

**PPC-S123**

UltraSlim™ Pentium® III  
processor-based 12.1" panel PC

**User's Manual**

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## **FCC Class B**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with this user's manual, it may cause harmful interference to radio communications. Note that even when this equipment is installed and used in accordance with this user's manual, there is still no guarantee that interference will not occur. If this equipment is believed to be causing harmful interference to radio or television reception, this can be determined by turning the equipment on and off. If interference is occurring, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to a power outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

*Warning: Any changes or modifications made to the equipment which are not expressly approved by the relevant standards authority could void your authority to operate the equipment.*

## Packing List

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Before installing your panel PC, ensure that the following materials have been received:

- PPC-S123 series panel PC
- User's manual
- Accessories for PPC-S123
  - Y-shaped adapter for PS/2 mouse and keyboard
  - Printer port adapter cable
  - COM port adapter cables
  - CPU push cover
  - CPU push screw driver
  - Warranty card
  - Power cord: USA type
  - AC/DC power adapter
  - DC plug-in housing (female)
  - External FDD flat cable
  - External IDE flat cable
  - Power cable for external FDD/HDD/CD-ROM
  - "Drivers and Utilities" CD-ROM disc
  - VESA-standard bracket for mounting
  - Mounting kits and packet of screws

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

**Note:**      *If you install an Intel® processor yourself, you must install a heat sink above the CPU. This will avoid heat damage to the CPU.*

## Additional Information and Assistance

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1. Visit the Advantech websites at **www.advantech.com** or **www.advantech.com.tw** where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

### **Warning!**



*1. Input voltage rated 19Vdc~26Vdc, 3A max*

*2. Use a 3 V @ 195 mA lithium battery*

*3. Packing: please carry the unit with both hands, handle with care*

*4. Our European representative:*

*Advantech Europe GmbH*

*Kolberger Straße 7*

*D-40599 Düsseldorf, Germany*

*Tel: 49-211-97477350*

*Fax: 49-211-97477300*

*5. Maintenance: to properly maintain and clean the surfaces, use only approved products or clean with a dry applicator*

# Safety Instructions

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1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - a. The power cord or plug is damaged.
  - b. Liquid has penetrated into the equipment.
  - c. The equipment has been exposed to moisture.
  - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
  - e. The equipment has been dropped and damaged.
  - f. The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS MAY DAMAGE THE EQUIPMENT.**

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70dB(A).

**DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

# Wichtige Sicherheitshinweise

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1. Bitte lesen Sie sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssig- oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlusssteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, dass diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluss an das Stromnetz die Anschlusswerte.
9. Verlegen Sie die Netzanschlussleitung so, dass niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen, die sich an den Geräten befinden, sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten, ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
  - a - Netzkabel oder Netzstecker sind beschädigt.
  - b - Flüssigkeit ist in das Gerät eingedrungen.
  - c - Das Gerät war Feuchtigkeit ausgesetzt.
  - d - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
  - e - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
  - f - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. Bitte lassen Sie das Gerät nicht unbehebt hinten unter  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) oder oben  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ), weil diesen Temperaturen das Gerät zerstört werden könnte.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70 dB(A) oder weniger.

DISCLAIMER: This set of instructions is given according to IEC704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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# CHAPTER 1

## General Information

This chapter gives background information on the PPC-S123 panel PC.

- Introduction
- General Specifications
- LCD Specifications
- Dimensions

# 1.1 Introduction

---

The PPC-S123 panel PC is an UltraSlim™ Pentium® III processor-based computer that is designed to serve as a human machine interface (HMI) and as a multimedia computer. It is a PC-based system with 12.1" color TFT LCD display, on-board PCI Ethernet controller, multi-COM port interfaces and a 16-bit stereo audio controller. With a built-in an external FDD, IDE connectors, and an optional PCI/ISA expansion socket, the PPC-S123 is as compact and user-friendly as a multi-function computer. In addition, its "fit anywhere" design makes it very flexible and able to be used in many different kinds of installations. It can be wall mounted, panel mounted or stood upright on a desktop.

For system integrators, this simple, complete, compact and highly integrated multimedia system lets you easily build a panel PC into your applications. Common industrial applications include factory automation systems, precision machinery, and production process control. It is also suitable for many nonindustrial applications, including interactive kiosk systems, entertainment management, and car park automation. Our panel PC is a reliable, cost-effective solution to your application's processing requirements.

## 1.2 General Specifications

---

### General

- **Dimensions (W x H x D):** 311 x 237 x 54.5mm (12.24" x 9.33" x 2.15")
- **Weight:** 2.6 kg (5.8 lbs)
- **Power supply:** 60 watts, AT type  
Input voltage: 19Vdc~26Vdc  
Output voltage: +5 V @ 8 A, +12 V @ 1.5 A, -12V@0.3A
- **Power adaptor:** AC/DC  
Input voltage: 100Vac~250Vac  
Output voltage: 24V @ 2.3A
- **Disk drive housing:** Space for one 2.5" HDD
- **Front panel:** IP65/NEMA4 compliant

### Standard PC functions

- **CPU:** Intel® Pentium® III up to 850 MHz and Celeron™ up to 900 MHz
- **BIOS:** Award 256 KB Flash BIOS, supports Plug & Play, APM
- **Chipset:** Intel® 82443BX/82371EB
- **Front side bus:** 66/100 MHz
- **2nd level cache:** On-die 256 KB for Pentium® III CPU and 128 KB for Celeron™ CPU
- **RAM:** Two 144-pin SODIMM sockets accept 32 ~ 512 MB SDRAM (3.3 V)
- **PCI bus master IDE interface:** Supports two connectors. Each connector has one channel and supports two IDE devices. Each channel supports PIO modes 0 ~ 4, DMA mode 0 ~ 2, and Ultra DMA 33/66simultaneously. The secondary connector is designated for the CD-ROM drive or external hard drive. BIOS supports IDE CD-ROM boot-up

- **Floppy disk drive:** Supports up to two FDDs (720 KB / 1.44 MB).
- **Parallel port:** One parallel port, supports SPP/EPP/ECP parallel mode. BIOS configurable to LPT1, LPT2, LPT3 or disabled
- **Serial ports:** Four serial ports with three RS-232 ports (COM 1,3, and 4), one RS-232/422/485 port (COM2). All ports are compatible with 16C550 UARTs, +5V/+12V power supply selectable
- **Universal serial bus (USB) port:** Supports up to two USB ports, USB v1.1 and Intel UHCI v1.1 compatible
- **PCI/ISA bus expansion slot (optional):** Accepts either one ISA card or one PCI bus card
- **SSD:** Built in type I CompactFlash socket, supports CompactFlash card shared with one IDE channel.
- **Watchdog timer:** 62-level, interval 1 ~ 62 seconds. Automatically generates system reset or IRQ11 when the system stops due to a program error or EMI. Jumperless selection and software enabled/disabled
- **Battery:** 3.0 V @ 195 mA lithium battery

## Flat panel interface

- **Chipset:** LynxEM4 SMI710
- **Display memory:** 4 MB on-die memory
- **Display type:** Simultaneously supports CRT and flat panel displays (EL, LCD and gas plasma)
- **Display resolution:** Supports non-interlaced CRT and TFT LCD displays up to 1280 x 1024 @ 16 M colors

## Audio function

- **Chipset:** ESS 1938 (PCI)
- **Audio controller:** 16-bit codec, full-duplex stereo single-chip PCI audio solution
- **Stereo sound:** 100% DOS GAME compatible (Sound Blaster or



Sound Blaster Pro)

- **Audio interface:** Line-in, Line-out

### **PCI bus Ethernet interface**

- **Chipset:** Realtek RTL 8139 PCI local bus Ethernet controller
- **Ethernet interface:** Full compliance with IEEE 802.3u 100Base-T and 10 Base-T specifications. Includes software drivers and boot ROM
- **100/10Base-T auto-sensing capability**

### **Touchscreen (optional)**

Type	Analog Resistive
Resolution	Continuous
Light Transmission	75%
Controller	RS232 interface (uses COM4)
Power Consumption	<5V @ 100 mA
Software Driver	Supports Windows NT/98/2000/ME
Durability (touches in a lifetime)	100 million

*Note: The panel PC with the optionally installed touch-screen will share COM4 port. Once the touchscreen is installed, the COM4 cannot be used for other purpose.*

## Optional modules

- **CPU:** Intel® Pentium® III up to 850 MHz and Celeron™ up to 900 MHz
- **Memory:** 32/64/128/256 MB SDRAM
- **HDD:** 2.5" HDD
- **Operating System:** Microsoft® DOS, Windows 98, NT, 2000
- **Touchscreen:** Analog resistive

## Environment

- **Operating Temperature:** 0 ~ 45° C (32 ~ 122° F)
- **Storage Temperature:** -20° ~ 60° C
- **Relative humidity:** 0~85%
- **Shock:** 10 G peak acceleration (11 msec duration)
- **Certification:** EMC: CE, FCC; Safety: UL1950 and EN60950

## 1.3 LCD Specifications

---

**Display type:** 12.1" TFT LCD

**Max. resolution:** 800x 600

**Colors:** 256 K or above

**Dot size (mm):** 0.31 x 0.31

**Viewing angle:** 100°

**Luminance:** 250 cd/m<sup>2</sup> or above

**Temperature:** 0 ~ 50° C

**\*VR control:** Brightness

**LCD MTBF:** 50,000 hours

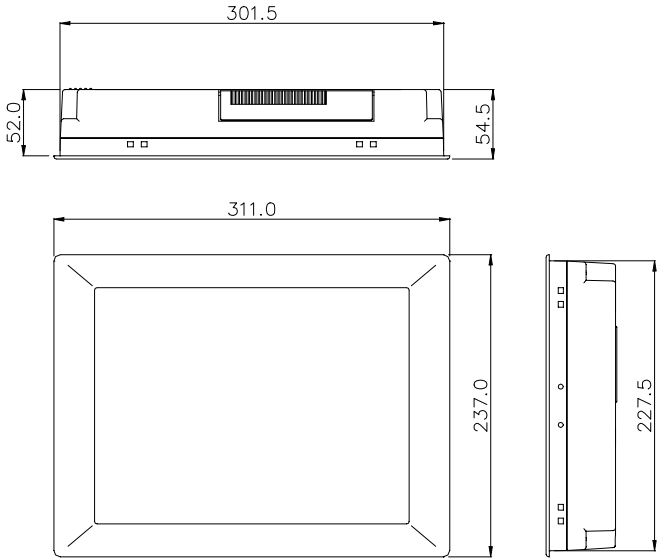
**Backlight lifetime:** 25,000 hours

\* The VR control is defined by hot key in DOS or BIOS mode as below: Ctrl-Alt-F3, Ctrl-Alt-F4.

*Note: The color LCD display installed in the panel PC is high-quality and reliable. However, it may contain a few defective pixels which do not always illuminate. With current technology, it is impossible to completely eliminate defective pixels. Advantech is actively working to improve this technology.*

# 1.4 Dimensions

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Unit: mm

**Figure 1-1: Dimensions of the PPC-S123**

# CHAPTER 2

## SYSTEM SETUP

- A Quick Tour of the Panel PC
- Installation procedures
- Running the BIOS Setup Program
- Installing System Software
- Installing the Drivers

## 2.1 A Quick Tour of the Panel PC

---

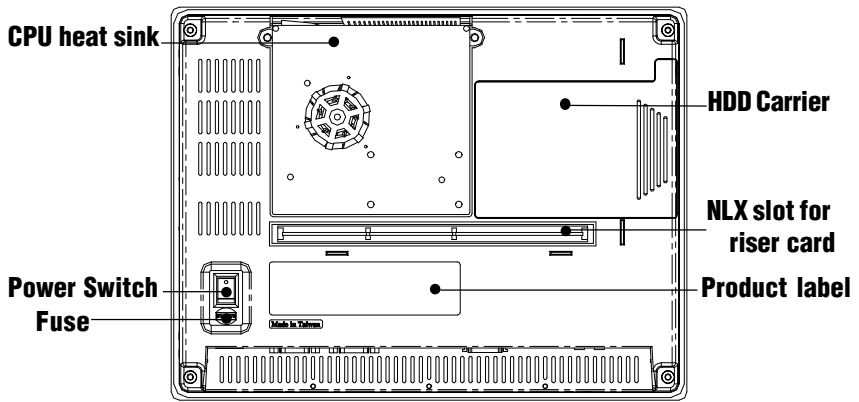
Before you start to set up the panel PC, take a moment to become familiar with the locations and purposes of the controls, drives, connectors and ports, which are illustrated in the figures below.

When you place the panel PC upright on the desktop, its front panel appears as shown in Figure 2-1.



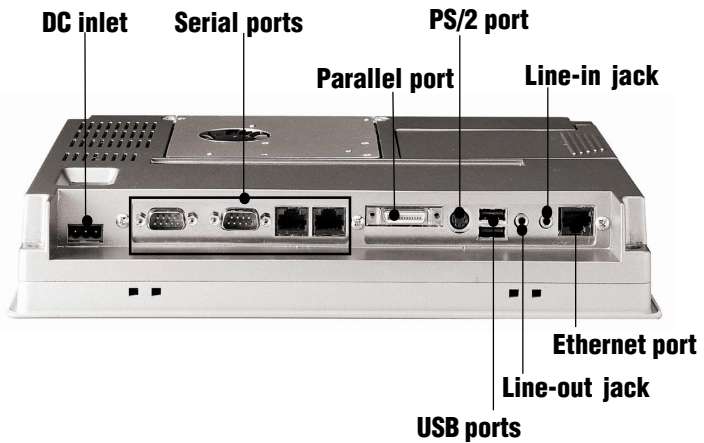
**Figure 2-1: Front view of the panel PC**

When you turn the panel PC around and look at its rear cover, you will find the CPU and heat sink space located on the center-top side and HDD carrier located on the right side, as shown in Figure 2-2. The sunken I/O section is at the bottom of the panel PC, as shown in Fig. 2-3. (The I/O section includes various I/O ports, including serial ports, parallel port, the Ethernet port, USB ports, the Line-in/Line-out jack, and so on.)



**Figure 2-2: Rear view of the panel PC**

Figure 2-3 shows the I/O section and power inlet of the panel PC



**Figure 2-3: Rear and bottom view of the panel PC**

## 2.2 Installation Procedures

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### 2.2.1 Connecting the power cord

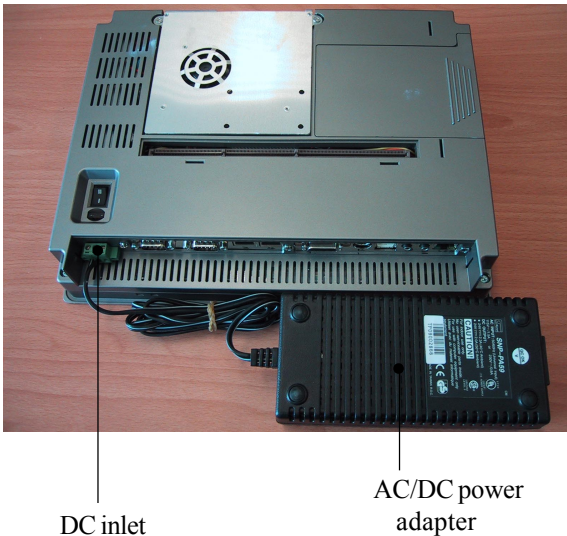
The panel PC can only be powered by a DC electrical outlet (19Vdc~26Vdc, 3A max.). Be sure to always handle the power cords by holding the plug ends only. Please follow the Figure 2-4 to connect the male plug of the power cord to the DC inlet of the panel PC.

