# MI900

LGA775 Core™ 2 Duo
Intel® Q965 Chipset
Mini-ITX Motherboard

# USER'S MANUAL

Version 1.0

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# Introduction

## Checklist

Your MI900 Core 2 Duo motherboard package should include the items listed below:

- The MI900 motherboard
- This User's manual
- 1 x I/O shield
- 1 x IDE cable
- 1 x SATA cable
- 1 CD containing the following:
  - Chipset Drivers
  - Flash Memory Utility

# Product Description

The MI900 Mini-ITX motherboard is designed for either the Intel® Core™2 Duo or Intel® Pentium® D processors of up to 1066MHz FSB. It is based on the Intel's Q965 Express chipset and it comes with two single-channel DDR2 memory slots and 4GB memory capacity for faster system responsiveness and support of 64-bit computing. The new IBASE motherboards are aimed for high performance PCs in the digital, communications and industrial sector.

On board is one PCI Express x16 slot that offers up to 3.5X the bandwidth over traditional PCI architecture to support the latest high-performance graphics cards. Dual independent display comes to life with the onboard Intel® Q965 integrated graphics for CRT and an optional SDVO card supporting either an LVDS or DVI display interface. LAN functionality is supported with a 10/100 Ethernet controller or with two Gigabit Ethernet controllers.

MI900 is expandable for 8x2 pins pin header for adaptor card ID394 that support 2 or 4 serial ports, or ID395 that support TPM 1.2 for security function. Other useful features on the board include four SATA II ports, six USB 2.0 interface, watchdog timer, digital I/O and two serial ports. Board dimensions are 170mm by 170mm. (Note: CPU power consumption – under 95watt recommended.)

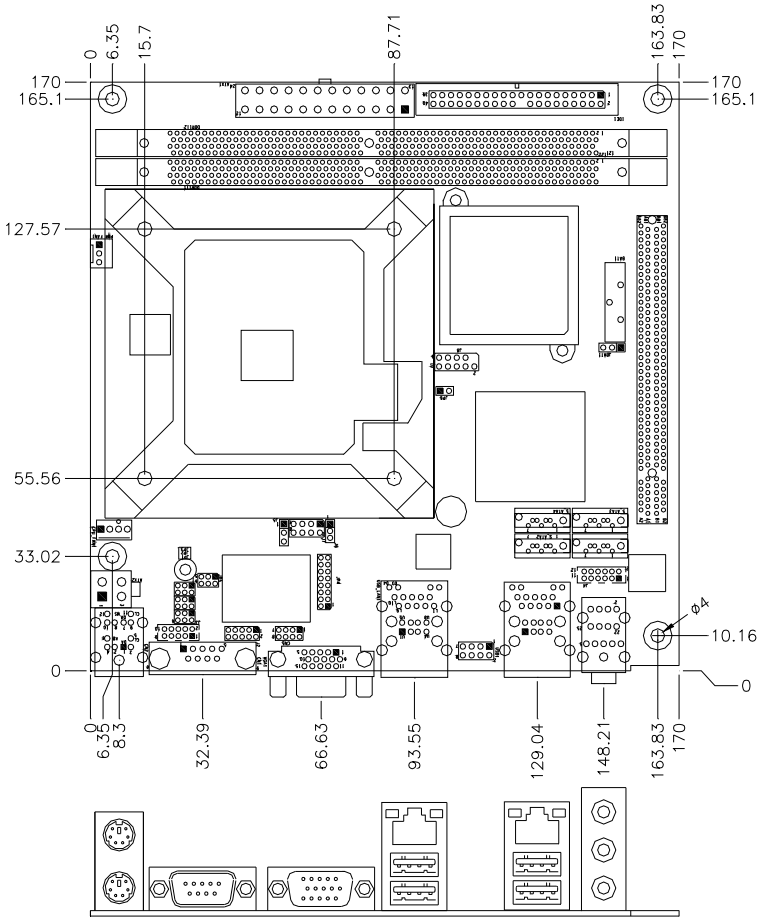
**MI900 FEATURES**

- Intel® Q965 Express Chipset Based
- Support LGA775 Intel® Core™2 Duo Processors
- Support FSB 1066/800/533MHz
- Support up to 4GB DDRII 800/667/533 memory
- 1 x PCI Express(x16)
- Support one 10/100 or two Gigabit LAN on board
- 4 x SATA II, 1 x IDE, 6 x USB 2.0, 2 x COM, 7.1Ch.HD Audio

# Specifications

| | |
|---|---|
| **Processor** | Supports Intel Core 2 Duo processor (Conroe core) in LGA775 socket |
| **FSB** | 533/800/1066 MHz |
| **Chipset** | Intel Q965 Chipset consisting of:<br>• Intel Q965 Graphic Memory Controller Hub (GMCH)<br>• Intel ICH8 I/O Controller Hub |
| **BIOS** | • Award BIOS: SPI interface only, supports ACPI, SMBIOS |
| **Memory** | • Two 240-pin DDRII 533/667/800 DIMM sockets (2x single ch)<br>• Supports max. 4 GB system memory |
| **Video** | Intel Q965 integrated graphic subsystem (GMA3000), dual independent display available through on-board VGA and PCI-e x16 expansion adapter (DVI or LVDS) or VGA card |
| **LAN** | LAN1: dual Footprint support option:<br>• Intel 82566DC Nineveh 10/100/1000 LAN<br>• Intel 82562V Ekron-N 10/100<br>LAN2: Marvell 88E8053 PCI-express Gigabit LAN controller x1 |
| **USB** | Intel ICH8 built-in USB 2.0 host controller, supports 6 ports:<br>• 4 ports in the rear I/O region<br>• 2 ports with on-board headers |
| **SATA II** | Intel ICH8 built-in SATA II controller (3.0Gb/sec) w/ 4 ports |
| **IDE** | JMicron JMB368 (PCI-e to PATA) x1 for 1 PATA channel |
| **Audio** | Intel ICH8 built-in high definition audio w/ Realtek ALC888 Codec |
| **LPC I/O** | Winbond W83627EHF: COM1 (RS232), COM2 (RS232/422/485) & Hardware monitor |
| **Edge Connectors** | • Mini-DIN for PS/2 KB & MS, DB9 connector for COM1, DB15 connector for VGA, RJ45 + dual USB stack connector x2 for LAN1~2 and USB1~4, Triple (3x1) audio phone jack stack connector |
| **On Board Headers / Connectors** | • SATA (7-pin shrouded vertical) connector x4, USB 5-6, COM2 (RS232/422/485), Digital I/O, 7.1 channel audio, IDE, CPU fan & system fan headers |
| **Expansion** | PCI-express (x16) slot x1<br>8x2 pins pin-header x1 for adaptor card:<br>- ID394 (2 or 4 serial ports - Fintek F81216)<br>- ID395 (TPM1.2 – Winbond WPCT200/ATMEL AT97SC3203 co-layout) |
| **RTC** | ICH8 built-in RTC with on-board lithium battery |
| **Watchdog Timer** | Yes (256 segments, 0, 1, 2…255 sec/min) |
| **Digital IO** | 4 in and 4 Out |
| **Other** | LAN Wakeup |
| **Power Connector** | 24 pins ATX main power + 4 pins 12V<br>**CPU Power: 95W max.** |
| **System Voltage** | +5V, +3.3V, +12V, -12V & 5VSB |
| **Board Size** | 170 x 170mm |

# Board Dimensions



# Installations

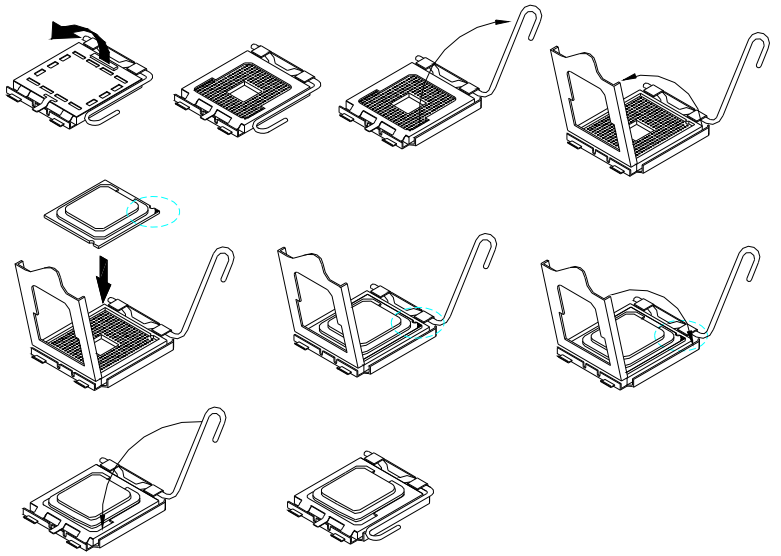
This section provides information on how to use the jumpers and connectors on the MI900 in order to set up a workable system. The topics covered are:

Installing the CPU ..... 6
ATX Power Installation ..... 6
Installing the Memory ..... 7
Setting the Jumpers ..... 8
Connectors on MI900 ..... 12

# Installing the CPU

The MI900 motherboard supports an LGA 775 processor socket for Intel® Core 2 Duo processors.

