PCA-6176 Series

Full-size Pentium® II/III
processor-based
PCI/ISA-bus CPU card

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A Message to the Customer

Advantech customer services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known.

Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

PCA-6176 series comparison table

Model	PCA-6176L	PCA-6176	PCA-6176F	PCA-6176S	PCA-6176E
CPU	**Intel**: Pentium® II/III 350 ~ 500 MHz	**Intel**: Pentium® II/III 350 ~ 500 MHz	**Intel**: Pentium® II/III 350 ~ 500 MHz	**Intel**: Pentium® II/III 350 ~ 500 MHz	**Intel**: Pentium® II/III 350 ~ 500 MHz
System chipset	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX
BIOS	Award, P&P	Award, P&P	Award, P&P	Award, P&P	Award, P&P
L2 cache	512 KB	512 KB	512 KB	512 KB	512 KB
Max. system RAM	1 GB SDRAM	1 GB SDRAM	1 GB SDRAM	1 GB SDRAM	1 GB SDRAM
VGA (AGP)	✗	ATI 3D Rage Pro Turbo	ATI 3D Rage Pro Turbo	ATI 3D Rage Pro Turbo	ATI 3D Rage Pro Turbo
LAN	✗	✗	10/100Base-T, Intel 82558	✗	10/100Base-T, Intel 82558
SCSI	✗	✗	Adaptec 7890 Ultra2 SCSI 32-bit	Adaptec 7890 Ultra2 SCSI 32-bit	✗
HISA	✓	✓	✓	✓	✓
USB	2	2	2	2	2
EIDE	4	4	4	4	4
2S/1P	✓	✓	✓	✓	✓

Other PCA-6176 Series features appear elsewhere in this manual

Product warranty

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one year from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, type of PC, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Initial Inspection

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 PCA-6176 Pentium® II/III single board computer
- 1 Pentium II/III CPU, and 1 cooling fan (optional)
- 1 PCA-6176 User's Manual
- Utility disks/CD with VGA BIOS
- 2 Ethernet driver disks/CD (PCA-6176E/F only)
- SCSI driver disks/CD (PCA-6176S/F only)
- 1 bus master driver disk/CD
- 2 disks/CD for OBS Win95 drivers
- 1 FDD cable
- 2 EIDE HDD cables
- 1 printer cable and 1 serial port cable
- 1 temperature sensor cable
- 1 ivory cable for keyboard and mouse
- 1 SCSI cable (Ultra/Ultra Wide) (PCA-6176S/F only)
- 1 USB cable (optional)
- 1 ATX-to-PS/2 power cable
- 1 Pentium® II/III CPU retention module (factory installed)

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

We have carefully inspected the PCA-6176 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt.

As you unpack the PCA-6176, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Contents

Hardware Configuration

This chapter gives background information on the PCA-6176. It then shows you how to configure the card to match your application and prepare it for installation into your PC.

Sections include:

- Introduction

- Features

- Specifications

- Board Layout

- Jumpers and Connectors

- Safety Precautions

- Jumper Settings

- System Memory

- Memory Installation Procedures

- Cache Memory

- Mounting the CPU and Cooling Modules

1.1 Introduction

The PCA-6176 series all-in-one industrial grade CPU card uses Intel's highly acclaimed Pentium® II/III processor, together with the Intel 440BX PCI chipset. The card works with standard ISA or PCI/ISA-bus passive backplanes.

The CPU provides 512 KB on-chip L2 cache, eliminating the need for external SRAM chips. It has two PCI EIDE interfaces (for up to four devices), and an FDD interface (for up to two devices). Other features include two RS-232 serial ports (16C550 UARTs with 16-byte FIFO or compatible), one enhanced parallel port (supports EPP/ECP), and support for two USB (Universal Serial Bus) ports. The PCI Bus Master IDE controller supports Ultra DMA/33 operation. This provides data transfer rates of over 33 MB/sec. System BIOS supports boot-up from an IDE CD-ROM, SCSI CD-ROM, ZIP and LS-120.

A backup of CMOS data is stored in the Flash memory, which protects data even after a battery failure. Also included is a 63-level watchdog timer, which resets the CPU or generates an interrupt if a program cannot be executed normally. This enables reliable operation in unattended environments.

The PCA-6176 series offers several impressive industrial features such as a VGA (AGP) controller, a PCI Ultra2 SCSI controller, a 10/100Base-T networking controller, and an ISA High Drive. All these make it an ideal choice for applications that require both high performance and full functionality.

1.2   Features

- Intel slot 1 architecture
- Pentium® II/III processor up to 500 MHz
- Intel 82440BX PCI set, FSB 66/100 MHz
- Four DIMM sockets to support Intel PC100-compliant SDRAMs up to 1 GB; supports ECC
- Award Flash BIOS, 2 Mbit
- On-board VGA (AGP)
- On-board Ethernet
- On-board SCSI
- On-board ATX power control connector to meet ACPI requirements
- Two enhanced IDE ports, supporting Ultra DMA/33, PIO Mode 4 and DMA Mode 2
- Two USB ports
- Two serial ports
- One bidirectional parallel port, supports ECP/EPP/SPP
- One floppy port and one keyboard/mouse port
- PCI V2.1 compliant
- PICMG 2.0 compliant
- Additional metal bracket to provide board stability with Pentium® II/III processor
- CMOS backup battery life of 7 years
- HISA (ISA High Drive)
- On-board security for hardware monitoring

1.3 Specifications

System

- **CPU**: Intel Pentium® II/III up to 500 MHz

- **BIOS**: Award Flash BIOS, 2 Mbit

- **Green function**: Supports power management operation via BIOS. Activated by keyboard or mouse activity

- **PCI enhanced IDE hard disk drive interface**: Supports up to four IDE (AT bus) large hard disk drives, or other enhanced IDE devices. Supports PIO Mode 4 (16.67 MB/s data transfer rate) and Ultra DMA/33 (33 MB/s data transfer rate). BIOS enabled/disabled

- **Floppy disk drive interface**: Supports up to two floppy disk drives, 5¼" (360 KB and 1.2 MB) and/or 3½" (720 KB, 1.44 MB, and 2.88 MB). BIOS enabled/disabled

Memory

- **RAM**: Up to 1 GB in four available 168-pin DIMM sockets. Supports PC100-compliant SDRAMs

- **ECC (parity DRAM only)**: Modules can detect multi-bit memory errors. Correction of 1-bit memory errors

Input/Output

- **Bus interface**: PCI/ISA bus, PICMG compliant

- **Bus speed**:
  ISA: 8 MHz
  PCI: 33 MHz

- **DMA channels**: 7

- **Interrupt levels**: 15

- **Enhanced parallel port**: Configurable to LPT1, LPT2, LPT3 or disabled. Standard DB-25 female connector provided. Supports EPP/ECP/SPP

- **Serial ports**: Two RS-232 ports with 16C550 UARTs (or compatible) with 16-byte FIFO buffer. Supports speeds up to 115.2 Kbps. Ports can be individually configured to COM1, COM2 or disabled

- **Keyboard and PS/2 mouse connector**: A 6-pin mini-DIN connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse. An on-board keyboard pin header connector is also available

- **ISA driver current**: 64 mA (High Drive)

VGA interface

- **Supports AGP 2X, 133 MHz**
- **Controller**: ATI 3D Rage Pro Turbo
- **Display memory**: SGRAM 4 MB

SCSI interface

- **PCI SCSI**: Supports 32-bit PCI interface and Ultra2 SCSI or legacy single-ended devices; data transfer up to 80 MB/sec.
- **Chipset:** Adaptec AIC-7890

LAN

- **Supports 10/100 Base T Ethernet networking**
- **Chipset**: Intel 82558

Industrial features

- **Watchdog timer**: Can generate a system reset or IRQ11. The watchdog timer is programmable, with each unit equal to one second (63 levels). The program uses I/O ports hex 043h and 443h to control the watchdog timer

Mechanical and environmental specifications

- **Operating temperature**: 0 ~ 60° C (32 ~ 140° F)
- **Storage temperature**: -40 ~ 60° C (-40 ~ 140° F)
- **Humidity**: 20 ~ 95% non-condensing
- **Power supply voltage**: +5 V, ±12 V
- **Power consumption:** +5 V @ 6.93 A (for Pentium® II 233 MHz)

    +5 V @ 8.4 A (for Pentium® II 300 MHz)

    +5 V @ 5.71 A (for Pentium® II 400 MHz)

    +5 V @ 6.22 A (for Pentium® II 450 MHz)

    +12 V @ 0.2 A (typical)

    -12 V @ 0.05 A (typical)
- **Board size**: 338 x 122 mm (13.3" x 4.8")
- **Board weight**: 0.5 kg (1.2 lbs)

1.4 Board Layout: Main Features
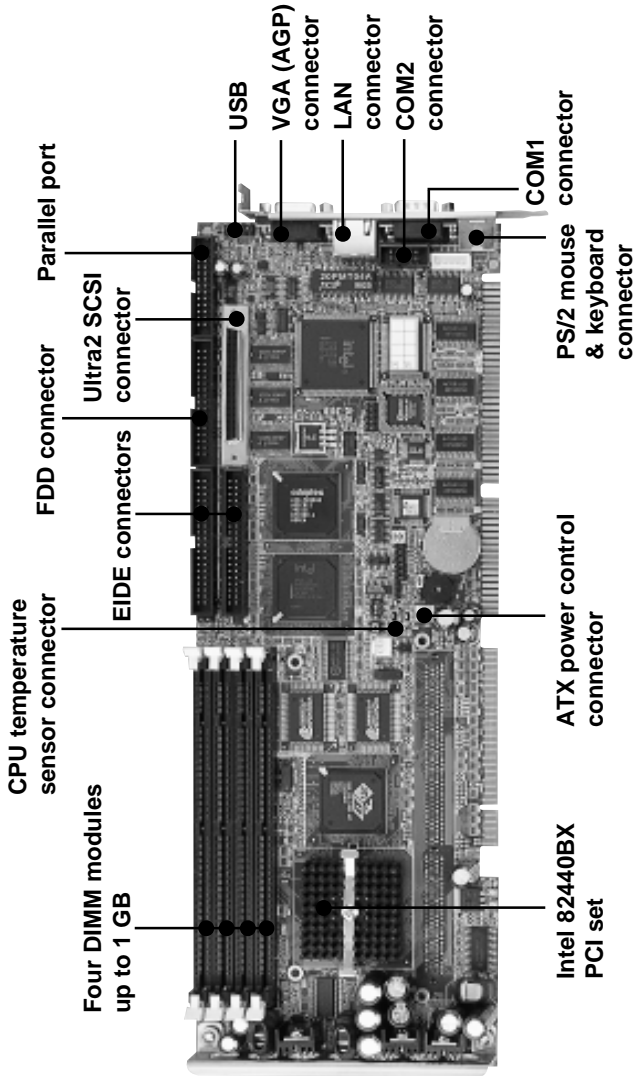
Figure 1-1: Board layout: main features

1.5 Jumpers and Connectors

Connectors on the PCA-6176 board link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

The tables below list the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your card.

Table 1-1: Jumpers

Label	Function
SW1	CPU clock ratio setting
J2	Watchdog output
J1	CMOS clear

Table 1-2: Connectors

Label	Function
CN1	Primary IDE connector
CN2	Secondary IDE connector
CN3	Floppy driver connector
CN4	Parallel port
CN5	SCSI connector
CN6	USB port
CN7	VGA connector
CN8	Ethernet connector
CN9	Serial port: COM1
CN10	Serial port: COM2
CN11	PS /2 keyboard and mouse
CN12	External keyboard connector
CN13	Infrared (IR) connector
CN14	CPU fan connector
CN15	CPU temperature sensor
CN16	Keyboard lock and power LED
CN17	External speaker
CN18	Reset connector
CN19	IDE LED
CN20	ATX feature connector
CN21	ATX soft power switch
CN22	Factory reserved (pin closed)

1.6 Board Layout: Jumper and Connector Locations
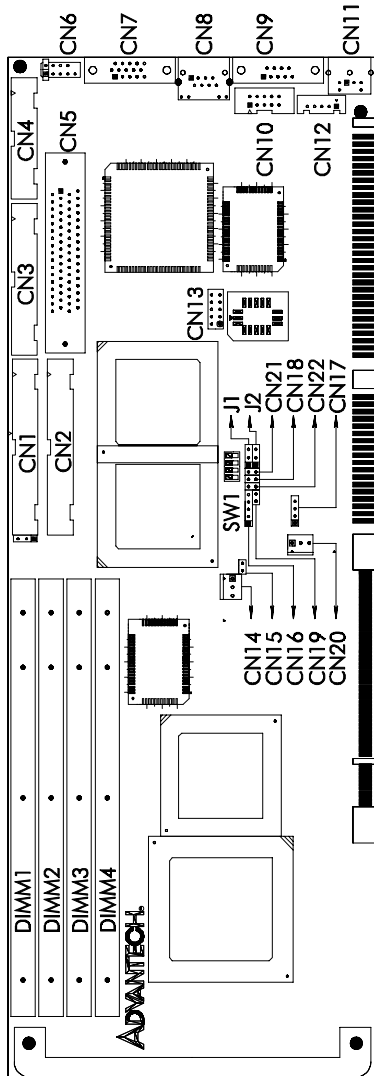
Figure 1-2: Board layout: connecter locations

1.7   Safety Precautions

Warning!   Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!   Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.8 Jumper Settings

This section provides instructions on how to configure your card by setting jumpers. It also includes the card's default settings and your options for each jumper.

1.8.1 How to set jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric 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 consists of a set of three pins, labeled 1, 2 and 3. In this case you connect either pins 1 and 2, or 2 and 3.

A pair of needle-nose pliers may be useful when setting jumpers.

