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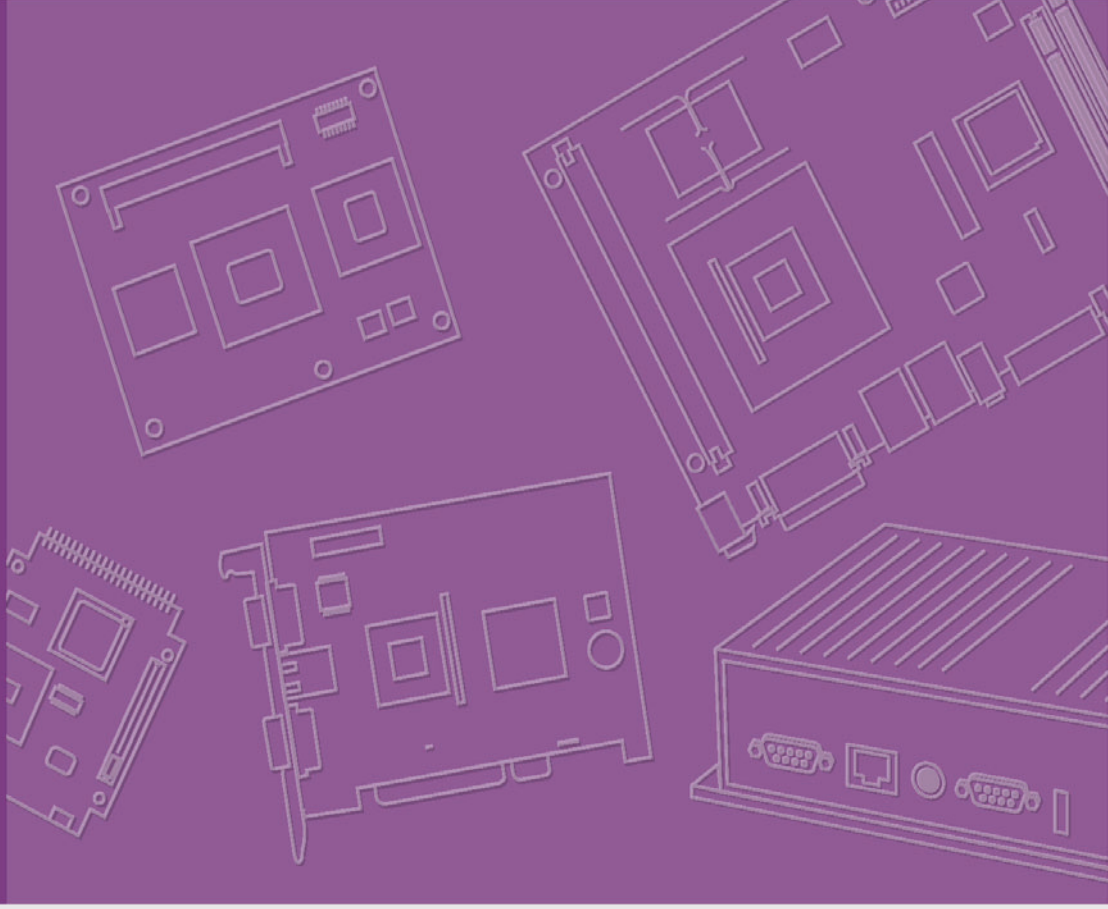
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User Manual

# PCI-7020

## PCI Half-sized Intel® LGA775 Processor Card with VGA/Single Gigabit LAN

*Trusted ePlatform Services*

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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.*



# Memory Compatibility

| Brand | Size | Speed | Type | Memory |
|---|---|---|---|---|
| Apacer(RoHS) | 512 MB | DDR2 533 | DDR2 | ELPIDA E5108AG-5C-E (64x8) |
| | 512 MB | DDR2 667 | DDR2 | ELPIDA E5108AG-6E-E (64x8) |
| | 1 GB | DDR2 533 | DDR2 | SAMSUNG K4T51083QB-ZKD5 (128x4) |
| | 1 GB | DDR2 533 | DDR2 | ELPIDA E5108AGBG-6E-E (64x8) |
| | 1 GB | DDR2 667 | DDR2 | ELPIDA E5108AGBG-6E-E (64x8) |
| | 2 GB | DDR2 667 | DDR2 | SEC K4T1G08400 (128x8) |
| DSL | 512 MB | DDR2 533 | DDR2 | infineon HYB18T512 800AF37 FSS43331 (64x8) |
| | 1 GB | DDR2 533 | DDR2 | ELPIDA E5108AE-5C-E (64x8) |
| | 1 GB | DDR2 667 | DDR2 | ELPIDA E5108AGBG-6E-E (64x8) |
| | 2 GB | DDR2 667 | DDR2 | ELPIDA E1108ACSE-6E-E(128x8) |
| Kingston(RoHS) | 2 GB | DDR2 667 | DDR2 | Micron 7KE12 D9HNL (128x8) |
| Transcend(RoHS) | 256 MB | DDR2 533 | DDR2 | infineon HYB18T512160AF3.7 3VV21710 (32x16) |
| | 256 MB | DDR2 533 | DDR2 | SAMSUNG 443 K4T56083QF-GCD5 (32x8) |
| | 512 MB | DDR2 533 | DDR2 | SEC K4T51083QC ZCD5 (64X8) |
| | 512 MB | DDR2 667 | DDR2 | SAMSUNG K4T51083QC ZCE6 (64x8) |
| | 1 GB | DDR2 667 | DDR2 | SEC K4T51083QE ZCE6 (64x8) |
| | 1 GB | DDR2 667 | DDR2 | SEC K4T51083QG HCE6 (64x8) |
| | 2 GB | DDR2 667 | DDR2 | SAMSUNG K4T1G084QD-ZCE6 (128x8) |
| | 2 GB | DDR2 667 | DDR2 | Micron 7HE12 D9HNL (128x8) |
| | 2 GB | DDR2 667 | DDR2 | SAMSUNG K4T1G084QA-ZCE6 (128x8) |

# Network Feature Comparison

| LAN/Model | PCI-7020F | PCI-7020VG | PCI-7020LV |
|---|---|---|---|
| LAN1: Intel® 82574L | Yes | Yes | No |

# Processor Support

| | |
|---|---|
| Intel Core™ 2 Duo Desktop Processor<br>Intel® Pentium® Dual-Core Desktop Processor<br>Intel Celeron® Processor 400 | Long-term supported P/N: E7400, E6400, E4300, E2160, Celeron 440 |
| Intel Pentium D Processor<br>Intel Pentium 4 Processor<br>Intel Celeron D Processor | |

***Note!*** *PCI-7020 CPU cooler (p/n:1960035861N000), It must use the CPU thermal design power lower than 65 Watt.*

# Product Warranty (2 years)

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

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

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

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

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

# Initial Inspection

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

| | |
|---|---|
| ■ PCI-7020 Intel® LGA775 processor-based single board computer | |
| ■ 1 PCI-7020 user manual | |
| ■ 1 CD with driver utility and manual (in PDF format) | |
| ■ 2 Power cable 12P / Big 4P | P/N: 1700006196 |
| ■ 1 Dual COM cable 2.0 mm pitch | P/N: 1700008762 |
| ■ 1 Serial ATA HDD data cable | P/N: 1700003194 |
| ■ 1 Serial ATA HDD power cable | P/N: 1703150102 |
| ■ 1 Printer port cable 2.0 mm pitch | P/N: 1700002223 |
| ■ 1 Y cable for PS/2 keyboard and PS/2 mouse | P/N: 1700060202 |
| ■ 1 USB cable with 4 ports | P/N: 1700014398 |
| ■ ATX feature cable | P/N: 1700002343 |
| ■ 1 Jumper pack | P/N: 9689000002 |
| ■ CPU cooler | P/N: 1960035861N000 |
| ■ 1 warranty card | |

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the PCI-7020 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the PCI-7020, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

***Note!*** *PCI-7020 CPU cooler (p/n:1960035861N000), It must use the CPU thermal design power lower than 65 Watt.*

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# Chapter 1

## Hardware Configuration

## 1.1 Introduction

The PCI-7020 is a half-size CPU card designed with the Intel® 945GC and ICH7R chipset (I/O controller) to support Core® 2 Duo / Dual-Core Pentium® / Pentium® 4 / Celeron® D processors (refer to "Processor Support" on page v) with a 533/800/1066 MHz front side bus and DDR2 533/667 MHz memory up to 4 GB. It is the best solution for high-performance computing and applications in which a wide I/O bandwidth is demanded.

The PCI-7020 offers a high-performance cost-saving integrated graphics unit, built into the Intel® 945GC chipset, and features the unique Intel® Extreme Graphics architecture to maximize VGA performance and share system memory up to 224 MB. It has 2 SODIMM sockets in two separated memory channels. It accepts up to 4 GB DDR2 SDRAM memory, enough for most applications. The PCI-7020 has a single Gigabit Ethernet LAN via dedicated PCI Express x 1 bus, which offers bandwidths up to 500 MB/s, eliminating network data flow bottlenecks, and incorporating Gigabit Ethernet. High reliability and outstanding performance make the PCI-7020 the ideal platform for industrial networking applications.

Three Serial ATA2 ports (up to 300 MB/s) allow the use of thin and long SATA cables for storage devices, eliminating cabling issues inside the industrial-grade chassis. In addition, the PCI-7020 also provides most of the popular I/O interfaces such as six USB 2.0 ports, 2 RS-232 ports and enhanced parallel port interface.

The PCI-7020 is designed with consideration for extended reliability, and is built especially to suit demanding industrial environments. The CMOS data backup and restore function protects the BIOS setup data from loss due to battery failure.

## 1.2 Features

- Supports LGA 775 Intel® Core® 2 Duo / Pentium® Dual-Core / Pentium® D / Pentium® 4 / Celeron® 400 / Celeron® D FSB 533/800/1066 MHz processors (refer to "Processor Support" on page v)
- Supports Dual Channel DDR2 533/667 SDRAM up to 4 GB
- Single Gigabit Ethernet via PCI Express x1 port
- 3 SATA2 connector; supports S/W RAID 0, 1 (LV sku has NO S/W RAID)
- 6 USB 2.0 ports
- 6 COM port supports (2 ports RS-232, and can add optional 4 port RS-232/422/485 by PCA-COM232 or PCA-COM485 module)
- CMOS automatic backup and restore to prevent accidental data loss of BIOS setup

# 1.3 Specifications

## 1.3.1 System

- **CPU:** Intel® LGA 775 Core® 2 Duo, Pentium Dual-Core, Pentium 4, Celeron D up to 2.93/2.7/3.4/3.6 GHz, (refer to "Processor Support" on page v), FSB 533/800/1066 MHz.
- **L2 cache:** CPU has built-in 4 MB (for Core® 2 Duo), 2 MB (for Pentium Dual-Core CPU), 2 MB (for Pentium 4 CPU), 512 KB (for Celeron D CPU) full-speed L2 cache
- **BIOS:** Award Flash BIOS (8 MB Flash Memory)
- **System chipset:** Intel 945GC with ICH7R/ICH7
- **SATA hard disk drive interface:** Three on-board SATA2 connectors with data transmission rate up to 300 MB/s; supports S/W RAID 0, 1 (LV sku has NO S/W RAID)

## 1.3.2 Memory

- **RAM:** Up to 4 GB in two 200-pin SODIMM sockets. Supports dual-channel DDRII 533/667 SDRAM.

## 1.3.3 Input/Output

- **PCI bus:** 32 bit / 33MHz to the backplane
- **Parallel port:** One EPP/ECP parallel port
- **Serial ports:** Two serial RS-232 ports (and can add optional 4 port RS-232/422/485 by PCA-COM232 or PCA-COM485 module)
- **Keyboard and PS/2 mouse connector:** One 6-pin mini-DIN connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse. An on board keyboard pin header connector is also available
- **USB port:** Supports up to six USB 2.0 ports with transmission rate up to 480 Mbps (2 ports on rear I/O, 4 ports onboard by 2.0 mm pitch box header)

## 1.3.4 Ethernet LAN

- Supporting single 10/100/1000Base-T Ethernet port(s) via PCI Express x1 bus which provides 500 MB/s data transmission rate
- **Controller:**
  - LAN 1: Intel® 82574L

## 1.3.5 Industrial Features

**Watchdog timer:** Can generate a system reset. The watchdog timer is pro-grammable to 255 levels, with each unit set to equal either one second or one minute.

## 1.3.6 Mechanical and Environmental Specifications

- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F, depending on CPU)
- **Operating humidity:** 40° C @ 85% RH Non-Condensing
- **Storage temperature:** -40 ~ 85° C (-40 ~ 185° F) non-condensing
- **Power supply voltage:** +5 V, +12 V, +5 VSBY
- **Power consumption:** +5 V @ 4.86 A, +12 V @ 4.38 A, +5 VSB @ 0.39 A (Intel Core 2 Duo 2.8 GHz, 65 W, 800 MHz FSB + 2 x 2 GB DDR2 667)
- **Board size:** 185 x 122 mm (7.28" x 4.8")
- **Board weight:** 0.185 kg (0.4 lbs.)

## 1.4 Jumpers and Connectors

Connectors on the PCI-7020 single board computer link to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure the system for any desired 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 the motherboard.

**Table 1.1: Jumpers**

| Label | Function |
|---|---|
| CMOS1 | CMOS clear |
| JWDT1 | Watchdog timer output selection |

**Table 1.2: Connectors**

| Label | Function |
|---|---|
| LPT1 | Parallel port |
| VGA1 | VGA connector |
| CF1 | CF socket |
| COM12 | RS232 serial ports connector |
| KBMS1 | PS/2 keyboard and mouse connector |
| KBMS2 | External keyboard/mouse connector |
| JIR1 | Infrared connector |
| JOBS1 | HW Monitor Alarm<br>Close: Enable OBS Alarm<br>Open: Disable OBS Alarm |
| CPUFAN1 | CPU FAN connector |
| JFP1 | Power and Reset Button connector |
| JFP2 | HDD LED/Speaker connector |
| LAN1 | LAN RJ45 connector |
| LANLED1 | LAN1 LED connector |
| HDAUD1 | HD Audio connector |
| SATA1 | Serial ATA1 |
| SATA2 | Serial ATA2 |
| SATA3 | Serial ATA3 |
| USB12 | Two USB port pin headers |
| USB34 | Two USB port pin headers |
| USB5 | USB connector |
| USB6 | USB connector |
| DIMMA1 | Memory connector channel A |
| DIMMB1 | Memory connector channel B |
| LPC1 | Low pin count connector |
| SPI1 | BIOS SPI Interface |
| JCASE1 | Case open |
| DVI1 | DVI connector (only for F sku) |