### 2.2.2 Connecting the keyboard or mouse

Before you start the computer, please connect the Y-shaped adaptor to the PS/2 mouse and keyboard port on the I/O section of the panel PC, then connect the necessary mouse or keyboard to the Y-shaped adaptor or serial ports.

### 2.2.3 Switching on the power

When you look at the rear side of the panel PC, you will see the power switch as shown in Figure 2-2.



**Figure 2-4: Connect the power cord to DC inlet**



## 2.3 Running the BIOS Setup Program

---

Your panel PC is likely to have been properly set up and configured by your dealer prior to delivery. You may still find it necessary to use the panel PC's BIOS (Basic Input-Output System) setup program to change system configuration information, such as the current date and time or your type of hard drive. The setup program is stored in read-only memory (ROM). It can be accessed either when you turn on or reset the panel PC, by pressing the "Del" key on your keyboard immediately after powering on the computer.

The settings you specify with the setup program are recorded in a special area of memory called CMOS RAM. This memory is backed up by a battery so that it will not be erased when you turn off or reset the system. Whenever you turn on the power, the system reads the settings stored in CMOS RAM and compares them to the equipment check conducted during the power on self-test (POST). If an error occurs, an error message will be displayed on screen, and you will be prompted to run the setup program.

If you want to change the setup of BIOS, refer to Chapter 8 for more detailed information.

## 2.4 Installing System Software

---

Recent releases of operating systems from major vendors include setup programs which load automatically and guide you through hard disk preparation and operating system installation. The guidelines below will help you determine the steps necessary to install your operating system on the panel PC hard drive.

*Note: Some distributors and system integrators may have already pre-installed system software prior to shipment of your panel PC.*

Installing software requires an installed HDD. Software can be loaded in the PPC-S123 using any of four methods:

### 2.4.1 Method 1: Use the Ethernet

You can use the Ethernet port to download software to the HDD.

### 2.4.2 Method 2: Use an FDD

The FDD port is located on the riser card as shown in Figure 3-10. Attach a communication cable and a power cable to the FDD port, then attach them to an FDD. Insert a disk containing the software and consult your software manual for installation procedures.

### 2.4.3 Method 3: Use the COM or parallel port

You can use Lap Link 6 or similar transmission software. Connect another PC to the PPC-S123 with an appropriate cable and transmit the software to the PPC-S123.

### 2.4.4 Method 4: Use a 3.5" HDD or CD-ROM

Please refer to Section 3.4.2 "Secondary HDD/CD-ROM drive installation"

## 2.5 Installing the Drivers

---

After installing your system software, you will be able to set up the Ethernet, SVGA, audio, and touchscreen functions. All drivers are stored in a CD-ROM disc entitled "Drivers and Utilities" which can be found in your accessory box.

The standard procedures for installing the drivers are described in Chapters 5, 6, 7, 9 respectively.

The utility directory includes multimedia programs. Refer to the README.TXT file inside the VGA folders for more detailed information.

The various drivers and utilities in the CD-ROM disc have their own text files which help users install the drivers and understand their functions. These files are a very useful supplement to the information in this manual.

*Note: The drivers and utilities used for the PPC-S123 panel PCs are subject to change without notice. If in doubt, check Advantech's website or contact our application engineers for the latest information regarding drivers and utilities.*



# CHAPTER 3

## Hardware and Peripheral Installation

- Overview of Hardware Installation and Upgrading
- Installing the 2.5" Hard Disk Drive (HDD)
- Installing the Central Processing Unit (CPU) and SDRAM Memory Module
- Floppy drive and 2nd hard drive/CD-ROM installation
- Adapter Cables Installation

## 3.1 Overview of Hardware Installation and Upgrading

---

The panel PC consists of a PC-based computer that is housed in a plastic front and rear panel. Any maintenance or hardware upgrades can be easily completed after removing both panels. Meanwhile your HDD, SDRAM, CPU are all readily accessible by removing the CPU heatsink and HDD carrier.

If you are a systems integrator and need to know how to completely disassemble the panel PC, you can find more useful information in Appendix B.

**Warning!** *Do not remove the plastic covers until you have verified that no power is flowing within the panel PC. Power must be switched off and the power cord must be unplugged. Every time you service the panel PC, you should be aware of this.*



## 3.2 Installing the 2.5" Hard Disk Drive (HDD)

---

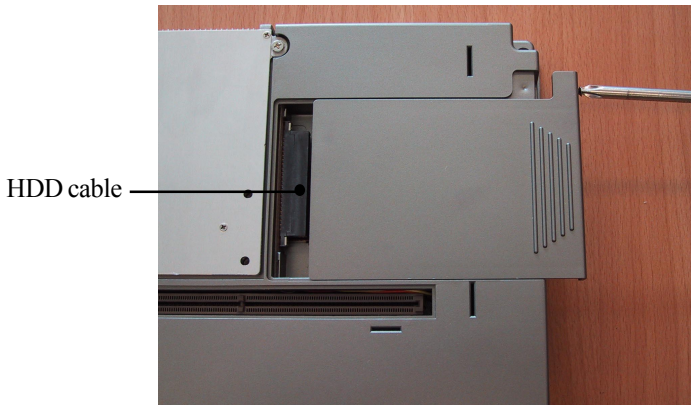
You can attach one enhanced Integrated Device Electronics (IDE) hard disk drive to the panel PC's internal controller which uses a PCI local-bus interface. The advanced IDE controller supports faster data transfer and allows the IDE hard drive to exceed 528 MB. The following instructions are for the installation:

1. Detach the HDD carrier by unscrewing one screw on the right side of the HDD carrier.
2. First connect the adapter connector to the 2.5" hard drive, then place the HDD inside the HDD carrier and tighten four screws from both sides of the HDD carrier as shown in Figure 3-1.
3. The HDD cable (FPC type) is next to the HDD carrier.

- Slide the HDD carrier with HDD back to original position, then fix it as shown in Figure 3-2.



**Figure 3-1: Install the HDD on the HDD carrier**



**Figure 3-2: Connect HDD to the HDD cable**

### 3.3 Installing the Central Processing Unit (CPU) and SDRAM Memory Module

---

The panel PC's central processing unit (CPU) can be upgraded to improve system performance. The panel PC provides one 370-pin socket (Socket 370). The CPU must come with an attached heat sink and CPU fan to prevent overheating. The panel PC also provides two 144-pin SODIMM sockets which can accept two SDRAM memory modules up to 512 MB.

**Warning!** *The CPU may be damaged if operated without a heat sink and a fan.*

**Caution!** *Always disconnect the power cord from your panel PC when you are working on it. Do not make connections while the power is on as sensitive electronic components can be damaged by the sudden rush of power.*

**⚡** *Only experienced electronics personnel should open the panel PC.*

1. Unscrew the six screws on the CPU heat sink as shown in Figure 3-3, then you can find one 370-pin CPU socket and one 144-pin SODIMM socket.



**Figure 3-3: Detach the CPU heat sink**



2. Insert the CPU in the correct orientation and gently slide the CPU in. It should insert easily. Make sure the pin of the CPU corresponds with the hole of socket. Do not use excessive force.

3 Place the metal CPU push cover on the top of the CPU as shown in Figure 3-4.



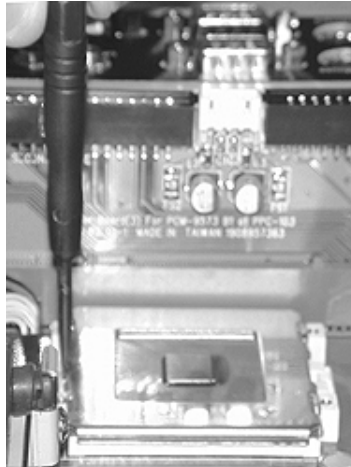
**Figure 3-4: Place CPU push cover over CPU**

4. Insert a flat-headed screwdriver into the side hole of the CPU at an upward perpendicular angle to the CPU, as shown in Figure 3-5. Make sure the slightly bend screwdriver head is pointing outward.

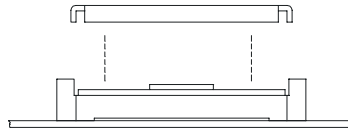


**Figure 3-5: Insert screw driver into the hole**

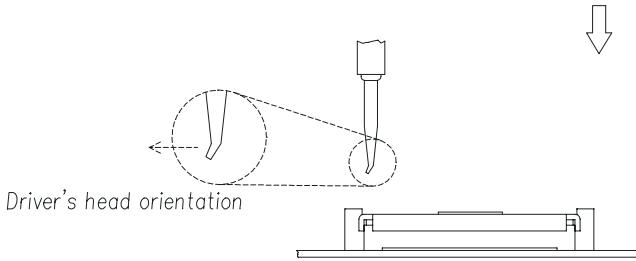
5. Gently lever at the CPU push cover by pushing the top end of the screwdriver away from the CPU (Figure 3-6, 3-7). After the CPU has been secured in the right position, remove the screw driver and the CPU push cover.



**Figure 3-6: Push CPU in position**

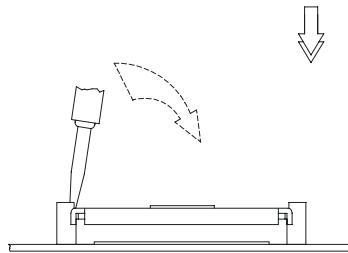


Put the CPU push cover on CPU socket.



Driver's head orientation

Please notice the driver's orientation, no matter locking or unlocking CPU, the driver head always orient to outside of CPU socket.

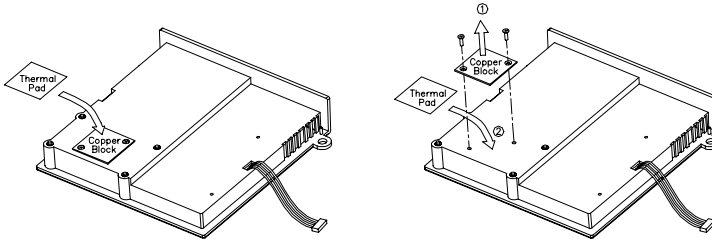


The force-used oriented.

**Figure 3-7: CPU installation**

For Intel FC-PGA CPU Type

For Intel PPGA CPU Type



**Figure 3-8: Fan cooling with heatsink assembly installation**

6. If the CPU to be installed is Type PPGA, please remove the copper block by unscrewing two screws before attaching the thermal pad on the heat sink. Prior to doing that, it would be helpful if you apply an even layer of the silicone heat sink paste on the top of the CPU.

7. Next, install an SDRAM module. Slip the memory module into the socket at a 45 degree angle as shown in Figure 3-9.



**Figure 3-9: Installing the memory module**

8. Push the module toward the horizontal ports at both ends of the socket until the module is upright and the retaining clips at both ends of the module click into place. When positioned correctly, the pins on top of the vertical posts should correspond to the circular holes on the ends of the module.
9. If a second 144-pin SODIMM socket is requested to install a second memory module, please follow Appendix B to disassemble the panel PC, then repeat steps 7 and 8 for each module you install.
10. Finally, put the heat sink back and tighten the six screws to fix it as shown in Figure 3-3.

## 3.4 Floppy drive and 2nd hard drive/CD-ROM installation

---

If you would like to install a floppy drive or 2nd hard drive, CD-ROM drive, a riser card which comes with the accessory box has to be installed first as shown in Figure 3-10.

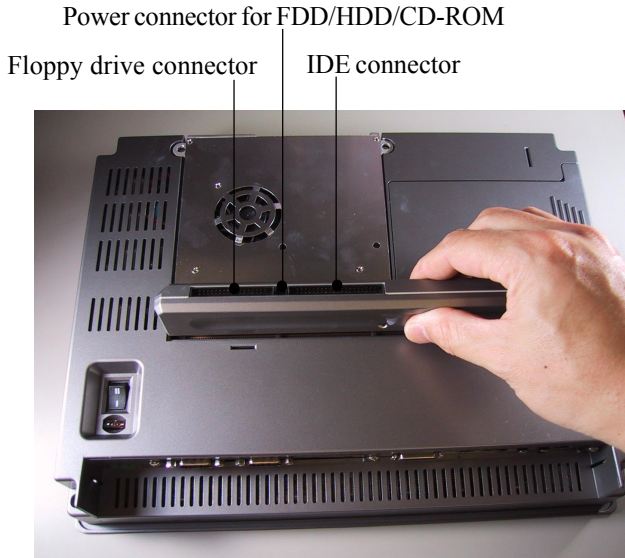
### 3.4.1 Floppy drive installation

Up to two floppy drives can be attached to the PPC-S123's I/O controller. Any combination of 5¼" (360KB and 1.2 MB) and/or 3½" (720KB, 1.44 MB, and 2.88MB) drives can be attached.

A 34-pin FDD connector is located on the riser card of the PPC-S123. Connect one end of a 34-pin daisy-chain drive connector cable and one end of a power signal cable (one each of these is included in the accessory box) to the FDD connector on the riser card and connect each of the other ends to an FDD.

*Note 1: Installation of two FDDs requires a flat ribbon connector with two plugs and a y-splitter for the power cable. The flat ribbon cable in the accessory kit has the required plugs. Users will have to procure an appropriate y-splitter for the power cable themselves.*

*Note 2: We recommend that only FDD be installed on your PPC-S123. The requisite power connector cable is included in the PPC-S123 accessory box.*



**Figure 3-10: Install the riser card**

### 3.4.2 2nd hard drive or CD-ROM drive installation

Two connectors are located on the riser card above the PPC-S123's I/O output connectors. The 40-pin connector is for an external set of master and slave hard disks/CD-ROM. Connect the single end of the appropriate cable to the PPC-S123, and connect the two remaining ends to your hard disk(s)/CD-ROM.

*Note 1: The 40-pin connector is a secondary channel.*

*Note 2: That part of the secondary IDE's cable which is below 45 cm in length is incorporated in the accessory box.*

**Warning!** Make sure that the red wire corresponds to pin 1 on the connectors



### 3.5 Adapter cable installation

---

Due to the PPC's compact design, the panel PC's edge for I/O ports is limited to accommodate fully integrated I/O ports. So we designed a simplified connector for the printer port, and COM ports. Please follow the instructions below to use this port:

1. A printer port adapter cable is included with the accessory box. Connect this cable with 26-pin MDR printer port on the panel PC (Figure 3-11), then you can connect a standard printer with the panel PC.



**COM3 port**                      **printer port**  
**COM4 port**

**Figure 3-11: Install the adapter**

2. Likewise, connect the two COM-port adapters which also come with the accessory box with the RJ-45 ports on the panel PC (Figure 3-11), then external devices can be connected.



# CHAPTER 4

## Jumper Settings and Connectors

This chapter tells how to set up the panel PC hardware, including instructions on setting jumpers and connecting peripherals, switches and indicators. Be sure to read all the safety precautions before you begin the installation procedures.

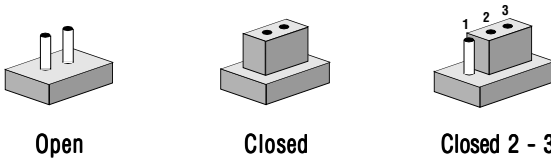
- Jumpers and Connectors
- CMOS Clear for External RTC (JP7)
- COM-port Interface
- VGA Interface
- Watchdog Timer Configuration

## 4.1 Jumpers and Connectors

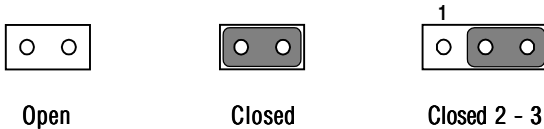
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### 4.1.1 Setting jumpers

You can configure your panel PC to match the needs of your application by setting jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper, you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either pins 1 and 2 or pins 2 and 3.



