PCE-5124

LGA775 Intel® Core™ 2 Quad / Core™ 2 Duo Processor-based 800/1066/1333 MHz FSB PICMG 1.3 Single Host Board with PCIe / DDR2 / Dual GbE LAN

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.

Certifications

FCC

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

- This device may not cause harmful interference
- 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.*

Memory Compatibility

Table 1.1: PCE-5124 Memory Tested for Compatibility

Brand	Size	Speed	Type	ECC	Vendor PN	Advantech PN	Memory
Transcend	512 MB	DDR 2 667	DDR2	N	78.91G92.420	N/A	ELPIDA E5108AG-6E-E (64x8)
	1 GB	DDR 2 667	DDR2	N	78.01G92.420	N/A	ELPIDA E5108AGBG-6E-E (64x8)
	512 MB	DDR 2 667	DDR2	N	TS64MLQ64V6J	96D2-512M667NN-TR	SEC K4T51083QC ZCE6 (64x8)
	512 MB	DDR 2 667	DDR2	N	TS64MLQ64V6J	96D2-512M667NN-TR	Micron 5XB32D9DCL (64x8)
	1 GB	DDR 2 667	DDR2	N	TS2QNJ23450-6S	96D2-1G667NN-TR	SEC K4T51083QE ZCE6 (64x8)
	2 GB	DDR 2 667	DDR2	N	TS256MLQ64V6U	N/A	Micron 7HE12 D9HNL (128x8)
	1 GB	DDR 2 800	DDR2	N	TS128MLQ64V8J	N/A	ProMOS V59C1512804QBF25 (64x8)
	2 GB	DDR 2 667	DDR2	N	TS256MLQ64V6U	N/A	SAMSUNG K4T1G084QA-ZCE6 (128x8)
DSL	1 GB	DDR 2 667	DDR2	N	N/A	N/A	ELPIDA E5108AGBG-6E-E (64x8)
	1 GB	DDR 2 800	DDR2	N	N/A	N/A	ELPIDA E5108AHSE-8E-E (64x8)
Kingston	2 GB	DDR 2 667	DDR2	N	KVR667D2N5/2G	N/A	Micron 7KE12 D9HNL (128x8)
	1 GB	DDR 2 800	DDR2	N	KVR800D2N5/1G	N/A	ELPIDA E5108AHSE-8E-E (64x8)

Network Feature Comparison

Table 1.2: PCE-5124 comparison table

LAN/Model	PCE-5124G2	PCE-5124VG
LAN1: Intel 82566DM	Yes	Yes
LAN2: Intel 82573V	Yes	No

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 motherboard, please make sure that the following materials have been shipped:

- 1 PCE-5124 PICMG 1.3 Single Host Board
- 1 PCE-5124 startup manual P/N: 2002512410
- 1 CD with utility P/N: 2062512400
- 1 FDD cable P/N: 1700340640
- 1 User note for full-sized CPU card P/N: 2002721020
- 2 Serial ATA HDD data cable P/N: 1700003194
- 2 Serial ATA HDD power cable P/N: 1703150102
- 1 COM + printer ports cable kit P/N: 1701260305
- 1 4-port USB cable kit P/N: 1700008461
- Keyboard and mouse Y cable P/N: 1700060202
- 1 jumper package P/N: 9689000068
- 1 warranty card P/N: 2190000902

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the PCE-5124 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-5124, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Contents

CHAPTER 1

Hardware Configuration

Chapter 1 Hardware Configuration

1.1 Introduction

PCE-5124 is a PICMG 1.3 form-factor single host board which is designed with Intel Q35 plus ICH9DO platform for industrial applications that need high computing power and strong I/O capability.

PCE-5124 supports 45nm and 65nm manufacture technology Intel® Core™ 2 Duo, Core™ 2 Quad, Pentium® Dual-Core and Celeron® 400 sequence processors with FSB up to 1333MHz and DDR2 667/800MHz SDRAM up to 8GB. By supporting advanced computing technology, PCE-5124 is suitable for computing power hungry industrial applications.

PCE-5124 performs excellent graphic processing capability by it's embedded Intel® Graphics Media Accelerator 3100 with shared memory up to 256MB. PCE-5124 can provide strong 2D/3D graphic processing power without an add-on graphic card, it saves user extra cost, power consumption and thermal design effort caused by an add-on graphic card.

PCE-5124 also has rich I/O interfaces, it's 6 SATA2 ports can support software RAID 0, 1, 10, 5 to be a cost-effective data reliability solution, the 6 on-board serial ports (COM ports) allows PCE-5124 to meet various industrial control applications. With 1 PCI-E x 16 and 4 PCI-E x 1 lanes go down to the backplane, PCE-5124 can expand various expansion slots such as PCI, PCI-X and PCI-E slots with various backplanes.

With outstanding performance and exceptional features, PCE-5124 is the very advanced computing platform for today's and tomorrow's up-and-coming industrial applications.

1.2 Features & Benifits

Features	Benefits
Supporting Intel® Core™ 2 Quad / Core™ 2 Duo / Pentium® Dual-core/ Celeron® 400 Series processors	Support Intel's most advanced 45-nm and 65-nm manufacture technology, multi-core processors that are with high performance and low power consumption (≤65W), suitable for applications that need strong computing power and high reliability.
One PCI Express X 16 and Four X 1 to backplane	PCIe x 16 can support the most powerful graphic cards for intense 3D graphic computing. 4 PCIe x 1 lanes can be flexibly configured as various kinds of expansion slots on the back plane for I/O card usage.
6 on-board SATA 2 ports supporting S/W RAID 0,1,5,10	A cost-saving solution to data storage protection and reliability.
Dual Gigabit Ethernet LAN via dedicated PCI Express X1 ports	Providing high throughputs for heavy loading networking applications.
Six serial ports, 1 of RS232/422/485, 5 of RS232.	Multi COM ports for automations such as machine control, factory applications, ...etc.

1.3 Specifications

1.3.1 System

- **CPU:** Intel Core 2 Quad / Core 2 Duo / Pentium Dual-core / Celeron 400 Sequence Processors with 800 / 1066 / 1333 MHz FSB.
- **L2 Cache:** Core 2 Quad: Maximum 12 MB

  Core 2 Duo: Maximum 6 MB

  Pentium Dual-core: Maximum 1 MB

  Celeron 400: Maximum 512 MB
- **BIOS:** AMI SPI BIOS (32 Mb SPI)
- **System Chipset:** Q35 GMCH plus ICH9DO ICH
- **SATA hard disk drive interface:** Six onboard SATA2 connectors with data transmission rates of up to 300 MB/s. These interfaces can be enabled/disabled in the BIOS.

Note: *PCE-5124 does NOT support PATA(IDE) interface.*

- **Floppy disk drive interface:** Supports one floppy disk drive, 5¼" (360 KB and 1.2 MB) or 3½" (720 KB, 1.44 MB). These interfaces can be enabled/disabled in the BIOS.

1.3.2 Memory

- **RAM:** Up to 8 GB in four 240-pin DIMM sockets. Supports dual-channel DDR2 667 / 800 MHz SDRAM.

1.3.3 Input/Output

- **PCI express lanes:** One PCI-E x 16 and four PCI-E x 1 lanes to the backplane.
- **PCI bus:** Four PCI masters to the backplane, 32-bit, 33 MHz PCI 2.2 compliant.
- **Enhanced parallel port:** This EPP/SPP/ECP port can be configured to LPT1, LPT2, LPT3 or disabled. A standard DB-25 female connector provided.
- **Serial ports:** Six serial ports, Five ones are of RS 232 and one is of RS-232 / 422 / 485.
- **PS/2 keyboard and mouse connector:** One 6-pin mini-DIN connectors is located on the mounting bracket for easy connection to a PS/2 keyboard and mouse via the Y-cable included in the package.
- **USB port:** Supports up to twelve USB 2.0 ports with transmission rate up to 480 Mbps. 8 ports are on the CPU card and 4 ports are on the backplane.

1.3.4 Graphics

- **Controller:** Intel® Graphics Media Accelerator 3100 embedded in the GMCH.
- **Display memory:** Dynamically shared system memory up to 256 MB.
- **CRT:** Up to 2048 x 1536 resolution, 400 MHz RAMDAC.
- **PCI express x16 slot on the backplane:** An external graphic card can be installed in the PCI-E x 16 slot for stronger 2D/3D graphic capability.

1.3.5 Ethernet LAN

- Supporting single/dual 10/100/1000Base-T Ethernet port(s) via the dedicated PCI Express x1 bus which provides 500 MB/s data transmission rate.
- **Controller:**
  LAN 1: Intel 82566DM (G2 version or VG version)
  LAN 2: Intel 82573V (G2 Version)

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).

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:** +3.3 V, +5 V, ±12 V
- **Power consumption:** Maximum: +5 V at 2.4 A, +3.3V at 3 A, +12 V CPU: Intel Core 2 Quad Desktop Processor Q6200; Memory: 4 DDR2 800 MHz 1 GB DIMMs

Voltage	+12 V	+5 V	+3.3 V	+5 VSB	-12 V	-5 V
Current	6.78 A	4.06 A	2.72 A	0.43 A	0	0

- **Board size:** 338.58 mm (L) x 126.39 mm (W) (13.3" x 4.98")
- **Board weight:** 0.490 kg

1.4 Jumpers and Connectors

Connectors on the PCE-5124 single host board link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

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

Table 1.1: Jumper list

Label	Function
CMOS1	CMOS clear
JWDT1	Watchdog Reset
JOBS1	HW Monitor Alarm

Table 1.2: Connector list		
Label		**Function**
FDD1		FDD connector
LPT1		Parallel port, Parallel port x 1, supports SPP/EPP/ ECP mode
LAN1		GbE LAN1 / Intel 82566DM
LAN2		GbE LAN2 / Intel 82573V
VGA1		VGA connector
KBMS1		PS/2 keyboard and mouse connector
KBMS2		External keyboard/mouse connector
COM1		Serial port: COM1; RS-232 (Box Header)
COM2		Serial port: COM2; RS-232 / 422 / 485 (G2 version: 9-pin Box Header; VG version: 9-pin D-Sub)
COM3-4		Serial port: COM3; RS-232 (20-pin Box Header)
COM5-6		Serial port: COM4; RS-232 (20-pin Box Header)
JSETCOM2		COM2 RS-232/422/485 mode selection
JIR1		Infrared connector
JFP3 (Keyboard Lock and Power LED)	Power LED	Suspend: Fast flash (ATX/AT)
		System On: ON (ATX/AT)
		System Off: OFF (AT)
		System Off: Slow flash (ATX)
JFP2		External speaker / SATA HDD LED connector
JFP1		Power Switch / Reset connector
JCASE1		Case Open
CPUFAN1		CPU FAN connector (4-pin)
LANLED1		LAN1/2 LED extension connector
HDAUD1		Connector for HD audio extension module
USB12		USB port 1, 2
USB34		USB port 3, 4
USB56		USB port 5, 6
USB78		USB port 7, 8
SATA1		Serial ATA1
SATA2		Serial ATA2
SATA3		Serial ATA3

Table 1.2: Connector list	
Label	**Function**
SATA4	Serial ATA4
SATA5	Serial ATA5
SATA6	Serial ATA7
SP1	Buzzer
CPU1	CPU Socket
DIMMA1	Memory connector channel A
DIMMA2	Memory connector channel A
DIMMB1	Memory connector channel B
DIMMB2	Memory connector channel B
GPIO1	GPIO pin header (SMD pitch-2.0 mm)

1.5 Board Layout: Jumper and Connector Locations

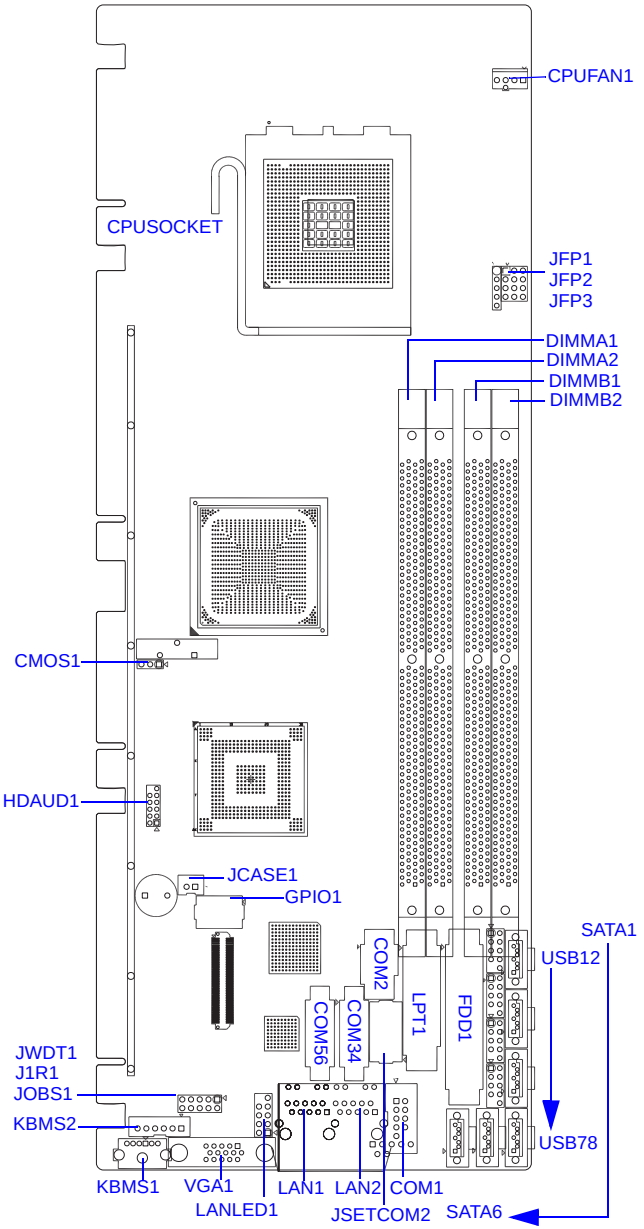


Figure 1.1: Jumper and connector locations

1.6 PCE-5124 Block Diagram

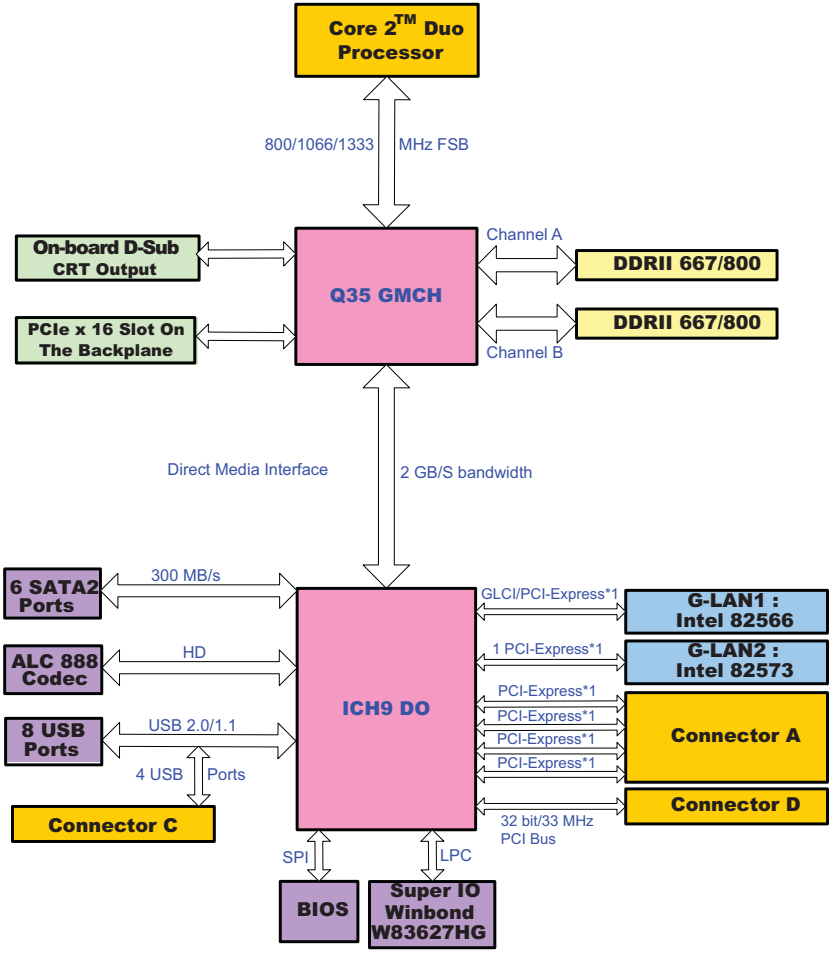


Figure 1.2: PCE-5124 block diagram

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 motherboard. 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. 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.*

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.*

1.8 Jumper Settings

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

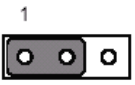
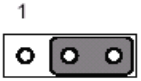
1.8.1 How to set jumpers

You can configure your motherboard 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.

