PCA-6188

Socket 478 Pentium® 4/Cele-ron® Full-sized Processor Card with PCI-X/ DDR / VGA / Dual GbE / 800 MHz FSB

User's Manual

Copyright Notice

This document is copyrighted, 2004, by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements to the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements upon the rights of third parties which may result from its use.

Acknowledgements

•AWARD is a trademark of Phoenix Technologies Ltd.

•IBM and PC are trademarks of International Business Machines Corporation.

•Intel®, Pentium® 4, and Celeron™ are trademarks of Intel Corporation.

•WinBond is a trademark of Winbond Corporation.

All other product names or trademarks are the properties of their respective owners.

1.0.1 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.

Table 1.1: PCA-6188 comparison table		
Model	PCA-6188VG-00A1	PCA-6188G2-00A1
VGA:ATi Mobility Radeon 9600 Pro VGA controller on board	Yes	Yes
USB 2.0 port	4	4
LAN 1: Intel 82547 10/100/1000Base-T	Yes	Yes
LAN 2: Intel 82541 10/100/1000Base-T	No	Yes

Table 1-2: PCA-6188 DDR memory compatibility table

Brand	Size	Speed	Type	ECC	Part Number	Memory	Full Load *
Apacer	256MB	DDR266	DDR	N/A	77.10603.112	Infineon HYB25D256800BT-7-(32×8)	N/A
Kingston	256MB	DDR266	DDR	N/A	N/A	Nanya NT5DS32MBAT-6	N/A
	256MB	DDR266	DDR	N/A	"KVR256X64C25/256	"Kingston D328DM-60(32×8)	N/A
	512MB	DDR266	DDR	N/A	KVR266X64C25/512	Kingston D328DL-60(32×8)	N/A
	512MB	DDR266	DDR	N/A	9905006-30.A00	Kingston D328DP-75	N/A
Apacer	512MB	DDR333	DDR	N/A	N/A	SAMSUNG K4H560838C-TCB3(32×8)	N/A
Transcend	256MB	DDR333	DDR	N/A	TS32MLD64V3F5	SAMSUNG K4H560838D-TCB3(32×8)	N/A
	512MB	DDR333	DDR	N/A	N/A	SAMSUNG K4H560838C-TCB3(32×8)	N/A
Samsung	256MB	DDR333	DDR	N/A	N/A	SAMSUNG K4H560838F-TCB3(32×8)	V
Kingston	512MB	DDR333	DDR	N/A	KVR333X64C25/512	Kingston D328DM-60(32×8)	N/A
	512MB	DDR333	DDR	N/A	N/A	Nanya NT5DS32MBAT-6	N/A
Apacer	256MB	DDR400	DDR	N/A	77.10639.535	PSC A2S56D30ATP -5(32×8)	V
	512MB	DDR400	DDR	N/A	77.10736.19G	Infineon HYB25D256807BT-5(32×8)	V
Transcend	256MB	DDR400	DDR	N/A	TS32MLD64V4F3	MOSEL V58C2256804SAT5(32×8)	V
Samsung	512MB	DDR400	DDR	N/A	N/A	SAMSUNG K4H560838F-TCCC(32×8)	V
UG	1GB	DDR266	DDR	N/A	N/A	Hynix HY5DU128822A1-H	V
Apacer	512MB	DDR333	DDR	N/A	77.10728.56G	Mosel V58C2256804SAT5B	V
DSL	512MB	DDR333	DDR	N/A	N/A	SAMSUNG K4H560838F-TCB3	V
	1GB	DDR333	DDR	N/A	N/A	SAMSUNG K4H510838B-TCB3	V
Transcend	1GB	DDR333	DDR	N/A	N/A	SAMSUNG K4H560438E-TCB3	V
Apacer	256MB	DDR400	DDR	N/A	77.10636.115	Infineon HYB25D256800BT-5	V
	256MB	DDR400	DDR	N/A	77.10636.465	SAMSUNG K4H560838E-TCCC	V
	512MB	DDR400	DDR	N/A	77.10736.114	Infineon HYB25D256800BT-5	V
	512MB	DDR400	DDR	N/A	77.10736.56G	Mosel V58C2256804SAT5B	V
	512MB	DDR400	DDR	N/A	77.10736.464	SAMSUNG K4H560838E-TCCC	V
	1GB	DDR400	DDR	N/A	77.11136.464	SAMSUNG K4H510838B-TCCC	V
DSL	256MB	DDR400	DDR	N/A	N/A	Hynix HY5DU56822BT-D43	V
	256MB	DDR400	DDR	N/A	N/A	SAMSUNG K4H560838E-TCCC	V
Kingston	256MB	DDR400	DDR	N/A	N/A	Hynix HY5DU56822CT-D43	V
Transcend	1GB	DDR400	DDR	N/A	N/A	SAMSUNG K4H510838B-TCCC	V
UG	512MB	DDR400	DDR	N/A	N/A	Hynix HY5DU56822CT-D43	V
Apacer	512MB	DDR333	DDR	V	77.10735.114	Infineon HYB25D256800BT-6	V
	512MB	DDR333	DDR	V	77.10735.464	SAMSUNG K4H560838E-TCB3	V
	1GB	DDR333	DDR	V	77.11135.464	SAMSUNG K4H510838B-TCB3	V
Apacer	512MB	DDR400	DDR	V	77.10738.114	Infineon HYB25D256800BT-5	V
	1GB	DDR400	DDR	V	77.11138.464	SAMSUNG K4H510838B-TCCC	V
Transcend	256MB	DDR400	DDR	V	N/A	Mosel V58C2256804SAT5	V
	512MB	DDR400	DDR	V	N/A	Mosel V58C2256804SAT5	V

Full Load* : Supports 4 modules inserted in four slots as two pairs of Dual-channel memory configuration

1.0.1 Product warranty

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

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:

Step 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.

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

Step 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.

Step 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.

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

1.0.2 Initial Inspection

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

1 PCA-6188 Pentium® 4/Celeron® processor-based single board computer

1 PCA-6188 Startup Manual

1 CD with driver utility and manual (in PDF format)

1 FDD cable	P/N: 1700340640
2 Ultra ATA 66/100 HDD cables	P/N: 1701400452
2 Serial ATA HDD data cable	P/N: 1700071000
2 Serial ATA HDD power cable	P/N: 1703150102
1 ATX 12V power converter cable	P/N: 170304015K
1 Printer (parallel) port & COM port cable kit	P/N: 1700060305
1 Dual COM port cable kit	P/N: 1701092300
1 Y cable for PS/2 keyboard and PS/2 mouse	P/N: 1700060202
2 Two USB ports cable	P/N 1700100170
1 DVI cable	P/N:1700000821
1 VGA cable p/n:	P/N:1700000259
1 Video Cable(S / Composite terminal)	P/N:1700000784
Warranty card	

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

We have carefully inspected the PCA-6188 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-6188, 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.

1.0.3 Release Note

Date	Revision	Description
August 2004	1st. Edition	Initial Release

Important Safety Information
SAFETY INSTRUCTIONS

FCC

This device complies with the requirements in part 15 of the FCC rules: Operation is subject to the following two conditions:

1.   This device may not cause harmful interference, and

2.   This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

CAUTION!!

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

General Information

Chapter 1 Hardware Configuration

1.1 Introduction

The PCA-6188 is designed with the Intel 875P chipset and 6300ESB (I/O controller) to support the most advanced Intel Pentium 4 processor, high speed/high capacity dual channel DDR400 memory, and high performance I/O functions such as dual Gigabit Ethernet ports, AGP 8X graphics controller, Serial/Parallel ATA ports, and a PCI-X 64-bit /66 Mhz bus. In compliance with PICMG 1.0 specification, PCA-6188 can be used with a wide choice of existing PCI/ISA backplanes to meet versatile requirements of industrial applications.

The PCA-6188 is designed to deliver high performance for industrial applications. It uses Intel's long-life 875P and 6300ESB chipset, capable of running the fastest Pentium 4 and Celeron processor. It has 4 DIMM sockets in two separated memory channels and can support ECC (error checking and correction) function for best reliability. It accepts up to 4GB DDR 400/333/266 SDRAM memory, enough for most of applications. The CSA (Communications Streaming Architecture) port of the 875P chipset provides dedicated 266 MB/s bandwidth for the 82547 Gigabit Ethernet controller. The 2nd Gigabit Ethernet ports uses Intel's 82541 controller connected to the 32-bit PCI bus of the 6300ESB I/O controller. The on-board AGP 8X ATI Mobility Radeon 9600 Pro graphic accelerator provides dual VGA display and supports LVDS and DVI interfaces for panel display. Two Serial ATA ports (up to 150MB/s) allows the use of thin and long SATA cables for storage devices, eliminating cabling issues inside industrial-grade chassis. In addition, the PCA-6188 also provides most of the popular I/O interfaces such as four USB 2.0 ports, AC-97 audio interface, 2 RS-232 ports, one enhanced parallel port and floppy disk interface.

The PCA-6188 is designed with reliability considerations to suit industrial environments. A specially designed heat-sink is attached to the main chips to keep them cool and to extend the operating temperature to 60 degreee Celsius. The CMOS data backup and restore function protects the BIOS setup data from loss due to battery failure. A 256-level watchdog timer prevents the system from hanging up if a program cannot be executed normally. A remote management port allows users to monitor the system health status and control the system remotely through standard

SNMP/HTTP protocol when used with Advantech's SNMP-1000 Intelligent System Manager.

Note: *Some of the features mentioned above are not available with all models. For more information about the specifications of a particular model, see Table 1.1: Comparison table and Section 1.3: Specifications.*

1.2 Features

1. Supports 2 Serial-ATA devices with Software RAID 0 or 1 functions
2. Supports Dual Channel DDR 266/333/400 SDRAM up to 4GB with ECC function
3. Onboard AGP 8X ATI Mobility Radeon 9600 Pro VGA controller, 64MB DDR SDRAM integrated
4. Supports dual display, LVDS and DVI
5. 64-bit, 66 MHz PCI-X
6. Supports 10/100/1000Base-T Ethernet
7. 4 USB 2.0 ports
8. CMOS automatic backup and restore to prevent accidental data loss of BIOS setup data
9. Remote management with SNMP-1000-B1

1.3 Specifications

1.3.1 System
- **CPU:** Intel® socket 478 Celeron® (Northwood) 2.0~2.8 GHz, Pentium® 4 (Northwood / Prescott) up to 3.4 GHz, FSB 400/533/800 MHz; suppports Intel Hyper-Threading technology. CPU with 1.75 V core voltage (Willamete) not supported.

- **L2 Cache:** CPU built-in 128/256/512/1024 KB full-speed L2 cache

- **BIOS:** Award Flash BIOS (4Mb Flash Memory)

- **System Chipset:** Intel 875P with 6300ESB

- **SATA/EIDE hard disk drive interface:** Supports up to two independent Serial ATA hard drives (up to 150MB/s) and two IDE hard disk drives or four enhanced IDE devices. Supports PIO mode 4 (16.67 MB/s data transfer rate) and ATA 33/66/100 (33/66/100MB/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). BIOS enabled/disabled

1.3.2 Memory
- **RAM:** Up to 4GB in four 184-pin DIMM sockets. Supports dual channel DDR266/333/400 SDRAM with ECC support

1.3.3 Input/Output
- **Bus interface:** PICMG 1.0 compliant PCI/ISA bus interface

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

- **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:** One 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 bus:** Supports ISA without DMA. PCI-to-ISA bridge: ITE IT8888

- **AC-97 Audio:** PCA-6188 can provide audio function with the optional audio extension module PCA-AUDIO-00A1

- **USB port:** Supports up to four USB 2.0 ports with the two USB 2.0

cable kits included, and supports transmission rates up to 480Mbps; available through two optional two-USB-port cable kits, P/N : 1700100170

1.3.4 VGA interface

- **Controller:** ATI Mobility Radeon 9600 Pro VGA controller
- **Display memory:** Graphic controller chip integrate 64MB DDR SDRAM.
- **Resolution:**
- 1 CRT1, 2048 x 1536, up to 200Hz vertical rate
- 1 CRT2, 2048 x 1536, up to 200Hz vertical rate
- 1 LVDS, dual 115MHz interface, 2048 x 1536@60Hz
- 1 DVI, 1600 x 1200@60Hz, 165MHz

1.3.5 Ethernet LAN

- Supports single/dual10/100/1000Base-T Ethernet networking
- **Controller:**
- Single 10/100/1000Base-T: Intel 82547GI (CSA)
- Dual 10/100/1000Base-T: Intel 82547GI (CSA) and Intel 82541GI (PCI)

1.3.6 Industrial features

- **Watchdog timer:** Can generate a system reset or IRQ11. The watchdog timer is programmable, with each unit equal to one second or one minute (255 levels). You can find programming detail in Appendix A

1.3.7 Mechanical and environmental specifications

- **Operating temperature:** 0°~60° C (32° ~ 140° F, Depending on CPU)
- **Storage temperature:** -20°~ 70° C (-4° ~ 158° F)
- **Humidity:** 20 ~ 95% non-condensing
- **Power supply voltage:** +5 V, ±12 V
- **Power consumption:** Typical : +5V:7.32A, +12V:7.68A (Intel Pentium 4 3.06GHz with 533MHz FSB, 1GB DDR 333 SDRAM)
- **Board size:** 338 x 122 mm (13.3" x 4.8")
- **Board weight:** 0.5 kg (1.2 lb)

1.4 Jumpers and Connectors

Connectors on the PCA-6188 single board computer 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 single board computer.

