

PCA-6009

**LGA775 Pentium® 4 /
Celeron® D Processor Card
with VGA/Gigabit LAN/HISA/
DVI (800 MHz FSB)**

User Manual

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A Message to the Customer

Advantech customer services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical support

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

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

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

Table 1.1: Table 1.1: PCA-6009 Comparison Table

Model	PCA-6009LV	PCA-6009VG
VGA: Intel 915 GV integrated VGA controller onboard	yes	yes
USB 2.0 port	4	4
LAN 1: Broadcom BCM5721 10/100/1000Base-T	no	yes

Table 1.2: PCA-6009 DDR memory compatibility table

Brand	Size	Speed	Type	ECC	Part Number	Advanced PN	Memory
Apacer	1 GB	DDR2 533	DDR2	N	78.0106 6.330	NA	HYB18T512 800AF37 FSS35249 0434
	1 GB	DDR2 533	DDR2	N	78.0106 6.400	NA	SAMSUNG K4T51083QB-ZKD5
UG	512 MB	DDR2 400	DDR2	N	UG64T6 400K8D U-4AM	NA	4WB42 D9CHL
	1 GB	DDR2 400	DDR2	N	UG12T6 400L8D U-4AM	NA	EPPIDA E5108AB-5C-E
Transcend	256 MB	DDR2 533	DDR2	N	NA	NA	SAMSUNG443 K4T56083QF-GC05
	1 GB	DDR2 533	DDR2	N	NA	NA	ELPIDA E5108AB-5C-E
DSL	512 MB	DDR2 533	DDR2	N	NA	NA	HYB18T512 800AF37 FSS43331 0440
	1 GB	DDR2 400	DDR2	N	NA	NA	HYB18T512A 800AF37 FSS43331 0440

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:

1. Collect all the information about the problem encountered. (For example, type of PC, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Initial Inspection

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

1 PCA-6009 Pentium 4/Celeron Dprocessor-based single board computer	
1 PCA-6009 Startup Manual	
1 CD with driver utility and manual (in PDF format)	
1 FDD cable	P/N: 1700340640
1 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 Y cable for PS/2 keyboard and PS/2 mouse	P/N: 1700060202
1 Four-USB port cables	P/N:1700000719
Jumper pack	P/N:9689000068
Warranty card	

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

We have carefully inspected the PCA-6009 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-6009, 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.

Release Note

Date	Revision	Description
June 2006	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.*

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CHAPTER

1

General Information

Chapter 1 Hardware Configuration

1.1 Introduction

The PCA-6009 is designed with the Intel 915GV chipset and ICH6 (I/O controller) to support 800 MHz Front side Bus, Intel Pentium 4/Celeron D processor, high speed/high capacity dual channel DDRII 400/533 memory, and high performance I/O functions such as Gigabit Ethernet ports, Serial/Parallel ATA ports, and PCI-Express host interface for LAN. In compliance with PICMG 1.0 specification, PCA-6009 can be used with a wide choice of existing PCI/ISA backplanes to meet versatile requirements of industrial applications.

The PCA-6009 is designed to deliver high performance for industrial applications. It uses Intel's long-life 915GV and ICH6 chipset, capable of running the fastest Pentium 4 and Celeron D processor. It has 2 DIMM sockets in two separated memory channels. It accepts up to 2 GB DDRII 400/533 SDRAM memory, enough for most of applications. The PCA-6009 features single Gigabit Ethernet network interface(s). With the Broadcom BCM5721 GbE controller designed-in, PCA-6009 implements the PCI Express host interface (PCI-E X1) in LAN connection with the maximum throughput of 2Gbps for heavy-duty industrial network application. The Intel 915GV integrated VGA provides superior 3D performance with unique Intel Graphics Media Accelerator 900. 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-6009 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-6009 is designed with reliability considerations to suit industrial environments. To prevent CPU damage from overheating, the PCA-6009 features a thermal protection circuit that enables the processor to automatically shut down when the cooling system fails.

1.2 Features

1. Supports 2 Serial-ATA devices
2. Supports Dual Channel DDRII 400/533 SDRAM up to 2 GB
3. Features a thermal protection circuit which will enable the processor to automatically shut down when the cooling system fails
4. Supports 10/100/1000Base-T Ethernet
5. 4 USB 2.0 ports
6. CMOS automatic backup and restore to prevent accidental data loss of BIOS setup data

1.3 Specifications

1.3.1 System

- **CPU:** Intel LGA 775 Celeron D up to 3.06GHz, Pentium 4 up to 3.4 GHz, FSB 533/800 MHz. Advantech also certifies several high-performance CPU coolers as optional parts for customers who use high-speed CPUs in 2U chassis or high temperature environments.
- **L2 Cache:** CPU built-in 256KB and 1 MB/2 MB full-speed L2 cache.
- **BIOS:** Award Flash BIOS (4Mb Flash Memory)
- **System Chipset:** Intel 915GV with ICH6
- **SATA/EIDE hard disk drive interface:** Two on-board serial ATA connectors with data transmission rate up to 150 MB/Sec and supporting Advanced Host controller interface (AHCI) technology. One IDE hard disk drives or two enhanced IDE devices. Supports PIO mode 4 (16.67MB/s data transfer rate) and ATA 33/66/100 (33/66/100MB/s data transfer rate.) BIOS enabled/disabled.
- **Floppy disk drive interface:** Supports one floppy disk drive, 5¼" (360 KB and 1.2 MB) or 3½" (720 KB, 1.44 MB). BIOS enabled/disabled

1.3.2 Memory

- **RAM:** Up to 2 GB in two 240-pin DIMM sockets. Supports dual channel DDRII 400/533 SDRAM.

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 onboard keyboard pin header connector is available.
- **ISA bus:** Supports ISA without DMA. PCI-to-ISA bridge: ITE IT8888
- **AC-97 Audio:** PCA-6009 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 one USB 2.0 cable kits included, and supports transmission rates up to 480 Mbps;

available through one 4-USB port cable kits, P/N: 1700000719

1.3.4 VGA interface

- **Controller:** Chipset integrated VGA controller
- **Display memory:** Dynamically shared system memory up to 128 MB.
- **Resolution:** Up to 2048x1536@ 85 Hz refresh

1.3.5 Ethernet LAN

- Supports 10/100/1000Base-T Ethernet port(s) via PCI Express x1 bus which provides 500 MB/s data transmission rate.
- **Controller:**
- Single 10/100/1000Base-T: Broadcom BCM5721

Note: *The Speed & Duplex mode default setting is full duplex mode and can NOT be changed*

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:** Maximum: +5V:6.64A, +12V:12.59A (Intel Pentium4 3.4GHz with 800MHz FSB, 2 X256 MB, 2 X512 MB DDRII 533 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-6009 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
CN3	FDD connector, Supports 360K/1.2M/720K/1.44M FDD x 2
CN4	Parallel port, Parallel port x 1, supports SPP/EPP/ECP mode
CN6	USB port 0,1
CN7	VGA connector
CN8	Ethernet connector 1
CN9	Serial port: COM1; RS232 (D-sub 9-pin connector)
CN10	Serial port: COM2; RS232 (9-pin connector)
CN11	PS/2 keyboard and mouse connector Cable length: 20 meters
CN12	External keyboard connector
CN13	Reserved

Table 1.2: Connectors

CN16 (keyboard lock and power LED)	Power LED Suspend: flash flash (ATX/AT) System On: ON (ATX/AT) System Off: OFF (AT) System OffL Slow flash (ATX)
CN17	External speaker
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
CN43	AC97 Link connector
CN63	USB port 3,4
CN65	Front Panel LAN Indicator connector
CN68	CPU FAN connector (4-pin)
SA0	Serial ATA0
SA2	Serial ATA2
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, the system may become unstable.*

