIP switch is used to change the pin assignments in the connector.

Connector type	MD-DS12300-14S-14 (JST) equivalent



SW6-OFF *1 (Factory default)				SW6-ON *2			
Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	MDATA	4	Vcc (+5V)	1	MDATA	4	Vcc (+5V)
2	KDATA	5	KCLOCK	2	KDATA	5	MCLOCK
3	GND	6	MCLOCK	3	GND	6	KCLOCK

***1 The keyboard can be connected directly.**
*2 Both of the keyboard and the mouse can be conncted with a conversion cable. Otherwise, the
mouse can be connected directly.

Tab 5.2: *KB/MOUSE Connector*

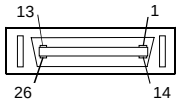
Power Supply Capacity

The power supply to the KB/MOUSE connector has the following capacity (for both of the keyboard and mouse to be used).
5V 0.5A(Max.)

5.3 Floppy Disk Interface

The Unit has a FD controller, allowing the FD connector at the bottom to accept one FD drive. The connector name is [FD].
The FD drive should be the dedicated option (PC-FDD25BH, separately priced).

Connnector type	26-pin half-pitch connector DX10G1M-26SE equivalent



Pin no.	Signalname	Direction	Pin no.	Signalname	Direction
1	HDSEL	Output	14	WRTPRT	Output
2	RDATA	Input	15	TRK0	Input
3	GND	---	16	GND	---
4	GND	---	17	WGATE	Output
5	GND	---	18	GND	---
6	WDATA	Output	19	GND	---
7	DENSEL	Output	20	STEP	Output
8	DENSEL	Output	21	DIR	Output
9	N.C.	---	22	MTRON	Output
10	DRVSEL	Output	23	N.C.	---
11	Vcc (+5V)	---	24	DSKCHG	Output
12	Vcc (+5V)	---	25	N.C.	---
13	INDEX	Input	26	Vcc (+5V)	---

Tab 5.3: *FD Connector*

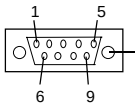
5.4 Serial Port Interfaces

The Unit has two RS-232C compatible serial port connectors (SERIAL1 as Serial PortA, SERIAL2 as Serial PortB). You can set COM1 to COM4 or disabled using BIOS Setup (described in Chapter 4). Note that SERIAL2 can be used by connecting the connector terminal (PPC-COT-01, separately priced).

COM	I/O adresses	IRQ
1	3F8h-3FFh	IR Q 3 IR Q 4 IR Q 5 IR Q 7 IR Q 9 IR Q 10 IR Q 11 IR Q 15
2	2F8h-2FFh	
3	3E8h-3EFh	
4	2E8h-2EFh	

Tab 5.4: *I/O Addresses and IRQs for SERIAL 1*

The BIOS's factory defaults for the serial port settings are as follows:
Serial port A: COM1 (3F8h-3FFh), IRQ4
Serial port B: COM2 (2F8h-2FFh), IRQ3

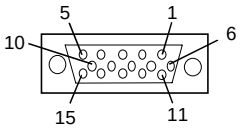
Connector used	9-pin D-SUB male connector		
			
Pin No.	Signalname	Meaning	Direction
1	DCD	Data carrier detect	Input
2	RXD	Reoeive dat from equipment	Input
3	TXD	Transmit data to equioment	Output
4	DTR	Data terminal ready	Output
5	GND	Signalground	—
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

Tab 5.5: *Serial1 Connector*

5.5 CRT Interface

The Unit has a CRT connector. The connector name is [RGB].

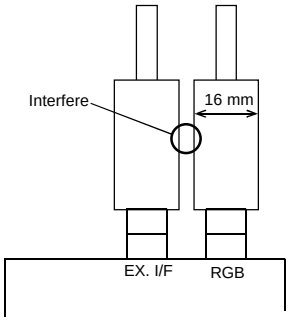
Connector used	15-pin HD-SUB female connector



Pin No.	Signalname	Pin No.	Signalname
1	RED	9	N.C.
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	N.C.
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	N.C.
8	GND	—	

Tab 5.6: *RGB Connector*

Note that, when the connector terminal (PPC-COT-01) or serial conversion cable (PPC-SCC-01) is connected to the EX.I/F connector, the connector at the end of the CRT cable may interfere with that of the connector terminal cable or serial conversion cable if the shell of the CRT cable connector is 16mm or more in width.



Viewed from top of the Unit

5.6 PCMCIA Slots

The Unit has PCMCIA compliant card slots (TYPE II card slots x 2 in “TYPE III x 1” size).

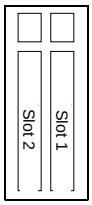


Fig 5.2: *Slot Numbers and Locations*

Notes! *1) To use a TYPE III card, plug it into slot 1.*
2) No PC Card can be hot-plugged under Windows NT Workstation 4.0 or Windows NT Embedded 4.0. Plug the PC Card before turning on the power to the Unit; unplug the PC Card after shutting down the OS and turning the power off.

Attaching a card stopper

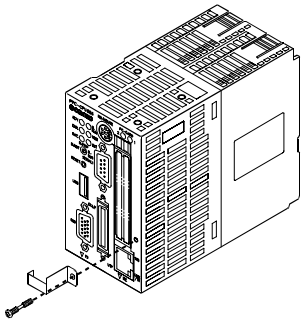


Fig 5.3: *Attaching a Card Stopper*

Card Slot Power Supply

The table below lists the card voltages and current capacities available to each PCMCIA slot.

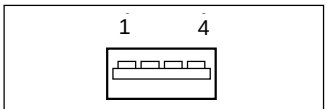
Voltage	Current capacity (Max.)
+5V	0.5A/Slot
+3.3V	0.5A/Slot
+12V	Not supplied

Tab 5.7: *Card Slot Power Supply*

5.7 USB Port

The Unit has one channel of USB interface. The connector name is [USB]. You can add another channel by connecting the connector terminal (PPC-COT-01, separately priced) to the Unit.

Note that the USB port is supported only by Windows 2000 Professional.



Pin no.	Signalname
1	Vcc (+5V)
2	DATA-
3	DATA+
4	GND

Tab 5.8: *USB Connector*

Power Supply Capacity

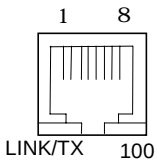
The capacity of power supplied to the USB connector per channel is as follows.
5V, 0.3A (Max.) / channel

5.8 Ethernet

The Unit has a Fast-Ethernet interface. The connector name is [UTP].

- Network system : 100BASE-TX/10BASE-T
- Transmission rate* : 100M/10M bps
- Maximum cable length : 100m/segment
- Controller : 82559(INTEL)
- The category 5 cable must be used for transmission at 100Mbps.

Connector type	RJ-45



Pin No.	Signalname	Meaning	Pin No.	Signalname	Meaning
1	TD +	Transmit data to equipment (+)	5	N.C.	Not connected
2	TD -	Transmit data to equipment (-)	6	RD -	Receive data from equipment (-)
3	RD +	Receive data from equipment (+)	7	N.C.	Not connected
4	N.C.	Not connected	8	N.C.	Not connected

Tab 5.9: *UTP Connector*

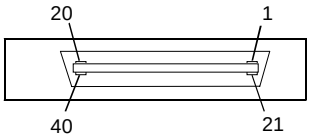
Network status indication LEDs

- LINK/TX : Remains on during normal connection and blinks during data transmission.
- 100M : Remains on during 100M operation.