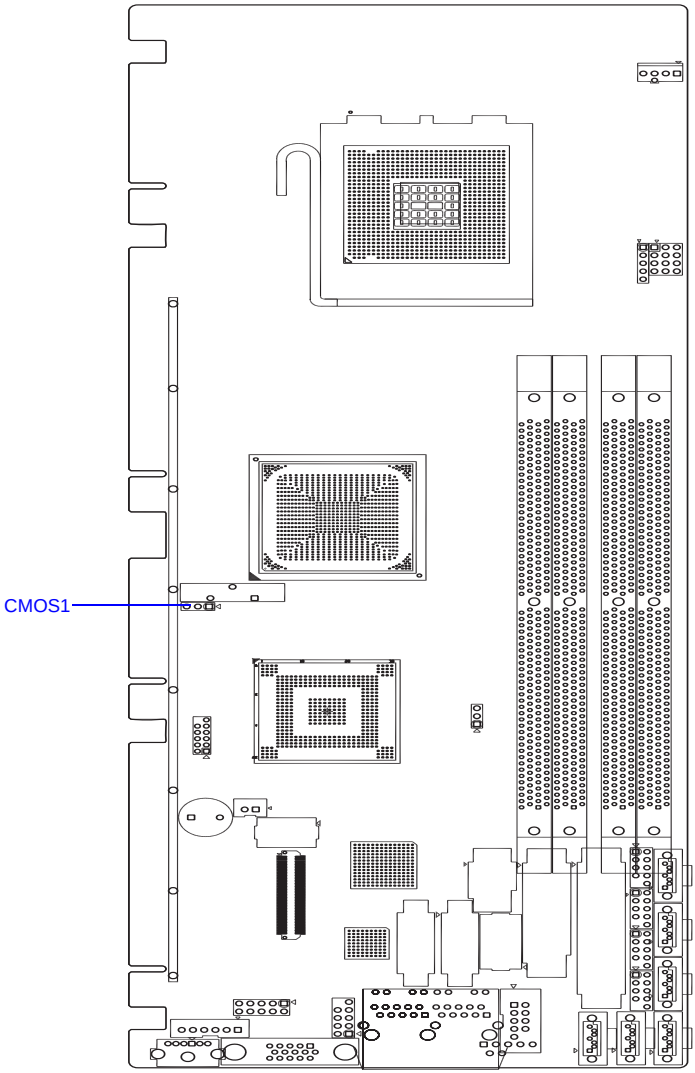
1.8.2 CMOS clear (CMOS1)

The PCE-5124 CPU card contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set J1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 1.3: CMOS (CMOS1)

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

* default setting


CMOS1

1.8.3 Watchdog timer output (JWDT1)

The PCE-5124 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 PCE-5124 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 (JWDT1)

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.

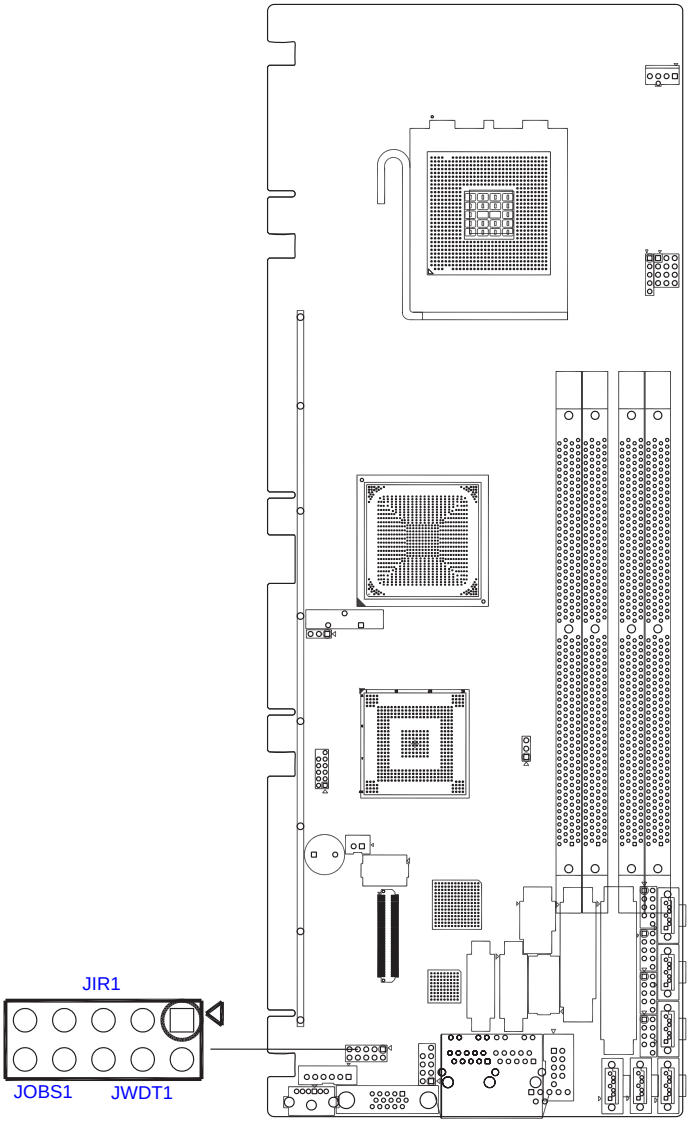

JIR1
JOBS1
JWDT1

Table 1.5: H/W monitor alarm (JOBS1)	
Function	**Jumper Setting**
AT Mode	1  1-2 closed
ATX Mode	1  2-3 closed

(JOBS1) is a 2-pin connector for setting enable/disable alarm while the on-board security event acts.

1.8.4 COM2 RS-232/422/485 mode selector (JESTCOM2)

Users can use JESTCOM2 to select among RS-232/422/485 modes for COM2. The default setting is RS-232.

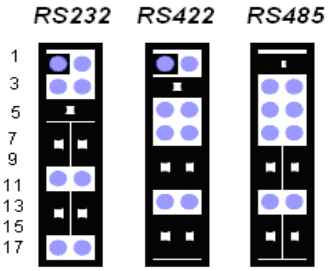
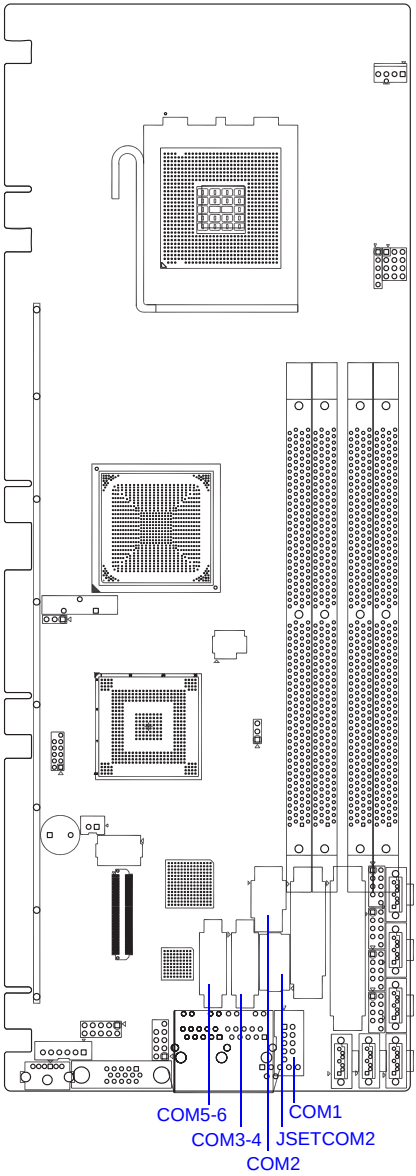


Figure 1.3: COM2 RS-232/422/485 jumper setting

Table 1.6: COM2 RS-232/422/485 mode selector	
Function	**Jumper Setting**
RS-232	(5-6) + (7-9) + (8-10) + (13-15) + (14-16) closed
RS-422	(3-4) + (9-11) + (10-12) + (15-17) + (16-18) closed
RS-485	(1-2) + (9-11) + (10-12) + (15-17) + (16-18) closed


COM5-6
COM3-4
COM2
JSETCOM2
COM1

1.9 System Memory

The PCE-5124 has four sockets for 240-pin dual inline memory modules (DIMMs) in two memory channels.

All these sockets use 1.8 V unbuffered double data rate synchronous DRAMs (DDR SDRAM). They are available in capacities of 256 MB, 512 MB, 1024 MB and 2 GB. The sockets can be filled in any combination with DIMMs of any size, giving a total memory size between 256 MB and 8 GB.

The PCE-5124 can accept DDR2 SDRAM memory chips without parity. Also note that the PCE-5124 accepts DDR2 667/800 MHz SDRAM, and DDR2 SDRAM. The PCE-5124 does NOT support ECC (error checking and correction).

Note: *Because PCE-5124 supports Intel® Active Management Technology 3.0 (iAMT 3.0) function, some capacity of system memory will be taken for iAMT 3.0 usage. Please see detailed description below.*

- *If both channels are occupied in the system are of the same size (DIMMA1+DIMMB1 = DIMMA2 + DIMMB2) then Intel AMT takes 32MB.*
- *If ch0 not equal ch1 (DIMMA1+DIMMB1 ≠ DIMMA2 + DIMMB2) then memory is configured in interleaved+stacked mode and Intel AMT takes only 16MB from CH0.*
- *If no ch0 memory is used, then Intel AMT would not function, then it does not occupy any memory size.*

Beside iAMT 3.0, due to PC architecture limitation, the memory capacity recognized by the BIOS may be different from that is physically installed in the DIMM slots.

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.

Note: *Because PCE-5124 supports Intel Active Management Technology 3.0 (iAMT3.0) which utilizes some memory space of channel 0, it's suggested that the user should not leave channel 0 DIMM slots (DIMMA1 and DIMMA2) empty, or it may cause some system abnormality.*

1.11 Cache Memory

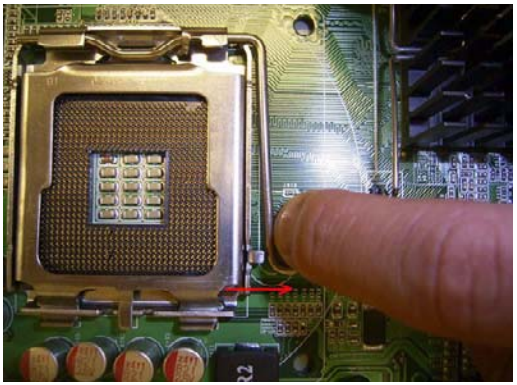
Those CPUs supported by PCE-5124 have 12 MB, 8MB, 6 MB, 4MB, 3MB, 2MB, 1 MB, 512KB L2 cache memory sizes.

1.12 Processor Installation

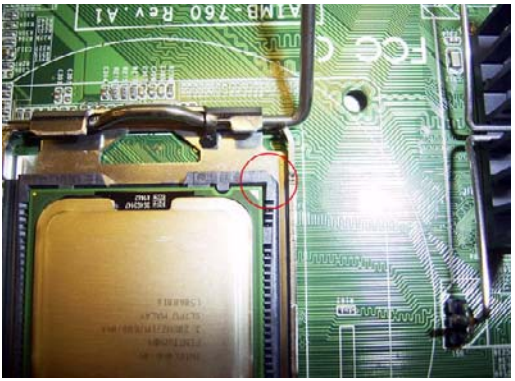
Warning! *Without a fan or heat sink, the CPU will overheat and cause damage to both the CPU and the single board computer. To install a CPU, first turn off your system.*

The PCE-5124 is designed for Intel® LGA 775 socket CPUs.

Step 1. Pull the bar beside the CPU socket outward and lift it.



Step 2. Align the triangular marking on the processor with the cut edge of the socket.



Step 3. Put the back socket cap and press down the bar to fix it.

CHAPTER 2

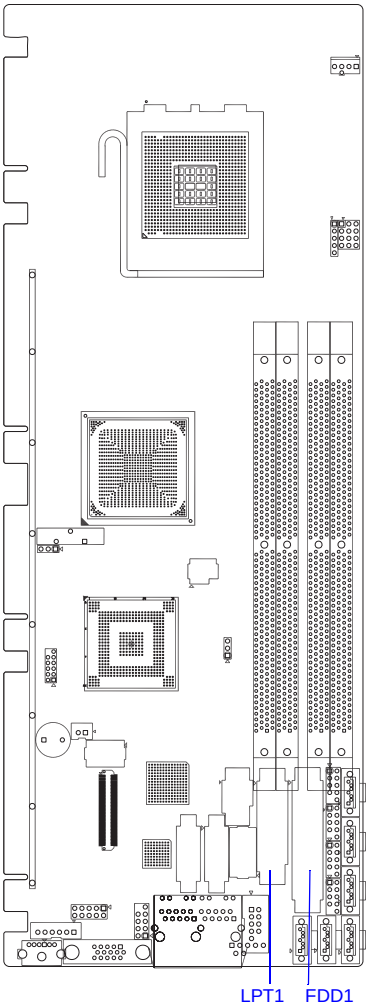
Connecting Peripherals

Chapter 2 Connecting Peripherals

2.1 Introduction

You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove the card to make all the connections.

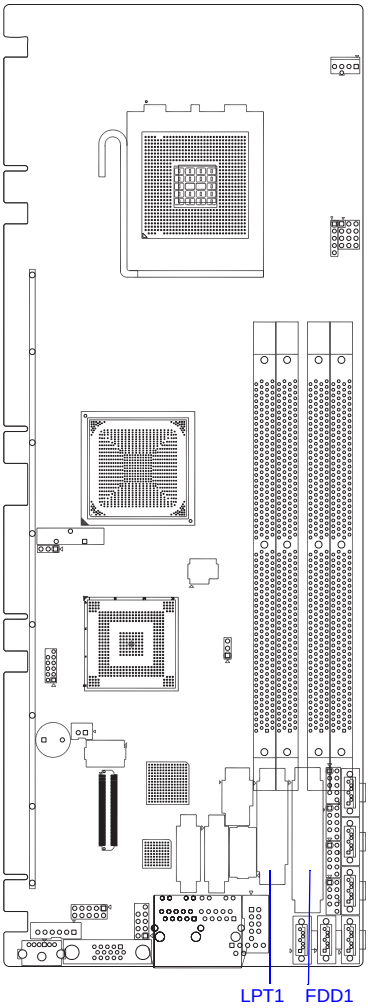
2.2 Floppy Drive Connector (FDD1)



You can attach up to two floppy disk drives to the PCE-5124's onboard controller. You can use 3.5" (720 KB, 1.44 MB) drives.

The motherboard 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.

