Pro-face
Human Machine Interface

Pro-face®

PL-5910 Series Panel Computer

User Manual

Introduction

Thank you for purchasing Pro-face's PL-5910 Series Panel Computer, hereafter referred to as "the PL". This unit embodies Pro-face's latest, cost-effective architecture and is designed for Industrial Automation users.

Prior to using your PL, be sure to read this manual thoroughly to familiarize yourself with the unit's operation procedures and functions.

NOTICE:

1. It is forbidden to copy the contents of this manual in whole, or in part, without the permission of the Digital Electronics Corporation.
2. The information in this manual is subject to change without notice.
3. This manual was written with care; however, if you should find any errors or omissions, please contact Digital and inform them of your findings.
4. Please be aware that Digital Electronics Corporation shall not be held liable by the user for any damages, related losses, or third party claims arising from the uses of this product.

Essential Safety Precautions

This manual includes the following cautions concerning procedures that must be followed to operate the PL-5910 Series unit correctly and safely. Prior to operating the PL, be sure to read this manual and any related materials thoroughly to understand the correct operation and functions of this unit.

Safety Icons

To allow you to use the PL correctly, throughout this manual, the following icons are provided to indicate items requiring special attention.

These icons indicate the following levels of danger:

Indicates situations where severe bodily injury, death or major equipment damage may occur.

Indicates situations where slight bodily injury or machine damage can occur.

WARNING

- **To avoid the possibility of an electric shock, be sure to connect the power cord to the PL before connecting it to the main power supply.**
- **A fire or electrical shock may occur if voltages used with the PL are beyond the specified range. Be sure to use only the specified voltage.**
- **Before opening the PL unit's rear maintenance cover, be sure to turn the unit's power OFF. This is because the PL unit's internal parts carry high voltages.**
- **To avoid fires or electrical hazards, do not modify the PL in any way.**
- **Do not create touch panel switches that are used to either control or to ensure the safety of equipment and personnel. Mechanical switches, such as an emergency stop switch, a deadman (two-handed) start switch, etc., must be installed and operated via a separate control system.**

⚠ WARNING

- **After the PL unit's backlight burns out, unlike "Standby Mode", the PL unit's touch panel is still active. If the operator fails to notice that the backlight is burned out and touches the panel, a potentially dangerous machine operation error can occur.**

  If your PL unit's backlight suddenly turns OFF, use the following steps to determine if the backlight is actually burned out.

  1) If your PL is <u>not</u> set to "Standby Mode" and the screen has gone blank, your backlight is burned out.

  2) Or, if your PL <u>is</u> set to Standby Mode, but touching the screen does not cause the display to reappear, your backlight is burned out.

- **If metal particles, water or other types of liquids contact any of the PL unit's internal parts, immediately turn the unit's power OFF, unplug the power cord, and contact either your PL distributor or the Digital Electronics Corporation.**
- **Read and understand Chapter 4 "Installation and Wiring" thoroughly in order to select an appropriate installation location for the PL.**
- **Before either plugging in or unplugging a board or interface connector, be sure to turn the PL unit's power OFF.**
- **To prevent a possible explosion, do not install the PL in areas containing flammable gases.**
- **Do not use the PL unit with aircraft control devices, aerospace equipment, central trunk data transmission (communication) devices, nuclear power control devices, or medical life support equipment, due to their inherent requirements of extremely high levels of safety and reliability.**
- **When using the PL with transportation vehicles (trains, cars and ships), disaster and crime prevention devices, various types of safety equipment, non life-support-related medical devices, etc. be sure to design redundant and/or fail-safe system designs to ensure the proper degree of reliability and safety.**

CAUTION

- **Do not strike the touch panel with a hard, heavy or pointed object, or press on the touch panel with excessive force, since it may damage the panel.**
- **Do not expose the PL to, or operate the PL in direct sunlight, high temperatures and humidity, and in areas where excessive dust and vibration will occur.**
- **Do not use the PL in areas where sudden, extreme changes in temperature can occur. These changes may cause condensation to form inside the unit, possibly causing an accident.**
- **To prevent the PL from overheating, be sure its air circulation vents are clear and clean, and keep the unit's operation area well-ventilated.**
- **Do not operate or store the PL near chemicals, or where chemicals can come in contact with the unit.**
- **To extend the lifetime of the PL unit's Hard Disk Drive (HDD), use the BIOS, [POWER MANAGEMENT SETUP]-[HDD Power Down] setting to stop the HDD motor when the HDD is not being operated. The factory setting of "5Min" is recommended.**

  With Windows®2000:

  Use the [Control Panel] -> [Power Option] -> [Power Setting] feature to turn the HDD off when not in use. (Recommended setting: [After 5 mins]

When PL Hard Disk Drive (HDD) data is lost:

- **The Digital Electronics Corporation cannot be held responsible or provide any compensation for damage(s) caused by the loss of data stored in the PL unit's hard disk drive (HDD). It is therefore strongly suggested that all important data and software be backed up regularly to an external data backup device.**
- **Be aware that the Digital Electronics Corporation bears no responsibility for any damages resulting from the customer's application of this unit's hardware or software.**

CAUTION

- **Since the PL unit's hard disk drive (HDD) is a consumable item, i.e. it has a finite lifetime, be sure to back up its data regularly and prepare a spare HDD unit.**
- **To prevent file data damage, be sure to shut down the PL unit's OS before turning OFF the main power.**
- **After turning OFF the PL unit's power, be sure to wait until the internal HDD stops spinning before turning the power ON again (approx. 5 seconds).**
- **Do not turn PL unit's power OFF while the HDD is operating.**

■ About the PL unit's Display Panel

- The PL unit's currently displayed data, its voltage and brightness setting each affect the intensity of *Contouring*. (i.e., when some parts of the screen are brighter than others, creating a wavelike pattern)
- There are minute grid-points (dark and light) on the Display Panel surface. This is part of the PL unit's design and not a defect.
- Shadows may appear at the top of the LCD. This is normal for an LCD display.
- Sometimes the display area may look as if the display colors have changed. This is a common attribute of LCD displays and is not a defect.
- Displaying a single image for long periods can cause an afterimage to remain when the display is changed to another screen. To prevent this, periodically turn the PL OFF and then ON again to remove this afterimage.

Table of Contents

Documentation Conventions

The list below describes the documentation conventions used in this manual.

Symbol	Meaning
	Indicates important information or procedures that must be followed for correct and risk-free software/device operation.
	Provides useful or important supplemental information.
*1	Indicates useful or important supplemental information.
Reference	Refers to useful or important supplemental information
1) , 2)	Indicates steps in a procedure. Be sure to perform these steps in the order given.
PL	Abbreviation for the PL-5910 Series of Industrial Computers.

PL Series Panel Types

DC24V Series Unit Model Numbers:

PL591 * - T**

A B C D E

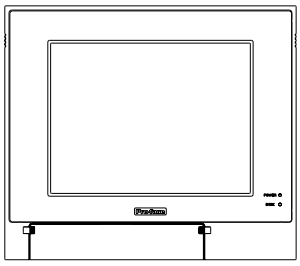
Item	Code	Meaning
A	PL591	PL-5910 Series Unit
B	0	3-slot type
	1	1-slot type
C	T	TFT Color LCD display
D	1	AC100V Model (no certification)
	4	CE Marking, UL/c-UL(CSA) Approval
E	*	Revision No.

Package Contents

The PL unit's packing box contains the items listed below. Please check to confirm that all items shown below have been included.

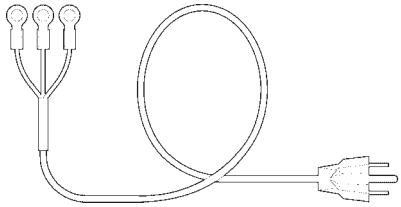
■ **PL Unit**

PL-5910T/PL-5911T

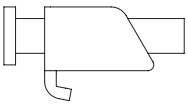


■ **Power Cord**

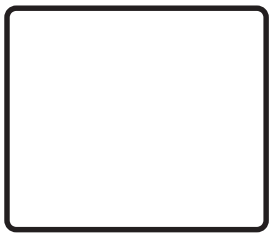
(included only with PL-5910-T11/PL5911-T11)



■ **Installation Fasteners (4 brackets/set)**

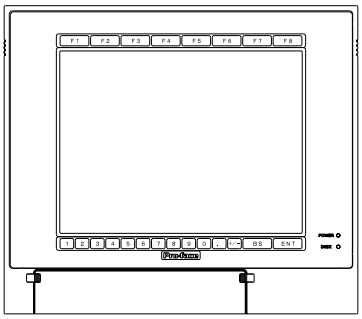


■ **Installation Gasket**



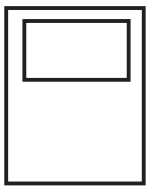
■ **Function Labels**

Attach the function labels as shown below.



■**PL-5910 Series User Manual & Driver CD**

■ **Installation Guide**



- Be careful when handling the PL not to damage the built-in HDD

- This power cord is designed only for AC100V/AC115V use. Any other voltage will require a different power cord.

- If your PL unit contains a built-in optional item, that item's Installation Guide will also be included in the PL unit's packing box. Be sure to check that all items normally included with that item are also included in this box.

The CD-ROM contains the PDF version of the User Manual, API Reference Manual and all PL-5910 Series Utility and Driver files.

Reference **Chapter 6 - Setting Up Your PL OS**

Special Features

The PL-5910 Series displays are equipped with the following features:

■ **The Latest, High-Performance Architecture**

Designed around the ULV Celeron® 650MHz CPU, the PL utilizes the type of high-performance architecture that offers you superior compatibility.

■ **Bright 10.4" LCD with a Wide Viewing Angle**

The PL unit's large 10.4-inch 640 x 480 TFT LCD display offers excellent visibility and brightness.

This top-of-the-line TFT color LCD allows you to create detailed and impressive 260,000-color images, with superb brightness and a wide viewing angle.

■ **Easy Front Panel Installation**

The PL is designed to be installed easily into the front of any panel or device. It is also rugged enough for use in harsh, industrial environments, such as those found in the factory automation industry and its front panel boasts an IP65f-equivalent rating.

■ **High Resolution, Analog Type Resistive Film Touch Panel**

Standard equipment with the PL is a high resolution 1024 x 1024 touch panel. Also, the separately sold mouse emulation utility provides mouse-like functionality and pointer control.

■ **Highly Expandable**

Two types of PL units are available: a 1-slot type (with 1 PCI bus), and a 3-slot type (with 2 PCI buses). These slots can accommodate both Digital's own optional boards as well as other commercially available expansion boards.

Digital also offers a wide variety of optional products, such as FDD units, DIM modules and others.

UL/c-UL/CSA Application Notes

The PL5910-T41-24V/PL5911-T41-24V Series units are UL/c-UL/CSA 60950 recognized products. (UL File No. E171486). Please pay special attention to the following instructions when applying for UL/c-UL/CSA approval for machinery which includes any of these PL units.

Equipment with a PL mounted in it requires UL evaluation for the combination of the PL and the equipment.

The PL conforms as a component to the following standards:

UL 60950-1

Third Edition, dated December 1st, 2001 (Standard for Safety of Information Technology Equipment)

CAN/CSA-C22.2 No. 60950-1-03

Third Edition, dated December 1st, 2001 (Standard for Safety of Information Technology Equipment)

PL5910-T41-24V (UL Registration Model: 3382701-01)

PL5911-T41-24V (UL Registration Model: 3382701-02)

When the PL unit is a built-in component of another product:

- The rear face of the PL unit is not an approved enclosure. When building the PL into another product, that product should be designed so as to meet standards for an approved enclosure.
- Use the PL indoors only.
- When using natural air ventillation, be sure to install the PL unit in a vertical panel. Also, be sure to create at least 50mm of air space around the rear face of the PL unit. If this amount of space is not created, the PL unit's internal temperature will increase and may lead to the unit's failing to meet UL standards.
- When connecting the PL unit's power cord, be sure to use a cord that is appropriate for the current and voltage used, and that has conductive wires that are 0.75 mm^2 or larger.
- When an end-use product will include the PL, be sure to design the PL unit's power cutoff switch as a separate disconnect device and locate it where the operator can easily reach it.
- Danger of explosion if backup battery is incorrectly replaced. Replaced only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CE Marking Notes

The PL5910-T41-24V/PL5911-T41-24V Series units are CE marked products that conform to EMC directives EN55011 (Group 1 Class A) and EN61000-6-2.

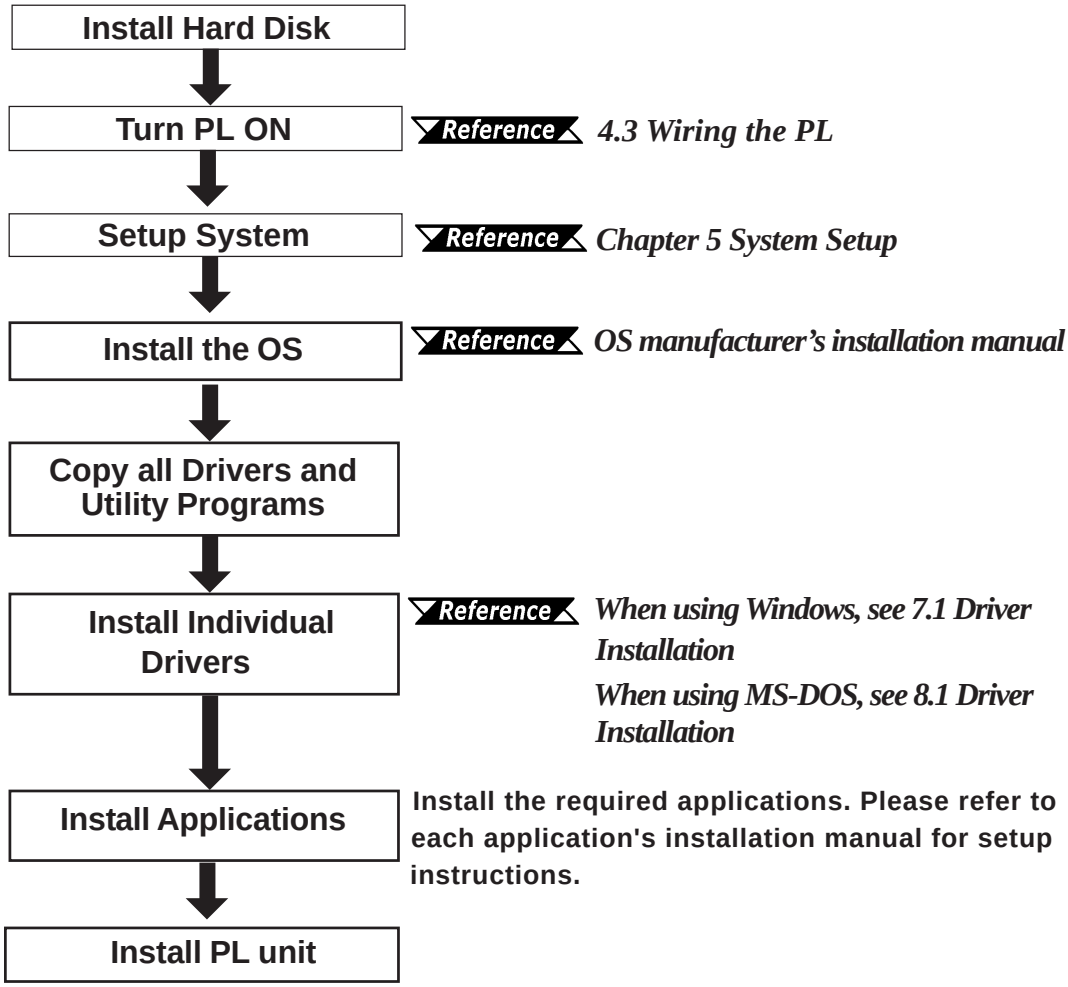
Memo

Chapter 1 PL Basics

1. PL Setup
2. PL System Design
3. Optional Items

1.1 PL Setup

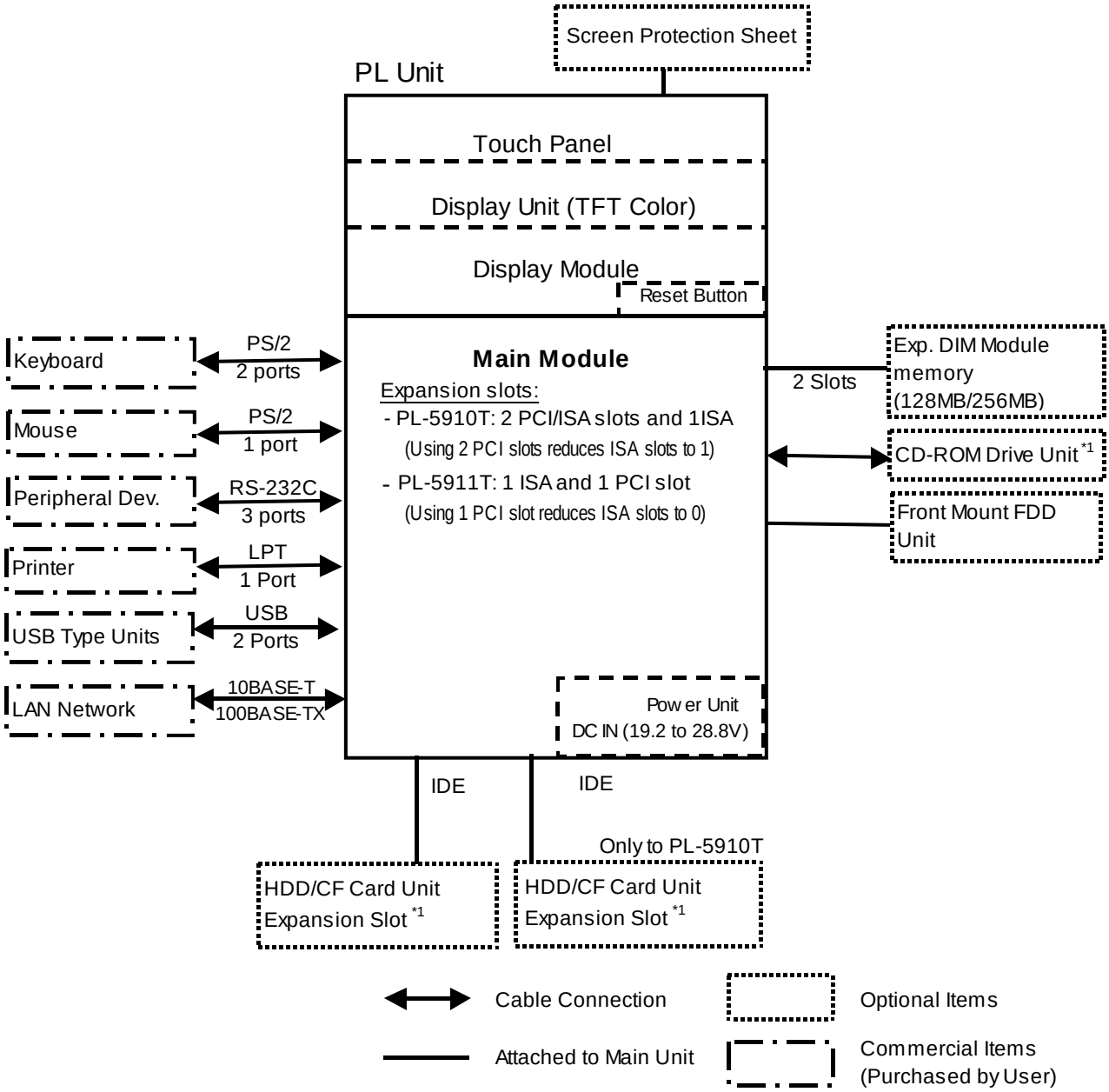
Use the following steps to set up your PL unit.



Important

- ***After completing the hardware setup and before any data or applications can be installed on the hard disk drive, the OS (Windows® or MS-DOS®) must be used to initialize the HDD and create partitions. For details concerning these procedures, refer to the OS maker's installation manual.***
- ***After turning the PL OFF, be sure to wait at least 5 seconds before turning ON again. If the unit is stated within 5 seconds, it may not start up correctly.***
- ***The PL is designed for use with MS-DOS®, WindowsNT® 4.0, and Windows®2000. Other operating systems are not supported by this PL unit's driver software.***

1.2 PL System Design



The above system configuration illustrates the PL unit's internal design and range of connectable peripherals. The user's actual configuration may differ.

**1 Certain limitations exist for the combinations of the HDD Unit, the CF Card unit, and the CD-ROM drive.*

Reference *1.3 Optional Items*

1.2.1 Connecting the PL Unit

The PL unit's touch panel can connected via a serial (COM4) interface or a USB interface. The PL unit's factory setting is for using a serial interface. If you have installed Windows®2000 in your PL unit and you wish to change this setting to a USB interface, please follow the steps given below.

MS-DOS® and WindowsNT®4.0 operating systems are not compatible with USB interfaces.

◆ **Touch Panel I/F Selector Switch**

Set the touch panel selector switch to "U". For details,

Reference *2.4 PL Part Names and Features*

Be sure to change the touch panel selector switch only after turning the PL unit OFF. If the PL unit is running when this is performed, it can cause the unit to malfunction.

1.3 Optional Items

■ Options

Name	Model Number	Description
DIM Module	PL-EM256	256MB of SDRAM (DIMM) memory
	PL-EM128	128MB of SDRAM (DIMM) memory
FDD Unit	PL-FD510	PC/AT compatible 3.5" FDD unit (Attaches to front slot)
CD-ROM Unit	PL-DK200	IDE (ATAPI) compatible CD-ROM drive unit – for development and maintenance use. (Connection cable is included with CD-ROM unit)
CF Card Unit	PL-CF200	Designed exclusively for 5V type cards.
CF Card	CA3-CFCALL/128MB-01	Type 1 CF card (128MB)
	CA3-CFCALL/256MB-01	Type 1 CF card (256MB)
	CA3-CFCALL/512MB-01	Type 1 CF card (512MB)
	CA6-CFCALL/1GB-01	Type 1 CF card (1GB)
HDD Unit	PL-HD220	20GB 2.5" HDD Unit (OS not included)
RS-232C/RS-485 Adaptor	PL-RC500	Converts an RS-232C interface to an RS-485 interface. Connects to COM3.
Screen Protection Sheet	PL-CS001	Disposable, dirt-resistant sheet for screen protection. Touch Panel can be used through this sheet. (10 sheets/set)
Glare Resistant Sheet	PL-NGS01	Disposable, glare-resistant sheet for screen protection. Touch Panel can be used through this sheet. (5 sheets/set)

■ Maintenance Options

Name	Model Number	Description
Installation Fasteners	CA3-ATFALL-01	Used to install the PL into a panel or cabinet. Same as original equipment brackets. (4 brackets/set)
Installation Gasket	PL-WS500	Used to prevent moisture from entering into the PL unit's case from the front face. Same as original equipment gasket.
Backlight	GP577T-BL00-MS	Spare Backlight for maintenance. (2 bulbs/set)

- **The PL is equipped with three IDE interfaces. Two can be used by the HDD or FFD units (PL-5911T can use only one), and one can be used by either the CD-ROM drive or the Mirror Disk unit. Physically, even though up to three IDE drive units can be connected at the same time, IDE interface specifications require that a controller's simultaneous operation be limited to a single master and slave unit, for a total of two devices. The following chart shows the combinations available when using two IDE units (PL-5911T can use only one).**

	MS	M	M	M	M	S					S				S				
CD-ROM Drive Unit				S					S				S					S	
CF Card Unit					S					S				S	M	M	M	M	MS

MS: Combination of 2 units - Master or Slave, is possible.

M: Used only for Master.

S: Used only for Slave.

- ***Since the PL unit's hard disk drive (HDD) is a consumable item, i.e. it has a finite usage lifetime, be sure to back up its data frequently and perform regular maintenance.***
- ***The Hard Disk lifetime given here may be reduced due to unforeseen environmental factors, however, generally speaking, at an operating temperature of 20°C and assuming 333 hours of operation (HDD motor is ON) per month (an access time of 20% or less), the HDD unit should last for 20,000 hours (power is ON) or approximately 5 years, whichever comes first.***

■ Commercially Available Items

PL-5910 Series units can all use commercially available expansion boards (PCI/ISA compatible) as well as a standard keyboard, mouse, printer, and USB-compatible devices. However, among the commercially available USB devices, not all will be compatible with the PL unit.

- **Be sure to use only DIM modules manufactured by Digital. Installing other DIM modules may result in either damage to or failure of the PL, and will void your warranty.**
- **When using USB type devices, be sure they are USB compatible, and be sure to read that device's Installation Guide prior to connecting it to the PL.**

Memo

Chapter 2 Specifications

1. General Specifications
2. Functional Specifications
3. Interface Connector Specifications
4. PL Part Names and Features
5. External Dimensions

2.1 General Specifications

2.1.1 Electrical

■ PL5900-T11, PL5901-T11

	PL5910-T11	PL5911-T11
Rated Voltage	AC100V	
Voltage Range	AC85V to AC132V	
Frequency	50/60Hz	
Allowable Voltage Drop	1 cycle or less (however, pause occurrences must be more than 1 second apart)	
Power Consumption	150VA or less	110VA or less
Voltage Endurance	AC1500V 20mA for 1 minute (between charging and FG terminals)	
Insulation Resistance	10MΩ or higher at DC500V (between charging and FG terminals)	

■ PL5900-T41-24V, PL5901-T41-24V

	PL5910-T41-24V	PL5911-T41-24V
Rated Voltage	DC24V	
Voltage Range	DC19.2V to DC28.8V	
Allowable Voltage Drop	10 ms or less (pause occurrences must be more than 1 second apart)	
Power Consumption	100W or less	80W or less
In-rush Current	30A or less	
Voltage Endurance	AC1000V 10mA for 1 minute (between charging and FG terminals)	
Insulation Resistance	10MΩ or higher at DC500V (between charging and FG terminals)	

2.1.2 Environmental

Ambient Operating Temperature	0°C to 45°C (with HDD attached: 5°C to 45°C)
Storage Temperature	-10°C to +60°C
Ambient Operating Humidity	10%RH to 85%RH (Wet bulb temperature of 29°C or less)
Ambient Storage Humidity	10%RH to 85%RH (Wet bulb temperature of 29°C or less)
Air Purity Level	0.1mg/m^3 or less (free of conductive particles and dust)
Atomosheric Pressure Resistance	800 to 1114hPa (2000 meters or lower)
Vibration Resistance	19.6m/s^2 at 10Hz to 25Hz in X, Y, Z directions for 30 minutes With HDD attached: 4.9m/s^2 With FD unit attached: 9.8m/s^2
Noise Endurance	Noise Voltage: 1500Vp-p Pulse Width: 50ns, 500ns, 1ms Rise Time: 1ns (via noise simulator)
Electrostatic Discharge Immunity	Contact: 4kV (IEC 61000-4-2 Level 2) Airborne: 8kV
Noise Immunity (First Transient Burst Noise)	Power Line: 2kV IEC 61000-4-4 Level 3 COM Port: 1kV IEC61000-4-4

- ***When using any of the PL unit's optional devices, be sure to check that device's specifications for any special conditions or cautions that may apply to its use.***
- ***Since the PL unit's hard disk drive (HDD) is a consumable item, i.e. it has a limited lifetime, be sure to back up its data regularly and prepare a spare HDD unit.***
- ***The Hard Disk lifetime given here may be reduced due to un-foreseen environmental factors, however, generally speaking, at an operating temperature of 20°C and assuming 333 hours of operation (HDD motor is ON) per month (an access time of 20% or less), the HDD unit should last for 20,000 hours (power is ON) or approximately 5 years, whichever comes first.***
- ***Using the Hard Disk in an environment that is excessively hot and/or humid will shorten the disk's usage lifetime. A wet bulb temperature of 29°C or less is recommended. This is equivalent to the following data.***

Temperature	Humidity
at 35°C	no higher than 64%RH
at 40°C	no higher than 44%RH

- ***To extend the lifetime of the PL unit's Hard Disk Drive (HDD), use the BIOS, [POWER MANAGEMENT SETUP]-[HDD Power Down] setting to stop the HDD motor when the HDD is not being operated. The factory setting of "5Min" is recommended.***

  With Windows®2000:

  Use the [Control Panel] -> [Power Option] -> [Power Setting] feature to turn the HDD off when not in use.
  (Recommended setting: [After 5 mins]

2.1.3 Structural

		PL-5910T	PL-5911T
Grounding *1		Exclusive grounding: Use your country's applicable standard.	
Rating (Front face of installed unit)		Equivalent to IP65f (JEM 1030) *2	
Weight		6.0 kg (13.2 lb) or less	5.5 kg (12.1 lb) or less
Cooling Method		Natural air ventilation	
External Dimensions		W 311mm[12.24in.] x H 271mm[10.67in.] x D 130mm[5.12in.] (excluding projections)	W 311mm[12.24in.] x H 271mm[10.67in.] x D 93mm[3.66in.] (excluding projections)
Dimensions Including FDD Unit	PL-FD500	W 311mm[12.24in.] x H 271mm[10.67in.] x D 130mm[5.12in.] (excluding projections)	W 311mm[12.24in.] x H 271mm[10.67in.] x D 123mm[4.84in.] (excluding projections)
	PL-FD510	W 311mm[12.24in.] x H 271mm[10.67in.] x D 147mm[5.79in.] (excluding projections)	W 311mm[12.24in.] x H 271mm[10.67in.] x D 145.7mm[5.74in.] (excluding projections)
Dimensions Including RS-232C/RS-485 Conversion Unit		W 311mm[12.24in.] x H 271mm[10.67in.] x D 152mm[5.98in.] (excluding projections)	W 311mm[12.24in.] x H 271mm[10.67in.] x D 115mm[4.53in.] (excluding projections)

***1** Only PL5910-T11/PL5911-T11 units. (Rated Voltage: 100VAC)*

***2** The front face of the PL unit, installed in a solid panel, has been tested using conditions equivalent to the standard shown in this specification . However even though the PL unit's level of resistance is equivalent to the standard, oils that should have no effect on the PL can possibly harm the unit. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the face of the unit for long periods of time. If the PL unit's front face protection sheet becomes peeled off, these conditions can lead to the ingress of oil into the PL and separate protection measures are suggested. Also, if non-approved oils are present, it may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the PL be sure to confirm the type of conditions that will be present in the PL unit's operating environment.*

2.2 Functional Specifications

2.2.1 General

CPU		ULV Celeron® 650MHz		
DRAM (SDRAM DIMM)		168 pin DIMM socket (256MB) x 2 DIMM (Max. 512MB)		
BIOS		Phoenix Technologies Co. FirstBIOS		
Secondary Cache Memory		256KB (pre-installed)		
Graphics		VGA (640 x 480 dots) VESA 265 colors/16-bit or 32-bit color		
Video Memory		UMA (unified memory architecture) type		
Touch Panel	**Type**	Resistive Film (Analog)		
	Resolution	1024 x 1024		
	Interface	COM4 : uses Mouse Emulator/ USB *1		
Interfaces	**Serial**	RS-232C (w/FIFO)	COM1	D-Sub 9 pin male (side)
			COM2	D-Sub 9 pin male (side, RI/+5V Changeover)
			COM3	D-Sub 9 pin male side (RI/+5V Changeover)
	Printer	Centronics Standard (SPP/ECP/EPP equivalent) D-sub 25 pin, female		
	Keyboard	PS/2 Interface (mini DIN 6 pin, female, side/front)		
	Mouse	PS/2 Interface (mini DIN 6 pin, female, side)		
	USB*1	USB Ver. 1.1 Interface (side/front)		
	Network	IEEE802.3 10BASE-T, 100BASE-TX (side)		
	RAS	RAS Interface (Dsub 25-pin male)		
	Disk I/F	FDD Unit	Front Access/ 2 modes/ 3.5 inch FD	
		E-IDE	Side-mount 2.5 inch HDD I/F PL-5910T: 2 slots PL-5911T: 1 slot Rear-mount CD-ROM (1 slot)	

**1 MS-DOS® and WindowsNT®4.0 do not support the USB feature.*

2.2.2 Display

Display Type	TFT Color LCD
Resolution	640 x 480 pixels
Dot Pitch	0.33 mm x 0.33 mm
Effective Display Area	W211.2 mm x H158.4 mm
Display Colors	18-bit color
Contrast Control	Not available
Backlight	CFL (User replaceable)
Backlight Lifetime	50,000 hours or longer at an ambient temperature of 25°C. (Until the backlight's brightness dims to half of the original level.)

When it is time to change the backlight, please contact your local PL distributor.

Reference *10.3.2 Replacing the Backlight*

2.2.3 Expansion Slots

■**PL-5910T**

	Board Size		Slot Pitch	Board Thickness
	PCI (Rev.2.1, 5V/32bit)	ISA		
1st slot	180 x 122mm	180 x 122mm	—	Less than 13mm
2nd slot	210 x 122mm	180 x 122mm	25mm	Less than 18mm
3rd slot	None	210 x 122mm	20mm	Less than 13mm
Power Supply	3.3V : 0.5A 5V : 3A 12V : 0.6A -5V : 0.1A -12V : 0.1A (total for 3 slots)			

For the 1st and 2nd slots either a PCI or an ISA type expansion board can be used.

■**PL-5911T**

	Board Size		Slot Pitch	Board Thickness
	PCI (Rev.2.1, 5V/32bit)	ISA		
1st slot	180 x 122mm	210 x 122mm	—	Less than 13mm
Power Supply	3.3V : 0.25A 5V : 1A 12V : 0.5A -5V : 0.1A -12V : 0.1A			

2.2.4 Clock (RTC) Accuracy

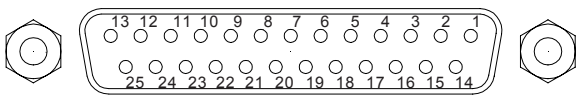
Clock(RTC) accuracy	±180 seconds per month

The PL unit's built-in clock (RTC) has a slight error. At the PL's specified ambient temperature and with the power turned OFF the error is ±180 seconds per month. However, ambient temperature fluctuations and the age of the unit may increase this error to ±300 seconds per month. If the PL unit's RTC clock accuracy is vital to system performance, regular adjustment of this clock is required.

2.3 Interface Specifications

2.3.1 Printer Interface (LPT1)

D-sub 25 Pin (Female)



Screw Size: **(4-40UNC): Inch Type**

Note:

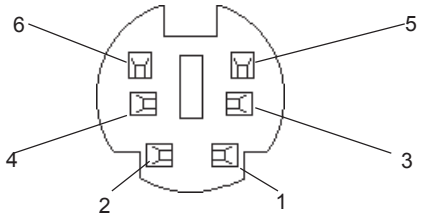
- **O.D.: Open Drain**
- **T.S.: 3-state Input**
- **TTLIN: TTL Input**

Pin No.	SPP/ECP Mode Signal Name	EPP Mode Signal Name	Direction	Electrical Specif.	Pin No.	SPP/ECP Mode Signal Name	EPP Mode Signal Name	Direction	Electrical Specif.
1*1	$\overline{\text{STRB}}$	$\overline{\text{WRITE}}$	In/Output	O.D/T.S	14*1	$\overline{\text{AUTOFD}}$	$\overline{\text{DSTRB}}$	In/Output	O.D/T.S
2	DATA0	DATA0	In/Output	T.S	15	$\overline{\text{ERROR}}$	$\overline{\text{ERROR}}$	Input	TTL
3	DATA1	DATA1	In/Output	T.S	16*1	$\overline{\text{INIT}}$	$\overline{\text{INIT}}$	In/Output	O.D/T.S
4	DATA2	DATA2	In/Output	T.S	17*1	$\overline{\text{SLCTIN}}$	$\overline{\text{ADSTRB}}$	In/Output	O.D/T.S
5	DATA3	DATA3	In/Output	T.S	18	GND	GND		
6	DATA4	DATA4	In/Output	T.S	19	GND	GND		
7	DATA5	DATA5	In/Output	T.S	20	GND	GND		
8	DATA6	DATA6	In/Output	T.S	21	GND	GND		
9	DATA7	DATA7	In/Output	T.S	22	GND	GND		
10	$\overline{\text{ACKNLG}}$	$\overline{\text{ACKNLG}}$	Input	TTL	23	GND	GND		
11	BUSY	$\overline{\text{WAIT}}$	Input	TTL	24	GND	GND		
12	PE	PE	Input	TTL	25	GND	GND		
13	SLCT	SLCT	Input	TTL					

**1 When using the printer interface in SPP mode, pins 1, 14, 16 and 17 become O.D. When using ESC or EPP modes, these pins will change to T.S.*

2.3.2 Keyboard Interface (KEY BOARD)

Mini - DIN 6 pin (Female)

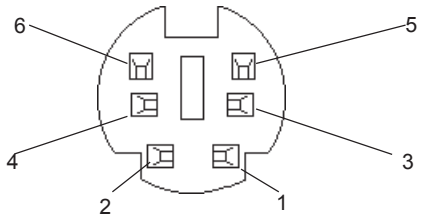


(Both front and side)

Pin No.	Signal Name
1	KEY DATA
2	NC
3	GND
4	+5V
5	KEY CLK
6	NC
SHIELD	GND

2.3.3 Mouse Interface (MOUSE)

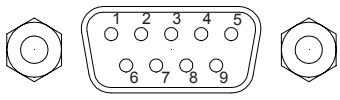
Mini - DIN 6 pin (Female)



Pin No.	Signal Name
1	Mouse DATA
2	NC
3	GND
4	+5V
5	Mouse CLK
6	NC
SHIELD	GND

2.3.4 RS-232C Interface (COM1/COM2/COM3)

D-sub 9 pin (Male)



Screw Size: **(4-40UNC): Inch Type**

Pin No.	Signal Name	Pin No.	Signal Name
1	CD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI/+5V
5	GND		

The GND terminal is the signal ground. Be sure to connect it with the cable's opposite side SG terminal.

No. 9 pin (RI/+5V) is used by COM2 and COM3 only. If COM1 is used, the pin becomes RI. The changeover from RI to +5V is set via the PL side face slide switch.

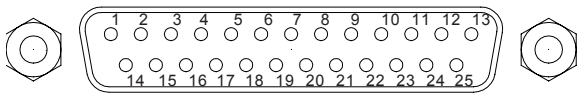
Reference *2.4 PL Part Names and Features*

Be sure to confirm what settings will be used by the other device and set the dip switches accordingly. Failure to do so can result in a unit malfunction or damage.

Whenever changing the PL dip switches, be sure to first turn the PL unit's power supply OFF. Failure to do so can cause a PL malfunction.

2.3.5 RAS Interface (RAS)

D-Sub 25 pin (Male)



Screw Size: **(4-40UNC): Inch Type**

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	**14**	GND
2	+5V (max. 100mA)	**15**	+5V
3	+12V (max.100mA)	**16**	NC
4	NC	**17**	NC
5	RESET INPUT (+)	**18**	NC
6	DIN 0 (+)	**19**	NC
7	DOUT (-)	**20**	NC
8	DOUT (+)	**21**	LAMP OUT (-)
9	ALARM OUT (-)	**22**	LAMP OUT (+)
10	ALARM OUT (+)	**23**	NC
11	RESET INPUT (-)	**24**	DIN1 (-)
12	DIN 0 (-)	**25**	NC
13	DIN 1 (+)		

Important

Be sure to use only the rated voltage level when using the No.2[+5V] and No.3 [+12V] for external power output. Failure to do so can lead to a unit malfunction or accident.

Note:

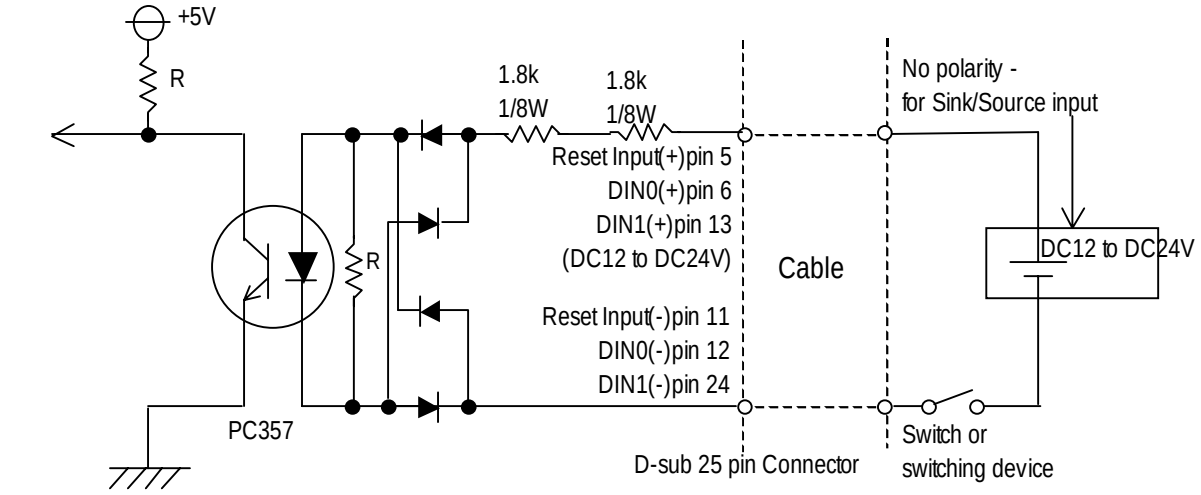
For detailed RAS Feature information,

Reference *9.1 RAS Feature*

■ External Input Signal (Used for both DIN and Remote Reset Input)

Input Voltage	DC12V to DC24V
Input Current	7mA
Operating Current	ON Voltage: 9V (min.), OFF Voltage: 3V (max.)
Insulation Method	Via Photocoupler

(Interface Circuit) (Connection Example)

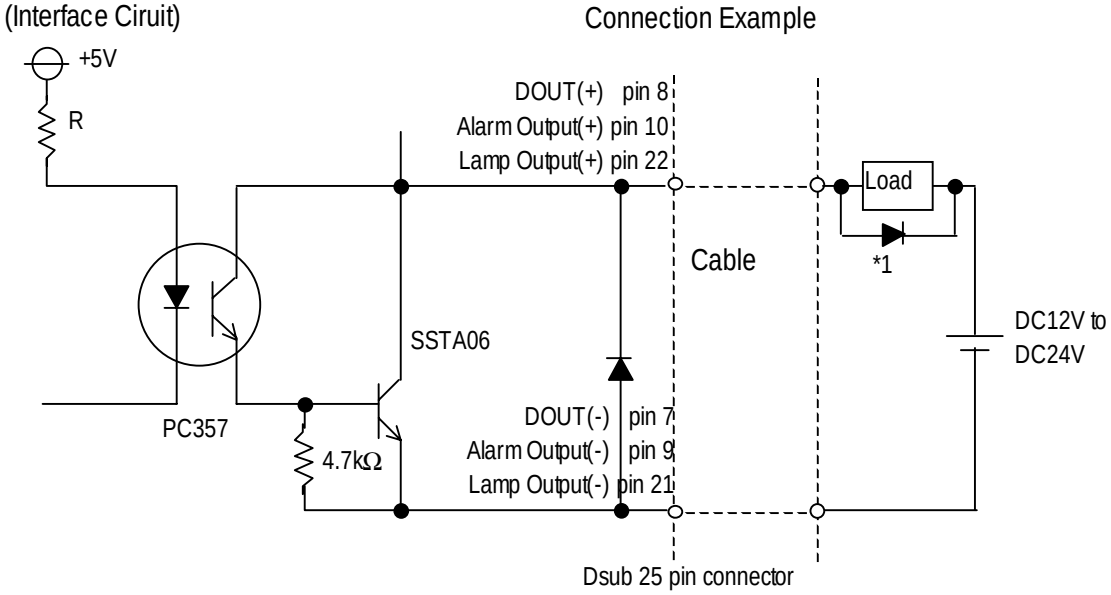


- ***General Purpose Input (DIN) level must be 1.5S or longer to be detected.***
- ***Be sure the voltage value between terminals is controlled via the input voltage, so that the PL is operated within its recommended range. If the input voltage exceeds this range, a malfunction or PL damage may occur.***
- ***With Sink/Source input, even if the D(-), and RESET(-) are positive, and D(+), RESET(+) are negative, no problems are created. Be sure to operate the unit within the recommended voltage range.***

For detailed connector wiring information,
Reference 2.3.5 RAS Interface (RAS)

■ External Output Signal (DOUT, Alarm Output, Lamp Output Port)

Rated Load Voltage	DC12V to DC24V
Maximum Load Current	100mA/point
Maximum Voltage Drop between Terminals	1.5V (at 100mA load current)
Isolation Method	Via photocoupler



- ***Be sure to operate the unit within its maximum load current. If the maximum load current exceeds this range, a malfunction or PL damage may occur.***
- ***Design your electrical system by adding the load current and voltage values to the terminal voltage. If load current value used is large, a maximum voltage of 1.5V will exist between the terminals.***
- ***When connecting an induction load, be sure to connect the above drawing's protection diode(*1).***

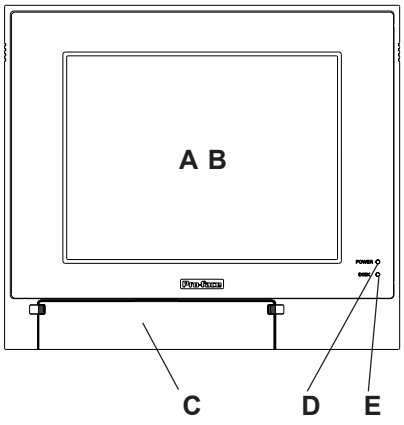
Note: **For detailed connector wiring information,**
Reference 2.3.5 RAS Interface (RAS)

■ External Power Output

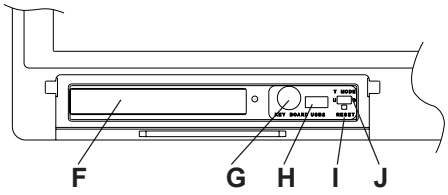
+5V :100mA (MAX)

+12V :100mA (MAX)

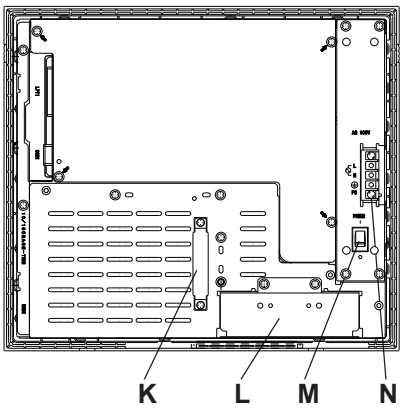
2.4 PL Part Names and Features



Front



(Inside Front Maintenance Cover)



Rear

A: Display

Display output area. The built-in VGA controller supports PC compatible architecture.