Table 1.1: Jumpers	
Label	Function
J1	CMOS Clear
J2	Watchdog timer output selection

Table 1.2: Connectors	
Label	**Function**
CN1	Primary IDE connector
CN2	Secondary IDE connector
CN3	Floppy drive connector
CN4	Parallel port
CN6	USB port 0,1
CN7	VGA connector
VCN2	VGA-2 connector
VCN4	LVDS connector
VCN5	DVI connector
CN10	Serial port: COM2 (10-pin connector)
CN11	PS/2 keyboard and mouse connector
CN12	External keyboard connector
CN13	Reserved
CN14	CPU FAN connector
CN16	Power LED
CN17	External speaker

Table 1.2: Connectors	
CN18	Reset connector
CN19	HDD LED connector
CN20	ATX feature connector
CN21	ATX soft power switch (PS_ON)
CN22	HW Monitor Alarm Close: Enable OBS Alarm Open: Disable OBS Alarm
CN23	Serial port: COM1 (10-pin connector)
CN24	2 LAN ports
CN29	SM BUS Connector PIN1: SMB_DATA PIN2: SMB_CLOCK
CN43	AC97 Link connector
CN63	USB port 2,3
SA0	Serial ATA0
SA1	Serial ATA1
ATX1	ATX 12V Auxillary power connector

Notice: *The 4-pin ATX 12V power connector "ATX1" must be connected to the power supply to provide adequate power to the CPU card. Otherwise system might be unstable.*

1.5 Board Layout: Jumper and Connector Locations
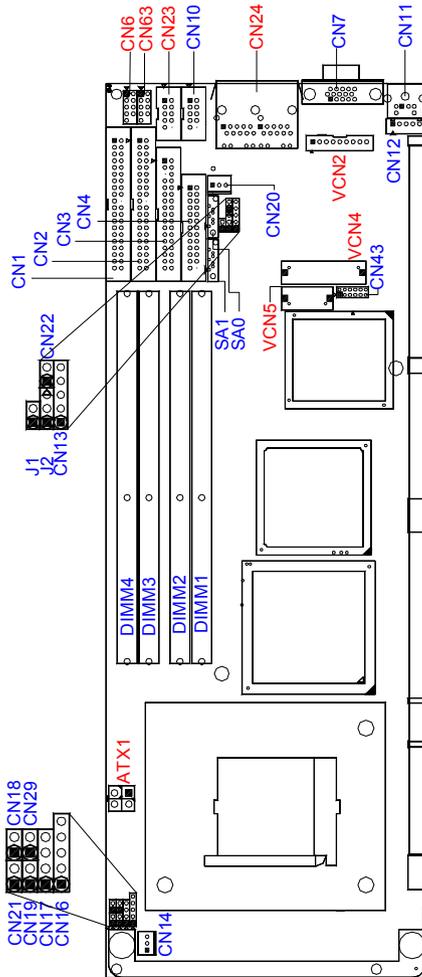
Figure 1.1: Jumper and Connector locations

1.6 PCA-6188 Block Diagram
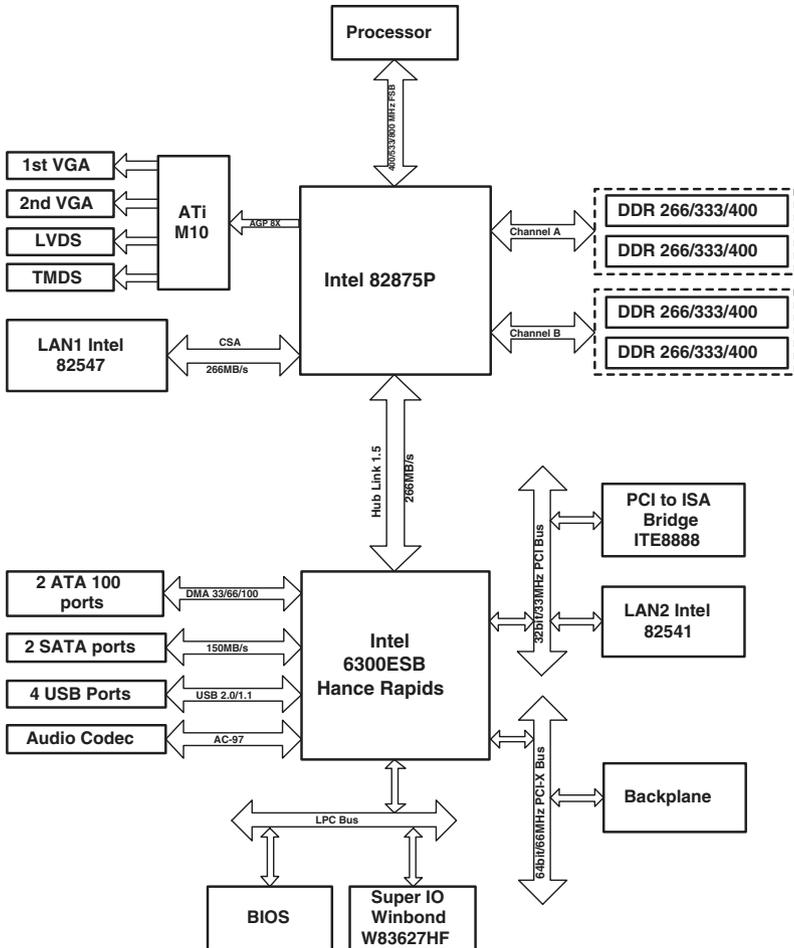
Figure 1.2:

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 single board computer. 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 on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

Caution!   *The computer is provided with a battery-powered Real-time Clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions.*

Notice: *Before install your PCA-6188 into a chassis, make sure that all components on both sides of the CPU card do not touch any metal parts, especially the chassis wall and add-on card at the adjacent slot.*

1.8 Jumper Settings

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

1.8.1 How to set jumpers

You can configure your single board computer to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. 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" (or turn ON) a jumper, you connect the pins with the clip. To "open" (or turn OFF) 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 CMOS clear (J1)

The PCA-6188 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 open. If you want to reset the CMOS data, set J1 to 1-2 closed for just a few seconds, and then move the jumper back to 1-2 open. This procedure will reset the CMOS to its default setting.

Table 1.3: CMOS (J1)

Function	Jumper Setting
* Keep CMOS data	
	⦿ ⦿ 1 -2 open
Clear CMOS data	
	⦿ ⦿ 1 - 2 closed

 * default setting

1.8.3 Watchdog timer output (J2)

The PCA-6188 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-6188 will recover from a software failure or an EMI problem. The J2 jumper settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

Table 1.4: Watchdog timer output (J2)

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

* default setting

Note: *The interrupt output of the watchdog timer is a low level signal. It will be held low until the watchdog timer is reset.*

1.9 System Memory

The PCA-6188 has four sockets for 184-pin dual inline memory modules (DIMMs) in two separated memory channels. It can operate with single channel or dual channel modules. We recommend to use dual channel mode to provide optimized performance.

All these sockets use 2.5 V unbuffered double data rate synchronous DRAMs (DDR SDRAM). They are available in capacities of 128, 256, 512 and 1024 MB. The sockets can be filled in any combination with DIMMs of any size, giving a total memory size between 128 MB and 4 GB.

Note: System resources such as PCI and AGP require physical memory address locations that reduce available memory addresses above 3GB. This may result in less than 4GB of memory being available to the operating system and applications.

1.9.1 CPU FSB and memory speed

The PCA-6188 can accept DDR SDRAM memory chips without parity. Also note: The PCA-6188 accepts PC2100 (DDR266), PC2700 (DDR 333) and PC3200 (DDR 400) DDR SDRAM, depending on the CPU front side bus frequency (FSB). Please refer below table for the relationship between the CPU FSB and memory speed.

Table 1.5: CPU FSB and memory speed

Memory Speed	Processor	FSB frequency	Memory speed Outcome
DDR400	Pentium 4	800 MHz	400 MHz
DDR333	Pentium 4	800 MHz	320 MHz
	Pentium 4	533MHz	333 MHz
	Pentium 4 or Celeron	400 MHz	266 MHz
DDR266	Pentium 4	533 or 400 MHz	266 MHz
	Celeron	400 MHz	266 MHz

The PCA-6188 supports ECC (error checking and correction). Memory modules with 9 SDRAM chips/side support ECC; The OS boot up time will become longer while use ECC RAM module, the larger capacity the time will be longer.

1.9.2 Dual channel configuration

The four DIMM sockets are arranged in two channels: DIMM1 & DIMM2 in channel A; DIMM3 & DIMM4 in channel B. To enable dual channel operation, please install a matched pair of DIMMs in DIMM1 & DIMM3 (green sockets). If additional memory is to be used, another matched pair of DIMMs have to be installed in DIMM2 & DIMM4 (purple sockets).

"Matched pair of DIMMs" means: same in speed (DDR266, DDR333, DDR400), same in size (128MB, 256MB, 512MB or 1GB), same in chip density (128 Mb, 256Mb or 512Mb and same in CSA latency. Any other memory configuration will result in single channel memory operation.

1.10 Memory Installation Procedures

To install DIMMs, 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. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.

1.11 Processor Installation

The CPU on the board must have a fan or heat sink attached, to prevent overheating.

Warning: Without a fan or heat sink, the CPU will over-heat and cause damage to both the CPU and the single board computer. To install a CPU, first turn off your system and remove its cover. Locate the processor socket 478.

1. Make sure the socket 478 lever is in the upright position. To raise the lever, pull it out to the side a little and raise it as far as it will go.

2. Place the CPU in the empty socket. Follow the instructions that came with the CPU. If you have no instructions, complete the following procedure. Carefully align the CPU so it is parallel to the socket and the notches on the corners of the CPU correspond with the notches on the inside of the socket. Gently slide the CPU in. It should insert easily. If it does not insert easily, pull the lever up a little bit more.

3. Press the lever down. The plate will slide forward. You will feel some resistance as the pressure starts to secure the CPU in the socket. This is normal and will not damage the CPU. When the CPU is installed, the lever should snap into place at the side of the socket.

Note : The CPUs made with 0.18 micro-meter process technology ("Willamette") cannot be supported by PCA-6188.

Connecting Peripherals

Chapter 2 Connecting Peripherals

2.1 Introduction

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 have a packed chassis, you may need to partially remove the card to make all the connections.

2.2 1st & 2nd (CN1, CN2) IDE Connectors

CN1

CN2
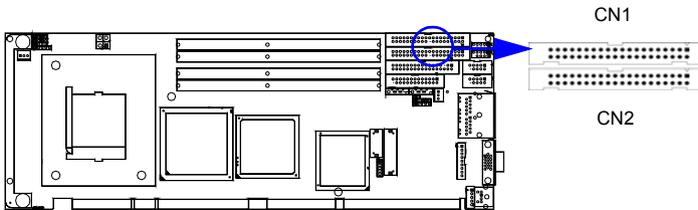
You can attach up to four IDE (Integrated Drive Electronics) drives to the PCA-6188's built-in controller. The primary (CN1) and secondary (CN2) connectors can each accommodate two drives.

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 single board computer. 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 the other 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.

2.3 Floppy Drive Connector (CN3)
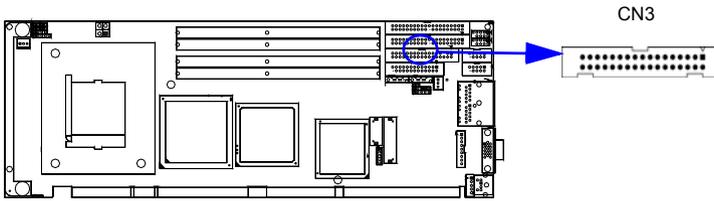
You can attach up to two floppy disk drives to the PCA-6188's on board controller. You can use 3.5" (720 KB, 1.44 MB) drives.

The single board computer 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 34-pin flat-cable connector (usually used for 3.5" drives). 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.