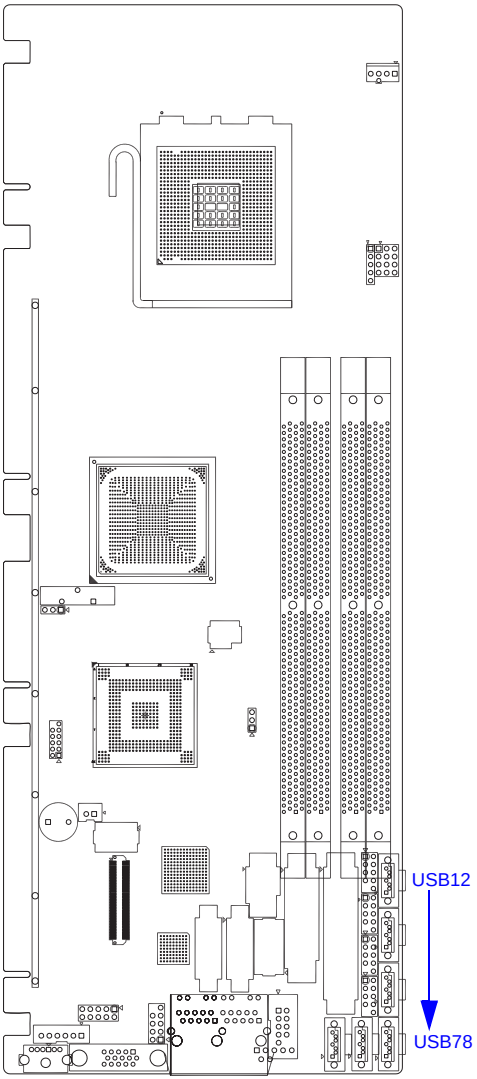
2.3 Parallel Port (LPT1)



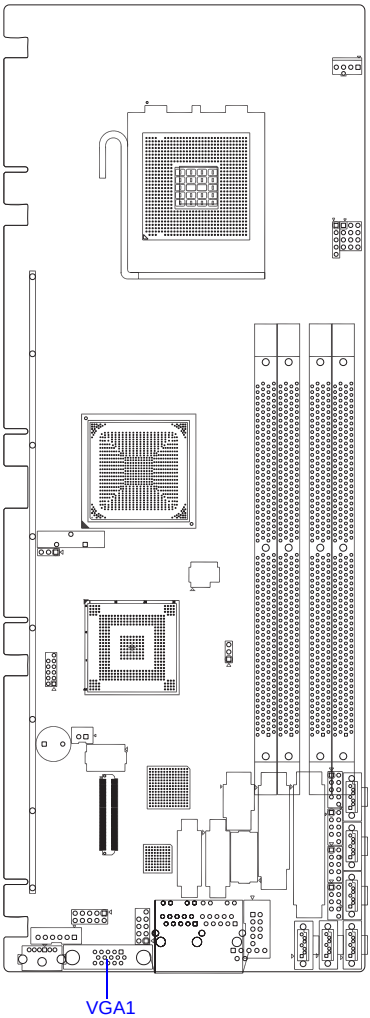
The parallel port is normally used to connect the motherboard to a printer. The PCE-5124 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, LPT1.

2.4 USB Ports (USB12, USB34, USB56, USB78)

The PCE-5124 provides up to eight USB (Universal Serial Bus) ports with complete Plug & Play and hot swap support for up to 127 external devices. These USB ports comply with USB Specification Rev. 2.0, support transmission rates up to 480 Mbps and are fuse protected. The USB interface can be disabled in the system BIOS setup.

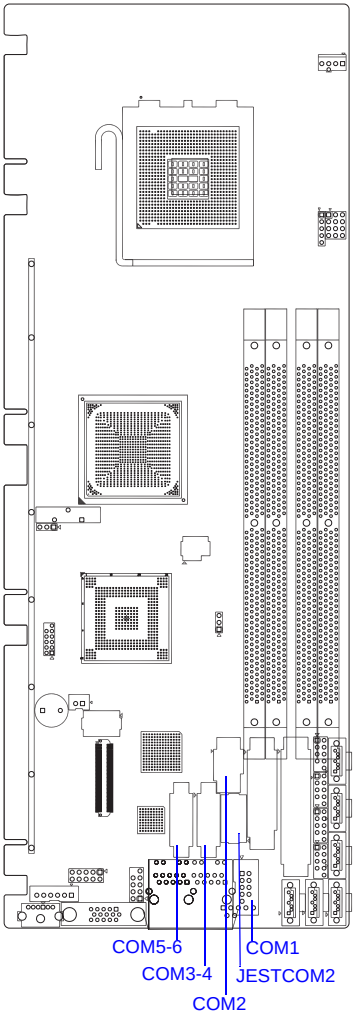


2.5 VGA Connector (VGA1)



The PCE-5124 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 VGA1 are detailed in Appendix B.

2.6 Serial Ports (COM1, COM2, COM3-4 & COM5-6)



The PCE-5124 offers six serial ports. The user can use JSETCOM2 to select among RS-232/422/485 modes for COM2. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

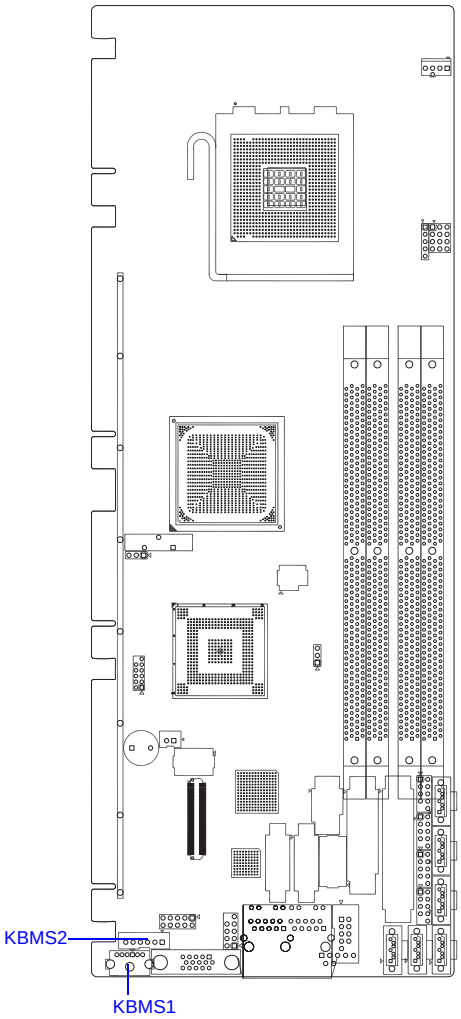
The IRQ and address ranges for both ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup.

Different devices implement the RS-232/422/485 standards in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

Note *There are two kinds of dual COM cable kits for PCE-5124 COM port pin headers, if you need to use more serial ports, you may purchase them from Advantech.*

1. *1701092300: 2.54 mm-pitch dual-COM port cable kit for COM 1-2*
2. *1700008762: 2.00 mm-pitch dual-COM port cable kit for COM 3-4 and COM 5-6*

2.7 PS/2 Keyboard and Mouse Connector (KBMS1)

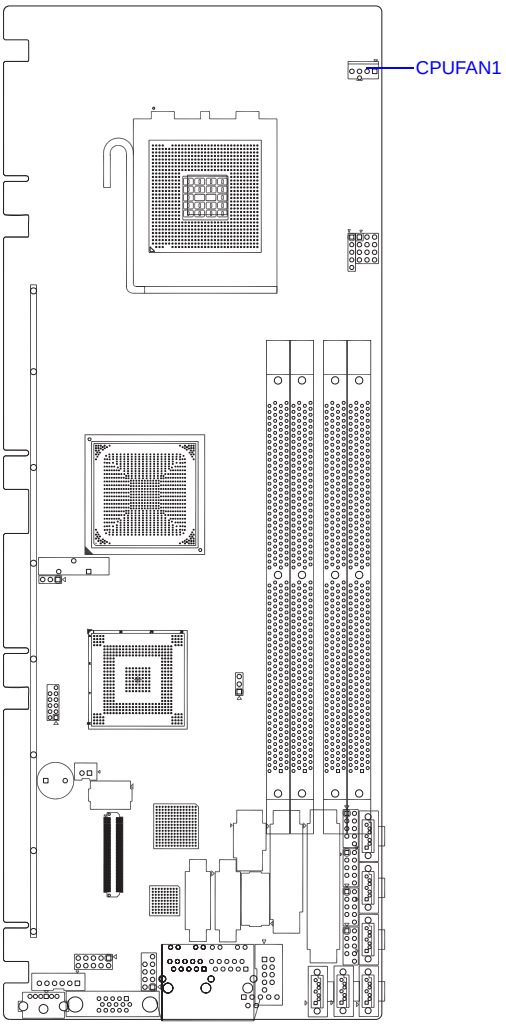


Two on-board 6-pin mini-DIN connectors (KBMS1) provide connection to PS/2 keyboard and mouse by the Y-cable (1700060202) in the package.

The on-board KBMS2 pin header provide connection the the front panel PS/2 keybaord and mouse connector of the chassis.

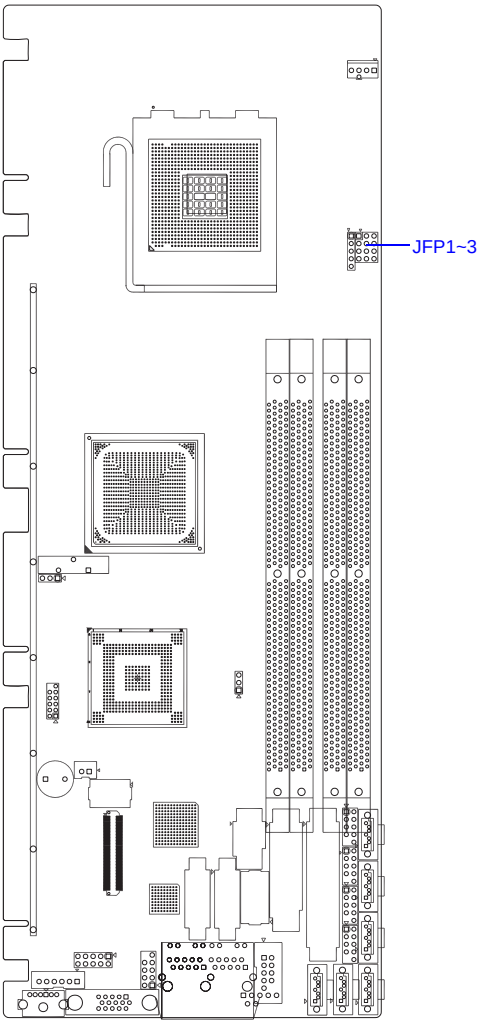
2.8 CPU Fan Connector (CPUFAN1)

This connector supports cooling fans of 500 mA (6 W) or less.



2.9 Front Panel Connectors (JFP1, JFP2 & JFP3)

There are several external switches to monitor and control the PCE-5124.



2.9.1 Power LED and keyboard lock (JFP3)

JFP3 is a 5-pin connector for the power 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

2.9.2 External speaker (JFP2)

JFP2 is a 4-pin connector for an external speaker. The PCE-5124 provides an onboard buzzer as an alternative to an external speaker. To enable the buzzer, set pins 5 and 7 as closed.

2.9.3 Reset connector (JFP1)

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

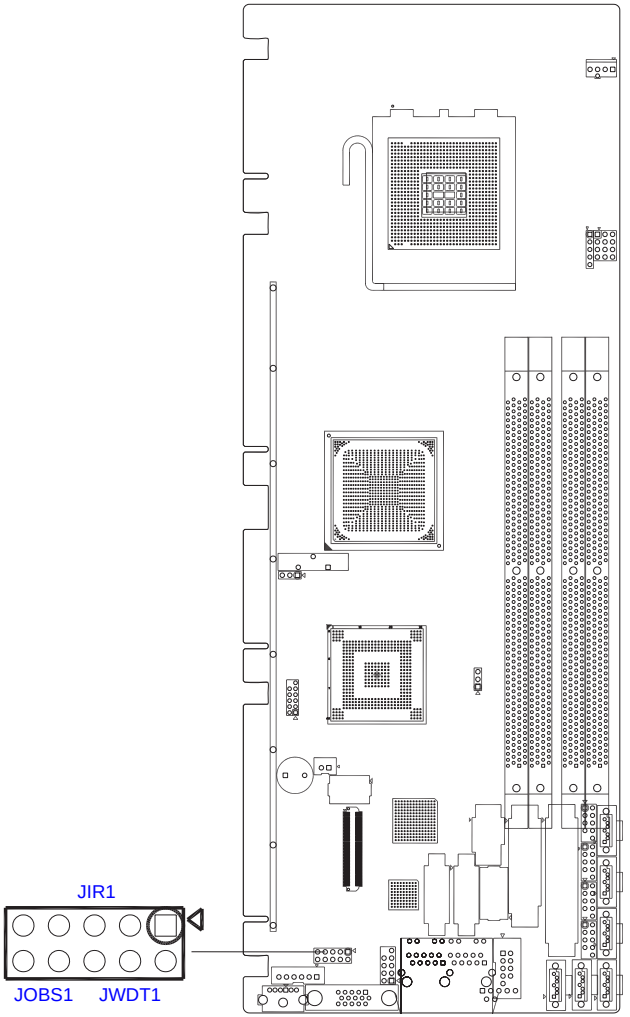
2.9.4 HDD LED connector (JFP2)

You can connect an LED to connector JFP2 to indicate when the HDD is active.

2.9.5 ATX soft power switch (JFP1)

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. This connection enables you to turn your computer on and off.

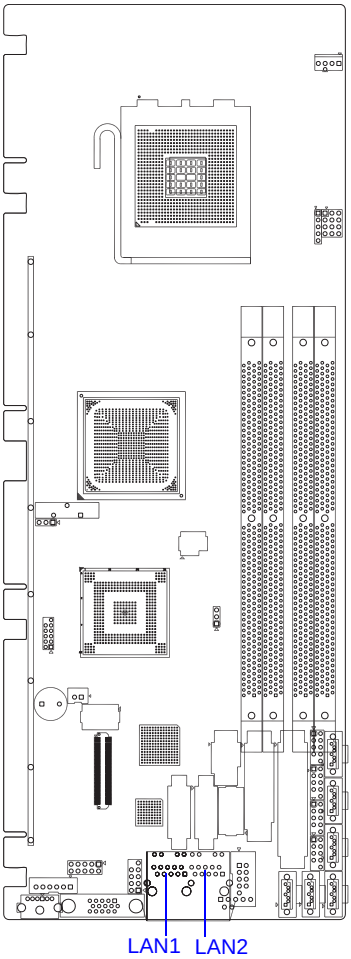
2.10 H/W Monitor Alarm (JOBS1)



Close: Enable OBS Alarm

Open: Disable OBS Alarm

2.11 LAN Ports (LAN1 & LAN2)

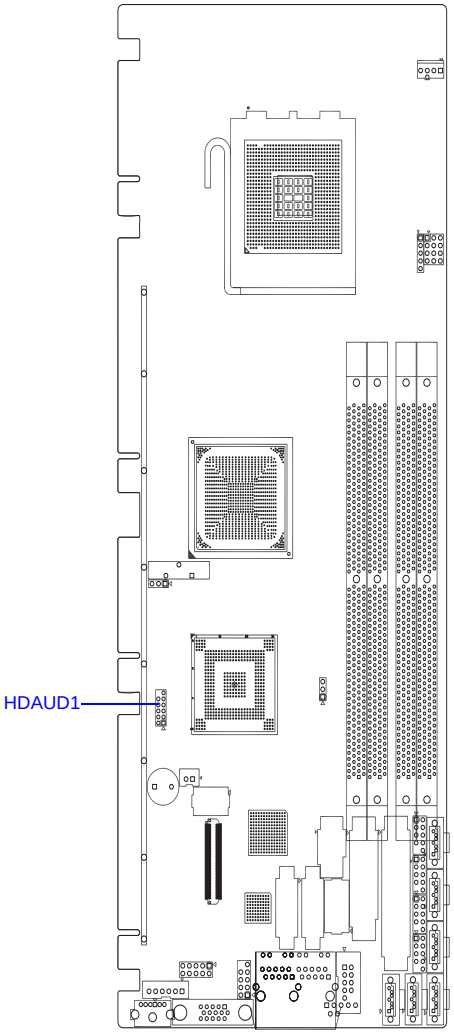


The PCE-5124 is equipped with one or two high-performance 1000 Mbps Ethernet LANs. They are supported by all major network operating systems. The RJ-45 jacks on the rear plate provide convenient connectivity.

