User Manual

PCE-7214

Dual Socket 771 Intel®
Quad-Core/Dual-Core

Xeon® Processor Card with
PCI Express / VGA /
Dual Gigabit LAN / FSB 1333 MHz

Trusted ePlatform Services

ADVANTECH

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Certifications

CE
FCC Class A

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.

Product Warranty (2 years)

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.

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

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen 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 merchandise 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.

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

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

We have carefully inspected the PCE-7214 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt.

As you unpack the PCE-7214, 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.

Initial Inspection

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

- 1 PCE-7214 Dual Intel® Xeon® / LV Xeon® processor-based single board computer
- 1 PCE-7214 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: 1700003194
- 2 Serial ATA HDD power cable   P/N: 1703150102
- 1 Printer (parallel) port & COM port cable kit   P/N: 1701260305
- 1 Dual USB cable kit   P/N: 1700008461
- 1 Y cable for PS/2 keyboard and PS/2 mouse   P/N: 1700060202
- 1 Jumper Pack   P/N: 9689000068
- 1 User note for full-sized CPU card
- 1 Warranty card

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

We have carefully inspected the PCE-7214 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt.

As you unpack the PCE-7214, 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.

> *Note!* Purchasing PCE-7214's proprietary CPU cooler(s) from Advantech is a must. Other brands of CPU coolers are NOT compatible with PCE-7214.
>
> *1. Advantech P/N 1750000282: Xeon CPU Cooler for 110W TDP CPU*
>
> *2. Advantech P/N 1750001660: Low Profile Xeon CPU Cooler for 55W TDP CPU*

Verified CPU List

CPU Family	sSpec.	Core Stepping	Power	Vcore	FSB	Mfg. Tech	HT	L2 cache
XEON-2.33 G (5148)	SLABH	B2	40W	1.150V-1.250V	1333	65nm	Y	4MB
XEON-2 G (5130)	SLAGC	G0	65W	1.275V	1333	65nm	Y	4MB
XEON-2 G (5405)	SLAP2	C0	80W	0.95V - 1.225V	1333	45nm	Y	12MB
XEON-1.60 G(5310)	SL9XR	B3	80W	1.325V max	1066	65nm	Y	8MB

Verified Memory List

Brand	Size	Speed	Type	ECC	Vendor PN	Memory
Transcend RoHS)	2GB	DDR2 533	Register DDR2	Y	TS256MQR72V5U	Micron 7WE17 D9HNL
	1GB	DDR2 667	Register DDR2	Y	TS128MQR72V6J	ELPIDA E5108AG-6E-E
	2GB	DDR2 667	Register DDR2	Y	TS256MQR72V6U	SAMSUNG K4T1G084QA
	4GB	DDR2 667	Register DDR2	Y	TS512MQR72V6T	ELPIDA E1104AOSE-6E-E

Certification and Safety Instructions

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.*

Contents

Appendix C   Programming the GPIO and Watchdog Timer 77

Chapter 1

Hardware
Configuration

1.1 Introduction

PCE-7214 is a server-grade PICMG® 1.3 full-sized system host board (SHB) that features dual Intel® Quad/Dual-Core Xeon computing power. It is an ideal solution for industrial HPC (high-performance PC) applications such as medical image processing, environment monitoring and telecommunications.

PCE-7214 is designed with an Intel® E5100 server chipset and has two LGA771 sockets for supporting dual Intel® Quad-Core or Dual-Core Xeon processors with 1333 MHz FSB and DDR2 667 MHz ECC and registered SDRAM up to 32 GB. High computing power makes it suitable for today's industrial applications that need intense image or data processing.

The PCIe lanes from PCE-7214 north bridge can be flexibly configured as PCIe x16, x 8 or x4 ports, plus four PCIe x 1 lanes from the south bridge, the PCE-7214 can be used with all Advantech PCE-5000 and PCE-7000 series backplanes for utilizing PCIe x16, x8, x4 and x 1 add-on cards. With supporting 30 Advantech backplanes, the PCI, PCI-X, and PCIe expansion options are both robust and numerous.

PCE-7214 is rich in I/O interfaces: it has six SATA 2 ports with RAID 0, 1, 5, and 10, providing high data transmission rates (300 MB/sec) and super-reliable read/write performance. The two serial ports (COM ports) can be used for device control applications. Dual Gigabit Ethernet LANs offer strong networking capability.

PCE-7214 has a PCIe x 1 interface XGI Volari Z11 graphics controller with 64 MB independent frame buffer memory, featuring low power and fan less on-board graphic solution, PCE-7214 provides targeted performance and reliable graphic capability for industrial server application.

In addition to board-level products, Advantech also offers rack-mount and wall-mount chassis options; with PCE-7214 joining the product portfolio, Advantech now can provide whole new high performance system-level solutions for industrial customers.

With outstanding performance and flexible expansion capability, PCE-7214 is an ideal computing platform for modern industrial HPC applications.

1.2 Features

- Compliance with PICMG® 1.3
- Support single/dual LGA771 socket Intel® Xeon® / LV Xeon® FSB 1333 Mhz processors
- Support Dual Channel DDR2 533/667 ECC Registered SDRAM up to 32 GB
- Two PCI Express X 8 or one x 16, and One X4 to backplane (Compatible with Advantech PCE-7000 and PCE-5000 series backplanes)
- 4 PCI 32bits / 33 MHz masters to backplane
- Intel® 82566DM/82573V Dual Gigabit Ethernet via dedicated PCI Express X1 port
- Onboard XGI® Volari® Z11 with 64 MB frame buffer memory
- 6 SATA HDDs Support S/W SATA RAID 0, 1, 5, 10
- 8 USB 2.0 ports on CPU card and 4 ones on backplane
- Remote management with SNMP-1000-B1 modules
- CMOS automatic back and prevent accidental data loss of BIOS setup

1.3 Specifications

1.3.1 System

- **CPU:** Dual Intel® 1333 MHz Quad-Core / Dual-Core Xeon® or LV Xeon® processors
- **L2 Cache:** CPU built-in 12 MB / 6 MB L2 cache
- **BIOS:** AMI Flash BIOS (32 Mb Flash Memory)
- **System Chipset:** Intel® E5100 + ICH9R
- **SATA/EIDE hard disk drive interface:** Supports up to 6 independent Serial ATA hard drives (up to 300 MB/s) with software RAID 0, 1, 5, 10 as well as one IDE port (maximum 2 devices)
- **Floppy disk drive interface:** Supports up to two floppy disk drives, $5^1/_4$ (360 KB and 1.2 MB) and/or $3^1/_2$ (720 KB, 1.44 MB). BIOS enabled/disabled.

1.3.2 Memory

- **RAM:** Up to 32 GB in four 240-pin DIMM sockets. Supports Dual-channel DDR2 533/667 MHz (ECC Registered DIMM).

> *Note!*   *PCE-7214 is NOT compatible with DDR2 memory modules that DO NOT have ECC and register functions. I.E., DDR2 memory modules MUST have ECC and register functions.*

1.3.3 Input/Output

- **Bus interface:** PICMG® 1.3 SHB Express compliant bus interface
- **PCI Express Bus:** Two x8 / one x 16 & one x4 to backplane
- **PCI Bus:** Four 32bit / 33 MHz PCI masters to backplane
- **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
- **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
- **High Definition Audio:** PCE-7214 can provide audio function with the optional audio extension module PCA-AUDIO-HDA1E
- **USB ports:** PCE-7214 supports up to 12 USB 2.0 ports with transmission rates up to 480Mbps; 8 USB ports on the CPU card, 4 USB ports on the backplane.

1.3.4 Graphic interface

- **Controller:** XGI Volari Z11
- **VRAM:** 64 MB frame buffer memory on chip
- **Resolution:** 1600 x 1200 at 70 Hz VGA output;15 pin D-Sub connector x1

1.3.5 Ethernet LAN

- Supports dual10/100/1000 Mbps Ethernet networking
- **Controller:** LAN 1: Intel® 82566DM; LAN 2: Intel® 82573V

1.3.6 Industrial features

- **Watchdog timer:** Can generate a system reset. 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, 3.3 V, +5 VSBY
- **Power consumption:**

  CPU: Two Intel® Xeon® 2.0 GHz / 4M/ 1333 MHz FSB / 65W TDP

  MEMORY: DDR2 2GB *4

  Test program, Intel® Max power 100% + BurnIn test 4.0

+12 V	9.7 A
+5 V	7.4 A
+3.3 V	2.5 A
+5 VSB	0.71 A
-12 V	0 A
-5 V	0 A

- **Board size:** 338 x 122 mm (13.3 x 4.8 inch)
- **Board weight:** 0.5 kg (1.2 lb)

1.4 Jumpers and Connectors

Connectors on the PCE-7214 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.

Below, Table 1.1 and Table 1.2 list the jumper and connector functions. 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: Jumper descriptions	
Label	**Function**
CMOS1	CMOS Clear
JWDT1	Watchdog timer output option

Table 1.2: Connector descriptions	
Label	**Function**
IDE1	Primary IDE connector
FDD1	Floppy drive connector
LPT1	Parallel port
VGA1	VGA connector
COM1	Serial port:COM1 (9-pin connector)
COM2	Serial port:COM2 (9-pin connector)
KBMS1	PS/2 keyboard and mouse connector
KBMS2	External keyboard/mouse pin header
JIR1	Infrared port pin header
CPUFAN1	CPU1 FAN connector
CPUFAN2	CPU2 FAN connector
JFP1	Power and Reset Button connector
JFP2	HDD LED / SNMP(SM bus) / Speaker connector
JFP3	Power LED and keyboard lock connector
JOBS1	HW Monitor Alarm Close: Enable OBS Alarm Open: Disable OBS Alarm
LAN12	Dual Giga LAN RJ45 connector with Transformer
HDAUD1	AC'97 Link connector
SATA1	Serial ATA1
SATA2	Serial ATA2
SATA3	Serial ATA3
SATA4	Serial ATA4
SATA5	Serial ATA5
SATA6	Serial ATA6
USB 12	USB port 1 and port 2
USB 34	USB port 3 and port 4
USB 56	USB port 5 and port 6
USB 78	USB port 7 and port 8
LANLED1	LAN1 and LAN2 LED connector
GPIO1	GPIO header

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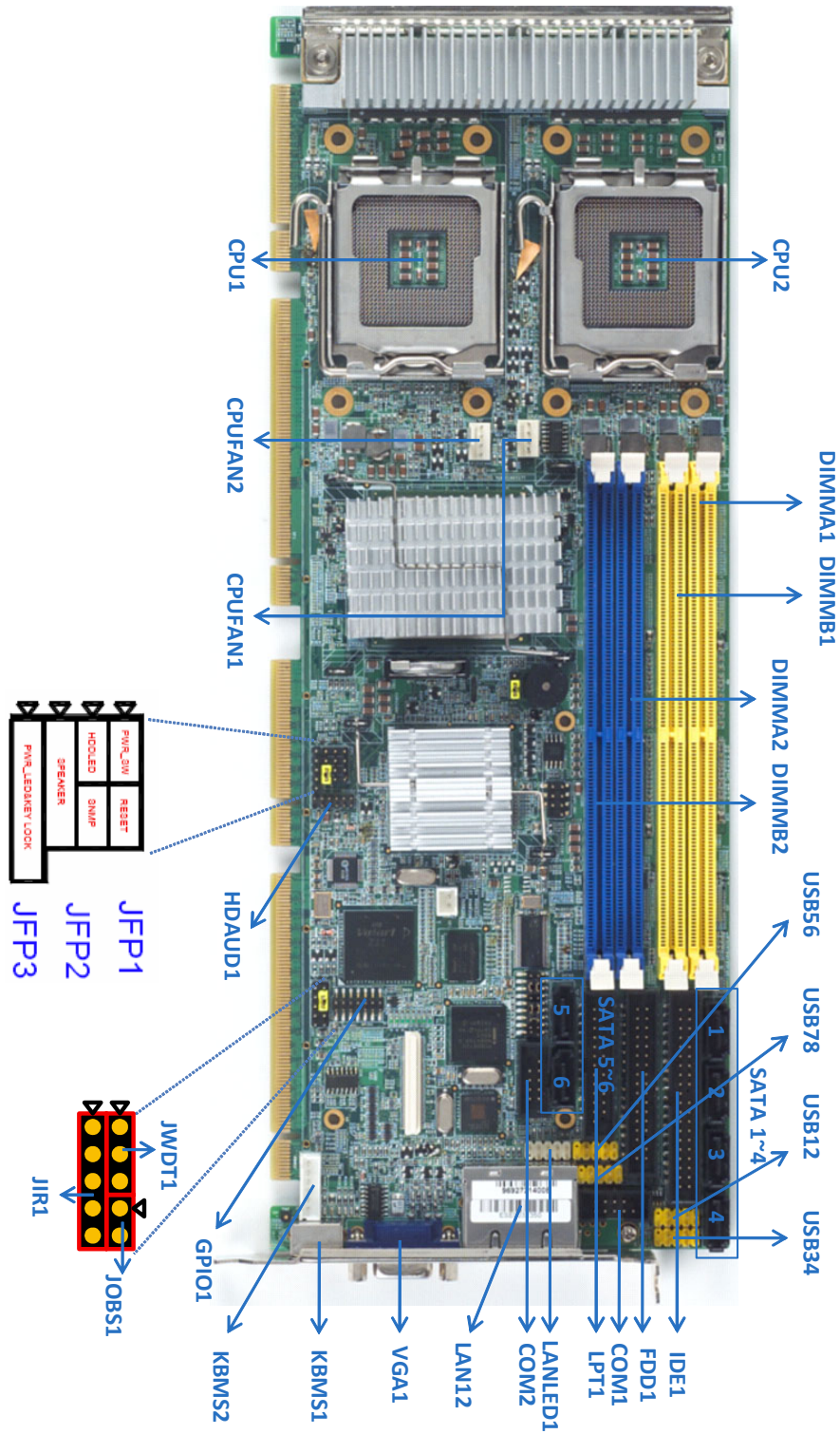
Figure 1.1 Jumper and Connector locations