5.9 IDE Interface

The Unit has an E-IDE controller, allowing the IDE connector at the bottom to connect the disk unit (separately priced). The connector name is [IDE].

Connector used	40-pin half pitch connector (1.27 mm pitch)



Pin No.	Signalname	Direction	Pin No.	Signalname	Direction
1	RESET #	Output	21	GND	—
2	DD7	Input/Output	22	DD8	Input/Output
3	DD6	Input/Output	23	DD9	Input/Output
4	DD5	Input/Output	24	DD10	Input/Output
5	DD4	Input/Output	25	DD11	Input/Output
6	DD3	Input/Output	26	DD12	Input/Output
7	DD2	Input/Output	27	DD13	Input/Output
8	DD1	Input/Output	28	DD14	Input/Output
9	DD0	Input/Output	29	DD15	Input/Output
10	GND	—	30	N.C.	—
11	DDRQ	Input	31	GND	—
12	DIOW #	Output	32	GND	—
13	DIOR #	Output	33	GND	—
14	IOCHRDY #	Input	34	DALE	Output
15	DDACK #	Output	35	GND	—
16	INTRQ	Input	36	Reserve	—
17	DA1	Output	37	Reserve	—
18	DA0	Output	38	DA2	Output
19	CSI #	Output	99	CS3#	Output
20	DACT #	Output	40	GND	—

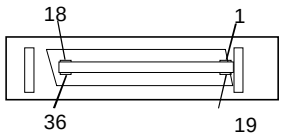
* This connector is common t the PC CPU nodule (bottom) and the disk unit (tront and bottom).

Tab 5.10: *IDE Connector*

5.10 Extension Interface

The extension interface can connect either the connector terminal (PPC-COT-01, separately priced) that converts the serial, parallel, or USB interface in the extension interface to the PC standard connector or the serial conversion cable (PPC-SCC-01, separately priced) for serial use only. The connector name is [EX.I/F].

Connector type	36-pin half-pitch connector DX10G1M -36SE equivalent



Pin No.	Signalname	Direction	Pin No.	Signalname	Direction
1	DCD	INPUT	19	DSR	INPUT
2	RXD	INPUT	20	RTS	OUTPUT
3	TXD	OUTPUT	21	CTS	INPUT
4	DTR	OUTPUT	22	RI	INPUT
5	GND	---	23	GND	---
6	STRB#	OUTPUT	24	AFEED#	OUTPUT
7	DATA 0	OUTPUT	25	ERROR#	INPUT
8	DATA 1	OUTPUT	26	IN IT#	OUTPUT
9	DATA 2	OUTPUT	27	SELECT IN	OUTPUT
10	DATA 3	OUTPUT	28	GND	---
11	DATA 4	OUTPUT	29	GND	---
12	DATA 5	OUTPUT	30	BUSY	INPUT
13	DATA 6	OUTPUT	31	PE	INPUT
14	DATA 7	OUTPUT	32	SELECT	INPUT
15	ACK#	OUTPUT	33	GND	---
16	GND	---	34	GND	---
17	DATA+	INPUT	35	DATA-	
18	+5V	---	36	+5V	---

Tab 5.11: *EX.I/F Connector*

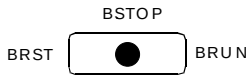
5.11 Operation Switches

Reset Switch

Name	Switch type	Definition
Reset switch	Pushbutton switch	Hardware reset switch Pressing the switch for at least one second reset the Unit.

Note! *Use the reset switch only when the Unit has hung or crashed. Using the switch in a normal state (with the OS up and running) causes the OS to abort without executing the legitimate shutdown procedure, possibly preventing the OS from running normally when restarted.*

Three-Position Toggle Switch



Name	Switch type	Definition
Toggle switch	3-position toggle switch	Bus interface driver control switch *1 B.RST (Bus interface driver RESET): Holding the toggle switch at the B.RST position for two seconds resets the MELSEC-Q Series modules under control of this Unit and the bus interface as well. Use this switch to reset only the MELSEC-Q Series modules instead of causing a hardware reset of B.STOP (Bus interface driver STOP): Stops of the operation of the bus interface driver, prevents user applications from issuing access to the modules on the bus, and turns the Y output (*2) off. Module diagnostic utilities (such as forced Y output and buffer memory batch-monitor) can be ex B.RUN (Bus interface driver RUN): Makes the bus interface driver active, allowing user applications to access modules on the bus.

*1 The bus interface driver allows the module to access various MELSEC-Q Series modules such as the PLC CPU, I/O, and intelligent function modules.

*2 The MELSEC-Q Series sequence program places "Y" at the beginning of the output number of each output module. The Y output signifies the output to an output module.

Fig 5.4: *Factory Default*

Examples of using the toggle switch for the single-CPU configuration with this Unit alone

Operation expected	Action to take
Stop user application access to the units on the bus	1) Set the toggle switch to B.STOP
Restart user application access to the units on the bus	1) Set the toggle switch to B.RUN
Resets the units on the bus and recover from the reset	1) Set the toggle switch to B.RUN. 2) Hold the toggle switch at the B.RST position for two seconds, then release the switch. 3) Set the toggle switch to B.RUN. 4) Execute the user application.

DIP Switch

No	Name	Switch type	Definition
1	SW-1	6-bit slide DIP switch	Reserved (Factory default: OFF)
2	SW-2		Reserved (Factory default: OFF)
3	SW-3		Reserved (Factory default: OFF)
4	SW-4		Reserved (Factory default: OFF)
5	SW-5		Reset method select switch (Factory default: OFF) When this Unit is module No.2 to 4 in the multiple PLC system *1 OFF : Setting the RESET/L.CLR switch on unit No.1 (PLC CPU) to RESET resets the bus interface driver without resetting this Unit. ON : Setting the RESET/L.CLR switch on unit No.1 (PLC CPU) to RESET resets this Unit.
6	SW-6		KB/MOUSE connector select switch (Factory default: OFF) OFF : Connect the PS2 keyboard *2 ON : Connect the PS/2 mouse or KB/MOUSE cable.

*1 For the multiple PLC system, see Chapter 6 "Combination with the MELSEC-Q Series".

*2 With SW-6 set to OFF, the KB/MOUSE connector is dedicated to the PS/2 keyboard and not available to the KEY/MOUSE cable.

Fig 5.5: *Factory Default*

Notes! *1) Before making changes to DIP switch settings, turn off the power to the Unit. Do not touch any DIP switch setting with the Unit powered.*

2) Usually, leave SW-5 set to OFF. If you set SW-5 to ON, the reset operation on Unit No.1 resets this Unit as well. If the OS is still up and running at that time, the reset causes the OS to abort without executing the legitimate shutdown procedure. Note that this may prevent the OS from running normally when restarted.