2.4 Parallel Port (CN4)
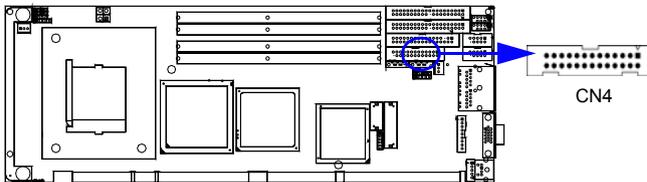
The parallel port is normally used to connect the single board computer to a printer. The PCA-6188 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, CN4. The card comes with an adapter cable which lets you use a traditional DB-25 connector. The cable has a 26-pin connector 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.

2.5 USB Ports (CN6,CN63)
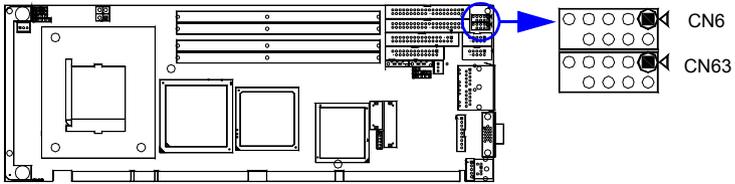
The PCA-6188 provides up to four ports of USB (Universal Serial Bus) interface, which gives complete Plug & Play and hot swapping for up to 127 external devices.The USB interface complies with USB Specification Rev. 2.0 support transmission rate up to 480 Mbps and is fuse-protected. The USB interface can be disabled in the system BIOS setup. To install the USB cable(p/n:1700100170) bracket, find an empty slot in your chassis and . Unscrew the plate that covers the end of the slot. Screw in the bracket in place of the plate. Next, attach the USB connector to CN6 orCN63 on the CPU card.

2.6 VGA Connector CN7
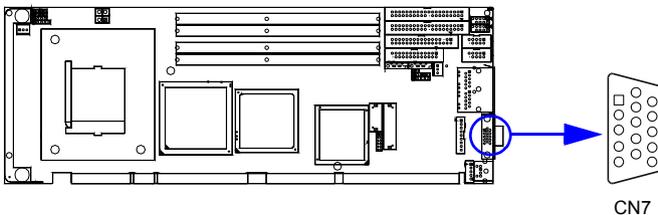
The PCA-6188 includes a VGA interface that can drive conventional CRT displays. CN7 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector CN7 are detailed in Appendix B.

2.7 CRT-2 connector VCN2
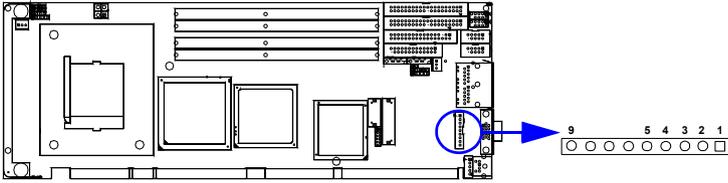
The PCA-6188 provide an additional VGA interface supports dual VGA display, VCN2 is an 9 pin connector. There are two type cables for user's different application. User can choose 15-pin to 9-pin D-Sub VGA cable (p/n: 1700000259) for providing VGA connector or choose Video Cable (p/n:1700000784) for providing S or AV terminal. Please be aware of S and AV terminal can not use at the same time, it will cause unstable situation.

2.8 LVDS connector VCN4
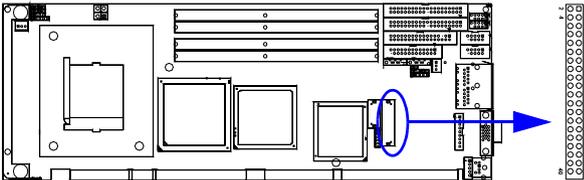
The PCA-6188 provide a LVDS interface supports 18 bits LCD panels. Pin assignments for LVDS connector VCN4 are detailed in Appendix B

2.9 DVI connector VCN5
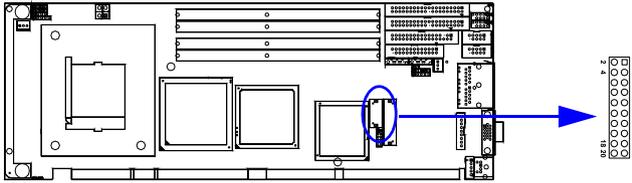
The PCA-6188 provides a DVI interface that supports DVI display. The user can choose 26-pin to 20-pin DVI cable (p/n: 1700000821) for providing DVI connector. Pin assignments for DVI connector VCN5 are detailed in Appendix B.

2.10 Ethernet Connector (CN24)
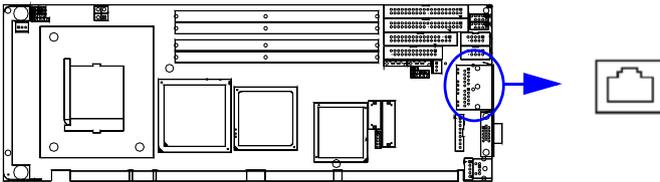
The PCA-6188 is equipped with single/dual high performance 1000 Base-T Ethernet interface. The CSA (Communications Streaming Architecture) port of the 875P chipset provides dedicated 266 MB/s bandwidth for the 82547 Gigabit Ethernet controller. The 2nd Gigabit Ethernet port uses Intel 82541 controller connected to the 32-bit PCI bus of the 6300ESB I/O controller. The PCA-6188 is fully compliant with IEEE 802.3ab 1000Base-T standards. It is supported by all major network operating systems and is 100% Novell NE-2000 compatible. An onboard RJ-45 jack provides convenient 10/100/1000Base-T RJ-45 operation.

2.11 Serial Ports (COM1 : CN23; COM2 : CN10)
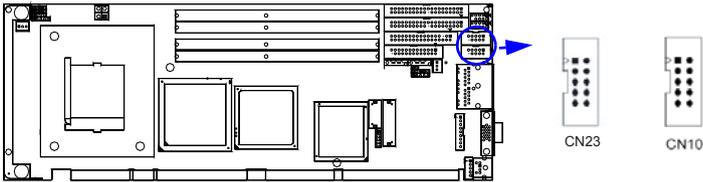
The PCA-6188 offers two serial ports, CN23 as COM1 and CN10 as COM2. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

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.

2.12 PS/2 Keyboard/Mouse Connector (CN11)
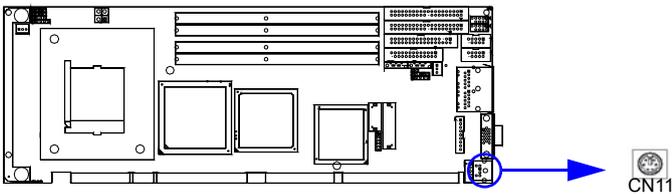
One 6-pin mini-DIN connectors (CN11) on the card mounting bracket provide connection to a PS/2 keyboard or a PS/2 mouse, respectively. CN11 can also be connected to an adapter cable (P/N: 1700060202, available from Advantech) for connecting to both a PS/2 keyboard and a PS/2 mouse.

2.13 External Keyboard Connector (CN12)

CN12
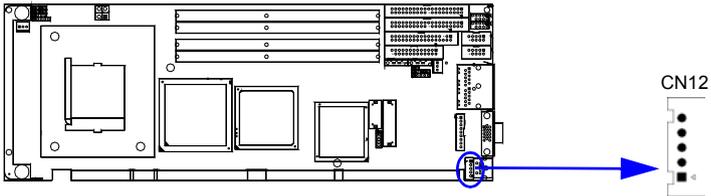
In addition to the PS/2 mouse/keyboard connector on the PCA-6188's rear plate, there is also an extra onboard external keyboard connector. This gives system integrators greater flexibility in designing their systems.

2.14 CPU Fan Connector (CN14)

CN14
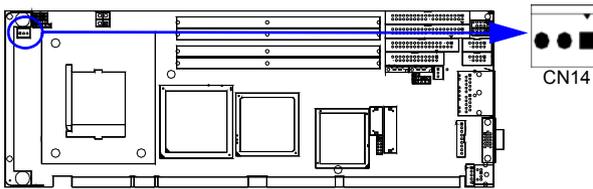
If a fan is used, this connector supports cooling fans of 500mA (6W) or less.

2.15 Front Panel Connectors (CN16, 17, 18, 19, 21&29)

There are several external switches to monitor and control the PCA-6188
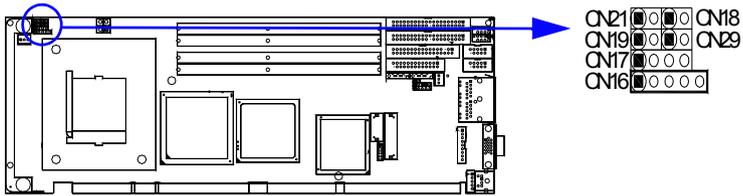
2.15.1 Power LED (CN16)

CN16 is a 5-pin connector for the power on LED. Refer to Appendix B 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:

Table 2.1: PS/2 or ATX power supply LED status

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

2.15.2 External speaker (CN17)

CN17 is a 4-pin connector for an external speaker. If there is no external speaker, the PCA-6188 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 3-4 as closed.
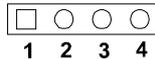
2.15.3 Reset (CN18)

Many computer cases offer the convenience of a reset button. Connect the wire for the reset button.

2.15.4 HDD LED (CN19)

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

2.15.5 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.

2.15.6 SM Bus Connector (CN29)

This connector is reserved for Advantech's SNMP-1000 HTTP/SNMP Remote System Manager. The SNMP-1000 allows users to monitor the internal voltages, temperature and fans from a remote computer through an Ethernet network.

CN29 can be connected to CN19 of SNMP-1000. Please be careful about the pin assignments, pin 1 must be connected to pin 1 and pin 2 to pin 2 on both ends of cable.

2.16 ATX feature connector (CN20)

CN20
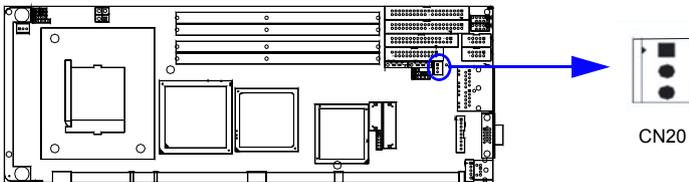
Connect to the CN1 on the Advantech backplane to enable the ATX function, 5V stand-by.

2.17 AC-97 Audio interface (CN43)

CN43
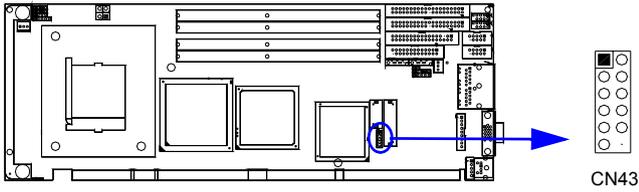
The PCA-6188 provides AC-97 audio through PCA-AUDIO-00A1 module from Advantech.

2.18 Serial ATA interface (SA0 and SA1)

SA0 & SA1
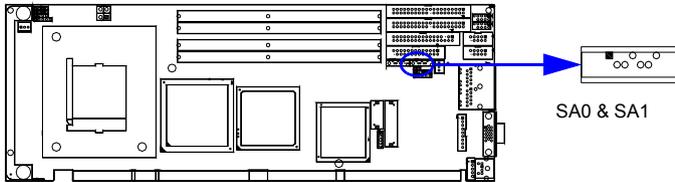
In addition to the two EIDE interfaces (up to four devices), the PCA-6188 features a high performance serial ATA interface (up to 150MB/s) which eases cabling to hard drives with thin and long cables.

2.19 Connecting to SNMP-1000 remote manager

Use the 6-pin to 8-pin cable to connect the single board computer to SNMP-1000. This cable comes with the SNMP-1000.

CPU Card   SNMP-1000

2.20 Auxiliary 4-pin power connector (ATX1)

To ensure the sufficiency of power supply for Pentium® 4 single board computer, one auxiliary 4 pin power connector is available on PCA-6188. This connector must be connected to the power supply, otherwise the system may become unstable.

Award BIOS Setup

Chapter 3 Award BIOS Setup

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-up memory (CMOS RAM) so that it retains the setup
information when the power is turned off.

3.1.1 CMOS RAM Auto-backup and Restore

The CMOS RAM is powered by an onboard button cell battery. When
you finish BIOS setup, the data in CMOS RAM will be automatically
backed up to Flash ROM. If operation in harsh industrial environments
cause a soft error, BIOS will recheck the data in CMOS RAM and auto-
matically restore the original data in Flash ROM to CMOS RAM for
booting.