1.5 Board Layout: Jumper and Connector Locations

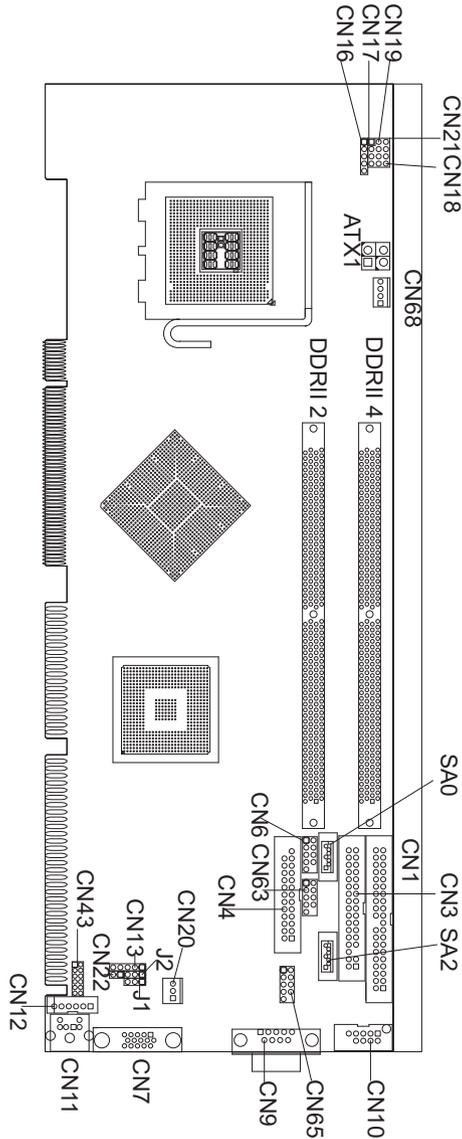


Figure 1.1: Jumper and Connector locations

1.6 PCA-6009 Block Diagram

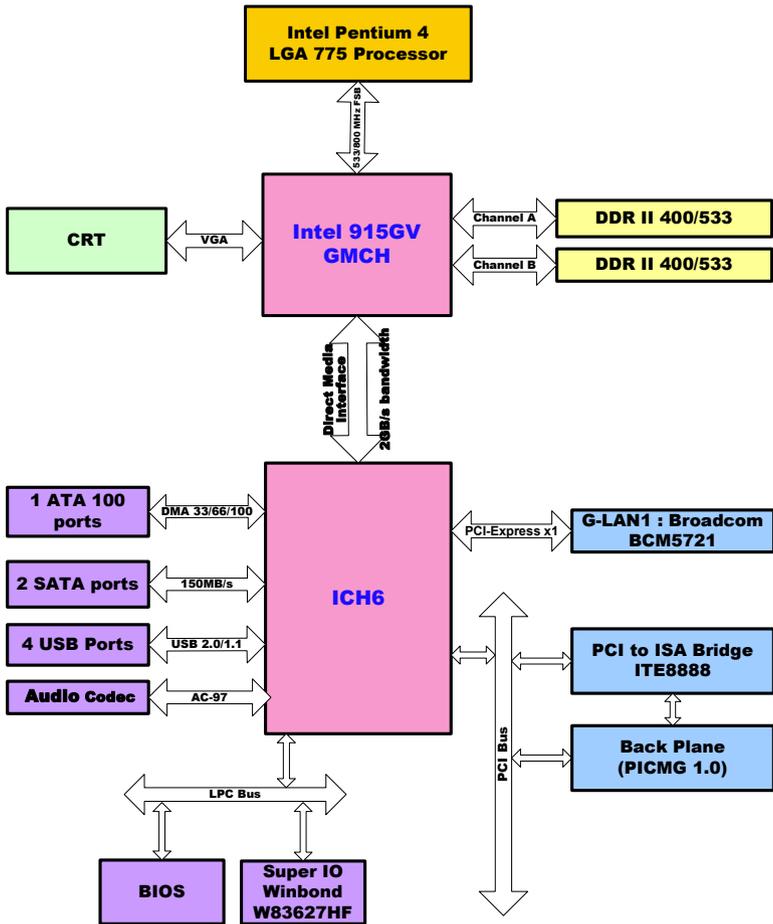


Figure 1.2: Block Diagram

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-6009 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.

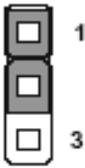
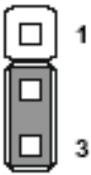
1.8.1 How to set jumpers

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-6009 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Table 1.3: CMOS (J1)

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

1.8.3 Watchdog timer output (J2)

The PCA-6009 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-6009 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-6009 has four sockets for 240-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 1.8 V unbuffered double data rate synchronous DRAMs (DDR2 SDRAM). They are available in capacities of 256, 512 and 1024 MB. The sockets can be filled in any combination with DIMMs of any size, giving a total memory size between 256 MB and 2 GB.

1.9.1 CPU FSB and memory speed

The PCA-6009 can accept DDR2 SDRAM memory chips without parity. Also note: The PCA-6009 accepts DDR2 400MHz SDRAM and DDR2 533MHz SDRAM, depending on the CPU front side bus frequency (FSB).

1.9.2 Dual channel configuration

The two DIMM sockets are arranged in two channels: DIMM2 in channel A; DIMM4 in channel B. To enable dual channel operation, please install a matched pair of DIMMs in DIMM2 & DIMM4

"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 LGA775.*

Warning: *Advantech highly recommends attaching only the dedicated LGA775 CPU coolers, Advantech part numbers ,1750000332 or 1750000334 both of which have a high MTBF and reliability. Using non-recommended CPU coolers, like Intel boxed CPU coolers, may result in PCB warping and CPU card overheating.*

1. The CPU has a plastic cap on it to protect the contact from damage. Before you install the CPU, always cover it to protect the socket pin. First, remove the cap from lever hinge side and the pins of socket reveal.
2. Open the load lever. Then, lift the load lever up and open the load plate. After confirming the CPU direction for correct mating, gently put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.
3. Cover the load plate onto the package. Press down the load lever lightly onto the load plate, and then secure the lever with the hook under retention tab. Confirm if your CPU cooler is firmly installed before turning on your system.

CHAPTER

2

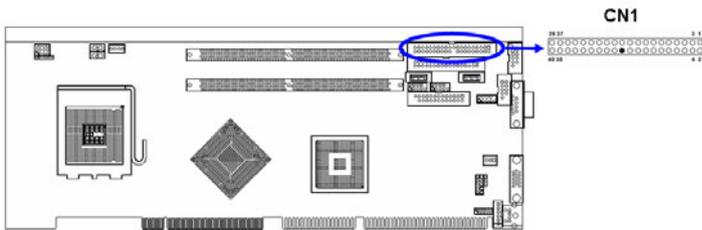
Connecting Peripherals

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 (CN1) IDE Connectors



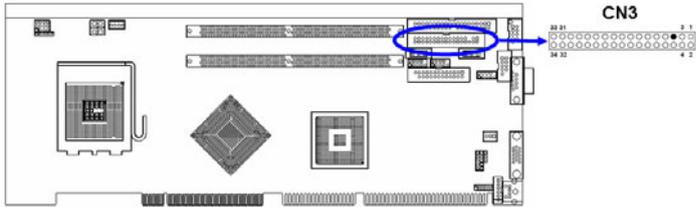
You can attach up to two IDE (Integrated Drive Electronics) drives to the PCA-6009's built-in controller. The primary (CN1) connector can accommodate two drives.

Wire number 1 on the cable is red or blue and the other wires are gray. Connect one end to connector CN1 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.

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.

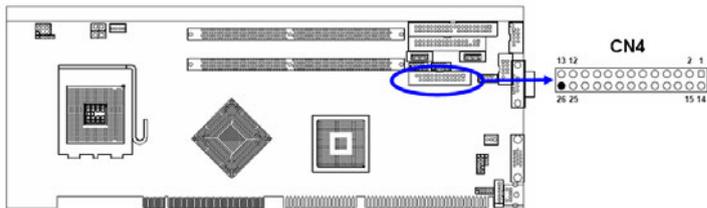
2.3 Floppy Drive Connector (CN3)



You can attach up to two floppy disk drives to the PCA-6009'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)

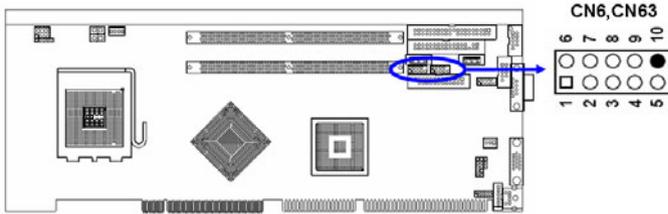


The parallel port is normally used to connect the single board computer to a printer. The PCA-6009 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, CN4. The card comes with an adapter cable which lets you use a traditional DB-25 connector. The cable has a 26-pin connector 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.

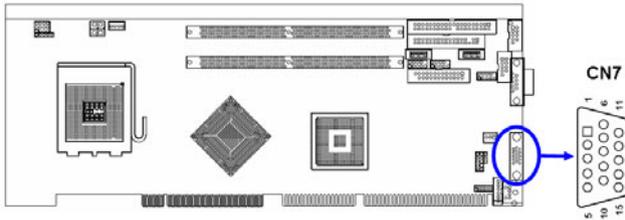
To install the bracket, find an empty slot in your chassis. Unscrew the plate that covers the end of the slot. Screw in the bracket in place of the plate. Next, attach the flat-cable connector to CN4 on the CPU card. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that wire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

2.5 USB Ports (CN6,CN63)



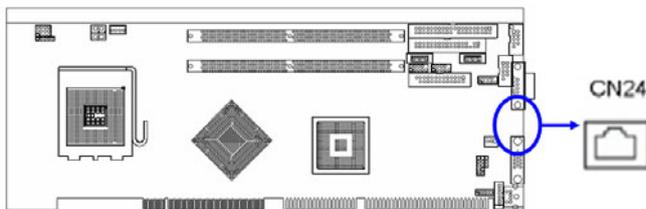
The PCA-6009 provides up to eight ports of USB (Universal Serial Bus) interface. The USB interface complies with USB Specification Rev. 2.0 support transmission rate up to 480 Mbps and is fuse-protected. The USB interface can be disabled in the system BIOS setup. To install the USB cable (p/n:1700000719) 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 or CN63.