5.12 LED Displays

Abbreviation	Name	Color	LED status	Definition
RDY	H/W READY	Green	On	The hardware is all set to go.
			Off	The hardware is not ready or a system WDT error has occurred.
			Blink	A reset by the reset switch has been accepted. The hardware is reset two seconds after the LED starts blinking.
B.RUN	BUS I/F DRIVER RUN	Green	On	The bus interface driver is running. (User applications have been enabled for bus access.)
			Off	The bus interface driver has been suspended. (The Y output is off.User applications have been disabled for bus access.)
			Blink	The bus interface driver has accepted a reset generated either by setting the toggle switch to B.RST or by resetting unit No. 1 in the multiple PLC configuration. *1
ERR.	SYSTEM ERROR	Red	On	A system error has occurred without stopping the output.
			Off	The Unit is in the normal state.
			Blink	A system error has occurred while stopping the output.
USER	USER ERROR	Red	On	A user error has occurred.
			Off	The Unit is in the normal state.
BAT.	BATTERY ALARM	Orange	On	The Unit or PC Card has caused an internal battery error. *2
			Off	The Unit is in the normal state.
EXIT	EXIT	Green	On	The shutdown procedure has been completed. *3
			Off	The shutdown procedure has not been completed.
PC-CARD 1	PC CARD 1 RDY	Green	On	PC CARD 1 has been recognized normally by the Unit and is accessible.
			Off	PC CARD 1 is not accessible.
PC-CARD 2	PC CARD 2 RDY	Green	On	PC CARD 2 has been recognized normally by the Unit and is accessible.
			Off	PC CARD 2 is not accessible.
100	100Mbps	Yellow	On	The transmission rate is 100 Mbps.
			Off	The transmission rate is 10 Mbps.
LINK/TX	LINK/TX	Green	On	The Unit has been connected normally to the Ethernet network.
			Off	The Unit has not been connected normally to the Ethernet network.
			Blink	Data is being transmitted.

*1 When the B.RUN LED is blinking, do not reset the bus interface driver by setting the toggle switch to B.RST or resetting unit No. 1 in the multiple PLC configuration again.

*2 Only the PC Cards which can detect their internal battery error normally are memory cards. When a PC Card other than memory cards, such as an I/O card (ATA card) or CardBus card, is used, this LED may go on with the card detected as a battery error. W

*3 It is effective only to use Windows 2000 Professional. When Windows 2000 Professional is shut down normally, the CRT screen becomes blank. The EXIT LED comes on,indicating that the shutdown procedure has been completed. Before turning the power off, ma

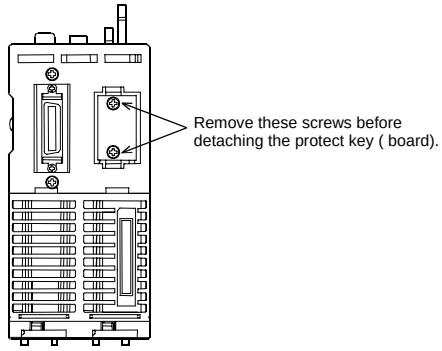
5.13 Handling the Software Protect Key

The software protect key is used by software to identify the machine to run on.

Note that, if this Unit goes wrong and must be replaced with a new one, some pieces of software won't work until the protect key in the new Unit is replaced with the protect key in the original Unit.

Detaching the Protect Key

Remove two screws and then the protect key.

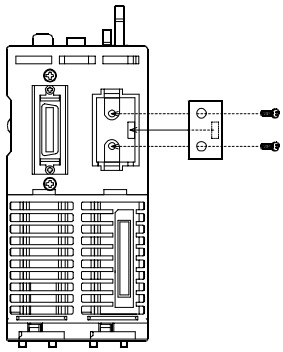


Attaching the Protect Key

Insert the connector of the protect key in the socket in the Unit, then fasten it using the two screws removed in "Detaching the Protect Key".

Tighten the screws within the following torque range.

Tightening torque range	36 to 48N·cm



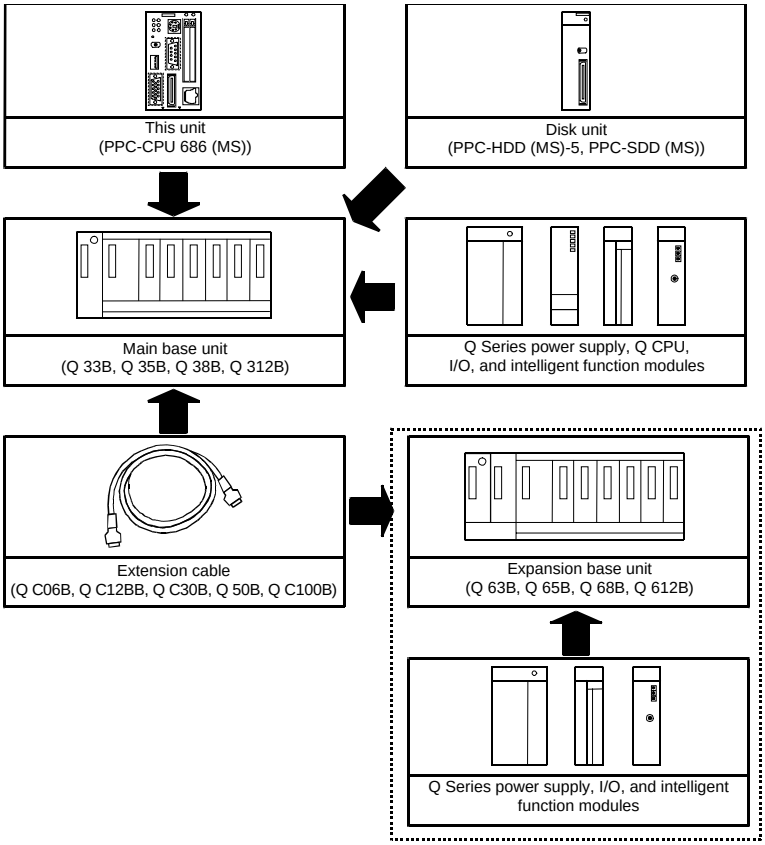
6 Combination with the MELSEC-Q Series

6.1 Overview

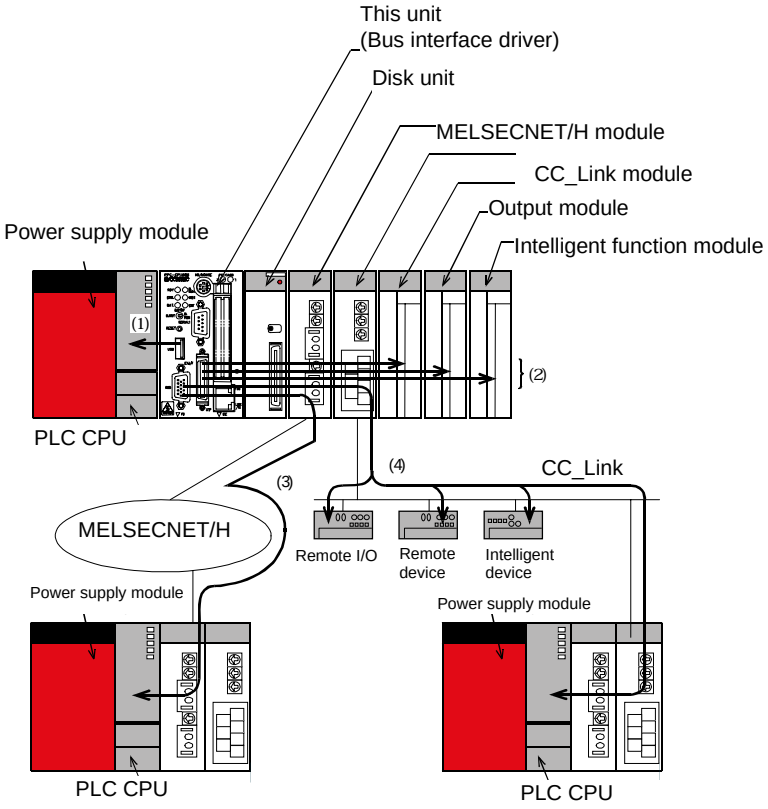
The PC CPU module can communicate with the MELSEC-Q Series PLC CPU module, intelligent function module, and I/O module at high speed by connecting the buses using the MELSEC-Q Series bus module.
Note that the bus interface driver is used for communication with the various modules in the MELSEC-Q Series, including the PLC CPU.
For details on each MELSEC-Q Series module and the bus interface driver, refer to the relevant manuals.