1.6 PCE-7214 Block Diagram
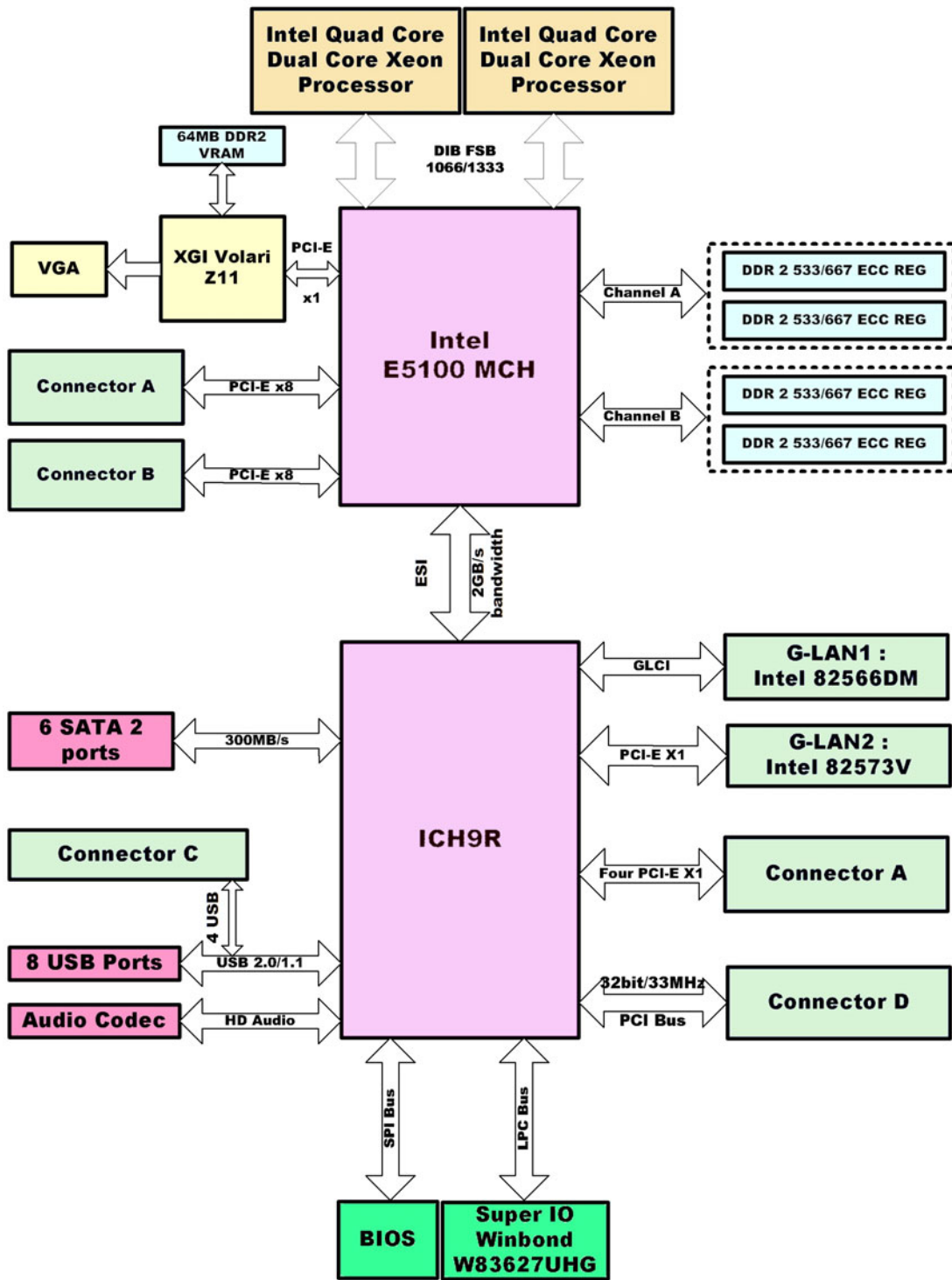
Figure 1.2 Block Diagram

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 discharges. 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.*

Note! *Before install your PCE-7214 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 System Memory

The PCE-7214 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 using dual channel mode to provide optimized performance. All these sockets use ECC registered DDR2-533/667 SDRAM. The maximum memory size is up to 32 GB.

1.9 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.

1.10 Processor Installation

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

> **Note!** Owing to a limitation of the Intel® E5100 chipset, when you only use single CPU on the PCE-7214, the CPU has to be installed in the CPU1 socket. Otherwise the system cannot boot up normally.

> **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.

1. Make sure the socket LGA771 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.
4. PCE-7214 accessory includes two CPU heat sink, please follow the installation guide in the heat sink Box to install it properly.CP

1.11 CPU Cooler Installation

Please ensure that the CPU cooler included with the PCE-7214 is installed as follows:

> **Note!**
>
> Purchasing PCE-7214's proprietary CPU cooler(s) from Advantech is a must. Other brands of CPU coolers are NOT compatible with PCE-7214.
>
> 1. Advantech P/N 1750000282: Xeon CPU Cooler for 110W TDP CPU
> 2. Advantech P/N 1750001660: Low Profile Xeon CPU Cooler for 55W TDP CPU
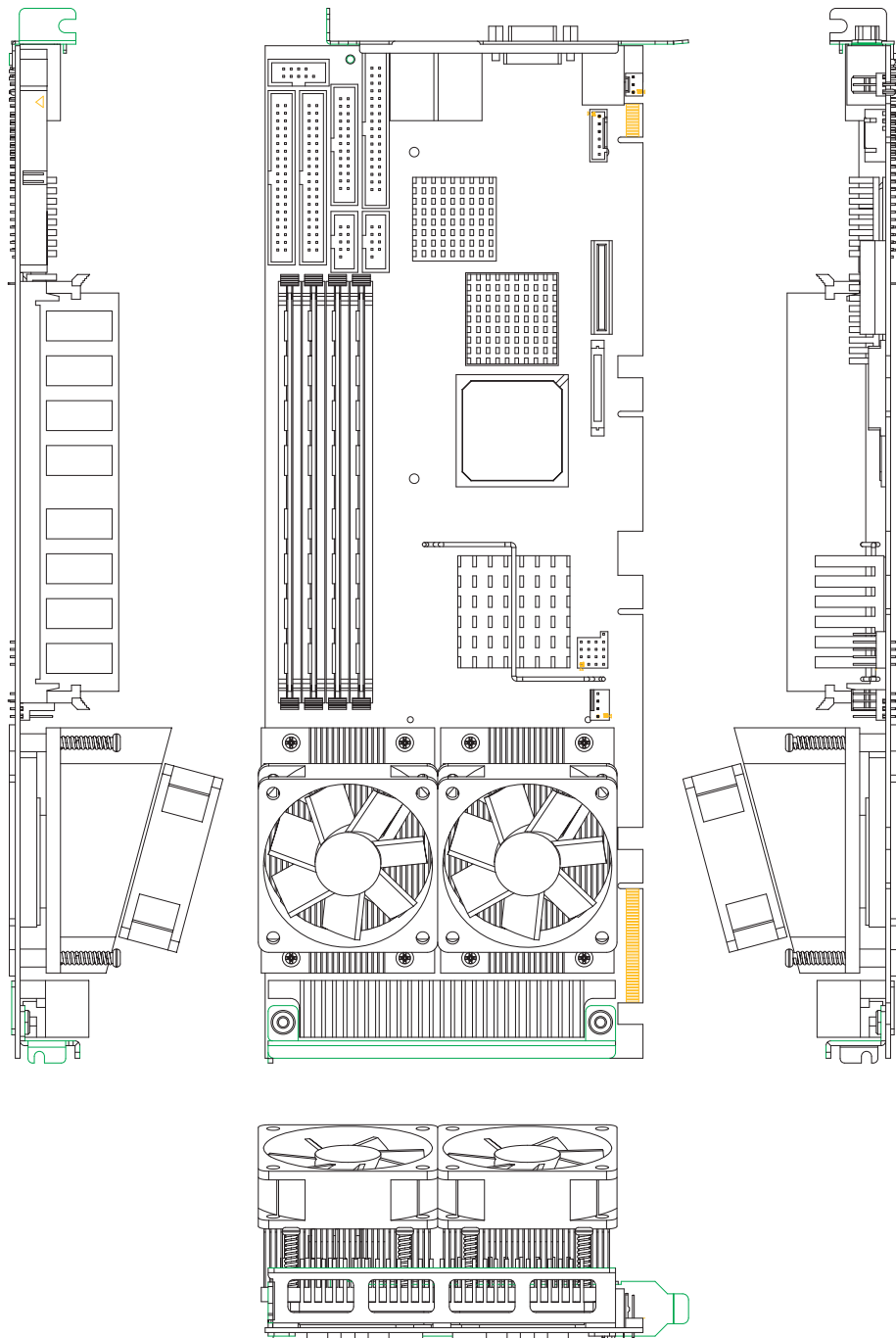
Figure 1.3 CPU Cooler Installation

Chapter 2

Connecting Peripherals & Jumper Settings

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.

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.

2.2 IDE Connector (IDE1)
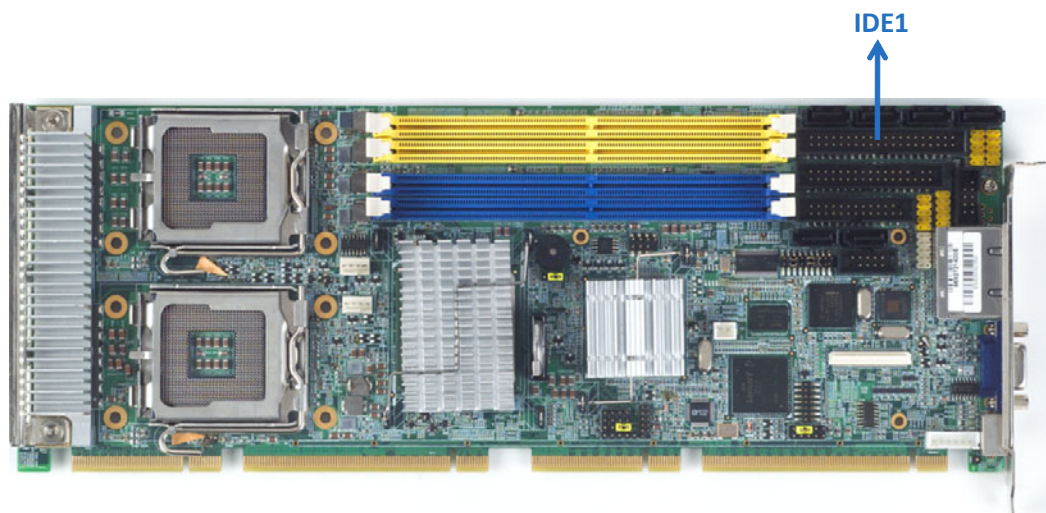
Figure 2.1 PCE-7214 IDE1 location

You can attach up to two IDE (Integrated Drive Electronics) drives to the PCE-7214's built-in controller. The primary 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 IDE1 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.

2.3   Floppy Drive Connector (FDD1)
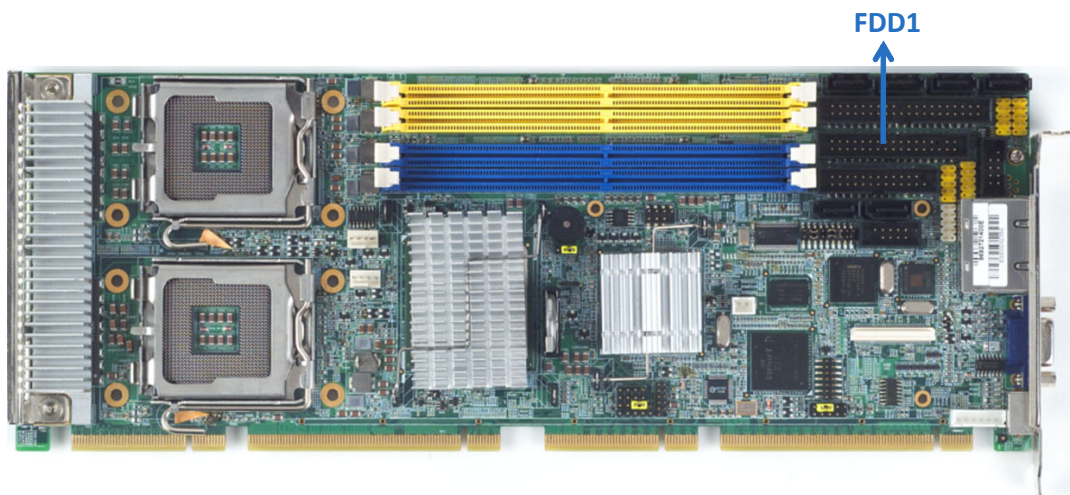
FDD1

Figure 2.2 PCE-7214 FDD1 location

You can attach up to two floppy disk drives to the PCE-7214'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 (LPT1)
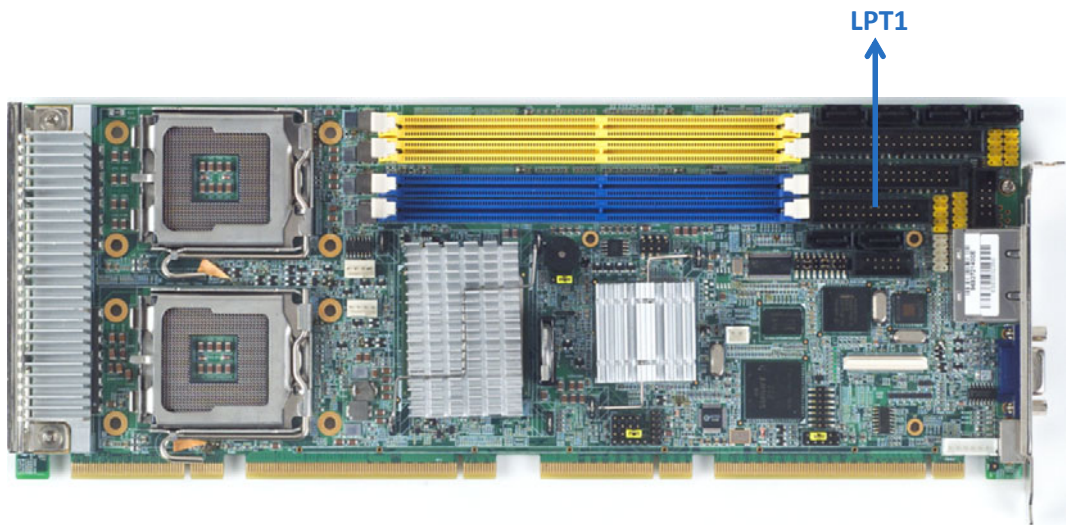
Figure 2.3 PCE-7214 LPT1 location

The parallel port is normally used to connect the single board computer to a printer. The PCE-7214 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, LPT1. 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 LPT1 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 LPT1. Pin 1 is on the upper right side of LPT1.

2.5 VGA Connector (VGA1)
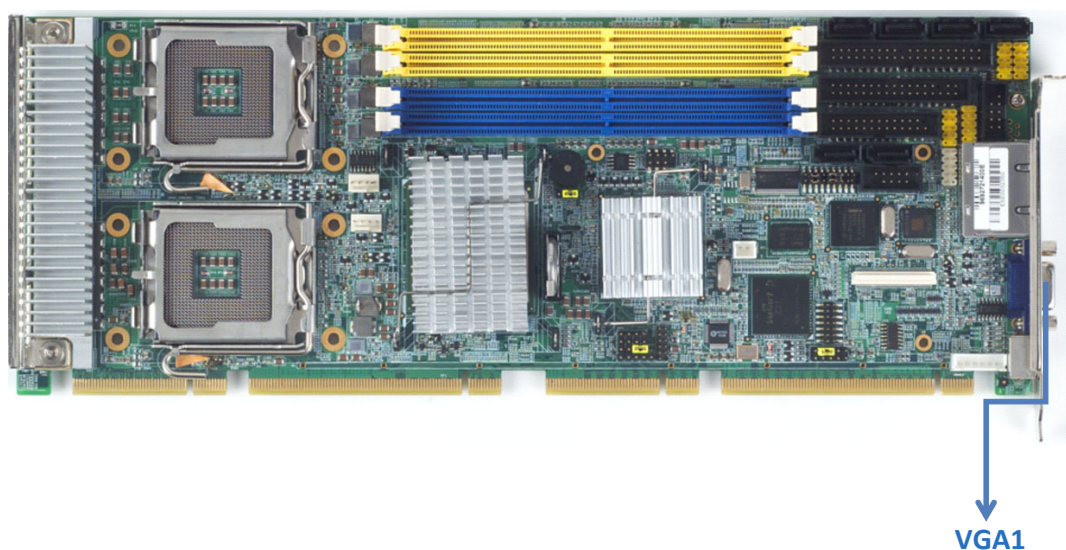
Figure 2.4 VGA Connector (VGA1)

The PCE-7214 includes a VGA interface that can drive conventional CRT displays. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector VGA1 are detailed in Appendix B.

