



User Manual

PCE-5125

LGA1156

**Intel® Core™ i7/i5/i3/Pentium®/
Xeon®**

**Duo Processor-based PICMG 1.3
Single Host Board with (ECC)
DDR3 / Dual GbE LAN**

Trusted ePlatform Services

ADVANTECH

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

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Declaration of Conformity

FCC Class A

Note: 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 equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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



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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.

Memory Compatibility

PCE-5125 Memory Tested for Compatibility

Brand	Size	Speed	ECC	Vendor PN	Advantech PN	Memory
Transcend	1GB	DDR3 1066	N	TS128MLK64V1U/ TS2KNU28100-1S	96D3- 1G1066NN-TR	SEC K4B1G0846D- HCF8 (128x8)
	1GB	DDR3 1066	N	TS128MLK64V1U	96D3- 1G1066NN-TR	SEC K4B1G0846D HCH9 ENJ038A3 (128x8)
	2GB	DDR3 1066	N	TS256MLK64V1U/ TS5KNU28300-1S	96D3- 2G1066NN-TR	SEC K4B1G0846D- HCF9(128x8)
	1GB	DDR3 1333	N	TS128MLK64V3U		SEC 907 HCH9 K4B1G08460(128x8)
	1GB	DDR3 1333	N	TS128MLK64V3U		Micron 9GF22 D9KPT (128x8)
	2GB	DDR3 1333	N	TS256MLK64V3U		SEC 907 HCH9 K4B1G08460(128x8)
Apacer	1GB	DDR3 1066	N	78.01GC3.420	96D3- 1G1066NN-AP	ELPIDA J1108BABG- AE-E
	2GB	DDR3 1066	N	78.A1GC3.421	96D3- 2G1066NN-AP	ELPIDA J1108BABG- AE-E
Kingston	1GB	DDR3 1333	N	KVR1333D3N9/1G		HYNIX H5TQ1G83BFR H9C 928AK (128x8)
	2GB	DDR3 1333	N	TS128MLK64V3U		ELPIDA J1108BDBG- DJ-F 093309DLK20 (256x8)

Specification Comparison

Model Name	Memory	LAN	VGA	USB	COM	Remote Management
PCE-5125QG2-00A1E	Non-ECC	2 GbE	Yes	14	2	SNMP-1000
PCE-5125WG2-00A1E	ECC/Non-ECC	2 GbE	Yes	14	2	SNMP-1000

Processor Support

Processor	PCE-5125QG2-00A1E	PCE-5125WG2-00A1E
Core i7 8XX	Yes	-
Core i5 7XX	Yes	Yes
Core i5 6XX	Yes	Yes
Core i3 5XX	Yes	Yes
Pentium G69XX	Yes	Yes
Xeon 34XX	-	Yes

Backplane Support Matrix Table

Model Processor	Model	Core™i5 6XX / Core™i3 5XX / Pentium® G69XX	Xeon 34XX ^{Note} / Core i7 8XX / Core i5 7XX
PCE-5125QG2-00A1E	PCE-5XXX		PCE-5XXX
PCE-5125WG2-00A1E	PCE-5XXX		PCE-5XXX PCE-7XXX with Dual or Single PCIe x 8 Slot(s)

Note! *If PCE-5125 is used on different backplanes which has different PCIe configuration. Below message would be showed on first time power on, and user has to turn off AC power and then turn on for PCIe re-configuration.*



Caution! *PCIe configuration error! Please turn off AC power before re-configuration.*



Initial Inspection

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

- 1 PCE-5125 PICMG 1.3 Single Host Board
- 1 PCE-5125 startup manual
- 1 CD with utility
- 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

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the PCE-5125 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-5125, 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.

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Chapter 1

Hardware
Configuration


1.1 Introduction


PCE-5125 is a PICMG 1.3 form-factor single host board which is designed with Intel® Q57/3450 PCH for industrial applications that need high computing power and strong I/O capability. PCE-5125 supports 32nm manufacture technology, LGA1156 socket Intel® Core™ i7/i5/i3, Pentium® and Xeon™ processors that integrate memory and graphic controllers and supports DDR3 1333 MHz SDRAM up to 8GB. By supporting advanced computing technology, PCE-5125 is suitable for computing power hungry industrial applications.

PCE-5125 performs excellent graphic processing capability by its processor integrated Intel® HD Graphics graphic core^{Note2} with shared memory up to 1GB when 2 GB and above system memory installed. With this feature, PCE-5125 can provide strong 2D/3D graphic processing power without an discrete graphic card to save user extra cost, power consumption and thermal design effort for an add-on graphic card.

PCE-5125 also has rich I/O interfaces, and it can support Advantech PCE-5XXX and 7XXX backplanes to offer various expansion slots such as PCI, PCI-X and PCIe slots with its PCIe lanes that are configurable as one x 16 or two x 8 and four x 1^{Note2} going down to the backplane. The six SATA ports (300MB/sec) support software RAID 0, 1, 5, 10 to be a cost-effective data reliability solution, the two on-board RS-232 serial ports are for COM port based industrial control applications. With flexible I/O and graphic expandability, PCE-5125 can be an excellent, cost effective graphic or I/O oriented workstation class hardware platform.

With outstanding performance and exceptional features, PCE-5125 is the ideal computing platform for advanced industrial applications.


Note!  Only Core™ i5 6XX, Core™ i3 and Pentium® processors have integrated Intel® HD Graphics graphic cores; other processors do NOT have graphic cores and need a discrete graphic card for graphic functions.

Note!  Only the workstation WG2 SKU plus Core™ i7, Core™ i5 7XX or Xeon® processors can support Advantech backplanes of PCE-5XXX series and 7XXX series that are with single or dual PCIe x 8 slot(s). WG2 SKU plus processors other than those mentioned above and QG2, QVG SKUs plus all kinds of processors can ONLY support PCE-5XXX series products. Please see table below for detailed information.

PCI Express Port & Graphics Function Support

Processor	Core i5 6XX / Core i3 5XX / Pentium G69XX		Xeon 34XX ^{Note1} / Core i7 8XX / Core i5 7XX	
	Supports on-board VGA		Doesn't support on-board VGA ^{Note2}	
PCIe	One PCIe x16	Two PCIe x 8	One PCIe x16	Two PCIe x 8
PCE-5125QG2-00A1E	Yes	No	Yes	No
PCE-5125W2-00A1E	Yes	No	Yes	Yes

Note!  Only PCE-5125WG2-00A1E supports Xeon® 34XX processors.

Note!  No on-board VGA means user must use a discrete graphic card, Advantech offers PCA-5650-00A1E Mini-PCIe graphic card which features no occupation of expansion slot and ultra low power consumption.


1.2 Features & Benefits

Features	Benefits
Supports Intel's® next generation Core™ i7/i5/i3 Processors.	Intel's next generation Core i7/i5/i3/Pentium/Xeon processor cores with quad/dual-core computing power brings quantum-leap performance improvement.
Supports DDR3 1333MHz SDRAM Max 8GB.	To provide higher memory data transmitting and processing efficiency, bringing higher system performance.
WG2 SKU supports dual PCIe x 8 or one x 16 lane(s) for supporting both PCE-7XXX/5XXX series BPs.	WG2 SKU supports dual PCIe x 8 or one x 16 lane(s) for supporting Advantech backplanes of PCE-5XXX series and 7XXX series that are with single or dual PCIe x 8 slot(s).
WG2 SKU supports ECC DDR3 1333MHz SDRAM.	To provide higher memory data transmitting reliability, suitable for applications that are sensitive to system stability such as medical, industrial server applications.
Fully supports Advantech SUSI APIs and Utilities.	To reduce customer S/W development effort with more reliable S/W quality, also provides value-added utilities such as system monitor and Embedded Security ID.

1.3 Specifications

1.3.1 System

- **CPU:** LGA1156-socket Core i7/i5/i3, Pentium and Xeon 34XX series processors

Note!  Core™i7 8XX, Core i5 7XX and Xeon 34XX series processors do NOT have an integrated Intel® HD Graphics graphic core; it's necessary to use a discrete graphic card/module to have video output.

- **L2 Cache:** Core™ i7 8XX: Maximum 8 MB
Core™ i5 7XX: Maximum 8 MB
Core™ i5 6XX: Maximum 4 MB
Core™ i3 5XX: Maximum 4 MB
Pentium® G69XX: Maximum 3 MB (Only supported by WG2 model)
Xeon® 34XX: Maximum 8 MB
- **BIOS:** AMI SPI BIOS (64 Mb SPI)
- **System Chipset:** Intel Q57/3450 platform control hub (PCH)

- **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-5125 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:**
 - WG2 SKU: Up to 8 GB in two 240-pin DIMM sockets. Supports dual-channel DDR3 800/1066/1333 MHz SDRAM WITH or WITHOUT ECC function.
 - QG2 SKUs: Up to 8 GB in two 240-pin DIMM sockets. Supports dual-channel DDR3 800/1066/1333 MHz SDRAM WITHOUT ECC function.

Note! ONLY WG2 SKU support DDR3 memory module with ECC function, QG2 can ONLY support those with NO ECC. Wrong memory configuration may cause no boot or system instability problems.



1.3.3 Input/Output

- **Backplane Support:**
Backplane Support Matrix Table:

Model	Core i5 6XX / Core i3 5XX / Pentium G69XX	Xeon 34XX ^{Note} / Core i7 8XX / Core i5 7XX
PCE-5125QG2-00A1E	PCE-5XXX	PCE-5XXX
PCE-5125WG2-00A1E	PCE-5XXX	PCE-5XXX PCE-7XXX with Dual or Single PCIe x 8 Slot(s)

- **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:** Two RS-232 serial ports
- **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 13 USB 2.0 ports with transmission rate up to 480 Mbps. 9 ports are on the CPU card and 4 ports are on the backplane.

1.3.4 Graphics

- **Controller:** Intel® HD Graphics embedded in the processor.
- **Display memory:** Max. 1 GB shared video memory with system memory ≥ 2 GB.
- **CRT:** Up to 2048 x 1536 resolution, 400 MHz RAMDAC.
- **PCI express x16/x8 slot on the backplane:** An external graphic card can be installed in the PCI-E x 16/ x 8 slot for stronger 2D/3D graphic capability.

1.3.5 Ethernet LAN

- Supporting single/dual 10/100/1000 Mbps Ethernet port(s) via the dedicated PCI Express x1 bus which provides 500 MB/s data transmission rate.
- **Controller:**
 - LAN 1: Intel® 82578DM for all SKUs.
 - LAN 2: Intel® 82583V for QG2 SKU; Intel 82574L for WG2 SKU.

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:** -40 ~ 85° C (-40 ~ 185° F)
- **Humidity:** 20 ~ 95% non-condensing
- **Power supply voltage:** +3.3 V, +5 V, +12 V, +5 V_{SB}
- **Power consumption:** Processor: Intel Core i7 860; Memory: 2 DDR3 1333 MHz 2 GB DIMMs

Voltage	+12 V	+5 V	+3.3 V	+5 V _{SB}
Current	12.156 A	15.576 A	12.108 A	0.024 A
- **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-5125 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
JCMOS1	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	Intel 82578DM for all SKUs
LAN2	LAN 2: Intel 82583V for QG2 SKU; Intel 82574L for WG2 SKU
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 (Box Header)
JIR1	Infrared connector
JFP1	Power Switch / Reset connector
JFP2	External speaker / SATA HDD LED connector
JFP3 (Keyboard Lock and Power LED)	Suspend: Fast flash (ATX/AT)
	System On: ON (ATX/AT)
	System Off: OFF (AT)
	System Off: Slow flash (ATX)
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
USB9	USB port 9
SATA1	Serial ATA1
SATA2	Serial ATA2
SATA3	Serial ATA3
SATA4	Serial ATA4
SATA5	Serial ATA5
SATA6	Serial ATA6
CPU1	CPU Socket
DIMMA1	Memory connector channel A
DIMMB1	Memory connector channel B
GPIO1	GPIO pin header (SMD pitch-2.0 mm)
MINIPCI1/2	Mini PCIe socket
LPC1	COM port module expansion pin-header

1.5 Board Layout: Jumper and Connector Locations

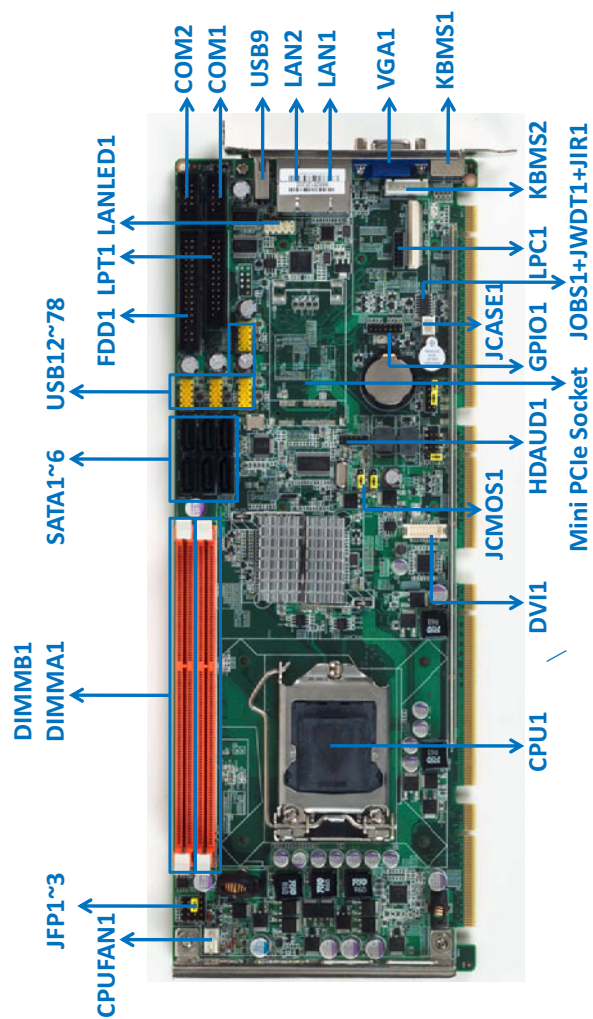


Figure 1.1 Jumper and connector locations

1.6 PCE-5125 Block Diagram

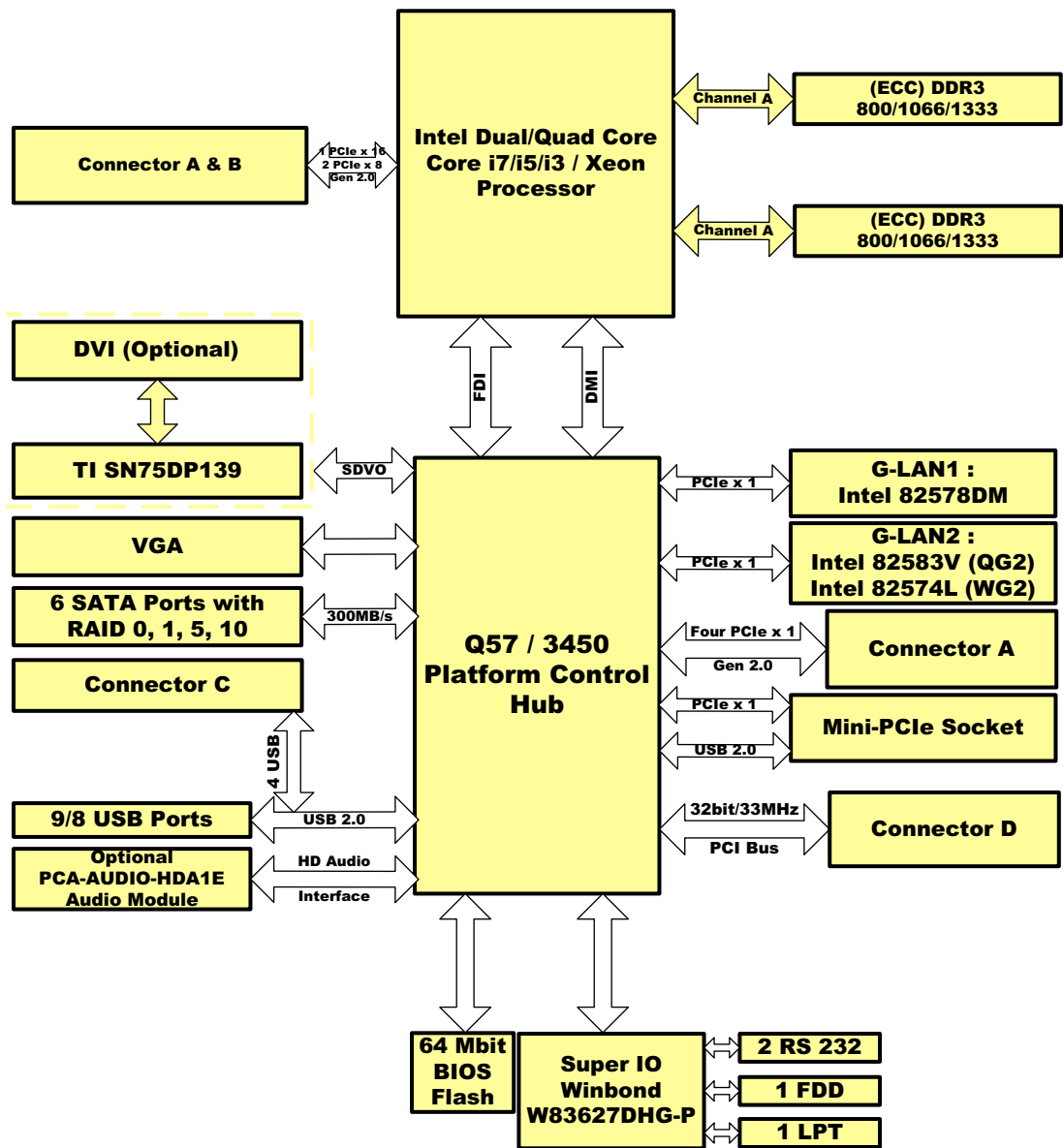


Figure 1.2 PCE-5125 block diagram

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 electrical 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. 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.