Table 2.2: LAN LED indicator

Lan mode	Lan Indicator
1 Gbps Link on	LED1 Green on
100 Mbps Link on	LED1 Orange on
Active	LED2 Green flash

2.12 High Definition Audio Module Interface

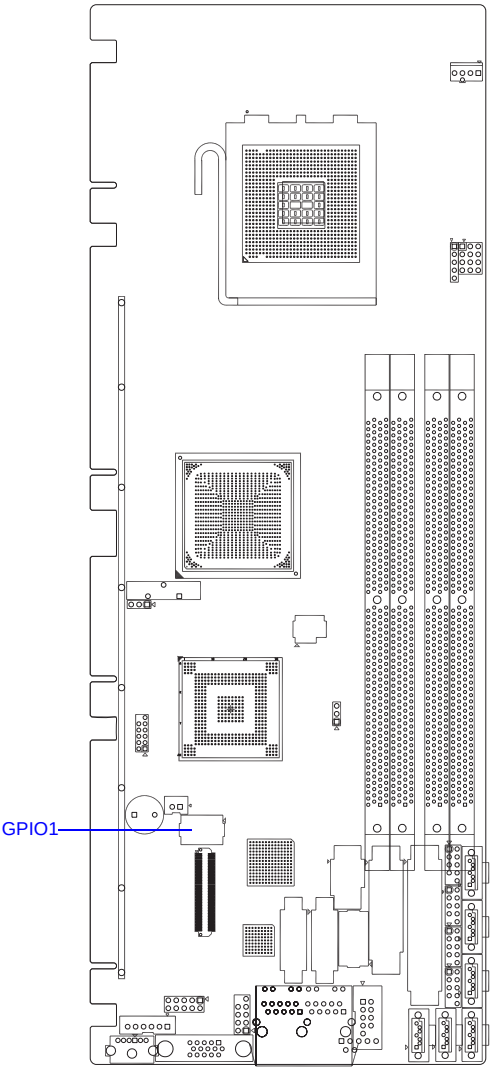


This HDAUD1 pin header is the connection interface to Advantech's 7.1 channel high definition audio module.

Note: *Advantech 7.1 channel high definition audio module ordering information.*

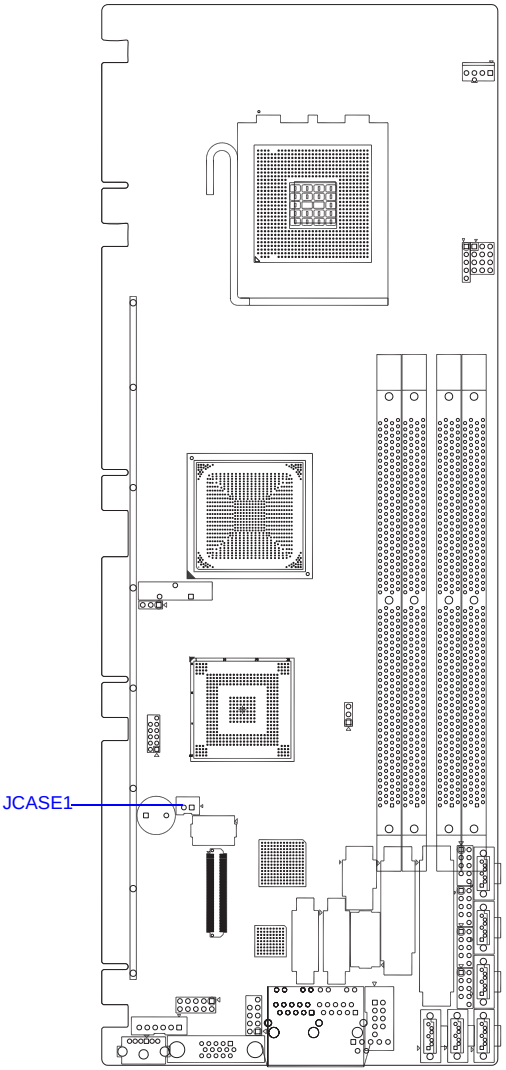
P/N: PCA-AUDIO-HDA1E

2.13 GPIO Header (GPIO1)



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 C.

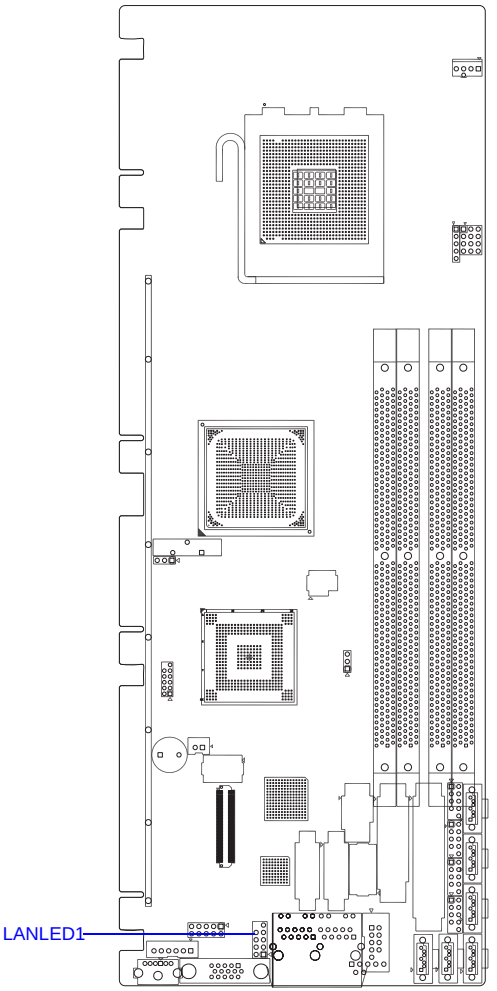
2.14 Case Open Connector (JCASE1)



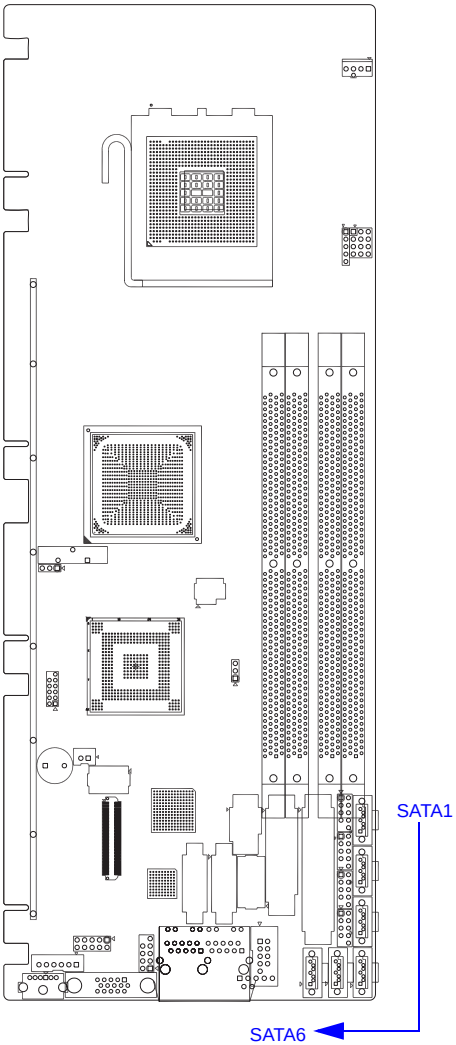
The 2-pin case open connector is for chassis with a case open sensor. While opening the case, the buzzer on motherboard will beep.

2.15 Front Panel LAN Indicator Connector (LANLED1)

Table 2.3: Front Panel LAN Indicator Connector	
LAN Mode	**Indicator**
G-LAN Link ON	Green ON
G-LAN Active	Green Flash
G-LAN Link Off	Green OFF



2.16 Serial ATA Interface (SATA1~SATA6)



The PCE-5124 features high performance serial ATA interfaces (up to 300 MB/s) those eases cabling to hard drives or CD/DVD drives with thin and long cables.

These six on-board SATA ports can be configured as RAID 0, 1, 10, 5. Please see the detailed BIOS setting instruction of this in Chapter 3.

CHAPTER 3

AMI BIOS Setup

Chapter 3 AMI BIOS Setup

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

With the AMIBIOS 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-5124 setup screens.

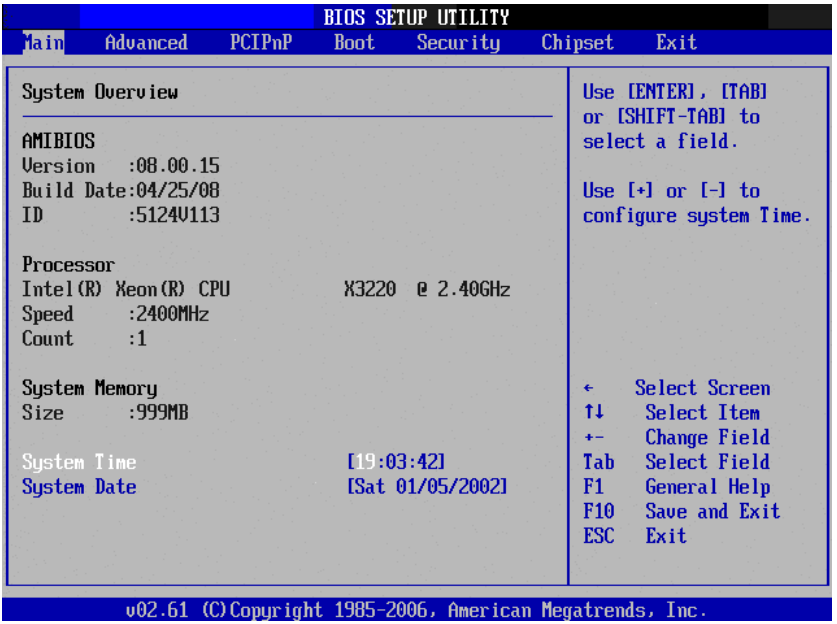


Figure 3.1: Setup program initial screen

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

Turn on the computer and check for the “patch” code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU’s system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

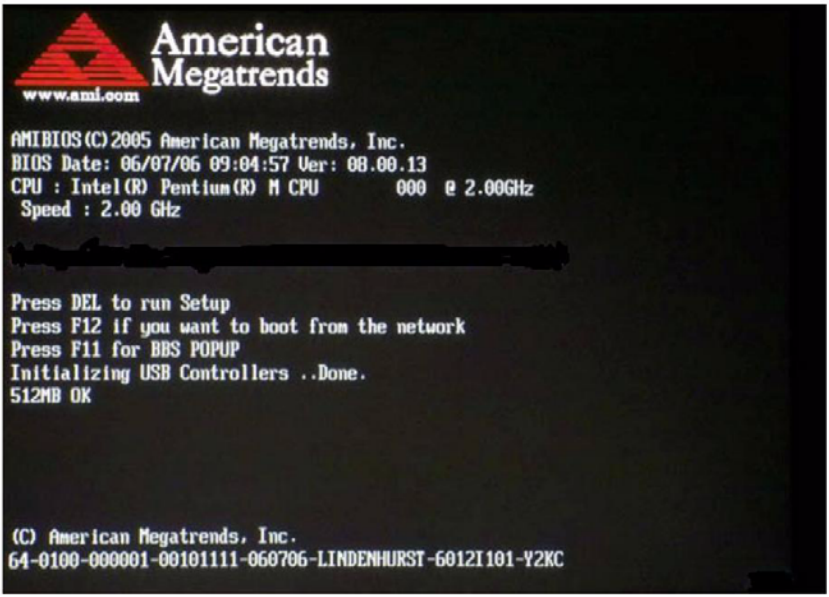


Figure 3.2: Press Del to run Setup

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.

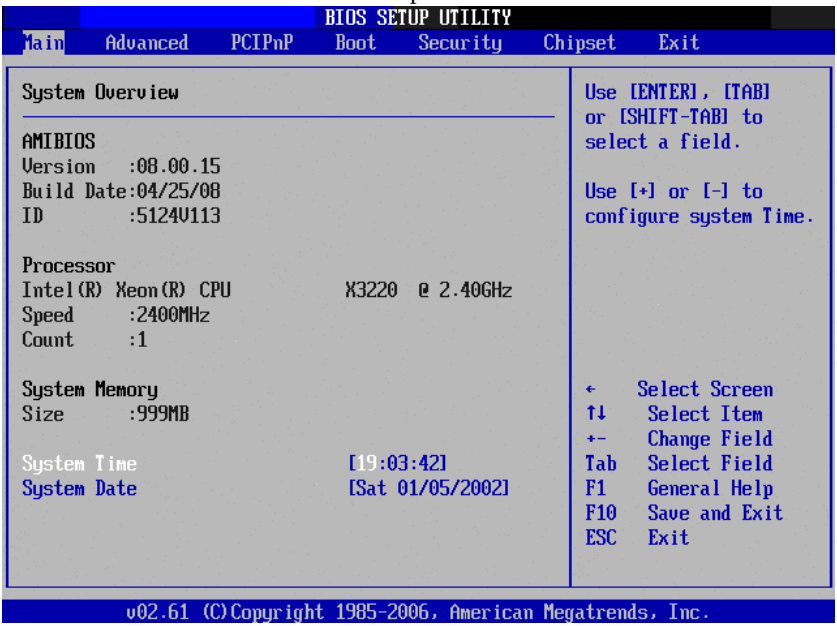


Figure 3.3: Main setup screen

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 be. 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-5124 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 screens is shown below. The sub menus are described on the following pages.

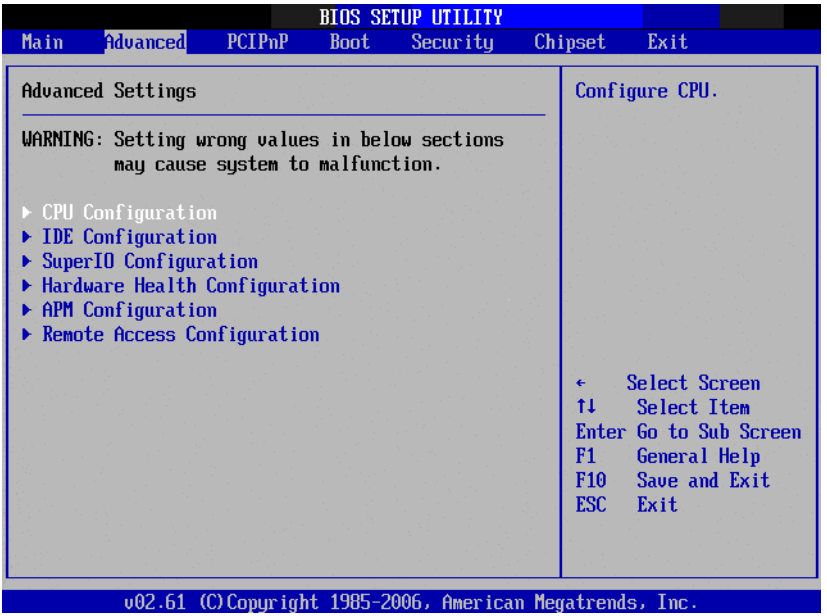


Figure 3.4: Advanced BIOS features setup screen

3.3.1 CPU configuration

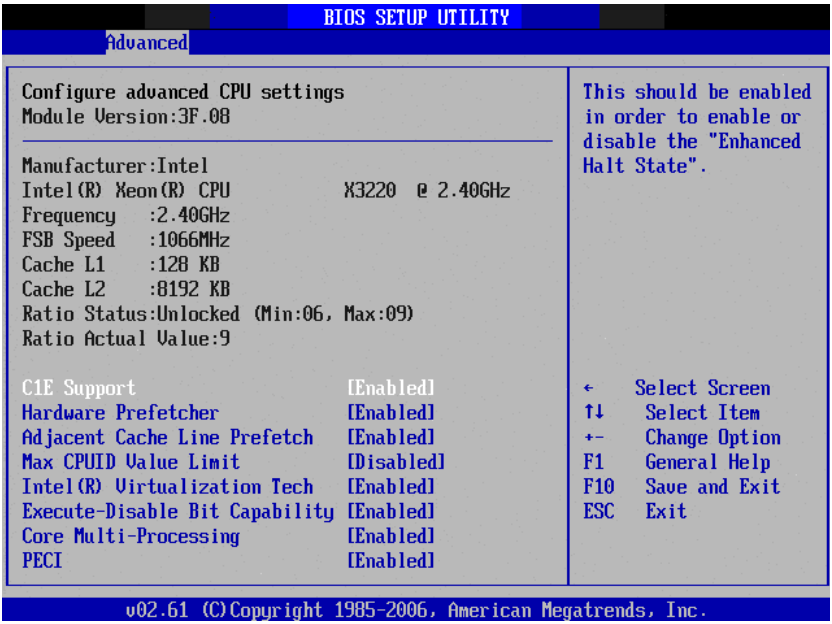


Figure 3.5: CPU configuration setting

C1E Support

Intel® CPU Enhanced Halt (C1E) function, a function to save CPU power consumption in system halt state. When enabled, the CPU speed and voltage will be reduced during system halt state to save power consumption. You may choose to enable or disable it.