## 1.5 Board Layout: Jumper and Connector

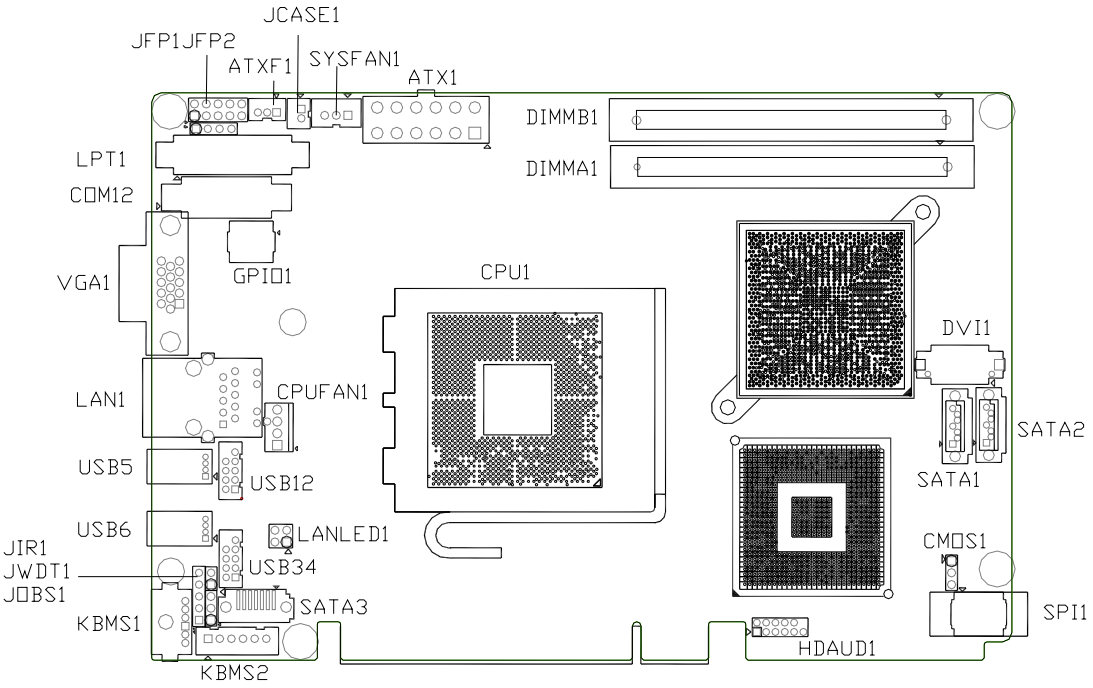



**Figure 1.1 Jumper and connector location (top)**

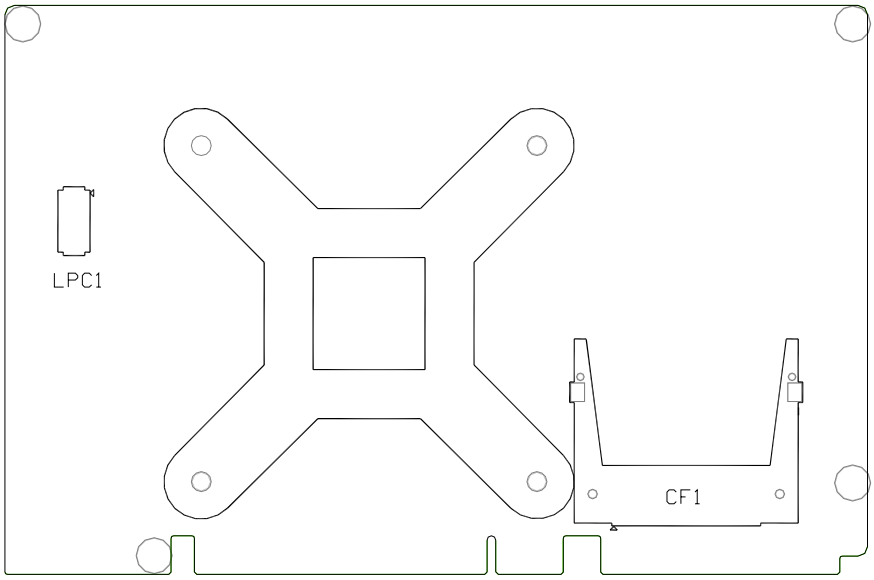



**Figure 1.2 Jumper and connector location (bot)**

## 1.6 PCI-7020 Block Diagram

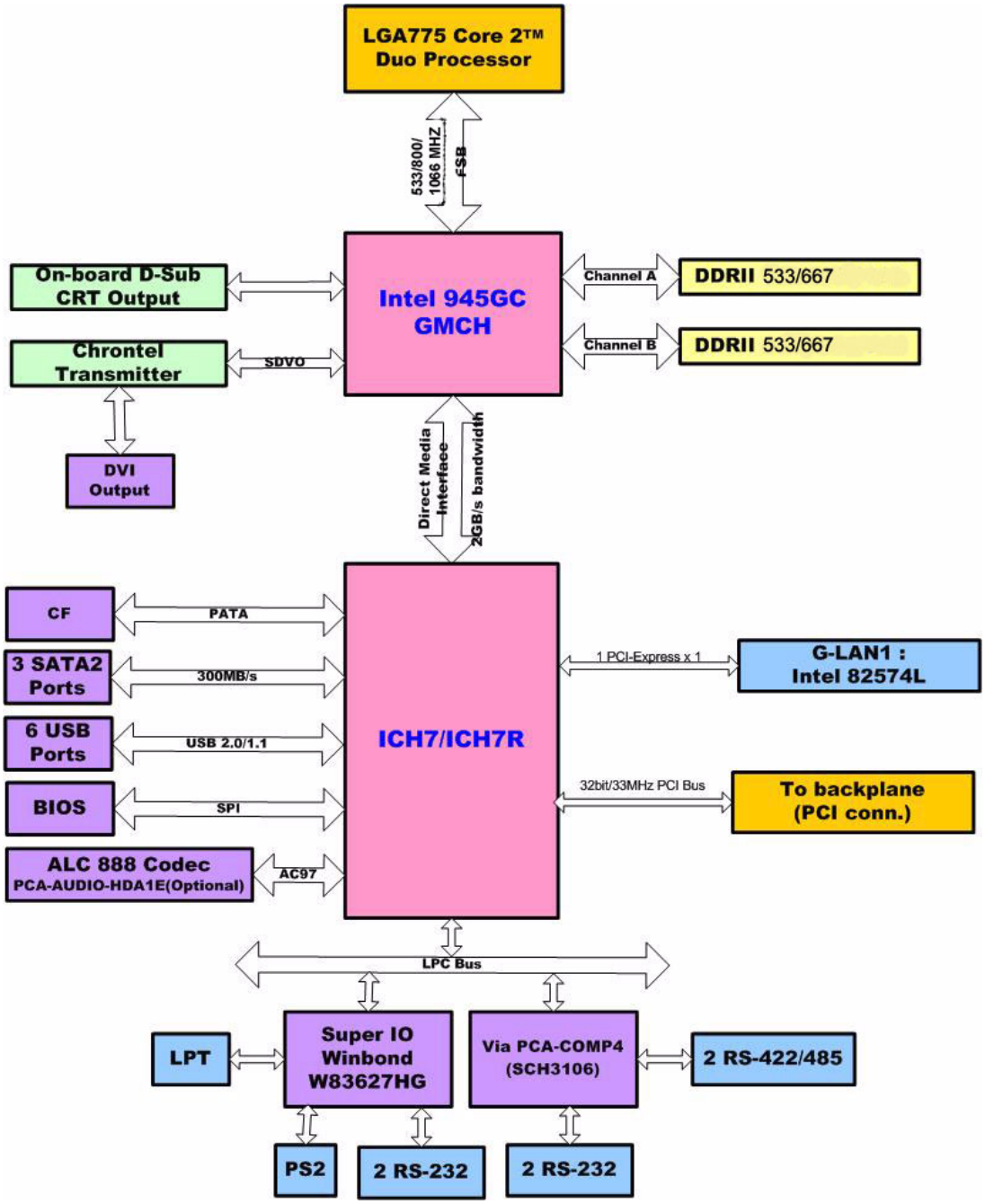



**Figure 1.3 PCI-7020 block diagram**

## 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 boards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static- dissipative surface or in a static-shielded bag when they are not in the chassis.*



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



***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 PCI-7020 by setting the jumpers. It also includes the PCI-7020's default settings and your options for each jumper.

### 1.8.1 How to Set Jumpers

You can configure your PCI-7020 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.

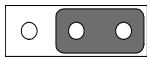
### 1.8.2 CMOS Clear (CMOS1)

The PCI-7020 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

| Table 1.3: CMOS (CMOS1) | |
|---|---|
| **Function** | **Jumper Setting** |
| Keep CMOS data * | 1  1-2 closed |
| Clear CMOS data | 1  2-3 closed |
| *default setting | |

### 1.8.3 Watchdog Timer Output (JWDT1)

The PCI-7020 contains a watchdog timer that will reset the CPU in the event the CPU stops processing. This feature means the PCI-7020 will recover from a soft- ware 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** |
| NC | 1  1-2 closed |
| Reset* | 1  2-3 closed |
| *default setting | |

## 1.9 System Memory

The PCI-7020 has two sockets for 200-pin dual inline memory modules (SODIMMs) in two memory channels. All these sockets use 1.8 V unbuffered double data rate synchronous DRAMs (DDR2 SDRAM). They are available in capacities of 256, 512, 1024 and 2048 MB. The sockets can be filled in any combination with DIMMs of any size, giving a total memory size between 256 MB and 4 GB.

### 1.9.1 CPU FSB and Memory Speed

The PCI-7020 supports Intel LGA775 CPUs with FSB 533/800/1066. The PCI-7020 can accept DDR2 SDRAM memory chips without parity. Also note: The PCI-7020 accepts DDR2 533/667MHz SDRAM. The PCI-7020 does NOT support ECC (error checking and correction).

## 1.10 Memory Installation Procedures

To install DIMMs, 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.

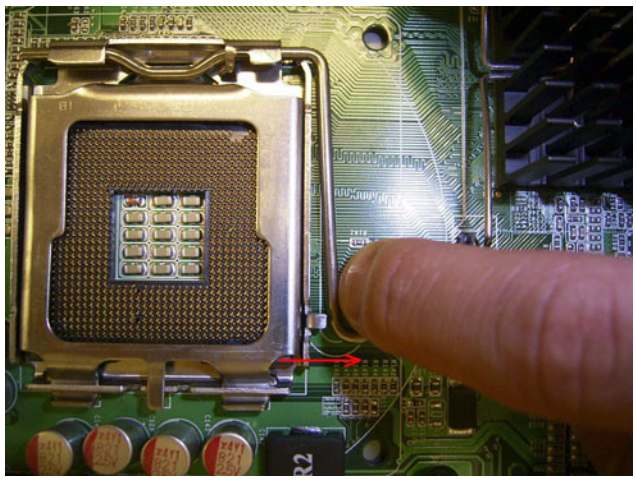
## 1.11 Cache Memory

PCI-7020 supports built-in 4 MB CPU cache (for Core® 2 Duo), 2 MB (for Pentium Dual-Core CPU), 2 MB (for Pentium 4 CPU), 512 KB (for Celeron D) L2 cache. The built-in second-level cache in the processor yields much higher performance than conventional external cache memories.

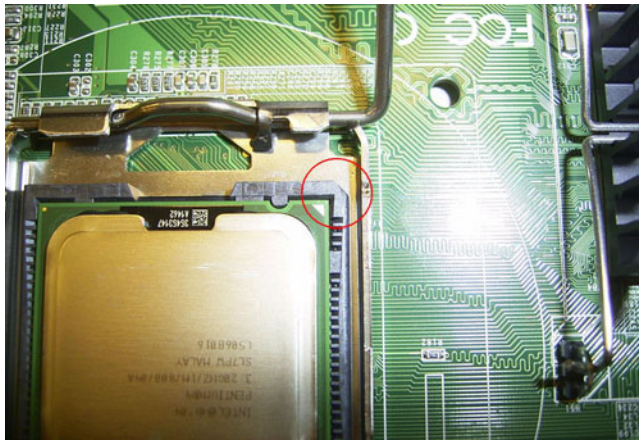
## 1.12 Processor Installation

PCI-7020 is designed for Intel® LGA 775 socket CPUs.

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



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



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



## 1.13 Power Model Setting and Installation

PCI-7020 can support AT or ATX power model settings. It can be used with back-planes and single boards.

Installation as below.

| ATX Power Supply | |
|---|---|
| With backplane | Please refer to Figure 1.4<br>1. Use 3 pin ATX signal cable (P/N:1700002343) to connect the ATXF1 on the CPU card with PS-ON (CN1) on the backplane.<br>2. Use power cable (P/N:1700006196) to connect power supply with ATX1 connector on the CPU card.<br>3. Connect the power supply and ATX1 connector on the backplane. |
| Single board | Please refer to Figure 1.5<br>1. Remove the jumper on CPU card ATXF1 1-2 pins.<br>2. Use power cable (P/N:1700000265) to connect the power supply with the ATX1 connector on the CPU card. |

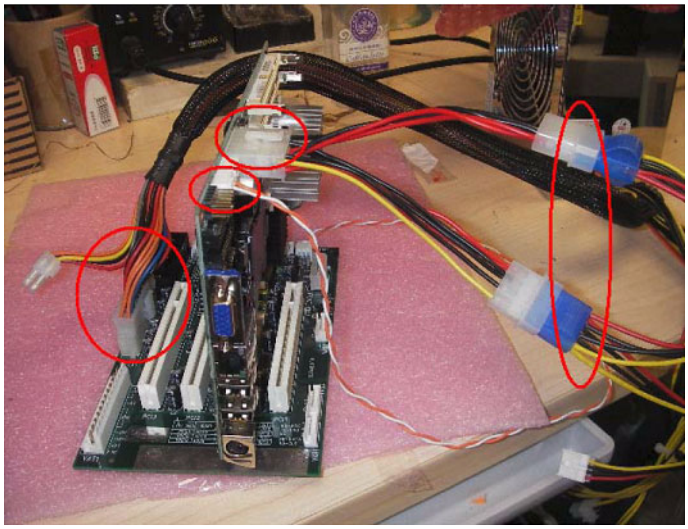


**Figure 1.4 ATX power setting of PCI-7020 with backplane**

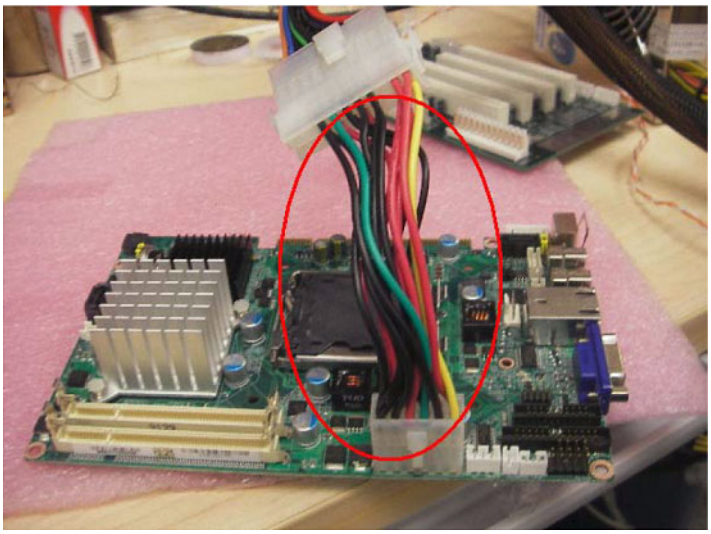


**Figure 1.5 ATX power setting of PCI-7020 with single board**

| AT Power Supply | |
|---|---|
| With backplane | Please refer to Figure 1.6<br>1. Short ATXF1 1-2 pins on CPU card and PS-ON(CN1) 1-2 pins on backplane.<br>2. Use power cable (P/N:1700006196) to connect the power supply with ATX1 connector on CPU card.<br>3. Connect the power supply and the ATX1 connector on the backplane. |
| Single board | Please refer to Figure 1.7<br>1. Short ATXF1 1-2 pins on CPU card.<br>2. Use the power cable (P/N:1700006196) to connect the power supply with the ATX1 connector on the CPU card. |

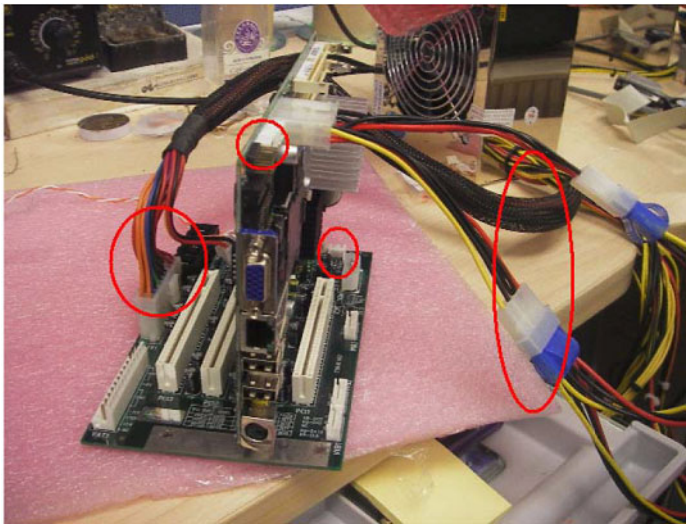


**Figure 1.6 AT power setting of PCI-7020 with backplane**

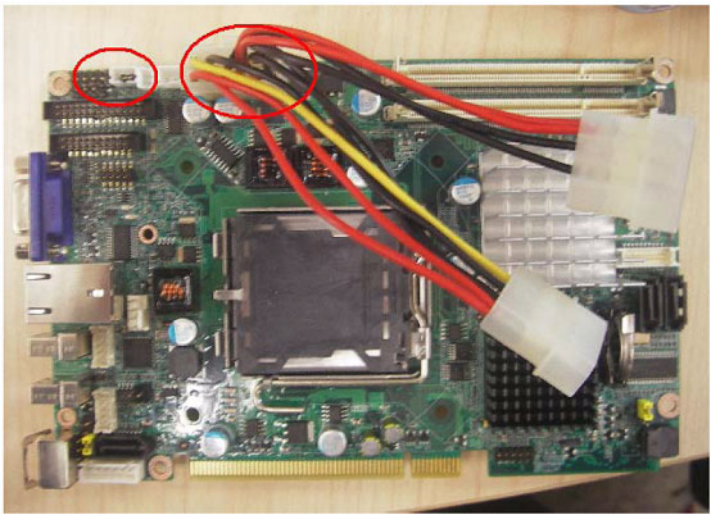


**Figure 1.7 AT power setting of PCI-7020 with single board**

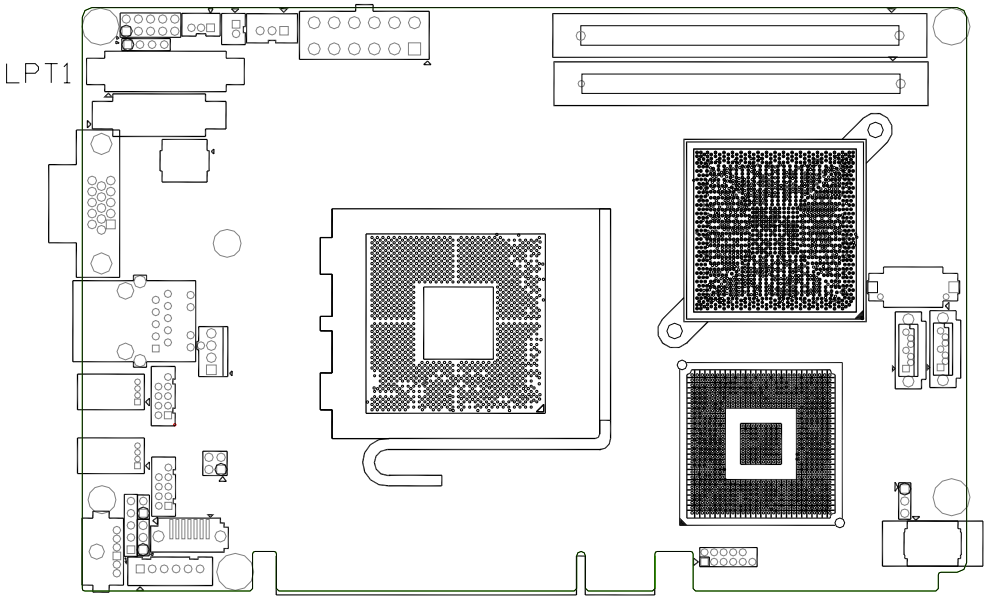
# Chapter 2

## Connecting Peripherals

## 2.1 Introduction

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

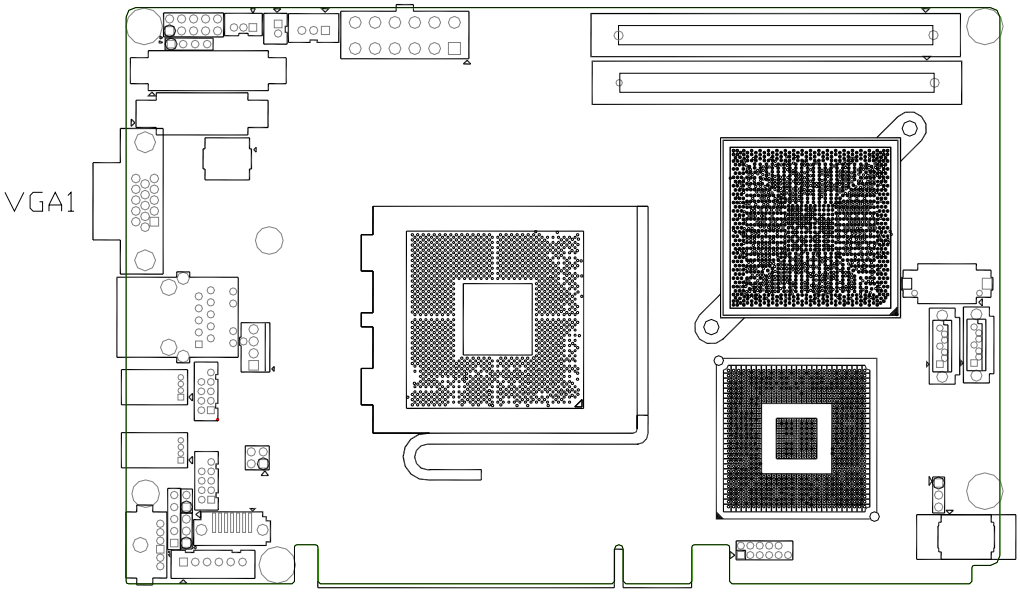
## 2.2 Parallel Port (LPT1)