B: Touch Panel

This high-resolution analog touch panel allows you to configure a keyboard-less system.

C: Front Maintenance Cover

Open this cover to access the Keyboard I/F, Reset Switch and connect the optional FDD unit.

D: Power Lamp LED (POWER)

The status of the lamp changes according to the alarm type detected by the RAS feature.

Reference *2.3.5 RAS Interface*

E: Hard Disk Access LED (DISK)

Lights during accesses to the hard disk.

F: FDD Front Face Blank Panel

Remove this cover to install the optional FDD Unit.

G: Keyboard Connector

A PS/2 compatible keyboard is connected here.

H: USB Connector (USB2)

To use the USB connector, you must install Windows 98 (SR2).

I: Hardware Reset Switch (RESET)

J: Touch Panel I/F Selector Switch (T MODE)

Select "U": Touch data is sent via USB I/F.
Select "S": Touch data is sent via serial I/F (COM4).
Factory setting is "S" (Serial).

K: IDE I/F Cover

To connect the optional CD-ROM drive unit (PL-DK200) or the RS-232C/RS-485 Adapter remove this cover and use this connector.

L: FDD Rear Face Blank Panel

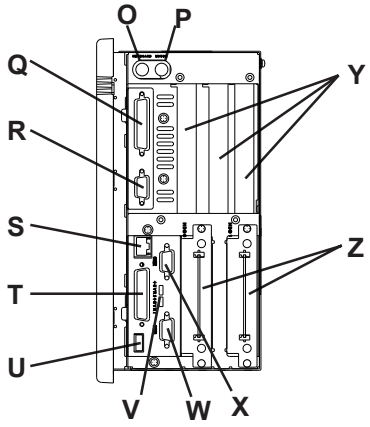
Remove this cover to install the optional FDD Unit.

M: Power Switch (POWER)

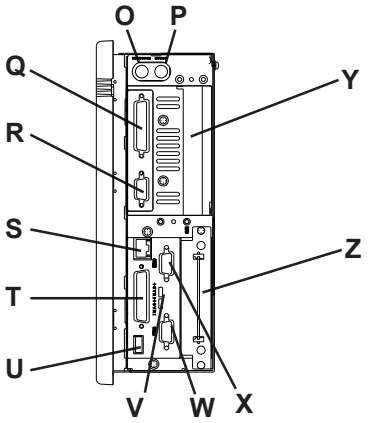
Turns the PL unit's power ON or OFF.

N: Power Terminal Block

Connect the PL unit's AC100V/DC24V power cord terminals here.



PL-5910T
(SIDE)



PL-5911T
(SIDE)

O: Keyboard Connector (KEYBOARD)
A PS/2 compatible keyboard can be connected here.

P: Mouse Connector (MOUSE)
A PS/2 compatible mouse can be connected here.

Q: Printer Connector (LPT1)
Centronics standard interface (D-sub 25 pin female connector), which connects a parallel device, such as a printer (supports ECP/EPP).

R: RS-232C Connector (COM1).

S: Ethernet Connector (10/100BASE-TX)
IEEE802.3 standard Ethernet interface.
10BASE-T/100BASE-TX auto changeover.

T: RAS Connector (RAS)
Interface for DIN, DOUT, Watchdog, and Remote Reset. (D-sub 25 pin male connector)

U: USB Connector (USB1)
To use the USB connector, you must install Windows 98 (SR2).

V:Signal Changeover Slide Switch (+5VRI)
This switch changes the COM2/COM 9-pin current from RI to 5V.

W: RS-232C Connector (COM2)
RI/+5V Changeover

X: RS-232C Connector (COM3)
RI/+5V Changeover

Y: Expansion Slot(s)

Z: HDD/CF Card Unit Expansion Slot
Houses an additional HDD unit or CF Card unit.

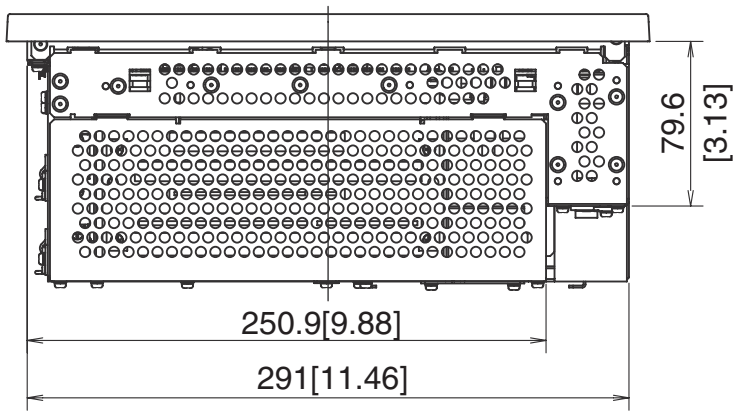
- ***When attaching peripheral units to the PL, be sure the PL unit's power cord is disconnected from the main power supply.***
- ***To avoid an electrical shock, be sure to disconnect the PL unit's power cord from the power supply before connecting the cord's power terminals or any peripheral devices to the PL.***

Reference *4.3.1 Connecting the Power Cord*

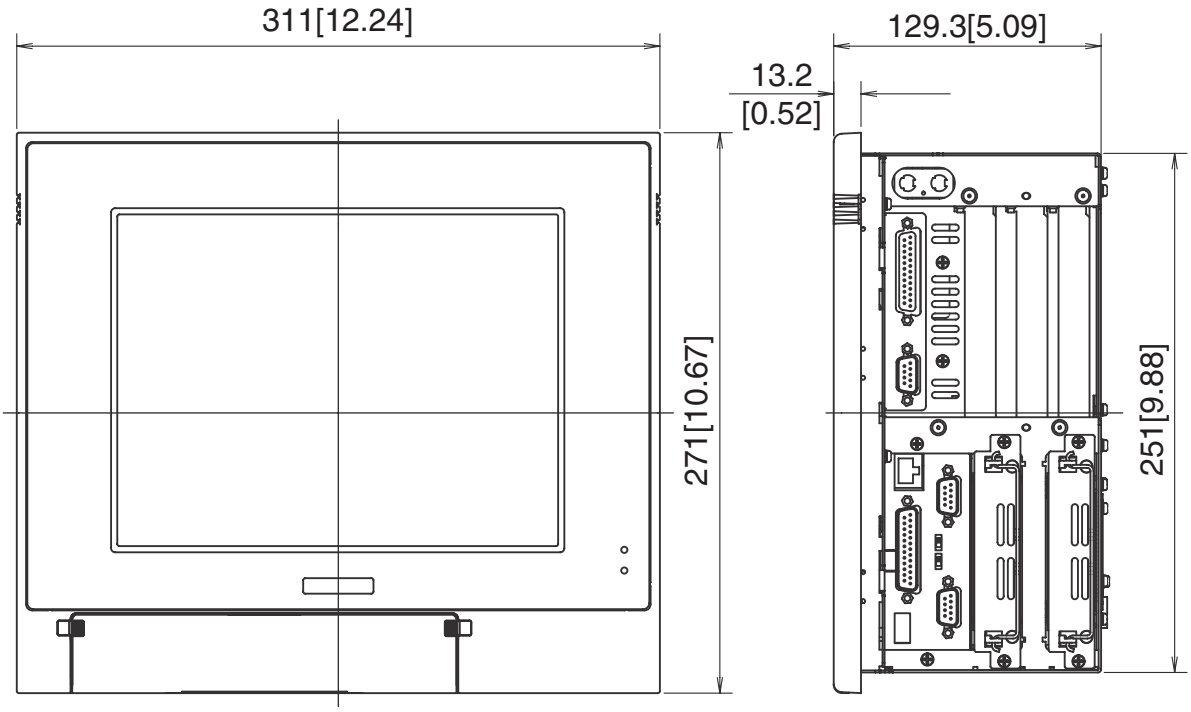
2.5 External Dimensions

2.5.1 PL-5910T

(Unit: mm [in.] - excluding projections)



Top

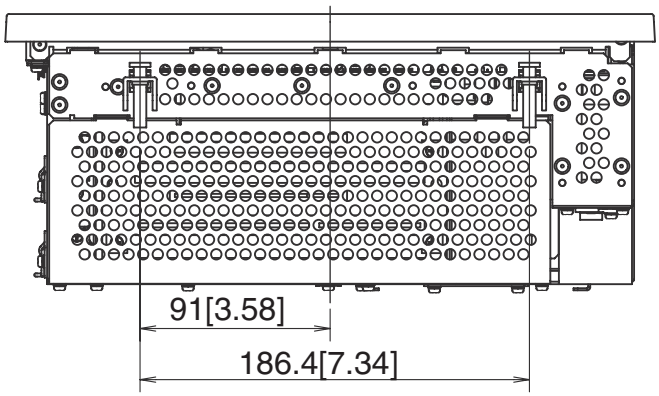


Front

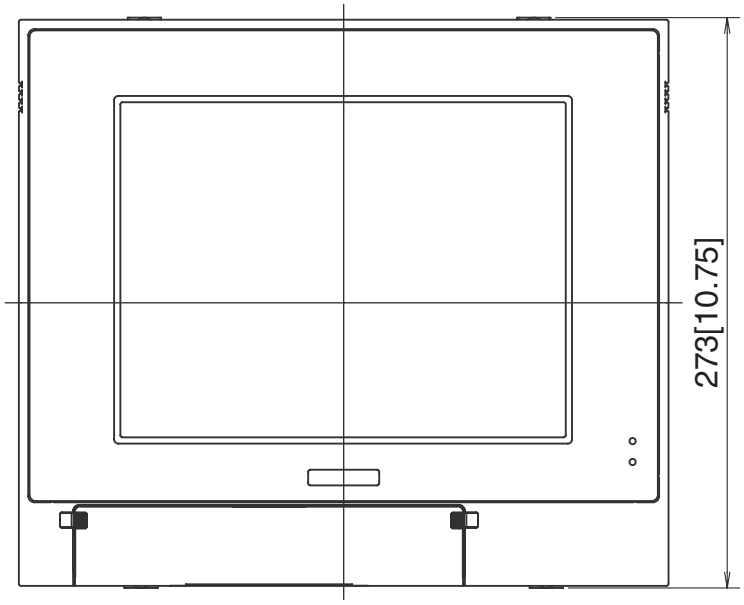
Right Side

2.5.2 PL-5910T with Installation Fasteners

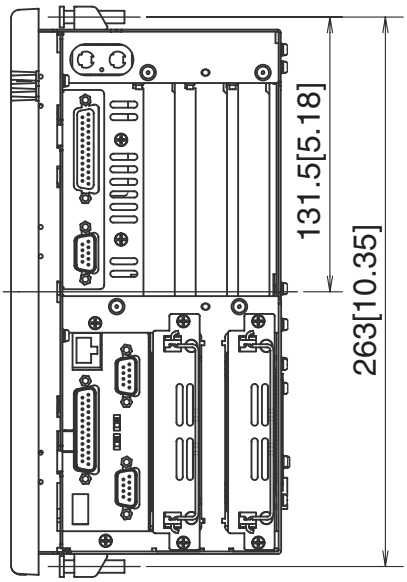
(Unit: mm [in.] - excluding projections)



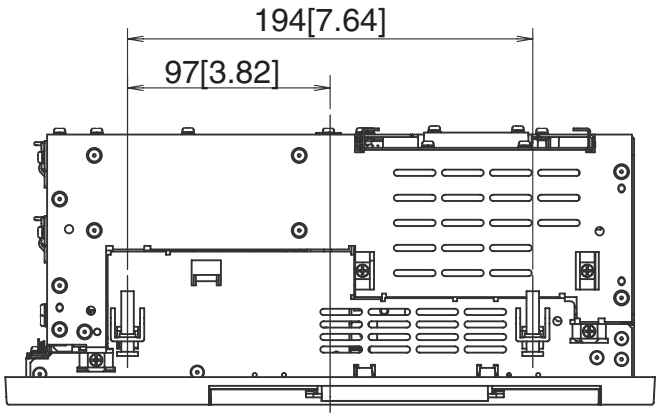
Top



Front



Right Side

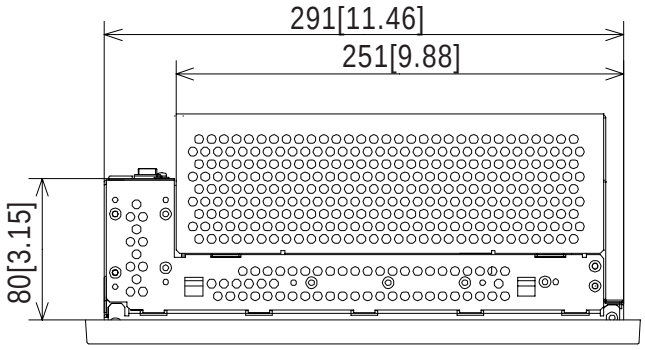


Bottom

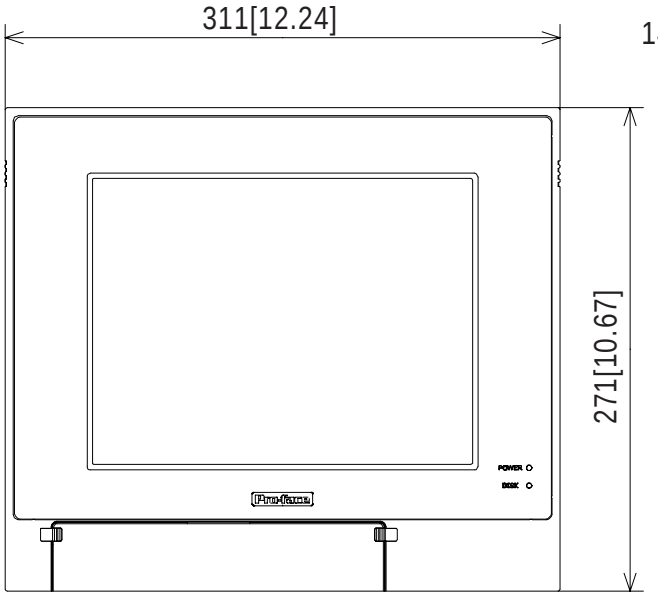
2.5.3 PL-5910T with FDD Unit

■When attaching PL-FD500

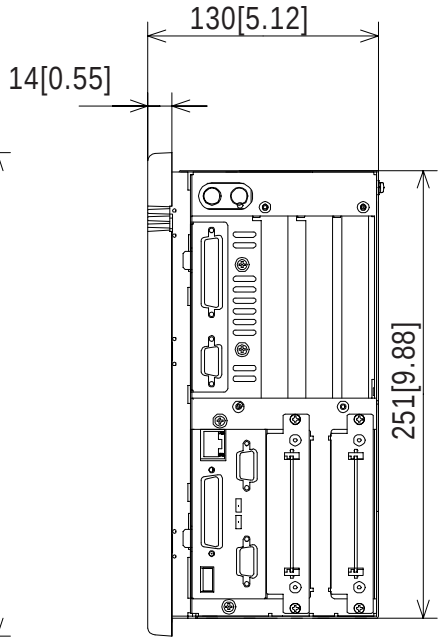
(Unit: mm [in.] - excluding projections)



TOP



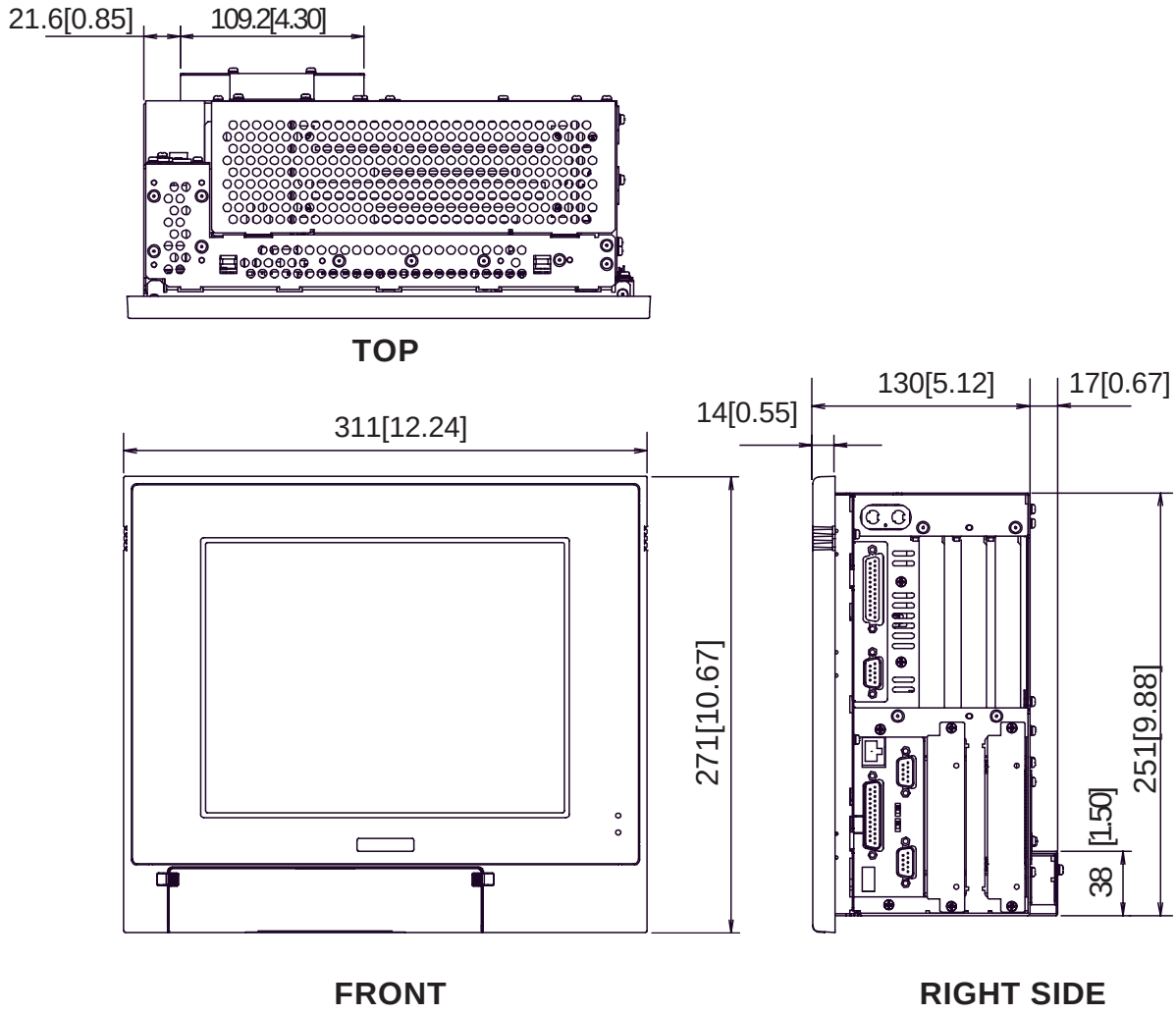
FRONT



RIGHT SIDE

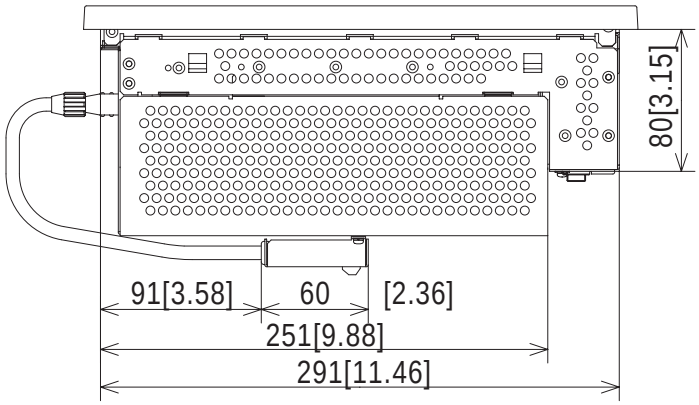
■When attaching PL-FD510

(Unit: mm [in.] - excluding projections)

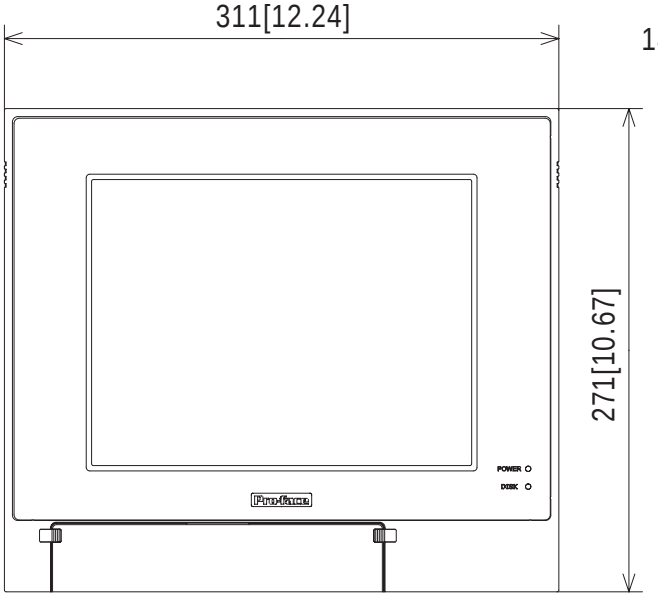


2.5.4 PL-5910T with PL-RC500 Conversion Unit

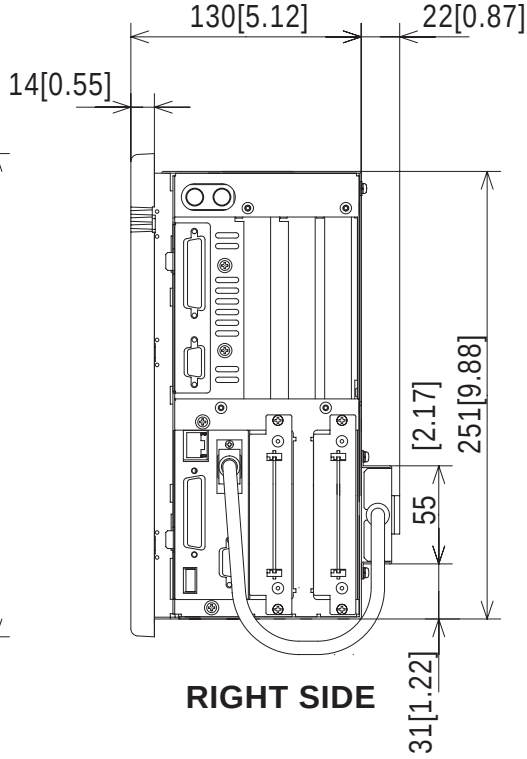
(Unit: mm [in.] - excluding projections)



TOP



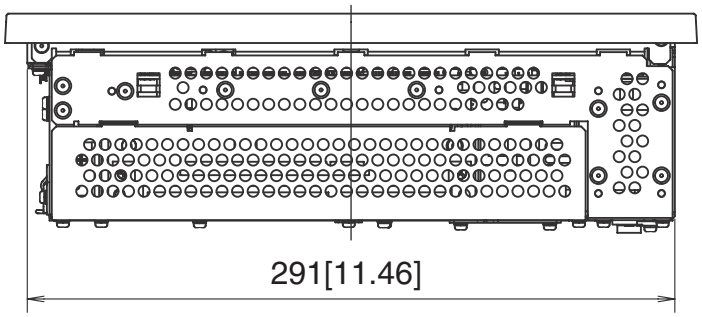
FRONT



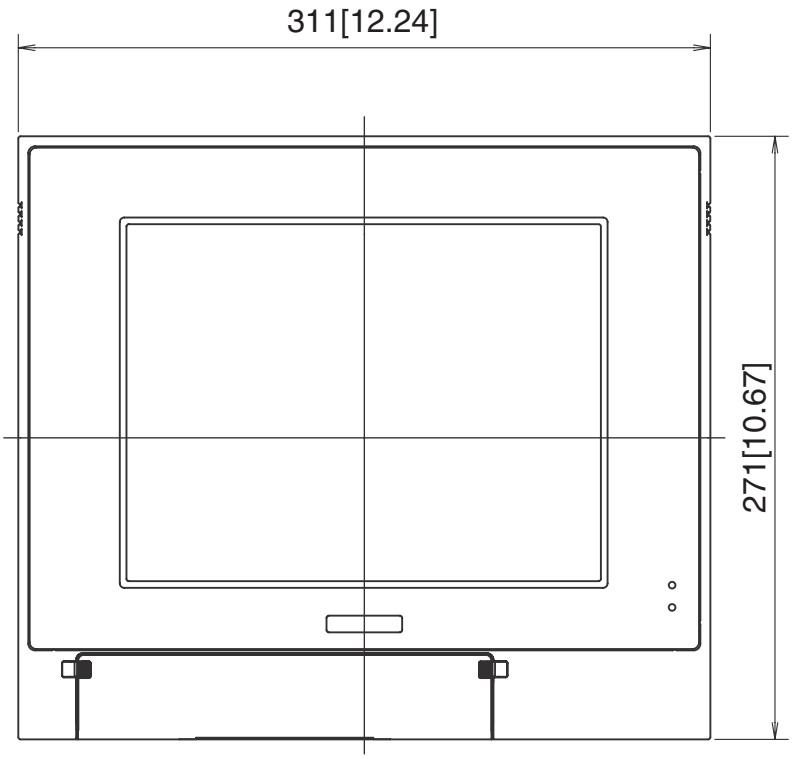
RIGHT SIDE

2.5.5 PL-5911T

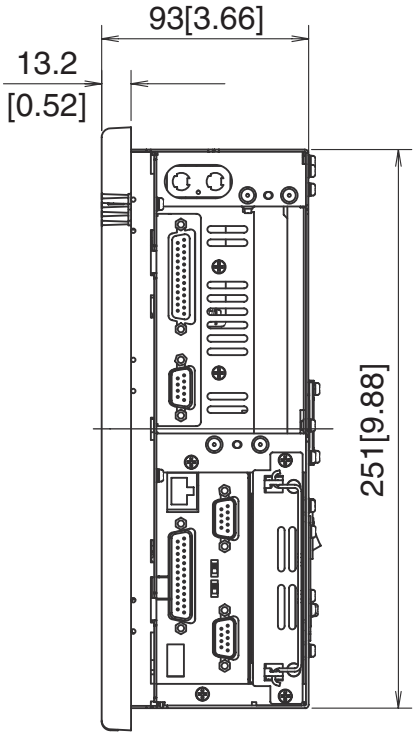
(Unit: mm [in.] - excluding projections)



Top



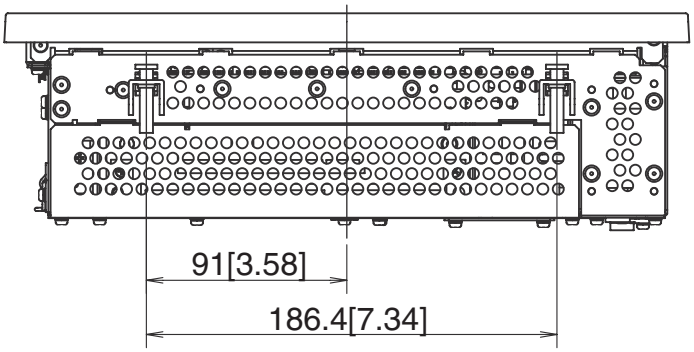
Front



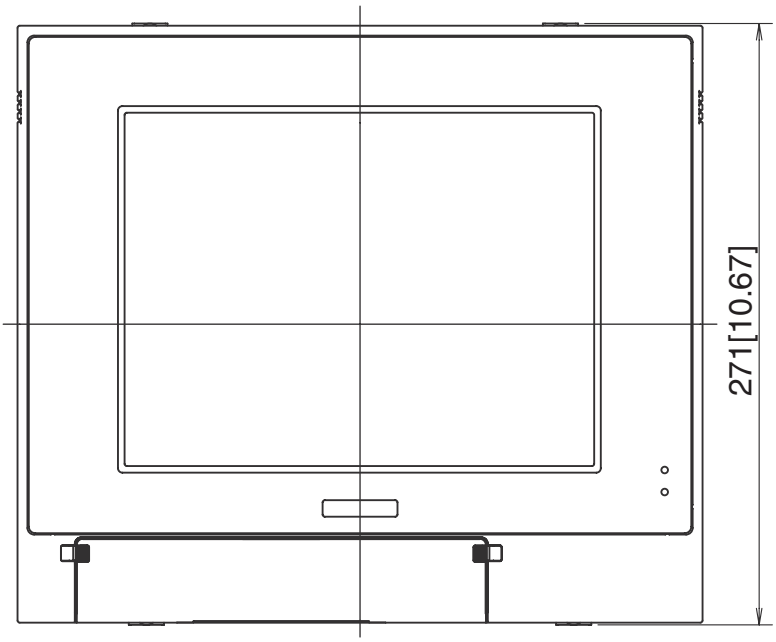
Right Side

2.5.6 PL-5911T with Installation Fasteners

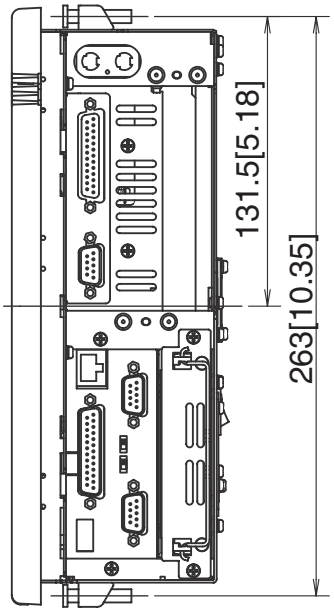
(Unit: mm [in.] - excluding projections)



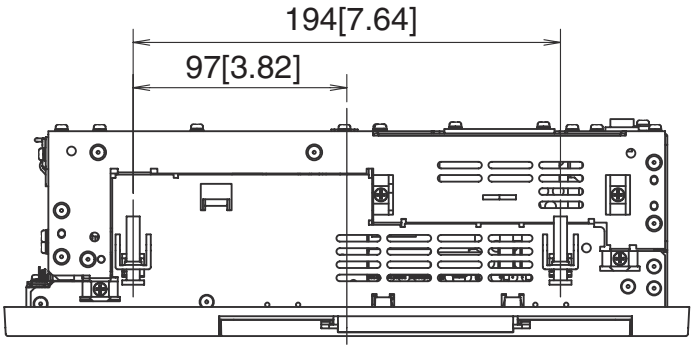
Top



Front



Right Side

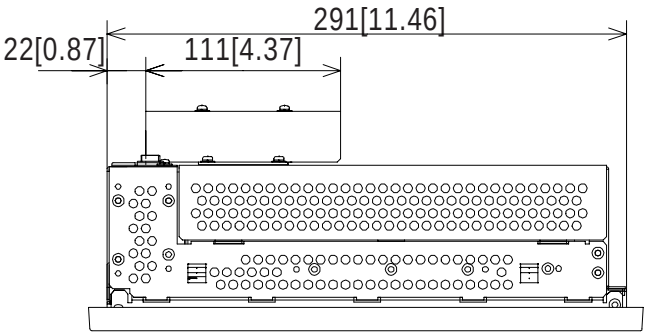


Bottom

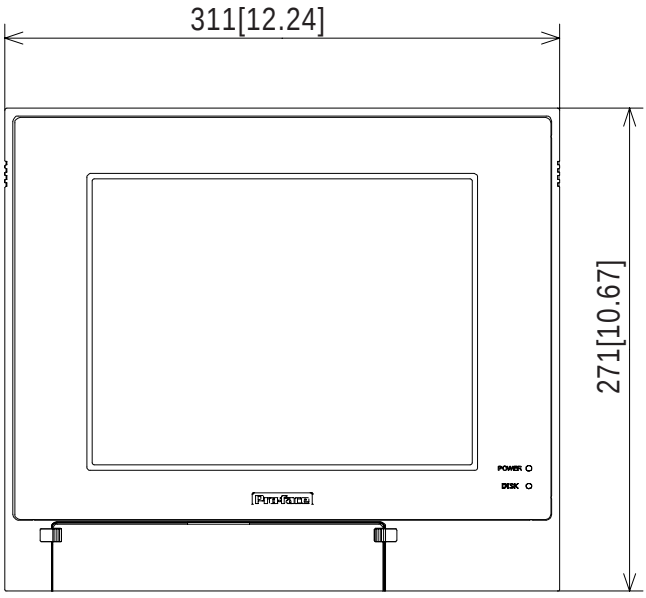
2.5.7 PL-5911T with FDD Unit

■When attaching PL-FD500

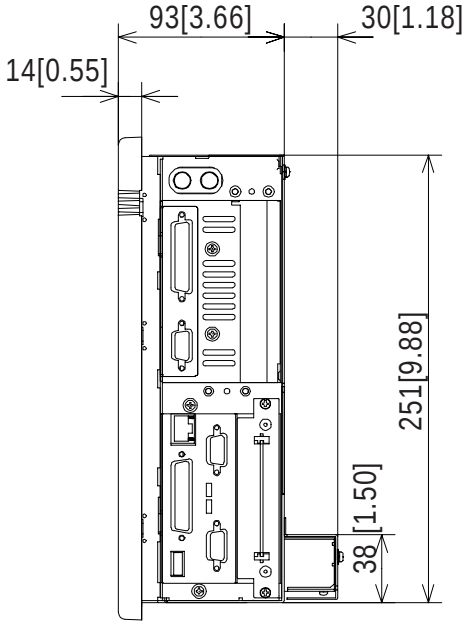
(Unit: mm [in.] - excluding projections)



TOP



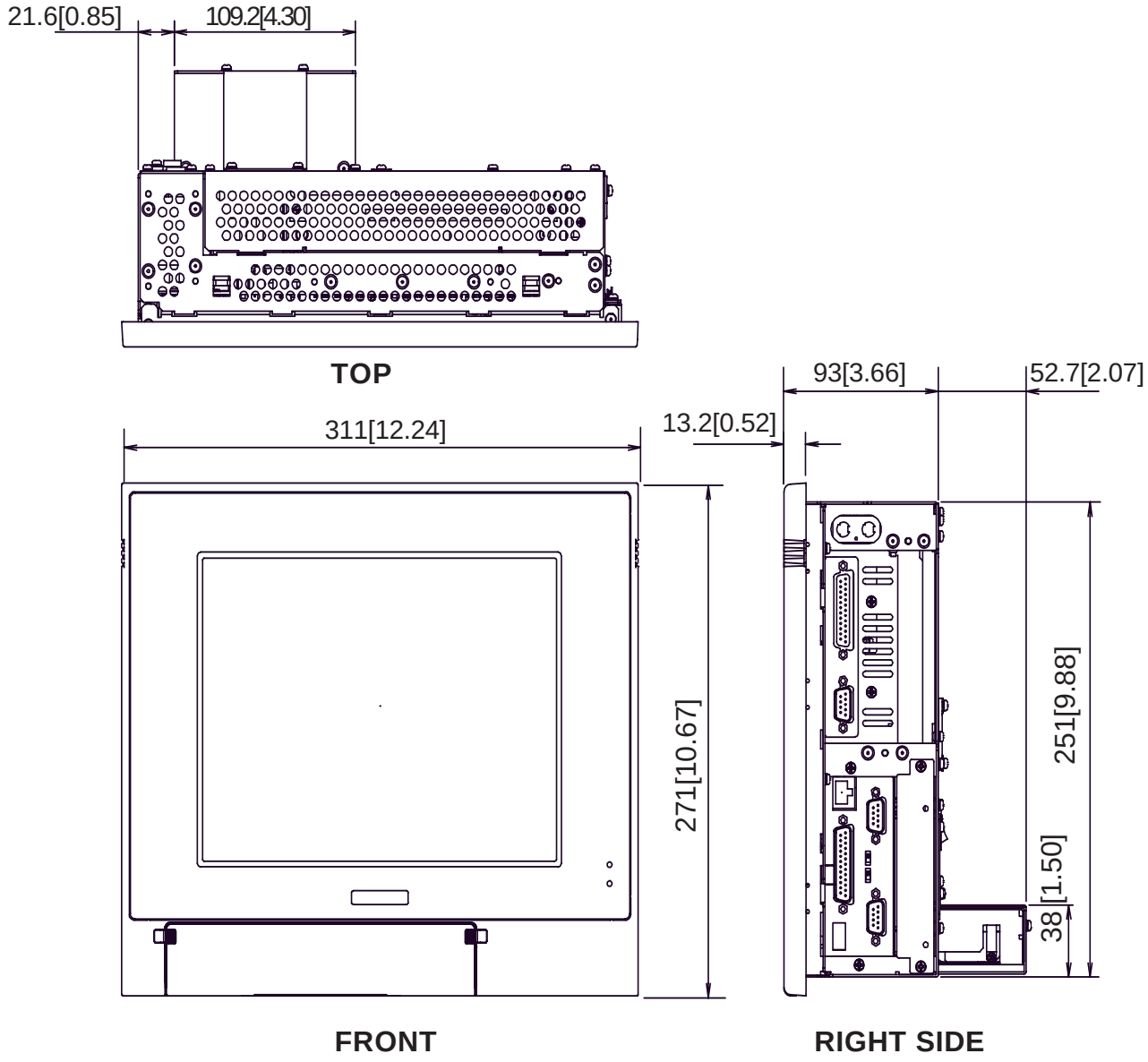
FRONT



RIGHT SIDE

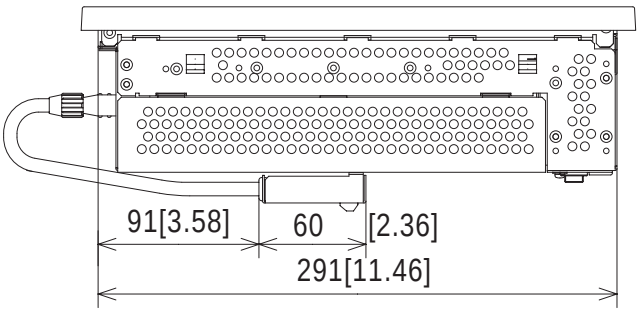
■When attaching PL-FD510

(Unit: mm [in.] - excluding projections)

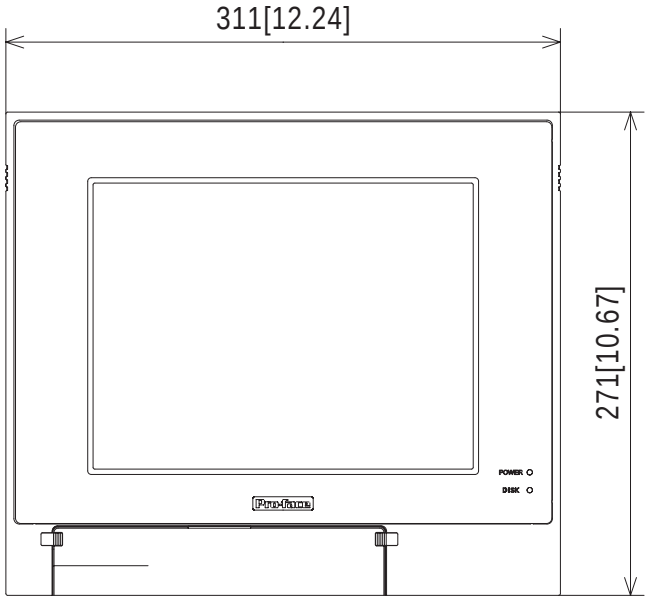


2.5.8 PL-5911T with PL-RC500 Conversion Unit

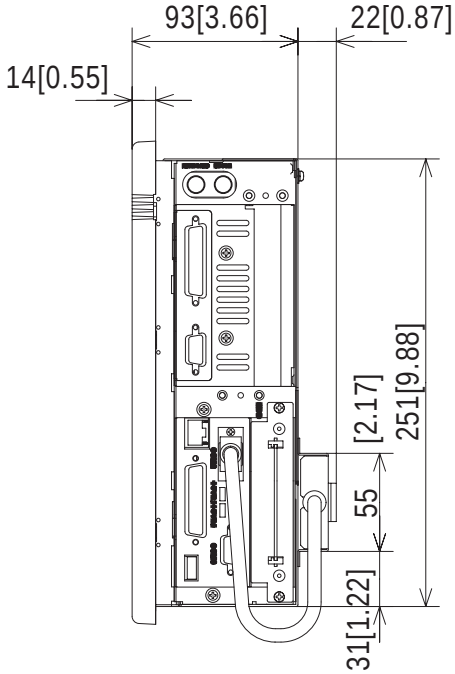
(Unit: mm [in.] - excluding projections)



Top



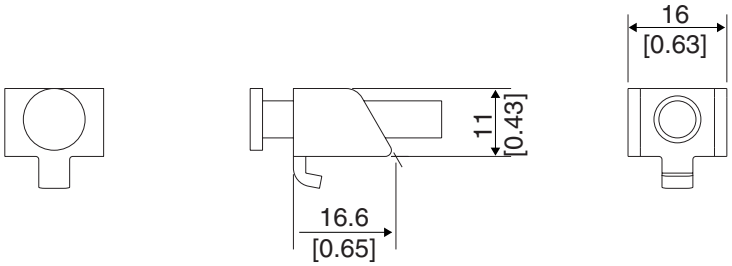
Front

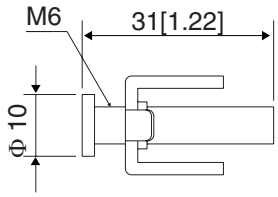


Side

2.5.9 Installation Fasteners

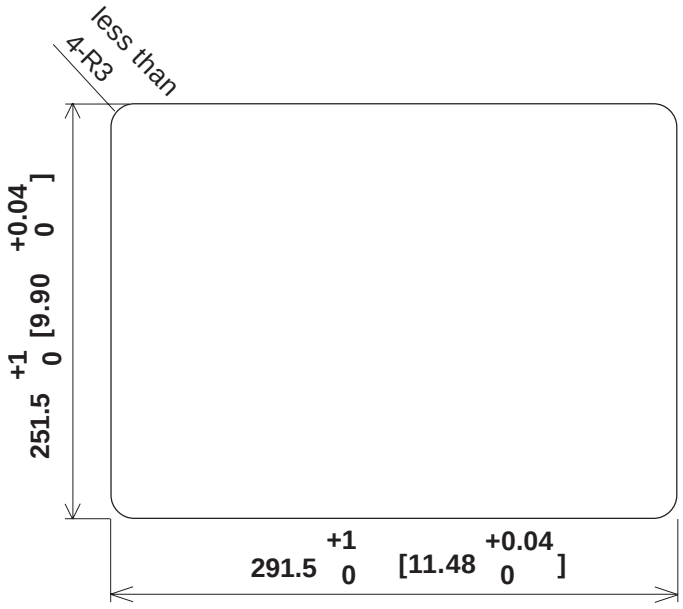
Unit:mm[in.]