The LGA 775 processor socket comes with a lever to secure the processor. Refer to the pictures below, from left to right, on how to place the processor into the CPU socket. ***Please note that the cover of the LGA775 socket must always be installed during transport to avoid damage to the socket.***



# ATX Power Installation

The system power is provided to the motherboard with the ATX1 and ATX2 power connectors. ATX1 is a 24-pin power connector and ATX2 is a 4-pin 12V power connector.

The 24-pin power connector can to be connected to a standard 20-pin ATX power connector in a standard ATX power supply (Min. 400watt).

Note: The power supply 5VSB voltage must be at least 2A.

## Installing the Memory

The MI900 motherboard supports four DDR2 memory sockets for a maximum total memory of 4GB in DDR memory type. It supports DDR2 533/667/800.

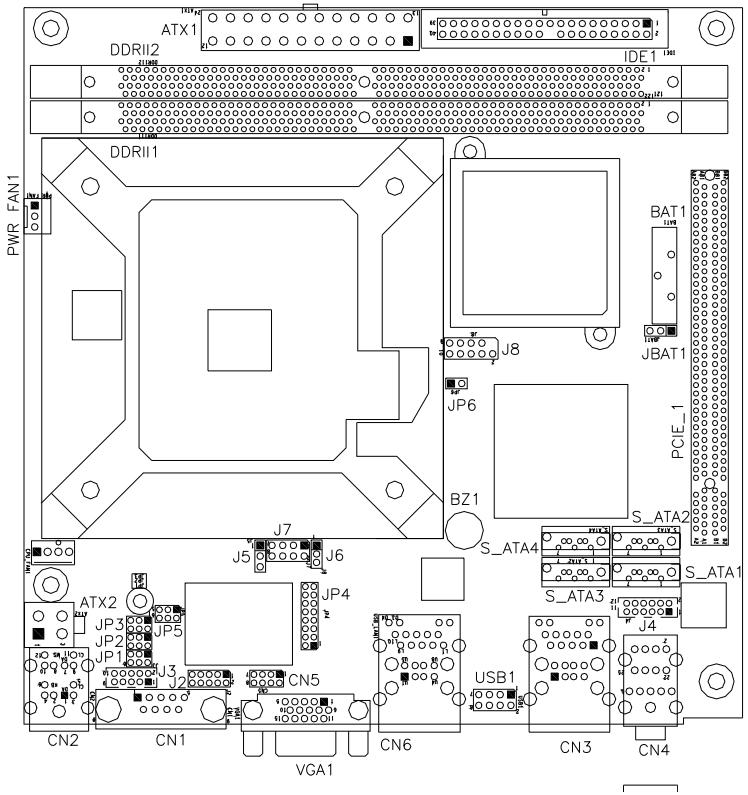
Basically, the system memory interface has the following features:

- Supports two 64-bit wide DDR data channels
- Available bandwidth up to 6.4GB/s (DDR2 800) for single-channel mode.
- Supports 256Mb, 512Mb, 1Gb DDR2 technologies.
- Supports only x8, x16, DDR2 devices with four banks
- Supports only unbuffered DIMMs
- Supports opportunistic refresh
- Up to 32 simultaneously open pages (four per row, four rows maximum)

# Setting the Jumpers

Jumpers are used on the motherboard are used to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors and their respective functions.

Jumper Locations on MI900/MI900F ..... 9
JBAT1: Clear CMOS Contents ..... 10
JP1, JP2, JP3: RS232/422/485 (COM2) Selection ..... 10
JP6: Processor Setting ..... 10
J6: Power ON Setting ..... 11

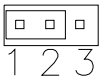
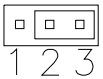



## Jumper Locations on MI900/MI900F

Jumper Locations on MI900/MI900F ..... 9
JBAT1: Clear CMOS Contents ..... 10
JP1, JP2, JP3: RS232/422/485 (COM2) Selection ..... 10
JP6: Processor Setting ..... 10
J6: Power ON Setting ..... 11

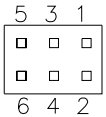
### JBAT1: Clear CMOS Contents

Use JBAT1, a 3-pin header, to clear the CMOS contents. *Note that the ATX-power connector should be disconnected from the motherboard before clearing CMOS.*

| JBAT1 | Setting | Function |
|---|---|---|
|  | Pin 1-2<br>Short/Closed | Normal |
|  | Pin 2-3<br>Short/Closed | Clear CMOS |

### JP1, JP2, JP3: RS232/422/485 (COM2) Selection

COM1 is fixed for RS-232 use only.
COM2 is selectable for RS232, RS-422 and RS-485.
**ID394:** COM3 and COM4 are fixed for RS-232 use only. The following table describes the jumper settings for COM2 selection.

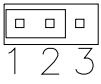
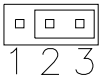



| COM2 Function | RS-232 | RS-422 | RS-485 |
|---|---|---|---|
| Jumper Setting (pin closed) | JP3: 1-2<br>JP1: 3-5 & 4-6<br>JP2: 3-5 & 4-6 | JP3: 3-4<br>JP1: 1-3 & 2-4<br>JP2: 1-3 & 2-4 | JP3: 5-6<br>JP1: 1-3 & 2-4<br>JP2: 1-3 & 2-4 |

### JP6: Processor Setting

| JP6 | Setting | Processor Used |
|---|---|---|
|  | Pin 1-2<br>Short/Closed | Celeron D |
|  | Pin 1-2<br>Open | Core 2 Duo,<br>Pentium D,<br>Pentium 4 HT |

### J6: Power ON Setting

| J6 | Setting | Function |
|---|---|---|
|  | Pin 1-2<br>Short/Closed | Power on by system button |
|  | Pin 2-3<br>Short/Closed | Power on by power supply AC on |

# Connectors on MI900

The connectors on MI900 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MI900 and their respective functions.

ATX1: 24-pin ATX Power Connector....14
ATX2: ATX 12V Power Connector....14
CPU_FAN1: CPU Fan Power Connector....14
PWR_FAN1: SYSTEM Fan Power Connectors....14
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JP4: For LPC I/F Adaptor Card....18
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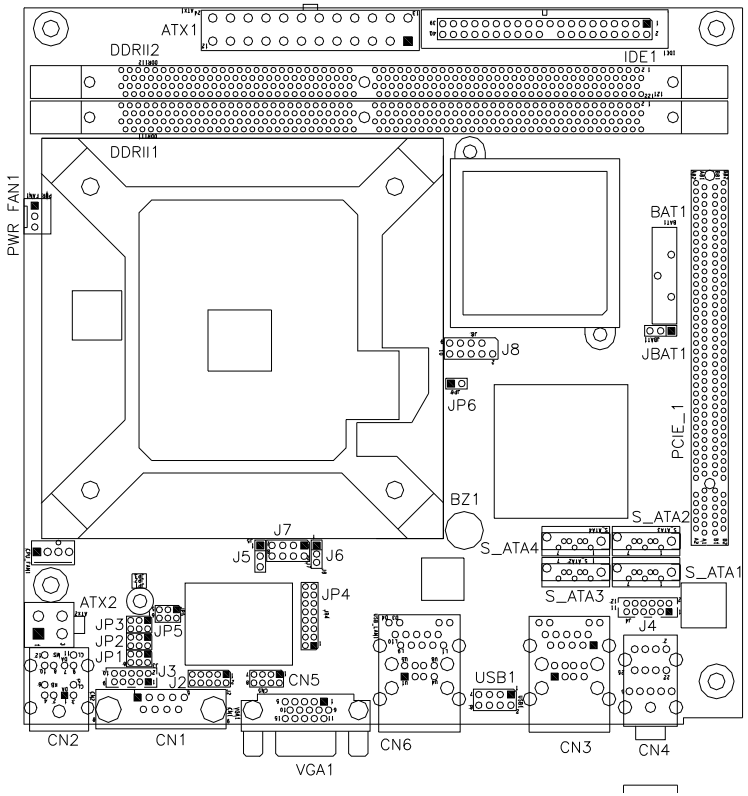


## Connector Locations on MI900/MI900F

ATX1: 24-pin ATX Power Connector ..... 14
ATX2: ATX 12V Power Connector ..... 14
CPU_FAN1: CPU Fan Power Connector ..... 14
PWR_FAN1: SYSTEM Fan Power Connectors ..... 14
CN2: PS/2 Keyboard and PS/2 Mouse Connectors ..... 15
CN1 J3: COM1/2 Serial Ports ..... 15
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CN3: Marvell 88E8053 PCI-express Gigabit LAN and USB6/7 Connector ..... 16
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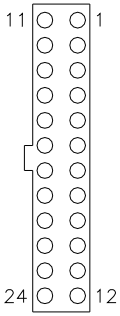
J4: External Audio Connector for 7.1 channel ..... 18
JP4: For LPC I/F Adaptor Card ..... 18
J5: Power LED ..... 18
J7: System Function Connector ..... 19
PCIE_1: x16 PCI Express Slot ..... 19