6.2 System Configuration

This Unit can be combined with MELSEC-Q Series modules as shown below.



6.3 Access Forms



The Unit can access various modules in the following forms.

① Access another PLC CPU in the local system.

② Access the I/O module or intelligent function module in the local system.

③ Access a PLC CPU via the MELSECNET/H module.

④ Access a remote I/O, remote device, intelligent device, or PLC CPU via the CC-Link module.

6.3.1 Multiple PLC Configuration

Multiple PLC Configuration Including This Unit

This Unit supports both of the single-CPU configuration with the Unit as only one CPU and the multiple PLC configuration with the Unit combined with other CPUs.
Note that only one PPC-CPU686(MS) (this Unit) can be installed in the same system.

Combination of CPUs

		Units No. 2 to 4			
		PLC CPU (Qn(H)CPU)	**Motion CPU (Q17? CPU)**	**This Unit**	**None (Single-CPU configuration)**
Unit No.1	PLC CPU	3	3	1	Supported
	Motion CPU	Not supported	Not supported	Not supported	Not supported
	This Unit	Not supported	Not supported	Not supported	Supported

Numbers : Maximum number of units installable

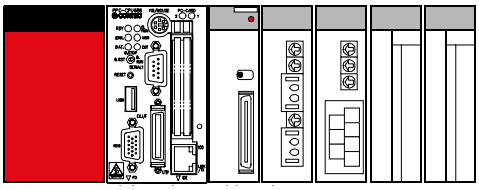
Notes!

1) This Unit cannot be Unit No.1 in the multiple PLC configuration. The multiple PLC configuration requires a PLC CPU.
2) For the multiple PLC configuration, place this Unit at the right end of a series of CPUs.
3) Although a total of up to three PLC and motion CPUs can be installed, the number of modules installable is restricted by the power capacity of the power supply module Q61P. See "Restriction by Power Capacity" in "Notes" for details.

CPU Configuration Diagrams

- Single-CPU configuration with this Unit as only one CPU

Unit No.1 ⋯This Unit

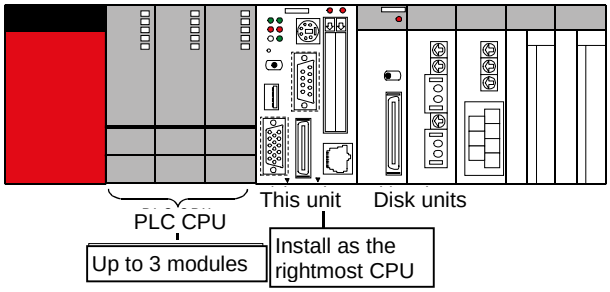


- Multiple PLC configuration with this Unit in combination with PLC CPUs

Maximum configuration with this Unit and three PLC CPUs

Units No.1 to 3 ⋯PLC CPUs

Unit No. 4 ⋯This Unit

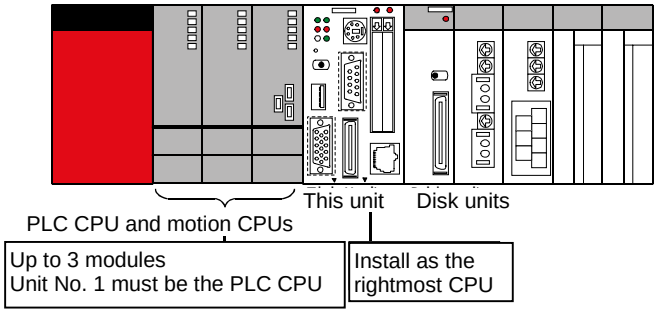


- Multiple PLC configuration with this Unit in combination with a PLC CPU and motion CPUs

Unit No.1 ⋯PLC CPU

Units No.2 and 3 ⋯Motion CPUs

Unit No.4 ⋯This Unit



Note! *The total number of PLC and motion CPUs installable is restricted by the power capacity of the Q Series power supply module (Q61P/Q64P)*
When a large number of I/O modules and intelligent function modules are used, the equivalent restriction applies to them in the same way. For details, see “Restriction by Power Capacity” in “Notes”.

Supported modules

Series	Classification	Model name	Support	Supported function version *1
Q Series	Base unit	All base units	Supported	---
	Power supply module	All power supply modules	Supported	---
	I/O module	All I/O modules	Supported	---
	A-D conversion module	Q64AD, Q68ADV, Q68ADI	Supported	B and later
	D-A conversion module	Q62DA, Q64DA, Q68DAV, Q68DAI	Supported	B and later
	Temperature control module	Q64TCTT, Q64TCRT, Q64TCTTBW, Q64TCRTBW	Supported	B and later
	Temperature-digital conversion module	Q64TD, Q64RD	Supported	B and later
	Positioning module	QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4, QD70P4, QD70P8	Supported	B and later
	High-speed counter	QD62, QD62D, QD62E	Supported	---
	Interrupt module	QI60	Supported	---
	FL-net (OPCN-2) module	QJ71FL71, QJ71FL71-B2	Supported	B and later
	MELSECNET/H module	QJ71LP21-25, QJ71BR11, QJ71LP21G, QJ71LP21GE	Conditionally supported *2	B and later
	CC-Link module	QJ61BT11	Conditionally supported *3	B and later
	Ethernet module	QJ71E71, QJ71E71-B2, QJ71E71-100	Not supported	---
	Serial communication module	QJ71C24, QJ71C24-R2	Not supported	---
	Intelligent communication module	QD51, QD51-R24	Not supported	---
A Series	All models		Not supported	---
GOT	All models		Not supported	---

*1: The modules with "B and later" are supported in function version B and later.

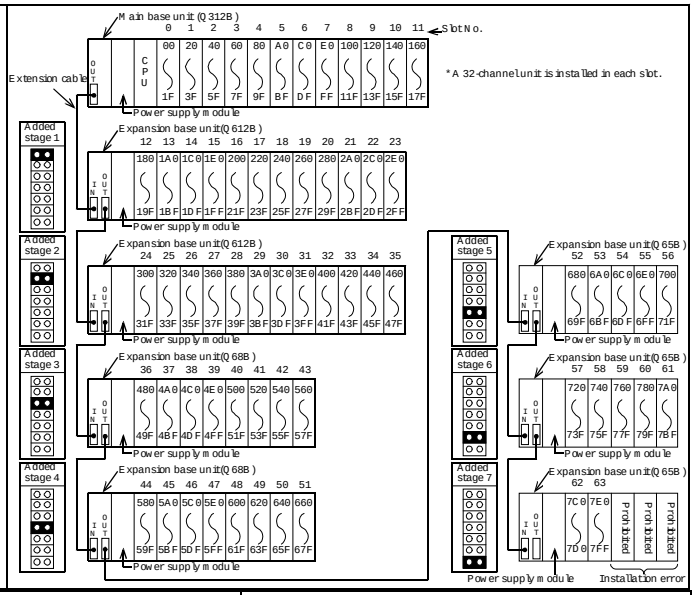
*2: - Only inter-PC networks can be used; remote I/O networks cannot be used.
- Transfer between data links cannot be performed.
- MELSECNET/H dedicated instruction cannot be used.
- The interrupt program start function cannot be used.
- Application programs can perform communication using the md function.
- Network parameters are set by the bundled utility.