1.8.2 CPU clock ratio setting (SW1)

You must configure your PCA-6176 CPU card to the frequency of your Intel Pentium® II/III processor by setting jumper SW1. The PCA-6176 SW1 is equpped to use Pentium processors with speeds of 233, 266, 300, 333, 350, 400, 450, and 500 MHz. Configure your PCA-6176 as follows:

Table 1-3: CPU clock ratio setting (SW1)

CPU freq.	Ratio	Bus clk	SW1-1	SW1-2	SW1-3
233 MHz	3.5	66 MHz	ON	ON	ON
266 MHz	4	66 MHz	OFF	OFF	OFF
300 MHz	4.5	66 MHz	OFF	OFF	ON
333 MHz	5	66 MHz	OFF	ON	OFF
366 MHz	5.5	66 MHz	OFF	ON	ON
350 MHz	3.5	100 MHz	ON	ON	ON
400 MHz	4	100 MHz	OFF	OFF	OFF
450 MHz	4.5	100 MHz	OFF	OFF	ON
500 MHz	5	100 MHz	OFF	ON	OFF
550 MHz	5.5	100 MHz	OFF	ON	ON

Note: SW1-4 is factory reserved.

1.8.3 CMOS clear (J1)

The PCA-6176 CPU card contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set J4 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 1-4: CMOS clear (J1)

Function	Jumper setting	
* Keep CMOS data	1-2 closed	
Clear CMOS data	2-3 closed	

* default setting

1.8.4 Watchdog timer output (J2)

The PCA-6176 contains a watchdog timer that will reset the CPU or send a signal to IRQ11 in the event the CPU stops processing. This feature means the PCA-6176 will recover from a software failure or an EMI problem. The J2 jumper settings control the outcome of what the computer will do if the watchdog timer is triggered.

Table 1-5: Watchdog timer output (J2)

Function	Jumper setting	
IRQ11	1-2 closed	
* Reset	2-3 closed	

* default setting

1.9 System Memory

The top-left edge of the PCA-6176 contains four sockets for 168-pin dual inline memory modules (DIMMs). All four sockets use 3.3 V unbuffered synchronous DRAMs (SDRAM). DIMMs are available in capacities of 16, 32, 64, 128, or 256 MB. The sockets can be filled in any combination with DIMMs of any size, giving your PCA-6176 single board computer between 16 MB and 1 GB of memory. Use the following table to calculate the total DRAM memory within your computer:

Table 1-6: DIMM module allocation table

Socket number	168-pin DIMM memory
1	(16, 32, 64, 128 or 256 MB) x 1
2	(16, 32, 64, 128 or 256 MB) x 1
3	(16, 32, 64, 128 or 256 MB) x 1
4	(16, 32, 64, 128 or 256 MB) x 1

1.9.1 Sample calculation: DIMM memory capacity

Suppose you install a 128 MB DIMM into your PCA-6176's socket 1, a 32 MB DIMM into socket 2 and 3, and you leave socket 4 empty. Your total system memory is 192 MB, calculated as follows:

Table 1-7: DIMM memory capacity sample calculation

Socket number	168-pin DIMM memory		Total memory
1	128 MB	x 1	128 MB
2	32 MB	x 1	32 MB
3	32 MB	x 1	32 MB
4	-	x 1	0 MB
Total memory			**192 MB**

1.9.2 Supplementary information about DIMMs

Your PCA-6176 can accept SDRAM memory chips (with or without parity). Also note:

- If the PCA-6176 operates at 100 MHz, only use PC100-compliant DIMMs. Most systems will not even boot if non-compliant modules are used. This is due to strict timing issues involved at this speed.

- SDRAM chips are usually thinner than EDO chips, and they usually have higher pin density.

- Chips with 9 chips/side support ECC; chips with 8 chips/side do not support ECC.

- Single-sided modules are typically 16 or 64 MB; double-sided modules are usually 32, 128, or 256 MB.

1.10 Memory Installation Procedures

To install any DIMM, first make sure the two handles of the DIMM socket are in the "open" position. i.e. The handles lean outward. Slowly slide the DIMM module along the plastic guides on both ends of the socket. Then press the DIMM module right down into the socket, until you hear a click. This is when the two handles have automatically locked the memory module into the correct position of the DIMM socket. (See Figure 1-3.) To take away a memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.
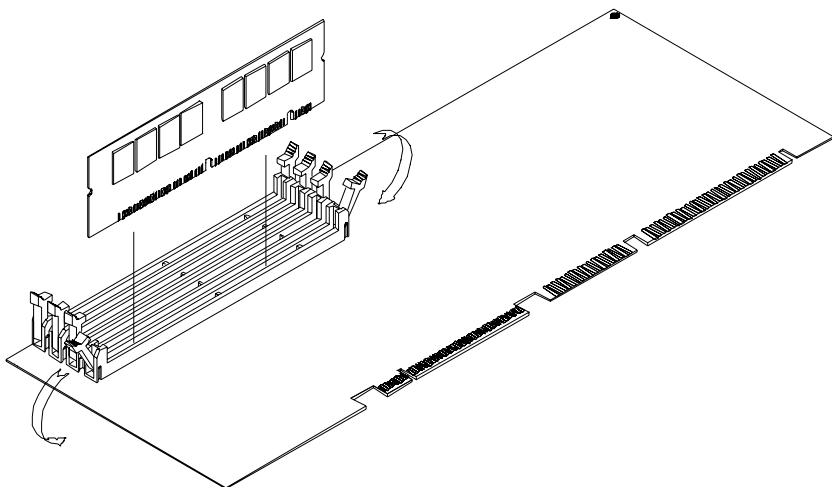
Figure 1-3: DIMM installation

1.11 Cache Memory

Since second level cache has been embedded into the Pentium® II/III CPU, you do not have to take care of either SRAM chips or SRAM modules. The built-in second level cache in the Pentium II/III yields much higher performance than external cache memories. The cache size in the Pentium II/III CPU is either 256 KB or 512 KB. Normally, for workstation and server applications, the 256 KB version is suffucient. However, if your system is for heavy duty applications, the 512 KB version will help a lot. The Pentium II/III has another version that provides much better data security if combined with DRAM ECC. This version was specifically developed for our Pentium II/III based SBC. Check with your vendor for various Pentium II/III models.

1.12 Mounting the CPU and Cooling Modules

The Pentium® II/III is a module-type CPU which runs at high speeds, for example 450 MHz, so the cooling mechanism becomes critical for system reliability. There are two types of cooling systems. One has a cooling fan attached to the heat sink of the Pentium II/III module. The other has a huge heat sink without any cooling fan attached. The first of these systems is recommended.

Both cooling systems for the Pentium II/III require a "retention module" to firmly fix the Pentium II/III CPU to slot 1.

Installing a Pentium II CPU with cooling modules requires an SECC I (single-edge contact connection I) system. Figure 1-4 illustrates the steps involved in mounting the retention module.

Installing a Pentium III CPU with cooling modules requires an SECC II (single-edge contact connection II) system. Figures 1-5 and 1-6 illustrate the steps involved in mounting the retention module.
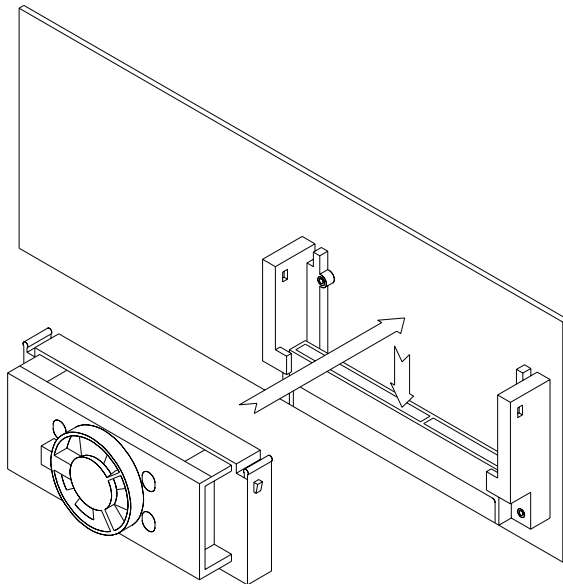
Figure 1-4: SECC I CPU installation
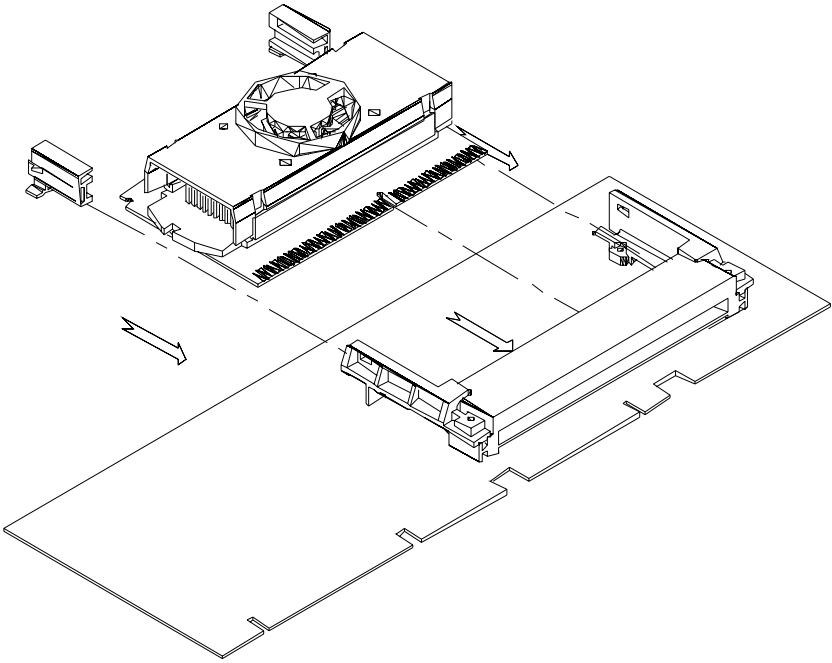
Figure 1-5: SECC II CPU installation - step 1
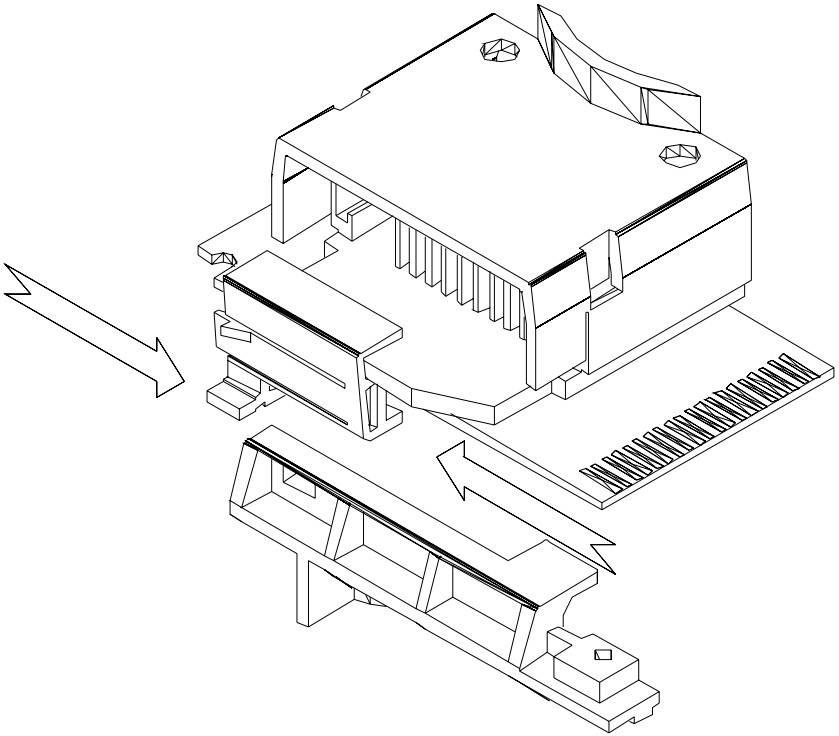
Figure 1-6: SECC II CPU installation - step 2

Connecting Peripherals

This chapter tells how to connect peripherals, switches and indicators to the PCA-6176 board. You can access most of the connectors from the top of the board while it is installed in the chassis. If you have a number of cards installed, or your chassis is very tight, you may need to partially remove the card to make all the connections.

2.1 Primary (CN1) and Secondary (CN2) IDE Connectors
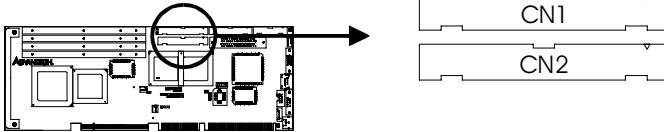
You can attach up to four IDE (Integrated Device Electronics) drives to the PCA-6176's internal controller. The primary (CN1) and secondary (CN2) connectors can each accommodate two drives.

Wire number 1 on the cable is red or blue and the other wires are gray. Connect one end to connector CN1 or CN2 on the CPU card. Make sure that the red/blue wire corresponds to pin 1 on the connector (in the upper right hand corner). See Chapter 1 for help finding the connector.

Unlike floppy drives, IDE hard drives can connect in either position on the cable. If you install two drives to a single connector, you will need to set one as the master and one as the slave. You do this by setting the jumpers on the drives. If you use just one drive per connector, you should set each drive as the master. See the documentation that came with your drive for more information.

Connect the first hard drive to the other end of the cable. Wire 1 on the cable should also connect to pin 1 on the hard drive connector, which is labeled on the drive circuit board. Check the documentation that came with the drive for more information.

Connect the second hard drive to the remaining connector (CN2 or CN1), in the same way as described above.

2.2 Floppy Drive Connector (CN3)
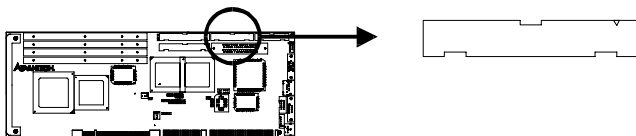
You can attach up to two floppy disk drives to the PCA-6176's on-board controller. You can use any combination of 5.25" (360 KB/1.2 MB) and/or 3.5" (720 KB/1.44/2.88 MB) drives.

The card comes with a 34-pin daisy-chain drive connector cable. On one end of the cable is a 34-pin flat-cable connector. On the other end are two sets of floppy disk drive connectors. Each set consists of a 34-pin flat-cable connector (usually used for 3.5" drives) and a printed circuit-board connector (usually used for 5.25" drives). You can use only one connector in each set. The set on the end (after the twist in the cable) connects to the A: floppy drive. The set in the middle connects to the B: floppy drive.