2.6 VGA Connector CN7



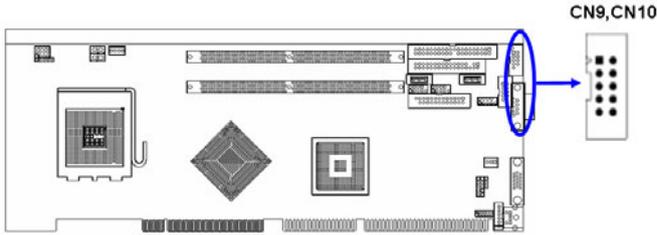
The PCA-6009 includes a VGA interface that can drive conventional CRT displays. CN7 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector CN7 are detailed in Appendix B.

2.7 Ethernet Connector (CN24)



The PCA-6009 is equipped with a high performance 1000 Base-T Ethernet interface. The Gigabit Ethernet ports uses the Broadcom BCM 5721 controller connected to the PCI-Express x1 of the ICH6 I/O controller. The PCA-6009 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.

2.8 Serial Ports (COM1: CN9/CN91; COM2: CN10)

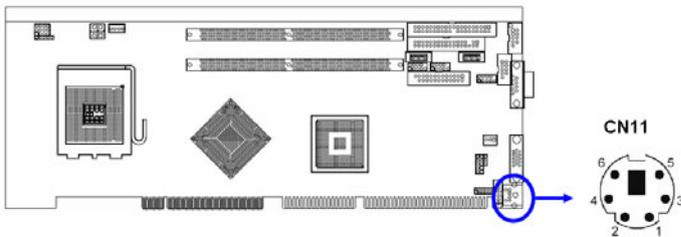


The PCA-6009 offers two serial ports, CN9 as COM1 and CN10 as COM2. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

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.

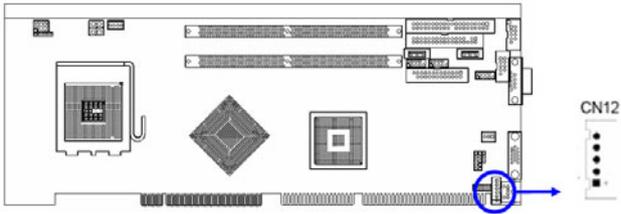
Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

2.9 PS/2 Keyboard/Mouse Connector (CN11)



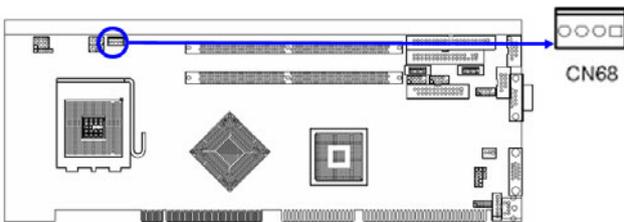
One 6-pin mini-DIN connectors (CN11) on the card mounting bracket provide connection to a PS/2 keyboard or a PS/2 mouse, respectively. CN11 can also be connected to an adapter cable (P/N: 1700060202, available from Advantech) for connecting to both a PS/2 keyboard and a PS/2 mouse.

2.10 External Keyboard Connector (CN12)



In addition to the PS/2 mouse/keyboard connector on the PCA-6009's rear plate, there is also an extra onboard external keyboard connector. This gives system integrators greater flexibility in designing their systems.

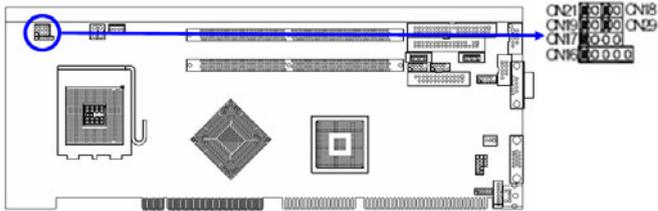
2.11 CPU Fan Connector (CN68)



The PCA-6009 provides 4 pin CPU fan connector.

2.12 Front Panel Connectors (CN16, 17, 18, 19)

There are several external switches to monitor and control the PCA-6009



2.12.1 Power LED (CN16)

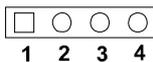
CN16 is a 5-pin connector for the power on LED. Refer to Appendix B for detailed information on the pin assignments. If a PS/2 or ATX power supply is used, the system's power LED status will be as indicated below:

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

2.12.2 External speaker (CN17)

CN17 is a 4-pin connector for an external speaker. If there is no external speaker, the PCA-6009 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 3-4 as closed.



2.12.3 Reset (CN18)

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



2.12.4 HDD LED (CN19)

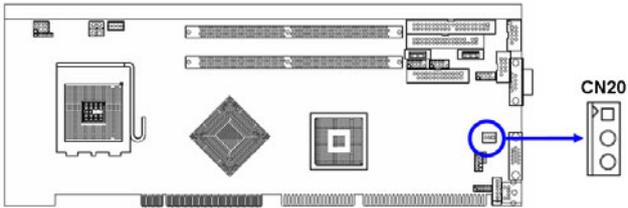
You can connect an LED to connector CN19 to indicate when the HDD is active.



2.12.5 ATX soft power switch (CN21)

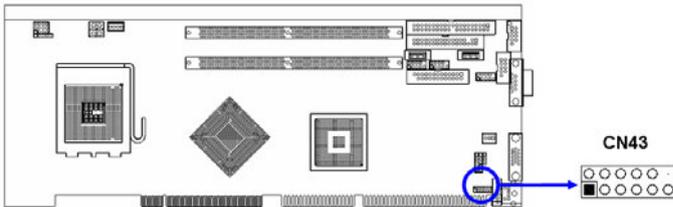
If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to CN21. This connection enables you to turn your computer on and off.

2.13 ATX Feature Connector (CN20)



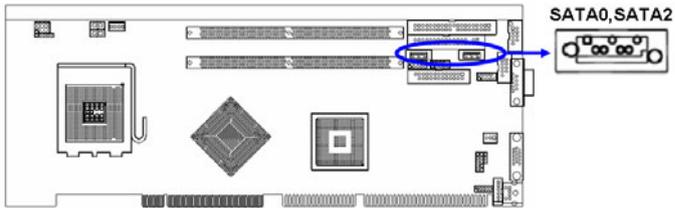
Connect to the CN1 on the Advantech backplane to enable the ATX function, 5V stand-by.

2.14 AC-97 Audio Interface (CN43)



The PCA-6009 provides AC-97 audio through PCA-AUDIO-00A1 module from Advantech.

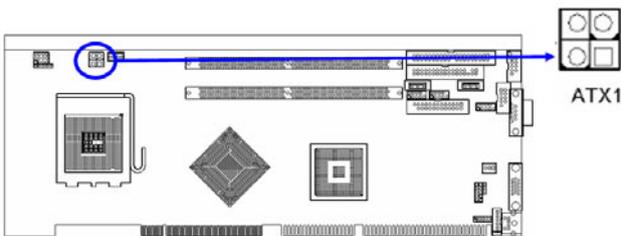
2.15 Serial ATA Interface (SATA0 and SATA2)



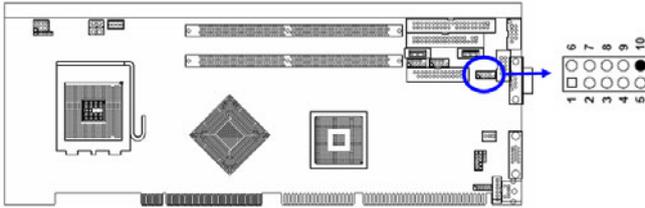
In addition to the one EIDE interfaces (up to two devices), the PCA-6009 provides two high performance serial ATA interfaces (up to 150MB/s) which eases cabling to hard drives with thin and long cables.

2.16 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-6009. This connector must be connected to the power supply, otherwise the system may become unstable.



2.17 Front Panel LAN Indicator Connector (CN65)



If you want to observe your LAN operating status through the front LED of system, you can connect the front LAN LED to the CN65 connector to indicate the LAN operating status. The indication of the front LAN LED is same as the indication of the RJ45 on the rear plate.

CHAPTER
3

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 causes a soft error, BIOS will recheck the data in CMOS RAM and automatically restore the original data in Flash ROM to CMOS RAM for booting.

Note: *If you intend to change the CMOS setting without restoring the previous backup, you have to click on "DEL" within two seconds of the "CMOS checksum error..." display screen message 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 to enter the BIOS setup.



Figure 3.1: Award BIOS Setup initial screen

3.3 Standard CMOS Setup

3.3.1 Date

The date format is <week>, <month>, <day>, <year>.

3.3.2 Time

The times format in <hour> <minute> <second>, based on the 24-hour military time clock.

3.3.3 IDE channel 0/1 Master/Slave

1. IDE HDD Auto-Detection:

Press "Enter" to select this option for automatic device detection.