*3: - CC-Link dedicated instructions cannot be used.
- The interrupt program start function cannot be used.
- Application programs can perform communication using the md function.
- Network parameters are set by the bundled utility.

6.4 Notes

Maximum Number of modules Installed and Maximum Number of I/O Channels

Example of system expansion



Maximum number of stages added	7 stages
Maximum number of I/O units installed	64 units
Maximum number of I/O channels	4,096 channels
Maximum number of MELSEC ET/H units installed	4 units
Maximum number of CC-Link units installed	4 units
Maximum number of interrupt units installed	1 unit

Notes
(1) Up to seven expansion base units can be added.
(2) The total length of extension cable must be 132 m.
(3) When using an extension cable, do not bundle it with route it near any main circuit (high voltage, large current).
(4) Set the extension stage numbers in ascending order without number dublication.
(5) Connect each extension cable from the extension cable connector OUT on one base unit to the extension cable connector IN on the extension base unit at the next stage.
(6) Installing 65 units or more results in an error.

Restriction by Power Capacity

This Unit uses the Q61P/Q64P as the Q Series power supply module, whose power capacity is 5VDC, 6A/8,5A. Some combination of this Unit with Q Series modules cannot be used depending on the configuration.
Calculate the total current consumption by the base units, PLC CPU modules, I/O modules, intelligent function modules, and peripheral devices to be used. Your system configuration is acceptable when the total current consumption is within 6A.
The table below lists the current consumption values of some modules for you reference. For the actual current consumption values of modules, refer to their manuals.

Classification	Model name	Current consumption (A) at 5 VDC
Main base unit	Q38B	0.077
	Q312B	0.087
PC CPU module	PPC-CPU686(MS)	3.0
Hard disk unit	PPC-HDD(MS)-5	0.88
Silicon disk unit	PPC-SDD(MS)	0.09
PLC CPU module	Q02CPU	0.60
	Q25HCPU	0.64
Motion CPU module	Q172CPU	1.62
	Q173CPU	1.75
Input module	QX10	0.05
	QX40	0.05
Output module	QY10	0.43
	QY40P	0.065
A-D conversion module	Q68ADV	0.64
D-A conversion module	Q64DA	0.345
Positioning module	QD75P4	0.58

- Multiple PLC configuration with the hard disk unit

If the total current consumption by the individual units exceeds 6A/8,5A, the configuration is not acceptable.

Number of CPU units			Main base unit	Total current consumption (A)	Remaining current capacity (A)			
PLC CPUs	Motion CPUs	This Unit						
Q25HCPU (0.64A)	Q173CPU cooling fan (1.83A)	PPC-CPU686(MS) PPC-HDD(MS)-5 (3.88A) *1	Q312B (0.087A)		Q61P (6A)	Judgement	Q64P (8,5)	Judgement
0	0	1	1	3.967	2.033	1 A to less than 5 A	4,533	1 A to less than 5 A
1	0	1	1	4.607	1.393	1 A to less than 5 A	3,893	1 A to less than 5 A
2	0	1	1	5.247	0.753	0 A to less than 1 A	3,253	1 A to less than 5 A
3	0	1	1	5.887	0.113	0 A to less than 1 A	2,613	1 A to less than 5 A
1	1	1	1	6.437	−0.437	Less than 0 A	2,063	1 A to less than 5 A
2	1	1	1	7.077	−1.077	Less than 0 A	1,423	1 A to less than 5 A
1	2	1	1	8.267	−2.267	Less than 0 A	0,233	0 A to less than 1 A

The remaining current capacity is used as a criterion.

1 A to less than 5 A: The system can grow.

0 A to less than 1 A: The configuration is acceptable but not expandable.

Less than 0 A: The configuration is not acceptable.

*1 Excluding the consumption current in the peripherals (including PC cards, USB equipment, keyboard, mouse) and/or connector terminals.

- Multiple PLC configuration with the silicon disk unit

If the total current consumption by the individual units exceeds 6A/8,5A, the configuration is not acceptable.

Number of CPU units			Main base unit	Total current consumption (A)	Remaining current capacity (A)			
PLC CPUs	Motion CPUs	This Unit						
Q25HCPU (0.64A)	Q173CPU cooling fan (1.83A)	PPC-CPU686(MS) PPC-SDD(MS) (3.09A) *1	Q312B (0.087A)		Q61P (6A)	Judgement	Q64P (8,5)	Judgement
0	0	1	1	3.177	2.823	1 A to less than 6 A	5,323	1 A to less than 6 A
1	0	1	1	3.817	2.183	1 A to less than 6 A	4,68	1 A to less than 6 A
2	0	1	1	4.457	1.543	1 A to less than 6 A	4,043	1 A to less than 6 A
3	0	1	1	5.097	0.903	0 A to less than 1 A	3,403	1 A to less than 6 A
1	1	1	1	5.647	0.353	0 A to less than 1 A	2,853	1 A to less than 6 A
2	1	1	1	6.287	−0.287	Less than 0 A	2,213	1 A to less than 6 A
1	2	1	1	7.477	−1.477	Less than 0 A	1,023	1 A to less than 6 A

The remaining current capacity is used as a criterion.

1 A to less than 6 A: The system can grow.

0 A to less than 1 A: The configuration is acceptable but not expandable.

Less than 0 A: The configuration is not acceptable.

*1 Excluding the consumption current in the peripherals (including PC cards, USB equipment, keyboard, mouse) and/or connector terminals.

- Configuration with many I/O modules and intelligent function modules

If the total current consumption by the modules on the main base unit, including this Unit and peripheral devices, exceeds 6A, move I/O modules and intelligent function modules to an expansion unit. The total current consumption by the modules on each base unit must not exceed 6A. If the system configuration is short of power capacity even with one expansion base unit added, add more than one expansion base unit.