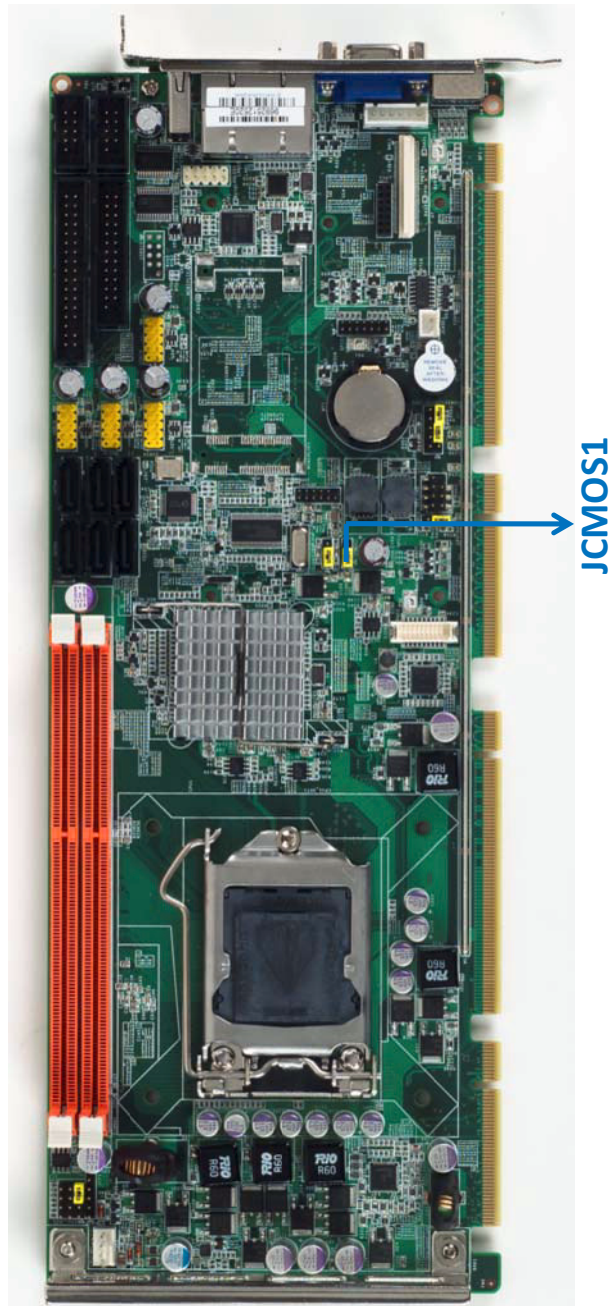
1.8.2 BIOS CMOS/ME data clear (JCMOS1)

The PCE-5125 CPU card contains a jumper that can erase BIOS CMOS data and ME (Intel Management Engine) data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset those 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: Clear BIOS CMOS/ME Data (JCMOS1)

Function	Jumper Setting
*Keep BIOS CMOS/ME data	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">1</div>  <div style="margin-left: 10px;">1-2 closed</div> </div>
Clear BIOS CMOS/ME data	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">1</div>  <div style="margin-left: 10px;">2-3 closed</div> </div>

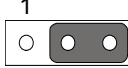
* default setting



1.8.3 Watchdog timer output (JWDT1)

The PCE-5125 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-5125 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 1.4: Watchdog timer output (JWDT1)

Function	Jumper Setting
* Reset	<div style="display: flex; align-items: center; gap: 10px;"> 1  2-3 closed </div>

*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.*

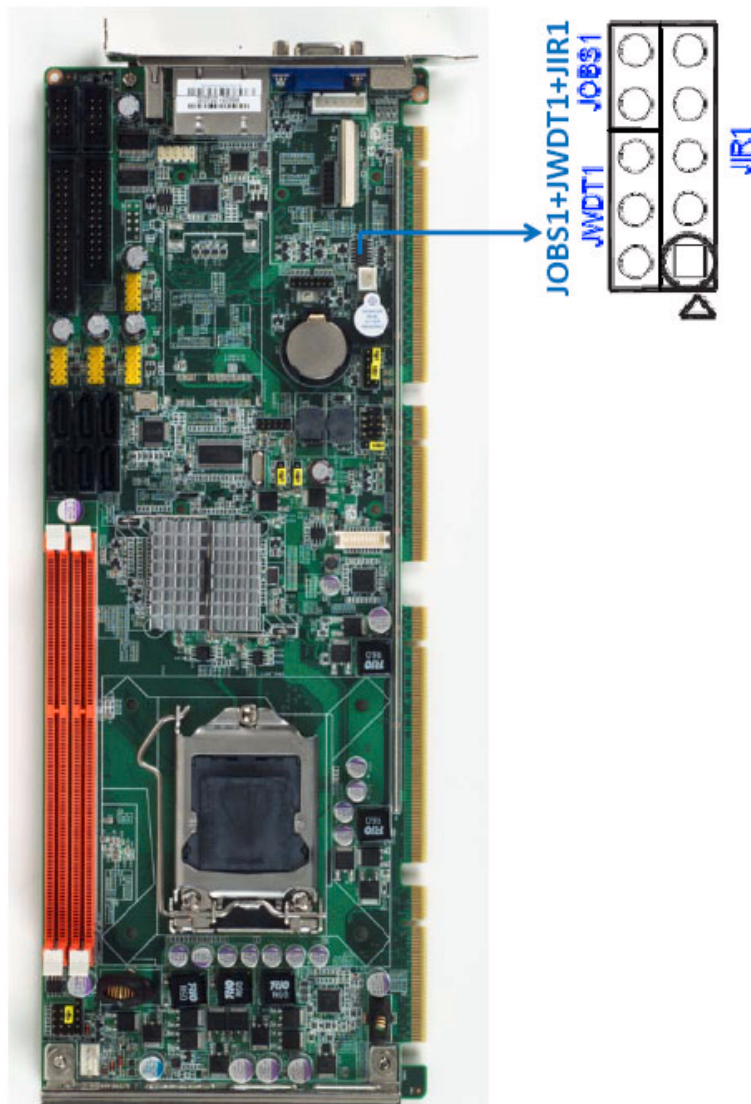




Table 1.5: H/W monitor alarm (JOBS1)

Function	Jumper Setting
Enabled	 1-2 closed
Disabled	 1-2 opened

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

1.9 System Memory

PCE-5125 has two 240-pin memory sockets for (ECC) DDR3 1066/1333 MHz memory modules with maximum capacity of 8GB. (Maximum 4GB for each DIMM)


PCE-5125 QG2 and QVG SKUs support non-ECC DDR3 memory modules.

PCE-5125 WG2 SKU supports ECC and non-ECC DDR3 memory modules.

Please be noted that PCE-5125 does NOT support registered DIMMs (RDIMMs).

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-5125 supports Intel Active Management Technology 6.0 (iAMT6.0) which utilizes some memory space of channel 0, it's suggested that the user should not leave channel 0 DIMM slots (DIMMA1) empty, or it may cause some system abnormality.

1.11 Cache Memory

CPUs supported by PCE-5125 have 8MB, 4MB, 3MB L2 cache memory sizes.

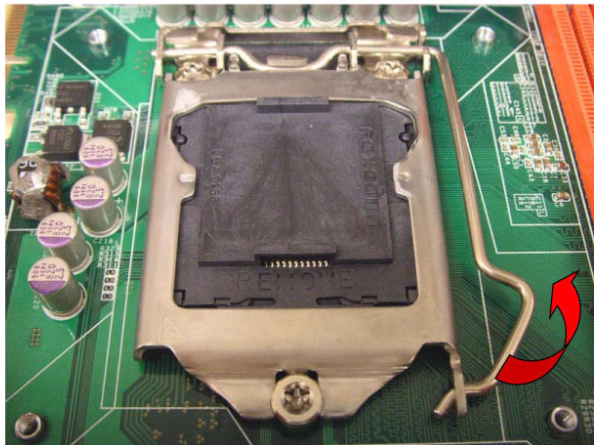
1.12 Processor Installation

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

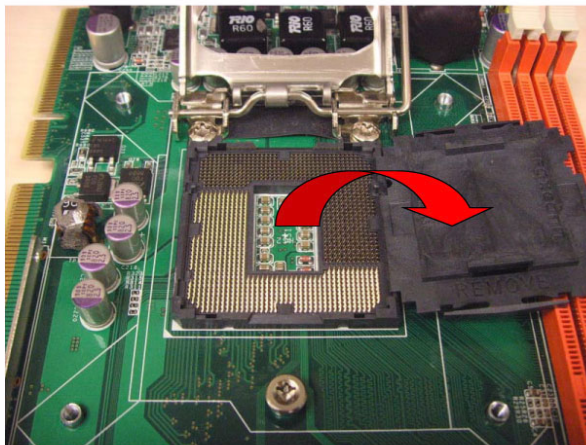


The PCE-5125 is designed for Intel® LGA 1156 socket processors.

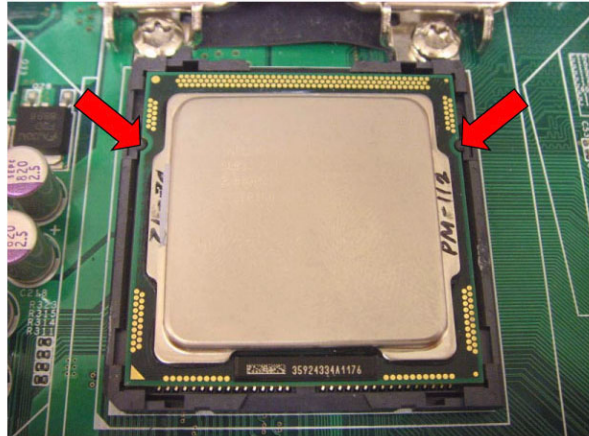
1. Pull the bar beside the processor socket outward and lift it.



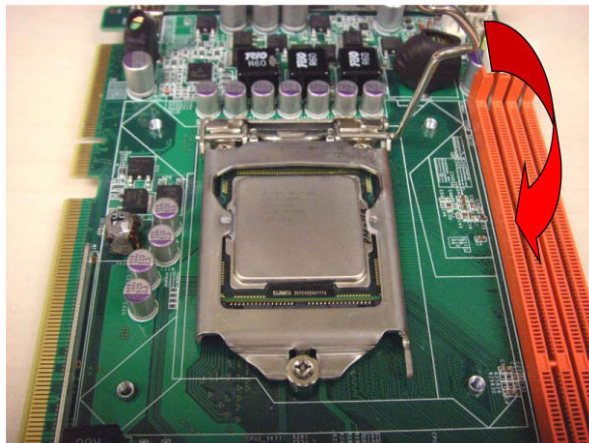
2. Remove the socket protection cap.



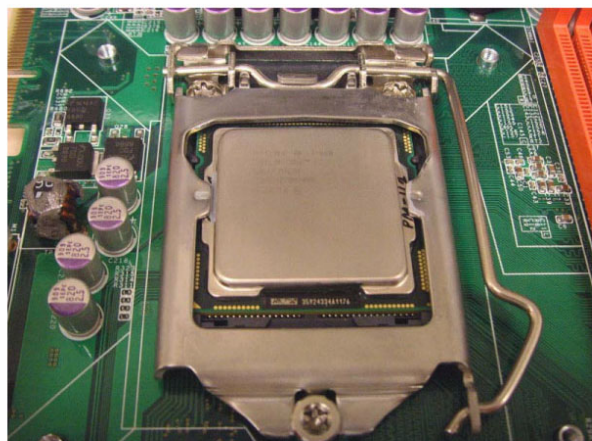
- Align the cuts on the processor with the edges of the socket.



- Replace the socket cap; lower retainer bar and clip it.



- Finish processor installation.



1.13 Processor Cooler Installation

Purchasing PCE-5125's proprietary CPU cooler (P/N: 1960047831N001) from Advantech is a must. Other brands' CPU coolers are NOT compatible with PCE-5125.

Advantech offers special designed CPU cooler of PCE-5125 for better heat dissipation efficiency and enhancing rigidity of CPU card, the part number is 1960047831N001, please do buy it with PCE-5125 CPU card since it is NOT compatible with other brand CPU cooler (neither is compatible with Intel boxed CPU cooler).

Please install 1960047831N001 CPU cooler following these instructions:

Attach the CPU cooler on CPU card by fastening four screws of the CPU cooler into the steel back-plate on PCB.



Note the direction of CPU cooler; it must follow that shown above. Installing CPU cooler in wrong direction may cause bad heat dissipation that may damage the CPU card.

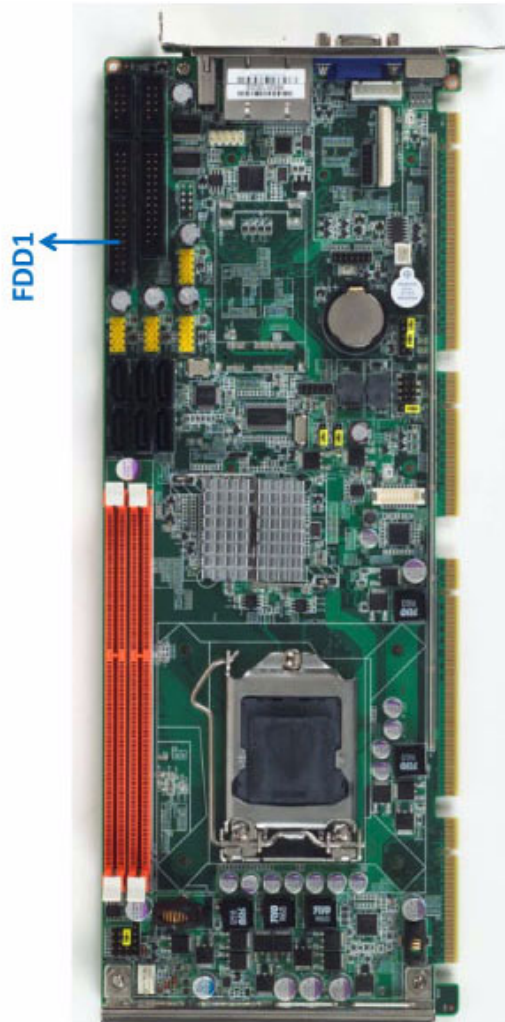
Chapter 2

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.