2.6 Serial Ports (COM1, COM2)
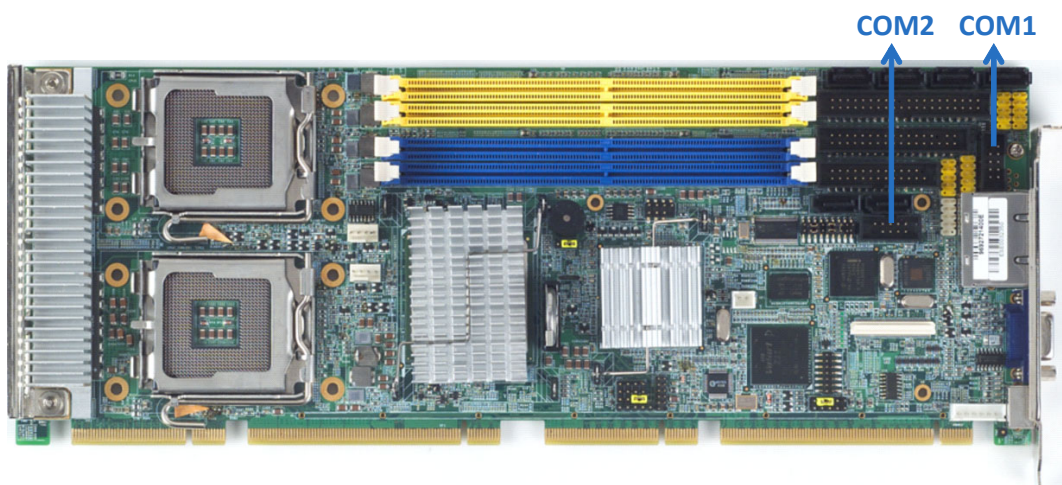
Figure 2.5 Serial Ports (COM1, COM2)

The PCE-7214 offers two serial ports COM1 and COM2. These ports can connect to serial devices, such as a mouse or to a communications network.

The IRQ and address ranges for all 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.

2.7 PS/2 Keyboard/Mouse Connector (KBMS1)
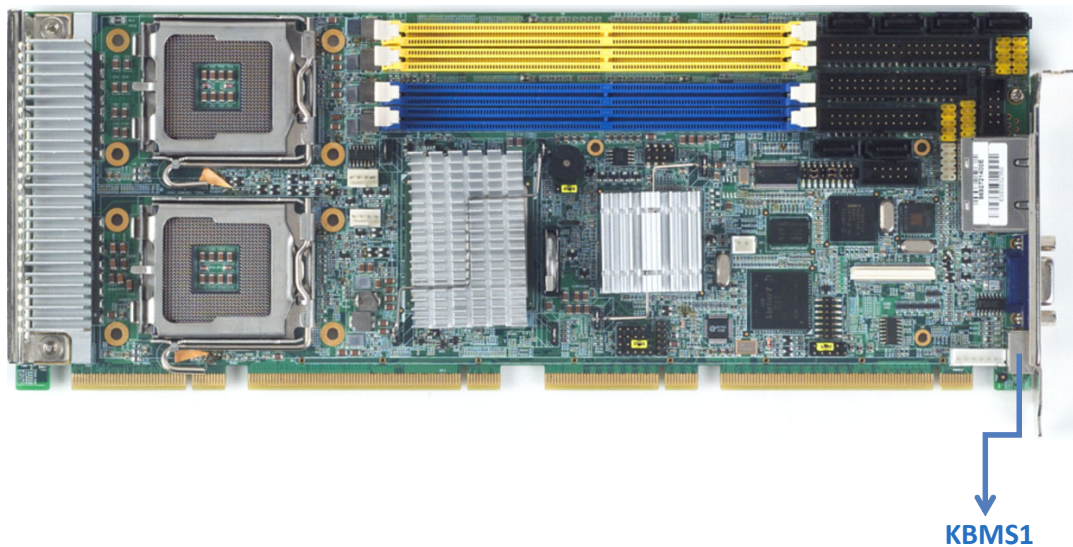
Figure 2.6 PS/2 Keyboard/Mouse Connector (KBMS1)

One 6-pin mini-DIN connector (KBMS1) on the card mounting bracket provides connection to a PS/2 keyboard or a PS/2 mouse, respectively. KBMS1 can also be connected to an adapter cable (P/N: 1700060202) for connecting to both a PS/2 keyboard and a PS/2 mouse.

2.8 External Keyboard Pin Header (KBMS2)
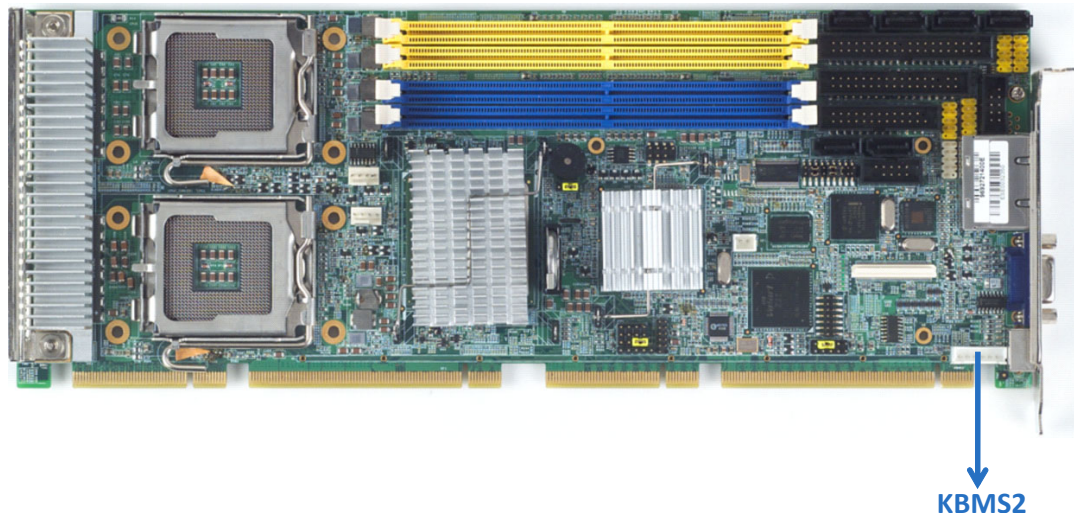
Figure 2.7 External Keyboard Connector (KBMS2)

In addition to the PS/2 mouse/keyboard connector on the PCE-7214's rear plate, there is also an extra onboard external keyboard pin header. This gives system integrators greater design flexibility.

2.9 CPU Fan Connectors (CPUFAN1, CPUFAN2)
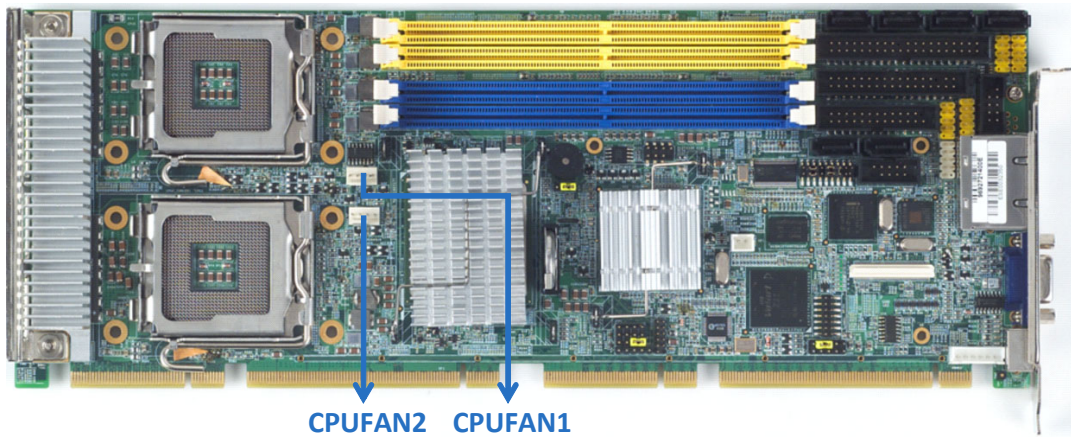
CPUFAN2   CPUFAN1

Figure 2.8 CPU Fan Connectors (CPUFAN1, CPUFAN2)

If a fan is used, these connectors support cooling fans of 12V/1A (12W) or less.

2.10 Front Panel Connectors (JFP1, JFP2, JFP3)

PWR_SW	RESET	JFP1
HDDLED	SNMP	JFP2
SPEAKER		
PWR_LED&KEY LOCK		JFP3
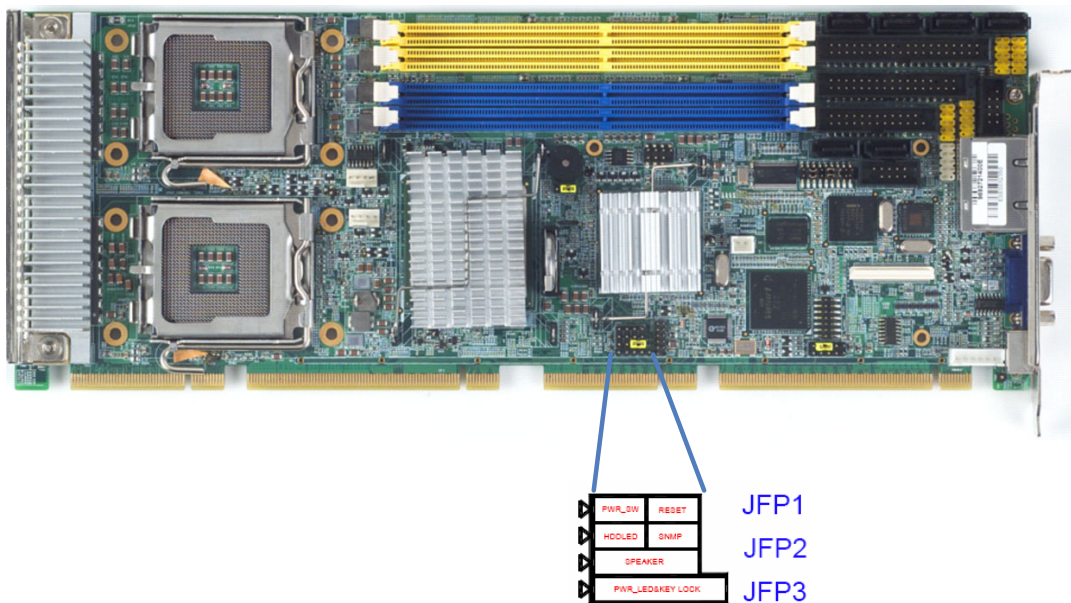
Figure 2.9 Front Panel Connectors (JFP1, JFP2, JFP3)

There are several external switches to monitor and control the PCE-7214.

PWR_SW	RESET	JFP1
HDDLED	SNMP	JFP2
SPEAKER		
PWR_LED&KEY LOCK		JFP3
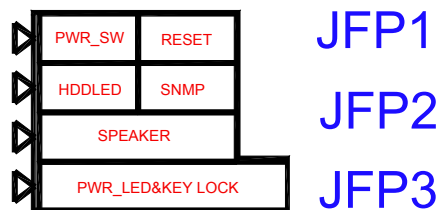
Figure 2.10 Detail (JFP1, JFP2, JFP3)

2.10.1 ATX soft power switch (JFP1 / PWR_SW)

If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to (JFP1 / PWR_SW). This connection enables you to turn your computer on and off.

2.10.2 2.12.2 Reset (JFP1 / RESET)

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

2.10.3 HDD LED (JFP2 / HDDLED)

You can connect an LED to connector (JFP2 / HDDLED) to indicate when the HDD is active.

2.10.4 SM Bus Connector (JFP2 / SNMP)

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.

(JFP2 / SNMP) 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.

2.10.5 External speaker (JFP2 / SPEAKER)

(JFP2 / SPEAKER) is a 4-pin connector for an external speaker. If there is no external speaker, the PCE-7214 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 3-4 as closed.

2.10.6 Power LED and keyboard lock connector (JFP3 / PWR_LED&KEY LOCK)

(JFP3 / PWR_LED&KEY LOCK) is a 5-pin connector for the power on LED and Key Lock function. Refer to Appendix B for detailed information on the pin assignments. The Power LED cable should be connected to pin 1-3. The key lock button cable should be connected to pin 4-5. There are 3 modes for the power supply connection. The first is "ATX power mode", system is on/off by a tentative power button. The second is "AT Power Mode", system is on/off by the switch of the Power supply. The third is another "AT Power Mode" which is using the front panel power switch. The power LED status is indicated as following table:

Table 2.1: ATX power supply LED status (No support for AT power)			
Power mode	LED (ATX Power mode) (On/off by tentative button)	LED (AT Power mode) (On/off by switch of Power supply)	LED (AT Power mode) (On/off by front panel Switch)
PSON1 (On Back-plane Jumper setting)	2-3 pin closed	1-2 pin closed	Connect 1-2 pin cable with switch
System On	On	On	On
System Suspend	Fast flashes	Fast flashes	Fast flashes
System Off	Slow flashes	Off	Off

2.11 HW Monitor Alarm (JOBS1) / Watch Dog Timer (JWDT1) / Infrared (JIR1)
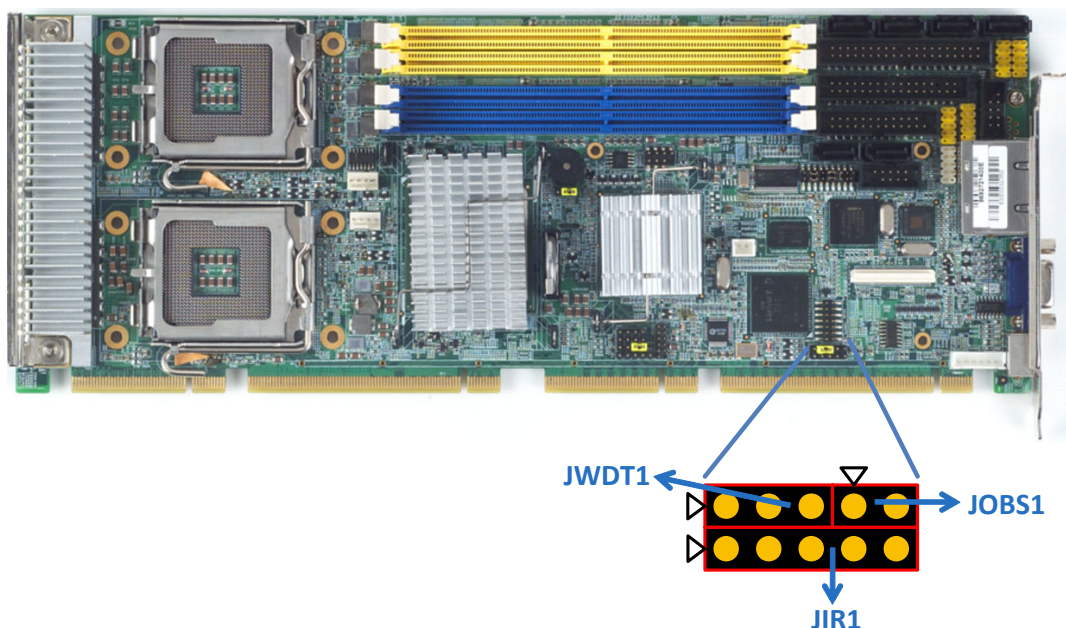
Figure 2.11 HW Monitor Alarm (JOBS1)

2.11.1 HW Monitor Alarm (JOBS1)

(JOBS1) is a 2-pin connector for setting enable/disable alarm while the On Board security event acts.
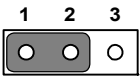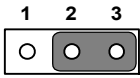
Table 2.2: Hardware Monitor Alarm setting	
Pin setting	Function
Close	Enable OBS alarm
open	Disable OBS alarm

2.11.2 Watchdog timer output (JWDT1)

The PCE-7214 contains a watchdog timer that will reset the CPU in the event the CPU stops processing. This feature means the PCE-7214 will recover from a software failure or an EMI problem. The JWDT1 jumper settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

Table 2.3: Watchdog timer output (JWDT1)	
Function	Jumper Setting
Enable	1 - 2 closed
* Disable	2 - 3 closed

* default setting

2.11.3 Infrared Connector (JIR1)

This 5-pin header is for connecting infrared device connector.