The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

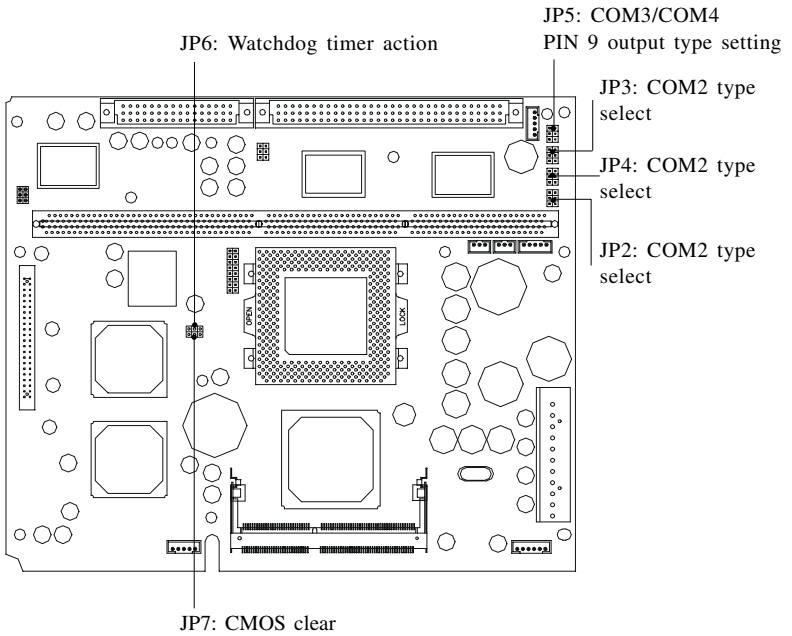
## 4.1.2 Jumpers and switch

The motherboard of the PPC-S123 has a number of jumpers that allow you to configure your system to suit your applications. The table below lists the function of each of the board's jumpers.

Table 4-1: Jumpers and their functions

<b>Label</b>	<b>Function</b>
JP2	COM2 RS-232/422/485 setting
JP3	COM2 RS-232/422/485 setting
JP4	COM2 RS-232/422/485 setting
JP5	COM3 / COM4 Pin 9 output type setting
JP6	Watchdog timer configuration
JP7	CMOS clear for external RTC

### 4.1.3 Locating jumpers and switch



**Figure 4-1: Jumpers on the PPC-S123 motherboard**

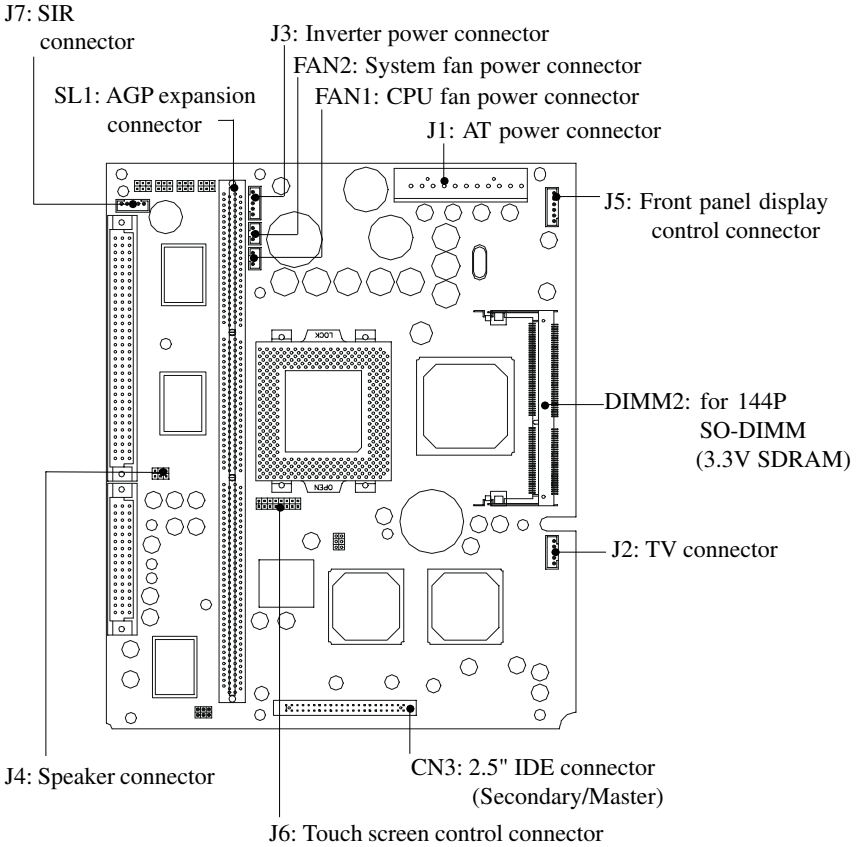
## 4.1.4 Connectors

Onboard connectors link the PPC-S123 to external devices such as external hard disk drives or floppy drives. The table below lists the function of each of the board's connectors.

Table 4-2: Connectors on the PPC-S123 motherboard

<b>Label</b>	<b>Function</b>
J1	AT power connector
J2	TV connector
J3	Inverter power connector
J4	Speaker connector
J5	Front panel display connector
J6	Touch screen control connector
J7	SIR connector
FAN1	CPU fan power connector
FAN2	System fan power connector
DIMM2	for 144P SO-DIMM (3.3V SDRAM)
SL1	AGP expansion connector

## 4.1.5 Locating connectors



**Figure 4-2: Locating connectors on the PPC-S123 motherboard**

## 4.2 CMOS Clear for External RTC (JP7)

**Warning:** To avoid damaging the computer, always turn off the power supply before setting “Clear CMOS”. Set the jumper back to “Normal operation” before turning on the power supply.

Table 4-3: Clear CMOS / External RTC (JP7)

*Normal operation	Clear CMOS

\* default setting

## 4.3 COM-port Interface

The panel PC provides four serial ports (COM1, 3, 4: RS-232; COM2: RS-232/422/485) in one COM port connector.

### 4.3.1 COM2 RS-232/422/485 setting (JP2, JP3, JP4)

COM2 can be configured to operate in RS-232, RS-422, or RS-485 mode. This is done via JP3, JP4 and JP5.

Table 4-4: COM2 RS-232/422/485 setting (JP2, JP3)

*RS-232	RS-422/485

\* default setting

Table 4-5: COM2 RS-232/422/485 setting (JP4)

*RS-232	RS-422	RS-485

\* default setting

The IRQ and the address ranges for COM1, 2, 3, and 4 are fixed. However, if you wish to disable the port or change these parameters later you can do this in the system BIOS setup. The table overleaf shows the default settings for the panel PC's serial ports.

COM1 and COM2 are one set. You can exchange the address range and interrupt IRQ of COM1 for the address range and interrupt IRQ of COM2. After exchanging, COM2's address range is 3F8 ~ 3FF and its request IRQ is IRQ4; and COM1's address range is 2F8 ~ 2FF and its interrupt IRQ is IRQ3.

COM3 and COM4 are another set. Their selectable function is the same as the COM1/COM2 set.

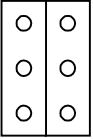
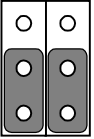
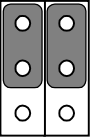
Table 4-6: Serial port default settings

Port	Address Range	Interrupt
COM1	2F8 ~ 2FF	IRQ3
COM2	3F8 ~ 3FF	IRQ4
COM3	3E8 ~ 3EF	IRQ10
COM4	2E8 ~ 2EF	IRQ5



### 4.3.2 COM3 / COM4 pin 9 output type setting (JP5)

Table 4-7: COM3/COM4 pin 9 setting (JP5)

*Normal operation	+5 V output	+12 V output
		

\* default setting

*Note:* Pins 1, 3 and 5 are for COM3.  
Pins 2, 4 and 6 are for COM4.

## 4.4 VGA Interface

The panel PC's AGP VGA interface can drive conventional CRT displays. It is also capable of driving a wide range of flat panel displays, including electroluminescent (EL), gas plasma, passive LCD and active LCD displays.

### 4.4.1 LCD panel power setting

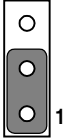
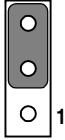
The panel PC's AGP SVGA interface supports 5 V and 3.3 V LCD displays. The LCD cable already has a built-in default setting. You do not need to adjust any jumper or switch to select the panel power.

## 4.5 Watchdog Timer Configuration

An onboard watchdog timer reduces the chance of disruptions which EMP (electromagnetic pulse) interference can cause. This is an invaluable protective device for standalone or unmanned applications. Setup involves one jumper and running the control software. (Refer to Appendix B.)

When the watchdog timer activates (i.e. CPU processing has come to a halt), it can reset the system or generate an interrupt on IRQ11. This can be set via jumper JP6 as shown below:

Table 4-8: Watchdog activity selection (JP6)

*System reset	IRQ11
	

\* default setting

# CHAPTER 5

## PCI Bus Ethernet Interface

This chapter provides information on Ethernet configuration.

- Introduction
- Installation of Ethernet Driver
  - for Windows 98
  - for Windows NT
  - for Windows 2000/ME
- Further Information

## 5.1 Introduction

---

The PPC-S123 is equipped with a high performance 32-bit Ethernet chipset which is fully compliant with IEEE 802.3 100 Mbps CSMA/CD standards. It is supported by major network operating systems. It is also both 100Base-T and 10Base-T compatible. The medium type can be configured via the RSET8139.exe program included on the utility disk.

The Ethernet port provides a standard RJ-45 jack. The network boot feature can be utilized by incorporating the boot ROM image files for the appropriate network operating system. The boot ROM BIOS files are combined with system BIOS, which can be enabled/disabled in the BIOS setup.

## 5.2 Installation of Ethernet Driver

---

Before installing the Ethernet driver, note the procedures below. You must know which operating system you are using in your PPC-S123, and then refer to the corresponding installation flow chart. Then just follow the steps described in the flow chart. You will quickly and successfully complete the installation, even if you are not familiar with instructions for Windows.

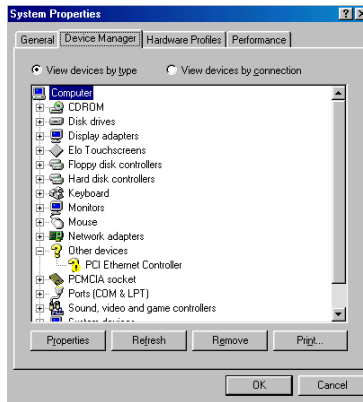
*Important: The following windows illustrations are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.*

*Note 1: The CD-ROM drive is designated as "D" throughout this chapter.*

*Note 2: <Enter> means pressing the "Enter" key on the keyboard.*

## 5.2.1 Installation for Windows 98

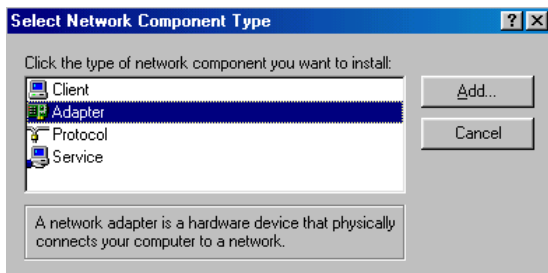
1. a. Select "Start," "Settings," "Control Panel," "System."  
b. Click "Device Manager" and "Other Devices."  
c. Remove "PCI Ethernet Controller."



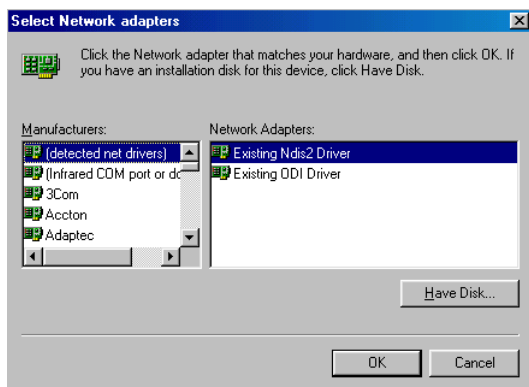
2. a. Select "Start," "Settings," "Control Panel," and "Network" icons.  
b. Click the "Add" button.



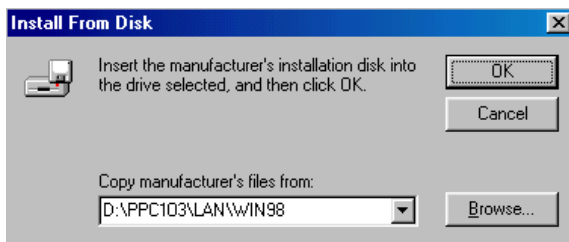
3 Select "Adapter" and then click the "Add" button.



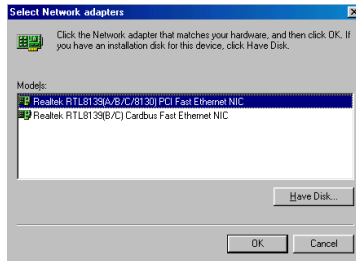
4. Press the "Have Disk" button.



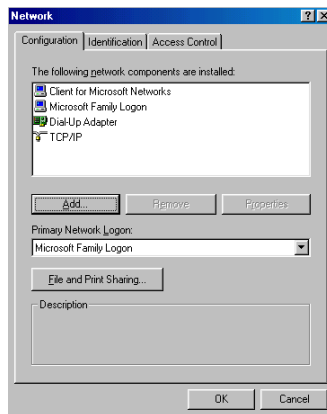
5. a. Type the path "D:\PPC-S123\LAN\WIN98."  
b. Click the "OK" button.



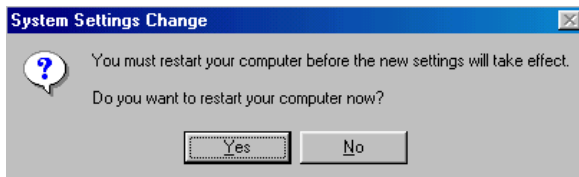
6. a. Choose the highlighted “Realtek RTL8139[A/B/C/8130]PCI Fast Ethernet NIC.”  
b. Press the “OK” button.



7. a. Press the “Add...” button to select suitable services or protocol.  
b. Press the “OK” button to finish network configuration.

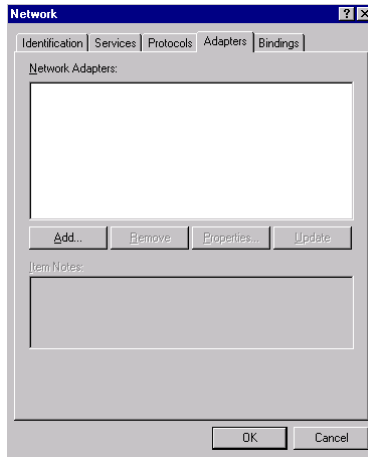


8. Press the “Yes” button to restart your computer.

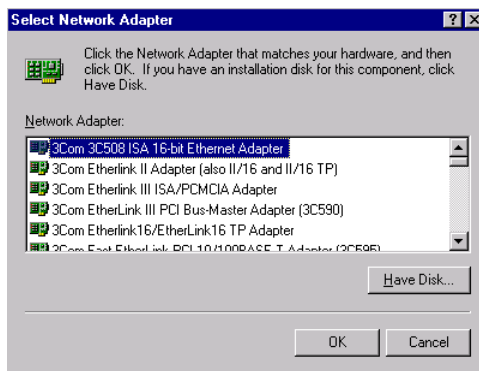


## 5.2.2 Installation for Windows NT

1. a. Select “Start,” “Settings,” “Control,” and then double click the “Network” icon.  
b. Choose the “Adapters” label.  
c. Click the “Add” button.