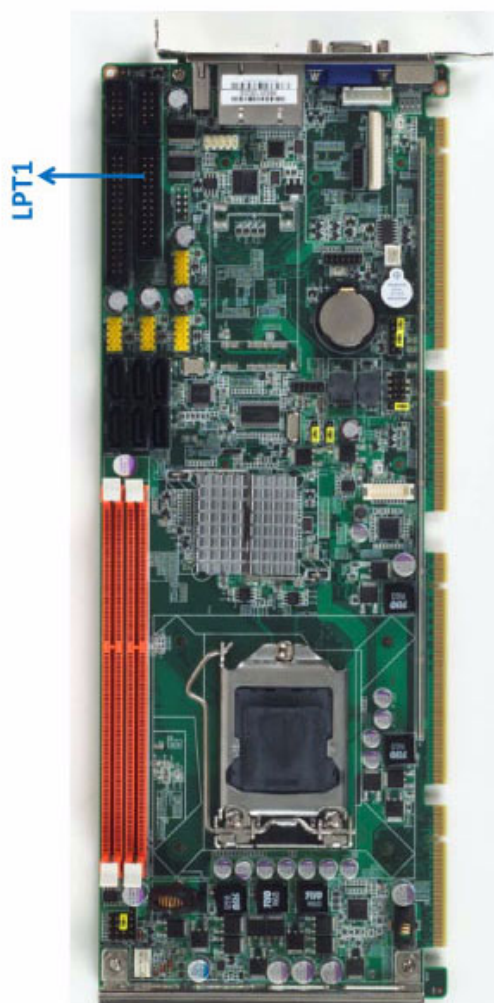
2.2 Floppy Drive Connector (FDD1)



You can attach up to two floppy disk drives to the PCE-5125's onboard controller. You can use 3.5" (720 KB, 1.44 MB) drives.

On the end of the cable is a 34-pin flat-cable connector. On the other end are two sets of 34-pin flat-cable connectors (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.

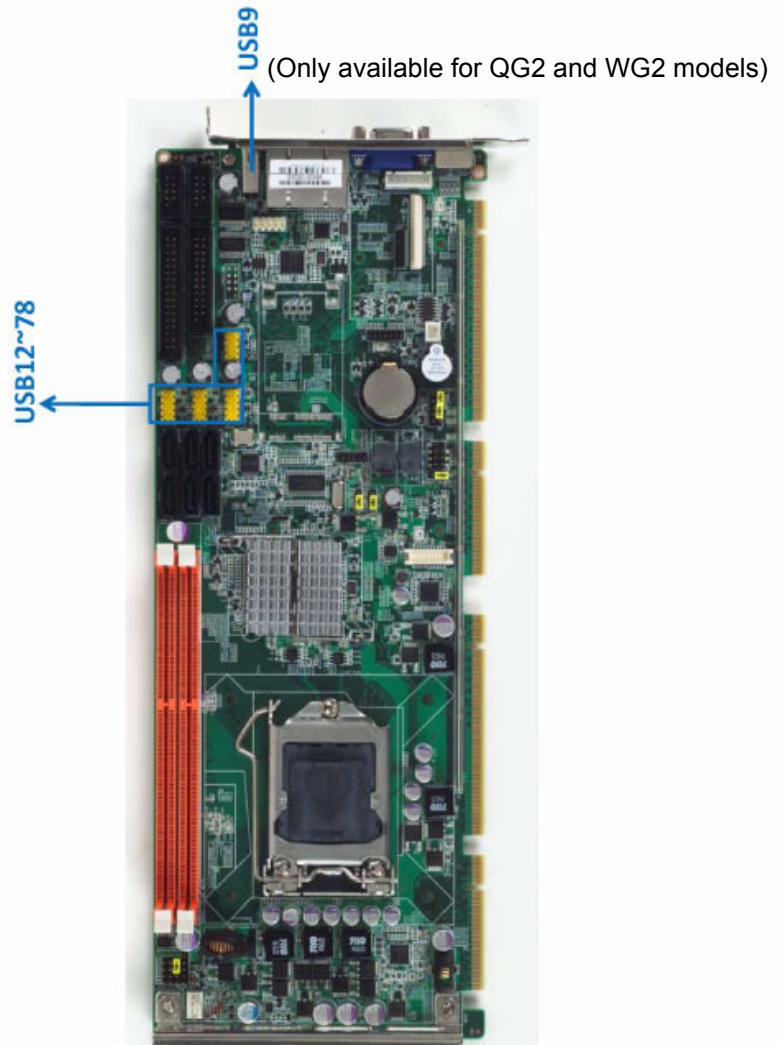
2.3 Parallel Port (LPT1)



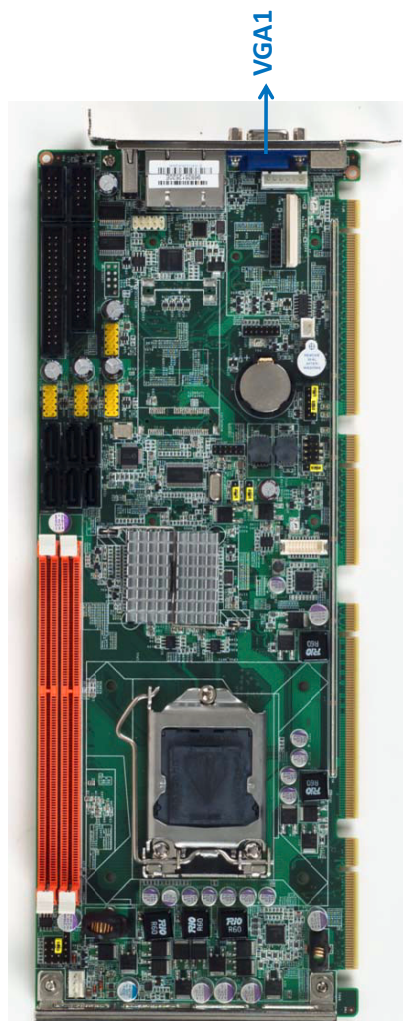
The parallel port is normally used to connect the motherboard to a printer. The PCE-5125 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, LPT1.

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

The PCE-5125 provides up to 9 USB (Universal Serial Bus) on-board 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.

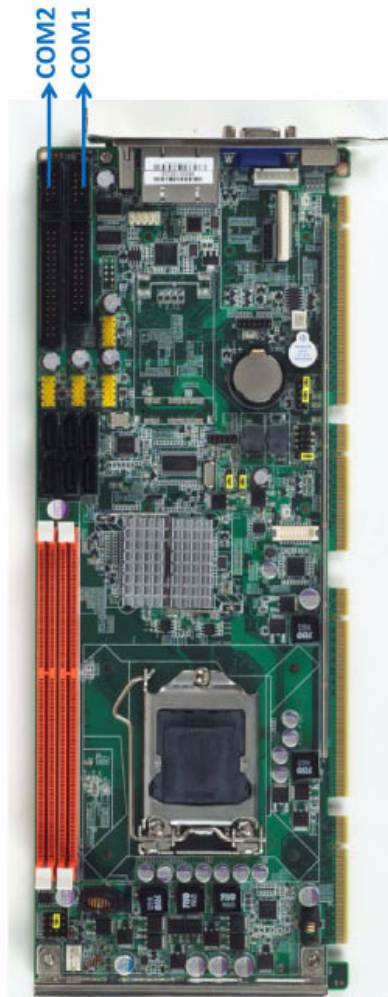


2.5 VGA Connectors (VGA1)



The PCE-5125 has VGA outputs that can drive conventional CRT display. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA.

2.6 Serial Ports (COM1 & COM2)

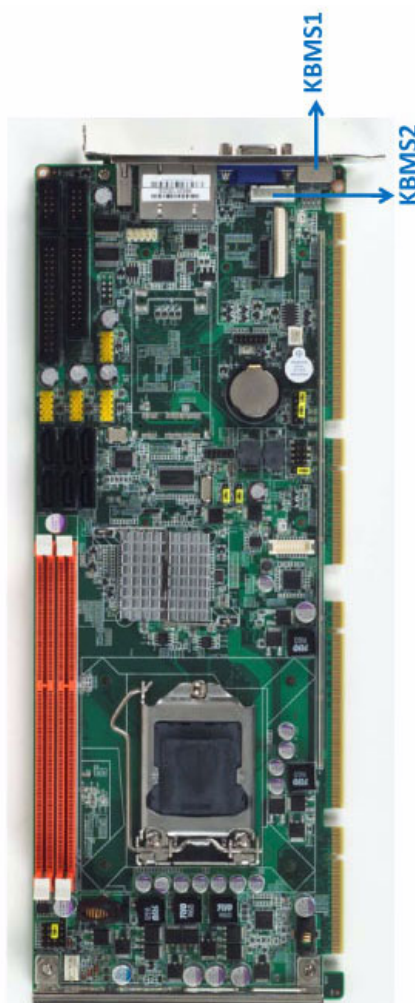


The PCE-5125 offers two serial ports. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

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.

You can purchase dual COM cable kit if you are a QG2 or WG2 user and want to use dual COM ports. The P/N is 1701092300.

2.7 PS/2 Keyboard and Mouse Connector (KBMS1/KBMS2)

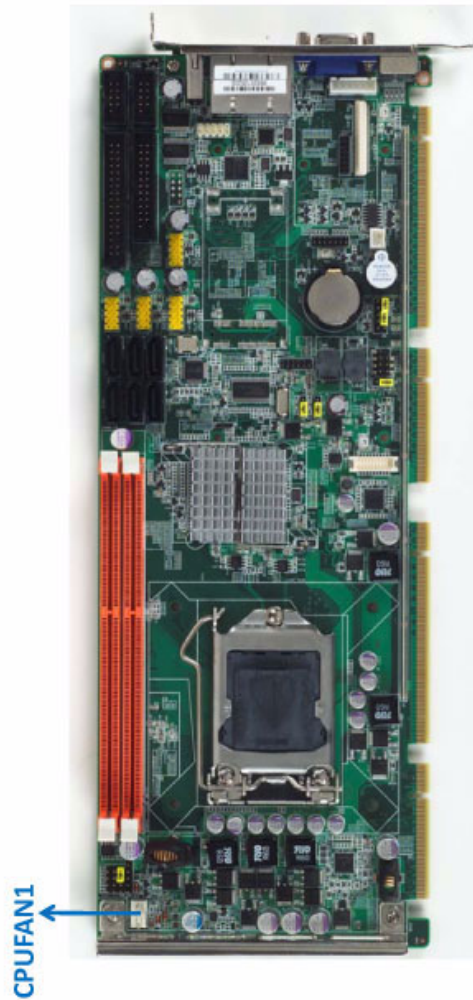


Two on-board 6-pin mini-DIN connectors (KBMS1) provide connection to PS/2 keyboard and mouse by the Y-cable (1700060202) in the package.

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

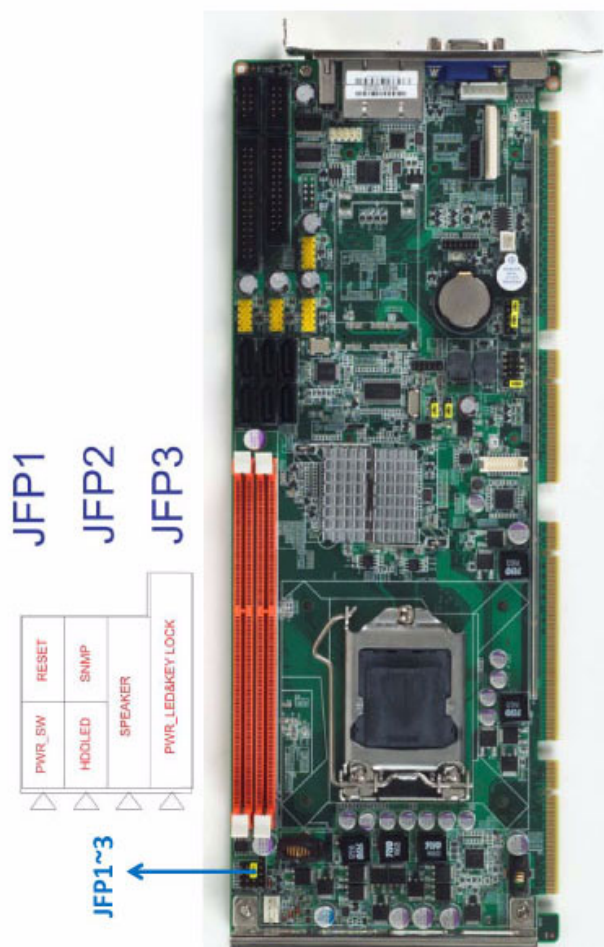
2.8 CPU Fan Connector (CPUFAN1)

This connector supports cooling fans of 500 mA (6 W) or less, and it also support smart fan control when using 4-pin cooler.



2.9 Front Panel Connectors (JFP1, JFP2 & JFP3)

There are several external switches to monitor and control the PCE-5125.



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:

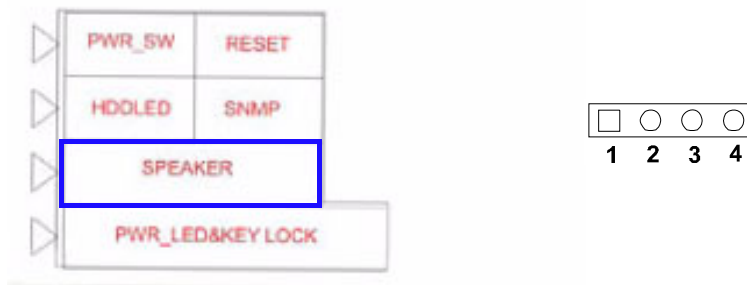
Table 2.1: PS/2 or ATX power supply LED status

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



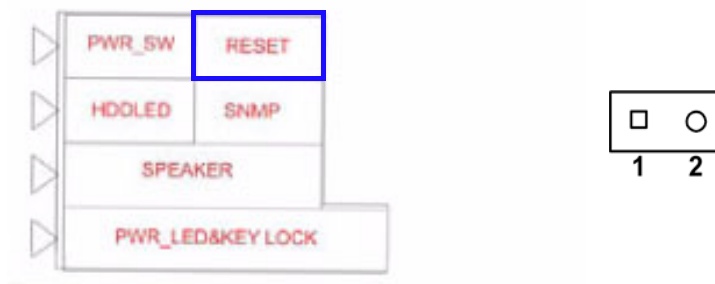
2.9.2 External speaker (JFP2)

JFP2 is a 4-pin connector for an external speaker. The PCE-5125 provides an onboard buzzer as an alternative to an external speaker. To enable the buzzer, set pins 5 and 7 as closed.