2.5.10 Panel Cut Dimensions

(Unit: mm [in.])



- ***Be sure the thickness of the panel is from 1.6 to 10 mm.***
- ***All panel surfaces used should be strengthened. Especially, if high levels of vibration are expected and the PL unit's installation surface (i.e. an operation panel's door, etc.) can move (i.e.open or close), due consideration should be given to the PL unit 's weight.***
- ***To ensure that the PL unit's moisture resistance is maintained, be sure to install the PL into a panel that is flat and free of scratches or dents.***
- ***Be sure all installation tolerances are maintained to prevent the unit from falling out of its installation panel.***

Memo

Chapter 3 Installing Optional Units and Expansion Boards

A wide variety of optional units and expansion boards made by Digital can be installed in the PL, as well as a number of commercially available PCI-bus or ISA-bus compatible boards. This chapter describes how to install these products in the PL.

3.1 Installation

The following pages describe the installation procedures for the PL unit's DIM module(PL-EM128/PL-EM256), FDD unit (PL-FD500/PL-FD510), HDD unit (PL-HD220), expansion boards and CD-ROM drive unit (PL-DK200).

Reference *For information about the installation of other option units, please refer to those unit's individual Installation Guide.*

⚠ WARNING

To prevent an electric shock or PL damage, confirm that the PL unit's power has been turned OFF before installing any optional units or expansion boards.

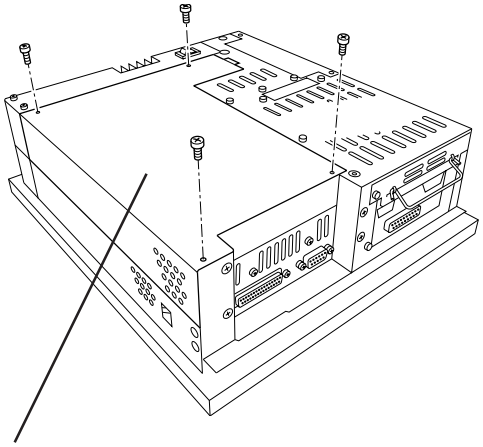
Important

- ***Use a screwdriver to loosen or tighten the screws. Be careful not to tighten screws too tightly, since it may damage the equipment.***
- ***Be careful when removing or inserting any screws that they do not fall inside the PL.***

3.1.1 Removing the Rear Maintenance Cover

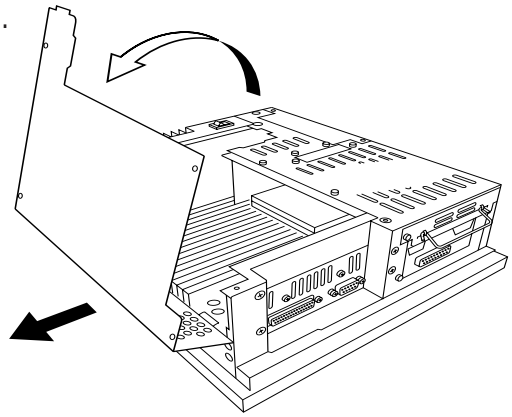
Be sure to handle the rear maintenance cover carefully, since it is made of aluminum and is easily bent.

1) Unscrew the four attachment screws used to hold the rear maintenance cover and half cover.



Rear Maintenance Cover

2) Remove the rear maintenance cover by lifting the cover in the direction shown.



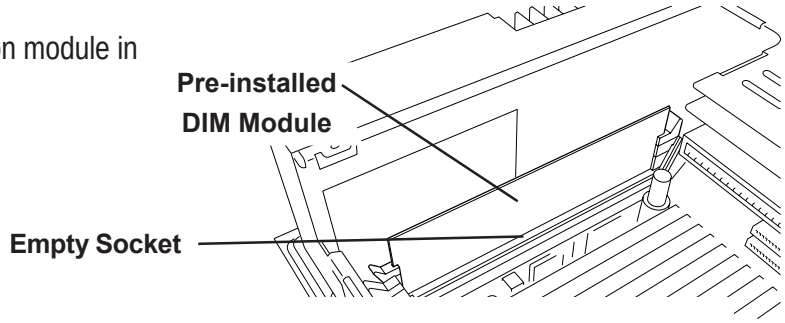
3.1.2 Installing the DIM Module (PL-EM128/PL-EM256)

Important

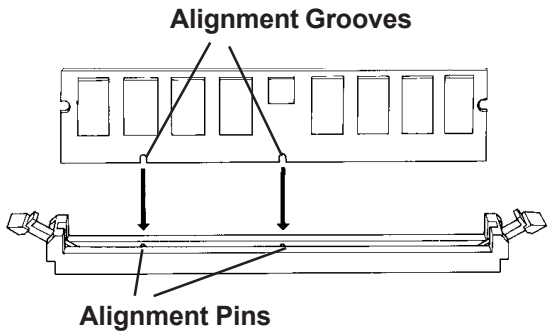
- ***Since DIM module sockets are fragile and break easily, be sure to install the DIM module carefully.***

The PL comes with two DIM sockets. Use the following procedure to install an expansion DIM module in the empty socket.

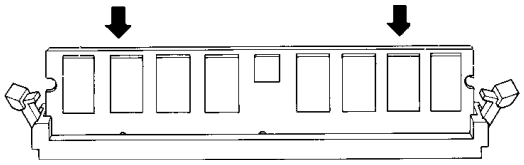
1) Insert the DIM expansion module in the empty socket.



2) Position the Alignment Grooves so that they fit the Alignment Pins.

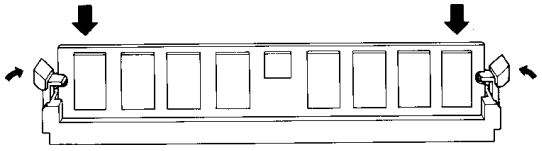


3) Insert the DIM module into the DIM module socket.



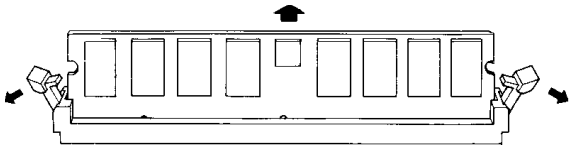
4) Push the DIM module down until the ejector tabs lock.

5) Replace the rear maintenance cover and the half cover and secure them in place with their attachment screws.



◆ To Remove the DIM Module

To remove a module, press down on the socket's ejector tabs to release the module.

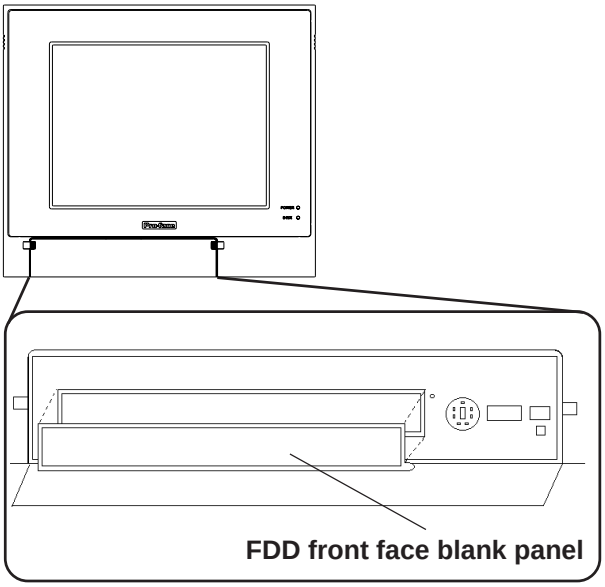


3.1.3 Installing the FDD Unit (PL-FD500)

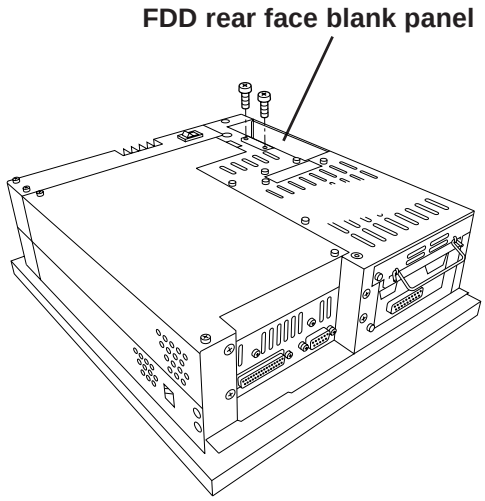
The installation procedures for the PL-5910T and the PL-5911T are different. The following steps, up to 3), are the same. After that, refer to your unit's specific installation instructions.

1) Open the front maintenance cover and remove the FDD front face blank panel.

2) Close the front maintenance cover.

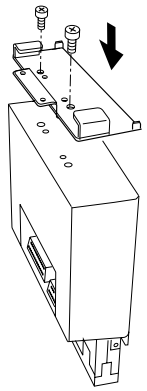


3) Remove the two attachment screws from the FDD rear face blank panel and remove the cover.

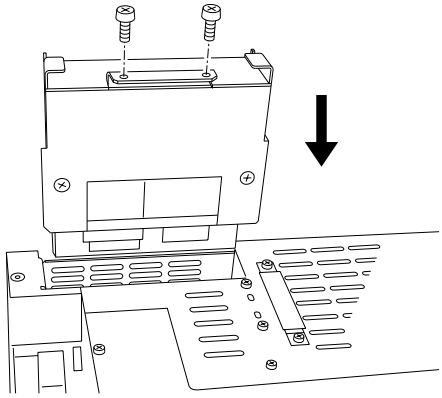


■ PL-5910T (3-Slot model)

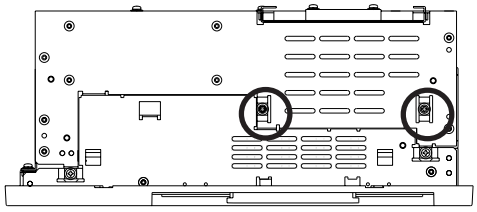
4) Attach the FDD rear face blank panel removed in step 3 to the FDD unit and secure it with the two attachment screws.
(Do not use the bracket that comes with the FDD Unit.)



5) Insert the FDD unit so that the PL and FDD unit connectors are securely connected.

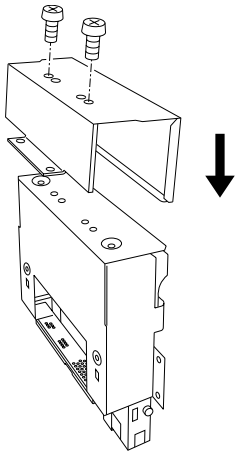


6) Secure the FDD unit to the PL using all four attachment screws. (Two FDD unit and two PL bottom face screws)

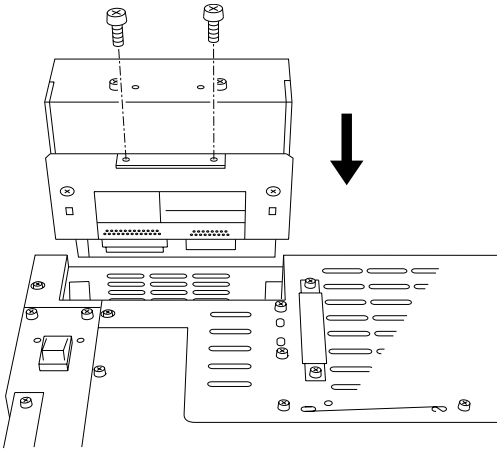


■ PL-5911T (1-Slot model)

4) Attach the bracket that comes with the FDD unit and secure it with the two attachment screws. (Do not use the FDD rear blank panel removed in step 3.)

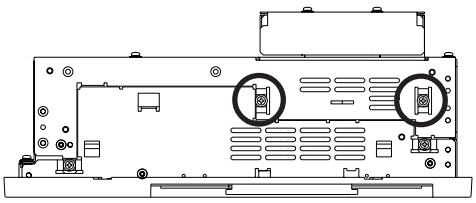


5) Insert the FDD unit so that the PL and FDD unit connectors are securely connected.



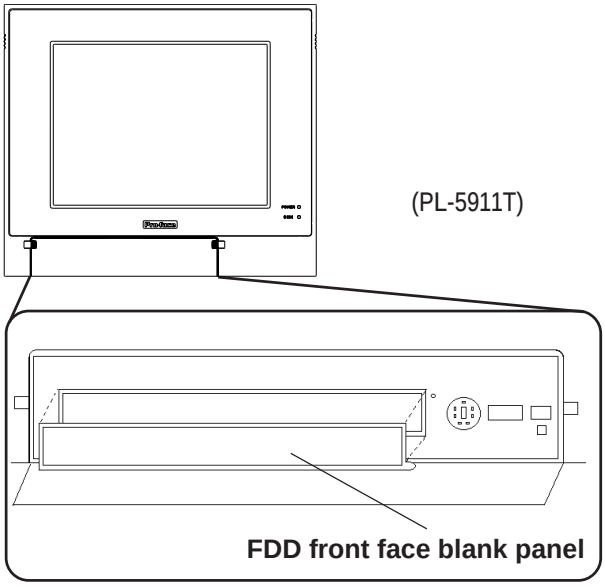
6) Secure the FDD unit to the PL using all four attachment screws. (Two FDD unit and two PL bottom face screws)

Note: **As this drawing shows, even when the FDD unit is inserted completely, it will protrude slightly from the back of the PL.**



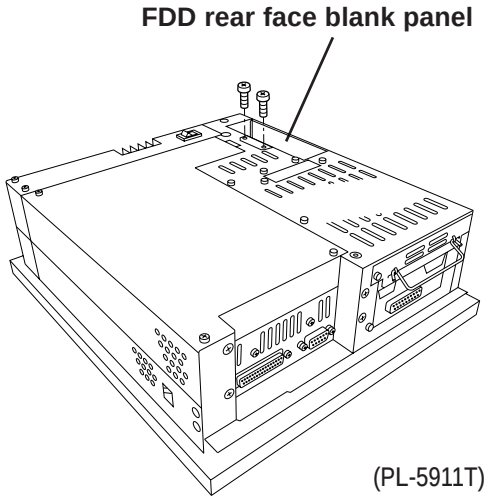
3.1.4 Installing the FDD Unit (PL-FD510)

Be sure to use the following installation procedures to insure that the unit is correctly installed. As for PL-5910T unit, the attachment procedures are same as PL-5911T unit.



1) Open the front maintenance cover and remove the FDD's blank (filler) panel.

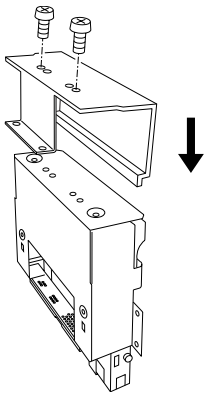
2) Close the front maintenance cover.



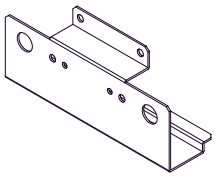
3) Unscrew the two rear face Blank Panel attachment screws, and remove the Blank Panel.

4) Attach the braket for PL-5911 Series that comes with the FDD unit to the FDD unit and secure it with the two (2) attachment screws. The necessary torque is 0.5 to 0.6N•m.

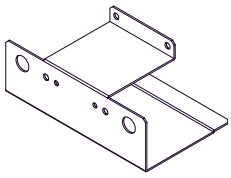
(Do not use the blank panel removed in step 3.)



Note: **When using PL-5910 Series unit, be sure to use the braket for PL-5910 Series.**



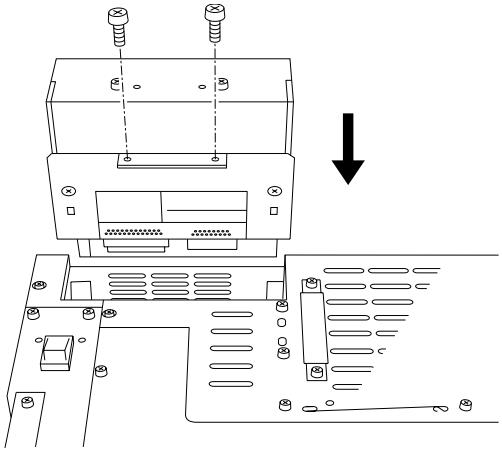
For PL-5910 Series



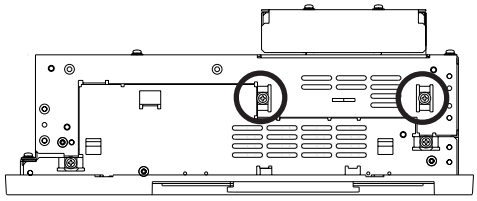
For PL-5911 Series

5) Insert the FDD unit into the PL. Be sure the connectors of the PL and the FDD unit are securely connected.

Attach the FDD unit to the PL using the FDD unit's four (4) attachment screws. The necessary torque is 0.5 to 0.6N•m.



6) This includes the two (2) PL bottom face attachment screws. The necessary torque is 0.5 to 0.6N•m.



Note: **Even after the unit is securely attached to the PL, part of the unit will extend out from the PL.**

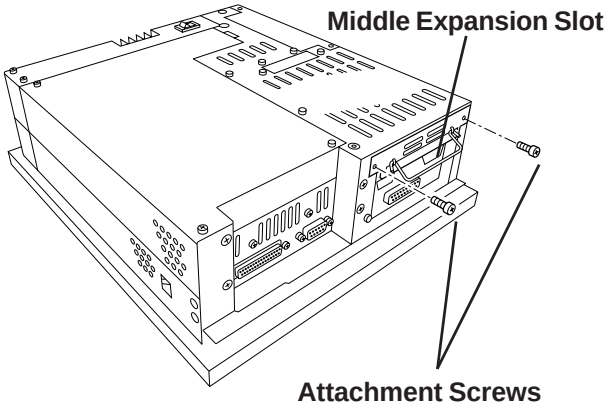
3.1.5 Removing/ Installing the HDD Unit (PL-HD220)

- **The following insertion/removal procedure is the same for the CF Card unit (PL-CF200).**
- **Certain operation restrictions apply to the HDD, CF Card, and CD-ROM units.**

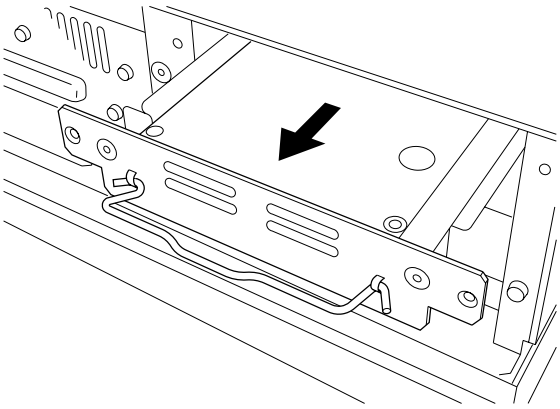
Reference 1.3 Optional Items

Since the HDD unit is a precision instrument, be sure not to subject it to excessive vibration or sudden shocks.

1) Remove the two attachment screws from the Expansion Slot Cover. (Middle cover on the PL-5910)



2) Grasp the HDD unit's handle and pull the unit slowly out of the PL. Be sure you do not damage the unit.

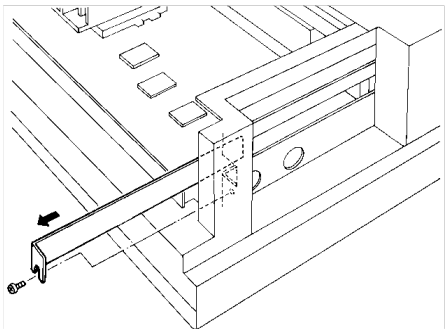


3) Insert the new HDD unit into the PL's guideways and push it in until its rear connector is securely connected.

4) Secure the unit in place with its two attachment screws.

3.1.6 Installing an Expansion Board

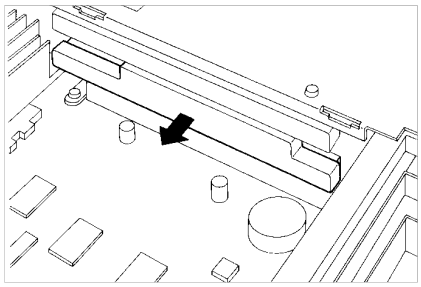
1) Unscrew the desired expansion slot's cover attachment screw, and remove the cover.



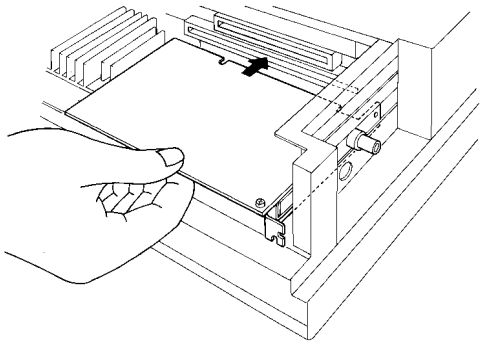
Reference ***3.1.1, Removing the Rear Maintenance Cover***

Unscrew the Blank Panel's attachment screw to remove the Blank Panel.

2) Remove the expansion slot's duster cover.

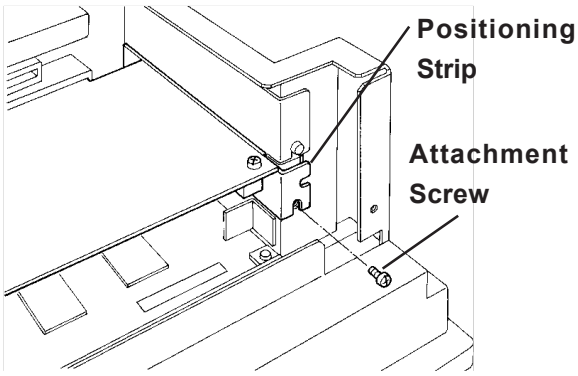


3) Insert the expansion board into the expansion slot.



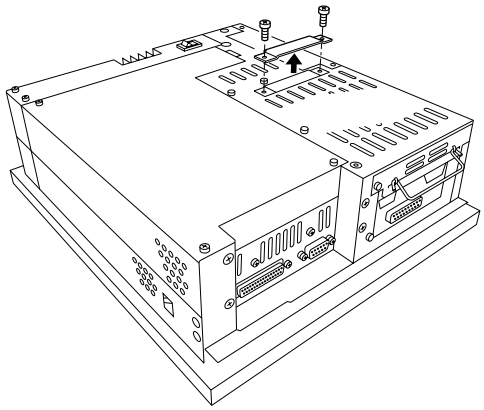
4) Secure the expansion board's metal positioning strip in place with its attachment screw.

5) Last, replace the rear maintenance cover and half cover and secure them in place with their attachment screws.



3.1.7 Connecting the CD-ROM Drive Unit (PL-DK200)

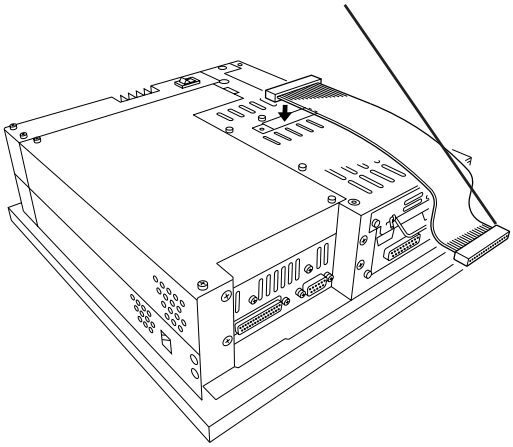
1) Unscrew the two IDE I/F cover attachment screws, and remove the cover.



2) Connect the CD-ROM unit cable to the PL's IDF I/F connector.

Be sure that the cable is securely connected before turning ON the PL's power switch.

Connected to CD-ROM



Memo

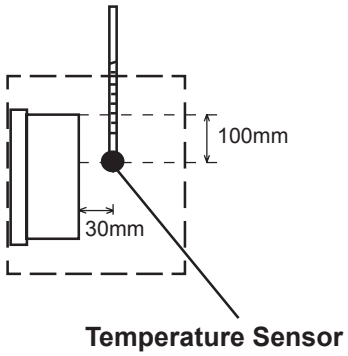
Chapter 4 Installation and Wiring

This chapter explains how to install and wire PL Series units, as well as the cautions required both before and during installation.

4.1 Installation Cautions

■ **Ambient Operating Temperature**

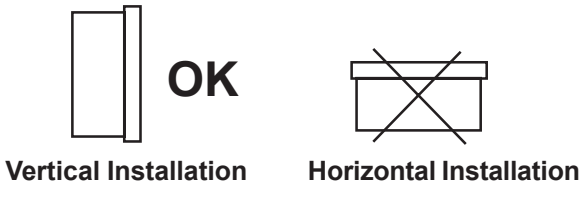
If this area's ambient operting temperature exceeds the allowed limit a machine breakdown can occur. (0°C to 45°C: without HDD unit, 5°C to 45°C: with HDD unit)

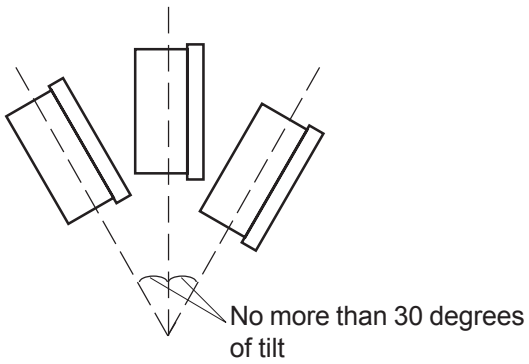


■ **Installation**

Be sure to install the panel in an upright (vertical) position.

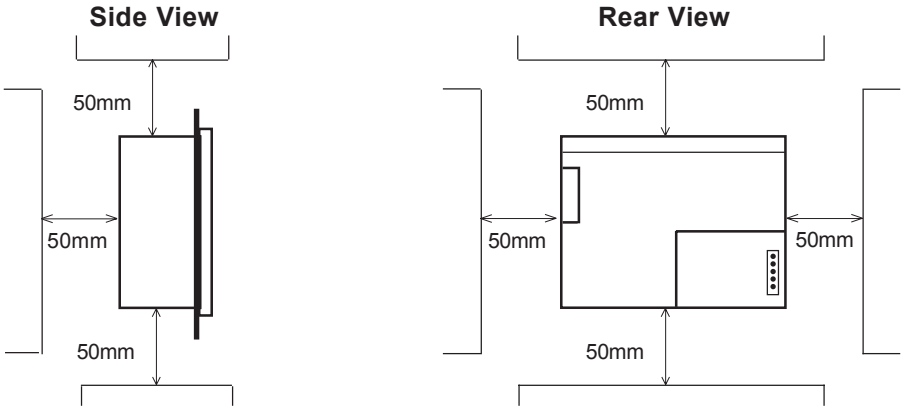
Also, be sure that the panel's viewing angle is tilted no more than 30 degrees from parallel to the operator (i.e. directly in front).





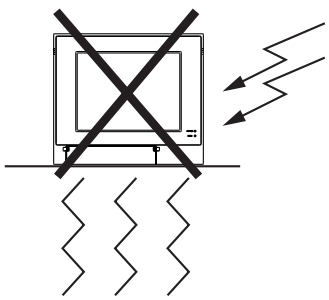
■ Installation Location

- Avoid placing the PL next to other devices that might cause overheating.
- Keep the PL away from arc-generating devices such as magnetic switches and non-fuse breakers.
- Avoid using the PL in environments where corrosive gases are present.
- To ensure the reliability, operability and ventilation of the PL, be sure to install it in locations that are more than 50mm away from adjacent structures or equipment. Also, consider the need for installing or removing expansion boards, or connectors when designing and installing your PL.



■ Vibration and Shocks

If the PL is moved when its enclosure doors are open, or while it is installed in a rack equipped with caster wheels, the hard disk can receive excessive vibration or jolting. Be especially careful at this time.



PL Configuration	Can Withstand
HDD	4.9m/s^2
FDD	9.8m/s^2
No drives	19.6m/s^2

Important

- ***The Hard Disk Drive is precision equipment and should not be moved or jolted . Especially when the PL is turned ON, even changing the PL's direction while it is on a table, or repositioning the unit should not be performed, since it can lead to a hard disk crash or malfunction.***
- ***When using a fan to cool the PL unit, be sure that the fan does not point directly at any of the PL unit's disk drive units, since it can lead to a hard disk crash or malfunction.***

4.2 Installing the PL

4.2.1 Installation Procedures

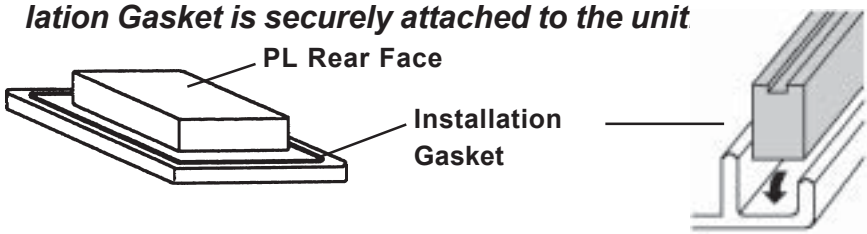
Follow the steps given below when installing the PL.

■ Attaching the Installation Gasket

Even if the your PL unit's Installation Gasket is not needed to prevent water from entering the unit, the gasket also acts as a vibration absorber and should always be attached. To install the gasket, place the PL face down on a soft surface and attach the gasket to the rear side of the display face, in the plastic bezel's groove (see picture below). Be sure the grooved face of the gasket is vertical.

Important

- ***Prior to installing the PL into a cabinet or panel, check that the Installation Gasket is securely attached to the unit***

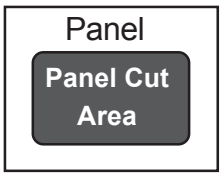


- ***Use for extended periods of time or repeated removal and reattachment of the PL unit in a panel may cause the installation gasket to fail to provide moisture resistance equivalent to IP65f. To provide a consistent level of dust and moisture resistance, Pro-face recommends replacing the gasket every year or whenever cracks or scratches appear.***
- ***The installation gasket's product code is PL-WS500.***
- ***Even if the PL unit is operated in an environment where dust and moisture resistance are not required, Pro-face strongly recommends the gasket is attached.***
- ***Since this gasket is not elastic, it should not be stretched. When installing the gasket, be careful not to tear it, especially in bezel corners.***
- ***Do not press the gasket's seam into any of the bezel's corners. If the seam is placed in a corner, strain on the gasket may cause it to tear at the seam.***
- ***To produce a consistent level of dust and moisture resistance, be sure to insert the gasket's seam in the bottom portion of the bezel, not in the sides or top.***
- ***The gasket is correctly inserted if approximately 2mm of gasket is visible above the bezel. When installing the gasket, be sure to check that the gasket is correctly inserted into the bezel.***
- ***If the gasket is not inserted correctly into the bezel, the moisture and dust resistance level will not be equivalent to IP65f.***

■ Create a Panel Cut

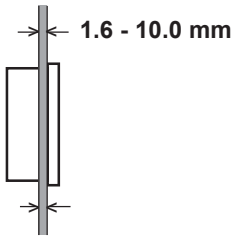
Create a panel cut for the PL, like that pictured here. Two additional items, the installtion gasket and the installation fasteners are also required when installing the PL.

Reference *2.5 PL Dimensions*



Note:

- **To obtain the maximum degree of moisture resistance, be sure to attach the PL to a smooth, flat surface.**
- **The panel itself can be from 1.6 to 10.0 mm thick.**

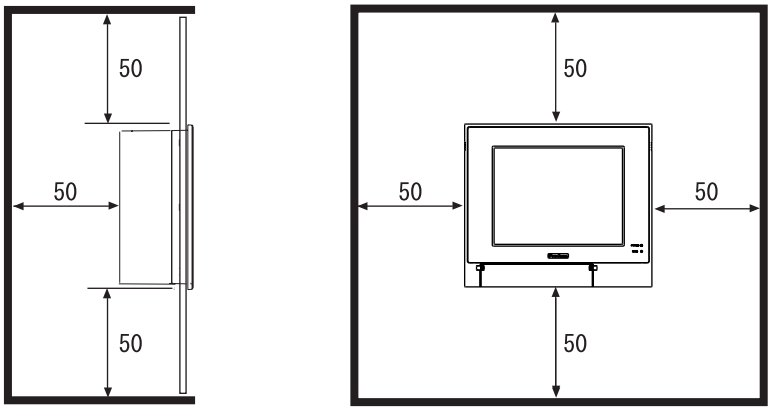


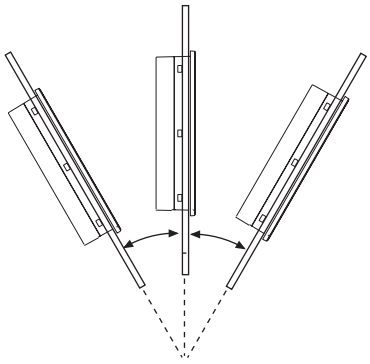
Important

Strengthening may be required for the panel. Be sure to consider the weight of the PL when designing the panel.

- **To enhance the PL unit's maintainability, operability and ventilation, allow at least 50 mm clearance between the PL and any other objects. (The clearance must be large enough to allow you to insert or remove expansion boards and to attach connectors.)**

Unit: mm



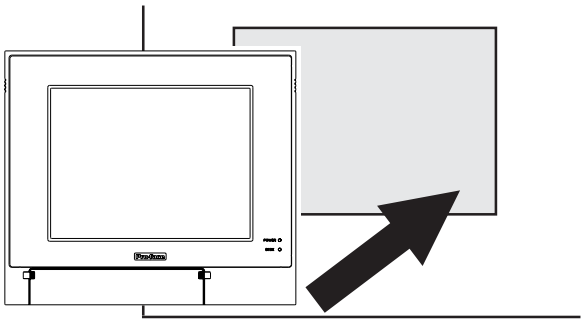


less than 30° from vertical

- **Avoid using the PL where the ambient temperature will exceed 45°C.**
- **Avoid placing the PL next to other devices that might cause overheating.**
- **Be sure that the panel's viewing angle is tilted no more than 30 degrees from parallel to the operator (i.e. operator is directly in front).**
- **Keep the PL away from arc-generating devices such as magnetic switches and non-fuse breakers.**
- **Avoid using the PL in environments where corrosive gases are present.**

■ Installation

1) Insert the PL into the panel.



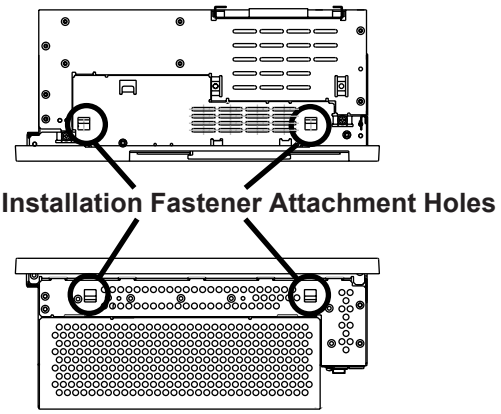
Important

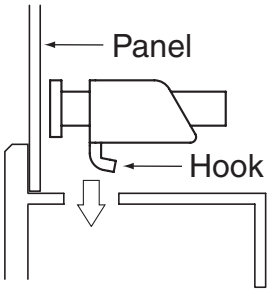
Be sure the panel cut's actual measurements are the same as those given here, otherwise the PL may slip or fall out of the panel.

Reference

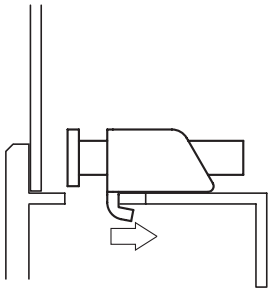
2.5.10 Panel Cut Dimensions

2) Insert the installation fastener hooks into the four installation fastener holes on PL unit's top and bottom sides.

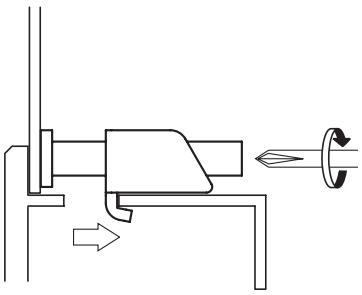




3) Slide the installation fasteners to the rear face.



4) Tighten the screws of the installation fasteners. Be sure to tighten the four screws in an even, criss-cross pattern.



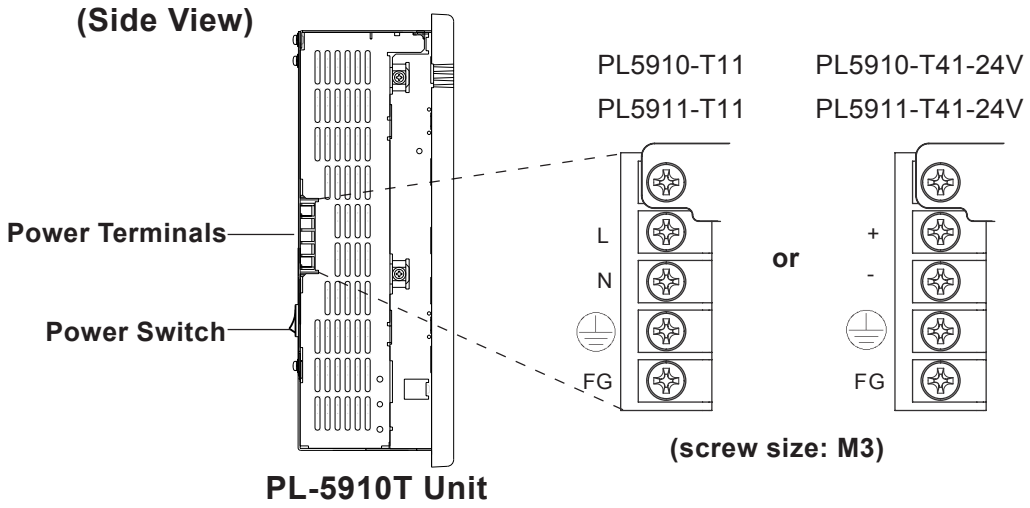
Important

- ***Do not use excessive force when tightening the main unit attachment screws. The torque required to render it waterproof is 0.5 N•m.***
- ***Installation Fastener model number: CA3-ATFALL-01.***

4.3 Wiring the PL

4.3.1 Connecting the Power Cord

Connect the PL unit's power cord to the rear face power terminals.



PL-5910T Unit

PL5910-T11, PL5911-T11	
L	AC Input Live Line
N	AC Input Neutral Line
FG	Grounding Terminal connected to the PL chassis.

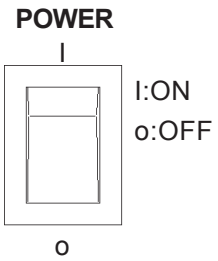
PL5910-T41-24V, PL5911-T41-24V	
+	Positive electrode
-	Negative electrode
FG	Grounding Terminal connected to the PL chassis.

Use the following steps when connecting the power cord to the PL unit's power terminals.

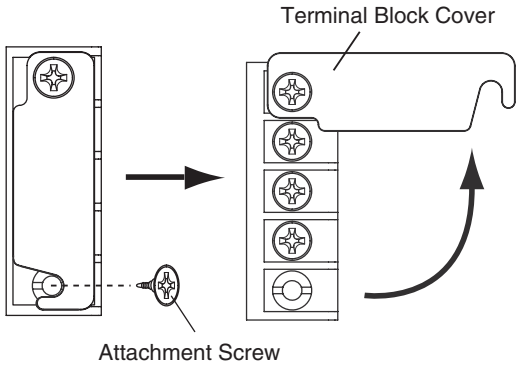
⚠ WARNING

- **To prevent an electric shock, be sure to turn the PL unit's power supply OFF before connecting the power cord terminals to the PL.**
- **To prevent fires, electrical hazards and equipment damage, be sure to use only the specified power supply voltage when operating the PL.**

1) Confirm that the PL unit's power switch is turned OFF.

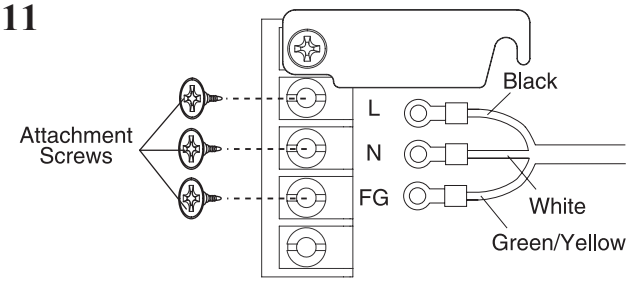


2) Next, loosen both attachment screws and swing the plastic terminal block cover 90° to expose the terminal block screws.



■ PL5910-T11, PL5911-T11

3) Loosen and remove the middle three screws from the terminal strip. Align the crimp terminals with each screw hole, and tighten the screws.