2. IDE Device Setup.

Auto: Automatically detecting IDE devices during POST

None: Select this when no IDE device is used and the system will skip the auto-detection step to make system start up faster.

Manual: User can manually input the correct settings.

3. Access Mode: The options are CHS/LBA/Large/Auto

4. Capacity of currently installed hard disk.

5. Cylinder Number of cylinders
6. Head: Number of heads
7. Precomp: Write precomp
8. Landing Zone: Landing zone
9. Sector: Number of sectors

3.3.4 Drive A / Drive B

This category identifies the types of floppy disk drives installed in the system. The options are: None/360K, 5.25"/1.2M, 5.25"/720K, 3.5"/1.44M, 3.5"/2.88M, 3.5".

3.3.5 Halt On

This category determines whether system start-up will halt or not when an error is detected during power up.

The options are: No Errors/All Errors/All, But Keyboard/All, But Diskette/All, But Disk/Key

3.3.6 Memory

The category displays base memory, extended memory and total memory detected during POST (Power On Self Test).

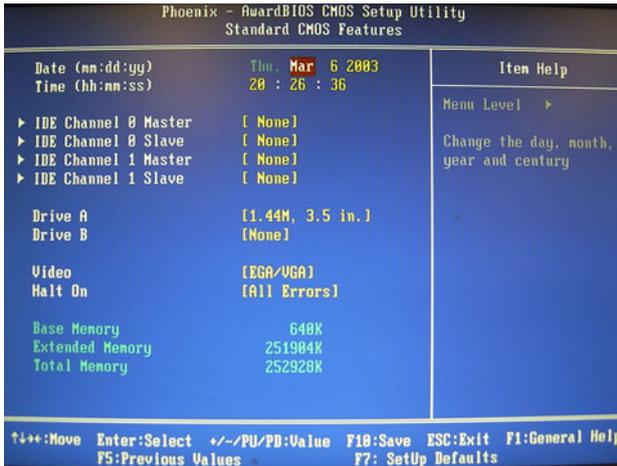


Figure 3.2: Standard CMOS Features Screen

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 PCA-6009 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.

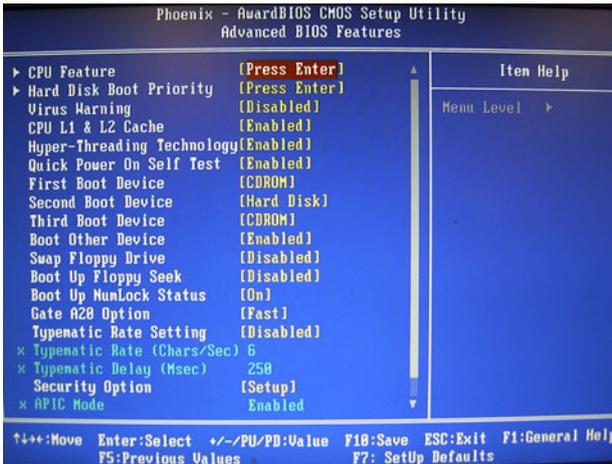


Figure 3.3: Advanced BIOS features screen

3.4.1 CPU Features

Delay Prior to thermal

This feature controls the activation of the Thermal Monitor's automatic mode. It allows you to determine when the Pentium 4's Thermal Monitor should be activated in automatic mode after the system boots. For example, with the default value of 16 Minutes, the BIOS activates the Thermal Monitor in automatic mode 16 minutes after the system starts booting up. The choices are 4 Min, 8 Min, 16 Min, and 32 Min.

Limit CPUID MaxVal

Set Limit CPUID MaxVal to 3, should be Disabled for WinXP.

Execute Disable Bit

When disabled, forces the XD feature flag to always return 0.

3.4.2 Hard Disk Boot Priority

Set hard disk boot device priority.

3.4.3 Virus Warning

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

3.4.4 CPU L1 & L2 Cache

Enabling this feature speeds up memory access. The commands are "Enabled" or "Disabled."

3.4.5 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 OSs which do not support HT technology.

3.4.6 Quick Power On Self Test

It allows the system to skip certain tests to speed up boot-up procedure.

3.4.7 First/Second/Third Boot Device

The BIOS tries to load the OS from the devices in the sequence set here. The options are: "Floppy", "LS120", "HDD-0", "SCSI", "CDROM", "HDD-1", "HDD-2", "HDD-3", "ZIP100", "USB-FDD", "USB-ZIP", "USBCDROM", "USB-HDD", "LAN", "Disabled".

3.4.8 Boot Other Device

To boot another device, the options are "Enabled" and "Disabled".

3.4.9 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."

3.4.10 Boot Up Floppy Seek

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

3.4.11 Boot Up NumLock Status

Set the boot up status Num Lock, the options are "On" and "Off".

3.4.12 Gate A20 Option

"Normal": A pin in the keyboard controller controls GateA20. Fast"
(Default): Lets chipset control GateA20.

3.4.13 Typematic Rate Setting

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

3.4.14 Typematic Rate (Chars/Sec)

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

3.4.15 Typematic Delay (msec)

Typematic delay is the time interval between the appearances of two consecutive characters, when the key is continuously depressed. The input values for this category are: 250, 500, 750, and 1000 (ms).

3.4.16 Security Option

This category determines whether the password is required when the system boots up or only when entering setup. The options are:

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

"Setup" The system will boot, but access to Setup will be denied unless the correct password is entered at the prompt.

Note: To disable security, select PASSWORD SETTING in the main menu. Then, 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.

3.4.17 APIC Mode

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

3.4.18 MPS Version Control For OS

The selections are "1.1" or "1.4" MPS 1.1 is the original specification. MPS version 1.4 adds extended configuration tables for improved support of multiple PCI bus configurations and greater expandability in the future. In addition, MPS 1.4 introduces support for a secondary PCI bus without requiring a PCI bridge .

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 PCA-6009, as shown in Figure 3-4:

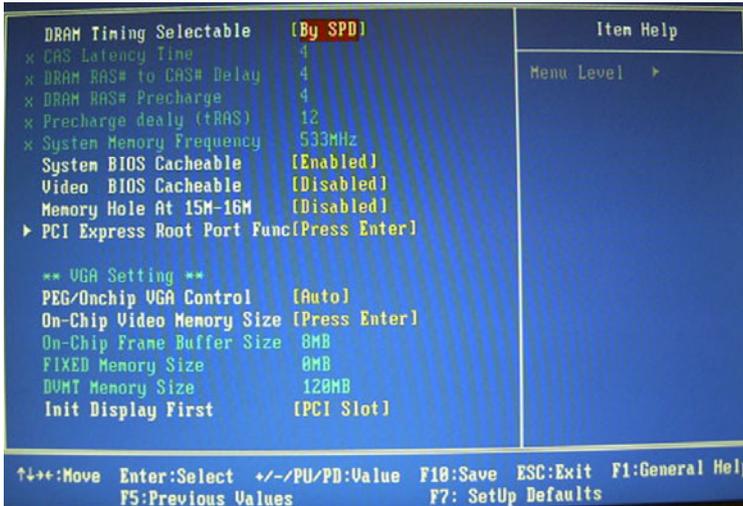


Figure 3.4: Advanced chipset features screen

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

When the DRAM Timing Selectable is set to [Manual], this field is adjustable. The category controls the CAS latency, which determines the time interval between SDRAM starting a read command and receiving it. Setting options: [3T], [4T], [5T], [Auto].

3.5.3 DRAM RAS# to CAS# Delay

When the DRAM Timing selectable is set to [Manual], this field is adjustable. When DRAM is refreshed, the rows and columns are addressed separately. This setup item allows user to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles are, the faster the DRAM speed is. Setting options: [2T] to [5T], [Auto].

3.5.4 DRAM RAS# Precharge

When the DRAM Timing Selectable is set to [Manual], this field is adjustable. This setting controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If no sufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Setting options: [2T] to [5T], [Auto].

3.5.5 Precharge Delay (t RAS)

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: "4" to "15" and "Auto."

3.5.6 System Memory Frequency

To adjust the frequency of memory. The choices are: "333MHz," "400MHz," "533MHz" 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 data 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 PCI-Express Root Port Func

PCI Express Port 1/2/3/4

The default setting is “Auto.” The choices are “Enabled,” “Disabled,” and “Auto.”

PCI-E Compliancy Mode

It allows user to select the PCI-E compliant mode. Setting options: [v1.0], [v1.0a].

3.5.11 On-Chip Video Memory Size

Use this field to select On-Chip Frame Buffer Size, Fixed Memory Size and DVMT Memory Size. Total Graphics Memory can be set as 64 MB, 128 MB or 224 MB.

3.5.12 On-Chip Frame Buffer Size

The On-Chip Frame Buffer Size can be set us 1 MB or 8 MB. This memory is shared with the system memory.

3.5.13 FIXED Memory Size

Specify the size of system memory to allocate for video memory.