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(R) 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

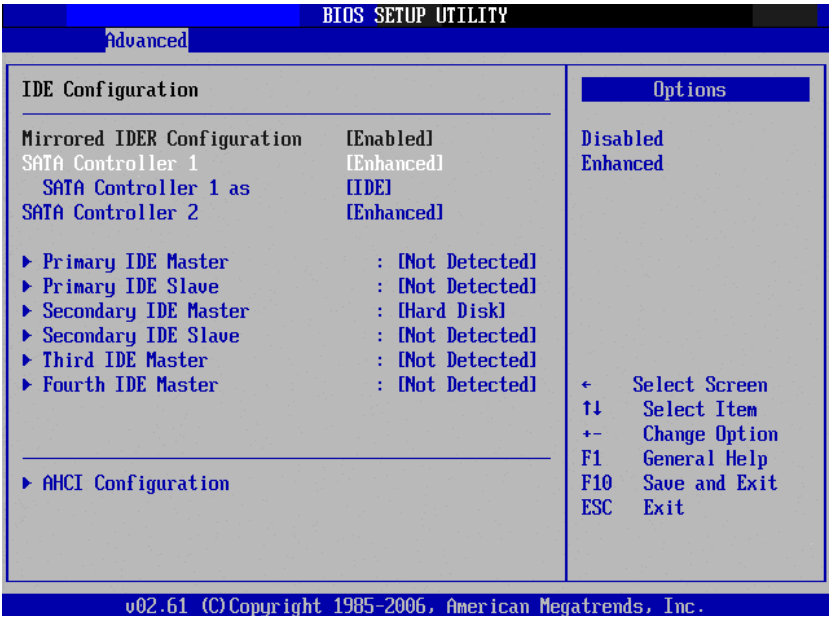


Figure 3.6: IDE configuration

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

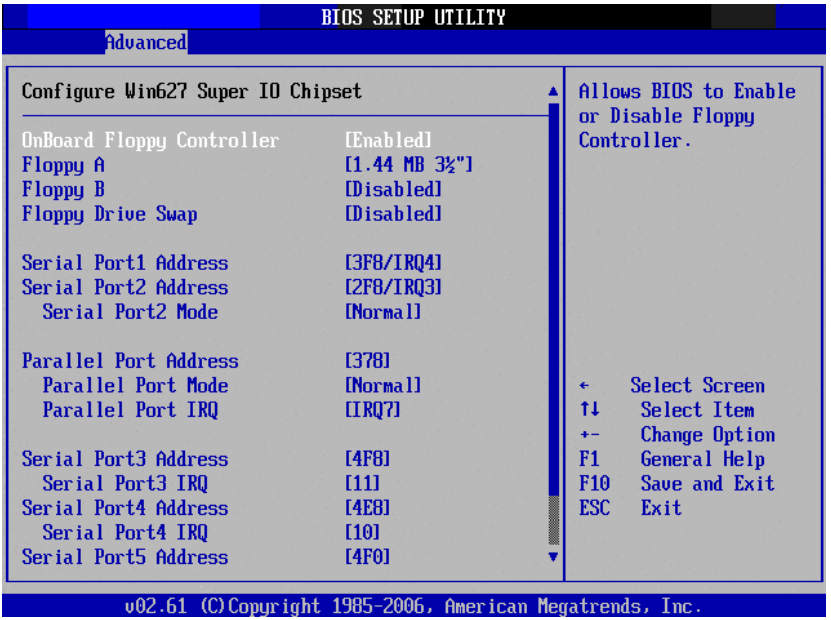


Figure 3.7: Super I/O configuration

OnBoard Floppy Controller

This option allows the BIOS to Enable or Disable the floppy controller.

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.

Serial port2 Mode

This option configures serial port 2 mode.

Serial Port 3/4/5/6 Address

This option configures serial port 3/4 base addresses.

Serial Port 3/4/5/6 IRQ

This option configures serial port 3/4 base IRQ.

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

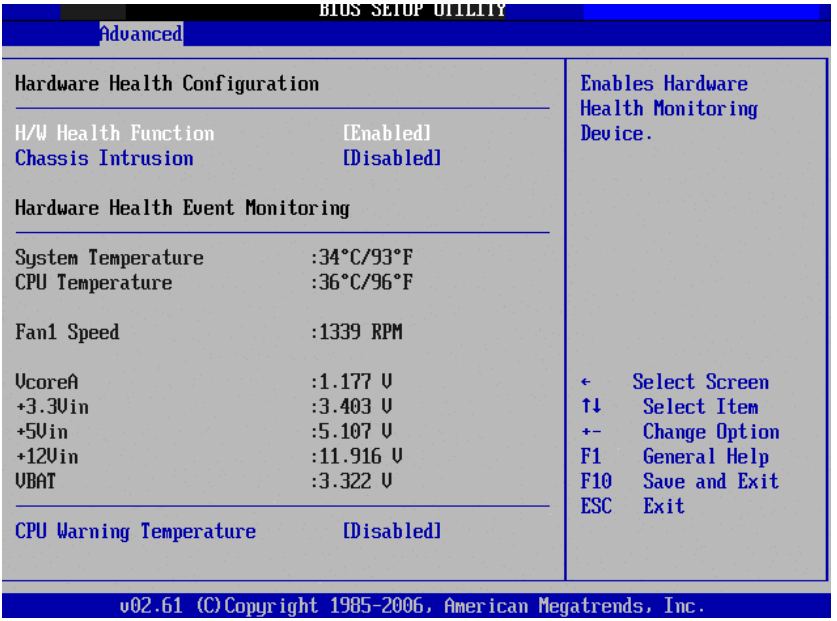


Figure 3.8: Hardware health configuration.

Hardware health function

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

Chassis Intrusion

Enable/Disable the Chassis Intrusion monitoring function. When 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

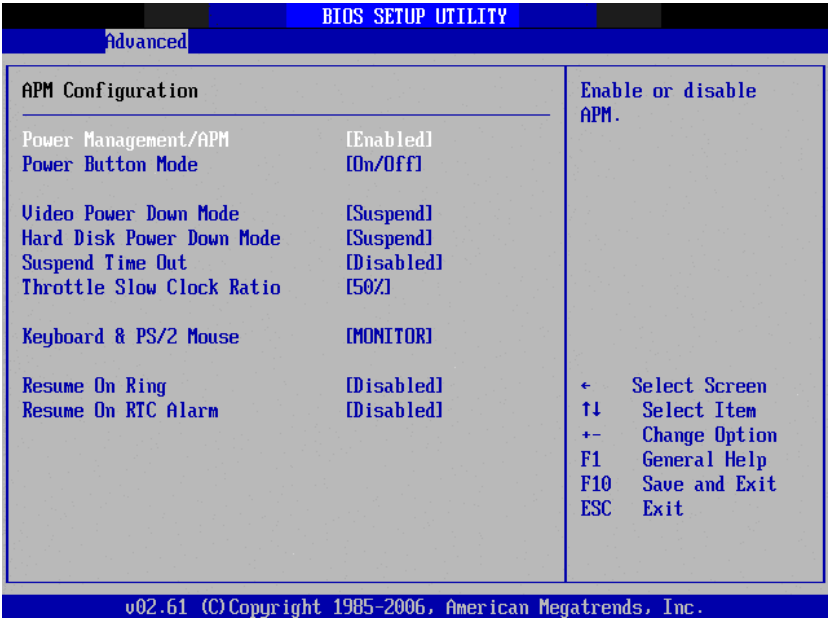


Figure 3.9: APM configuration

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.

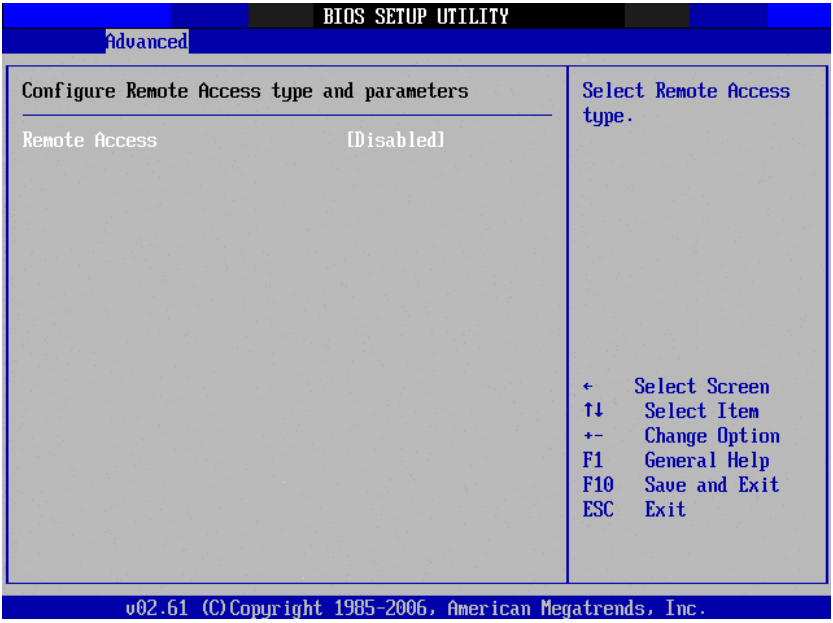


Figure 3.10: Configure remote access type and parameters

Remote Access

You can disable or enable the BIOS remote access feature here. This function is used to redirect the console from the serial port. The Optimal and Fail-Safe default setting is Disabled.

3.4 PCI/PNP Setup

Select the PCI/PnP tab from the PCE-5124 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.

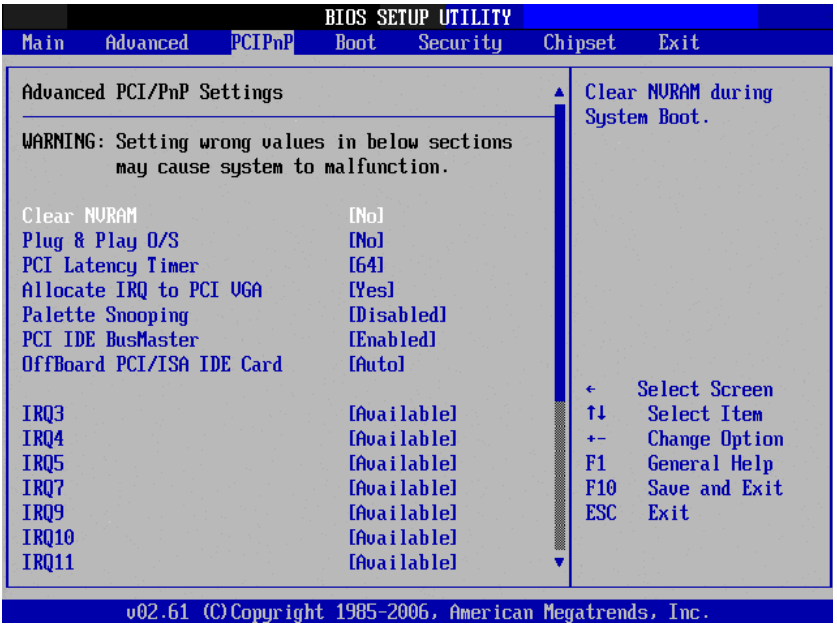


Figure 3.11: PCI/PNP setup

3.4.1 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.

3.4.2 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.

3.4.3 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.

3.4.4 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.

3.4.5 Palette snooping

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

3.4.6 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.

3.4.7 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.

3.4.8 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

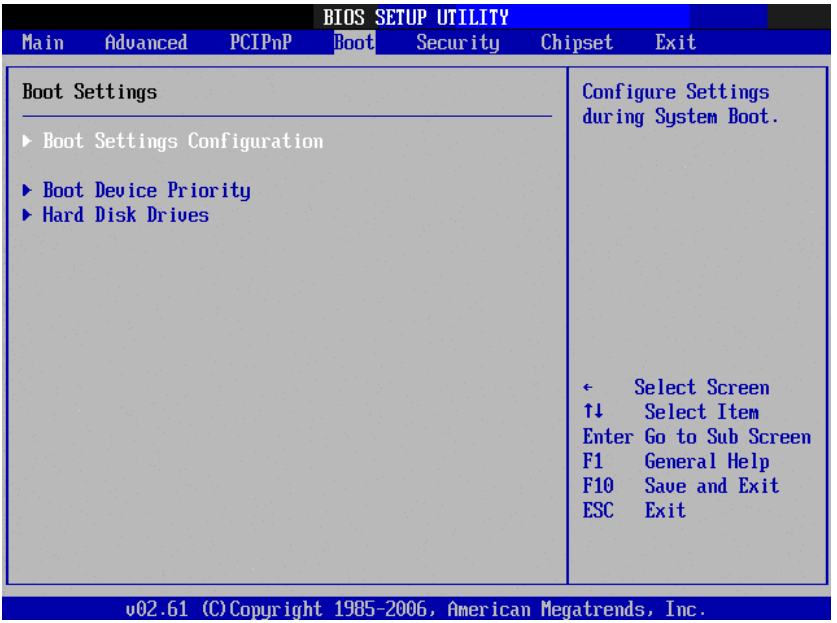


Figure 3.12: Boot setup utility

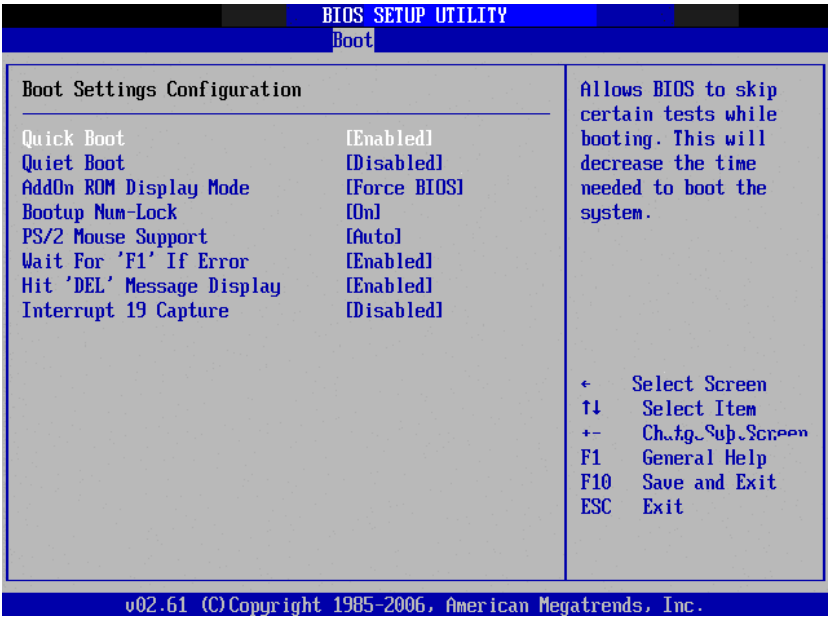


Figure 3.13: Boot setting configuration

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.