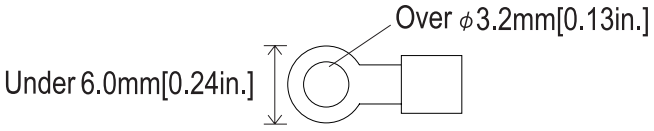


Crimp Terminal Types :

Note:

V1.25-3, by J.S.T. or equivalent (JIS standard part number : RAV1.25-3)

- **Crimp terminals must be the same as shown below.**

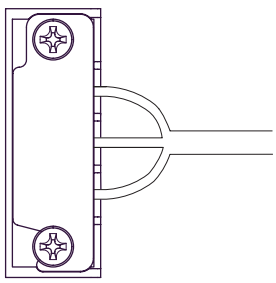


- **Check that each crimp terminal is correctly positioned and secure it in place. Required torque is 0.5 to 0.6N•m.**

Important

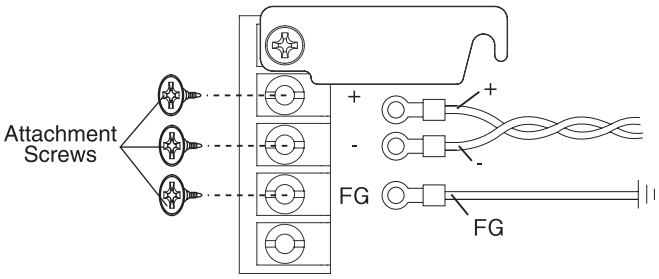
- ***The colors used in these figures are for the cable which came with the PL.***
- ***This power cable is designed only for AC100V/ AC115V use. Any other power level should use its own specially designed cable.***

4) Reattach the terminal strip's transparent cover and tighten both the attatchment screws.



■ PL5910-T41-24V, PL5911-T41-24V

3) Loosen and remove the middle three screws from the terminal strip. Align the crimp terminals with each screw hole, and tighten the screws.

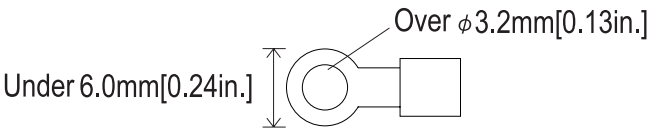


Note:

Crimp Terminal Types :

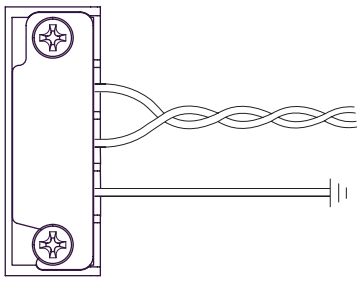
V1.25-3, by J.S.T. or equivalent (JIS standard part number : RAV1.25-3)

- **Crimp terminals must be the same as shown below.**



- **Check that each crimp terminal is correctly positioned and secure it in place. Required torque is 0.5 to 0.6N•m.**

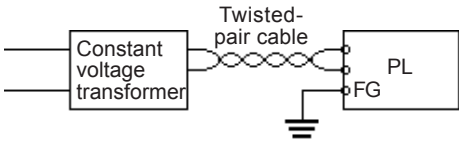
4) Reattach the terminal strip's transparent cover and secure it in place with its attatchment screws.



4.3.2 Power Supply Cautions

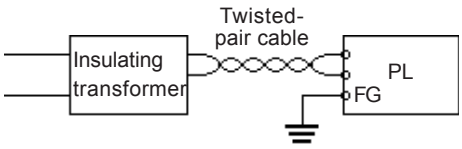
When connecting the PL unit's AC power terminals, please be aware of the following:

- If voltage fluctuations are expected to vary beyond the specified range, connect a constant voltage transformer.



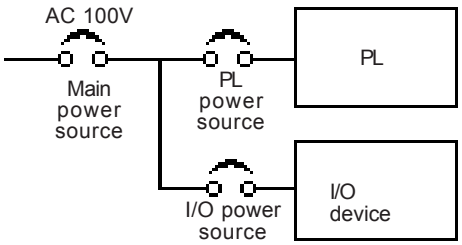
Reference *2.1 General Specifications*

- Use a low-noise power supply both between the lines and between the PL and its ground. If there is still excess noise, connect an insulating transformer (noise-prevention type).



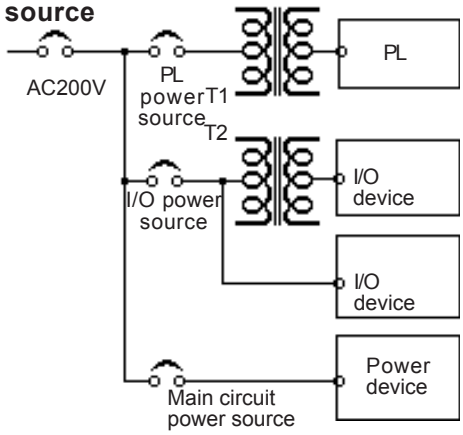
Note: **Be sure any constant or insulating transformer used has a capacity of 200VA or more.**

- Wire the power cords of the PL, I/O devices, and power supply devices separately.



Main power source

- Attaching a ferrite core to the power cord will improve noise immunity.
- Isolate the main circuit (high voltage, large current) line, I/O signal lines, and power cord, and do not bind or group them together.

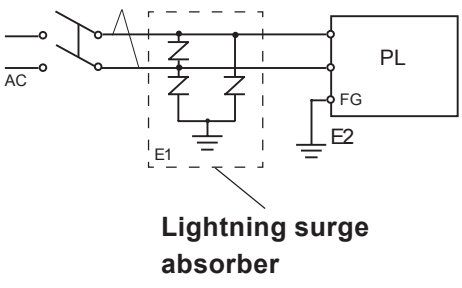


- To prevent damage from lightning, connect a lightning surge absorber.

Important

- ***Ground the lightning surge absorber (E1) and the PL (E2) separately.***
- ***Select a lightning surge absorber which will not exceed the allowable circuit voltage, even when the voltage rises to the maximum.***

Twisted-pair cable



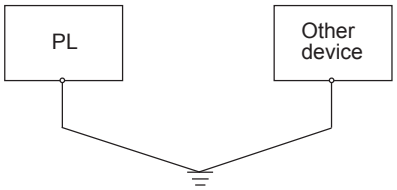
4.3.3 Grounding Cautions

- Set up a dedicated ground when using the rear panel's FG terminal.

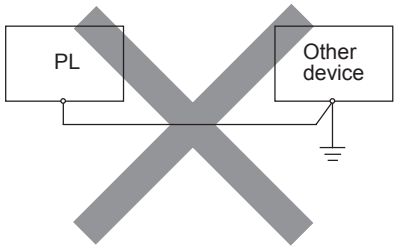
(a) Dedicated Ground - best *1

- If a dedicated ground is not possible, use a shared ground, as shown in figure (b).
- The grounding point must be as close to the PL as possible, and the grounding wires must be as short as possible. If the wires must be long, use thick, insulated wires and run them through conduits.

(b) Shared Ground - allowed *1



(c) Shared ground - <u>not</u> allowed



4.3.4 Cautions When Connecting I/O Signal Lines

- I/O signal lines must be wired separately from charged lines.
- If the power cord needs to be wired together with the (I/O) signal lines for any reason, use shielded lines and ground one end of the shield to the PL unit's FG terminal.
- To improve noise immunity, attaching a ferrite core to the power cord is recommended.

**1 Use a grounding resistance of less than 100Ω and a 2mm^2 or thicker wire, or your country's applicable standard. For details, contact your local PL distributor.*

Chapter 5 System Setup

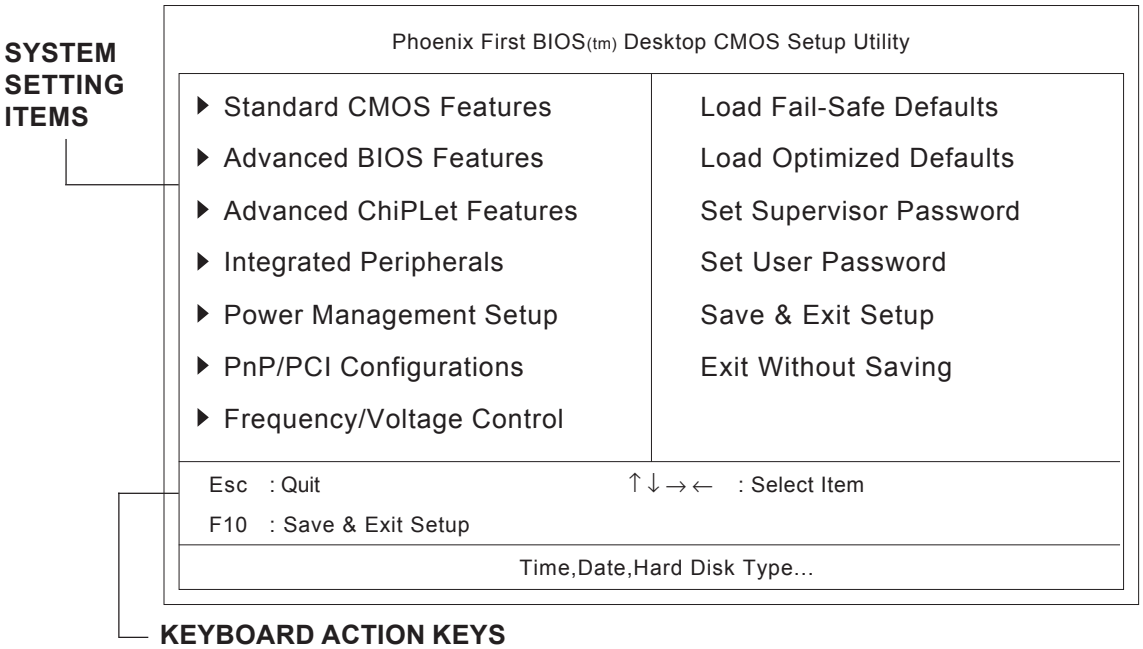
5.1 Setup Procedures

- **This chapter explains the PL unit's BIOS settings. If you set the wrong BIOS parameters, your PL unit may be unstable or be damaged. Normally, the PL unit can be operated only with the factory (default) settings. Since changing BIOS settings requires special training, do this only when necessary and after discussion with Pro-face's technical support.**
- **A USB-type keyboard is required for entering PL unit BIOS settings.**

1) Connect a keyboard to the PL.

2) Turn the PL unit's power ON.

3) After the logo mark "Pro-face" appears at the bottom of screen, press the [DEL] or [F2] key until the following screen appears.



4) Use the arrow keys to move the cursor to the desired selection.

- **Start the utility again if the main menu closes.**
- **The BIOS setup menu is subject to change without notice. The images in the following pages are only examples and may differ from the actval screens you see.**

■ Key Functions

The Setup Utility keys have the following meanings.

ESC	Main menu--Quit and do not save changes to CMOS Status Page Setup Menu and Option Page Setup Menu--Exit current page and return to Main Menu.
↑	Move to previous item.
↓	Move to next item.
→	Move to the right.
←	Move to the left.
Enter	Selects the item. If there is another item below, control moves down to that item.
PU (PageUp)	Increase the numeric value or make changes.
PD (PageDown)	Decrease the numeric value or make changes.
+	Increase the numeric value or make changes.
-	Decrease the numeric value or make changes.
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu.
F5	Restore the previous CMOS value from CMOS. (Only for Option Page Setup Menu).
F6	Load default CMOS value from the BIOS default table. (Only for Option Page Setup Menu).
F7	Load defaults.
F10	Save all the CMOS changes. (Only for Main Menu).

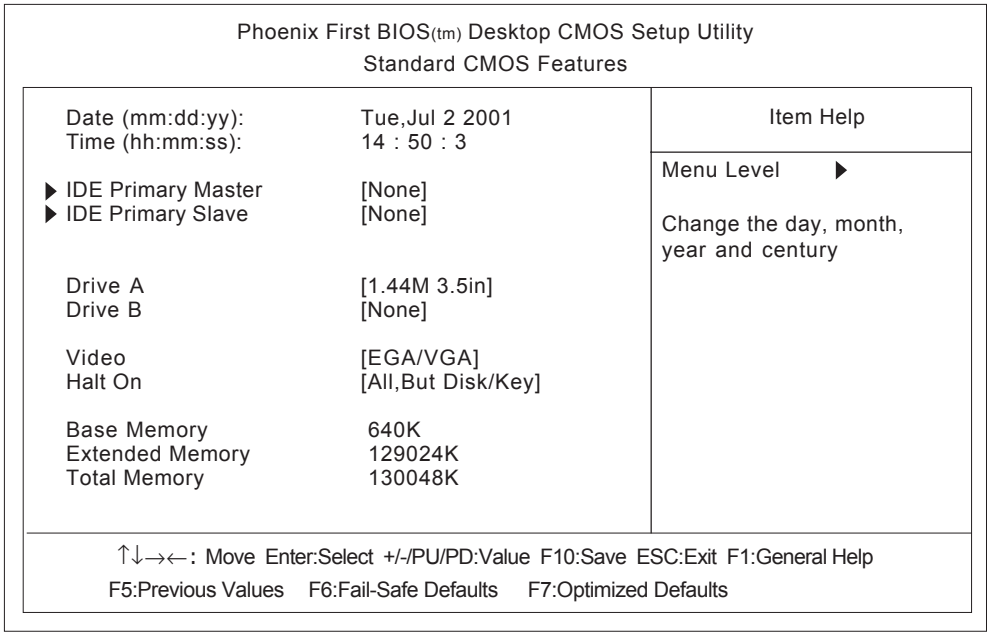
In the main menu, use the arrow keys to move the cursor to the desired selection. Each item is highlighted as it is selected. Press the [Enter] key to move to an item's submenu.

5.2 System Parameters

5.2.1 Standard CMOS Features

Normally, use only the factory (default) settings.

Selecting the STANDARD CMOS FEATURES menu item produces the following screen.



■ **Date (mm:dd:yy)**

The PL unit's internal calendar and clock allow you to set the date. The day of the week is automatically set and is display-only.

Month: Jan/Feb/Mar/Apr/May/Jun/Jul/Aug/Sep/Oct/Nov/Dec
Day:1 to 31
Year: 1999 to 2099

■ **Time (hh:mm:ss)**

Sets the PL unit's internal clock. The time is calculated based on a 24-hour clock. For example, 1 pm. is 13:00:00.

Hours: 0 to 23
Minutes: 0 to 59
Seconds: 0 to 59

■ **IDE Primary Master (Slave)**

Displays the name of the IDE type Hard Disk connected to the PL. Pressing the [Enter] key will call up the Parameter settings menu. For details, refer to ***5.2.2 IDE HDD Auto Detection***

■ Drive A / Drive B

This setting determines the format used by the PL's internal floppy disk drive. The available settings are [None], [360K, 5.25in], [1.2M, 5.25in], [720K, 3.5in], [1.44M, 3.5in], or [2.88M, 3.5in]. The factory settings are Drive A [1.44M, 3.5in] and Drive B [None] and recommended for most users.

■ Video

Designates the type of display monitor and display adaptor. Selections available are [EGA/VGA], [CGA40], [CGA80], and [MONO]. Factory setting is [EGA/VGA] and is strongly recommended for most users.

■ Halt On

Designates the type of processing that will be performed when an error occurs during the Initial Start-Up's Self Test. The [All But Keyboard] selection is factory set and recommended for most users.

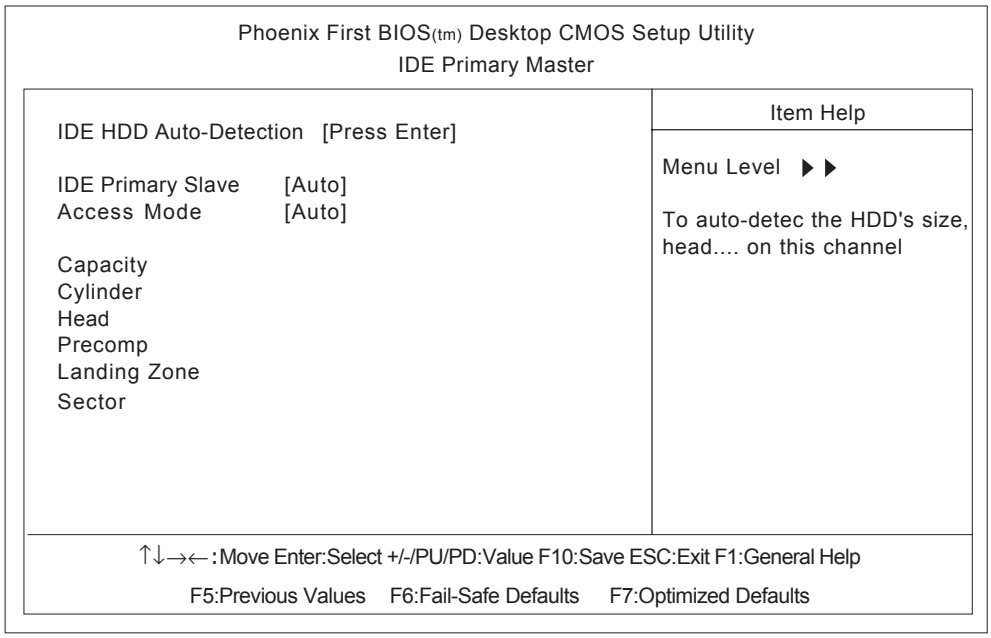
[All Errors]	:	Displays all errors and stops the unit.
[No Errors]	:	Displays all errors and does not stop the unit.
[All,But Keyboard]	:	Displays all errors, except for those related to the keyboard, and stops the unit.
[All,But Diskette]	:	Displays all errors, except for those related to the disk drive (FDD), and stops the unit.
[All,But Disk/Key]	:	Displays all errors, except for those related to the disk drive (FDD) and keyboard, and then stops the unit.

■ Base Memory / Extended Memory / Total Memory

These features provide information about each type of memory.

5.2.2 IDE HDD Auto-Detection

Selecting either [IDE Primary Master] or [IDE Primary Slave] will call up the following menu. The following example uses the [IDE Primary Master] setting.



■ IDE HDD Auto-Detection

This setting detects the hard disk connected to the IDE interface.

■ IDE Primary Master (Slave)

This setting designates the IDE type Hard Disk's parameter setting method.
The available settings are [None], [Auto], or [Manual]. The factory default setting is [Auto] and is recommended for most users.

■ Access Mode

This setting designates the IDE type Hard Disk's access mode. The available settings are [CHS], [LBA], [Large], or [Auto]. The factory default setting is [Auto] and is recommended for most users.

■ Capacity/ Cylinder/ Head/ Precomp/ Landing Zone/ Sector

These settings designate individual IDE-type Hard Disk parameter settings.
When the [IDE Primary Master (Slave)] setting is set to [Manual], the Access Mode must be [CHS]. When the [IDE Primary Master (Slave)] setting is set to [Auto], these values are automaticaly detected.
[Capacity] is set automaticaly.

5.2.3 Advanced BIOS Features

Selecting the ADVANCED BIOS FEATURES menu item calls up the following screen.

Phoenix First BIOS(tm) Desktop CMOS Setup Utility
Advanced BIOS Features

			Item Help
	Virus Warning	[Disabled]	Menu Level ▶
	CPU Internal Cache	[Enabled]	
	External Cache	[Enabled]	Allows you to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, BIOS will show a warning message on screen and an alarm will beep
	CPU L2 Cache ECC Checking	[Enabled]	
	Quick Power On Self Test	[Enabled]	
	First Boot Device	[Floppy]	
	Second Boot Device	[HDD-0]	
	Third Boot Device	[CDROM]	
	Fourth Boot Device	[Disabled]	
	Swap Floopy Drive	[Disabled]	
	Boot Up Floppy Seek	[Enabled]	
	Boot Up NumLock Status	[On]	
	Typematic Rate Setting	[Disabled]	
x	Typematic Rate(Chars/Sec)	6	
x	Typematic Delay (Msec)	250	
	Security Option	[Set up]	
	Authentication Level	[Low]	
	OS Select For DRAM > 64MB	[Non-OS2]	
	HDD S.M.A.R.T. Capability	[Disabled]	
	Report No FDD For WIN 95	[No]	
	Video BIOS Shadow	[Enabled]	
	Small Logo (EPA) Show	[Disabled]	

↑↓→←: Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

■ Virus Warning

This setting determines whether to display a warning when a write to the HDD's start-up sector is attempted. The available settings are [Enabled] or [Disabled]. The factory default setting is [Disabled] and is recommended for most users.

■ CPU Internal Cache

This setting determines the usage of the CPU's internal cache memory. The available settings are [Disabled] or [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

■ External Cache

This setting enables/disables external cache memory. The available settings are [Disabled] or [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

■ CPU L2 Cache ECC Checking

This setting turns ON or OFF external(L2) SEcondary Cache Memory's ECC (Error Check Correction). The available settings are [Disabled] and [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

Quick Power On Self Test

This setting determines whether the quick self test is performed when the power is turned on. The available settings are [Disabled] or [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

First/ Second/ Third/ Fourth Boot Device

The selections for the search drive sequence of the operating system.
The available settings are [Floppy], [HDD-0], [SCSI], [CDROM], [HDD-1], [HDD-2], [HDD-3], [USB-FDD], [USB-ZIP], [USB-CDROM], [USB-HDD], [LAN], and [Disabled]. Factory settings are: First: [Floppy], Second: [HDD-0], Third: [CDROM], Fourth: [Disabled].

Swap Floppy Drive

This setting swaps Drives A and B. The available settings are [Disabled] or [Enabled]. The factory default setting is [Disabled] and is recommended for most users.

Boot Up Floppy Seek

The setting checks whether the floppy disk drive is installed during the system boot-up process. The available settings are [Disabled] or [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

Boot Up Numlock Status

This setting specifies the Numlock key status upon the startup. The available settings are [On] and [Off]. The factory default setting is [On] and is recommended for most users.

Typematic Rate Setting

The setting specifies the keyboard speed used when repeating characters.
The available settings are [Enabled] and [Disabled]. The factory default setting is [Disabled].

Typematic Rate (Chars/ Sec)

This setting specifies the actual typematic rate (repeated character input per second) when the [Typematic Rate Setting] option is set to [Enabled]. The settings are used to determine how many repeats are performed in one second. The factory default setting is [6].
The available settings are [6], [8], [10], [12], [15], [20], [24], and [30].

Typematic Delay (Msec)

When [Typematic Rate Setting] is set to [Enabled], this setting determines the delay period until the initial repetition is started. The [250] selection is factory set. The available settings are [250], [500], [750], and [1000].

Security Option

This setting designates the area to request a password. If a password needs to be entered, select [Setup] in BIOS setup, or [System] during system startup. This setting is NOT available if the password is not set in the [SET SUPERVISOR PASSWORD] or [SET USER PASSWORD] areas. The factory default setting is [Setup] and is recommended for most users.

[SET SUPERVISOR PASSWORD] Reference *5.2.14 Set Supervisor Password*

[SET USER PASSWORD] Reference *5.2.15 Set User Password*

Authentication Level

Sets the security level for an application that uses the FirstWare security feature.

Selections can be [High], [Medium], or [Low]. Factory setting is [Low].

OS Select For DRAM > 64MB

Selects the usage method for 64MB or more of DRAM memory.

The available settings are [Non-OS2] and [OS2]. The factory default settting is [Non-OS2] and is recommended for most users.

HDD S.M.A.R.T Capability

This feature enables/disables the HDD unit's SMART (Self-Monitoring Analysis and Reporting Technology) feature. The available selections are [Enabled] and [Disabled], [Disabled] is factory set and recommended for most users.

Report No FDD For WIN 95

This setting determines if the FDD node is reported by BIOS to WIN95. The available settings are [No] and [Yes]. The factory default setting is [No].

Video BIOS Shadow

This feature enables/disables copying of Video BIOS to RAMF (video accellerator). The available selections are [Enabled] and [Disabled], [Enabled] is factory set.

Small Logo (EPA) Show

Enables/disables the initial display at startup of the EPA logo. The available selections are [Enabled] and [Disabled]. [Disabled] is factory set.

5.2.4 Advanced ChiPLet Features

Selecting the ADVANCED CHIPLET FEATURES menu item calls up the following screen.

These are ADVANCED OPTIONS. The parameters in this screen are for system designers, service personnel, and experienced users only. Do not reset these values unless you understand the consequences of your changes.

Phoenix First BIOS(tm) Desktop CMOS Setup Utility
Advanced ChiPLet Featrues

		Item Help
SDRAM CAS Latency Time	[3]	
SDRAM Cycle Time Tras/Trc	[Auto]	Menu Level ▶
SDRAM RAS-to-CAS Delay	[Auto]	
SDRAM RAS Precharge Time	[Auto]	
System BIOS Cacheable	[Disabled]	
Video BIOS Cacheable	[Disabled]	
Memory Hole At 15M-16M	[Disabled]	
CPU Latency Timer	[Enabled]	
Delayed Transaction	[Enabled]	
AGP Graphics Aperture Size	[65MB]	
On-Chip Video Window Size	[65MB]	

↑↓→←: Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

■ SDRAM CAS Latency Time

Designates the clock counts used, from the enabling of CAS to the start of the burst transmission. Can be set to either [3] or [2]. Factory default setting is [3] and strongly recommended for most users.

■ SDRAM Cycle Time Trans/Trc

Designates the number of SLCK's for an access cycle, i.e. the minumum required time from when a bank is activated to the activation of an identical bank. Settings are [7/9], [5/7] or [Auto]. Factory default setting is [Auto] and strongly recommended for most users.

■ SDRAM RAS-to-CAS Delay

Designates the timing delay used between RAS and CAS strobe signals. Settings are [2], [3], or [Auto]. Factory default setting is [Auto] and strongly recommended for most users.

■ SDRAM RAS Precharge Time

Designates the pre-charge time value used, to allow RAS to accumulate its charge before DRAM refresh. Settings are [2], [3], or [Auto]. Factory default setting is [Auto] and strongly recommended for most users.

System BIOS Cacheable

Sets whether the System BIOS Cache is used or not. When the OS is set to use this cache, the PL unit's processing speed will increase. Settings available are [Enabled] and [Disabled]. The factory setting is [Disabled] and is recommended for most users.

Video BIOS Cacheable

Sets whether the Video BIOS Cache is used or not. Settings available are [Enabled] and [Disabled]. The factory setting is [Disabled]. When this feature is [Enabled], the BIOS ROM range available for caching is from C0000h - F7FFFh, which will improve video performance. However, if another program tries to write to this area of memory, a system error may occur.

Memory Hole At 15M-16M

This setting determines whether to designate the memory space from 15MB to 16MB as the buffer area for the ISA bus card. The available settings are [Disabled] and [Enabled]. The factory default setting is [Disabled] and is recommended for most users.

CPU Latency Timer

If Enabled, a deferrable CPU cycle will only be Deferred after it has been in a Snoop Stall for 31 scans and another ADS# has arrived. If Disabled, changeable CPU cycles will be changed after an ADS number is received by GMCH.

Delayed Transaction

Designates the length of the pre-charge time. The available settings are [Enabled] and [Disabled]. The factory default setting is [Enabled] and is recommended.

AGP Graphics Aperture Size

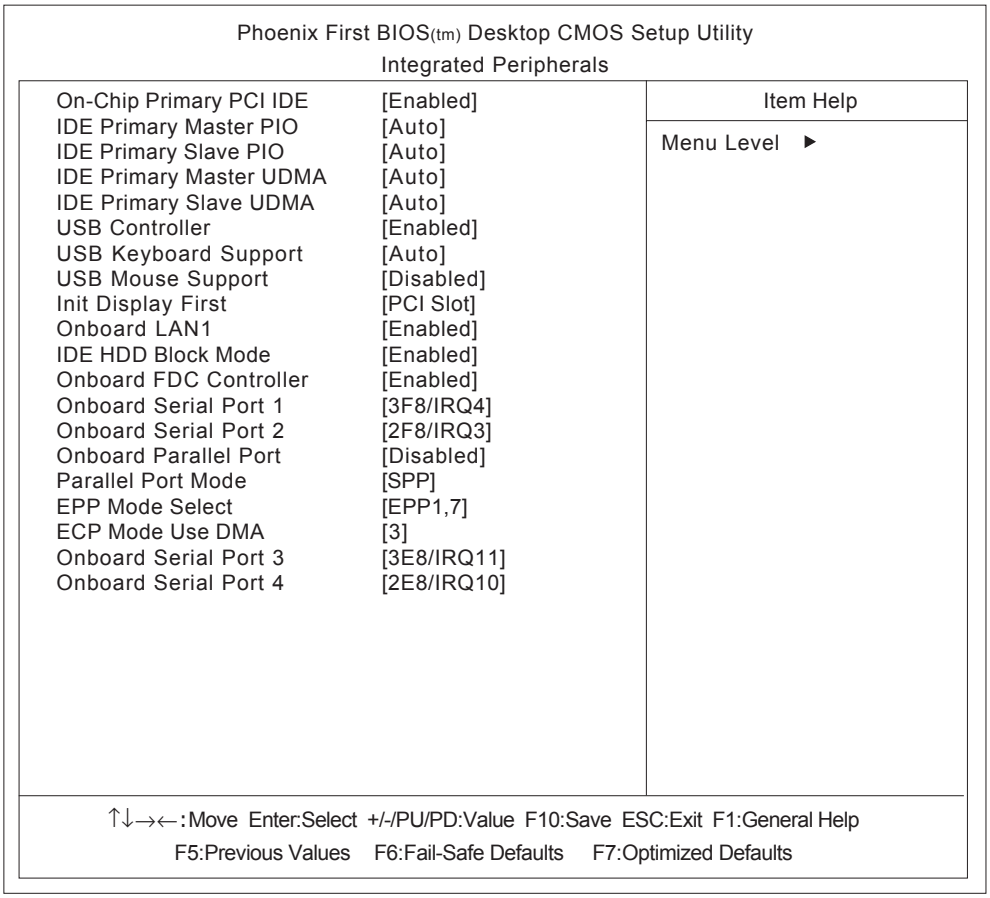
Designates the address range used for PCI memory addresses allocated to AGP graphic memory. The available settings are [64MB] or [32MB]. [64MB] is the factory setting.

On-Chip Video Window Size

Designates the on-chip video window size used by the VGA driver. The available settings are [Disabled] and [64MB]. The factory default setting is [64MB].

5.2.5 Integrated Peripherals

Selecting INTEGRATED PERIPHERALS SETUP menu item Displays the following screen.



■ **On-Chip Primary PCI IDE**

Designates the internal IDE port's setting. The two selections available are [Disabled] and [Enabled]. The [Enabled] selection is factory set and recommended for most users.

■ **IDE Primary Master (Slave) PIO**

Designates the Primary Master Drive's PIO (Programmed Input/Output) Operation Mode. The selections available are [Auto], [Mode0], [Mode1], [Mode2], [Mode3], or [Mode4]. The [Auto] selection is factory set and recommended for most users. If the On-Chip Primary PCI IDE setting is set to [Disabled], this setting can not be changed.

■ **IDE Primary Master (Slave) UDMA**

Designates the Primary Master Drive's UDMA Operation Mode. The two selections available are [Auto] or [Disabled]. The [Auto] selection is factory set and recommended for most users. If the On-Chip Primary PCI IDE setting is set to [Disabled], this setting can not be changed.

■ **USB Controller**

Select [Enabled] or [Disable] when attaching a USB device. The [Disabled] selection is factory set and recommended for most users. When using the USB I/F or the USB connector for connecting the touch panel, set this item to "Enabled".

■ USB Keyboard Support

Select [Enabled] or [Disable] if your system contains a USB controller and you wish to use a USB keyboard. The available settings are [Disabled] and [Enabled]. The factory default setting is [Auto]. If, however, the USB Controller is set to [Disabled], this setting cannot be changed.

■ USB Mouse Support

This setting allows you to connect a USB mouse, even if the OS does not support it. It allows the BIOS to use a mouse driver and treats the mouse as if it were a PS/2 type mouse.The available settings are [Disabled] and [Enabled]. The factory default setting is [Auto]. If, however, the USB Controller is set to [Disabled], this setting cannot be changed.

■ Init Display First

When both a PCI and an AGP display boards are installed, this setting designates which will have first priority. Settings are [PCI slot] or [Onboard/AGP]. The factory default setting is [PCI slot].

■ Onboard LAN

Disables/enables the LAN connector. The available settings are [Disabled] and [Enabled]. The factory default setting is [Enabled].

■ IDE HDD Block Mode

This setting determines whether to enable the Block Mode on the HDD supporting the Block Mode. The available settings are [Disabled] and [Enabled]. The factory default setting is [Enabled] and is recommended for most users.

■ Onboard FDC Controller

Designates whether the PL unit's FDD (Floppy Disk Drive) controller is enabled or disabled. Settings available are [Disabled] or [Enabled]. The [Enabled] selection is factory set.

■ Onboard Serial Port 1

Designates the PL unit's Serial Port 1 I/O address. The selections include [Disabled], [3F8/IRQ4], [3F8/IRQ11], [2F8/IRQ3], [2F8/IRQ10], [3E8/IRQ4], [3E8/IRQ11], [2E8/IRQ3] and [2E8/IRQ10].

The [3F8/IRQ4] selection is factory set and recommended for most users.

■ Onboard Serial Port 2

Designates the PL unit's Serial Port2 I/O address. The selections include [Disabled], [3F8/IRQ4], [3F8/IRQ11], [2F8/IRQ3], [2F8/IRQ10], [3E8/IRQ4], [3E8/IRQ11], [2E8/IRQ3] and [2E8/IRQ10].

The [2F8/IRQ3] selection is factory set and recommended for most users.

Onboard Parallel Port

Designates the PL unit's Parallel Port I/O address. The selections include [Disabled], [378/IRQ7], [278/IRQ5], and [3BC/IRQ7]. The [378/IRQ7] selection is factory set.

Parallel Port Mode

Designates the parallel port's operation mode. This can only be set when the Onboard Parallel Port is not set to [Disabled]. Settings are [SPP], [EPP], [ECP+EPP], and [Normal]. The [SPP] selection is factory set.

EPP Mode Select

Designates the EPP mode's specification level. This canonly be set when the Onboard Parallel Port is not set to [Disabled]. Settings are [EPP1.9], and [EPP1.7]. The [EPP1.9] selection is factory set.

ECP Mode Use DMA

Designates the ECP mode's DMA number. This canonly be set when the Onboard Parallel Port is not set to [Disabled]. Settings are [1], and [1]. The [3] selection is factory set.

Onboard Serial Port 3

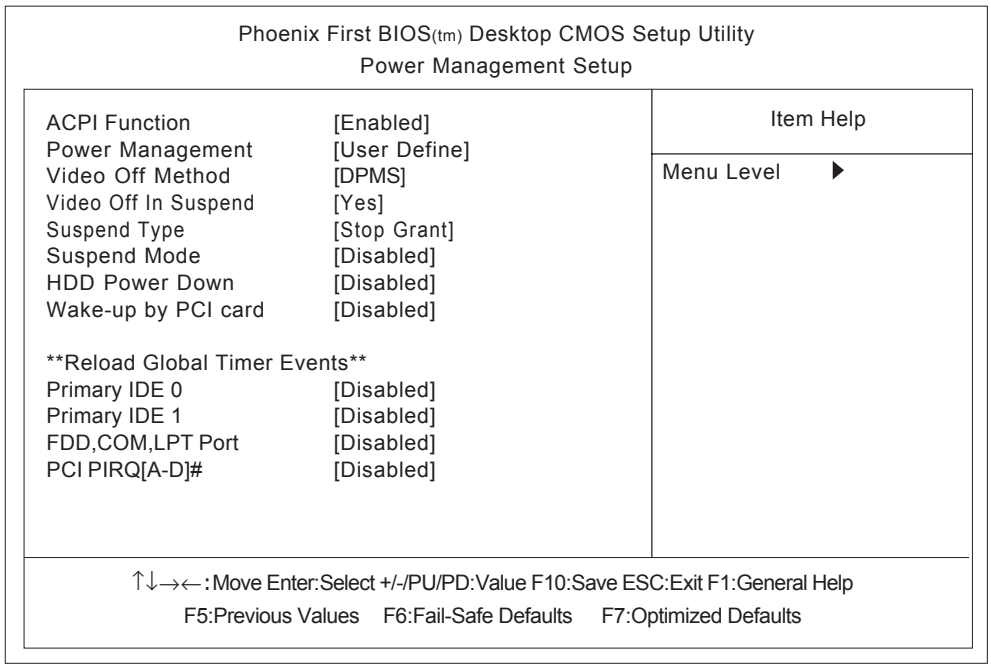
Designates the interupt number for the PL unit's onoard Serial Port3. The selections include [Disabled], [3F8/IRQ4], [3F8/IRQ11], [2F8/IRQ3], [2F8/IRQ10], [3E8/IRQ4], [3E8/IRQ11], [2E8/IRQ3] and [2E8/IRQ10].
The [3E8/IRQ11] selection is factory set.

Onboard Serial Port 4

Designates the interupt number for the PL unit's onoard Serial Port 4. The selections include [Disabled], [3F8/IRQ4], [3F8/IRQ11], [2F8/IRQ3], [2F8/IRQ10], [3E8/IRQ4], [3E8/IRQ11], [2E8/IRQ3] and [2E8/IRQ10].
The [2E8/IRQ10] selection is factory set.

5.2.6 Power Management Setup

Selecting the POWER MANAGEMENT SETUP menu item calls up the following screen.



■ ACPI Function

Enables/disables the ACPI feature. Selections are [Enabled] or [Disabled]. [Enabled] is factory set. If your PL unit's OS is ACPI compatible, be sure to set this setting to [Enabled].

■ Power Management

You can choose from three power management options. These are [User Define], [Min Saving] or [Max Saving]. The [User Define] selection is factory set and recommended for most users.

■ Video Off Method

This setting determines the method to blank the display screen. The available settings are [Blank Screen], [V/H SYNC+Blank], and [DPMS]. The [V/H SYNC+Blank] blanks the display and also suspends the Vertical/Horizontal synchronization signal of the display. The [Blank Screen] selection blanks the display. The [DPMS] selection controls the operation when a CRT that supports DPMS*1 is used. The factory default setting is [DPMS] and is recommended for most users.

■ Video Off In Suspend

Designates how the monitor is blanked. The available settings are [Yes] and [No]. The factory default setting is [Yes].

1 This standard is approved by the VESA (Video Electronics Standards Association).

■ **Suspend Type**

Designates the type of suspend method used. The available settings are [Stop Grant] and [PwrOn Suspend]. The factory default setting is [Stop Grant] and recommended for most users.

■ **Suspend Mode**

When enabled, designates the period of time before all devices except the CPU are shut down. The available settings are [1Min], [2Min], [4Min], [8Min], [12Min], [20Min], [30Min], [40Min], [1Hour] and [Disabled]. The factory default setting is [Disabled] and recommended for most users.

■ **HDD Power Down**

After the hard disk's motor stoPL, this setting designates the length of time until the PL unit enters energy-saving mode. The available selections are [1Min], [2Min], [3Min], [4Min], [5Min], [6Min], [7Min], [8Min], [9Min], [10Min], [11Min], [12Min], [13Min], [14Min], [15Min] and [Disabled]. [5Min] is factory set and recommended for most users. If the Power Management setting is set to other than [User Define], this setting can not be changed.

■ **Wake-Up by PCI Card**

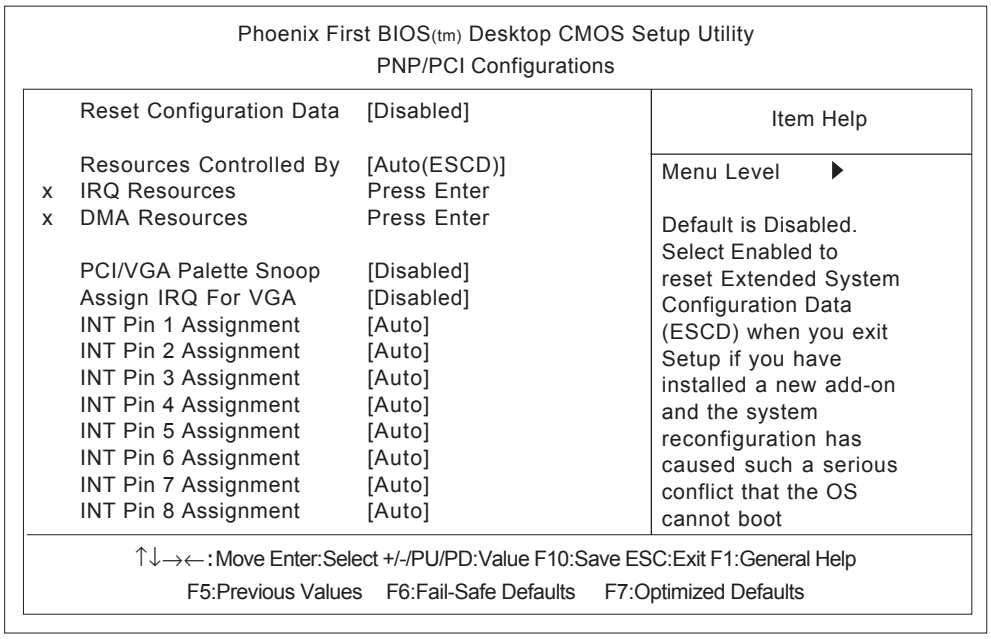
Enables/disables waking up the PL unit's system via an expansion board signal. The two selections available are [Disabled] and [Enabled]. The [Disabled] selection is factory set.

■ ****Reload Global Timer Events****

This feature sets the event that reloads the amount (period) of PL unit idle time prior to changing to energy-saving mode. Thus, when an event occurs for any of the items in this area that are set to [Enabled], the PL unit will recover from energy-saving mode.[Enabled/Disabled] is possible for the following settings: [Primary IDE 0], [Primary IDE 1], [FDD], [COM], [LPT Port], [PCI PIRQ[A-D]#]. Factory settings are all [Disabled].

5.2.7 PnP/PCI Configurations

Selecting the PnP/PCI CONFIGURATION menu item Displays the following screen.



■ Reset Configuration Data

Designates whether ESCD (Extended System Configuration Data) data should be erased or not. The two selections available are [Disabled] and [Enabled]. The [Disabled] selection is factory set and recommended for most users.

■ Resources Controlled By

The Plug-and-Play feature allows you to designate whether the allocation of I/O Port, IRQ and DMA resources is performed automatically or manually. The two selections available are [Manual] or [Auto(ESCD)]. If [Auto(ESCD)] is selected, the IRQ Resources and DMA Resources selection will be disabled. The [Auto(ESCD)] selection is factory set and recommended for most users.

■ IRQ Resources

When resources are controlled using [Manual], manually set each IRQ assignment.

Press the [Enter] key to display the IRQ setting menu.

Reference *5.2.8 IRQ Resources*

■ DMA Resources

When [Resources Controlled By] is set to [Manual], manually set each DMA assignment. Press the [Enter] key to display the DMA setting menu.

Reference *5.2.9 DMA Resources*

■ PCI/VGA Pallet Snoop

The two selections available are [Disabled] and [Enabled]. The [Disabled] selection is factory set and recommended for most users. However, if a VGA or MPEG board is used, set thsi to [Enabled]. For setting details, refer to your VGA or MPEG board's Installation guide.