2.12 Dual Giga LAN RJ45 connector (LAN12)
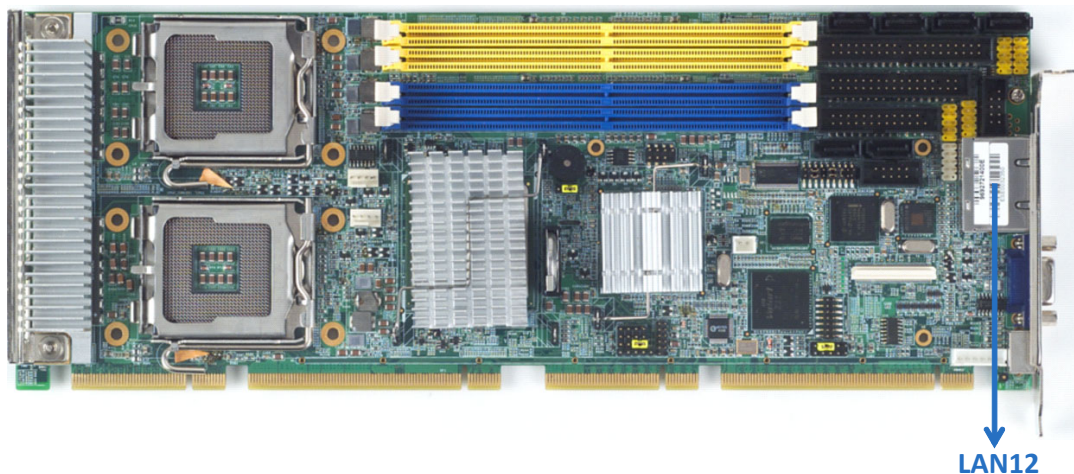
LAN12

Figure 2.12 Dual Giga LAN RJ45 connector (LAN12)

PCE-7214 uses the Intel$^®$ 82566DM/82573V Gigabit LAN chips are linked to dedicated PCIe x1 lanes. PCE-7214 provide high throughputs for heavy loading networking environment. It provides two RJ-45 connectors in the rear side and is convenient for most industrial applications.

2.13 High Definition Audio Interface (HDAUD1)
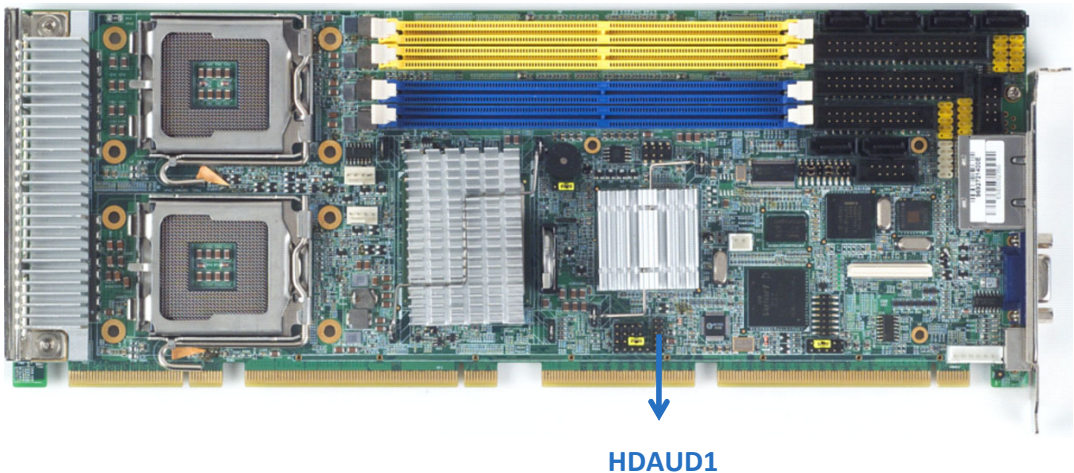
HDAUD1

Figure 2.13 High Definition Audio Interface (HDAUD1)

The PCE-7214 provides high definition audio through PCA-AUDIO-HDA1E module from Advantech.

2.14 Serial ATA interface (SATA1 ~ SATA6)
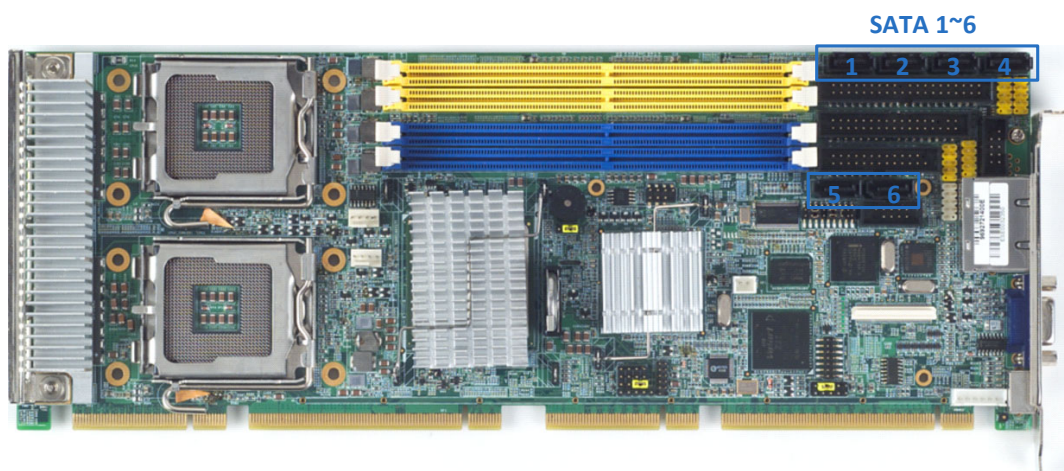
Figure 2.14 Serial ATA interface (SATA1 ~ SATA6)

In addition to the EIDE interface (up to two devices), the PCE-7214 features a high performance serial ATA interfaces (up to 300 MB/s) that eases cabling to hard drives with thin and long cables. These six port can be configured as RAID 0, 1, 5, 10 modes.

2.15 LAN1 and LAN2 LED connector (LANLED1)
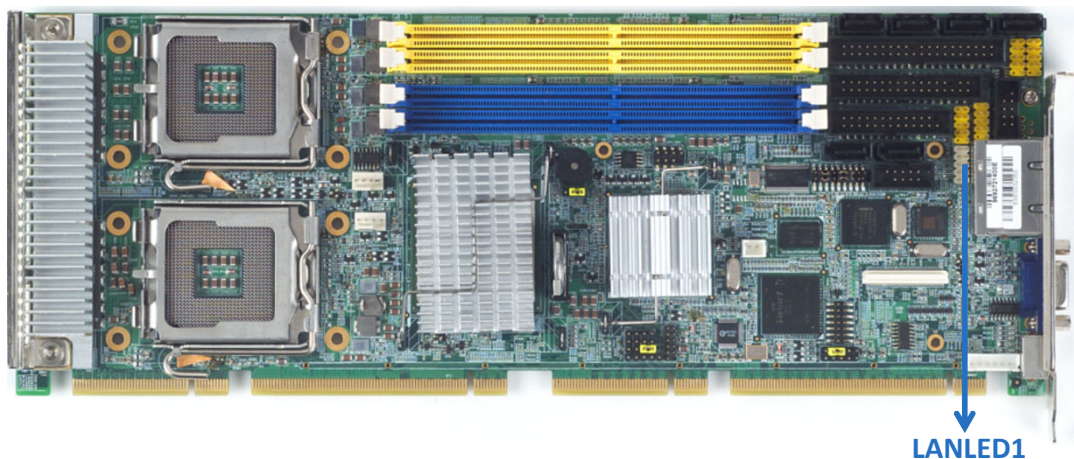
Figure 2.15 LAN1 and LAN2 LED connector (LANLED1)

PCE-7214 provides an external LAN LED Pin header for connecting to the front side of the chassis. With this convenient design users may know whether the LAN port is acting or not easily. Refer to Appendix B for detailed information on the pin assignments.

2.16 GPIO header (GPIO1)
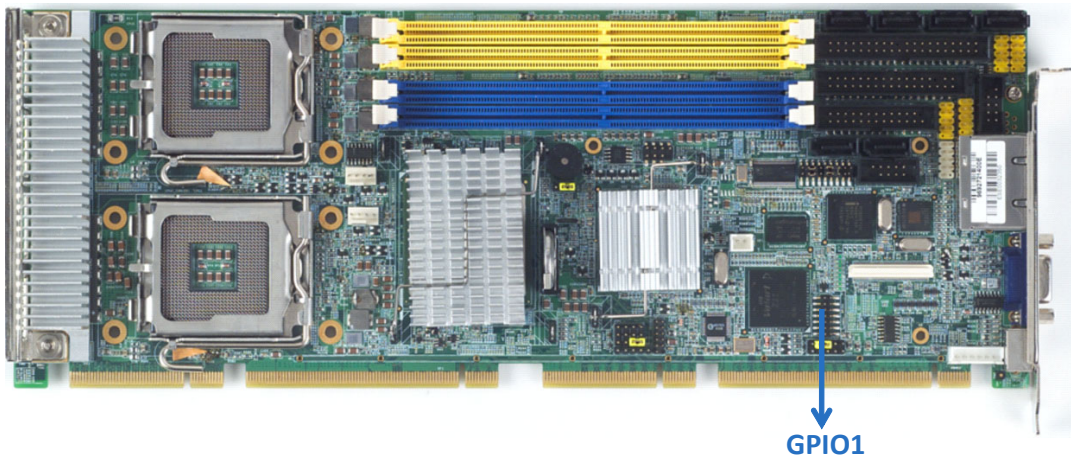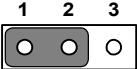
Figure 2.16 GPIO header (GPIO1)

PCE-7214 provides 14-Pins pin header for Digital I/O usage. Refer to Appendix B for detailed information on the pin assignments and programming guide in Appendix B.

2.17 CMOS clear (CMOS1)

The PCE-7214 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 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 2.4: CMOS (CMOS1)		
Function	**Jumper Setting**	
* Keep CMOS data	1 2 3	1 - 2 closed
Clear CMOS data	1 2 3	2 - 3 short

* default setting

CMOS1
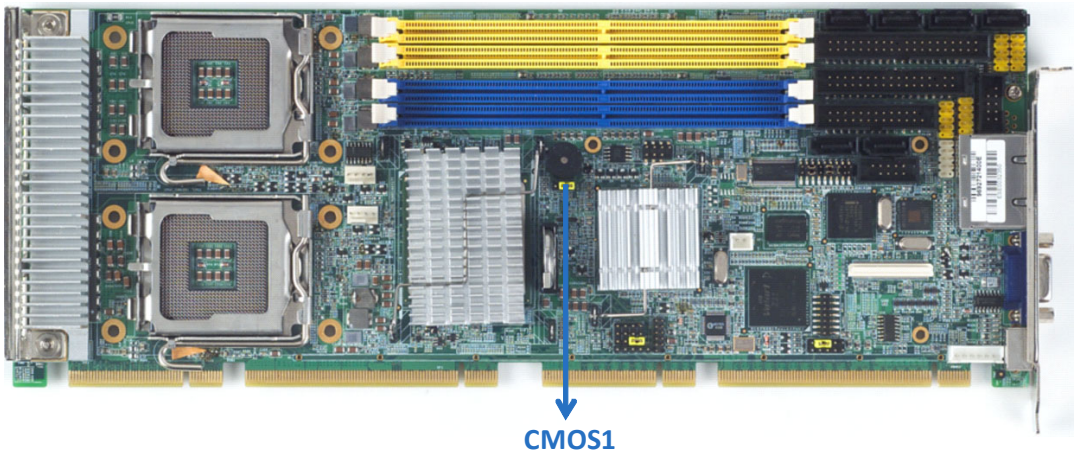
Chapter **3**

AMI BIOS Setup

AMI BIOS has been integrated into many motherboards for over a decade. In the past, people often referred to the AMI BIOS setup menu as BIOS, BIOS setup or CMOS setup.

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off. This chapter describes the basic navigation of the PCE-7214 setup screens.

```
                        BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

  System Overview                                 Use [ENTER], [TAB]
                                                  or [SHIFT-TAB] to
  AMIBIOS                                         select a field.
  Version    :08.00.14
  Build Date:04/01/09                             Use [+] or [-] to
  ID         :7214X024                            configure system Time.

  Processor
  Intel(R) Xeon(R) CPU       5130  @ 2.00GHz
  Speed      :2000MHz
  Count      :1

  System Memory                                   ←     Select Screen
  Size       :4096MB                              ↑↓    Select Item
                                                  +-    Change Field
  System Time                [09:11:50]           Tab   Select Field
  System Date                [Thu 04/02/2009]     F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit


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```

Figure 3.1 Setup program initial screen

AMI'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 CMOS so it retains the Setup information when the power is turned off.

3.1   Entering Setup

Press the "Del" key during the Power On Self Test (POST) process and you can enter the BIOS setup screen, otherwise the system will continue the POST process.

3.2   Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

```
                         BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

 System Overview                                    Use [ENTER], [TAB]
                                                    or [SHIFT-TAB] to
 AMIBIOS                                            select a field.
 Version    :08.00.14
 Build Date:04/01/09                                Use [+] or [-] to
 ID         :7214X024                               configure system Time.