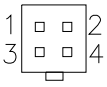
### ATX1: 24-pin ATX Power Connector




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| 3.3V | 13 | 1 | 3.3V |
| -12V | 14 | 2 | 3.3V |
| Ground | 15 | 3 | Ground |
| PS-ON | 16 | 4 | +5V |
| Ground | 17 | 5 | Ground |
| Ground | 18 | 6 | +5V |
| Ground | 19 | 7 | Ground |
| -5V | 20 | 8 | Power good |
| +5V | 21 | 9 | 5VSB |
| +5V | 22 | 10 | +12V |
| +5V | 23 | 11 | +12V |
| Ground | 24 | 12 | +3.3V |

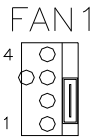
### ATX2: ATX 12V Power Connector

This connector supplies the CPU operation voltage



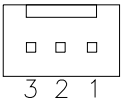

| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | Ground |
| 3 | +12V |
| 4 | +12V |

### CPU_FAN1: CPU Fan Power Connector

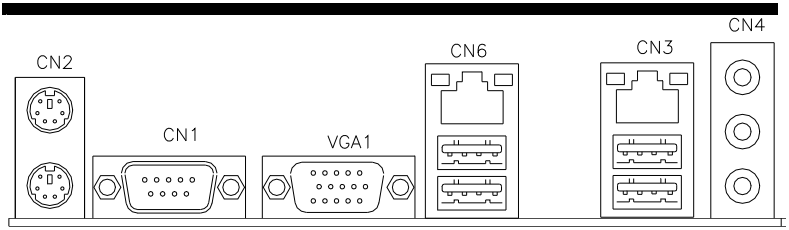



| Pin # | Signal Name |
|---|---|
| 1 | Control |
| 2 | Sense |
| 3 | +12V |
| 4 | Ground |

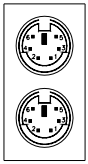
### PWR_FAN1: SYSTEM Fan Power Connectors




| Pin # | Signal Name |
|---|---|
| 1 | Sense |
| 2 | +12V |
| 3 | Rotation detection |




### CN2: PS/2 Keyboard and PS/2 Mouse Connectors



Mouse (top)
Keyboard (bottom)

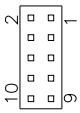
| Keyboard Signal | Pin # | Mouse Signal |
|---|---|---|
| Keyboard data | 1 | Mouse data |
| N.C. | 2 | N.C. |
| GND | 3 | GND |
| 5V | 4 | 5V |
| Keyboard clock | 5 | Mouse clock |
| N.C. | 6 | N.C. |

### CN1 J3: COM1/2 Serial Ports

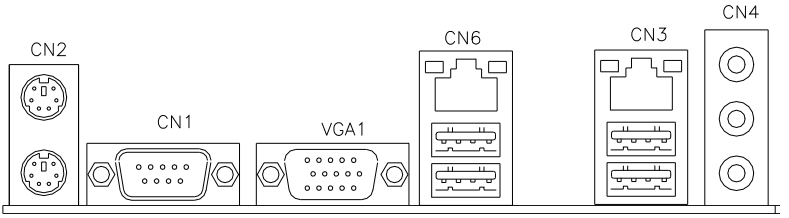
**CN1** (COM1) is a DB-9 connector, while J3 are COM pin-header connectors.

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| DCD, Data carrier detect | 1 | 6 | DSR, Data set ready |
| RXD, Receive data | 2 | 7 | RTS, Request to send |
| TXD, Transmit data | 3 | 8 | CTS, Clear to send |
| DTR, Data terminal ready | 4 | 9 | RI, Ring indicator |
| GND, ground | 5 | 10 | Not Used |

**J3**: COM2 is jumper selectable for RS-232, RS-422 and RS-485.

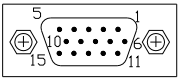



| Pin # | Signal Name | | |
|---|---|---|---|
| | RS-232 | R2-422 | RS-485 |
| 1 | DCD | TX- | DATA- |
| 2 | RX | TX+ | DATA+ |
| 3 | TX | RX+ | NC |
| 4 | DTR | RX- | NC |
| 5 | Ground | Ground | Ground |
| 6 | DSR | RTS- | NC |
| 7 | RTS | RTS+ | NC |
| 8 | CTS | CTS+ | NC |
| 9 | RI | CTS- | NC |
| 10 | NC | NC | NC |




### VGA1: VGA CRT Connector

VGA1 is a DB-15 VGA connector located beside the COM1 port. The following table shows the pin-out assignments of this connector.



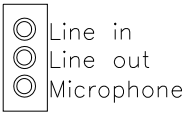

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Red | 1 | 2 | Green |
| Blue | 3 | 4 | N.C. |
| GND | 5 | 6 | GND |
| GND | 7 | 8 | GND |
| VCC | 9 | 10 | GND |
| N.C. | 11 | 12 | DDCDATA |
| HSYNC | 13 | 14 | VSYNC |
| DDCCLK | 15 | | |

### CN3: Marvell 88E8053 PCI-express Gigabit LAN and USB6/7 Connector

### CN6: Intel 82562V 10/100 or Intel 82566DC GbE RJ-45 and USB4/5 Connector

***Note: 10/100 LAN for MI900; DUAL Gigabit LAN for MI900F***

### CN4: Audio Connector

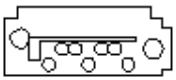



CN4 is a 3-jack audio connector

### F_USB1: USB0/USB1 Connector

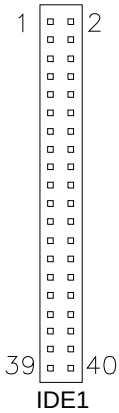

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Vcc | 1 | 2 | Ground |
| USB0- | 3 | 4 | USB1+ |
| USB0+ | 5 | 6 | USB1- |
| Ground | 7 | 8 | Vcc |

### S_ATA1, S_ATA2, S_ATA3, S_ATA4: SATA HDD Connectors



| Pin # | Signal Name |
|---|---|
| 1 | Ground |
| 2 | TX+ |
| 3 | TX- |
| 4 | Ground |
| 5 | RX- |
| 6 | RX+ |
| 7 | Ground |

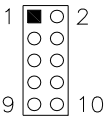
### IDE1: Primary IDE Connectors




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Reset IDE | 1 | 2 | Ground |
| Host data 7 | 3 | 4 | Host data 8 |
| Host data 6 | 5 | 6 | Host data 9 |
| Host data 5 | 7 | 8 | Host data 10 |
| Host data 4 | 9 | 10 | Host data 11 |
| Host data 3 | 11 | 12 | Host data 12 |
| Host data 2 | 13 | 14 | Host data 13 |
| Host data 1 | 15 | 16 | Host data 14 |
| Host data 0 | 17 | 18 | Host data 15 |
| Ground | 19 | 20 | Protect pin |
| DRQ0 | 21 | 22 | Ground |
| Host IOW | 23 | 24 | Ground |
| Host IOR | 25 | 26 | Ground |
| IOCHRDY | 27 | 28 | Host ALE |
| DACK0 | 29 | 30 | Ground |
| IRQ14 | 31 | 32 | No connect |
| Address 1 | 33 | 34 | No connect |
| Address 0 | 35 | 36 | Address 2 |
| Chip select 0 | 37 | 38 | Chip select 1 |
| Activity | 39 | 40 | Ground |

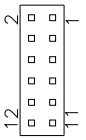
### J2: Digital I/O Connector (4 in, 4 out)

This 10-pin digital I/O connector supports TTL levels and is used to control external devices requiring ON/OFF circuitry.