The parallel port is normally used to connect the single board computer to a printer. The PCI-7020 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, LPT1. The card comes with an adapter cable which lets you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB-25 connector on the other, mounted on a retaining bracket. The bracket installs at the end of an empty slot in your chassis, giving you access to the connector.

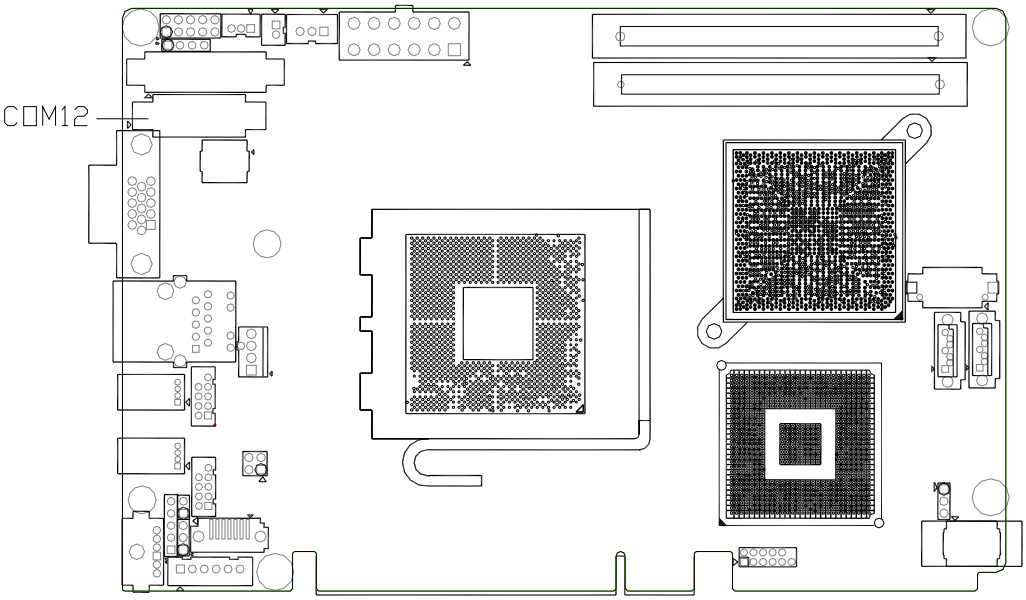
To install the bracket, find an empty slot in your chassis. Unscrew the plate that covers the end of the slot. Screw in the bracket in place of the plate. Next, attach the flat-cable connector to LPT1 on the CPU card. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that wire 1 corresponds to pin 1 of LPT1. Pin 1 is on the upper right side of LPT1.

## 2.3 VGA Connector (VGA1)




The PCI-7020 includes a VGA interface that can drive conventional CRT displays. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector VGA1 are detailed in Appendix B.

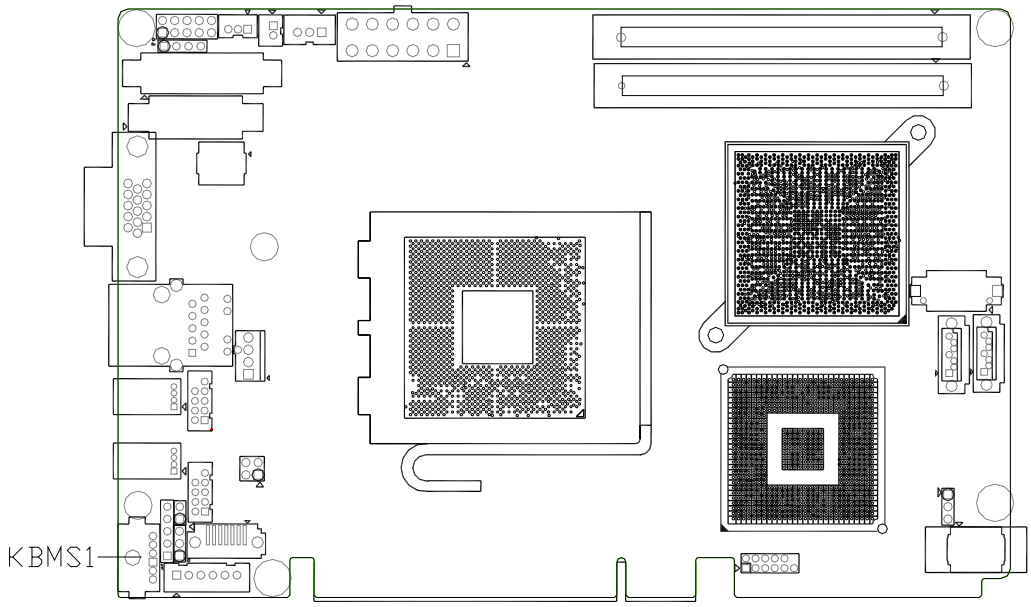
## 2.4 Serial Ports (COM1, COM2)




The PCI-7020 offers two serial ports COM1, COM2. These ports can connect to serial devices, such as a mouse or to a communications network.

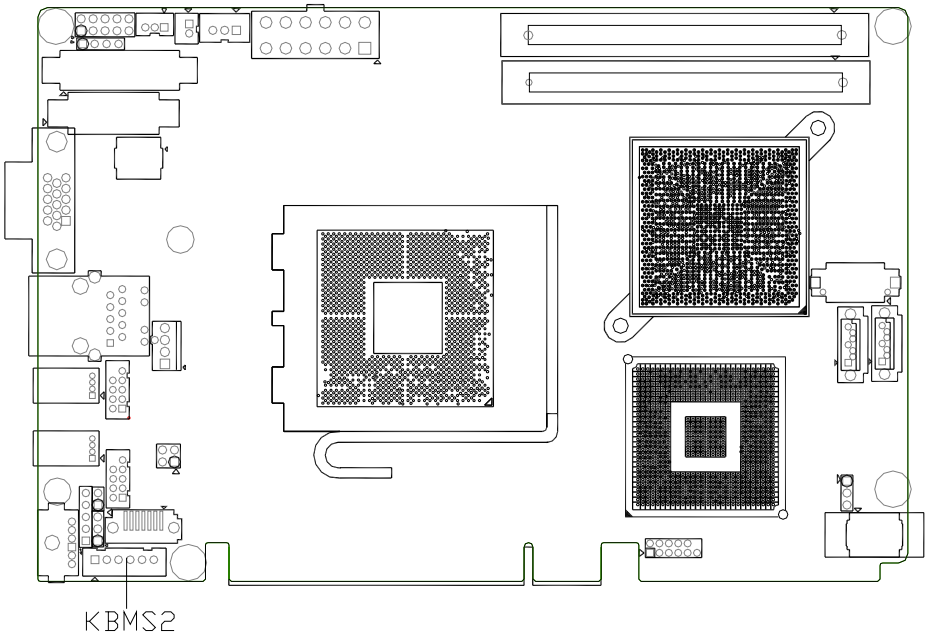
The IRQ and address ranges for all ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup. Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

## 2.5 PS/2 Keyboard and Mouse Connector (KBMS1)



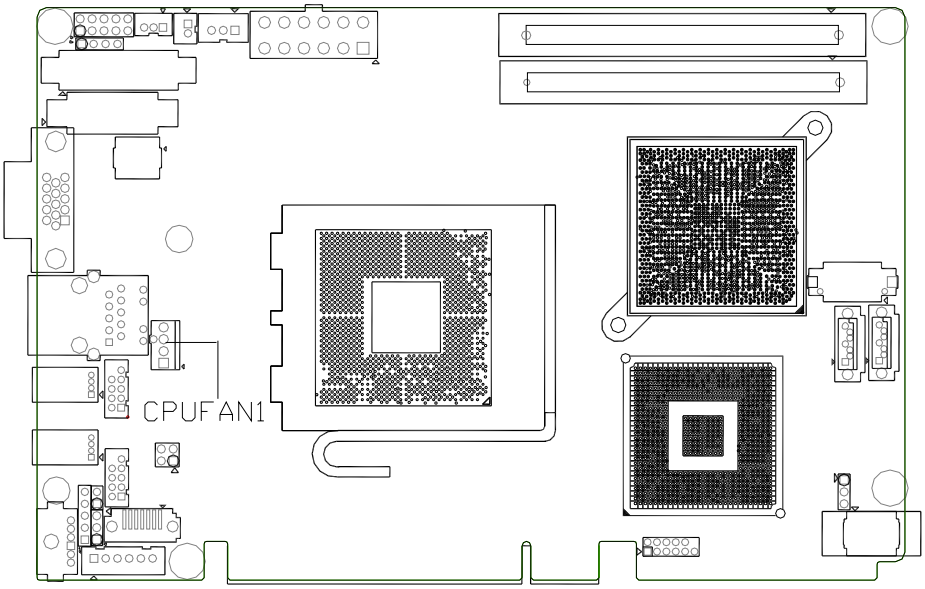

One 6-pin mini-DIN connectors (KBMS1) on the card mounting bracket provide connection to a PS/2 keyboard or a PS/2 mouse, respectively. KBMS1 can also be connected to an adapter cable (P/N: 1700060202) for connecting to both a PS/2 keyboard and a PS/2 mouse.

## 2.6 External Keyboard & Mouse (KBMS2)



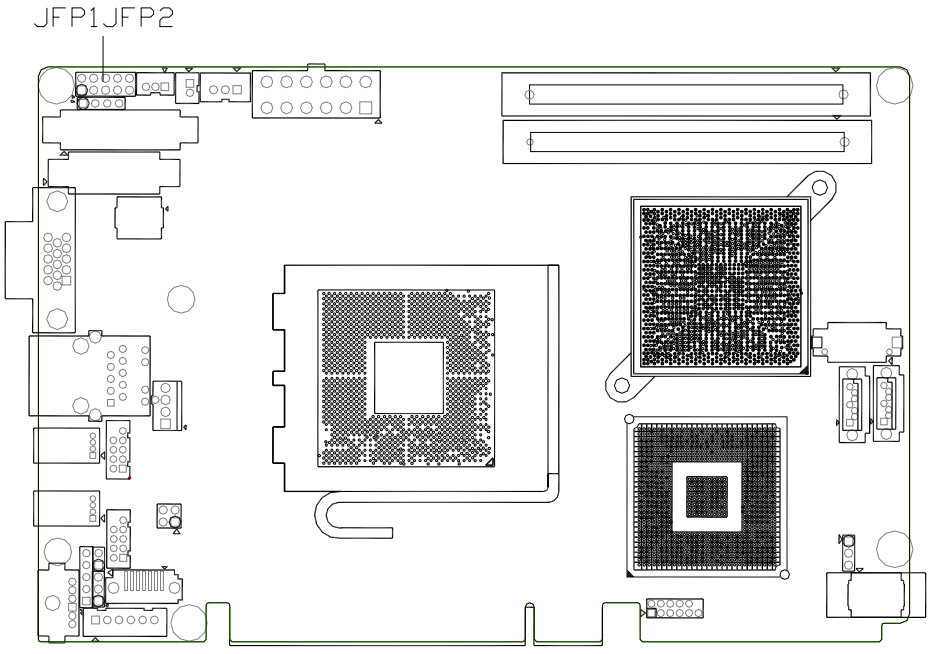

In addition to the PS/2 mouse/keyboard connector on the PCI-7020's rear plate, there is also an extra onboard external keyboard and mouse connector. This gives system integrators greater flexibility in designing their systems.

## 2.7 CPU Fan Connector (CPUFAN1)



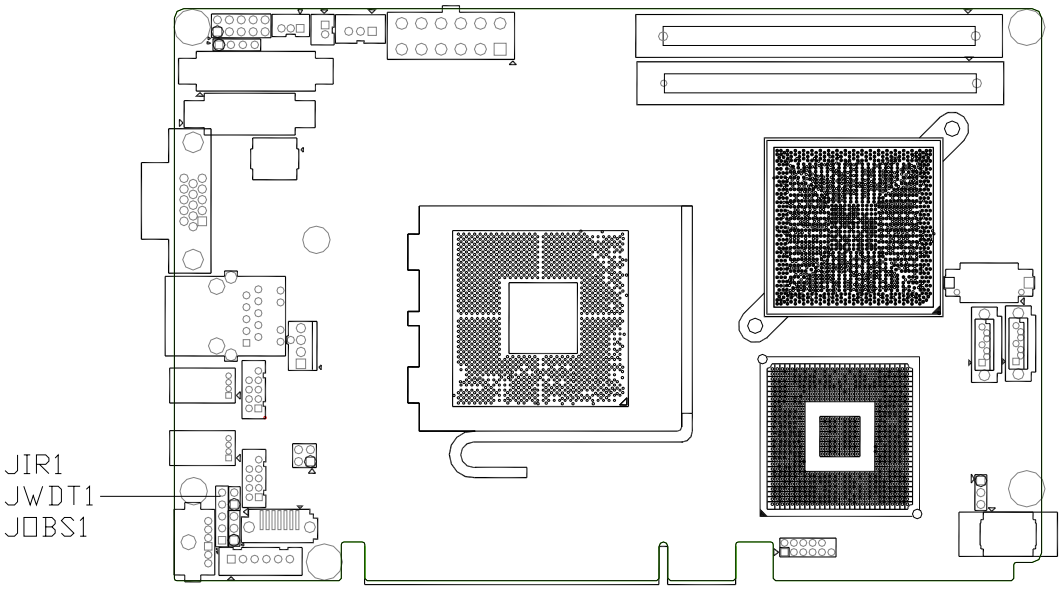

If a fan is used, this connector supports cooling fans of 12 V/1 A (12 W) or less.

## 2.8 Front Panel Connectors (JFP1, JFP2)




There are several external switches to monitor and control the PCI-7020.

## 2.9 H/W Monitor Alarm (JOBS1)

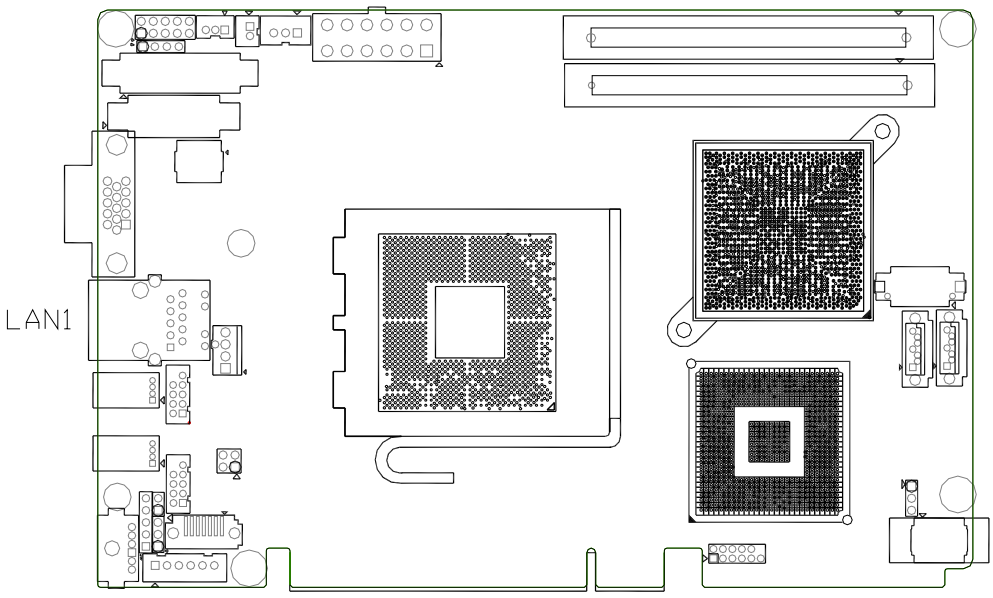



(JOBS1) is a 2-pin jumper to enable/disable the alarm for on board security events.