 Processor
 Intel(R) Xeon(R) CPU          5130  @ 2.00GHz
 Speed      :2000MHz
 Count      :1

 System Memory                                      ←    Select Screen
 Size       :4096MB                                 ↑↓   Select Item
                                                    +-   Change Field
 System Time                   [09:11:50]           Tab  Select Field
 System Date                   [Thu 04/02/2009]     F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit

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```

Figure 3.2 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

3.2.1   System time / System date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.3 Advanced BIOS Features Setup

Select the Advanced tab from the PCE-7214 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

```
                          BIOS SETUP UTILITY
  Main   Advanced   PCIPnP    Boot    Security    Chipset    Exit

  Advanced Settings                              Configure CPU.

  WARNING: Setting wrong values in below sections
           may cause system to malfunction.

  ▶ CPU Configuration
  ▶ IDE Configuration
  ▶ Floppy Configuration
  ▶ SuperIO Configuration
  ▶ Hardware Health Configuration
  ▶ USB Configuration
  ▶ AHCI Configuration
  ▶ APM Configuration                    ←     Select Screen
  ▶ MPS Configuration                    ↑↓    Select Item
  ▶ Remote Access Configuration          Enter Go to Sub Screen
                                         F1    General Help
                                         F10   Save and Exit
                                         ESC   Exit

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```

Figure 3.3 Advanced BIOS features setup screen

3.3.1 CPU configuration

```
                    BIOS SETUP UTILITY
     Advanced

 Configure advanced CPU settings              Sets the ratio
 Module Version:3F.13                         between CPU Core
 _____          Clock and the FSB
 Manufacturer:Intel                           Frequency.
 Intel(R) Xeon(R) CPU      5130 @ 2.00GHz     Note:
 Frequency   :2.00GHz                         For CedarMill and
 FSB Speed   :1332MHz                         Prescott Family CPUs,
 Cache L1    :64 KB                           the setup option only
 Cache L2    :4096 KB                         available when Intel
 Ratio Status:Unlocked (Min:06, Max:06)       SpeedStep technology
 Ratio Actual Value:6                         is disabled.

 Ratio CMOS Setting         [6]               ←    Select Screen
 Hardware Prefetcher        [Enabled]         ↑↓   Select Item
 Adjacent Cache Line Prefetch [Enabled]       +-   Change Option
 Max CPUID Value Limit      [Disabled]        F1   General Help
 Intel(R) Virtualization Tech [Enabled]       F10  Save and Exit
 Execute-Disable Bit Capability [Enabled]     ESC  Exit
 Core Multi-Processing      [Enabled]
 PECI                       [Enabled]


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```

Figure 3.4 CPU configuration setting

Hardware Prefetcher

Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency. You may choose to enable or disable it.

Adjacent Cache Line Prefetch

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to enable or disable it.

Max CPUID Value Limit

This is disabled for Windows XP.

Intel® Virtualization Technology

This feature is used to enable or disable the Intel Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system. It does this by creating virtual machines, each running its own x86 operating system.

Execute Disable Bit

This item specifies the Execute Disable Bit Feature. The settings are Enabled and Disabled. The Optimal and Fail-Safe default setting is Enabled. If Disabled is selected, the BIOS forces the XD feature flag to always return to 0.

Core Multi-Processing

When this option disabled, BIOS disables one execution core.

PECI

You may choose to disable or enable the Platform Environment Control Interface function.

3.3.2 IDE configuration


```
                        BIOS SETUP UTILITY
        Advanced

IDE Configuration                                      Options

    Configure SATA as           [IDE]              IDE
                                                   RAID
  ▶ SATA 1                     : [Not Detected]    AHCI
  ▶ SATA 2                     : [Not Detected]
  ▶ SATA 3                     : [Not Detected]
  ▶ SATA 4                     : [Not Detected]
  ▶ SATA 5                     : [Not Detected]
  ▶ SATA 6                     : [Not Detected]


  Hard Disk Write Protect       [Disabled]         ←    Select Screen
  IDE Detect Time Out (Sec)     [35]               ↑↓   Select Item
  ATA(PI) 80Pin Cable Detection [Host & Device]    +-   Change Option
                                                   F1   General Help
                                                   F10  Save and Exit
                                                   ESC  Exit



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```

Figure 3.5 IDE configuration

AHCI Configuration

AHCI is a new interface specification that allows the SATA controller driver to support advanced features. While entering setup, BIOS auto detects the presence of AHCI devices. This displays the status of auto detection of AHCI devices.

3.3.3 Super I/O configuration

```
                     BIOS SETUP UTILITY
  Advanced

Floppy Configuration                        Select the type of
                                            floppy drive
Floppy A                    [1.44 MB 3½"]   connected to the
Floppy B                    [Disabled]      system.




                                            ←     Select Screen
                                            ↑↓    Select Item
                                            +-    Change Option
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit


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```

```
                     BIOS SETUP UTILITY
  Advanced

Configure Win627UHG Super IO Chipset        Allows BIOS to Enable
                                            or Disable Floppy
OnBoard Floppy Controller   [Enabled]       Controller.
Serial Port1 Address        [3F8]
Serial Port2 Address        [2F8]
  Serial Port2 Mode         [Normal]
Parallel Port Address       [378]
  Parallel Port Mode        [ECP & EPP]
    EPP Version             [1.9]
    ECP Mode DMA Channel    [DMA3]
  Parallel Port IRQ         [IRQ7]


                                            ←     Select Screen
                                            ↑↓    Select Item
                                            +-    Change Option
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit


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```

Figure 3.6 Super I/O configuration

PCE-7214 User Manual

Floppy A

Select the type of floppy drive connected to the system. We suggest you disable the floppy while installing Windows Vista without a floppy drive.

Floppy B

Select the type of floppy drive connected to the system.

Serial Port1 Address

This option configures serial port 1 base addresses.

Serial Port2 Address

This option configures serial port 2 base addresses.

Parallel Port Address

This configures parallel port base addresses. The following options are also available:

- Parallel Port Mode
- Parallel Port IRQ

3.3.4 Hardware health function

```
                        BIOS SETUP UTILITY
     Advanced

 Hardware Health Configuration                        Options

 System Temperature          :28°C/82°F          Disabled
 CPU1 Temperature            :29°C/84°F          Enabled

 CPUFAN1 Speed               :7031 RPM

 Vcore1                      :1.088 V
 Vcore2                      :0.040 V
 +5V                         :5.006 V
 +12V                        :11.776 V
 +3.3V                       :3.216 V
 5VSB                        :5.006 V            ←     Select Screen
 VBAT                        :2.886 V            ↑↓    Select Item
                                                 +-    Change Option
 Chassis Intrusion           [Disabled]          F1    General Help
 CPU Warning Temperature     [Disabled]          F10   Save and Exit
 Shutdown Temperature        [Disabled]          ESC   Exit


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```

Figure 3.7 Hardware health configuration.

Hardware health function

Enables/Disables the onboard hardware monitor controller. If this option is enabled, the BIOS and OBS utility can get the system board health information from hardware monitor controller.

Chassis Intrusion

Enables/Disables the Chassis Intrusion monitoring function. When enabled and the case is opened, the buzzer beeps.

Hardware health event monitoring

When the Hardware Health Function is enabled, the BIOS will display hardware health information.

CPU warning temperature

Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the buzzer will beep.

3.3.5 APM configuration
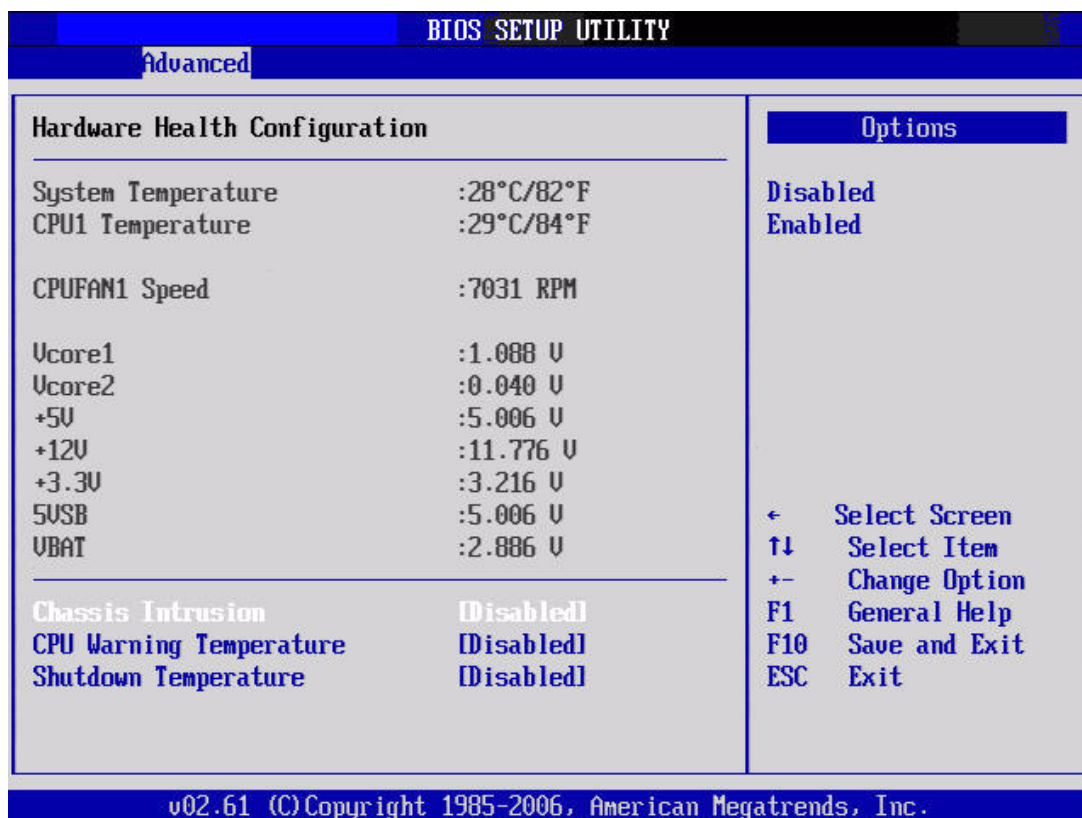
Figure 3.8 APM configuration

Power Management/APM

Enable or disable APM.

Video Power Down Mode

Set the Video Power Down mode to the Suspend or Standby mode.

Hard Disk Power Down Mode

Set Power Down Hard Disk mode to Suspend or Standby mode.

Suspend Time Out

Enter Suspend after the specified time.

Throttle Slow Clock Ratio

Select the duty cycle in throttle mode.

Keyboard & PS/2 Mouse

When you set this to Monitor, you can monitor the PS/2 keyboard and mouse ports.

Power Button Mode

Power on, off or enter suspend mode when the power button is pressed. The following options are also available.

- Resume On Ring: Disable/Enable RI wake event.
- Resume On LAN: Disable/Enable LAN PME wake event.
- Resume On RTC Alarm: Disable/Enable RTC wake event.

```
                        BIOS SETUP UTILITY
    Advanced

Configure Remote Access type and parameters          Select Remote Access
                                                     type.
Remote Access                [Enabled]

Serial port number           [COM1]
    Base Address, IRQ        [3F8h, 4]
Serial Port Mode             [115200 8,n,1]
Flow Control                 [None]
Redirection After BIOS POST  [Always]
Terminal Type                [ANSI]
VT-UTF8 Combo Key Support    [Enabled]
Sredir Memory Display Delay  [No Delay]

                                                  ←     Select Screen
                                                  ↑↓    Select Item
                                                  +-    Change Option
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit



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```

Figure 3.9 Configure remote access type and parameters

Remote Access

Enable or disable remote management functions.

Serial Port Number

Selects the serial port for console redirection usage, available options are "COM1" and "COM2".

The base address

This item changes with selected serial port number automatically and is not user-changeable.

Serial port Mode

Sets the Serial port mode.

Flow Control

Sets the flow control for console redirection, available options are "None", "Hardware" and "Software".

Redirection After BIOS POST

Sets the redirection mode after the BIOS Power On Self Test (POST), available options are "Disabled", "Boot Loader" and "Always".

Terminal Type

Sets the target terminal type Configuration options, available options are "ANSI", "VT100", "VT-UTF8".

VT-UTFS Combo Key Support

Sets the VT-UTFS combo key support for ANSI or VT-100 terminals, available options are "Disabled" undeniably".

Sredir Memory Display Delay

Sets the delay seconds to display memory information, available options are "No Delay", "Delay 1~4 Second(s)".

3.4 PCI/PNP Setup

Select the PCI/PnP tab from the PCE-7214 setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

```
                     BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

 Advanced PCI/PnP Settings                       ▲   Clear NVRAM during
                                                     System Boot.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 Clear NVRAM                    [No]
 Plug & Play O/S                [No]
 PCI Latency Timer              [64]
 Allocate IRQ to PCI VGA        [Yes]
 Palette Snooping               [Disabled]
 PCI IDE BusMaster              [Enabled]
 OffBoard PCI/ISA IDE Card      [Auto]
                                                  ←    Select Screen
 IRQ3                           [Available]       ↑↓   Select Item
 IRQ4                           [Available]       +-   Change Option
 IRQ5                           [Available]       F1   General Help
 IRQ7                           [Available]       F10  Save and Exit
 IRQ9                           [Available]       ESC  Exit
 IRQ10                          [Available]
 IRQ11                          [Available]    ▼

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```

Figure 3.10 PCI/PNP setup

Clear NVRAM

Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM). The Optimal and Fail-Safe default setting is No.

Plug and play O/S

Set this value to allow the system to modify the settings for Plug and Play operating system support. The Optimal and Fail-Safe default setting is No.

PCI latency timer

Use this to adjust the PCI Latency Timer. This option sets the latency of all PCI devices on the PCI bus. The Optimal and Fail-Safe default setting is 64.

Allocate IRQ to PCI VGA

Set this value to allow or stop the system from giving the VGA adapter card an interrupt address. The Optimal and Fail-Safe default setting is Yes.

Palette snooping

Set this value to allow the system to modify the Palette Snooping settings. The Optimal and Fail-Safe default setting is Disabled.

PCI IDE BusMaster

Set this value to allow or prevent the use of PCI IDE Busmastering. The Optimal and Fail-Safe default setting is Disabled.

Off board PCI/ISA IDE card

Set this value to allow an add-on PCI/ISA IDE card to be selected. The Optimal and Fail-Safe default setting is Auto.

IRQ

■ IRQ[3,4,5,7,9,10,11,14,15]:
  – Available: Specified IRQ is available to be used by PCI/PnP devices.
  – Reserved: Specified IRQ is reserved for use by Legacy ISA devices.

■ DMA Channel [0,1,3,5,6,7]:
  – Available: Specified DMA is available to be used by PCI/PnP devices.
  – Reserved: Specified DMA is reserved for use by legacy ISA devices.
  – Reserved Memory Size: Size of memory block to reserve for legacy ISA devices.