Assign IRQ For VGA

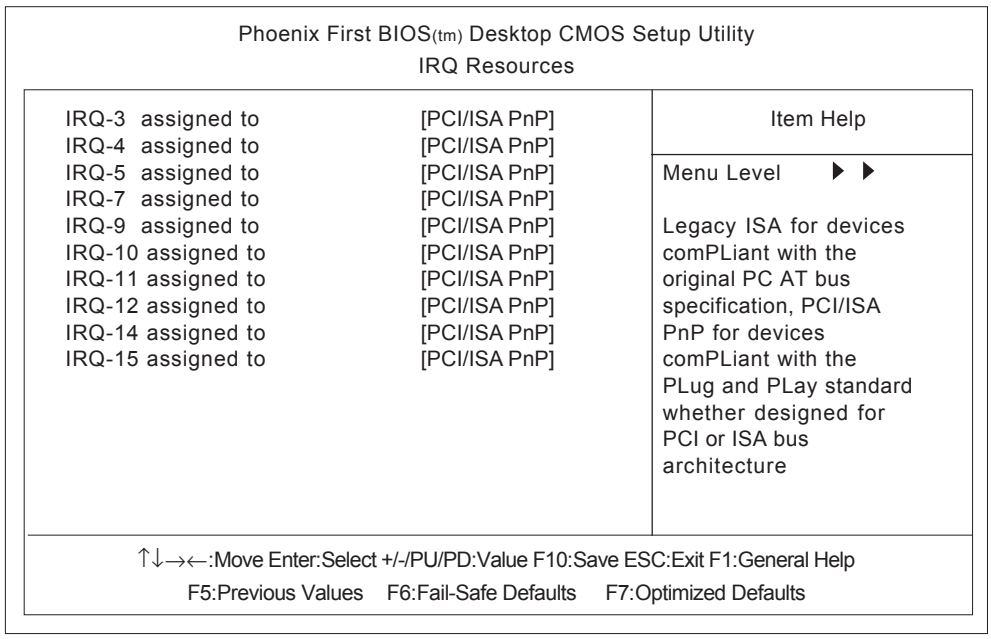
Designates if the interrupt used by the VGA controller is enabled or disabled. The two selections available are [Disabled] and [Enabled]. The [Disabled] selection is factory set and recommended for most users.

INT Pin 1(2/3/4/5/6/7/8) Assignment

Used when manually allocating the PCI interrupt signal to an IRQ. Select either [Auto], [3], [4], [5], [7], [9], [10], [11], [12], [14], or [15]. Factory setting is [Auto].

5.2.8 IRQ Resources

Select IRQ Resources from the PnP/ PCI Configurations menu and the following screen will appear.



■ **IRQ-3 (4/5/7/9/10/11/12/14/15) assigned to**

This setting determines the type of device assigned to the IRQ. This function is available when the [PnP/ PCI Configurations] menu's [Resources Control By] option is set to [Manual].

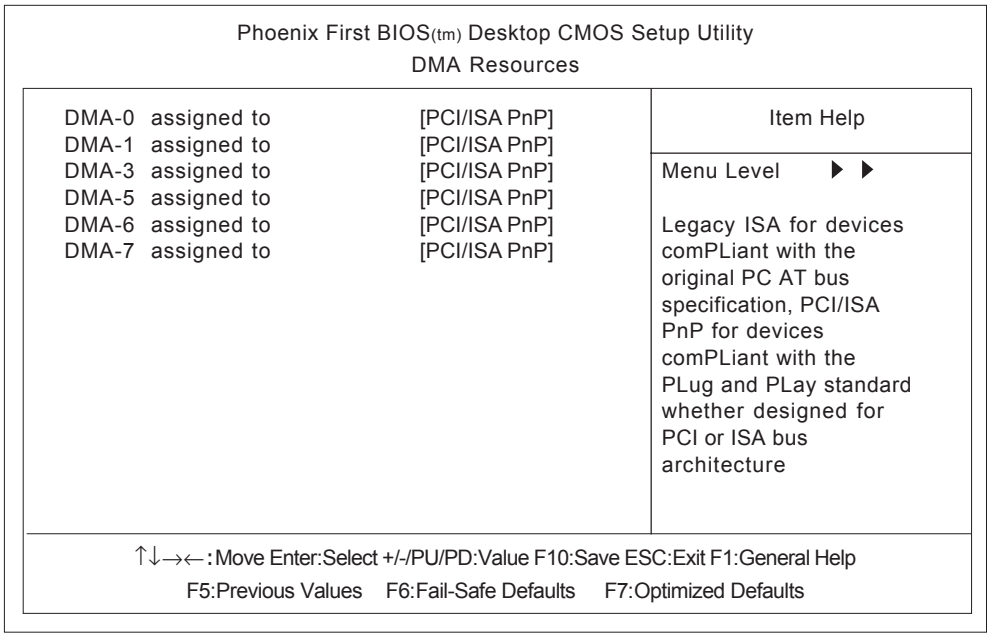
[PCI/ISA PnP] ..... Select to use a PnP-ready PCI or ISA card.

[Legacy ISA] ..... Select to use a non-PnP ISA card.

The initial settings are all [PCI/ISA PnP].

5.2.9 DMA Resources

Selecting DMA Resources from the PnP/PCI Configuration menu and the following screen will appear.



■ **DMA-0 (1/3/5/6/7) assigned to**

This setting designates the type of device assigned to the DMA channel. This function is available when the [PnP/ PCI Configurations] menu's [Resources Control By] option is set to [Manual].

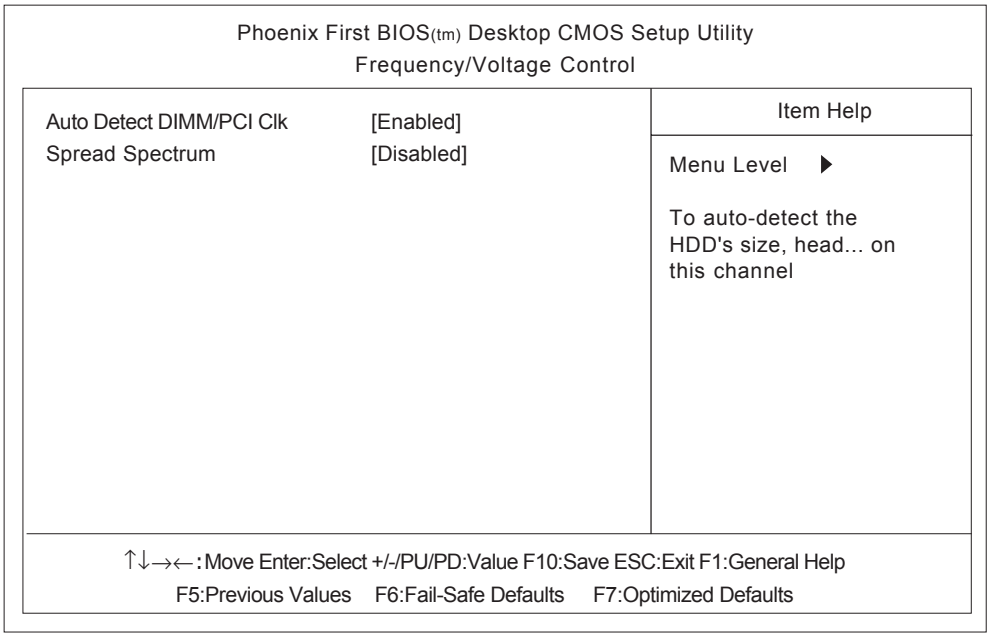
[PCI/ISA PnP] ..... Select to use a PnP-ready PCI or ISA card.

[Legacy ISA] ..... Select to use a non-PnP ISA card.

The initial settings are all [PCI/ISA PnP].

5.2.10 Frequency/Voltage Control

Selecting the Frequency/Voltage Control menu item produces the following screen.



■ Auto Detect DIMM/PCI CLK

This setting designates the auto detect of the DIMM/PCI clock. The available settings are [Enabled] and [Disabled]. The factory default setting is [Enabled] and strongly recommended for users.

■ Spread Spectrum

This setting allows you to set the CPU Clock generator's spread Spectrum. The available settings are [Enabled] and [Disabled]. The factory default setting is [Disabled] and strongly recommended for users.

5.2.11 Load Fail-Safe Defaults

This setting designates if a (fail) safe system using the minimum number of required system settings is set up or not. When the selection [Load Fail-Safe Defaults] is chosen, the following message will appear.

Load Fail-Safe Defaults (Y/N)?

To change from the current system setting to the Fail-Safe defaults, click [Y]. To leave the current system settings unchanged, select [N].

5.2.12 Load Optimized Defaults

Selecting [Load Optimized Defaults] designates whether or not you will revert to the PL unit's factory settings. When the selection [Load Optimized Defaults] is chosen, the following message will appear.

Load Optimized Defaults (Y/N)?

To change from the current system setting to the Optimized defaults, click [Y]. To leave the current system settings unchanged, select [N].

5.2.13 Set Supervisor Password

This password is used to change system information settings. It is designed to prevent unapproved users from changing the system information settings. Entering up to 8 characters here will overwrite the current password.

When you wish to have no password, click on the [Enter] key. Next, the words "PASSWORD DISABLE" will appear, providing confirmation that the Password is no longer set.

When password input is required, use the [Advanced BIOS Features] area's [Security Option] feature to enter the password.

Reference *5.2.3 ADVANCED BIOS FEATURES*

5.2.14 Set User Password

This password is used to view system information settings. It is designed to prevent unapproved users from viewing the system information settings. Entering up to 8 characters here will overwrite the current password.

When you wish to have no password, click on the [Enter] key. Next, the words "PASSWORD DISABLE" will appear, providing confirmation that the Password is no longer set.

When password input is required, use the [Advanced BIOS Features] area's [Security Option] feature to enter the password.

Reference *5.2.3 ADVANCED BIOS FEATURES*

- ***When using either [Set Supervisor Password] or [Set User Password], you can easily view and change system settings.***
- ***When using BOTH the [Set Supervisor Password] and [Set User Password] features, [Set User Password] will allow you to only view system data, not change it.***

5.2.15 Save & Exit Setup

This feature saves the settings entered in the Setup Utility and restarts the PL unit.

When the selection [Save & Exit Setup] is chosen, the following message will appear.

SAVE to CMOS and EXIT (Y/N)?

To save the new settings and restart the PL unit, click [Y]. To leave the current settings unchanged, select [N].

5.2.16 Exit Without Saving

This feature quits the Setup Utility program without saving any settings entered and restarts the PL unit.

When the selection [Exit Without Saving] is chosen, the following message will appear.

Quit Without Saving (Y/N)?

To save the new settings and restart the PL unit, click [Y]. To leave the current settings unchanged, select [N].

Chapter 6 OS Setup

6.1 CD-ROM Contents

6.1.1 Tree-Diagram List

The following tree diagram shows the contents of the CD-ROM disk.

PL-5910 Series User Manual & Driver CD

- [Driver]
  - [Chipset] Chipset Driver
  - [Display] Display Driver
    - [WinNT] WindowsNT®4.0 Display Driver
    - [Win2000] Windows®2000 Display Driver
  - [LAN] LAN Driver
    - [DOS]
      - [NDIS2] MS-DOS® LAN Driver
    - [WinNT] WindowsNT®4.0 LAN Driver
  - [UPDD] Mouse Emulator
- [Manual] Manual
  - [ENG]
    - pl5910e.pdf PL-5910 Series User Manual
    - 5910apie.pdf PL-5910 Series API Reference Manual
  - [JPN]
    - pl5910j.pdf PL-5910 Series User Manual
    - 5910apij.pdf PL-5910 Series API Reference Manual
- [Reader] PDF Data Reader
  - [ENG]
    - ar60eng.exe English Acrobat Reader 6.0 Installer
  - [JPN]
    - ar60jpn.exe Japanese Acrobat Reader 6.0 Installer
- [Utility] Utility Setup Data
  - FdMake.exe Utility Disk Creation Tool
  - Blset.exe Backlight Burnout Detection Program
  - [DOS] MS-DOS® Drivers and Utility Programs
    - ATPH59.exe MS-DOS® Touch Panel Handler
    - BLSET.exe Backlight Burnout Detection Program
    - CALIB59.exe MS-DOS® Touch Panel Data Correction
    - DISP.exe Display ON/OFF Control Program
    - EXTCOM.sys Serial Port Driver
    - KEYEM_PL.exe MS-DOS® Keyboard Emulator
    - INT5F.com Backlight Control Program
  - [WinNT] WinodwsNT®4.0 Driver and Utilities
  - [Win2000] Winodws®2000 Driver and Utilities
  - [Shutdown] Remote Shutdown Installer
  - [RASSvr] Remote RAS Server Installer

6.2 Setting Up Your PL OS

Prior to using the PL unit with the MS-DOS®/WindowsNT®4.0/Windows®2000 operating system, certain utility software must be installed.

1. Installing the HDD Unit

Be sure to check that the hard disk drive unit (PL-HD220), CD-ROM drive unit (PL-DK200), floppy disk drive (PL-FD500/PL-FD510) and a PS-2 (mini-DIN) type keyboard are all correctly connected to the PL unit.

Reference **Chapter 3 Installing Optional Units and Expansion Boards**
PL-HD220 Installation Guide
PL-DK200 Installation Guide
PL-FD500 Installation Guide
PL-FD510 Installation Guide

2. System Parameters Setup

After entering all system parameters, check that each unit is correctly recognized by the PL.

Reference **Chapter 3 Installing Optional Units and Expansion Boards**
PL-HD220 Installation Guide
PL-DK200 Installation Guide
PL-FD500 Installation Guide
PL-FD510 Installation Guide

3. OS Setup

The PL unit is designed to operate using the following OS types.

The PL unit is designed to operate under the following standard Windows OS versions. PL operation with any other maker's OS is not guranteed.

- **MS-DOS® 6.2**
- **Windows NT® 4.0 (Windows Service Pack 6a or higher)**
- **Windows® 2000 (Windows Service Pack 4 or higher)**

4. PL Driver and Utility Setup

Use the [PL-5910 Series User Manual & Driver CD] to install the necessary drivers and utility software. For installation details,

Reference Windows®: 7.1 Installation Methods
MS-DOS: 8.1 MS-DOS® Utility Programs

5. Driver Installation

Install the drivers required for your system.

Reference Windows®: 7.2 Installing Drivers
MS-DOS: 8.1.7 LAN Drivers

Chapter 7 Using Windows

7.1 Installation Methods

7.1.1 Installation Procedures

The following two installation methods are available. Please use the method that best suits your system's design.

■ **Installing Software from the CD-ROM**

To set up the correct software for your PL unit's OS, double-click on the "PL-5910 Series User Manual & Driver CD" folder's "Setup.exe" file. This will automatically install the required drivers and utility programs on your PL unit's C: drive.
For details concerning these programs, refer to

Reference *7.1.2 Hard Disk Contents*

Ex. When using Windows®2000 (and the CD-ROM drive is "D:")

D:Utility\Win2000*1\Disk1\Setup.exe

■ **Installing Software from an FD (Utility Disk)**

Use the PL unit's floppy disk drive to create a floppy disk that can be used to install the Driver & Utility programs designed specifially for your PL unit's OS.

Step 1 Insert the PL unit's additional CD-ROM disk "PL-5910 Series User Manual & Driver CD" in the PL unit's CD-ROM drive.

Step 2 Double click on the "Fdmake.exe" program, that is located in the CD-ROM disk's [OS] -> [Disk 1] folder.

This will create the FD (Utility Disk).

Step 3 Insert the FD(Utility Disk) in the PL unit's FDD unit.

Step 4 Double click on the FD's "Setup.exe" file.
Follow the instructions given by the Installer program to complete the installation.

For details concerning these programs, refer to

Reference *7.1.2 Hard Disk Contents*

**1 If theOS is WindowsNT® 4.0 (Windows Service Pack 6 or higher): Enter "Winnt"*

7.1.2 Hard Disk Contents

When you set up the PL unit's utility software, the folder [Proface] will automatically be created on the C: drive. Inside that folder are the following programs.

(Same for all Windows OS types.)

[Proface]

[Blsaver]	Backlight control screen saver
[Chipset]	Chipset driver
[Disp]	Display ON/OFF utility
[Display]	Graphic Accelerator Driver
[Funckey]	Function Keyboard
[Keyclick]	On-screen Keyboard Emulator
[Lan]	LAN driver
[Pl59api]	API-DLL
[Shutdown] - [Client]	Remote Shutdown Client Application
[Sysmon]	System monitor/RAS application
[Updd]	Mouse Emulator

Note:

- **The above contents will change, depending on the OS installed in your PL unit.**
- **When the PL unit's Utility Setup is performed, the following control drivers are automatically installed in the PL unit's system folder.**
  - **PLYSYSMON.SYS Hardware driver (WindowsNT® 4.0 and Windows®2000)**
  - **BLCTRL.SYS Backlight control driver (WindowsNT® 4.0 and Windows®2000)**

7.2 Installing Drivers

In order to use the PL unit's special features, 4 types of drivers have been created. ([Chipset], [Graphic Accelerator], [LAN] and [Mouse Emulator].

If your PL has no pre-installed OS, or has had its OS recovered, please install the following drivers as required.

Please note that drivers set up manually cannot be uninstalled later.

The following explanation assumes the utility progams have been previously installed on your PL unit's hard disk in the [Proface] folder.

7.2.1 Installing the Chipset Driver

Use the following explanation to install the PL-5910 Series chipset driver in your PL unit. Installing this driver will cause your OS to recognize your hard disk. This driver, however, cannot be used with Windows NT® 4.0.

1) Depending on your PL unit's OS, click on the following file in your "Proface" folder's "Chipset" folder. Follow the instructions given to complete the installation.

C:\Proface\Chipset\infinst_autol.exe

7.2.2 Installing the Graphic Accelerator Driver

Use the following explanation to install the PL-5910 Series Graphic Accelerator driver in your PL unit. Installing this driver will speed up your PL unit's display, using special hardware features.

According to the OS installed in your PL, double click on the appropriate file. (Follow the instructions given in the install program.)

For WindowsNT®4.0:

C:\Proface\Display\winntm67.exe (for Windows)

For Windows®2000:

1) Open the [Control Panel] and click on the [System] icon.

2) In the [System Properties] - [Hardware] tab, double-click on [Device Manager].

3) In [Other Devices], double click on [Video Controller (VGA compatible)].

4) Click on the [Driver] tab's [Update Driver] button.

5) When the [Update Device Driver Wizard] screen appears, click on [Next].

6) In the [Install Hardware Device Driver] screen, select [Search for a suitable driver (recommended)] and click on [Next].

7) In the [Locate Driver Files] screen, select [Specify a location] and click on [Next].

8) In the [Copy manufacturer's files from] area, enter C:\Proface\Display and click [OK].

9) Use the driver file's search screen to check that "gi815xnt5.inf" has been found and click on [Next].

10) Wait while the file is copied to your PC.

11) Click [Finish] in the [Update Device Driver Wizard] final screen.

12) Click [Close] to close the Device Manager screen.

13) When the System Settings Edit screen appears, restart the PL.

7.2.3 Installing the LAN Driver

Use the following explanation to install the PL-5910 Series LAN driver in your PL unit. Installing this driver allows you to access a LAN. If your PL unit's OS is Windows®2000, the LAN driver does not need to be installed.

- **Before installing the LAN Driver, be sure the [Integrated Peripherals]'s [SIS 540 Onchip PCI Device] is set to [Enabled].**
  The factory default setting is [Enabled].

  Reference **5.2.5 Integrated Peripherals**

- **Be sure the PL unit's optional CD-ROM drive (PL-DK200) is connected and operating correctly prior to inserting the your OS' CD-ROM into the CD-ROM drive.**

◆ With Windows NT® 4.0

1) Double click on [Network] icon from [Start] -> [Settings] -> [Control Panel].
   (The [Network Configuration] dialog box will appear.)
2) Click on [Yes].
   (The Network Setup Wizard will appear.)
3) Select [Wired to the network:], and click on [Next].
4) Click on [Select from list].
   (The Network Adaptor selection dialog box will appear.)
5) Click on [Have disk].
   (The "Insert floppy disk" dialog box will appear.)
6) Enter "C:\Proface\lan" and click [OK].
   (The "Select OEM Option" dialog box will appear.)
7) Click on [OK].
   (The Network Setup wizard will appear.)
8) Click on [Next].
9) Select the desired network protocol and click on [Next].
10) Select the desired service to install and click on [Next].
11) Click on [Next].
    (The WindowsNT setup dialog box will appear.)
12) Designate the location[*1] of the i386 folder and click [Continue].

13) Enter “C:\Proface\Lan” and click [Continue].

(The "Speed /Duplex mode" dialog box will appear.)

14) Enter the appropriate settings for your Network.

(The "Input Network Address" dialog box will appear.)

15) Click on [Next].

16) Click on [Next].

17) Enter the settings to connect with your network.

(The Network Setup Wizard will appear.)

18) Click on [Next].

19) Click on [Next].

(The Service Control Manager dialog box will appear.)

20) Enter your computer name and your workgroup name, and click [Next].

21) Click [Completed].

(The Network setting change dialog box will appear.)

22) Click [Yes] and the PL will restart.

(The service control manager dialog box will appear.)

23) Restarting the PL will cause an error message to appear, which requires the PL unit's Service Pack to be reinstalled.

24) After the Service Pack is reinstalled, restart the PL. This completes the installation.

7.2.4 Installing the Mouse Emulator

Once installed, this Mouse Emulator allows you to use the touch panel.

Prior to installing the Mouse Emulator, be sure to designate the interface to be used (COM4 or USB). However, a USB interface can only be designated when the OS is Windows®2000.

Reference *1.2.1 Touch Panel Connection*

◆ Installing the Mouse Emulator

1) It is required to agree to "DMC Corporation Mouse Emulation Software (TSC-1310D/DD) Software License Agreement" beforehand.

Reference *Appendices 2 Consent Agreement*

2) Start "C:\Proface\UPDD\Setup.exe" file.

3) Follow the instructions given on the screen to install the Touch Panel Driver.

4) Refer to "C:\Proface\UPDD\Readmee.pdf" for the rest, the details of the setting.

**1 Designate the WindowsNT® 4.0 CD-ROM disk’s “i386” folder.*

7.3 Windows® Utility Programs

The PL unit is equipped with the following special features. The following files have been copied to the PL unit's hard disk and are contained in the [Proface] folder.

File Name	Windows NT®4.0/Windows®2000
PL_BLIOC.DLL	C:\Winnt\System32
PL_DLL.DLL	
PL_IOC.DLL	
Backlight Control.scr	
Disp.exe	C:\Proface\Disp
Keyclick.exe	C:\Proface\Keyclick
PL_Smon.exe	C:\Proface\Sysmon
PL_Wps.exe	C:\Proface\Sysmon
Fnckey.exe	C:\Proface\Funckey

7.3.1 API-DLL

This is a dynamic library designed to allow user applications to access the PL unit's resident RAS feature. API-DLL consists of three types, which are explained below.

Reference *PL-5910 Series API Reference Manual*

■ Backlight Control (Pl_blioc.dll)

This API-DLL file provides a dynamic library that allows User-created applications to utilize the PL-5910 Series unit's backlight control feature. This file must be installed into the same directory as the User's application.

■ System Monitor (Pl_dll.dll)

This API-DLL file provides a dynamic library that allows User-created applications to utilize the PL-5910 Series' System Monitor feature. This file must be installed into the same directory as the user's application.

■ RAS Feature (Pl_ioc.dll)

This dynamic link library file allows user-created applications to utilize the PL unit's RAS feature.

7.3.2 Backlight OFF Screen Saver (Backlight control.scr)

This software is used to turn OFF the PL unit's backlight after a specified period of inactivity. The use of this feature will help to extend the life of the backlight.

To use this feature, click the Windows [Control Panel] -> [Screen] -> [Screen Saver] and select the Screen Saver's [Backlight Control].

Note: **Certain application programs may not allow the PL unit's backlight to turn OFF. Please test each program individually to check if the screen saver will operate correctly.**

7.3.3 Screen Display ON/OFF Utility (Disp.exe)

This command line utility is used to turn OFF both the PL unit's backlight and display.

Settings Used	DISP [ON/OFF] ↵
Option Switch	ON: Displayed / OFF: Not Displayed
Return Value	0: Completed Normally / -1: Option Switch Error

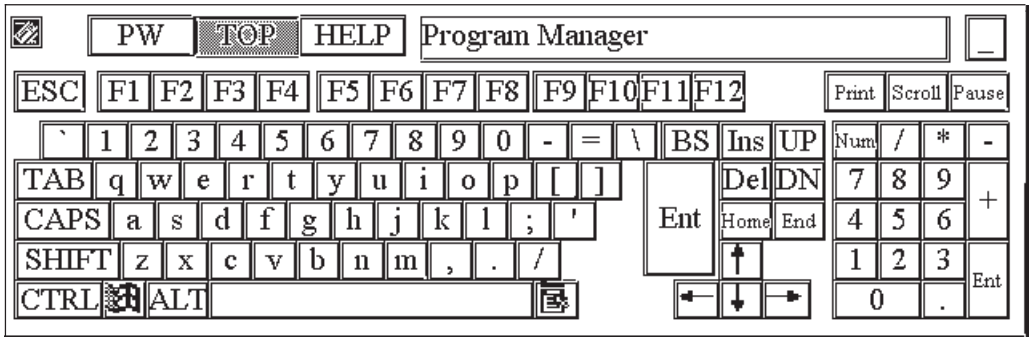
Important ***When using Windows to create an application to turn the backlight's display continuously ON or OFF, use the backlight control PL_BLIOC.DLL.***

7.3.4 Keyboard Emulator (Keyclick.exe)

This program allows you to perform data input using a windows-compatible mouse. When this program is run under Windows®, the following keyboard screen will appear.

It is required to agree to "IN-fINITY soft Keyclick32 License Agreement".

Reference *Appendices 2 Consent Agreement*



Note:

- **Certain application programs do not support this keyboard emulator. Please test each application individually to check if the keyboard emulator will operate correctly.**
- **This application cannot be used to enter Windows® startup screen User Name and Password information.**
- **To change the Keyclick program's font size a keyboard is required.**
- **For details concerning the Keyclick program's operation, simply click on the HELP button to call up the program's online help data.**

7.3.5 System Monitor/RAS Application (Pl_smon.exe/Pl_wps.exe)

This utility provides monitoring of the PL unit's temperature and voltage level, via the RAS and system monitoring functions.

◆ **System Monitor Program (Pl_Smon.exe)**

For details, Reference *9.2.3 System Monitor Operation (Pl_Smon.exe)*

◆ **Monitor Parameter Setting Program (Pl_Wps.exe)**

For details, Reference *9.2.2 System Monitor Property Settings (Pl_Wps.exe)*

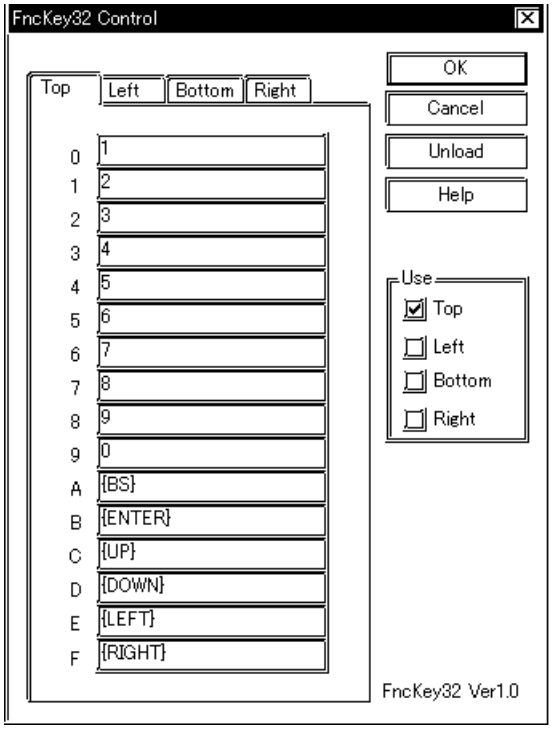
7.3.6 Function Key Utility (Fnckey32.exe)

This utility reserves an area of the PL screen for function key use.

■ Start-up

1) Start up the Funckey32 Control Dialog Box from [Start] - [Prgram] - [Funckey] - [Funckey Configuration].

2) Select a the desired Function Key tab and click the [USE] area.



◆ Special Key Settings

When creating a special key, use the following code;

Key	Setting	Key	Setting
Alt	{ALT}	Tab	{TAB}
Back Space	{BS}	Up	{UP}
Break	{BREAK}	F1	{F1}
Caps	{CAPSLOCK}	F2	{F2}
Ctrl	{CONTROL}	F3	{F3}
Del	{DEL}	F4	{F4}
Down	{DOWN}	F5	{F5}
End	{END}	F6	{F6}
Enter	{ENTER}	F7	{F7}
Esc	{ESC}	F8	{F8}
Help	{HELP}	F9	{F9}
Home	{HOME}	F10	{F10}
Insert	{INSERT}	F11	{F11}
Left	{LEFT}	F12	{F12}
Num Lock	{NUMLOCK}	Shift [DOWN]	{SHIFT+}
Page Down	{PGDN}	Ctrl [DOWN]	{CONTROL+}
Page Up	{PGUP}	Alt [DOWN]	{ALT+}
Print Screen	{PRTSC}	Shift [UP]	{SHIFT-}
Right	{RIGHT}	Ctrl [UP]	{CONTROL-}
Shift	{SHIFT}	Alt [UP]	{ALT-}
Scroll Lock	{SCROLLLOCK}		

When the taskbar has been shifted to the bottom of the PL screen, the lower (Bottom) row of function keys cannot be used.

7.4 Windows NT® 4.0 / Windows ®2000 Settings

Perform the following settings as required by your OS.

7.4.1 Automatic System Log-On Setup

■ **When using Windows NT® 4.0**

1) Click on the 2000 main screen's "Start" button, and select the "Enter Filename" item. Enter the text "C:\WINNT\REGEDIT.EXE" and press [Enter] to start the program.

2) When the REGEDIT Registry Tree appears, select the "Winlogon" subkey via the following text:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\WindowsNT\ Current Version\Winlogon.

3) In the "DefaultUserName" field, enter the User name to be used for the Automatic Log-on.

4) Select the Edit menu's [New/String Value] feature.

5) To the Data Items present, add "AutoAdminLogon" to the Name column's data, and then enter "1" in that entry's Data field.

6) Add "Default Password" to the Name column's data, and enter the password used previously for the DefaultUserName in the Data field.

A user with no password cannot automatically log on.

7) REGEDIT data entry is now finished.

- **If a User attempting to automatically log on is not attached to an "Administrators" group, i.e. no Default Password string is specified, Windows NT automatically changes the value of the AutoAdminLogon key from 1(true) to 0(false), thereby disabling the AutoAdminLogon feature. In that case, if the Shift key is held down during Logoff, the "Login Data" dialog box will appear and the User can use the name of another, registered User to log-on successfully.**
- **If Auto LogOn Setting are not entered, when logging on, a PS/2 type keyboard is required.**

■ **When using Windows® 2000**

1) Start the Control Panel's [Users and Passwords].

2) Select an automatic log-on user and deselect the [Users must enter a user name and password to use this computer (E)] checkbox.

3) Click on the [Advancedl] tab and deselect the [Require users to press Ctrl-Alt-Delete before logging on (R)] checkbox.

4) Click the [Apply(A)] button and when the automatic login dialog box appears, enter your password.

7.4.2 Using an Uninterrupted Power Supply

Prior to turning OFF the PL unit's power, be sure to shut down the NT correctly via the NT OS' "Shutdown" feature. It is recommended that an Uninterrupted Power Supply Device is used to prevent the accidental loss of User data, due to an unexpected power outage.

When using an Uninterrupted Power Supply (UPS), the unit can be set to switch to backup power, which will provide enough time to safely shut down your PL, or it can even shut down your PL for you.

For details, please consult your local dealer of UPS units.

7.4.3 When Changing the System Design

When the PL unit is connected to a printer or to a LAN network, the Windows system settings must be changed.

■ **When using Windows NT®4.0**

- **Changing the System Design**

  When the Windows NT® 4.0 system design is changed, the following messages will appear.

Windows NT Setup

Setup needs to copy some Windows NT files

Setup will look for the files in the location specified below. If you want Setup to look in a different place, type the new location. When the location is corrent, click Continue.

Files Needed

Some files on WindowsNT Workstation CD-ROM are needed. Insert WindowsNT Workstation CD-ROM into the drive selected below, and then click OK.

Even when one of these messages appears, designate a new location for the system design change folder (Windows NT® 4.0 CD-ROM's [I386]) and click on [Next].

D:\I386 (CD-ROM drive is "D")

- **Reinstalling Service Pack Data**

  When changing the Windows NT system settings, the system files are written over your existing Service Pack 1 files. Be sure to set up your Service Pack data again.

■ **When using Windows® 2000**

• **Changing the System Design**

When the Windows® 2000 system design is changed, the following messages will appear.

> **Please insert the floppy disk labeled'Windows2000 Professional CD-ROM' into drive D and then click OK.**
>
> **You can also click OK if you want files to be copied from an altemate location. such as a network sever or a compact disc.**

Designate the new folder location for the system settings (Windows®2000 CD-ROM's [I386]) and click on [Next].

D:\I386 (CD-ROM drive is "D")

7.4.4 Changing to the NTFS File System

■ **With a hard disk using WindowsNT® 4.0 and Windows® 2000**

If your hard disk was formatted using the Windows DOS compatible FAT32 system, you can use the following command to convert the hard disk to an NTFS system.

convert x:/fs:ntfs, where "x" is the drive name of your hard disk.

After converting data to the NTFS file system, it cannot be converted back to the FAT32 (DOS compatible) file system.

Chapter 8 Using MS-DOS

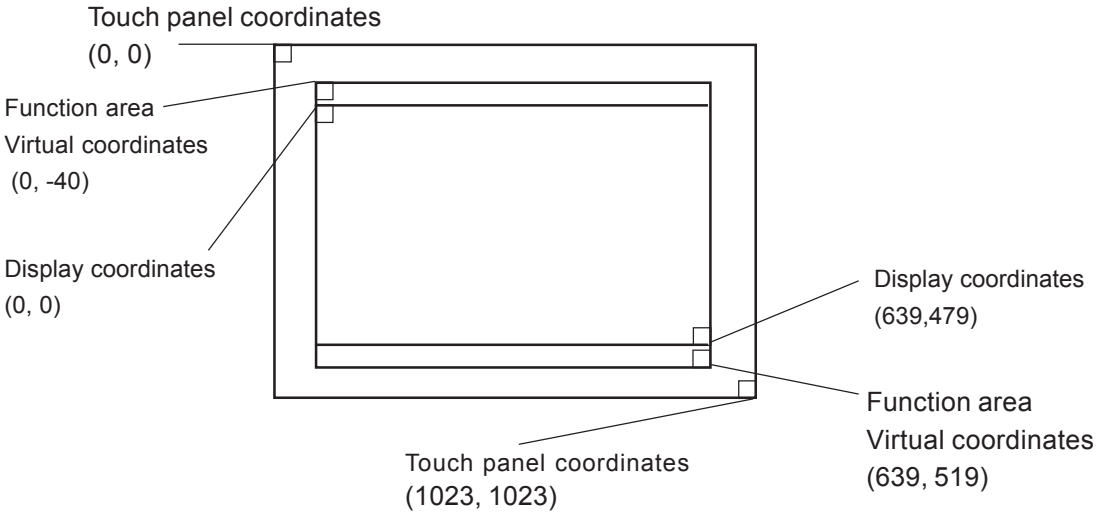
8.1 MS-DOS® Utility Programs

These MS-DOS® utilities canbe used only if the PL unit's OS is MS-DOS. The Windows OS' MS-DOS ®prompt and command prompt cannot be used.

8.1.1 Touch Panel Handler (Atph59.exe)

With an analog touch panel, input is recognized within a 1024 x 1024 pixel area, with the lower left-hand corner as the coordinate origin point. However, most display panels use the upper left-hand corner as the origin point and have a resolution of 640 x 480 pixels. Consequently, depending on the conditions of use, the touch panel position and display position may not be the same. Here, the ATPH59.EXE application solves this problem by converting input from the touch panel into the corresponding display panel coordinates, allowing the use of application programs which use absolute coordinate input or area input from a touch panel.

The relationship between touch panel coordinates and display coordinates is as follows.

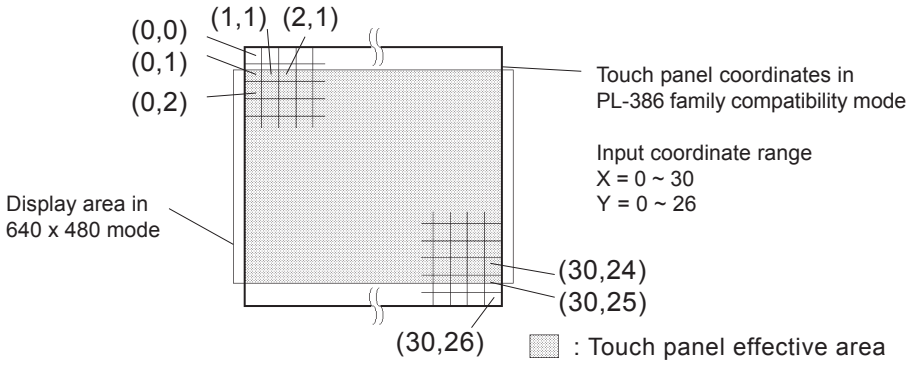


When the ATPH59.exe program is used, touch panel coordinates are converted to display coordinates.

Relationship between touch panel coordinates and display coordinates when using the PL-386 Series compatibility mode

To ensure compatibility with 16 x 14 (31 x 27 by double precision) touch panels used on the Digital PL-386 family of Panel Computers, the TPH.EXE (PL-386 command) function can be used as is.

The relationship between touch panel coordinates and display coordinates is as follows.



A 2-point touch gives the midpoint coordinate between the two coordinate values.

■ Start-up

ATPH59 [Parameter] [↵]

* Parameters

-a<n> Specifies the I/O base address of the touch panel's SIO port.

Hexadecimal, Default: 2e8 (COM4)

n= 3f8 (COM1)
2f8 (COM2)
3e8 (COM3)
2e8 (COM4)

-q<n> Specifies the interrupt level (IRQ) of the touch panel's SIO port.

Default: 10 (COM4)
n= 4 (COM1)
3 (COM2)
11 (COM3)
10 (COM4)

-i<n> Sets the software interrupt vector number when calling up functions.
Hexadecimal, Default: n=59

-r Cancels the resident command.

-c <path name> Specifies the data file containing the calibrated value obtained from CALIB59.EXE (touch panel data calibration). When defaulted to, ATPH59.CAL of the current directory is used.

∗ Example atph59 -a2e8 -q10 -cc:\atph59.cal

Normally, only "atph59" is needed.

At startup, the following message will appear on the screen.

```
Analog Touch Panel Handler ATPH59.EXE Version X.XX  Copy-
right (c) 2000 Digital Electronics Corporation
Stay resident.
```

After startup, these commands reside in memory.

- ***If an error is generated because, for example, there is no file created by the CALIB59.EXE application, the following message appears on the screen, and the system will start up in a mode that does not calibrate data.***

```
WARNING!! Can't open CAL file.
Stay resident.
```

- ***Unless properly calibrated, the display and touch panel input positions may not be the same.***

■ Functions

ATPH59.EXE calls up functions using a software interrupt (default: INT 59h).

INT 59h Function List

Function code	Description
8000h	Touch panel initialization
8100h	Touch panel input (unrestricted wait)
8101h	Touch panel input (immediate restore)
8102h	Touch panel non-destructive input
8200h	Input buffer clear
8500h	Touch panel status detection
FE00h	Resident check

8000h Touch panel initialization

This initializes the touch panel and clears the touch panel's input buffer.

Input AX = 8000h

Output AH = 0: Successfully completed

After the application starts up, this function is issued.

Touch panel cannot be used for 0.5s after the function is issued.

8100h Touch panel input (unrestricted wait)

Returns coordinates of the area/position touched. Waits until data is input.

Input AX = 8100h

Output AH = 0: Successfully completed
BX = Y coordinate in 640 x 480 mode (-40 - 519)
DX = X coordinate in 640 x 480 mode (0 - 639)
CX = Number of valid input buffers on touch panel

8101h Touch panel input (immediate restore)

Returns coordinates of the area/position touched. Immediately restored if nothing is entered.

Input AX = 8101h

Output AH = 0: Input ON
1: Input OFF
BX = Y coordinate in 640 x 480 mode (-40 - 519)
DX = X coordinate in 640 x 480 mode (0 - 639)
CX = Number of valid input buffers on analog touch panel

8102h Touch panel non-destructive input

Returns coordinates of the area/position touched. Does not update the touch panel input buffer.

Input AX = 8102h

Output AH = 0: Input on
1: Input off
BX = Y coordinate in 640 x 480 mode (-40 - 519)
DX = X coordinate in 640 x 480 mode (0 - 639)
CX = Number of valid input buffers on analog touch panel

8200h Input buffer clear

Clears touch panel input buffers.

Input AX =8200h

Output AH = 0: Successfully completed

8500h Touch panel status detection

Returns touch panel status

Input AX = 8500h

Output AH = Status in 640 x 480 mode

Bit 1	Bit 0	Description
0	0	Area touched
0	1	Unchanged
1	0	Not available
1	1	Area released

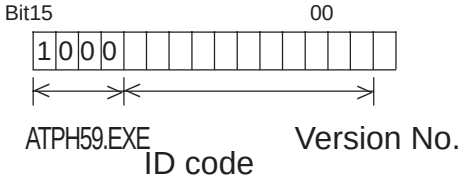
* For an explanation on how to use the function, see “function 500h.”

FE00h Resident check

When the ATPH59.EXE application resides in memory, returns a fixed message and version.

Input AX = FE00h

Output AH = 0: Successfully completed
BL = ‘Y’
BH = ‘B’
CX = Version No.



Carry = Clear

Functions available in PL-386 Compatibility Mode

The following data details the functions available in the PL-386 compatibility mode (when the user's PL-386 application is used without further conversion, updating or formatting).

<INT 59h Function List>

Function code	Description
0000h	Touch panel initialization
0100h	Touch panel input (unrestricted wait)
0101h	Touch panel input (immediate restore)
0102h	Touch panel non-destructive input
0200h	Input buffer clear
0300h	Coordinate code register
0400h	Coordinate code input (unrestricted wait)
0401h	Coordinate code input (immediate restore)
0402h	Coordinate code non-destructive input

0000h Touch panel initialization

This initializes the touch panel and clears the touch panel's input buffer.

Input AX = 0000h

Output AH = 0: Successfully completed

After the application starts up, this function is issued.

Touch panel cannot be used for 0.5s after this function is issued.

0100h Touch panel input (unrestricted wait)

Returns coordinates of the area/position touched. Waits until input is made.

Input AX = 0100h

Output AH = 0: Successfully completed
BH = Y coordinate range in PL-386 compatibility mode (0 - 26)
BL = X coordinate range in PL-386 compatibility mode (0 - 30)
CX = Number of valid data sets in touch panel input buffers

0101h Touch panel input (immediate restore)

Returns coordinates of the area/position touched. Immediately restored after input is made.

Input AX= 0101h

Output AH = 0: Input on ("1" when input is off)
BH = Y coordinate range in PL-386 compatibility mode (0 - 26)
BL = X coordinate range in PL-386 compatibility mode (0 - 30)
CX = Number of valid data sets in touch panel input buffers

0102h Touch panel non-destructive input

Returns coordinates of the area/position touched. Does not update touch panel input buffer.