3.5.14 DVMT Memory Size

Specify the size of DVMT memory to allocate for video memory.

3.5.15 Init Display First

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

3.6 Integrated Peripherals

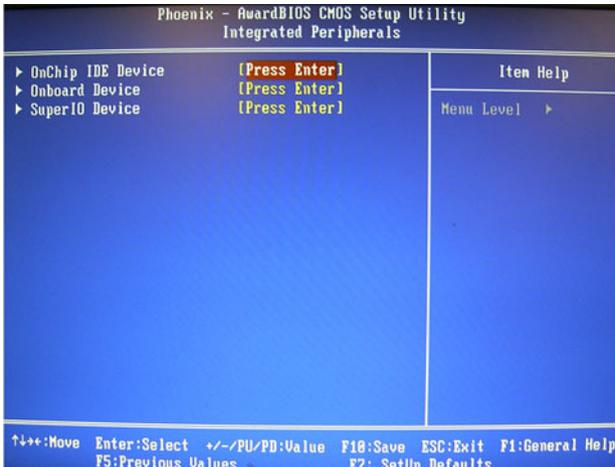


Figure 3.5: Integrated peripherals

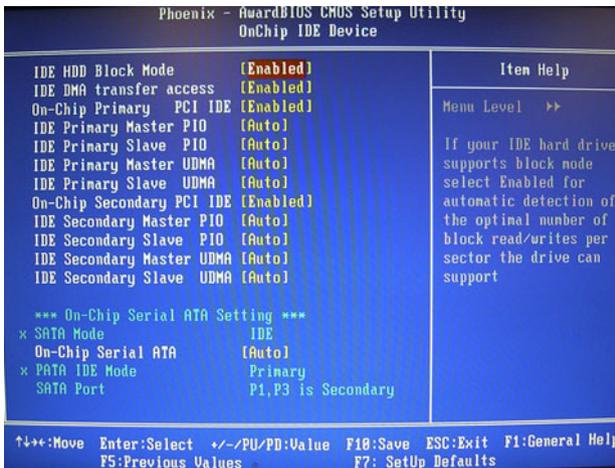


Figure 3.6: On-Chip IDE Device

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 IDE DMA Transfer Access

Use this field to enable or disable IDE DMA transfer access.

3.6.3 On-Chip IDE Device

IDE Primary Master/Slave PIO/UDMA Mode (Auto). The channel has both a master and a slave, making four IDE devices possible. Because two IDE devices 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.

3.6.4 SATA Mode

The setting choices for the SATA Mode are IDE, RAID and AHCI Mode. Select [IDE] if you want to have SATA function as IDE. Select [AHCI] for Advanced Host Controller Interface (AHCI) feature, with improved SATA performance with native command queuing. Select [RAID] to use SATA as RAID function. RAID function is supported on the board if it uses ICH6R. Otherwise, it is not supported.

3.6.5 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 maxes of 4 IDE drives are supported. The "SATA Only" means SATA is operating in legacy mode.

3.6.6 PATA IDE Mode

This item allows you to select parallel ATA channel. The setting option is Secondary only.

3.6.7 SATA Port

This feature allows users to view the SATA port setting. Because the PCA-6009 supports two SATA ports, SATA1 and SATA3, this option will force PATA Mode to Secondary, and display “P0, P2 Secondary”. This configuration is dependent on the chipset datasheet.

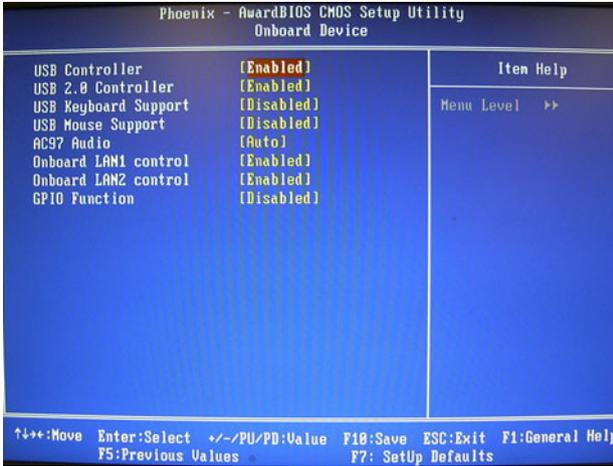


Figure 3.7: Onboard Device

3.6.8 USB Controller

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

3.6.9 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."

3.6.10 USB Keyboard/Mouse Support

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

3.6.11 AC97 Audio

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

3.6.12 Onboard LAN1 Control

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

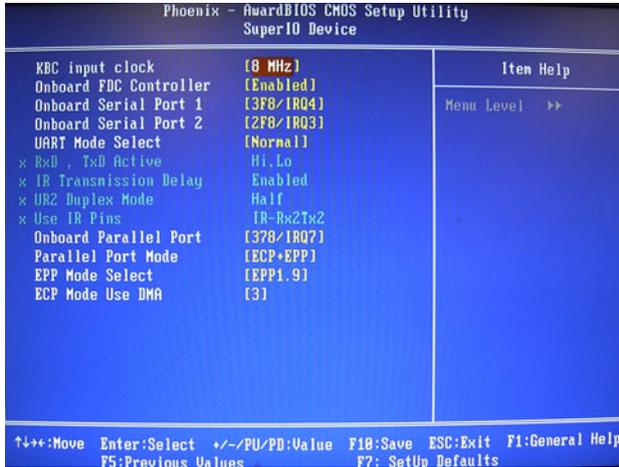


Figure 3.8: Super I/O Device

3.6.13 KBC Input Clock

This BIOS feature allows you to adjust the keyboard interface clock for a better response or to fix a keyboard problem. It is recommended that you select the 16MHz option for a better keyboard response. But if the keyboard performs erratically or fails to initialize, try a lower clock speed.

3.6.14 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.

3.6.15 Onboard Serial Port 1

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

3.6.16 Onboard Serial Port 2

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

3.6.17 UART Mode Select

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

3.6.18 Rx/D, Tx/D Active

This item allows you to determine the active of Rx/D, Tx/D. The Choices: "Hi, Hi," "Lo, Lo," "Lo, Hi," "Hi, Lo."

3.6.19 IR Transmission Delay

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

3.6.20 UR2 Duplex Mode

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

3.6.21 Use IR Pins

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

3.6.22 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.

3.6.23 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.

3.6.24 EPP Mode Select

This field allows you to select EPP port type 1.7 or 1.9. The choices: "EPP1.9", "EPP1.7".

3.6.25 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, you can select DMA channel 1 or DMA channel 3. Leave this field on the default setting.

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.

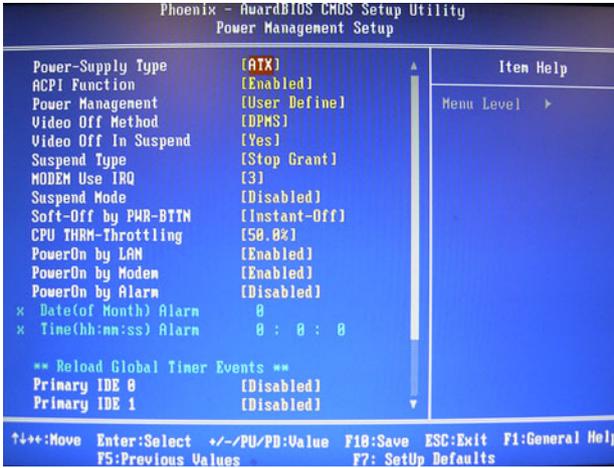


Figure 3.9: Power management setup screen (1)

3.7.1 Power Supply Type

PCA-6009 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 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.

3.7.10 CPU THRM-Throttling

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

3.7.11 PowerOn by Modem

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

3.7.12 PowerOn by LAN

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

3.7.13 PowerOn by Alarm

The Choice : "Enabled", "Disabled".

3.7.14 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".

3.7.15 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".

3.7.16 PCI PIRQ [A-D]#

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

3.7.17 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.

3.8 PnP/PCI Configurations

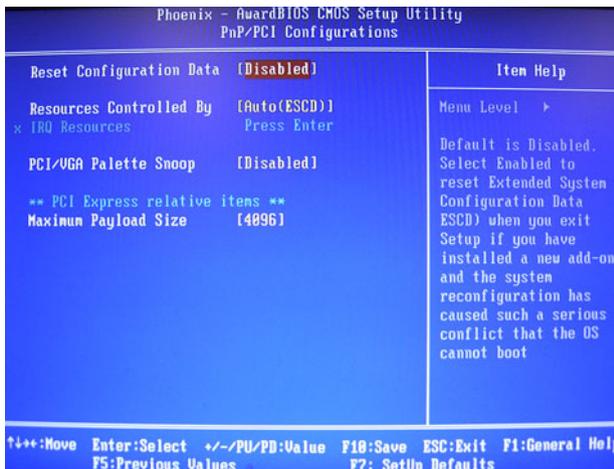


Figure 3.10: PnP/PCI configurations screen

3.8.1 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.