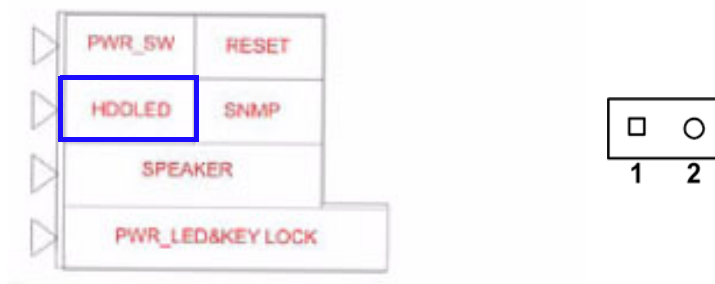
2.9.3 Reset connector (JFP1)

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.

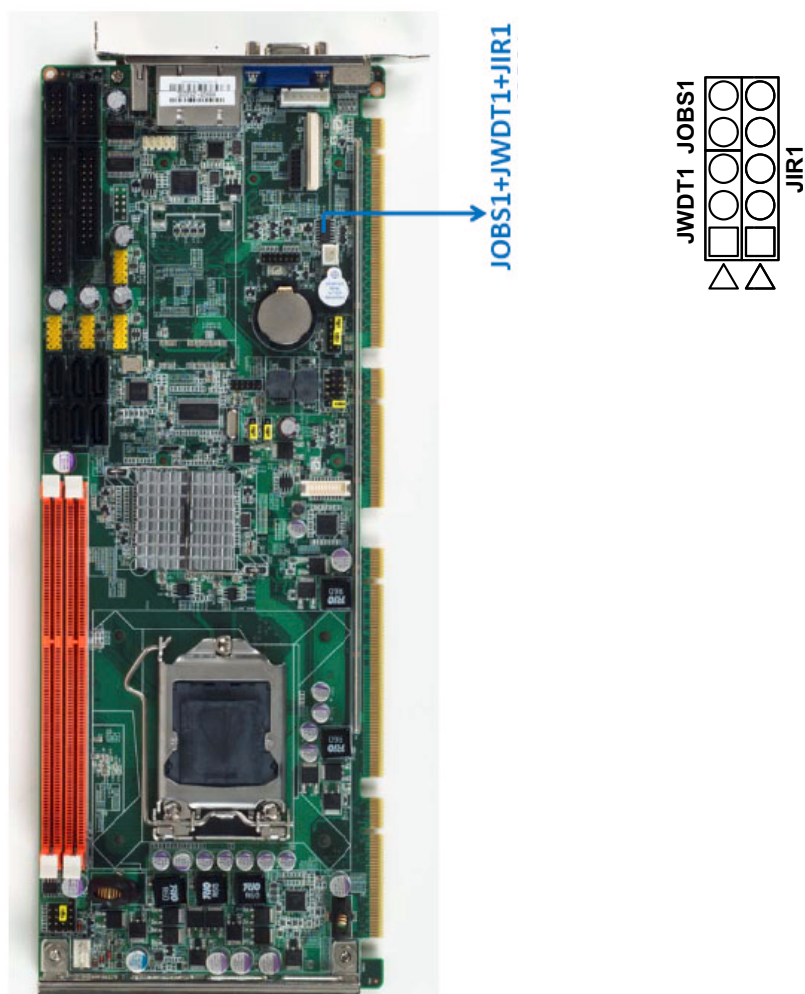


2.9.5 ATX soft power switch (JFP1)

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/Watchdog Timer/Infrared



2.10.1 H/W Monitor Alarm (JOBS1)

This 2-pin header is for enabling/disabling H/W monitor alarm function.

Closed: Enables OBS Alarm

Open: Disables OBS Alarm

2.10.2 Watchdog Timer (JWDT)

This is for setting action trigger by watchdog timer.

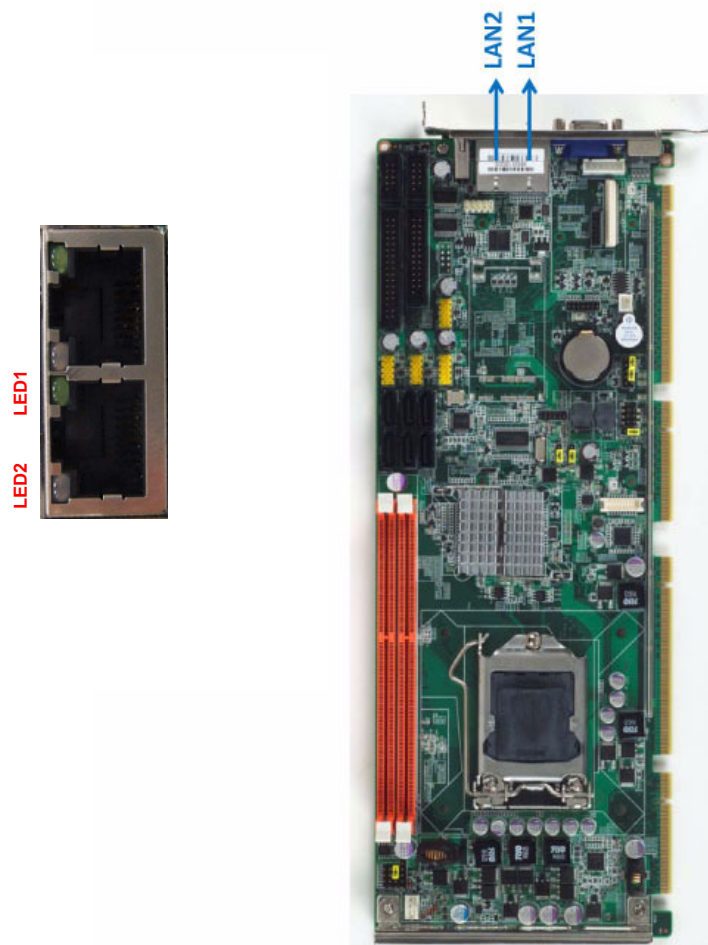
1-2 Pin Close: No Action

2-3 Pin Close: System Reset

2.10.3 Infrared Interface(JIR)

This is a 5-pin header for an infrared device.

2.11 LAN Ports (LAN1 & LAN2)

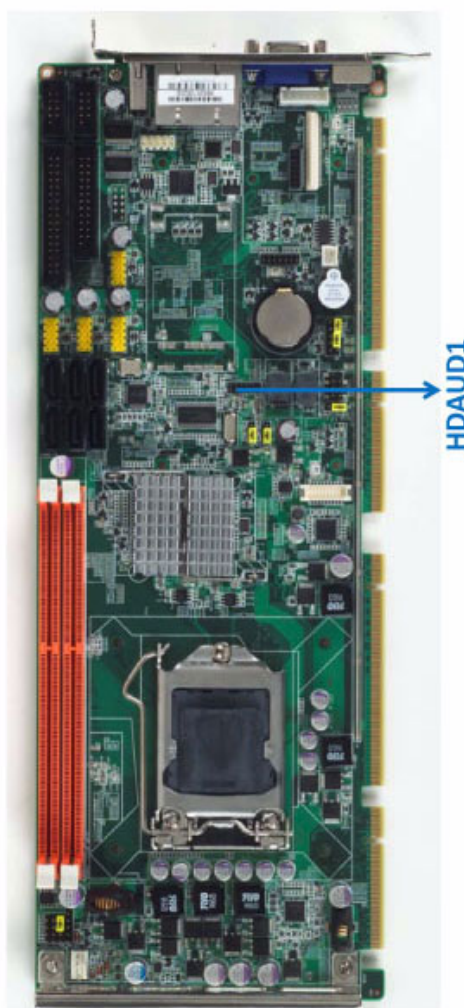


The PCE-5125 is equipped with one or two high-performance 1000 Mbps Ethernet LANs. They are supported by all major network operating systems. The RJ-45 jacks on the rear plate provide convenient connectivity.

Table 2.2: LAN LED Indicators

LAN Mode	LED1	LED2*
1000Mbps Link On	Green On	On
1000Mbps Active	Green on	Flash
1000Mbps Link Off	Off	Off
100Mbps Link On	Orange On	On
100Mbps Active	Orange On	Flash
100Mbps Link Off	Off	Off
10Mbps Link On	Off	On
10Mbps Active	Off	Flash
10Mbps Link Off	Off	Off

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

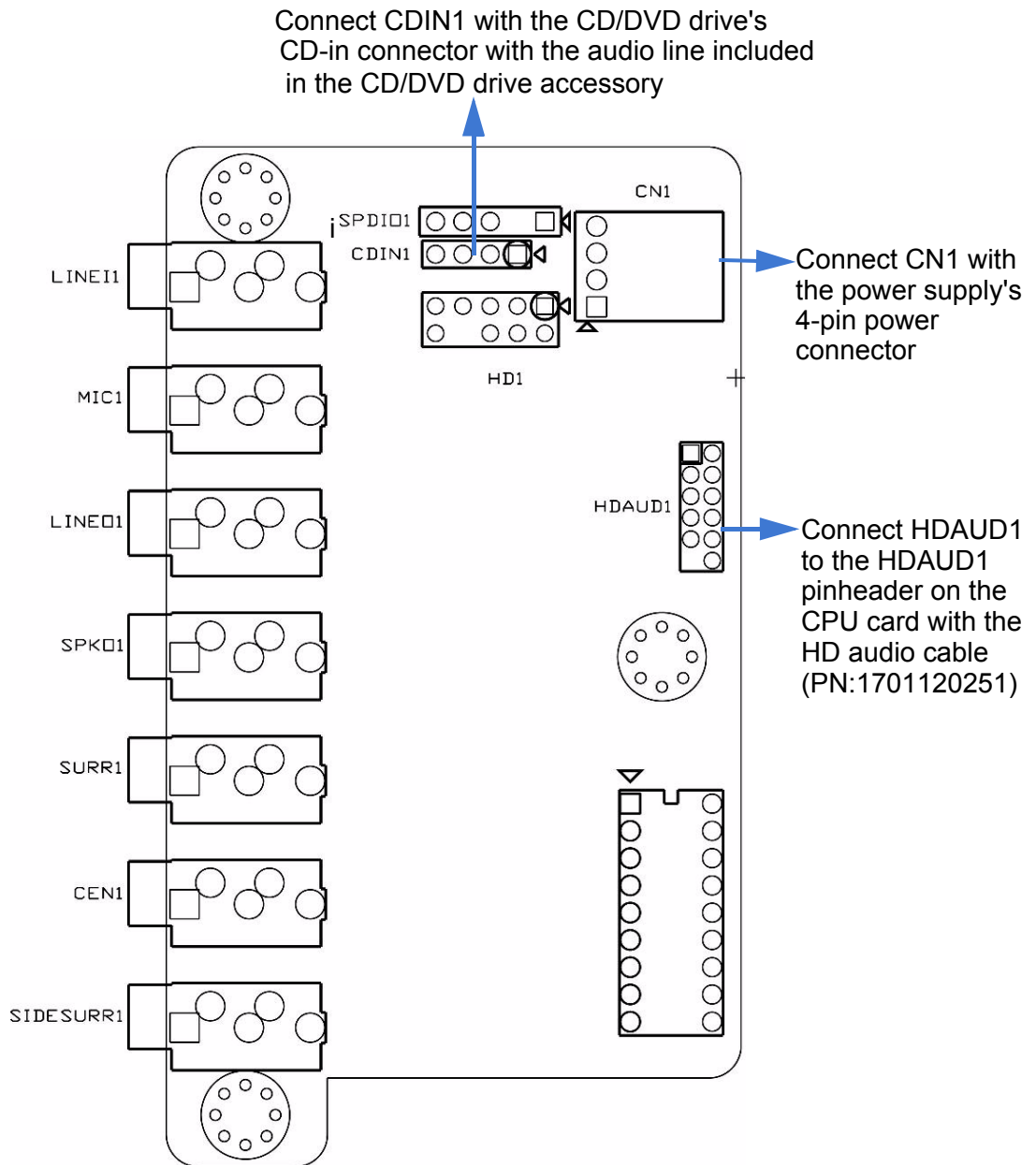
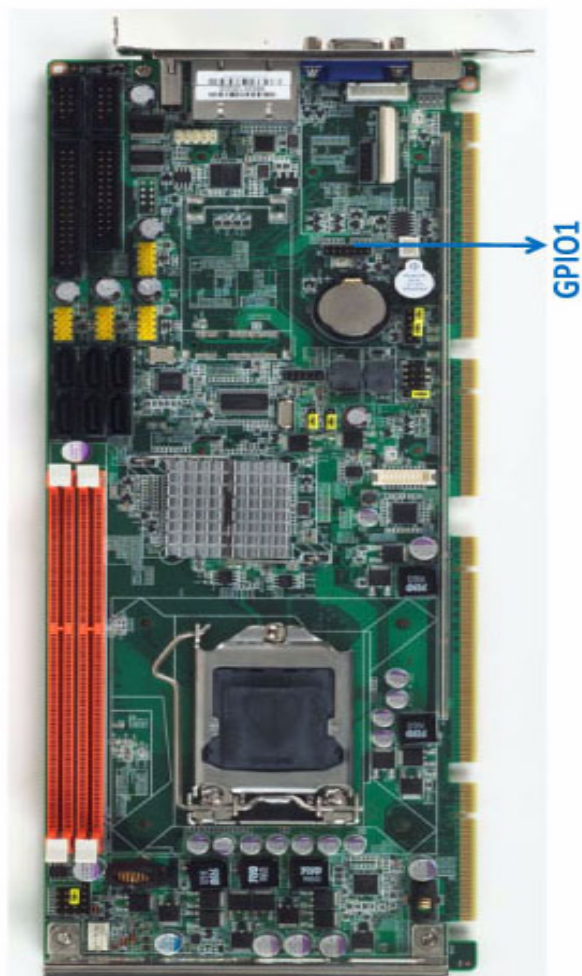


Figure 2.1 Jumper and connector locations of PCA-AUDIO-HDA1E

Note! Please remove the yellow jumper cap on the CPU card's HDAUD1 pinheader before connecting the HD audio cable to it.

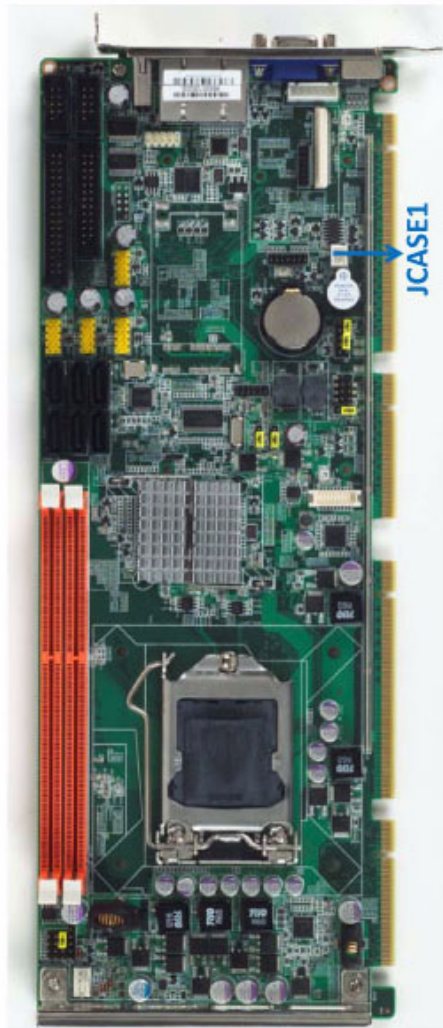


2.13 GPIO Header (GPIO1)



Provides 14-Pins pin header for 8-bit 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)

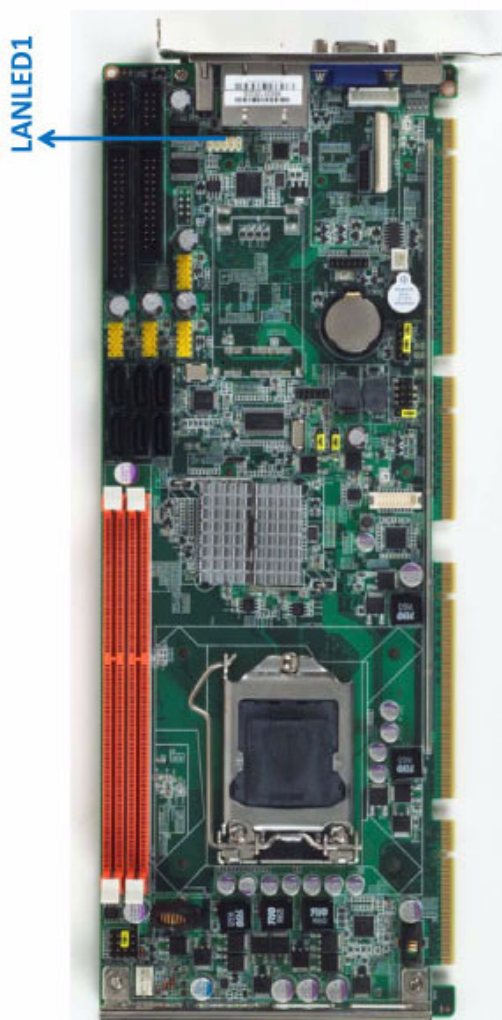


The 2-pin case open connector is for chassis with a case open sensor. When the case is open, the buzzer on motherboard will beep.