2.3 Parallel Port Connector (CN4)
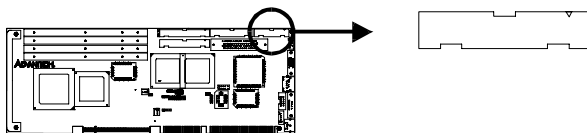
The parallel port is normally used to connect the CPU card to a printer. The PCA-6176 includes an on-board parallel port, accessed through a 26-pin flat-cable connector, CN4. The card comes with an adapter cable which lets you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB-25 connector on the other, mounted on a retaining bracket. The bracket installs at the end of an empty slot in your chassis, giving you access to the connector.

The parallel port is designated as LPT1, and can be disabled or changed to LPT2 or LPT3 in the system BIOS setup.

To install the bracket, find an empty slot in your chassis. Unscrew the plate that covers the end of the slot. Screw in the bracket in place of the plate. Next, attach the flat-cable connector to CN4 on the CPU card. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that wire 1 corresponds to pin 1 of CN4. Pin 1 is on the upper right side of CN4.

2.4 SCSI Connector (CN5)
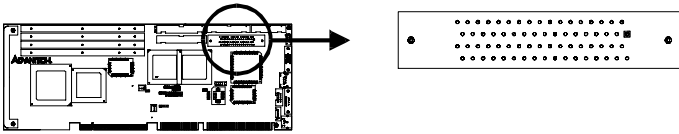
The PCA-6176S/F series has a 68-pin, dual in-line connector for Ultra2 SCSI devices. Connection of SCSI devices requires special attention, especially when determining the last drive on the SCSI chain. Refer to Chapter 6 and your device's operating manual for detailed installation advice.

2.5 USB Connector (CN6)
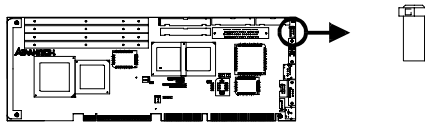
The PCA-6176 CPU card provides one USB (Universal Serial Bus) interface, which give complete Plug & Play and hot attach/detach for up to 127 external devices.The USB interface complies with USB Specification Rev. 1.0, and is fuse-protected.

The USB interface is accessed through a 10-pin flat-cable connector, CN6. The adapter cable has a 10-pin connector on one end and a USB connector on the bracket.

The USB interface can be disabled in the system BIOS setup.

2.6 VGA Connector (CN7)
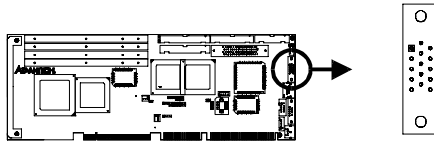
The PCA-6176E/S/F PCI SVGA interface can drive conventional CRT displays. CN7 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector CN7 are detailed in Appendix B.

2.7 Ethernet Connector (CN8)
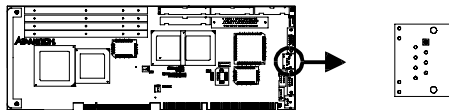
The PCA-6176E/F is equipped with a high performance 32-bit PCI-bus Ethernet interface, which is fully compliant with IEEE 802.3 10/100 Mbps CSMA/CD standards. It is supported by all major network operating systems, and is 100% Novell NE-2000 compatible. An on-board RJ-45 jack provides convenient 10/100Base-T RJ-45 operation.

2.8 Serial Ports (CN9: COM1; CN10: COM2)

CN10   CN9
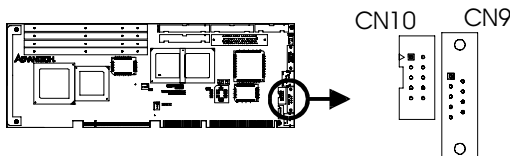
The PCA-6176 offers two serial ports, CN9 as COM1 and CN10 as COM2. These ports can connect to serial devices (such as a mouse, printers, and so on) or to a communication network.

Table 2-1: Serial port connections (COM1, COM2)

Connector	Ports	Address	Interrupt
CN9	COM1	3F8*, 3E8	IRQ4
CN10	COM2	2F8*, 2E8	IRQ3

* default settings

The IRQ and address ranges for both ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup.

Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

2.9 PS/2 Keyboard and Mouse Connector (CN11)
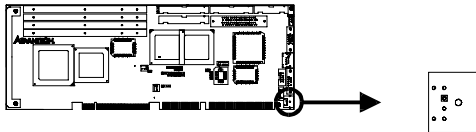
The PCA-6176 board provides a keyboard connector. A 6-pin mini-DIN connector (CN11) on the card mounting bracket supports single-board computer applications. The card comes with an adapter to convert from the 6-pin mini-DIN connector to a standard DIN connector and to a PS/2 mouse connector.

2.10 External Keyboard Connector (CN12)
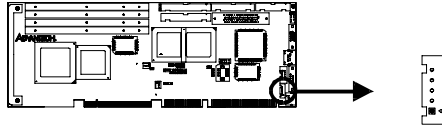
In addition the the PS/2 mouse/keyboard connector on the PCA-6176's rear plate, there is also an extra on-board external keyboard connector. This gives system integrators greater flexibility in designing their systems.

2.11 IR Connector (CN13)
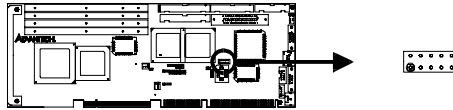
This connector supports the optional wireless infrared transmitting and receiving module. This module mounts on the system case. You must configure the setting through the BIOS setup.

2.12 CPU Fan Connector (CN14)
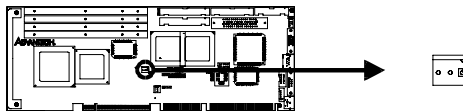
This connector supports cooling fans of 500 mA (6 W) or less.

2.13 CPU Temperature Sensor (CN15)
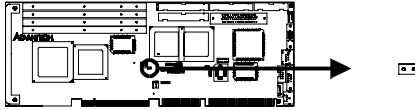
This connector supports hardware monitoring for CPU temperature, CPU fan speed, and system voltage. For details, refer to Chapter 7: On-board Security Setup.

2.14 Front Panel Connectors (CN16, CN17, CN18, CN19 and CN21)

There are several external switches to monitor and control the PCA-6176.
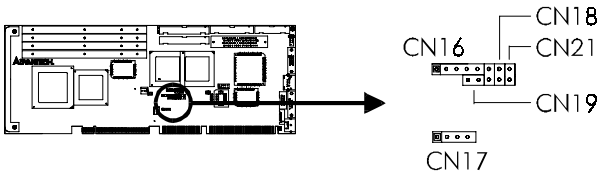
2.14.1 Keyboard lock and power on LED (CN16)

CN16 is a 5-pin connector for the keyboard lock and power on LED. Refer to Appendix B Section 13 for detailed information on the pin assignments. If a PS/2 or ATX power supply is used, the system's power LED status will be as indicated below:

Power Mode	LED (PS/2 Power)	LED (ATX Power)
System On	On	On
System Suspend	Fast flashes	Fast flashes
System Off	Off	Slow flashes

2.14.2 External speaker (CN17)

CN17 is a 4-pin connector for an extenal speaker. If there is no external speaker, the PCA-6176 provides an on-board buzzer as an alternative. To enable the buzzer, set pins 3-4 as closed.

2.14.3 Reset (CN18)

Many computer cases offer the convenience of a reset button. Connect the wire from the reset button to CN18.

2.14.4 IDE LED (CN19)

You can connect an LED to connector CN19 to indicate when the HDD is active.

2.14.5 ATX soft power switch (CN21)

If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to CN21. This connection enables you to turn your computer on and off.

2.15 ATX Power Control Connectors (CN20 and CN21)
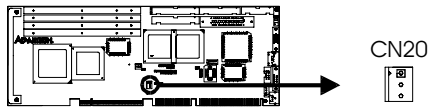
CN20

Note: Refer to the diagram on the opposite page for the location of CN21.

2.15.1 ATX feature connector (CN20) and soft power switch connector (CN21)

The PCA-6176 can support an advanced soft power switch function if an ATX power supply is used. To enable the soft power switch function:

1. Take the specially designed ATX-to-PS/2 power cable out of the PCA-6176's accessory bag.

2. Connect the 3-pin plug of the cable to CN20 (ATX feature connector).

3. Connect the power on/off button to CN21. (A momentary type of button should be used.)

Note: *If you do not use an ATX power connector, make sure that pins 2-3 are closed.*

Warnings: *1. Make sure that you unplug your power supply when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your CPU card and expansion cards.*

2. ATX power supplies may power on if certain motherboard components or connections are touched by metallic objects.

Important: *Make sure that the ATX power supply can take at least a 720 mA load on the 5 V standby lead (5VSB). If not, you may have difficulty powering on your system and/or supporting the "Wake On LAN" function.*

2.15.2 Controlling the soft power switch

Users can also identify the current power mode through the system's power LED (see Section 2.14.1).

Award BIOS Setup

This chapter describes how to set the card's BIOS configuration data.

3.1   Introduction

Award's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed RAM so that it retains the setup information when the power is turned off.

3.2   Entering Setup

Turn on the computer and check for the "patch code". If there is a number assigned to the patch code, it means that the BIOS supports your CPU.

If there is no number assigned to the patch code, please contact Advantech's applications engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid.

After ensuring that you have a number assigned to the patch code, press <Del> to allow you to enter the setup.

3.3 Standard CMOS Setup

Choose the "STANDARD CMOS SETUP" option from the "INITIAL SETUP SCREEN" menu, and the screen below will be displayed. This standard setup menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory.

```
                    ROM PCI/ISA BIOS (2A69KAKF)
                       STANDARD CMOS SETUP
                       AWARD SOFTWARE, INC.

   Date (mm:dd:yy) : Tue, Mar  2 1999
   Time (hh:mm:ss) : 16 : 31 : 52

   HARD DISKS          TYPE    SIZE    CYLS HEAD PRECOMP LANDZ SECTOR  MODE

   Primary Master   : AUTO      0       0    0     0       0     0    AUTO
   Primary Slave    : NONE      0       0    0     0       0     0    ---
   Secondary Master : AUTO      0       0    0     0       0     0    AUTO
   Secondary Slave  : NONE      0       0    0     0       0     0    ---

   Drive A : 1.44M, 3.5 in.
   Drive B : None

   Video    : EGA/VGA
   Halt On  : All,But Keyboard

   ESC : Quit           ↑ ↓ → ←  : Select Item      PU/PD/+/- : Modify
   F1  : Help          (Shift)F2 : Change Color
```

Figure 3-1: CMOS setup screen

3.4 BIOS Features Setup

The "BIOS FEATURES SETUP" screen appears when choosing the "BIOS FEATURES SETUP" item from the "CMOS SETUP UTILITY" menu. It allows the user to configure the PCA-6176 according to his particular requirements.

Below are some major items that are provided in the BIOS FEATURES SETUP screen.

A quick booting function is provided for your convenience. Simply enable the Quick Booting item to save yourself valuable time.

```
                    ROM PCI/ISA BIOS (2A69KAKF)
                         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 : Disabled    D0000-D3FFF Shadow  : Disabled
Quick Power On Self Test  : Enabled     D4000-D7FFF Shadow  : Disabled
Boot Sequence             : C,A,SCSI    D8000-DBFFF Shadow  : Disabled
Swap Floppy Drive         : Disabled    DC000-DFFFF Shadow  : Disabled
Boot Up Floppy Seek       : Disabled
Boot Up NumLock Status    : On
Gate A20 Option           : Fast
Typematic Rate Setting    : Disabled
Typematic Rate (Chars/Sec) : 6
Typematic Delay (Msec)    : 250
Security Option           : Setup
PCI/VGA Palette Snoop     : Disabled
OS Select For DRAM > 64MB : Non-OS2    ESC : Quit        ↑↓→← : Select Item
Report No FDD For WIN 95  : Yes        F1  : Help        PU/PD/+/- : Modify
                                       F5  : Old Values  (Shift)F2 : Color
                                       F6  : Load BIOS  Defaults
                                       F7  : Load Setup Defaults
```

Figure 3-2: BIOS features setup screen

3.4.1 Virus Warning

While the system is booting up, and after boot-up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system. In this case, a warning message will be displayed. You can run the anti-virus program to locate the problem.

If Virus Warning is disabled, no warning message will appear if anything attempts to access the boot sector or hard disk partition.

3.4.2 Quick Power On Self Test

This option speeds up the Power-On Self Test (POST) conducted as soon as the computer is turned on. When enabled, BIOS shortens or skips some of the items during the test. When disabled, the computer conducts normal POST procedures.

3.4.3 Boot Sequence

This function determines the sequence in which the computer will search the drives for the disk operating system (i.e. DOS). The BIOS provides the folllowing boot sequences:

A,C, SCSI
C,A, SCSI (Default)
C, CDROM, A
CDROM, C, A
D, A, SCSI
E, A, SCSI
F, A, SCSI
SCSI, A, C
SCSI, C, A
C only
LS/ZIP, C

3.4.4 Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. A 360 KB type drive is 40 tracks; while 720 KB, 1.2 MB, and 1.44 MB type drives are all 80 tracks.

Enabled   BIOS searches the floppy drive to determine if it is 40 or 80 tracks. Note that BIOS cannot differentiate between 720 KB, 1.2 MB, and 1.44 MB type drives. This is because they are all 80 tracks.

Disabled BIOS will not search for the floppy drive type by track number. Note that there will not be any warning message if the drive installed is 360 KB.

3.4.5 Boot Up NumLock Status

The default is "On".

On   Keypad boots up to number keys.

Off   Keypad boots up to arrow keys.

3.4.6 Gate A20 Option

Normal   The A20 signal is controlled by the keyboard
                controller or chipset hardware.

Fast (Default) The A20 signal is controlled by Port 92 or the
                chipset specific method.

3.4.7 Typematic Rate Setting

The typematic rate determines the characters per second accepted by
the computer. The Typematic Rate setting enables or disables the
typematic rate.

3.4.8 Typematic Rate (Chars/Sec)

BIOS accepts the following input values (characters/second) for
typematic rate: 6, 8, 10, 12, 15, 20, 24, 30.

3.4.9 Typematic Delay (msec)

Typematic delay is the time interval between the appearance of two
consecutive characters, when holding down a key. The input values
for this category are: 250, 500, 750, 1000 (msec).

3.4.10 Security Option

This setting determines whether the system will boot up if the
password is denied. Access to Setup is, however, always limited.

System   The system will not boot, and access to Setup will be
           denied if the correct password is not entered at the prompt.