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Ground | 1 | 2 | +5V |
| Out3 | 3 | 4 | Out1 |
| Out2 | 5 | 6 | Out0 |
| IN3 | 7 | 8 | IN1 |
| IN2 | 9 | 10 | IN0 |

### J4: External Audio Connector for 7.1 channel



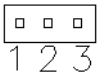

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| SIDESURR L | 1 | 2 | SIDESURR R |
| SIDESURR Detect | 3 | 4 | Ground |
| SURR Out L | 5 | 6 | SURR Out R |
| SURR Out Detect | 7 | 8 | Ground |
| Center Out | 9 | 10 | LFE Out |
| Center/ LFE Detect | 11 | 12 | Ground |

### JP4: For LPC I/F Adaptor Card

ID394 with Fintek F81216, 2 or 4 Serial Ports
ID395 Winbond WPCT200 x1 for TPM1.2

### J5: Power LED

The power LED indicates the status of the main power switch.




| Pin # | Signal Name |
|---|---|
| 1 | Power LED |
| 2 | No connect |
| 3 | Ground |

## J7: System Function Connector


**ATX Power ON Switch: Pins 1 and 2**
This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

**Hard Disk Drive LED Connector: Pins 3 and 4**
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

| Pin # | Signal Name |
|---|---|
| 4 | HDD Active |
| 3 | 5V |

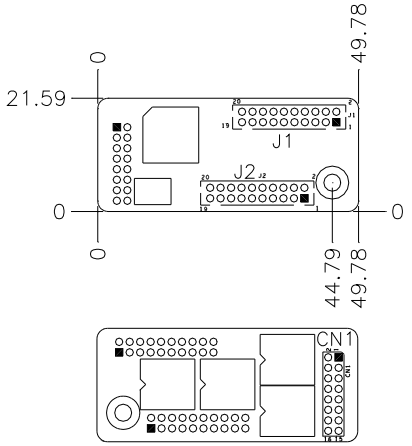
**Reset Switch: Pins 5 and 6**
The reset switch allows the user to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

**+5V and 5VSB Signals: Pins 7 and 8**

| Pin # | Signal Name |
|---|---|
| 7 | +5V |
| 8 | +5VSB |

## PCIE_1: x16 PCI Express Slot

### ID394 LPC Serial Ports Adaptor Card




J1 J2: COM3/4/5/6 Serial Ports

J1 - COM3/4 pin-header connector.

PIN1~PIN10 COM3

PIN11~PIN20 COM4

J2 - COM5/6 pin-header connector.

PIN1~PIN10 COM5

PIN11~PIN20 COM6

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| DCD, Data carrier detect | 1 | 2 | DSR, Data set ready |
| RXD, Receive data | 3 | 4 | RTS, Request to send |
| TXD, Transmit data | 5 | 6 | CTS, Clear to send |
| DTR, Data terminal ready | 7 | 8 | RI, Ring indicator |
| GND, ground | 9 | 10 | Not Used |
| DCD, Data carrier detect | 11 | 12 | DSR, Data set ready |
| RXD, Receive data | 13 | 14 | RTS, Request to send |
| TXD, Transmit data | 15 | 16 | CTS, Clear to send |
| DTR, Data terminal ready | 17 | 18 | RI, Ring indicator |
| GND, ground | 19 | 20 | Not Used |

CN1: LPC I/F connectors

Package list:

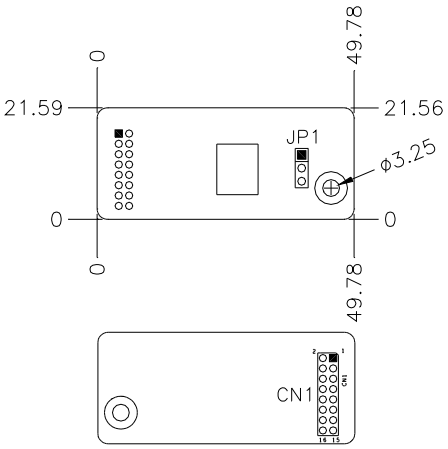
COM port cable (PK1-20B) x 2

Nylon Nut x 1

Screw x 2

Washer x2

**ID395 WINBOND WPCT200 for TPM1.2**




CN1: LPC I/F connectors

Package list

- Nylon Nut x 1
- Screw x 2
- Washer x2

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# BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the board. The topics covered in this chapter are as follows:

BIOS Introduction ..... 24
BIOS Setup ..... 24
Standard CMOS Setup ..... 26
Advanced BIOS Features ..... 29
Advanced Chipset Features ..... 32
Integrated Peripherals ..... 33
Power Management Setup ..... 36
PNP/PCI Configurations ..... 38
PC Health Status ..... 39
Frequency/Voltage Control ..... 40
Load Fail-Safe Defaults ..... 41
Load Optimized Defaults ..... 41
Set Supervisor/User Password ..... 41
Save & Exit Setup ..... 41
Exit Without Saving ..... 41
2nd SuperIO Device ..... 42
Security Chip Configuration ..... 43

## BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press  <DEL>  to  Enter  Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Phoenix - AwardBIOS CMOS Setup Utility

| | |
|---|---|
| Standard CMOS Features | Frequency/Voltage Control |
| Advanced BIOS Features | Load Fail-Safe Defaults |
| Advanced Chipset Features | Load Optimized Defaults |
| Integrated Peripherals | Set Supervisor Password |
| Power Management Setup | Set User Password |
| PnP/PCI Configurations | Save & Exit Setup |
| PC Health Status | Exit Without Saving |
| ESC : Quit | ↑ ↓ → ← : Select Item |
| F10 : Save & Exit Setup | |
| Time, Date, Hard Disk Type… | |

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section, which displays information on the currently highlighted item in the list.

***Note**: If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

***Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

## Standard CMOS Setup

"Standard CMOS Setup" choice allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

| | | |
|---|---|---|
| Date (mm:dd:yy) | Fri, Oct 20, 2006 | Item Help |
| Time (hh:mm:ss) | 16 : 11 : 00 | Menu Level > |
| IDE Channel 0 Master | None | Change the day, month, |
| IDE Channel 0 Slave | None | Year and century |
| IDE Channel 1 Master | None | |
| IDE Channel 1 Slave | None | |
| IDE Channel 2 Master | None | |
| IDE Channel 3 Master | None | |
| IDE Channel 4 Master | None | |
| IDE Channel 4 Slave | None | |
| Video | EGA/VGA | |
| Halt On | All , But Keyboard | |
| Base Memory | 640K | |
| Extended Memory | 2086912K | |
| Total Memory | 2087936K | |

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

### Date

The date format is:

| | |
|---|---|
| **Day :** | **Sun to Sat** |
| **Month :** | **1 to 12** |
| **Date :** | **1 to 31** |
| **Year :** | **1999 to 2099** |

To set the date, highlight the “Date” field and use the PageUp/ PageDown or +/- keys to set the current time.

### Time

The time format is: **Hour : 00 to 23**
**Minute : 00 to 59**
**Second : 00 to 59**

To set the time, highlight the “Time” field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

### IDE Channel Master/Slave

The onboard Serial ATA connectors provide Primary and Secondary channels for connecting up to four Serial ATA hard disks . Each channel can support up to two hard disks; the first is the “Master” and the second is the “Slave”.

Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select ‘Manual’ to define the drive information manually. You will be asked to enter the following items.

| | |
|---|---|
| **Capacity :** | Capacity/size of the hard disk drive |
| **Cylinder :** | Number of cylinders |
| **Head :** | Number of read/write heads |
| **Precomp :** | Write precompensation |
| **Landing Zone :** | Landing zone |
| **Sector :** | Number of sectors |

The Access Mode selections are as follows:

| | |
|---|---|
| CHS | (HD < 528MB) |
| LBA | (HD > 528MB and supports Logical Block Addressing) |
| Large | (for MS-DOS only) |
| Auto | |

### Drive A / Drive B

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

| 360KB | 1.2MB | 720KB | 1.44MB | 2.88MB |
|---|---|---|---|---|
| 5.25 in. | 5.25 in. | 3.5 in. | 3.5 in. | 3.5 in. |

### Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

| | |
|---|---|
| EGA/VGA | For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default) |
| CGA 40 | Power up in 40 column mode. |
| CGA 80 | Power up in 80 column mode. |
| MONO | For Hercules or MDA adapters. |

### Halt On

This field determines whether or not the system will halt if an error is detected during power up.

| | |
|---|---|
| No errors | The system boot will not be halted for any error that may be detected. |
| All errors | Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted. |
| All, But Keyboard | The system boot will not be halted for a keyboard error; it will stop for all other errors |
| All, But Diskette | The system boot will not be halted for a disk error; it will stop for all other errors. |
| All, But Disk/Key | The system boot will not be halted for a keyboard or disk error; it will stop for all others. |

## Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

| | | |
|---|---|---|
| CPU Feature | Press Enter | ITEM HELP |
| Hard Disk Boot Priority | Press Enter | |
| Virus Warning | Disabled | Menu Level > |
| CPU L1 and L2 Cache | Enabled | |
| Hyper-Threading Technology | Enabled | |
| Quick Power On Self Test | Enabled | |
| First Boot Device | Hard Disk | |
| Second Boot Device | CDROM | |
| Third Boot Device | USB-FDD | |
| Boot Other Device | Enabled | |
| Boot Up NumLock Status | On | |
| Gate A20 Option | Fast | |
| Typematic Rate Setting | Disabled | |
| Typematic Rate (Chars/Sec) | 6 | |
| Typematic Delay (Msec) | 250 | |
| Security Option | Setup | |
| APIC Mode | Enabled | |
| MPS Version Control for OS | 1.4 | |
| OS Select For DRAM>64MB | Non-OS2 | |
| Small Logo (EPA) Show | Disabled | |

### CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

### Hard Disk Boot Priority

With the field, there is the option to choose, aside from the hard disks connected, "Bootable add-in Cards" which refers to other external devices.