3.6 Security Setup

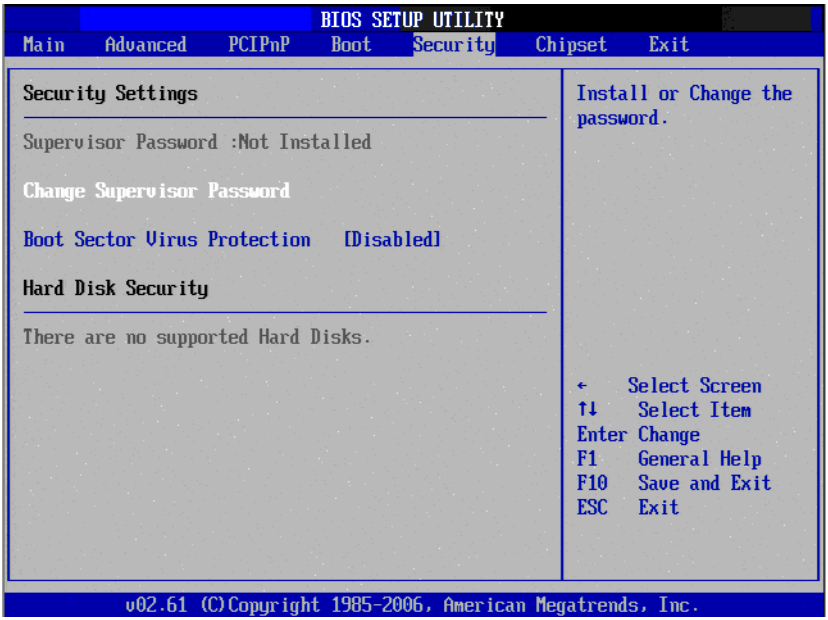


Figure 3.14: Password configuration

Select Security Setup from the AIMB-556 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

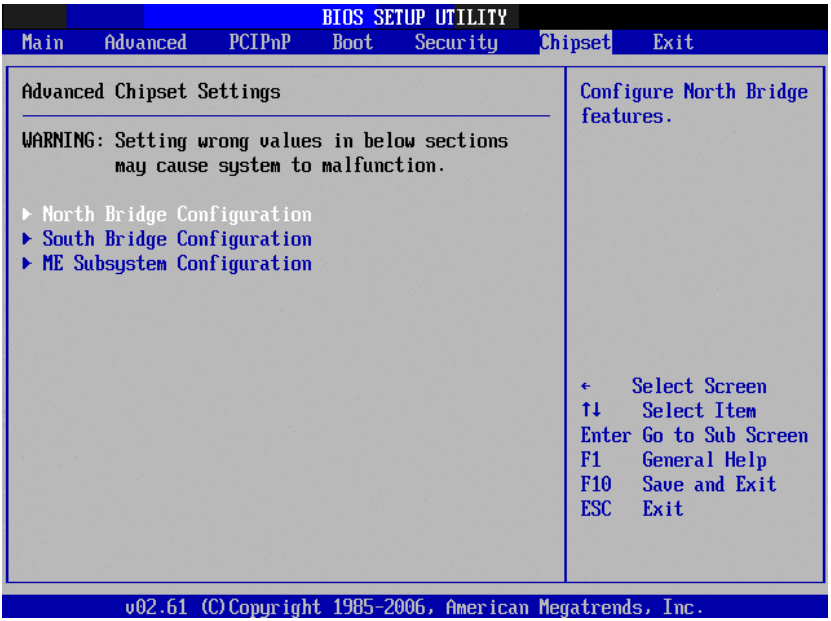


Figure 3.15: Advanced Chipset Settings

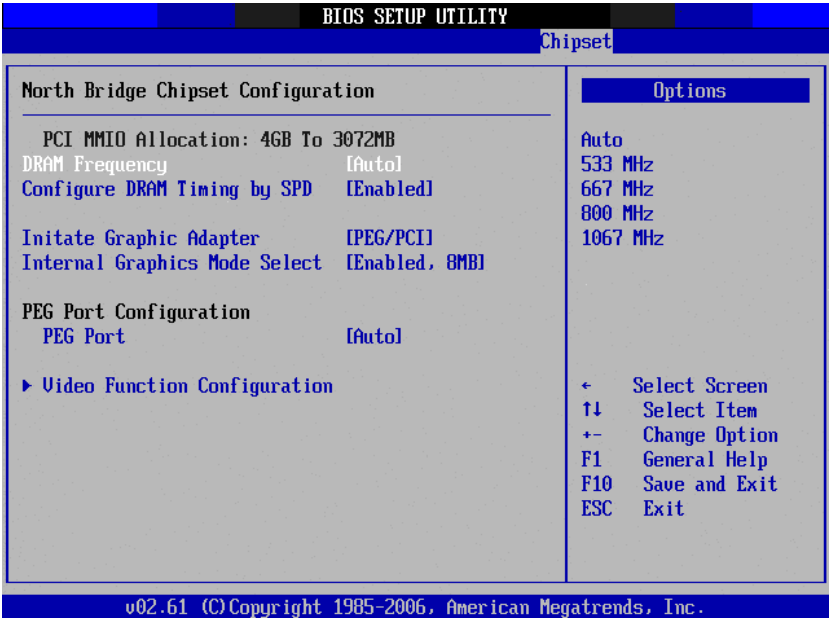


Figure 3.16: North bridge configuration

The following options are available:

- **Boots Graphic Adapter Priority**: Select which graphics controller to use as the primary boot device.
- **Internal Graphics Mode Select**: Select the amount of system memory used by the Internal graphics device.
- **PEG Port**: Auto or Disabled.
- **PEG Force x1**: Enabled or Disabled.

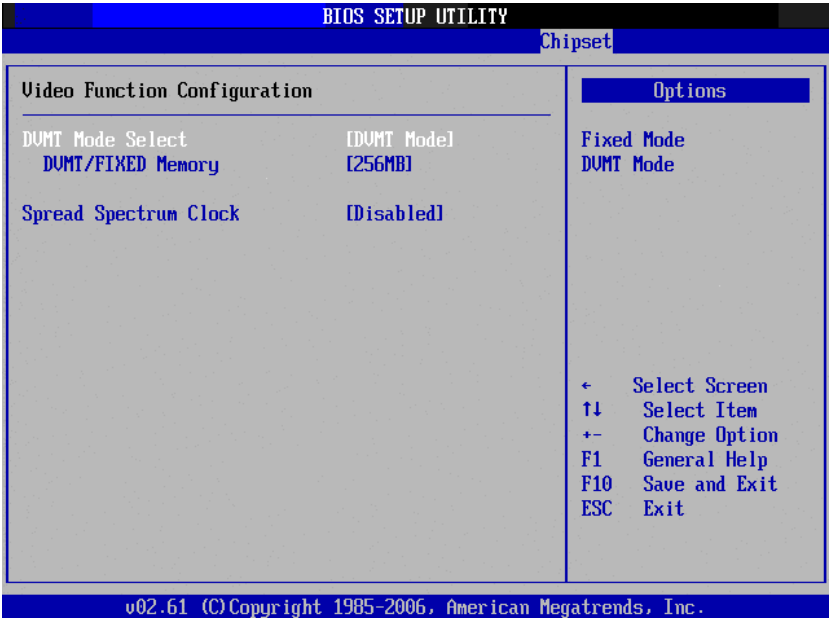


Figure 3.17: Video function configuration

DVMT model select

Displays the active system memory mode.

DVMT / FIXED Memory

Specify the amount of DVMT / FIXED system memory to allocate for video memory.

Spread spectrum clock

Enable/Disable spread spectrum.

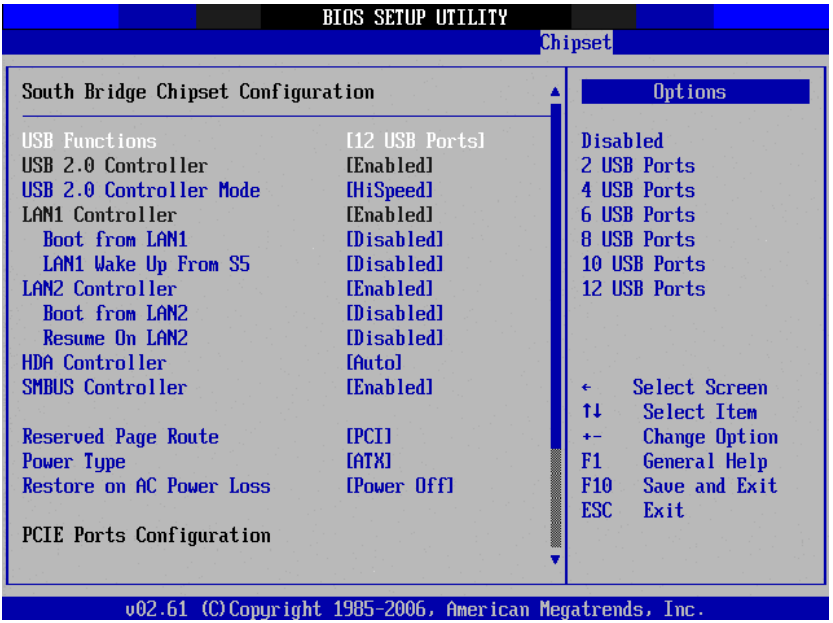


Figure 3.18: South bridge configuration

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.
- **GbE Controller**: Enables or disables the GbE controller.
- **GbE LAN boot**: Enables or disables GbE LAN 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

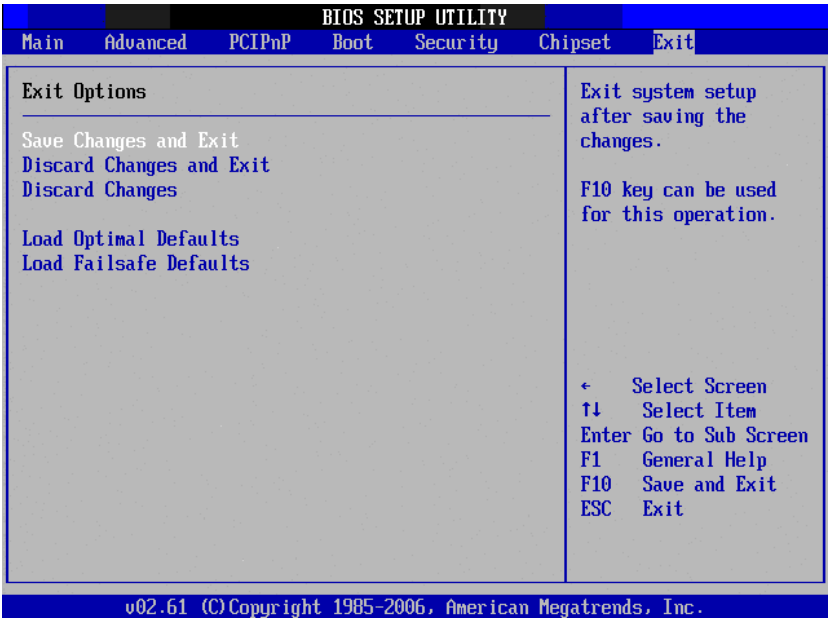


Figure 3.19: Exit option

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 AIMB-556 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 AIMB-556 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

Chapter 4 Chipset Software Install 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-5124 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 (R) Chipset Components in the Device Manager

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

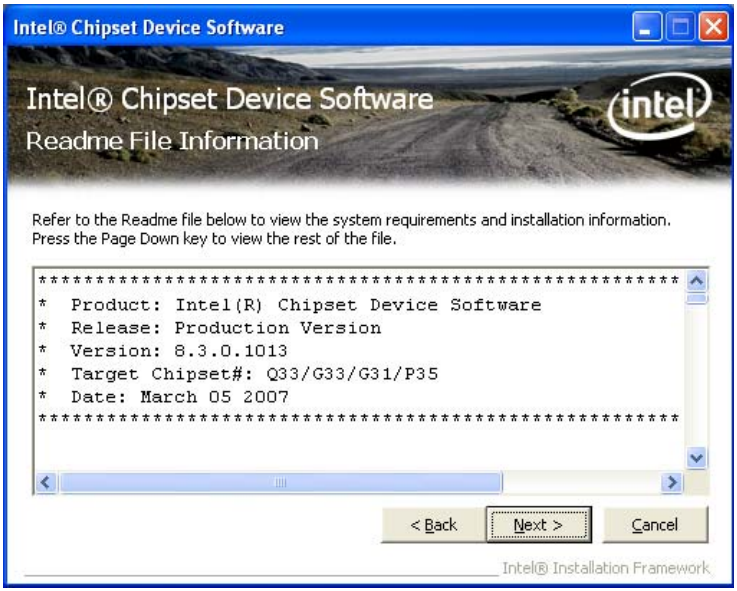
- Microsoft Windows Vista
- Microsoft Windows Vista x64 Edition*
- Microsoft Windows XP Professional x64 Edition
- Microsoft Windows XP professional with Service Pack 2
- Microsoft Windows 2000 with Service Pack 4

4.3 Windows XP Driver Setup

1. Insert the driver CD into your system's CD-ROM drive. Select the folder "Intel INF" then click "infinst_autol.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

VGA Setup

Chapter 5 VGA Setup

5.1 Introduction

The Intel Q35 integrated graphics controller provides an analog display port. You need to install the VGA driver to enable the function.

The Intel Q35 integrated graphics controller includes the following features.

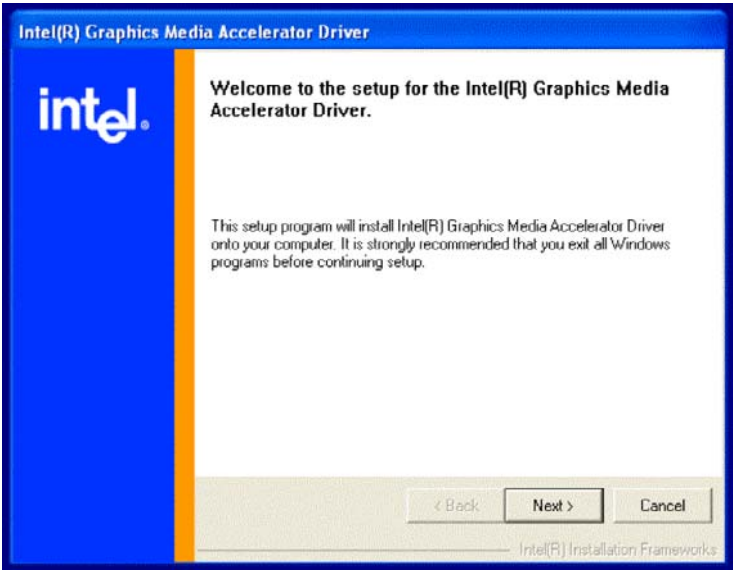
- **Graphics Media Accelerator 3100:** Incorporating the latest Microsoft DirectX 10 support capabilities, the Intel GMA 3100 GPU allows software developers to create lifelike environments and characters. Dual independent display, enhanced display modes for widescreen flat panels, and optimized 3D support deliver an intense and realistic visual experience without requiring a separate graphics card.

5.2 Windows XP Driver Setup

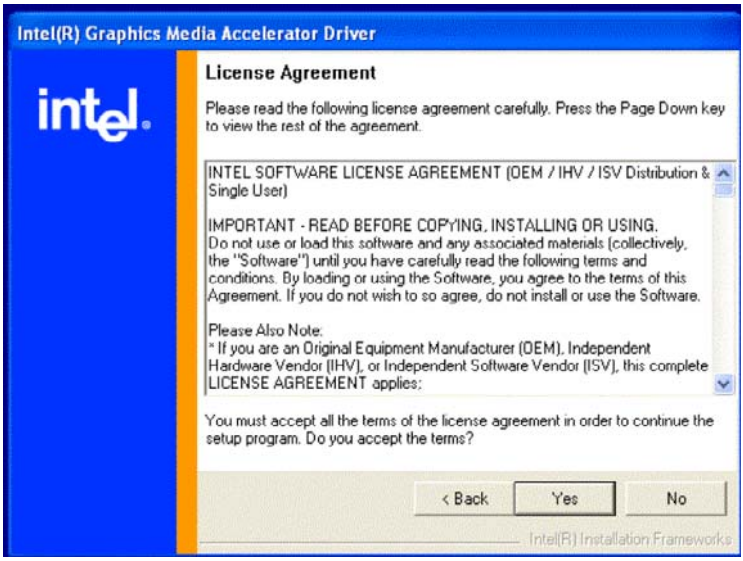
Note: *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 4 for information on installing the CSI utility.*

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

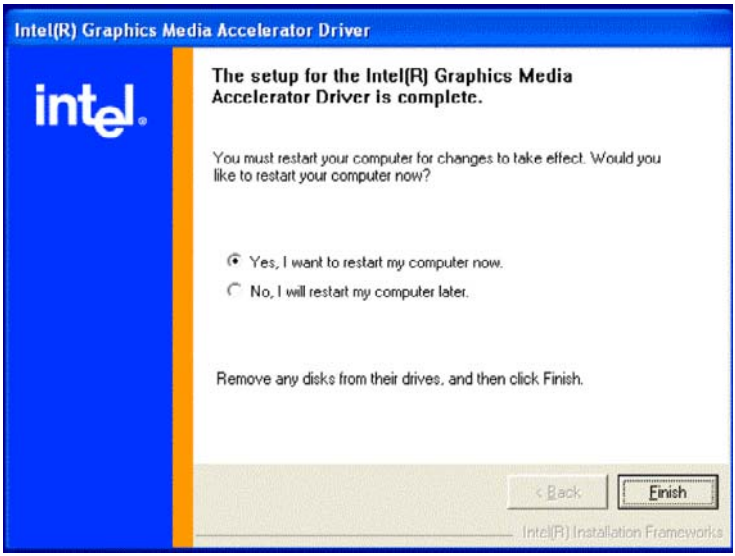
1. Click “Next” to continue the installation.