**Table 2.1: Hardware Monitor Alarm Setting**

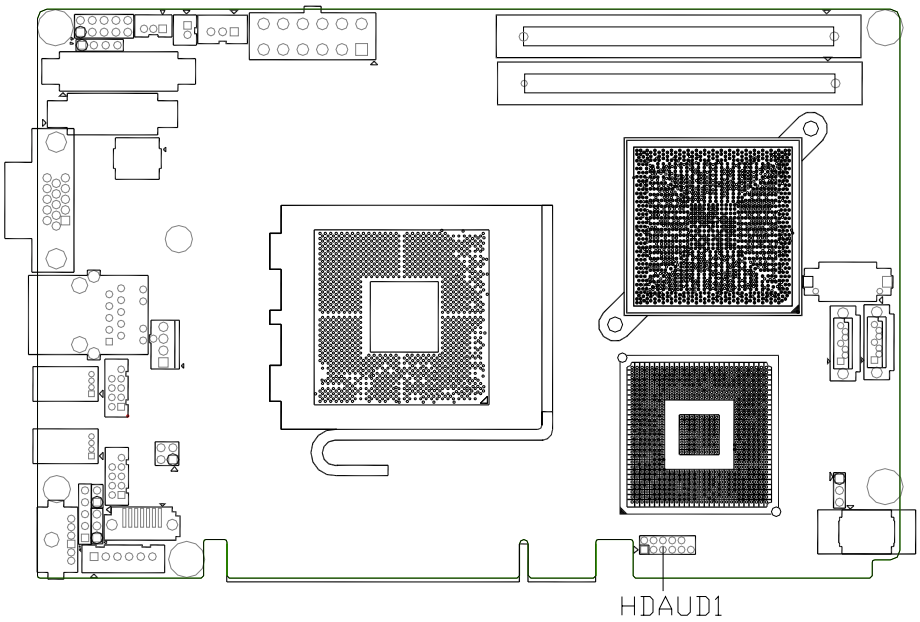
| Pin Setting | Function |
|---|---|
| closed | Enable OBS alarm |
| open | Disable OBS alarm |

## 2.10 LAN RJ45 Connector (LAN1)



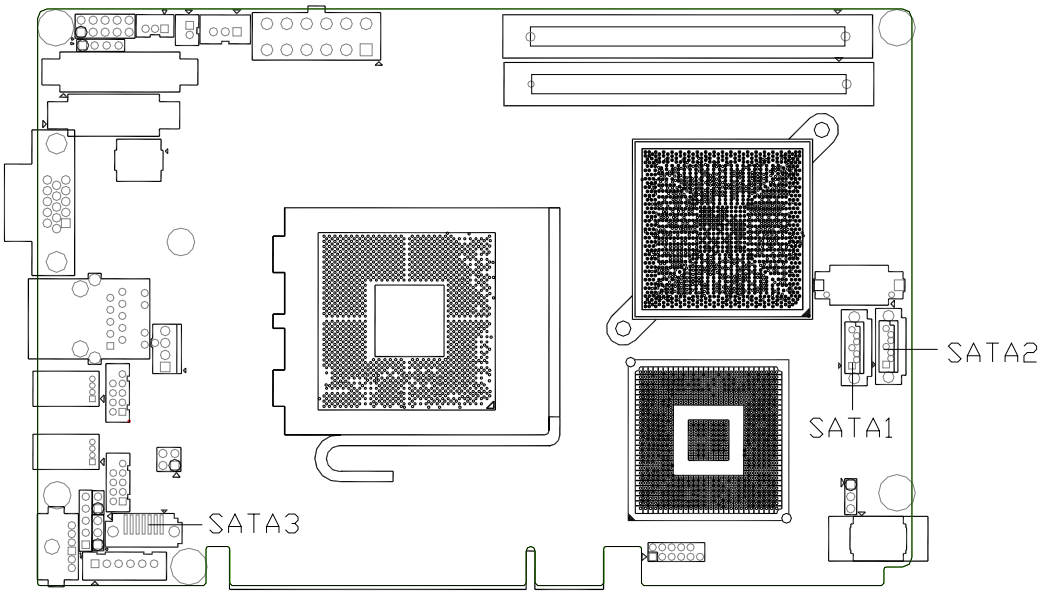

PCI-7020 uses the Intel 82574L Gigabit LAN chip which is linked to PCIe x1 link. With this chip, PCI-7020 may provide high throughputs for a heavy load networking environment. It provides one or two RJ-45 connectors in the rear side and is convenient for most industrial applications.

## 2.11 HD Link Connector (HDAUD1)



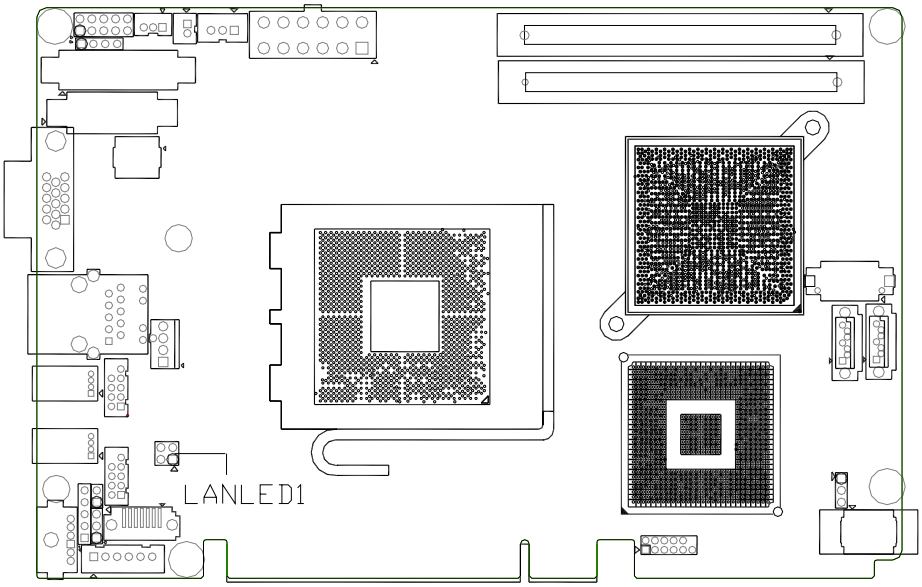

The PCI-7020 provides HD audio through PCA-AUDIO-HDA1 module from Advantech.

## 2.12 Serial ATA2 Interface (SATA1 ~ SATA3)




The PCI-7020 features a high performance serial ATA2 interface (up to 300MB/s) which eases cabling to hard drives with thin and long cables.

## 2.13 LAN LED Connector (LAN LED1)




PCI-7020 provides an external LAN LED Pin header for connecting to the front side of the chassis. With this convenient design users can easily see whether the LAN port is active or not. Refer to Appendix B for detailed information on the pin assignments.

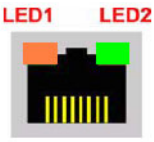
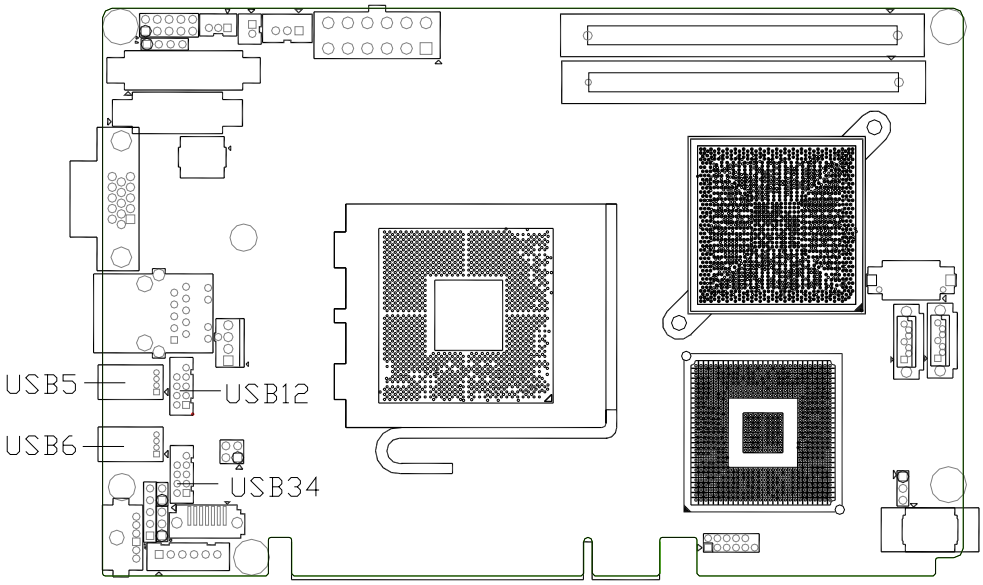



**Table 2.2: Front Panel LAN Indicator Connector**

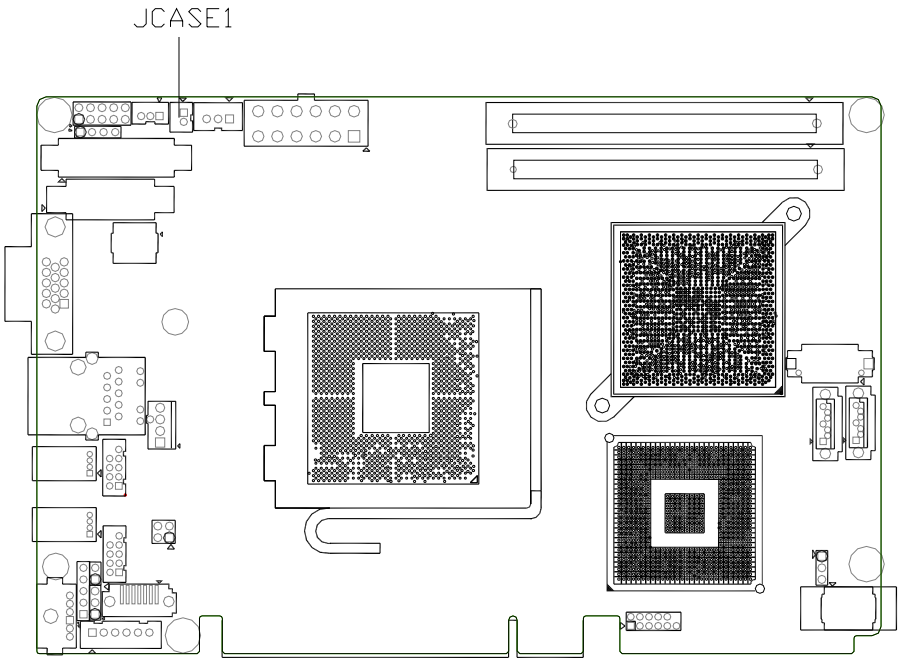
| LAN Mode | | LED1 | LED2 |
|---|---|---|---|
| 1000 Mbps | Link On | Green On | On |
| | Active | Green on | Green Flashes |
| | Link Off | Off | Off |
| 100 Mbps | Link On | Orange On | Green On |
| | Active | Orange On | Green Flashes |
| | Link Off | Off | Off |
| 10 Mbps | Link On | Off | Green On |
| | Active | Off | Green Flashes |
| | Link Off | Off | Off |

## 2.14 USB (USB12, USB34, USB56)




The PCI-7020 board provides up to Six USB (Universal Serial Bus) ports. This gives complete Plug and Play, and hot attach/detach for up to 127 external devices. The USB interfaces comply with USB specification Rev. 2.0, and are fuse protected. The USB interface is accessed through the 5 x 2-pin flat-cable connector, CN9 (USB0, 1), CN10 (USB2, 3). You will need an adapter cable if you use a standard USB connector. The adapter cable has a 5 x 2-pin connector on one end and a USB connector on the other. The USB interfaces can be disabled in the system BIOS setup.

## 2.15 Case Open (JCASE1)




PCI-7020 provides 2-Pins pin header for case open detection. This function could be enabled or disabled in the BIOS setting. When the PIN is shorted, it will cause the on board buzzer to sound.

# Chapter 3

## Award BIOS Setup

# 3.1 Introduction

Award's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery backed-up memory (CMOS RAM) so that it retains the setup information when the power is turned off.

## 3.1.1 CMOS RAM Auto-backup and Restore

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

***Note!*** *If you intend to change the CMOS setting without restoring the previous backup, you have to click on "DEL" within two seconds of the "CMOS checksum error..." display screen message appearing. Then enter the "Setup" screen to modify the data. If the "CMOS checksum error..." message appears again and again, please check to see if you need to replace the battery in your system.*

# 3.2 Entering Setup

Turn on the computer and press <Del> to enter the BIOS setup.

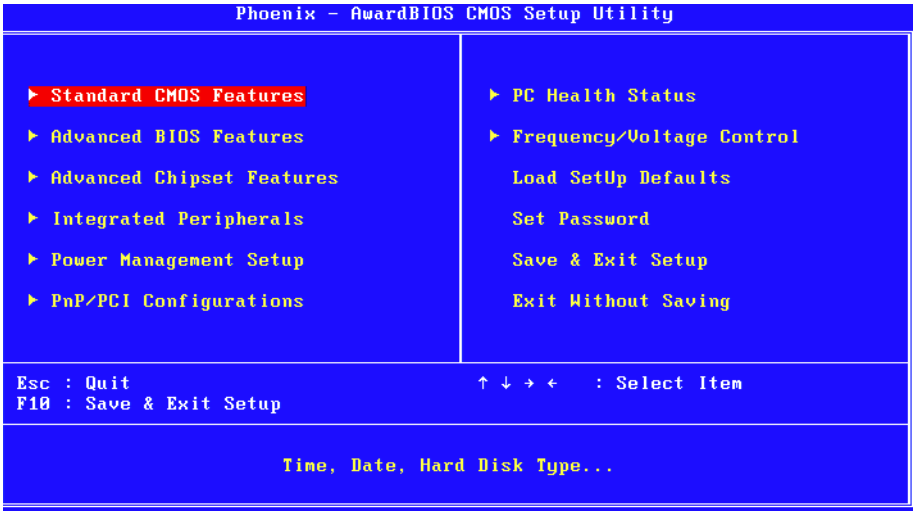



**Figure 3.1 Award BIOS setup initial screen**

## 3.3 Standard CMOS Setup

- **Date**
  The date format is <week>, <month>, <day>, <year>.
- **Time**
  The time format is <hour> <minute> <second>, based on the 24-hour clock.
- **IDE channel 0/1 Master/Slave**
  - **IDE HDD Auto-Detection:** Press “Enter” to select this option for automatic device detection.
  - **IDE Device Setup:**
    **Auto:** Automatically detects IDE devices during POST
    **None:** Select this when no IDE device is used. The system will skip the auto-detection step to make system start up faster.
    **Manual:** User can manually input the correct settings.
  - **Access Mode:** The options are CHS/LBA/Large/Auto
  - **Capacity:** Capacity of currently installed hard disk.
  - **Cylinder:** Number of cylinders
  - **Head:** Number of heads
  - **Precomp:** Write precomp
  - **Landing Zone:** Landing zone
  - **Sector:** Number of sectors
- **Halt On**
  This category determines whether system start-up will halt or not when an error is detected during power up.
  The options are: No Errors/All Errors/All, But Keyboard/All, But Diskette/All, But Disk/Key
- **Memory**
  This category displays base memory, extended memory, and total memory detected during POST (Power On Self Test).

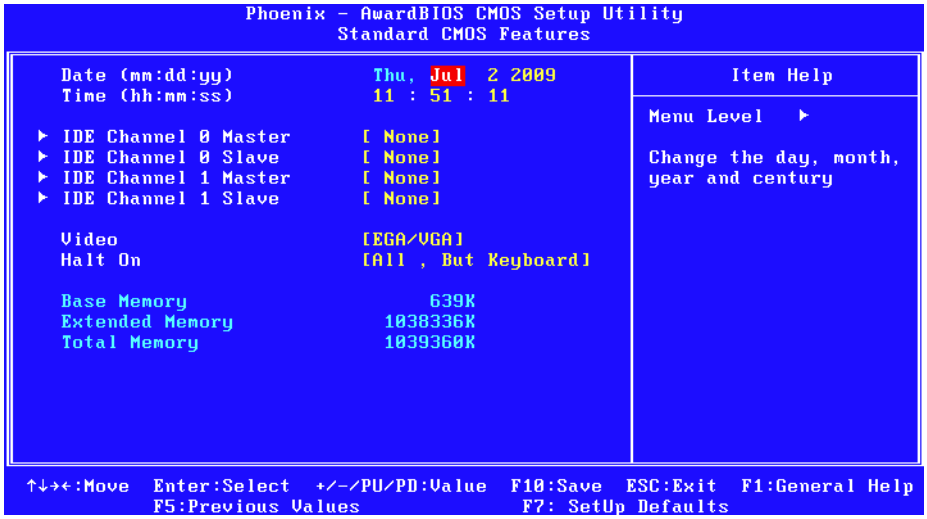



**Figure 3.2 Standard CMOS features screen**

# 3.4 Advanced BIOS Features

The “Advanced BIOS Features” screen appears when choosing the “Advanced BIOS Features” item from the “Initial Setup Screen” menu. It allows the user to configure the PCI-7020 according to his particular requirements. Below are some major items that are provided in the Advanced BIOS Features screen. A quick booting function is provided for your convenience. Simply enable the Quick Booting item to save yourself valuable time.