### Virus Warning

If this option is enabled, an alarm message will be displayed when trying to write on the boot sector or on the partition table on the disk, which is typical of the virus.

### CPU L1 / L2 Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory. When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These items allow you to enable (speed up memory access) or disable the cache function. By default, these items are Enabled.

### Hyper-Threading Technology
Hyper-Threading Technology enables two logical processors on a single physical processor by replicating, partitioning, and sharing the resources within the Intel NetBurst microarchitecture pipeline.

### Quick Power On Self Test
When enabled, this field speeds up the Power On Self Test (POST) after the system is turned on. If it is set to *Enabled*, BIOS will skip some items.

### First/Second/Third Boot Device
These fields determine the drive that the system searches first for an operating system. The options available include *LS120*, *Hard Disk*, *CDROM*, *ZIP100*, *USB-FDD*, *USB-ZIP*, *USB-CDROM* and *Disabled*.

### Boot Other Device
These fields allow the system to search for an OS from other devices other than the ones selected in the First/Second/Third Boot Device.

### Boot Up NumLock Status
This allows you to activate the NumLock function after you power up the system.

### Gate A20 Option
This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

### Typematic Rate Setting
When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to ***Disabled.***

### Typematic Rate (Chars/Sec)
When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.

### Typematic Delay (Msec)
When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to ***250msec.***

### Security Option

This field allows you to limit access to the System and Setup. The default value is ***Setup***. When you select *System,* the system prompts for the User Password every time you boot up. When you select *Setup,* the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

### APIC Mode

APIC stands for Advanced Programmable Interrupt Controller. The default setting is ***Enabled***.

### MPS Version Control for OS

This option is specifies the MPS (Multiprocessor Specification) version for the OS. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is ***1.4***.

### OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is ***Non-OS/2***.

### Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up. The default setting is ***Disabled***.

## Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

| | | |
|---|---|---|
| System BIOS Cacheable | Enabled | ITEM HELP |
| Memory Hole at 15M-16M | Disabled | Menu Level > |
| PCI Express Root Port Func | Press Enter | |
| | | |
| ** VGA Setting ** | | |
| PEG/On Chip VGA Control | Auto | |
| On-Chip Frame Buffer Size | 8MB | |
| DVMT Mode | DVMT | |
| DVMT/FIXED memory Size | 128MB | |

### System BIOS Cacheable

The setting of *Enabled* allows caching of the system BIOS ROM at F000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

### Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB. The choices are *Enabled* and *Disabled*.

### On-Chip VGA Setting

The fields under the On-Chip VGA Setting and their default settings are:

PEG/On Chip VGA Control: Auto
On-Chip Frame Buffer Size: 8MB
DVMT Mode: DVMT
DVMT/Fixed Memory Size: 128MB

## Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details follow.

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

| | | |
|---|---|---|
| OnChip IDE Device | Press Enter | ITEM HELP |
| SuperIO Device | Press Enter | |
| USB Device Setting | Press Enter | Menu Level > |

Phoenix - AwardBIOS CMOS Setup Utility
**OnChip IDE Device**

| | | |
|---|---|---|
| IDE HDD Block Mode | Enabled | ITEM HELP |
| IDE DMA transfer access | Enabled | |
| IDE Primary Master PIO | Auto | Menu Level > |
| IDE Primary Slave PIO | Auto | |
| IDE Primary Master UDMA | Auto | |
| IDE Primary Slave UDMA | Auto | |
| On-Chip Secondary PCI IDE | Enabled | |
| IDE Secondary Master PIO | Auto | |
| IDE Secondary Slave PIO | Auto | |
| IDE Secondary Master UDMA | Auto | |
| IDE Secondary Slave UDMA | Auto | |
| SATA Mode | IDE | |
| LEGACY Mode Support | Enabled | |

Phoenix - AwardBIOS CMOS Setup Utility
**SuperIO Device**

| | | |
|---|---|---|
| POWER ON Function | BUTTON ONLY | ITEM HELP |
| KB Power ON Password | Enter | |
| Hot Key power ON | Ctrl-F1 | Menu Level > |
| Onboard Serial Port 1 | 3F8/IRQ4 | |
| Onboard Serial Port 2 | 2F8/IRQ3 | |
| PWRON After PWR-Fail | Off | |

Phoenix - AwardBIOS CMOS Setup Utility
**USB Device Setting**

| | | |
|---|---|---|
| USB 1.0 Controller | Enabled | ITEM HELP |
| USB 2.0 Controller | Enabled | Menu Level > |
| USB Keyboard Function | Enabled | |
| USB Mouse Function | Enabled | |
| USB Storage Function | Enabled | |
| *** USB Mass Storage Device Boot Setting *** | | |

### IDE HDD Block Mode
This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

### IDE DMA Transfer Access
This field, by default, is enabled

### OnChip Secondary PCI IDE
This field, by default, is enabled

### IDE Primary/Secondary Master/Slave PIO
These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

### IDE Primary/Secondary Master/Slave UDMA
These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

### SATA Mode
The setting choices for the SATA Mode are IDE, RAID and AHCI Mode. Select [IDE] if you want to have SATA function as IDE.
Select [AHCI] for Advanced Host Controller Interface (AHCI) feature, with improved SATA performance with native command queuing & native hot plug. Select [RAID] to use SATA as RAID function. RAID function is supported on the board if it uses ***ICH8R, but this is optional.***

### LEGACY Mode Support
When the Serial ATA (SATA) is set with the legacy mode enabled, then the SATA is set to the conventional IDE mode. Legacy mode is otherwise known as compatible mode.

### Power ON Function
This field is related to how the system is powered on – such as with the use of conventional power button, keyboard or hot keys. The default is ***BUTTON ONLY***.

### KB Power ON Password
This field allows users to set the password when keyboard power on is the mode of the Power ON function.

### Hot Key Power ON
This field sets certain keys, also known as hot keys, on the keyboard that can be used as a 'switch' to power on the system.

### Onboard Serial Port
These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

| | |
|---|---|
| Serial Port 1 | 3F8/IRQ4 |
| Serial Port 2 | 2F8/IRQ3 |

### PWRON After PWR-Fail
This field sets the system power status whether *on or off* when power returns to the system from a power failure situation.

### USB 1.0 Controller
The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***.

### USB 2.0 Controller
The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***. In order to use USB 2.0, necessary OS drivers must be installed first. ***Please update your system to Windows 2000 SP4 or Windows XP SP2.***

### USB Keyboard/Mouse/Storage Function
The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Disabled***.

## Power Management Setup

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

| | | ITEM HELP |
|---|---|---|
| ACPI Function | Enabled | |
| ACPI Suspend | S1(POS) | |
| Power Management | User Define | Menu Level > |
| Video Off Method | V/H SYNC+Blank | |
| Video Off In Suspend | Yes | |
| Suspend Type | Stop Grant | |
| Modem Use IRQ | 3 | |
| Suspend Mode | Disabled | |
| HDD Power Down | Disabled | |
| Soft-Off by PWR-BTTN | Instant-Off | |
| CPU THRM-Throttling | 50.0% | |
| Resume by Alarm | Disabled | |
| Date (of Month) Alarm | 0 | |
| Time (hh:mm:ss) Alarm | 0 : 0 : 0 | |
| ** Reload Global Timer Events ** | | |
| Primary IDE 0 | Enabled | |
| Primary IDE 1 | Enabled | |
| Secondary IDE 0 | Enabled | |
| Secondary IDE 1 | Enabled | |
| FDD, COM, LPT Port | Enabled | |
| PCI PIRQ[A-D] # | Enabled | |

### ACPI Function

Enable this function to support ACPI (Advance Configuration and Power Interface).

### ACPI Suspend

The default setting of the ACPI Suspend mode is ***S1(POS)***.

### Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

| | |
|---|---|
| Min. Power Saving | Minimum power management |
| Max. Power Saving | Maximum power management. |
| User Define | Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min. |

### Video Off Method

This field defines the Video Off features. There are three options.

| | |
|---|---|
| V/H SYNC + Blank | Default setting, blank the screen and turn off vertical and horizontal scanning. |
| DPMS | Allows BIOS to control the video display. |
| Blank Screen | Writes blanks to the video buffer. |

### Video Off In Suspend
When enabled, the video is off in suspend mode.

### Suspend Type
The default setting for the Suspend Type field is ***Stop Grant***.

### Modem Use IRQ
This field sets the IRQ used by the Modem. By default, the setting is ***3***.

### Suspend Mode
When enabled, and after the set time of system inactivity, all devices except the CPU will be shut off.

### HDD Power Down
When enabled, and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

### Soft-Off by PWRBTN
This field defines the power-off mode when using an ATX power supply. The *Instant Off* mode allows powering off immediately upon pressing the power button. In the *Delay 4 Sec* mode, the system powers off when the power button is pressed for more than four seconds or enters the suspend mode when pressed for less than 4 seconds.

### CPU THRM-Throttling
When the system enters Doze mode, the CPU clock runs only part of the time. You may select the percent of time that the clock runs.