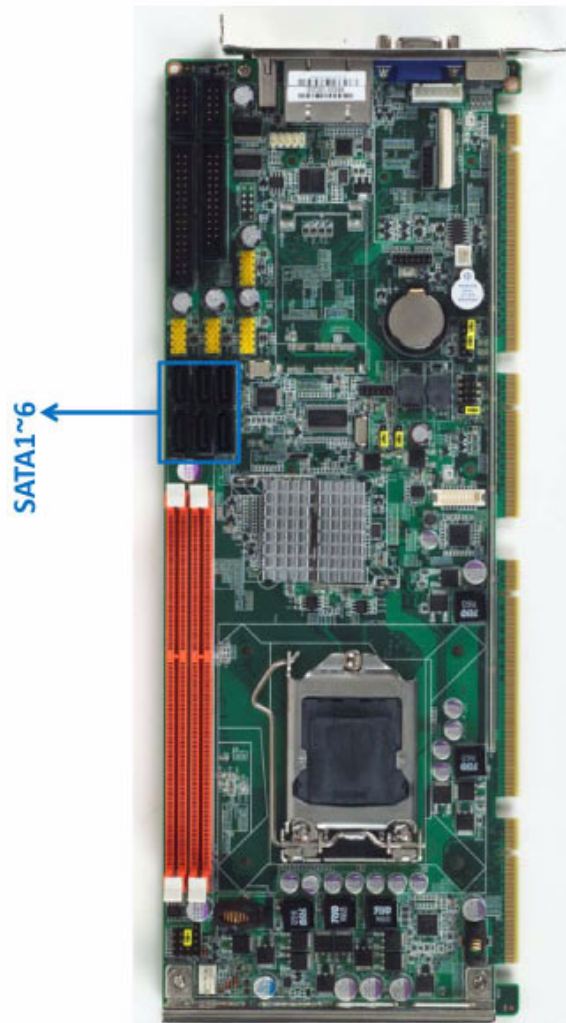
2.15 Front Panel LAN Indicator Connector (LANLED1)

Table 2.3: LAN LED Indicators

LAN Mode	LED1	LED2*
1000Mbps Link On	Green On	On
1000Mbps Active	Green on	Flash
1000Mbps Link Off	Off	Off
100Mbps Link On	Orange On	On
100Mbps Active	Orange On	Flash
100Mbps Link Off	Off	Off
10Mbps Link On	Off	On
10Mbps Active	Off	Flash
10Mbps Link Off	Off	Off



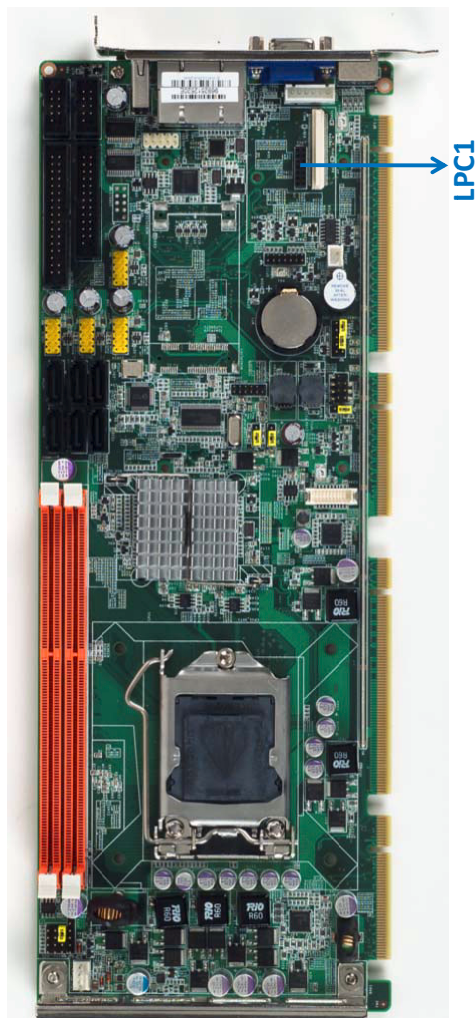
2.16 Serial ATA Interface (SATA1~SATA6)



The PCE-5125 features high performance serial ATA interfaces (up to 300 MB/s) which eases cabling to hard drives or CD/DVD drives with long cables.

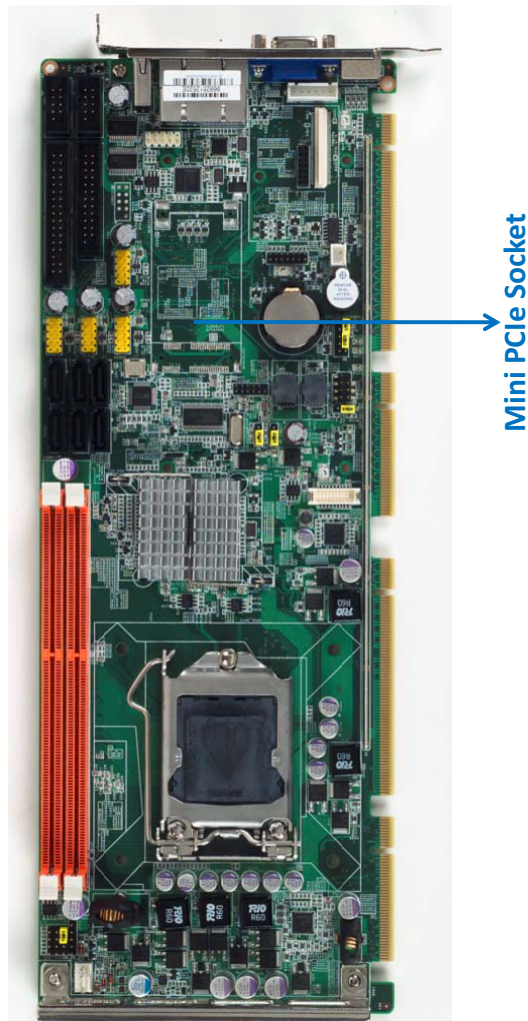
These six on-board SATA ports can be configured as RAID 0, 1, 10, or 5. Please see the detailed BIOS setting instructions for this in Chapter 3.

2.17 LPC Extension Interface (LPC1)



LPC1 is a 4-pin female pinheader for adopting Advantech proprietary COM port extension module PCA-COM485-00A1E which features four extra COM ports (serial ports) supporting RS-422/485 with auto flow control function.

2.18 Mini PCIe Extension Interface (MINIPCI1~2)



MINIPCI1~2 combines a Mini PCIe socket which contains one PCIe x 1 (Gen 2.0) and one USB 2.0 port. This is mainly for adopting Advantech PCA-5650-00A1E Mini PCIe graphic card for those users that use Core i7 8XXX, Core i5 7XXX but do not want to use up one expansion slot for a discrete PCI/PCIe graphics card.

Chapter 3

AMI BIOS Setup

3.1 Introduction

AMIBIOS has been integrated into quantities of 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-5125 setup screens.

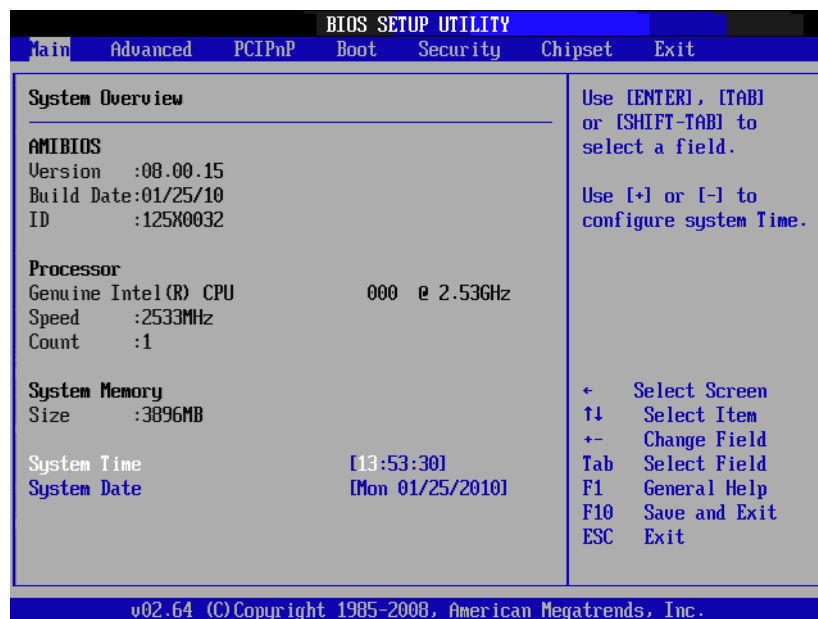


Figure 3.1 Setup program initial screen

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.

3.2 Entering Setup

Turn on the computer and check for the “patch” code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact 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 and you will immediately be allowed to enter Setup.

3.2.1 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 3.2 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.

3.2.1.1 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.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the PCE-5125 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.

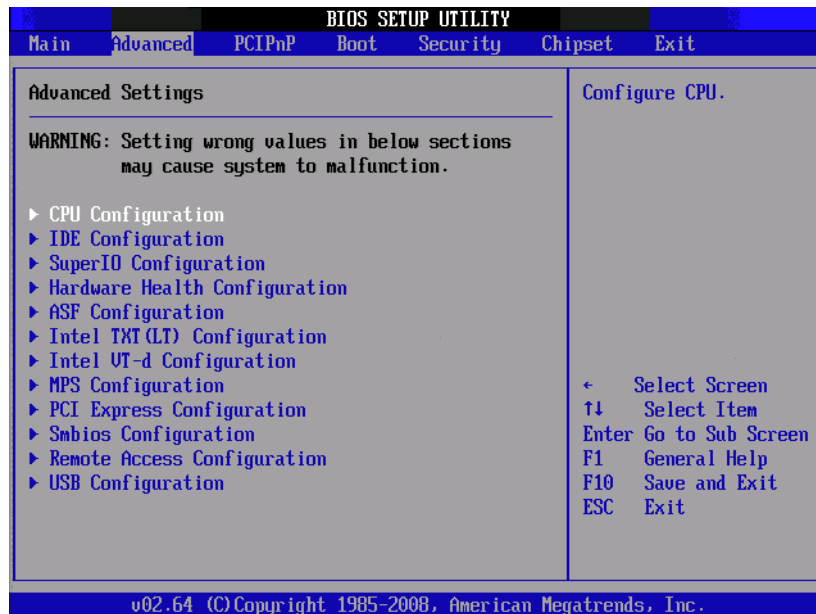


Figure 3.3 Advanced BIOS features setup screen

3.2.2.1 CPU configuration

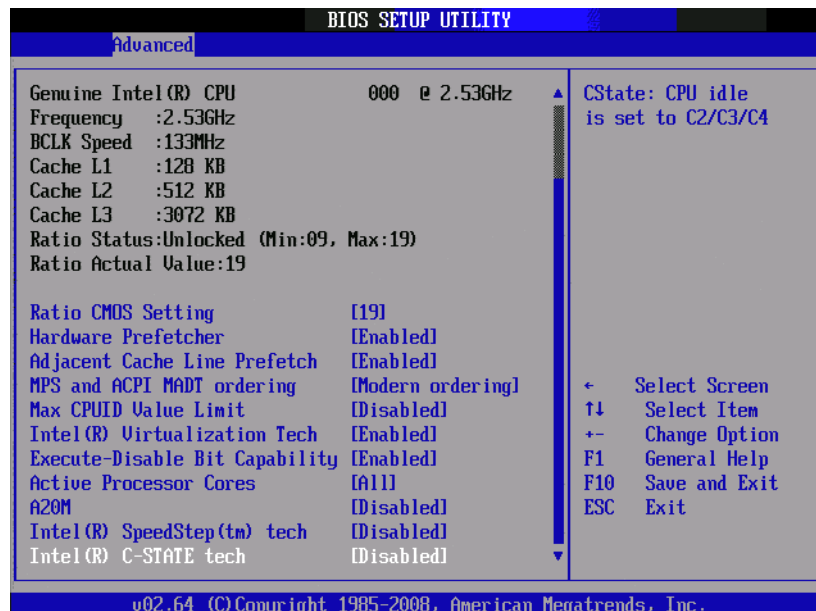


Figure 3.4 CPU configuration setting

- **Ratio CMOS Setting**
Use this to set the ratio between CPU core clock and BCLK frequencies.
- **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.
- **MPS and ACPI MADT ordering**
This feature allows the user to set MADT ordering. Modern ordering is for Windows XP or later OSes. Legacy ordering is for Windows 2000 or earlier OSes.
- **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 Capability**
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.
- **Active Processor Cores**
Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.
- **A20M**
This is to make legacy OSs compatible with some APs.
- **Intel® SpeedStep™ Tech**
When set to disabled, the CPU runs at its default speed, when set to enabled, the CPU speed is controlled by the system.
- **Intel® C-State Tech**
When enabled, this function reduces CPU power consumption in a system halt state. You may choose to enable or disable it.

3.2.2.2 IDE Configuration

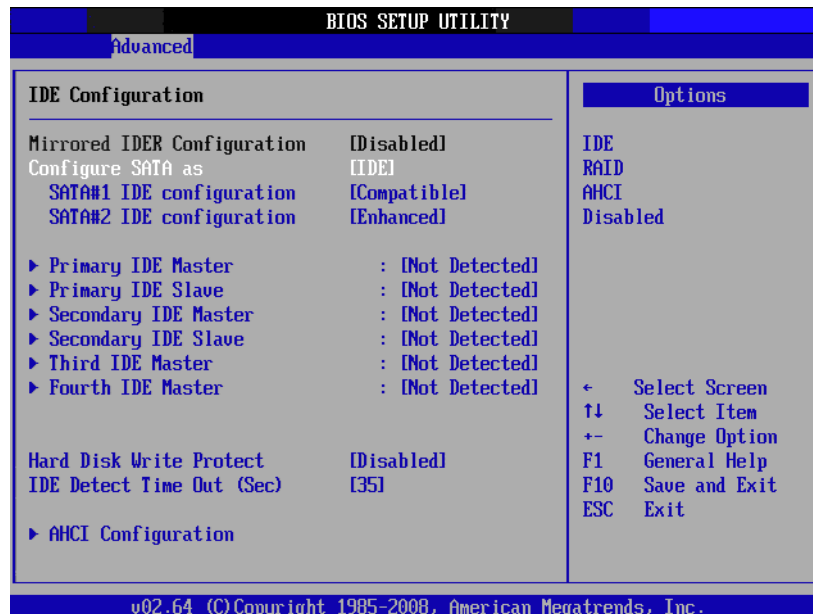


Figure 3.5 IDE configuration

- **Configure SATA as**
This can be configured as IDE, RAID, AHCI, or Disabled.
- **Primary/Secondary/Third/Fourth IDE Master**
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
- **Primary/Secondary/Third/Fourth IDE Slave**
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
- **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.