Note: *If you intend to change the CMOS setting with-
              out restoring the previous backup, you have to
              click on "DEL" within two seconds of the
              "CMOS checksum error..." display screen mes-
              sage appearing. Then enter the "Setup" screen
              to modify the data. If the "CMOS checksum
              error..."message appears again and again,
              please check to see if you need to replace the
              battery in your system.*

3.2 Entering Setup

Turn on the computer and press <Del> to allow you to enter the BIOS setup.
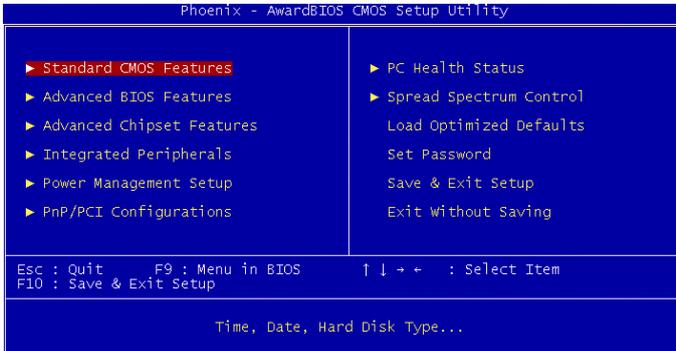
Figure 3.1: Award BIOS Setup initial screen

3.3 Standard CMOS Setup

Choose the "Standard CMOS Features" option from the "Initial Setup Screen" menu, and the screen below will be displayed. This menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory.

Figure 3.2: Standard CMOS features screen

3.4 Advanced BIOS Features

The "Advanced BIOS Features" screen appears when choosing the "Advanced BIOS Features" item from the "Initial Setup Screen" menu. It allows the user to configure the PCI-6188 according to his particular requirements. Below are some major items that are provided in the Advanced BIOS Features screen. A quick booting function is provided for your convenience. Simply enable the Quick Booting item to save yourself valuable time
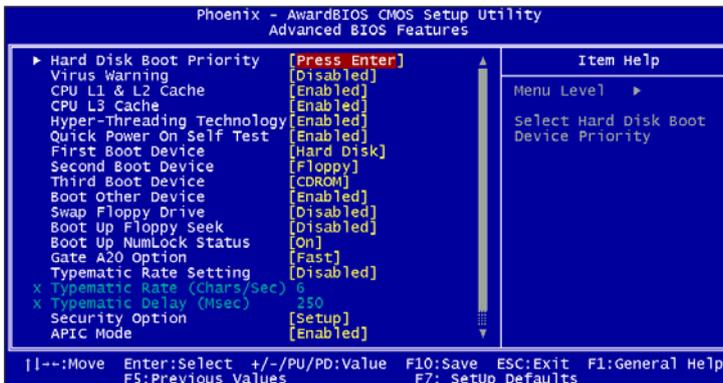
Figure 3.3: Advanced BIOS features screen

3.4.1 Hard Disk Boot Priority
Select hard disk boot device priority.

3.4.2 Virus Warning
Enable virus warning, the commands are "Enabled" or "Disabled".

3.4.3 CPU L1 & L2, L3 Cache
Enabling this feature speeds up memory access. The commands are "Enabled" or "Disabled."

3.4.4 Hyper-Threading Technology
While using CPU with Hyper-Threading technology, you can select "Enabled" to enable Hyper Threading Technology in OS which supports Hyper-Threading Technology or select "Disabled" for other OS which do not support HT technology.

3.4.5 Quick Power On Self Test

Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.

3.4.6 First/Second/Third Boot Device

The BIOS tries to load the OS with the devices in the sequence selected. Choices are: "Floppy", "LS120", "HDD-0", "SCSI", "CDROM", "HDD-1", "HDD-2", "HDD-3", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN", "Disabled".

3.4.7 Boot Other Device

To boot another device, choose "Enabled" or "Disabled".

3.4.8 Swap Floppy Drive

If the system has two floppy drives, choose "Enabled" to assign physical drive B to logical drive A and vice-versa. The commands are "Enabled" or "Disabled."

3.4.9 Boot Up Floppy Seek

Selection of the command "Disabled" will speed the boot up. Selection of "Enabled" searches disk drives during boot up.

3.4.10 Boot Up NumLock Status

 This feature selects the "power on" state for NumLock. The commands are "Off" or "On."

3.4.11 Gate A20 Option

"Normal":   A pin in the keyboard controller controls GateA20.

"Fast" (Default):   Lets chipset control GateA20.

3.4.12 Typematic Rate Setting

The typematic rate is the rate key strokes repeat as determined by the key-board controller. The commands are "Enabled" or "Disabled". Enabling allows the typematic rate and delay to be selected.

3.4.13 Typematic Rate (Chars/Sec)

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

3.4.14 Typematic Delay (msec)

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

3.4.15 Security Option

Select whether the password is required every time the system boots or only when you enter setup.

"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 SET-*
> *TING" 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.*

3.4.16 APIC Mode

This setting allows you to enable the APIC mode, the choice is "Disabled" or "Enabled."

3.4.17 MPS Version Control For OS

This reports if an FDD is available for Windows 95. The selections are

"1.1" or "1.4."

3.5 Advanced Chipset Features

By choosing the "Advanced Chipset Features" option from the "Initial Setup Screen" menu, the screen below will be displayed. This sample screen contains the manufacturer's default values for the PCI-6188, as shown in Figure 3-4:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    Advanced Chipset Features

   DRAM Timing Selectable      [By SPD]          Item Help
   CAS Latency Time            [2]
   Active to Precharge Delay   [8]            Menu Level   ►
   DRAM RAS# to CAS# Delay     [4]
   DRAM RAS# Precharge         [4]
   Memory Frequency For        [Auto]
   System BIOS Cacheable       [Enabled]
   Video  BIOS Cacheable       [Disabled]
   Memory Hole At 15M-16M      [Disabled]
   Delay Prior to Thermal      [16 Min]
   AGP Aperture Size (MB)      [128]
   Init Display First          [PCI Slot]
   DRAM Data Integrity Mode    [ECC]



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

Figure 3.4: Advanced chipset features screen

Note: *DRAM default timings have been carefully chosen and should ONLY be changed if data is being lost. Please first contact technical support.*

3.5.1 DRAM Timing Selectable
This item allows you to control the DRAM speed. The selections are "Manual" or "By SPD".

3.5.2 CAS Latency Time
This controls the latency between DDR RAM read command and the time that the data actually becomes available. Leave this on the default setting. The options are "2", "2.5" or "3".

3.5.3 Active to Precharge Delay

This item allows you to select the value in this field, depending on whether the board has paged DRAMs or EDO (extended data output) DRAMs. The choices are: "8", "7", "6" and "5".

3.5.4 DRAM RAS# to CAS# Delay

In order to improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB. The Choice: "4", "3" and "2".

3.5.5 DRAM RAS# Precharge

This controls the idle clocks after issuing a precharge command to DRAM. Leave this on the default setting. The choice : "4", "3" and "2".

3.5.6 Memory Frequency

To adjust the frequency of memory. The choice : "DDR266", "DDR333", "DDR400" and "Auto".

3.5.7 System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may occur. The Choices: "Enabled", "Disabled".

3.5.8 Video Bios Cacheable

Selecting Enabled allows caching of the video BIOS, resulting in better system performance. However, if any program writes to this memory area, a system error may occur. The Choices: "Enabled", "Disabled".

3.5.9 Memory Hole At 15M-16M

Enabling this feature reserves 15 MB to 16 MB memory address space for ISA expansion cards that specifically require this setting. This makes memory from 15 MB and up unavailable to the system. Expansion cards can only access memory up to 16 MB. The default setting is "Disabled."

3.5.10 Delay Prior to Thermal

Select the period if user wants to lower the CPU speed when CPU temperature is too high. The choice: "4 Min", "8 Min", "16 Min" and "32 Min".

3.5.11 AGP Aperture Size (MB)

Select the size of Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The Choice : "4", "8", "16", "32", "64", "128", and "256".

3.5.12 Init Display First

Choose the first display interface to initiate while booting. The choice is "PCI Slot" or "Onboard".

3.5.13 DRAM Data Integrity Mode

The system can auto-detect whether the SDRAM module supports ECC memory or not. When using the ECC SDRAM module, users can manually choose "ECC" or "non-ECC".

3.6 Integrated Peripherals
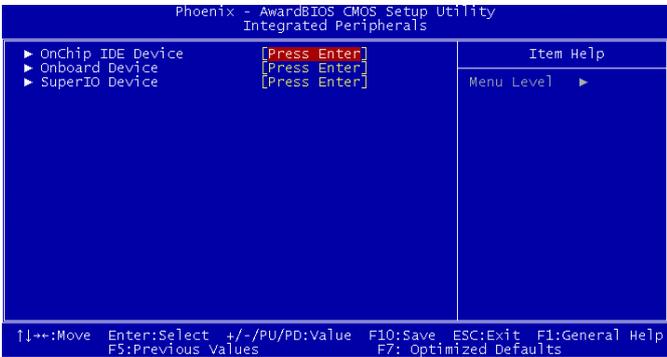
Figure 3.5: Integrated peripherals
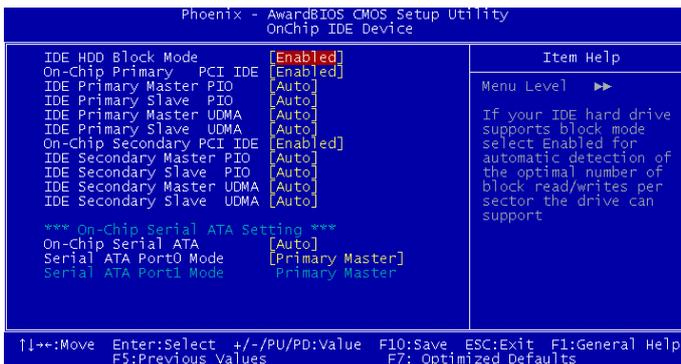
Figure 3.6: On-Chip IDE Device

3.6.1 IDE HDD Block Mode

If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

3.6.2 On-Chip IDE Device

IDE Primary (Secondary) Master/Slave PIO/UDMA Mode (Auto) Each channel (Primary and Secondary) has both a master and a slave, making four IDE devices possible. Because each IDE device may have a different Mode timing (0, 1, 2, 3, 4), it is necessary for these to be independent. The default setting "Auto" will allow auto detection to ensure optimal performance.

3.6.3 On-Chip Serial ATA

Choose the status of serial ATA, the default setting is "Auto" which let system to arrange all parallel and serial ATA resource automatically. The "Disabled" will disable SATA controller. The "Combined Mode" will combine PATA and SATA, and max of 2 IDE drives in each channel. The "Enhanced Mode" will enable both SATA and PATA, and max of 6 IDE drives are supported. The "SATA Only" means SATA is operating in legacy mode.

3.6.4 Serial ATA Port0/Port1 Mode

Select the mode for SATA port0 and SATA port1. The choices are "Primary Master", "Primary Slave", "Secondary Master", "Secondary Slave", "SATA0 Master" and "SATA1 Master".
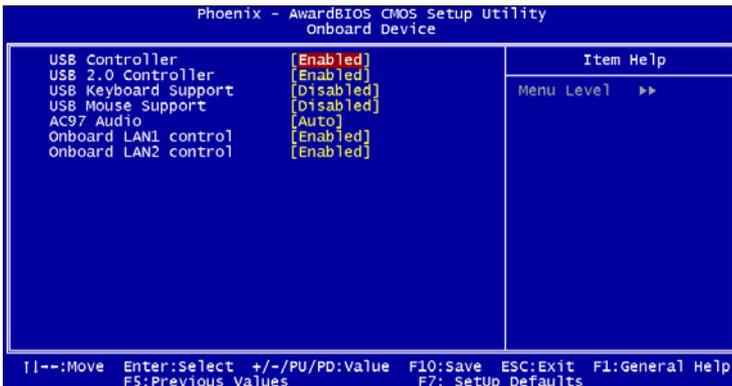
Figure 3.7: Onboard Device

3.6.5 USB Controller

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. The choices: "Enabled", "Disabled".

3.6.6 USB 2.0 Controller

This entry is to disable/enable the USB 2.0 controller only. The BIOS itself may/may not have high speed USB support. If the BIOS has high speed USB support built in, the support will automatically turn on when a high speed device is attached. The choices are : "Enabled" or "Disabled."

3.6.7 USB Keyboard/Mouse Support

Select Enabled if user plans to use an USB keyboard. The choices are: "Enabled", "Disabled."

3.6.8 AC97 Audio

Select Disable if you do not want to use AC-97 audio. Option is "Auto", "Disabled."

3.6.9 Onboard LAN1 Control

Options are "Enabled" and "Disabled" Select Disable if user does not want to use onboard LAN controller1

3.6.10 Onboard LAN2 Control

Options are "Enabled" and "Disabled" Select Disable if user does not want to use onboard LAN controller.

Figure 3.8: SuperIO Device

3.6.11 Onboard FDC Controller

When enabled, this field allows you to connect your floppy disk drives to the onboard floppy disk drive connector instead of a separate controller card. If you want to use a different controller card to connect the floppy disk drives, set this field to Disabled.