3.8.2 Resources Controlled By

The commands here are "Auto(ESCD)" or "Manual." Choosing "Manual" requires you to choose resources from each following sub-menu.

This shows you the current CPU FAN operating speed.

3.9.5 System FAN Speed

This shows you the current System FAN operating speed.

3.9.6 VCORE and Other Voltages

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

3.9.7 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

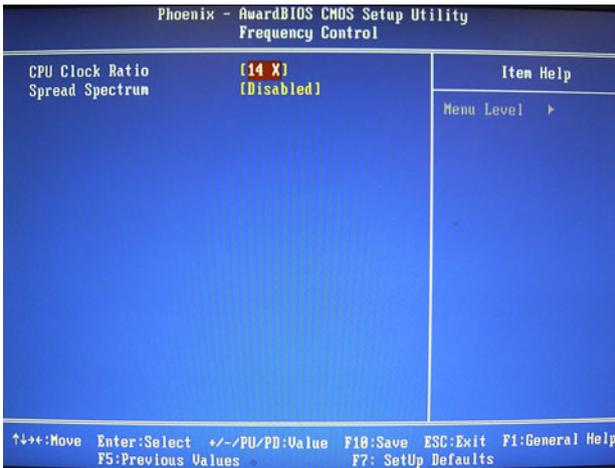


Figure 3.12: Spread Spectrum Control screen

3.10.1 CPU Clock Ratio

Key in a DEC number to set up the CPU Clock Ratio (Min=14; Max=17). This item only shows up in special situations.

3.10.2 Spread Spectrum

This setting allows you to reduce the EMI by modulating the signals the CPU generates so that the spikes are reduced to flatter curves. It achieves this by varying the frequency slightly so that the signal does not use any particular frequency for more than a moment. The choices are: "Disabled," and "Enabled."

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.

CHAPTER **4**

**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-6009 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. .

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
- 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 2000

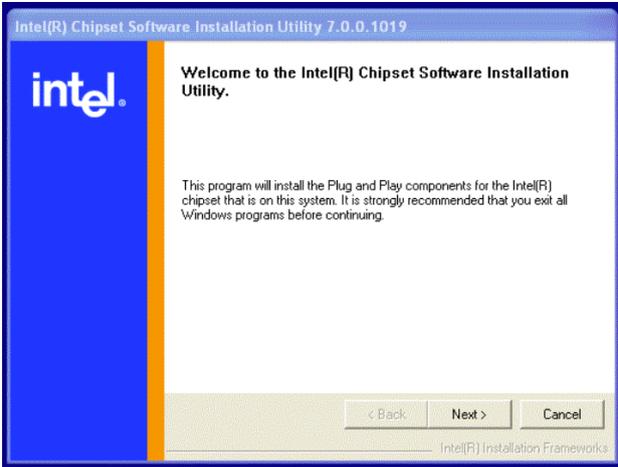
Windows XP

4.3 Windows XP Driver Setup

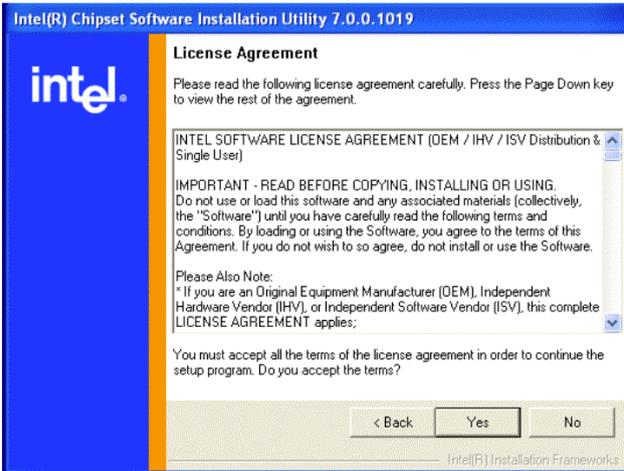
1. Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears. Move the mouse cursor over the "Auto" button under the "CSI UTILITY" heading, a message pops up telling you to install the CSI utility before other device drivers, as shown in the following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



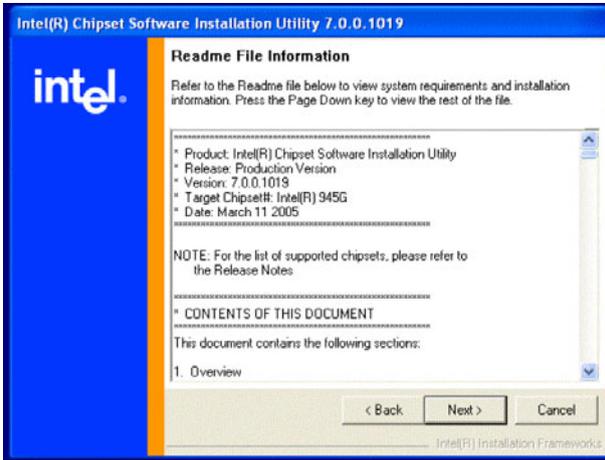
2. Click "Next" when you see the following message.



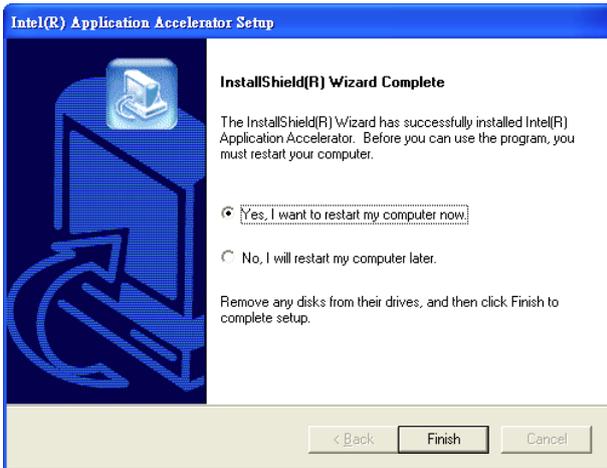
3. Click "Yes" when you see the following message.



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



5. When the following message appears, click "Finish" to complete the installation and restart Windows.



CHAPTER
5

VGA Setup

Chapter 5 VGA Setup

5.1 Introduction

The Intel 915GV integrated graphics controller provides an analog display port and DVI interface through SDVO ports. You need to install the VGA driver to enable the function.

The features include:

- Intel Graphics Media Accelerator 900: Incorporating the latest Microsoft* DirectX*9 support capabilities, it allows software developers to create real-life environments and characters. Dual independent display, enhanced display modes for widescreen flat panels, and optimized 3D support deliver an intense and realistic visual experience without requiring a separate graphics card.
- Intel Serial Digital Video Output (SDVO): The PCA-6009 provides DVI interface through SDVO ports. It supports CRTs via a VGA connector with a maximum pixel clock of 400 MHz (up to 2048x1536 resolution @ 85 Hz refresh rate)

5.2 Windows XP Driver Setup

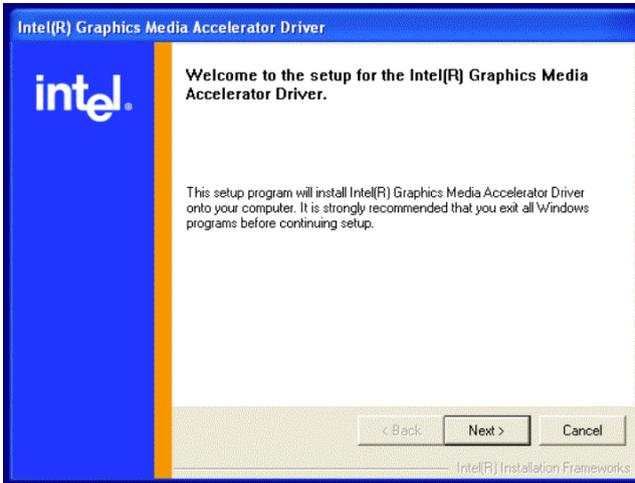
Note: Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 4 for information on installing the CSI utility

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.

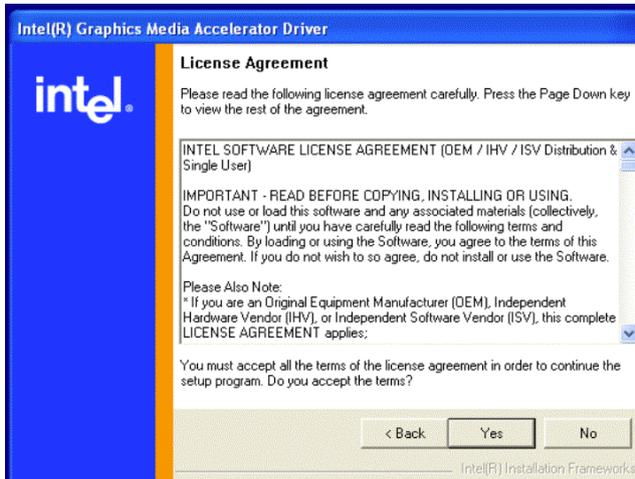


The following installation procedure is for Windows XP. For other operating systems, please do a manual installation.