### Resume by Alarm
This field enables or disables the resumption of the system operation. When enabled, the user is allowed to set the *Date* and *Time*.

### Reload Global Timer Events
The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events that can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

## PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

| | | |
|---|---|---|
| Init Display First | PCI Slot | ITEM HELP |
| Reset Configuration Data | Disabled | |
| | | Menu Level > |
| Resources Controlled By | Auto (ESCD) | |
| IRQ Resources | Press Enter | |
| PCI/VGA Palette Snoop | Disabled | |
| INT Pin 1 Assignment | Auto | |
| INT Pin 2 Assignment | Auto | |
| INT Pin 3 Assignment | Auto | |
| INT Pin 4 Assignment | Auto | |
| INT Pin 5 Assignment | Auto | |
| INT Pin 6 Assignment | Auto | |
| INT Pin 7 Assignment | Auto | |
| INT Pin 8 Assignment | Auto | |
| **PCI Express relative items** | | |
| Maximum Payload Size | 128 | |

### Init Display First

The default setting is ***PCI Card***.

### Reset Configuration Data

The default value is ***Disabled.***

### Resources Controlled by

This PnP BIOS can configure all of the boot and compatible devices with the use of a PnP operating system such as Windows 95.

### PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

### Maximum Payload Size

The default setting of the PCI Express Maximum Payload Size is 128.

## PC Health Status

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

| | | ITEM HELP |
|---|---|---|
| Shutdown Temperature | Disabled | |
| CPU Warning Temperature | Disabled | |
| Current System Temp | 32°C/89°F | |
| Current CPU Temp | 39°C/102°F | Menu Level > |
| CPU Fan Speed | 4000 RPM | |
| Power Fan Speed | 0 RPM | |
| Vcore | 1.24 V | |
| 12 V | 12.03 V | |
| 1.8 V | 1.92 V | |
| 5 V | 4.99 V | |
| 3.3 V | 3.15 V | |
| VBAT (V) | 3.13 V | |
| 5VSB(V) | 5.29 V | |

### CPU Warning Temperature

This field allows the user to set the temperature so that when the temperature is reached, the system sounds a warning. This function can help prevent damage to the system that is caused by overheating.

### Shutdown Temperature

This field allows the user to set the temperature by which the system automatically shuts down once the threshold temperature is reached. This function can help prevent damage to the system that is caused by overheating.

### Temperatures/Fan Speeds/Voltages

These fields are the parameters of the hardware monitoring function feature of the board. The values are read-only values as monitored by the system and show the PC health status.

## Frequency/Voltage Control

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

| | | |
|---|---|---|
| Auto Detect PCI Clk | Disabled | ITEM HELP |
| Spread Spectrum | Disabled | Menu Level > |

### Auto Detect PCI Clk

This field enables or disables the auto detection of the PCI clock.

### Spread Spectrum

This field sets the value of the spread spectrum. The default setting is ***Disabled***. This field is for CE testing use only.

## Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

## Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

## Set Supervisor/User Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

## Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

## Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.

## 2nd SuperIO Device

The 2nd SuperIO selection under the Integrated Peripherals will appear if the ID394-R daughter card is used on the motherboard.

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

| | | |
|---|---|---|
| OnChip IDE Device | Press Enter | ITEM HELP |
| SuperIO Device | Press Enter | |
| 2nd SuperIO Device | Press Enter | Menu Level > |
| USB Device Setting | Press Enter | |

Phoenix - AwardBIOS CMOS Setup Utility
**2nd SuperIO Device**

| | | |
|---|---|---|
| Onboard Serial Port 3 | 230h | ITEM HELP |
| Serial Port 3 Use IRQ | IRQ5 | |
| Onboard Serial Port 4 | 238h | Menu Level > |
| Serial Port 4 Use IRQ | IRQ7 | |
| Onboard Serial Port 5 | Disabled | |
| Serial Port 5 Use IRQ | IRQ10 | |
| Onboard Serial Port 6 | Disabled | |
| Serial Port 6 Use IRQ | IRQ11 | |

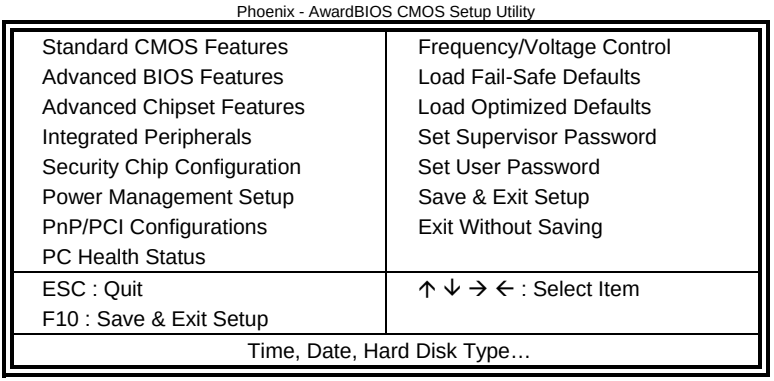
### Onboard Serial Port

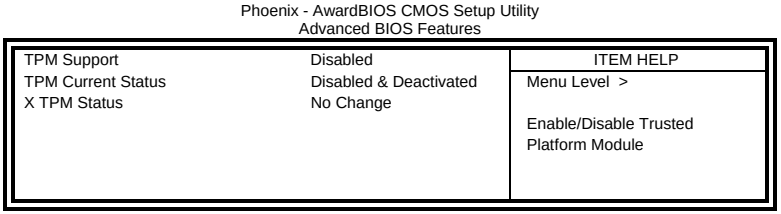
These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

| | |
|---|---|
| Serial Port 3 | 230/IRQ5 |
| Serial Port 4 | 238/IRQ7 |
| Serial Port 5 | Disabled/IRQ10 |
| Serial Port 6 | Disabled/IRQ11 |

## Security Chip Configuration

The Security Chip Configuration selection in the BIOS Utility will appear only if the ID395-R daughter card is used on the motherboard.




### TPM Support
The default setting is ***Disabled***.

### TPM Current Status
The default setting is ***Disabled*** & ***Deactivated***.

### TPM Status
The default setting is ***No change***.

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# Drivers Installation

This section describes the installation procedures for software and drivers under the Windows 2000 and Windows XP. The software and drivers are included with the board. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

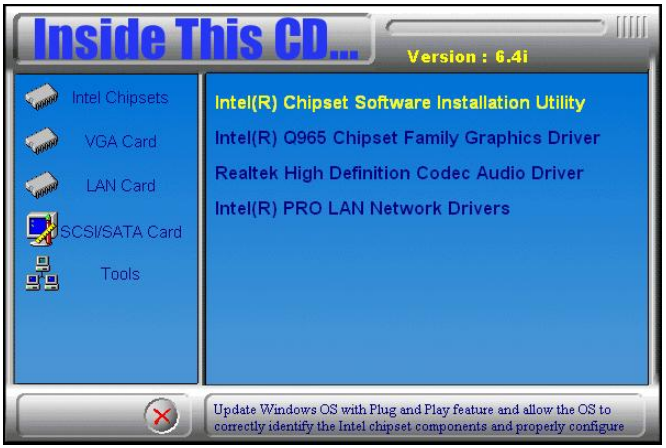
Intel Q965 Chipset Software Installation Utility.....46
Intel Q965 Chipset Graphics Driver.....48
Realtek Codec Audio Driver Installation.....50
Intel LAN Drivers Installation.....51

**IMPORTANT NOTE:**
After installing your Windows operating system (Windows 2000/XP), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

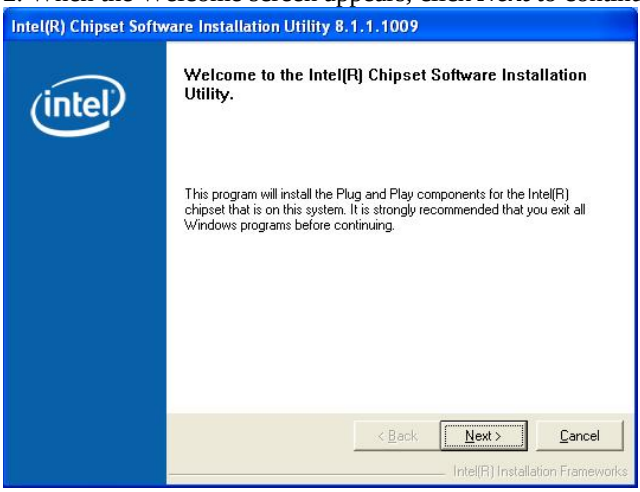
# Intel Q965 Chipset Software Installation Utility

The Intel® Q965 Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation under Windows 2000/XP. (Before installed Intel Chipset Software Installation Utility,Please update your system to Windows 2000 SP4 or Windows XP SP1A)

1. Insert the CD that comes with the board and the screen below would appear. Click ***Intel (R) Q965 Chipset Drivers***, then ***Intel(R) Chipset Software Installation Utility***.