3.6.12 Onboard Serial Port 1

The settings are "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/ IRQ3" and "Disabled" for the on-board serial connector.

3.6.13 Onboard Serial Port 2

The settings are "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/ IRQ3" and "Disabled" for the on-board serial connector.

3.6.14 UART Mode Select

This item allows you to select UART mode. The choices: "IrDA", "ASKIR", "Normal".

3.6.15 RxD, TxD Active

This item allows you to determine the active of RxD, TxD. The Choices: "Hi, Hi," "Lo, Lo," "Lo, Hi," "Hi, Lo."

3.6.16 IR Transmission Delay

This item allows you to enable/disable IR transmission delay. The choices: "Enabled", "Disabled".

3.6.17 UR2 Duplex Mode

This item allows you to select the IR half/full duplex function. The choices: "Half", "Full".

3.6.18 Use IR Pins

The Choice : "RxD2, TxD2", "IR-Rx2Tx2".

3.6.19 Onboard Parallel Port

This field sets the address of the on-board parallel port connector. You can select either "378/IRQ7", "278/IRQ5", "3BC/IRQ7", or "Disabled". If you install an I/O card with a parallel port, make sure there is no conflict in the address assignments. The single board computer can support up to three parallel ports, as long as there are no conflicts for each port.

3.6.20 Parallel Port Mode

This field allows you to set the operation mode of the parallel port. The setting "Normal" allows normal speed operation, but in one direction only. "EPP" allows bidirectional parallel port operation at maximum speed. "ECP" allows the parallel port to operate in bi-directional mode

and at a speed faster than the maximum data transfer rate. "ECP + EPP" allows normal speed operation in a two-way mode.

3.6.21 EPP Mode Select
This field allows you to select EPP port type 1.7 or 1.9. The choices:

"EPP1.9", "EPP1.7".

3.6.22 ECP Mode Use DMA
This selection is available only if you select "ECP" or "ECP + EPP" in the Parallel Port Mode field. In ECP Mode Use DMA, you can select DMA channel 1, or DMA channel 3. Leave this field on the default setting.

3.6.23 PWRON After PWR-Fail
Use this to set up the system after power failure. The "Off" will keep the system powered off after power failure, the "On" will boot up the system after failure, and the "Former-Sts" will return the system to the status before power failure.

3.7 Power Management Setup

The power management setup controls the single board computer's "green" features to save power. The following screen shows the manufacturer's defaults.
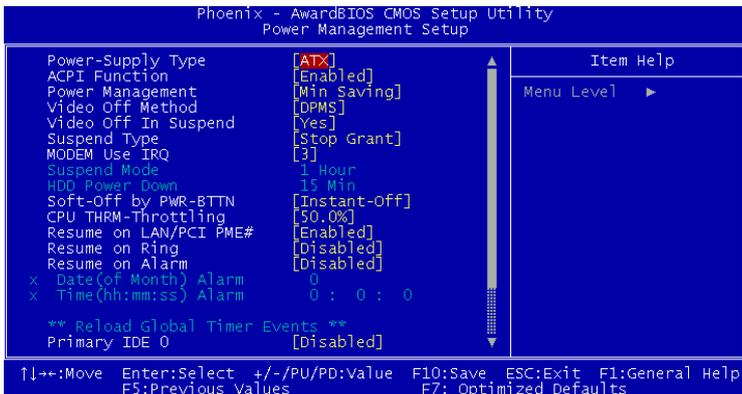
Figure 3.9: Power management setup screen (1)

3.7.1 Power Supply Type

PCA-6188 can support both "ATX" and "AT" power supply. Customers can choose the PSU type through this selection. The choices are: "ATX","AT". While selecting "AT", the ACPI function will disable automatically.

3.7.2 ACPI function

The choices are: "Enabled", "Disabled".

3.7.3 Power Management

This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

> 1. HDD Power Down

> 2. Suspend Mode

There are three selections for Power Management, and they have fixed mode settings.

Min Saving	Minimum power management., Suspend Mode = 1 hr., and HDD Power Down = 15 min.
Max Saving	Maximum power management., Suspend Mode = 1 min., and HDD Power Down = 1 min.
User Defined (Default)	Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down which ranges from 1 min. to 15 min, and disabled.

3.7.4 Video Off Method

Use this to select the method to turn off the video. The choices are : "Blank Screen", "V/H SYNC+ Blank", "DPMS".

3.7.5 Video Off In Suspend

When the system is in suspend mode, the video will turn off. The choices are "No" and "Yes".

3.7.6 Suspend Type

The choices are : "Stop Grant", "PwrOn Suspend".

3.7.7 Modem Use IRQ

This determines the IRQ that the MODEM can use.The choices are: "3", "4", "5", "7", "9", "10", "11", "NA".

3.7.8 Suspend Mode

Please refer to 3.7.3

3.7.9 HDD Power Down

Please refer to 3.7.3

3.7.10 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.

3.7.11 CPU THRM-Throttling

This field allows you to select the CPU THRM-Throttling rate. The choices: "75.0%", "50.0%", and "25.0%".

3.7.12 PowerOn by Modem

To enabled or disable the function to power on the system via Modem from the remotehost. The Choice : "Enabled", "Disabled".

3.7.13 PowerOn by LAN

This item allows you to power on the system by LAN. The choices: "Enabled", "Disabled".

3.7.14 PowerOn by Alarm

The Choice : "Enabled", "Disabled".

3.7.15 Primary IDE 0 (1) and Secondary IDE 0 (1)

When Enabled, the system will resume from suspend mode if Primary IDE 0 (1) or Secondary IDE 0 (1) is active. The choice: "Enabled", "Disabled".

3.7.16 FDD, COM, LPT PORT

When Enabled, the system will resume from suspend mode if FDD, COM port, or LPT port is active. The choice: "Enabled", "Disabled".

3.7.17 PCI PIRQ [A-D]#

When Enabled, the system will resume from suspend mode if interrupt occurs. The choice: "Enabled", "Disabled".

3.8 PnP/PCI Configurations
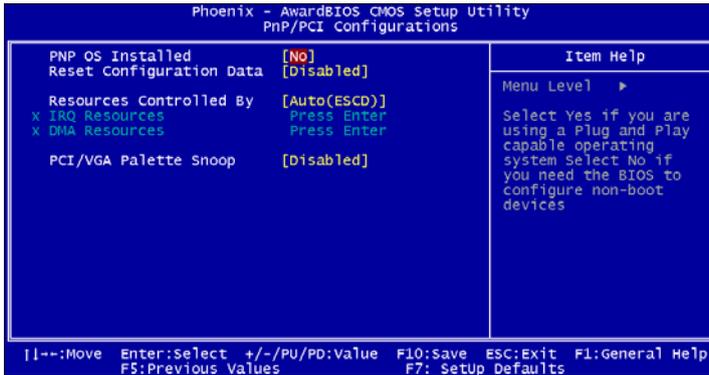
Figure 3.10: PnP/PCI configurations screen

3.8.1 PNP OS Installed
Select "Yes" if you are using a Plug and Play capable operating system. Select "No" if you need the BIOS to configure non-boot device

3.8.2 Reset Configuration Data
Default is Disabled. Select Enable to reset Extended System Configuration Data (ESCD) if you have installed a new add-on, and system configuration has caused such a conflict that OS cannot boot.

3.8.3 Resources Controlled By
The commands here are "Auto(ESCD)" or "Manual." Choosing "Manual" requires you to choose resources from each following sub-menu. "Auto(ESCD)" automatically configures all of the boot and Plug and Play devices, but you must be using Windows 95 or above.

3.8.4 PCI/VGA Palette Snoop
This is set to "Disabled" by default.

3.9 PC Health Status

3.9.1 CPU Warning Temperature

This item will prevent the CPU from overheating. The choices are: "Disabled," "50C/122F," "53C/127F," "56C/133F," "60C/140F," "63C/145F,"

"66C/151F," and "70C/158F."

.
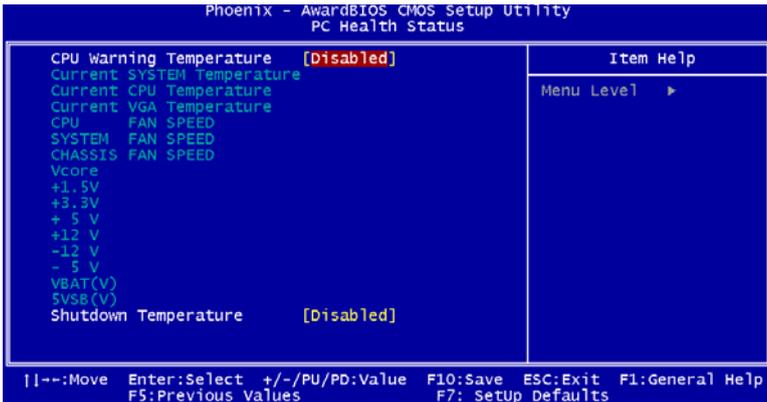
Figure 3.11: PC health status screen

3.9.2 Current System Temperature

This shows you the current temperature of system.

3.9.3 Current CPU Temperature

This shows you the current CPU temperature.

3.9.4 Current VGA Temperature

This shows you the current VGA chip temperature.

3.9.5 CPU FAN Speed

This shows you the current CPU FAN operating speed.

3.9.6 System FAN Speed

This shows you the current System FAN operating speed.

3.9.7 Chassis FAN Speed

This shows you the current Chassis FAN operating speed.

3.9.8 VCORE, +1.5V, VCC3, +5V, +12V, -12V, -5V, VBAT(V), 5VSB(V)

This shows you the voltage of VCORE, +1.5V, VCC3, +5V, +12V, -12V, -5V, VBAT(V), and 5VSB(V).

3.9.9 Shutdown Temperature

The system will shut down automatically when the CPU temperature is over the selected setting. This function can prevent CPU damage caused by overheating.

3.10 Frequency / Voltage Control

```
              Phoenix - AwardBIOS CMOS Setup Utility
                     Frequency/Voltage Control
   CPU Clock Ratio        [ 8 X]                    Item Help
   Auto Detect PCI Clk    [Enabled]
   Spread Spectrum        [Disabled]         Menu Level   ▶




↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
           F5:Previous Values              F7: SetUp Defaults
```
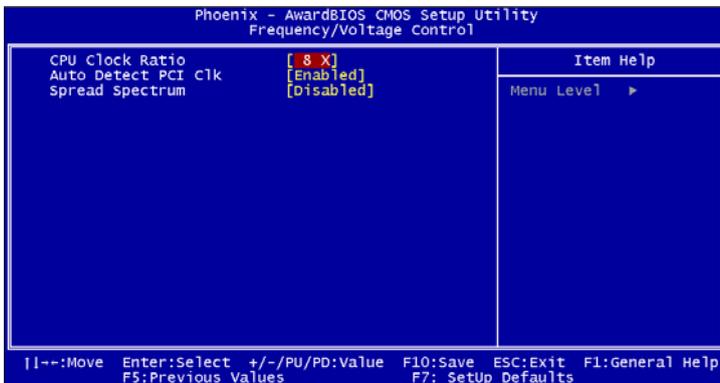
Figure 3.12: Spread Spectrum Control screen

3.10.1 CPU Clock Ratio

Key in a DEC number to set up the CPU Clock Ratio (Min=8; Max=50). This item only shows up in special situations.

3.10.2 Auto Detect PCI Clk

There are two selections: "Enable" and "Disable". When "Enable" is selected, the Clock signal of the empty PCI slot will disable automatically. This function could reduce the EMI issue.

3.10.3 Spread Spectrum

To enable/disable the spread spectrum. The choices are : "Disabled," "-0.40%," "- 0.50%," "- 0.60%," and "- 1.00%".

3.11 Password Setting

To change the password:

1.   Choose the "Set Password" option from the "Initial Setup Screen" menu and press <Enter>.

The screen will display the following message:

```
Please Enter Your 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:

```
Please Confirm Your 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" from the "Advanced BIOS Features" menu.

3.12 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.

3.13 Exit Without Saving

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

Chipset Software Installation Utility

Chapter 4 Chipset Software Install Utility

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 device drivers for the PCA-6188 board are located on the software installation CD. The auto-run function of the driver CD will guide and link you to the utilities and device drivers under a Windows system. The Intel® Chipset Software Installation Utility is not required on any systems running Windows NT 4.0. Updates are provided via Service Packs from Microsoft*.

> *Note:* *The files on the software installation CD 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 relevant operating system commands and the pertinent sections of your application software's user's manual before performing the installation.