3.2.2.3 Super I/O Configuration

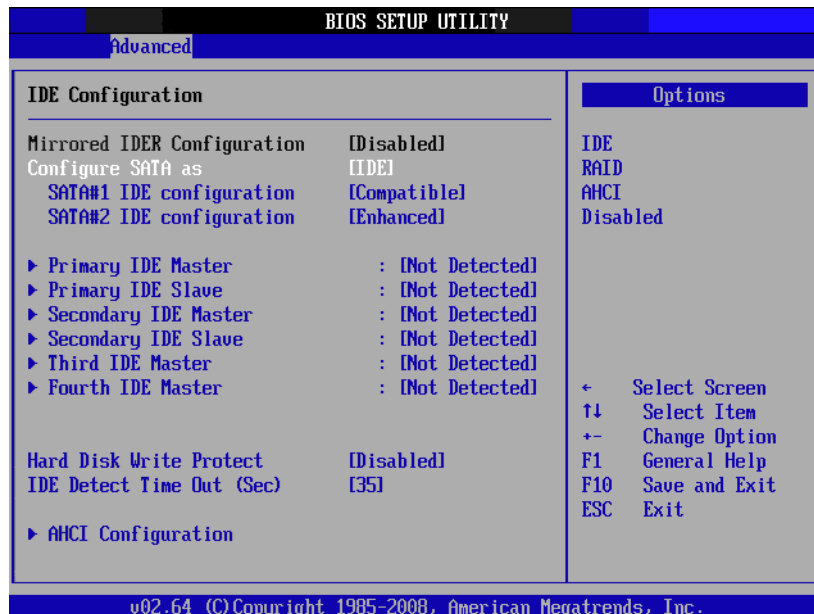


Figure 3.6 Super I/O configuration

- **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.
- **Parallel Port Address**
This configures parallel port base addresses. The following options are also available:
- **Parallel Port Mode**
This option configures Parallel Port mode. Available options include Normal, Bi-directional, ECP, EPP, ECP & EPP.
- **Parallel Port IRQ**
This option configures Parallel Port base IRQ.

3.2.2.4 Hardware Health Configuration

The main screen shows your system health information including system/CPU temperature, CPU fan speed and system voltage values.

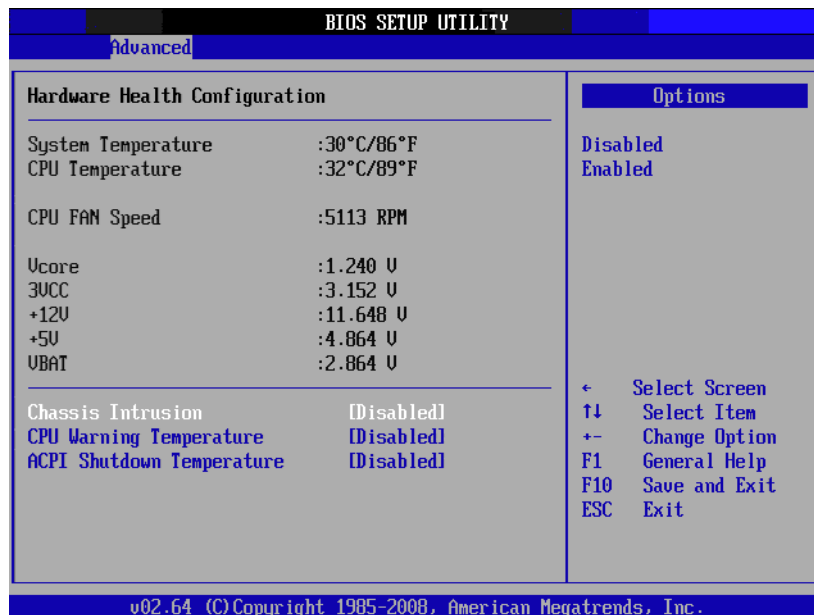


Figure 3.7 Hardware health configuration.

- **Chassis Intrusion**
Enable/Disable the Chassis Intrusion monitoring function. When enabled and the case is opened, the speaker beeps.
- **CPU Warning Temperature**
Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature**
Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.

3.2.2.5 ASF Configuration

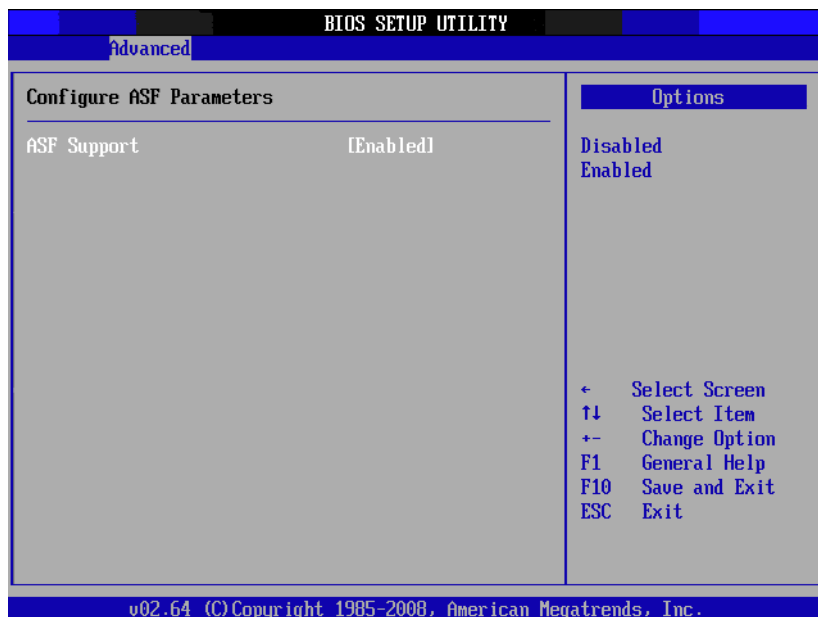


Figure 3.8 Configure ASF parameters

- **ASF Support**
Use this to enable or disable ASF function.

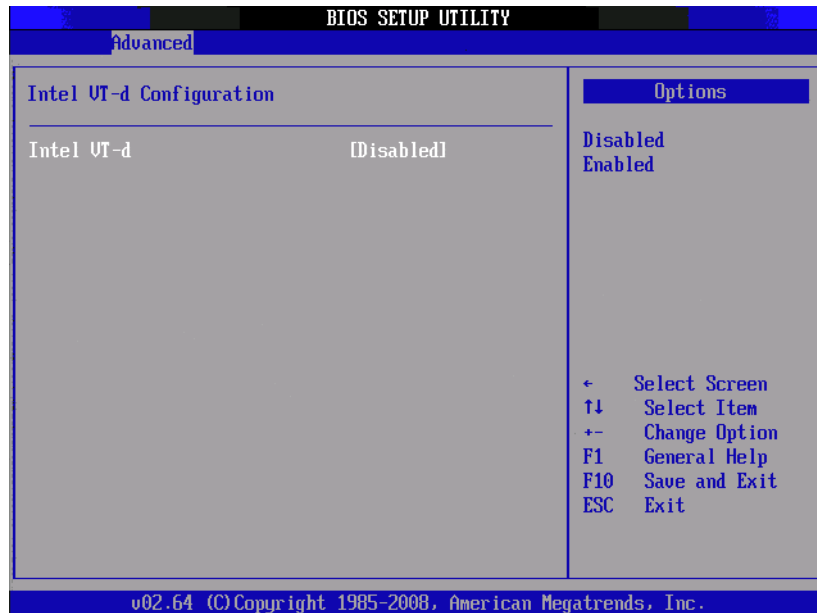
3.2.2.6 Intel TXT (LT) Configuration



Figure 3.9 Configure Intel TXT parameters

This enables or disables Intel® Trusted Execution Technology.

3.2.2.7 Intel VT-d



- **Intel VT-d Configuration**

To support Intel chipset virtualization technology for directed I/O.

3.2.2.8 MPS Configuration



Figure 3.10 Configure MPS parameters

- **MPS Revision**

Choose Multi Processor Specification for OS compatibility.

3.2.2.9 PCI-Express Configuration



Figure 3.11 Configure PCI-Express parameters

- **Relaxed Ordering**
This item enables or disables PCI Express device relaxed ordering.
- **Maximum Payload Size**
Either set Maximum payload for PCI Express device, or allow system BIOS select the value.
- **Extended Tag Field**
If Enabled, it allows device to use 8-bit tag field as a requester.
- **No Snoop**
This item enables or disables PCI Express device No Snoop option.
- **Maximum Read Request Size**
This item sets maximum read request size of PCI Express device, or allows system BIOS select the value.
- **Active State Power-Management**
This is to enable or disable PCI-Express port's power saving function. Enabling this could reduce add-on card compatibility.
- **Extended Synch**
If Enabled, it allows generation of extended synchronization patterns.

3.2.2.10 Smbios Configuration

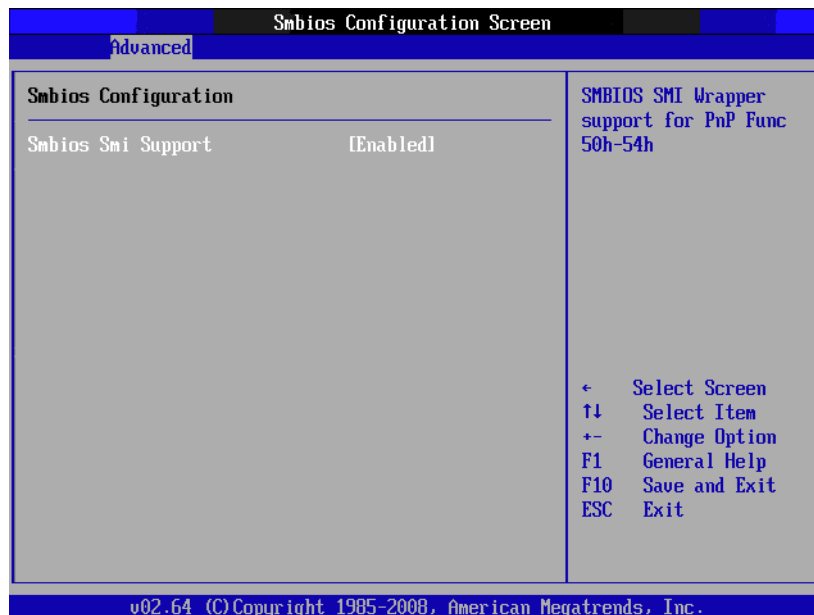


Figure 3.12 Configure Smbios parameters

- **Smbios Support**

This allows user to enable or disable SMBIOS support.

3.2.2.11 Remote Access Configuration

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.

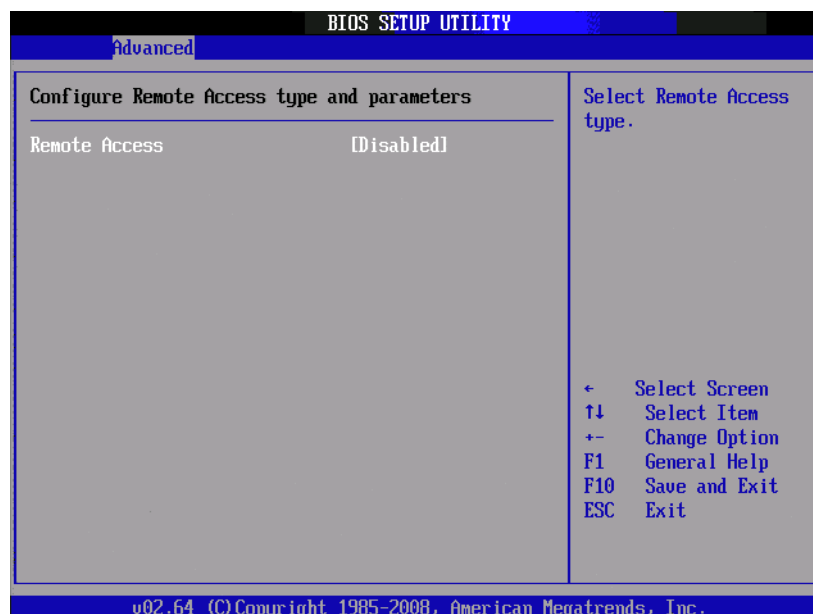


Figure 3.13 Remote access configuration

Note! *If you want to use SOL, which is provided by Intel AMT, you have to enable the Remote access feature.*



3.2.2.12 USB Configuration



Figure 3.14 USB configuration

- **USB Function**
This enables or disables USB host controllers.
 - EHCI Controller#1
This allows user to enable or disable USB EHCI Controller#1.
 - EHCI Controller#2
This allows user to enable or disable USB EHCI Controller#2.
- **Legacy USB Support**
This is for supporting USB device under legacy OS such as DOS. When choosing "AUTO", the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged and disable USB legacy mode when no USB device is plugged.
- **USB 2.0 Controller Mode**
This is to set speed of the USB 2.0 Controller.
- **BIOS EHCI Hand-Off**
This enables or disables supporting OS without EHCI hand-off feature.
- **Legacy USB 1.1 HC Support**
This enables or disables USB 1.1 support.

3.2.3 PCI/PnP Setup

Select the PCI/PnP tab from the PCE-5125 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 3.15 PCI/PnP setup

3.2.3.1 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.

3.2.3.2 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.

3.2.3.3 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.

3.2.3.4 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.

3.2.3.5 Palette snooping

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

3.2.3.6 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.

3.2.3.7 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.

3.2.3.8 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.

3.2.3.9 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.

3.2.4 Boot Setup Utility



Figure 3.16 Boot setup utility

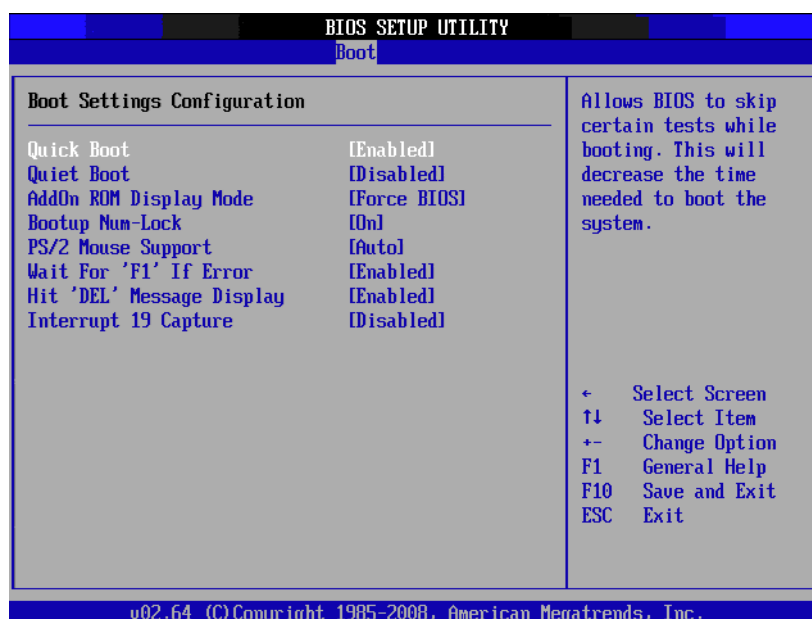


Figure 3.17 Boot setting configuration

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.
- **PS/2 Mouse Support:** Select support for PS/2 Mouse.
- **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.
- **Interrupt 19 Capture:**
Some add-on cards' option ROMs need Interrupt 19, this is to enable or disable supporting this kind of add-on cards.