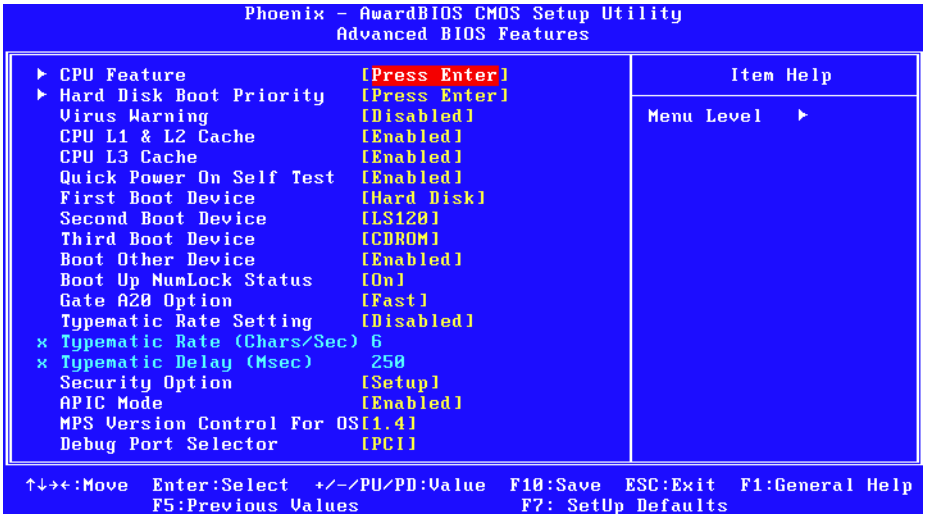



**Figure 3.3 Advanced BIOS features screen**

- **CPU Features**
  - **Delay Prior to thermal**
    This feature controls the activation of the Thermal Monitor's automatic mode. It allows you to determine when the Pentium 4's Thermal Monitor should be activated in automatic mode after the system boots. For example, with the default value of 16 Minutes, the BIOS activates the Thermal Monitor in automatic mode 16 minutes after the system starts booting up. The choices are 4 Min, 8 Min, 16 Min, and 32 Min.
  - **Limit CPUID MaxVal**
    Set Limit CPUID MaxVa1 to 3. This should be disabled for WinXP.
  - **C1E Function**
    "Enabled" or "Disabled" C1E function.
  - **Execute Disable Bit**
    When disabled, forces the XD feature flag to always return 0.
  - **Virtualization Technology**
    "Enabled" and "Disabled" the Virtualization Technology
- **Hard Disk Boot Priority**
  Set hard disk boot device priority.
- **Virus Warning**
  Enables or disables the virus warning.
- **CPU L1& L2 Cache**
  Enabling this feature speeds up memory access. The commands are “Enabled” or “Disabled.”
- **CPU L3 Cache**
  Enabling this feature speeds up memory access. The commands are “Enabled” or “Disabled”.

- **Quick Power On Self Test**
  This allows the system to skip certain tests to speed up the boot-up procedure.
- **First/Second/Third Boot Device**
  The BIOS tries to load the OS with the devices in the sequence selected. Choices are: “LS120”, “Hard Disk”, “CDROM”, “ZIP100”, “USB-FDD”, “USB-ZIP”, “USB-CDROM”, “LAN1”, “LAN2” and “Disabled”.
- **Boot Other Device**
  Use this to boot another device. The options are “Enabled” and “Disabled”.
- **Boot Up NumLock Status**
  Sets the boot up status Num Lock. The options are “On” and “Off”.
- **Gate A20 Option**
  “Normal”: A pin in the keyboard controller controls GateA20. Fast (Default) lets chipset control GateA20.
- **Typematic Rate Setting**
  The typematic rate is the rate key strokes repeat when a keypress is held. The commands are “Enabled” or “Disabled”. Enabling allows the typematic rate and delay to be selected.
- **Typematic Rate (Chars/Sec)**
  The BIOS accepts the following input values (characters/second) for typematic auto repeat rate: 6, 8, 10, 12, 15, 20, 24, and 30.
- **Typematic Delay (msec)**
  Typematic delay is the keypress time interval before auto repetition begins. The input values for this category are: 250, 500, 750, and 1000 (ms).
- **Security Option**
  This category determines whether the password is required when the system boots up or only when entering setup. The options are:
  - **System:** The system will not boot, and access to Setup will be also denied unless the correct password is entered at the prompt.
  - **Setup:** The system will boot, but access to Setup will be denied unless the correct password is entered at the prompt.

***Note!*** *To disable security, select PASSWORD SETTING in the main menu. Then, you will be asked to enter a password. Simply press <Enter> to disable security. When security is disabled, the system will boot and you can enter Setup freely.*

- **APIC Mode**
  This setting allows you to enable the APIC mode. The choices are “Disabled” or “Enabled.”
- **MPS Version Control For OS**
  This setting allows you to select the MPS version.The choices are "1.1” or "1.4".
- **Debug Port Selector: PCI**
  Select port 80 error code forward to PCI/LPC.

# 3.5 Advanced Chipset Features

By choosing the “Advanced Chipset Features” option from the “Initial Setup Screen” menu, the screen below will be displayed. This sample screen contains the manufacturer’s default values for the PCI-7020, as shown in Figure 3.4:

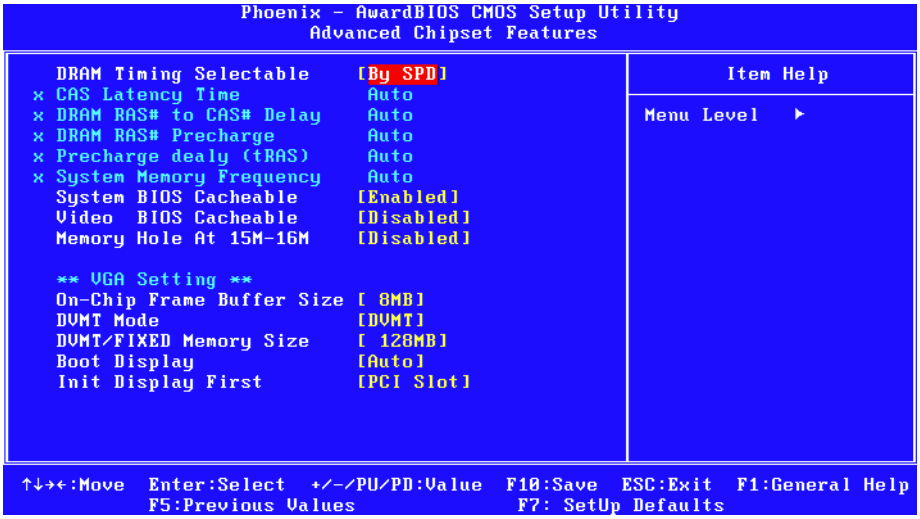



**Figure 3.4 Advanced chipset features screen**

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

- **DRAM Timing Selectable**

  This item allows you to control the DRAM speed. The selections are “Manual” or “By SPD”.

- **CAS Latency Time**

  When DRAM Timing Selectable is set to [Manual], this field is adjustable. This controls the CAS latency, which determines the time interval between SDRAM starting a read command and receiving it. The options are [3T], [4T], [5T], [6T] and [Auto].

- **DRAM RAS# to CAS# Delay**

  When DRAM Timing selectable is set to [Manual], this field is adjustable. When DRAM is refreshed, the rows and columns are addressed separately. This setup item allows users to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles are, the faster the DRAM speed is. Setting options are [2T] to [6T], and [Auto].

- **DRAM RAS# Precharge**

  When the DRAM Timing Selectable is set to [Manual], this field is adjustable. This setting controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If sufficient time has not been allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Setting options are [2T] to [6T], and [Auto].

- **Precharge Delay (RAS)**

  This item allows you to select the value in this field, depending on whether the board has paged DRAMs or EDO (extended data output) DRAMs. The choices are: “4” to “15” and “Auto”.

- **System Memory Frequency**
  To adjust the frequency of memory. The choices are: “400 MHz”, “533 MHz”, “667 MHz”, and “Auto”.
- **System BIOS Cacheable**
  Selecting “Enabled” allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes data to this memory area, a system error may occur. The choices are “Enabled”, and “Disabled”.
- **Video BIOS Cacheable**
  Selecting “Enabled” allows caching of the video BIOS, resulting in better system performance. However, if any program writes to this memory area, a system error may occur. The choices are “Enabled”, and “Disabled”.
- **Memory Hole At 15M-16M**
  Enabling this feature reserves 15 MB to 16 MB memory address space for ISA expansion cards that specifically require this setting. This makes memory from 15 MB and up unavailable to the system. Expansion cards can only access memory up to 16 MB. The default setting is “Disabled”.
- **On-Chip Frame Buffer Size**
  The On-Chip Frame Buffer Size can be set to 1 MB or 8 MB. This memory is shared with the system memory.
- **DVMT Mode**
  Displays the active system memory mode.
- **DVMT / FIXED Memory Size**
  Specify the size of DVMT / FIXED system memory to allocate for video memory.
- **Init Display First**
  Choose the first display interface to initiate while booting. The choice is “PCI Slot” or “Onboard”.

# 3.6 Integrated Peripherals

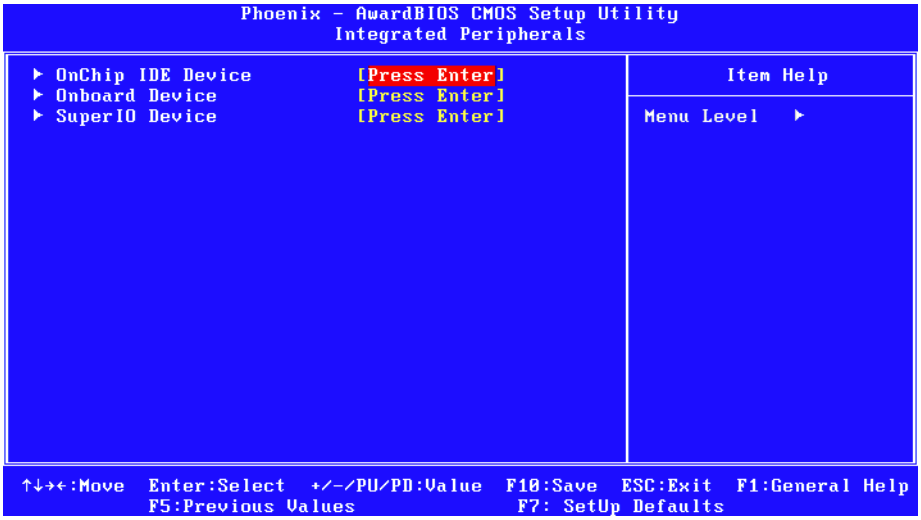



**Figure 3.5 Integrated peripherals**

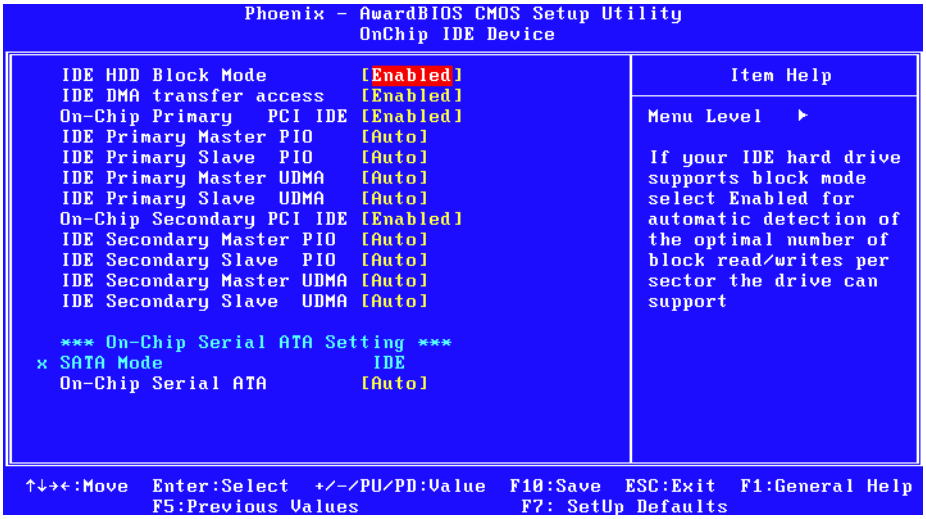



**Figure 3.6 On-Chip IDE device**

- **IDE HDD Block Mode**

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

- **IDE DMA Transfer Access**

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

- **On-Chip Primary / Secondary IDE Device**

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

- **On-Chip Serial ATA**

  Choose the status of serial ATA. The default setting is “Auto” which lets the system arrange all parallel and serial ATA resources automatically. The “Disabled” setting disables the SATA controller. The “Combined Mode” combines PATA and SATA, and maximum of 2 IDE drives in each channel. The “Enhanced Mode” enables both SATA and PATA, and a maximum of 6 IDE drives are supported. The “SATA Only” setting means SATA is operating in legacy mode.

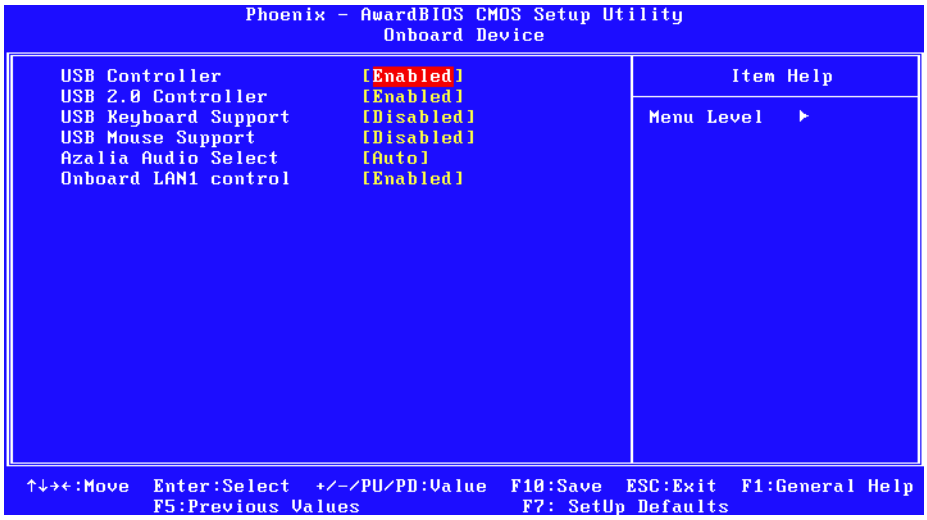



**Figure 3.7 Onboard device**

- **USB Controller**

  Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. The choices are “Enabled” and “Disabled”.

- **USB 2.0 Controller**

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

- **USB Keyboard / Mouse Support**

  Select Enabled if you plan to use an USB keyboard. The choices are “Enabled” and “Disabled”.

- **Azalia Audio Select**

  Select “Disable” if you do not want to use audio.

- **Onboard LAN1 Control**

  Options are “Enabled” and “Disabled”. Select “Disabled” if you don’t want to use onboard LAN controller1.

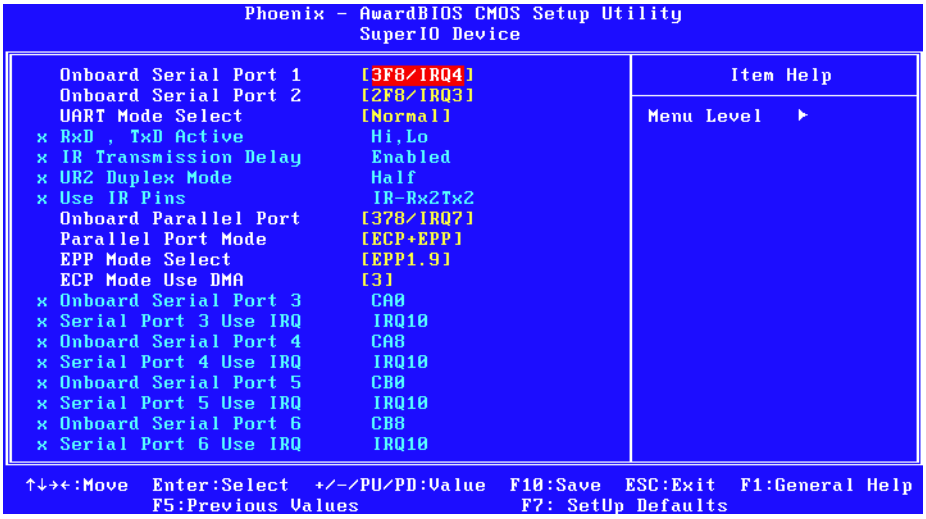



**Figure 3.8 Super I/O device**

- **Onboard Serial Port 1**

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

- **Onboard Serial Port 2**

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

- **UART Mode Select**

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

- **RxD, TxD Active**

  This item allows you to determine the active level of the RxD and TxD serial lines. The Choices: “Hi, Hi”, “Lo, Lo”, “Lo, Hi”, and “Hi, Lo”.

- **IR Transmission Delay**

  This item allows you to enable/disable IR transmission delay. The choices are “Enabled” and “Disabled”.