4.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs to the target system the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI and ISA PnP services.
- AGP support.
- IDE Ultra ATA 100/66/33 and Serial ATA interface support.
- USB 1.1/2.0 support (USB 2.0 driver needs to be installed separately for Win98)

- Identification of Intel® chipset components in the Device Manager.
- Integrates superior video features. These include filtered sealing of 720 pixel DVD content, and MPEG-2 motion compensation for software DVD

Note: *This utility is used for the following versions of Windows system, and it has to be installed before installing all the other drivers:*

Windows 98SE

Windows 2000

Windows Me

Windows XP

4.3 Windows XP Driver Setup

1. Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears. Move the mouse cursor over the "Auto" button under the "CSI UTILITY" heading, a message pops up telling you to install the CSI utility before other device drivers, as shown in the following figure. Click on this button. Taking Windows XP as example.

2.   Click "Next" when you see the following message.
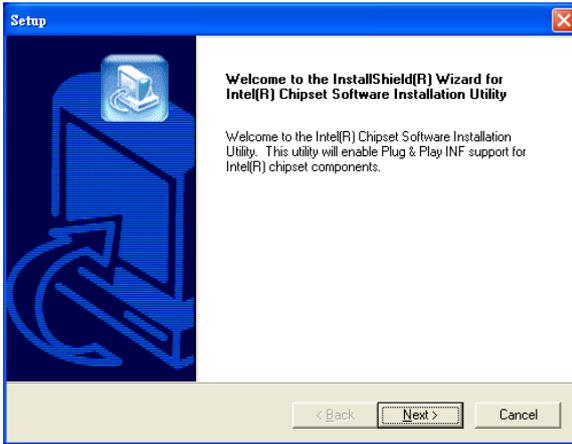
3.   Click "Yes" when you see the following message.
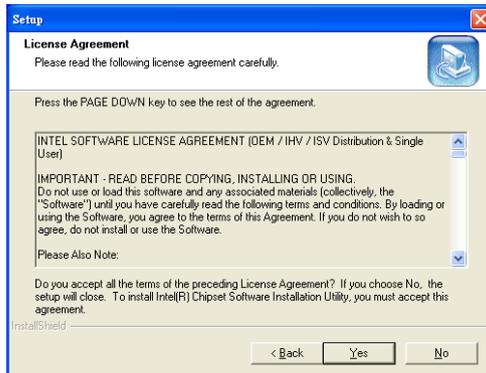
4.   Click "Next" when you see the following message.
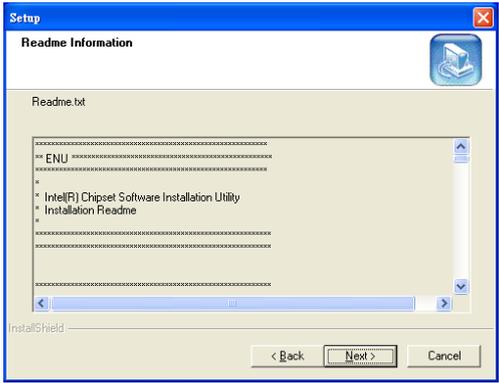
5.   When the following message appears, click "Finish" to complete the installation and restart Windows.
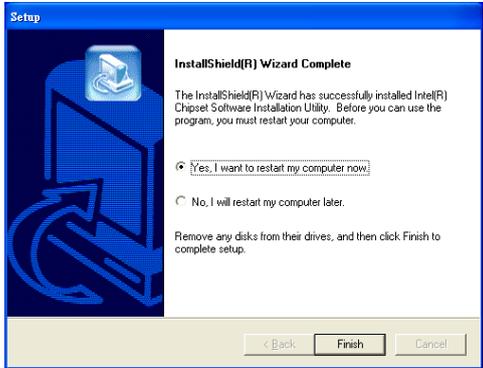
VGA Setup

Chapter 5 VGA Setup

5.1 Introduction

The PCA-6188 has VGA onboard, you need to install the VGA driver to enable the function.

The on-board AGP 8X ATI® Mobility Radeon® 9600 Pro graphic accelerator provides dual VGA display and supports LVDS and DVI interface for panel display. The features include:

• Support Microsoft® DirectX® 9.0

• Full precision floating point with full performance

• Support for AGP 8X

• Full supported by OpenGL® using custom extensions

• Support for GDDR2-M memory, offering highest mobile memory speeds with lowest power consumption

• ATi Mobility Radeon 9600 Pro VGA controller provides users with the optimal balance between performance and power consumption

• Integrated dual-channel LVDS, with support for notebook LCD panels as up to QXGA resolutions (2048x1536)

• 165 MHz integrated TMDS transmitter, for support of DVI Digital Flat Panels at up to UXGA resolution (1600x1200)

• Integrated TV-Out Encoder

• Dual RAMDACs at speeds of 400MHz

• On-chip 64MB DDR (128-bit)

5.2 Windows XP Driver Setup

> *Note:*   *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 4 for information on installing the CSI utility*

1.   Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure. Under the "VGA DRIVERS" heading, click on one of the buttons (labeled "W2K XP", "WIN9X ME", and "WIN NT" respectively) according to the operating system you are using. The following installation procedure is for Windows XP. For other operating systems, please follow the on-screen installation guide

1.   Please click on "Next" to continue the installation
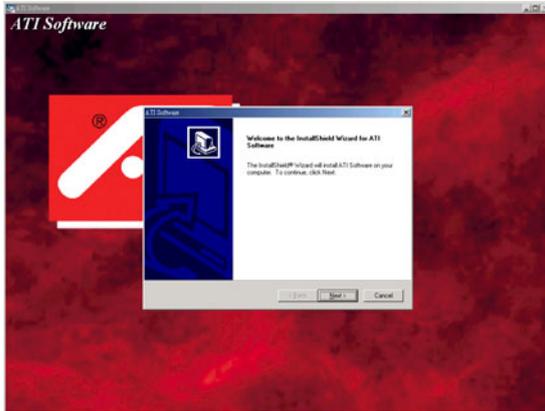
2. You will see a welcome window. Please chick on "Yes" to continue the installation.
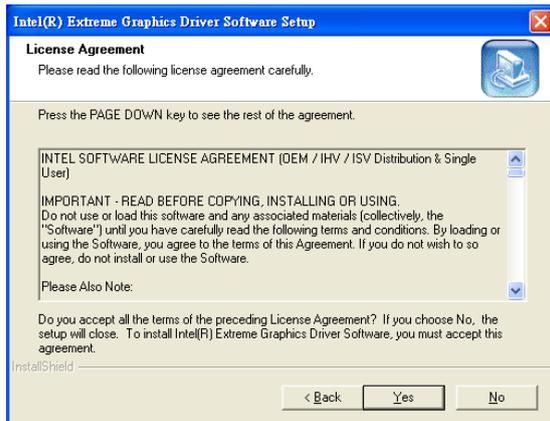
3. Click "Express: Recommend" when you see the following message.
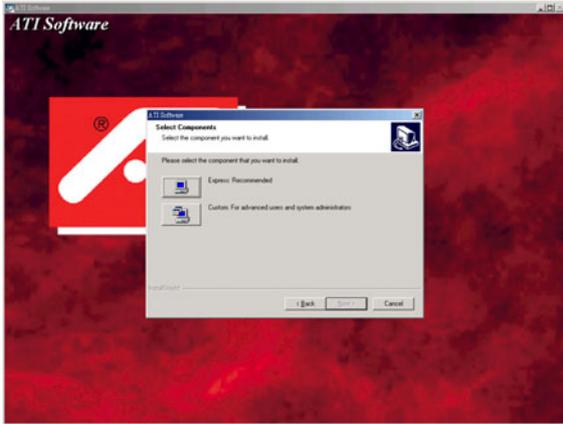
4. Click "Finish" to complete the installation and restart the computer now or later.

LAN Configuration

Chapter 6 LAN Configuration

6.1 Introduction

The PCA-6188 features the 32-bit 10/100/1000 Mbps Ethernet network interface. This interface supports bus mastering architecture and auto-negotiation features. Therefore, standard twisted-pair cabling with RJ-45 connectors for 10 Mbps, 100 Mbps and 1000 Mbps connections can be used. Extensive driver support for commonly-used network systems is also provided.

6.2 Features

- Optional single/dual Intel 82547/82541 10/100/1000 Base-T Ethernet LAN controller
- Supports Wake-on-LAN remote control function
- PCI Bus Master complies with PCI Rev. 2.2
- MAC & PHY (10/100/1000 Mbps) interfaces
- Complies with 1000Base-T, 100Base-TX, and 10Base-T applications
- Fully supports 1000Base-T, 100Base-TX, and 10Base-T operation
- Single RJ-45 connector gives auto-detection of 10 Mbps, 100 Mbps, or 1000 Mbps network data transfer rates and connected cable types
- Plug and Play
- Enhancements on ACPI & APM
- Complies with PCI Bus Power Management Interface Rev. 1.1
- ACPI Rev. 2.0, and Device Class Power Management Rev. 1.0

6.3 Installation

> *Note:*   *Before installing the LAN drivers, make sure the*
> *CSI utility has been installed on your system.*
> *See Chapter 4 for information on installing the*
> *CSI utility.*

The PCA-6188's onboard Ethernet interface supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides driver setup procedure for the operating system you are using.

6.4 Win XP Driver Setup (Intel 82547/41)

1. Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure. Under the "LAN Drivers" heading, click on the "Manual" to open file manager, then click "SETUP.EXE" to run the installation procedure.

2. Select "I accept the terms in the license agreement" and click "Next" to continue.
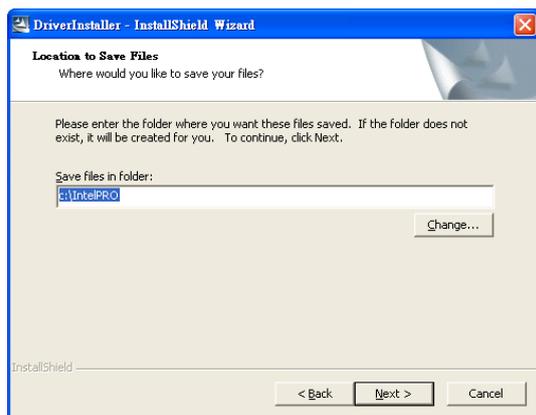
3. Click "Next" to continue.
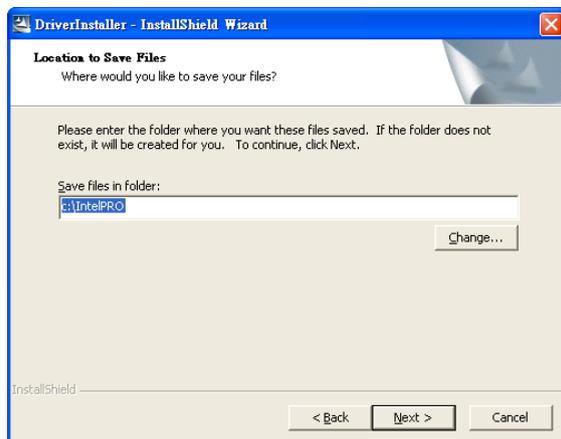
4.   Click "Install Software" to start the installation procedure.

5.   The driver will be installed automatically and the LAN function will be enabled after the installation.

USB 2.0 Configuration
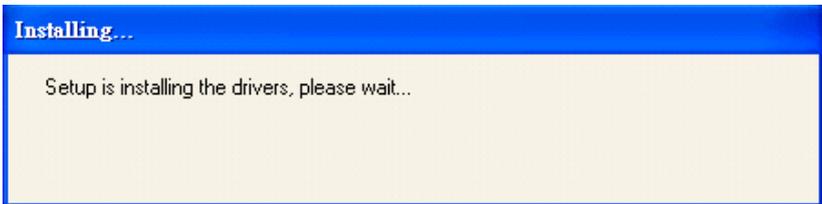
Chapter 7 USB 2.0 Configuration

7.1 Introduction

The PCA-6188 is designed with Intel 6300ESB which supports both USB1.1 and USB 2.0 high-speed transmission. It remains compatible with today's USB device. High-speed USB 2.0 provides data transfer up to 480Mb/s which is 40 times faster than USB 1.1. It is ideal for today's speed-demanding I/O peripherals.

7.2 Features

- Provides data transmission rate up to 480Mb/s
- Offer 40X greater bandwidth than USB 1.1
- Offers complete compatibility with current USB device

7.3 Installation

Note:　　*Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 4 for information on installing the CSI utility.*

Note:　　*USB 2.0 driver is not available for Windows 98SE/ME from PCA-6188 driver CD. Under these operating systems, the USB device will operate at USB 1.1 speeds.*

Note:　　*Install service pack 4 under Windows 2000 to enable USB 2.0.*

Note:　　*Install service pack 1 under Windows XP to enable USB 2.0.*

Onboard Security Setup

Chapter 8 Onboard Security Setup

8.1 Introduction

The PCA-6188's hardware monitor is designed with Winbond W83627HF. Onboard security (OBS) functions monitor key hardware. They help you maintain your system's stability and durability. The PCA-6188 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 1.8 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.