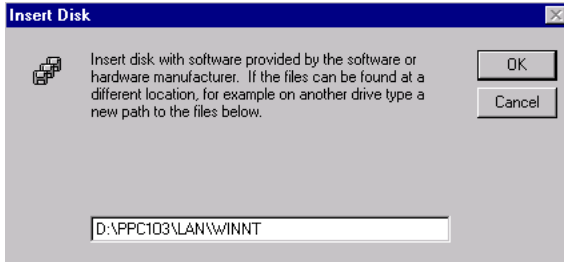


2. Press “Have Disk.”

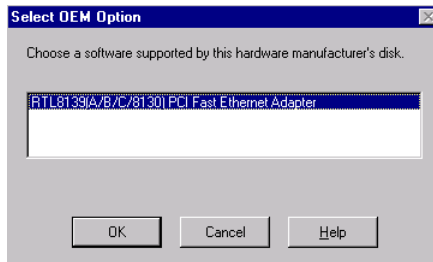




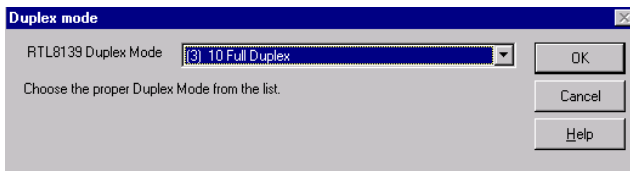
3. a. Type the path “D:\PPC-S123\LAN\WINNT4”  
b. Press the “OK” button.



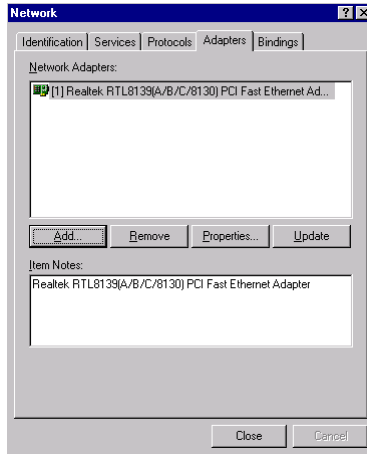
4. a. Choose the highlighted “RTL8139[A/B/C/8130] PCI Fast Ethernet Adapter.”  
b. Click the “OK” button.



5. Choose a suitable RTL8139 Duplex mode for your application.



6. Finish the network configuration and then click the “OK” button.



### 5.2.3 Installation for Windows 2000/ME

After finishing the Windows 2000/ME installation, the system will automatically detect the Ethernet hardware and install the Ethernet driver from the drivers database from Windows 2000 or Windows ME when the system reboots.

Users are not required to install the Ethernet driver themselves.

## 5.3 Further Information

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Realtek website: [www.realtek.com.tw](http://www.realtek.com.tw)

Advantech websites: [www.advantech.com](http://www.advantech.com)  
[www.advantech.com.tw](http://www.advantech.com.tw)

# CHAPTER 6

## **AGP SVGA Setup**

- Introduction
- Installation of SVGA Driver
  - for Windows 98
  - for Windows NT
  - for Windows 2000
  - for Windows ME
- Further Information

## 6.1 Introduction

---

The PPC-S123 has an onboard AGP flat panel/VGA interface. The specifications and features are described as follows:

### 6.1.1 Chipset

The PPC-S123 uses a Lynx EM4 SMI710 chipset from Silicon Motion Inc. for its AGP/SVGA controller. It supports many popular LCD, EL, and gas plasma flat panel displays and conventional analog CRT monitors. The SMI 710 VGA BIOS supports monochrome LCD, EL, color TFT and STN LCD flat panel displays. In addition, it also supports interlaced and non-interlaced analog monitors (color and monochrome VGA) in high-resolution modes while maintaining complete IBM VGA compatibility. Digital monitors (i.e. MDA, CGA, and EGA) are NOT supported. Multiple frequency (multisync) monitors are handled as if they were analog monitors.

### 6.1.2 Display memory

With onboard 4 MB display memory, the VGA controller can drive CRT displays or color panel displays with resolutions up to 1280 x 1024 at 16 M colors.

## 6.2 Installation of SVGA Driver

---

Complete the following steps to install the SVGA driver. Follow the procedures in the flow chart that apply to the operating system that you are using within your PPC-S123.

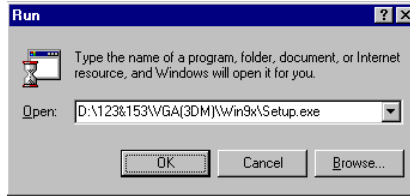
*Important: The following windows illustrations are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.*

*Note 1: The CD-ROM drive is designated as "D" throughout this chapter.*

*Note 2: <Enter> means pressing the "Enter" key on the keyboard.*

## 6.2.1 Installation for Windows 98

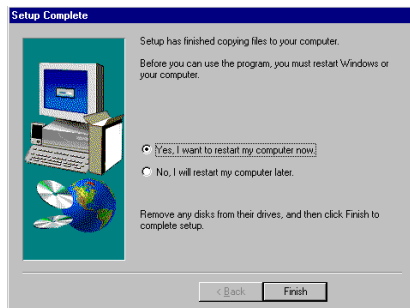
1. a. Select "Start" and "Run"
- b. Type the path "D:\PPC-S123\VGA\Win98&ME\Setup.exe"
- c. Click "OK"



2. a. Click "Next"



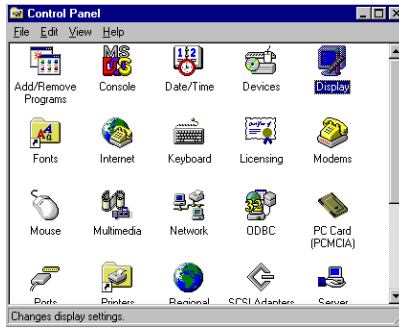
3. Click "Finish" to reboot the system



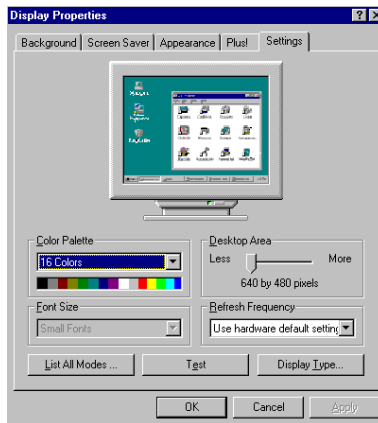
## 6.2.2 Installation for Windows NT

*Note: Service Pack X (X=3, 4, 5, 6, ....) must be installed first before you install the Windows NT VGA driver.*

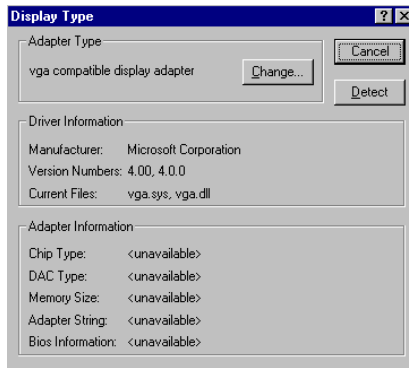
1. a. Select "Start", "Settings", "Control Panel".  
b. Double click the "Display" icon.



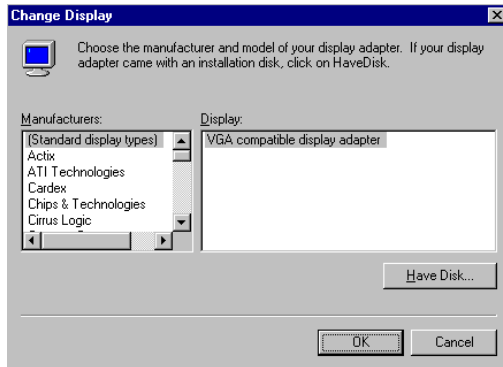
2. a. Choose the "Settings" label.  
b. Press the "Display Type" button.



3. a. Press the "Change..." button.

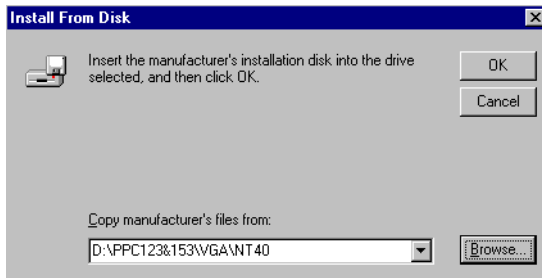


4. a. Click the "Have Disk..." button.

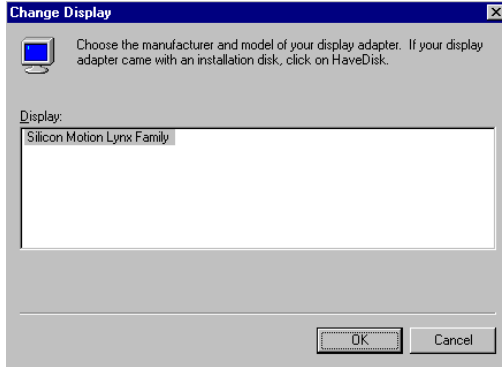


5. a. Type the path: D:\PPC-S123VGA\NT40

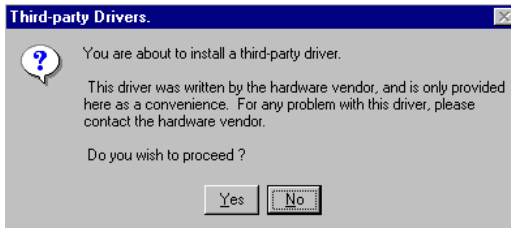
b. Press the "OK" button.



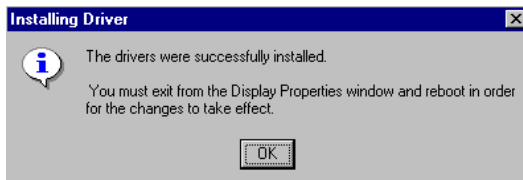
- 6. a. Select the highlighted item.
- b. Click the "OK" button.



- 7. a. Press the "Yes" button to proceed. .



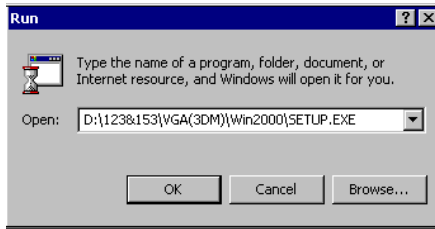
- 8. a. Press "OK" reboot.





## 6.2.3 Installation for Windows 2000

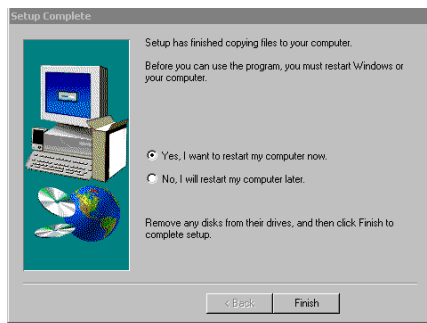
1. a. Select "Start", "Run"
- b. Type the path: "D:\PPC-S123\VGA\Win2000\Setup.exe"
- c. Click "OK"



2. Click "Next"

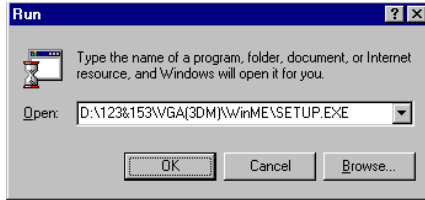


3. a. Click "Finish" to reboot the system

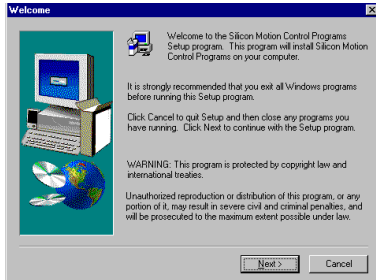


## 6.2.4 Installation for Windows ME

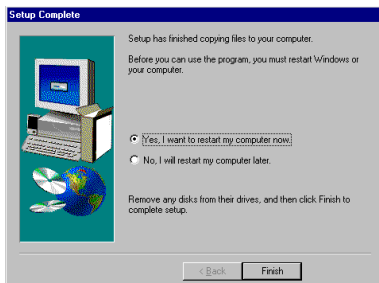
1. a. Select "Start", "Run"
  - b. Type the path: "D:\PPC-S123\VGA\Win98&ME\Setup.exe"
  - c. Click "OK"



2. Click "Next"



3. a. Click "Finish" to reboot the system



## 6.3 Further Information

---

For further information about the AGP/SVGA installation in your PPC-S123, including driver updates, troubleshooting guides and FAQ lists, visit the following web resources:

Silicon Motion website:

**[www.siliconmotion.com](http://www.siliconmotion.com)**

Advantech websites:

**[www.advantech.com](http://www.advantech.com)**

**[www.advantech.com.tw](http://www.advantech.com.tw)**



# CHAPTER 7

## Audio

- Introduction
- Installation of Audio Driver
  - for Windows 98
  - for Windows NT
  - for Windows 2000
  - for Windows ME

## 7.1 Introduction

---

The PPC-S123's onboard audio interface provides high-quality stereo sound and FM music synthesis (ESFM) by using the ES-1938 audio controller from ESS Technology, Inc. The audio interface can record, compress, and play back voice, sound, and music with a built-in mixer control. The PPC-S123's onboard audio interface also supports the Plug and Play (PnP) standard and provides PnP configuration for audio, FM, and MPU-104 logical devices. It is compatible with Sound Blaster, Sound Blaster Pro version 3.01, voice, and music functions. The ESFM synthesizer is register compatible with the OPL3 and has extended capabilities.

## 7.2 Installation of Audio Driver

---

Before installing the audio driver, please take note of the procedures detailed below. You must know which operating system you are using in your PPC-S123, and then refer to the corresponding installation flow chart. Just follow the steps in the flow chart. You can quickly and successfully complete the installation, even though you are not familiar with instructions for Windows.