- **UR2 Duplex Mode**

  This item allows you to select the IR half/full duplex function. The choices are “Half” and “Full”.

- **Use IR Pins**

  The choices are “RxD2, TxD2” and “IR-Rx2Tx2”.

- **Onboard Parallel Port**

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

- **Parallel Port Mode**

  This field allows you to set the operation mode of the parallel port. The setting “Normal” allows normal speed operation, but in one direction only. “EPP” allows bi-directional parallel port operation at maximum speed. “ECP” allows the parallel port to operate in bi-directional mode and at a speed faster than the maximum data transfer rate. “ECP + EPP” allows normal speed operation in a two-way mode.

- **EPP Mode Select**
  This field allows you to select EPP port type 1.7 or 1.9. The choices are “EPP1.9” and “EPP1.7”.
- **ECP Mode Use DMA**
  This selection is available only if you select “ECP” or “ECP + EPP” in the Parallel Port Mode field. In ECP Mode, you can select DMA channel 1 or DMA channel 3. Leave this field on the default setting.
- **Onboard Serial Port 3 (Optional)**
  The settings are "CA0", CA8" and “Disabled” for the on-board serial connector 3.
- **Series port 3 use IRQ**
  The settings are "IRQ10", "IRQ11" and "Disabled" for the on-board serial connector 3.
- **Onboard Serial Port 4 (Optional)**
  The settings are "CA0", CA8" and “Disabled” for the on-board serial connector 4.
- **Series port 4 use IRQ**
  The settings are "IRQ10", "IRQ11" and "Disabled" for the on-board serial connector 4.
- **Onboard Serial Port 5 (Optional)**
  The settings are "CA0", "CA8" and "Disabled" for the on-board serial connector 5.
- **Series port 5 use IRQ**
  The settings are "IRQ10", "IRQ11" and "Disabled" for the on-board serial connector 5.
- **Onboard Serial Port 6 (Optional)**
  The settings are "CA0", "CA8" and "Disabled" for the on-board serial connector 6.
- **Series port 6 use IRQ**
  The settings are "IRQ10", "IRQ11" and "Disabled" for the on-board serial connector 6.

# 3.7 Power Management Setup

The power management setup controls the single board computer's “green” features to save power. The following screen shows the manufacturer defaults.

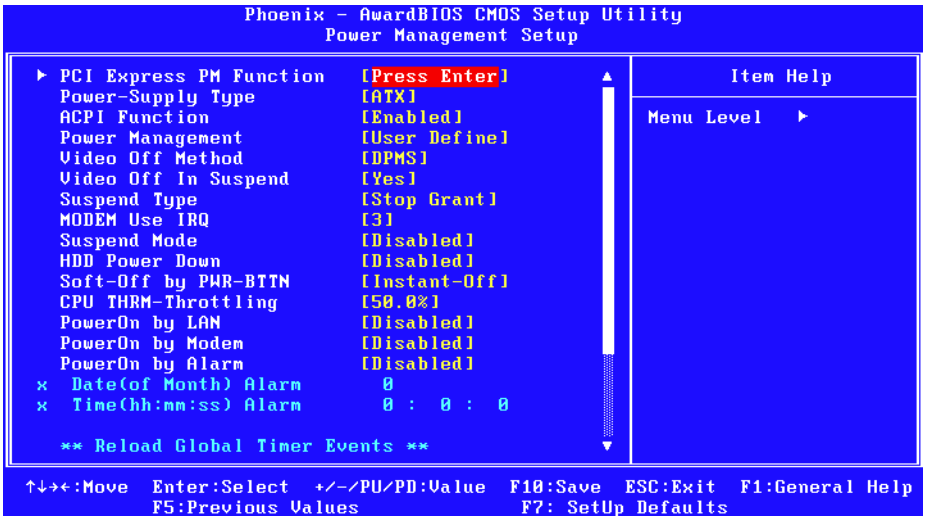



**Figure 3.9 Power management setup screen**

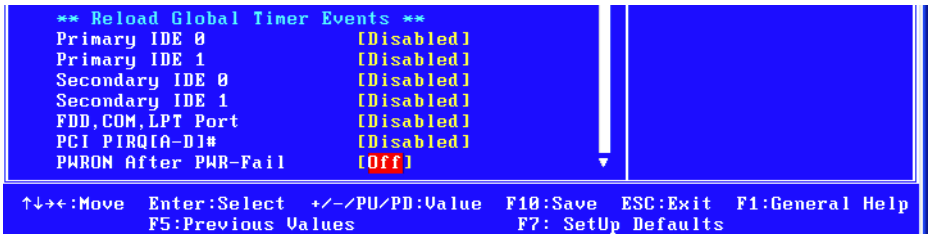



**Figure 3.10 Power management setup screen (Conn.)**

- **PCI express PM Function**

  This is to setup PCI Express's PME function “Enable” or “Disable”.

- **Power Supply Type**

  PCI-7020 can support both “ATX” and “AT” power supplies. Customers can choose the PSU type through this selection. The choices are “ATX” and “AT”. Selecting “AT” disables the ACPI function automatically.

- **ACPI Function**

  The choices are: “Enabled” and “Disabled”.

- **Power Management**

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

  – HDD Power Down
  – Suspend Mode
  – There are three selections for Power Management, and they have fixed mode settings.

**Table 3.1: Power Saving**

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

- **Video Off Method**
  Use this to select the method to turn off the video. The choices are “Blank Screen”, “V/H SYNC+ Blank”, and “DPMS”.
- **Video Off In Suspend**
  When the system is in suspend mode, the video will turn off. The choices are “No” and “Yes”.
- **Suspend Type**
  The choices are “Stop Grant” and “PwrOn Suspend”.
- **Modem Use IRQ**
  This determines the IRQ that the MODEM can use.The choices are “3”, “4”, “5”, “7”, “9”, “10”, “11”, and “NA”.
- **Suspend Mode**
  Please refer to Table 3.1.
- **HDD Power Down**
  Please refer to Table 3.1.
- **Soft-Off by PWR-BTTN**
  If you choose “Instant-Off”, then pushing the ATX soft power switch button once will switch the system to “system off” power mode. You can choose “Delay 4 sec”. If you do, then pushing the button for more than 4 seconds will turn off the system, whereas pushing the button momentarily (for less than 4 seconds) will switch the system to “suspend” mode.
- **CPU THRM-Throttling**
  The ability is control how much percent of your CPU's clock speed will be throttled down when the CPU overheats. You can set "75.0%", "50.0%", and "25.0%".
- **PowerOn by LAN**
  This item allows you to power on the system by LAN. The choices are “Enabled” and “Disabled”.
- **PowerOn by Modem**
  To enabled or disable the function to power on the system via a Modem connection from a remote host. The choice “Enabled” and “Disabled”.
- **PowerOn by Alarm**
  The choices are “Enabled” and “Disabled”. Fields that follow below indicate date of current month and time of alarm settings, if enabled.
- **Primary IDE 0 (1) and Secondary IDE 0 (1)**
  When Enabled, the system will resume from suspend mode if Primary IDE 0 (1) or Secondary IDE 0 (1) becomes active. The choices are “Enabled” and “Disabled”.

- **FDD, COM, LPT PORT**

  When Enabled, the system will resume from suspend mode if the FDD, interface, COM port, or LPT port is active. The choices are “Enabled” and “Disabled”.

- **PCI PIRQ [A-D]#**

  When Enabled, the system resumes from suspend mode if an interrupt occurs. The choices are “Enabled” and “Disabled”.

- **PWRON After PWR-Fail**

  Use this to set up the system after power failure. The “Off” setting keeps the system powered off after power failure, the “On” setting boots up the system after failure, and the “Former-Sts” returns the system to the status before power failure.

## 3.8 PnP/PCI Configurations

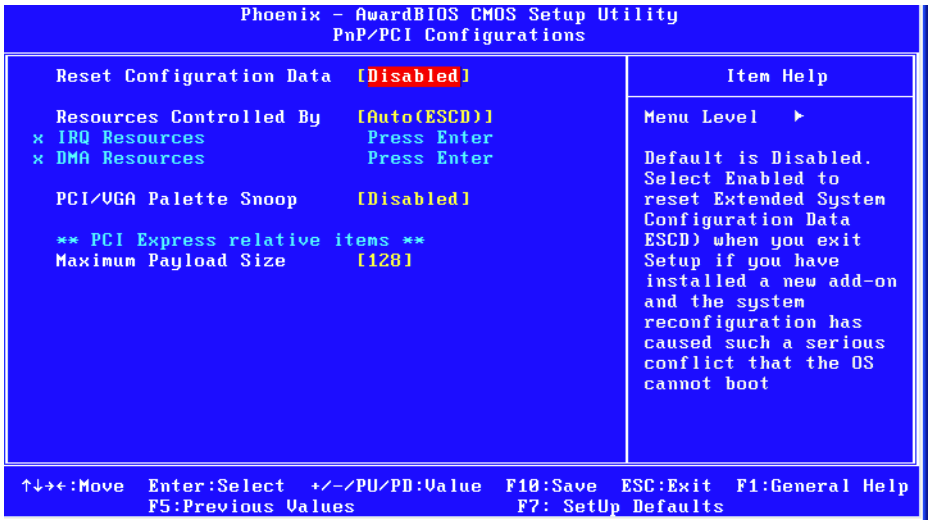



**Figure 3.11 PnP/PCI configurations screen**

- **Reset Configuration Data**

  The default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) if you have installed a new add-on card, and system configuration is in such a state that the OS cannot boot.

- **Resources Controlled By**

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

- **PCI / VGA Palette Snoop**

  This is set to “Disabled” by default.

- **Maximum Payload Size**

  This allows you to set the maximum TLP payload size for PCI Express devices. The options are [128 bytes].

## 3.9 PC Health Status

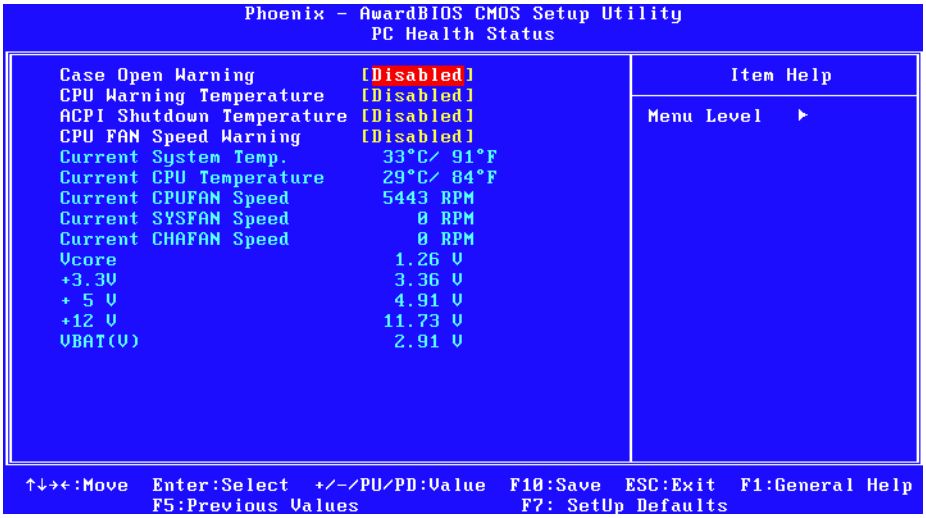



**Figure 3.12 PC health status screen**

- **Case Open Warning**
  Enable this to detect if the case is open or closed.
- **CPU Warning Temperature**
  This item will prevent the CPU from overheating. The choices are “Disabled”, "50C/122F", "53C/127F", "56C/133F", “60C/140F”, “63C/145F”, “66C/151F”, “70C/158F”.
- **Shutdown Temperature**
  The system will shut down automatically when the CPU temperature is over the selected setting. This function can prevent CPU damage caused by overheating.
- **Current System Temperature**
  This shows you the current temperature of system.
- **Current CPU Temperature**
  This shows the current CPU temperature.
- **CPU FAN Speed**
  This shows the current CPU FAN operating speed.
- **SYS FAN Speed**
  This shows the current CPU FAN operating speed.
- **CHA FAN Speed**
  This shows the current CHA FAN operating speed.
- **VCORE and Other Voltages**
  This shows the voltage of VCORE, +3.3 V, +5 V and +12 V, VBAT (V).

# 3.10 Frequency / Voltage Control

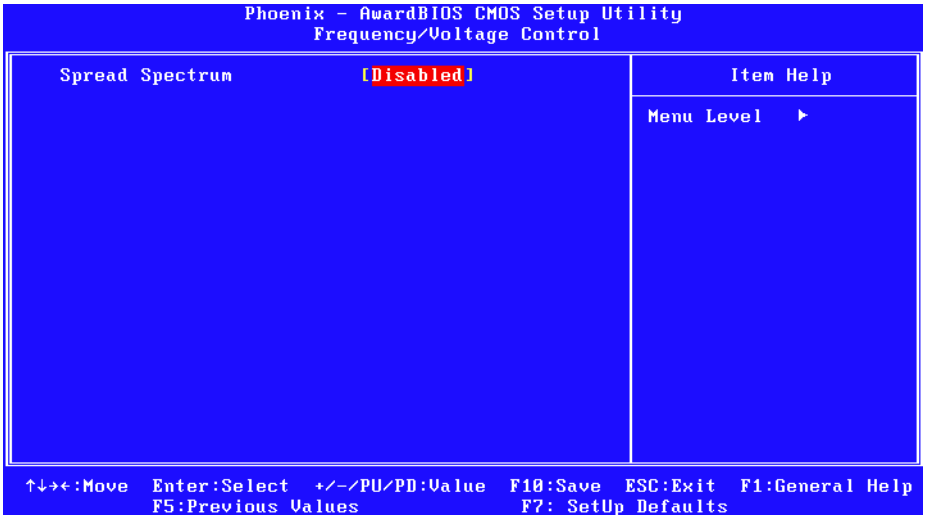



**Figure 3.13 Spread spectrum control screen**

- **Spread Spectrum**

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

## 3.11 Password Setting

Follow these steps to change the password.

1. Choose the "Set Password" option from the "Initial Setup Screen" menu and press <Enter>. The screen displays the following message:

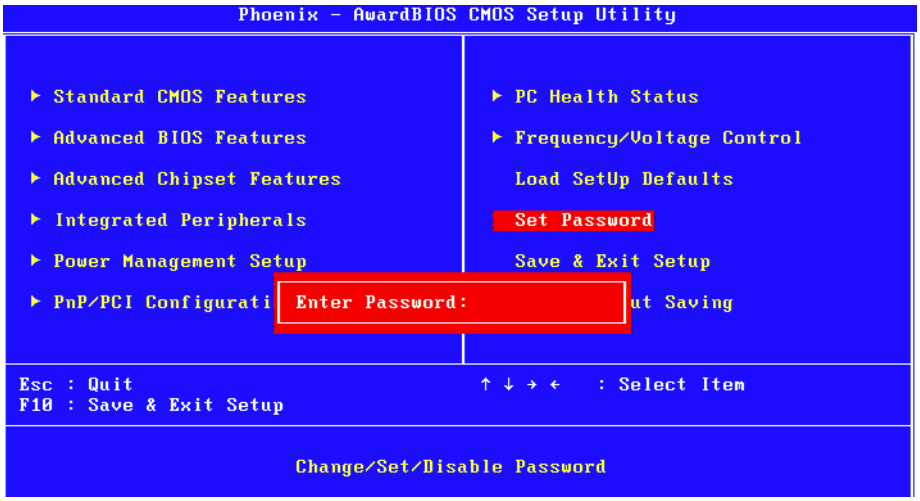



**Figure 3.14 Enter password**

2. Fill in the password, and press <Enter>.
3. Please confirm your password, type the current password and press <Enter>.
4. After pressing <Enter> (ROM password) or the current password (user-defined), you can change the password stored. The password must be no longer than eight (8) characters.