7 Reset Specifications

7.1 Reset Specifications

Reset type		Single-CPU configuration	Multiple PLC configuration (Units No.2 to 4)	
			DIP switch with SW-5 set to OFF	DIP switch with SW-5 set to ON
Reset involving a reset of this Unit	Reset by recycling the power supply	Available Recycling the power supply after shutdown. This Unit and all the modules on the bus are reset.	Available (Same as left)	Available (Same as left)
	Reset by restarting the OS	Available Restart followed by OS shutdown. This Unit and all the Units on the bus are reset.	Available Restart followed by shutdown after resetting Unit No.1. This Unit and all the modules on the bus are reset. (Restarting the OS without resetting Unit No.1 results in a multiple PLC down error. In the multiple PLC configuration, therefore, Unit No.1 must	Unavailable This Unit and all the modules on the bus are reset when Unit No.1 is reset. Therefore the OS restart cannot be executed. (Restarting the OS without resetting Unit No.1 results in a multiple PLC down error. In the multiple PLC configuration, therefore, U
	Reset by resetting Unit No.1	No combination	No combination	Available Resetting Unit No.1 after shutdown. This Unit and all the modules on the bus are reset.
Bus interface driver reset	Reset by resetting Unit No.1	No combination	Available Resetting Unit No.1. The bus interface driver and all the modules on the bus are reset.	No combination
	Reset by the toggle switch	Available Setting the toggle switch to B.RST. The bus interface driver and all the modules on the bus are reset.	No combination Since the bus interface driver and all the modules on the bus are reset when Unit No.1 is reset, there is no need to set the toggle switch to B.RST. (Setting the toggle switch to B.RST without resetting Unit No.1 results in a multiple PLC down error. In the multiple PLC congiguration, therefore, Unit No.1 must be reset.)	Unavailable Since this Unit and all the modules on the bus are reset when Unit No.1 is reset, the toggle switch cannot be used to reset. (Setting the toggle switch to B.RST without resetting Unit No.1 results in a multiple PLC down error. In the multiple PLC congiguration, therefore, Unit No.1 must be reset.)

7.2 Reset Procedure Involving a Reset of the Unit

Reset by Recycling the Power Supply

① Shut down the OS (or set the shutdown command input to ON).

② Check that the EXIT LED on this Unit comes on
(or that the shutdown completion output is turned ON).

③ Turn the power off.

④ Turn the power on back.

Restarting the OS (DIP switch with SW-5 set to OFF)

① In the multiple PLC CPU configuration, reset CPU Unit No.1 (PLC CPU).

② Shut down the OS on the screen, then restart it.

③ In the multiple PLC CPU configuration, cancel the reset of CPU Unit No.1 (PLC CPU).

Reset by resetting Unit No.1 (PLC CPU) (DIP switch with SW-5 set to ON)

① Shut down the OS on the screen
(or set the shutdown command input to ON).

② Check that the EXIT LED on this Unit comes on
(or that the shutdown completion output is turned ON).

③ Reset the switch on Unit No.1.

④ Release the switch on Unit No.1 from the reset.

Notes! *The shutdown command input and shutdown completion output require the connector terminal (PPC-COT-01, separately priced). These functions are supported only by Windows 2000 Professional.*
For details, refer to the connector terminal manual.
- The EXIT LED comes on only when you shut down Windows 2000 Professional.
- To reset this Unit or restart the OS in the multiple PLC CPU configuration, be sure to reset CPU Unit No.1 (PLC CPU) in advance. Doing so without resetting CPU Unit No.1 causes a multiple PLC CPU down error on another CPU module.

7.3 Bus Interface Driver Reset Procedure

Single-CPU configuration with this Unit as only one CPU Unit

① Stop the user application.

② Set the toggle switch to B.RST (hold the switch at the B.RST position for two seconds, then release it).

③ Set the toggle switch to B.RUN.

④ Execute the user application.

Multiple PLC CPU configuration (DIP switch with SW-5 set to ON)

① Stop the user application.

② Reset CPU Unit No.1.

③ Release CPU Unit No.1 from the reset.

④ Execute the user application.

Note! *In the multiple PLC CPU configuration, reset the bus interface driver by resetting CPU Unit No.1 (PLC CPU). Setting the toggle switch to B.RST without resetting CPU Unit No.1 results in a multiple PLC CPU down error on another CPU module.*

8 Troubleshooting

8.1 Tips for Better Troubleshooting

Key points for establishing a system faster are minimizing the number of problems developing and, once a problem has developed, identifying the cause as soon as possible.
You should perform troubleshooting with the following three basic points in mind.

(A) Check visually.

Check the following items:

① Behavior of external devices

② Existence or absence of power supply

③ Wiring state (connection cable)

④ LED indication (Power indicator LED)

After checking the Unit for items (1) to (4), connect the Unit to external devices and check the behavior of the user program.

(B) Identify the problem.

Take the following steps to observe how the symptom changes:

① Change the input state to check whether the correct change can be read by the test program.

② Turning the output on and off repeatedly to check whether the state of the external device changes correctly.

(C) Narrow the range down.

Check the results of (A) and (B) above to locate the fault in one of the following options:

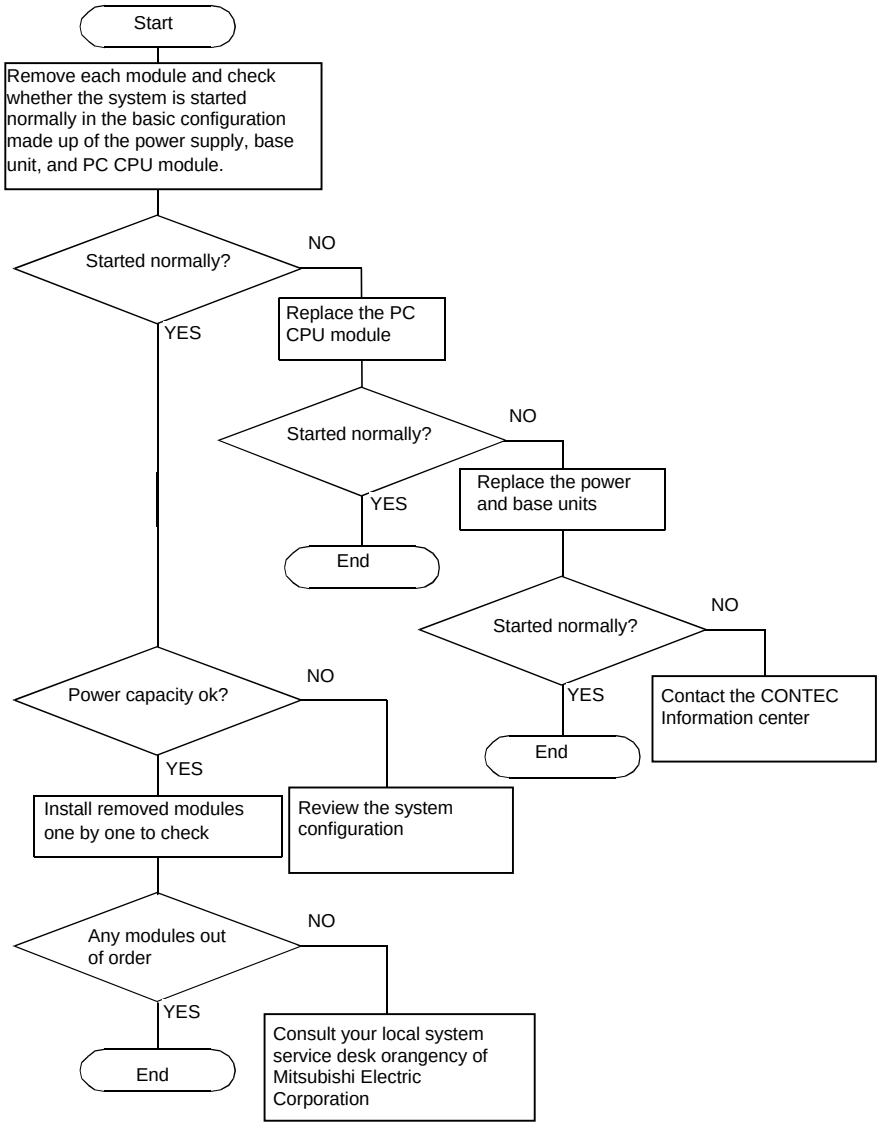
① The Unit side or external device side

② This Unit or any other Unit

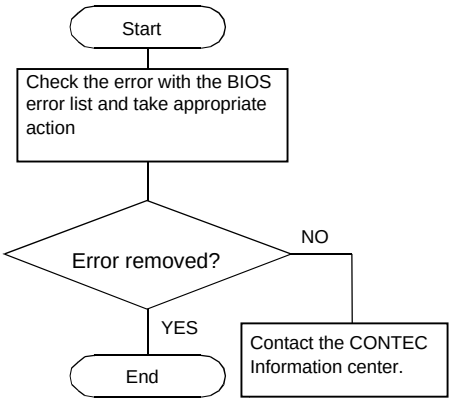
③ Connection cable

④ User program

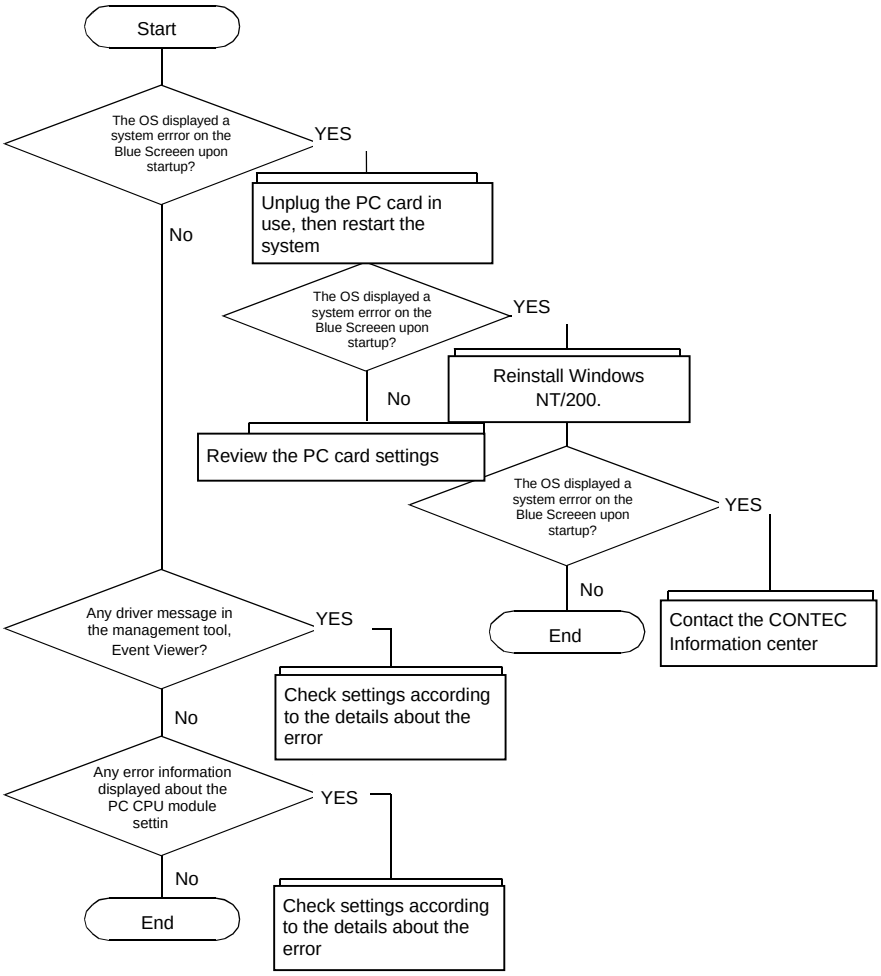
8.1.1 The Unit Won't Start Normally



8.1.2 The Unit Starts with a BIOS Error displayed



8.1.3 The OS Won't Start Normally



BIOS Errors

BIOS Error List (1)

Error message		Description	Action to take
0200:	Failure Fixed Disk	Hard disk error	Check the hard disk connection cable, master/slave setting switch, and unit engagement. If they have no problem, something may be wrong with the drive.
0210:	Stuck Key	Keyboard error	Check the cable connection. If it has no problem, replace the keyboard with a different model.
0211:	Keyboard Error	Keyboard error	Replace the keyboard with a different model. If the error persists the keyboard interface may be faulty.
0212:	Keyboard Controller Failed	Keyboard controller error	Replace the keyboard with a different model. If the error persists the keyboard interface may be faulty.
0220:	Monitor type does not match CMOS - Run SETUP	The monitor type does not match CMOS data. Use BIOS Setup.	Run BIOS Setup to make the correct setting.
0230:	System RAM Failed at offset:	System RAM error	Repair the PC CPU module by replacing the component.
0231:	Shadow Ram Failed at offset:	Shadow RAM error	Repair the PC CPU module by replacing the component.
0232:	Extended RAM Failed at address line :	Extended RAM error	Repair the PC CPU module by replacing the component.
0250:	System battery is dead - Replace and run SETUP	The system battery is dead. Replace the battery and use BIOS Setup.	The system battery is dead. Request CONTEC for repair because the RTC must be replaced.
0251:	System CMOS checksum bad - Default configuration used	System CMOS checksums are invalid. Factory defaults are loaded.	When CMOS data is cleared immediately after a BIOS update, system CMOS checksums become invalid. Run BIOS Setup to set up your system again. If this error is persistent, CMOS (RTC) may be defective or the battery may be dying.
0252：	Password checksum bad - Passwords cleared	The password checksum is invalid. The password is cleared.	Run BIOS Setup to set a password again. If this error is persistent, CMOS (RTC) may be defective or the battery may be dying.
0260：	System timer error	System timer error	Repair the PC CPU module by replacing the component.
0270:	Real time clock error	Real time clock error	Repair the PC CPU module by replacing the component.
0271:	Check date and time settings	Check the date and time with BIOS Setup.	Run BIOS Setup to set the date and time. If this error is persistent, CMOS (RTC) may be defective or the battery may be dying.

BIOS Error List (2)

Error message		Description	Action to take
0280:	Previous boot incomplete - Default configuration used	The last boot failed to terminate normally. Factory defaults are loaded.	A power shutdown or reset during a boot may cause this error upon the next boot. Run BIOS Setup to check settings. Avoid a power shutdown or reset during a boot.
02B0:	Diskette drive A error	Floppy disk A error	Check the connection cable for engagement. If it has no problem, something may be wrong with the PC CPU module.
02B2:	Incorrect Drive A - run SETUP	The type of drive A is invalid. Use BIOS Setup.	Run BIOS Setup to set the drive type correctly.
02D0:	System cache error - Cache disabled	System cache error. The cache cannot be used.	Repair the PC CPU module by replacing the component.
02F5:	DMA Test Failed	The DMA test terminated abnormally.	Repair the PC CPU module by replacing the component.
Beep with no error message on the screen			There may be a problem with memory or ROM. Repair the PC CPU module by replacing the