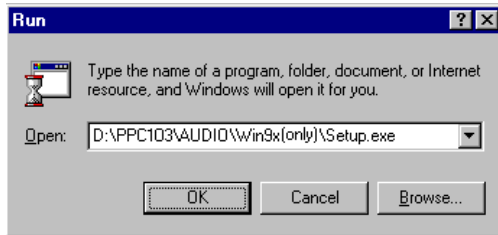
*Important: The following windows illustrations are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.*

*Note 1: The CD-ROM drive is designated as "D" throughout this chapter.*

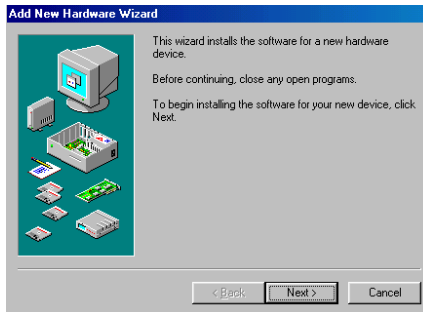
*Note 2: <Enter> means pressing the "Enter" key on the keyboard.*

## 7.2.1 Installation for Windows 98

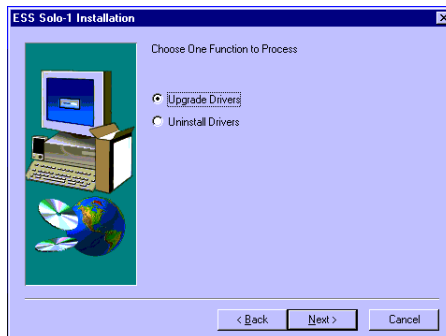
1. a. Select “Start” and “Run”  
b. Enter the driver path  
“D:\PPC-S123\Audio\Win9x(only)\Setup.exe”



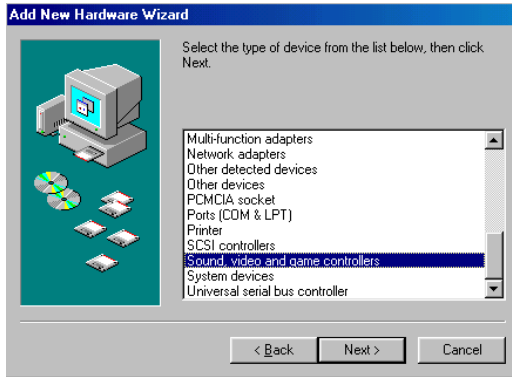
2. Click “Next” to continue the installation



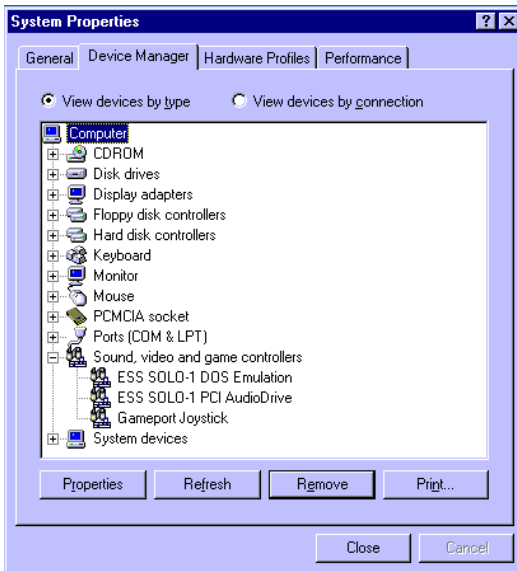
3. a. Select “Upgrade Drivers”  
b. Click “Next”



4. Click “Finish” to complete the installation and restart your computer.



5. a. After installation, select “Start,” “Settings,” “Control Panel,” “System”  
b. Click the “Device Manager” tab to see the result of your installation.



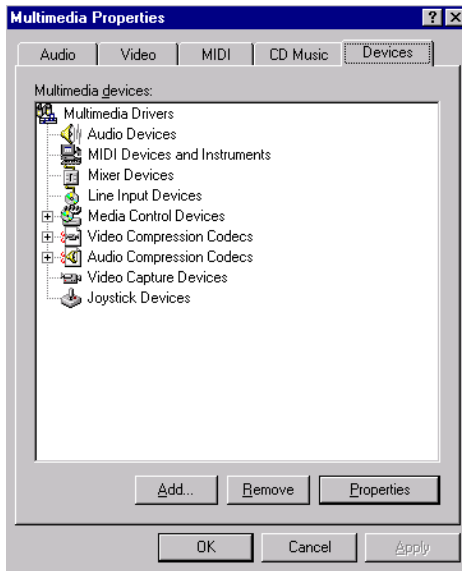


## 7.2.2 Installation for Windows NT

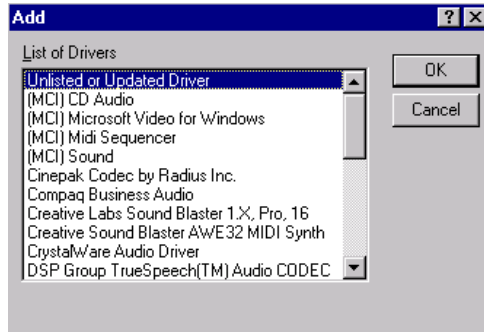
1. a. Select “Start,” “Setting” and “Control Panel”  
b. Double click the “Multimedia” icon.



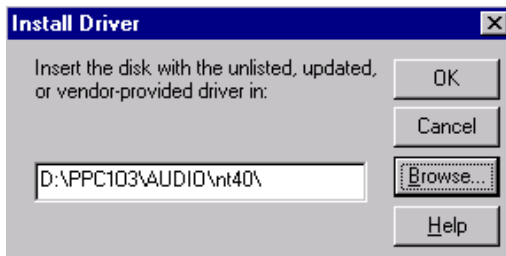
2. a. Select the “Devices” item.  
b. Click the “Add...” button.



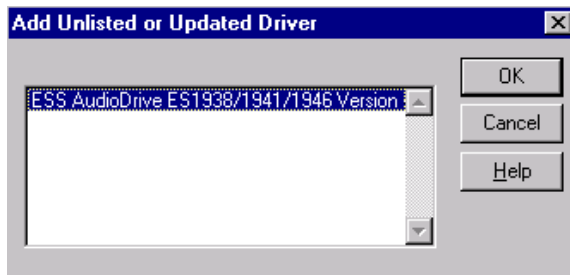
3. a. Choose the “Unlisted or Updated Driver” item.
- b. Click the “OK” button.



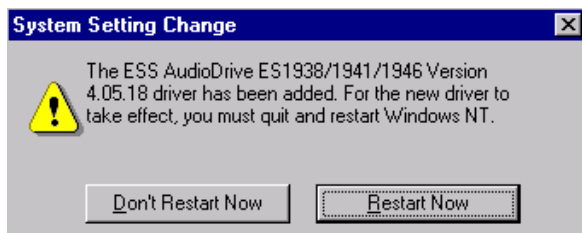
4. a. Type the path “D:\PPC-S123\audio\NT40\”
- b. Click the “OK” button.



5. a. Select the highlighted item.
- b. Press the “OK” button.



6. Press the “Restart Now” button to reboot your computer.



### 7.2.3 Installation for Windows 2000/ME

After installing Windows 2000/ME, the system can automatically detect the audio hardware and install the driver from the driver database in Windows 2000 or Windows ME when the system reboots.

It is not necessary to install the audio driver manually.



# CHAPTER 8

## **Award BIOS Setup**

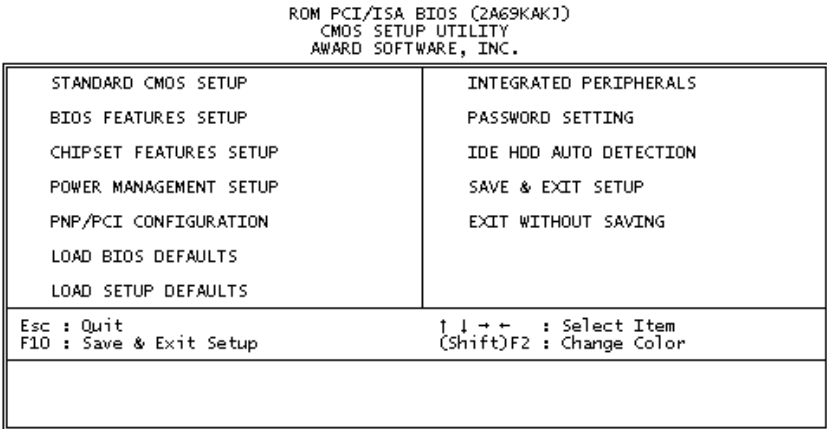
This chapter describes how to set BIOS configuration data.

# 8.1 Award BIOS Setup

The PPC-S123 comes with an Award BIOS chip that contains the ROM setup for your system. This chip serves as an interface between the processor and the rest of the mainboard's components. This chapter explains the information contained in the setup program and tells you how to modify the settings according to your system configuration. Some setup items will not be explained, because it is recommended that users do not change such items.

*Note: Values for the various setup items that appear on your own screen (including default values) may not be the same as the values shown on the screen figures in this chapter. This is because the BIOS is revised and updated from time to time. If in doubt, check Advantech's website for the latest BIOS versions and related information.*

# 8.2 CMOS Setup Utility



**Figure 8-1: Setup program initial screen**

A setup program, built into the system BIOS, is stored in the CMOS RAM that allows the configuration settings to be changed. This

program is executed when the user changes the system configuration; when the user changes the system backup battery; or when the system detects a configuration error and asks the user to run the setup program. At power-on RAM testing, the message "Press DEL to enter Setup" appears. After pressing the "DEL" key, the CMOS setup utility screen will appear as shown in Fig. 8-1. Use the arrow keys to select and press "Enter" to run the selected program.

## 8.3 Standard CMOS Setup

```

ROM PCI/ISA BIOS (2A69KAKJ)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

```

Date (mm:dd:yy) : Thu, Nov 25 1999								
Time (hh:mm:ss) : 17 : 4 : 41								
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	:	0	0	0	0	0	0	0 NORMAL
Primary Slave	:	0	0	0	0	0	0	0 NORMAL
Secondary Master	:	0	0	0	0	0	0	0 NORMAL
Secondary Slave	:	0	0	0	0	0	0	0 NORMAL
Drive A : None								
Drive B : None								
Video : EGA/VGA								
Halt On : All Errors								
ESC : Quit		↑ ↓ ← → : Select Item			PU/PD/+/- : Modify			
F1 : Help		(Shift)F2 : Change Color						

**Figure 8-2: CMOS setup screen**

The standard CMOS setup screen is shown above. System BIOS automatically detects memory size, so no changes are necessary. It has a few items requiring setting. Each item may have one or more optional settings. System BIOS allows you to change the system date and time, IDE hard disk, floppy disk drive types for drives A: and B:, boot-up video display mode, and POST error handling selection. Use the arrow keys to highlight the item and then use the "PgUp" or "PgDn" keys to select the value you want for each item.

### **8.3.1 Hard disk configurations**

#### **TYPE**

Select from 1 to 45 to fill the remaining fields with predefined values for disk drives. Select "User" to fill the remaining fields. Select "Auto" to detect the HDD type automatically.

#### **SIZE**

Hard disk size. The unit is megabytes (MB).

#### **CYLS**

The cylinder number of the hard disk.

#### **HEAD**

The read/write head number of the hard disk.

#### **PRECOMP**

The cylinder number at which the disk drive changes the write timing.

#### **LANDZ**

The cylinder number where the disk drive heads (read/write) are seated when the disk drive is parked.

#### **SECTOR**

The sector number of each track defined on the hard disk.

#### **MODE**

Select "Auto" to detect the mode type automatically. If your hard disk supports the LBA mode, select "LBA" or "Large". However, if your hard disk supporting cylinder is more than 1024 MB and does not support the LBA function, you have to select "Large". If your hard disk supporting cylinder is below 1024 MB, select "Normal".



## 8.4 BIOS Features Setup

```
ROM PCI/ISA BIOS (2A69KAKJ)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.
```

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF Shadow	: Disabled
CPU L2 Cache ECC Checking	: Enabled	D0000-D3FFF Shadow	: Disabled
Processor Number Feature	: Enabled	D4000-D7FFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D8000-DBFFF Shadow	: Disabled
Boot From LAN First	: Disabled	DC000-DFFFF Shadow	: Disabled
Boot Sequence	: C, A, SCSI		
Swap Floppy Drive	: Disabled		
Boot Up Floppy Seek	: Enabled		
Boot Up NumLock Status	: On		
Gate A20 Option	: Fast		
Typeomatic Rate Setting	: Disabled		
Typeomatic Rate (Chars/Sec)	: 6		
Typeomatic Delay (Msec)	: 250		
Security Option	: Setup	ESC : Quit	↑↓←→ : Select Item
PS/2 mouse function control	: Enabled	F1 : Help	PU/PD/+/- : Modify
PCI/VGA Palette Snoop	: Disabled	F5 : Old Values (Shift)	F2 : Color
OS Select For DRAM > 64MB	: Non-OS2	F6 : Load BIOS Defaults	
Report No FDD For WIN 95	: Yes	F7 : Load Setup Defaults	

**Figure 8-3: BIOS features setup screen**

Moving around the BIOS Features and Chipset Features setup programs works the same way as moving around the Standard CMOS setup program. (Refer to the next section for Chipset Features setup.) The BIOS Features setup program is shown above. Users are not encouraged to run the BIOS and Chipset Features setup programs. Your system should have been fine-tuned before shipping. Improper setup may cause the system to fail, so consult your dealer before making any changes.

### **Virus Warning**

When enabled, it assigns the BIOS to monitor the master boot sector and the DOS sector of the first hard disk drive.

The options are: Disabled (Default), Enabled.

### **CPU Internal Cache**

When enabled, it improves system performance. Disable this item when testing or troubleshooting.

The options are: Enabled (Default), Disabled.

### **External Cache**

When enabled, supports an external cache SRAM.

The options are: Enabled (Default), Disabled.

### **CPU L2 Cache ECC Checking**

Allows the CPU L2 cache to enable the memory parity check.

The options are: Disabled (Default), Enabled.

### **Quick Power On Self Test**

When enabled, allows the BIOS to bypass the extensive memory test.

The options are: Disabled (Default), Enabled.

### **Boot From LAN First**

Enables the system to boot from a LAN.

The options are: Disabled (Default), Enabled.

### **Boot Sequence**

Allows the system BIOS to first try to boot the operating system from the selected disk drive.

The options are:

C, A, SCSI (Default)

LS/ZIP, C

C (only)

SCSI, C, A

SCSI, A, C

F, A, SCSI

E, A, SCSI

D, A, SCSI

CDROM, C, A

C, CDROM, A

### **Swap Floppy Drive**

When enabled, allows you to switch the order in which the operating system accesses the floppy drives during boot-up.

The options are: Disabled (Default), Enabled.

### **Boot Up Floppy Seek**

When enabled, assigns the BIOS to perform floppy disk drive tests by issuing seek commands. Note that such tests are time-consuming.

The options are: Enabled (Default), Disabled.

### **Boot Up NumLock Status**

When set to "On", allows the BIOS to automatically enable the NumLock function when the system boots up.

The options are: On (Default), Off.

### **Typematic Rate Setting**

The term typematic means that when a keyboard key is held down, the character is repeatedly entered until the key is released. When this item is enabled, you may change the typematic repeat rate.

The options are: Disabled (Default), Enabled.

### **Typematic Rate (Chars/Sec)**

Sets the rate of a character repeat when the key is held down.

The options are: 6 (Default), 8, 10, 12, 15, 20, 24, 30.

### **Typematic Delay (msec)**

Sets the delay time before a character is repeated.

The options are: 250 (Default), 500, 750, 1000 milliseconds.

### **Security Option**

Allows you to set the security level of the system.

The options are: Setup (Default), System.

### **PS/2 Mouse Function Control**

When enabled, the PS/2 mouse is activated.

The options are: Disabled (Default), Enabled.

### **PCI/VGA Palette Snoop**

When enabled, allows you to install an enhanced graphics adapter card. If your graphics adapter card does not support the Palette Snoop function, set at "Disabled" to avoid system malfunctions.

The options are: Disabled (Default), Enabled.

### **OS Select For DRAM > 64MB**

If your operating system (OS) is OS2, select "OS2". Otherwise, stay with the default setting Non-OS2.

### **Report No FDD For WIN 95**

Assigns IRQ6 for the FDD.

The options are: Yes (Default), No.

### **Video BIOS Shadow**

When enabled, allows the BIOS to copy the video ROM code of the add-on video card to the system memory, giving faster access.