3.2.5 Security Setup



Figure 3.18 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>:

3.2.5.1 Boot sector Virus protection

The boot sector virus protection will warn if any program tries to write to the boot sector.

3.2.6 Advanced Chipset Settings



Figure 3.19 Advanced chipset settings

3.2.6.1 North Bridge Chipset Configuration

These options allows user to do settings for memory and graphic controllers.

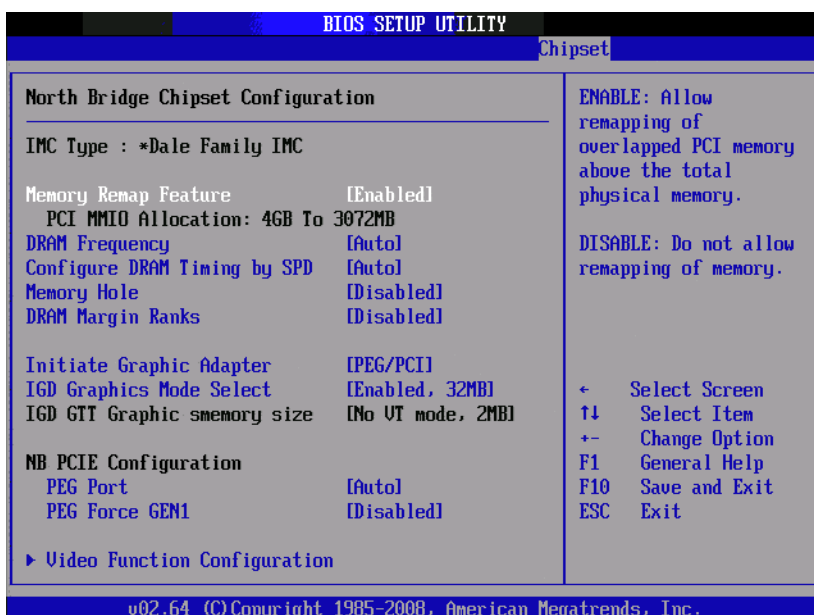


Figure 3.20 North bridge configuration

- **Memory Remap Feature**
Enabling this feature allows the system to use memory capacity larger than 4GB, disabling this limits system memory capacity no more than 4GB.
- **DRAM Frequency**
This setting allows user to select DRAM frequency.
- **Configure DRAM Timing by SPD**
When enabling, DRAM will operate with a frequency set by SPD, disabling this will allow user to manually set DRAM frequency.

- **Memory Hole**
This setting allows user to reserve the 1MB of memory required by some legacy add-on cards.
- **DRAM Margin Ranks**
This allows user to enable or disable function of DRAM Margin Ranks.
- **Initiate Graphic Adapter**
This setting allows user to select which graphics controller to be the primary graphic device when booting up.
- **PEG Port**
This is for user to choose manually enabling or disabling PCIe graphic port or leave it to automatically detect presence of a add-on PEG graphic card.
- **PEG Force GEN1**
This setting allows user to manually downgrade PEG port to Gen 1.
- **Video Function Configuration**
This item is allows the user to set Video memory. There are three options, [128 MB]/[256 MB]/[Maximum DVMT]



Figure 3.21 Video function configuration

3.2.6.2 South Bridge Chipset Configuration

These options allow users to do settings for memory and graphic controllers.

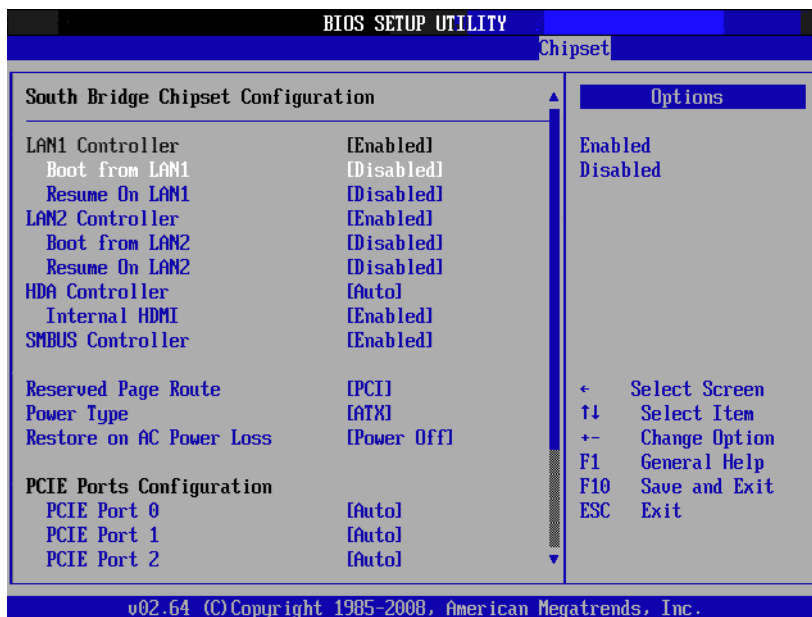


Figure 3.22 South bridge configuration



- **LAN1 Controller**
Enables or disables the LAN1 controller.
- **Boot From LAN1**
Enables or disables LAN1 boot.
- **Resume On LAN1**
Enables or disables LAN1 resuming.
- **LAN2 Controller**
Enables or disables the LAN2 controller.
- **Boot From LAN2**
Enables or disables LAN2 boot.

- **Resume On LAN2**
Enables or disables LAN2 resuming.
- **HDA Controller**
Enables or disables the High Definition audio controller.
- **Internal HDMI**
Enables or disables the HDMI controller.
- **SMBUS Controller**
Enables or disables the SMBUS controller.
- **Reserved Page Route**
This allows user to define which interface to send out 80 port message. Available options are PCI and LPC.
- **Power Type**
This allows user to choose power type.
- **Restore on AC Loss**
This allows user to define how the system responds to power restore after AC power loss.
- **PCIe Ports Configuration**
This is for user to choose manually enabling or disabling PCIe port or leave it to automatically detect presence of an add-on card.
- **Resume on Ring**
Enabling this means the system can be awakened by modem ring.
- **Resume on RTC Alarm**
Enabling this allows the system to be awakened by an RTC alarm.

3.2.6.3 ME Subsystem Configuration

These options allow user to do settings for the management engine (ME) subsystem.

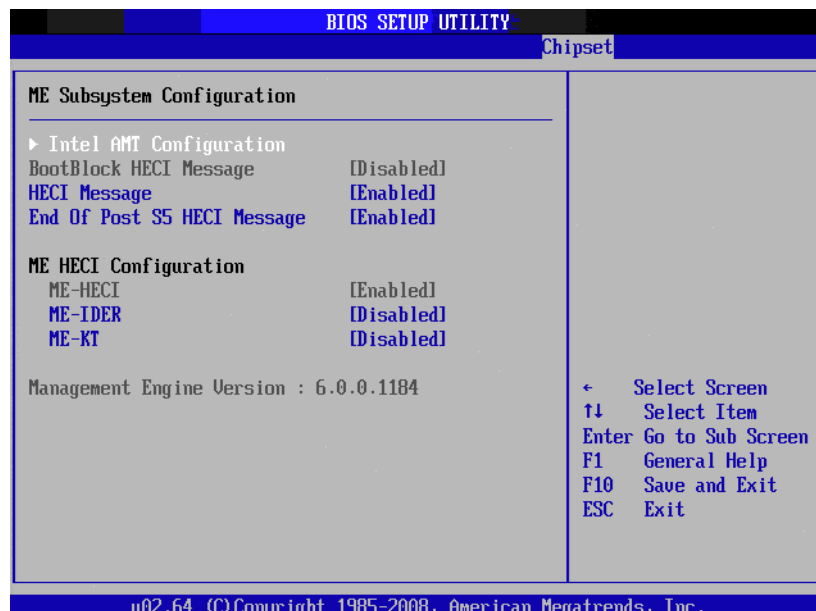


Figure 3.23 ME subsystem configuration

- **Intel AMT Configuration**
 - **Boot Block HECI Message**

This allows user to enable or disable Boot Block HECI messaging between system BIOS code and ME code.

- **HECI Message**

This allows user to enable or disable HECI messaging between system BIOS code and ME code.

- **End of POST S5 HECI Message**

Enabling this will let system BIOS code to inform ME code ending of POST S5 via HECI messaging.

- **ME HECI Configuration**

- **ME-HECI**

This allows user to enable or disable HECI function of ME.

- **ME-IDER**

This allows user to enable or disable IDE redirection function of ME.

- **ME-KT**

This allows user to enable or disable KT function of ME.

3.2.7 Exit Option

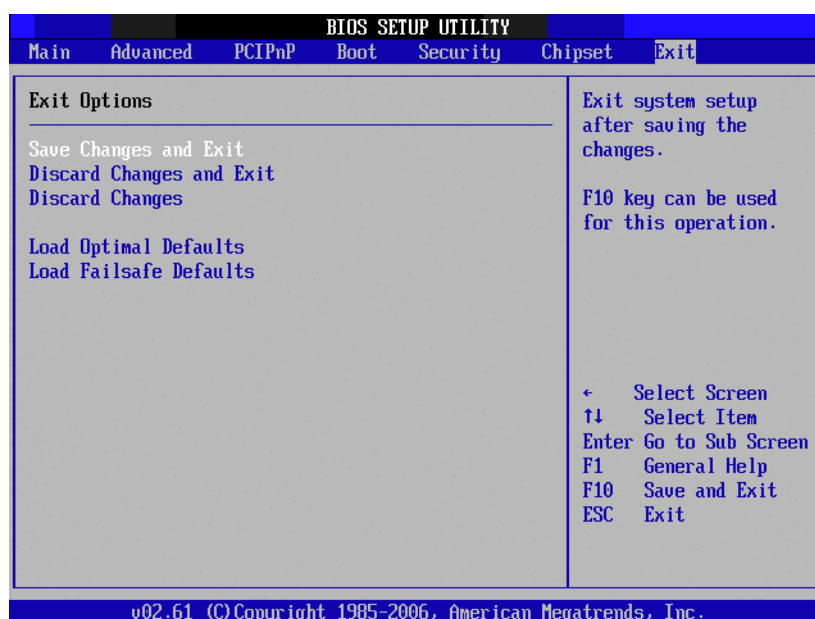


Figure 3.24 Exit option

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.

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

Load optimal defaults

The PCE-5125 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>.

Load fail-Safe defaults

The PCE-5125 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

Value-Added Software Services

4.1 Value-Added Software Services

Software API: An interface that defines the ways in which an application program may request services from libraries and/or operating systems. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications. The API and utility is only for XP, and if user needs Linux version API and utility, please contact with Advantech representative for support it.

4.1.1 Software API

4.1.1.1 Control

GPIO



General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. allows users to monitor the level of signal input or set the output status to switch on/off the device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

4.1.1.2 Monitor

Watchdog



A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

Hardware Monitor



The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

4.1.2 Software Utility

Embedded Security ID



The embedded application is the most important property of a system integrator. It contains valuable intellectual property, design knowledge and innovation, but it is easily copied! The Embedded Security ID utility provides reliable security functions for customers to secure their application data within embedded BIOS.

Monitoring



The Monitoring utility allows the customer to monitor system health, including voltage, CPU and system temperature and fan speed. These items are important to a device; if critical errors happen and are not solved immediately, permanent damage may be caused.

eSOS



The eSOS is a small OS stored in BIOS ROM. It will boot up in case of a main OS crash. It will diagnose the hardware status, and then send an e-mail to a designated administrator. The eSOS also provides remote connection: Telnet server and FTP server, allowing the administrator to rescue the system.

Note: This function requires BIOS customization.

Chapter 5

Chipset Software
Installation Utility

5.1 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-5125 are located on the software installation CD. The driver in the folder of the driver CD will guide and link you to the utilities and drivers under a Windows system. 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.

5.2 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 PnP services
- IDE Ultra ATA 100/66/33 and Serial ATA interface support
- USB 1.1/2.0 support
- Identification of Intel® chipset components in the Device Manager
- Integrates superior video features. These include filtered sealing of 720 pixel DVD content, and MPEG-2 motion compensation for software DVD

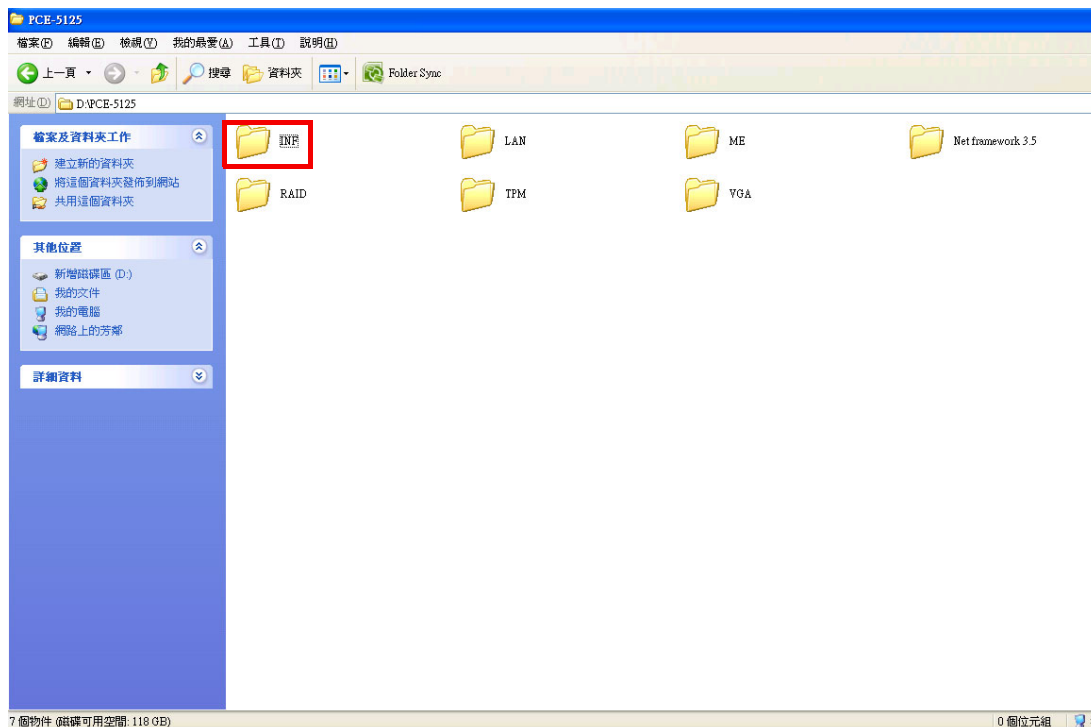
5.3 Windows® XP / Windows® 7 Driver Setup

1. Insert the driver CD into your system's CD-ROM drive. You can see the driver folder items. Navigate to the "INF" folder and click "infinst_autol.exe" to complete the installation of the driver.

Note! *Wrong driver installation may cause unexpected system instability.*



The drivers on this CD support both Windows XP 32-bit /64-bit and Windows 7 32-bit/64-bit.



Chapter 6

Integrated Graphic
Device Setup

6.1 Introduction

The Intel® Core™ i5-6xx, Core™ i3-5xx and Pentium® CPUs with dual core processors have integrated graphics controllers embedded. You need to install the VGA driver to enable this function, which includes the following features:

- **Optimized integrated graphic solution:** Intel Graphics Flexible Display Interface supports versatile display options and 32-bit 3D graphics engine. Dual independent display, enhanced display modes for widescreen flat panels for extend, twin, and clone dual display mode, and optimized 3D support deliver an intensive and realistic visual experience. Again, only Core™ i5-6xx, Core™ i3-5xx and Pentium® CPUs with dual core have embedded integrated graphics, Core™ i7, Core™ i5- 7xx with quad core do not.