8.2 Windows XP Driver Setup

1.   Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure. Click on the "Install" button under the "OBS DRIVERS" heading.

2.   Click "Next" when you see the following message.

3. Click "Next" when you see the following message.

Choose Destination Location

Setup will install Winbond HWDoctor in the following directory.

To install to this directory, click Next.

To install to a different directory, click Browse and select another directory.

You can choose not to install Winbond HWDoctor by clicking Cancel to exit Setup.

Destination Directory
C:\Program Files\Winbond\HWDoctor   Browse...

InstallShield

< Back   Next >   Cancel

4. Click "Next" when you see the following message.

Select Program Folder

Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing Folders list. Click Next to continue.

Program Folders:
Winbond HWDoctor

Existing Folders:
GlobalSCAPE
Intel Application Accelerator
啟動
系統管理工具
遊樂場
附屬應用程式

InstallShield

< Back   Next >   Cancel

5.   Click "Next" to continue.

Start Copying Files

Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.

Current Settings:

Setup Type:
    Complete

Target Folder
    C:\Program Files\Winbond\HWDoctor

User Information
    Name: Ellen
    Company: advantech

InstallShield

[< Back]   [Next >]   [Cancel]

6.   Click "Finish" when you see the following message.

Setup Complete

Setup has finished copying files to your computer.

Before you can use the program, you must restart Windows or your computer.

(•) Yes, I want to restart my computer now.

(○) No, I will restart my computer later.

Remove any disks from their drives, and then click Finish to complete setup.

InstallShield

[< Back]   [Finish]
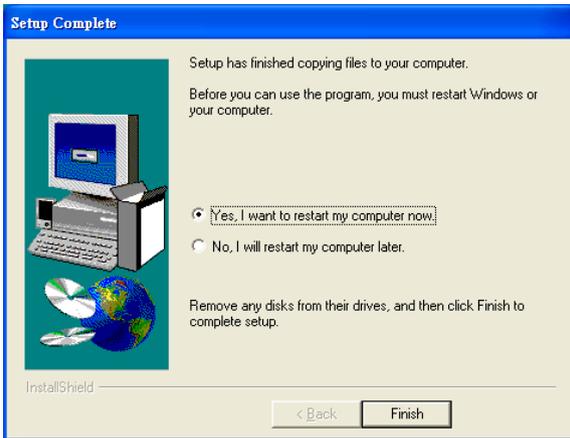
8.3 Using the OBS Hardware Doctor Utility

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 activate to attract your attention.

OBS 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 onboard security

system.

You can view or change values for various OBS settings by running this utility:

1.   From the desktop of Windows, click on "Start" and select "Programs" , select "Winbond HWDoctor" and click "HWDOCTOR."

2.   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.
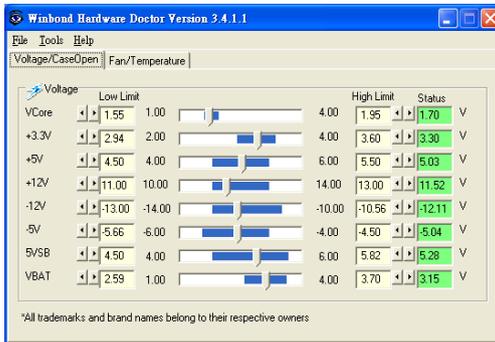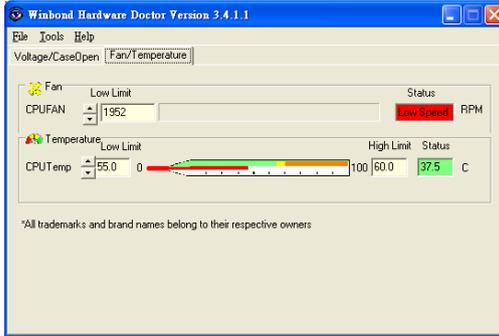
SATA RAID Setup

Chapter 9 SATA RAID Setup

9.1 Introduction

To support demanding disk I/O, Intel 6300ESB chipset integrates two
Serial ATA controllers with software RAID 0 and 1 capability. RAID 0
stripping increases the storage performance and is designed to speed up
data transfer rates for disk-intensive applications. RAID 1 mirroring pro-
tects valuable data that might be lost in the event of a hard drive failure.

> *Note:*   *Operating system support list: Microsoft Win-*
> *dows 2000, Windows Server 2003, Windows*
> *XP; Linux: Red Hat Advanced Server 2.1 and*
> *3.0, SuSE SLES 8.0 and 8.2, SuSE 9.0, United*
> *Linux 1.0, Miracle Linux 2.1*

> *Note:*   *Device drivers and utility software require*
> *around 20 MB disk space*

9.2 Entering Setup

Turn on the computer and press <Ctrl> + <A> when following message
prompted to enter the "Adaptec Embedded SATA HostRAID Controller"
for setup:

Press <Ctrl><A> for Adaptec RAID Configuration Utility

Figure 9.1: RAID Setup initial screen

9.3 Array Configuration Utility

Select the "Array Configuration Utility" in the "Initial Setup Screen" menu, and the "SATA RAID Setup Main Menu screen" screen will display. This menu allows users to configure RAID function such as manage/create array, add/delete hotspare and initialize drives.

Figure 9.2: SATA RAID Setup Main Menu screen

9.3.1 Managing Arrays
Viewing Array Properties

1.   From the manual, select the "Manage Arrays"

2.   Select the array in the "List of array" and press "Enter" to view the selected array properties

3.   Press "Esc" to return to the previous menu

Deleting Arrays

1.   From the manual, select the "Manage Arrays"

2.   Select the array you want to delete, and press "Delete"

3.   In the "Array Properties" dialog box, select "Delete" and press "Enter", then following warning message will be displayed:

Warning!!   Deleting the array will render array unusable.

Do you want to delete the array? (Yes/No):

4.   If press "Yes", then following message will be displayed, and select the number you want: *To delete the partition table, choose which member: member #0, member #1, both, none*

5.   Press "Esc" to return to the previous menu

9.3.2 Creating Arrays

Before creating arrays, please make sure that the disks for the array already connected and installed in the system.

1. Select "Create Array" from the setup main menu

2. Select the disks for the new array then press "Insert". To deselect any disk, highlight the disk then press "Delete"

3. Press "Enter" when both selected disks ready, then the Array Properties menu displays

4. In the Array Properties menu, select a type of array and press "Enter".

5. Type in a label of the created array and press "Enter"

6. For RAID 0, please select the desired stripe size from 16, 32, and 64 KB

7. Press "Done" when you finished

9.3.3 Adding/Removing a Bootable Array

To make a bootable array:

1. Select "Manage Arrays" from main menu

2. Select the array that you want to make it bootable and press "Ctrl+B" to make it a bootable array

3. To make the array nonbootable, select a bootable array and press "Ctrl+B" to make it become nonbootable

9.3.4 Add/Delete Hotspares

To make add, delete, or view hotspares, please select the "Add/Delete Hotspares" option.

1. Select "Add/Delete Hotspares" from the main menu

2. Select and highlight the disk you want to designate as a Hotspare, and then press "Insert"

3. Press "Yes" when the following message is displayed:
    Do you want to create spare? (Yes/No)

9.3.5 Initializing Disk Drives

Initializing drives

1. Select "Initialize Drives" from the main menu

2. Select and highlight the disk you want to initializing, and then press "Insert"

3. Repeat Step 2 for initialize more drive

4. Press "Enter"

5. Read the warning message and type "Y" to continue

9.3.6 Rebuilding Arrays

You can rebuild the array to have optimal status by replacing a failed disk of a RAID 1 or RAID 10 array with a new disk.

> *Note:* *Rebuilding applies to Fault Tolerant arrays (RAID 1) only.*

You can perform a Rebuild in the following ways:

System Shutdown Rebuild

Shutdown the system and replace the failed disk with a new one with equal or greater capacity. Once the system is booted, a new drive can be assigned as the spare drive, and this will start the Rebuild task. All the data from the good disk will be copied to the new one, and the original RAID 0 or RAID 1 array will be recreated.

Manual Rebuild

1. Select "Manage Arrays" from the main menu

2. Select and highlight the disk you want to rebuild, and then press "Ctrl + R" to Rebuild

Verifying Drives

If having a mismatch of data during a build of RAID 1, you can verify the drives with following steps:

1. Select the drives you want to verify

2. Press "Ctrl+S"

3. When the Verify is complete, you will be notified with any errors found during the Verify operation.

9.4 Installing the driver

Installing the driver in Windows system

Be sure to create the array before entering or installing the operating system.

1. Restart the computer

2. Press <Ctrl> + <A> to enter the "Adaptec Embedded SATA Host RAID Controller" to setup the SATA array system

3. When the array is build, insert the driver CD and restart the system

4. Windows searches the disk for a suitable driver

5. When the Adaptec Embedded Serial ATA HostRAID driver is found, press "Enter". Follow the instructions to complete your installation.

Programming the Watchdog Timer

Appendix A Programming the watchdog

A.1 Programming the Watchdog Timer

The PCA-6188's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function after the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1.1 Watchdog timer overview

The watchdog timer is built into the super I/O controller W83627HF. It provides the following functions for user programming:

- Can be enabled and disabled by user's program.
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes.
- Generates an interrupt or resets signal if the software fails to reset the timer after time-out.

A.1.2 Reset/ Interrupt selection

The J2 jumper is used to select reset or interrupt (IRQ 11) in the event the watchdog timer is tripped. See Chapter 1 for detailed jumper settings.

Note: *The interrupt output of the watchdog timer is a low level signal. It will be held low until the watchdog timer is reset.*

A.1.3 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E(hex) and 2F(hex).

2E (hex) is the address port. 2F(hex) is the data port.

You must first assign the address of register by writing address value

into address port 2E(hex), then write/read data to/from the assigned

register through data port 2F (hex).

```
┌─────────────────────┐
│                     │
│   Unlock W83627H    │
│                     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│                     │
│  Select register of │
│   watchdog timer    │
│                     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│                     │
│ Enable the function of │
│  the watchdog timer │
│                     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│                     │
│  Use the function of │
│  the watchdog timer │
│                     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│                     │
│   Lock W83627HF     │
│                     │
└─────────────────────┘
```

Watchdog Timer Registers		
Address of register (2E)	**Attribute**	
Read/Write	Value (2F) and description	
87 (hex)	-----	Write this address to I/O address port 2E (hex) twice to unlock theW83627HF
07 (hex)	write	Write 08 (hex) to select register of watchdog timer.
30 (hex)	write	Write 01 (hex) to enable the function of the watchdog timer. Disabled is set as default.
F5 (hex)	write	Set seconds or minutes as units for the timer.
Write 0 to bit 3: set second as counting unit. [default]		
Write 1 to bit 3: set minute as counting unit		
F6 (hex)	write	0: stop timer [default] 01~FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F5 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.

F7 (hex)	read/write	Bit 6: Write 1 to enable keyboard to reset the timer, 0 to disable.[default] Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0] Bit 4: Read status of watchdog timer, 1 means timer is ""time out""."
AA (hex)	-----	Write this address to I/O port 2E (hex) to lock the watchdog timer.2

Table A.1: Watchdog timer registers

A.1.4 Example Program

1.   Enable watchdog timer and set 10 sec. as timeout interval

```
;-----------------------------------------------------------
Mov dx,2eh                      ; Unlock W83627HF
Mov al,87h
Out dx,al
Out dx,al
;-----------------------------------------------------------
Mov al,07h                      ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov  al,08h
Out   dx,al
;-----------------------------------------------------------
Dec dx                ; Enable the function of watchdog timer
Mov  al,30h
Out   dx,al
Inc   dx
Mov  al,01h
Out   dx,al
```

```
;----------------------------------------------------------
Dec dx                ; Set second as counting unit
Mov  al,0f5h
Out   dx,al
Inc   dx
In    al,dx
And al,not 08h
Out   dx,al
;----------------------------------------------------------
Dec dx           ; Set timeout interval as 10 seconds and start counting
Mov  al,0f6h
Out   dx,al
Inc   dx
Mov  al,10
Out   dx,al
;----------------------------------------------------------
Dec dx           ; lock W83627HF
Mov  al,0aah
Out   dx,al
```