3.5 Boot Setup Utility
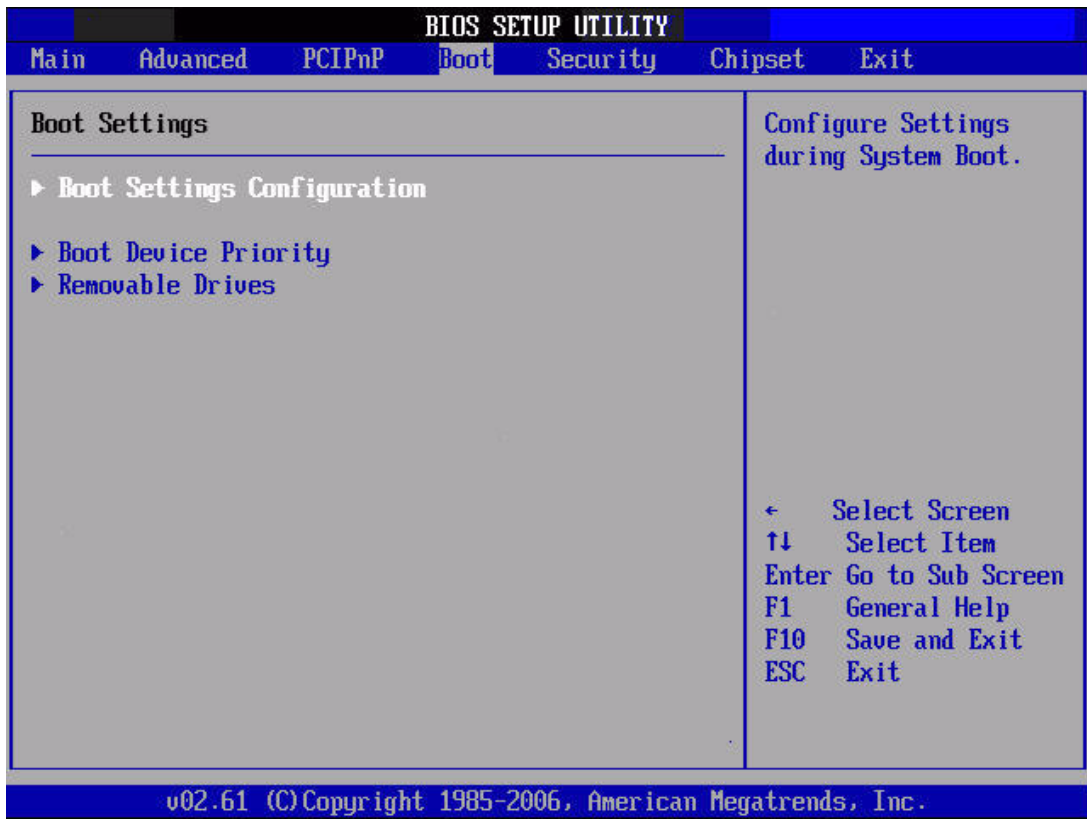
Figure 3.11 Boot setup utility

```
                    BIOS SETUP UTILITY
                         Boot

Boot Settings Configuration                      Allows BIOS to skip
                                                 certain tests while
Quick Boot               [Enabled]               booting. This will
Quiet Boot               [Disabled]              decrease the time
AddOn ROM Display Mode    [Force BIOS]           needed to boot the
Bootup Num-Lock          [On]                    system.
PS/2 Mouse Support       [Auto]
Wait For 'F1' If Error   [Enabled]
Hit 'DEL' Message Display [Enabled]
Interrupt 19 Capture     [Disabled]



                                                 ←     Select Screen
                                                 ↑↓    Select Item
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit



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```

Figure 3.12 Boot setting configuration

The following options are available:

- **Quick Boot:** Allows the BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
- **Quiet Boot:** If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Bootup Num-Lock:** Select the Power-on state for Numlock.
- **Wait For 'F1' If Error:** Wait for the F1 key to be pressed if an error occurs.
- **Hit 'DEL' Message Display:** Displays "Press DEL to run Setup" in POST.
- **1st Boot Device:** Set the device for 1st boot priority.

3.6 Security Setup

```
                        BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

 Security Settings                              Install or Change the
                                                password.
 Supervisor Password :Not Installed
 User Password        :Not Installed

 Change Supervisor Password
 Change User Password

 Boot Sector Virus Protection    [Disabled]


                                                ←    Select Screen
                                                ↑↓   Select Item
                                                Enter Change
                                                F1   General Help
                                                F10  Save and Exit
                                                ESC  Exit




        v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

Figure 3.13 Password configuration

Select Security Setup from the PCE-7214 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

■ **Change Supervisor Password**

■ **Boot sector Virus protection:** The boot sector virus protection will warn if any program tries to write to the boot sector.

3.7 Advanced Chipset Settings

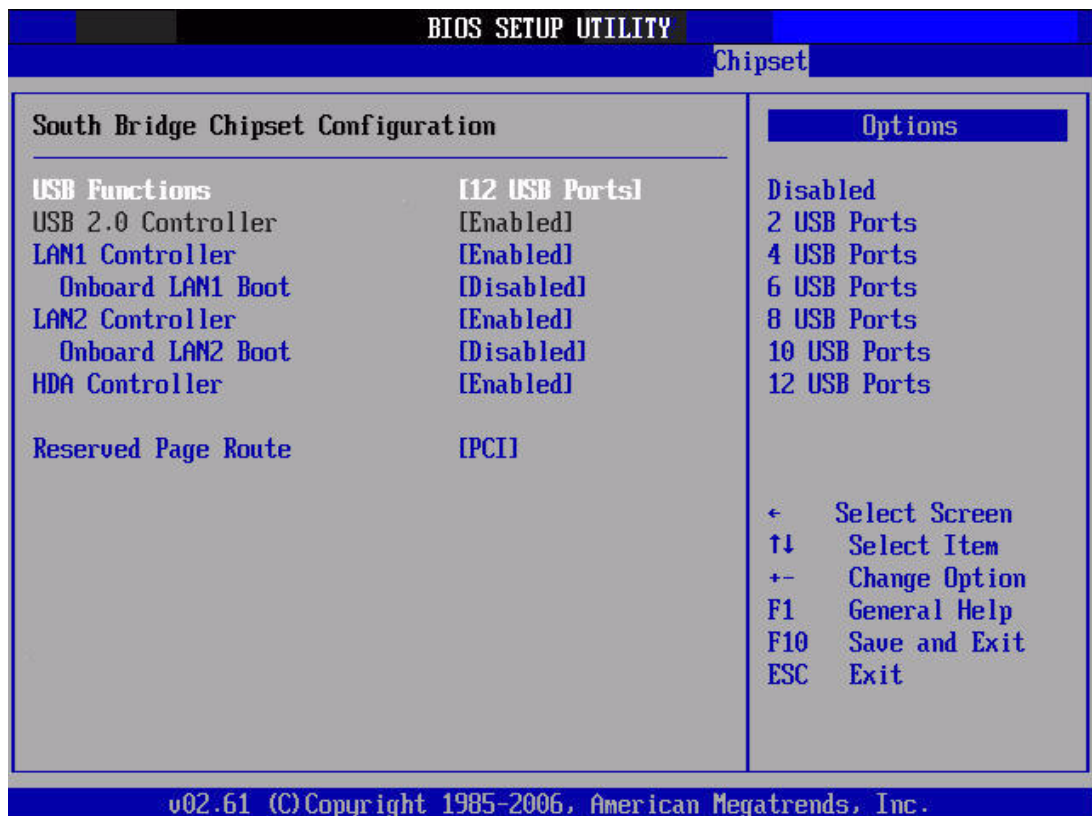**Figure 3.14 Advanced Chipset Settings**

Figure 3.15 Souh bridge configuration

The following options are available:

- **USB Functions:** Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports or 8 USB Ports.
- **USB 2.0 Controller:** Enables or disables the USB 2.0 controller.
- **LAN1 Controller:** Enables or disables the LAN1 controller.
- **On-board LAN1 boot:** Enables or disables LAN1 boot.
- **On-board LAN2 boot:** Enables or disables LAN2 boot.
- **LAN2 Controller:** Enables or disables the LAN2 controller.
- **HDA Controller:** Enables or disables the HDA controller.
- **SMBUS Controller:** Enables or disables the SMBUS controller.

3.8 Exit Option

Figure 3.16 Exit option

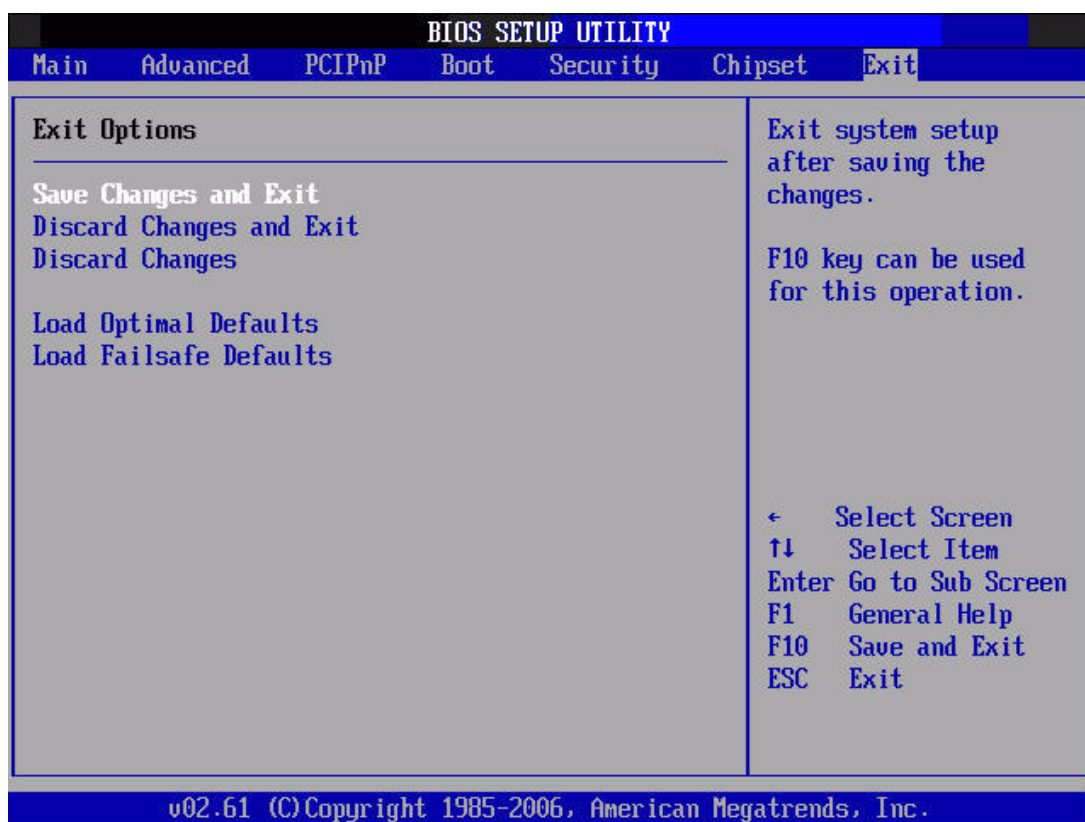## 3.8.1 Save changes and exit

When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears:

   Save Configuration Changes and Exit Now?

   [Ok] [Cancel]
2. Select Ok or Cancel.

3.8.2 Discard changes and exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears:

    Discard Changes and Exit Setup Now?

    [Ok] [Cancel]

2. Select Ok to discard changes and exit.

    Discard Changes

3. Select Discard Changes from the Exit menu and press <Enter>.

3.8.3 Load optimal defaults

The PCE-7214 automatically configures all setup items to optimal settings when you select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

3.8.4 Load fail-Safe defaults

The PCE-7214 automatically configures all setup options to fail-safe settings when you select this option. Fail-Safe Defaults are designed for maximum system stability, but not maximum performance. Select Fail- Safe Defaults if your computer is experiencing system configuration problems.

1. Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The following message appears:

    Load Fail-Safe Defaults?

    [OK] [Cancel]

2. Select OK to load Fail-Safe defaults.

Chapter 4

**Chipset Software
Installation Utility**

4.1 Before you Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the PCE-7214 are located on the software installation CD. 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 manual before performing the installation.

4.2 Introduction

The Intel Chipset Software Installation (CSI) utility installs 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 ISAPNP Services
- PCIe Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

> **Note!** *One of the following operating systems must be fully installed and running on the system before installing this software:*
> *1. Microsoft Windows* Server 2003*
> *2. Microsoft Windows Server 2003 x64 Edition**
> *3. Microsoft Windows XP Professional x64 Edition**
> *4. Microsoft Windows XP*
> *5. Microsoft Windows 2000*
> *6. Microsoft windows Vista*

4.3   Driver Setup

1.   Insert the driver CD into your system's CD-ROM drive. Select the folder "1_Intel INF" then click "Setup.exe". A message pops up telling you to install the CSI utility before other device drivers. Windows XP is used as an example in the following steps.

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

Graphic Setup

5.1 Introduction

The XGI Volari Z11 integrated graphics controller provides an analog display port. You need to install the graphic driver to enable the function.

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. Select the folder "2_VGA" then click the XGIRun.exe ICON, then the installation process will be automatically finished.

Chapter   6

LAN Configuration

6.1 Introduction

The PCE-7214 has a single/dual Gigabit Ethernet LAN interface (Intel 82566DM and 82573V) that is connected to a dedicated PCIe x1 link to eliminating network bottle-necks by offering a bandwidth of up to 500 MB/s.

6.2 Features

- Integrated 10/100/1000 Mbps transceiver
- 10/100/1000 Mbps triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCIe 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 integrated PCE-7214 Intel gigabit Ethernet 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 the driver setup procedure for the operating system you are using.

6.4 Win XP Driver Setup (LAN)

1. Insert the driver CD into your system's CD-ROM drive. Select the folder "3_LAN" then click the proper LAN driver for the OS. Windows XP is used as an example in the following steps.