Setup   The system will boot, but access to Setup will be denied if
           the correct password is not entered at the prompt.

Note: *To disable security, select "PASSWORD SETTING"
in the main menu. At this point, you will be asked to
enter a password. Simply press <Enter> to disable
security. When security is disabled, the system will
boot, and you can enter Setup freely.*

3.4.11 PCI/VGA Palette Snoop

Some display cards that are nonstandard VGA such as graphics
accelerators or MPEG video cards may not show colors properly. The
setting *Enabled* should correct this problem. Otherwise leave this on
the setup default setting of *Disabled*.

3.4.12 OS Select for DRAM > 64 MB

This setting is under the OS/2 system.

3.4.13 Video BIOS Shadow

This determines whether video BIOS will be copied to RAM, which is
optional according to the chipset design. When enabled, Video BIOS
Shadow increases the video speed.

3.4.14 C8000-CBFFF Shadow / DC000-DFFFF Shadow

These determine whether optional ROM will be copied to RAM in
blocks of 16 KB.

Enabled   Optional shadow is enabled.

Disabled   Optional shadow is disabled.

3.5 Chipset Features Setup

By choosing the "CHIPSET FEATURES SETUP" option from the INITIAL SETUP SCREEN menu, a screen as shown in Fig. 3-3 below will be displayed. This sample screen contains the manufacturer's default values for the PCA-6176.

If you enable the OBS function, you can view the temperature, fan speed and voltage of your PC system. The data will be displayed in similar fashion to the display shown in Fig. 3-3 below:

```
            ROM PCI/ISA BIOS (2A69KAKF)
               CHIPSET FEATURES SETUP
                AWARD SOFTWARE, INC.

SDRAM RAS-to-CAS Delay    : 3    Power-Supply Type        : ATX
SDRAM RAS Precharge Time  : 3    Auto Detect DIMM/PCI Clk : Enabled
SDRAM CAS latency Time    : Auto Spread Spectrum Modulated: Disabled
SDRAM Precharge Control   : Disabled
DRAM Data Integrity Mode  : Non-ECC
System BIOS Cacheable     : Enabled  Current CPU Temperature  : 22°C/71°F
Video  BIOS Cacheable     : Enabled  Current CPUFAN Speed     : 4090 RPM
Video RAM Cacheable       : Disabled CPU_VCC    (V) : 1.95 V
8 Bit I/O Recovery Time   : 1 BUSCLK TRANS_VCC  (V) : 1.50 V
16 Bit I/O Recovery Time  : 1 BUSCLK CHIP_VCC   (V) : 3.3 V
Memory Hole At 15M-16M    : Disabled + 5 V  :   4.89 V
Passive Release           : Enabled  +12 V  :  11.91 V
Delayed Transaction       : Enabled  -12 V  : -11.36 V
AGP Aperture Size (MB)    : 64       - 5 V  : - 5.0 V

                                 ESC : Quit        ↑↓→← : Select Item
                                 F1  : Help        PU/PD/+/- : Modify
                                 F5  : Old Values  (Shift)F2 : Color
                                 F6  : Load BIOS  Defaults
                                 F7  : Load Setup Defaults
```

Figure 3-3: CHIPSET features setup screen

3.6 Power Management Setup

The power management setup controls the CPU card's "green" features. The following screen shows the manufacturer's defaults:

```
                    ROM PCI/ISA BIOS (2A69KAKF)
                       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     : Suspend      Primary IDE 1       : Disabled     │
│ Suspend Mode        : Disable      Secondary IDE 0     : Disabled     │
│ HDD Power Down      : Disable      Secondary IDE 1     : Disabled     │
│ Soft-Off by PWR-BTTN : Instant-Off Floppy Disk         : Disabled     │
│ CPUFAN Off In Suspend: Enabled     Serial Port         : Enabled      │
│ MODEM Use IRQ       : 3            Parallel Port       : Disabled     │
│ PowerOn by Modem    : Enabled                                         │
│ PowerOn by Alarm    : 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 3-4: Power management setup screen

3.6.1 Power Management

This option allows you to determine if the values in power management are disabled, user-defined, or predefined.

3.6.2 HDD Power Management

You can choose to turn the HDD off after one of the time intervals listed, or when the system is in Suspend mode. If the HDD is in a power saving mode, any access to it will wake it up.

Note: *The HDD will not power down if the Power Management option is disabled.*

3.6.3 Soft-Off by PWR-BTTN

If you choose "Instant-Off", then pushing the ATX soft power switch button once will switch the system to "system off" power mode.

You can choose "Delay 4 sec." If you do, then pushing the button for more than 4 seconds will turn off the system, whereas pushing the button momentarily (for less than 4 seconds) will switch the system to "suspend" mode.

3.7 PCI Configuration Setup

```
                    ROM PCI/ISA BIOS (2A69KAKF)
                        PNP/PCI CONFIGURATION
                         AWARD SOFTWARE, INC.

PNP OS Installed        : No          Assign IRQ For VGA  : Enabled
Resources Controlled By : Manual
Reset Configuration Data : Disabled   Used MEM base addr  : N/A

IRQ-3  assigned to : PCI/ISA PnP      Assign IRQ For USB  : Disabled
IRQ-4  assigned to : PCI/ISA PnP
IRQ-5  assigned to : PCI/ISA PnP
IRQ-7  assigned to : PCI/ISA PnP
IRQ-9  assigned to : PCI/ISA PnP
IRQ-10 assigned to : PCI/ISA PnP
IRQ-11 assigned to : PCI/ISA PnP
IRQ-12 assigned to : PCI/ISA PnP
IRQ-14 assigned to : PCI/ISA PnP
IRQ-15 assigned to : PCI/ISA PnP
DMA-0  assigned to : PCI/ISA PnP
DMA-1  assigned to : PCI/ISA PnP      ESC : Quit          ↑↓→← : Select Item
DMA-3  assigned to : PCI/ISA PnP      F1  : Help          PU/PD/+/- : Modify
DMA-5  assigned to : PCI/ISA PnP      F5  : Old Values   (Shift)F2 : Color
DMA-6  assigned to : PCI/ISA PnP      F6  : Load BIOS  Defaults
DMA-7  assigned to : PCI/ISA PnP      F7  : Load Setup Defaults
```

Figure 3-5: PCI configuration screen

3.7.1 IRQ-xx assigned to : PCI/ISA PnP

These fields indicate whether or not the displayed IRQ for each field is being used by a legacy (non-PnP) card. Two options are available: PCI/ISA PnP or Legacy ISA. The first option, the default setting, indicates that the displayed IRQ is not used to determine if an ISA card is using that IRQ. If you install a legacy ISA card that requires a unique IRQ, you must set the field for that IRQ to "Legacy ISA". Say, for example, that you install a legacy ISA card that requires IRQ 10. You must then set "IRQ-10 assigned to :" as "Legacy ISA".

3.7.2 DMA-x assigned to : PCI/ISA PnP

These fields indicate whether or not the displayed DMA channel for each field is being used by a legacy (non-PnP) card. Two options are available: PCI/ISA PnP or Legacy ISA. The first option, the default setting, indicates that the displayed DMA channel is not used to determine if an ISA card is using that channel. If you install a legacy ISA card that requires a unique DMA channel, you must set the field for that channel to "Legacy ISA".

3.7.3 Used MEM base addr : N/A

This field allows you to set the base address and block size of a legacy ISA card that uses any memory segment within the C800H and DFFFH address range. If you have such a card, select a used base address from the six available options. The "Used MEM base addr" field will then appear for selecting the block size. If you have more than one legacy ISA card in your system that needs to use this address range, you can increase the block size to either 8 K, 16 K, 36 K or 64 K.

3.8 Load BIOS Defaults

"LOAD BIOS DEFAULTS" indicates the most appropriate values for the system parameters for maximum stability. These default values are loaded automatically if the stored record created by the setup program becomes corrupted (and therefore unusable).

3.9 Load Setup Defaults

"LOAD SETUP DEFAULTS" loads the values required by the system for maximum performance.

3.10 Integrated Peripherals

```
                  ROM PCI/ISA BIOS (2A69KAKF)
                    INTEGRATED PERIPHERALS
                      AWARD SOFTWARE, INC.

IDE HDD Block Mode      : Enabled    KBC input clock         : 8 MHz
IDE Primary Master PIO  : Auto       Onboard FDC Controller  : Enabled
IDE Primary Slave  PIO  : Auto       Onboard Serial Port 1   : 3F8/IRQ4
IDE Secondary Master PIO : Auto      Onboard Serial Port 2   : 2F8/IRQ3
IDE Secondary Slave  PIO : Auto      UART Mode Select        : Normal
IDE Primary Master UDMA  : Auto
IDE Primary Slave  UDMA  : Auto
IDE Secondary Master UDMA: Auto      Onboard Parallel Port   : 378/IRQ7
IDE Secondary Slave  UDMA: Auto      Parallel Port Mode      : ECP+EPP
On-Chip Primary   PCI IDE: Enabled   ECP Mode Use DMA        : 3
On-Chip Secondary PCI IDE: Enabled   EPP Mode Select         : EPP1.7
Onboard PCI SCSI Chip    : Enabled
USB Keyboard Support     : Disabled
Init Display First       : AGP