Input AX = 0102h

Output AH =0: Input present (No input = 1)
BH = Y coordinate range in PL-386 compatibility mode (0 - 26)
BL =X coordinate range in PL-386 compatibility mode (0 - 30)
CX = Number of valid data sets in touch panel input buffers

0200h Input buffer clear

Clears touch panel input buffers.

Input AX = 0200h

Output AH = 0: Successfully completed

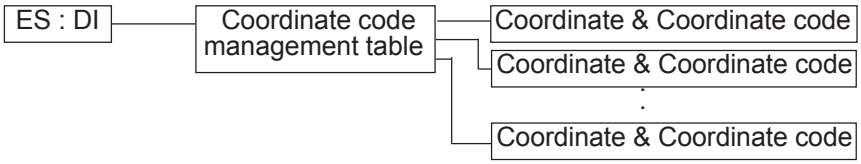
0300h Coordinate code register

Registers code corresponding to the display coordinates.

Input AX =0300h
ES = Segment from coordinate code management table
DI = Offset from coordinate code management table

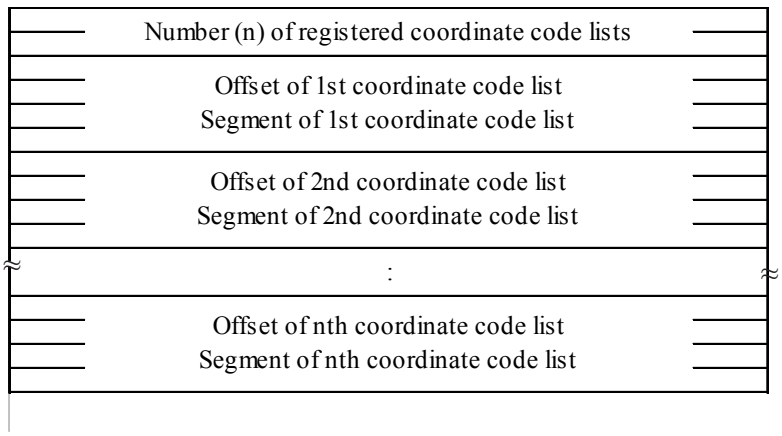
Output AH =0: Successfully completed

∗ Relationship between coordinate code management table and coordinate code



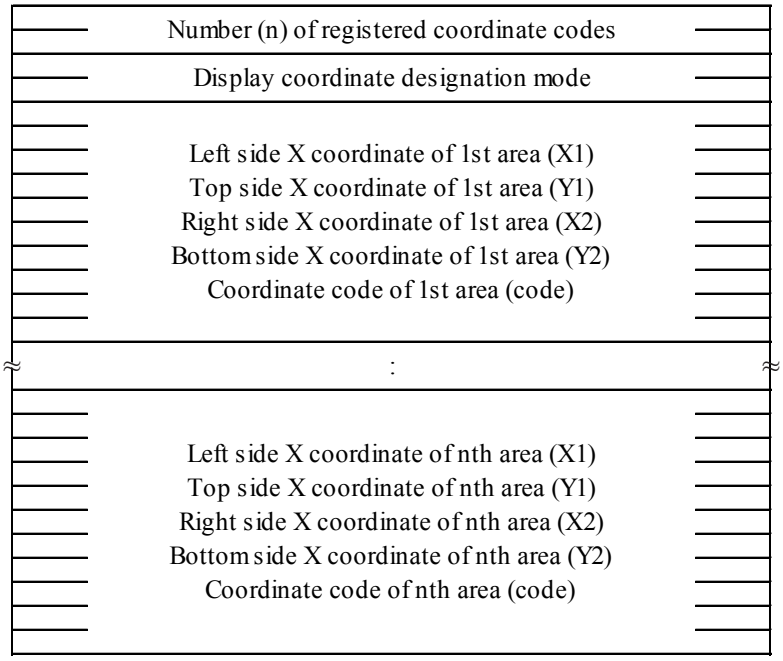
∗ Coordinate Code Management Table Design

The coordinate code management table manages positions of multiple coordinate code lists.



* Coordinate Code List Design

The coordinate code list determines which code is returned when the touch panel is pressed in a specific area. These coordinates specify the display coordinates.



0400h Coordinate code input (unrestricted wait)

Returns coordinates of the area/position touched and coordinate code. Waits until data is entered.

Input AX = 0400h

Output AH = 0: Successfully completed
BH = Y coordinate range in PL-386 compatibility mode (0 - 26)
BL = X coordinate range in PL-386 compatibility mode (0 - 30)
CX = Number of valid data sets in touch panel input buffers
DX = Coordinate code

Note: To use function 0400h, it is necessary to first register the coordinate codes.

0401h Coordinate code input (immediate restore)

Returns coordinates of the area/position touched and coordinate code. Immediately restored after data is entered.

Input AX = 0401h

Output AH = 0: Input on ("1" when input is off)
BH = Y coordinate range in PL-386 compatibility mode (0 - 26)
BL = X coordinate range in PL-386 compatibility mode (0 - 30)
CX = Number of valid data sets in touch panel input buffers
DX = Coordinate code

Note: To use function 0401h, it is necessary to first register the coordinate codes.

0402h Coordinate code non-destructive input

Returns coordinates of the area/position touched. Does not update the touch panel input buffer.

Input AX = 0402h

Output AH = 0: Input on ("1" when input is off)
BH = Y coordinate range in PL-386 family compatibility mode (0 - 26)
BL = X coordinate range in PL-386 family compatibility mode (0 - 30)
CX = Number of valid data sets in input buffers on touch panel
DX = Coordinate code

To use function 0402h, it is necessary to first register the coordinate codes.

0500h Touch panel status detection

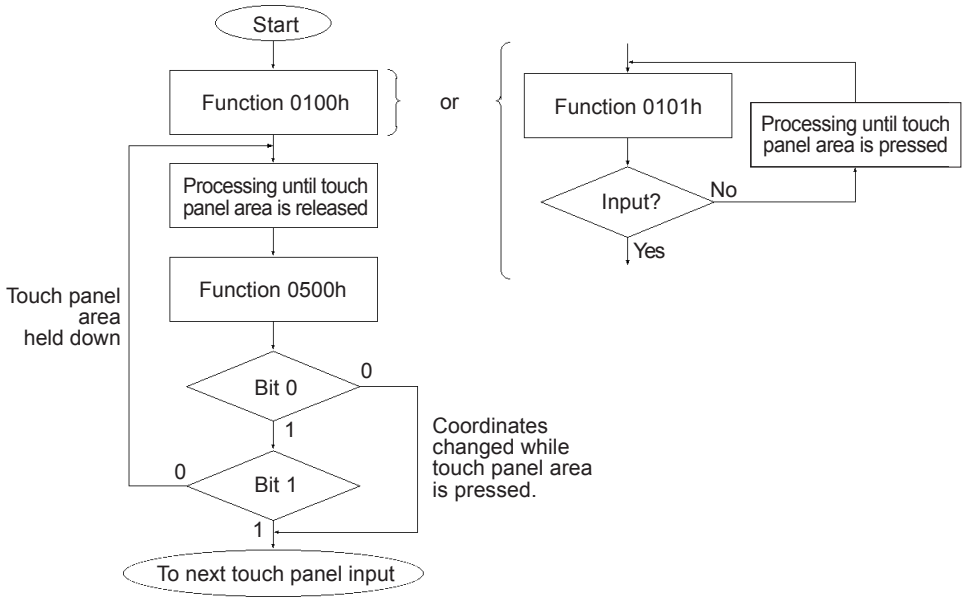
Returns the touch panel's current status

Input AX = 0500h

Output AH = Status in PL-386 compatibility mode

Bit 1	Bit 0	Description
0	0	Area pressed
0	1	Unchanged
1	0	Not available
1	1	Area released

How to use function 0500h



■ Functions

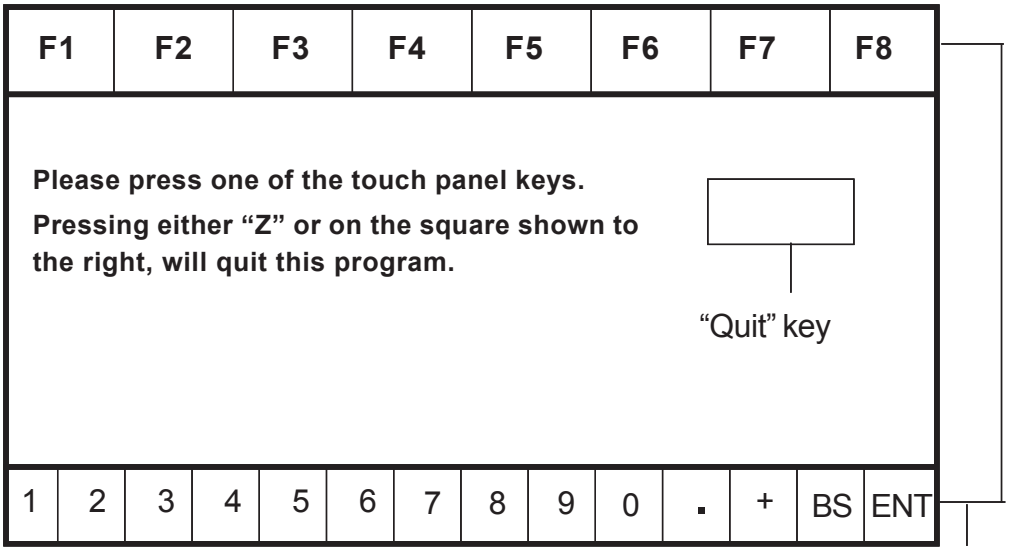
The following sample program was created with the ATPH59.EXE (Touch Panel Handler) application.

Sample Program made with the Touch Panel Handler

Compiler Method

cl sample.c

If not adding GRAPHICS.LIB to SLIBCE.LIB, add **/link graphics.lib.**



This sample program is designed to perform processing based on the touch panel input received from either the upper or lower function keys, or the screen's designated Quit key area.

```
/* This sample program is used by the ATPH59.EXE touch panel handler.
*  Input can be performed by pressing on designated areas of the screen.
*  Before starting this program, be sure to start the ATPH59.EXE program
*/

#include<stdlib.h>
#include<stdio.h>
#include<dos.h>
#include<graph.h>
#include<conio.h>
```

```
#define   ATPH_SYS_CALL      0x59          /* ATPH System Call  */
#define    KEYBOARD_BIOS     0x16          /* Key Board BIOS     */
#define   WRITE_DATA         0x05          /* Key Board Input    */
#define    TP_IN_NOWAIT       0x8101       /* ATPH Input         */
#define    TP_CONDITION       0x8500       /*TouchPanelCondition*/

#define   ZKEYCODE           0x7a          /* "Z" keycode   */
#define   DATA8254           0x40          /* Timer Data         */
#define   CTRL8254           0x43          /* Timer Controller     */
#define   CTRL8042           0x61          /* Buzzer ON/OFF    */
#define   BEEP_TIME          20000         /* Beep's ON period       */

#define   FALSE              0
#define   TRUE               1

struct function_coordinate
{
    short    sx;                           /* X coordinate (left,upper)    */
    short    sy;                           /* Y coordinate  (left,lower)   */
    short    ex;                           /* X coordinate (Right Upper)  */
    short    ey;                           /* Y coordinate (Right,lower)  */
    short    key;                          /* Key Code           */
}
    tpcd [] =
    {
    480,    40,     559,    80,       0x2c7a,        /* Square's display  */

    1,      -40,    79,     -1,       0x1e61,        /* Function Sheet F1 */
    80,     -40,    159,    -1,       0x3062,        /* Function Sheet F2 */
    160,    -40,    239,    -1,       0x2e63,        /* Function Sheet F3 */
    240,    -40,    319,    -1,       0x2064,        /* Function Sheet F4 */
    320,    -40,    399,    -1,       0x1265,        /* Function Sheet F5 */
    400,    -40,    479,    -1,       0x2166,        /* Function Sheet F6 */
    480,    -40,    559,    -1,       0x2267,        /* Function Sheet F7 */
    560,    -40,    639,    -1,       0x2368,        /* Function Sheet F8 */
```

```
    1,     479,   39,    519,          0x0231,          /* Function Sheet 1  */
    40,    479,   79,    519,          0x0332,          /* Function Sheet 2  */
    80,    479,   119,   519,          0x0433,          /* Function Sheet 3  */
    120,   479,   159,   519,          0x0534,          /* Function Sheet 4  */
    160,   479,   199,   519,          0x0635,          /* Function Sheet 5  */
    200,   479,   239,   519,          0x0736,          /* Function Sheet 6  */
    240,   479,   279,   519,          0x0837,          /* Function Sheet 7  */
    280,   479,   319,   519,          0x0938,          /* Function Sheet 8  */
    320,   479,   359,   519,          0x0a39,          /* Function Sheet 9  */
    360,   479,   399,   519,          0x0b30,          /* Function Sheet 0  */
    400,   479,   439,   519,          0x342e,          /* Function Sheet .  */
    440,   479,   479,   519,          0x272b,          /* Function Sheet +  */
    480,   479,   559,   519,          0x0e08,          /* Function Sheet BS */
    560,   479,   639,   519,          0x1c0d,          /* Function Sheet ENT*/
    0,     0,     0,     0,           0
    };

struct key_code
{
   char   keyname[3];                                  /* Touch Key Name    */
   short  keycode;                                     /* Key Code          */
}
   kbcd[]=
   {
   " Z ",                          0x7a,               /Display Square */

   " A ",                          0x61,               /* Function Sheet F1 */
   " B ",                          0x62,               /* Function Sheet F2 */
   " C ",                          0x63,               /* Function Sheet F3 */
   " D ",                          0x64,               /* Function Sheet F4 */
   " E ",                          0x65,               /* Function Sheet F5 */
   " F ",                          0x66,               /* Function Sheet F6 */
   " G ",                          0x67,               /* Function Sheet F7 */
   " H ",                          0x68,               /* Function Sheet F8 */
```

```
    " 1 ",                  0x31,           /* Function Sheet 1  */
    " 2 ",                  0x32,           /* Function Sheet 2  */
    " 3 ",                  0x33,           /* Function Sheet 3  */
    " 4 ",                  0x34,           /* Function Sheet 4  */
    " 5 ",                  0x35,           /* Function Sheet 5  */
    " 6 ",                  0x36,           /* Function Sheet 6  */
    " 7 ",                  0x37,           /* Function Sheet 7  */
    " 8 ",                  0x38,           /* Function Sheet 8  */
    " 9 ",                  0x39,           /* Function Sheet 9  */
    " 0 ",                  0x30,           /* Function Sheet 0  */
    " . ",                  0x2e,           /* Function Sheet .  */
    " + ",                  0x2b,           /* Function Sheet +  */
    "B S",                  0x08,           /* Function Sheet BS */
    "ENT",                  0x0d,           /* Function Sheet ENT*/
     0,       0
    };

union REGS inregs, outregs;

/*************/
/* BUZZER ON */
/*************/
void buzzer_on(void)
{
   int timer;

    outp   (CTRL8253, 0xb6);
    outp   (DATA8253+2, 0x33);
    outp   (DATA8253+2, 0x05);                  /* Length of buzzer sounding */

    outp   (CTRL8042, ((inp(CTRL8042) | 0x3) & 0xff)    /* Buzzer On        */

       for (timer = 0 ; timer<BEEP_TIME; timer++);
}
```

```
/***************/
/*  BUZZER OFF  */
/***************/
voidbuzzer_off(void)
{
   outp (CTRL8042, (inp(CTRL8042) & 0xfc));      /* Buzzer Off       */
}

/**********************/
/* WAIT TOUCHPANEL OFF */
/**********************/
voidwait_touch_off(void)
{
   while(1)
    {
       inregs.x.ax = TP_CONDITION;
     int86(ATPH_SYS_CALL, &inregs, &outregs);

       if(outregs.h.ah == 3)                          /* Touch Panel Off   */
        {
            break;
        }

       else if(outregs.h.ah == 0)                     /* Touch Panel On    */
        {
          inregs.x.ax = TP_IN_NOWAIT;
         int86(ATPH_SYS_CALL, &inregs, &outregs);
                                              /* ATPH Function Call*/
        }
    }
}
```

```
/**********************/
/* INPUT TUCHPANEL */
/**********************/
void touchpanel_on(void)
{
   int i, value;

   inregs.x.ax = TP_IN_NOWAIT;
   int86(ATPH_SYS_CALL, &inregs, &outregs);

    if(outregs.h.ah == 0)                              /* Touch Panel On    */
     {
        value=FALSE;
        for(i=0; tpcd[i].sx; i++)
          {
           if(                                         /* Time in area    */
             ((short)outregs.x.dx > tpcd[i].sx)&&
             ((short)outregs.x.bx > tpcd[i].sy)&&
             ((short)outregs.x.dx < tpcd[i].ex)&&
            ((short)outregs.x.bx < tpcd[i].ey))
    {
                inregs.h.ah = WRITE_DATA;
                inregs.x.cx = tpcd[i].key;
                int86(KEYBOARD_BIOS, &inregs, &outregs);

                buzzer_on();
                wait_touch_off();
                buzzer_off();
                value=TRUE;
                break;
     }
 }
```

```
        if(value == FALSE)                          /* time out (of) area      */
         {
           wait_touch_off();
         }
     }
}

/********************/
/* KEYBOARD INPUT*/
/********************/
int keyboard_on(void)
{
   int i, ky;

   if(kbhit())
    {
      ky=getch();
      for(i=0; kbcd[i].keycode; i++)
       {
         if(ky == kbcd[i].keycode)
          {
            printf("push key is [%s]. \r",kbcd[i].keyname);
              if(ky == ZKEYCODE)
                {
              printf(" push [%s]key. finishprogram. \n",kbcd[i].keyname);

                return(TRUE);                   /* Program End       */
              }
              break;
          }
      }
     }
   return(FALSE);
}
```

```
/*****************/
/* MAIN VARIABLES */
/*****************/
voidmain(void)
{
   if(!(_setvideomode(_VRES16EXCOLOR)))
    {
      printf("error: can't set graphics mode ");

        exit(1);                                    /* ERROR:Program End */
      }
   _rectangle(_GBORDER,tpcd[0].sx,tpcd[0].sy,tpcd[0].ex,tpcd[0].ey);
                                                    /*  MAKE A SCREEN FRAME   */
   printf("please push touchpanel or key \n");
   printf("End program by pressing [ Z ]key or screen. \n");

   while(1)
    {
      touchpanel_on();
      if(keyboard_on())
       {
          _setvideomode(_DEFAULTMODE);  /* RETURN TO VIDEOMODE */
           exit(0);
       }
    }
}
```

8.1.2 Touch Panel Data Calibration(CALIB59.EXE)

By touching the specified position (upper left-hand corner or lower right-hand corner) on the panel, the difference between the screen's logical value and its measured value is corrected. Furthermore, it is possible to create files with data based on calibration results obtained here, to be used with the ATPH59.EXE application (Touch Panel Handler).

■ Start-up

CALIB59 [Parameter] ↵

* Parameter

-a<n> Specifies the I/O base address of the touch panel's SIO port.
Hexadecimal, Default: 2e8 (COM4)
n= 3f8 (COM1)
2f8 (COM2)
3e8 (COM3)
2e8 (COM4)

-q<n> Specifies the interrupt level (IRQ) of the touch panel's SIO port.
Default: 10
n= 3, 4, 10, 11

-c <path name> Specifies the data file containing the calibrated value obtained from the CALIB59.EXE application (touch panel data calibration). When defaulted to, ATPH59.CAL of the current directory is specified.

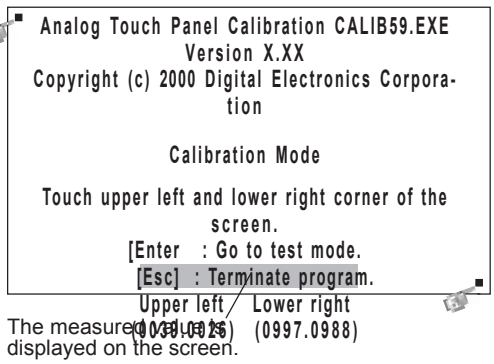
∗Example CALIB59 -a2e8 -q10 -cc:\atph59.cal

Note: • **Normally, only "CALIB59" is needed.**

■ Operation

```
Analog Touch Panel Calibration CALIB59.EXE
Version X.XX
 Copyright(c) 2000 Digital Electronics Corporation
          Calibration Mode
Touch upper left and lower right cornner of the screen.
        [Enter]  : Go to test mode.
         [Esc]   : Terminate program.
        Upper left   Lower right
        (0000,0000) (0000,0000)
```

1) When the CALIB59.EXE application is opened up, the message shown at the left will appear on the screen, and two points will light up, in both the upper left-hand and lower right-hand corners.



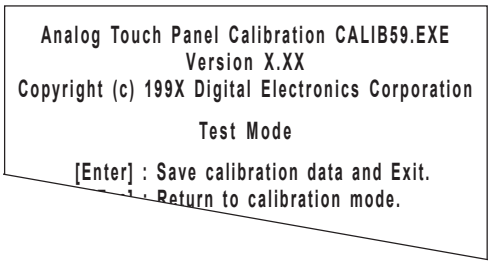
The measured value is displayed on the screen.

2) Touch each point, in the order it appears.

- ***Do not touch both points simultaneously.***
- ***Touch the panel exactly on the lit up areas.***
- ***The measured value is redisplayed if you touch the panel again.***

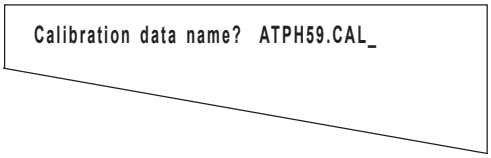
The difference between the logic value and the measured value is obtained.

To quit programming, press the [Esc] key. Then, when the message shown on the left appears, press the [Y] key. The program will end without saving data. Here, pressing the [N] key will return you to the calibration mode.



3) Start up the "Test Mode" with the [↵] key.
This mode tests the calibrated value to determine if it is correct or not.
The perimeter is OK if it is drawn along the path you traced by finger. Otherwise, return to the "Calibration Mode" and touch the lit up areas again.

You can return to the "Calibration Mode" with the [Esc] key.



4) If test results are OK, press the [Enter] key.
When the message shown at the left appears, input the data file name and press the [↵] key.

When specifying the data file name for the parameter (-C=[path name]) at the CALIB59.EXE start-up, the program ends without displaying the message shown on the left.

8.1.3 Screen Display ON/OFF Utility (Disp.exe)

This command line utility is used to turn the PL unit's backlight and display ON or OFF.

Settings Used	DISP ON ↵ or DISP OFF ↵
Option Switch	ON: Displayed / OFF: Not Displayed
Return Value	0: Completed Normally / -1: Option Switch Error

When using Windows to create an application to turn the backlight's display continuously ON or OFF, the backlight control program (INT5F.COM) must be started

Reference *8.1.6 Backlight Control Program (INT5F.COM)*

8.1.4 Serial Port Driver(EXTCOM.SYS)

The Panel Computer (PL) unit's RS-232C BIOS (INT 14h) has been enhanced and uses reception interrupt when transmitting data. (Can be used like a Windows®PC standard function) As a result, this software does not need to be installed when an application for controlling the serial port directly is used, or when Windows is running.

- A Port Base Address: Reception Buffer Size (unit = KB)

The Port Base Address, or the Reception Buffer Size can be designated here. Parameters for up to four ports can be entered, using the predefined Port numbers of 0 to 3 (COM1 to COM).

Port Base Address Table

Port Number	Port Base Address	Interrupt Device Level	Description
0	3F8h	IRQ4	COM1 RS-232C (SIO1)
1	2F8h	IRQ3	COM2 RS-232C (SIO2)
2	3E8h	IRQ11	COM3 RS-485 Multidrop Connection Possible
3	2E8h	IRQ10	COM4 Reserved for Touch Panel (Not available to User)

- N Designates the ports not used by EXTCOM.SYS.

Ex.) When port 1 is not to be used by EXTCOM.SYS;

DEVICE = EXTCOM.SYS -A3F8:1 -N -A3E8:1 -N can be used.

- **-A and -N recognize Port numbers based on the positions designated for them.**
- **When DEVICE = EXTCOM.SYS is entered, all ports are used by EXTCOM.SYS.**

With the PL-5910 series units, normally port number 3 (COM4) can not be used. As a result, be sure to designate all the unit's ports in this statement.

Ex.) DEVICE = EXTCOM.SYS -A3F8:1 -N -A3E8:1 -N -M

• -M is used when Port 2 (COM3:RS-485) is used for a Multi-Drop connection. When this port is designated for Multi-Drop, startup is performed with DTR set to "OFF" (unable to transfer data).

■ Functions

EXTCOM.SYS uses a software interrupt (INT 14h) to call the following functions.

INT 14h Function Code Chart

Function Code	Explanation
00h	Initialize Transmission port
01h	Send 1 byte data
02h	Receive 1 byte data
03h	Read Transmission port status
10h	Expansion setting
11h	Forced 1 byte data send
12h	1 byte data reception (immediate reply)
13h	Read Expansion Transmission port Status
15h	Receive 1 byte data safely
16h	Enable RS-485 Sending/Transmission
17h	Disable RS-485 Sending/Transmission
FEh	Resident Check

- **RS-232C (COM1,COM2) and RS-485 (COM3) can be used even if the EXTCOM.SYS program is not installed. However, the receive interrupt and expansion features cannot be used.**
- **Depending on the BIOS function call used, the RS-232C (COM1, COM2) and RS-485 (COM3) are enabled. Also, the RS-232C (COM1, COM2) can be used with only a device name.**
- **Port 3 (COM4) can be used to control the Touch Panel. Since PL-5910 series units use ATPH59 for control, normally EXTCOM.SYS should be set to <u>not</u> use port 3.**

Next, each function will be explained.

The Line Status and the Modem Status bits are used as follows:

(Each of these bits is enabled when it is "1", and disabled when it is "0")

■ Line Status

Bit 0	Data Ready
Bit 1	Overrun Error
Bit 2	Parity Error
Bit 3	Frame Error
Bit 4	Break Detect
Bit 5	Transmit's Reserved Register Free
Bit 6	Transmit's Shift Register Free
Bit 7	Time Out Error

■ Modem Status

Bit 0	Unused
Bit 1	Unused
Bit 2	Unused
Bit 3	Unused
Bit 4	Clear To Send
Bit 5	Data Set Ready
Bit 6	Ring Indicator
Bit 7	Carrier Detect

Function 00h Initialize Transmission Port

This function performs Transmission Port initialization. Clears the Transmission buffer.

Input: AH = 00h,

AL = Port Parameter

Bit 0,1 Data bit length

00: Unsettable 01: Unsettable 10: 7 bit 11: 8 bit (default)

Bit 2 Stop Bit

0: 1 stop bit 1: 2 stop bits (default)

Bit 3,4 Parity

00: NON (default) 01: ODD 10: NON 11: EVEN

Bit 5,6,7 Baud Rate

000:110, 001:150, 010:300, 011:600, 100:1200,

101:2400, 110:4800, 111:9600 (default)

DX = Port Number (0 to 3)

Output: AH = Line Status,

AL = Modem Status

Function 01h Transmit 1 Byte Data

Transmits 1 byte data..

Input: AH = 01h

AL = Transmission Data

DX = Port Number (0 to 3)

Output: AH = Line Status (During timeout; bit 7 becomes 1)

AL = Transmission Data

Function 02h Receive 1 Byte Data

Receives 1 byte of data. If characters are present in the buffer while the buffer is being refreshed, these characters are returned. If there are no characters in the buffer, the computer waits until a timeout occurs.

Input: AH = 02h

DX = Port Number (0 to 3)

Output: AH = Line Status (When no data; bit 7 becomes 1 (Timeout))

AL = Receive Data

Function 03h Read Transmission Port Status

Reads the status of the transmission port.

Input: AH = 03h

DX = Port Number (0 to 3)

Output: AH = Line Status

AL = Modem Status

Function 10h Expansion Setting

Designates the type of data transmission method used. XON/XOFF and RTS can be used at the same time.

Input: AH = 10h

AL = Flow Control Method

Bit 0	Flow is controlled according to the XON/XOFF setting at the time of data reception.
	0: Not used for control (default) 1: Used for control
Bit 1	Flow is controlled according to the RTS setting at the time of data reception.
	0: Not used for control (default) 1: Used for control
Bit 2,3	Reserved (Keep set to "0")
Bit 4	Other party's XON/XOFF setting during data transfer
	0: Disabled (default) 1: Enabled
Bit 5	Other party's CTS setting during data transfer
	0: Disabled (default) 1: Enabled
Bit 6,7	Reserved (Keep set to "0")

CH = Timing used for enabling XON (default is 25)

Designates what percentage the buffer must empty to before the XON command is enabled.

CL = Timing used for enabling XOFF (default is 75)

Designates what percentage the buffer must fill to before the XOFF command is enabled.

* Be sure that: $0 \leqq CH \leqq CL \leqq 100$.

BH = Length of transmit time out (Unit = 500msec) Default - 6 [3 seconds]

BL = Length of receive time out (Unit = 500msec) Default - 6 [3 seconds]

DX = Port Number (0 to 3)

Output: AH = Line Status

0: Normal exit Other than 0: Designated error

Function 11h Forced 1 Byte Data Send

Regardless of the other party's data flow control, a bit of data is sent.

Input: AH = 11h

AL = Transmission Data

DX = Port Number (0 to 3)

Output: AH = Line Status

AL = Transmission Data

Function 12h 1 Byte Data Reception (Immediate Reply)

Receives 1 byte data. Responds immediately if no data is present in the reception buffer.

Input: AH = 12h

DX = Port Number (0 to 3)

Output: AH = Line Status (If not data is present, bit 7 changes to "1"(timeout)

AL = Reception Data

Function 13h Read Expansion Transmission Port Status

When expansion settings are used, reads the condition of the data transmission port.

Input: AH = 13h

DX = Port Number (0 to 3)

Output: AH = Line Status

AL = Modem Status

BX = Current Data Reception Amount

CL = Condition of Flow Control

Bit 0	Sending (Here) Terminal's XON/XOFF
	0: OFF, 1: ON
Bit 1	Sending (Here) Terminal's RTS
	0: OFF, 1: ON
Bit 2,3	Unused
Bit 4	Receiving (There) Terminal's XON/XOFF
	0: OFF, 1: ON
Bit 5	Receiving (There) Terminal's RTS
	0: OFF, 1: ON
Bit 6,7	Unused

Function 15h Receive 1 Byte Data Safely

Receives 1 byte data. However, the reception buffer is not refreshed. Also, responds immediately if the buffer contains no data.

Input: AH = 15h
DX = Port Number (0 to 3)

Output: AH = Line Status
AL = Reception Data

Function 16h Enable RS485 Sending/Transmission

Used with Multi-Drop connections, via the RS-485 port (No. 2).

When DTR turns ON, transmission becomes possible.

Input: AH = 16h

Output: (None)

Function 17h Disable RS485 Sending/Transmission

Used with Multi-Drop connections, via the RS-485 port (No. 2).

When DTR turns OFF, transmission is not possible.

Input: AH = 17h

Output: (None)

Function FEh Resident Check

When the EXTCOM.SYS program is resident, returns a fixed message and the version (number).

Input: AH = FEh

Output: BL = "Y"
BH = "A"
CX = Version Number
Carry = Clear

8.1.5 Backlight Burnout Detection Program (BLSET.EXE)

This application detects if the backlight has burned out. This program is stored in [Utility] folder of the PL-5910 Series User Manual & Driver CD. Copy this program to an FD or to the PL's hard disk and then execute this program with DOS.

■Start-up

BLSET ON [↵] or BLSET OFF [↵]

[ON] means the touchpanel is disabled when a backlight burnout is detected.

[OFF] means the touchpanel will remain active after a backlight burnout is detected.

The factory setting is [OFF].

For detection feature details, refer to ***9.1 RAS Feature.***

8.1.6 Backlight Control Program (INT5F.COM)

This resident program controls the backlight.

■ Usage

1) Copy the backlight control program (INT5F.COM) to the startup disk.

2) Use a text editor to add the INT5F.COM data to the AUTOEXEC.BAT file.

If an application is started by the AUTOEXEC.BAT file that uses GENIFA, be sure to enter the INT5F.COM text so that it is started before the application that uses GENIFA.

8.1.7 LAN Driver

Please refer to your network software's operation manual when installing the desired driver. For detailed PL driver location information,

Reference *6.1.1 Tree Diagram List*

8.2 Serial Communication

This section explains how to perform serial-type communication with a PL unit.

■ RS-232C (COM1/COM2) Cable Connections

<Example 1>

PL		Dsub 25-pin	
1	CD	1	FG
2	RKD	2	SD
3	TXD	3	RD
4	DTR	4	RTS
5	GND	5	CTS
6	DSR	6	DSR
7	RTS	7	SG
8	CTS	8	CD
9	RI	20	DTR

<Example 2>

PL		Dsub 25-pin	
1	CD	1	FG
2	RKD	2	SD
3	TXD	3	RD
4	DTR	4	RTS
5	GND	5	CTS
6	DSR	6	DSR
7	RTS	7	SG
8	CTS	8	CD
9	RI	20	DTR

■ Sample output program

Below is a sample program for sending 1 character from the RS-232C connector.

Important

Because the PL uses an AT-compatible BIOS, the serial communication BIOS (INT 14 h) does not support communications by interrupt. Therefore, install a reception interrupt function in the application.

```
#include <stdio.h>
#include <dos.h>

union     REGS   ir,or;

main( ){
     ir.h.ah   =    0x00 ;    /* Initialization */
     ir.h.al   =    0xe3 ;    /* 9600bps,8bit,NONE,1stop */
     ir.x.dx   =    0 ;       /*   COM1   */
     int86 (0x14,&ir,&or) ;

     ir.h.ah   =    0x01 ;    /* 1 character output */
     ir.h.al   =    0x32 ;    /*   '2'    */
     ir.x.dx   =    0 ;       /*   COM1   */
     int86 (0x14,&ir,&or) ;
}
```

Note:

Changing commands or parameters also changes function (mode setting, data reception, etc.).

8.3 BIOS List

■ INT 5h Display Hard Copy

Operation	Input	Output
Screen hard copy		0050:0000h Print-screen flag 0: Hard copy function unused or completed successfully 1: Now printing -1: Error

■ INT 10h Video BIOS

Operation	Input	Output
Setting video mode	AH = 00h AL = Value of selected mode (Bits 0 to 6), Video RAM clear (Bit 7)	
Setting cursor shape	AH = 01h CG = Cursor start position and display CL = Cursor end position	
Setting cursor position	AH = 02h BH = Page No. DH = Value of specified line DL = Value of specified column	
Reading cursor position	AH = 03h BH = Page No.	CH = Cursor start position and display CL = Cursor end position DH = Current cursor line position DL = Current cursor column position
Reading light pen position	AH = 04h	AH = 0: Light pen switch is off. = 1: Light pen switch is on. BX = X coordinate (0 - 319, 639) CH = Y coordinate (0 - 199) CX = Y coordinate in new graphic mode (0, XXX) DH = Light pen line position in character units DL = Light pen column position in character units
Switching active page	AH = 05h AL = Page No.	
Scrolling up	AH = 06h AL = Number of lines to scroll up BH = Attribute of line to clear CH = Highest line in scroll up range CL = Farthest left column in scroll up range DH = Lowest line in scroll up range DL = Farthest right column in scroll up range	
Scrolling down	AH = 07h AL = Number of lines to scroll down BH = Attribute of line to clear CH = Highest line in scroll down range CL = Farthest left column in scroll down range DH = Lowest line in scroll down range DL = Farthest right column in scroll down range	

Operation	Input	Output
Reading character/attribute at cursor position	AH = 08h BH = Page No.	AL = Character code AH = Attribute (In text mode)
Writing character/attribute at cursor position	AH = 09h AL = Character code BH = Page No. BL = Attribute CX = Number of characters to output	
Writing character at cursor position	AH = 0Ah AL = Character code BH = Page No. BL = Attribute (Effective only in graphic mode) CX = Number of characters to output	
Color Pallet Settings		
Setting overscan, background color, and display color brightness	AH = 0Bh BH = 00h BL = Color code	
Setting color group	AH = 0Bh BH = 01h BL = Color group	
Writing point in graphic mode	AH = 0Ch AL = Attribute BH = Page No. CX = X coordinate DX = Y coordinate	
Reading point in graphic mode	AH = 0Dh BH = Page No. CX = X coordinate DX = Y coordinate	AL = Attribute
Writing character/attribute at cursor position and move cursor	AH = 0Eh AL = Character code BL = Attribute (Effective only in graphic mode)	
Reading video data	AH = 0Fh	AH = Number of single lines AL = Video mode BH = Active page No.
Setting pallet register		
Setting pallet register	AH = 10h AL = 00h BH = Pallet code BL = Pallet register No.	
Setting overscan register	AH = 10h AL = 01h BH = Pallet code	
Setting pallet register and overscan register	AH = 10h AL = 02h ES:DX= 17-byte data address	
Setting attribute code intensity/brink	AH = 10h AL = 03h BH = 00h: Set attribute bit 7 to intensity function. = 01: Set attribute bit 7 to blink function.	
Reading basic pallet register	AH = 10h AL = 07h BL = Basic pallet register to read (0 - 15)	BH = Value read

Operation	Input	Output
Setting pallet register		
Reading overscan register	AH = 10h AL = 08h	BH = Value read
Reading basic pallet register and overscan register	AH = 10h AL = 09h ES:DX = 17-byte buffer in which return value is located	
Setting expansion pallet register	AH = 10h AL = 10h BX = Selected expansion pallet register DH = Red value CH = Green value CL = Blue value	
Setting block in expansion pallet register	AH = 10h AL = 10h ES:DX = Color value table BX = First expansion pallet register to set CX = Number of blocks set inexpansion pallet registers	
Selecting pallet page mode	AH = 10h AL = 12h BL = 00h BH = Pallet page mode = 00h: 4-pallet page mode = 01h: 16-pallet page mode	
Selecting pallet page	AH = 10h AL = 13h BL = 01h BH = Expansion pallet page No.	
Reading expansion pallet register	AH = 10h AL = 15h BX = Expansion pallet register to read	
Reading block in expansion pallet register	AH = 10h AL = 17h ES:DX = Buffer address of value to read BX = Expansion pallet address No. where to start reading CX = Number of registers to read	Buffer selected in ES:DX
Reading pallet page	AH = 10h AL = 17h	BL = Current pallet page mode = 0: 4-pallet page mode = 1: 16-pallet page mode BH = Current expansion pallet pagemode
Gray scale conversion	AH = 10h AL = 1Bh BX = First expansion pallet register CX = Number of expansion pallet registers to convert	
Font registration		
Font registration of user-defined character	AH = 11h AL = 00h BH = Number of vertical bits in character BL = Character generator bank No. CX = Number of characters to register DX = First character code to register ES:BP = Top address in user-defined table	

Operation	Input	Output
Font registration		
8 x 14 dot font registration (PC character set, inside video BIOS ROM)	AH = 11h AL = 01h BL = Character generator bank No.	
8 x 8 dot font registration (PC character set, inside video BIOS ROM)	AH = 11h AL = 021h BL = Character generator bank No.	
Overwriting character map register	AH = 11h AL = 03h BL = Character map register value	
8 x 16 dot font registration (PC character set, inside video BIOS ROM)	AH = 11h AL = 04h BL = Character generator bank No.	
Font registration of user-defined character (Video controller auto set)	AH = 11h AL = 10h BH = Number of vertical bits in character (Horizontal fixed to 8 bits) BL = Character generator bank No. CX = Number of characters to register DX = First character code to register ES:BP = Top address in user-defined table	
8 x 14 dot font registration (PC character set, inside video BIOS ROM) [Video controller auto set]	AH = 11h AL = 11h BL = Character generator bank No.	
8 x 8 dot font registration (PC character set, inside video BIOS ROM) [Video controller auto set	AH = 11h AL = 12h BL = Character generator bank No.	
8 x 16 dot font registration (PC character set, inside video BIOS ROM) [Video controller auto set	AH = 11h AL = 14h BL = Character generator bank No.	
Font registration (CGA) in 0:7Ch (INT 1Fh)	AH = 11h AL = 20h ES:BP = Top address in font table	
Font registration (CGA) in 0:10Ch (INT 43h)	AH = 11h AL = 21h BL = 0: (Number of lines per DL register value) 1: 14 lines 2: 25 lines 3: 43 lines CX = Number of vertical bits per character DL = Number of screen lines (When BL = 0) ES:BP = Top address in font table	
8 x 14 dot font registration (PC character set, inside video BIOS ROM) [Graphics]	AH = 11h AL = 22h BL = 0: (Number of lines per DL register value) 1: 14 lines 2: 25 lines 3: 43 lines DL = Number of screen lines (When BL = 00h)	

Operation	Input	Output
Font registration		
8 x 8 dot font registration (PC character set, inside video BIOS ROM) [Graphics]	AH = 11h AL = 23h BL = 0: (Number of lines per DL register value) 1: 14 lines 2: 25 lines 3: 43 lines DL = Number of screen lines (When BL = 00h)	
8 x 16 dot font registration (PC character set, inside video BIOS ROM) [Graphics]	AH = 11h AL = 24h BL = 0: (Number of lines per DL register value) 1: 14 lines 2: 25 lines 3: 43 lines DL = Number of screen lines (When BL = 00h)	
Reading font table data	AH = 11h AL = 30h BL = 0: Return INT 1Fh (CGA font) entry address with ES:BP register. 1: Return INT 43h entry address with ES:BP register. 2: Return 8 x 14 font address with ES:BP register. 3: Return 8 x 8 font address with ES:BP register. 4: Return 8 x 8 font (80h) address with ES:BP register. 5: Reserved	CX = Number of vertical bits per DL = character ES:BP Number of lines per screen - 1 = Address of data specified in BH
Performance selection		
Reading video mode data (Color/B/W mode)	AH = 12h BL = 10h	BH = 0: Color mode 1: B/W mode (MDA mode) BL = Video RAM memory size CH = Reserved CL = DIP switch setting
Selecting video BIOS print-screen	AH = 12h BL = 10h	
Selecting vertical resolution	AH = 12h BL = 30h AL = Selected vertical resolution = 00h: 200 display lines = 01h: 350 display lines = 02h: 400 display lines	AL = 12h Successfully executed
Default pallet load enable/disable	AH = 12h BL = 31h AL = Load selection 0: Default pallet loading enabled 1: Default pallet loading disabled	AL = 12h Successfully executed
Video enable/disable	AH = 12h BL = 32h AL = 0: Video enabled 1: Video disabled	AL = 12h Successfully executed
Gray scale enable/disable	AH = 12h BL = 33h AL = 0: Gray scale enabled 1: Gray scale disabled	AL = 12h Successfully executed