2. You will see a welcome window. Please click “Yes” to continue the installation. .



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



CHAPTER 6

Onboard Security Setup

Chapter 6 Onboard Security Setup

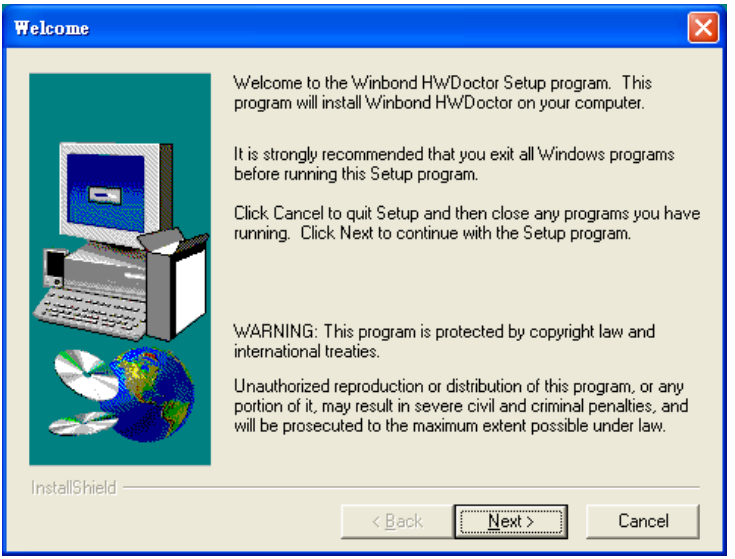
6.1 Introduction

The PCE-5124's hardware monitor is based on the Winbond W83627HG chip. Onboard security (OBS) functions monitor key hardware to help you maintain system stability and durability. The PCE-5124 can monitor five sets of positive system voltages, two sets of system negative voltages, CPU cooling fan speed, and CPU temperature. The positive system voltages that can be monitored include:

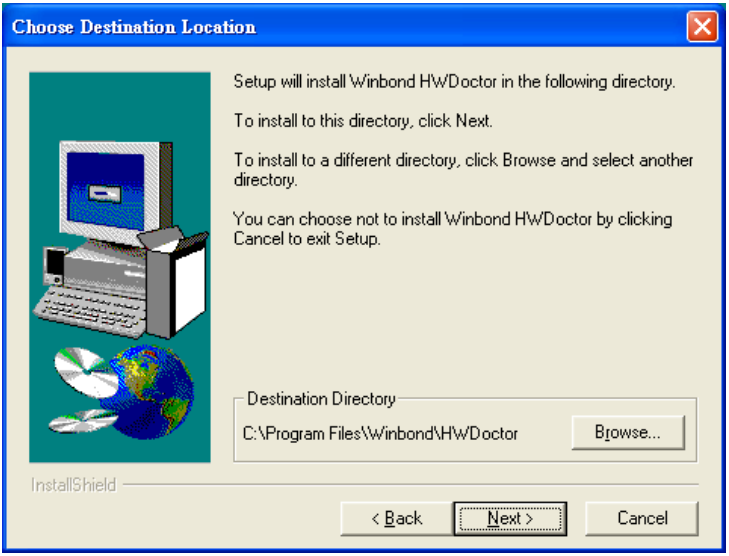
- CPU core voltage: 1.3 ~ 3.3 V, according to Intel specifications.
- Transmission voltage from CPU to chipset: typically 1.8 V.
- Chipset voltage: typically 3.3 V.
- Main voltage: +5 V, +12 V.

6.2 Windows XP Driver Setup

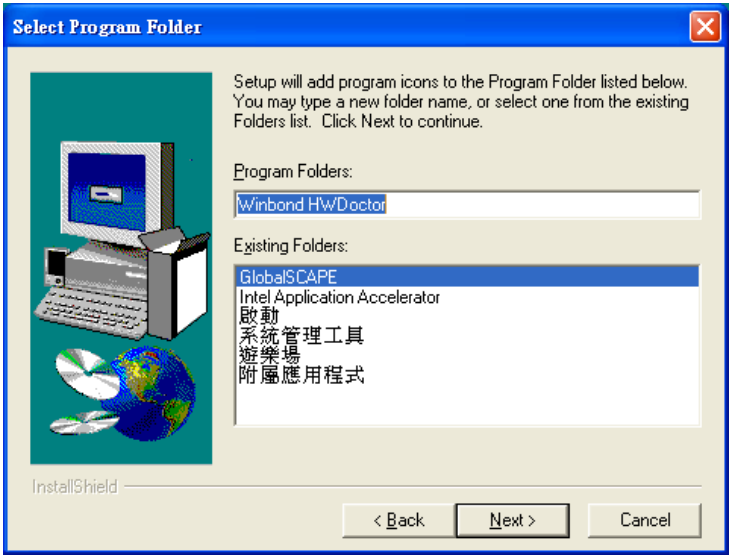
1. Insert the driver CD into your system's CD-ROM drive. Selecting the folder "OBS" then click the "setup.exe". Windows XP is used as an example in the following steps.
2. Click "Next" when you see the following message.



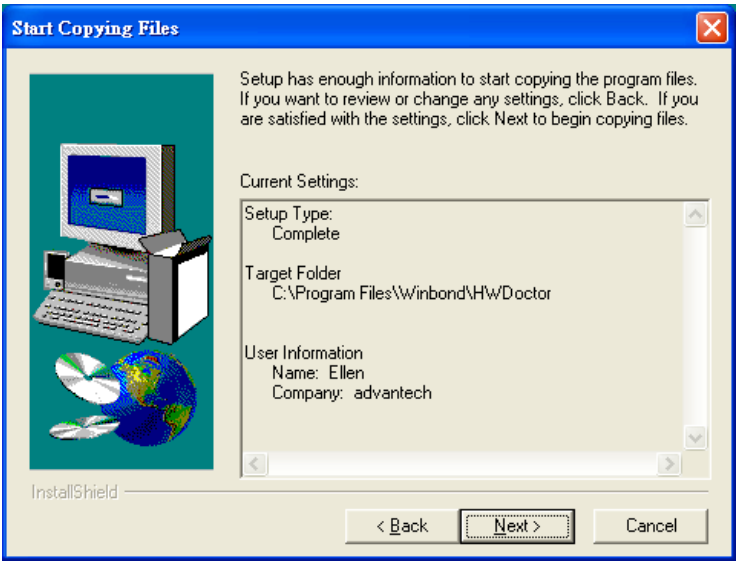
3. Click “Next” when you see the following message.



4. Click “Next” when you see the following message..



5. Click “Finish” when you see the following message.



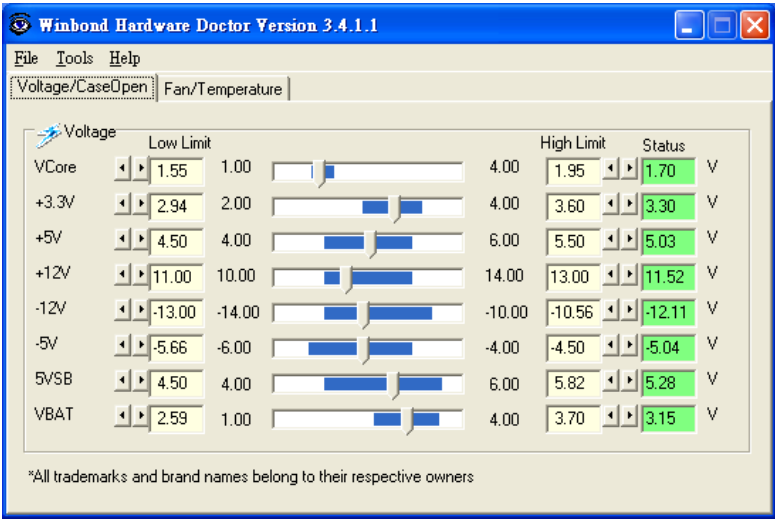
6.3 Using the OBS Hardware Doctor Utility

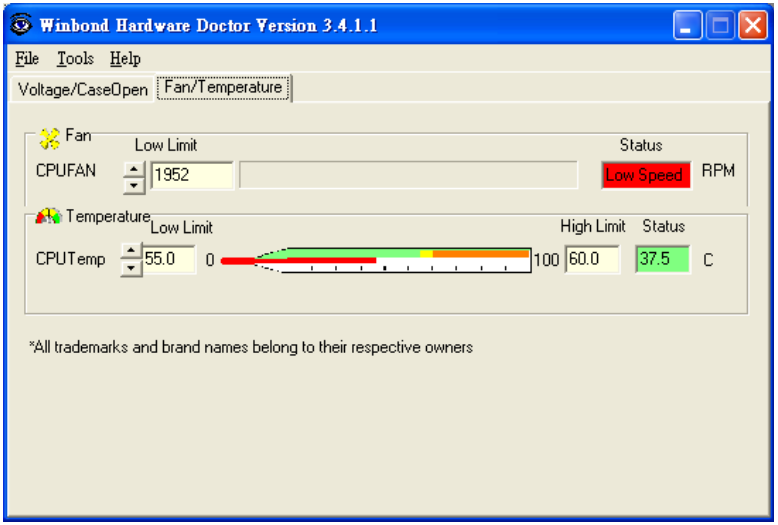
After completing the setup, all the OBS functions are permanently enabled. When a monitored reading exceeds safe limits, a warning message will be displayed and an error beep will sound to attract your attention.

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 following these steps.

From Windows desktop, click on “Start” and select “Programs”, select “Win bond HWDoctor” and click “HWDOCTOR”. 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.


Winbond Hardware Doctor Version 3.4.1.1
File Tools Help
Voltage/CaseOpen
Fan/Temperature
Voltage
Low Limit
High Limit
Status
VCore 1.55 1.00 4.00 1.95 1.70 V
+3.3V 2.94 2.00 4.00 3.60 3.30 V
+5V 4.50 4.00 6.00 5.50 5.03 V
+12V 11.00 10.00 14.00 13.00 11.52 V
-12V -13.00 -14.00 -10.00 -10.56 -12.11 V
-5V -5.66 -6.00 -4.00 -4.50 -5.04 V
5VSB 4.50 4.00 6.00 5.82 5.28 V
VBAT 2.59 1.00 4.00 3.70 3.15 V
*All trademarks and brand names belong to their respective owners


Winbond Hardware Doctor Version 3.4.1.1
File Tools Help
Voltage/CaseOpen
Fan/Temperature
Fan
Low Limit
Status
CPUFAN 1952 Low Speed RPM
Temperature
Low Limit
High Limit
Status
CPUTemp 55.0 0 100 60.0 37.5 C
*All trademarks and brand names belong to their respective owners

CHAPTER 7

LAN Configuration

Chapter 7 LAN Configuration

7.1 Introduction

The PCE-5124 has a single/dual Gigabit Ethernet LAN interface (Intel 82566DM and 82573V) that is connected to a dedicated PCIe x1 link to eliminating network bottlenecks by offering a bandwidth of up to 500 MB/s.

7.2 Features

- Integrated 10/100/1000Base-T transceiver
- 10/100/1000Base-T triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCIe x1 host interface

7.3 Installation

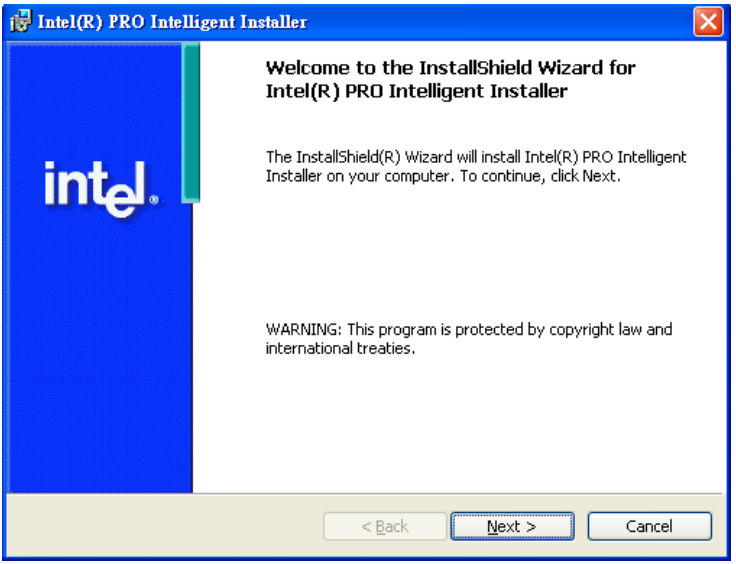
Note: *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 4 for information on installing the CSI utility.*

The integrated PCE-5124 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.

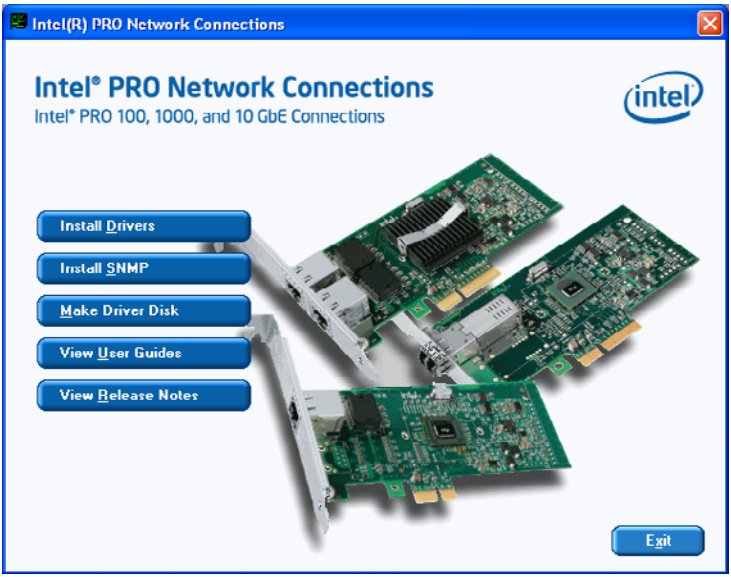
7.4 Win XP Driver Setup (LAN)

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

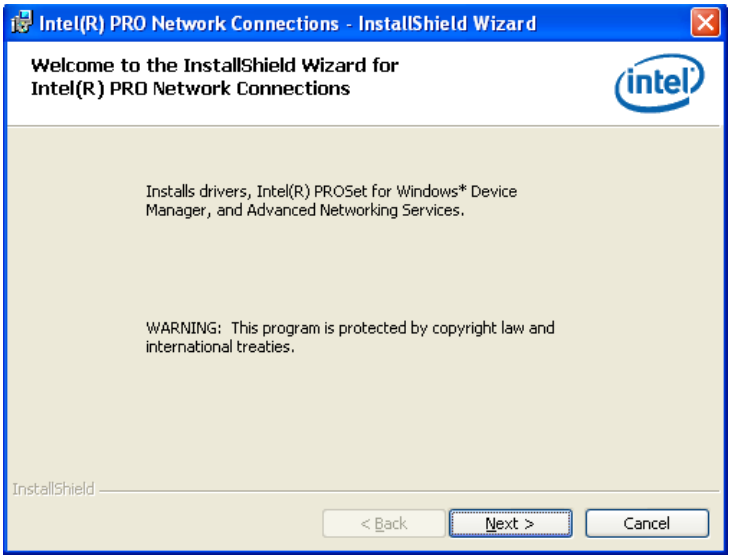
2. You will see a welcome window. Click "Next" to continue the installation.



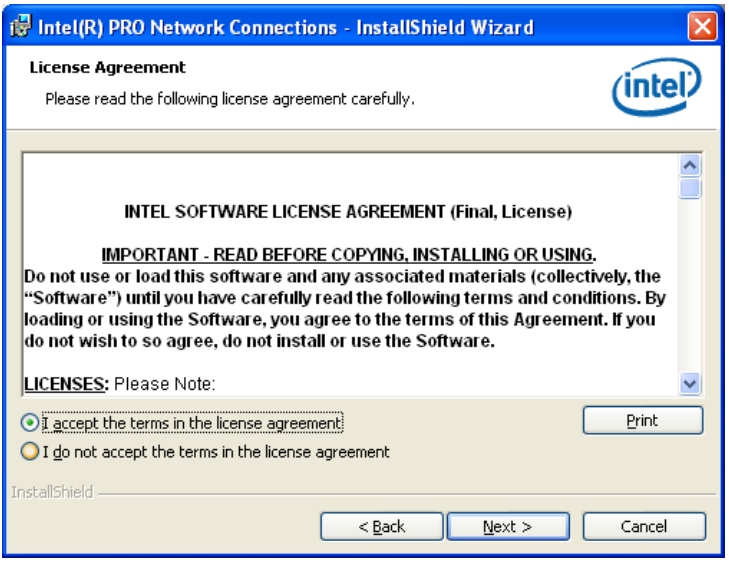
3. Click “Install Driver” to start the installation procedure.