The options are: Enabled (Default), Disabled.

### **C8000-CBFFF Shadow through to DC000-DFFFF Shadow**

When enabled, allows the BIOS to copy the BIOS ROM code of the add-on card to the system memory for faster access. It may improve the performance of the add-on card. Some add-on cards will not function properly if their BIOS ROM codes are shadowed. To use this option correctly, you need to know the memory address range used by the BIOS ROM of each add-on card.

The options are: Disabled (Default), Enabled.

## 8.5 Chipset Features Setup

*Note: It is strongly recommended that setup items in this section NOT be changed, because advanced knowledge is required to effect such changes.*

ROM PCI/ISA BIOS (2A69KAKJ)  
 CHIPSET FEATURES SETUP  
 AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	Power-Supply Type	: AT
EDO DRAM Speed Selection	: 60ns	Auto Detect DIMM/PCI Clk	: Enabled
EDO CASX# MA Wait State	: 2	Spread Spectrum	: Disabled
EDO RASX# Wait State	: 1	CPU Host Clock (CPU/PCI)	: Default
SDRAM RAS-to-CAS Delay	: 3	CPU Warning Temperature	: Disabled
SDRAM RAS Precharge Time	: 3	Current System Temp.	:
SDRAM CAS latency Time	: Auto	Current CPU Temperature	:
SDRAM Precharge Control	: Disabled	Current System Fan Speed	:
DRAM Data Integrity Mode	: Non-ECC	Current CPU Fan Speed	:
System BIOS Cacheable	: Enabled	Vcore	: +3.3V
Video BIOS Cacheable	: Enabled	+ 5 V	: +12 V
Video RAM Cacheable	: Enabled	-12 V	: -
8 Bit I/O Recovery Time	: 1		
16 Bit I/O Recovery Time	: 1		
Memory Hole At 15M-16M	: Disabled		
Passive Release	: Enabled	ESC : Quit	↑↓←→ : Select Item
Delayed Transaction	: Disabled	F1 : Help	PU/PD/+/- : Modify
AGP Aperture Size (MB)	: 64	F5 : Old Values (Shift)F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

**Figure 8-4: Chipset features setup screen**

### **EDO CASX# MA Wait State**

Sets the EDO CASX# MA wait state.

The options are: 1 (Default), 2.

### **EDO RASX# Wait State**

Sets the EDO RASX# wait state.

The options are: 1 (Default), 2.

### **SDRAM CAS Latency Time**

Sets the SDRAM CAS latency time.

The options are: Auto (Default), 2, 3.

### **SDRAM Data Integrity Mode**

### **System BIOS Cacheable**

When enabled, allows the ROM area F000H-FFFFH to be cacheable when the cache controller is activated. The recommended setting is "Disabled", especially for high speed CPUs (200 MHz and above).

### **Video BIOS Cacheable**

When enabled, allows the system to use the video BIOS codes from SRAMs, instead of the slower DRAMs or ROMs.

The options are: Enabled (Default), Disabled.

### **Video RAM Cacheable**

Enables video RAM to be cacheable.

The options are: Disabled (Default), Enabled.

### **16 Bit I/O Recovery Time**

Sets 16-bit I/O signal recovery time.

The options are: 1 (Default), 2, 3, 4, N/A.

### **Memory Hole at 15M-16M**

When enabled, the memory hole at the 15 MB address will be relocated to the 15 ~ 16 MB address range of the ISA cycle when the processor accesses the 15 ~ 16 MB address area.

The options are: Disabled (Default), Enabled.

### **Delayed Transaction**

When disabled, the system operates normally. When enabled, the system can support lower-speed ISA devices.

The options are: Disabled (Default), Enabled.

### **Spread Spectrum**

When disabled, the system operates normally. When enabled, the spread spectrum will be set to 0.5% (CNTR).

The options are: Disabled (Default), Enabled.

## 8.6 Power Management Setup

ROM PCI/ISA BIOS (2A69KAKJ)  
POWER MANAGEMENT SETUP  
AWARD SOFTWARE, INC.

Power Management : User Define	** Reload Global Timer Events **
PM Control by APM : Yes	IRQ[3-7,9-15],NMI : Disabled
Video Off Method : V/H SYNC+Blank	Primary IDE 0 : Disabled
Video Off After : Standby	Primary IDE 1 : Disabled
MODEM Use IRQ : 3	Secondary IDE 0 : Disabled
Doze Mode : Disable	Secondary IDE 1 : Disabled
Standby Mode : Disable	Floppy Disk : Disabled
Suspend Mode : Disable	Serial Port : Enabled
HDD Power Down : Disable	Parallel Port : Disabled
Throttle Duty Cycle : 62.5%	
PCI/VGA Act-Monitor : Disabled	
Soft-Off by PWR-BTTN : Instant-Off	
PWRON After PWR-Fail : Always Off	
PowerOn by Ring : Disabled	
IRQ 8 Break Suspend : Disabled	
	ESC : Quit            ↑↓←→ : Select Item
	F1 : Help            PU/PD/+/- : Modify
	F5 : Old Values    (Shift)F2 : Color
	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

**Figure 8-5: Power management setup screen**

### Power Management

When enabled, allows you to use Power Management features.

The options are: Disabled (Default), Enabled.

### PM Control by APM

The option "No" allows the BIOS to ignore the APM (Advanced Power Management) specification. Selecting "Yes" will allow the BIOS to wait for APM's prompt before it enters Doze mode, Standby mode, or Suspend mode. If the APM is installed, it will prompt the BIOS to set the system into power saving mode after all tasks are done.

The options are: Yes (Default), No.

### Video Off Option

This feature provides the selections for the video display power saving mode. The option "Susp, Stby--Off" allows the video display to go blank if the system enters Suspend or Standby mode. The option "Suspend--Off" allows the video display to go blank if the system

enters Suspend mode. The option "All Modes--Off" allows the video display to go blank if the system enters Doze mode or Suspend mode. The option "Always On" allows the video display to stay in Standby mode even when the system enters Doze or Suspend mode.

The options are: Susp, Stby= Off (Default), Suspend =Off

All Mode+ Off, Always On.

### **Video Off Method**

"DPMS Supported" allows the BIOS to blank off the screen display with your VGA card which supports DPMS (Display Power Management Signaling function). "Blank Screen" allows the BIOS to blank the screen display by turning off the red-green-blue signals.

The options are: DPMS Supported (Default), Blank Screen.

### **MODEMUse IRQ**

This feature allows you to select the IRQ# to meet your modem's IRQ#.

The options are: 3 (Default), 4, 5, 7, 9, 10, 11, NA.

### **Doze Mode**

The system will not enter Doze mode, because this option is designated as "Disabled".

### **Standby Mode**

The system will not enter Standby mode, because this option is designated as "Disabled".

### **Suspend Mode**

The system will not enter Suspend mode, because this option is designated as "Disabled".

### **HDD POWERDown**

Selecting "Disabled" will turn off the hard disk drive (HDD) motor. Selecting "1 Min.. 15 Min" allows you to define the HDD idle time before the HDD enters Power Saving Mode.

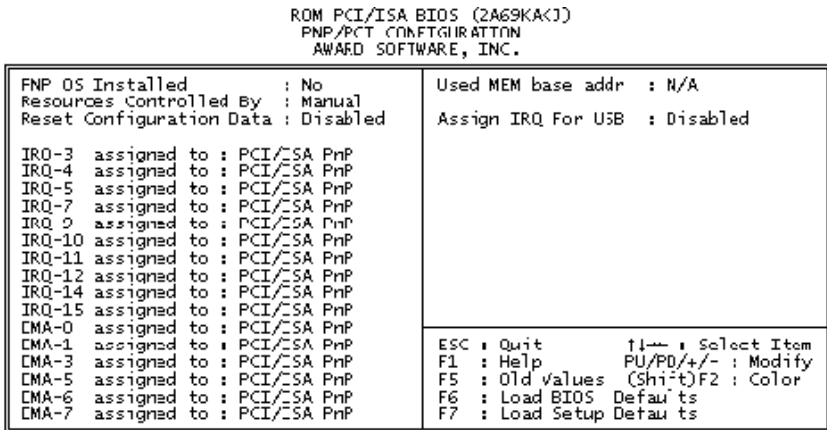
The options "1 Min.. 15 Min" and "When Suspend" will not work concurrently. When the HDD is in Power Saving Mode, any access to



the HDD will wake it up.

The options are: Disabled (Default), 1 Min., 15 Min.

## 8.7 PNP/PCI Configuration Setup



**Figure 8-6: PNP/PCI configuration setup screen**

### PNP OS Installed

Select Yes if the installed system supports the PnP function. Select No if the installed system does not support the PnP function.

The options are: No (Default), Yes.

### Resources Controlled By

If set at "Auto", the BIOS automatically arranges all system resources for you. If there are conflicts or you are not satisfied with the configuration, simply set all the resources listed in the above figure by selecting "Manual".

The options are: Manual (Default), Auto.

The manual options assigned to IRQ-/DMA- are: Legacy ISA, PCI/ISA PnP.

### Reset Configuration Data

When enabled, this feature allows the system to clear the last BIOS configuration data and then reset the data with the default BIOS configuration data.

The options are: Disabled (Default), Enabled.

### Used MEM base addr

Choose and use the MEM base address.

The options are: N/A (Default), C800 ~ DC00.

### Assign IRQ for USB

Assigns an IRQ for the USB.

The options are: Disabled (Default), Enabled.

## 8.8 Load BIOS Defaults

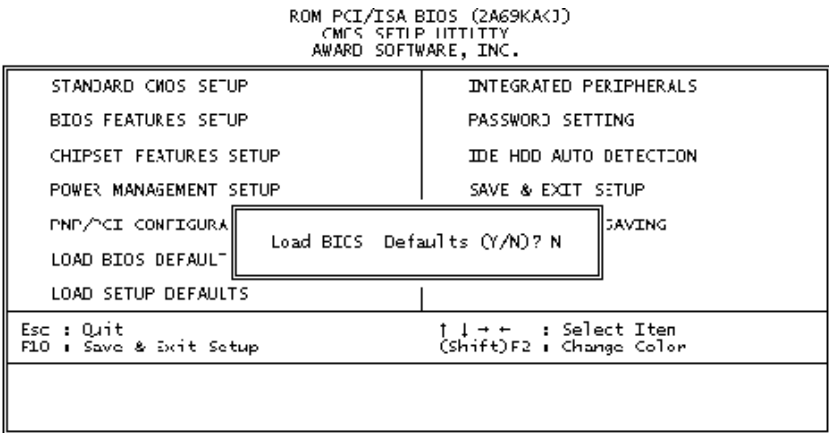


Figure 8-7: Load BIOS defaults screen

## 8.9 Load Setup Defaults

Selecting this field loads the factory defaults for BIOS and Chipset Features. The system will automatically detect these defaults.

## 8.10 Integrated Peripherals

```
ROM PCI/ISA BIOS (2A69KAK1)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.
```

IDE HDD Block Mode : Enabled	Onboard Serial Port 2 IRQ: 3
On-Chip Primary PCI IDE: Enabled	UART Mode Select : :
On-Chip Secondary PCI IDE: Enabled	UART2 Duplex Mode : Half
IDE Primary Master PIO : Auto	RxD , TxD Active : Hi,Lo
IDE Primary Slave PIO : Auto	IR Transmittiion delay : Enabled
IDE Secondary Master PIO : Auto	Onboard Parallel Port : :
IDE Secondary Slave PIO : Auto	Onboard Parallel Port IRQ: 7
IDE Primary Master UDMA : Auto	Parallel Port Mode : :
IDE Primary Slave UDMA : Auto	ECP Mode Use DMA : 3
IDE Secondary Master UDMA: Auto	EPP Mode Select : EPP1.7
IDE Secondary Slave UDMA: Auto	Onboard Serial Port 3 : 3E8H
Onboard PCI Lan Chip : Enabled	Serial Port 3 Use IRQ : IRQ10
USB Keyboard Support : Disabled	Onboard Serial Port 4 : 2E8H
Init Display First : PCI Slot	Serial Port 4 Use IRQ : IRQ5
KBC input clock : 8 Mhz	
Onboard FDC Controller : Enabled	
Onboard Serial Port 1 : :	
Onboard Serial Port 1 IRQ: 4	
Onboard Serial Port 2 : :	

**Figure 8-8: Integrated peripherals screen**

### IDE HDD Block Mode

This allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

The options are: Enabled (Default), Disabled.

### IDE Primary/Secondary Master/Slave PIO

IDE hard disk drive controllers can support up to separate hard drives.

These drives have a master/slave relationship which is determined by the cabling configuration used to attach them to the controller. Your system supports two IDE controllers - a primary and a secondary - so you have the ability to install up to four separate hard disks.

PIO means Programmed Input/Output. Rather than having the BIOS issue a series of commands to effect a transfer to or from the disk

drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the task by themselves.

Your system supports five modes, numbered from 0 through 4, which differ primarily in timing. When "Auto" is selected, the BIOS will choose the best available mode.

The options are: Auto, (Default), Disabled.

### **Primary/Secondary Master/Slave Ultra DMA**

DMA means Direct Memory Access. Ultra DMA is faster than DMA. DMA is a method of transferring data to or from memory at a fast rate, without involving the CPU.

When you select "Auto", the BIOS will choose the best available mode.

The options are: Auto (Default), Disabled.

### **Onboard FDD Controller**

When enabled, the floppy disk drive (FDD) controller is activated.

The options are: Enabled (Default), Disabled.

### **Onboard Serial Ports 1 & 2**

If the serial ports use the onboard I/O controller, you can modify your serial port parameters.

The options for Port 1 are: 3F8/IRQ4 (Default), 2E8/IRQ3, Disabled, 2F8/IRQ3, 3E8/IRQ4.

The options for Port 2 are: 2F8/IRQ3 (Default), 3E8/IRQ4, 2E8/IRQ3, Disabled, 3F8/IRQ4.

### **Onboard Serial Ports 3 & 4**

If the serial ports use the onboard I/O controller, you can modify your serial port parameters.

The options for Port 3 are: 3E8/IRQ10 (Default), 2E8/IRQ5, Disabled.

The options for Port 4 are: 2E8/IRQ5 (Default), Disabled, 3E8/IRQ10.

### **Onboard Parallel Port**

If the parallel port uses the onboard I/O controller, you can modify your parallel port parameters. When you select "Disabled", the next two setup items will disappear.

The options are: 378/IRQ7 (Default), 3BC/IRQ7, 278/IRQ5, Disabled.

### **Parallel Port Mode**

You can choose different data transfer modes for your system.

The options are: ECP & EPP (Default), SPP, EPP, ECP.

### **ECP Mode Use DMA**

You can choose different DMA modes for data transfer.

The options are: 3 (Default), 1.