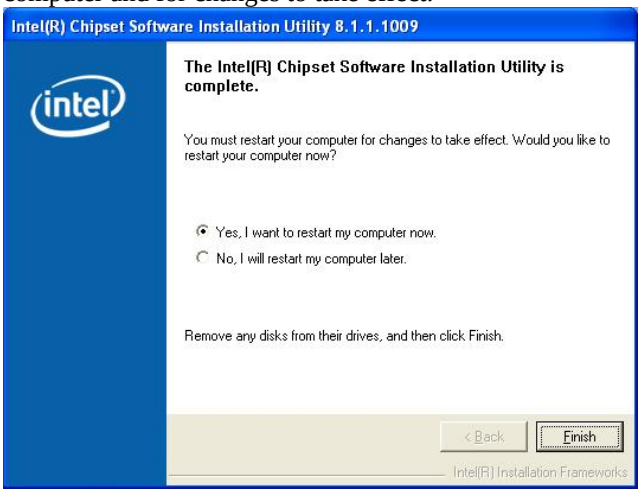
2. When the Welcome screen appears, click ***Next*** to continue.




3. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

4. On the Readme Information screen, click ***Next*** to continue the installation.

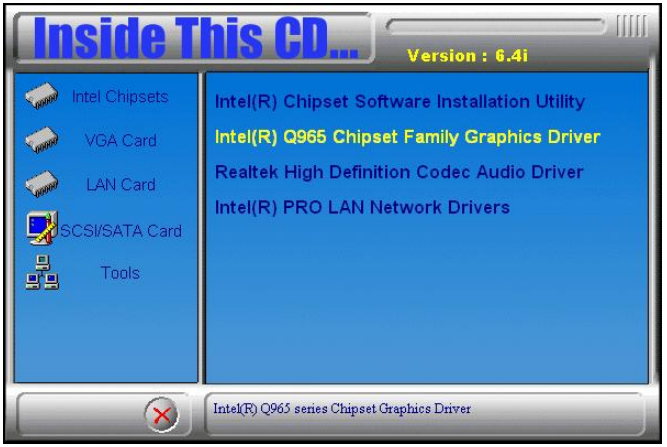
5. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.



# Intel Q965 Chipset Graphics Driver

Follow the instructions below to complete the installation under Windows 2000/XP.

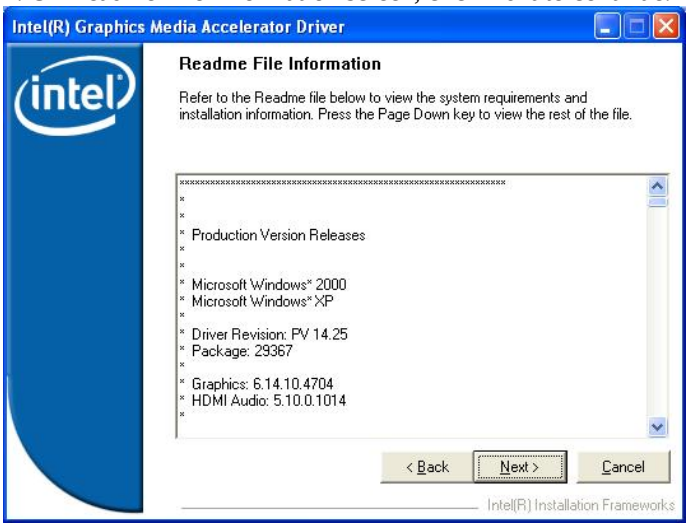
1. Insert the CD that comes with the board and the screen below would appear. Click ***Intel (R) Q965 Chipset Drivers***, then ***Intel (R) Q965 Chipset Family Graphics Driver***.



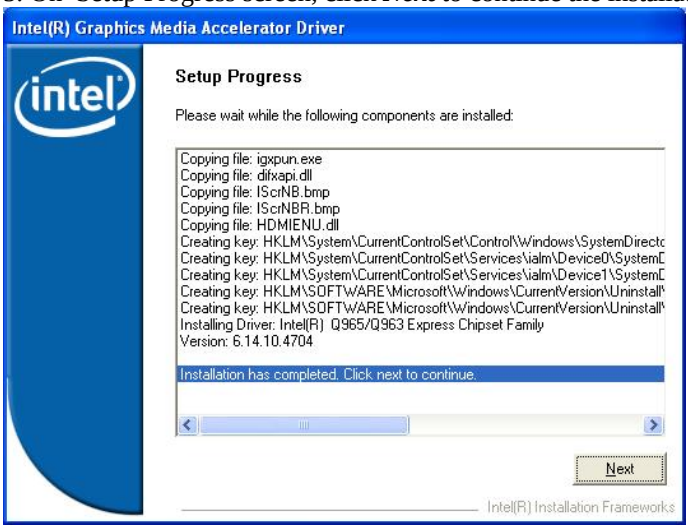

2. When the Welcome screen appears, click ***Next*** to continue.

3. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

4. On Readme File Information screen, click ***Next*** to continue.




5. On Setup Progress screen, click ***Next*** to continue the installation.

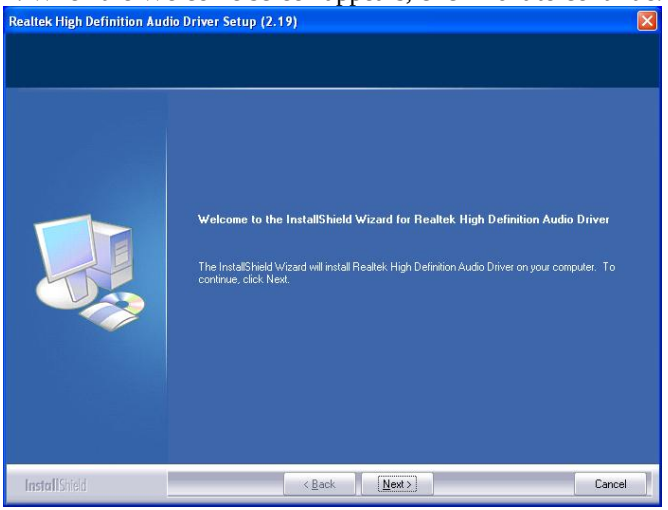



6. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

# Realtek Codec Audio Driver Installation

1. Insert the CD that comes with the board and the screen below would appear. Click ***Intel (R) Q965 Chipset Drivers***, then ***Realtek High Definition Codec Audio Driver***.


2. When the Welcome screen appears, click ***Next*** to continue.

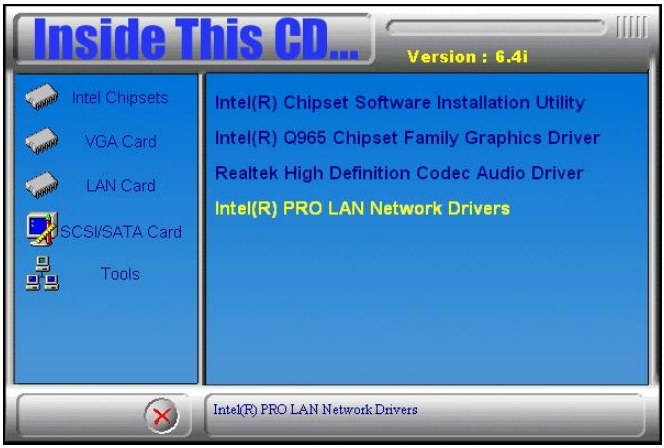



3. The Setup process is now complete. Restart the computer when prompted for changes to take effect.

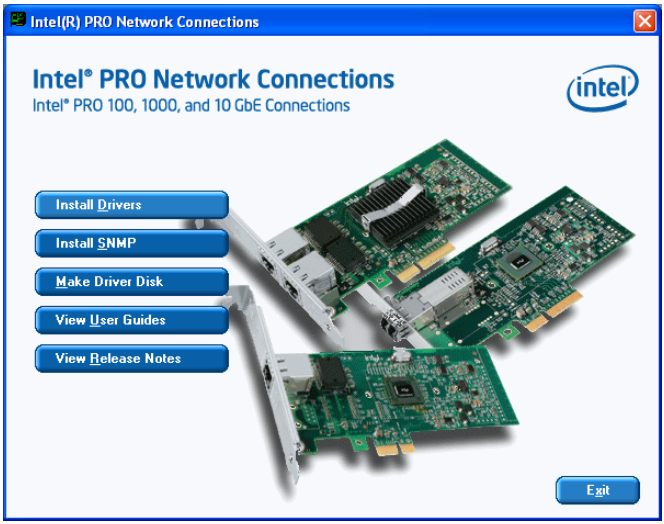
# Intel LAN Drivers Installation

Follow the steps below to start installing the Intel PCI Express Gigabit LAN drivers.

1. Insert the CD that comes with the board. On the initial screen, Click ***Intel (R) Q965 Chipset Drivers,*** then ***Intel(R) PRO LAN Network Drivers***.