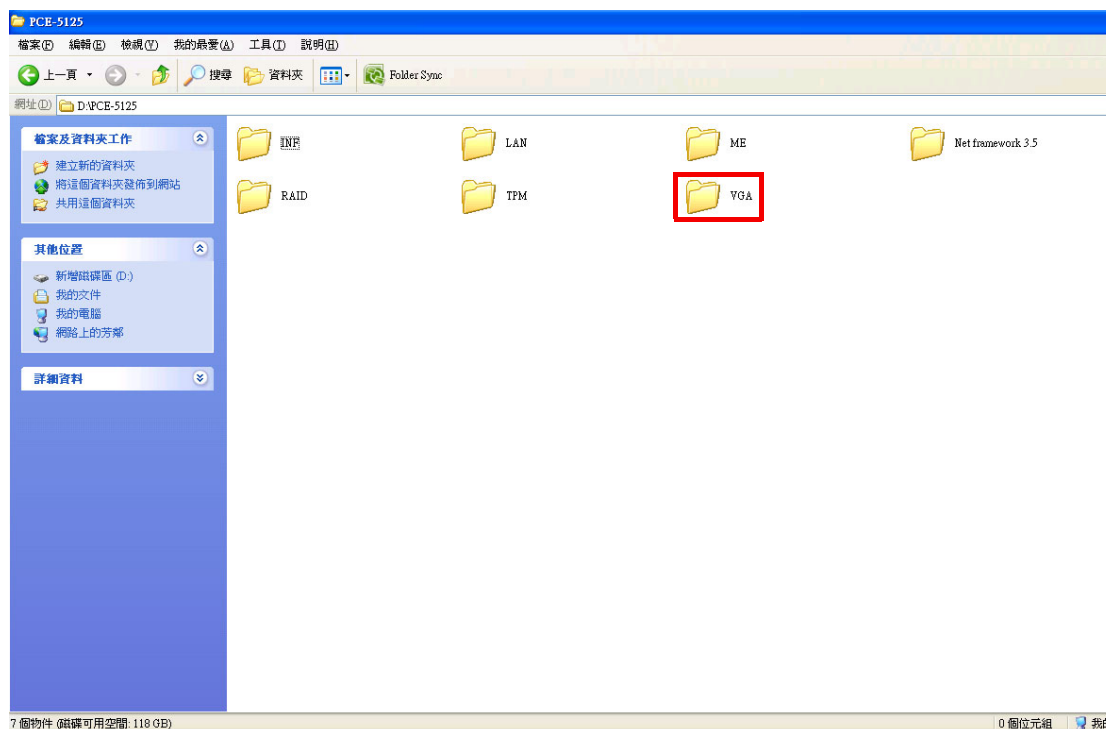
6.2 Windows XP/Windows 7 Driver Setup

Note! Before installing this driver, make sure the INF driver has been installed in your system. See Chapter 5 for information on installing the INF driver.



Insert the driver CD into your system's CD-ROM drive. You can see the driver folder items. Navigate to the "VGA" folder and click "setup.exe" to complete the installation of the driver.

Note! Wrong driver installation may cause unexpected system instability.



Chapter 7

LAN Configuration

7.1 Introduction

The PCE-5125 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Intel 82578DM (LAN1) and 82583V (LAN2 of QG2) or 82574L (LAN2 of WG2) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

7.2 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.

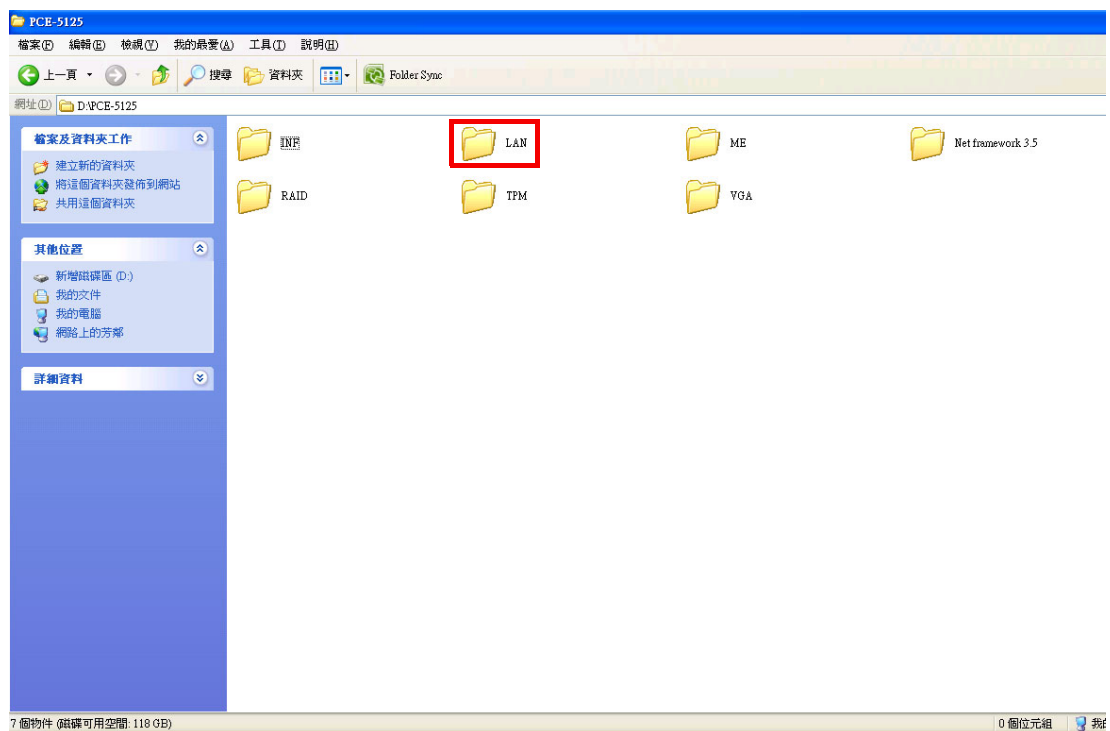


The PCE-5125's Intel 82578DM (LAN1) and 82583V/82574L (LAN2) Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies from system to system. Please find and use the section that provides the driver setup procedure for the operating system you are using.

7.3 Win XP /Win 7 Driver Setup (LAN)

Insert the driver CD into your system's CD-ROM drive. Navigate to the "DRV_LAN" folder and click "setup.exe" to complete the installation of the driver.

Note! Wrong driver installation may cause unexpected system instability.



Chapter 8

SATA RAID Setup

8.1 Introduction

To support demanding disk I/O, Intel Q57/3450 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.

8.2 SATA RAID Driver and Utility Setup

Note!  For the detailed installation instructions for the SATA RAID driver and utility, please check the User Guide in 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 "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 Introduction

The PCE-5125'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.

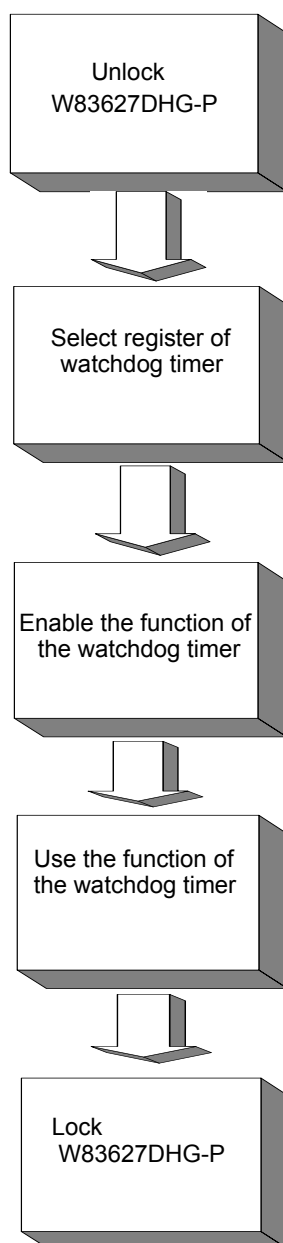
A.1.1 Watchdog timer overview

The watchdog timer is built in to the W83627DHG-P 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).


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 W83627DHG-P
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 W83627DHG-P
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 W83627DHG-P
Mov    al,0aah
Out    dx,al

2.  Enable watchdog timer and set 5 minutes as timeout interval
;-----
Mov dx,2eh          ; Unlock W83627DHG-P
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 W83627DHG-P
Mov    al,0aah

```

Out dx,al

3. Enable watchdog timer to be reset by mouse

```
-----  
Mov dx,2eh ; Unlock W83627DHG-P  
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 W83627DHG-P  
Mov al,0aah  
Out dx,al
```

4. Enable watchdog timer to be reset by keyboard

```
-----  
Mov dx,2eh ; Unlock W83627DHG-P  
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          ; Enables watchdog timer to be strobe reset by keyboard
Mov    al,0f7h
Out    dx,al
Inc    dx
In     al,dx
Or    al,40h
Out    dx,al
;-----
Dec dx          ; Lock W83627DHG-P
Mov    al,0aah
Out    dx,al

```

5. Generate a time-out signal without timer counting

```

;-----
Mov dx,2eh      ; Unlock W83627DHG-P
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 W83627DHG-P
Mov   al,0aah
Out  dx,al
```

Appendix **B**

I/O Pin Assignments

B.1 Floppy Drive Connector (FDD1)

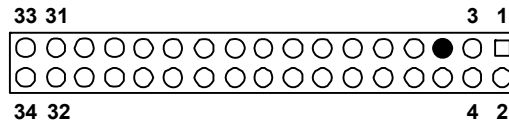


Table B.1: Floppy drive connector (FDD1)

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)

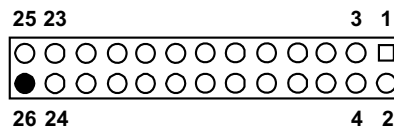


Table B.2: Parallel port connector (LPT1)

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)

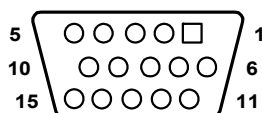


Table B.3: VGA connector (VGA1)

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)

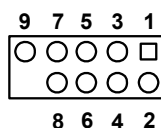


Table B.4: RS-232 serial port (COM1)

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 Serial Port (COM2)

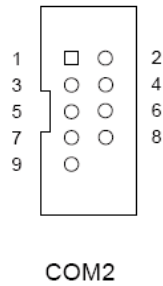


Table B.5: RS-232 serial port (COM2)

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

B.6 USB Header (USB12 ~ 78)

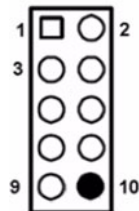


Table B.6: USB Header (USB12 ~ 78)

Pin	Signal	Pin	Signal
1	USB1_VCC5	6	USB2_D+
2	USB2_VCC5	7	GND
3	USB1_D-	8	GND
4	USB2_D-	9	GND
5	USB1_D+	10	Key

B.7 PS/2 Keyboard/Mouse Connector (KBMS1)

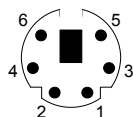


Table B.7: PS/2 keyboard/mouse connector (KBMS1)

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

B.8 External Keyboard Connector (KBMS2)

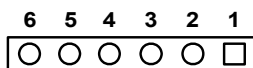


Table B.8: External keyboard connector (KBMS2)

Pin	Signal
1	KBCLK
2	KBDAT
3	MSDAT
4	GND
5	MSVCC
6	MSCLK

B.9 CPU Fan Power Connector (CPUFAN1)

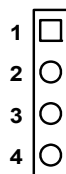


Table B.9: CPU fan power connector (CPUFAN1)

Pin	Signal
1	GND
2	+12V
3	Detect
4	FANPWM

B.10 Power LED and Keyboard Lock Connector (JFP3 / PWR_LED & KEY LOCK)

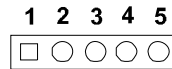


Table B.10: Power LED and keyboard lock connector (JFP3 / PWR_LED & KEY LOCK)

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

B.11 External Speaker Connector (JFP2 / SPEAKER)

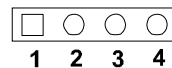


Table B.11: External speaker connector (JFP2 / SPEAKER)

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

B.12 Reset Connector (JFP1 / RESET)

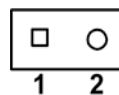


Table B.12: Reset connector (JFP1 / RESET)

Pin	Signal
1	RESET #
2	GND

B.13 HDD LED (JFP2 / HDDLED)

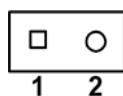


Table B.13: HDD LED (JFP2 / HDDLED)

Pin	Signal
1	IDE LED+
2	IDE LED-

B.14 ATX Soft Power Switch (JFP1 / PWR_SW)

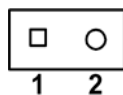


Table B.14: ATX soft power switch (JFP1 / PWR_SW)

Pin	Signal
1	5VSB
2	PWR-BTN

B.15 Hi-definition Audio Link Connector (HDAUD1)

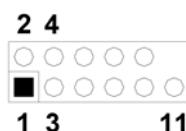


Table B.15: Hi-definition audio link connector (HDAUD1)

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.16 SM Bus Connector (JFP2 / SNMP)

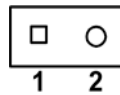


Table B.16: SM bus connector (JFP2 / SNMP)

Pin	Signal
1	SMB_DATA
2	SMB_CLK

B.17 LAN1 and LAN2 LED Connector (LANLED1)

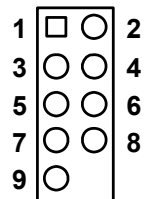


Table B.17: LAN1 and LAN2 LED connector (LANLED1)

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.18 GPIO Header (GPIO1)

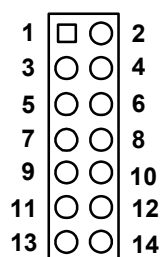


Table B.18: GPIO header (GPIO1)

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.19 System I/O Ports

Table B.19: System I/O ports

Addr. range (Hex)	Device
00h-1Fh	DMA Controller
20h-2Dh	Interrupt Controller
2E-2F	LPC SIO
30h-42h	Interrupt Controller
43h	Timer/Counter
4E-4F	LPC SIO
50h-53h	Timer/Counter
60h-66h	Microcontroller
70h-77h	RTC Controller
80h-91h	DMA Controller
92h	Reset Generator
93h-9Fh	DMA Controller
A0h-B1h	Interrupt Controller
B2h-B3h	Power Management
B4h-BDh	Interrupt Controller
C0h-DHh	DMA Controller
F0h	Interrupt Controller
1F0h-1F7h	SATA Controller or PCI
290h-29Fh	H/W Monitor
376h-3F6h	SATA Controller or PCI
4D0h-4D1h	Interrupt Controller
C80h-CBFh	Com3-Com6
3F8-3FF	Com1
2F8-2F0	Com2
4700-470F	TPM
600h-67Fh	SMSC Secondary I/O used

B.20 DMA Channel Assignments

Table B.20: 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.21 Interrupt Assignments

Table B.21: Interrupt assignments

Priority	Interrupt#	Interrupt source
1	NMI	Parity error detected
2	IRQ0	Interval timer
3	IRQ1	Keyboard
-	IRQ2	Interrupt from controller 2 (cascade)
4	IRQ8	Real-time clock
5	IRQ9	Cascaded to INT 0A (IRQ 2)
6	IRQ10	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.22 1st MB Memory Map

Table B.22: 1st MB memory map

Addr. range (Hex)	Device
E0000h - FFFFFh	BIOS
CF000h - 0FFFFh	Unused
C0000h - CBFFFh	VGA BIOS
A0000h - BFFFFh	Video Memory
00000h - 9FFFFh	Base memory

B.23 PCI Bus Map

Table B.23: 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

C.1 Supported GPIO Register

Below are the detailed descriptions of the GPIO addresses and programming sample.

C.2 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.3 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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