2. You will see a welcome window. Click "Next" to continue the installation.
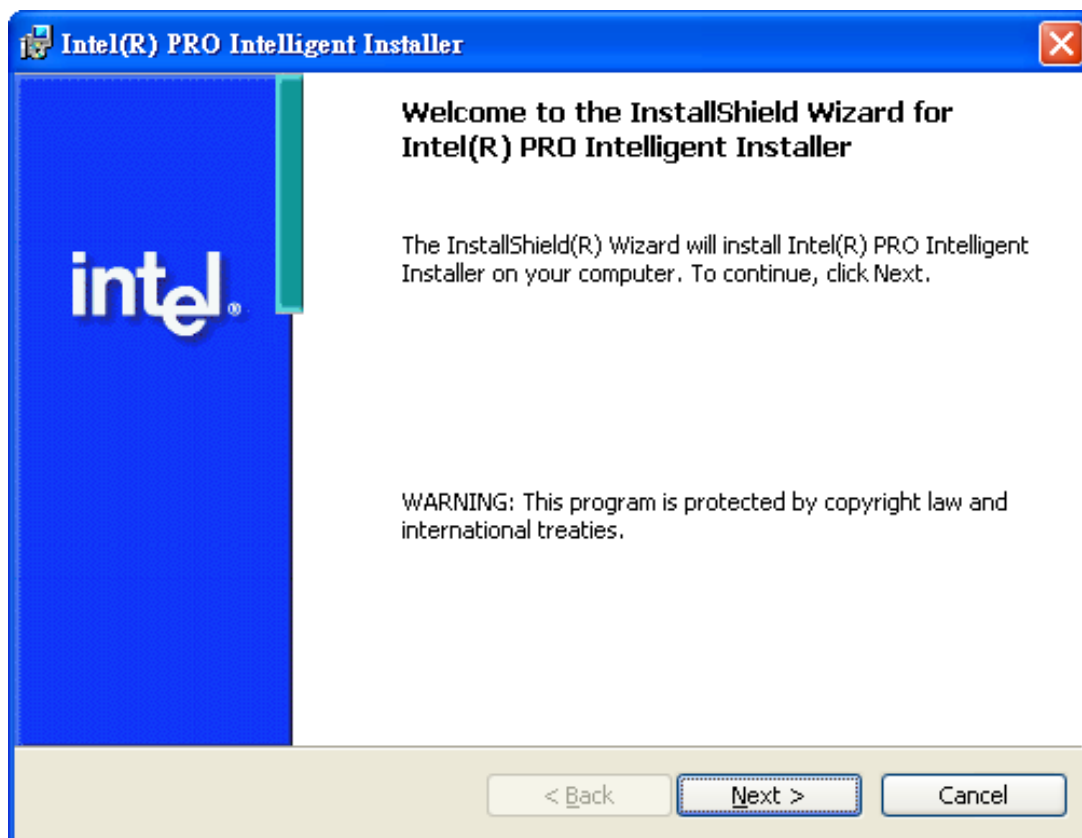
3. Click "Install Drivers" to start the installation procedure.
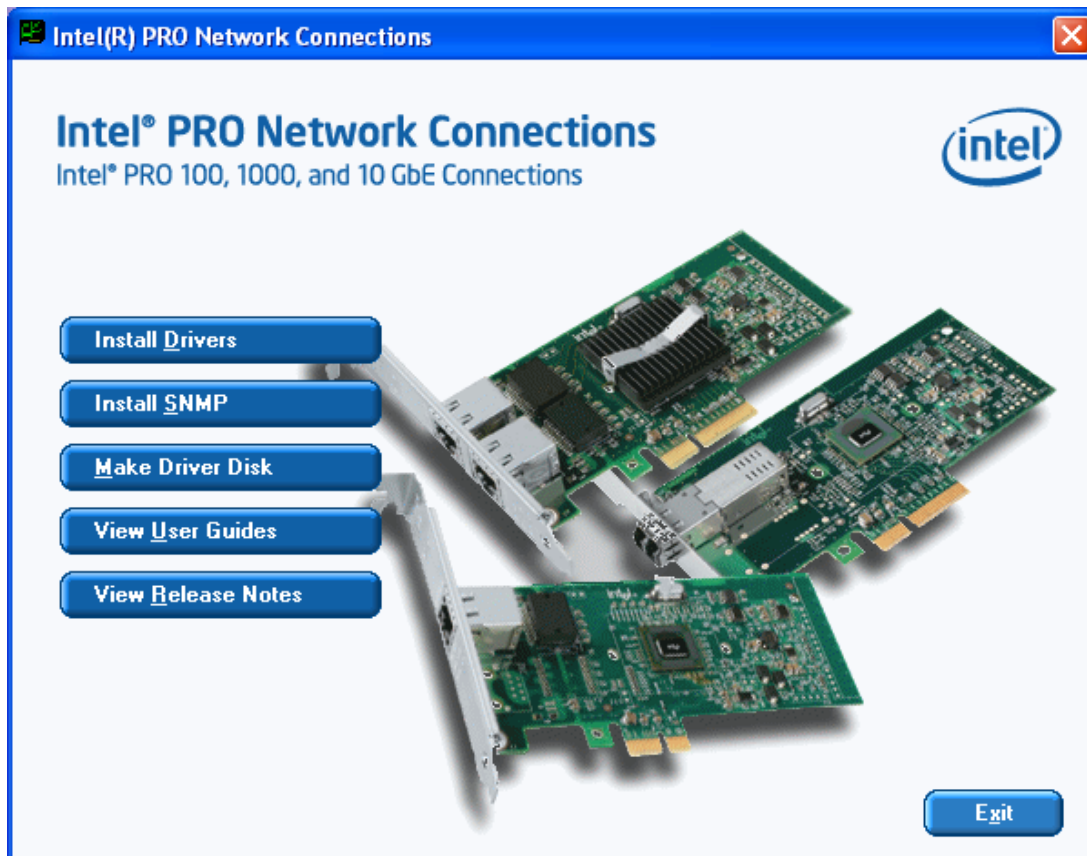
4. Click "Yes" to continue the installation.
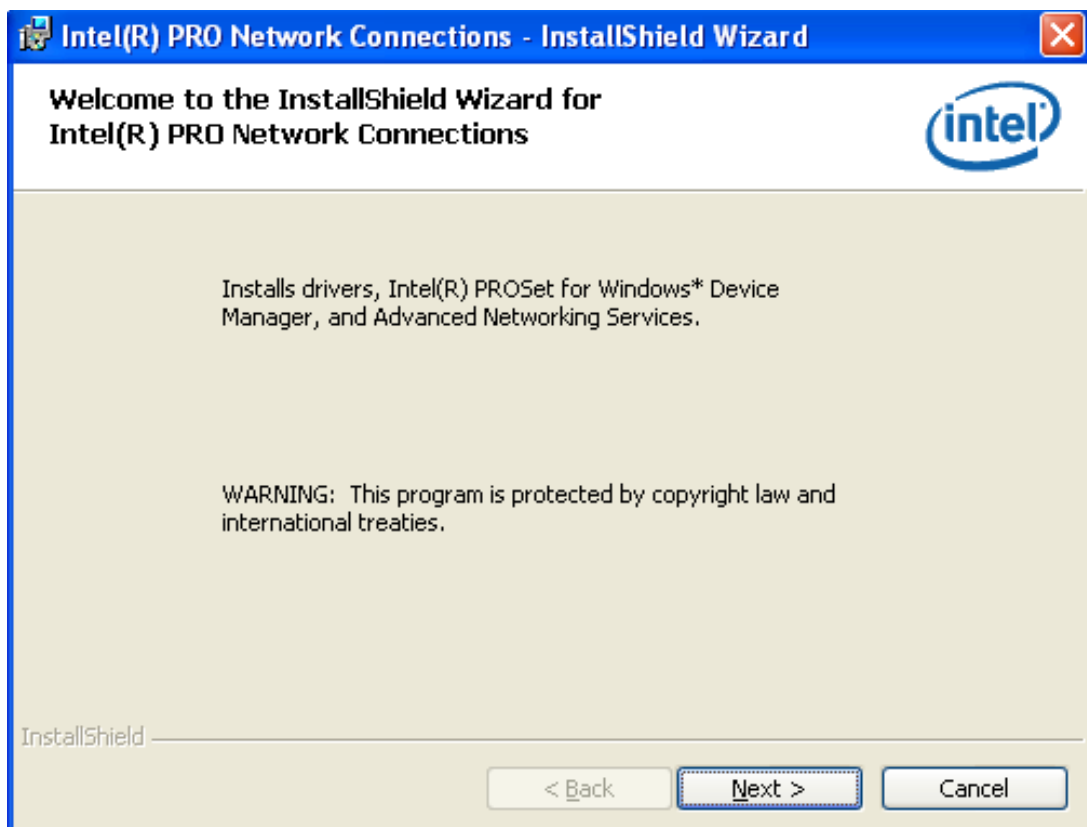
5.   Select "I accept the terms in the license agreement" and click "Next" to continue.
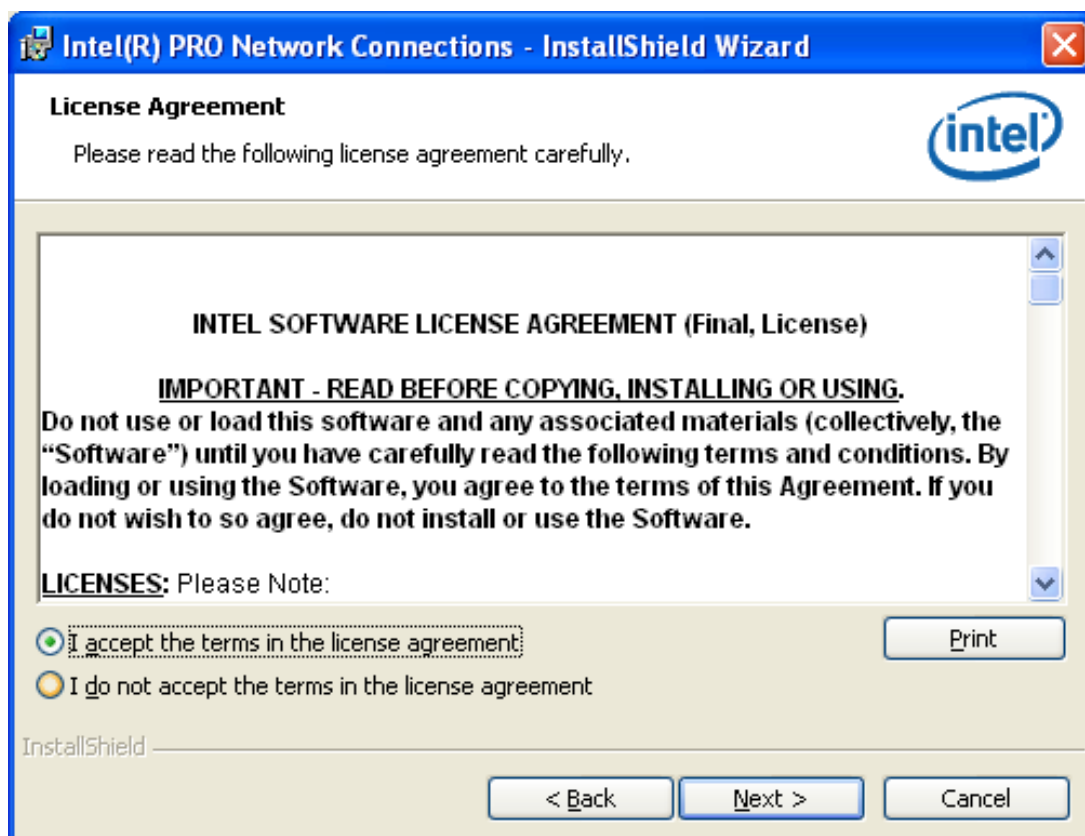
6.   Select "Complete" and click "Next" to continue.
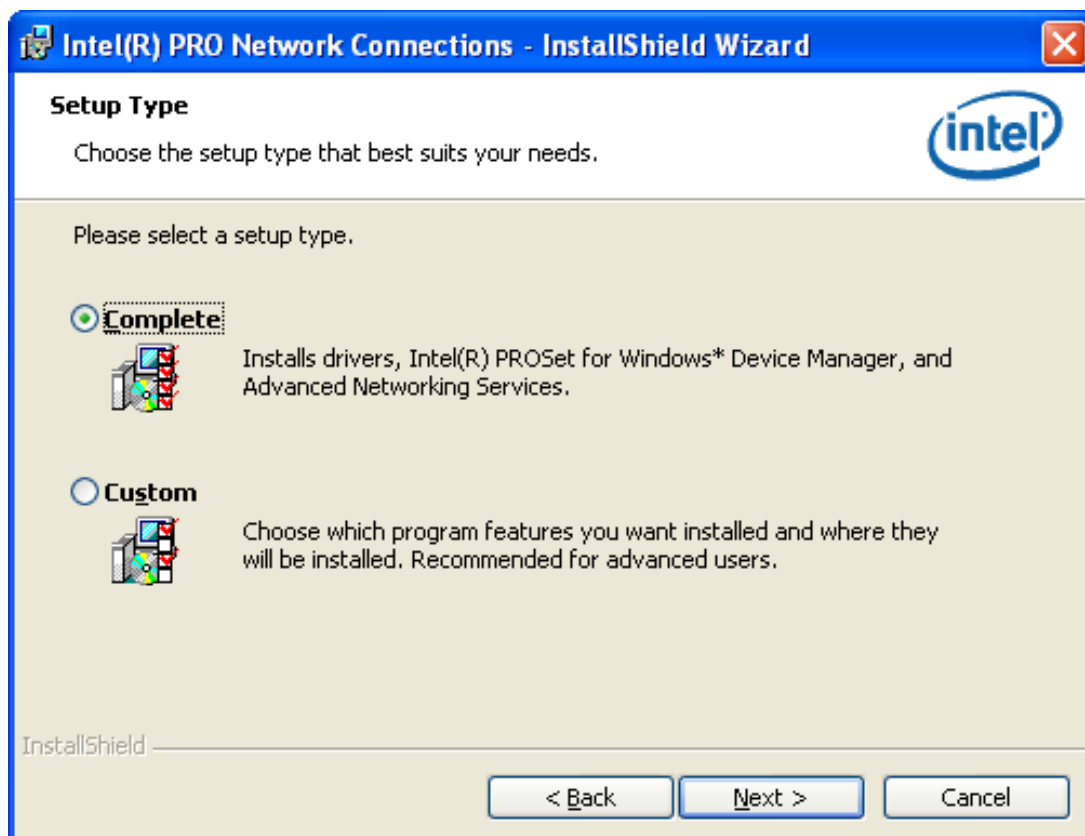
7. Click "Install" to begin the installation.
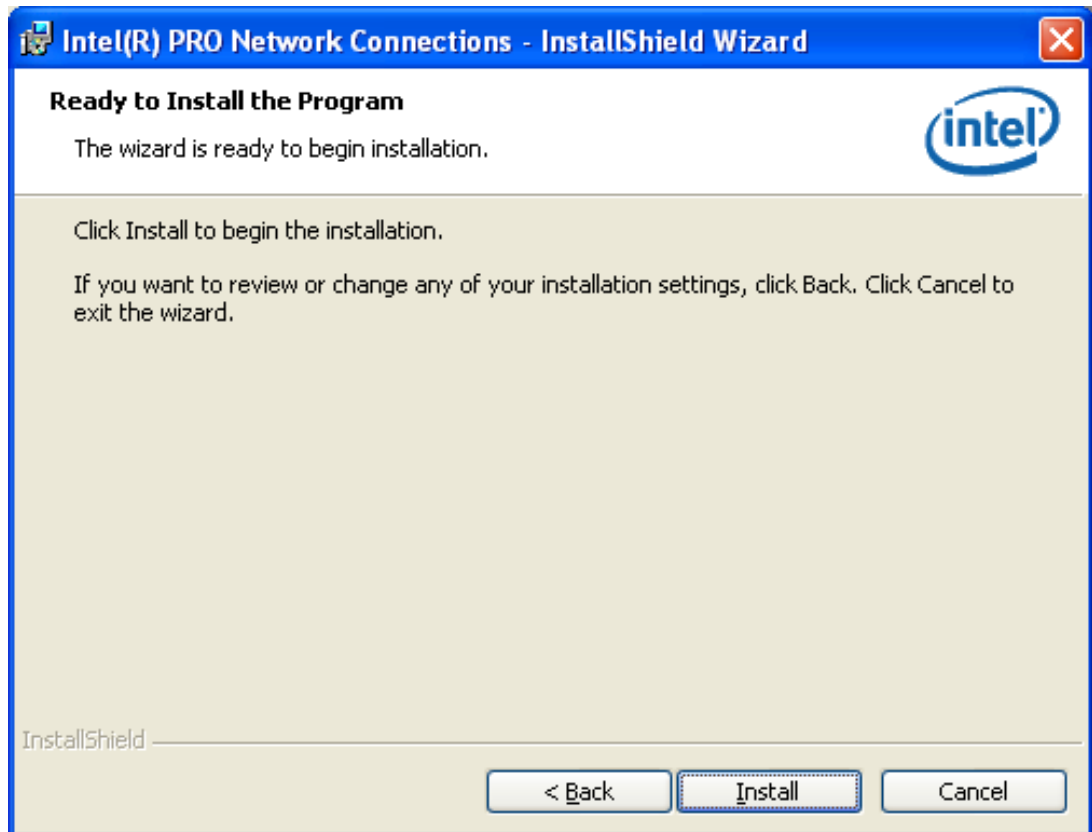
8. Click "Finish" to complete the installation.