Operation		Input	Output
Performance selection			
	Cursor emulator enable/disable	AH = 12h BL = 34h AL = Selection 0: Cursor emulator enabled 1: Cursor emulator disabled	AL = 12h : Successfully executed
	Screen ON/OFF	AH = 12h BL = 6h AL = 0: Screen ON 1: Screen OFF	AL = 12h : Successfully executed
Character string output to screen			
	Character output without cursor movement	AH = 13h AL = 00h BH = Page No. BL = Attribute CX = Length DH = Starting line position of first character in character string DL = Starting column position of first character in character string ES:BP = Top address in character string	
	Character output with cursor movement	AH = 13h AL = 01h BH = Page No. BL = Attribute CX = Number of characters DH = Starting line position of first character in character string DL = Starting column position of first character in character string ES:BP = Top address in character string	
	Character output and attribute selection without cursor movement	AH = 13h AL = 02h BH = Page No. CX = Number of characters DH = Starting line position of first character in character string DL = Starting column position of first character in character string ES:BP = Top address in character string	
	Character output and attribute selection with cursor movement	AH = 13h AL = 03h BH = Page No. CX = Number of characters DH = Starting line position of first character in character string DL = Starting column position of first character in character string ES:BP = Top address in character string	
Display combination code			
	Reading display combination code	AH = 1Ah AL = 00h	AL = 1Ah : Successfully executed BL = Active-display code BH = Nonactive-display code
	Writing display combination code	AH = 1Ah AL = 01h BL = Active-display code BH = Nonactive-display code	AL = 1Ah : Successfully executed
Status information		AH = 1Bh BX = Implementation type ES:DI = Return information buffer	AL = 1Bh : Successfully executed

Operation	Input	Output
Video status save & restore		
Reading buffer size	AH = 1Ch AL = 00H CX = Request status Bit 0: Video hardware status Bit 1: Video BIOS data area Bit 2: Expansion pallet register save / restore	AL = 1Ch : Successfully executed BX = Buffer size in 64-byte units
Status save	AH = 1Ch AL = 01h CX = Request status Bit 0: Video hardware status Bit 1: Video BIOS data area Bit 2:Expansion pallet register save/ restore ES:BX = Address of data save area	AL = 1Ch : Successfully executed
Status save as	AH = 1Ch AL = 02h CX = Request status Bit 0: Video hardware status Bit 1: Video BIOS data area ES:BX = Bit 2: Expansion pallet register ssave / restore	

■ INT 11h Reading System Data

Operation	Input	Output
Reading system data		AX = System configuration data AX bit Bits 15 & 14 : Number of printer ports Bits 11, 10 & 9 : Number of RS-232C ports Bits 7 & 6 : Number of internal FDDs 0, 0 : 1 0, 1 : 2 Bits 5 & 4 : Screen mode 0, 1 : 40 x 25 line mode 1, 0 : 80 x 25 line mode Bit 1 : 80287 CPU yes/no 0 : No 1 : Yes Bits 13, 12, 8, 3, 2 & 0 : Reserved

■ INT 12h Reading Memory Size

Operation	Input	Output
Reading memory size		AX =Memory size in 1 K units

■ INT 13 Disk BIOS

<table>
<tr><th>Operation</th><th>Input</th><th>Output</th></tr>
<tr><td>Disk reset</td><td>AH = 00h
DL = Drive No.
(FDD:00h-01h;HDD:80h-81h)</td><td>CY = 0 : Successfully completed
= 1 : Error
AH = Status
Fbppy disk status table
<table><tr><th>Status</th><th>Description</th></tr><tr><td>00h:</td><td>Successfully completed</td></tr><tr><td>01h:</td><td>Wrong command sent</td></tr><tr><td>02h:</td><td>Cannot find address mark</td></tr><tr><td>03h:</td><td>Attempted writing on protected disk</td></tr><tr><td>04h:</td><td>Cannot find requested sector.</td></tr><tr><td>06h:</td><td>Disk was changed.</td></tr><tr><td>08h:</td><td>DMA overrun</td></tr><tr><td>10h:</td><td>CRC error during diskette reading</td></tr><tr><td>20h:</td><td>Crashed FDC</td></tr><tr><td>40h:</td><td>Crashed during seek operation</td></tr><tr><td>80h:</td><td>Timer overflowed</td></tr></table>
Hard disk status table
<table><tr><th>Status</th><th>Description</th></tr><tr><td>00h:</td><td>Successfully completed</td></tr><tr><td>01h:</td><td>Wrong command sent</td></tr><tr><td>02h:</td><td>Cannot find address mark</td></tr><tr><td>04h:</td><td>Cannot find requested sector.</td></tr><tr><td>07h:</td><td>Drive parameter error</td></tr><tr><td>08h:</td><td>DMA overrun</td></tr><tr><td>10h:</td><td>Error during reading</td></tr><tr><td>20h:</td><td>Crashed HDC</td></tr><tr><td>40h:</td><td>Crashed during seek operation</td></tr><tr><td>80h:</td><td>Timer overflowed</td></tr><tr><td>BBh</td><td>Undefined error</td></tr></table></td></tr>
<tr><td>Reading disk drive data</td><td>AH = 01h
DL = Drive No.
(FDD:00h-01h;HDD:80h-81h)</td><td>AH = Disk Drive Status</td></tr>
<tr><td>Reading seactor</td><td>AH = 02h
AL = Number of sectors

WithFDD
CH = Track No.
CL = Sector No.
WithHDD
CH = Cylinder No.
CL = Insignificant 8 bits Sector No.(Bits 0 - 6)
= Cylinder No. Significant 2 bits (Bits 7 - 8)
DH = Head No.
DL = Drive No. (FDD : 00h - 01h, HDD : 80h - 81h)
ES BX = Buffer address</td><td>CY = 0 : Successfully completed
= 1 : Error
AH = Status</td></tr>
</table>

Operation	Input	Output
Writing sector	AH = 03h AL = Number of sectors **With FDD** CH = Track No. CL = Sector No. **With HDD** CH = Cylinder No. Insignificant 8 bits CL = Sector No. (Bits 0 - 5) = Cylinder No. Significant 2 bits (Bits 6-7) DH = Head No. DL = Drive No. (FDD: 00h - 01h, HDD: 80h - 81h) ES:BX = Buffer address	CY = 0: Successfully completed = 1: Error AH = Status
Sector content check	AH = 04h AL = Number of sectors **With FDD** Track No. CH = Sector No. CL = Cylinder No. Insignificant 8 bits **With HDD** Sector No. (Bits 0 - 5) CH = Cylinder No. Significant 2 bits (Bits 6-7) CL = Head No. = Drive No. (FDD: 00h - 01h, DH = HDD: 80h - 81h) DL =	CY = 0: Successfully completed = 1: Error AH = Status
Track/Cylinder format	AH = 05h AL = Track/Cylinder No. Insignificant 8 bits CL = Track/Cylinder No. Significant 2 bits DH = Head No. DL = Drive No. ES:BX = Top address in format data table	CY = 0: Successfully completed = 1: Error AH = Status
Reading drive parameters	AH = 08h DL = Drive No. (FDD: 00h - 01h, HDD: 80h - 81h)	CY = 0: Successfully completed = 1: Error AH = Status When FDD drive No. specified in DL ES:DI = Drive parameter starting address CH = Insignificant 8 bits in 10 bit value for max. number of tracks CL = Bits 7 & 6: Insignificant 2 bits in 10 bit value for max. number of tracks Bits 5 - 0: Max. number of sectors per track DH = Max. number of heads DL = Number of built-in floppy disk drives BL = Bits 3 - 0: CMOS valid drive type value Bits 7 - 4: Fixed to 0 When HDD drive No. specified in DL CH = Max. number of cylinders CL = Max. number of usable sectors and Significant bit in max. number of cylinders DH = Max. number of usable heads DL = Number of built-in hard disk drives

Operation	Input	Output
Hard disk drive parameter initialization	AH = 09h DL = Drive No.	CY = 0: Successfully completed = 1: Error AH = Status
Hard disk seek	AH = 0Ch CH = Insignificant 8 bits in cylinder No. CL = Significant 2 bits in cylinder No. DL = Drive No. DH = Head No.	CY = 0: Successfully completed = 1: Error AH = Status
Hard disk drive reset	AH = 0Dh DL = Drive No.	CY = 0: Successfully completed = 1: Error AH = Status
Hard disk drive ready check	AH = 10h DL = Drive No.	CY = 0: Successfully completed = 1: Error AH = Status
Hard disk drive recalibration	AH = 11h DL = Drive No.	CY = 0: Successfully completed = 1: Error AH = Status
Disk type check	AH = 15h DL = Drive No.	CY = 0: Successfully completed = 1: Error CX:DX = Total number of sectors (HDD only) AH = 00h: No disk = 01h: Floppy disk unchanged = 02h: Disk was changed = 03h: Hard disk
Media change check	AH = 16h DL = Drive No.	AH = 00h: Disk unchanged = 01h: Inconsistent parameter = 06h: Disk was changed (Carry bit ON) = 80h: Drive not ready
Setting drive type for formatting	AH = 17h DL = Drive No. AL = 0: No disk 1: Use 2-sided disk on 2-sided drive. 2: Use 2-sided disk on high-density drive. 3: Use 2HD disk on high-density drive. 4: Use 720K disk on 720K-byte drive.	CY = 0: Successfully completed = 1: Error AH = Status
Setting media type for formatting	AH = 18h CH = Insignificant 8 bits in 10 bit value for max. number of tracks CL = Bits 7 & 6: 10 bit value for max. number of tracks Bits 5 - 0: Max. number of sectors per track DL = Drive No.	ES:DI = Address of drive parameter table for floppy disk type AH = 00h and CY =0: Supports tracks and number of tracks per sector. AH = 01h and CY =1: Cannot use function. AH = 00h and CY =1: Does not support tracks and number of tracks per sector.

■ INT 14h RS-232C

Operation	Input	Output
Setting RS-232C line mode	AH = 00h AL = Line mode/Parameter Bits 7, 6, 5: Baud rate 0, 0, 0: 110 Baud 0, 0, 1: 150 Baud 0, 1, 0: 300 Baud 0, 1, 1: 600 Baud 1, 0, 0: 1200 Baud 1, 0, 1: 2400 Baud 1, 1, 0: 4800 Baud 1, 1, 1: 9600 Baud Bits 4&3: Parity X, 0: No parity 0, 1: Odd parity 1, 2: Even parity Bit 2: Stop bits 0: 1 bit length 1: 2 bit length Bits 1&0: Word length 1, 0: 7 bits 1, 1: 8 bits DX = Port No.	
Sending 1-byte data	AH = 01h AL = Data to send DX = Port No.	AH = Line control status Bit 7: Time over error Bit 6: Transmission shift register empty Bit 5: Transmission hold register empty Bit 4: Break detected Bit 3: Framing error Bit 2: Parity error Bit 1: Overrun Bit 0: Data ready
Receiving 1-byte data	AH = 02h DX = Port No.	AL = Received data AH = Line control status
Reading communication port status	AH = 03h DX = Port No.	AL = Line control status AL = Modem status Bit 7: Carry detected Bit 6: Call signal received Bit 5: Data-set ready Bit 4: Transmission enabled (CTS) Bit 3 - 0: Not in use

■ INT 15h Other System Services

Operation	Input	Output
Wait time check	AH = 83h AL = 00h: Interval timer start 01h: Interval timer stop ES:BX = End flag address CX:DX = Wait time in 1 µsec units	CY = 0: Successfully completed = 1: Error

<table>
<tr><th>Operation</th><th>Input</th><th>Output</th></tr>
<tr><td colspan="3">Joystick</td></tr>
<tr><td>Reading button status</td><td>AH = 84h
DX = 00h</td><td>AL = Button status
00h: Pressed
01h: Not pressed
Bit 7: 2nd button status on 2nd joystick
Bit 6: 1st button status on 2nd joystick
Bit 5: 2nd button status on 1st joystick
Bit 4: 1st button status on 1st joystick</td></tr>
<tr><td>Reading resistance value</td><td>AH = 84h
DX = 01h</td><td>AX = Resistance value of horizontal coordinate of 1st joystick
BX = Resistance value of vertical coordinate of 1st joystick
CX = Resistance value of horizontal coordinate of 2nd joystick
DX = Resistance value of vertical coordinate of 2nd joystick</td></tr>
<tr><td>Wait timer overwait</td><td>AH = 86h
CX:DX = Wait time in µsec units</td><td>CY = 0: Successfully completed
= 1: Already triggered or not supported</td></tr>
<tr><td>Transmitting memory block in protect mode</td><td>AH = 87h
ES:SI = Top address in descriptor
ES:SI =
Dummy (00h)
GDT(00h)
Source segment descriptor
Destination segment descriptor
BIOS C5 (00h)
SS (00h)
CX = Number of words to transfer</td><td>ZF = 1: Successfully completed
CY = 1: Error
AH = 00h: Successfully completed
= 01h: RAM parity error
= 02h: Not in protect mode</td></tr>
<tr><td>Starting protect mode</td><td>AH = 89h
BH = Offset of insignificant (mask) interrupt vector address
BL = Offset of significant (slave) interrupt vector address
ES:SI = Top address in following table
CS dummy (00h)
GDT
IDT
DS
ES
SS
CS
TEMP BIOS (00h)</td><td>CY = 0: Successfully completed
AH = 00h
CS = CS value specified in ES:SI table
DS = DS value specified in ES:SI table
ES = ES value specified in ES:SI table
SS = DS value specified in ES:SI table
CY = 1: Error
AH = FFh</td></tr>
</table>

■ INT 16h Keyboard BIOS

Operation	Input	Output
Reading data by key input	AH = 00h	AH = Secondary code AL = Primary code (Character code)
Data check by key input	AH = 01h	ZF = 0: Input data exists. = 1: Input data does not exist. AH = Secondary code AL = Primary code (Character code)
Reading shift status	AH = 02h	AL = Shift status
Setting repeat delay and repeat rate	AH = 03h AL = 05h BH = Delay time (Bits 0 &1) BL = Primary code (Bits 0 - 4)	
Writing key data	AH = 05h CH = Secondary code CL = Primary code	AL = 00h: Successfully completed = 01h: No available space in buffer (CY =1)
Wiring data by key input (101/AXkeyboard compatible)	AH = 10h	AH = Secondary code AL = Primary code (Character code)
Data check by key input (101/AXkeyboard compatible)	AH = 11h	ZF = 0: Input data exists. = 1: Input data does not exist. AH = Secondary code AL = Primary code (Character code)
Reading shift status (101/AXkeyboard compatible)	AH = 12h	AL = Shift status 1 AH = Shift status 2

■ INT 17h Printer BIOS

Operation	Input	Output
1-character output	AH = 00h AL = Character code of character to DX = output Device No.	AH = Printer status
Printer initialization	AH = 01h DX = Device No.	AH = Printer status
Status check	AH = 02h DX = Device No.	AH = Printer status

■ INT 1Ah Setting/Reading Time and Date

Operation	Input	Output
Reading clock	AH = 01h	CX = Significant 16 bits of current clock data DX = Insignificant 16 bits of current clock data AL = Overflow flag on 24-hour system
Setting clock	AH = 01h CX = Significant 16 bits of clock data DX = Insignificant 16 bits of clock data	
Reading time	AH = 02h	CH = Hours (BCD) CL = Minutes (BCD) DH = Seconds (BCD) DL = Summertime option (0 or 1) CY = End status 0: Successfully completed 1: Error
Setting time	AH = 03h CH = Hours (BCD) CL = Minutes (BCD) DH = Seconds (BCD) DL = Summertime option (0 or 1)	
Reading date	AH = 04h	CH = Western calendar (Year given as 2-digit BCD, significant 2 bits: 19 or 20) CL = Year (BCD) DH = Month (BCD) DL = Day (BCD) CY = End status 0: Successfully completed 1: Error
Setting date	AH = 05h CH = Western calendar (Year given as 2-digit BCD, significant 2 bits: 19 or 20) CL = Year (BCD) DH = Month (BCD) DL = Day (BCD)	
Setting alarm	AH = 06h CH = Hours (BCD) CL = Minutes (BCD) DH = Seconds (BCD)	CY = End status 0: Successfully completed 1: Error
Clearing alarm	AH = 07h	

■ INT 1Ah Setting/Reading Time and Date

Operation	Input	Output
Display ON/OFF (Including backlight)	AX=0800h BL=0:OFF 1:ON	AH=0: Successfully Completed 1: Error

Chapter 9 System Monitoring

9.1 RAS Feature

9.1.1 Using the RAS Feature

RAS stands for Reliability, Availability and Serviceability and is a device-level monitoring function that provides a variety of features to improve the reliability of your PL system.

Though the standard set of RAS features used will vary depending on the devices used, the following features are used to provide Alarm Monitoring and External Input Signal support.

Alarm Monitoring	Power Voltage Alarm Internal Temperature Alarm Watchdog Timer Time Up Backlight Burnout Detection Touch Panel Alarm SMART Alarm
External Input Signal	Standard Signal Input (DIN 2 bit) Remote Reset Input*1

Also, when either the one of the above mentioned alarms occurs, or an external signal input is received, the following types of alarm processing output signals and features are supported.

External Output Signal	Standard Signal Output (DOUT 1 bit) Alarm Output (1 point) Lamp Output (1 point)
Types of Processing (all units)	LED Indicator (3-state display – 1 point) Pop-up Message Output Buzzer Output System Shutdown System Reset

Furthermore, using the PL unit's System Monitor feature (included in the software utility disk), allows the easy setting and control (Enable/Disable) of the previously mentioned Alarm Monitor and External Input Signals.

Last, the system monitor feature's use of an Application Link Library (API-DLL) allows it to also be used with other applications.

**1 The remote reset feature's input can be either enabled or disabled, the alarm output setting cannot be set to trigger a forced system reset.*

9.1.2 RAS Feature Details

■ Alarm Monitoring

◆Power Voltage Alarm

Monitors the condition of the PL unit's internal and CPU power.

◆Cooling Fan Alarm

Monitors the condition of the PL unit's internal power and CPU cooling fans.

◆Internal Temperature Alarm

Monitors the PL unit's internal and CPU vicinity temperatures.

The degree of monitoring (3 levels) and the enabling or disabling of the above three items is performed via the System Setup Area's settings.

For detailed information about the monitoring level settings,

Reference *5.2.12 PC Health Status*

This utility can also be used to enable or disable the above mentioned features, as well as designate what type of processing is to be performed.

◆Watchdog Timer Time Up

This feature alternately writes Time Up Count values from the CPU to the RAS feature's special programmable timer and then periodically clears them, which provides a means of monitoring CPU performance. If the clearing of this count value is stopped, the timer will overflow and an alarm will be detected. The System Monitor utility can be used to enable or disable this feature, as well as designate what type of processing is performed.

◆Touch Panel Alarm

This feature detects a Touch Panel alarm. When this alarm occurs, the PL unit's front panel LED indicator will blink.

◆Backlight Burnout Detection

This feature allows you to detect when the PL unit's backlight burns out.

When this feature is enabled and a backlight burnout occurs, touch operation will be disabled and PL unit's front panel LED indicator will blink red and orange. The factory setting is "Enabled" and is recommended to prevent accidental touch panel operation. This setting is controlled via the MS-DOS utility BLSET.EXE. For details,

Reference *8.1.5 Backlight Burnout Detection Feature (BLSET.EXE)*

◆SMART Alarm

Monitors the status of the hard disk. Detects a warning of trouble of the hard disk.

Important

- ***Administrator Authentication is required for executing SMART Monitoring.***
- ***In order to execute a SMART monitoring, the OS needs to be WindowsNT®4.0, or Windows® 2000.***

- ***A CF card doesn't support SMART and therefore the status of the CF card cannot be monitored.***
- ***When a hard disk except options made by Pro-face is used, operation of SMART Monitoring cannot be guaranteed.***

  The hard disks as shown in the table below are supported.

Model No.	Software Rev.
PL-HD5910-WNT-BLD	Rev.A or later
PL-HD5910-2WK-BLD	

- ***The SMART Monitor can be performed for the hard disk connected to the IDE only. The state of the hard disk connected via a USB or a SCSI cannot be monitored.***
- ***In order to execute a SMART monitoring, the BIOS needs to set up. [Advanced BIOS Features] - [HDD S.M.A.R.T Capability] - [Enabled]***

■ External Input Signal

The PL unit's RAS interface connector uses the following input signals.

Standard Signal Input (DIN)

This standard digital input is used for alarm detection in external devices. The input signal uses two bits.

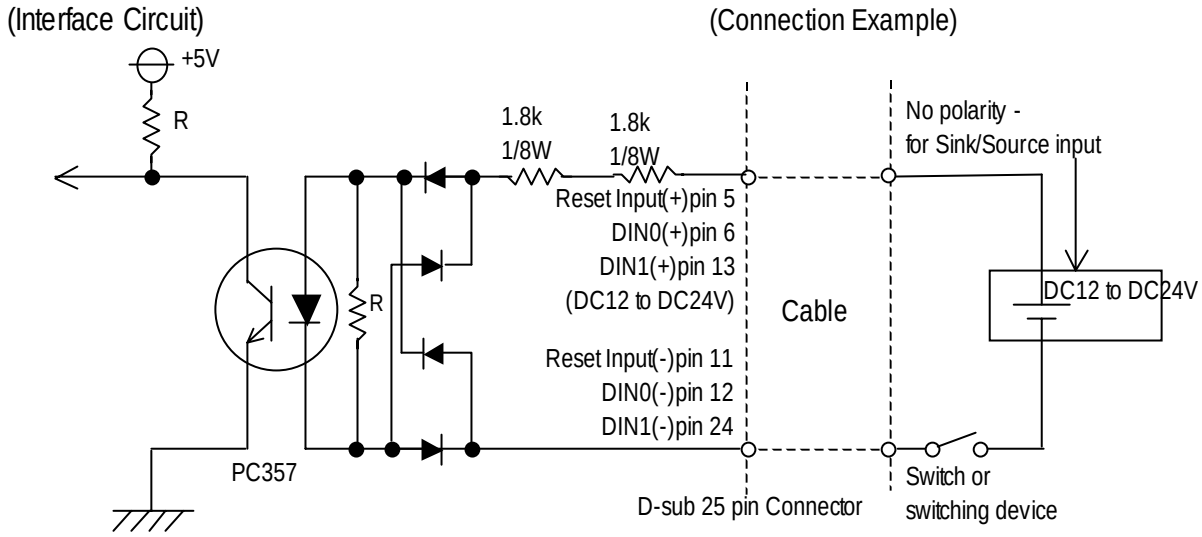
The System Monitor utility can be used to enable or disable this feature, as well as designate what type of processing is to be performed once a signal is received.

Remote Reset Input

This is the reset signal sent from an external device to the PL. When this signal is enabled, a forced reset of the PL is performed.

The System Monitor utility can be used to enable or disable this feature

Input Voltage	DC12V to DC24V
Input Current	7mA
Operating Current	ON Voltage: 9V (min.), OFF Voltage: 3V (max.)
Insulation Method	Via Photocoupler



Important

- ***General Purpose Input (DIN) level must be 1.5S or longer to be detected.***
- ***Be sure the voltage value between terminals is controlled via the input voltage, so that the PL is operated within its recommended range. If the input voltage exceeds this range, a malfunction or PL damage may occur.***
- ***With Sink/Source input, even if the D(-), and RESET(-) are positive, and D(+), RESET(+) are negative, no problems are created. Be sure to operate the unit within the recommended voltage range.***

Note:

For detailed connector wiring information,
Reference 2.3.5 RAS Interface

■ External Output Signal

The PL unit's RAS interface connector uses the following output signals.

◆ General Purpose Signal Output (DOUT)

This general purpose digital output signal provides system condition information to external devices.

The System Monitor's API-DLL are used by applications to control this signal.

◆ Alarm Output (1 point)

◆ Lamp Output (1 point)

The above mentioned general purpose digital output signals provide system condition information to external devices.

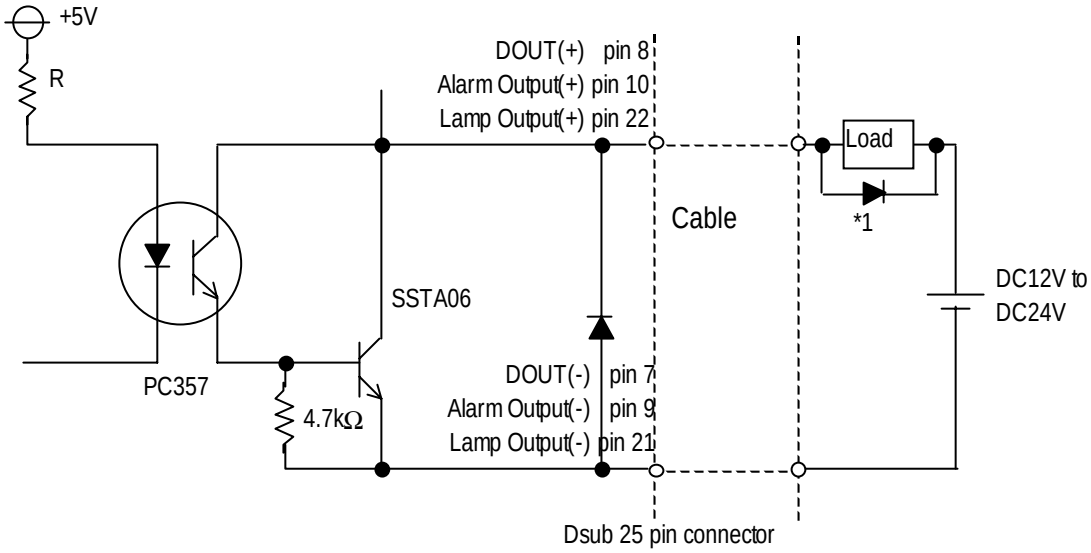
The System Monitor utility can be used to enable or disable any of these output signals.

Also, when Alarm Output is enabled, the indicator is always lit orange.

Rated Load Voltage	DC12V to DC24V
Maximum Load Current	100mA/point
Maximum Voltage Drop between Terminals	1.5V (at 100mA load current)
Isolation Method	Via photocoupler

(Interface Ciruit)

Connection Example



- ***Be sure to operate the unit within its maximum load current. If the maximum load current exceeds this range, a malfunction or PL damage may occur.***
- ***Design your electrical system by adding the load current and voltage values to the terminal voltage. If load current value used is large, a maximum voltage of 1.5V will exist between the terminals.***
- ***When connecting an induction load, be sure to connect the above drawing's protection diode(*1).***

For connection pin location details,

Reference *2.3.5 RAS Interface*

■ Types of Processing (all units)

The PL provides system condition information via the following methods.

LED Indicator (3-state display – 1 point)

In addition to indicating if the unit's power is ON or OFF, the 3-state LED indicator (power lamp) provides the following system condition information.

Color	Indicates	Output Created
Green	Normal Operation (Power ON)	None
Orange	RAS alarm	System Monitor enables the alarm output setting.
	Touch Panel alarm	None
Flashing Orange/Red	Backlight Alarm	None

Pop-up Message Output

This feature uses the Windows® system's pop-up message feature to indicate that an alarm has occurred.

Buzzer Output

This feature uses the PL unit's internal speaker to indicate the system's condition.

System Shutdown

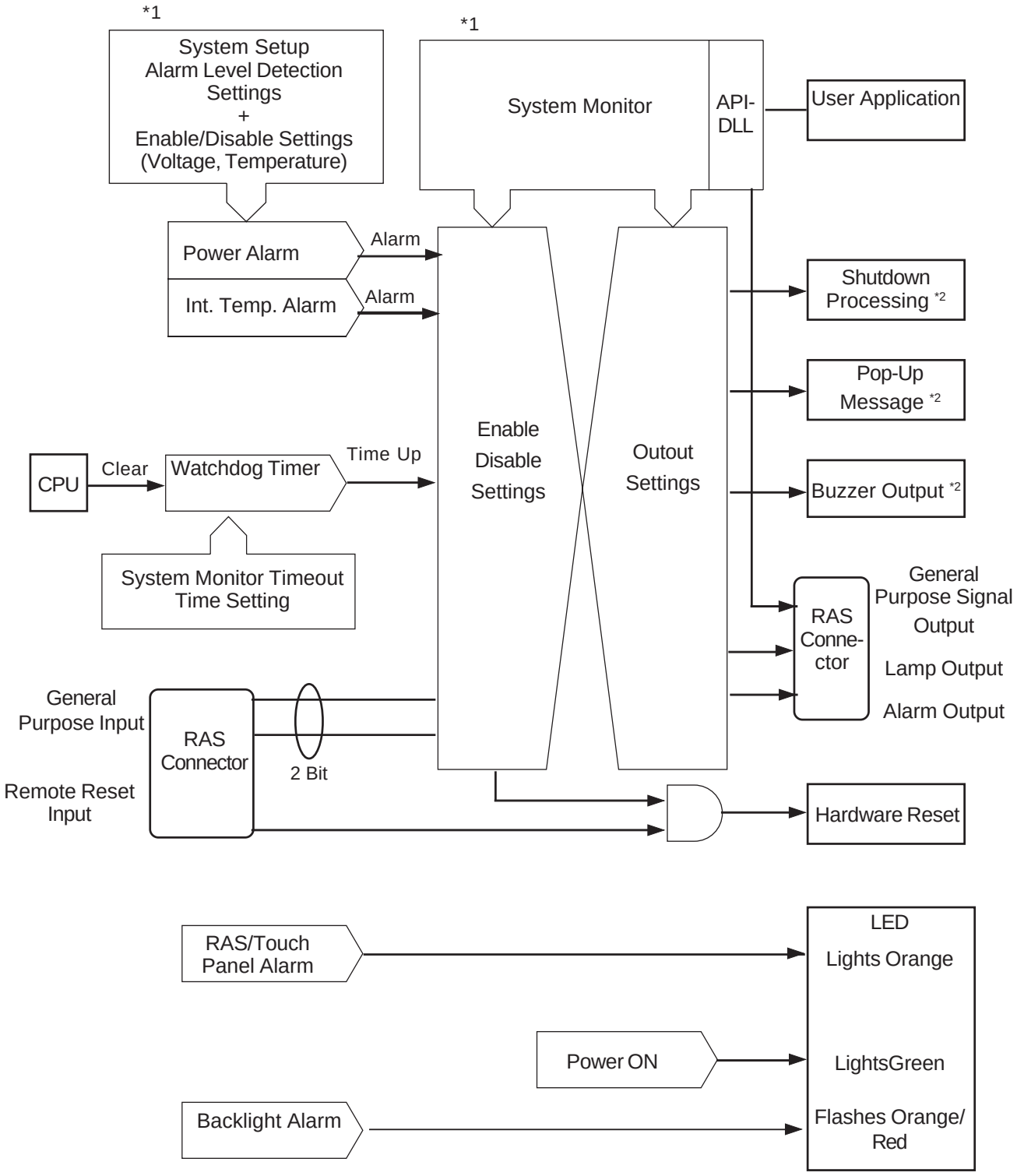
This feature shuts down the PL unit's OS (Windows® 95/ Windows® 98 Second Edition). The System Monitor utility can be used to enable or disable this feature.

System Reset

This feature resets the system once the Watchdog Timer has reached Time Up.

The System Monitor is used to enable/disable the reset feature.

9.1.3 RAS Feature Overview



**1 Set these according to the specifications of your system.*

Reference *9.2 System Monitor*

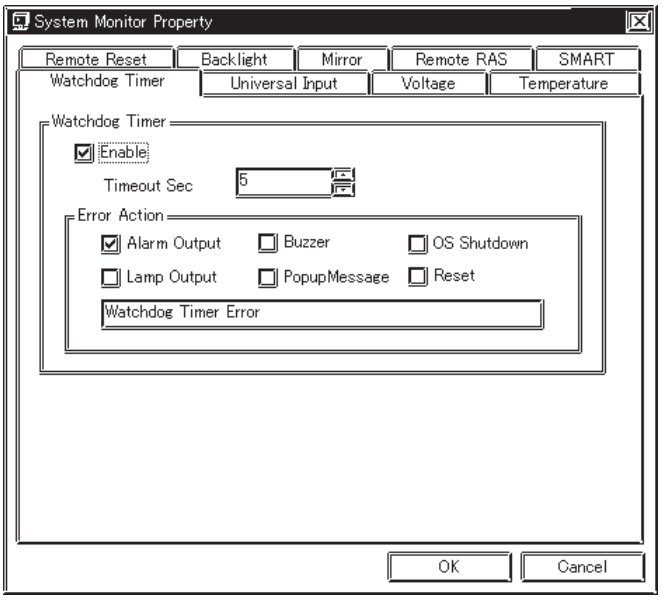
**2 Output via the RAS feature.*

9.2 System Monitor

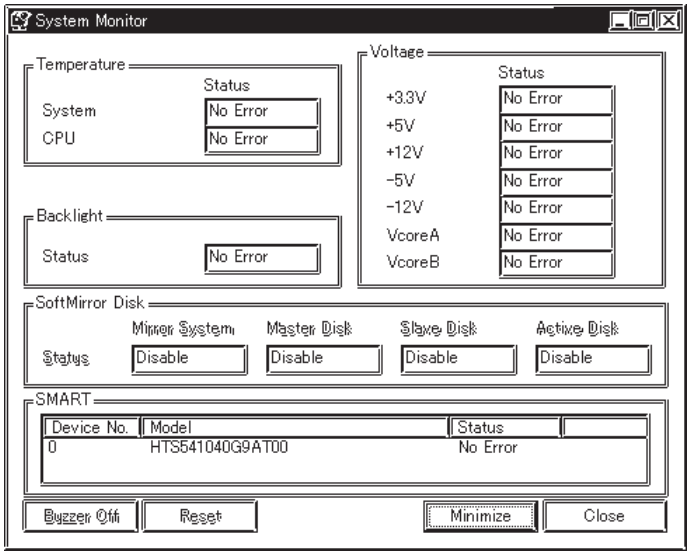
9.2.1 Setup

Follow the steps shown here to complete the System Monitor/RAS setup.

■ System Monitor Property Settings



1) Start the PL unit's OS and click on the [Start] -> [Program] ->[System Monitor]->[System Monitor Property] screen. In this screen enter the System Monitor/ RAS Event settings for each feature/tab. Click on the [OK] button and the program will automatically close.



2) Restart the [System Monitor] utility, click on the [System Monitor] button and you can begin to monitor PL activity.

Note:

- **Administrator Authentication is required for executing SMART Monitoring. When a user who does not have the administrator authentication logs in, nothing is displayed in the item of**
- **In order to execute a SMART monitoring, the OS needs to be WindowsNT®4.0, or Windows® 2000.**
- **In order to execute a SMART monitoring, the BIOS needs to set up. [Advanced BIOS Features] - [HDD S.M.A.R.T Capability] - [Enabled]**

9.2.2 System Monitor Property Settings (PL_Wps.exe)

The following chart shows the features available when any of the monitoring value ranges set in the [PC Health Status] menu is exceeded.

O: Can be set X: Cannot be set

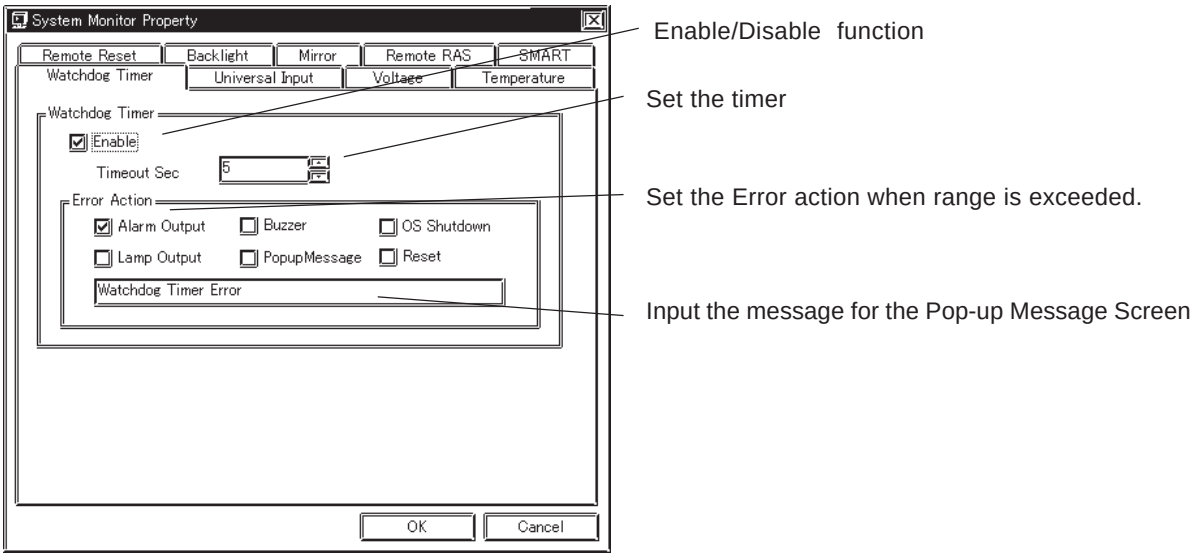
	Enable	Alarm Output	Lamp Output	Buzzer	Popup Message	OS Shutdown	OS Restart*1	Time Out
Watchdog Timer	O	O	O	O	O	O	O	O
Voltage	O	O	O	O	O	O	X	X
Temperature	O	O	O	O	O	O	X	X
UniversalIn0	O	O	O	O	O	O	X	X
UniversalIn1	O	O	O	O	O	O	X	X
Backlight	O	O	O	O	O	X	X	X
Remote Reset	O	X	X	X	X	X	X	X
SMART	O	O	O	O	O	X	X	X

**1 When setting Enable on Remote Reset, the same action as the Reset occurs. Performing reset without first shutting down the PL unit's OS may destroy the PL unit's file data system.*

Each of the above items performs the following operation.

Item	Operation
Alarm Output	RAS Interface Alarm Output (#9 to #10) signal is output. Power LED turns orange.
Lamp Output	RAS Interface Alarm Output (#21 to #22) signal is output.
Buzzer	Buzzer sound is output as an alarm notification. (except for when the OS Shutdown feature is checked)
Popup Message	Error message appears as a Pop-Up Message Screen (on the PL unit's screen)
OS Shutdown	Shuts down the PL unit's OS. This can be set to either display a shutdown confirmation message, or perform a forced OS shutdown.Default is display a shutdown confirmation message.
Reset	Resets the PL unit by performing a forced shutdown.
Enable	Allows setting of monitoring items.

The System Monitor Property Screen is as follows.



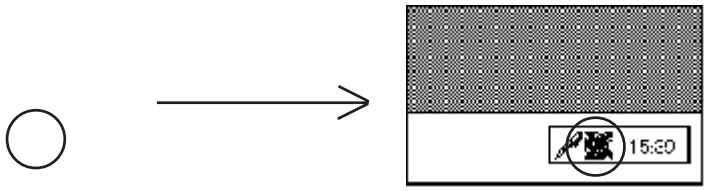
Use the PL unit's BIOS screen to enable/disable Watchdog Timer features or to set the Timer.

9.2.3 System Monitor Operation (PL-Smon.exe)

As soon as the PL unit's OS starts up, instead of showing the System Monitor Dialog box, the Alarm Monitoring icon appears in the System Tray. (see below)

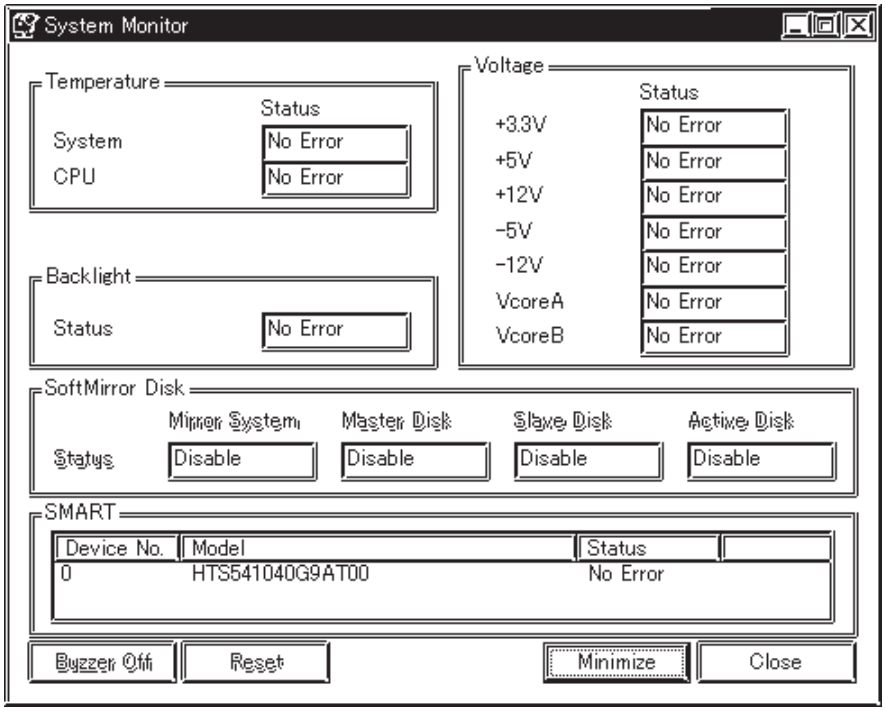
Usually, when a System Monitor dialog box appears, the user checks the current condition and then left-clicks the mouse on the system tray icon to call up the System Monitor screen.

When an alarm is detected, the actions set in the System Monitor Property screen are performed, and an "X" appears over the System Tray icon. When this occurs, double-click on the icon to view the alarm contents.



Start-up Icon **Alarm condition Icon**

The System Monitor screen is as shown below.



System Monitor Screen

In addition to the "Buzzer Off", "Reset", "Minimize", and "Close" buttons, the System Monitor screen contains the following features.

Button Name	Meaning
Buzzer Off	Stops the Alarm buzzer.
Reset	Resets alarm operation or System Monitor's internal alarm hold condition.
Minimize	Minimizes the System Monitor icon.
Close	Quits the System Monitor software.

Within the System Monitor screen are the words "No Error", "Error", and "Disable". They show the current status of items being monitored, such as Voltage, Temperature, and Backlight.

Status Name	Meaning
No Error	Normal operation
Error	Alarm
Disable	Not monitored

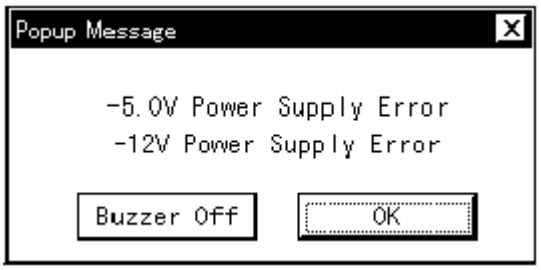
Whenever an alarm occurs for one of the monitored items, or when input (Universal Input) is detected from an external source, The operation designated in the System Monitor Property screen (Error Action) is performed.

Reference *9.2.2 System Monitor Property Settings*

Each error action, once an error or input is detected, is performed only once.

If +3.3V and +5.0V are monitored and a pop-up message is designated for the error action, when the +3.3V alarm is detected, a pop-up message will appear. Click on [OK] and the box is closed. Then, when a +5.0V alarm occurs, the +5.0V pop-up message will appear.

The pop-up message provides information about the type of error and the error contents. When this message box's [Buzzer Off] button is clicked, the buzzer sound will stop. Clicking on [OK] will close the box.



Pop-up Message Box

When “OS Shutdown” has been selected, the shutdown processing begins without the user’s explicit approval. Normally, if the user wishes to display the System Monitor screen and check the current conditions, they simply double-click on the System Tray icon and the screen appears. When an alarm has triggered a buzzer, the normally gray (disabled) “Buzzer Off” button’s display becomes normal (active). When a pop-up message has been triggered, the pop-up message screen will also contain an active “Buzzer Off” button.