2. On the next screen, click ***Install Drivers*** to start the drivers installation.



3. When the Welcome screen appears, click ***Next*** to continue.

4. In the License Agreement screen, click ***I accept the terms in license agreement*** and ***Next*** to accept the software license agreement and proceed with the installation process.

5. When the Setup Type appears, click ***Complete*** and ***Next*** to continue.


6. When the Ready to Install the Program screen appears, click ***Install*** to continue.

7. The Setup process is now complete (InstallShield Wizard Completed). Click ***Finish*** to restart the computer and for changes to take effect.

Follow the steps below to install the **Marvell Gigabit LAN** drivers.

1. Insert the CD that comes with the motherboard. Click ***LAN Card*** and then ***Marvell LAN Controller Drivers***.


2. Click Next when the InstallShield Wizard welcome screen appears.


3. Click Next to agree with the license agreement.

4. Click Next when the Readme Information screen appears to proceed with the drives installation process.

5. When the Installation is complete, click Finish for the changes to take effect.

# Appendix

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses that also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address | Device Description |
|---|---|
| 000h - 01Fh | DMA Controller #1 |
| 020h - 03Fh | Interrupt Controller #1 |
| 040h - 05Fh | Timer |
| 060h - 06Fh | Keyboard Controller |
| 070h - 07Fh | Real Time Clock, NMI |
| 080h - 09Fh | DMA Page Register |
| 0A0h - 0BFh | Interrupt Controller #2 |
| 0C0h - 0DFh | DMA Controller #2 |
| 0F0h | Clear Math Coprocessor Busy Signal |
| 0F1h | Reset Math Coprocessor |
| 1F0h - 1F7h | IDE Interface |
| 278h - 27Fh | Parallel Port #2(LPT2) |
| 2F8h - 2FFh | Serial Port #2(COM2) |
| 2B0h - 2DFh | Graphics adapter Controller |
| 378h - 3FFh | Parallel Port #1(LPT1) |
| 360h - 36Fh | Network Ports |
| 3B0h - 3BFh | Monochrome & Printer adapter |
| 3C0h - 3CFh | EGA adapter |
| 3D0h - 3DFh | CGA adapter |
| 3F0h - 3F7h | Floppy Disk Controller |
| 3F8h - 3FFh | Serial Port #1(COM1) |

# B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|---|---|
| IRQ0 | System Timer Output |
| IRQ1 | Keyboard |
| IRQ2 | Interrupt Cascade |
| IRQ3 | Serial Port #2 |
| IRQ4 | Serial Port #1 |
| IRQ5 | Reserved |
| IRQ6 | Floppy Disk Controller |
| IRQ7 | Parallel Port #1 |
| IRQ8 | Real Time Clock |
| IRQ9 | Reserved |
| IRQ10 | Reserved |
| IRQ11 | Reserved |
| IRQ12 | PS/2 Mouse |
| IRQ13 | 80287 |
| IRQ14 | Primary IDE |
| IRQ15 | Secondary IDE |

# C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//=====================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====================================================================
====
#include <stdio.h>
#include <stdlib.h>
#include "W627EHF.H"
//=====================================================================
====
int main (int argc, char *argv[]);
void copyright(void);
void EnableWDT(int);
void DisableWDT(void);
//=====================================================================
====
int main (int argc, char *argv[])
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        copyright();

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return 1;
        }

        if (Init_W627EHF() == 0)
        {
                printf(" Winbond 83627HF is not detected, program abort.\n");
                return 1;
        }
        bTime = strtol (argv[1], endptr, 10);
```

```
        printf("System will reset after %d seconds\n", bTime);

        EnableWDT(bTime);

        return 0;
}
//==========================================================================
void copyright(void)
{
        printf("\n======== Winbond 83627EHF Watch Timer Tester (AUTO DETECT)
========\n"\
                        "       Usage : W627E_WD reset_time\n"\
                        "       Ex : W627E_WD 3  => reset system after 3 second\n"\
                        "            W627E_WD 0  => disable watch dog timer\n");
}
//==========================================================================
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_W627EHF_Reg( 0x2D);
        bBuf &= (!0x01);
        Set_W627EHF_Reg( 0x2D, bBuf);                   //Enable WDTO

        Set_W627EHF_LD( 0x08);                          //switch to logic device 8
        Set_W627EHF_Reg( 0x30, 0x01);                   //enable timer

        bBuf = Get_W627EHF_Reg( 0xF5);
        bBuf &= (!0x08);
        Set_W627EHF_Reg( 0xF5, bBuf);                   //count mode is second

        Set_W627EHF_Reg( 0xF6, interval);               //set timer
}
//==========================================================================
void DisableWDT(void)
{
        Set_W627EHF_LD(0x08);                           //switch to logic device 8
        Set_W627EHF_Reg(0xF6, 0x00);                    //clear watchdog timer
        Set_W627EHF_Reg(0x30, 0x00);                    //watchdog disabled
}
//==========================================================================
```

```
//=============================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=============================================================================
====
#include "W627EHF.H"
#include <dos.h>
//=============================================================================
====
unsigned int W627EHF_BASE;
void Unlock_W627EHF (void);
void Lock_W627EHF (void);
//=============================================================================
unsigned int Init_W627EHF(void)
{
        unsigned int result;
        unsigned char ucDid;

        W627EHF_BASE = 0x2E;
        result = W627EHF_BASE;

        ucDid = Get_W627EHF_Reg(0x20);
        if (ucDid == 0x88)
        {       goto Init_Finish;    }

        W627EHF_BASE = 0x4E;
        result = W627EHF_BASE;
        ucDid = Get_W627EHF_Reg(0x20);
        if (ucDid == 0x88)
        {       goto Init_Finish;    }

        W627EHF_BASE = 0x00;
        result = W627EHF_BASE;

Init_Finish:
        return (result);
}
//=============================================================================
void Unlock_W627EHF (void)
{
        outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
        outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
}
//=============================================================================
====
void Lock_W627EHF (void)
{
        outportb(W627EHF_INDEX_PORT, W627EHF_LOCK);
}
//=============================================================================
void Set_W627EHF_LD( unsigned char LD)
{
        Unlock_W627EHF();
        outportb(W627EHF_INDEX_PORT, W627EHF_REG_LD);
        outportb(W627EHF_DATA_PORT, LD);
```

```
	Lock_W627EHF();
}
//===========================================================================
void Set_W627EHF_Reg( unsigned char REG, unsigned char DATA)
{
	Unlock_W627EHF();
	outportb(W627EHF_INDEX_PORT, REG);
	outportb(W627EHF_DATA_PORT, DATA);
	Lock_W627EHF();
}
//===========================================================================
unsigned char Get_W627EHF_Reg(unsigned char REG)
{
	unsigned char Result;
	Unlock_W627EHF();
	outportb(W627EHF_INDEX_PORT, REG);
	Result = inportb(W627EHF_DATA_PORT);
	Lock_W627EHF();
	return Result;
}
//===========================================================================




//===========================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//===========================================================================
#ifndef __W627EHF_H
#define __W627EHF_H		1
//===========================================================================
#define	W627EHF_INDEX_PORT		(W627EHF_BASE)
#define	W627EHF_DATA_PORT		(W627EHF_BASE+1)
//===========================================================================
#define	W627EHF_REG_LD			0x07
//===========================================================================
#define W627EHF_UNLOCK			0x87
#define	W627EHF_LOCK			0xAA
//===========================================================================
unsigned int Init_W627EHF(void);
void Set_W627EHF_LD( unsigned char);
void Set_W627EHF_Reg( unsigned char, unsigned char);
unsigned char Get_W627EHF_Reg( unsigned char);
//===========================================================================
#endif	//__W627EHF_H
```

File of the Main.cpp

```
//====================================================================
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//====================================================================
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "W627HF.H"
//====================================================================
void ClrKbBuf(void);
int main (int argc, char *argv[]);
//====================================================================
int main (int argc, char *argv[])
{
	unsigned char ucDO = 0;				//data for digital output
	unsigned char ucDI;				//data for digital input
	unsigned char ucBuf;

	Set_W627HF_LD( 0x07);				//switch to logic device 7

	Set_W627HF_Reg(0xF1, 0x00);			//clear
	ucDI = Get_W627HF_Reg(0xF1) & 0x0F;

	ClrKbBuf();
	while(1)
	{
		ucDO++;
		Set_W627HF_Reg(0xF1, ((ucDO & 0x0F) << 4));
		ucBuf = Get_W627HF_Reg(0xF1) & 0x0F;
		if (ucBuf != ucDI)
		{
			ucDI = ucBuf;
			printf("Digital I/O Input Changed. Current Data is 0x%X\n",ucDI);
		}

		if (kbhit())
		{
			getch();
			break;
		}
		delay(500);
	}
	return 0;
}
//====================================================================
void ClrKbBuf(void)
{
	while(kbhit())
	{	getch();	}
}
//--------------------------------------------------------------------------
```