Chapter 7

SATA RAID Setup

7.1 Introduction

To support demanding disk I/O, Intel ICH9R chipset integrates six Serial ATA controllers with software RAID 0, 1, 5, 10 capabilities.

RAID 0 striping increases the storage performance and is designed to speed up data transfer rates for disk-intensive applications.

RAID 1 mirroring protects valuable data that might be lost in the event of a hard drive failure.

RAID 5 array contains three or more hard drives where the data is divided into manageable blocks called strips. Parity is a mathematical method for recreating data that was lost from a single drive, which increases fault-tolerance. The data and parity are striped across all the hard drives in the array. The parity is striped in a rotating sequence to reduce bottlenecks associated with the parity calculations.

RAID 10 array uses four hard drives to create a combination of RAID levels 0 and 1. The data is striped across a two-drive array forming the RAID 0 component. Each of the drives in the RAID 0 array is then mirrored by a RAID 1 component.

7.2 SATA RAID Driver and Utility Setup

Note! *For the detailed installation instructions for the SATA RAID driver and utility, please check the User Guide on the driver CD. Path: \RAID\Manual*

Note! *Before you install the Intel® Matrix Storage Manager, please read the "readme.txt" which is in the folder "4_RAID".*

The driver is in the CD's "RAID" folder. You may go to the directory of the CD and follow Intel's installation guide to install the driver and utility.

Appendix A

Programming the Watchdog Timer

A.1 Watchdog Timer

The PCE-7214'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 W83627UHG. 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 JWDT1 jumper is used to select reset 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 W83627UHG   │
│                     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Select register of │
│   watchdog timer    │
│                     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Enable the function │
│ of the watchdog     │
│ timer               │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Use the function of│
│  the watchdog timer │
│                     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│                     │
│  Lock W83627UHG     │
│                     │
└─────────────────────┘
```
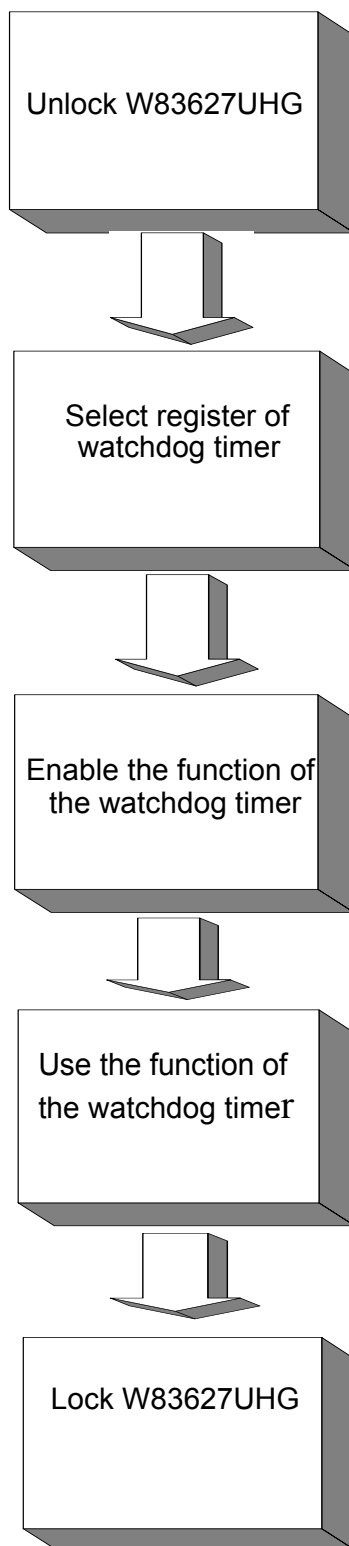
Table A.1: Watchdog Timer Registers		
Address of register (2E)	**Attribute**	
Read/Write	Value (2F) and description	
87 (hex)	-----	Write this address to I/O address port 2E (hex) twice to unlock theW83627UHG
07 (hex)	write	Write 08 (hex) to select register of watchdog timer.
30 (hex)	write	Write 01 (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,2e            ; Unlock W83627UHG
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 W83627UHG
Mov     al,0aah
Out     dx,al
```

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

```
;-----------------------------------------------------------------------
Mov dx,2eh           ; unlock W83627UHG
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 W83627UHG
Mov     al,0aah
Out     dx,al
3.      Enable watchdog timer to be reset by mouse
;-------------------------------------------------------------------------
Mov dx,2eh              ; unlock W83627UHG
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 W83627UHG
Mov      al,0aah
Out      dx,al
```

4.   Enable watchdog timer to be reset by keyboard

```
;-------------------------------------------------------------------------
Mov dx,2eh            ; unlock W83627UHG
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 W83627UHG
Mov     al,0aah
Out     dx,al
5.      Generate a time-out signal without timer counting
;----------------------------------------------------------------------
Mov dx,2eh              ; unlock W83627UHG
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 W83627UHG
Mov     al,0aah
Out     dx,al
```

Appendix B

I/O Pin Assignments

B.1 IDE Hard Drive Connector (IDE1)
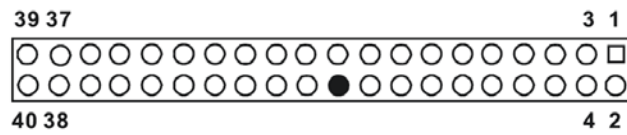

Table B.1: IDE hard drive connector (IDE1)			
Pin	**Signal**	**Pin**	**Signal**
1	IDE RESET*	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	N/C
21	DISK DMA REQUEST	22	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

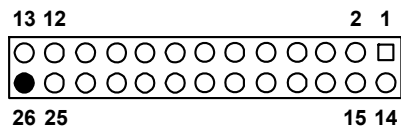* low active

B.2 Floppy Drive Connector (FDD1)
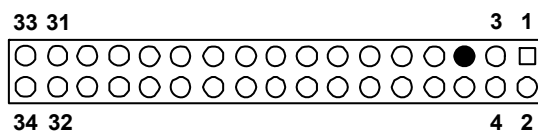
| Table B.2: Floppy drive connector (FDD1)			
Pin	Signal	Pin	Signal
1	GND	2	FDHDIN*
3	GND	4	N/C
5	N/C	6	FDEDIN*
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	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 (LPT1)

Table B.3: Parallel port connector (LPT1)			
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 VGA Connector (VGA1)
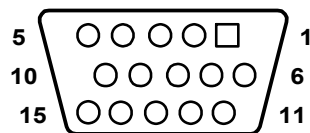
Table B.4: VGA connector (VGA1)			
Pin	Signal	Pin	Signal
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK

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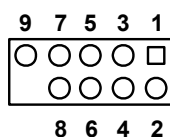
Pin	Signal
Table B.5: RS-232 serial port (COM1,COM2)	
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
10	N/A

B.6 PS/2 Keyboard/Mouse Connector (KBMS1)
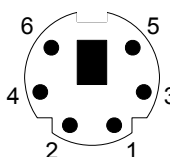
Pin	Signal
Table B.6: PS/2 keyboard/mouse connector (KBMS1)	
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

B.7 External Keyboard/Mouse Pin Header (KBMS2)

```
6   5   4   3   2   1
┌─────────────────────┐
│ ○   ○   ○   ○   ○   □ │
└─────────────────────┘
```
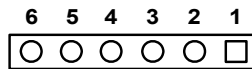
Table B.7: External Keyboard/Mouse Pin Header (KBMS2	
Pin	Signal
1	KBCLK
2	KBDAT
3	MSDAT
4	GND
5	MSVCC
6	MSCLK

B.8 CPU Fan Power Connector (CPUFAN1,CPUFAN2)

```
┌───┐
│▷□ │  1
│ ○ │
│ ○ │
└───┘
```
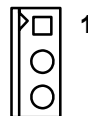
Table B.8: CPU Fan Power Connector (CPUFAN1,CPUFAN2)	
Pin	Signal
1	GND
2	+12V
3	Detect

B.9 Power LED and Keyboard Lock Connector (JFP3 / PWR_LED & KEY LOCK)

```
1   2   3   4   5
┌─────────────────────┐
│ □   ○   ○   ○   ○ │
└─────────────────────┘
```
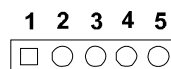
Table B.9: Power LED and Keyboard Lock Connector (JFP3 / PWR_LED & KEY LOCK)	
Pin	Function
1	LED power (+5 V)
2	NC
3	GND
4	KEYLOCK#
5	GND

B.10 External Speaker Connector (JFP2 / SPEAKER)

```
□ ○ ○ ○
1  2  3  4
```
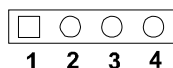
Table B.10: External Speaker Connector (JFP2 / SPEAKER)	
Pin	Function
1	SPK+
2	NC
3	SPK_IN
4	SPK-

B.11 Reset Connector (JFP1 / RESET)

```
□ ○
1  2
```
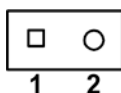
Table B.11: Reset connector (JFP1 / RESET)	
Pin	Signal
1	RESET #
2	GND

B.12 HDD LED (JFP2 / HDDLED)

```
□ ○
1  2
```
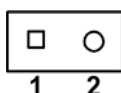
Table B.12: Reset connector (JFP1 / RESET)	
Pin	Signal
1	IDE LED+
2	IDE LED-

B.13 ATX Soft Power Switch (JFP1 / PWR_SW)
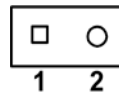
Table B.13: Reset connector (JFP1 / RESET)	
Pin	**Signal**
1	5VSB
2	PWR-BTN

B.14 Hi-definition audio Link connector (HDAUD1)
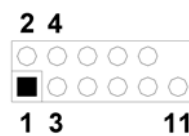
Table B.14: Hi-definition audio link connector (HDAUD1)			
Pin	**Signal**	**Pin**	**Signal**
1	ACZ_VCC	2	GND
3	ACZ_SYNC	4	ACZ_BITCLK
5	ACZ_SDOUT	6	ACZ_SDIN0
7	ACZ_SDIN1	8	-ACZ_RST
9	ACZ_12V	10	GND
11	GND	12	N/C

B.15 SM Bus Connector (JFP2 / SNMP)
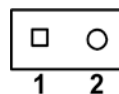
Table B.15: SM bus connector (JFP2 / SNMP)	
Pin	**Signal**
1	SMB_DATA
2	SMB_CLK

B.16 LAN1 and LAN2 LED connector (LANLED1)

```
1 □ ○ 2
3 ○ ○ 4
5 ○ ○ 6
7 ○ ○ 8
9 ○
```
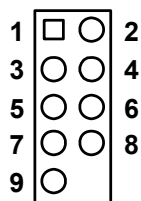
Table B.16: LAN1 and LAN2 LED connector (LANLED1)	
Pin	Signal
1	#LAN1_ACT
2	V33_AUX
3	#LAN1_LINK1000
4	#LAN1_LINK100
5	V33_AUX
6	#LAN2_ACT
7	V33_AUX
8	#LAN2_LINK1000
9	#LAN2_LINK100

B.17 GPIO header (GPIO1)

```
 1 □ ○ 2
 3 ○ ○ 4
 5 ○ ○ 6
 7 ○ ○ 8
 9 ○ ○ 10
11 ○ ○ 12
13 ○ ○ 14
```
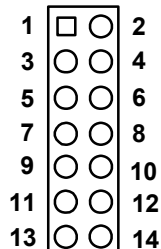
Table B.17: GPIO header (GPIO1)	
Pin	Signal
1	GPIO_1
2	GPIO_5
3	VCC_GPIO
4	GND
5	GPIO_2
6	GPIO_6
7	GND
8	GND
9	GPIO_3
10	GPIO_7
11	GND
12	GND
13	GPIO_4
14	GPIO_8

B.18 System I/O Ports

Addr. range (Hex)	Device
	Table B.18: System I/O ports
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.19 DMA Channel Assignments

Table B.19: DMA channel assignments	
Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

B.20 Interrupt Assignments

Table B.20: 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.21 1st MB Memory Map

Table B.21: 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.22 PCI Bus Map

Table B.22: PCI bus map				
Function Signals	**IDSEL**	**INT# pin**	**GNT**	**REQ**
PCI slot 1	AD31	INT D, A, B, C	GNT A	REQ A
PCI slot 2	AD30	INT C, D, A, B	GNT B	REQ B
PCI slot 3	AD29	INT B, C, D, A	GNT C	REQ C
PCI slot 4	AD28	INT A, B, C, D	GNT D	REQ D

Appendix C

Programming the GPIO and Watchdog Timer

C.1 Supported GPIO Register

Bellow are detailed description of the GPIO addresses and programming sample.

C.1.1 GPIO Registers

CRF0 (GP10-GP17 I/O selection register. Default 0xFF)

When set to a '1', respective GPIO port is programmed as an input port.

When set to a '0', respective GPIO port is programmed as an output port.

CRF1 (GP10-GP17 data register. Default 0x00)

If a port is programmed to be an output port, then its respective bit can be read/written.

If a port is programmed to be an input port, then its respective bit can only be read.

CRF2 (GP10-GP17 inversion register. Default 0x00)

When set to a '1', the incoming/outgoing port value is inverted.

When set to a '0', the incoming/outgoing port value is the same as in data register.

Extended Function Index Registers (EFIRs)

The EFIRs are write-only registers with port address 2Eh or 4Eh on PC/AT systems.

Extended Function Data Registers(EFDRs)

the EFDRs are read/write registers with port address 2Fh or 4Fh on PC/AT systems.

C.1.2 GPIO Example program-1

```
-----------------------------------------------------------
 Enter the extended function mode, interruptible double-write
-----------------------------------------------------------
MOV DX,4EH
MOV AL,87H
OUT DX,AL
OUT DX,AL

-----------------------------------------------------------
Configure logical device 7(GP10~GP17), configuration register CRF0,CRF1,CRF2
-----------------------------------------------------------
MOV DX,4EH
MOV AL,07H ; point to Logical Device Number Reg.
OUT DX,AL
MOV DX,4FH
MOV AL,07H ; select logical device 7
OUT DX,AL ;
MOV DX,4EH
MOV AL,F0
OUT DX,AL
MOV DX,4FH
MOV AL,00H  ; 01:Input  00:output  for  GP10~GP17
OUT DX,AL
MOV DX,4EH
MOV AL,F2H ;
OUT DX,AL
MOV DX,4FH
MOV AL,00H    ;Set GPIO is normal not inverter
OUT DX,AL;
MOV DX,4EH
MOV AL,F1H
OUT DX,AL
MOV DX,4FH
MOV AL,??H ;  Put the output value into AL
OUT DX,AL


-----------------------------------------------------------
Exit extended function mode |
-----------------------------------------------------------
MOV DX,4EH
MOV AL,AAH
OUT DX,AL
```

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