## **8.11 Password Setting**

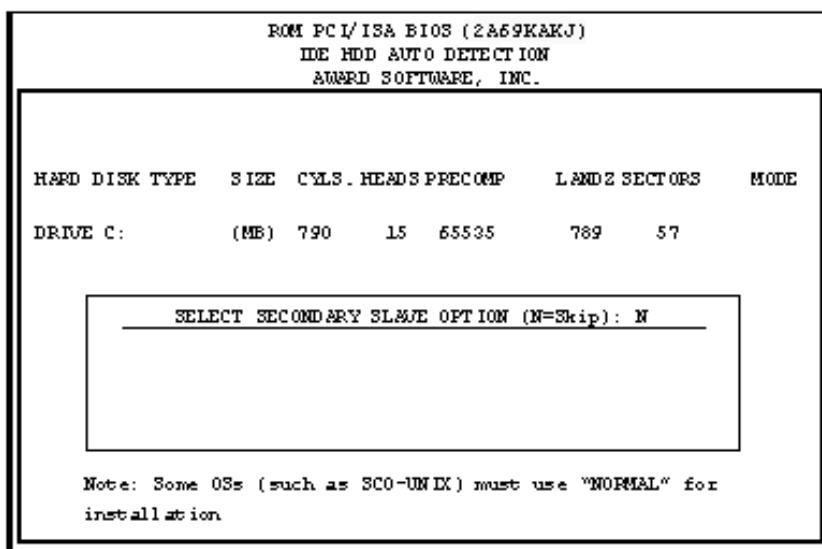
---

To enable the password setting, select the item from the Standard CMOS Setup. You will be prompted to create your own password. Type your password up to eight characters and press "Enter". You will be asked to confirm the password. Type the password again and press "Enter". You may also press "Esc" to abort the selection and not enter a password. To disable the password, press "Enter" when you are prompted to enter the password. A message will appear, confirming the password is disabled.

Under the BIOS Features setup, if "System" is selected under the Security Option field and the Supervisor Password is enabled, you will be

prompted for the supervisor password every time you try to enter the CMOS Setup utility. If "System" is selected and User Password is enabled, you will be requested to enter the user password every time you reboot the system. If "Setup" is selected under the Security Option field and User Password is enabled, you will be prompted only when you reboot the system.

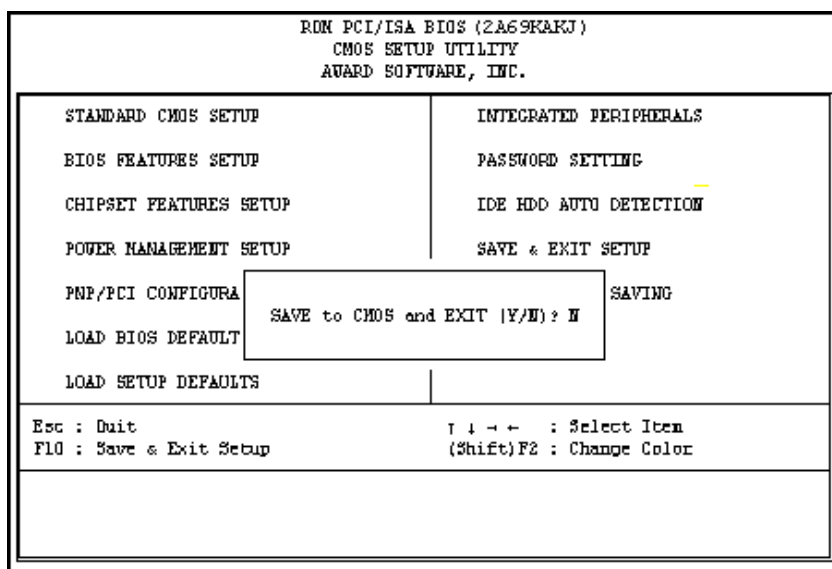
## 8.12 IDE HDD Auto Detection



**Figure 8-9: IDE HDD auto detection screen**

The IDE Hard Disk Drive Auto Detection feature automatically configures your new hard disk. Use it for quick configuration of new hard disk drives. This feature allows you to set the parameters of up to four IDE HDDs. The option with "(Y)" is recommended by the system BIOS. You may also key in your own parameters instead of setting them according to the system BIOS. After keying in all settings, press "Esc" to return to the main menu. For confirmation, enter the Standard CMOS Setup feature.

## 8.13 Save and Exit Setup



**Figure 8-10: Save and exit setup screen**

After you have made changes in the BIOS setup, press "Esc" to return to the main menu. Move the cursor to "Save and Exit Setup", or press "F10" and then press "Y", to change the CMOS Setup. If you did not change anything, press "Esc" again or move the cursor to "Exit Without Saving" and press "Y" to retain the setup settings. The following message will appear at the center of the screen to allow you to save data to CMOS and exit the setup utility:

```
SAVE to CMOS and EXIT (Y/N)?
```

## 8.14 Exit Without Saving

If you select this feature, the following message will appear at the center of the screen to allow you to exit the setup utility without saving CMOS modifications:

```
Quit Without Saving (Y/N) ?
```





# CHAPTER 9

## Touchscreen

- Introduction
- Installation of Touchscreen Drivers
  - for Windows 98/ME
  - for Windows NT
  - for Windows 2000

## 9.1 Introduction

---

### 9.1.1 General information

The PPC-S123's optional touchscreen incorporates advanced second-generation 8-wire resistive, impact-resistant technology. It allows 75% light transmission. The resistive model has an antiglare surface. This model provides greatly enhanced visual resolution. It also has new improved scratch-resistant features.

The touchscreen is manufactured from UL-recognized components. Its fire resistance meets the UL-746C, 19 mm (0.75") flame test standard. Systems incorporating the touchscreen, controllers, and cables have been approved to FCC Class A and Class B standards.

For more detailed information, please visit the following websites:

[www.dynapro.com](http://www.dynapro.com)

or

[www.3m.com/us/electronics\\_mfg/touch\\_systems](http://www.3m.com/us/electronics_mfg/touch_systems)

### 9.1.2 General specifications

Please refer to Chapter 1, Section 1.2 of this manual.

### 9.1.3 Environmental specifications

**Temperature:** -20° ~ 50° C (operating)  
-40° ~ 80° C (storage)

**Relative humidity:**

90 RH at 35° C (operating)

90 RH at 35° C for 240 hours, non-condensing (storage)

**Chemical resistance:** The active area of the touchscreen is resistant to the following chemicals when exposed for a period of one hour at a temperature of 21° C (71° F):

- Acetone
- Methylene chloride
- Methyl ethyl ketone
- Isopropyl alcohol
- Hexane
- Ammonia-based glass cleaners
- Turpentine
- Mineral spirits
- Foods and beverages

## 9.2 Installation of Touchscreen Drivers

---

The touchscreen driver for Windows contains a native, 32-bit driver and a 32-bit control panel program for the PPC-S123 system.

To facilitate installation of the touchscreen driver, you should read the instructions in this section carefully before you attempt installation.

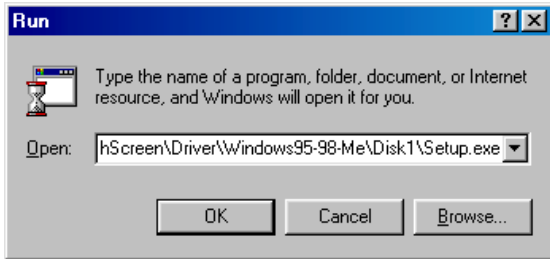
*Important: The following windows illustrations are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.*

*Note 1: The CD-ROM drive is designated as "D" throughout this chapter.*

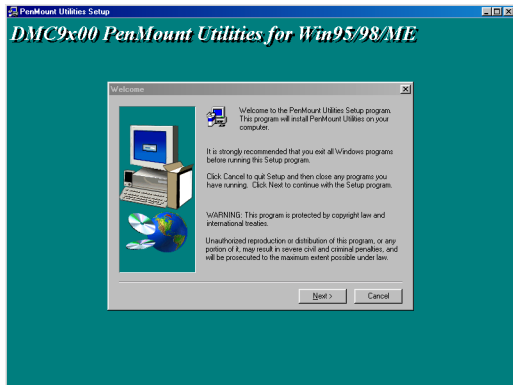
*Note 2: <Enter> means pressing the "Enter" key on the keyboard.*

## 9.2.1 Installation for Windows 98/ME

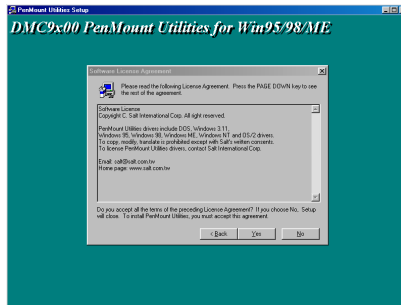
1. a. Select "Start", "Run"
  - b. Type the path D:\PPC-S123\Touchscreen\Driver\Windows95-98-ME\Disk1\Setup.exe
  - c. Click "Ok"



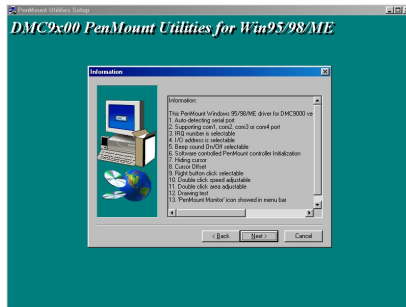
2. Click "Next"



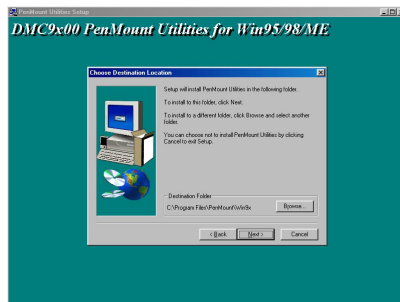
### 3. Click "Yes" to accept the agreement



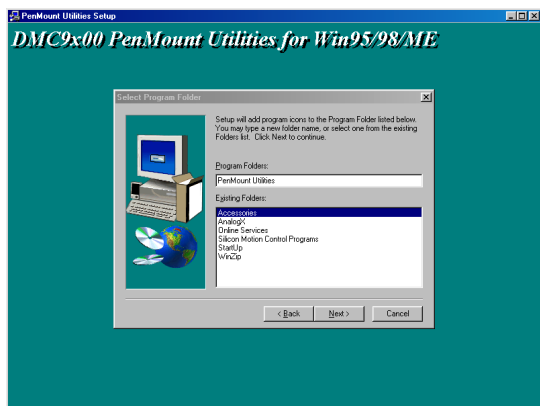
### 4. Click "Next"



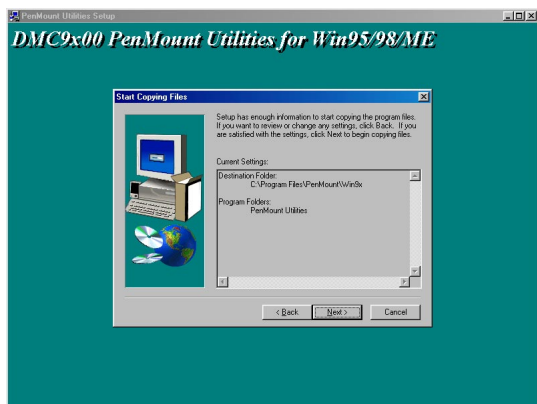
### 5. Choose the directory, then click "Next"



6. Click "Next"



7. Click "Next"

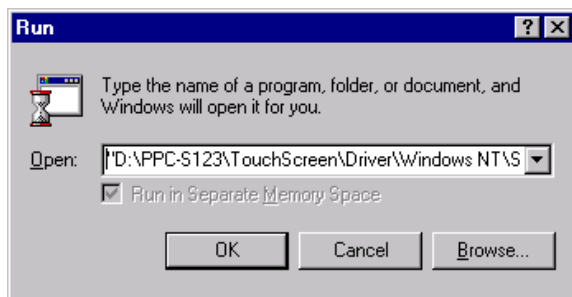


8. Click "Finish" to complete the installation. Then follow the instruction to reboot the computer.

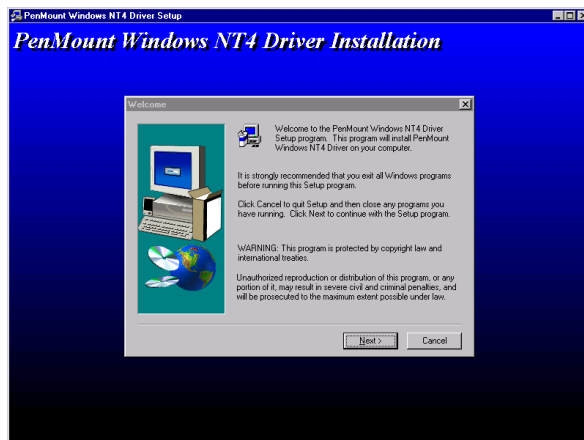


## 9.2.2 Installation for Windows NT

1. a. Select "Start", "Run"
  - b. Type the path D:\PPC-S123\Touchscreen\Driver\WindowsNT\Setup.exe
  - c. Click "OK"

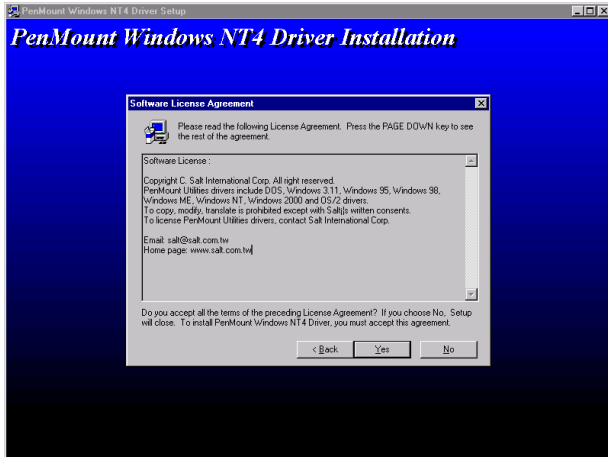


2. Click "Next"

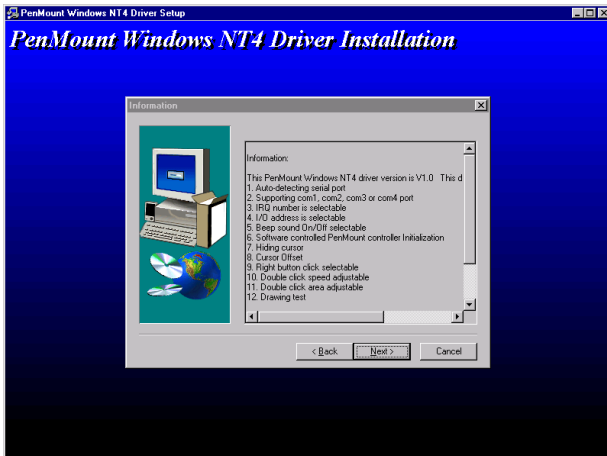




### 3. Click "Yes" to accept the agreement



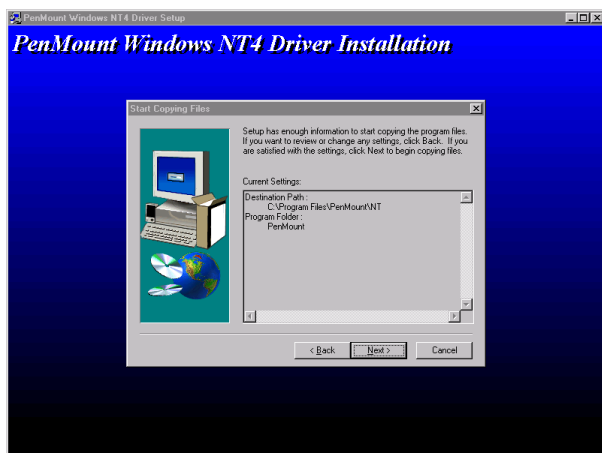
### 4. Click "Next"