Important

Once an alarm has occurred, the System Monitor will continue to remain in the "Alarm" state. (i.e. the alarm detected "X" will continue to be displayed on the System Tray icon.)

To release this condition, click on the System Monitor dialog box's [Reset] button. Or, turn the PL unit's power OFF, find and solve the problem, and turn the PL unit's power ON again.

9.2.4 Error Messages

The following error messages occur via the settings in the System Monitor, and the System Monitor Property dialog boxes.

■ System Monitor

◆ Alarm Pop-up Messages

When the Pop-up messages related to the Error Action are enabled, the following error messages will appear.

Error Type	Message	Solution
CPU Voltage	"VcoreA Power Supply Error"	The PL unit may be damaged. Please contact your local PL distributor.
CPU Voltage 2	"VcoreB Power Supply Error"	
+3.3V	"+3.3V Power Supply Error"	
+5.0V	"+5V Power Supply Error"	
+12V	"+12V Power Supply Error"	
-12V	"-12V Power Supply Error"	
-5V	"-5V Power Supply Error"	
System Temperature	"System Temperature Error"	Check that the operation temperature is within the specified range (0^{o}C to 45^{o}C).
CPU Temperature	"CPU Temperature Error"	
Universal Input 0	"Universal Input 0"	Has universal input signal (DIN).
Universal Input 1	"Universal Input 1"	
Watchdog	"Watch Dog Timer Error"	The watchdog timer has timed out.
Backlight	"Back Light Blowout Error"	Replace the backlight unit. 10.3.2 Replacing the Backlight
SMART	"SMART Error"	Replace the HDD unit.

Driver Error

"The system monitor driver not found."

"Install the latest driver."

Driver Version Error

"The old system monitor driver version."

"Update the driver."

Overlapping Startup message

"System monitor has started. "

"Terminate the system monitor in starting."

Shutdown Confirmation

"The system monitor is terminated."

"Are you sure?"

■ System Monitor Property Screen

◆ Overlapping startup message

"System Monitor Property has started."

"Terminate the system monitor property in starting."

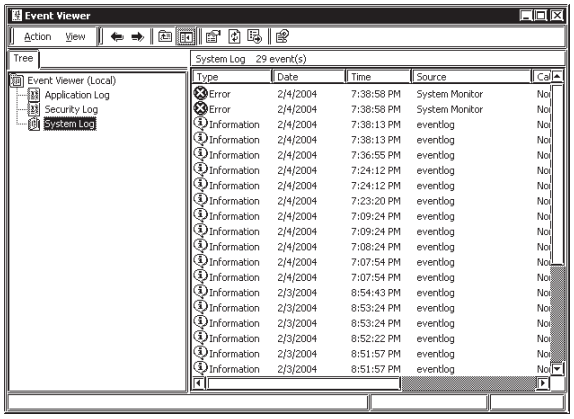
◆ Shutdown Confirmation message

"Save Changes to the registry?"

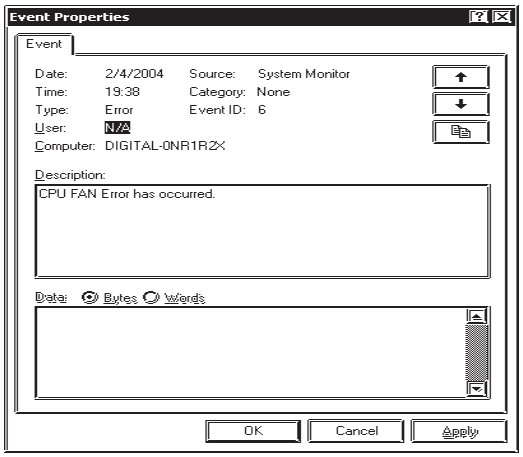
9.2.5 Error Displays When Using Event Viewer

Error type/location and error actions are recorded as error events in the System Log. Error event information can be checked using the Event Viewer.

■ Error Message Display



1) Start the [Control Panel] -> [Administrative Tools] -> [Event Viewer], and select [System Log].



2) Select the System Monitor's error and click the [Properties] icon. When the [Event Properties] dialog box appears, the error message will appear in the [Description] area.

◆ Error Type/Location

The error types/locations shown by the Event Viewer are as follows.

Error Type	Message	Solution
CPU Voltage	"VcoreA Power Supply Error"	The PL unit may be damaged. Please contact your local PL distributor.
CPU Voltage 2	"VcoreB Power Supply Error"	
+3.3V	"+3.3V Power Supply Error"	
+5.0V	"+5V Power Supply Error"	
+12V	"+12V Power Supply Error"	
-12V	"-12V Power Supply Error"	
-5V	"-5V Power Supply Error"	
System Temperature	"System Temperature Error"	Check that the operation temperature is within the specified range (0^{o}C to 45^{o}C).
CPU Temperature	"CPU Temperature Error"	
Universal Input 0	"Universal Input 0"	Has universal input signal (DIN).
Universal Input 1	"Universal Input 1"	
Watchdog	"Watch Dog Timer Error"	The watchdog timer has timed out.
Backlight	"Back Light Blowout Error"	Replace the backlight unit. 10.3.2 Replacing the Backlight
SMART	"SMART Error has occurred. Attribute (No.) (Attribute Name) Device (No.) (HD Model). The descriptions in the parentheses vary depending on details of occurring errors and the device having errors occur (0:Master,1:Slave)."	Replace the HDD unit.

◆ Error Action

Using the Event Viewer the following actions can be taken when an error occurs.

- **The data shown in the table's "□" indicates the error type/location.**
- **The actions to take after an error occurs are set via the System Monitor Property screen.**

Error Action	Error Message
Buzzer	Buzzer has sounded because of oo error.
Popup Message	Popup message has been shown because of □□ error.
OS Shutdown	Window has been shut down because of □□ error.
ALARM	ALARM has output because of □□ error.
LAMP	LAMP has output because of □□ error.

When a "+3.3V" error occurs and the buzzer sounds, two errors will be displayed, "+3.3V Error has occurred." and "Buzzer has sounded because of +3.3V error".

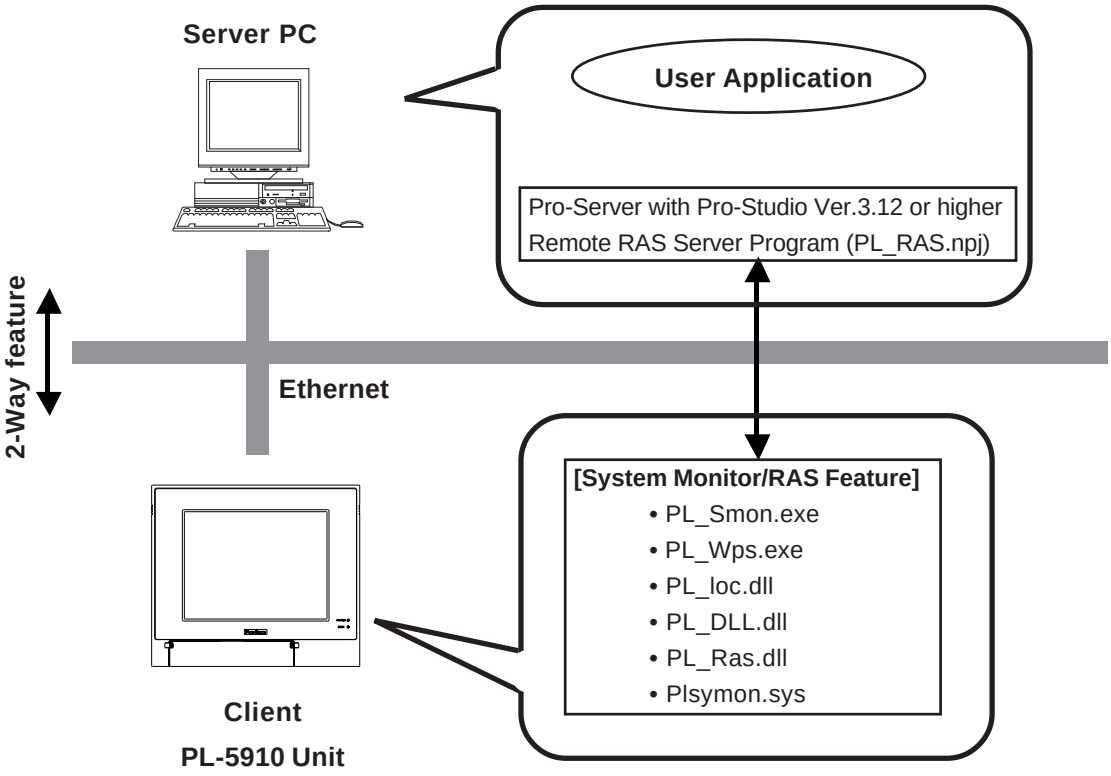
9.3 Remote RAS

The Remote RAS feature uses Pro-face's Pro-Server with Pro-Studio (optional) software. This software is installed in the host PC to monitor and control the PL unit's System Monitor /RAS feature.

Pro-Server with Pro-Studio Ver.3.12 of higher is required to use the Remote RAS feature. When using this feature, refer to Pro-Server's documentation as well as this manual.

9.3.1 System Design

A system using this feature functions as follows.



9.3.2 Installation Procedures

In the server PC, start up the "Setup.exe" file in the [RASSvr] folder on the accessory CD-ROM, and then install the program by following the instructions on the screen.

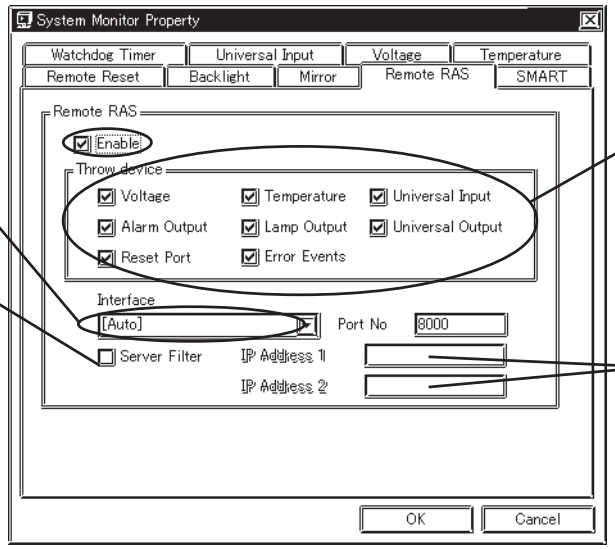
9.3.3 Using the RAS Feature

To monitor the System Monitor/RAS features from the server PC, you need to set up the Remote RAS feature and start up the System Monitor (PL_Smon.exe).

■ Setting Up the Client PL

(1) Select [Start] → [Programs] → [System Monitor] → [System Monitor Property] commands to start the System Monitor Property.

(2) On the [Remote Ras] tab, put a check mark to the [Enable] checkbox.



IP Address used to connect with Pro-Server*1

This feature designates that the PL will communicate only with the server at the specified IP address.

Put check marks on the items you want to monitor.

Specify the IP address of the server you want to communicate with.

The Remote RAS feature is now enabled.

To activate the Remote RAS feature, you are required to start the PL unit's System Monitor (PL_Smon.exe) feature.

■ Setting Up the Server PC

(1) Start up the Pro-Studio.

(2) Register the PL you want to include in the network as a network station, and edit the participating stations.

Reference ***Pro-Server with Pro-Studio for Windows Operation Manual***

Note: **When using Pro-Studio's [Find Stations] command to register a PL as a network node, activate System Monitor via the PL unit's Remote RAS feature.**

(3) Select [PL, PS-B] for the PLC type on the network station editing.

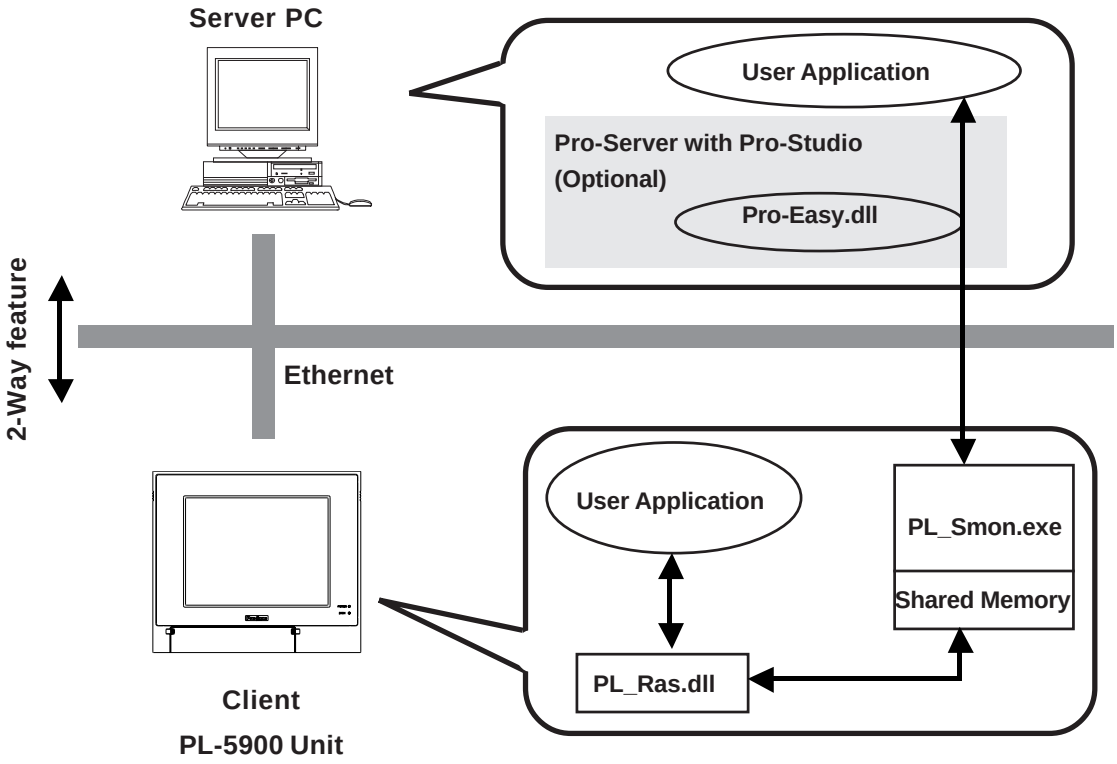
(4) When registering symbols, refer to the Device Address List.

Note: **You are not required to transfer Pro-Studio's network project file to the client PL.**

**1 When allocating 2 or more IP Addresses to the PL unit, [Auto] cannot be selected. Enter settings that allow the reading of a fixed IP Address from a DHCP server. For details, contact your company's network administrator.*

9.3.4 System Monitor/RAS Feature Read/Write

The read/write operation of the operating conditions of the client PL and System Monitor/RAS feature can be performed from the server PC via the Pro-Server.



- The status of the System Monitor/RAS feature is stored in the shared memory for which device address is assigned.

  Reference ■ ***List of Device Addresses /■ Bit Assign of DIN, Error Event, and Error Mask***

- The status of the System Monitor/RAS feature is transferred to the Pro-Server via Ethernet from the PL_Smon.exe. The RAS feature including voltage and temperature can be monitored by monitoring the device addresses assigned from the Pro-Studio.
- The user applications in the server PC monitors the RAS feature through the Pro-Easy.dll program provided from the Pro-Server.
- The client PL shares the data with the user applications on the server PC by using the shared memory. The data transfers on both sides are processed via the PL_Ras.dll and Pro-Easy.dll programs.
- The client PL can be shut down and re-started by writing specific value to the software reset port.

For the details of device Read/Write and access procedures, refer to the "List of Device Addresses" below.

■ Device Address List

Device	Device Type	Device Symbol	Read/ Write	Bit Access	16-bit Access	32-bit Access
CPU Voltage (mV)	WORD	VLT	READ	—	VLT0	—
+3.3V Voltage (mV)	WORD				VLT1	
+5V Voltage (mV)	WORD				VLT2	
+12V Voltage (mV)	WORD				VLT3	
-5V Voltage (mV) *4	WORD				VLT4	
-12V Voltage (mV)	WORD				VLT5	
CPU Voltage2 (mV)	WORD				VLT6	
CPU Temperature (°C)	WORD	TMP			TMP0	
System Temperature (°C)	WORD				TMP1	
DIN	WORD	DIN		DIN00-DIN01	DIN0	
DOUT	WORD	DOUT	Read/ Write	DOUT00	DOUT0	
Error Event	WORD	ERR	Read	ERR00-ERR0E	ERR0	
Internal Memory Area *1	WORD	LS	Read/ Write	LS00000-LS0000F to LS02550-LS0255F	LS0000 to LS0255	LS0000 to LS0254
Shared Memory	WORD	PL		PL00000-PL0000F to PL02550-PL0255F	PL0000 to PL0255	PL0000 to PLS0254
Software Reset Port *2	WORD	RST		—	RST0	—
Error Mask *3	WORD	ERRM	Read	ERRM00-ERRM0E	ERRM0	—

1. *Used for the system to read/write the data and perform monitoring operation.*

2. *Shuts down and restarts the operation system on the client PL.*

3. *Indicates the error event that is being monitored by the PL.*

4. *-5V Voltage is ffff(hex), 65535 (decimal).*

When "Forced Shutdown" or "Forced Reboot" is written to the device address, the system automatically shuts down/restarts the operation system without prompting the confirmation for saving the data on current applications.
Be careful during data writes to avoid accidental data loss.

Write Value		Operation
Decimal	Hexadecimal	
1	0001	Shutdown
2	0002	Reboot
257	0101	Forced Shutdown
258	0102	Forced Reboot

■ DIN, Error Event, and Error Mask Bit Assignments

Device Name	Item	Bit
DIN	DIN0	DIN00
	DIN1	DIN01
	DIN2	DIN02
	DIN3	DIN03
Error Event	CPU Voltage Error	ERR00
	+3.3 V Voltage Error	ERR01
	+5 V Voltage Error	ERR02
	+12 V Voltage Error	ERR03
	-5 V Voltage Error	ERR04
	-12 V Voltage Error	ERR05
	CPU Voltage2 Error	ERR06
	CPU Temperature Error	ERR07
	System Temperature Error	ERR08
	Watchdog Timer Error	ERR09
	SMART Error	ERR0C
Error Mask	CPU Voltage Error	ERRM00
	+3.3 V Voltage Error	ERRM01
	+5 V Voltage Error	ERRM02
	+12 V Voltage Error	ERRM03
	-5 V Voltage Error	ERRM04
	-12 V Voltage Error	ERRM05
	CPU Voltage2 Error	ERRM06
	CPU Temperature Error	ERRM07
	System Temperature Error	ERRM08
	Watchdog Timer Error	ERRM09
	SMART Error	ERRM0C

■ Error Messages

This section describes the error messages of the Pro-Server that are displayed for the errors caused during device read/write operations. The following table lists the RAS feature error codes.

Error Code		Error Message
Decimal Number	Hexadecimal Number	
9530	253Ah	RAS Initialization Error
9531	253Bh	Command not supported.
9532	253Ch	Access type not supported.
9533	253Dh	Read/Write type not supported.
9534	253Eh	Access to the device rejected.
9535	253Fh	Value setting to the device/retrieval failed.
65535 (Unsigned)	ffffh	Returned invalid values or unsupported devices are read/written for Voltage or Temperature.

Reference *For error messages other than listed above, refer to "**Pro-Server with Pro-Studio for Windows Operation Manual**".*

9.3.5 Restrictions

The following table lists the features of Pro-Server that are supported by the PL. For the details of each feature, refer to "Pro-Server with Pro-Studio for Windows Operation Manual".

Pro-Server Feature	❍: Supported x: Not Supported
DDE Feature	❍
Simplified DLL Feature (ProEasy.dll)	Listed Separately
OPC Server Interface	❍
SRAM Backup Data	x
Action Feature	x
Distribution Feature	x
Data Viewer	❍ *1
VBA Feature Assist	❍
Device Data Backup/Restore Feature	❍
Capture Screen Save Feature	x
Security Feature	❍
Device Monitor	❍
Status Monitor	x
Read Time Measurement	❍

1. *Pro-Server with Pro-Studio Ver.4.0 or higher is required.*

<Available Simplified DLL Features>

- Direct Read Feature
- Direct Write Feature
- Cache Read Feature
- Retrieval of Multithreading Handle
- Release of Multithreading Handle
- Loading of Network Project File
- Error Code String Conversion
- Station Status Readout Feature
- Initialization of Simplified DLL
- Termination of Simplified DLL

Note:

- **The OS types supported by the PL unit and the OS types supported by Pro-Server are different.**
- **Remote RAS and Pro-Server cannot be run simultaneously on the PL.**

9.4 Remote Shutdown Feature

The Remote Shutdown feature allows the user to shut down and/or restart the PL from the server PC via the network when the Pro-Server is not installed to the system. The installer of this application is included on the accessory CD-ROM (\Utility\Shutdown).

When the installer is started, you are asked to select the application for server or the client. Select the desired application, and follow the instruction on the screen to complete the installation.

File Name	Folder (Same for both WindowsXP and Windows2000)
RSClt.exe	C:\Proface\Shutdown\Client
RSSvr.exe	C:\Proface\Shutdown\Server

Reference *6.1.1 Software*

Note:

- **For the operation procedure of this feature, refer to the online help of the Remote Shutdown Application.**
- **Both applications (for server and client) can be installed on the PL to achieve self-control system. In such a case, however, the PL should be connected to a network.**

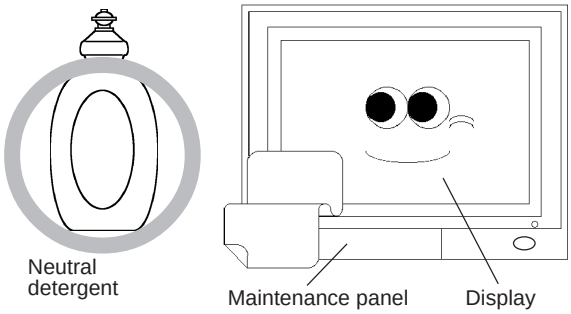
Memo

Chapter

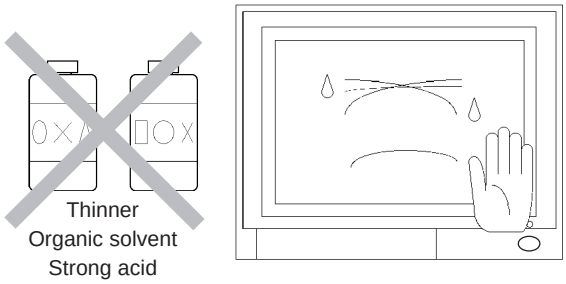
10 Maintenance and Inspection

10.1 Regular Cleaning

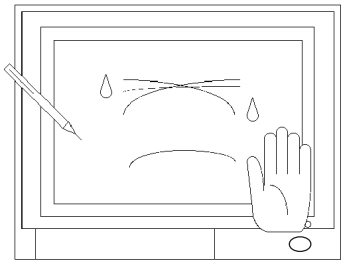
10.1.1 Cleaning the Display



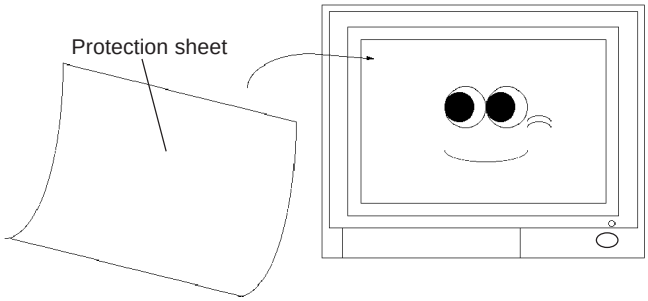
When the display surface or frame become dirty, use a soft cloth moistened with neutral detergent to wipe away any dust or stains.



Do not clean the unit with thinner, organic solvents, or strong acids.



Do not use sharp or hard objects, such as a mechanical pencil or screwdriver, to push on the display. This could damage the unit.



Use the screen protection sheet when using the PL in extremely dirty or dusty areas.

10.2 Usage Lifetimes

The PL unit's consumable parts have the following lifetimes.

Part Name	Lifetime
Backup Lithium Battery	Approx. 7 years (Ambient operating temperature of 25°C)
HDD	20,000 hours (motor is ON) or 5 years, whichever comes first. (Ambient operating temperature of 20°C, motor is ON for 333 hours/month - access time is 20% or less)
Backlight	50,000 hours or more (At an ambient operating temperature of 25°C, time required for backlight to dim to half its original brightness)
Touch Panel	1 million operations/touches or more (Same position)

10.3 Part Replacement

10.3.1 Replacing the Installation Gasket

The installation gasket protects the PL and improves its water resistance. For instructions on installing the PL unit's gasket.

Reference *4.2 Installing the PL*

A gasket which has been used for a long period of time may have scratches or dirt on it, and could have lost much of its water resistance. Be sure to change the gasket periodically (or when scratches or dirt become visible).

10.3.2 Replacing the Backlight

The PL unit's backlight can be changed after it burns out.

PL units use a CFL, long-life type backlight. The actual life of the backlight however, will vary depending on the PL's operating conditions, and periodic replacement may be required.

Follow the steps explained below.

Note: Please use the following table to identify which backlight model number to use when ordering your backlight.

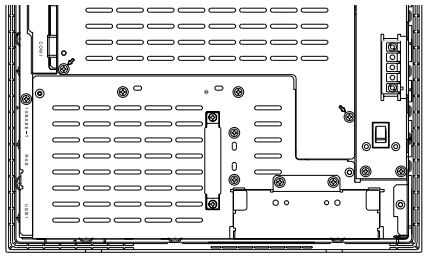
PL Type	Backlight Type
PL- 5900T	GP577RT-BL00-MS
PL- 5901T	

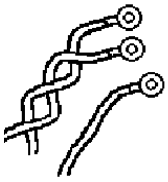
⚠ WARNINGS

- **Whenever changing the backlight, be sure the PL unit's power cord has been disconnected and that the unit is cooled down.**
- **When the PL unit's power cord is connected and the PL is ON, high voltage runs through the wires in the backlight area—*do not touch them!***
- **When the PL unit's power has just been turned OFF, the backlight area is still very hot! Be sure to wear gloves to prevent being burned.**
- **Do not try to replace the backlight while the PL is installed in a cabinet or panel. Remove the PL first, then begin the backlight replacement procedures.**
- **Be careful when handling the backlight, since it is made of glass and very fragile.**

Follow the steps given below to change the PL's backlight. Be sure to wear cotton gloves when performing this work to prevent burns.

1) Unplug the PL's power cord from the main power supply and then disconnect the PL power cord terminals from the PL's power terminal block.

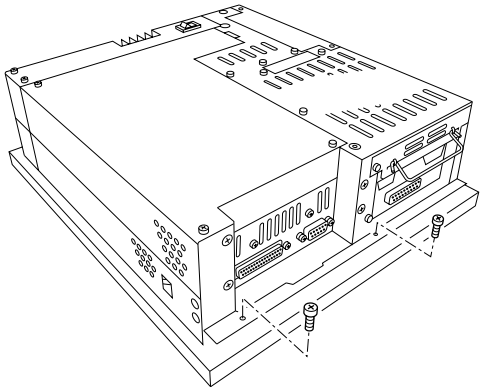




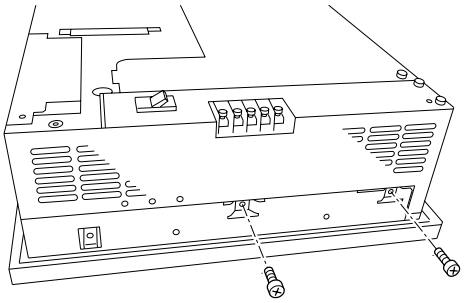
Be sure to perform the backlight changeover on a flat, level surface. This will prevent damage to the PL unit and the accidental cutting of any of its power cord terminals.

2) Remove the power cord.

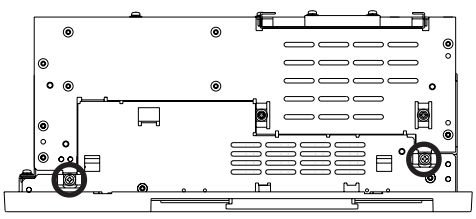
3) Unscrew and remove the two attachment screws from the right side of the PL.



4) Unscrew and remove the two attachment screws from the left side of the PL.

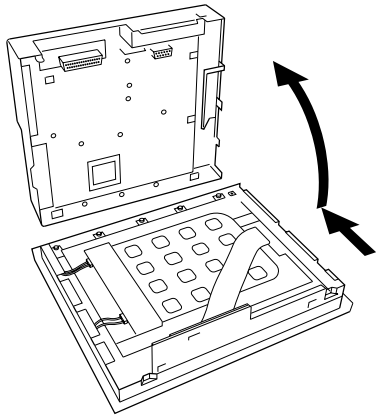


5) Unscrew and remove the two attachment screws from the bottom of the PL.

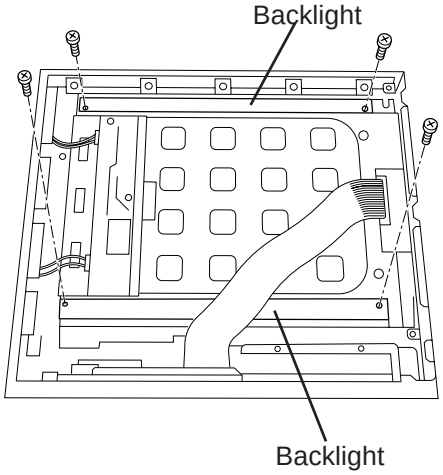


6) Slide the rear cover to the top side.

7) Lift up the rear face and remove it from the front face.

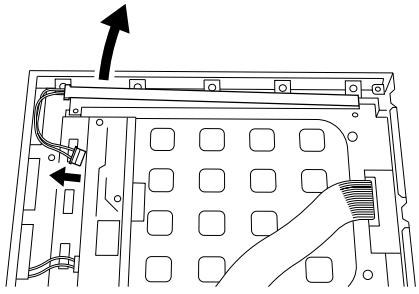


8) Unscrew and remove the four attachment screws securing the backlight.



- ***Use a "0" sized Phillips screwdriver to remove the backlight attachment screws (4 screws).***
- ***Be careful not to lose the screws.***
- ***Be careful when removing the screws so that they do not fall inside the PL, since they may cause the unit to malfunction.***

9) Remove the connector from the inverter board.



10) Lift up the backlight and slowly pull the unit out of the PL.

11) Insert the replacement backlight by reversing the removal procedure. Secure the replacement backlight with the screws and insert the connector to the inverter board.

- ***The PL's backlights are installed at the top and bottom of the LCD panel. Whenever you change a backlight, be sure to change <u>both</u> backlights.***
- ***Be sure to insert the connector to the inverter board and push it until its rear connector is securely connected, or it may cause damage.***

12) Reattach the PL rear unit to the PL front unit, using the PL's guide slots, i.e. reverse the procedure use to separate them.
Be careful not to catch or cut any of the PL's internal cables while reattaching the two units.

13) Replace the six attachment screws removed in step 3), 4) and 5).

10.4 Troubleshooting

The following information describes the possible problems that might occur while using the PL unit.

If this information does not provide a solution for your PL unit problem, please contact your local PL distributor for assistance.

Q. The PL unit will not start.

The message “Invalid System Disk” appears.

- ◆ Check to see if a floppy disk is inserted in the PL unit’s floppy disk drive. If there is a floppy disk in the drive, remove (eject) it.
- ◆ Startup halts at the white Pro-face screen

  This may be due to the HDD being busy and cannot respond. If an external (optional) unit is transmitting vibration to the PL, remove that unit.

The message “Disk Boot Failure” appears.

- ◆ Try turning the PL unit OFF and then ON again.
- ◆ Check your BIOS settings to see if the HDD is being detected.

  5.2.2 IDE HDD AUTO DETECTION

  If the PL can detect the HDD, the HDD unit may be damaged. Pro-face recommends you change the HDD unit.

  If the PL can not detect the HDD unit, the HDD unit (containing the OS, etc.) may have crashed. Pro-face recommends you reinstall the PL unit’s OS.
- ◆ Check if the OS can be restarted after the reinstall.

A beeping sound is heard.

- ◆ Memory is not correctly installed in the PL unit. Check that the memory card is correctly inserted into its socket.

Q. The display screen does not appear or is dark.

- ◆ If the PL unit’s LED is flashing orage and red, the backlight is burnt out. Please follow the instructions given here to replace the backlight unit.

  10.3.2 Replacing the Backlight
- ◆ After the BIOS screen appears, if the Windows screen does not appear, the screen’s resolution may be set to VGA or higher.

Q. The Touch Panel’s position is not correctly aligned.

- ◆ If the position is not correct, please use the Touch Panel Calibration feature.

Q. Touch Panel does not respond.

- ◆ If the touch panel's LED has turned orange, a touch panel alarm has occurred. Please contact your local PL distributor for assistance.
- ◆ Check if the touch panel I/F selector switch (T MODE) and the touch panel driver (UPDD) settings are the same. If they are not, set them so they are the same.

  Reference *1.2.1 Connecting the Touch Panel*

- ◆ If the touch panel's I/F selector switch (T MODE) setting is "S" and the touch panel driver (UPDD) setting is COM4, check that the BIOS setting for the COM4 I/O address is "2E8/IRQ10".

  Reference *5.2.5 INTEGRATED PERIPHERALS ■ Onboard Serial Port 4*

- ◆ Check to see if debris or dirt is covering any portion of the touch panel. If it is, please contact your local PL distributor for cleaning instructions.
- ◆ Check to see if the panel's bezel has become deformed and is touching the touch panel surface.If the bezel is deformed and is touching the panel surface, please contact your local PL distributor for repair instructions.
- ◆ Check if the touch panel is damaged or cracked. If it is damaged or cracked, please contact your local PL distributor for repair instructions.
- ◆ Check if the touch panel driver (UPDD) is installed.

  When using Windows®:

  Reference *7.2.5 Installing the Mouse Emulator*

  When using MS-DOS:

  Reference *8.1.1 Touch Panel Driver (ATPH59.EXE)*

- ◆ Check that other touch panel drivers are not installed. If installed, uninstall all of them.

Q. USB Devices will not operate.

- ◆ If the PL unit's OS Windows® 2000? With WindowsNT® 4.0 or MS-DOS USB devices will not operate.
- ◆ Check if the USB device's power cord is attached and if power is turned ON.
- ◆ Check if the USB unit's cable is correctly connected to the USB socket.
- ◆ Check if the BIOS settings are set for a USB I/F.

  5.2.5 INTEGRATED PERIPHERALS ■ USB Controller

- ◆ If a USB hub is used, check if the hub is correctly positioned.
- ◆ Check if the current USB driver(s) is/are old. If they are, install the latest version of the driver(s) from the manufacturer's home page.

Q. Cannot connect to the network

- ◆ Check if the LAN cable is correctly connected.
- ◆ Check if the LAN driver is installed.

  Windows: 7.2.4 LAN Driver

  MS-DOS: 8.1.7 LAN Driver
- ◆ Check if the network (Web Server, HUB, tc.) is operating normally.
- ◆ Check if the current network settings (IP Address, Network Name, etc.) are correct.
- ◆ Check if the BIOS is set to allow LAN use.

Reference *5.2.5 INTEGRATED PERIPHERALS ■ Onboard LAN*

Q. Can not use peripheral devices

- ◆ Check if the peripheral device's cable is correctly connected.
- ◆ Check if the peripheral device requires a driver.
- ◆ Check if the PL unit's BIOS is set to recognize the peripheral device.
- ◆ Check if an interrupt conflict has occurred. If it has, open an unused interrupt. For example, if the PL unit's COM port is not being used, select [Disabled] in the BIOS to free that interrupt.

Reference *Appendix 1.3 Interrupt Map*

Q. PL unit has frozen

- ◆ Check that all mouse and touch operation has stopped. If there is any response from either, it simply means that the processing load is large. Please wait until the task is completed.
- ◆ Check if pressing the Ctrl + Alt + Delete keys produces any response. If the unit responds, shut down all tasks and try restarting the OS to see if this solves the problem.
- ◆ Check if the HDD unit is being accessed or not. Try to reset or shutdown the unit to see if this solves the problem.

10.5 Periodic Maintenance Points

Check the PL periodically to ensure it is in good working condition.

Ambient environment check

- Is the ambient temperature within the specified range?
  (0°C to 45°C - without HDD unit, 5°C to 45°C - with HDD unit)
- Is the ambient humidity within the specified range (10%RH to 85 %RH) ?
- Is the atmosphere free of corrosive gas ?

Electrical specifications check

- Is the voltage adequate (AC85V to AC132V, 50/60 Hz or DC19.2V to DC28.8V)?

Installation check points

- Is the connection cable firmly connected (not loose) ?
- Are any bolts or screws loose ?
- Are there any flaws or tears in the moisture resistant gesket ?

Display check

- Is the display bright enough ?

When the PL's Standard Display's backlight needs to be replaced, please contact your local PL distributor.

Appendices

A.1 Hardware Configuration

The following data explains the design of the I/O Map, Memory Map and Interrupt Map, as well as additional hardware design items including the RAS feature.

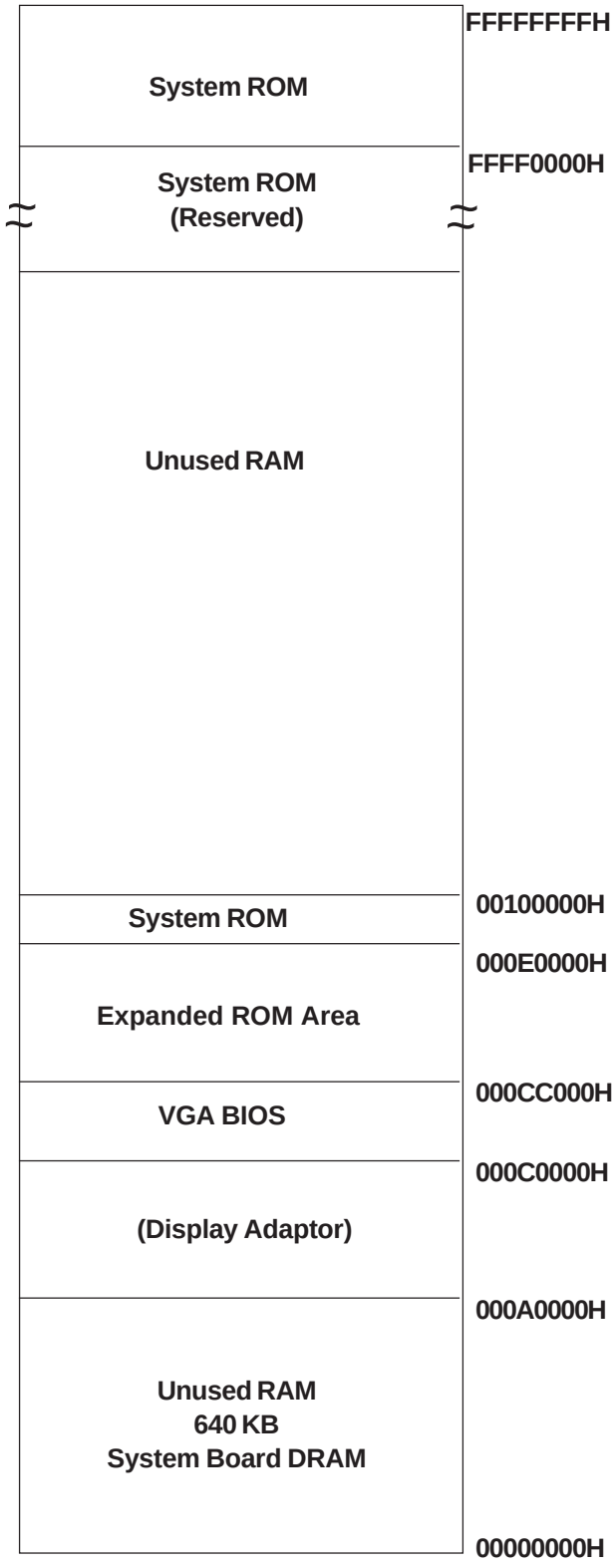
A.1.1 I/O Map

Address	AT System Device	System Device
0000H - 001FH	DMA controller (8237)	
0020H - 003FH	Interrupt controller (8259A)	
0040H - 005FH	System timer (8254)	
0060H - 006FH	Keyboard (H8/3332)	
0070H - 007FH	Real-time clock, NMI mask	
0080H - 009FH	DMA bank register	
00A0H - 00BFH	Interrupt controller 2 (8259A)	
00C0H - 00DFH	DMA controller 2 (8237)	
00F0H - 00FFH	Numeric data processor	
01F0H - 01FFH	Hard disk (IDE)	
0280H - 028FH	Reserved (System internal use)	
0290H - 0297H	Reserved	System Monitor
02A0H - 02BFH	Reserved (System internal use)	
02E8H - 02EFH	Reserved	Serial port 4 (COM4)
02F8H - 02FFH	Serial port 2 (COM2): General use	
0378H - 037FH	Parallel port	
03B0H - 03BBH	Video controller (VGA)	
03C0H - 03DFH	Video controller (VGA)	
03E0H - 03E7H	Reserved (System internal use)	Serial port 3 (COM3)
03E8H - 03EFH	Reserved	
03F0H - 03F7H	Floppy disk controller	
03F8H - 03FFH	Serial port 1 (COM1) :General use	
0400H - 041FH	Reserved (System internal use)	

**1 This device is not supported by the system, but is reserved as standard.*

Depending on the arrangement of any connected Plug-and-Play devices, these features perform different functions/actions.

A.1.2 Memory Map



A.1.3 Interrupt Map

■ Hardware Interrupt List

	Description
NMI 0	Parity Error or I/O Channel Check
IRQ 0	Timer (in the Chipset)
IRQ 1	Keyboard
IRQ 2	Cascade from Controller 2
IRQ 3	Serial Port 2 (COM2): General Use Port
IRQ 4	Serial Port 1 (COM1): General Use Port
IRQ 5	Available for users*
IRQ 6	Floppy Disk Controller
IRQ 7	Parallel Port 1 (LPT1) : Printer Port
IRQ 8	Real Time Clock
IRQ 9	Available for users*
IRQ 10	Serial Port 4 (COM4): Touch Panel: General Use Port
IRQ 11	Serial Port 3 (COM3): General Use Port
IRQ 12	PS/2 Mouse
IRQ 13	Numeric Calculation Processor
IRQ 14	Hard Disk (IDE)
IRQ 15	Available for users*

The "*" mark indicates that, depending on the customer's settings, the following devices are automatically allocated as Plug and Play devices.

Display Controller

SMBus Controller

Multimedia Device

Network Controller

USB Controller

■ DMA Channel List

	Description
DMA 0	
DMA 1	
DMA 2	Floppy disk controller
DMA 3	
DMA 4	Cascade to controller 1
DMA 5	
DMA 6	
DMA 7	

For 8-bit transmission

For 16-bit transmission

A.2 Consent Agreement

■ DMC Corporation Mouse Emulation Software (TSC-1310D/DD) Software License Agreement

Before unsealing and using this product, please read the following license agreement carefully:

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(1) Use and copying of the product against the terms of the license and disassembling, reverse engineering, and modifying the product.

(2) Transfer, leasing and sublicensing of the product to the third party.

(3) Deletion and/or change of display of the intangible property right including the copyright displayed on the medium containing the product.

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