9 Appendix

9.1 Memory Map

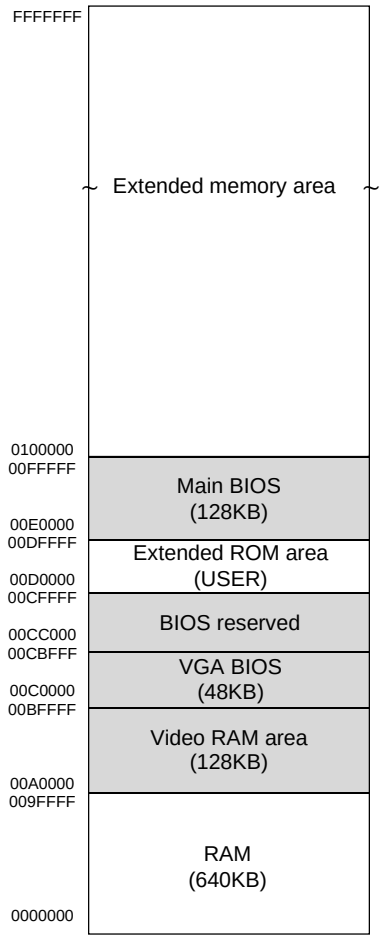


Fig 9.1: *Memory Map*

9.2 I/O Port Addresses

Address range (hex)	Content	Remarks
000~00F	DMA controller 1 (slave)	ch0-ch3 (8-bit transfer)
010~01F	System reserved	
020~03F	Interrupt controller 1 (master)	
040~05F	Timer	
060~06F	Keyboard	
070~07F	RTC/NMI mask	
080~09F	DMA page register	
0A0~0BF	Interrupt controller 2 (slave)	
0C0~0DF	DMA controller 2 (master)	ch5-ch7 (16-bit transfer)
0E0~0FF	System reserved	
100~12F	Available to user	
130~13F	System reserved	
140~16F	Available to user	
170~18F	System reserved	
190~1DF	Available to user	
1E0~1EF	System reserved	
1F0~1FF	IDE hard disk controller	Primary
200~277	Available to user	
278~27F	Reserved for parallel port	LPT2
280~2E7	Available to user	
2E8~2EF	Reserved for serial port	COM4
2F0~2F7	Available to user	
2F8~2FF	Serial port	COM2
300~35F	Available to user	
360~377	System reserved	
378~3AF	Parallel port	LPT1
3B0~3BB	System reserved	
3BC~3BF	Reserved for parallel port	LPT3
3C0~3DF	System reserved	
3E0~3E7	PCMCIA	
3E8~3EF	Reserved for serial port	COM3
3F0~3F7	FD controller	
3F8~3FF	Serial port	COM1
4D0~4DF	System reserved	
CF0~CFF	System reserved	
1000~107F	System reserved	
46E8	System reserved	
83D0~B3D3	System reserved	

Tab 9.1: I/O Port Addresses

9.3 Interrupt Levels

Type	8259	Priority	Description	Vector
NMI		Top	-I/O CH CK or WDT	02H
IRQ0	MASTER	?	Timer 0	08H
IRQ1	〃	?	Keyboard	09H
IRQ2	〃	?	Interrupt controller 2 (slave)	0AH
IRQ8	SLAVE	?	Real time clock	70H
IRQ9	〃	?	System reserved	71H
IRQ10	〃	?	Unused (Available to user)	72H
IRQ11	〃	?	PCI device	73H
IRQ12	〃	?	PS/2 mouse	74H
IRQ13	〃	?	Coprocessor	75H
IRQ14	〃	?	Hard disk	76H
IRQ15	〃	?	System reserved	77H
IRQ3	MASTER	?	Serial port 2 (COM2)	0BH
IRQ4	〃	?	Serial port 1 (COM1)	0CH
IRQ5	〃	?	Unused (Available to user)	0DH
IRQ6	〃	?	Floppy disk	0EH
IRQ7	〃	Bottom	Parallel port (LPT1)	0FH

Tab 9.2: *Hardware Interrupt Levels (Factory Defaults)*

9.4 ATA Card Boot Procedure

You can boot the system from the ATA card by changing the relevant setting using BIOS Setup. Note that the OS that can be booted from the ATA card is Windows NT Workstation 4.0 or Windows NT Embedded 4.0 only.
Follow the steps below to change the BIOS Setup value:

① Plug the ATA card in Slot1 on this Unit, then turn on the system power supply.

② When the system is normal, the “Press <F2> to enter SETUP” prompt appears at the bottom of the screen. Press the <F2> key at the keyboard to invoke BIOS Setup.

③ In the Advanced window, set “PCMCIA ATA DISK:” to [Secondary].

④ In the PCI Configuration window, set “IRQ 15:” for “PCI/PNP ISA IRQ Resource Exclusion” to [Reserved].

⑤ In the Exit window, select “Exit Saving Changes” to save the changes you made.

⑥ The system will be restarted automatically. Press the <F2> key again to invoke BIOS Setup.

⑦ In the Boot window, the name of the ATA card to be used appears under “Hard Drive”. Move it to the beginning of the device list displayed under “Hard Drive”.

⑧ In the Exit window, select “Exit Saving Changes” to save the changes you made.

⑨ The system will be restarted automatically and booted from the ATA card.

10 Options

Serial Conversion Cable

- PPC-SCC-01 — 36-pin half-pitch to 9-pin D-SUB conversion cable (500mm in cable length)

Hard Disk Unit

- PPC-HDD(MS)-5 — 5-GB hard disk unit
- PPC-HBR-01 — Hard disk unit shock-proof fixing brackets

Silicon Disk Units

- PPC-SDD(MS)-32 — 32-MB silicon disk unit
- PPC-SDD(MS)-64 — 64-MB silicon disk unit
- PPC-SDD(MS)-128 — 128-MB silicon disk unit
- PPC-SDD(MS)-192 — 192-MB silicon disk unit
- PPC-SDD(MS)-320 — 320-MB silicon disk unit
- PPC-SDD(MS)-500 — 500-MB silicon disk unit
- PPC-SDD(MS)-1000 — 1-GB silicon disk unit

CD-ROM Drive

- PPC-CDD-01 — Dedicated CD-ROM drive (400mm in cable length)

Connector Terminal

- PPC-COT-01 — Terminal box to convert the serial, parallel, and USB interfaces in the extension interface (EX.I/F) to the PC standard connectors (1m in cable length)

Floppy Disk Unit

- PC-FDD25BH — 3.5-inch floppy disk drive (600mm in cable length)

Analog input type color TFT LCD (with touch panel), LCD dedicated power supply

- IPC-PALA-D 1510 Monitor — 15” Touchscreen

Manuals

- PPC-CPU686(MS)-MU — (English version of the User’s Manual)
  PC CPU module User’s Manual
  Bus Interface Driver User’s Manual

11 PC CPU Related Manuals

- PC CPU module User's Manual
  Bundled with the PPC-CPU686(MS)-MJ (Japanese version) or PPC-CPU686(MS)-MU (English version).

- Bus Interface Driver User's Manual
  Bundled with the PPC-CPU686(MS)-MJ (Japanese version) or PPC-CPU686(MS)-MU (English version).

- Hard Disk Unit Manual
  Bundled with the PPC-HDD(MS)-5.

- Silicon Disk Unit Manual
  Bundled with the PPC-SDD(MS) Series.

- Connector Terminal Manual
  Bundled with the PPC-COT-01.

- CD-ROM Drive Manual
  Bundled with the PPC-CDD-01.

- Manual for Hard Disk Unit Shock-proof Fixing Brackets
  Bundled with the PPC-HBR-01.

12 Recommended Products

Keyboard/Mouse shared cable

- PPC-YCAB-01

List of Figures

List of Tables

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