2.   Enable watchdog timer and set 5 minutes as timeout interval

```
;----------------------------------------------------------
Mov dx,2eh        ; unlock W83627H
Mov al,87h
Out dx,al
Out dx,al
;----------------------------------------------------------
Mov al,07h        ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov  al,08h
Out   dx,al
```

```
;---------------------------------------------------------
Dec dx          ; Enable the function of watchdog timer
Mov  al,30h
Out   dx,al
Inc   dx
Mov  al,01h
Out   dx,al
;---------------------------------------------------------
Dec dx          ; Set minute as counting unit
Mov  al,0f5h
Out   dx,al
Inc   dx
In    al,dx
Or  al,08h
Out   dx,al
;---------------------------------------------------------
Dec dx          ; Set timeout interval as 5 minutes and start counting
Mov  al,0f6h
Out   dx,al
Inc   dx
Mov  al,5
Out   dx,al
;---------------------------------------------------------
Dec dx          ; lock W83627HF
Mov  al,0aah
Out   dx,al
3.    Enable watchdog timer to be reset by mouse
;---------------------------------------------------------
Mov dx,2eh      ; unlock W83627H
Mov al,87h
Out dx,al
```

```
Out dx,al
;-------------------------------------------------------
Mov al,07h        ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov al,08h
Out   dx,al
;-------------------------------------------------------
Dec dx            ; Enable the function of watchdog timer
Mov al,30h
Out   dx,al
Inc   dx
Mov al,01h
Out   dx,al
;-------------------------------------------------------
Dec dx            ; Enable watchdog timer to be reset by mouse
Mov al,0f7h
Out   dx,al
Inc   dx
In    al,dx
Or   al,80h
Out   dx,al
;-------------------------------------------------------
Dec dx            ; lock W83627HF
Mov al,0aah
Out   dx,al
4.    Enable watchdog timer to be reset by keyboard
;-------------------------------------------------------
Mov dx,2eh        ; unlock W83627H
Mov al,87h
Out dx,al
```

```
Out dx,al
;----------------------------------------------------------
Mov al,07h          ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov al,08h
Out   dx,al
;----------------------------------------------------------
Dec dx           ; Enable the function of watchdog timer
Mov al,30h
Out   dx,al
Inc   dx
Mov al,01h
Out   dx,al
;----------------------------------------------------------
Dec dx           ; Enable watchdog timer to be strobed reset by keyboard
Mov al,0f7h
Out   dx,al
Inc   dx
In    al,dx
Or   al,40h
Out   dx,al
;----------------------------------------------------------
Dec dx           ; lock W83627HF
Mov al,0aah
Out   dx,al
5.    Generate a time-out signal without timer counting
;----------------------------------------------------------
Mov dx,2eh        ; unlock W83627H
Mov al,87h
Out dx,al
```

```
Out dx,al
;----------------------------------------------------------
Mov al,07h        ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov al,08h
Out   dx,al
;----------------------------------------------------------
Dec dx            ; Enable the function of watchdog timer
Mov al,30h
Out   dx,al
Inc    dx
Mov al,01h
Out   dx,al
;----------------------------------------------------------
Dec dx            ; Generate a time-out signal
Mov al,0f7h
Out   dx,al                     ;Write 1 to bit 5 of F7 register
Inc    dx
In    al,dx
Or   al,20h
Out   dx,al
;----------------------------------------------------------
Dec dx            ; lock W83627HF
Mov al,0aah
Out   dx,al
```

I/O Pin Assignments

Appendix B Pin Assignments

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

```
39 37                                              3  1
┌─────────────────────────────────────────────┐
│ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ □ │
│ ○ ○ ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ │
└─────────────────────────────────────────────┘
40 38                                              4  2
```
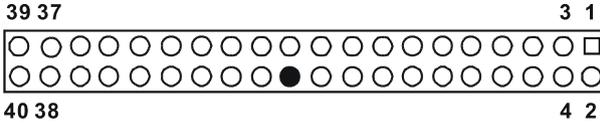
Table B.1: IDE hard drive connector (CN1, CN2)			
Pin	Signal	Pin	Signal
1	IDE RESET*	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	N/C
21	DISK DMA REQUEST	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO CHANNEL READY	28	CSEL
29	HDACKO*	30	GND
31	IRQ14	32	IDSC16-
33	ADDR 1	34	PDIAG
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
```
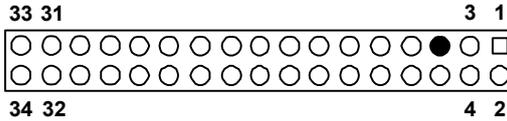
Table B.2: Floppy drive connector (CN3)			
Pin	Signal	Pin	Signal
1	GND	2	FDHDIN*
3	GND	4	N/C
5	N/C	6	FDEDIN*
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	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
```
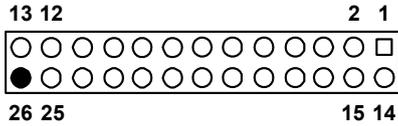
Table B.3: Parallel port connector (CN4)			
Pin	Signal	Pin	Signal
1	STROBE*	14	AUTOFD*
2	D0	15	ERR
3	D1	16	INIT*
4	D2	17	SLCTINI*
5	D3	18	GND
6	D4	19	GND
7	D5	20	GND
8	D6	21	GND
9	D7	22	GND
10	ACK*	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	N/C
* low active			

B.4 USB Connector (CN6, CN63)

```
1 □ ○ 6
2 ○ ○ 7
3 ○ ○ 8
4 ○ ○ 9
5 ○ ● 10
```
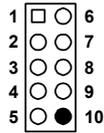
Table B.4: USB1/USB2 connector (CN6)

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

B.5 VGA Connector (CN7)

```
5  ○ ○ ○ ○ □  1
10  ○ ○ ○ ○ ○  6
15  ○ ○ ○ ○ ○  11
```
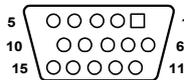
Table B.5: VGA connector (CN7)

Pin	Signal	Pin	Signal
1	RED	9	VCC
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

B.6 VCN2 VGA-2 connector

```
9                5  4  3  2  1
○  ○  ○  ○  ○  ○  ○  ○  □
```
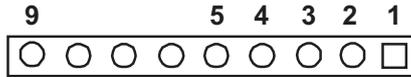
Table B.6: VCN2 VGA-2 connector	
Pin	Signal
1	CRT2_R1
2	CRT2_G1
3	CRT2_B1
4	GND
5	D2_HS1OUT
6	D2_VS1OUT
7	DDC3_SDAOUT
8	DDC3_SCLOUT
9	VCC_VGA03

B.7 VCN4 LVDS connector

```
1  3                                    39
□ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
2  4                                    40
```
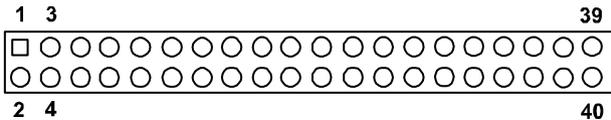
Table B.7: VCN4 LVDS connector			
Pin	Signal	Pin	Signal
1	VDDSAFE5	21	G4
2	VDDSAFE5	22	G5
3	GND	23	G6
4	GND	24	G7
5	VDDSAFE3	25	R0
6	VDDSAFE3	26	R1
7	VCON	27	R2
8	GND	28	R3

9	B0	29	R4
10	B1	30	R5
11	B2	31	R6
12	B3	32	R7
13	B4	33	GND
14	B5	34	GND
15	B6	35	SFCLK
16	B7	36	FLM
17	G0	37	M
18	G1	38	LP
19	G2	39	ENBKL
20	G3	40	ENVEE

B.8 VCN5 DVI connector
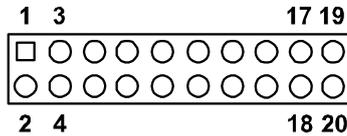
Table B.8: VCN5 DVI connector			
Pin	**Signal**	**Pin**	**Signal**
1	#TMDS1_0	11	GND
2	AGP_5V_TMDS2	12	DDC3_SDAOUT
3	TMDS1_0	13	#TMDS1_2
4	GND	14	#TMDS1_2
5	GND	15	TMDS1_2
6	TMDS1_CK	16	ATI_12C_DAT
7	#TMDS1_1	17	AGP_5V_TMDS2
8	GND	18	ATI_12C_CLK
9	#TMDS1_1	19	CPIS_ENA_BL
10	DDC3_SCLOUT	20	CPIS_VDD_VCL

B.9 COM1/COM2 RS-232 Serial Port (CN23, CN10)
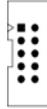
Table B.9: COM1/2 RS-232 serial port (CN9/10)	
Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

B.10 Keyboard and Mouse Connnector (CN11)
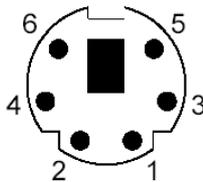
Table B.10: Keyboard and mouse connector (CN11)

Pin	Signal
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

B.11 External Keyboard Connector (CN12)

```
5   4   3   2   1
○   ○   ○   ○   □
```
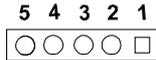
Table B.11: External keyboard connector (CN12)

Pin	Signal
1	CLK
2	DATA
3	NC
4	GND
5	VCC

B.12 CPU Fan Power Connector (CN14)

Table B.12: CPU Fan Power Connector (CN14)	
Pin	Signal
1	GND
2	+12V
3	Detect

B.13 Power LED (CN16)

You can use an LED to indicate when the single board computer is on. Pin 1 of CN16 supplies the LED's power, and Pin 3 is the ground.
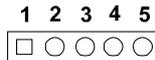
Table B.13: Power LED and keylock conn (CN16)	
Pin	Function
1	LED power (+5 V)
2	NC
3	GND
4	NC
5	GND

B.14 External Speaker Connector (CN17)

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

```
□ ○ ○ ○
1  2  3  4
```
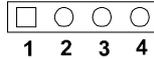
Table B.14: External Speaker Connector (CN17)	
Pin	Function
1	Internal buzzer
2	NC
3	Internal buzzer
4	Speaker out

B.15 Reset Connector (CN18)

```
□  1
○
```

Table B.15: Reset connector (CN18)	
Pin	Signal
1	RESET
2	GND

B.16 HDD LED Connector (CN19)

```
□  1
○
```

Table B.16: HDD LED connector (CN19)

Pin	Signal
1	VCC (LED+)
2	IDE LED (LED-)

B.17 ATX Feature Connector (CN20)

```
▷□  1
 ○
 ○
```

Table B.17: ATX feature connector (CN20)

Pin	Signal
1	PS-ON
2	VCC
3	VCCSB

B.18 ATX Soft Power Switch (CN21))

Table B.18: ATX soft power switch (CN21)

Pin	Signal
1	5VSB
2	PWR-BTN

B.19 H/W Monitor Alarm (CN22)

Table B.19: H/W monitor alarm (CN22)

Pin	Signal
1	Enable OBS alarm
2	Disable OBS alarm

B.20 AC-97 Audio Interface (CN43)
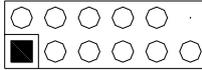
Table B.20: AC-97 Audio Interface (CN43)

1 VCC	2 GND
3 SYNC	4 BITCLK
5 SDOUT	6 SDIN0
7 SDIN1	8 AC-RST
9 +12V	10 GND
11 GND	12 N/C

B.21 SM Bus Connector (CN29)

Table B.21: SM Bus Connector (CN 29)

Pin	Signal
1	SMB_DATA
2	SMB_CLK

B.22 System I/O Ports

Table B.22: 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 (LPT3)
290-297	On-board hardware monitor
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT2)
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

B.23 DMA Channel Assignments

Table B.23: 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.24 Interrupt Assignments

Table B.24: Interrupt assignments

Priority	Interrupt#	Interrupt source
1	NMI	Parity error detected
2	IRQ0	Interval timer
3	IRQ1	Keyboard
-	IRQ2	Interrupt from controller 2 (cascade)
4	IRQ8	Real-time clock
5	IRQ9	Cascaded to INT 0A (IRQ 2)
6	IRQ10	Available
7	IRQ11	Available
8	IRQ12	PS/2 mouse
9	IRQ13	INT from co-processor
10	IRQ14	Primary IDE Channel
11	IRQ15	Secondary IDE Channel
12	IRQ3	Serial communication port 2
13	IRQ4	Serial communication port 1
14	IRQ5	Parallel port 2
15	IRQ6	Diskette controller (FDC)
16	IRQ7	Parallel port 1 (print port)

B.25 1st MB Memory Map

Table B.25: 1st MB memory map

Addr. range (Hex)	Device
E0000h - FFFFFh	BIOS
CC000h - DFFFFh	Unused
C0000h - CBFFFh	VGA BIOS
A0000h - BFFFFh	Video Memory
00000h - 9FFFFh	Base memory

B.26 PCI Bus Map

Table B.26: PCI bus map

Function Signals	Device ID	INT# pin	GNT	REQ
Onboard LAN1		INT E		
OnboardLAN2	AD21	INT H	GNT F	REQ F
SCSI	AD19	INT F, G	GNT A	REQ A
Bridge	AD22		GNT E	REQ E
PCI slot 1	AD31	INT B, C, D, A	GNT A	REQ A
PCI slot 2	AD30	INT C, D, A, B	GNT B	REQ B
PCI slot 3	AD29	INT D, A, B, C	GNT C	REQ C
PCI slot 4	AD28	INT A, B, C, D	GNT D	REQ D