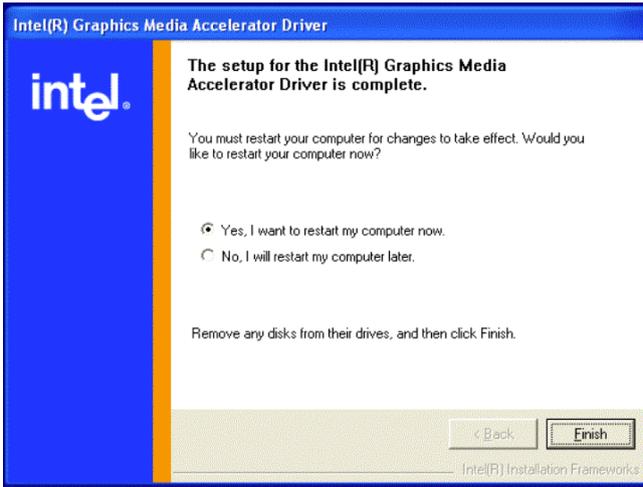
1. Please click on "Next" to continue the installation



2. You will see a welcome window. Please click on "Yes" to continue the installation.



3. Click "Finish" to complete the installation and restart the computer now or later.



CHAPTER
6

LAN Configuration

Chapter 6 LAN Configuration

6.1 Introduction

The PCA-6009 features single/dual Gigabit Ethernet network interface. With the Broadcom BCM5721 GbE controller designed-in, PCA-6009 implements the PCI Express host interface (PCI-E X1) in LAN connection with the maximum throughput of 2Gbps for heavy-duty industrial network application.

6.2 Features

Integrated 10/100/100 BASE-T transceiver

1. 10/100/1000 BASE-T triple-speed MAC
2. High-speed RISC core with 24-KB cache
3. On-chip voltage regulation
4. Supporting Wake-on-LAN (WOL) function
5. PCI Express X1 host interface

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-6009's Broadcom BCM5721 Gigabit integrated controller 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 (Broadcom BCM5721)

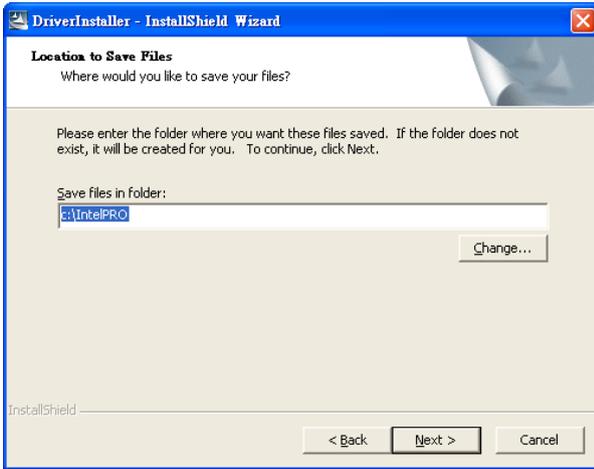
1. Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure. Under the "LAN Drivers" heading, click on the "Manual" to open file manager, then click "SETUP.EXE" to run the installation procedure.



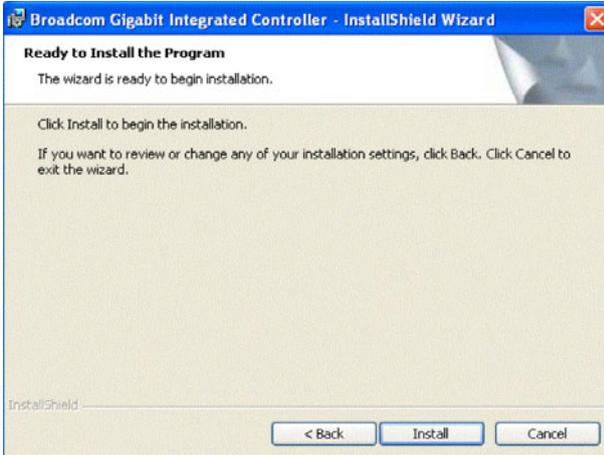
2. Please click on "Next" to continue the installation



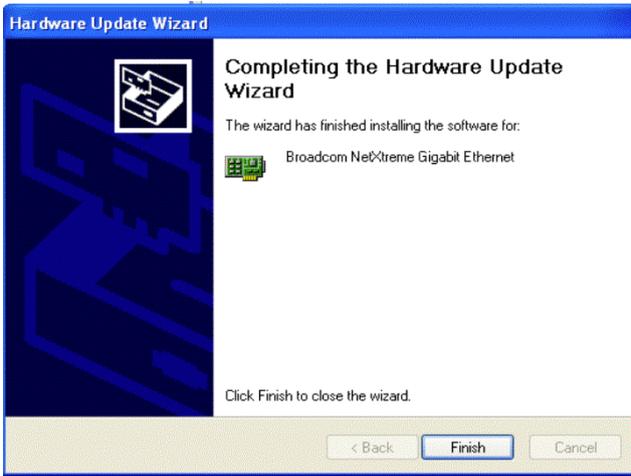
3. You will see the license agreement. Please click on "next" to continue the installation.



4. Click "Install" to continue.



5. Click "Finish" to complete the installation.



CHAPTER
7

USB 2.0 Configuration

Chapter 7 USB 2.0 Configuration

7.1 Introduction

The PCA-6009 is designed with Intel ICH6 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-6009 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.*

CHAPTER

8

Onboard Security Setup

Chapter 8 Onboard Security Setup

8.1 Introduction

The PCA-6009's hardware monitor is designed with Winbond W83627HG. Onboard security (OBS) functions monitor key hardware. They help you maintain your system's stability and durability. The PCA-6009 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:

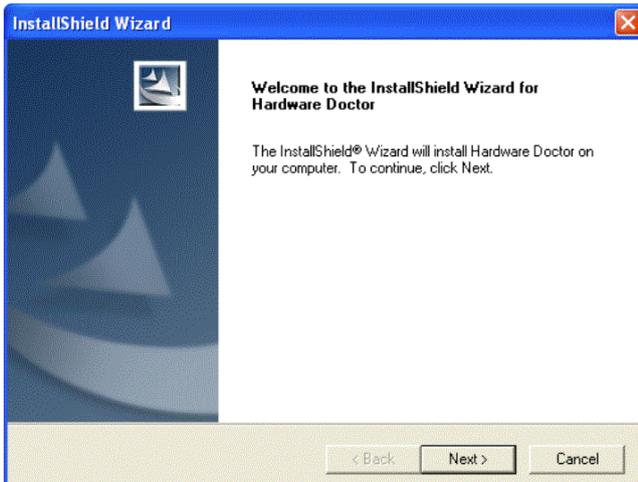
- Main voltage: -5 V, -12 V.

8.2 Windows XP Driver Setup

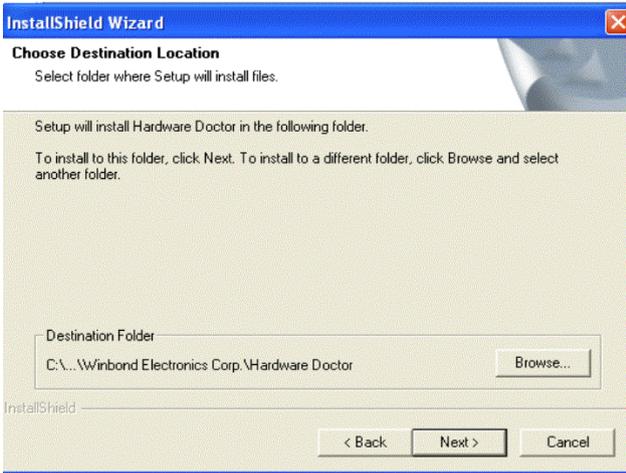
1. Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure. Click on the "Install" button under the "OBS DRIVERS" heading.



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



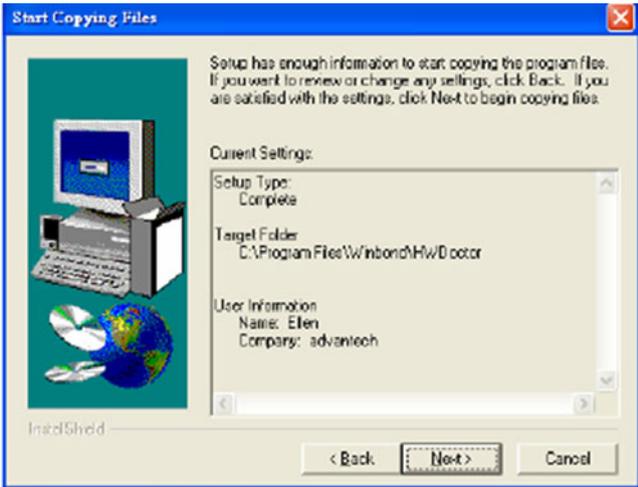
3. Click "Next" when you see the following message.