# 3.12 Load Setup Defaults

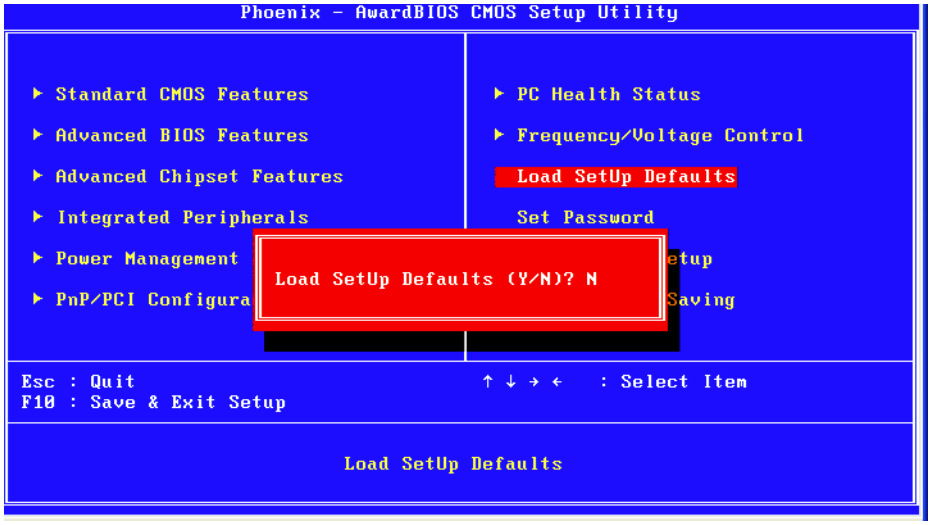



**Figure 3.15 Load setup defaults screen**

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Load setup Defaults (Y/N)? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

## 3.13 Save & Exit Setup

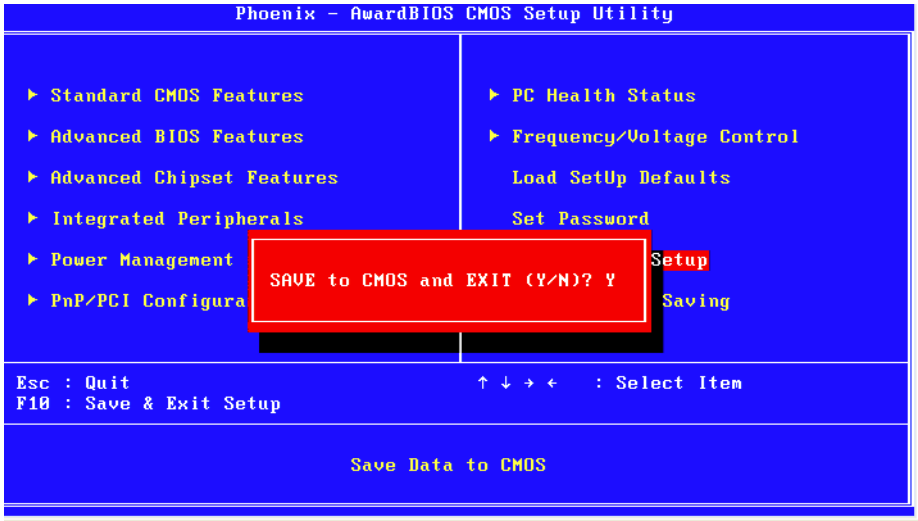



**Figure 3.16 Save to CMOS and Exit**

If you select this and press <Enter>, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The processor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

## 3.14 Exit Without Saving

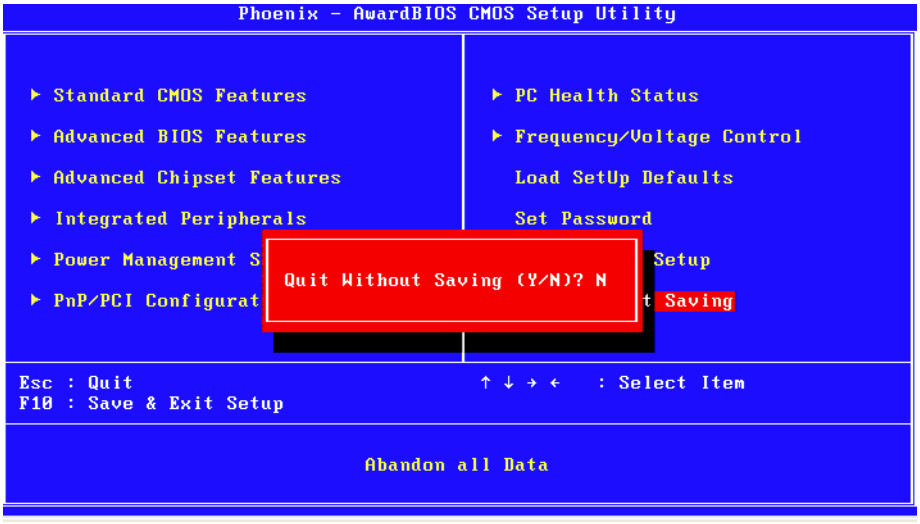



**Figure 3.17 Quit Without Saving**

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

# Chapter 4

## Chipset Software Installation Utility

## 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 PCI-7020 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
- IDE/ATA33/ATA66/ATA100 Storage 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 system, 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 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. Click "Next" when you see the following message.



6. When the following message appears, click “Finish” to complete the installation and restart Windows.



# Chapter 5

## VGA Setup

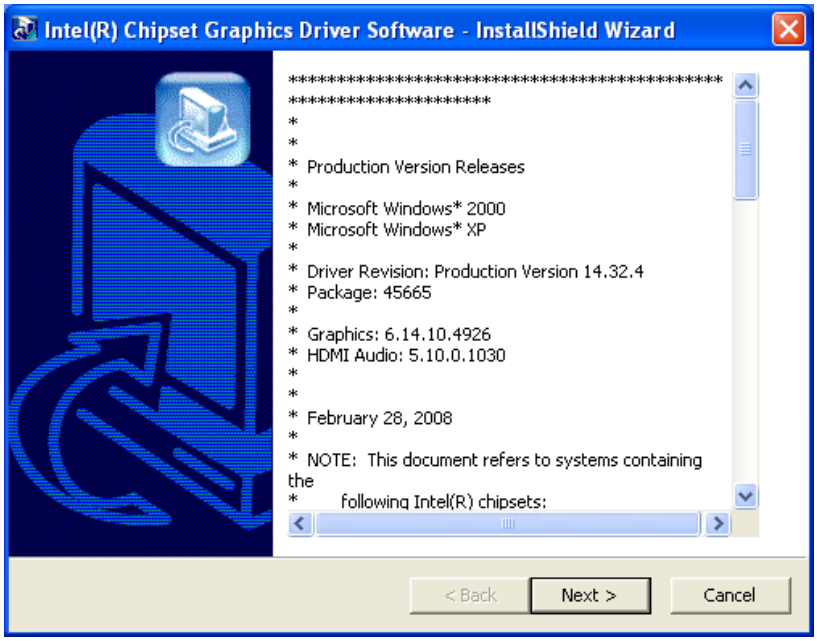
## 5.1 Introduction

The Intel 945GC integrated graphics controller provides an analog display port. You need to install the VGA driver to enable the function. The Intel 945GC integrated graphics controller incorporates the latest Microsoft* DirectX*9 support capabilities. It allows software developers to create life like environments and characters. Enhanced display modes for widescreen flat panels, and optimized 3D support delivers 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.*

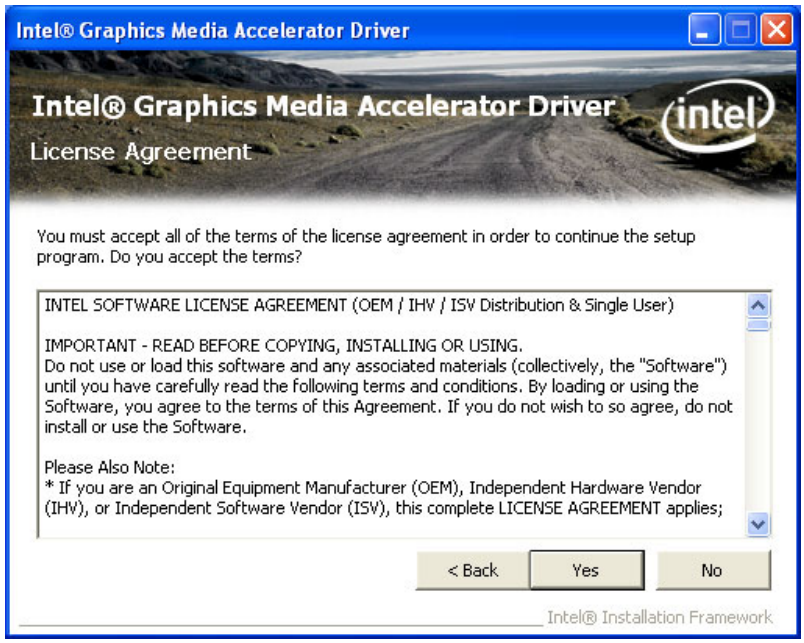
1. Insert the driver CD into your system's CD-ROM drive. Select the folder "VGA" then click the proper VGA driver for the OS. Windows XP is used as an example in the following steps.
2. Click "Next" when you see the following message.



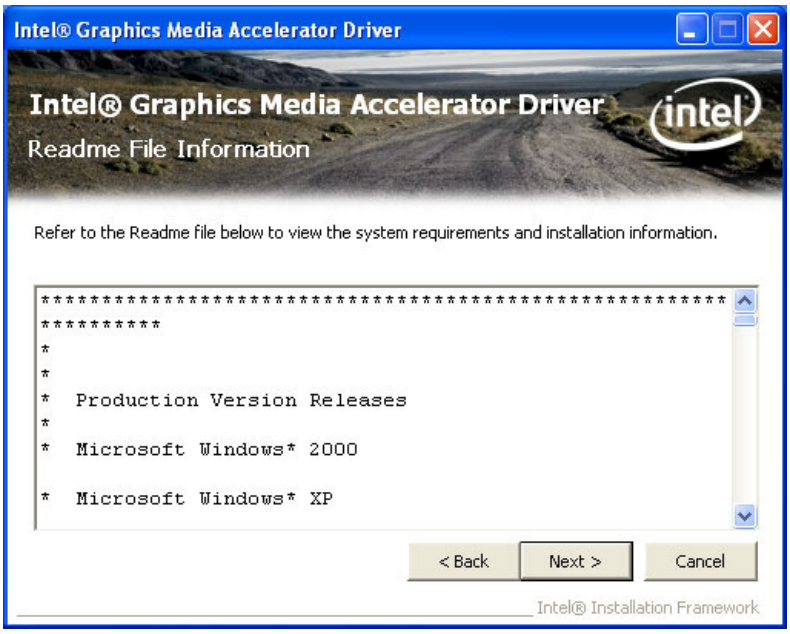
3. You will see a welcome window. Please click "Next" to continue the installation.



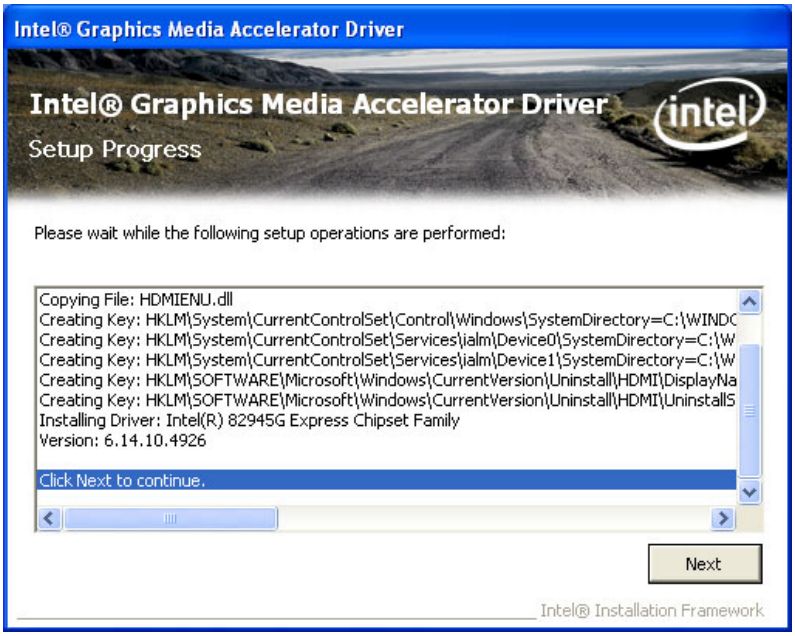

4. Click "Yes" when you see the following message.



5. When you see the following message , please click "Next" to continue the installation.




6. Please click "Next" to continue the installation.



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



# Chapter 6

## LAN Configuration

## 6.1 Introduction

The PCI-7020 has a single Gigabit Ethernet LAN via dedicated PCI Express x 1 bus (Intel® 82574L), which offers bandwidth of up to 500 MB/s, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet to operate at 1000 Mbps.

## 6.2 Features

- Integrated 10/100/1000 BASE-T transceiver
- 10/100/1000 BASE-T triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCI Express X1 host interface

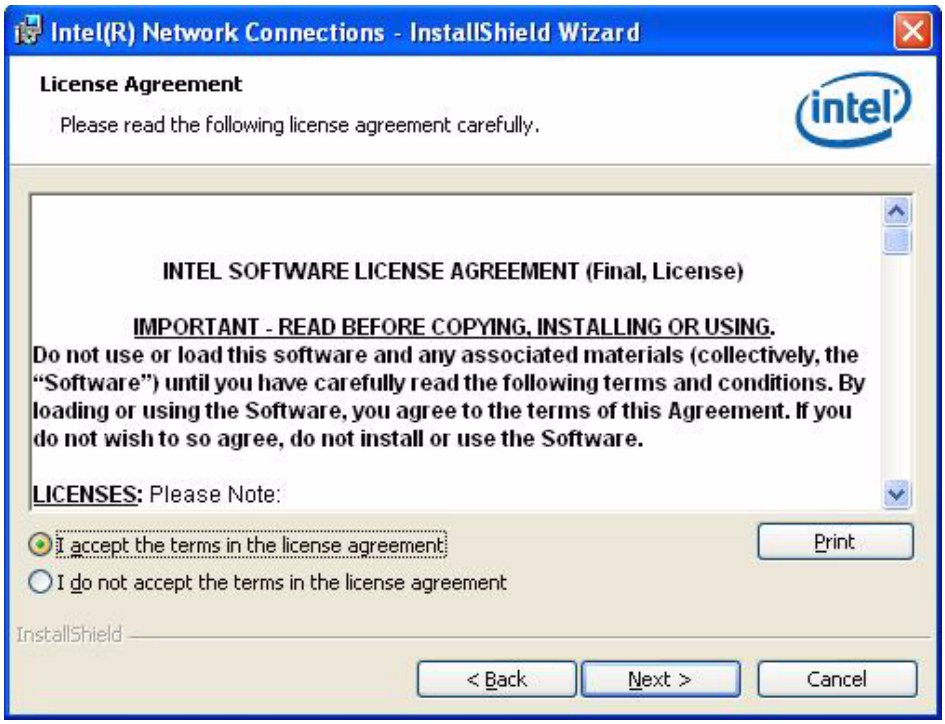
## 6.3 Installation

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

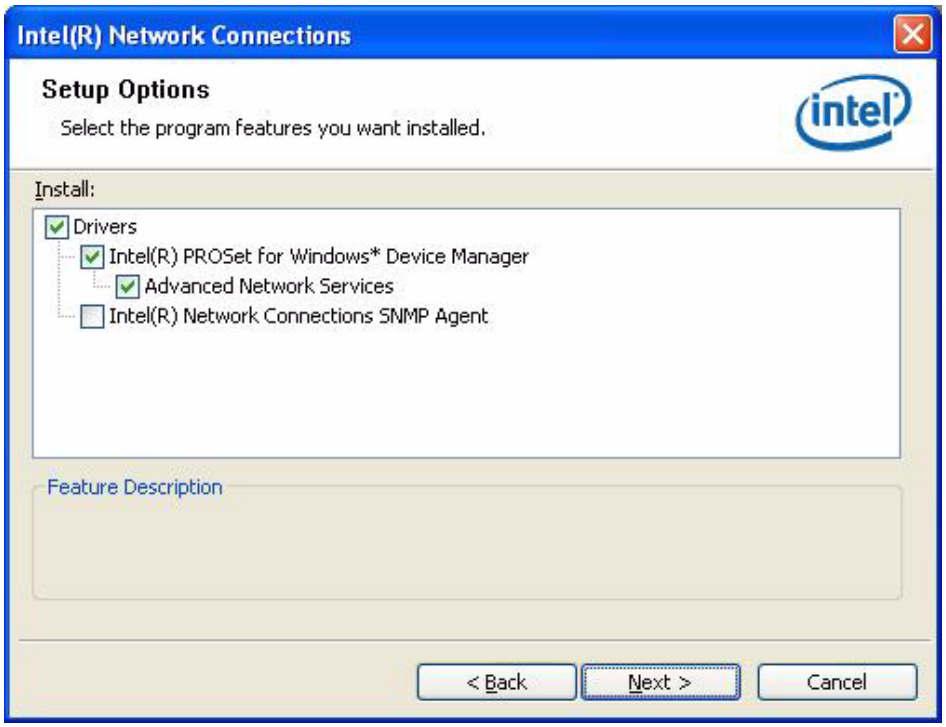
The PCI-7020 Intel 82574L Gigabit integrated controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

## 6.4 Win XP Driver Setup

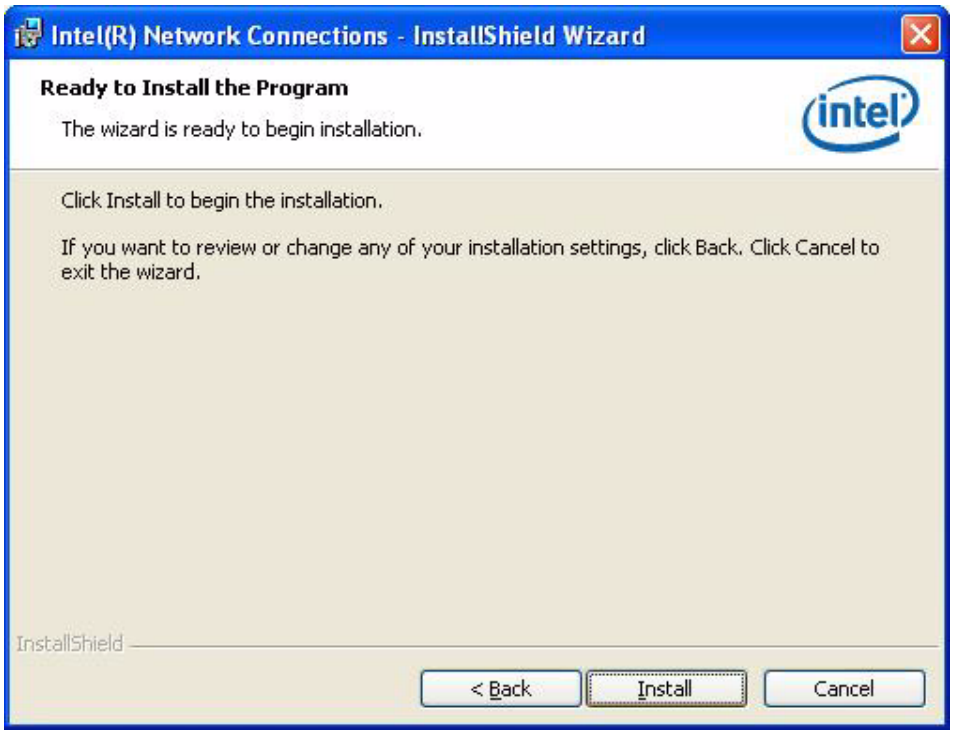
1. Insert the driver CD into your system's CD-ROM drive. Select the folder "LAN" then click the proper LAN driver for the OS. Windows XP is used as an example in the following steps.
2. Select “I accept the terms in the license agreement” and click “Next” to continue.