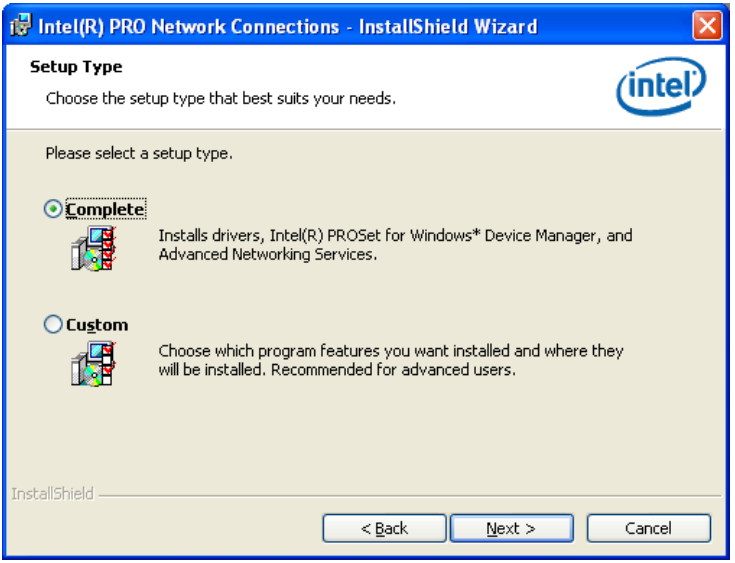
4. Click “Yes” to continue the installation.



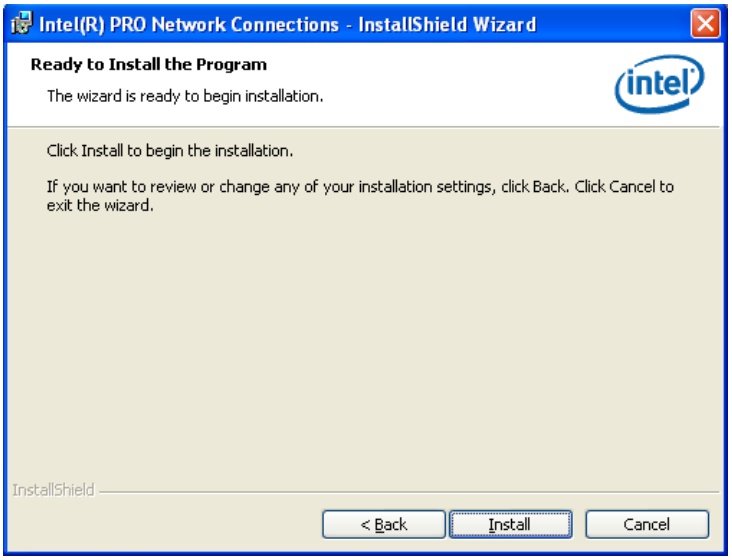
5. Select “I accept the terms in the license agreement” and click “Next” to continue.



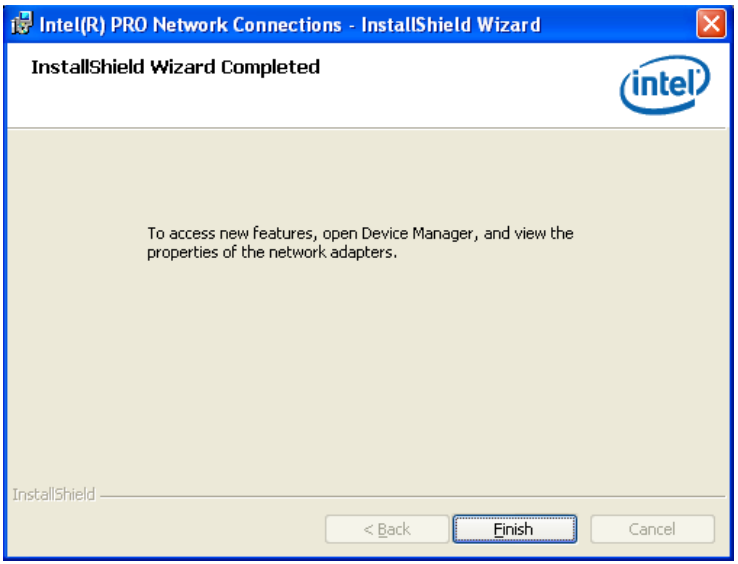
6. Select “Complete” and click “Next” to continue.



7. Click “Install” to begin the installation.



8. Click “Finish” to complete the installation.



CHAPTER 8

SATA RAID Setup

Chapter 8 SATA RAID Setup

8.1 Introduction

To support demanding disk I/O, Intel ICH9DO chipset integrates six Serial ATA controllers with software RAID 0, 1, 5, 10 capabilities.

RAID 0 stripping 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.

8.2 SATA RAID Driver and Utility Setup

Note: *For the detail installation guide of SATA RAID driver & utility please check the User Guide in the driver CD. Path: \RAID\Manual*

Note: *Before you install the Intel(R) Matrix Storage Manager Please read the "readme.txt" which is in the folder "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

Appendix A Programming the Watchdog Timer

A.1 Introduction

The PCE-5124's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within 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 in to the W83627HG super I/O controller. It provides the following user programmable functions:

- 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 reset signal if the software fails to reset the timer before time-out

A.1.2 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 write an address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

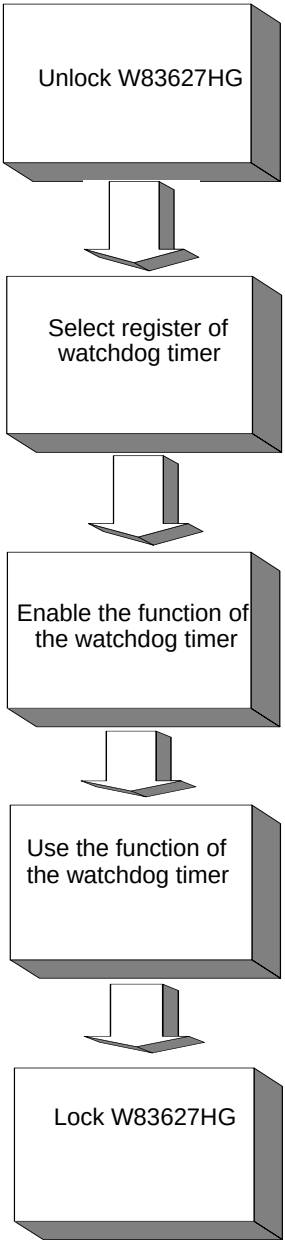

Unlock W83627HG
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock W83627HG

Table A.1: Watchdog timer registers

Address of register (2E)	Attribute Read/ Write	Value (2F)& description
87 (hex)	-----	Write this address to I/O address port 2E (hex) twice to unlock the W83627HG
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 minutes 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 “timeout”.
AA (hex)	-----	Write this address to I/O port 2E (hex) to lock the watchdog timer 2.

A.1.3 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 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 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 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                ; 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 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                  ; 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 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                ; 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 I/O Pin Assignments

B.1 Floppy Drive Connector (FDD1)

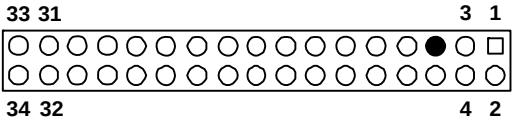


Table B.1: Floppy drive connector (FDD1)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	FDHDIN*
3	GND	4	N/C
5	N/C	6	FDEDIN*
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE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

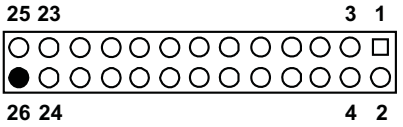


Table B.2: Parallel port connector (LPT1)			
Pin	**Signal**	**Pin**	**Signal**
1	STROBE*	2	AUTOFD*
3	D0	4	ERR
5	D1	6	INIT*
7	D2	8	SLCTINI*
9	D3	10	GND
11	D4	12	GND
13	D5	14	GND
15	D6	16	GND
17	D7	18	GND
19	ACK*	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	N/C
* low active			

B.3 VGA Connector (VGA1)

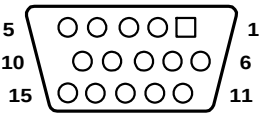


Table B.3: VGA connector (VGA1)

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
8	GND		

B.4 RS-232 Serial Port (COM1)

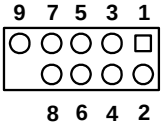


Table B.4: RS-232 serial port (COM1)	
Pin	**Signal**
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	N/A

B.5 RS 232/422/485 Serial Port (COM2)

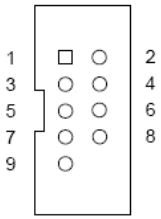


Table B.5: RS-232 / 422 / 485 serial port (COM2)

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

B.6 RS-232 Serial Port (COM3-4)

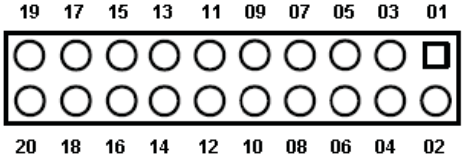


Table B.6: RS-232 serial port (COM3-4)

Pin	Signal	Pin	Signal
P1	UART3_#DCD	P11	UART4_#DCD
P2	UART3_#DSR	P12	UART4_#DSR
P3	UART3_SIN	P13	UART4_SIN
P4	UART3_#RTS	P14	UART4_#RTS
P5	UART3_SOUT	P15	UART4_SOUT
P6	UART3_#CTS	P16	UART4_#CTS
P7	UART3_#DTR	P17	UART4_#DTR
P8	RIC	P18	RID
P9	GND	P19	GND
P10	GND	P20	GND

B.7 RS-232 Serial Port (COM5-6)

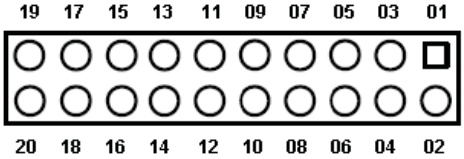


Table B.7: RS-232 serial port (COM5-6)

Pin	Signal	Pin	Signal
P1	UART5_#DCD	P11	UART6_#DCD
P2	UART5_#DSR	P12	UART6_#DSR
P3	UART5_SIN	P13	UART6_SIN
P4	UART5_#RTS	P14	UART6_#RTS
P5	UART5_SOUT	P15	UART6_SOUT
P6	UART5_#CTS	P16	UART6_#CTS
P7	UART5_#DTR	P17	UART6_#DTR
P8	RIC	P18	RID
P9	GND	P19	GND
P10	GND	P20	GND

B.8 USB Header (USB12 ~ 78)

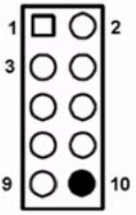


Table B.8: USB Header (USB12 ~ 78)

Pin	Signal	Pin	Signal
1	USB0_VCC5	6	USB1_D+
2	USB1_VCC5	7	GND
3	USB0_D-	8	GND
4	USB1_D-	9	GND
5	USB0_D+	10	Key

B.9 PS/2 Keyboard/Mouse Connector (KBMS1)

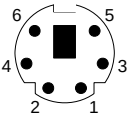


Table B.9: PS/2 keyboard/mouse connector (KBMS1)

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

B.10 External Keyboard Connector (KBMS2)

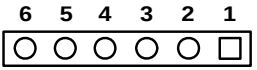


Table B.10:External keyboard connector (KBMS2)	
Pin	**Signal**
1	KBCLK
2	KBDAT
3	MSDAT
4	GND
5	MSVCC
6	MSCLK

B.11 CPU Fan Power Connector (CPUFAN1)

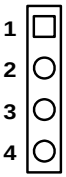


Table B.11: CPU fan power connector (CPUFAN1)	
Pin	**Signal**
1	GND
2	+12V
3	Detect
4	FANPWM

B.12 Power LED and Keyboard Lock Connector (JFP3 / PWR_LED & KEY LOCK)

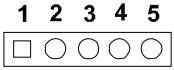


Table B.12:Power LED and keyboard lock connector (JFP3 / PWR_LED & KEY LOCK)

Pin	Signal
1	LED power (+5 V)
2	NC
3	GND
4	KEYLOCK#
5	GND

B.13 External Speaker Connector (JFP2 / SPEAKER)

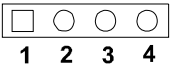


Table B.13:External speaker connector (JFP2 / SPEAKER)

Pin	Signal
1	SPK+
2	NC
3	SPK_IN
4	SPK-

B.14 Reset Connector (JFP1 / RESET)

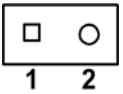


Table B.14:Reset connector (JFP1 / RESET)	
Pin	**Signal**
1	RESET #
2	GND

B.15 HDD LED (JFP2 / HDDLED)

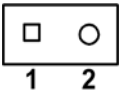


Table B.15:HDD LED (JFP2 / HDDLED)	
Pin	**Signal**
1	IDE LED+
2	IDE LED-

B.16 ATX Soft Power Switch (JFP1 / PWR_SW)

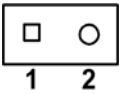


Table B.16:ATX soft power switch (JFP1 / PWR_SW)

Pin	Signal
1	5VSB
2	PWR-BTN

B.17 Hi-definition Audio Link Connector (HDAUD1)

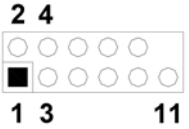


Table B.17:Hi-definition audio link connector (HDAUD1)

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.18 SM Bus Connector (JFP2 / SNMP)

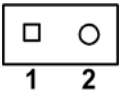


Table B.18:SM bus connector (JFP2 / SNMP)	
Pin	**Signal**
1	SMB_DATA
2	SMB_CLK

B.19 LAN1 and LAN2 LED Connector (LANLED1)

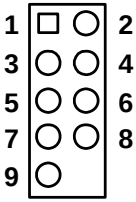


Table B.19:LAN1 and LAN2 LED connector (LANLED1)	
Pin	**Signal**
1	#LAN1_ACT
2	#LAN2_ACT
3	V33_AUX
4	V33_AUX
5	#LAN1_LINK1000
6	#LAN2_LINK1000
7	#LAN1_LINK100
8	#LAN2_LINK100
9	V33_AUX

B.20 GPIO Header (GPIO1)

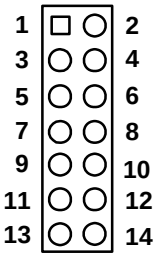


Table B.20: GPIO header (GPIO1)	
Pin	**Signal**
1	GPIO_1
2	GPIO_5
3	VCC_GPIO
4	GND
5	GPIO_2
6	GPIO_6
7	GND
8	GND
9	GPIO_3
10	GPIO_7
11	GND
12	GND
13	GPIO_4
14	GPIO_8

B.21 System I/O Ports

Table B.21: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
200-207	Game I/O
290-297	On-board hardware monitor
2F8-2FF	Serial port 2
378-37F	Parallel printer port 1 (LPT2)
3B0-3BF	Intel(R) Q35 Express Chipset Family
3C0-3CF	Intel(R) Q35 Express Chipset Family
3D0-3DF	Color/graphics monitor adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
2F8-2FF	Serial port 2
400-41F	SM bus controller
480-4BF	CPU card resource
400-4D1	CPU card resource
4E0-4E7	Serial port 6
4E8-4EF	Serial port 4
4F0-4F7	Serial port 5
4F8-4FF	Serial port 3

800-87F	Power management

B.22 DMA Channel Assignments

Table B.22:DMA channel assignments

Channel	Signal
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.23 Interrupt Assignments

Table B.23: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	Serial Port 4, 6
7	IRQ11	Serial Port 3, 5
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	NA
15	IRQ6	NA
16	IRQ7	Parallel port 1 (print port)

B.24 1st MB Memory Map

Table B.24:1st 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.25 PCI Bus Map

Table B.25:PCI bus map

Signal	IDSEL	INT# pin	GNT	REQ
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

Appendix C

Programming the GPIO

Appendix C Programming GPIO

C.1 Supported GPIO Register

Below are the detailed descriptions 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
------------------------------------------------------------------
Configurate 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
```