                                     ESC : Quit        ↑↓→← : Select Item
                                     F1  : Help        PU/PD/+/- : Modify
                                     F5  : Old Values  (Shift)F2 : Color
                                     F6  : Load BIOS  Defaults
                                     F7  : Load Setup Defaults
```

Figure 3-6: Integrated peripherals

Note: *If you enable the IDE HDD block mode, the enhanced IDE driver will be enabled.*

3.11 Password Setting

To change the password:

1. Choose the "PASSWORD SETTING" option from the Setup main menu and press <Enter>.

   The screen will display the following message:

   ```
   Enter Password:
   ```

   Press <Enter>.

2. If the CMOS is good, or if this option has been used to change the default password, the user is asked for the password stored in the CMOS. The screen will display the following message:

   ```
   Confirm Password:
   ```

   Enter the current password and press <Enter>.

3. After pressing <Enter> (ROM password) or the current password (user-defined), you can change the password stored in the CMOS. The password must be no longer than eight (8) characters.

Remember, to enable the password setting feature, you must first select either Setup or System to secure your option in "BIOS FEA-TURES SETUP".

3.12 IDE HDD Auto Detection

"IDE HDD AUTO DETECTION" automatically self-detects for the correct hard disk type.

3.13 Save & Exit Setup

If you select this and press <Enter>, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

3.14 Exit Without Saving

Selecting this option and pressing <Enter> lets you exit the setup program without recording any new values or changing old ones.

AGP VGA Setup

The PCA-6176 series features an on-board AGP VGA interface. This chapter provides instructions for installing and operating the software drivers on the display driver disk/CD included in your package.

4.1 Before you begin

To facilitate the installation of the enhanced display device drivers and utility software, you should read the instructions in this chapter carefully before you attempt installation. The enhanced display drivers for the PCA-6176 series board are located on the software installation diskette. You must install the drivers and utility software by using the supplied SETUP program for DOS drivers.

Note: The files on the software installation diskette are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.

Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the pertinent sections of your application software's user's manual and the relevant operating system commands before performing the installation.

4.2 Features

- Built-in ATI RAGE PRO TURBO 128-bit 3D multimedia accelerator

- Supports AGP 2x (133 MHz) mode with sideband addressing and AGP texturing

- PC 98 compliant

- Superior 3D performance achieved through a floating print setup engine rated at 1.2 million triangles/sec

- Integrated 230 MHz DAC allows 85 Hz refresh at 1600 x 1200 resolution

- Complete local language support

- Power management for full VESA DPMS and EPA Energy Star compliance

- User-friendly installation for Windows 95 and Windows NT

- AGP 1.0 interface

- 4 MB, 164-bit, 100 MHz SGRAM frame buffer interface with 800 MB/sec bus bandwidth

- Integrates superior video features. These include filtered sealing of 720 pixel DVD content, and MPEG-2 motion compensation for software DVD

4.3 Installation

Disk 1 (or CD):

Disk ATI RAGE PRO TURBO - AGP/VGA for Win95/98 - #1 V1.00, and Windows NT drivers

Disk 2 (or CD):

Disk ATI RAGE PRO TURBO - AGP/VGA for Win95/98 - #2 V1.00, and Windows NT drivers

Disk 3 (or CD):

Disk ATI RAGE PRO TURBO - AGP/VGA for Win95/98 - #3 V1.00, and Windows NT drivers

Disk 4 (or CD):

Disk ATI RAGE PRO TURBO - AGP/VGA for WinNT - V1.00

4.4 Driver installation

Necessary prerequisites

The instructions in this manual assume that you understand elementary concepts of MS-DOS and the IBM personal computer. Before you attempt to install any driver or utility, you should know how to copy files from a floppy disk/CD to a directory on the hard disk. You should also understand the MS-DOS directory structure, and know how to format a floppy disk. If you are uncertain about any of these concepts, please refer to the DOS or Windows user reference guides for more information before you proceed with the installation.

Before you begin

Before you begin installing software drivers, you should make a backup copy of the display driver disk/CD and store the original in a safe place. The display driver disk/CD contains drivers for several versions of certain applications. You must install the correct version in order for the driver to work properly, so make sure you know which version of the application you have.

Changing display drivers in Windows

To change display drivers in Windows, select the *Windows Setup* icon from the Main window. You will be shown the current setup configuration. Select *Change System Settings* from the Option menu. Click on the arrow at the end of the Display line. You will be shown a list of display drivers. Click on the driver you want. Then click on the *OK* button. Follow the directions to complete the setup.

Changing color schemes

After you change display drivers, you may notice that the color scheme used by Windows looks strange. This is because different drivers have different default colors. To change the color scheme, select the *Control Panel* from the Main window. Select the *Color* icon. You will be shown the current color scheme. Choose a new color scheme and click the *OK* button.

4.5 Windows 95/98 Drivers Setup Procedure

Note 1: *There are two ways to set up the PCA-6176's VGA. You can follow the procedures in this chapter, or you can use the setup function provided by Windows 95 or Windows 98.*

Note 2: *If you follow the procedures in this chapter, you must use Disk 1 (provided in your PCA-6176 kit).*

1. In the Windows 95/98 screen, click "Start". Select "Settings", and then click the "Control Panel" icon.

2. When installing Windows 95, an "Add New Hardware Wizard" window will appear. Select "Next".
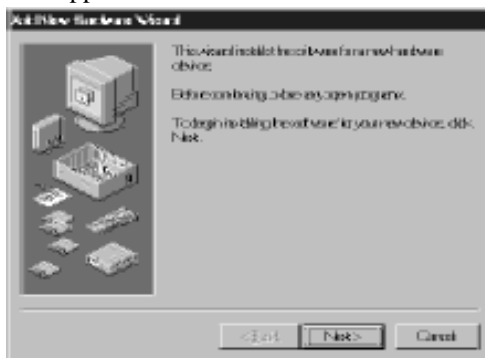
3. If you choose "Yes (Recommended)" and press "Next", the Hardware Wizard will help you find the new hardware.

    If the Hardware Wizard cannot find the new hardware, or if you want to set up the VGA driver by yourself, select "No, I want to select the hardware from a list", and press "Next".

4. In the "Hardware types" list, select "Display adapters" and press "Next".
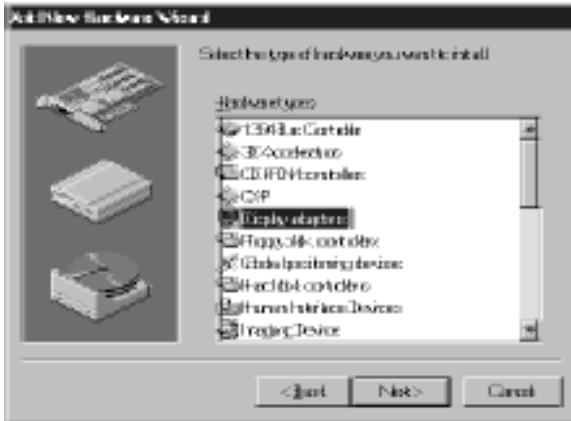
5. Insert disk #1 and select "Have Disk".
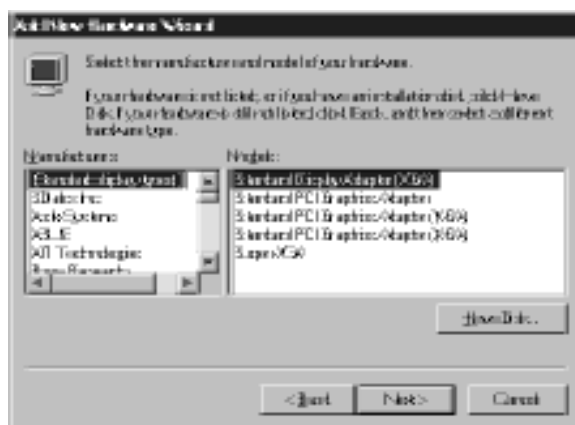
6. Click "OK".
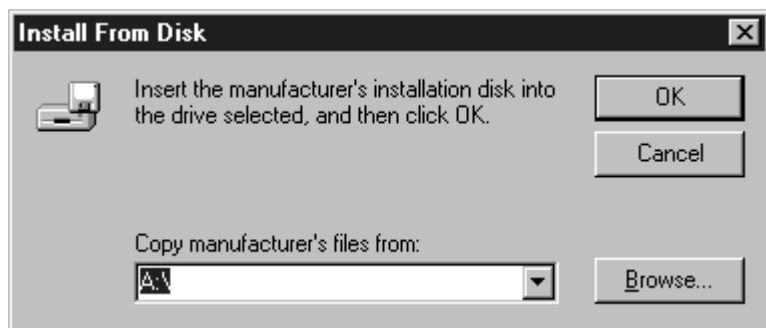
7. Select "macxw4.inf" and click "OK".

8. Select "RAGE PRO TURBO AGP (English)" and click "OK".

9.   Click "Next".

10. Insert disk # 2 and click "OK".

11. Insert disk # 3 and click "OK".

12. Click "Finish" to complete the setup procedure.
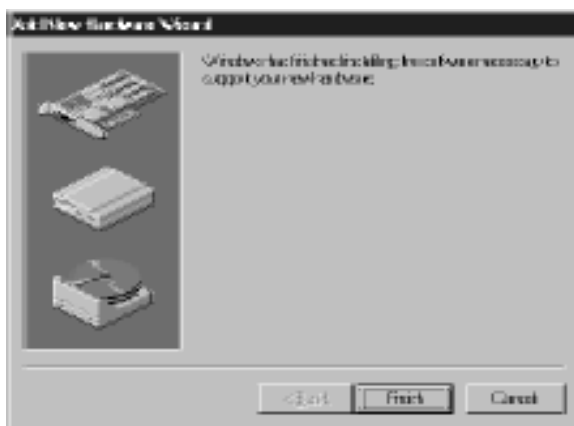
4.6　Windows NT Drivers Setup Procedure

1. In the "Control Panel" screen, select the "Display" icon and click "Display Type".

2. Click "Change".

3. Click "Have Disk".

4. Click "Browse" to look for the driver program.
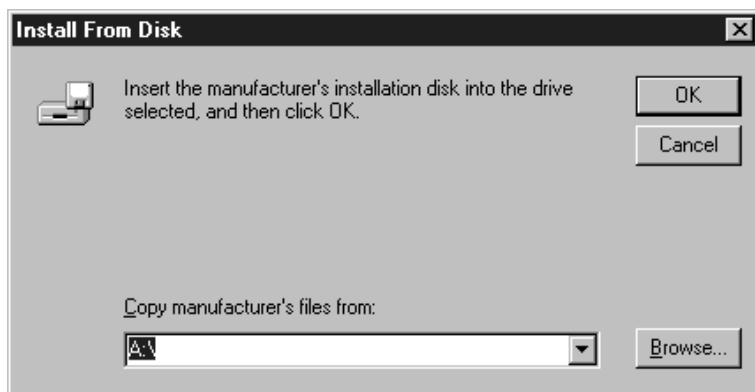
5. Select "atirage" and click "Open".

6. Select "ATIRAGE PRO TURBO AGP 2X" and click "OK".

7. When the driver has been successfully installed, click "OK".
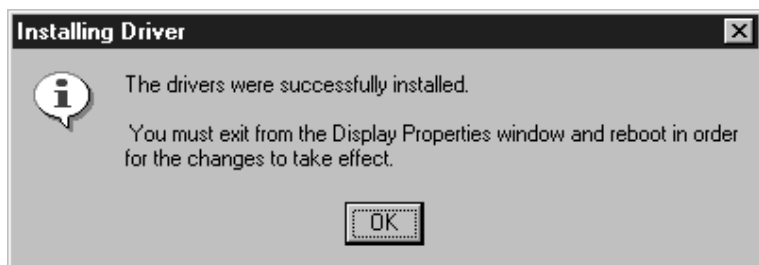
8. Click "Yes" to restart your computer and enable the changes to take effect.
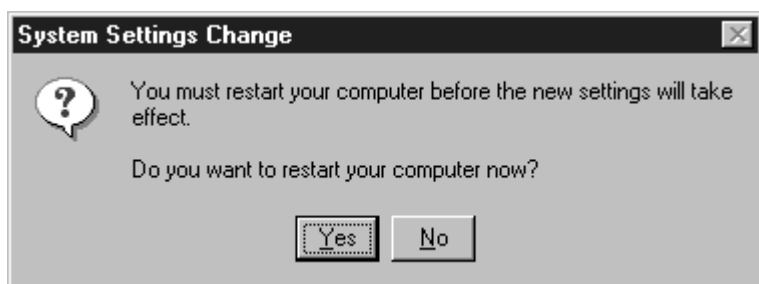
LAN Configuration

The PCA-6176E/F features an on-board LAN interface. This chapter gives detailed information on Ethernet configuration. It shows you how to configure the card to match your application requirements.

5.1 Introduction

The PCA-6176E/F features an optional 32-bit 10/100 Mbps Ethernet network interface. This interface supports bus mastering architecture and auto-negotiation features. Therefore standard twisted-pair cabling with RJ-45 connectors for both 10 Mbps and 100 Mbps connections can be used. Extensive driver support for commonly-used network systems is also provided.

5.2 Features

- Intel 82558 Ethernet LAN controller (fully integrated 10Base-T/100Base-TX)

- Supports "Wake On LAN" remote control function

- PCI Bus Master complies with PCI Rev 2.1

- MAC & PHY (10/100 Mbps) interfaces

- Complies to IEEE 802.3 10Base-T and IEEE 802.3U 100Base-T interfaces

- Fully supports 10Base-T and 100Base-TX operations

- Single RJ-45 connector provides auto-detection of 10 Mbps or 100 Mbps network data transfer rates and connected cable types

- 32-bit Bus Master technology complies with PCI Rev. 2.1

- Plug and Play

- Enhancements on ACPI & APM

- Complies with PCI Bus Power Management Interface Rev. 1.0, ACPI Rev. 1.0, and Device Class Power Management Rev. 1.0

5.3 Drivers Installation

The PCA-6176E/F's on-board Ethernet interface supports all major network operating systems.

The BIOS automatically detects the LAN while booting, and assigns an IRQ level and I/O address. No jumpers or switches are required for user configuration.

The drivers and installation instructions are located in the following directories of the utility diskette/CD:

• Dos: Drivers for DOS platforms

• Info: Installation instructions

• Nwserver: Drivers for Novell NetWare

• Wfw: Drivers for Windows 3.11 for Workgroups

Please refer to the text files in the Info directory for detailed information about installing the drivers.

Note: *Operating system vendors may post driver updates on their web sites. Please visit the web sites of OS vendors to download updated drivers.*

5.4 Windows 95/98 Drivers Setup Procedure

1. In the Windows 95/98 screen, click "Start". Select "Settings", and then click the "Control Panel" icon.

2. Click "Next".
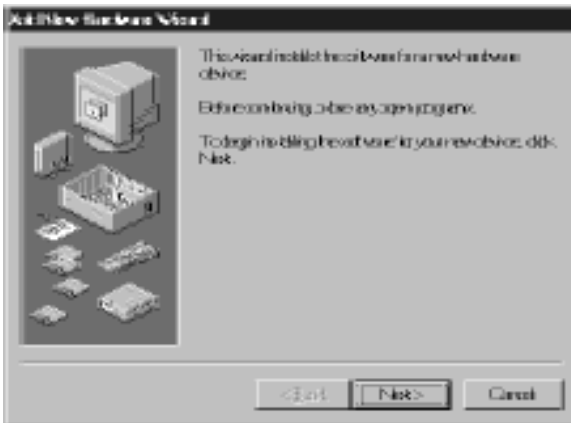
3. Click "Next".
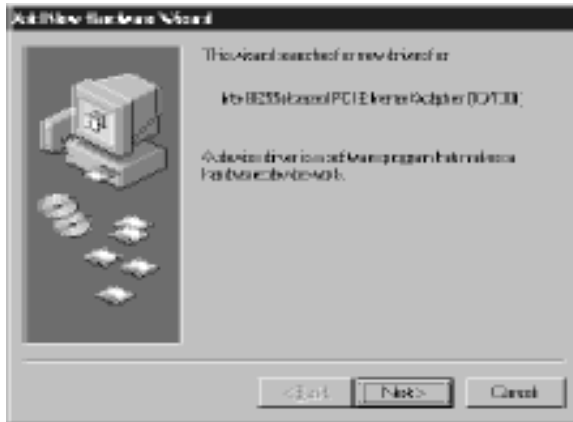
4. Click "Next".

5. Follow the instructions on the screen and click "Have Disk".

6. Click "Browse".

Install From Disk

Insert the manufacturer's installation disk into the drive selected, and then click OK.

OK
Cancel

Copy manufacturer's files from:

A:\
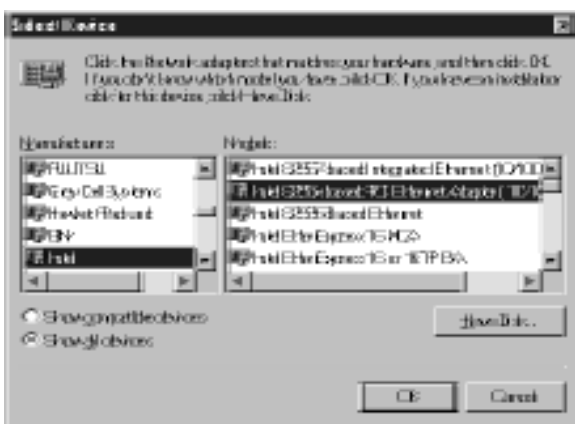
Browse...
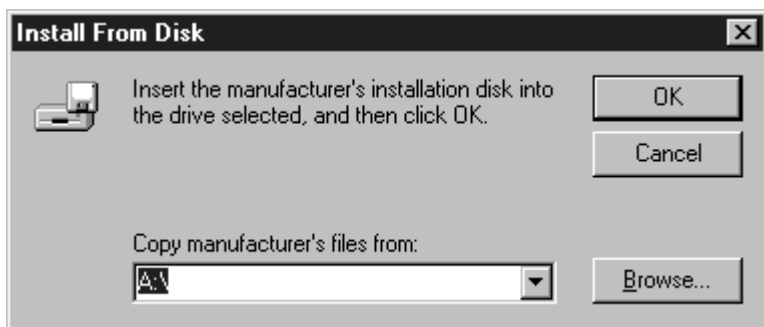
7. Select "net82557.inf" and click "OK".

8. Click "OK".

Install From Disk ×

Insert the manufacturer's installation disk into the drive selected, and then click OK.

OK

Cancel

Copy manufacturer's files from:

A:

Browse...

9. Click "OK".

10. Click "Next".

11. Click "Finish".

12. Click "Yes".

5.6 Windows NT Drivers Setup Procedure

Note: *You must install your Windows NT drivers before you begin to connect up your LAN wiring. Otherwise LAN irregularities may occur.*

1. In the "Windows NT" screen, click "Start" and select "Settings". Then click the "Control Panel" icon to select "Network".

2. Click "No".
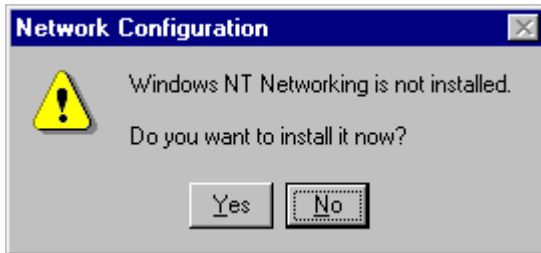
3. Click "Add" to add your new driver.

4. Select "Have Disk" to find the Network Adapters Driver program.

5. Click "OK".
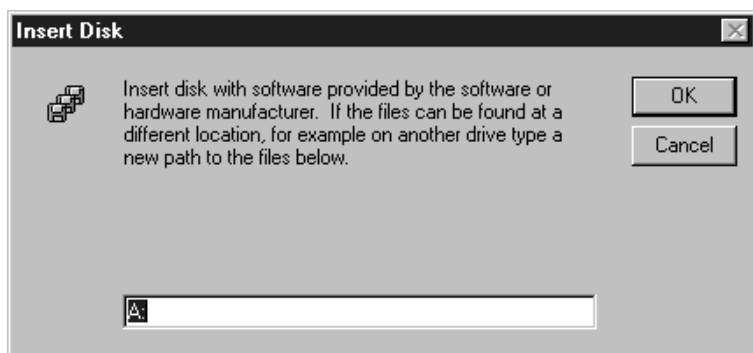
6. Select "Intel(R) PRO Adapter" and click "OK".
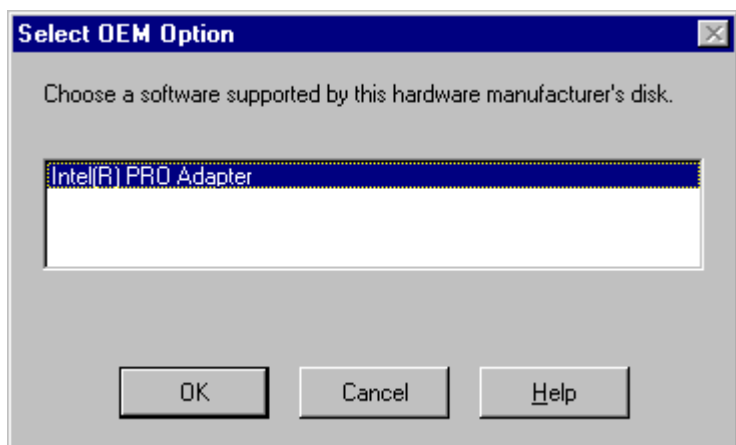
7. You will then find the new network adapter "Intel 8255x-based PCI Ethernet Adapter (10/100)" in Windows.

Network Adapters:

[1] Intel 8255x-based PCI Ethernet Adapter (10/100)

Add...   Remove   Properties...   Update

Item Notes:

Intel 8255x-based PCI Ethernet Adapter (10/100) [Bus 0 Slot 10]

Close   Cancel
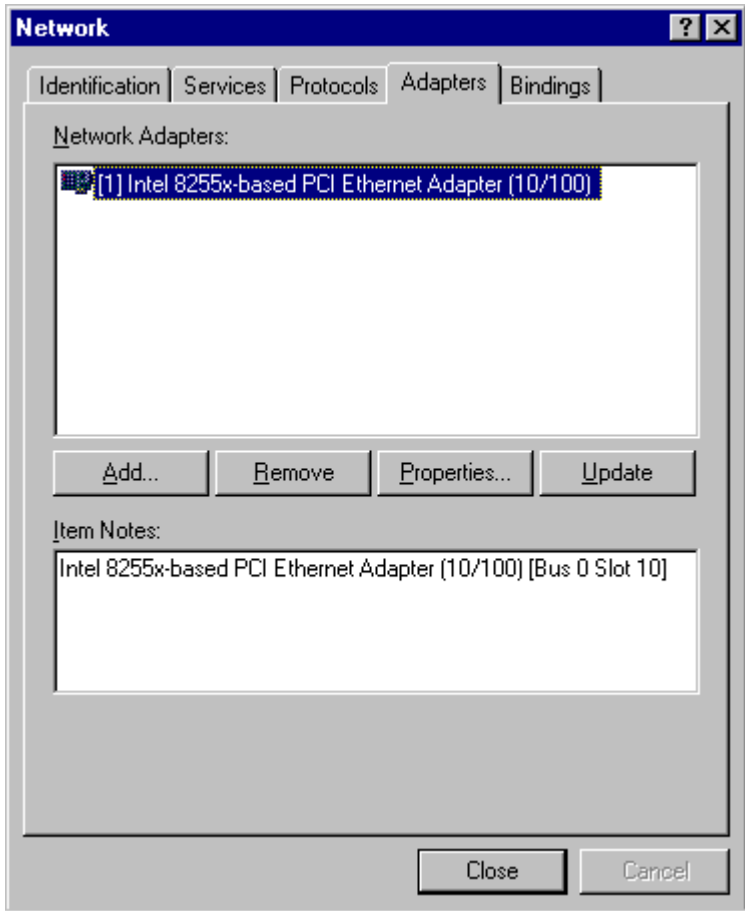
SCSI Setup and Configurations

The PCA-6176S/F features an on-board SCSI interface. This chapter explains basic SCSI concepts, and provides instructions for installing the software drivers with the SCSI driver disks/CD included in your package. For more details, refer to the "Adaptec 7800 Family Manager Set" User's Guide.

6.1   Introduction

The PCA-6176S/F is equipped with an Adaptec AIC-7890 single-chip PCI-to-SCSI host adapter which provides a powerful Ultra2 multitasking interface between your computer's PCI bus and SCSI devices (disk drives, CD-ROM drives, scanners, tape backups, removable media drives, etc.). Up to a total of 15 SCSI devices can be connected to the SCSI connector on AIC-7890.

The Adaptec AIC-7890 is a 16-bit, LVD/SE (Low Voltage Differential/Single-Ended) SCSI solution for your computer. It can support both legacy Fast SCSI and Ultra SCSI devices, as well as the newest LVD Ultra2 SCSI devices.

If you need to configure the SCSI, the on-board SCSI Select configuration utility allows you to change host adapter settings without opening the computer or handling the board. In addition, the SCSI Select utility contains a utility to low-level format, and it verifies the disk media on your hard disk drives.

Note: *If any peripheral is attached to the Ultra2 SCSI segment and is running at SE mode, one or more Ultra/Ultra Wide peripherals will be attached to the Ultra2 SCSI segment and will cause the Ultra2 SCSI segment to run at speeds up to 40 MBytes/sec instead of 80 MBytes/sec.*

6.2   Configuring the SCSI Adapter

Access the SCSI BIOS by holding down both the CTRL and A keys when you see the BIOS banner message listing the driver name and the attached devices. For example:

```
Adaptec AIC-7890 SCSI BIOS Build 20107

(c) 1998 Adaptec, Inc.  All Rights Reserved.

<<<Press <Ctrl><A> for SCSISelect(TM)
Utility>>>
```

The SCSI Select screen will come up. Instructions on how to move the cursor and select options are listed at the bottom of the program windows. You can select either Configure/View Host Adapter Settings or SCSI Disk Utilities.

6.3   SCSI Terminators

To ensure reliable communication, the SCSI bus must be properly terminated. Termination is controlled by a set of electrical resistors, called terminators. Terminators must be placed (or enabled) at the two extreme ends of the SCSI bus. All devices that lie between the ends must have their terminators removed (or disabled).

Since methods for terminating a SCSI peripheral can vary widely, refer to the peripheral's documentation for instructions on how to enable or disable termination. Here are some general guidelines for termination:

• Termination on internal SCSI peripherals is usually controlled by manually setting a jumper or switch on the peripheral, or by physically removing or installing one or more resistor modules on the peripheral.

• Termination on external SCSI peripherals is usually controlled by installing or removing a SCSI terminator. On some external peripherals, termination is controlled by setting a switch on the rear of the drive.

• By default, termination on the CPU card itself is automatic (the preferred method).

• Internal Ultra2 peripherals are set at the factory with termination disabled, which cannot be changed. Proper termination for internal Ultra2 peripherals is provided by the built-in terminator at the end of the Ultra2 internal SCSI cable.

• Most non-Ultra2 SCSI peripherals come from the factory with termination enabled.

6.4 Adaptec EZ-SCSI Utility

Adaptec EZ-SCSI gives you what you need to use your SCSI devices most effectively with Windows 95 and Windows NT. You can also use Adaptec EZ-SCSI on computers running DOS, Windows 3.1x, or Windows for Workgroups 3.1x.

6.4.1 Quick start instructions

First, install the SCSI devices (see the hardware documentation for details). Then follow the instructions for your operating system software in one of the following sections. We recommend that after you install Adaptec EZ-SCSI, you run SCSI Tutor to learn more about the features of SCSI.

6.4.2 Windows 95 or Windows NT

If you want to install Windows 95 or Windows NT on a new computer system, you may not be able to access your SCSI CD-ROM drive at first. (Usually, you install Windows 95 and Windows NT from a CD-ROM disc.) To gain access to your CD-ROM drive, follow the DOS Quick Start instructions. Then reboot your computer and follow these instructions:

1. Install Windows 95 or Windows NT version 3.51 or above, and start it running on your computer.

2. Insert the Adaptec EZ-SCSI Setup disk/CD into your floppy disk/ CD drive.

3. Click the Start button and select Run.

4. Type a:\setup if you are using the A: drive or b:\setup if you are using the B: drive. Then click OK.

5. Follow the instructions that appear on the screen.

6.4.3 Windows / Windows for Workgroups 3.1x

1. Install Windows 3.1x or Windows for Workgroups 3.1x, and start it running on your computer.

2. Insert the Adaptec EZ-SCSI Setup diskette into your floppy disk drive.

3. Select File/Run from the Program Manager menu.

4. When the Run dialog box appears, type a:\setup if you are using the A: drive or b:\setup if you are using the B: drive. Then click OK.

5. Follow the instructions that appear on the screen.

6.4.4 DOS

1. Install DOS 6.x or above, and start it running on your computer.

2. Insert the Adaptec EZ-SCSI Setup diskette into your floppy disk drive.

3. At the DOS prompt, type a:\install (assuming your 3.5" floppy is the A: drive). Then press Enter.

4. Follow the instructions that appear on the screen.

6.4.5 SCSI device troubleshooting

Review this checklist if your newly installed SCSI disk drives, CD-ROM drives, or other devices do not seem to work properly:

1. Make sure that termination is correctly set for all devices on the SCSI bus, as described in your host adapter documentation.

2. Make sure that there are no hardware conflicts such as devices in your computer trying to use the same interrupts (IRQs) or DMA channels.

3. Make sure that the cables connecting the external and internal SCSI devices and the host adapter are attached securely. Also make sure that the pin 1 orientation is correct for internal cables.

4. Make sure that each SCSI device connected to the host adapter has a unique SCSI ID.

5. Make sure that CD-ROM drives and other SCSI devices are attached to a power source and are turned on.

6.4.6 Windows 95 / Windows NT troubleshooting

What is a miniport driver, and how do I make sure that the miniport driver is installed correctly?

Miniport drivers are a new kind of 32-bit protect mode device driver used by Windows 95 and Windows NT to control host adapters and other kinds of devices. Windows 95 and Windows NT include a set of miniport drivers for various types of SCSI host adapters. The host adapter miniport driver is automatically installed and configured during Windows 95 and Windows NT installation if your host adapter is already installed. To make sure that the driver is installed correctly in systems running Windows 95, open the Control Panel, double-click on System, and click the Device Manager tab. Then double-click the SCSI Controllers icon. You should then be able to see the model name of the SCSI host adapter(s) installed in your system.

What if there is no SCSI Controllers icon under Device Manager, or the model name of the SCSI chipset does not appear under Device Manager?

If the SCSI Controllers icon or your host adapter's model name does not appear, open Control Panel and double-click the Add New Hardware icon. Let Windows search for the host adapter by selecting Yes on the second screen of the Add New Hardware Wizard.

If Windows does not detect the host adapter, run the Add New Hardware Wizard again. This time, select No on the second screen of the wizard, then select SCSI Controllers on the next screen. Select the name of your host adapter when it appears.

If the name of your SCSI chipset does not appear, you may be able to find its miniport driver on the Windows 95 CD-ROM. Follow these steps:

1. Place the Windows 95 CD-ROM in your CD-ROM drive, and run the Add New Hardware Wizard.

2. Select "No" on the second screen, and select SCSI Controllers on the next screen.

3. Click on the Have Disk button, then click the Browse button.

4. Look in the \drivers\storage directory of the CD-ROM, and select the name of your SCSI host adapter if it appears.

What if a yellow exclamation point or a red X appears in Device Manager in front of my host adapter?

1. Open the Control Panel, double-click on System, and click the Device Manager tab.

2. Double-click the SCSI Controllers icon, select the name of the old host adapter, and click Remove.

3. Turn off the computer and physically remove the currently installed host adapter.

4. Install the new host adapter according to the instructions in the hardware documentation.

5. Turn the computer on. If the new host adapter supports Plug and Play, Windows will install and configure it automatically. Otherwise, run Add New Hardware to make sure the new driver is loaded.

If I am running under Windows 95, do I need lines for the Adaptec real mode ASPI drivers and mscdex in my config.sys and autoexec.bat files?

Usually, you do not need to use these real mode ASPI drivers, because the new Windows miniport drivers support most SCSI host adapters and SCSI devices. However, you need to load the drivers (including mscdex, if you have a CD-ROM drive) if any of the following is true:

- You are running in MS-DOS mode.

- You are using a scanner or another SCSI device with config.sys- or autoexec.bat- based drivers, such as HP's sjiix.sys.

- You have an older model SCSI1 CD-ROM drive that Windows 95 does not support.

- You are using a CD-Recorder drive. (Note, however, that some newer models of CD-Recorder drives can use the embedded Windows miniport drivers.)

To install the Adaptec EZ-SCSI DOS drivers, click the Start button and select Restart the Computer in MS-DOS mode. When the DOS prompt appears, follow the Quick Start instructions for DOS.

My CD-ROM drive does not work properly under Windows 95.

Some older models of SCSI CD-ROM drives are not compatible with the embedded Windows 95 CD-ROM driver. You can add support for the CD-ROM drive by doing the following:

1. Click the Start button and select Restart the Computer in MS-DOS mode.

2. When the DOS prompt appears, follow the Quick Start instructions for DOS.

3. When you have finished running Adaptec EZ-SCSI for DOS, find the file named cdtsd.vxd in the windows\system\iosubsys directory and rename it cdtsd.sav.

My CD-ROM drive shows up as more than one icon under My Computer.

This means that the mapping between mscdex, which runs in real mode, and the Windows95 CD-ROM driver does not match. You can correct this in one of two ways:

- Comment out the line that loads mscdex.exe in the autoexec.bat file.

- Change the /L switch on the line that loads mscdex.exe in the autoexec.bat file so that it assigns the CD-ROM drive the next highest logical drive letter after the hard disk drives.

6.4.7 Information for DOS/Windows 3.1x users

The following information may be useful if you install Adaptec EZ-SCSI on a computer running DOS, Windows 3.1x, or Windows for Workgroups 3.1x.

Note: *The Windows 95 / Windows NT troubleshooting section describes a few situations when you may need to use the DOS/Windows 3.1x drivers and ASPI managers under Windows 95 or Windows NT.*

6.4.8 DOS and Windows 3.1x device drivers

Device drivers are software programs that enable your computer to communicate with SCSI devices such as hard disk drives, CD-ROM drives, and scanners. Each kind of device requires a different device driver. Adaptec EZ-SCSI includes several DOS/Windows 3.1x device drivers that are copied to your hard disk during installation. If Adaptec EZ-SCSI finds these kinds of devices on your computer, it adds command lines to your config.sys and autoexec.bat files to load the necessary device drivers.

To learn more about the Adaptec EZ-SCSI device drivers, including their command line option information, refer to the Adaptec EZ-SCSI Online Reference (a Windows Help application).

6.4.9 DOS and Windows 3.1x ASPI managers

ASPI (Advanced SCSI Programming Interface) managers are software programs that enable the SCSI device drivers, your host adapter, and your SCSI devices to communicate with one another. ASPI managers are written for a specific operating system, such as DOS, and a specific family of Adaptec host adapters.