5. Choose the directory, then click "Next"



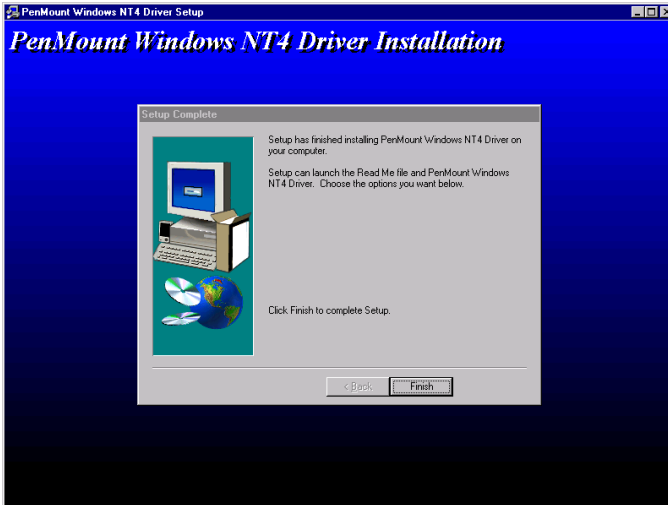
6. Click "Next"



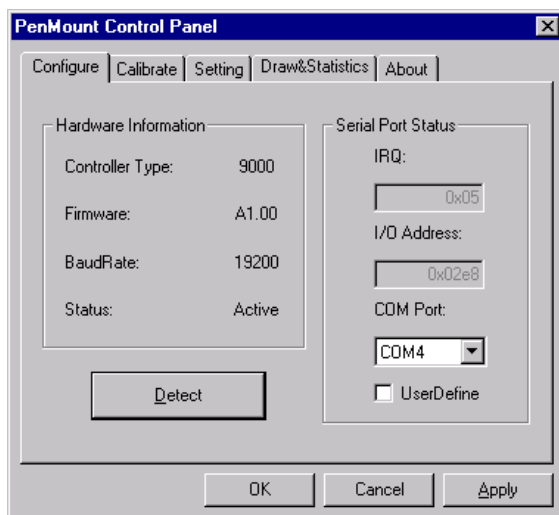
7. Click "Finish"



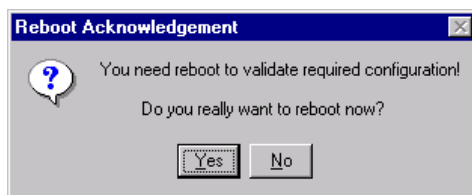
8. Click "Finish" to complete the installation



9. Click "Detect" to find the COM4 port as the touchscreen interface

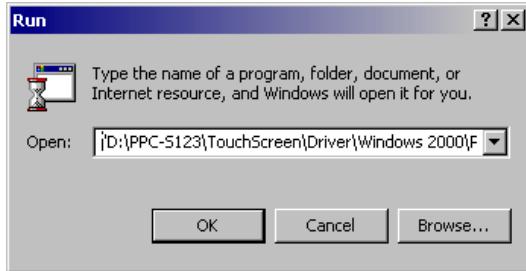


10. Click "Yes" to reboot the system

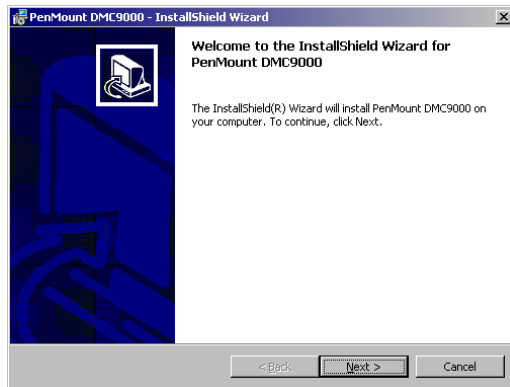


## 9.2.2 Installation for Windows 2000

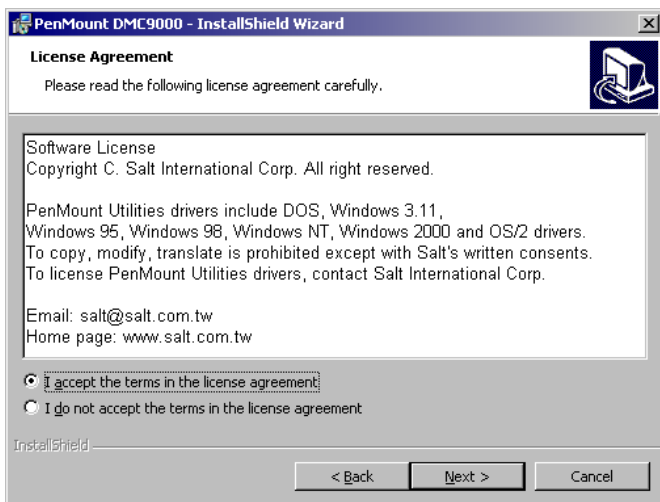
1. a. Select "Start", "Run"
  - b. Type the path D:\PPC-S123\Touchscreen\Driver\Windows2000\PenMountWin2000\Setup.exe
  - c. Click "Ok"



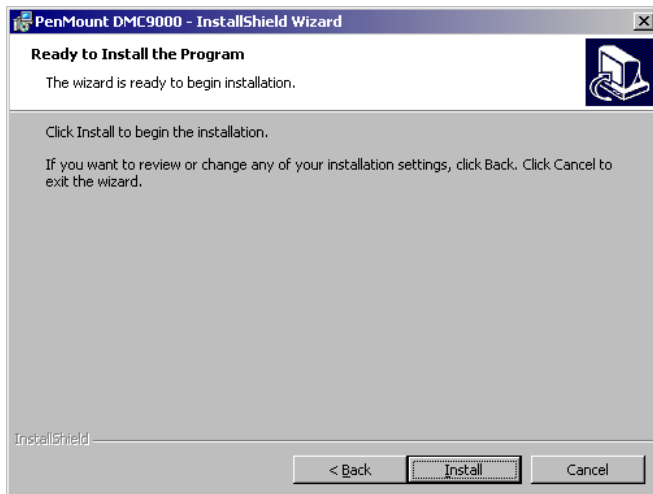
2. Click "Next"



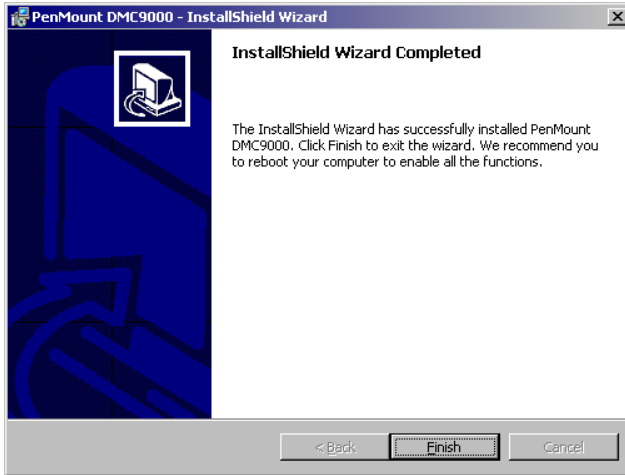
### 3. Click "Next" to accept agreement



### 4. Click "Install" to start the installation



5. Click "Finish"



6. After proceeding with the above procedures and rebooting the system, click "Start", "Setting", "Control Panel", select "Add New Hardware", then follow the instructions to complete the driver installation.





## **Programming the Watchdog Timer**

The PPC-S123 is equipped with a watchdog timer that resets the CPU or generates an interrupt if processing comes to a standstill for any reason. This feature ensures system reliability in industrial standalone or unmanned environments.

## A.1 Programming the Watchdog Timer

---

To program the watchdog timer, you must write a program which writes I/O port address 443 (hex). The output data is a time interval value. The value range is from 01 (hex) to 3E (hex), and the related time interval is from 1 sec. to 62 sec.

<b>Data</b>	<b>Time Interval</b>
01	1 sec.
02	2 sec.
03	3 sec.
04	4 sec.
•	•
•	•
•	•
3E	62 sec.

After data entry, your program must refresh the watchdog timer by rewriting the I/O port 443 (hex) while simultaneously setting it. When you want to disable the watchdog timer, your program should read I/O port 443 (hex).

The following example shows how you might program the watchdog timer in BASIC:

```
10      REM   Watchdog timer example program
20      OUT &H443, data REM   Start and restart the
      watchdog
30      GOSUB 1000 REM   Your application task #1,
40      OUT &H443, data REM   Reset the timer
50      GOSUB 2000 REM   Your application task #2,
60      OUT &H443, data REM   Reset the timer
70      X=INP (&H443) REM, Disable the watchdog timer
80      END

1000    REM   Subroutine #1, your application task
      •
      •
      •
1070    RETURN
2000    REM   Subroutine #2, your application task
      •
      •
      •
2090    RETURN
```



**APPENDIX**

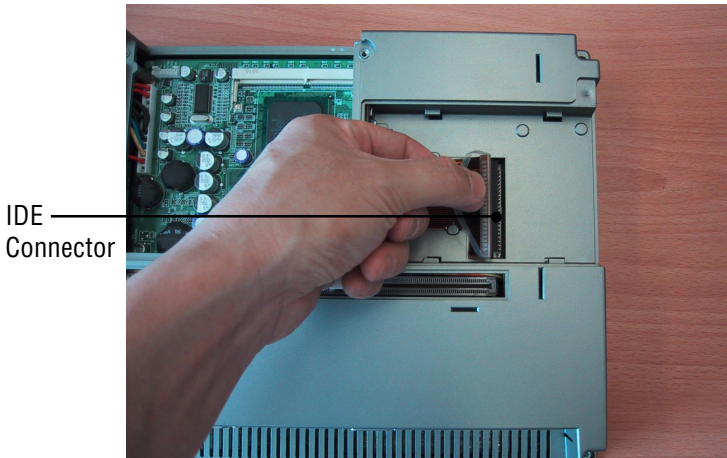
**B**

**Full Disassembly  
Procedures**

If you want to completely disassemble the panel PC, follow the step-by-step procedures below. Users should be aware that Advantech Co., Ltd. takes no responsibility whatsoever for any problems or damage caused by the user disassembly of the panel PC. Make sure the power cord of the panel PC is unplugged before you start disassembly.

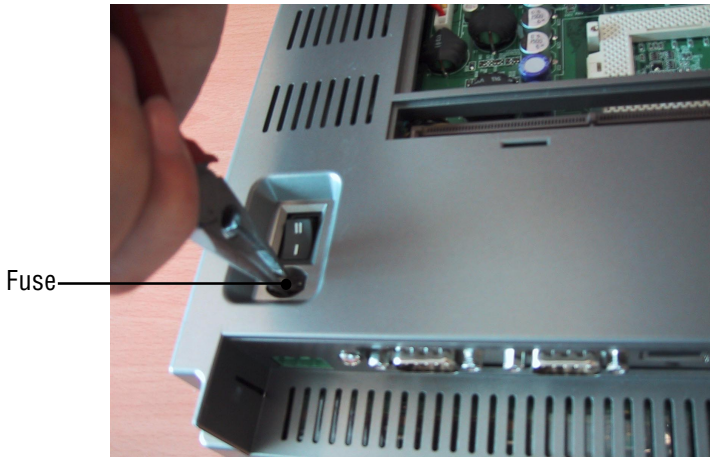
The following procedures do not include the detailed disassembly procedures for the CPU, HDD, and SDRAM; all of which can be found in Chapter 3.

1. Detach the CPU heatsink and HDD carrier as described in Chapter 3. Then disconnect the HDD cable by pulling the connector from the CPU board as shown in Figure B-1.



**Figure B-1: Disconnect the IDE connector**

2. Use the pliers to remove the fuse.



**Figure B-2: Remove the fuse**

3. Unscrew the four screws located at the corner, and the three screws located on the button of the panel PC to separate the front and rear panel.



**Figure B-3: Remove the seven screws on the rear panel**

4. After separating the front and rear panel, you can find the LCD module and CPU board respectively.



**Figure B-4: Separate the front and rear panel**

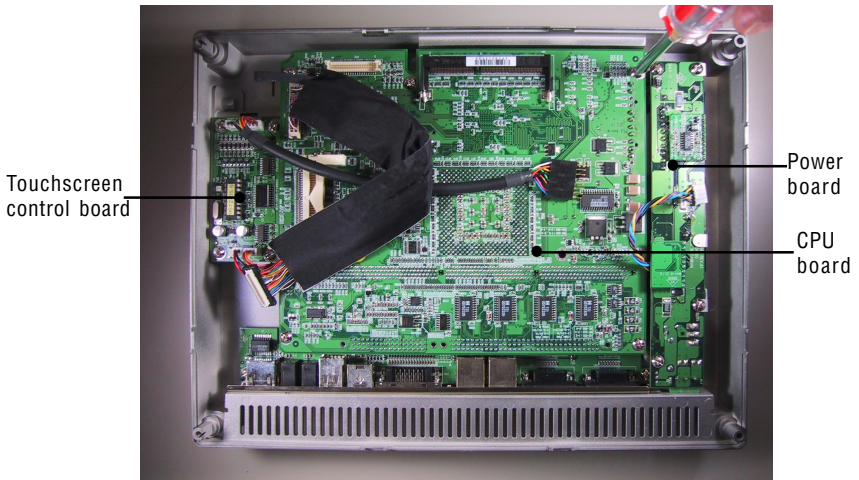
5. Unscrew the four screws located at the corner of the LCD to remove the LCD and inverter.



**Figure B-5: Remove the inverter and LCD**



6. Unscrew the necessary screws on the CPU board, power board, and touchscreen control board respectively to detach them.



**Figure B-6: Remove the CPU board, power board and touchscreen control board**



**APPENDIX**

**C**

## **I/O Pin Assignments**

## C.1 Keyboard connector (CN8-1)

---

Table C-1: Keyboard connector

Pin	Signal
1	KB_DT
2	N/A
3	GND
4	+5 V
5	KB_CK
6	N/A

## C.2 Mouse connector (CN8-2)

---

Table C-2: Mouse connector

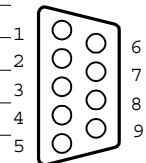
Pin	Signal
1	MS_DT
2	N/A
3	GND
4	+5 V
5	MS_CK
6	N/A

## C.3 COM1 RS-232 serial port (CN1)

---

Table C-3: COM1 RS-232 serial port

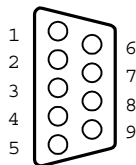
Pin	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



## C.4 COM3 RS-232 serial port (CN4)

Table C-4: COM3 RS-232 serial port

Pin	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



## C.5 COM4 RS-232 serial port (CN5)

Table C-5: COM4 RS-232 serial port

Pin	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

## C.6 COM2 (CN2)

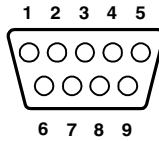


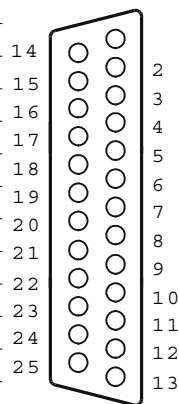
Table C-6: COM2

Pin	Signal		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	---
4	DTR	RX-	---
5	GND	GND	---
6	DSR	---	---
7	RTS	---	---
8	CTS	---	---
9	RI	---	---

## C.7 Parallel port connector (CN3)

Table C-7: Parallel port connector

Pin	Signal
1	STROBE*
2	D0
3	D1
4	D2
5	D3
6	D4
7	D5
8	D6
9	D7
10	ACK*
11	BUSY
12	PE
13	SLCT
14	AUTOFD*
15	ERR*
16	INIT*
17	SLCTINI*
18	GND
19	GND
20	GND
21	GND
22	GND
23	GND
24	GND
25	GND



\* active low





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