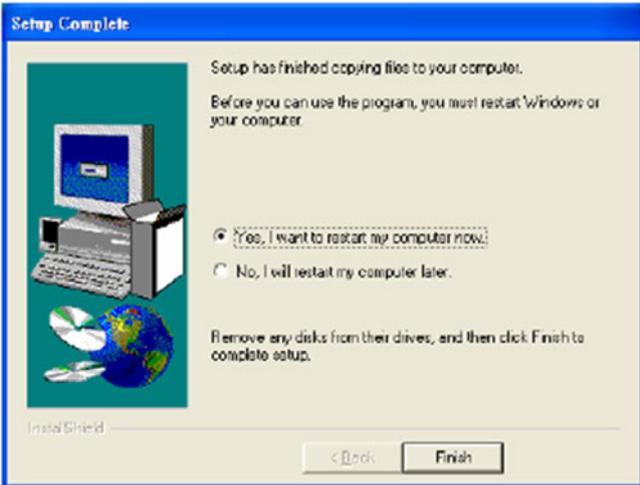
4. Click "Next" when you see the following message.



5. Click "Finish" to complete the installation



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



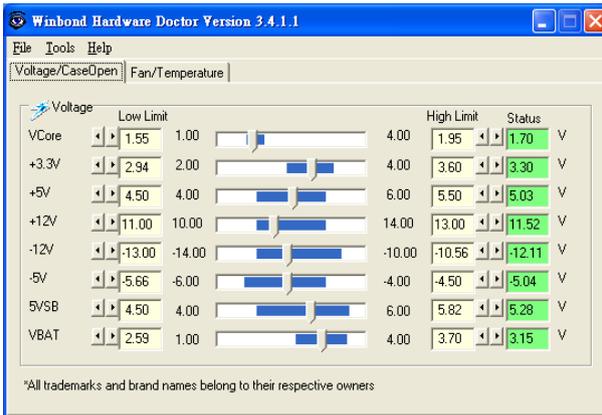
8.3 Using the OBS Hardware Doctor Utility

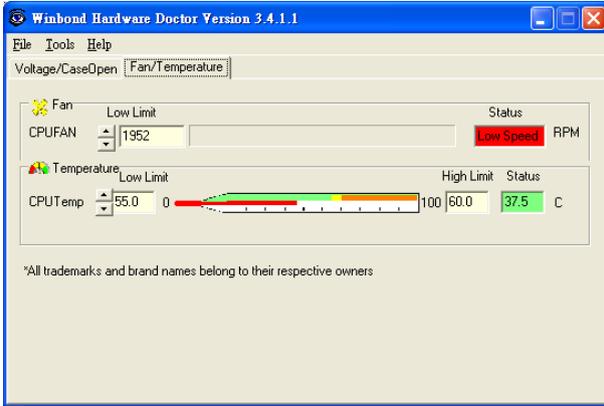
After completing the setup, all the OBS functions are permanently enabled. When a monitored reading exceeds safe limits, a warning message will be displayed and an error beep tone will activate to attract your attention.

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 "Program," select "Winbond HWDDoctor" 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.





Appendix

A

Programming the Watchdog Timer

Appendix A Programming the watchdog

A.1 Programming the Watchdog Timer

The PCA-6009'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 W83627HG. 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).

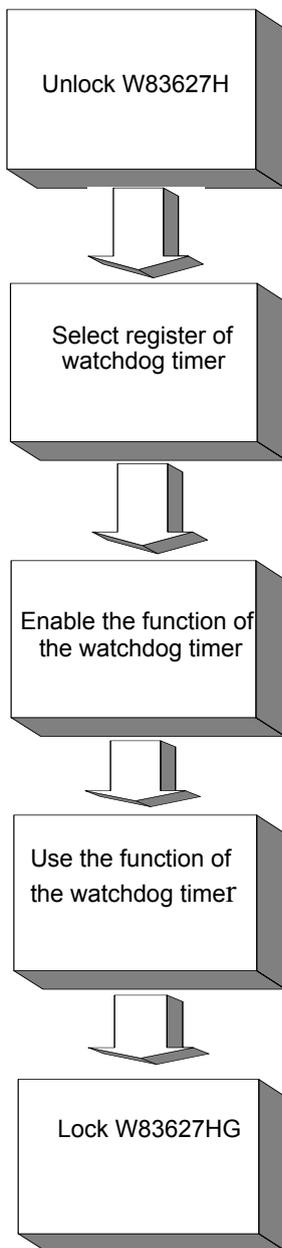


Table A.1: Watchdog Timer Registers

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 theW83627HG
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

A.1.4 Example Program

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

```

;-----
Mov dx,2eh                ; Unlock W83627HG
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 W83627HG
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 W83627HG
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 W83627HG
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 W83627HG
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 W83627HG
Mov al,0aah
Out dx,al

```

Appendix

B

I/O Pin Assignments

Appendix B Pin Assignments

B.1 IDE Hard Drive Connector (CN1)

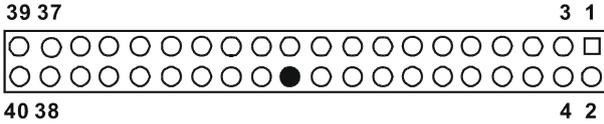


Table B.1: IDE hard drive connector (CN1, CN2)

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)

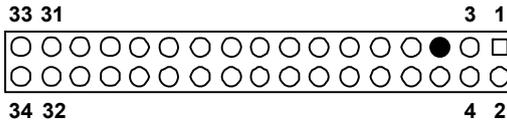


Table B.2: Floppy drive connector (CN3)

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)

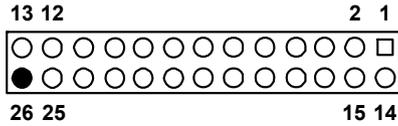


Table B.3: Parallel port connector (CN4)

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)

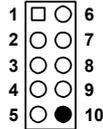


Table B.4: USB1/USB2 connector (CN6)

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)

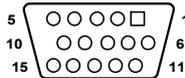


Table B.5: VGA connector (CN7)

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 COM1/COM2 RS-232 Serial Port (CN9/CN10)

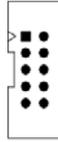


Table B.6: COM1/2 Serial Port (CN9/CN10)

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

B.7 Keyboard and Mouse Connector (CN11)

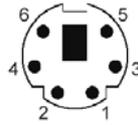


Table B.7: Keyboard and mouse connector (CN11)

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

B.8 External Keyboard Connector (CN68)



Table B.8: External keyboard connector (CN12)

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

B.9 CPU Fan Power Connector (CN14)

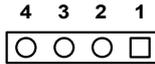


Table B.9: CPU Fan Power Connector (CN68)

Pin	Signal
1	GND
2	+12V
3	FANIO
4	FAMPWM

B.10 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.

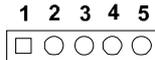


Table B.10: Power LED and keylock conn (CN16)

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

B.11 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.

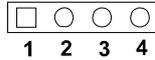


Table B.11: External Speaker Connector (CN17)

Pin	Function
1	Internal buzzer
2	NC
3	Internal buzzer
4	Speaker out

B.12 Reset Connector (CN18)



Table B.12: Reset connector (CN18)

Pin	Signal
1	RESET
2	GND

B.13 HDD LED Connector (CN19)



Table B.13: HDD LED connector (CN19)

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

B.14 ATX Feature Connector (CN20)



Table B.14: ATX feature connector (CN20)

Pin	Signal
1	PS-ON
2	VCC
3	VCCSB

B.15 ATX Soft Power Switch (CN21)



Table B.15: ATX soft power switch (CN21)

Pin	Signal
1	5VSB
2	PWR-BTN

B.16 H/W Monitor Alarm (CN22)



Table B.16: H/W monitor alarm (CN22)

Pin	Signal
1	Enable OBS alarm
2	Disable OBS alarm

B.17 AC-97 Audio Interface (CN43)

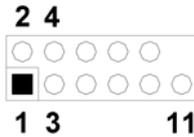


Table B.17: AC-97 Audio Interface (CN43)

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.18 Front Panel LAN Indicator connector (CN65)



Table B.18: Front Panel LAN Indicator connector (CN65)

Pin	Signal	Pin	Signal
1	LAN1_LINK N/C	6	LAN2_LINK1000
2	LAN2_LINK N/C	7	LAN1_LINK100
3	LAN1_ACT	8	LAN2_LINK100
4	LAN2_ACT	9	3VDUAL
5	LAN1_LINK1000		

B.19 System I/O Ports

Table B.19: 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.20 DMA Channel Assignments

Table B.20: 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.21 Interrupt Assignments

Table B.21: 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.22 1st MB Memory Map

Table B.22: 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.23 PCI Bus Map

Table B.23: PCI bus map

Function Signals	Device ID	INT# pin	GNT	REQ
Onboard LAN1		INT E		
Onboard LAN2	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