Adaptec EZ-SCSI includes several ASPI managers for DOS/Windows 3.1x. When you install Adaptec EZ-SCSI on these operating systems, it detects what kind of host adapter is installed in your computer and automatically configures your system with the correct ASPI manager. To learn more about these ASPI managers, including their command line option information, refer to the Adaptec EZ-SCSI Online Reference (a Windows Help application).

6.4.10 DOS formatting utilities

Adaptec EZ-SCSI includes several DOS-based formatting utilities.

Low-level formatter (scsifmt)
Use the DOS-based scsifmt utility for low-level formatting of SCSI hard disk drives, removable media, and Floptical® drives. You can also use it to scan a disk device for surface defects before you store data on it.

Run scsifmt from the DOS prompt, not from the Windows MS-DOS prompt. Before you run it, make sure that the disk devices you want to format are connected to the host adapter and are powered on. Then follow these steps:

1. Change to the directory where scsifmt.exe is located (usually c:\scsi), type scsifmt at the DOS prompt, and press Enter.

Note: *If you are formatting a SCSI disk device that supports more than one LUN (for example, Iomega's Bernoulli dual multidrive), type scsifmt/L at the command line.*

2. When the first screen appears, read it and press Enter to continue. (Press F1 at any time to view Help). Information about your SCSI disk devices appears on the screen.

3. Use the arrow keys to move the highlight bar to a disk device you want to format or verify, then press Enter.

4. When the next screen appears, select either Format or Verify (to verify that the disk is free of surface defects). Then press Enter.

Warning: *Back up important data before you format the disk device! A low-level format erases all data from the disk.*

5. If you select Format, confirm that you want to format the disk, and then wait while the disk device is formatted. This may take a long time if the disk is large.

   If you select Verify, you can press Esc at any time to stop the verification process. (This does not damage the disk.) If the utility finds bad blocks on the disk, it displays information about them. You can reassign the bad block(s) to prevent data from being stored there.

6. Repeat steps 3, 4, and 5 as needed, to format or verify other disk devices. When you have finished, press Esc to exit.

Formatter and partitioner (afdisk)

Use the DOS-based afdisk utility to partition and format SCSI hard disk drives, Floptical® drives, and magneto-optical drives. You can also use afdisk to remove DOS and non-DOS partitions from a disk drive, and to format removable media in standard hard disk format, OS/2 floppy format, or DOS V (Japanese) format.

Note: *Use afdisk only if the disk device is not controlled by the host adapter BIOS. That is, if the host adapter does not have BIOS, or if its BIOS is not enabled. If the disk device is controlled by the host adapter BIOS, use the DOS afdisk utility to partition and format the disk device. (See the MS-DOS documentation.)*

Run afdisk from the DOS prompt only, not from the Windows MS-DOS prompt. Before you run it, make sure that the disk devices you want to format and partition are connected to the host adapter and are powered on. Then follow these steps:

1. Change to the directory where afdisk.exe is located (usually c:\scsi), type afdisk at the DOS prompt, and press Enter. Information about your SCSI disk devices appears on the screen. (The number that appears after Target is the device's SCSI ID.)

2. Use the arrow keys to move the highlight bar to the disk device you want to partition, and then press Enter.

   - If the selected disk device is controlled by the host adapter BIOS, you can view information about it but you cannot partition it with afdisk. (Use the DOS afdisk and format utilities.)

   - If the selected disk device is unpartitioned, you must partition it before you can format it. To do this, follow the instructions on the screen. (Press F1 to see an explanation of the partitioning options.)

   Information about the selected disk device appears in the lower left of the screen. Disks smaller than 1 GB have 64 heads, 32 sectors per track, and cylinders equal to the number of megabytes of available capacity. Disks larger than 1 GB have 255 heads, 63 sectors per track, and one cylinder per 8 MB of available capacity.

3. To create a new partition on the disk device, press Ins. The "Create a DOS Partition" window appears in the lower right of the screen and suggests that you create one partition on the disk device, equal to its entire capacity. If this is what you want to do, skip to Step 5.

4. To change the size of the partition, use the arrow keys to select Start Cylinder and End Cylinder, and type in the numbers you want. Partitions up to 2 GB are supported.

5. When the number of cylinders is what you want, press Esc. When the confirmation prompt appears, select Yes and press Enter to create the partition. To create more partitions on the same disk device, repeat steps 3, 4, and 5. As you create partitions on the disk., they are added to the window at the upper right of the screen.

6. Press Esc to return to the "Select SCSI Device to Partition" window. If you want to partition a different disk device, select the device from the list and repeat the earlier steps.

7. To quit afdisk, press Esc and select Yes to confirm that you want to quit.

On-board Security Setup

This chapter explains OBS concepts and provides instructions for installing the relevant software drivers. This is done using the OBS driver disks/CD included in your PCA-6176 package.

7.1 Introduction

On-board security (OBS) functions monitor key hardware. They help you maintain your system's stability and durability.

The PCA-6176 can monitor 5 sets of system positive voltages, 2 sets of system negative voltages, CPU cooling fan speed, and CPU temperature.

The positive system voltage sets which can be monitored include:

• CPU core voltage: 1.3 V ~ 3.3 V, according to Intel specifications

• Transmission voltage from CPU to chipset: typically 1.5 V

• Chipset voltage: typically 3.3 V

• Main voltage: +5 V, +12 V

The negative system voltage sets which can be monitored include:

• Main voltage: -5 V, -12 V

7.2 Installation of OBS Devices

After you have mounted the CPU and cooling modules, enable the OBS functions as follows:

1. Take the specially designed temperature sensor cable out of the accessories bag.

2. Connect the 2-pin header of the cable to CN15.

3. Attach the sticker to the heat sink, but NOT on the plastic portion of the heat sink.

4. Place the sensor on the nearest part of the CPU, to ensure that true CPU temperature is measured.

7.3   Driver Installation

7.3.1 Necessary prerequisites

The instructions in this manual assume that you understand
elementary concepts of MS-DOS and the IBM personal computer.
Before you attempt to install any driver or utility, you should know
how to copy files from a floppy disk/CD to a directory on the hard
disk. You should also understand the MS-DOS directory structure,
and know how to format a floppy disk. If you are uncertain about any
of these concepts, please refer to DOS or Windows user reference
guides for more information before you proceed with the installation.

7.3.2 Before you begin

Before you begin installing software drivers, you should make a
backup copy of the display driver disk/CD and store the original in a
safe place. The display driver disk/CD contains drivers for several
versions of certain applications. You must install the correct version
in order for the driver to work properly, so make sure you know
which version of the application you have.

Utility disk/CD 1: OBS Monitor Win95/98 V 1.10 #1

Utility disk/CD 2: OBS Monitor Win95/98 V 1.10 #2

7.3.3 Windows 95/98 drivers setup procedure

1. Insert the OBS driver disk into drive A:.
    Type:

    ```
    A:\setup.exe
    ```

    Press <Enter> to run the driver SETUP program.

Figure 7-1: Hardware Doctor setup - initial screen

2. If your operating system is Win95/98, you will see the following screen images after running the driver. You must then reboot your system, start the procedure from Step 1 again, and then proceed directly to Step 3.

Figure 7-2: Setup under Win95/98
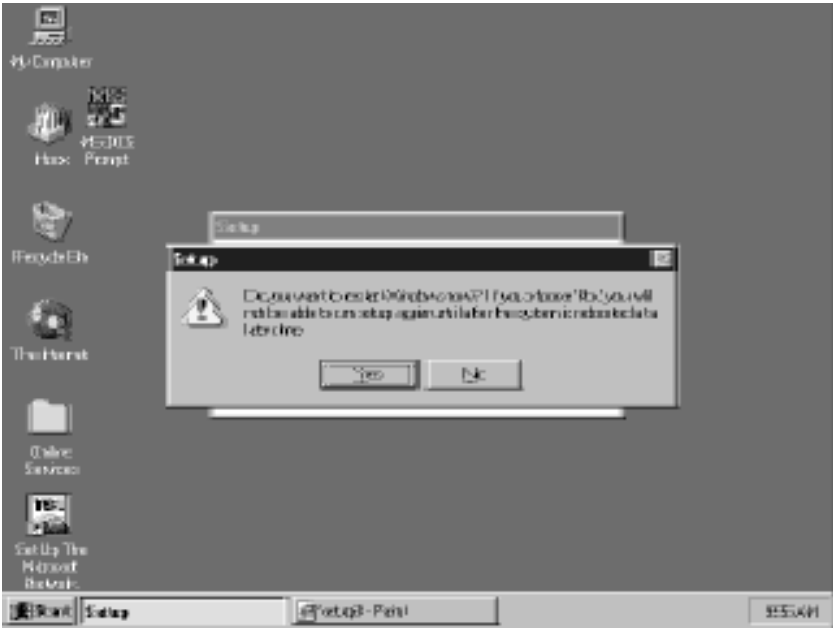
Figure 7-3: Restarting Windows

3. Follow the screen instructions to install the software.

Figure 7-4: Hardware Doctor setup - installation screen

4. Complete the setup.

Figure 7-5: Hardware Doctor setup - completion screen

5. Using your file manager, click on "Hardware Doctor" in drive C:, and then click on "W83781".
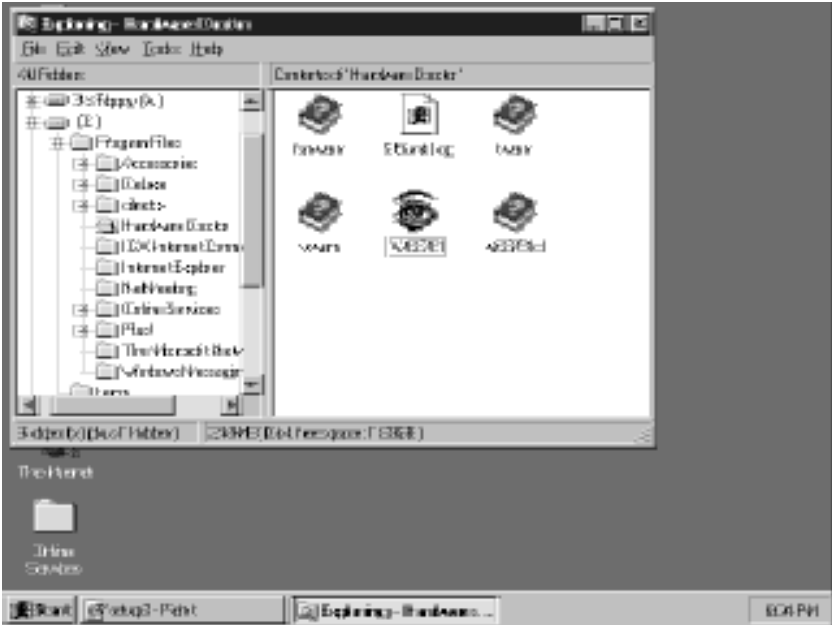
Figure 7-6: Exploring - Hardware Doctor

6. It is recommended that you load the default values for all the OBS settings. However, if desired, you can establish new conditions for voltage, fan speed and temperature.
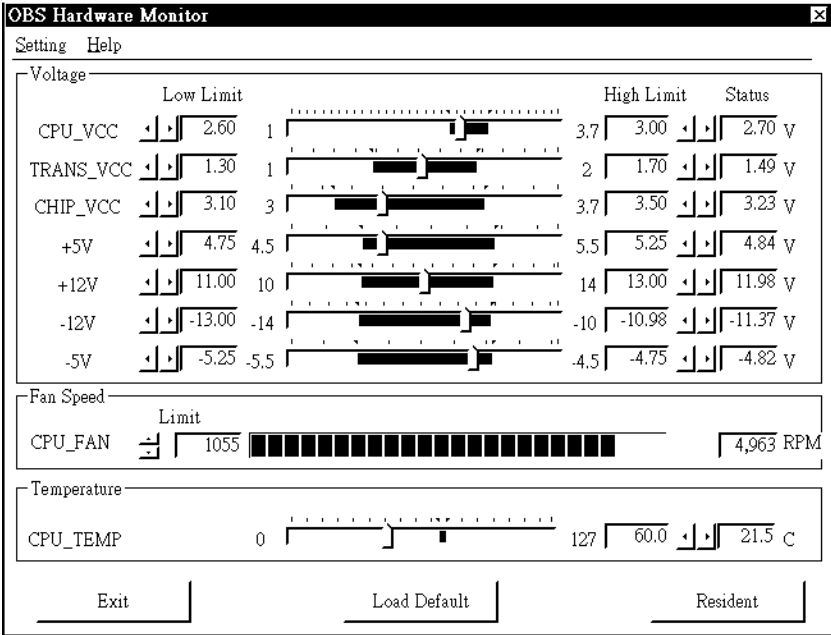
Figure 7-7: Winbond Hardware Doctor

7. "Winbond Hardware Doctor" will show an icon on the right side of the bottom window bar. This icon is the "Terminate and Stay Resident" (TSR) icon. It will permanently remain in the bottom window bar, and will activate warning signals when triggered by the on-board security system.
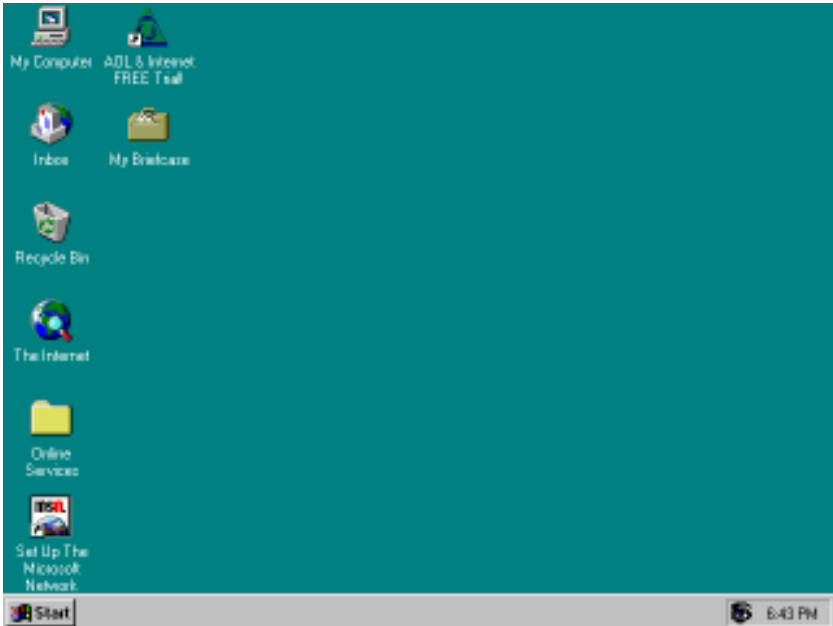
Figure 7-8: "Terminate and Stay Resident" (TSR) icon on the right side of the bottom window bar

8. Click on "Setting", then "Monitoring Config." While enabling each OBS function, you can choose "Faults 1". This will result in a warning message being delivered as soon as any monitored reading exceeds safe limits for the first time. Alternatively, you can set up "Count 3". This will result in a warning message being delivered only after any monitored reading exceeds safe limits for a third time. It is recommended that you load the default settings for all the OBS functions.
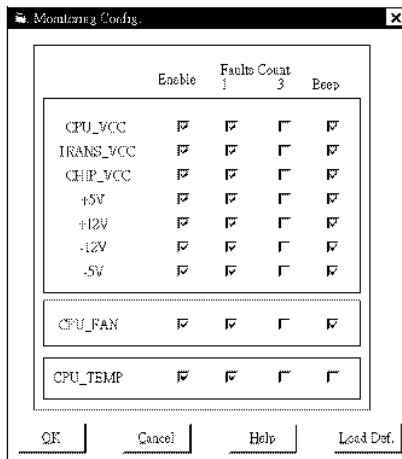
Figure 7-9: Monitoring Config.

9. After completing the setup, all the OBS functions are permanently enabled. When a monitored reading exceeds safe limits, a warning message will be displayed and an error beep tone will be activated to attract your attention.
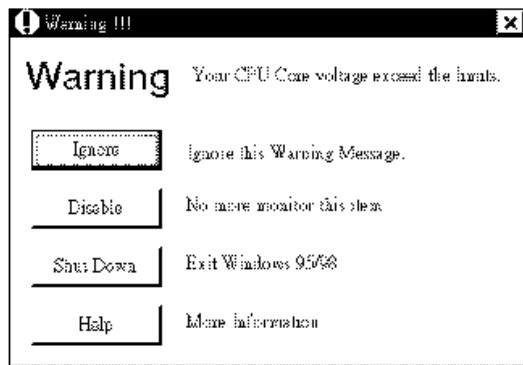
Figure 7-10: Warning display

A

Programming the Watchdog Timer

The PCA-6176 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 3F (hex), and the related time interval is 1 sec. to 63 sec.

Data	Time Interval
01	1 sec.
02	2 sec.
03	3 sec.
04	4 sec.
•	•
•	•
•	•
3F	63 sec.

After data entry, your program must refresh the watchdog timer by rewriting 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
```