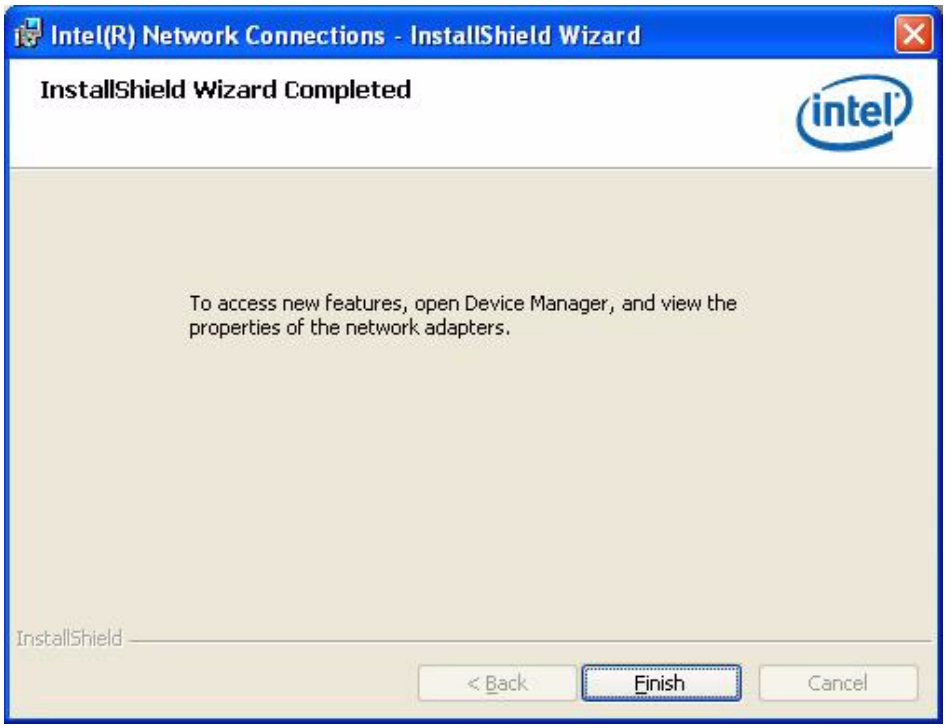

3. Click “Next” to continue.



4. Click “Install” to start the installation procedure.




5. Click "Finish" to complete the installation and the LAN function will be enabled after the installation.



# Appendix A

## Programming the Watchdog Timer

# A.1 Programming the Watchdog Timer

The PCI-7020 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 super I/O controller W83627HG. It provides the following functions for user programming:

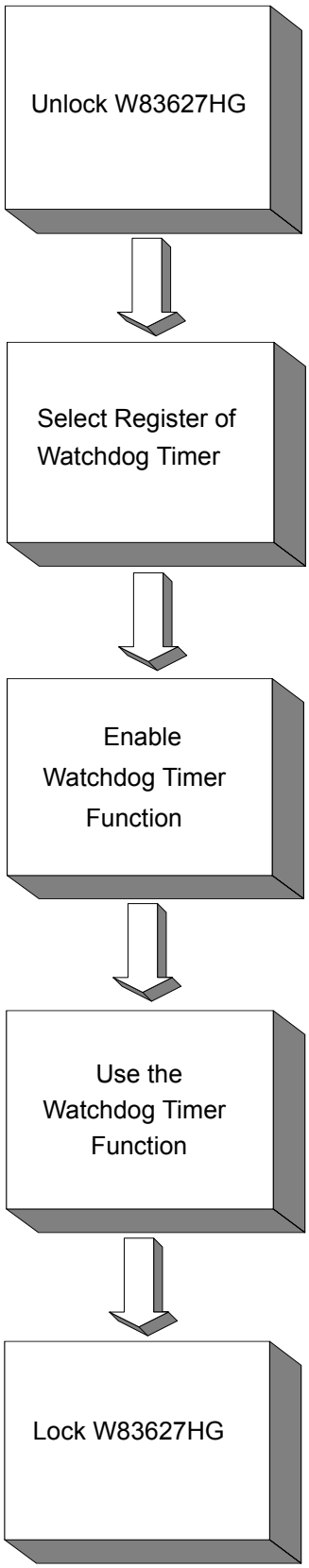
- Can be enabled and disabled by user's program.
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes.
- Generates an interrupt or reset signal if the software fails to reset the timer before time-out.

## A.1.2 Jumper selection

The JWDT1 jumper is used to select reset in the event the watchdog timer is tripped. See Chapter 1 for detailed jumper settings.

## A.1.3 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E(hex) and 2F(hex).
2E (hex) is the address port. 2F(hex) is the data port. You must first assign the address of register by writing 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 Watchdog Timer Function
Use the Watchdog Timer Function
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]<br>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]<br>Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0]<br>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.1.4 Example Program

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

```
;--------------------------------------------------------
Mov dx,2eh          ; Unlock W83627HG
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h          ; Select registers of watchdog timer
Out     dx,al
Inc     dx
Mov     al,08h
Out     dx,al
;--------------------------------------------------------
Dec dx              ; Enable the function of watchdog timer
Mov     al,30h
Out     dx,al
Inc     dx
Mov     al,01h
Out     dx,al
;--------------------------------------------------------
Dec dx              ; Set second as counting unit
Mov     al,0f5h
Out     dx,al
Inc     dx
In      al,dx
And al,not 08h
Out     dx,al
;--------------------------------------------------------
Dec dx              ; Set timeout interval as 10 seconds and start counting
Mov     al,0f6h
Out     dx,al
Inc     dx
Mov     al,10
Out     dx,al
;--------------------------------------------------------
Dec dx              ; lock W83627HG
Mov     al,0aah
Out     dx,al
```

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

```
;--------------------------------------------------------
Mov dx,2eh          ; unlock 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
```

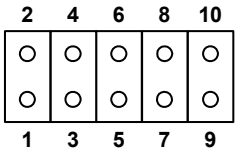
5. Generate a time-out signal without timer counting

```
;--------------------------------------------------------
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

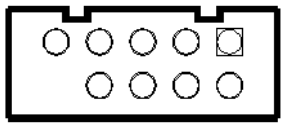
## I/O Pin Assignments

# B.1 Front Panel Connectors (JFP1)



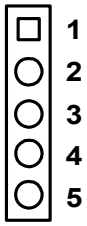

| Table B.1: Front Panel Connectors (JFP1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | HDD LED+ | 2 | HDD LED- |
| 3 | Power LED+ | 4 | Power LED- |
| 5 | Suspend LED+ | 6 | Suspend LED- |
| 7 | System Reset Button | 8 | GND |
| 9 | ATX Power Button | 10 | GND |

# B.2 USB Ports (USB12/USB34)



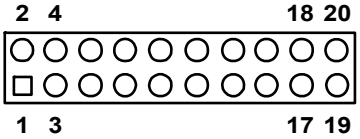
| Table B.2: USB Ports (USB12/USB34) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | VCC | 2 | VCC |
| 3 | USB Data1- | 4 | USB Data2- |
| 5 | USB Data1+ | 6 | USB Data2+ |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | |

## B.3 IR Connector (JIR1)



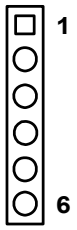

| Table B.3: IR Connector (JIR1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | VCC |
| 2 | NC |
| 3 | IR_RX |
| 4 | GND |
| 5 | IR_TX |

## B.4 Serial Ports (COM12)



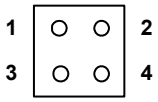

| Table B.4: Serial Ports (COM12) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | DCD1 | 2 | DSR1 |
| 3 | RX1 | 4 | RTS1 |
| 5 | TX1 | 6 | CTS1 |
| 7 | DTR1 | 8 | RI1 |
| 9 | GND | 10 | GND |
| 11 | DCD2 | 12 | DSR2 |
| 13 | RX2 | 14 | RTS2 |
| 15 | TX2 | 16 | CTS2 |
| 17 | DTR2 | 18 | RI2 |
| 19 | GND | 20 | GND |

## B.5 PS/2 Keyboard / Mouse Connector (KBMS2)



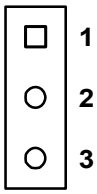

| Table B.5: PS/2 Keyboard / Mouse Connector (KBMS2) | |
|---|---|
| **Pin** | **Signal** |
| 1 | PS2 keyboard clock |
| 2 | PS2 keyboard data |
| 3 | PS2 mouse data |
| 4 | GND |
| 5 | VCC |
| 6 | PS2 mouse clock |

## B.6 LAN LED Connector (LANLED1)



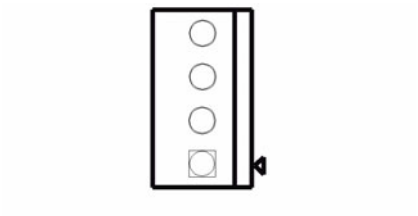

| Table B.6: LAN LED Connector (LANLED1/LANLED2) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | LAN1_LINK/ACTIVITY# | 2 | LAN1_1000# |
| 3 | VCC3 | 4 | LAN1_100# |

## B.7 ATX Feature Connector (ATXF1)



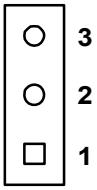

| Table B.7: ATX Feature Connector (ATXF1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | 5 V standby |
| 2 | VCC |
| 3 | PS_ON# |

## B.8 CPU FAN Connector (CPUFAN1)



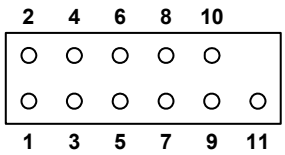
| Table B.8: CPU FAN Connector (CPUFAN1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | GND |
| 2 | +12 V |
| 3 | FAN_TACH |
| 4 | FAN_PWM |

## B.9 System FAN Connector (SYSFAN1)



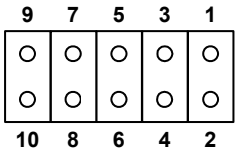

| Table B.9: System FAN Cconnector (SYSFAN1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | FAN_PWM |
| 2 | +12 V |
| 3 | FAN_TACH |

## B.10 Audio Interface Connector (HDAUD1)



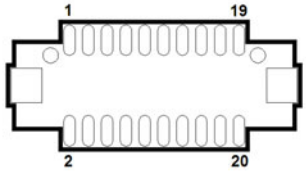

| Table B.10: Audio Interface Connector (HDAUD1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | ACZ_VCC | 2 | GND |
| 3 | ACZ_SYNC | 4 | ACZ_BITCLK |
| 5 | ACZ_SDOUT | 6 | ACZ_SDIN0 |
| 7 | ACZ_SDIN1 | 8 | ACZ_RST# |
| 9 | ACZ_12V | 10 | GND |
| 11 | GND | 12 | |

## B.11 GPIO Header (GPIO1)




| Table B.11: GPIO Header (GPIO1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | GPIO1 | 2 | GPIO5 |
| 3 | GPIO2 | 4 | GPIO6 |
| 5 | GPIO3 | 6 | GPIO7 |
| 7 | GPIO4 | 8 | GPIO8 |
| 9 | VCC | 10 | GND |

## B.12 DVI LCD Panel Connector (DVI1)




| Table B.12: DVI LCD Panel Connector (DVI1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | TDC0- | 2 | VCC |
| 3 | TDC0+ | 4 | TLC- |
| 5 | GND | 6 | TLC+ |
| 7 | TDC1- | 8 | GND |
| 9 | TDC1+ | 10 | SC_DDC |
| 11 | GND | 12 | SD_DDC |
| 13 | TDC2- | 14 | HPDETT |
| 15 | TDC2+ | 16 | NC |
| 17 | VCC | 18 | NC |
| 19 | NC | 20 | NC |

## B.13 Low Pin Count Header (LPC1)

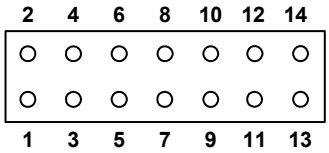



**Table B.13: Low Pin Count Header (LPC1)**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LPC_CLK | 2 | LPC_LAD1 |
| 3 | LPC_RST# | 4 | LPC_LAD0 |
| 5 | LPC_FRAME# | 6 | +3.3 V |
| 7 | LPC_LAD3 | 8 | GND |
| 9 | LPC_LAD2 | 10 | NC |
| 11 | SERIRQ | 12 | PWROK |
| 13 | 5 V Standby | 14 | +5 V |

## B.14 ATX Power Control Connector (ATX1)

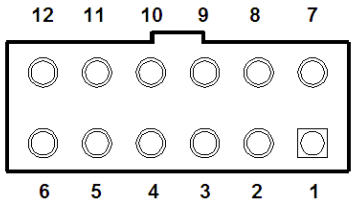
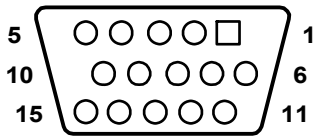



**Table B.14: ATX Power Control Connector (ATX1)**

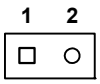
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | GND | 7 | GND |
| 2 | +5 V | 8 | GND |
| 3 | +5 V | 9 | 5 V Standby |
| 4 | GND | 10 | PSON# |
| 5 | +5 V | 11 | GND |
| 6 | +5 V | 12 | +12 V |

## B.15 VGA Connector (VGA1)



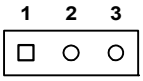

| Table B.15: VGA Connector (VGA1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | RED | 9 | CRT_VCCIN |
| 2 | VGA_G | 10 | GND |
| 3 | VGA_B | 11 | N/C |
| 4 | N/C | 12 | V_SDAT |
| 5 | GND | 13 | H-SYNC |
| 6 | GND | 14 | V-SYNC |
| 7 | GND | 15 | V_SCLK |

## B.16 H/W Monitor Alarm (JOBS1)




| Table B.16: H/W Monitor Alarm (JOBS1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | BUZZ_VCC |
| 2 | FAILLED_BEEP |

## B.17 Watchdog Timer Output (JWDT1)




| Table B.17: Watchdog Timer Output (JWDT1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | NC |
| 2 | 5VSB_WDTO |
| 3 | SYS RST |

# Appendix C

## System Assignments

# C.1 System I/O Ports

**Table C.1: System I/O Ports**

| Addr. range (Hex) | Device |
|---|---|
| 000-01F | Interrupt controller 1, master |
| 022-023 | Chipset address |
| 040-05F | 8254 timer |
| 060-06F | 8042 (keyboard controller) |
| 070-07F | Real-time clock, non-maskable interrupt (NMI) mask |
| 080-09F | DMA page register |
| 0A0-0BF | Interrupt controller 2 |
| 0C0-0DF | DMA controller |
| 0F0 | Clear math co-processor |
| 0F1 | Reset math co-processor |
| 0F8-0FF | Math co-processor |
| 1F0-1F8 | Fixed disk |
| 278-27F | Parallel printer port 2 (LPT3) |
| 290-297 | On-board hardware monitor |
| 2F8-2FF | Serial port 2 |
| 360-36F | Reserved |
| 378-37F | Parallel printer port 1 (LPT2) |
| 3B0-3BF | Monochrome display and printer adapter (LPT1) |
| 3C0-3CF | Graphics adapter |
| 3D0-3DF | Color/graphics monitor adapter |
| 3F0-3F7 | Diskette controller |
| 3F8-3FF | Serial port 1 |
| CA0-CA7 | Serial port 3 |
| CA8-CAF | Serial port 4 |
| CB0-CB7 | Serial port 5 |
| CB8-CBF | Serial port 6 |
| C80-C87 | Serial port 7 |
| C88-C8F | Serial port 8 |
| C90-C97 | Serial port 9 |
| C98-C9F | Serial port 10 |

## C.2 DMA Channel Assignments

**Table C.2: DMA Channel Assignments**

| Channel | Function |
|---|---|
| 0 | Available |
| 1 | Available |
| 2 | Floppy disk (8-bit transfer) |
| 3 | Available |
| 4 | Cascade for DMA controller 1 |
| 5 | Available |
| 6 | Available |
| 7 | Available |

## C.3 Interrupt Assignments

**Table C.3: 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 communication port 3/4/5/6 |
| 7 | IRQ11 | Serial communication port 7/8/9/10 |
| 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 | Available |
| 15 | IRQ6 | Available |
| 16 | IRQ7 | Parallel port 1 (print port) |

## C.4 1st MB Memory Map

**Table C.4: 1st MB Memory Map**

| Addr. range (Hex) | Device |
|---|---|
| E0000h - FFFFFh | BIOS |
| D0000h - DFFFFh | Unused |
| C0000h - CFFFFh | VGA BIOS |
| A0000h - BFFFFh | Video Memory |
| 00000h - 9FFFFh | Base memory |

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