Pin Assignments

This appendix contains information of a detailed or specialized nature. It includes:

- IDE Hard Drive Connector
- Floppy Drive Connector
- Parallel Port Connector
- SCSI Connector
- USB Connector
- VGA Connector
- Ethernet 10Base-T RJ-45 Connector
- COM1/COM2 RS-232 Serial Port
- Keyboard and Mouse Connector
- External Keyboard Connector
- IR Connector
- CPU Fan Power Connector
- Power LED and Keylock Connector
- External Speaker
- Reset Connector
- HDD LED Connector
- ATX Feature Connector
- System I/O Ports
- DMA Channel Assignments
- Interrupt Assignments
- 1st MB Memory Map
- PCI Bus Map

B.1 IDE Hard Drive Connector (CN1, CN2)

```
39 37  ....  3  1
 ○  ○        ○  ○
         • • •
 ○  ○        ○  ○
40 38  ....  4  2
```
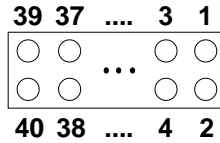
IDE hard drive connector (CN1, CN2)

Pin	Signal	Pin	Signal
1	IDE RESET*	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	N/C
21	N/C	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO CHANNEL READY	28	N/C
29	HDACKO*	30	GND
31	IRQ14	32	IOCS16
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HARD DISK SELECT 0*	38	HARD DISK SELECT 1*
39	IDE ACTIVE*	40	GND

* low active

B.2 Floppy Drive Connector (CN3)

```
33 31 ....  3  1
○  ○       ○  ○
      • • •
○  ○       ○  ○
34 32 ....  4  2
```
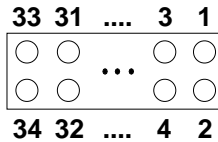
Floppy drive connector (CN3)

Pin	Signal	Pin	Signal
1	GND	2	DENSITY SELECT*
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	26	TRACK 0*
27	GND	28	WRITE PROTECT*
29	GND	30	READ DATA*
31	GND	32	HEAD SELECT*
33	GND	34	DISK CHANGE*

* low active

B.3 Parallel Port Connector (CN4)

13 12 .... 2 1

○ ○ • • • ○ ○
○ ○ ○ ○

26 25 .... 15 14
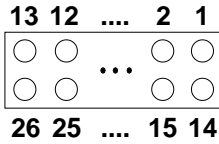
Parallel port connector (CN4)

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

B.4 SCSI Connector (CN5)

34 33 .... 2 1

68 67 .... 36 35
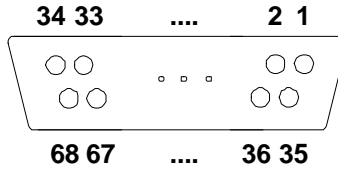
SCSI connector (CN5)

Pin	Function	Pin	Function
1	SD+12	35	SD-12
2	SD+13	36	SD-13
3	SD+14	37	SD-14
4	SD+15	38	SD-15
5	SDP+1	39	SDP-1
6	SD+0	40	SD-0
7	SD+1	41	SD-1
8	SD+2	42	SD-2
9	SD+3	43	SD-3
10	SD+4	44	SD-4
11	SD+5	45	SD-5
12	SD+6	46	SD-6
13	SD+7	47	SD-7
14	SDP+0	48	SDP-0
15	GND	49	GND
16	DIFS	50	SENIN
17	TPWEX	51	TPWEX
18	TPWEX	52	TPWEX
19	NC	53	NC
20	GND	54	GND
21	SATN+	55	SATN-
22	GND	56	GND
23	SBSY+	57	SBSY-
24	SACK+	58	SACK-
25	SRST+	59	SRST-
26	SMSG+	60	SMSG-
27	SSEL+	61	SSEL-
28	SCD+	62	SCD-
29	SREQ+	63	SREQ-
30	SIO+	64	SIO-
31	SD+8	65	SD-8
32	SD+9	66	SD-9
33	SD+10	67	SD-10
34	SD+11	68	SD-11

B.5 USB Connector (CN6)

```
1  ◯ ◯  2
   ◯ ◯
   ◯ ◯
   ◯ ◯
9  ◯ ◯  10
```
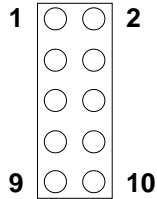
USB1/USB2 connector (CN6)

Pin	USB1 Signal	Pin	USB2 Signal
1	+5 V	2	+5 V
3	UV-	4	UV-
5	UV+	6	UV+
7	GND	8	GND
9	Chassis GND	10	Key

B.6 VGA Connector (CN7)

```
5  ◯ ◯ ◯ ◯ ◯ ▢  1
    ◯ ◯ ◯ ◯ ◯
15  ◯ ◯ ◯ ◯ ◯  10
```
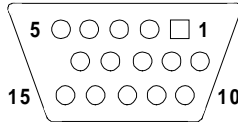
VGA connector (CN7)

Pin	Signal	Pin	Signal
1	RED	9	N/C
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK
8	GND		

B.7 Ethernet 10Base-T RJ-45 Connector (CN8)

Ethernet 10Base-T RJ-45 connector (CN8)

Pin	Signal
1	XMT+
2	XMT-
3	RCV+
4	N/C
5	N/C
6	RCV-
7	N/C
8	N/C

B.8 COM1/COM2 RS-232 Serial Port (CN9, CN10)

COM1/COM2 RS-232 serial port (CN9/CN10)

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

B.9 Keyboard and Mouse Connnector (CN11)

Keyboard and mouse connector (CN11)

Pin	Signal
1	KB DATA
2	MS DATA
3	GND
4	V_{CC}
5	KB CLOCK
6	MS CLOCK

B.10 External Keyboard Connector (CN12)

External keyboard connector (CN12)

Pin	Signal
1	CLK
2	DATA
3	NC
4	GND
5	V_{CC}

B.11 IR Connector (CN13)

IR connector (CN13)

Pin	Signal	Pin	Signal
1	+5 V	2	N/C
3	FIRRX	4	CIRRX
5	IR_RX	6	+5VSB
7	GND	8	N/C
9	IR_TX	10	N/C

B.12 CPU Fan Power Connector (CN14)

1 2 3

○ ○ ○
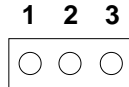
CPU fan power connector (CN14)

Pin	Signal
1	GND
2	+12 V
3	Detect

B.13 Power LED and Keylock Connector (CN16)

You can use an LED to indicate when the CPU card is on. Pin 1 of CN16 supplies the LED's power, and Pin 3 is the ground.

You can use a switch (or a lock) to disable the keyboard so that the PC will not respond to any input. This is useful if you do not want anyone to change or stop a program which is running. Simply connect the switch from Pin 4 to Pin 5 of CN16.

Power LED and keylock connector (CN16)

Pin	Function
1	LED power (+5 V)
2	NC
3	GND
4	Keyboard lock
5	GND

B.14 External Speaker (CN17)

The CPU card has its own buzzer. You can also connect it to the external speaker on your computer chassis.

External speaker (CN17)

Pin	Function
1	+5 V_{CC}
2	GND
3	Internal buzzer
4	Speaker out

B.15 Reset Connector (CN18)

1   2
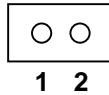
Reset connector (CN18)

Pin	Signal
1	GND
2	Reset

B.16 HDD LED Connector (CN19)

HDD LED connector (CN19)

Pin	Signal
1	V_{CC}
2	LED

B.17 ATX Feature Connector (CN20)

ATX feature connector (CN20)

Pin	Signal
1	PS-ON
2	V_{CC}
3	5VSB

B.18 System I/O Ports

System I/O ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
022-023	Chipset address
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) mask
080-09F	DMA page register
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200-207	Game I/O
278-27F	Parallel printer port 2 (LPT 3)
290-297	On-board hardware monitor
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT 2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and printer adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
443	Watchdog timer

B.19 DMA Channel Assignments

DMA channel assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

B.20 Interrupt Assignments

Interrupt assignments

Priority	Interrupt#	Interrupt source
1	NMI	Parity error detected
2	IRQ 0	Interval timer
3	IRQ 1	Keyboard
-	IRQ 2	Interrupt from controller 2 (cascade)
4	IRQ 8	Real-time clock
5	IRQ 9	Cascaded to INT 0A (IRQ 2)
6	IRQ 10	Available
7	IRQ 11	Available
8	IRQ 12	PS/2 mouse
9	IRQ 13	INT from co-processor
10	IRQ 14	Fixed disk controller
11	IRQ 15	Available
12	IRQ 3	Serial communication port 2
13	IRQ 4	Serial communication port 1
14	IRQ 5	Parallel port 2
15	IRQ 6	Diskette controller (FDC)
16	IRQ 7	Parallel port 1 (print port)

B.21 1st MB Memory Map

1st MB memory map

Addr. range (Hex)	Device
F0000h - FFFFFh	System ROM
C8000h - EFFFFh	Unused
C0000h - C7FFFh	VGA BIOS
B8000h - BFFFFh	CGA/EGA/VGA text
B0000h - B7FFFh	Unused
A0000h - AFFFFh	EGA/VGA graphics
00000h - 9FFFFh	Base memory

B.22 PCI Bus Map

PCI bus map

Function	Signals: Device ID	INT# pin	GNT# pin
On-board LAN	AD21	INT D	GNT E
On-board SCSI	AD20	INT A	GNT A
PCI slot 1	AD31	INT B, C, D, A	GNT A
PCI slot 2	AD30	INT C, D, A, B	GNT B
PCI slot 3	AD29	INT D, A, B, C	GNT C
PCI slot 4	AD28	INT A, B, C, D	GNT D

Note: *In the PCA-6176S/F, SCSI devices use "GNT A" signals via PCI slot 1. Therefore, PCI slot 1 cannot be used for plug-in bus master add-on cards such as a SCSI card or LAN card.*